SECTION 32 9219

SEEDING

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LANL MASTER SPECIFICATION

Word file at <http://engstandards.lanl.gov>

This template must be edited for each project.  In doing so, specifier must add job-specific requirements.  Brackets are used in the text to indicate designer choices or locations where text must be supplied by the designer.  Once the choice is made or text supplied, remove the brackets.  The specifications must also be edited to delete specification requirements for processes, items, or designs that are not included in the project -- and specifier’s notes such as these.  To seek a variance from requirements in the specifications that are applicable, contact the Engineering Standards Manual [Civil](http://engstandards.lanl.gov/POCs.shtml#civil) POC. Please contact POC with suggestions for improvement as well.

When assembling a specification package, include applicable specifications from all Divisions, especially Division 1, General requirements.

Specification developed for ML-4 projects.  For ML-1, 2, and 3 applications, additional requirements and independent reviews should be added if increased confidence in procurement or execution is desired; see ESM Chapter 1 Section Z10 Specifications and Quality sections.

This specification is to be used for the stabilization of disturbed areas with native plant seed. See ESM Civil Chapter 3, Section G2050, Landscaping and ESM Architectural Chapter 4, Section B-C\_GEN, G2050 for additional guidance for landscaping and revegetation projects.

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1. GENERAL
	1. SECTION INCLUDES
		1. Seed Mixes
		2. Mulching Products
		3. Preparation of Seedbed.
		4. Application of Seed.
		5. Using Hydraulic Mulch and Rolled Erosion Control Products.
		6. Watering and Maintenance.
	2. RELATED SECTIONS
		1. Section 01 5705, *Temporary Controls and Compliance Requirements*
		2. Section 01 2500, *Substitution Procedures*
		3. Section 31 2000, *Earth Moving*
	3. ACTION SUBMITTALS
		1. Submit the following in accordance with project submittal procedures:
			1. Catalog data, including proposed seed mix, amendments, mulch, tackifier, fertilizer and erosion controlblankets.
			2. Certification substantiating that material complies with specified requirements. Submit certified seed bag tags and copies of seed invoices identified by project name.
			3. Installation instructions, including proposed seeding schedule. Coordinate with specified maintenance periods to provide maintenance from date of final acceptance. Once schedule is accepted, revise dates only with LANL approval after documentation of delays.
	4. QUALITY ASSURANCE
		1. Subcontractor Qualifications:
			1. Perform work by a single firm experienced with the type and scale of work required and having equipment and personnel adequate to perform the work satisfactorily.
		2. Material Quality Control:
			1. Provide seed mixture in containers sealed and labeled by seed dealer. Container label shall show origin of seed and pure live seed (PLS) content, species andpercentages in seed mix, lot number, test information including, purity, germination, percentage seed crop, percentage inert, percentage noxious/restricted weeds, net weight, test date, date of packaging, and location of packaging. The seed dealer may premix the seed, documentation shall be provided the same as if the seeds were sold or bagged separately. Seed analysis shall be no older than five months for seed shipped interstate, and no older than nine months for seed shipped intrastate.
			2. Furnish seed labeled in accordance with the requirements of federal seed laws and New Mexico Department of Agriculture seed labeling laws. Such resulting requirements include but are not necessarily limited to Federal Seed Act and Amendments, rules and regulations established by the United States Department of Agriculture, the New Mexico Seed Law and all resulting regulations or restrictions established by New Mexico State University or other authorized entity.
			3. In addition, ensure seed mix and its application comply with the requirements of all other federal and New Mexico statutes and regulations governing seeds, plants and weeds. These requirements include but are not necessarily limited to the Noxious Weed Control Act and all rules, regulations, or control measures by a noxious weed control district embracing Los Alamos County, New Mexico; and the Harmful Plant Act.
			4. Wood or bark mulch shall be clean and free of plastic, metal or other trash.
			5. Water used for irrigation shall be free of oil, acid, salt or other substances harmful to plants.
			6. Soil amendments, such as sand or compost, shall be clean and free of toxic materials.
	5. DELIVERY, STORAGE AND HANDLING
		1. Deliver packaged materials in original sealed and labeled containers from seed dealer. Protect materials from deterioration during delivery and while stored at site. Opened or wet seed shall be rejected and returned to the responsible party.
		2. Temperature of the seed in storage shall not exceed the supplier’s recommended maximum temperature.
2. PRODUCTS
	1. product options and substitutionS
		1. Comply with Section 01 2500, *Substitution Procedures*.
	2. SEED
		1. Obtain native grass, forb/wildflower, shrub, and pollinator seed from sources whose origin would ensure site adaptability at LANL (e.g., species suited for dry sites above 7000ft elevation). Plant sources from New Mexico or surrounding states are preferred.
		2. Develop seed mixture as follows: Choose a minimum of 5 grass species; 3 forb/wildflower species, 2 shrub species; and 3 pollinator species from the Native Perennial Mix list. At least one milkweed species (*Asclepias* spp.) must be included in all seed mixes. Use a ratio of 70-75 percent grasses, 5-10 percent forb/wildflower, 5-10 percent shrub species, and 5-10 percent pollinators. These species are applicable for both undeveloped and urban-interface areas.
			1. Contact LANLSTORMWATER@lanl.gov if assistance is needed sourcing seed.

NATIVE PERENNIAL MIX

| *Common Name* | *Scientific Name* | *% of Mix* |
| --- | --- | --- |
| **Grasses** |
|  Blue grama\* | *Bouteloua gracilis* | 15-30 |
|  Arizona fescue† | *Festuca arizonica* | 5-10 |
|  Prairie junegrass† | *Koeleria macrantha* | 5 - 10% |
|  Bottlebrush squirreltail\* | *Elymus elymoides* | 5-10 |
|  Little bluestem† | *Schizachyrium scoparium* | 5-10 |
|  Indian ricegrass, Paloma\* | *Achnatherum/Oryzopsis hymenoides* | 5-10 |
|  Mountain brome† | *Bromus marginatus* | 5-10 |
|  Sand dropseed\* | *Sporobolus cryptandrus* | 1 - 8% |
|  Slender wheatgrass† | *Elymus trachycaulus* | 15-20 |
|  Western wheatgrass† | *Pascopyrum smithii* | 15-20 |
|  Needle and Thread grass\* | *Stipa comata* | 5 - 10% |
|  New Mexico needlegrass\*  | *Stipa neomexicana* | 5-10 |
|  Galleta | *Pleuraphis jamesii* | 3-5% |
|  Buffalo grass | *Buchloe dactyloides* | 5-7 |
| **Forbs/Wildflowers** |
|  Firewheel/Blanketflower | *Gaillardia pulchella* | 2% |
|  Evening primrose | *Oenothera caespitosa* | 1% |
|  Gooseberry leaf globemallow | *Sphaeralcea grossulariafolia* | 1% |
|  Scarlet gilia | *Ipomopsis aggregata* | 1% |
|  Plains aster | *Aster biglovii* | 1% |
|  Western yarrow | *Achillea millifolium* | ½% |
|  Fringed sage | *Artemisia frigida* | 1% |
|  Blue flax | *Linum perenne lewisii* | 2% |
|  Scarlet bugler | *Penstemon barbatus* | 2% |
|  Palmer penstemon | *Penstemon palmerii* | 1% |
|  Prairie coneflower | *Ratibida columnifera* | 1% |
|  Showy golden-eye | *Heliomerus multiflora* | 1% |
|  Purple geranium | *Geranium caespitosum* | 5% |
|  Plains Coreopsis | *Coreopsis tinctoria* | 1% |
|  Prairie Clover | *Dalea* spp. | 2% |
| **Shrubs** |
|  Any native species | (e.g., *Rhus, Ribes,* *Fallugia*, *Atriplex*, *Chrysothamnus*, etc.) | 5-10% |
| **Pollinator Species** |
|  Showy milkweed | *Asclepias speciosa* | 1-3% |
|  Butterfly weed | *Asclepias tuberosa* | 1-3% |
|  Horsetail milkweed | *Asclepias subverticillata* | 1-3% |
|  Spider milkweed | *Asclepias asperula* | 1-3% |
|  Rocky Mountain beeplant | *Cleome serrulata* | 1-3% |
|  Buckwheats | *Eriogonum spp.* | 1-3% |
|  Sunflowers | *Helianthus spp.* | 1-3% |
|  Spectaclepod | *Dimorphocarpa wislizeni* | 1-3% |
|  Western Wallflower | *Erysimum capitatum* | 1-3% |
|  Scorpion Weed | *Phacelia integrifolia* | 1-3% |
| Cota | *Thelesperma megapotamicum* | 1-3% |
| Hairy False Golden-aster | *Heterotheca villosa* | 1-3% |
| Chocolate flower | *Berlandiera lyrata* | 1-3% |
| Maximillian Sunflower | *Helianthus maximiliani*  | 1-3% |
| Dotted Blazingstar | *Liatris punctata* | 1-3% |
| Locoweeds | *Oxytropis and Astragulus*  | 1-3% |
| Groundsels | *Senecio spp.* | 1-3% |
| Native thistles | *Cirsium spp.* | 1-3% |
| Adonis Blazingstar | *Mentzelia multiflora* | 1-3% |

\*Species particularly suited for especially dry sites

†Species particularly suited for higher elevations (above 7000 ft.)

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Choose one or more appropriate mulching methods to use in conjunction with seeding. Indicate where each stabilization method is to be used on the construction drawings. Delete methods not used from Specifications.

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* 1. Wood MULCH
		1. Wood Mulch or green-waste mulch shall be free from noxious weeds, mold or other objectionable material. Size distribution should rand in length from 1-inch to 2 inches with <25% exceeding 2-inches in size and <30% being less than 0.25-inches in size. A coarse/shredded material is preferable over a chipped material. Wood or bark mulch can be used to mulch seed beds.
	2. Hydraulic mulch
		1. Provide Flexible Growth Medium (FGM) such as Flexterra**™**/CocoFlex ET**™** composed of long strand, thermally processed wood fibers, crimped, interlocking fibers and performance enhancing additives. The FGM requires no curing period and upon application forms an intimate bond with the soil surface to create a continuous, porous, absorbent and flexible erosion resistant cover that allows for rapid germination and accelerated plant growth.
		2. The FGM shall be hydraulically applied to the soil as a viscous mixture, creating a continuous three-dimensional blanket that adheres to the soil surface. Upon drying, the matrix shall form a high-strength, porous and erosion-resistant mat that shall not inhibit the germination and growth of plants in and beneath the layer. The matrix shall retain its form despite re-wetting. The FGM shall be 100% biodegradable over time, non-toxic to fish and wildlife, and it shall not contain any non-photo-degradable synthetic fibers.
	3. Rock Mulch
		1. Rock mulch shall be washed and screened, coarse angular material 0.5 to 2.5-inch diameter, exhibit at least one fractured face, and be free of organic material.
	4. ROLLED EROSION CONTROL PRODUCTS (RECP)
		1. For all non-channel applications provide the following:
			1. Slopes 3:1 or less:

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| Permanent turf reinforcement matting |
| A machine-produced mat of 100% UV stable polypropylene fiber. The matting shall be of consistent thickness with synthetic fibers evenly distributed over the entire area of the mat. The matting shall be covered on the top with black heavyweight UV stabilized polypropylene netting having ultraviolet additives to prevent breakdown and an approximate 0.50 x 0.50 inch (1.27 x 1.27 cm) mesh size. The bottom net shall also be UV stabilized polypropylene, with a 0.625 x 0.625 inch (1.57 x 1.57 cm) mesh size. The matting shall be sewn together on 1.50 inch (3.81 cm) centers with non-degradable thread, such as North American Green P300 or Western Excelsior EXCEL PP5-12. |

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| Temporary coir blend blanketa  |
| A machine-produced mat of 100% coconut fiber with a functional longevity of up to 24 months. The blanket shall be of consistent thickness with the coconut evenly distributed over the entire area of the mat. The blanket shall be covered on the top and bottom sides with 100% biodegradable woven natural organic fiber netting. The netting shall consist of machine directional strands formed from two intertwined yarns with cross directional strands interwoven through the the twisted machine strands to form an approximate 0.50 x 1.0 in (1.27 x 2.54 cm) mesh. The blanket shall be sewn together on 1.50 inch (3.81 cm) centers with degradable thread, such as North American Green C125BN. |

 aUse of temporary coir blend blankets is limited to areas where vegetation growth is favorable
 and shall be approved by EPC-CP prior to installation. Contact EPC-CP at
 LANLSTORMWATER@lanl.gov.

2. Slopes greater than 3:1:

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| Permanent turf reinforcement mat |
| Option 1: | A machine-produced mat of 100% UV stable polypropylene fiber. The matting shall be of consistent thickness with synthetic fibers evenly distributed over the entire area of the mat. The matting shall be covered on the top with black heavyweight UV stabilized polypropylene netting having ultraviolet additives to prevent breakdown and an approximate 0.50 x 0.50 inch (1.27 x 1.27 cm) mesh size. The bottom net shall also be UV stabilized polypropylene, with a 0.625 x 0.625 inch (1.57 x 1.57 cm) mesh size. The matting shall be sewn together on 1.50 inch (3.81 cm) centers with non-degradable thread, such as North American Green P300 or Western Excelsior EXCEL PP5-12. |
| Option 2: | A machine-produced mat of 100% coconut fiber matrix incorporated into permanent three-dimensional turf reinforcement matting. The matrix shall be evenly distributed across the entire width of the matting and stitch bonded between super heavy duty UV-stabilized nettings with 0.50 x 0.50 in. (1.27 x 1.27 cm) openings, an ultra heavy duty UV-stabilized, dramatically corrugated (crimped) intermediate netting with 0.5 x 0.5 in. (1.27 x 1.27 cm) openings, and covered by a super heavy duty UV-stabilized nettings with 0.50 x 0.50 in. (1.27 x 1.27 cm) openings. The three nettings shall be stitched together on 1.50 in. (3.81 cm) centers with UV-stabilized polypropylene thread to form permanent three-dimensional turf reinforcement matting such as North American Green C350. |

* + 1. For all channel applications provide the following (Shear stress must be calculated by a qualified engineer or hydrologist):
			1. For channels subject to flow producing an unvegetated shear stress of 4 lbs/ft2 or less:

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| Permanent turf reinforcement mat |
| Option 1: | A machine-produced mat of 100% UV stable polypropylene fiber. The matting shall be of consistent thickness with synthetic fibers evenly distributed over the entire area of the mat. The matting shall be covered on the top with black heavyweight UV stabilized polypropylene netting having ultraviolet additives to prevent breakdown and an approximate 0.50 x 0.50 inch (1.27 x 1.27 cm) mesh size. The bottom net shall also be UV stabilized polypropylene, with a 0.625 x 0.625 inch (1.57 x 1.57 cm) mesh size. The matting shall be sewn together on 1.50 inch (3.81 cm) centers with non-degradable thread, such as North American Green P300 or Western Excelsior EXCEL PP5-12. |
| Option 2: | A machine-produced mat of 100% coconut fiber matrix incorporated into permanent three-dimensional turf reinforcement matting. The matrix shall be evenly distributed across the entire width of the matting and stitch bonded between super heavy duty UV-stabilized nettings with 0.50 x 0.50 in. (1.27 x 1.27 cm) openings, an ultra heavy duty UV-stabilized, dramatically corrugated (crimped) intermediate netting with 0.5 x 0.5 in. (1.27 x 1.27 cm) openings, and covered by a super heavy duty UV-stabilized nettings with 0.50 x 0.50 in. (1.27 x 1.27 cm) openings. The three nettings shall be stitched together on 1.50 in. (3.81 cm) centers with UV-stabilized polypropylene thread to form permanent three-dimensional turf reinforcement matting such as North American Green C350. |

* + - 1. For channels subject to flow producing an unvegetated shear stress greater than 4 lbs/ft2 :

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| Permanent composite turf reinforcement mat |
| A machine-produced composite turf reinforcement mat comprised of a 100% UV stabilized polypropylene fiber matrix incorporated into permanent three-dimensional turf reinforcement matting. The matrix shall be evenly distributed across the entire width of the matting and stitch bonded between a super heavy duty UV stabilized bottom net with 0.50 x 0.50 inch (1.27 x 1.27 cm) openings, an ultra-heavy duty UV stabilized, dramatically corrugated (crimped) intermediate netting with 0.50 x 0.50 inch (1.27 x 1.27 cm) openings, and covered by a super heavy duty UV stabilized top net with 0.50 x 0.50 inch (1.27 x 1.27 cm) openings. The corrugated netting shall form prominent closely spaced ridges across the entire width of the mat. The three nettings shall be stitched together on 1.50 inch (3.81 cm) centers with UV stabilized polypropylene thread to form a permanent three-dimensional turf reinforcement matting, such as North American Green P550. |

* + 1. Use fasteners as appropriate for substrate and according to manufacturer’s recommendations. Shallow, rocky or loose soils may require spikes and large washers to secure the matting.
	1. AMENDMENTS / SOIL ADDITIONS
		1. Fertilizer: Apply slow-release organic fertilizers such as Biosol Mix, Biosol, Gro-Power, Osmocote, or approved equal to minimize deficiencies of the topsoil. Micronizing fertilizer is acceptable for use in the spring and summer months. Fertilizer may be used for more rapid growth, but is not required. Do not use fertilizer in channel bottoms.
		2. Water: Clean, fresh, and free of substances or matter that could inhibit vigorous growth.
		3. Sand: Clean, washed, and free of toxic materials.
1. EXECUTION
	1. PrepaRATION
		1. Preparation of the Seedbed:
			1. Prepare seedbed to a minimum depth of 4 inches when tilling with a disc, harrow or chiseling tool, minimum 2 inches depth if using hand tools. Uproot all competitive vegetation during seedbed preparation and work soil uniformly, leaving surface rough to reduce surface erosion and to retain water runoff. Remove large clods and stones, or other foreign material that would interfere with seeding equipment and erosion control blankets.
			2. Perform tillage across slope and along the contour to adequately break up soil. Do not till up and down slopes, as this will create excessive surface erosion problems.
			3. Do not do work when soil is saturated, frozen or ground is otherwise in a non‑tillable condition.
			4. To minimize dust problems for adjoining areas, when wind speeds are over 10 mph, dust control measures shall be implemented.
			5. The extent of seedbed preparation shall not exceed the area on which the entire seeding operation can be accomplished within a one week period.
		2. Soil Amendments/Additions: Uniformly apply slow release organic fertilizer to prepared seedbed in accordance with manufacturer recommended rates.
		3. Prepare seedbed again if prior to seeding rain or some other factor has affected the prepared surfaces and will prevent seeding to the proper depth.
	2. APPLICATION OF SEED
		1. General:
			1. Do not seed during windy weather, or when seedbed is snow-covered or under standing water.
			2. Equip seed boxes used for drill and broadcast seeding with an agitator.
			3. To prevent stratification of seed mix, do not run seed box agitators while seeding is not being performed.
			4. If seed mix is transported to site in a seed box or other equipment that subjects mix to shaking or similar movement that has the potential to cause stratification, remix seed prior to application.
			5. Seeding equipment shall be calibrated as appropriate to distribute seed at the specified rates.
			6. Unless otherwise shown on Drawings, seed areas disturbed by or denuded by construction operations or erosion.
			7. Use markers to ensure that no gaps will exist between passes of seeding equipment.
		2. Drill Seeding:

When drill seeding, plant seed mix at a rate of 30–35 pure live seed (PLS) lbs/acre. Uniformly apply prescribed mix over area to be seeded as follows:

* + - 1. Accomplish seeding operations, where practical, by drilling in a direction across slope and along the contour.
			2. Plant seeds approximately 1/4 inch deep.
			3. Do not exceed 4 inches distance between drilled furrows. If furrow openers on drill exceed 4 inches, drill area twice to obtain a 4-inch distance between furrows.
			4. Seed with grass wheels, rate control attachments, seed boxes with agitators, and separate boxes for small seed.
			5. Once seed is applied, apply full complement of mulch. This shall allow seed to be in good contact with soil surface and not suspended in mulch matrix.
			6. Prohibit vehicles from traveling over the seeded areas for at least one year.
		1. Broadcast Seeding:

When broadcast seeding, plant seed mix at a rate of 32–37 PLS lbs./acre.

* + - 1. Mechanically broadcast seed by use of a hydraulic mulch slurry blower, rotary spreader, or a seeder box with a gear feed mechanism. If seeding is done with a slurry blower, use highest pressure and smallest nozzle opening that will accommodate the seed.
			2. If using hydraulic mulch to broadcast seed, use a 2-step process. Apply seed with a trace amount of hydraulic mulch. Once seed is applied, apply full complement of mulch. This shall allow seed to be in good contact with soil surface and not suspended in mulch matrix.
			3. For all other seeding applications, immediately rake seedbed thoroughly to provide approximately 1/4 inch of soil cover over of the seed. Then apply mulch as necessary.
			4. Prohibit vehicles from traveling over the seeded areas.
	1. Wood mulch
		1. Place wood mulch on slopes 4:1 or less. Spread mulch uniformly over area to achieve no less than 80 percent ground cover and at a depth of 2-4 inches.
	2. hydraulic mulch
		1. For maximum performance, apply FGM in a two-step process:
			1. Step One: Mix and apply seed and soil amendments with small amount of FGM for visual metering.
			2. Step Two: Mix and apply FGM at a rate of 50 lb. per 125 gallons (23 kg/475 liters) of water over freshly seeded surfaces. Confirm loading rates with equipment manufacturer. Do not leave seeded surfaces unprotected, especially if precipitation is imminent.
		2. Mixing:

A mechanically agitated hydraulic-application machine is recommended:

* + - 1. Fill tank to middle of agitator shaft or tank about 1/3 full of water. Turn on pump to wet or purge lines. Begin agitating. Keep adding water slowly while adding the FGM at a steady rate.
			2. Consult application and loading charts to determine number of bags to be added. Mix at a rate of 50 lbs of FGM per 125 gallons (23kg/475 liters). Contact equipment manufacturer to confirm optimum FGM mixing rates.
			3. All FGM should be loaded when the tank is approximately 3/4 full.
			4. Fertilizer should be added once the tank is nearly full.
			5. Before applying, mix the slurry for at least 10 minutes after adding the last amount of FGM. This is very important to fully activate the bonding additives and to attain proper viscosity.
			6. Turn off re-circulation valve to minimize potential for air entrainment within the slurry.
		1. Application:

Use a fan-type nozzle (50-degree tip) whenever possible for best soil surface coverage. Apply FGM from opposing directions to soil surface, reducing the “shadow effect” and assuring a minimum of 95% of soil surface coverage. Slope interruption devices or water diversion techniques are recommended when slope lengths exceed 100 feet (30 m). Install materials at the following minimum application rates:

CONDITION ENGLISH SI

≤ 3H to 1V ............................... 3000 lb/ac............................. 3400 kg/ha

>3H to 1V and ≤ 2H to 1V ....... 3500 lb/ac ............................ 3900 kg/ha

>2H to 1V and ≤ 1H to 1V ....... 4000 lb/ac ............................ 4500 kg/ha

>1H to 1V ................................ 4500 lb/ac ............................ 5100 kg/ha

Below ECB or TRM ................. 1500 lb/ac ............................ 1700 kg/ha

As infill for TRM ....................... 3500 lb/ac ............................ 3900 kg/ha

Do not apply material in channels, swales or other areas where concentrated flows are anticipated, unless installed in conjunction with a temporary erosion control blanket or non-degradable turf reinforcement mat. After application, thoroughly flush the tank, pumps and hoses to remove all FGM material. Wash all material from the exterior of the machine and remove any slurry spills (FGM will be more difficult to remove once it dries).

* 1. Rock Mulch
		1. Apply rock mulch to a depth of 2 to 3 inches with uniform coverage and no bare earth showing. Seed area prior to installation.
	2. Rolled erosion control product (recp)
		1. Place RECP over native grass seeding immediately following the raking operation.
		2. Install RECPs in accordance with manufacturer’s specifications.
		3. For slope installations, apply as follows:

Upslope Anchor – utilize one of the methods detailed below for initial anchoring of Rolled Erosion Control Products (RECP):

* + - 1. Install the RECP 3 ft. (900 mm) beyond the shoulder of the slope onto flat final grade. Secure roll end with a single row of fasteners on 1 ft. (300-mm) centers.
			2. Anchor trench: Excavate a 6 in. by 6 in. (150 mm by 150 mm) anchor trench. Extend the upslope terminal end of the RECP 3 ft. (900 mm) past the anchor trench. Use fasteners to secure the product to the bottom of the anchor trench on 1 ft. (300 mm) centers. Backfill the trench and compact the soil into the anchor trench.
			3. Unroll blanket downslope in direction of water flow.
			4. Overlap edges of adjacent parallel rolls 2 to 4 inches and fasten every 3 feet.
			5. When blankets are spliced, place blankets end over end (shingle style) with 6-inch overlap. Fasten through overlapped area, approximately 12 inches apart.
			6. Lay blankets loosely and maintain direct contact with soil. Do not place over protruding objects; rocks, grass, etc.
			7. Fasten blankets sufficiently to anchor blanket and maintain blanket contact with soil per manufacturer’s instructions. Shallow, rocky or loose soils may require spikes and large washers to secure the blankets.

Seams – utilize one of the methods detailed below for seaming of RECP:

* + - 1. Adjacent seams: Overlap edges of adjacent RECP by 2 to 4 in. (50 to 100 mm) or by abutting products as defined by manufacturer. Use a sufficient number of fasteners to prevent seam or abutted rolls from separating.
			2. Consecutive rolls: Shingle and overlap consecutive rolls 2 to 6 in. (50 to 150 mm) in the direction of flow. Secure fasteners through seam at 1 ft. (300 mm) intervals.
			3. Check seam. Construct a fastener check seam along the top edge of RECP for slope application and at specified intervals in a channel by installing two staggered rows of fasteners 4 in. (100 mm) apart on 4 in. (100 mm) centers.
			4. Slope interruption check slot: Excavate a trench measuring 6 in. wide by 6 in. deep (150 x 150 mm). Secure product to the bottom of the trench with fasteners. Fold product over upslope material and fill and compact the trench on the downslope side of check slot and seed fill. Continue rolling material downslope over trench.

Terminal Ends – utilize one of the methods detailed below for all terminal ends of RECPs:

1. Install the RECP 3 ft. (900 mm) beyond the end of the channel and secure end with a single row of fasteners on 1 ft. (300-mm) centers.
2. Anchor trench: Excavate a 6 in. by 6 in. (150 mm by 150 mm) anchor trench. Extend the terminal end of the RECP 3 ft. (900 mm) past the anchor trench. Use fasteners to secure the product into the bottom of the anchor trench on 1 ft. (300 mm) centers. Backfill the trench and compact the soil into the anchor trench. Apply seed and any necessary soil amendments to the compacted soil and cover with remaining 1 ft. (300 mm) terminal end of the RECP. Secure terminal end of RECP with a single row of fasteners on 1 ft. (300 mm) centers.
	* 1. Check slot: Construct a fastener check slot along the terminal end of the RECP by installing two rows of staggered fasteners 4 in. (100 mm) apart on 4 in. (100 mm) centers.
	1. WATERING
		1. Where temporary watering is required for seeded areas, provide temporary water system which may be a sprinkler system, or a water truck with a spray boom or any other method satisfactory to distribute a uniform coverage of clean water (free of oil, acid, salt or other substances harmful to plants) to previously seeded and mulched areas.
		2. If a temporary sprinkler system is used, keep all pipe connections tight to avoid leakage and loss of water, and to prevent washing or erosion of growing areas. Maintain sprinklers in proper working order during watering.
		3. Do not drive trucks with spray systems on seeded areas and ensure water force does not cause movement of mulch or seed on the ground.
	2. MAINTENANCE
		1. Begin maintenance immediately after planting. Keep re-vegetated areas free of noxiousweeds.
		2. Maintain seeded areas for not less than 60 days after final acceptance of work and longer as required to achieve final stabilization as described in Article 3.10 ACCEPTANCE.
		3. Reseed void areas greater than 6 square feet or repetitive voids greater than 2 square feet amounting to more than 10 percent of any area that appears the growing season following installation.
	3. CLEANUP AND PROTECTION
		1. After completion of work, clear site of excess soil, waste material, debris and objects that may hinder maintenance and detract from neat appearance of site.
		2. Protect seeded areas, work and materials from damage due to vehicles, pedestrians, and operations by other subcontractors. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged work as directed.
		3. Upon completion of all seeding operations, clean the portion of the project site used for storing materials and equipment of all debris. Remove all superfluous materials and equipment from the project site. Sweep walks and pavement clean upon completion of work in this section.
	4. ACCEPTANCE
		1. Seeded areas will be reviewed for acceptance by LANL when final stabilization has been achieved. Final stabilization is defined as “All soil disturbing activities at the site have been completed and a uniform (e.g., evenly distributed, without large bare areas) perennial vegetative cover of 70 percent of the native background vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.” Stabilization shall be in conformance with the Storm Water Pollution Prevention Plan (SWPPP), as applicable.
		2. In the event that all other work required by the Subcontract is completed before final stabilization is achieved or because seasonal limitations prevent seeding, partial acceptance of the work shall be made with final acceptance delayed until satisfactory vegetative growth has been established.

END OF SECTION

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Do not delete the following reference information:

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THE FOLLOWING STATEMENT IS FOR LANL USE ONLY

This project specification section is based on LANL Master Specification Section 32 9219 Rev. 5, dated September 7, 2021.