CONSTRUCTION STANDARD SPECIFICATION

SECTION 02922

LAWNS AND GRASSES

Page

PART 1 - GENERAL 3

1.1 RELATED DOCUMENTS 3
1.2 SUMMARY 3
1.3 REFERENCES 3
1.4 SUBMITTALS 4
1.5 QUALITY ASSURANCE 4
1.6 DELIVERY, STORAGE AND HANDLING 5
1.7 JOB CONDITIONS 5
1.8 PROTECTION OF SEEDED AND SODDED AREAS 5
1.9 DELIVERY, STORAGE, AND HANDLING 6

PART 2 - PRODUCTS 6

2.1 SEED 6
2.2 RESTORATION SEED MIX 7
2.3 INTERMEDIATE AREAS 7
2.4 TURFGRASS MIX 7
2.5 TURFGRASS SOD 8
2.6 MEADOW GRASSES AND WILDFLOWERS 8
2.7 INORGANIC SOIL AMENDMENTS 8
2.8 ORGANIC SOIL AMENDMENTS 9
2.9 FERTILIZERS 10
2.10 PLANTING SOILS 10
2.11 HAY MULCHES 10
2.12 PESTICIDES 11
2.13 EROSION-CONTROL MATERIALS 12
2.14 ENYMATIC AGENT 12

PART 3 - EXECUTION 12

3.1 EXAMINATION 12
3.2 PREPARATION 13
3.3 AREA PREPARATION 13
3.4 PREPARATION FOR EROSION-CONTROL MATERIALS 14
3.5 SEEDING 14
3.6 HYDROMULCHING/TACKIFIER ; Slopes flatter than 3:1, Irrigated sites 15
3.7 HAY MULCH: Remote Areas-Slopes flatter than 3:1, Non-Irrigated Sites 15
3.8 HYDRO 16
3.9 SODDING 16
3.10 TURF RENOVATION 16
3.11 MAINTENANCE 17

3.12	SATISFACTORY TURF	18
3.13	MEADOW	18
3.14	MEADOW MAINTENANCE	18
3.15	PESTICIDE APPLICATION	19
3.16	CLEANUP AND PROTECTION	19
3.17	FINAL INSPECTION AND ACCEPTANCE.	19

CONSTRUCTION STANDARD SPECIFICATION

SECTION 02922

LAWNS AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Work under this Section consists of preparing all areas indicated on the Contract Drawings for native grass seeding, sodding, furnishing and installing all seed and wildflower, mulch, fertilizer and soil amendments, and related work specified herein.

1.2 SUMMARY

A. Section Includes:

1. Seeding.
2. Hydroseeding.
3. Sodding.
4. Plugging.
5. Sprigging.
6. Meadow grasses and wildflowers.
7. Erosion-control material(s).
8. Grass paving.

B. Related Sections:
1. Section 02200 "Earthwork" for excavation, filling and backfilling, and rough grading.
2. Section 02812 "Irrigation Systems" for turf irrigation.

1.3 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

U.S. DEPARTMENT OF AGRICULTURE (USDA) AMS SEED ACT (1995)
Federal. See Act Regulations Part 201.

Federal Seed Act and Amendments

AMERICAN SOCIETY FOR TESTING AND MATERIALS – ASTM

ASTM D 4972 (1995a) pH of Soils

ASTM D 5268 (1992; R 1996) Topsoil used for Landscaping Purposes.

ASSOCIATION OF OFFICIAL SEED ANALYSTS – AOSA

New Mexico Crop Improvement Association

New Mexico Seed Law

New Mexico State University – College of Agriculture & Home Economics

Noxious Weed Control Act

1.4 SUBMITTALS

A. Submit in accordance with the requirements of Section 01330 – Submittal Procedures:

1. Certification of Landscape Work

a. Certificates of inspection and manufacturer's or vendor's certified analysis for soil amendments, mulch blankets, fertilizer, hay mulch, straw mulch and tackifier/hydro-mulch materials.
b. Vendor’s certification for each seed mixture required, stating botanical and common name, percentages or purity, germination, and weed seed percentages for each seed species. Seed bag tag and weights per bag with copies of invoices.
c. Proposed source of all native grass, shrub seed and wildflower seed, which shall indicate the location from which the seed was harvested.

B. Seeding Schedule: Propose seeding schedule showing scheduled dates for each type of seeding in each area of job site. Coordinate with specified maintenance periods to provide maintenance from date of final acceptance. Revise dates if necessary only with the SCO’s (Sandia Construction Observer) approval after documentation of delays.

C. Maintenance Instructions – Landscape Work: Instructions shall be submitted recommending procedures for the maintenance, including irrigation schedule of seeding work for one full year if an irrigation system is part of the project.

D. Qualification Data: For qualified landscape installer.

E. Provide MSDS sheets for Pesticides and Herbicides

1.5 QUALITY ASSURANCE

A. General

1. Landscape Contractor: A single licensed firm specializing in all aspects of landscape work and has a minimum of 5 years of experience in performing seeding and sodding as specified herein.
2. Provide seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging. Containers shall be shipped with certificates of inspection as required by the governing authorities and the NMSL.
3. All native grass and wild flower seed shall be certified by state of origin. The certification authority for the state of New Mexico is the New Mexico Crop Improvement Association [505.646.4125].
4. Seed Labeling: Furnish seed label in accordance with the requirements of the Federal and New Mexico statutes and regulations governing seed labeling. Such requirements include the Federal Seed Act and Amendments, rules and regulations established by the US Department of Agriculture, the New Mexico Seed Law, and all resulting regulations or restrictions established by the New Mexico State University – College of Agriculture and Home Economics.
5. Ensure the seed mix and its application complies with the requirements of all other Federal and New Mexico statutes and regulations governing seeds, plants, and weeds: these requirements include but are not limited to: the Noxious Weed Control Act and all rules, regulations, and weed control measures. Refer to the USDA.
6. Do not make substitutions for specified materials.
7. Pesticide Applicator: State licensed, commercial.

B. Analysis and Standards

1. Standard products shall be packed with manufacturer's certified analysis.
2. For other materials, an analysis shall be performed by a recognized laboratory in accordance with methods established, wherever applicable.

1.6 DELIVERY, STORAGE AND HANDLING

A. Packaged Materials: Packaged materials shall be delivered in sealed containers showing the weight, analysis and name of manufacturer. Materials shall be protected from deterioration during delivery and while stored at Contractor’s yard or job site.

1.7 JOB CONDITIONS

A. Seeding shall not be performed until finish grading and structures in or adjacent to areas to be planted have been installed and approved.

B. Work within seasonal limitations for various seed species. Refer to Section 3.04A.

C. When detrimental conditions are encountered, notify the SCO before proceeding.

1.8 PROTECTION OF SEEDED AND SODDED AREAS

A. Seeded and sodded areas shall be protected from damage, disturbance, or construction activity after planting operations are complete.

B. Damage resulting from construction activities, erosion, gulleys, washouts, pedestrian or vehicular traffic, or other causes shall be repaired by filling with topsoil, tamping, re-fertilizing, and reseeding or resodding by the Contractor at his expense, if such damage occurs prior to final acceptance of the project.

C. Protection and Maintenance of Native Grass Seed in Irrigated Areas:

1. For areas where temporary irrigation is provided, protect and maintain native grass seeded areas until uniform germination and growth is established. At that time, the area will be inspected and approved by the SCO if no void or bare areas greater than 25 square inches occur within the seeded area. If these standards are not met the area shall be reseeded and maintained until final acceptance. Remove tumbleweed, Russian Thistle and other nuisance, non-grassy weeds during the maintenance period.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.

B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod in time for planting within 24 hours of harvesting. Protect sod from breakage and drying.

PART 2 - PRODUCTS

2.1 SEED

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.

B. Contractor shall furnish certification showing origin of all seed and pure live seed (PLS) purity times percent germination. Each bag of seed shall be tagged and sealed by the producer in accordance with the U.S. Department of Agriculture rules and regulation under the Federal Seed Act and applicable State seed laws or other local certification authority within the state of origin. The label shall indicate analysis of seed and date of analysis. Seed may be premixed by the seed dealer and appropriate data indicated on the bag label for each variety. Refer to 2.02.D for seed mixture and rate of application.

C. State-certified seed of grass species as specified.

D. Seed shall be domestic grown and shall be furnished in sealed standard containers, each of which carries the analysis label.

E. Seed which has become wet, moldy, musty or otherwise damaged will not be acceptable.

F. Seed rate is given in pounds of pure live see (PLS) per acre.

2.2 RESTORATION SEED MIX

A. The designer shall specify on the plans where to use and what type of mix to use. Seed Species as follows shall be identified as "restoration mix" and shall be used in more remote areas:

Restoration Mix Seed Blend:

COMMON NAME	GENUS & SPECIES	PLS PER ACRE
Purple Three Awn	Aristida purpurea	0.9
"Viva" Galleta Caryopsis	Hilaria jamesii	2
Chamisa/RubberRabbit-bush	Chrysothamnus nauseous	0.5
Globemallow	Sphaeralcea ambigua	0.2
Blue Grama"Hachita"	Boutelouta Gracilis	3
Sideoats Grama	Boutelouta Curtipendula	6
Mesa dropseed	Sporobolus flexuous	0.2
Alkali Sacaton (Salado)	Sporobolus Airoides	0.5
Saltbrush Four-wing	Atriplex canescens	3.0
Apache Plume	Fallugia paradoxa	1
Indian Ricegrass	Achnatherum or Oryzop-sis.hym	2.5
Galleta Caryopsis (viva)	Hilaria jamesli	1
TOTAL RATE	**~**	**19.5 lbs PLS/Acre**

2.3 INTERMEDIATE AREAS

A. The designer shall specify on the plans where to use and what type of mix to use. Seed Species as follows shall be identified as "intermediate mix" and shall be used where an umowed look of grasses only can be accepted:

Intermediate Mix Seed Blend:

COMMON NAME	GENUS & SPECIES	PLS PER ACRE
Indian Rice grass	Oryzopsis hymenoides	1.8
Blue Grama "Hachita"	Boutelouta Gracilis	6.8
Galleta Carayopsis (viva)	Hilaria jamesii	1.5
Sideoats Grama	Boutelouta Curtipendula	2
Sand dropseed	Sporobolus cryptandrus	0.5
Alkali Sacaton (Salado)	Sporobolus Airodies	0.9
Grama, Black	Bouteloua eriopodia	0.6
Mesa dropseed	Sporobolus flexuosus	0.6
Spike Muhly	Muhlenbergia wrightii	0.8
TOTAL RATE	**~**	**15.5 lbs PLS/Acre**

2.4 TURFGRASS MIX

A. The designer shall specify on the plans where to use and what type of mix to use. Seed Species as follows shall be identified as "Warm season turfgrass mix" and shall be used at high visibility areas where a "turf-like" solution is required:

Warm Season Turfgrass Mix Seed Blend:

COMMON NAME	GENUS & SPECIES	PLS PER 1000-SF
Buffalo grass	Buchloe dadctyloides	3
TOTAL RATE	**~**	**3 lbs PLS/1000 sf**

2.5 TURFGRASS SOD

A. Turfgrass Sod: Certified, including limitations on thatch, weeds, diseases, nematodes, and insects], complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted.

B. Warmseason Turfgrass species: Buffalo Grass, Buchoe dactyloides

2.6 MEADOW GRASSES AND WILDFLOWERS

A. The designer shall specify on the plans where to use and what type of mix to use. Seed Species as follows shall be identified as “Wildflower Addition mix” and shall be used as an option to any of the other mixes:

Wildflower Addition Mix Seed Blend:

COMMON NAME	GENUS & SPECIES	PLS PER ACRE
Purple Aster	Aster bigelovii	0.8
Blue Flax	Linum perenne lewisii	0.1
Desert Marigold	Baileya multiradiata	0.2
Plains Coreopsis	Coreopsis tinctoria	2.2
Firewheel	Gaillardia aristata	0.8
Pink Wild Snapdragon	Penstemon ambiguus	1.3
Mexican Hat	Ratibida columnifera	0.2
Yellow Prairie Coneflower	Ratibida	3
TOTAL RATE	**~**	**6 lbs PLS/Acre**

B. Seed Carrier: Inert material, sharp clean sand or Perlite, mixed with seed at a ratio of not less than two parts seed carrier to one part seed.

2.7 INORGANIC SOIL AMENDMENTS

A. Sulfur: Granular, biodegradable, containing a minimum of 90% percent sulfur, and with a minimum of 99% percent passing through No. 6 (3.35-mm) sieve and a maximum of 10% percent passing through No. 40 (0.425-mm) sieve.

B. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20% percent iron and 10% percent sulfur.

C. Perlite: Horticultural Perlite, soil amendment grade.

D. Agricultural Gypsum: Minimum 90% percent calcium sulfate, finely ground with 90% percent passing through No. 50 (0.30-mm) sieve.

E. Sand: Clean, washed, natural or manufactured, and free of toxic materials.

F. Diatomaceous Earth: Calcined, 90% percent silica, with approximately 140% percent water absorption capacity by weight.

G. Zeolites: Mineral clinoptilolite with at least 60% percent water absorption by weight.

2.8 ORGANIC SOIL AMENDMENTS

A. OMNI as available from:

1. Western Organic Inc., Albuquerque, New Mexico 87125, (505) 877-8670

2. Apply at a rate of 2" – 3" inches loose depth to achieve a 50/50 mix.

B. Premium Compost available from:

1. Soilutions, New Mexico Compost Products, Compost Site: 9008 Bates Road, SE, Albuquerque, New Mexico 87105, (505) 877-0220
2. Apply [till] at a rate of 2" – 3"inches loose depth to achieve a 50/50 mix.

C. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35% to 55% percent by weight; 100% percent passing through ½" inch (12.5-mm) sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5% percent inert contaminants and free of substances toxic to plantings; and as follows:

1. 70% percent by volume, organic compost. Compost to be screened to ½" inch minus. pH not to exceed 7.5. Electrical conductivity (EC) of compost not to exceed 3.5 mmhos/cm. Percentage of organic matter shall not be less than 80%,percent tested by simple combustion. Total nitrogen (TKN+N03-N) shall not exceed 50:1. product to be City of Albuquerque Compost or equal.
2. Organic Matter Content: 50 to 60 percent of dry weight.
3. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

D. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture, with a pH range of 3.4 to 4.8.

E. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100% to 2000% percent.

F. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.

1. In lieu of decomposed wood derivatives, mix partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb/cu. ft. (2.4 kg/cu. m) of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 lb/cu. ft. (4 kg/cu. m) of loose sawdust or ground bark.

G. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25% percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

2.9 FERTILIZERS

A. Fertilizer: Comply with FS-O-F-241, Type [I] [II], Grade [A] [B]; recommended for grass with 50% percent of the elements derived from organic sources, of proportion necessary to eliminate any deficiencies of topsoil. Provide nutrients required by soil analysis. Fertilizers shall be granular form starter fertilizer with a guaranteed analysis of nitrogen 18% - phosphoric acid 25% - soluble potash 10%

B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20% available phosphoric acid.

2.10 PLANTING SOILS

A. Planting Soil: Existing, in-place surface soil. Verify suitability of existing surface soil to produce viable planting soil. Remove stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth. Mix surface soil with the following soil amendments and fertilizers in the following quantities to produce planting soil:

1. Apply 2” inch layer of compost or Omni Organic Amendment.
2. Weight of Iron Sulfate per 1000 Sq. Ft. (92.9 Sq. m):.
3. Weight of Agricultural Gypsum per 1000 Sq. Ft. (92.9 Sq. m): 5 lbs.
4. Weight of Superphosphate per 1000 Sq. Ft. (92.9 Sq. m): 1 lbs.
5. Weight of Commercial Fertilizer per 1000 Sq. Ft. (92.9 Sq. m): Enough to provide 1 lb of P/1000sf.

2.11 HAY MULCHES

A. Provide hay mulch that is perennial native or introduced grasses of fine-stemmed varieties. At least 65% percent of the herbage by weight of each bale of straw must be 10” inches in length or longer.

1. Hay with noxious seeds or plants will not be accepted. Rotted, brittle or molded hay will not be accepted.

2. Marsh grass or prairie hay composed of native grass species to be seeded is acceptable. Provide marsh grass composed of mid to tall native grasses (usually tough and wiry grass and grass-like plants found in the lowland areas within the Rocky Mountain Region).
3. Tall wheat grass, intermediate wheat grass, switch grass or orchard hay are acceptable if cut prior to seed formation.
4. Hay Mulch for vegetative mulch shall be harvested stalks of oats, wheat, barley or rye. Rotted, brittle, or moldy hay is not acceptable.

B. Fiber Mulch: Provide mulch material consisting of virgin wood fibers manufactured expressly from whole wood chips. Process the chips in such a manner as to contain no growth or germination inhibiting factors. Do not produce fiber from recycled material such as sawdust, paper, cardboard, or residue from pulp and paper plants. Mulch shall be free of noxious weed seed.

C. Hydromulch: Excel Fibermulch with binder as manufactured by American Excelsior Co.; 850 Avenue H East, P.O. Box 5067, Arlington, Texas, 76001, (817) 640-1555, local phone (505) 345-7806.

D. Tackifier: Exact-Tak tackifier as manufactured by American Excelsior Co.; 850 Avenue H East, P.O. Box 5067, Arlington, Texas, 76001, (817) 640-1555, local phone (505) 345-7806.

1. Bagged mulch/tackifier mix that is homogenous within the unit package may also be used. Tackifier shall adhere to the fibers during manufacturing to prevent separation during shipment and to avoid chemical agglomeration during mixing in the hydraulic mulching equipment.
2. Tackifier: A natural glue made form plant material that holds seed and mulch in place. Rate: 2 lbs. per 1,000 sf. The product shall be composed of 90% percent wood fiber, 9% percent blended hydrocolloid-based binder, and 1% percent mineral activators – all by total weight and shall be 100% percent biodegradable and non-toxic to wildlife. The BFM shall not contain any synthetic fibers.
3. Asphalt Emulsion: ASTM D977, Grade SS-1; nontoxic and free of plant-growth or germination inhibitors.

2.12 PESTICIDES

A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

2.13 EROSION-CONTROL MATERIALS

A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6” inches (150 mm) long.

B. Erosion-Control Fiber Mesh: Biodegradable burlap or spun-coir mesh, a minimum of 0.92 lb/sq. yd. (0.5 kg/sq. m), with 50% to 65% percent open area. Include manufacturer's recommended steel wire staples, 6” inches (150 mm) long.

C. Where indicated on Contract Drawings, provide soil retention blanket of a uniform web of interlocking wood fibers and weed-free, with a backing of mulch net fabric on one side only. Produce the wood fibers from aspen wood 0.021 inch by 0.042 inches, plus or minus 25% percent with the length 6” inches or longer. Minimum blanket size is 36” inches by ¼” inch thickness before placing. Provide blanket net fabric with a mesh size 5/8” inches by ¾” inches maximum, of extruded polypropylene with 1% to 2% percent carbon black additive. Roll weight shall average 0.8 pound per s.y., plus or minus 10% percent, and noted on the roll wrapper or attached tag.

D. Staples: U-shaped, 11 gauge or heavier steel wire, minimum leg length of 8” inches after bending with a throat approximately 2” inches wide.

E. Wood Stakes: Use 2” x 2” x 12” inch pine or fir stakes, beveled at one end in under-laying soil conditions.

2.14 ENYMATIC AGENT

A. BioMax or Super Bio is available from

1. Organic Technology Inc.
   14013 Encantando Rd. NE
   Albuquerque, New Mexico 87123 (505) 291-1100

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.

1. Verify that no foreign or deleterious material or liquid such as sheetrock, construction debris, paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
2. Protect grade stakes set by others until directed to remove them.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways. Meet requirements of dust control permits.

3.3 AREA PREPARATION

A. Limit turf subgrade preparation to areas to be planted.

B. Newly Graded Subgrades: Rip subgrade to a minimum depth of **6" inches (150 mm)**. Loosen soil and remove clods and stones larger than **2" inches (50 mm)** in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property in the top 4" inches of soil.

1. Apply commercial fertilizer sulfur directly to subgrade before loosening.
2. Spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.

    a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
    b. Mix sulfur with dry soil before mixing fertilizer.

3. For sodded areas and when noted on the plans spread organic material to a depth of 2 **" inches** but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

C. Unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:

1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
2. Loosen surface soil to a depth of at least 6" inches (150 mm). If necessary apply contact herbicide and allow 3 days to work on plant materials before removal. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 6" inches (150 mm) of soil. Till soil to a homogeneous mixture of fine texture.

a. Apply superphosphate fertilizer directly to surface soil before loosening.

3. Remove stones larger than 2” inches (50 mm) in any dimension and sticks, roots, trash, and other extraneous matter in the top 4” inches of soil.
4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.

D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus ½” inch (13 mm) of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

E. Prior to seeding, water all areas thoroughly for 2 weeks to the point of saturation to produce weed growth. Water at the rate of 2 cycles/day, at a rate determined on the Contract Drawings. Apply "Roundup" herbicide to kill all growth, and proceed with seed installation after period recommended by herbicide manufacturer.

F. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

G. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 PREPARATION FOR EROSION-CONTROL MATERIALS

A. Prepare area as specified in "Area Preparation" Article.

B. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.

C. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.5 SEEDING

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph (8 km/h). Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.

1. Do not use wet seed or seed that is moldy or otherwise damaged.
2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.

B. Sow seed at a total rate as designated in the materials PART 2.

C. Rake seed lightly into top 1/8” inch (3 mm) of soil, roll lightly, and water with fine spray or drill seed with a roller attachment..

D. Protect seeded areas with slopes exceeding 1:4 with erosion-control blankets and 1:6 with erosion-control fiber mesh installed and stapled according to manufacturer's written instructions.

3.6 HYDROMULCHING/TACKIFIER ; Slopes flatter than 3:1, Irrigated sites

A. Immediately following the raking/chaining operation, apply hydro-mulch fibers with tackifier to seeded areas at the rate specified by the manufacturer. Mix slurry in a tank with an agitator system and spray, under pressure, uniformly over seeded areas.

B. Use both vertical and horizontal movements in the applicator to achieve an even application of the slurry material. Keep all materials in uniform suspension throughout the mixing and suspension cycle when using hydraulic mulching equipment.

C. Combine mulch with a colloidal polysaccharide tackifier that has no growth or germination inhibiting factors and is nontoxic. Apply the uniform mixture to the seeded area.

3.7 HAY MULCH: Remote Areas-Slopes flatter than 3:1, Non-Irrigated Sites

A. Immediately following the raking/chaining operation, add straw mulch to the seeded areas.

B. Apply straw mulch at a minimum of 1.5 tons per acre of air dry material. Spread the straw mulch uniformly over the area either by hand or with a mechanical mulch spreader. When spread by hand, tear the bales of straw apart and fluff before spreading. Do not mulch when wind velocity exceeds 10 mph.

C. Wherever the use of crimping equipment is practical, place mulch in the manner noted above by anchoring it into the soil. The mulch shall be wetted and allowed to soften for 15 to 20 minutes prior to crimping. Use a heavy disc such as a mulch tiller, with flat serrated disc at least ¼" inch in thickness, having dull edges, and space no more than 9" inches apart to anchor the mulch into the soil, with discs of sufficient diameter to prevent the frame of the equipment form dragging the mulch. Anchor mulch a minimum depth of 2" inches and across the slope where practical with no more than two passes of the anchoring equipment.

D. Where small grain mulch is used as indicated on Contract Drawings, it shall be crimped in two directions in a cross-hatched pattern.

E. Where mulch areas cannot be anchored by crimping, provide hydro-mulch wood fibers with tackifier at the rate of 500 lbs. per acre. Mix slurry in a tank with an agitator system and spray, under pressure, uniformly over seeded areas. Keep all materials in uniform suspension throughout the mixing and suspension cycle when using hydraulic mulching equipment. Mix 400 lbs. Of wood fiber with 100 lbs. of tackifier.

F. Keep all materials in uniform suspension throughout the mixing and suspension cycle when using hydraulic mulching equipment.

3.8 HYDRO

A. Hydroseeding: Mix specified fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

1. Mix slurry with manufacturer's recommended tackifier.
2. Apply slurry uniformly to all areas to be seeded in a one-step process. Apply slurry at a rate so that mulch component is deposited at not less than 1500-lb/acre (15.6-kg/92.9 sq. m) dry weight, and seed component is deposited at not less than the specified seed-sowing rate.
3. Apply slurry uniformly to all areas to be seeded in a two-step process. Apply first slurry coat at a rate so that mulch component is deposited at not less than 500-lb/acre (5.2-kg/92.9 sq. m) dry weight, and seed component is deposited at not less than the specified seed-sowing rate. Apply slurry cover coat of fiber mulch (hydromulching) at a rate of 1000 lb/acre (10.4 kg/92.9 sq. m).

3.9 SODDING

A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.

B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

1. Lay sod across angle of slopes exceeding 1:3.
2. Anchor sod on slopes exceeding 1:6 with wood pegs or steel staples spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.

C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2” inches (38 mm) below sod.

3.10 TURF RENOVATION

A. Renovate existing turf.

B. Renovate existing turf damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.

1. Reestablish turf where settlement or washouts occur or where minor regrading is required.
2. Install new planting soil as required.

C. Remove sod and vegetation from diseased or unsatisfactory turf areas; do not bury in soil.

D. Remove topsoil containing foreign materials such as oil drippings, fuel spills, stones, gravel, and other construction materials resulting from Contractor's operations, and replace with new planting soil.

E. Mow, de-thatch, core aerate, and rake existing turf.

F. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.

G. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Owner's property.

H. Till stripped, bare, and compacted areas thoroughly to a soil depth of 6” inches (150 mm).

I. Apply soil amendments and initial fertilizers required for establishing new turf and mix thoroughly into top 4” inches (100 mm) of existing soil. Install new planting soil to fill low spots and meet finish grades.

J. Apply sod as required for new turf.

K. Water newly planted areas and keep moist until new turf is established.

3.11 MAINTENANCE

A. Maintain and establish by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.

1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
3. Apply treatments as required to keep plants and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

B. Watering: Where shown, install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4” inches (100 mm).

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
2. Water turf with fine spray at a minimum rate of 1” inch (25 mm) per week unless rainfall precipitation is adequate.

C. Mow buffalo grass or sod as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height (2” inches) without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings. Do not delay mowing

until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:

1. Mow annual weeds to a height of 6” inches until project acceptance.

D. Buffalo Grass post fertilization: Apply fertilizer after initial mowing and when grass is dry

1. Use fertilizer that will provide actual nitrogen of at least 1 lb/1000 sq. ft. (0.45 kg/92.9 sq. m) to turf area.

3.12 SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by Architect:

1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 75% percent coverage with no bare spots exceeding 8” inches.
2. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.

B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

3.13 MEADOW

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph (8 km/h). Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.

1. Do not use wet seed or seed that is moldy or otherwise damaged.

B. Sow seed at a total rate of 4 oz./1000 sq. ft. (113 g/92.9 sq. m) .

C. Brush seed into top 1/16” inch (1.6 mm) of soil, roll lightly, and water with fine spray.

D. Protect seeded areas from hot, dry weather or drying winds by applying peat or compost mulch within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 3/16”inch (4.8 mm), and roll surface smooth.

E. Water newly planted areas and keep moist until meadow is established.

3.14 MEADOW MAINTENANCE

A. Maintain and establish meadow by watering, weeding, mowing, trimming, replanting, and performing other operations as required to establish a healthy, viable meadow. Roll, regrade, and replant bare or eroded areas and remulch. Provide materials and installation the same as those used in the original installation.

1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and meadow damaged or lost in areas of subsidence.
2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
3. Apply treatments as required to keep meadow and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

B. Watering: Install and maintain temporary piping, hoses, and meadow-watering equipment to convey water from sources and to keep meadow uniformly moist.

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
2. Water meadow with fine spray at a minimum rate of ½" inch (13 mm) per week for six weeks after planting unless rainfall precipitation is adequate.

3.15 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents in accordance with requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.16 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

C. Remove nondegradable erosion-control measures after grass establishment period.

3.17 FINAL INSPECTION AND ACCEPTANCE.

A. Upon written request by the Contractor, five days in advance of the end of the maintenance and guarantee period and after substantial completion, an inspection of the work will be made by the SCO. The Contractor will be notified in writing of the Final Acceptance, or of work required. The Contractor will be responsible for all maintenance until all punch list items are completed and Final Acceptance is granted at which time Sandia will assume responsibility

B. Where inspected work does not comply with the requirements of the Specification and Contract Drawings, replace rejected work and continue specified maintenance until re-inspected by the

SDR and the SCO and the work is found to be acceptable. Promptly Remove rejected equipment

- END OF SECTION -