

SECTION 641 - HYDRO-MULCH SEEDING

641.01 Description. This section describes application of mulch, seed adapted to site, fertilizer and water using hydraulic equipment in designated areas. This section also provides instructions for continuous care and maintenance.

641.02 Materials.

(A) Seed. Seed adapted to site shall be certified to the following properties:

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| Pure Seed | 95% minimum |
| Crop Seed | 1% maximum |
| Weed | 0.5% maximum |
| Inert Material | 5% maximum |
| Germination | 85% minimum |

Apply the seeds at the rate of one hundred (100) pounds per acre (minimum) and within twelve (12) months of the date of the certified germination test.

Seed shall comply with Hawaii Administrative Rules Title 4, Subtitle 6, Chapter 67 Seed Rules; shall be certified for compliance by a Hawaii-licensed seed dealer; and shall be purchased from that dealer.

Seed shall be delivered to the project in labeled and sealed containers. Seed and labels shall be subject to testing provisions of the Association of Official Seed Analysts. The Engineer will not accept for use seed that is more than 12 months old from date of certified germination test.

Recommendation of seed producer shall be followed in determining quantity of seed to apply per acre.

(B) Fertilizer. Proper fertilizer shall be used in hydro-mulch mix, depending of condition of soil. The Contractor shall provide a Spoil Analysis Report, if requested by the Engineer, and shall use report to determine quantity and ratio of fertilizer for sustained growth of grass.

(C) Mulch. Mulch shall be specially processed fiber containing no growth or germination inhibiting components. Recycled mulch material, such as processed newspaper, is allowable if accepted for use by the Engineer. Fibers shall form homogeneous slurry after addition and agitation in hydro-mulch seeder with seed, fertilizer, water and other additives not detrimental to plant growth. When hydraulically sprayed on soil, fibers shall form blotter-like ground cover that readily absorbs water and allows infiltration to underlying soil.

(D) **Soil and Mulch Tackifier.** Tackifier used with mulch shall be hydrocolloidal or organic.

(1) **Hydrocolloidal Tackifier.** Hydrocolloidal tackifier shall be formulated for use with hydraulically planted grass seed or stolons, alone or in combination with fertilizer, wood fiber mulch, and other accepted additives. Tackifier shall consist of at least three different but complementary hydrocolloids, two of which shall be Glactomannan and Plantago Ovata. Latter component shall have muciloid content of at least 85 percent.

Tackifier shall be applied at rate of 80 pounds per acre, shall be pH stable with fertilizer, and shall hydrate and disperse in mixing tank with water and other materials to form homogeneous slurry. Tackifier shall leave loose, chain-like stabilizing film on surface of soil, allow moisture to percolate into soil during seed germination and seedling growth, and break itself down through microbial action. Tackifier shall not inhibit plant germination or growth.

(2) **Organic Tackifier.** Organic tackifier shall be, starch-based tackifier formulated for use with conventional mulches. Active ingredient in tackifier shall be 100 percent derived from plant starch.

Dry powder tackifier shall be blended with insolubilizer. After blending and mixing with water, tackifier shall swell, become sticky, and be suitable for use during heavy rain. Tackifier shall be applied at rate of 80 pounds per acre. Emulsion shall cure on surface of soil and become insoluble. Tackifier shall not inhibit plant germination or growth.

641.03 Construction Requirements.

(A) **Seeding.** Apply the seeded mulch within two days after completion of slopes or portion of slope when exposed face attains height of 15 feet. Notify the Engineer not less than 24 hours ahead of hydro-mulch seeding operation. Do not hydro-mulch until the Engineer inspects and accepts the areas for planting.

The Engineer will inspect slopes to ensure that surface and subsurface water are properly collected and disposed of and areas to be planted are protected from erosion. Upon the Engineer's acceptance for planting, begin hydro-mulch seeding of slopes. Acceptance for planting does not relieve the Contractor of responsibility for repair of slope damage until grassed areas are accepted as described in Subsection 641.03 (D) - Acceptance.

Place seeded mulch evenly and completely over ground in one application at minimum rate of 1,500 pounds of mulch per acre. Use

accepted hydro-mulch seeder with built-in agitation system and operating capacity sufficient for uniform mixing until slurry is pumped out of tank. Equip seeder with distribution and discharge lines large enough to prevent stoppage, and hydraulic discharge spray nozzles that provide uniform distribution of slurry.

In areas that are inaccessible to hydro-mulch seeder, plant by accepted hand methods.

When hydro-mulch seeding is done in conjunction with erosion control matting, install erosion control matting to completion and follow with hydro-mulching within 24 hours.

Water immediately after planting to moisten the soil and mulch. Continue watering as necessary to ensure proper germination and growth. Water in a way that will prevent erosion, using equipment that will not damage planted areas. Replace watering equipment that cause erosion or runoff.

If there is slope erosion or movement of silt, remove displaced material immediately. Restore areas that are eroded to depth greater than two inches of original grade or width greater than three inches.

(B) Planting Period. Begin planting period immediately after seeding area is accepted by the Engineer. If area has mixture of trees, shrubs, and grass, do not start planting period until all trees, shrubs, and grass have been planted. If only grass is planted, during planting period provide 95 percent coverage with 5-inch tall healthy grass within 90 days. Re-seed areas after 30 days that do not show thorough "catch" in accordance with Subsection 641.03(A) - Seeding until the Engineer determines there is satisfactory growth.

(C) Plant Establishment. Plant establishment is nine months after accepted completion date of planting period. During plant establishment period, water, fertilize, weed, and mow grassed areas with accepted equipment when grass reaches average height of 3 inches. Replace grass the Engineer considers unsuitable, sick, or that are dead. Remove and dispose of trash and debris. Provide insect and disease protection and control.

In addition to fertilizer that is applied during initial hydro-mulch seeding, fertilize plantings at least four times during plant establishment period. Fertilize at rate of not less than 300 pounds per acre per application. Interval between fertilizations shall not be closer than 2-1/2 months. Notify the Engineer 24 hours before applying fertilizer.

The Engineer will credit the Contractor plant establishment days when work is done in accordance with the contract documents and when the Engineer determines that no work is required, regardless of whether the Contractor actually performs plant establishment work. The Engineer will

149 not credit the Contractor with plant establishment days when the Engineer
150 determines that work is necessary but the Contractor fails to adequately
151 perform plant establishment work.

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153 (D) **Acceptance.** The Engineer will base acceptance of planted areas
154 on 98 percent coverage of healthy, well established grass, at least 3 inches
155 tall, at the end of plant establishment period. No 100 square foot area
156 shall show more than 2 square feet of bare earth. Mow grass before
157 requesting acceptance.

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159 **641.04 Method of Measurement.** Hydro-mulch seeding will be paid on a lump
160 sum basis. Measurement for payment will not apply.

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162 **641.05 Basis of Payment.** The Engineer will pay for the accepted hydro-mulch
163 seeding on a contract lump sum basis. Payment will be full compensation for the
164 work prescribed in this section and the contract documents.

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166 The Engineer will pay for the following pay item when included in the
167 proposal schedule:

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169 **Pay Item**

Pay Unit

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171 Hydro-Mulch Seeding

Lump Sum

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173 The Engineer will allow partial payment of hydro-mulching seeding as
174 follows:

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176 (1) 30 percent of the contract price upon completion of hydro-mulching
177 seeding;

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179 (2) 15 percent of the contract price in three equal monthly payments for
180 satisfactory performance during the planting period;

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182 (3) 48 percent of the contract price in eight equal monthly payments for
183 satisfactory performance during the plant establishment period; and

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185 (4) 7 percent of the contract price upon final acceptance at the end of the
186 plant establishment period.

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END OF SECTION 641