



MULE-HIDE GreenGrid™ VEGETATIVE ROOF SYSTEM GUIDE SPECIFICATIONS

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SECTION XXXXX

GREEN ROOF COMPONENTS

PART 1 - GENERAL

1.1 SCOPE

Furnish all labor, materials, tools, and equipment to furnish and install green roof modules provided by Mule-Hide Products Co., Inc. called GreenGrid™ Vegetative Roof System including growth media and plant species, as shown on the drawings or as directed by the Engineer. This work shall also include installing an irrigation system, if required, on the drawings.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- a. Roofing Systems - specified in Section XXXX.
- b. Plants - specified in Section XXXX.

1.3 QUALITY ASSURANCE

- a. There should be no deviation made from this specification or the detail drawings without prior written approval 14 days prior to the start of the project.
- b. Before installation of the modules, the roof shall be inspected by a technical representative of the roofing contractor/manufacturer to determine the adequacy of the roof surface to accept the modules.
- c. It shall be the Owner's responsibility to determine the adequacy of the roof to support the existing and proposed loads. Verification of the integrity of the roof for water tightness shall also be the responsibility of the Owner if the green roof is installed on an existing roof system.
- d. Upon completion of the installation, an inspection shall be conducted by a Technical Representative to ascertain that the modules have been installed according to these specifications and details. This inspection is not intended to be a final inspection for the benefit of the owner but for the benefit of determining whether a warranty shall be issued.
- e. The green roof modular components and growth media will be purchased



from Mule-Hide Products Co., Inc.

PART 2 - PRODUCTS

2.1 MODULES

- a. The modules are black in color and are formed of 150 mil (4-inch) and 200 mil (8-inch) HDPE (100% recycled post industrial HDPE). Each module contains a drainage/root retardant layer already placed in the module, and is pre-planted with growth media and plant species of the color and type desired by the client.
- b. Modules size: 2 feet by 2 feet and 2 feet by 4 feet. Depths of modules are 4 inches and/or 8 inches (nominal). 2 feet by 2 feet triangles in 4 and 8-inch depths are also available.
- c. Module weight (maximum wet weight):
 1. Extensive (4-inch): 16 -22 lbs per sf wet
 2. Intensive (8-inch): 35+ lbs per sf wet
- d. Module clearance of drainage channels above the roof is 0.5 inches.

2.2 GROWTH MEDIA

- a. An engineered lightweight blend consisting of inorganic and organic components meeting the recommendations of a soil scientist.

2.3 PLANTS

- a. Extensive - GreenGrid™ recommended design mix of grasses, perennials, and groundcovers that can thrive in a non-irrigated, extensive rooftop environment in the project location. Plants shall be selected according to their USDA hardiness zone classification.
 - i. Minimum planting density - Plants should be supplied in minimum size of 3-inches deep by 1.5-inches wide (plugs) and planted in the green roof modules at a minimum rate of 1 plant per square foot.
 - ii. Recommended planting density - Plants should be supplied in minimum size of 3-inches deep by 1.5-inches wide (plugs) and planted 8 inches on center.



b. Intensive – Plants should include grasses, perennials, and groundcovers that can thrive in an irrigated or non-irrigated, intensive rooftop environment in the project location. Plants shall be selected according to their USDA hardiness zone classification.

i. Typical planting density - Plants should be supplied in quart or gallon sized containers and planted in the green roof modules at a rate of 1.5 plants per square foot.

c. Plants shall be installed in accordance with the landscape design.

2.4 PAVER (optional)

a. Standard Paver size: 2 feet by 2 feet, and 1.75-inches in depth. Various paver depths are available.

b. Pavers are composed of 100% recycled rubber and are available in various colors.

c. Standard Paver weight: 7.5 lbs. per square foot.

2.5 EDGE ELEMENTS (optional)

Composed of wood, aluminum, and/or recycled HDPE (in various colors and designs) for placement on viewable edge of modules.

2.6 DRIP IRRIGATION SYSTEM (optional)

a. Composed of black polystyrene tubing and flow controlling emitters.

b. Water usage for complete module irrigation: 2 gallons per 8 inch module.

c. Time to complete module irrigation: approximately 30 minutes per 8 inch module.

d. Damm Drip Irrigation Rings: designed for individual area watering of larger size containers. The ring encircles the plant and water is emitted in 5 areas through 10 holes to ensure uniform watering. Drip rings come in 5 sizes with different length lead tubes.

e. Damm Drip Irrigation Tubes: there are three types of drip tubes: DTS with a .045 inside diameter green tube, DTM with a .060 inside diameter brown tube, .075 inside diameter blue tube. All consist of two parts: the flow controlling emitter and the tube ring.

- f. The Damm Drip Irrigation Products install easily into flexible black poly tubing. The tools required to assemble a custom water system are:
- Main water line (3/4" or 1" diameter flexible black poly tubing)
 - Damm Drip Tubes or Drip Rings
 - Damm Hand Pick Tool

2.6 SUBMITTALS

- a. When the proposed project components vary outside of this specification, submit these altered components for review.
- b. Submit an installation plan including but not limited to: roof quality control, system delivery, and maintenance plan until green roof acceptance.
- c. Provide a water hook-up installation submittal if an irrigation system is required on the drawings.

2.7 DELIVERY, STORAGE, AND HANDLING

- a. Coordinate planted modules shipment, delivery and installation of planted grids within a 24-hour period from the time the modules are shipped.
- b. Maintain the health of the plants prior to installation by providing water and protection from wind, as required ensuring plant survival.
- c. Do not crack or drop modules during handling and installation.

2.8 PROJECT CONDITIONS

- a. Perform module installation only after appropriate roofing/membrane system has been installed and/or inspected.
- b. Restrict traffic from work areas until modules are installed. Erect signs and barriers as required.
- c. Provide hoses, etc. for temporary irrigation as needed for plant maintenance until roof system acceptance.

2.9 WARRANTY

- a. Provide a uniform stand of plants by watering and maintaining green roof areas until final acceptance. Replant areas that fail to provide a uniform stand of plants, with specified materials, until all affected areas are



accepted by the Owner.

- b. Upon acceptance of the installation by Mule-Hide, a GreenGrid Material warranty shall be offered.

PART 3 - EXECUTION

3.1 INSTALLATION SEASON

Unless otherwise permitted, module installation shall be done between April 1 and October 15, but not when the weather is below 50° F.

3.2 SITE PREPARATION

- a. Areas to have modules installed shall have an installed roofing system, with smooth free draining and an even surface.
- b. The area shall be thoroughly cleaned debris that might interfere with laying of the modules.
- c. Examine finish surfaces, grades, and roof quality. Do not start module installation work until unsatisfactory conditions are corrected.
- d. A geotechnical fabric will be provided under the modules as a slip sheet to help protect the roofing system during module installation.

3.4 LAYING MODULES

- a. The modules are designed to be placed directly atop a slip sheet for minor protection on top of a roofing membrane or can be placed on any other media assuming structural capacity is present.
- b. After installing modules, all shall be watered sufficiently with a fine spray to insure growth. Water shall be free of substances harmful to plant growth. Hoses or other methods of irrigation shall be furnished by the Contractor.
- c. Do not install on saturated roof surface or under freezing weather conditions, the latter unless with the express permission of Mule-Hide Products Co., Inc.

3.5 MAINTENANCE

- a. Maintain modules for a period of at least 30 days after completion and



acceptance of the module installation operations.

- b. Maintain modules, including watering, spot weeding, application of herbicides, fungicides, insecticides (if necessary) and replanting until a full, uniform stand of plants free of weeds, undesirable grass species, disease, and insects is achieved and accepted by the Owner.
 - 1. Water modules/plants as required to establish proper rooting.
 - 2. Repair, rework, and replant all areas that have washed out or are eroded. Replace undesirable or dead areas with new plants.
 - 3. Apply herbicides as required to control weed growth at the nursery prior to module shipment, delivery and installation. Comply with all applicable local, State and Federal regulations and label instructions when applying these materials.
 - 4. Apply fungicides and insecticides as required to control diseases and insects. Comply with all applicable local, State and Federal regulations and label instructions when applying these materials.
 - 5. Utilize nursery recommended maintenance procedures.

3.6 ACCEPTANCE

- a. Inspection to determine acceptance of modules will be made by the Owner, upon Contractor's request. Provide notification at least 7 working days before requested inspection date.
 - 1. Modules will be acceptable, provided all requirements, including maintenance period, have been complied with, and healthy, even colored viable plants are established.
- b. Upon acceptance, the Owner will assume module/plant maintenance.

3.7 CLEANING

- a. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, debris, and equipment. Repair damage resulting from module installation operations.

END OF SECTION