

Mulches for Horticultural and Non-Horticultural Use

Covered Products:

Various organic and inorganic mulch products used in horticultural or non-horticultural applications as described in this specification.

Goal:

To provide guidance for state procurement that describes the positive attributes and concerns associated with various mulch options and encourages the use of certain mulches for certain applications.

Background:

Mulch is a protective layer of material applied to the surface of an area of soil with the intention of providing an optimum soil environment for planting and turf establishment, preventing erosion, stabilizing soil, moderating soil temperatures, conserving moisture, improving soil fertility, reducing weed growth, -enhancing the visual appeal of the area or breaking the impact of falls. When selecting mulch, any of these functions can be considered.

Mulch can be organic or inorganic in nature and is used in a variety of settings, from landscape development to playgrounds. When selecting mulch, affected entities should consider the entire life cycle of the project, materials selected based on the concept of sustainability, maintenance needs, and cost.

Definitions:

Mulch - Any product or material utilized as an aboveground dressing.

Organic mulch – Mulch composed of material that biodegrades and feeds the soil for planting or turf establishment. Organic mulches include materials such as shredded wood, wood chips, wood fiber, pine needles, compost, paper, straw, shredded vegetation or grass clippings.

Inorganic mulch – Mulch composed of materials that do not biodegrade and do not feed the soil for planting or turf establishment. Inorganic mulches include materials such as stone, gravel, recycled material including rubber, glass and fabric.

Unadulterated materials – Wood or other materials that are not treated with chemicals such as glues, preservatives, pesticides, herbicides, or paint, including, but not limited to, creosote, chromated copper arsenate (CCA) and pentachlorophenol.

Standard Setting and Certification Programs:

New York State Department of Environmental Conservation, Advisory Invasive Plant List, located at: <http://www.dec.ny.gov/animals/65408.html>.

New York State Department of Environmental Conservation, New York Standards and Specifications for Erosion and Sediment Controls, located at <http://www.dec.ny.gov/chemical/29066.html>.

New York State Department of Environmental Conservation, NYS Stormwater Management Design Manual, located at <http://www.dec.ny.gov/chemical/29072.html>. The manual was updated to include green infrastructure in August 2010.

Sierra Business Council, Sediment Source Control Handbook, 2009, located at http://www.dot.ca.gov/hq/LandArch/ec/references/hogan_tahoe/SSCH2008.pdf#page=141&page mode=bookmarks.

U.S. Compost Council, Seal of Testing Assurance, located at <http://compostingcouncil.org/seal-of-testing-assurance>

Specifications:

In General:

Affected entities are encouraged to use mulch where appropriate to prevent erosion, stabilize soil, conserve water, prevent the spread of invasive species, and improve soil fertility. The use of the right mulch in the right place can be a key component of green infrastructure.

Onsite and Local Sources:

Affected entities shall use onsite sources of material for mulch to the maximum extent practicable, where such material is available, provides an acceptable level of performance, and meets operational objectives for the application desired.

If onsite sources are not available or acceptable, affected entities are shall use local sources of mulch or material for mulch to the maximum extent practicable, where such mulch or material is available, provides an acceptable level of performance, and meets operational objectives for the application desired.

Unadulterated Materials:

Affected entities shall use unadulterated materials for mulch to the maximum extent practicable, including wood and other materials derived from waste or recycled sources.

Invasive Species Control:

Due to the nature of invasive plants to rapidly colonize any area of disturbed soil, affected entities are strongly encouraged to mulch and seed disturbed areas as soon as possible. If outside the growing season for seed germination, disturbed sites should still be mulched.

While mulching and seeding is an important measure for controlling invasive species, affected entities should be aware that some types of mulches have the potential to spread invasive insects, insect larvae and seeds. Off-site sources of mulch shall be free of invasive insects, plant parts or seeds to the maximum extent practicable. The use of wood fiber or straw mulch is strongly encouraged over other options. If hay mulch is used, it should originate from an invasive free source. (A list of plants identified as invasive in NYS can be found at <http://www.dec.ny.gov/animals/65408.html>.)

In order to kill invasive insect larvae, wood or other organic mulch material from off-site sources shall be chipped to a size of 1" or less in two dimensions. For example, a chip 1" wide by 1" thick by three or more inches long would be acceptable.

Organic Mulch:

Affected entities are strongly encouraged to use organic mulches in horticultural applications, particularly where new plant or turf growth is desired. Organic mulches perform a wide range of positive functions, including erosion control, site stabilization, water conservation, soil temperature moderation, weed control, enhancing visual appeal and improving soil composition.

Organic mulches are encouraged for horticultural use because they biodegrade, enhancing soil structure and contributing to soil fertility. They allow oxygen through soil spaces and facilitate the release of carbon dioxide from root systems through soil spaces.

The following list discusses some of the types of organic mulches that may be considered for use, including their positive attributes and any concerns. This is not meant to be an exclusive or exhaustive list.

- *Wood chips or shredded wood.* Wood is a renewable resource plentiful in New York State and offers all the benefits of organic mulch. It is strongly encouraged for invasive plant species control. Off-site sources of wood should be chipped to a small size in order to control invasive species, as specified above. Wood sources treated with creosote, chromated copper arsenate (CCA) or pentachlorophenol shall not be used.
- *Seedless straw.* Straw is a renewable resource plentiful in New York State and offers all the benefits of organic mulch. It is strongly encouraged for invasive species control due to the fact that unlike hay, which is freshly cut cereal grain stalks and seed heads suitable for use as feed, straw is only the dried stems of cereal crops free of seeds. NYS DOT materials specifications describe straw as "stalks of oats, wheat, rye or other similar crops which are free from noxious and invasive species."
- *Pine needles.* Pine needles, also known as pine straw, are a renewable, sustainable resource as the needles are naturally shed by pine trees. They are also remarkably effective at preventing run-off. Pine is perfect for acid-loving plants such as roses, azaleas, and oleanders. It may be wise to test for soil acidity when using pine straw for growing vegetables, which prefer slightly alkaline soil.

- Compost. Compost is humus-like material resulting from aerobic, thermophilic decomposition of organic constituents including but not limited to leaves, wood chips, grass clippings, food scraps and manure. Compost has better moisture retention capacity than most other materials, and slowly adds nutrients to the soil. The properties of compost depend on the feedstock and the process used to produce the compost. High quality compost is produced in such a way as to kill invasive insects and weed seeds. Coarse compost works better than fine compost as mulch since it is less likely to act as a growing matrix for windblown or bird dropped seeds.
- Newspapers. Mulching with newspapers is one of the most environmentally friendly options as it is reuse of a renewable resource. It is best suited to small areas such as backyard gardens; it is not practical for large projects.
- Shredded vegetation and grass clippings. On-site vegetation and grass clippings can also be used as mulch. Again, these are best suited to small areas such as backyard gardens, and should not contain invasive species or seeds, even from the site itself. While the use of off-site vegetation and clippings are generally discouraged (as off-site sources may be a significant source of invasive plants and insects), off-site vegetation and clippings from municipal or local sources that are free of invasive species may be acceptable.
- Hydromulch. This type of mulch is characterized by method of application. Materials are mixed with water and applied by a spray mechanism. NYS DOT materials specifications further define hydromulch as “manufactured so that the materials will remain uniformly suspended in water under agitation and will blend with seeds, fertilizer and other additives to form an homogeneous slurry, . . . which, upon hydraulic application, shall form a blotter-like ground coating with moisture absorption and percolation properties and the ability to cover and hold seeds in contact with the soil.” To achieve this performance standard, one of the “additives” needs to be some form of binding agent (typically biodegradable polymers also known as soil stabilizers or mulch “anchorage”). Fairly precise mixing ratios and application rates are needed for optimum results. Hydromulches are suitable alone for general surface flow but should not be used in concentrated-flow situations, such as channels, without rolled erosion control or similar mechanical soil stabilization products. They can be used in combination with other types of mulches; for instance, a wood fiber with binder can be hydraulically applied over straw spread without water. Materials typically used for hydromulches include:
 - **Straw:** 100% Straw with a binder.
 - **Wood Fiber:** 100% recycled long strand, thermally refined wood fibers, manufactured from wood recovered or diverted from solid waste and phytosanitized. Used for general seeding and for erosion control including steep slopes (with tackifier).
 - **Cellulose:** Clean, recycled cellulose fiber, generally from news print. Used for general seeding on relatively flat slopes.
 - **Cellulose and Wood Fiber Blend:** Biodegradable recycled wood fibers and paper, phyto-sanitized. Usually 70% wood fiber and 30% cellulose fiber.
 - **Cotton Hydro:** A blend of mechanically processed straw fibers (80% maximum) and reclaimed cotton plant materials. Used for general seeding on flat-to-gentle slopes.

- **Pelletized Hydro Mulch**: A combination of paper and raw lumber chips made into small pellets to give them added weight and further prevent their being blown away after drying. Straw is also available in pelletized form for hydromulching.

The following types of organic mulches are NOT recommended for use:

- Hay. Hay is often cut from mixed crop fields that tend to include invasive plants and seeds. The use of hay is strongly discouraged and has been replaced by straw.
- Cypress. Cypress is one of the most common woods used to make chip mulch. Effective and affordable, it is also detrimental to the environment. To process the mulch, many virgin trees are cut down. The cypress tree acts to store and filter freshwater from the wetlands in which it grows. By eliminating these trees, an important wildlife habitat becomes threatened.
- Peat moss. The use of peat moss is discouraged since it is not a sustainable product. It needs to be transported long distances, and takes a long time to naturally produce.
- Adulterated materials. Any materials not consistent with the definition of unadulterated materials. Wood sources treated with creosote, chromated copper arsenate (CCA) or pentachlorophenol shall not be used.

Inorganic Mulch:

Inorganic mulch can be used for erosion control, site stabilization, water conservation, enhancing visual appeal and breaking the impact of falls where new plant or turf growth is not desired. Affected entities are encouraged to use inorganic mulches for specialty applications, such as roof gardens, small urban spaces or playgrounds, where successful planting or turf establishment is not the primary concern and aesthetic and functional issues such as visual fill, color, texture and cushioning are important. This includes such uses as erosion control along slopes, linear roadway projects, or drip lines close to buildings.

Inorganic mulches are not encouraged for horticultural use because they do not contribute to soil fertility, do not provide benefits to plants and turf, and may have an adverse affect on plant growth. Most are not moisture-retentive, and they are not as efficient at allowing oxygen and carbon dioxide into and out of the plant's root systems as organic materials. They are, by their nature, inert. Some may breakdown over a very long period while most do not. Maintenance can be expensive and time consuming. As they age, some inorganic mulch can become discolored, and inspection and replenishment is often necessary. In order to replenish, the old layer often must be removed and a new one added. If multiple layers of inorganic mulch are added to a planting area, the material may eventually bury the crowns of the plants while failing to provide needed nutrients for their roots.

The following list discusses some of the types of inorganic mulches that may be considered for use, including their positive attributes and any concerns. This is not meant to be an exclusive or exhaustive list.

- Recycled Glass. Glass is essentially a natural material and can act to improve drainage.

- Gravel and Stone. These are usually used for aesthetic reasons on a small scale or for erosion control. They are generally not used for planting purposes. Gravel and stone can require significant maintenance for weeds.
- Rubber mulch. Rubber mulch is made from recycled vehicle tires and is available in a variety of long-lasting colors. In appearance and usage it is often compared to wood mulch. Rubber mulch lasts for multiple seasons, reducing maintenance costs compared to mulch that has to be refreshed annually. Like wood mulch, rubber mulch is often used for playground cover to enhance fall-height safety. Rubber mulch may release quantities of zinc, which can inhibit the growth of new seedlings, therefore it is not recommended for the establishment of new plants and should be used with caution in horticultural applications where zinc sensitivity might be an issue. Colored rubber coatings can reduce the leaching of zinc by as much as 80%. Recent studies conducted by the NYS Department of Environmental Conservation and the NYC Department of Health and Mental Hygiene have concluded that exposure to any chemicals in crumb rubber used in synthetic turf fields (the same material used for rubber mulch) is likely to be small and unlikely to increase the risk for any health or environmental effect.

The following types of inorganic mulches are NOT recommended for use:

- Waste material without a BUD. Any waste material from an off-site source that has not been granted a Beneficial Use Determination (BUD) by the NYS Department of Environmental Conservation.
- Plastic mulch. Plastic mulch has been used for blocking weed growth, but it is a non-biodegradable synthetic material which must be removed before growing plants, and is not beneficial for growing plants. It is not less expensive than other encouraged mulch options.

Renewable and Recycled Content:

Affected entities are encouraged to use renewable sources of material for mulch where such mulch is available, meets other environmentally preferable criteria established in this specification, provides an acceptable level of performance, and meets operational objectives for the application desired.

Affected entities are encouraged to use recycled materials for mulch where such material is available, meets other environmentally preferable criteria established in this specification, provides an acceptable level of performance, and meets operational objectives for the application desired.

Application Guidelines:

Affected entities are encouraged to consult with landscape architects and other professionals when choosing specific materials to meet the criteria established in this specification.

By choosing the appropriate mulch for a given application and follow successful application techniques, affected entities can ensure the greatest amount of success. Mulching information is available from the following agencies:

- NYS Department of Transportation: Highway Design Manual, Chapter 28 “Landscape Architecture and Community Design For Transportation” (to be issued January 2013). Posted at NYSDOT’s general link to the Highway Design Manual: <https://www.dot.ny.gov/divisions/engineering/design/dqab/hdm>

Also, NYSDOT’s [standard specifications](#) include specifications for mulch (key sections: 610-1.08; 610-2.08; 610-3.08; 611-3.01; 713-05; and 713-11). Open the most recent version shown here):

<https://www.dot.ny.gov/main/business-center/engineering/specifications/updated-standard-specifications-us>

- NYS Office of General Services: The general link to OGS specifications is: <https://online.ogs.ny.gov/DNC/MasterSpec04/masterspecdivisionlisting.asp>. The OGS specification sections that reference mulch include the following:
 - Division 31:
 - Section 310000 Earthwork
 - Section 310101 Site Restoration
 - Section 312513 Erosion and Sediment Control
 - Division 32:
 - Section 327101 Wetland Mitigation
 - Section 329219 Seeding
 - Section 329600 Transplanting
 - Section 329301 Plants
 - Section 329117 Flexible Growth Medium

Bulk Delivery and Alternate Packaging:

If a mulch material needs to be purchased from off site, affected entities are encouraged to purchase the material in bulk in order to limit the number of shipments and avoid the need for any packaging. If this is not viable, affected entities are encouraged to use innovative packaging that reduces the weight of packaging and the generation of packaging waste. Bidders/contractors are encouraged to use reusable materials and containers and to utilize packaging configurations that take advantage of storage containers designed to be part of the product for the shipment of multi-unit purchases. New York State recognizes that these packaging methods are in the development stage and may not be currently available. Companies are urged to consider more of these options, and state contractors are urged to offer these services as part of their contract price list. Authorized users are urged to inquire about these programs when purchasing and determine the best solution for their needs.

Packaging:

Packaging shall comply with Environmental Conservation Law section 37-0205. Packaging shall not contain inks, dyes, pigments, adhesives, stabilizers, or any other additives to which any lead, cadmium, mercury or hexavalent chromium is intentionally added or contain incidental concentrations of lead, cadmium, mercury or hexavalent chromium which together are greater than 100 parts per million by weight (0.01%).