

ON-SITE REUSE OF GROUND WOOD WASTE FROM GEORGIA RESIDENTIAL CONSTRUCTION

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Due to tremendous population growth, residential construction in Georgia is a thriving industry. According to the National Association of Homebuilders (NAHB) Research Center, an average new home produces four tons of construction waste. Currently, most construction waste is put in dumpsters and taken to a construction and demolition (C&D) landfill. However, several residential construction wastes can be recycled or reused as part of a “green” building practice. These include cardboard, metals, scrap wallboard, and wood waste. This bulletin provides you the information you need for on-site reuse of wood wastes at a residential construction site.

Beneficial Reuse, A Better Way of Doing Things...

For wood waste to be reused on-site, it needs to be ground. Although grinding is an extra expense in equipment and labor, it saves money on disposal costs. Whether or not grinding and on-site reuse is cost-effective will depend on tipping fees, the distance to a C&D landfill, labor costs, the builders market (production or custom), and how the ground material is used.

Ground wood waste provides a free source of mulch for landscaping, erosion and sediment control, delivery pads, and temporary paths or roads. Builders use ground wood waste on landscape beds around individual homes or at development entrances. Ground wood waste also has been used for a variety of erosion control measures including mulch blankets, berms, and in geosynthetic filter socks. Some builders use ground wood waste to mulch a delivery area. This keeps building materials clean and easy to handle. Using ground wood waste on access areas reduces the amount of mud and dirt entering the home, making clean up easier. All these uses have the potential to save the builder and the homeowner money.



On-site reuse also means that the material is not landfilled. Over the long run, this saves landfill space and will save society money. On-site reuse is part of a “green” building program. Both the EarthCraft House™ and the Leadership in Energy and Environmental Design (LEED)™ rating system give credits for construction waste management. The Earth Craft House™ program gives specific credits for grinding and using wood waste as a mulch. The LEED-H system credits the reduction in construction waste. If you are a builder, this may be part of your marketing plan. Many homeowners are interested in building practices that conserve natural resources and are environmentally friendly.



Figure 1. An example of ground wood waste at the construction site.

Beneficial reuse requires doing things a little differently. The wood waste needs to be separated from other construction wastes. Construction crews should be trained to place the wood waste in a separate area. Although some builders may rent or buy grinders to process the construction waste, many are contracting with a construction waste manager who provides this service. In either case, the management of construction waste will need to be coordinated with various construction crews as well as the landscapers who will be working on the site. Issues that should be discussed include where to locate the temporary ground wood waste storage piles or other staging areas, grinding schedules so the waste can be ground in a timely matter, crew training, and intended use of the ground wood waste. There are several sources of information on construction waste management listed in the “More Information” section.

Can All Wood Waste Be Reused?

YES!	NO!
Dimension lumber	Treated lumber
Engineered wood	Prefinished flooring
Finger-jointed studs	Painted or stained wood

Several different types of wood may be used in residential construction: treated lumber, dimension lumber, engineered wood products, finger-jointed studs, and painted or other pre-finished products. Dimension lumber is solid wood cut to certain dimensions, such as 2 x 4s or 4 x 6s. Engineered wood products are construction materials designed for certain uses that contain adhesives to bind pieces of wood together. Laminated timbers, oriented strand board, and plywood are all examples of engineered wood products. Research has shown that dimension lumber, engineered wood products, and finger-jointed studs can be ground and beneficially reused. ***Treated lumber should not be ground and reused.*** Treated lumber contains metals or other preservatives that make it unsuitable for beneficial reuse. Waste from treated lumber should be taken to a C&D landfill and not mixed with other wood wastes. In addition, painted or stained woods, or prefinished flooring should not be ground and reused onsite.

Is Reuse of Engineered Wood Products Safe for the Environment?

As mentioned above, engineered wood products contain adhesives such as phenol formaldehyde and resorcinol. There have been concerns about potential environmental impacts from the organic chemicals in these adhesives. These concerns range from the exposure of workers to harmful organic chemicals to surface water contamination and effects on plant growth.

The US Environmental Protection Agency and the wood product industries have conducted several studies on organic chemical releases to the air from engineered wood products. These studies focus on the amount of formaldehyde released indoors from these products. In general, the amounts released were low and below standards set by the Occupational Safety and Health Administration (OSHA). It is highly unlikely that ground engineered wood products would generate levels of formaldehyde outdoors that would exceed these standards.

Research at the University of Georgia studied water quality effects of using engineered wood products as a mulch. Organic chemicals associated with the adhesives were not found in the runoff water from plots mulched with ground engineered wood products. The study indicated potential water quality impacts from beneficial reuse on residential construction sites were low. A companion study did not see any effects on the growth of three common landscaping plants. In fact, small amounts of nitrogen and phosphorus were released from the mulch, and may have provided nutrients to the plants.

These studies indicate that including ground engineered wood products in the wood waste for on-site beneficial reuse should not pose a threat to the environment.



Figure 2. An azalea being grown with a mulch of wood waste in the UGA nursery study.

What about Regulatory Issues?

Wood waste is regulated under the Georgia Department of Natural Resources, Environmental Protection Division (EPD), Solid Waste Management Program. EPD is interested in decreasing the amount of construction wastes that are landfilled. No permit is required for on-site beneficial reuse if recommended practices are followed. Recommended practices **DO NOT** include burying wood waste, whether it is ground or not ground. Recommended practices also **DO NOT** include storing large amounts of ground materials at a location other than the construction site.

Use of the ground wood waste for erosion and sediment control must be part of the erosion and sediment control plan approved by local authority.

The How-Tos of On-site Beneficial Reuse

Planning Ahead – Your first step is planning ahead. Develop a plan for how your construction waste will be managed. This should include how wood wastes suitable for reuse will be segregated and stored. The wood waste can be placed in a designated area or in a separate container. Crews should be trained to keep the wood waste in the designated area, to make sure treated lumber is kept separate from other wood wastes, and to use the wood waste collection area for only wood waste, not for trash.

You should designate a grinding site and the area where the ground wood waste will be stored if it is not used immediately. Storage sites should be located on high ground away from ponded or flowing water. The storage site should also be easily accessible.



Figure 3. Example of a wood waste storage area.

Estimating Wood Waste Volume

Formulas can be used to estimate the amount of wood waste produced at a site. Although this varies by the size and the type of house construction, you can make estimates based on average figures. NAHB estimates there are 1.5 lbs of wood waste generated per square foot of house. This is 11 cubic yards of waste for a 2,000 square-foot house or 0.006 cubic yard per square foot. Most studies indicate there is a 50% reduction in waste volume after grinding. The volume of ground wood waste can be estimated as follows:

Square feet in the house x 0.006 cubic yards per square foot x 0.5 = cubic yards of ground wood waste

For example: $2,000 \text{ ft}^2 \times 0.006 \text{ yds}^3/\text{ft}^2 \times 0.5 = 5.5 \text{ yds}^3$

If you are applying the ground wood waste to a 2 inch depth for mulch or erosion control, then area you can cover can be calculated as follows:

Cubic yards of ground wood waste ÷ depth of mulch applied x 324 = square feet of area covered

For example: $5.5 \text{ yds}^3 \div 2 \text{ in} \times 324 = 891 \text{ ft}^2$ or slightly smaller than a 30 ft x 30 ft area.

Efforts should be made to use the ground wood waste fairly quickly after grinding. Leaving ground wood waste stockpiled over 3 feet high for an extended period of time can cause the mulch to sour. Sour mulch is caused by a lack of oxygen within the mulch pile. These conditions can cause a build up of compounds such as acetic acid. These compounds can be harmful to some plants, particularly tender annuals and perennials. It will be beneficial to coordinate with the landscaper and the grinder at the beginning of construction so that ground wood waste is stored properly and is not in areas that could cause problems at a later date.

Grinding Tips – The wood waste should be ground and screened through a two-inch screen. Make sure that any other trash that may have been mixed into the wood waste is removed before grinding.

You should be aware of and train your crew to follow safety practices when working near or with a grinder. This may include wearing safety glasses and hearing protectors. Consult OSHA for safety information. Many grinders have magnets and other metal removal devices that remove nails. If contracting with a grinder, you may want to specify these type of devices in the contract.

Recommended Practices for High Traffic Areas – High traffic areas may be paths into the house, temporary roads, or staging and delivery areas. Ground wood waste helps reduce soil disturbance, reduces the amount of dirt or mud entering the house during construction, and keeps building materials clean and easy to handle. The ground wood waste should be spread in a 2 to 3 inch layer over the heavy use area.

After construction is finished, if the ground wood waste has not been mixed into the soil by traffic, it should be raked and spread out over an area about three times as large as the original area. This will prevent a concentration of wood waste from being incorporated in a particular soil area that could cause plant growth problems by tying up the nitrogen needed for plant growth. In areas where traffic has incorporated the ground wood waste, tillage may be needed to remove soil compaction.



Figure 4. Ground wood waste used for a delivery pad.

Recommended Practices for Erosion and Sediment Control – Ground wood waste can be used successfully for erosion and sediment control. Mulch berms and mulch blankets are approved by the Soil and Water Conservation Commission (SWCC) as erosion and sediment control measures. However, you should contact your county's erosion and sediment control officer for approval of these practices as part of the sediment and erosion control plan.

Ground wood waste can be used several different ways. As a mulch, it can be spread evenly over disturbed soil areas 2 to 3 inches deep to protect the soil from erosion. This is known as a mulch blanket. Another use is a filter berm. This is a long mound of mulch that retards water movement and filters out sediments. Filter berms that are at least 12 inches high and 24 inches wide are used at the base and tops of slopes to prevent water concentrating and creating a channel. On longer slopes, several filter berms may need to be used positioned at regular intervals down the slope. Wood waste mulch can be used in combination with other structural practices.

In general, mulch is used like compost for erosion control. You should follow approved guidelines for field applications of compost. You can find more specifics on compost erosion control standards in the "More Information" section. Mulch, however, is not compost. Compost is organic material that has been managed through a decomposition process. Mulches contain high amounts of carbon and can create nitrogen deficiencies if too much is incorporated in one place.

Mulch can be left in place or removed at end of a project. A good example of an area where the mulch would be best left in place is a slope where groundcovers, shrubs, or trees will be planted. If an area is to be seeded into grass, you may want to remove the mulch rather than incorporate it. Incorporating freshly ground wood mulch can create nitrogen deficiency in the newly planted grass. If the wood mulch is incorporated, adequate nitrogen should be added to encourage good growth. Based on estimated C:N ratios, this should be in the range of 9 to 18 lbs of ammonium nitrate per cubic yard of ground wood waste. However, you should consult with your County Agent for site specific recommendations.



Figure 5. Ground wood waste being used in a berm for erosion and sediment control.

Carbon, Nitrogen and Plants

Wood waste contains a lot of carbon (C). Nitrogen (N) is a nutrient needed for good plant growth. In the soil, microorganisms use the C from organic matter like wood as food. They need N to be able to use the C. When microorganisms and plant roots compete for N, the microorganisms win and plants suffer.

If wood waste is incorporated into the soil, make sure adequate N is there for plants to grow. Healthy plants should have a green color. Yellow leaves may indicate not enough N is available. Notice the yellow color on the leaves below.



Recommended Practices for Mulch – Ground wood waste can be used in landscaping beds as mulch. The mulch is a light brown or blond color initially, but weathers to light gray within a year. If the homeowners prefer a dark colored mulch, the ground wood waste can be used as a base layer and topdressed with pine needles or a darker mulch. Mulch colorants can also be sprayed on the ground wood waste to create a darker color. The ground wood waste mulch should be placed in a 2 to 3 inch layer. More than 3 inches of any mulch tends to create problems with too much moisture retention, fungi, or decreased oxygen supply to plant roots. The mulch should be pulled away from the base of ornamental trees and shrubs about 2 to 3 inches. This will discourage rodents from gnawing on the tree trunk and reduce the possibility of root rot.

If the ground wood waste is being used as mulch around house foundations, make sure there is at least 6 to 8 inches of clear space from the foundation. If the house is built on a slab, place the mulch 6 to 8 inches away from the slab. If the house is built on a cinder block foundation, mulch can be placed up to the base of the foundation if there is at least 6 to 8 inches between the mulch surface and the wood foundation band. These simple practices can decrease the potential of problems from termites or other insects. The moisture retained by mulch can attract termites, but it is unlikely to serve as a food source for them.

Summary

Beneficial reuse of wood wastes from residential construction is a recognized “green building” technique. It can divert wastes from the landfill and decrease waste management costs. Research has shown that if recommended practices are followed, there is little threat to the environment. Ground wood wastes can be used as mulches, for erosion and sedimentation control, and for high traffic areas. Beneficial reuse should be a part of any green building program.

More Information

EarthCraft House. Information available at: www.earthcrafthouse.com/

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