GREEN CONSTRUCTION GUIDE

A guide to set up new home construction recycling and encourage the use of recycled-content building materials

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Introduction to Construction Site Recycling

Background

Areas across Saginaw County have been experiencing a housing boom in recent years, with a 39% increase in single family, duplex and multi-family building permits issued since 2000 [1]. Associated with this increase in housing starts is an increase in waste materials generated. According to the Michigan Department of Environmental Quality (MDEQ), approximately 8,400,000 cubic yards of construction and demolition (C&D) waste are generated yearly in Michigan, of which 1,300,000 cubic yards comes from new residential construction. It is estimated that this represents 20% - 30% of all waste generated in mid-Michigan.

These numbers are staggering in terms of the quantity of materials being sent to landfills. Luckily, there are alternative disposal options for much of the waste generated on a construction site. The National Association of Home Builders Research Center (NAHBRC) estimates that between 50% - 80% of construction waste has the potential to be recycled. Salvage, reuse and recycling can handle a large percentage of the material generated from building homes.

Mid Michigan Waste Authority (MMWA) would like to encourage contractors to begin "thinking green" when building. Examples of green thinking include:

- purchasing environmentally friendly materials;
- purchasing materials made from recycled-content products; and
- reducing waste on site by adopting sound building practices that will reduce the generation of waste in the first place and recycling.

This document was developed to help contractors get into the "green" mindset. Inside are step-by-step directions to develop and implement recycling programs that will reduce the amount of waste generated for regular disposal in the landfill. A list of haulers and recyclers in the area who can help you get recycling is also included. In addition, this guide will provide a list of recycled-content products and other green products that could easily be incorporated into the building process, as well as information on how to purchase these products.

[1] Building permit summaries provided by the Saginaw County Metropolitan Planning Commission.

Common Terms or Concepts

Avoided disposal costs: materials that are diverted for recycling will reduce the amount of waste remaining for traditional disposal. The difference is known as avoided disposal costs.

C&D debris: waste materials, (including packaging, wood scraps, drywall cutoffs, shingles, land-clearing debris and more) generated at construction and demolition sites.

Recyclables: materials that can be diverted from the waste stream to a market for recycling. On a typical Saginaw-area construction site, these materials are wood, cardboard, and metals.

Waste Stream: the total amount of waste materials from a particular area (such as a jobsite or entire subdivision), as it moves from point of origin to disposal.

Why Consider Recycling?

Construction site recycling is important for many reasons. In addition to the obvious environmental benefits achieved, such as saving landfill space, there are other benefits which can have a positive impact for your company. Listed below are three significant benefits to implementing a recycling program.

1. ***Potential cost savings.***

   The cost of waste disposal at a residential construction site can be quite high (see box at right). Diverting materials from the landfills is good not only for environmental reasons, but also for economic reasons. Waste materials often cost significantly less to recycle than to dispose of in the traditional method (at a landfill).

2. ***Waste reduction and recycling can help your company become more efficient.***

   Materials that end up in the dumpster actually are paid for twice -- once at the time of purchase, and again in the cost of disposal. By carefully observing which materials are being wasted, you can determine how efficiently your crews and subcontractors are using materials, which in turn can affect your bottom line.

3. ***Good marketing tool.***

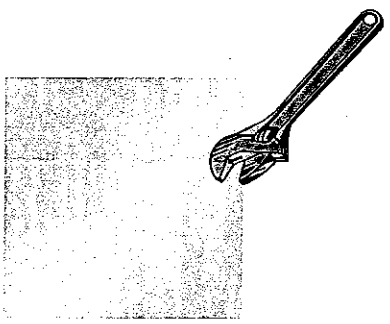
   As you build, promote your company as a contractor who is responsible for proper management of waste. Post signs and advertise to prospective buyers that "XYZ Construction is striving to protect the environment." You may also wish to distribute a pamphlet or flyer explaining your company's unique "green building" approach. You may be surprised how many people will respond positively to this claim.

Did You Know?

Job site recycling can save you money!

The average cost of a 30-yard dumpster in the Saginaw area is $390 per pull. With the average 2,000 square foot house needing two dumpsters per house, that means that building contractors are spending nearly $800 per house on waste disposal.

It is estimated that 50%-80% of the construction waste stream could be reduced, reused, or recycled. That in turn would reduce waste disposal costs accordingly.



Types of Waste Materials Generated

Typical materials generated on a new home construction site include wood, drywall, corrugated cardboard, metals, brick, vinyl siding, plastic piping, shingles, insulation, glass, land-clearing materials and more. It is possible to determine when during the building process each of these materials is typically generated. For instance, land-clearing waste is often generated prior to the start of construction; wood scraps usually are generated during the framing stage; drywall scraps would come next. Corrugated cardboard is usually a packaging product associated with fixtures, windows, etc. and would come during the trim and finishing stages of the project. Knowing when during the construction process each material is generated can be helpful when designing your recycling program, and is discussed further in that section.

According to research for the National Association of Homebuilders Research Center, the following table demonstrates a breakdown of typical materials generated.

"Typical" Construction Waste Estimated for a 2,000-square-foot Home

Material	Weight (in pounds)	Volume (in cubic yards)*
Solid sawn wood	1,600	6
Engineered wood	1,400	5
Drywall	2,000	6
Cardboard (OCC)	600	20
Metals	150	1
Vinyl (PVC)**	150	1
Masonry ***	1,000	1
Hazardous materials	50	-
Other	1,050	11
Total	8,000	50

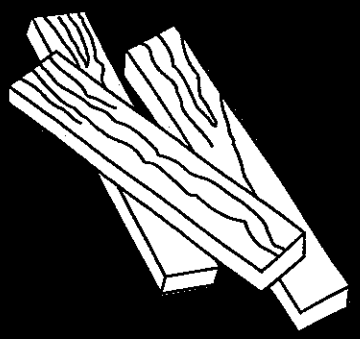
* Volumes are highly variable due to compressibility and captured air space in waste materials.

** Assuming three sides of exterior clad in vinyl siding.

*** Assuming a brick veneer on home's front facade.

Quick Facts:

- Wood waste can account for 40% to 50% of the residential construction waste stream.
- Corrugated cardboard is the most common building product packaging material, and while it may not contribute much to total weight, it can represent up to 30% of the total volume of waste generated on the jobsite. Large pieces of cardboard often take up large amounts of space in the dumpster, and can result in the dumpster being emptied long before it is actually necessary.
- Drywall waste makes up about 15% of jobsite waste. In some areas of the country, drywall can be ground and land-applied as a soil amendment. This is currently not a widely-practiced method of disposal for clean drywall scraps in Michigan, but hopefully it will become popular in the future.



Implementing a Recycling Program on the Jobsite "Step-by-Step"

Step #1: Determine materials that can be recycled

In order to determine which materials would be most logical to recycle, you should take a look at your jobsite waste stream. As described previously, the most common materials generated and recyclable from a construction site include wood, metals, corrugated cardboard, asphalt or brick, and land-clearing materials. However, each contractor generates these materials in differing quantities, and while it may make sense for one contractor to recycle brick, another may generate it in such small quantities that it would not be economically feasible to do so. To figure out what will work, check what materials you generate and estimate that volume.

Determining your waste stream can be as simple as keeping an eye on how quickly your waste containers fill up with certain materials at certain points in the building process. Most wood waste is generated during the framing stage, so a builder can often get an idea of how much wood waste will be generated after this point. For instance, if you have filled up approximately half of a 20-cubic yard waste container after the framing stage, you can estimate that you generated roughly 8 to 10 yards of wood waste per home. Repeat this estimation process for cardboard (most often generated during finish and trim phases) and for other materials you may wish to recycle. See the sidebar at right for tips why it is a good idea to determine which materials are generated at different points in the building process.

Keeping an eye on which materials fill up your waste container most quickly will help you determine which materials to recycle

Contractors also should be aware of markets for the materials generated. Markets for wood, cardboard and metals are readily available across the country, while markets for materials such as drywall and vinyl siding vary by region. Michigan is still looking to develop markets for these materials, but none are readily available at the moment. Therefore, contractors in the Saginaw area should likely focus on recovering cardboard, wood and metals.

"What?" & "When?"

Once you have determined *which* materials are generated in a significant quantity, it can be valuable to determine *when* during the building process they are generated.

- Most wood waste is generated during the framing phase, while most cardboard would be generated towards the end, when finish work such as fixture installation, etc. is performed.
- If you will recycle the materials individually, identifying when they are created is wise. You could potentially save time and money by consolidating materials for delivery to a recycler until the particular stage of the building process is complete. Costs will also be kept low by obtaining a container for cardboard recycling at the end of the project, rather than paying to rent a container for it from framing on, when little cardboard waste is normally generated.
- Regardless of the waste handling method you select, you should estimate disposal cost savings due to materials that are recycled or salvaged. Subtract the quantity of those target materials from the total waste to determine how much waste remains to be disposed of. Next, determine if the size of waste container or frequency of pickup can be reduced, either of which would result in cost savings.

Step #2: Select a method of handling materials

Many studies on waste handling methods have been done throughout the country, and each has produced different results. As with many things, the facets of the new home construction market are many and varied, and differ greatly from one area of the country to another. To put together a recycling program that works in this area, contractors need to read the options outlined below and pick the best fit. Once you have determined which materials would be logical to recycle, you will need to contact various haulers and recyclers (see Appendix B for a listing) to determine the best method of handling the materials.

For instance, in some cases it may be more cost effective to contract with a hauler to remove all materials in one roll-off container at the same time. But others may find it easier to separate each material into a different container (i.e., wood, cardboard) and have them hauled individually. Some contractors may even decide they do not generate enough material to justify hiring a hauler to remove the materials, and instead deliver the product to a recycler themselves. To help you determine how to prepare to recycle, the various program options are detailed below.

- ***Mixed Material Collection.*** Contractors that are concerned with space for more than one dumpster on site often prefer the mixed material collection method. This type of collection typically allows the contractor to dispose all materials in one container, and requires the waste hauler or recycler to sort out the materials at their location.

  This method requires virtually no additional labor for separating materials, which means that less effort is needed to educate workers. However, this can be a more costly method of disposal, and due to the mixture of all materials in one container, contamination often decreases the value of the materials. In addition, this method of collection may not be available in all areas of the country. Check with your local haulers for availability if you are interested in this type of collection.

- ***Time-Based Separation.*** In more metropolitan areas, a method of waste handling known as "time-based separation" has proven popular with some builders. This type of program focuses on recovering the materials as they are generated. Sometimes this type of collection is offered by "site clean-up"

So You Want to Start Recycling in the Tri-City Saginaw Area?

There are two materials that will be easiest to recycle in the Saginaw area: ***wood*** and ***cardboard***. The best method for recycling these materials will be based upon the quantity of the material generated. This will depend largely on the number of homes being built.

- Unlike large builders that develop an entire subdivision simultaneously and can use one centrally-located recycling container for numerous houses, most builders in the Saginaw area build a limited number of houses in a particular neighborhood. Often the wood waste or cardboard generated at a single home is not enough quantity to fill an entire container. Therefore, it is suggested that several builders work together to share the cost of containers for cardboard and wood recycling.
- Another option would be for a builder or several builders to haul the cardboard and wood waste generated at different construction sites to one central location for disposal in a recycling container.

services. In some instances, the service provider will actually do some pre-processing on site (e.g., bale the cardboard, grind the wood). This type of program works best if materials from multiple homes are generated at one time.

The main advantage of a time-based separation program is that while individual recyclable materials are recovered through source-separation, separate containers are not generally required. Instead, areas are often fenced off for storage of materials. The main disadvantage is that they often require additional room on site for storage of materials and processing equipment, and can be more costly than other methods of collection. Another disadvantage is that this concept of waste collection is not available in all areas of the country.

The Saginaw area does not appear to have any recyclers practicing this method at this time. A large volume of material is needed to make this a viable option.

- ***Recyclable Sorting On-Site (Source Separation).*** A good method of recycling a few designated materials is source separation. Source separation requires the segregation of a particular waste material in a specific container or designated storage area. For example, the photo below right shows a dumpster that has been designated for wood scrap recycling only and the photo on page 8 demonstrates a similar method of collecting cardboard.

This method could be costly for a contractor building a single house, as it often does not generate enough of a single type of waste material to fill an entire roll-off container. However, this could still work well for several homes and/or several contractors.

If you are interested in implementing this type of program, you may wish to talk with other contractors that are building in your neighborhood and discuss the possibility of sharing costs for a centrally-located recycling container. Another option that has been known to work well is for a single contractor to select one jobsite to locate the wood or cardboard recycling container, and use their pickup trucks to haul scraps of wood and cardboard from other houses for disposal.

Recycling With Multiple Builders = Cost Savings

As noted previously, many of the m id-Michigan new home developments are built out by multiple contractors. Partnering with another builder or two for recycling can be the key.

Working together can be the best way to achieve cost savings by recycling enough material, as well as widen access to recycling and expand your professional network.

To make this happen, read the five steps through, copy them and share with your colleagues. With just a little effort and this guide, you can set up a great recycling program.

Step #3: Put the Program in Place

A. Contact Haulers -- Now that you have decided which materials you generate in significant quantities to recycle, and determined the best method of handling the materials, you should contact haulers in the area and discuss different options for your jobsite.

It is important to discuss waste handling methods, the amount of separation required, the space requirements (for containers) on the site, and costs. A list of haulers and recyclers operating in the Saginaw area is included in this Guide. See Appendix B for more information.

B. Get Recycling Containers -- After you agree to terms with a hauler or recycler, obtain the necessary recycling containers or designate an area for storage and collection of recyclables. Depending on the type of program selected, you could either purchase these containers yourself, or pay to rent the container from the waste hauler or recycler.

C. Teach Workers What & How to Recycle -- The next important step in implementing the recycling program is to educate your employees and any subcontractors on how to actually recycle the selected materials. Some companies choose to designate one person onsite to function as the "Recycling Coordinator" and oversee the program. This person may be the site manager or another willing individual who will work to ensure that everyone, including the subcontractors, understands and follows the program. However, selecting one person to perform this role is not necessary if you have a small group of workers that are willing to cooperate and participate in the program.

Some steps to easily educate workers about your recycling program include:

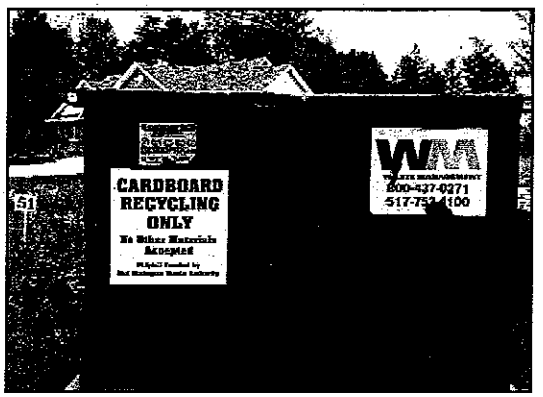
- ***Discuss the recycling program at site safety or other meetings with the subcontractors.*** This education step could simply involve a verbal explanation to the contractors, depending on the number of subcontractors involved and the complexity of the recycling program itself. On the other hand, it might be better to distribute a handout or checklist explaining how the materials are to be separated, preparation of materials (i.e., nails removed, no garbage, etc.), and other pertinent details. Seeing the steps they need to follow in black and white can increase program success. A sample handout is included in this guide as Appendix A.

Possible barriers to recycling program implementation:

While implementing a recycling program can be quite simple, it is important to consider possible issues that may arise in order to more easily address them.

- *Costs.* The contractor must evaluate all aspects (current disposal costs, cost to add recycling services, avoided disposal costs) to determine the true cost of recycling.
- *Additional time may be required for sorting.* Once the program is in place, sorting will become routine for workers. In some instances, the contractor may choose to deliver the materials themselves to the recycling center, and additional drive time should be taken in to consideration.
- *Space issues for storing containers or materials.* This issue can typically be resolved with some creative thinking by the contractor -- store cardboard scraps in the same area as wood scraps after they are removed for recycling, for instance.
- *Contamination.* Fly dumping by neighbors is the most common source of contamination. Some contractors choose to store their scraps in a locked garage to prevent this from happening.

- ***Create large, simple signs.*** Depending on the design of the program, this could simply be a sign designating "MIXED RECYCLABLES" to hang near the roll-off container (in multiple languages, if necessary). On the other hand, if the materials are to be source-separated and placed on piles or in separate containers, multiple signs will be necessary to prevent contamination. Sign examples: "CLEAN WOOD RECYCLING ONLY," "CARDBOARD RECYCLING ONLY," "GARBAGE ONLY."



The photograph at right shows a roll-off container properly labeled for cardboard recycling only. Also posting "NO DUMPING" signs may help to reduce the amount of contamination through fly dumping as well.

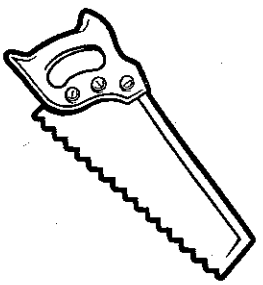
Step #4: Begin recycling

Now that you have the containers in place and the workers and subcontractors have been educated about the program, you should start recycling. Separate out the wood and cardboard (or whichever materials you have selected) and place them in the designated areas or containers. The remainder of the waste should continue to go in the regular roll-off container as before.

It's as easy as that - four simple steps and you are now recycling! If you are partnering with other builders, check in with them to ensure they have informed their subcontractors and staff about the program and that they continue to participate.

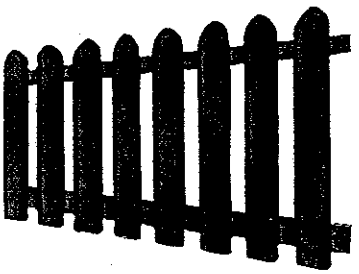
Step #5: Follow-up and maintenance

The final step in the process of implementing a recycling program is to check in periodically with the workers and subcontractors, as well as the waste hauler, to find out if any problems are occurring. The waste hauler will inform you if contamination is a problem, and you can discuss with workers ways to avoid that issue. Some ideas for following up and maintaining the program include:



- ***Check-up on participation and check-in when needed.*** Follow-up with the subcontractors to see if they are participating, through informal discussion on site, phone calls or formal meetings if needed. If the program is not being followed adequately, you may wish to call additional meetings with the group, or with a specific individual, to discuss the program.

The program should be evaluated periodically as well. If subcontractors are not following the program and have complaints about the setup (i.e., the dumpster for recyclables is located too far from the work site), take steps to address the concerns. You may also find that the program needs to be adjusted along the way to suit your needs better -- don't be afraid to change things.



- ***Provide results and rewards!*** Remember to keep your workers and partners up to date on program results so they know they are making a difference. And, knowing that their activities have an impact encourages people to keep participating.

It's always good practice to say thanks for a job well done, or to provide incentives to get the result you need -- recycling program success. If the program seems to be working well, the person in charge may wish to provide encouragement to the subcontractors in the form of donuts at a coffee break or pizza for lunch.

Thomas Farms Pilot Recycling Project

During the fall of 2003, the Mid Michigan Waste Authority partnered with the Saginaw Home Builders Association, Waste Management of Michigan, Putt Inc., and a number of contractors to implement a pilot project for new home construction job-site wood and cardboard recycling.

Three contractors took advantage of the project to recycle their wood and cardboard waste. Two roll-off containers from Waste Management were placed in an empty lot in the Thomas Farms development located in Thomas Township, one each for wood waste and cardboard. At the end of the project, the waste from approximately ten homes was placed in the roll-off containers. These homes were all at varying stages of construction, and therefore contributed different kinds and amounts of waste. For instance, one home only generated cardboard, and two homes generated only wood waste. In addition, some waste was generated at homes outside of the Thomas Farms subdivision and transported to these containers for disposal by the contractors.

In four months, both the wood and the cardboard roll-off containers were pulled four times each. This represents over 4 tons of cardboard that was recycled, and 120 cubic yards of wood that was chipped into mulch to use in landscaping.

In addition, this program showed contractors the amount of money that could be saved by recycling: ***over $500!*** Had the waste been placed in regular roll-off containers, it would have cost $3,120 for disposal. By recycling, it cost only $2,600.

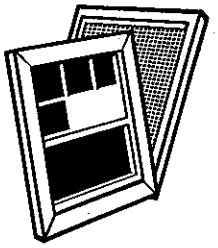
The participating contractors were more than happy to help out their environment and reduce waste by recycling; they commented that the program was wonderful and look forward to continuing recycling.

Buying "Green" Products

What Makes a Product "Green?"

There are a number of construction products that can be easily used for new home building that are considered green. According to Environmental Building News, a publication produced by Building Green, Inc., a product is considered green if it meets one of several criteria:

1. Products made with salvaged, recycled, or agricultural waste
2. Products that conserve natural resources
3. Products that avoid toxic or other emissions
4. Products that reduce environmental impacts during construction, demolition, or renovation
5. Products that save energy or water
6. Products that contribute to a safe, healthy indoor environment



Based upon the above criteria, it would seem to be logical that a builder might have interest in incorporating some green products into the design of a new home. The benefits of purchasing green materials will be discussed in the following sections.

Why Buy "Green"?

The marketplace drives the manufacture of products, recycled or not. Herein lies the key to all of recycling. Without a market for a products, there is no economic reason to collect recyclables. Many environmental reasons can be promoted for recycling (saving resources, extending landfill life, less polluting in the environment). Without economic feasibility, these reasons alone will not satisfy the business environment. That is why it is important to buy recycled to stimulate markets, provide jobs, and make more efficient use of our existing resources.

An example of "closing the loop" in the recycling process can be seen with wood recycling. Wood scraps generated from new home construction can be recycled into engineered-wood products like furniture and plastic-composite decks, as well as landscaping mulch, playground material, animal bedding, compost and landfill roads. Some processors reuse wood from broken pallets in the production of new pallets. When builders purchase these recycled-content products, the " recycling loop" is closed.

A Word on Energy Savings:

As mentioned in the list at left, products that save energy or water are considered "green." Products that can save energy fall into several distinct subcategories.

1. Building components that reduce heating and cooling loads, such as structural insulated panels (SIPs), insulated concrete forms (ICFs), and high-performance windows and glazings.

2. Equipment that saves energy, such as refrigerators and water heaters that meet Energy Star standards or higher.

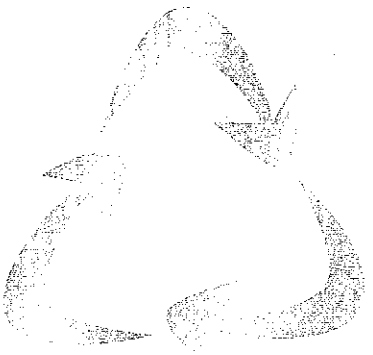
3. Renewable energy and fuel cell equipment, such as solar water heaters, photovoltaic systems and wind turbines.

For more information on energy savings, visit **www.buildinggreen.com** or **www.energystar.gov** for more details on the Energy Star program.

What to Look for When Buying "Green"

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System certifies buildings, not products. However, since the products and materials that are used in designing and construction a project can contribute to earning LEED points, third-party certification programs may offer assistance when seeking environmental building materials.

When you are looking to purchase an environmentally-responsible product, there are several different types of symbols or certifications that may indicate the product's "greenness." What may be the most widely-known symbol is the "chasing arrows", signifying recycled-content. Other examples of symbols or certifications include:



FSC Certified. The Forest Stewardship Council (FSC) promotes responsible forest management globally by certifying forest products. Visit www.fscus.org for more information.

Green Seal. Green Seal (www.greenseal.org) is an independent, non-profit organization that strives to achieve a healthier and cleaner environment by identifying and promoting products and services that cause less toxic pollution and waste, conserve resources and habitats, and minimize global warming and ozone depletion.

Low-Emitting Materials (Carpets). The Carpet and Rug Institute's Green Label Indoor Air Quality Test Program identifies low-emitting carpet systems that meet scientifically established standards. Visit www.carpet-rug.com for more information.

ENERGY STAR. Many different types of products are certified as energy-efficient through the ENERGY STAR program (www.energystar.gov).

Green-e. Certain renewable energy sources (solar, wind, geothermal, biomass or low-impact hydro sources), are defined by the Center for Resource Solutions Green-e (www.green-e.org) products certification requirements.

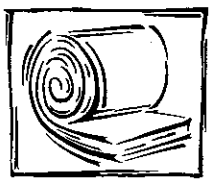
GreenGuard. The GreenGuard (www.greenguard.org) Environmental Institute is a global, non-profit organization with a scientific, third-party board to establish and test environmental standards for low-emitting indoor products and building materials.

What Types of Products Are Available?

A variety of products made from recycled materials are available to the construction industry. A supplemental Green Products Resources library is available at MMWA (989-755-2716) with detailed listings on a wide variety of products, including ASTM data where available, retail locations in Michigan, company information and brand names.

The U.S. Environmental Protection Agency produces the Comprehensive Procurement Guide (CPG) as part of their ongoing effort to promote the use of materials recovered from this waste stream. The CPG Program recommends high-performance construction products, including:

- ***Building insulation***. Recycled-content insulation is available in standard forms (rolls, loose fill, and spray foam) and contains a range of recovered materials, including glass cullet, plastics, paper fiber, and blast furnace slag. Cellulose insulation is made from recycled wood fiber, primarily newspaper. One hundred pounds of cellulose insulation may contain between 80 and 85 pounds of recycled newsprint.



- ***Carpet***. Contractors can select recycled-fiber carpet made from either polyester or nylon. Environmentally-responsible carpet may also be available with recycled-content backing. Often carpet is made from recycled PET bottles, even though it is not advertised as such. The carpet distributor can usually confirm whether it is recycled-content. It is estimated that two cases of pop bottles diverted from the waste stream will make one square yard of polyester carpet.

- ***Cement and concrete***. These materials can be made using fly ash recovered from coal-burning power plants and ground blast furnace slag recovered from iron production.

- ***Consolidated and reprocessed latex paint***. Consolidated paint, produced by mixing different types of collected post-consumer paint, is only recommended for outdoor applications. Reprocessed paint is sorted according to color, finish and type during collection and can be used either outdoors or indoors. When purchasing paint, contractors can look for paints labeled "Low VOC (volatile organic compounds) emissions" as well (see sidebar at right).

Why Buy "Green" Paint?

Anyone who has ever painted a room knows that paint has a very distinctive smell --sometimes driving occupants out of a newly-painted room for days. Some people wish to avoid these fumes, which may include petroleum derivatives, formaldehyde and heavy chemical preservatives, and have begun to seek alternatives to traditional paint.

Several different kinds of "greener" paint are available:

- *Low-VOC and Zero-VOC paints*. These paints are classified as low volatile organic compounds (VOC) because they are water-based and release lower levels of toxic emissions. Zero-VOC paints contain fewer than 0.5 grams of these toxic molecules per liter.

- *Natural paints*. Made solely from plants and minerals, these water-based natural paints do not emit odors. In fact, some even have pleasant smells such as citrus, lavender, or essential oils.

- *Milk paints*. These paints are the oldest form of paints, and were first sold commercially in the mid-1800s. They are made from milk, protein, clay, lime and earth pigments, and come in deep, rich colors.

Information on where to purchase these paints is available in Appendix C.

- ***Floor tiles***. Recycled-content floor tiles and patio blocks can contain high percentages of plastic or rubber salvaged from truck and airplane tires.

- ***Laminated paperboard and structural fiberboard***. Paperboard contains brown kraft paper and can be ideal for indoor decorative applications such as millwork and furniture components. Fiberboard is manufactured using recycled wood, cane, or paper and can be used as structural material, insulation, or acoustical tile.

Habitat for Humanity's "ReStore Saginaw"

A ReStore is a great concept -- it combines both recycling and purchasing salvaged or recycled materials with a way to generate money for Habitat for Humanity. Donations of closeout and surplus items from area home-supply stores and retailers, leftovers from remodeling projects or house demolitions, and general donations from residents of Saginaw County are accepted and then sold to the public and contractors at 50% of their value.

Typical items that may be found at ReStore Saginaw include: tools, paint wallpaper, accessories such as drawer pulls/knobs, windows, doors, fixtures, lighting units, screens, plumbing fixtures, and more.

The ReStore is unique within Saginaw County, but has proven successful in other areas of Michigan and throughout the country. Benefits of the ReStore Saginaw include:

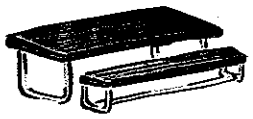
Habitat for Humanity's ReStore
2121 S. Michigan Ave.,
Saginaw
Monday through Friday
7:30 am to 3:00 pm.

- conserves resources by keeping otherwise unwanted items out of landfills;
- provides a local place to shop for recycled building and home improvement supplies;
- allows for donation opportunities to help others benefit from good quality yet unneeded materials; and
- provides funding for operational expense for Saginaw Habitat for Humanity to continue working towards its mission of eliminating poverty housing.

Donations may be brought to the store during the posted business hours. If a donation cannot be made during that time, please call the ReStore at 989-791-4598 to arrange an appointment, or for transportation of the donated materials if necessary.

The ReStore also accepts batteries, cell phones, and printer ink cartridges for recycling.

- ***Recycled plastic lumber***. Recycled-content lumber can contain as much as 100% post-consumer plastic (often milk jugs) or a blend of recycled plastic and recycled wood waste. Plastic lumber is often touted for being long lasting -- some manufacturers guarantee their products for 50 years. It does not require painting or staining; it is graffiti resistant; and it can be sawed and drilled like wood. Recycled plastic lumber is usually recommended for use in decking or fencing rather than in load-bearing areas of building construction.

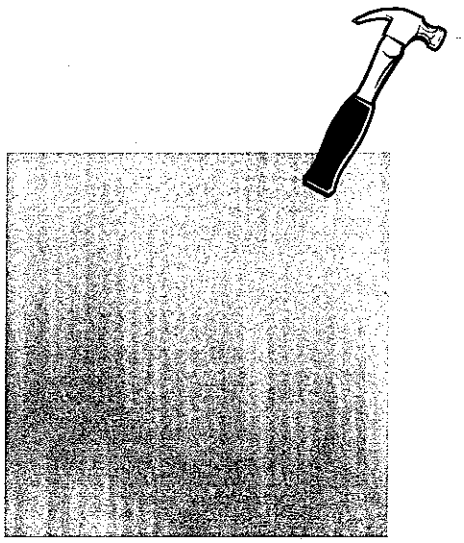


Appendix C of this document lists manufacturers or retailers of recycled-content products available in the Saginaw area. MMWA also has a comprehensive Green Product Resource listing -- call for details and to borrow. **With just a little additional effort, you can include these items in your next new home construction project!**

Will I Sacrifice Quality if I Purchase Recycled-Content Products?

No! Cellulose insulation made from newspaper is a good example of a high-quality recycled-content product. Studies have shown that cellulose-insulated buildings may use 20% to 40% less energy than buildings insulated with fiberglass, even if the R-value of the insulation in the walls and ceilings is identical.

Many area contractors are also using the fabricated wood I-beams, which are touted as stronger than typical wood beams.



What is "Green" Building?

The Home & Building Association of Greater Grand Rapids, sponsors a program where builders become "Certified Green Built" by building homes that are energy efficient, environmentally friendly, healthy and safe, and resource responsible. While no official program to certify builders is in place in the Saginaw area at present, contractors are encouraged to adopt these practices as part of their home designs.

Different aspects of home building have different "green" approaches that would qualify under the Green Built program. A few of these ideas are summarized below for local contractors to incorporate in their own building plans.

Land Use. Ideas include salvaging existing vegetation; installing permeable patios, walkways and driveways; using soil erosion control measures; and reusing existing topsoil.

Water Efficiency. Practices to improve water efficiency include installation of a water tempering valve on water heater; insulating hot water lines; choosing 0.8 gallon flush toilets; installation of a rainwater cistern; locating the water heater within 20 feet of the kitchen and laundry; and directing gutters and downspouts to a pervious area.

Roof. Contractors can select a recycled-content roof material or a 30-year or 40-year roofing material rating.

Framing / Decking. Builders can opt for engineered "I" joists in roofs and floors; reducing framing studs (such as 24-inch centers); using steel studs; installing insulated concrete forms; purchasing lumber from certified sustainable harvested sources; and using decking made from recycled materials.

Design Efficiency / Waste Management. Ideas in this category include use of recycled or reclaimed lumber; using finger-jointed studs; installing composite trim; selling or donating scrap materials; and selecting suppliers with return policies.

In addition, contractors are encouraged to select appliances with ENERGY STAR ratings since they use less energy, which translates into savings for the occupant and an improved environment. Builders can find more specific information on the Certified Green Built program at www.hbaggr.com/about_issues_green.htm.

Waste Reduction

Another important way for a contractor to "build green" is to reduce waste generated on the jobsite.

Several ways to do this include:

1. Use designs with standard sizes and building techniques (i.e., switch from 16-inch to 24-inch studs wherever possible).

2. Work with suppliers to reduce packaging waste. Ask that fixtures and other items be shipped with minimal packaging, and check if the supplier will take back their pallets.

3. Invest in a computer program that will more accurately determine the exact amount of material needed on site to reduce waste.

4. Make all wood cuts at a central location, or bring them to a central location, so smaller lengths of lumber needed for cripples and lintels are readily available. Bridging, blocking, and back-framing lumber can also come from the cut-off pile.

Appendix A: Sample Educational Sheet for Distribution to Workers

Construction Waste Recycling Program

Recycling construction waste can save both money and natural resources. XYZ Builders has decided to recycle WOOD and CARDBOARD created at its construction sites. All employees and subcontractors will be expected to follow the instruction for recycling these materials. It is very important that the appropriate items are separated out, since the goal of this program is to divert materials from the waste stream for recycling.

XYZ Builders Recycling Program Rules:

Wood and cardboard are being recycled in our recycling program. These materials need to be separated at the construction site, then transported to the designated locations to be recycled.

Two roll-off containers will be placed onsite, labeled "RECYCLE: CARDBOARD ONLY" and "RECYCLE: WOOD ONLY." Only the labeled material can be put in each roll-off container. Please follow these guidelines of what to separate into each bin to help make this project successful.

WOOD

Will Accept:

- Stumps
- Brush
- Untreated lumber
- Pallets

Will Not Accept:

- No cardboard
- No pressure treated wood
- No painted or stained wood
- No decking
- No green lumber
- No plastic

CARDBOARD

Will Accept:

- Cardboard only - must flatten
- Chipboard or cereal box type containers accepted
- Cut 2 foot x 3 foot (if possible)

Will Not Accept:

- No food stained containers such as pizza boxes
- No other items!

Everything else should be disposed of in the regular waste dumpster at your jobsite. Thank you for your cooperation with this environmentally friendly program.

Appendix B: List of Haulers and Recyclers

The following are the names, addresses and telephone numbers of businesses in the mid-Michigan area that collect and/or process C&D materials for recycling. Information provided includes the materials accepted and the type of service provided. Handlers and processors are categorized by the type of material accepted.

Haulers

Billy's Contracting
Saginaw, MI
989-753-7719
Accepts: Clean asphalt, concrete, wood, brush, metal

Disposal Management
888-872-7485
www.rubbishonline.com

Waste Management, Inc.
1311 N. Niagara, Saginaw, MI 48602
989-752-3999

Recyclers

Antique Brick Company
Utica, MI
800-345-0128
Accepts: Old brick from deconstruction projects -- call ahead.

Champagne and Marx Excavating, Inc.
1445 Liberty Rd., Saginaw, MI
989-755-8971 or 989-755-0371
Accepts: Broken asphalt, concrete and brick.

Disposal Management
888-872-7485
www.rubbishonline.com
Accepts: Corrugated cardboard and concrete.

Habitat for Humanity
Saginaw, MI
989-753-5200
Accepts: Neutral color latex paint, gently used or surplus building supply.

Putt, Inc.
2610 Salzburg Rd, Freeland, MI 48623
989-496-2335
info@puttinc.com
Accepts: Clean wood, pallets, untreated lumber, brush, stumps.

RRS/FCR of Saginaw
911 Veterans Memorial Pkwy, Saginaw, MI 48601
989-754-7402
Accepts: Corrugated cardboard. This is a multi-material recycling plant -- call for specifics.

Saginaw Rock Products Company
1701 N. First St., Saginaw, MI
989-754-5861
Accepts: Clean concrete only.

Waste Management Recycle America Alliance
1957 Findley, Saginaw, MI 48601
989-754-6511
Accepts: Corrugated cardboard, plastics, metals. This is a multi-material recycling plant -- call for specifics.

Appendix C: Where to Buy "Green" Building Materials

Following is a list of locations where recycled-content and other green products can be purchased. However, since retailers frequently add new items to their product lines, you should also be sure to ask your local retailers if they stock any specific materials, such as carpet made from recycled plastic or low-VOC paint.

Flooring

Bridgeport Flooring Covering
5183 Dixie Highway
Bridgeport, MI
989-777-5666
Carries recycled-content carpet padding. Ask about recycled-fiber carpet as well.

Insulation

Applegate Insulation
Webberville, MI
800-627-7536
www.applegateinsulation.com
Thermal insulation from recycled paper. Call directly for purchasing information. ENERGY STAR certified.

Nu-wool
Jenison, MI
800-748-0128
www.nuwool.com
Thermal insulation from recycled paper. Call directly for purchasing information.

Integrated Insulation

Insulspan
PO Box 39
9012 East US 223
Blissfield, MI 49228
517-486-4844 phone 517-486-2056 fax
www.insulspan.com or insulspan@insulspan.com
Manufactures high quality, foam core panels suitable for residential and commercial building applications. The solid, one piece structural components can be used in walls, floors and roofs. ENERGY STAR certified.

Tri-City Thermo-form, Inc.
191 Hendrie
Bay City, MI 48706
517-686-9714
Provides insulated concrete forms (I.C.F. Systems) above and below grade for both commercial and residential buildings. ENERGY STAR certified.

Lumber

Plasteak
Akron, OH
1800-320-1841
www.plasteak.com
Recycled lumber, decking and ecoboard-- 80% to 100% recycled content. Call directly for purchasing information.

Stock Building Supply
802 Ashman St.
Midland, MI 48640
989-631-4290
Local distributor for Trex Lumber (95% recycled wood and plastic)

Wolohan Lumber
3400 Bay Rd.
Saginaw, MI 48603
989-793-3191
Local distributor for Trex Lumber (95% recycled wood and plastic)

Appendix C: Where to Buy "Green" Building Materials (cont.)

Paint

Low-VOC and Zero-VOC paints:

Benjamin Moore (Pristine Eco Spec)
800-344-0400
www.benjaminmoore.com

Eco-Wise (ChemSafe)
210-657-5321
www.ecowise.com

The Glidden Company (ProMaster)
800-834-6077
www.icipaintstores.com

ICI DuLux Paints (Lifemaster 2000)
800-984-5444
www.iciduluxpaints.com

Pittsburgh Paints (Pure Performance)
888-774-7732
www.pittsburghpaints.com

Sherwin-Williams (Harmony)
800-321-8194
www.sherwinwilliams.com

Natural paints made from plants and minerals:

EcoDesign (BioShield)
800-621-2591
www.bioshieldpaint.com

Environmental Building Supplies (Aglaia)
503-222-3881
www.ecohaus.com

Natural Home (Auro)
707-824-0914
www.naturalhomeproducts.com

Non-toxic, natural milk paints:

Antique Drapery Rod Co. Inc. (Healthy Milk Paint)
214-653-1733
www.antiquedraperyrod.com

Sawyer Finn (Natural Milk Paint)
816-421-3321
www.sawyerfinn.com

Old Fashioned Milk Paint Co.
978-448-6336
www.milkpaint.com

Roofing Materials

IKO
538 Cosmopolitan
Marshall, MI
1-800-IKO-ROOF
www.iko.com
70% recycled material in the organic and glass fiber asphalt shingles.

Appendix D: "Green" Building and Construction Site Recycling Resources

Please note that in addition to the following listing of resources, MMWA will have a collection of books and other resources available at their office. Please call 989-755-2716 for more information.

Websites

Building Green.Com <www.buildinggreen.com>

Environmental Design and Construction <www.EDCmag.com>

Energy & Green Building Resource Center (Program of Recycle Ann Arbor) <www.environmentalhouse.org>

Green Building Source <www.oikos.com>

King County Solid Waste Division <http://dnr.metrokc.gov/swd/bizprog/sus_build/susbuild.htm>

Michigan Department of Environmental Quality <www.michigan.gov/deq>

Portland Metro Recycling <www.metro-region.org>

Toolbase <www.toolbase.org>

Urban Options (solar educational home based in East Michigan) <www.urbanoptions.org>

US Department of Energy <http://www.sustainable.doe.gov/buildings/affhousing.shtml#Overview>

US Environmental Protection Agency <www.epa.gov>

US Green Building Council <www.usgbc.org>

Books and Publications

U.S. EPA, 2000 Buy-Recycled Series: Construction Products. EPA530-F-00-009, April 2000.

Triangle J Council of Governments, Construction and Demolition Debris Reduction and Recycling: A Regional Approach, June 1993.

Triangle J Council of Governments, WasteSpec, July 1995.

Building Green, Inc., GreenSpec Directory: Product Directory with Guideline Specifications, Third Ed., October 2002.

Organizations

Construction Materials Recycling Association (CMRA)
P.O. Box 644
Lisle, IL 60532
630-548-4510 <www.cdrecycling.org>

National Association of Homebuilders Research Center
400 Prince George's Boulevard
Upper Marlboro, MD 20774
301-249-4000 <www.nahbrc.com>

References

The following is a list of references that have been used to created this guide and can be consulted if you have further questions about construction site recycling or green building.

Cellulose Insulation Manufacturers Association, *Here's Why Cellulose Insulation is Best for Your Home.*

GreenSeal, *Choose Green Report: Carpet.* December 2001.

Home & Building Association of Greater Grand Rapids, *Certified Green Built.*

Hucal, Clark Michelle, *Environmental Certainty,* EnvironmentalDesign+Construction, July/August 2003.

Illinois Department of Commerce and Community Affairs, *Illinois Construction and Demolition Site Recycling Guidebook,* 1997.

National Association of Homebuilders Research Center, *Residential Construction Waste Management: A Builder's Field Guide.*

Paper, Heather J., *Safe Haven: Color Your Home with Eco-friendly Products.* www.vegetariantimes.com, May 2003.

Solid Waste Management Coordinating Board, *Environmentally Preferable Purchasing Guide.* November 2002.

U.S. EPA, *Building Savings: Strategies for Waste Reduction of Construction and Demolition Debris from Buildings.* EPA-530-F-00-001. June 2000.

U.S. EPA, *Waste Wise Update: Building for the Future.* EPA-530-N-02-003. February 2002.

WasteCap Wisconsin, *Construction and Demolition Debris Briefing Paper: Reducing, Reusing, and Recycling.*