



Contractors bidding for any type of construction, demolition, or renovation project can get a jump on competitors by getting into a “materials management” mindset. Knowing how to reduce waste at the jobsite, reuse materials on-site and off-site via outlets for other contractors, and recycle unavoidable materials can result in reduced disposal fees and lower purchasing costs. Having a materials management plan can enhance a contractor’s employability and reputation with customers. Today’s economy drives this type of quality and innovation from businesses. Following is guidance for achieving waste reduction, reuse and recycling in the construction, demolition, and remodeling fields. These recommendations are based on actual experimentation, experience, and success. They are simple and achievable. We encourage you to consider them for your next project.

RECOMMENDED STEPS

ATTEND PRE-BID MEETING AND PREPARATION

Participate in the pre-bid meeting to learn all aspects of the job, including material management details, such as design specifications, required waste diversion goals, materials to be used and generated at the jobsite, site space constraints, etc. In preparing the bid, anticipate materials that could be worth salvaging and used in a renovation or demolition job.

For new construction, consider any architectural or design requirements that could impact waste generation (such as non-standard specifications or use of unusual materials that may not be recyclable). Also consider using advanced framing techniques that result in less wood use. In addition, connect with waste haulers, reuse and recycling businesses and organizations, local solid waste personnel, and the regional green building association to determine opportunities and requirements for local, state, and regional reuse and recycling.

DEVELOP THE BID

Review bid and contract documents. When developing your bid response, consider including a waste management plan (detailed below). For optimum management of waste materials, adopt a materials management hierarchy in the plan—reduce, reuse, and recycle. If a waste management goal has not been specified by the contracting party, include an estimated diversion goal. A minimum diversion goal of 50% is commonly achieved by reusing and recycling all clean wood, metal, cardboard, concrete, stone, and brick. Higher diversion rates can be achieved by also diverting wallboard, roofing shingles, and other jobsite materials (as available markets allow).

Preventing waste helps reduce both disposal and purchasing costs. This can be achieved in all phases of a construction project; starting with the design (e.g., architectural designs that utilize

advanced framing techniques and specify standardized sizes for building materials.). Consider on-site reuse opportunities, such as reuse of wood cuts, leftover insulation, and rock and concrete. For demolition and renovation projects, make recommendations on soft stripping opportunities (a form of deconstruction). Salvaging and deconstruction takes more labor and time, but can often be justified by material sales (such as high value old timber and architectural salvage) and there may be tax benefits by donating materials to charitable organizations.¹

MATERIALS MANAGEMENT PLAN CONTENTS

Prior to the start of the project, engage the property owner (manager or developer), architect, and essential crew members and subcontractors in developing a materials management plan. The plan should include the following details on waste prevention, reuse, and recycling:

- Clearly defined waste prevention strategies to be implemented.
- Clearly defined waste minimization and recycling goals.
- Identification of materials to be reused and recycled—on or off-site.
- Identification of hazardous materials that will be on the jobsite, appropriate disposal methods and protocols, and system for tracking materials.
- Plan and process for materials collection, storage, and hauling.
- Anticipated quantity (weight or cubic yards) of each reusable, salvageable, and/or recyclable materials.
- Itemization of estimated costs and savings as a result of the proposed plan.
- Methods for tracking weight or volume, destination, and end-uses of all reused and recycled materials.
- Education on reuse and recycling for everyone working at the jobsite.
- Details on the signage to be used at the jobsite.

PRE-WORK MEETING AND PREPARATION

Prior to beginning work at the site, hold a mandatory meeting with all crew, subcontractors, architect, engineers, and the owner (developer), to review: the materials management plan; the materials reduction, reuse, and recycling procedures and schedule, and responsibilities. Discuss the expectations and requirements for everyone on-site and the coordination between the contractor, sub-contractors, architect, engineers, project manager, and owner. Discuss and resolve any preliminary issues or concerns with the plan and describe how problems will be resolved during implementation.

Make any necessary revisions to the materials management plan as discussed at the pre-work meeting. Review with the owner or property manager, as necessary. Distribute final copies of the plan to the job site foreman and all subcontractors. Include a general overview of the plan at crew and subcontractor orientations, as well as stage specific instruction on required separation and handling of reusable and recyclable materials. Keep materials management as an agenda item for all future jobsite meetings.

Ensure that reuse and recycling procedures adhere to worker safety requirements and environmental compliance measures, including erosion and storm water control. Incorporate appropriate measures to contain lead-based paint and dust, asbestos-based products, and any other hazardous materials.

¹ Building Materials Reuse Association www.bmra.org



IDENTIFY RECYCLING METHOD AND HAULER(S)

Factors that will determine the most cost-effective and practical recycling for the job include existing markets, processing facilities in the area, hauling opportunities, the type and scale of the job, and storage availability. Contact area haulers and C&D processing facilities to determine the most cost-effective recycling opportunities to meet the needs of the particular jobsite. Local solid waste personnel and state or regional green building organizations may also be able to offer insight.

When seeking a hauler it is important that they can help you meet your waste management goals, meet your budgetary expectations, and provide documentation on the individual materials, weights/volumes diverted, and end-markets for each. There are many different scenarios for how this can work. Some haulers can take waste and recyclables. Other haulers can take only waste or only recyclables. It is important that you research the details of haulers' services and capabilities and engage one that will be able to serve your specific needs.

DEFINITIONS

Following are some definitions that can help when deciding on the hauling and recycling services:

- **Commingled C&D Recycling and Trash Hauling:** All recyclable materials and trash are collected in the same dumpster. The dumpster is then brought to a C&D sorting facility where the recyclables are picked out.
- **Commingled Recycling:** All recyclable materials are placed in a single container and transported to a processing facility for sorting and recycling. Non-recyclable waste is typically kept in a separate container.
- **Source Separated Recycling:** Materials are collected in separate containers as they are generated. A recycling hauler (or multiple haulers) transports materials to a recycling facility.
- **Time-Based Separation:** Separated materials are collected during each phase of construction or deconstruction. Typically one primary type of material is recovered at a time, such as wood from framing. The material is separated by the on-site generator, stored, and typically removed prior to the next phase of construction. This method is particularly helpful if space is an issue.
- **Self-Haul:** Designate an area or "recycling station" for each separated material and assign someone to transport materials to a recycling facility.

WORK WITH VENDORS ON WASTE PREVENTION

Copyright © July 2011 by Northeast Recycling Council, Inc. www.nerc.org

3

Permission to copy is granted, provided that the copies are not made or distributed for resale and that the copyright notice and this notice are retained. NERC is an equal opportunity provider and employer.

- Notify vendors of the need for reduced packaging.
- Request delivery of materials to the jobsite without packaging (already unwrapped or unstrapped).
- Request vendors to backhaul packaging (e.g. pallets, plastic film or wrap, and banding).
- Require all unavoidable packaging used for delivered materials to be made of recyclable materials (e.g., cardboard instead of polystyrene, steel banding instead of plastic wrap or plastic banding.)
- Request “just-in-time” delivery to reduce the potential for damage to items stored on-site.
- Select vendors that offer pre-cut sizes or pre-fabricated or pre-assembled products.
- Select vendors that will take back excess products.

ON-SITE WASTE PREVENTION

Being familiar with the waste generated on the jobsite will offer the opportunity to track how efficiently and conscientiously your crew and subcontractors use materials.

Following are some on-site waste prevention strategies:

- Limit overage by using exact measurements when ordering materials.
- Implement strict guidelines for waste prevention on the job.
- Require all subcontractors to measure and cut materials accurately. (“Measure twice, cut once”).
- If you find that certain workers are creating excessive waste, consider charging them for the cost of the materials as well as the related disposal costs.

ON-SITE MATERIAL REUSE

- Leftover fiberglass and rigid insulation can be used in attic and basement spaces.
- Rigid insulation scraps can be placed under concrete flooring.
- Save and store leftover flooring sheet materials and carpet scraps for the homeowner or building manager, if all parties are agreeable.
- Consider on-site grinding of downed trees for use as mulch and fill, if allowed by local and state regulations.
- Use excess brick and concrete material as inert fill under walkways or driveways, if allowed by local and state regulations.
- Stockpile soils on-site to conserve the natural environment and save disposal costs, if allowed by local and state regulations.

OFF-SITE MATERIAL REUSE

If not returnable, slightly damaged finished products such as cabinets and doors can be donated to certain nonprofit organizations, such as a Habitat Restore or other C&D Materials Exchanges. By doing so, a tax-exempt charitable donation benefit may be available. Be sure to have identified the potential recipient and assure their interest in the materials as part of the project planning phase.

For renovation and demolition (“deconstruction”) projects, coordinate the recovery of reusable and salvageable items with the planned renovation and demolition schedule. It is important to determine who controls the debris from the site. Does it belong to the owner, contractor, deconstruction or reuse person hired, or is it being donated? Potential reusable building materials include appliances, bathroom fixtures, bricks, cabinets, carpeting, dimensional lumber, doors, ductwork, flooring, insulation, light fixtures, marble, metal framing, paneling, pipes, plywood, shelving, stairs, tile, trim, windows, and wood beams. Integrate deconstruction plans with the building engineering survey and worker safety plan. Include an assessment of the building condition and all potential hazards, including asbestos or lead, in the structure as part of the safety plan.



Contact reuse businesses (reused building supply centers) and organizations (such as Habitat for Humanity) that will accept the recovered materials. Other options include take back by the site owner, developer, or on-site auctions. Consider listing items on Materials Exchanges, eBay, or Craigslist. Develop storage plans to prevent damage and pilfering of salvaged items; describe transportation logistics for getting materials to reuse businesses if they do not provide pick-up.

ON-SITE WASTE MANAGEMENT IMPLEMENTATION PLAN

- Designate an on-site materials manager, preferably one who is dedicated to reuse and recycling. The manager will be responsible for monitoring the reuse and recycling program, tracking the materials brought on-site and taken out, ensuring that crew and subcontractors participate in the program, working with haulers to make sure that they are providing adequate services, and keeping everyone informed about the program.
- Develop a site plan/map, especially for larger jobs. The mapping should clearly specify how the jobsite will flow (e.g., placement of dumpsters, area for deliveries, etc.).
- If space is limited, plan deliveries according to the installation schedule. Designate a receiving area for storing delivered items. Make the delivery area convenient to the work site. Reduce handling and minimize potential damage by ensuring that materials are protected.
- Place mis-delivered and substandard items aside in a protected area for return to suppliers for credit.
- Discuss container or storage options with the hauler(s). Think “out of the box”—often haulers will recommend standard 30 cubic yard collection containers, particularly for waste. Such practices foster continued wastefulness and add unnecessary costs. Recycling compliance can also be harder to monitor. Smaller containers or fenced-off covered areas may suffice. Consider working with a hauler who can manually or mechanically pick up materials from the fenced area. In areas with high disposal fees and good markets for construction materials, these types of cleanup services can prove to be cost-effective.
- Use large, simple signage to designate the appropriate materials for each container or station. Use of graphics on the signs and multiple languages, as appropriate. Clearly list acceptable and non-acceptable materials.
- Make bins or storage areas convenient and easily accessible.
- Provide clearly marked areas for reuse, and train staff to use reusable wood and other materials before cutting new material. Where appropriate, establish a designated area for the materials generated by each trade, such as a wood pile for framers.
- Protect reusable materials from the elements and secure all materials from pilfering and contamination.

DOCUMENT AND MONITOR THE PROCESS

- Check the recycling containers or stations daily to ensure materials are being recycled and separated properly. Watch for contamination and look for the source of any inappropriate materials.
- Call haulers for collection shortly before dumpsters are full.
- Require haulers to provide weights (or volumes) and documentation of recycling for all materials removed from the site, as well as records of trash generation and disposal. Also keep records of any on-site or off-site waste prevention and reuse; estimating weight or volume diversion.
- Maintain accurate records of all weights and costs, including labor, container rental, hauling charges (recycling and garbage), and tipping or processing fees (and landfill disposal).
- Require haulers to specify container rental charges, hauling charges, and tipping fees. If self hauling, maintain internal records of labor, fuel, etc. Any tax benefits from donation of materials or resale values should also be included in the cost-benefit analysis.
- Calculate cost savings from recycling versus disposal.
- Provide progress updates on waste diversion goals to all on the jobsite, so they know their efforts have been recognized and are contributing to the project goal.

ADDRESSING OTHER ISSUES

- Hold subcontractors accountable by requiring them to purchase their own supplies. This encourages wise purchasing and will reduce waste. See “Subcontractor Guidelines” below.
- Safety concerns may prevent or limit deconstruction opportunities. Be aware of asbestos, mercury, or lead-containing materials and any structural issues.
- The general contractor is responsible for waste at jobsites. Monitoring waste generation can help protect your company from potential liability resulting from unauthorized or illegal disposal of wastes, particularly potentially hazardous wastes.
- Some of the common hazardous wastes found on job sites are thermostats, smoke detectors, fluorescent light bulbs, and propane tanks. Contact the state environmental agency for more information on what items are considered hazardous wastes and how to manage them.

ADVERTISE YOUR MATERIAL MANAGEMENT EFFORTS

Market your company by boasting about its environmental achievements. Measuring the environmental benefits of the jobsite reuse and recycling efforts is possible by plugging the material tonnages into the US Environmental Protection Agency’s [WARM Tool](#). This information can be used in any marketing materials developed to promote the project.

SUBCONTRACTOR GUIDELINES

REQUIRE "SUPPLY AND INSTALL" SUBCONTRACTS – To encourage subcontractors to conserve materials, require them to be responsible for ordering and purchasing their own materials. This will encourage the most efficient use of materials and reduce waste.

ENGAGE INVOLVEMENT IN MATERIALS MANAGEMENT PLAN DEVELOPMENT - Take the opportunity to involve all crew and subcontractors in the development and implementation of the materials management plan. Explain the goals for the project and ask for input on ways to make the implementation of the plan work efficiently. Allow time for subcontractors to integrate reuse and recycling into their work plans and schedule.



INCLUDE WASTE MANAGEMENT EDUCATION AND REMINDERS IN PRE-CONSTRUCTION AND REGULAR JOBSITE MEETINGS - Communicate the source reduction, reuse, and recycling goals; and methods for implementing waste minimization and diversion program, storage, and other requirements to all subcontractors and crew at the pre-construction meetings. Clearly outline all expectations of each subcontractor. Include ongoing education and program updates at regularly scheduled meetings; include training for new subcontractors as they come on the jobsite. When possible, provide training to all supervisors and laborers. Provide incentives, such as free lunch, as rewards for attendance at trainings. Be sure that all subcontractor supervisors know who to contact if there is a problem.

IDENTIFY MATERIALS HANDLING REQUIREMENTS – Require subcontractors to fully participate in the implementation of the materials management plan. Include requirements in all bid documents and contracts; particularly for large jobs and with unfamiliar subcontractors. Alternatively, require subcontractors to be responsible for their own waste disposal. Some subcontractors, such as plumbers, electricians, HVAC contractors, and roofers, may already recycle materials that have high value (such as metals). Ask for estimated tonnages of these materials to include in the project records.

SAMPLE SPECIFICATION FOR SUBCONTRACTOR AGREEMENTS - "The subcontractor will make a good-faith effort to reduce the amount of waste generated on the jobsite and reuse and recycle material as per the contractor's materials management plan. The subcontractor will follow the designated handling procedures for each type of material generated on-site and provide documentation to verify material reuse, recycling, and disposal as indicated in the material management plan."²

² Adapted from the King County Washington, Green Tools
<http://your.kingcounty.gov/solidwaste/greenbuilding/specifications-plans.asp>