



BUILDING MATERIALS MANAGEMENT AND WASTE MINIMIZATION PROGRAM

This is a Best Management Practices (BMP) program guide designed to assist construction and demolition (C&D) professionals working in the Dubuque Metropolitan Area Solid Waste Agency planning area of Dubuque and Delaware counties. The BMP guide offers building industry professionals, such as architects, contractors, renovators, and owners, guidelines, procedures, and worksheets for establishing reuse and recycling programs at project sites. Local case studies have been conducted on construction, demolition, deconstruction and renovation (CDDR) projects in Dubuque. Case study results have shown that C&D projects, where BMP's were used, experienced reduced project costs and fewer materials landfilled.

The Green Vision Building Materials Management and Waste Minimization Program is a high priority of the Dubuque Metropolitan Area Solid Waste Agency. The Iowa Department of Natural Resources (IDNR) has designated C&D waste as a targeted material for diverting from Iowa landfills. Building and demolition professionals can play an important role in assisting the Agency and IDNR in meeting their goals of diverting reusable and recyclable materials from landfilling.



TABLE OF CONTENTS

Cover Page	Page 1
Table of Contents	Page 2
Introduction	Page 3
The Four R's of Green Vision Buildings – Materials Management & Waste Minimization Program	Page 4
Rethink	Page 5
Reduce	Page 7
Reuse	Page 8
Recycle	Page 9
Enlisting Support	Page 10
Material Management Plan and Reporting Form	Page 11
Sample Materials Management Plan and Reporting Form	Page 12
Estimated Volumes to Weight Conversions Reference	Page 13
Additional Sources of Information	Page 14
Glossary of Terms	Page 15
Enviro-Stars Honor Roll	Page 16
Directory of CDDR Markets	Page 19



The Four R's

Rethinking, reducing, reusing and recycling – the “Four R’s” – focus on resource efficiency. Typically, these practices can save money and control costs by:

- Decreasing the amount of new materials needed for building; and,
- Reducing waste disposal costs.

Consider each of the “Four R’s”. For example, if you reduce C&D waste, you’ll pay less in landfill disposal fees. Buying and using recycled materials provide a market for those materials, while making your project more resource-efficient.

Equally important, you’ll be helping reduce the amount of materials being buried at the Dubuque Metropolitan Area Solid Waste Agency (DMASWA) Landfill. Your efforts should also prove to be of value to the owner of your project.

For C&D materials management to be most effective, one must be committed to good planning, coordination of effort, and always looking for ways to rethink, reduce, reuse and recycle. Thank you for joining with the DMASWA in this important effort!



Rethink! - CONSTRUCTION

Creating and implementing a successful materials management strategy starts with making a commitment. First, decide that effective materials management is a priority, and then follow through. Critical to making your commitment a reality is developing a written plan before construction begins:

Start early

You need enough time to develop your overall materials management plan. The earlier you begin planning, and the more detailed your plan, the more effective it can be.

Make a goals statement

Specific values and comments you want to incorporate in your plan should be written down and shared with everyone who will “touch” the project.

For example, a sample goal statement may read, “Whenever and wherever possible, the construction of the XYZ project will:

- Emphasize salvage and reuse.
- Maximize recycling and recovery.
- Use recycled-content building materials.
- Incorporate an efficient recycling system for the building’s occupant.
- Dispose of hazardous waste properly.
- Conserve energy.

Assess the potential waste

This Assessment can be completed in one of two ways. Most simply, compare the material orders to design specs to gauge the potential components of the waste stream. Or, for a more comprehensive assessment, contact Dubuque Metropolitan Area Solid Waste Agency at 563-589-4250 to request a waste sort at an existing construction site. The assessment will enable you to identify C&D discard and scrap materials that will be generated in large volumes. Knowing these numbers will help you more accurately estimate costs and/or savings when completing the materials management plan.

Incorporate recycled or recycled-content building materials into the plan

Using recycled-content building materials reduces the amount of virgin material needed – less lumber, drywall, concrete, brick, and steel. Also, it closes the recycling loop. Using recycled items helps create a market for more recycled products; it's a linked process.

Design the building for occupant recycling

Now is the time to consider recycling opportunities for the building's future occupants. Incorporating design concepts that make recycling more convenient than disposal will best serve the occupants. For example, consider the convenience of consolidation points, collection areas and storage spaces for separation of recyclables. Also consider the types of discards/trash the occupants will generate and which of these materials are recyclable. Will office paper be the major component of this stream? Will food scraps and packaging also be factors?

Rethink! - DEMOLITION

Before the demolition process begins, several steps may be taken to manage and reduce the materials landfilled.

One very significant way to reduce debris during demolition is to rethink the whole project: perhaps it makes more sense to renovate an existing building than demolish it and construct a new one. This, of course, would not only reduce the landfill tonnage and disposal fees, it would also reduce the amount of new materials needed for construction. If an existing structure is physically sound, or can be made so, there are often some very compelling reasons for saving it from the wrecking ball.

If the plan *does* call for demolition . . .

Conduct a waste audit

This is an inventory of the materials that will be generated at the demolition site. The type and volume of materials generated will depend on the type and size of the structure being demolished. For example, a manufacturing plant would likely produce more recyclable materials than a house, which will typically generate a great deal of mixed material that could end up in the landfill.

Chart a timeline

This is a schedule showing the stages of the demolition process. At various stages, specific types of materials may be salvaged from the building for reuse or recycling. For instance, one of the very earliest stages would be when all of the finish items – doors, cabinets, carpet, sinks, bath fixtures, and so on are removed from the building and sold or warehoused for later use.



Reduce!

Reduction means fewer materials are produced at the building site – less in terms of the component building products and the packaging that’s used to protect them until they’re needed. There’s:

- Less to pay for initially; and,
- Less to haul away when the project is completed.

Reduction examples:

Use standard-size materials in the design of your project

By using standard sizes, there will be less wasted lumber, drywall and other materials – and less cutting required, which reduces labor costs and speeds construction. Floor plans should be developed to optimize the amount of subflooring and sheathing required. Thoughtful placement of framing studs can reduce the number of corner studs needed and the amount of lumber used in door and window openings. The floor plan should take maximum advantage of purchased materials and eliminate redundant items.

Optimize use of purchased materials

Consider pre-cut studs and joints. Use end pieces and other “leftover” materials wherever possible. Also, to keep mistakes to a minimum . . . measure twice, cut once!

Improve materials storage procedures

The objective is to reduce the amount of material that becomes “spoiled” – either from exposure to the elements or damage by construction equipment.

Reduce the amount of packaging left at the site by suppliers

On purchase orders, request that suppliers deliver goods with a minimum of packaging, or that they take back the packaging material. Purchase materials such as fasteners, paints, caulking, and drywall mud in bulk containers.

Buy more durable materials . . .

. . . Such as kiln-dried wood, to reduce the amount of material lost due to warpage or shrinkage.



Reuse!

Many items from homes or commercial buildings can be reused. Tubs, sinks, doors, windows, cabinets, and other usable items should be removed before demolition or renovation and taken to salvage companies.

Also, a number of nonprofit groups in eastern Iowa will accept these materials and use them to repair homes for low-income families. Some salvage companies and nonprofit organizations will even come to your job site to pick up materials they can use. **Refer to the DMASWA C&D “Directory” for information.**

If there are antiques, tin ceilings, ornate woodwork, or anything else of value in the structure being demolished, contact area antique shops and restoration businesses to see if they’re interested in salvaging these items.

Another idea is to . . .

Hold a “Salvage Sale” . . .

. . . Where all salvageable material is offered for sale to remodelers or renovators.

Wherever practical, consider utilizing “used” material for a project rather than new.

Used fixtures and decorative items often add “personality” to a project. Obtaining materials and supplies from salvage yards or second-hand stores usually saves money, while helping to create markets for these materials.

Think of creative ways to reuse construction leftovers

For example, plastic sheets can be used to cover material and protect it from the weather. Or use them in place of garbage bags to hold trash. Drywall pails are excellent for keeping items together, such as tools or loose material – fasteners, for instance – that might otherwise be lost or scattered.



Recycle!

Often, waste materials that are landfilled can be recycled. Typically, recycling companies will only accept items that are kept separated and “clean”.

Recycling containers or specially marked areas designated for materials should be at the construction site to separate and store the materials before they go to a recycler.

Common construction materials that can be recycled are metal, wood, cardboard, asphalt, and concrete. Containers for each type of material should be clearly marked. You may want to lock some of the containers at night to prevent theft and keep unwanted materials out of the bin.

Some companies, such as scrap metal dealers and cardboard recyclers, may even pay for the materials.

Others charge to accept or pick up recyclables. Even if a fee is charged, it is often less than the cost of landfill disposal.

In addition to the items salvaged for reuse, a building scheduled for demolition may hold a “treasure” of recyclable materials.

Metal, wood, concrete, asphalt, brick and rubble can all be removed and recycled, depending on their condition. Recyclers want clean material with little contamination. Therefore, you may need to separate materials according to the recyclers’ specifications. Depending on what’s being recycled, a fee may be charged for acceptance of the material, or you may be paid for it.



Enlisting Support

We have suggested a number of strategies for minimizing construction and demolition materials. For these strategies to work, everyone involved in a project must be informed and committed to their success.

Some workers on the job site may find it difficult to change old habits, or may not be fully motivated to cooperate. So it's important to teach them why rethinking, reducing, reusing and recycling benefits everyone. They need to know why materials to be salvaged must be kept clean and separated . . . why they should work to optimize the use of materials . . . and why they have a stake in reducing waste.

Frequent reminders – both verbal and visual – also are important. Large signs designating recycling areas work well. You may also consider providing incentives or participation awards – such as caps or T-shirts – to reinforce the importance of following the waste minimization plan.

Most important is communication. Make sure foremen and supervisors understand the waste minimization plan before the job starts. Let all subcontractors and their employees know what the plan is – and the reasons behind it. And make sure they understand that you demand the plan be followed.

Help them to realize that when you succeed, they succeed . . . in fact, *everyone* does!



Estimated Volume-To-Weight Conversions

Asphalt (milled, ripped)	1,380 lbs/ yd³	1.4 yd³/ton
Cardboard	100 lbs/ yd³	20.0 yd³/ton
Concrete (block & brick)	4,000 lbs/ yd³	0.5 yd³/ton
Drywall	500 lbs/ yd³	4.0 yd³/ton
Land-clearing debris (loose brush)	250 lbs/ yd³	8.0 yd³/ton
Lumber (loose dimensional)	244 lbs/ yd³	8.2 yd³/ton
Metals (ferrous/nonferrous)	590 lbs/ yd³	3.4 yd³/ton
Mixed waste (general refuse)	350 lbs/ yd³	6.0 yd³/ton

Volume-to-weight conversions are helpful for estimating the weight of discarded materials in a disposal or recycling container. It should be noted, however, that the actual conversions for C&D debris are highly variable. They depend on the specific type of material in each category, material size, loading method and amount of precipitation received at the site where the materials are being stored. The conversions shown above should only be used as rough estimates for calculating recycling savings. Monitoring the actual weights of the materials disposed of and recycled from your projects will allow you to develop more accurate conversion factors. These conversions will be modified with experience by Dubuque Metropolitan Area Solid Waste Agency.

ADDITIONAL SOURCES OF INFORMATION

WEBSITE INFORMATION

<http://www.metrokc.gov/dnrp/swd/construction-recycling/documents/CDLguide.pdf>

Construction Recycling Directory King County/ Seattle

<http://www.nahbrc.org/>

National Association of Home Builders

<http://www.deconstructioninstitute.com/>

Deconstruction Institute

<http://www.kchba.org/buildgreenkc/index.shtml>

Home Builders Association of Greater Kansas City

<http://www.cdrecycling.org/>

Construction Materials Recycling Association (CMRA)

<http://www.ubma.org/>

Building Materials Reuse Association

<http://www.redo.org/>

Reuse Development Organization, Inc. (ReDO)

<http://www.greenguide.com/>

Green Building Resource Guide

http://www.recycleworks.org/con_dem/index.html

San Mateo County RecycleWorks

<http://www.recyclecddebris.com/rCDd/>

Houston-Galveston Area Council (H-GAC).

<http://www.peakstoprairies.org/p2bande/construction/C&DWaste/infolinks.cfm>

EPA Region 8 – Montana Extension

<http://www.restorationwarehouse.net/>

Restoration Warehouse

<http://www.ilsr.org/recycling/decon/deconatwork.html>

Institute for Local Self-Reliance

http://www.smartgrowth.org/library/constwastemgmt_hndbk.html

Construction Waste Management Handbook for *Homestead Habitat for Humanity*

http://www.afandpa.org/Content/NavigationMenu/Wood_Products/Green_Building/Green_Building.htm

American Forest & Paper Association (AF&PA)

http://www.cwc.org/wood_bp.htm

Clean Washington Center

<http://www.shinglerecycling.org/>

Construction Materials Recycling Association (CMRA)

<http://www.huduser.org/publications/pdf/decon.pdf>

U.S. Department of Housing and Urban Development

<http://www.buildingreuse.org/>

Building Materials Reuse Association

<http://www.demolitionassociation.com/>

National Demolition Association

<http://www.nwpc.com/>

National Wooden Pallet and Container Association

<http://www.greenbuilder.com/sourcebook/constructionwaste.html>

PRINTED INFORMATION

Training Handbook Associated with Demolition Management Workshops by the Iowa Department of Natural Resources, 2003. A copy is available for check out at the Solid Waste Agency Administrator's office located at 925 Kerper Court, Dubuque, Iowa 563-589-4354 or cgoddard@cityofdubuque.org.

Glossary

Construction and Demolition Debris: scrap building materials including wood, metals, drywall, cardboard, concrete and asphalt that result from construction or demolition of structures. Also includes land-clearing debris.

Drywall: includes gypsum wall board and sheet rock. Drywall does not include lath and plaster.

Mixed Debris: several types of materials combined in one container.

Processing: the reduction, separation, recovery, conversion, or recycling of C & D debris.

Recycling: process of sorting, cleaning, treating, and reconstituting solid waste or other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying solid waste.

Resource Efficiency: any aspect of a construction project that makes better use of resources than would occur with normal construction practices.

Reuse: using material in its original form more than once, instead of throwing it away.

Source-Separated: similar materials that are separated from different incompatible materials according to the type of material each is.

Waste Audit: an inventory of excess materials generated on the project site over a period of time.

Waste Minimization Management Plan: a plan that identifies strategies and details the processes for handling, reducing, reusing and recycling C&D debris on a specific project in order to meet the project's waste minimization management goals.



DUBUQUE METROPOLITAN AREA SOLID WASTE AGENCY'S GREEN VISION BUILDINGS ENVIRO-STARS HONOR ROLL

About The GVB Enviro-Stars Honor Roll

The Enviro-Stars Honor Roll recognizes individuals, businesses and organizations for rethinking, reducing, reusing, recycling and properly managing construction, deconstruction, demolition, and renovation (CDDR) discards. The program was created to give individuals, businesses and organizations incentives and recognition for minimizing CDDR debris, while giving consumers an objective way to identify environmentally innovative individuals, businesses and organizations that:

- CONSERVE – Landfill space,
- SUSTAIN – Natural resources availability for future generations,
- IMPROVE – Pollution prevention.

Individuals, businesses and organizations earning an Honor Roll status will be featured in success stories sent to local media, and highlighted in brochures and advertisements. The recipients will be listed on the Green Vision Buildings page on the DMASWA's website. Consumers who want to hire or support these Honor Roll individuals, businesses and organizations can look for their Enviro-Stars display, or use our online Enviro-Stars honor roll list.

The Green Vision Buildings (GVB) Program provides free assistance and recognition to owners, architects, contractors, haulers, and processors who recycle, minimize waste, and use recycled content building materials. Since 2003, the Agency has tracked 25 projects that have diverted more than 26,665 tons of material from being buried at the landfill, saving more than \$836,768 in avoided disposal fees. (1/27/07)

To join the Green Vision Buildings program:

- Complete the GVB Materials Management Plan and Reporting Form for each project and send, deliver or fax a copy to the GVB Administrator before the project begins.
- The GVB Administrator will then visit the project site to verify the application and possibly suggest additional ways to improve your Materials Management Program and use of recycled content materials.
- During the construction, deconstruction, demolition or renovation process, keep track of the material tonnage diverted from the landfill and how it was beneficially used. Also track the tonnage sent to the Landfill.

When the project is concluded, send the finished Material Management Plan and Reporting Form to the GVB Administrator for a final review.

The application procedure for the GVB Enviro-Stars Honor Roll requires for each project:

- Complete the Green Vision Buildings (GVB) Materials Management Plan and Reporting Form (see page 11) and mark the appropriate request box to be eligible for the honor roll. The form must be used for both the initial estimate and the verifiable final results.
- Projects must divert to a beneficial use by reusing or recycling at least 70% of the materials normally taken to the landfill.
- When building or renovating, projects must use six or more recycled content building materials or 10 % of the total weight of the materials used in the project.

Other project-related individuals, businesses and organizations may be eligible for recognition from the Agency. All awards are given at the discretion of Dubuque Metropolitan Area Solid Waste Agency.

The GVB Enviro-Stars Honor Roll Benefits:

- A framed certificate for display in your lobby or office.
- Use of a standard tag line to promote your company as being on the GVB Enviro-Stars Honor Roll.
- Written press release recognizing your support of the GVB Enviro-Stars Program.
- Reference as an Honoree of the GVB Enviro-Stars Program in Agency promotional materials, presentations, events, websites and other possible promotions.
- Recognition on the GVB Enviro-Stars Honor Roll list. List renewal can be achieved through continued successful use of the Material Management Plan Program.

CURRENT MEMBERS

Congratulations to our Current Green Vision Buildings Honor Roll members! Their use of inventive approaches to recycling and minimizing waste at CDDR sites demonstrates a commitment to protecting the environment by reducing, reusing, recycling and diverting materials from the landfill.

- Dubuque County Historical Society
- Durrant Group Incorporated
- Conlon Construction Company
- Dubuque Community School District
- HyVee Grocery Stores
- Tschiggfrie Excavating
- City of Dubuque Housing Department
- Mid America Architectural Salvage
- Frey Construction Company
- Tri State Development Company
- Straka Johnson Architects PC
- Miron Construction
- Mike Winger Construction Company
- Tricon Construction Group
- Jeff Kieffer Excavating
- JP Cullen & Sons

PAST MEMBERS

Congratulations to our past Green Vision Buildings Enviro-Stars Honor Roll members! Their use of inventive approaches to recycling and minimizing waste at CDDR sites demonstrated a commitment to protecting the environment by reducing, reusing, recycling and diverting materials from the landfill.

- All are present members of the Green Vision Buildings Honor Roll.

BACKGROUND

The Green Vision Buildings Program assists the building construction and demolition sectors with establishing jobsite materials recycling and reduction programs, providing recognition to those contractors and project owners. Businesses already recognized by the Green Vision Buildings Program are eligible for multiple awards.

DIRECTORY OF CDDR MARKETS ([link to directory brochure](#)) – a directory of local Construction/Demolition/Deconstruction/Recycling Markets is available upon request or by downloading from website.