

US EPA ARCHIVE DOCUMENT

# Best Management Practices for Colleges and Universities



## Sustainable Design & Building *Management of Construction Debris*

Updated January 2007

**Summary:** The Ohio Environmental Protection Agency (OEPA) put forth rules that went into effect on September 30, 1996, regarding the disposal of construction and demolition (C&D) waste. Many other states and localities have put forth similar rulings over the past few years. C&D waste is from the alteration, construction or destruction of a building. Contractors are required to dispose of C&D waste at approved disposal facilities. It may include shingles, roofing paper, drywall, plaster, studs, joists, rafters, electrical wiring, plumbing fixtures, heating equipment, cement blocks, cabinets, glass, window frames, structural metal, and wall coverings and can also include packaging materials such as pallets, cardboard, and empty caulking tubes. It does not include materials such as yard waste, furniture, appliances, etc. that should be removed prior to demolition either inside or outside of the buildings.

Ohio University was in front of the curve *and* went a step further. In 1990, a recycling and reuse (R/R) program, as part of the Grounds and Refuse Department, was launched. Ed Newman, in the Recycling and Refuse Department, was initially hired to manage trash sent to landfill. After witnessing the vast magnitude of waste generated on campus, especially with construction projects, Ed began a program to draw out and isolate C&D waste for R/R with the support of top administrators. The Association of Ohio Recyclers, who meet once a month, was and continues to be a source of good information in furthering the program at Ohio University.



### Campus Profile

**Ohio University**  
**Athens, Ohio**  
**UG Students:** 16,332  
**Grad Students:** 4,000  
**Resident Students:** 7,500  
**Faculty & Staff:** 3,500  
**Campus Area:** 1,700 acres  
**Buildings:** 200  
**Waste Areas on campus that house dumpsters:** 90

### Project Goals

- To protect the environment and save natural resources.
- Reduce the costs of disposal.
- Reduce the amount of waste being sent to landfill.
- Increase recycling and reuse on campus and in neighboring communities.
- Prevent the potential unauthorized disposal of C&D waste.



### Description

The amount of waste being generated was substantial due to the number of construction/renovation (C/R) projects on campus. A good deal of the waste sent to landfill from these projects had the potential to be recycled or reused.

### Green Activities:

Recycling Web Page  
<http://www.facilities.ohiou.edu/recycle/>

US EPA New England Best Management Practices Catalog for Colleges and Universities

For more information about the catalog and other case studies visit

<http://www.epa.gov/ne/assistance/univ/bmpcatalog.html>

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## Pre-Project Considerations

- Get to “know” trash on campus; what various departments on campus dispose of and what they may need.
- Maintain relationships with the University Planning and Implementation department on campus to be a part of the C/R process.
- Obtain vehicles and services (vans, trucks, roll-off dumpsters, vendors) to collect and move materials.
- Work cooperatively with general contractors and subcontractors; get involved (as “allowed”) at the site.
- Promote specific language in contract and bid documents to ensure all construction companies on a project become involved in separating out C&D waste *and* hauling the waste material to the appropriate end site for either disposal or recycling.
- If possible, obtain areas on campus to store the C&D waste material for R/R.
- Set up relationships with re-use and recycling organizations in your area.

## Steps Taken

1. The University determines a construction/renovation project will take place.
2. Preconstruction bids and contracts with appropriate language on recycling and reuse are put in place.
3. The building is cleared of all employees/students and the items they wish to keep or move to the new space.
4. The Recycling and Refuse Department walks the building and takes all items “not nailed down”.
5. Then the items that are “nailed down”, that are not a safety hazard or will not release hazardous materials, are removed (e.g., fixed seating, blackboards).



*The above two items are completed in a pre-determined time frame that the project manager and contractor provide to the University in order to maintain project schedules.*

6. Grounds recycles and reuses landscaping material around the building as will other maintenance departments.
7. R/R items are sorted and stored on campus, if needed, until appropriate outlets are found.
8. Items that can be reused on campus are delivered to those who can use them (e.g., pallets for the ceramics department). The remainder goes to the compost site.
9. Other reuse items will be referred to the Purchasing Department on campus. A form can be found on line to allow for some items to be auctioned off (some will be auctioned off on eBay!).
10. Other reuse items will be diverted to reuse organizations.
11. Some materials will be sent to a scrap dealer for recycling.
12. Items that cannot be recycled or reused will be landfilled.
13. During the demolition phase, roll-offs (or dumpsters) are situated by the construction site and concrete, masonry, scrap metal, and other C&D debris is collected. This can be arranged with the contractors.
14. Other C&D material that fit the OEPA definition during the project will be collected, segregated, and directed to recycling, reuse or to an approved landfill.

## Tools Used

- Five vehicles “recovered” from other departments on campus. The department is looking forward to purchasing a new 16 foot box-truck and dump trailers next fiscal year.
- Nine roll-off dumpsters owned by the department for C&D.
- Carts and other equipment to help move items around campus.
- When labor is short we sometimes use community service crews arranged through Athens County Municipal Court to help remove materials from buildings before the demolition phase.



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## Participants

The Recycling and Refuse Department is part of one of the six major departments in Facilities Management and has two full time staff and part time student help.

Without the student staff, the campus Recycling and Refuse Office would be much less effective and efficient. Since 1990, 60 students have worked in the office. Currently (2002-2003) there are 4 students with the office.

## Performance and Benefits

All possible C&D waste is being recycled or reused. This program has **greatly** reduced the amount of waste that reaches landfills. The program also saves the University money in disposal costs. Lastly, programs such as these protect the environment by putting recycled products back into the market, thus reducing the need to use raw materials.

### Examples:

(1) The Recycling and Refuse Department had 30 days to collect material prior to construction on the gym. The gym was being converted to a building dedicated to Health and Human Services with classroom and office space. During demolition, the concrete, masonry, and scrap metal were all recovered. This material was sent to a scrap metal contractor who **used it for aggregate**. It is estimated that 30 cubic yard rollofs filled continuously, 12 hours a day for 3 weeks, were diverted from going to landfill.

(2) One of the roads on campus was being redone. 1290 Tons or 85% of the asphalt taken up from the old road was used for the new road. The remaining 15% is being saved on campus for other road projects.

(3) A site was recently cleared to build a new residence hall. All but about 5% of the woody material was chipped to be composted or used on pathways and the logs from the trees will be value added to make products for campus.

See <http://www.facilities.ohiou.edu/recycle/> for great facts and figures on other C/R projects on campus.

### Financial Info

In Ohio, costs to dispose of C&D waste run approx. \$31 a ton. Handling, transporting, and tipping fees can be extra.

The Department's Budget is for general campus duties and includes:

- 2 staff
- students
- contracts with trash/recycling companies
- supplies
- vehicle maintenance

### And...

The Department received a grant from the Ohio Department of Natural Resources, that was matched by the University) to purchase the rollofs.

## Lessons Learned

- Refer to your local/state solid waste management rules for the governance of C&D waste.
- It is relatively easy to isolate C&D waste.
- One difficulty in separating C&D waste is the quick pace of construction jobs and the pressure to keep within a set schedule.
- While data and figures have not been consistently collected, it is still easy to see savings with a program in place.
- Work with contractors; put language into their contracts to promote recycling and reuse; make them responsible for their projects. One example at Ohio University is when contracts specify a "clean up laborer", we have them incorporate recycling efforts with this position.
- Sometimes you can't place material for reuse. Sometimes, even after your best efforts, landfill is the only option.
- Try to obtain (and hold onto) enough storage space on campus to sort and store the material.
- Look for grant money to help fund your operation or to purchase equipment.
- Use vendors/contractors who take away the institution's trash to move the institution's roll-offs around campus as needed.

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- When removing items from the building, ensure that they are completely free of hazardous materials (i.e., radioactive sources from lab equipment) and will not cause the release of any hazardous material such as ACM.
- Communicate with everyone involved.
- The program might work better in a city where there is more of a demand for reuse material.
- Work with contractors who support the idea of recycling and reuse.
- If you are in a rural area, you might need to set up your own markets for reuse.
- Set up an area for collecting C&D waste for in-house construction jobs near the college's facility/operations.
- It would be useful to set up programs that systematically track costs, savings, amount of material sent out for recycling, reuse, and disposal.
- Smaller contractors appear to comply better with the recycling/reuse program.
- Update standards for contractors to refer to.

## For Further Information

You may contact [Ed Newman](#), or [Henry Woods](#), at (740)593-0231 for questions.

Great Links on Ohio University's Grounds, Recycling and Refuse Web Page

<http://www.facilities.ohiou.edu/recycle/>

CURC – College/University Recycling Council part of the National Recycling Coalition

<http://www.nrc-recycle.org/councils/CURC/default.htm>

US EPA Site on Construction and Demolition Debris

<http://www.epa.gov/epaoswer/non-hw/debris-new/index.htm>

Ohio Department of Natural Resources

<http://www.ohiodnr.com/recycling/>

Ohio EPA Division of Solid & Infectious Waste Management

<http://www.epa.state.oh.us/dsiwm/index.html>

## Other Recycling Programs on Campus

**Recycle Mania** is a friendly competition between eight top recycling programs in the United States. Schools will compete to see who can collect the largest amount of recyclables from residence halls, on-campus apartments and dining halls in 10 weeks. Measurements will be reported on a daily basis in pounds recycled per student living on-campus. The Recycle Mania event will provide students with a fun, pro-active activity in waste-reduction. The university that recycles the most in the residence halls, on-campus apartments and dining halls wins. A Recycle Mania trophy will be presented to the winner's. The main goal of this event is to increase student awareness in campus recycling at the participant's school. In the end, this event will display that all eight universities have made achievements in recycling and waste reduction!

<http://www.facilities.ohiou.edu/recycle/>

## Other Successful Programs

Harvard University

University of North Carolina

Washington State

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