Meredith Klekotka
Wendy Noël
Eleanor Garretson

Deconstruction

Introduction/Background

Our group formed as part an Environmental Ethics class assignment aimed at providing an "opportunity to practice institutional change at Carleton and to use this experience as a means of developing our views about environmental ethics". [1] At the National Conference on Sustainability earlier in the term, Meredith was inspired by other colleges' accomplishments in promoting a sustainable campus culture and their fearlessness in undertaking major projects. At the conference, Meredith was most moved by "recovering architect" Bob Berkebile's speech about green buildings; he spoke of creating sustainable spaces in which to interact, work, and play. This project has provided an opportunity for us to pursue direct actions on campus concerning a topic that intrigued us: deconstruction.

Deconstruction is the systematic disassembly of buildings in order to salvage materials for reuse or recycling.[2] Each year, U.S. builders produce between 30 and 35 million tons of construction and demolition waste, accounting for 24% of the solid waste in our landfills.[3] This massive waste output occurs despite the fact that as much as 90% of building materials can be recycled or reused.[4]

The Carleton campus master plan from November 2004 states that the campus should reflect the values of community, sustainability, and stewardship that are integral to our institution. Carleton has a great opportunity to express these core values and set an example for the broader community by using deconstruction techniques in the renovation

of the middle school. Though recent demolitions on campus have recycled up to 30% of the materials, we feel that construction and renovation on campus should include the recycling and reuse of all salvageable materials. Carleton's purchase of the former Northfield Middle School (NMS) building was only finalized this term. Due to other construction projects that will soon be under way, demolition of the NMS building will be postponed for two to three years. Our deconstruction proposal will, therefore, accompany the NMS project from the building's acquisition through the entire renovation process. This timeframe will allow us to research extensively and present deconstruction as a viable alternative to demolition.

We hope that the deconstruction of the NMS building will set a precedent for future growth on campus. Many buildings on campus are slated for demolition within the next five to ten years, including the Music Hall, Arena Theater, and the Concert Hall. Making deconstruction a norm on campus has the potential to significantly decrease demolition wastes produced by Carleton.

Procedures/Activities

Our initial steps in this project were 1) to individually research deconstruction tactics that have been successful at other colleges and 2) to find companies in Minnesota that could help us reach our goals. After compiling general information on the process of deconstruction, we wrote and edited our project proposal detailing our short and long-term goals (Appendix 1). Meredith then met with Richard Strong, director of facilities, to report our findings. Richard was optimistic about the feasibility of deconstruction at Carleton.

Wendy and Eleanor joined art department faculty for a tour of the middle school led by Richard Strong and Robert Lamppa, senior project manager. They learned about the future uses of the facility while assembling a list of major materials within the building (Appendix 2). Armed with the list of materials, we all began researching and contacting deconstruction groups and recycling centers in Minnesota. Meredith got in touch with two regional firms, VEIT companies and the Green Institute.

Our group discussed potential demolition and construction companies with Rob, and compiled the following list of companies in addition to VEIT and the Green Institute: M.A. Mortenson in Minneapolis, McGough Companies in the twin cities, Carl Bolander and Sons Company in St. Paul, and BOLDT Construction in Appleton, Wisconsin. Meredith contacted Kirk Ilenda, head of business development at BOLDT. This week, we will send him this proposal with the building dimensions and material lists in the hopes of receiving a preliminary cost estimate.

Near the end of the term, facilities received blueprints of the NMS building and Wendy and Eleanor met with Richard to review the plans. Unfortunately, the blueprints did not include the original plans for the section to be renovated. Despite the lack of appropriate blueprints, Wendy and Eleanor were able to find the building's dimensions and used them to compile rough estimates of the major exterior materials (Appendix 3). The list of exterior and interior materials, as well as calculations of material quantities will be vital in estimating costs and in speaking with consultants.

Findings/Lessons

Richard Strong and Rob Lamppa are excellent resources. They are excited about the possibility of deconstruction and were more than willing to offer help and advice on our project. In order for deconstruction to be seriously considered, our group and future students must demonstrate that deconstruction is a feasible alternative to demolition. Richard stressed that this is a several year project requiring students' sustained effort and enthusiasm, but that it is entirely possible. The facilities department has already exhibited strong support for student-initiated sustainablity projects on campus such as the wind turbine and the Olin green roof.

During our tour of the middle school, we learned of several potential short and long-term uses for the building. It is most likely that the space will eventually become an art facility, supplementing or replacing the currently overcrowded Boliou Hall. Since a permanent art facility is still at least three years away, the art faculty hopes to use the space for storage and individual studios temporarily, which would require minimal adjustments to the building. Richard and the art department faculty still need to meet with the town building inspector to determine exactly what needs to be done before the building can be occupied or used to house potentially flammable or toxic art supplies. While the building's temporary use probably won't produce much waste, it is wise to stay involved in these plans to make sure that the reuse and recycling of building materials occurs whenever possible.

We also learned that the NMS building consists of three major sections: the original 1910 building, a 1934 addition, and a 1954 addition. Minimal modifications may occur in the 1934 and 1910 sections, but the majority of upcoming work will focus on the

1954 addition. This section's concrete and steel infrastructure will likely be saved and the new building will be constructed around the existing frame. Deconstruction is extremely compatible with this project, since demolition speed will already be constrained by the need to preserve parts of the building.

The tour gave us a good sense of the materials within the building, though our calculations of material percentages within the structure are probably not very accurate. It is impossible to precisely calculate material percentages without architectural plans, but our list allowed us to continue initial research on what materials can be recycled. The amount of hardware such as shelves, sinks, and vents in the building may require special plans for reuse.

The architectural blueprints that facilities requested from the Northfield school system were a big disappointment. They arrived late in the term and did not contain the original architectural plans, which would have included a complete list of materials and amounts. The available blueprints were subcontractor plans with electrical, plumbing, hardware, and foundation drawings. Frequent past renovations on the buildings meant several of the plans were out of date and there were no blueprints more recent than 1973. We attempted to compile a rough estimate of the amounts of major exterior materials such as cement blocks, brick, and concrete by measuring the outside dimensions from the electrical plans and estimating percentages by visual assessment of the building. We estimated some interior material amounts by combining information from the tour and the subcontractor plans, though these were inaccurate. The original architectural plans will hopefully be available soon in order for us to get accurate material estimates.

Many different parties are actively invested in the future of the NMS building, including facilities, residential life, the art department, and the office of the president. The project's collaborative nature makes it difficult to identify all the parties that may be a good audience for deconstruction, though Richard is an invaluable resource for discussions of the building. An important lesson learned this term is that extensive communication is essential in order for this project to succeed.

In our research, we found that companies specializing in deconstruction work are scarce in this area. It seems that companies focused on deconstruction are few and far-between, but we were able to find environmentally-conscious demolition and construction companies. Our first contact was VEIT, a large construction and demolition company that emphasizes the recycling of building materials. Their website seemed promising due to VEIT projects such as deconstruction of the St. Paul Civic Center where 98% of the building materials were recycled. VEIT can recycle almost all of the materials in the middle school in their own recycling centers. However, potential costs of employing VEIT in the NMS building deconstruction were not promising, and Rob was hesitant to use VEIT because of rumors of recent financial troubles in the company.

After VEIT, we considered The Green Institute, a deconstruction and green building company in Minneapolis. Our contact there, Julie Larson, reviewed the list of materials we sent her and informed us that the small scale of the NMS project and the distance of Carleton from their headquarters would not make it economically feasible for them. Usually, the Green Institute only takes materials from buildings for their own construction projects. They do have a reuse store that sells used building supplies but most of the inventory is supplied through donations.[5] Perhaps some hardware from the

middle school, such as sinks or shelves, could be donated to the Green Institute Reuse Center if alternatives aren't found.

BOLDT Company is the best of the deconstruction options we have considered so far. They have sustainability in their mission statement and manage all stages of the demolition process. BOLDT will deconstruct and recycle what they can and hire a demolition company to finish the job. They also have a consultant proficient in sustainable building who is qualified to oversee LEED building certification projects. Meredith contacted their local office in Cloquet, Minnesota and was put in touch with Kirk Ilenda, head of business development. Kirk was very enthusiastic about the project and seemed confident that they could take the job. In talking with Kirk, we found out that they use VEIT as their demolition company! When asked about their recent financial problems, Kirk said he was not aware of them.

It is difficult to form plans for deconstruction when the extent and nature of the renovations are still unclear. The project will have to remain flexible to respond to changes in the NMS building use and renovation plans. We will continue to look for immediate, if small, steps that we can take next term in order to move toward the long term goal of establishing deconstruction as the regular demolition procedure at Carleton.

Recommendations

In order to ensure that this project continues, Wendy and Eleanor plan to work on deconstruction as their ENTS capstone in the winter and spring. Meredith will also continue to work on the project this year and provide continuity into next year.

Next term, we will expand our research into local demolition firms, in order to get a better idea of what companies would be most compatible with this project. We hope to compile a comparative list of companies that addresses cost, availability, and environmental practices. This list will hopefully move beyond a strict cost-benefit analysis to address ethical concerns regarding Carleton's commitment to sustainability and to the local community. Once we have selected what we believe to be the top companies, we will pass our recommendations to facilities.

We hope to have recommendations by the end of winter term. A recently added goal of our project is to encourage the deconstruction of Watson house, which is slated for demolition this summer. The demolition and construction companies will not be selected until April, so it is possible that we will be able to use a deconstruction firm for this project as well. It would be very exciting to see deconstruction used at Carleton this year!

We will continue to stay in close contact with Richard and Rob in order to keep updated on adjustments to the renovation plans for the middle school. We also hope to get the full original architectural plans for the 1954 addition in the near future, in order to assemble a complete and accurate material list. Another tour of the NMS building will allow us to record a detailed list of the amount and type of hardware in the building.

In order to publicize deconstruction, we will informally introduce our idea to President Oden at his student office hours. We will also talk with Media Relations, where Eleanor works, to see the extent to which Carleton's publicity office would be interested in covering this story, perhaps as part of a story on the green building practices being integrated into Watson house. Most importantly, we hope to interact with other

Carleton students in order to gain momentum and support for deconstruction and to recruit committed students to continue the project after our group has graduated. Promoting deconstruction of the NMS building will require a lot of energy, as well as continuity in leadership. Therefore, it will be extremely important to find committed students to continue the work until the project is completed in several years.

Next term, we will present the college with several recommendations of sustainable, cost-effective deconstruction firms. By providing information on deconstruction and direct contact with possible firms, we will facilitate the use of deconstruction in the middle school and perhaps Watson house. Ultimately, this project will culminate with a pledge from the college to make deconstruction the form of demolition used at Carleton, thus creating a more sustainable campus.

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[1] Environmental Ethics Website. Jen Everett 11/10/05.
http://www.acad.carleton.edu/courses/f05/phil/phil242-00-f05/assignments.htm
[2] Peaks to Prairies pollution prevention information center. "Deconstruction".
http://peakstoprairies.org/p2bande/construction/c&dwaste/deconstruction.cfm
[3] U.S. Department of Energy. Buildings Energy Data Book, Section 3.4: C&D waste.
http://buildingsdatabook.eren.doe.gov/docs/3.4.1.pdf
[4] Minnesota Office of Environmental Assistance. www.moea.state.mn.us/index.html
[5] The Green Institute. 2005. http://www.greeninstitute.org

Appendices:

Appendix 1: initial project proposal

Green procurement and zero waste: green design
Eleanor Garretson, Meredith Klekotka, Wendy Noël

Mission Statement:
We envision a Carleton community with low impact, all local or sustainable purchasing, and zero waste.

Goals:

Short Term: Get a pledge from the construction committee to deconstruct the middle school and to use recycled and/or local materials in the new construction process. Also, to get students involved in the planning process: feedback and suggestions from students are important because students directly reap the benefits or costs of new facilities, and should, therefore, be involved in decisions concerning future facilities on campus.

Long Term: Make green building and deconstruction a campus standard and put it in the college's mission statement as a goal towards achieving a sustainable campus.

Research:
We need to research other colleges that have successfully deconstructed buildings (Middlebury, University of Madison, etc.) and we need to find out the cost, how long deconstruction took, the processes involved, and check if other school mission statements include a dedication to green building. We also need to be in contact with St. Olaf. Their website should provide good detail. Also, the AASHE website should have some good information for us with regards to the process of deconstruction and what other schools around the country have done and problems they've run into. We need to make sure it can happen despite the Minnesota winter and what time of the year if best. The deconstruction sites online have provided contact info so we could ask them. We need to get in touch with whoever is in charge of the planning for the middle school and determine the project's time frame. We need to determine the overall cost of the project, and begin to work on an argument that supports financing deconstruction and green construction.

Ethical Questions:
Can we justify NOT building sustainably?
What is our responsibility as a college and as students to promote sustainability?
Would green design still be advisable if it involved higher costs, especially without consulting the sources of the college's endowment?

Appendix 2: Interior materials

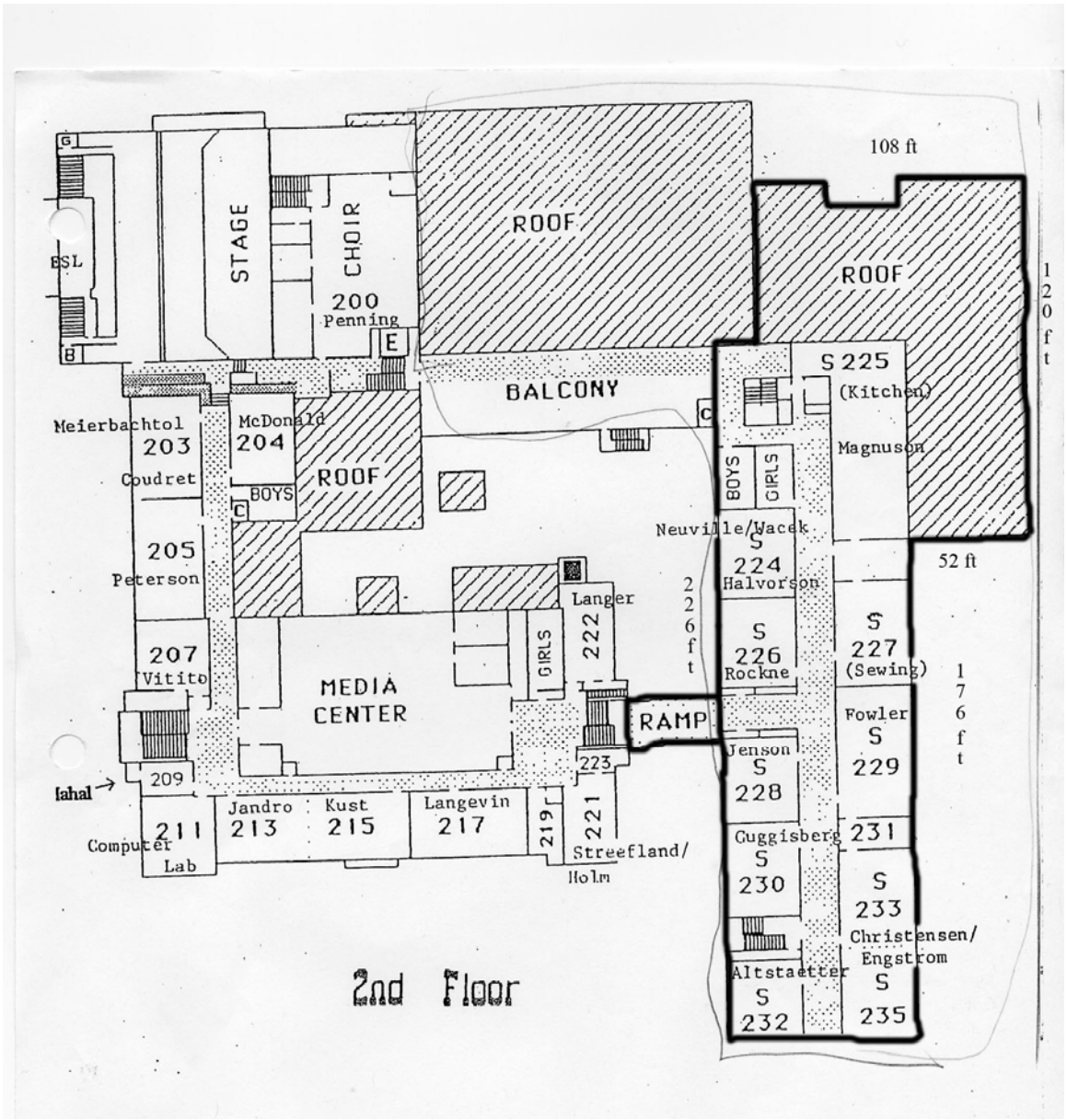
VEIT recycles:
wood from cabinets and doors (must be clean)
concrete (this includes ceramic tile)
metal (sinks, lockers, and vents)
stone
cement blocks
brick
cardboard ceiling tiles

We still have need to find a way to recycle:
- carpet
-glass (we definitely know this can be done but have to find a company to come get it!)
-hardware: lights, pipes, shelves
-linoleum tiles (most of the floors)

Appendix 3: Dimensions and approximate compositions of exterior walls of the Middle School section to be deconstructed first (1954 addition). All materials in these exterior walls are easily reused (bricks; doors), or recycled (windows; granite blocks). Approximately 7,754 square feet of the exterior is brick; recycling or reusing the brick portions alone would be a dramatic amount of material diverted from an area landfill.

	dimensions (sq.ft.)	brick (sq.ft.)	windows	single doors	granite blocks (48x24x3")	
A	5650	1865	86	5		
b	1600	1371	6	1		
c	4400	1452	84	12		
d	1300	975	2			
e	3000	1200	18			36
f	2700	891	8			14
total	18650	7754	204	18		50

Appendix 4: A blueprint of the top floor of the Middle School building. The section outlined in bold will be the first to be torn down. Appendix 2 and 3 refer to this section.



Appendix 5: Annotated Contact List

Annotated Contact List

Richard Strong:

Director of Facilities Management and Planning, Carleton College
rstrong@acs.carleton.edu
507-646-4271

Richard helped us on the tour, finding blueprints (and reading them), and general communication, support, and advice.

Robert Lamppa:

Senior Project Manager/Owner's Representative, Carleton College
rlamppa@acs.carleton.edu
507-646-7893

Rob gave us a list of demolition companies that have been used by the college in the past. He accompanied the art faculty tour and helped us identify materials. He also has given general support and advice.

Kirk Ilenda:

Head of Business Development, BOLDT Construction
kirk.ilenda@boldt.com
218-878-4529

Kirk spoke to us about the feasibility of using BOLDT to deconstruct our middle school. He will receive a copy of this project report and use the dimensions to produce a rough cost estimate.

J. Larson:

Green Institute Employee
jlarson@greeninstitute.org

Ms. Larson spoke with Meredith on the phone. She assessed whether the Green Institute could use any of the Middle School materials and decided they would not be a good match for this project.

Annotated list of resources

DECONSTRUCTION FIRM RESEARCH

Duluth Builder's Association
http://duluthbx.com/IPIN2/CInfo.asp?txtCID=4

We used this website to find phone and fax numbers at the regional BOLDT office. It also includes the office's company directory with employees' names, titles, and email addresses.

BOLDT Construction's official website.
http://www.theboldtcompany.com/home.html#

Contains extensive information about their services and completed projects. Also links to their three divisions: BOLDT Consulting Services, BOLDT Technical Services, and BOLDT BUILDS Construction Services.

Carl Bolander and Sons' website.
http://www.bolander.com/

Contains information on the company's background, capabilities, construction services, environmental services, and rental sales. We will pursue research and contacts with this company next term.

M.A. Mortenson's website.
http://www.mortenson.com/

Contains information on services, delivery methods, and an extensive list of their projects operations ranging from education to sustainable Native American buildings. An excellent resource, but Carleton is not in their price range.

McGough Construction's website.
http://www.mcgough.com/

Contains information on corporate services, development, construction, faculty management, and their portfolio. Another very impressive website and a feasible option that we will contact next term.

INFORMATION ON DECONSTRUCTION

Institute for Local Self-reliance
http://www.ilsr.org/recycling/indexdeconstruction.html

This website has general background information on deconstruction including the economic and environmental benefits. It also has links to articles and websites addressing deconstruction. The organization runs several deconstruction initiatives.

U.S. Department of Housing and Urban Development, *A Guide To Deconstruction*,
http://www.huduser.org/publications/pdf/decon.pdf

A guide to deconstruction focusing on community benefits such as job training. Information about what should be included in a building assessment when considering deconstruction. This will be helpful when we are touring Watson House with various competing demolition companies to make sure they are adhering to best practices. Also contains several profiles of successful deconstruction projects.

U.S. Environmental Protection Agency, *Strategies for Waste Reduction of Construction and Demolition Debris from Buildings*
www.ilsr.org/recycling/buildingdebris.pdf

Includes general background information on deconstruction including material percentages saved and material lists from several case studies. Also includes strategies to make sure that companies are using the best deconstruction practices before and during actual demolition. Includes extensive case studies of different scale buildings.

MINNESOTA DECONSTRUCTION INFORMATION

Minnesota Office of Environmental Assitance
www.moea.state.mn.us/index.html

Great resource for Minnesota green building and C&D waste information including government specifications. Many wonderful links!

Minnesota Recycling Markets Directory
www.moea.state.mn.us/market/markets/

Includes a list of brokers, processors and end users of construction and demolition wastes. This may be useful for materials or hardware we haven't yet found a company that would take.

Minnesota Materials Exchange
www.mnexchange.org

Materials exchange connects businesses that have reusable goods to those who can use them. Minnesota's program is a network of free services around the state and could help us find buyers for specialty hardware items.

WasteSpec: Model Specifications for Construction Waste Reduction, Reuse & Recycling
www.tjcog.dst.nc.us/cdwaste.htm#wastespec

A 114 page manual includes model specifications tailored to different stages of the construction and demolition process. Provides information on cost implications for specific deconstruction techniques. We have not yet read this document but it will be helpful to specify waste reduction practices that we want included in the demolition contract.

National Association of Demolition Contractors
www.demnolitionassociation.com

This organization officially supports deconstruction techniques. Their website includes links to over 900 demolition contractors.