



Finding Value in **Recovered**

Building Materials

Prepared by:

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For:

**Pennsylvania Department
of Environmental Protection**

Since 1974, the Institute for Local Self-Reliance (ILSR) has advised citizens, activists, policymakers, and entrepreneurs on how to design and implement state-of-the-art recycling technologies, policies, and programs with a view to strengthening local economies. ILSR's mission is to provide the conceptual

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framework, strategies, and information to aid the creation of ecologically sound and economically equitable communities. ILSR has been an early champion of building deconstruction, authoring three major reports on the subject, coordinating the first national conference on deconstruction, helping to start deconstruction enterprises, and providing technical training to workers.

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Linda Knapp
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1



2



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The challenge is figuring out how to cost-effectively recover materials from abandoned buildings (1 and 2), prepare materials for sale (3), and make them readily available to consumers at a retail facility (4).

In 2004, the Pennsylvania Department of Environmental Protection awarded the Institute for Local Self-Reliance (ILSR) a grant to assess the supply and demand for recoverable residential building materials in Southeastern Pennsylvania. Partnering with the Penn State University's Hamer Center for Community Design, ILSR undertook the following major grant objectives:

- Create a Market Development Advisory Committee;
- Identify the potential supply of building materials for reuse from abandoned buildings slated for demolition under the City of Philadelphia's Neighborhood Transformation Initiative;
- Survey select public and private sector projects in Southeastern Pennsylvania to assess the potential supply of used building materials;
- Survey various stakeholders within the region to explore barriers to further growth to residential building material recovery;
- Summarize and recommend state policy options to spur growth in residential building material recovery; and
- Hold training workshops in Southeastern Pennsylvania oriented toward sharing with various stakeholders the barriers and opportunities to growing the building material reuse infrastructure in Southeastern Pennsylvania.

This report presents our findings and recommendations, organized into five sections:

- I. Supply of Building Materials in Southeastern Pennsylvania
- II. Demand for Building Materials in Southeastern Pennsylvania
- III. Barriers to Further Growth of Reuse and Deconstruction Operations in the Region
- IV. Model Policies in Place Elsewhere
- V. Policy Recommendations for the Keystone State

Several appendices contain additional data on the Market Development Advisory Committee and its meetings, specific demolition/deconstruction projects in the region, sample policies, a listing of deconstruction and reuse businesses in Southeastern Pennsylvania, and ILSR's training and outreach efforts.

In addition, ILSR and the Hamer Center for Community Design have prepared a companion report, *Vanishing Points: An Inventory of Abandoned Homes in Philadelphia*. *Vanishing Points* documents the condition of 311 abandoned buildings targeted by Philadelphia's Neighborhood Transformation Initiative for demolition and assesses each unit's viability to be deconstructed in order to salvage materials for reuse.

This report, *Finding Value in Recovered Building Materials*, can serve as a resource to strengthen public and private efforts to recover wood, bricks, architectural salvage, and other building materials and to support the emerging deconstruction and reuse companies in the region. The supply of building materials is enormous and growing. The demand for recovered materials is ripe for nurturing, due in part to the exploding green building industry. The techniques for and cost-effectiveness of salvaging building materials continue to improve. Given the right institutional and infrastructure support and policies, entrepreneurs in the region could expand their building reuse operations. This is a win-win opportunity for city and state officials who want to reduce landfill disposal and costs, reverse urban blight, and support a local reuse economy and new jobs and businesses.

Supply of Building Materials in Southeast Pennsylvania

The potential supply of reusable building materials in Southeast Pennsylvania is large and growing due to two mutually reinforcing trends:

- The tonnage of construction materials generated is increasing; and
- Public and private sector initiatives to recover construction materials are expanding.

Tonnage of Construction Materials Generated Grows

Recent trends indicate that the supply of recoverable materials is increasing in the five counties that form Southeastern Pennsylvania – Bucks, Chester, Delaware, Montgomery, and Philadelphia. The tonnage of construction and demolition (C&D) materials generated increased fourfold in a decade, from 72,069 tons in 1994 to 373,074 tons in 2004.

Chester and Philadelphia counties generate the lion's share of construction materials, 73 percent of the regional total. In Chester, construction materials make up almost one-quarter of the waste destined for landfill disposal. See Table 1. These figures do not include materials recovered, which are not tracked.

Table 1: Construction Waste Generated by County, 1994 vs. 2004 (tons)

	Bucks	Chester	Delaware	Montgomery	Philadelphia	Total
Year 1994						
Construction Waste	26,545	16,105	3,192	20,429	5,798	72,069
Total Waste	662,607	353,220	726,829	802,432	1,721,678	4,266,766
% Construction	4.0%	4.6%	0.4%	2.5%	0.3%	1.7%
Year 2004						
Construction Waste	51,314	142,143	3,912	44,360	131,346	373,074
Total Waste	659,976	607,342	932,197	1,064,850	2,165,715	5,430,080
% Construction	7.8%	23.4%	0.4%	4.2%	6.1%	6.9%

Source: PA DEP Bureau of Land Recycling and Waste Management, Division of Reporting and Fee Collection, 2005.

Available data indicate that the region is a destination for more construction materials than it actually generates. In 2004, landfills located in Southeastern Pennsylvania received a reported 1,059,755 tons of construction materials, of which an estimated 35 percent was generated within the region and 62 percent was generated within the state (versus imported from out of state). See Table 2.

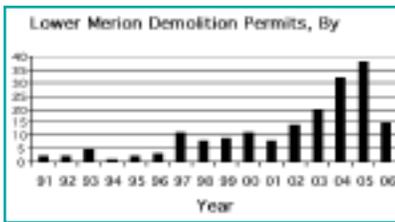
Table 2: Construction Materials Received by Southeast PA Landfills, 2004 (tons)

	Total Construction Waste Received	Construction Waste Received from PA	% Received from PA
Waste Received by:			
Alliance Sanitary Landfill	15,946	3,768	24%
Chester County Solid Waste	43,580	43,580	100%
Chrin Brothers Landfill	57,241	44,291	77%
Cumberland County Landfill	70,716	57,112	81%
FRS Pioneer Crossing Landfill	12,476	11,210	90%
Grand Central Landfill	31,093	30,575	98%
GROWS Landfill	265,704	48,352	18%
IESI PA Bethlehem Landfill	35,718	30,171	84%
IESI Blue Ridge Landfill	13,344	12,316	92%
Modern Landfill	147,737	146,383	99%
Mostoller Landfill	25,584	22,757	89%
New Morgan Landfill	99,534	98,058	99%
Pine Grove Landfill	2,341	2,341	100%
Pottstown Landfill WM	13,541	13,532	100%
SECCRA Landfill	38,290	38,290	100%
Superior Greentree Landfill	22,399	14,402	64%
Tullytown Resource Recovery	164,512	39,743	24%
Total Received	1,059,755	656,877	62%

Source: PA DEP Bureau of Land Recycling and Waste Management, Division of Reporting and Fee Collection, 2005.

Buildings being torn down or renovated represent an enormous potential supply of reusable building materials. While there are no records specifically quantifying these activities for Southeastern Pennsylvania, there are numerous plans for building demolition, redevelopment and renovation, which generally fall into four broad categories.

- **Publicly funded projects to support public housing and economic development:** Projects include HOPE VI grants from the US Department of Housing and Urban Development (HUD), Community Block Grants, PA Infrastructure Development Grants, Community Block Development Grants and Municipal Bonds issued for specific projects such as Philadelphia's Neighborhood Transformation Initiative. These grants are used for renovation and most frequently demolition of dilapidated housing to make way for new or renovated subsidized housing. Housing authorities, community development corporations or economic development agencies frequently provide oversight for this work.



- **Demolition of single-family housing in rural and suburban areas:**

This includes the demolition of farm structures to make way for residential tract development or single large lots, as well as the demolition of modest housing structures for high value “mini” mansions. These demolitions are most frequently privately financed by construction companies or independent builders.

- **Commercial and industrial demolition for new construction in municipal centers and former manufacturing or industrial plants:**

These occur as both private and publicly financed projects, or as public/private partnerships as represented in Brownfield projects, Keystone and other state and federal development zones and similar public initiatives.

- **Renovation of residential, commercial and industrial facilities:**

In renovations, interiors can be stripped, providing opportunities for architectural salvage.

All of these represent opportunities for deconstruction and architectural salvage. In Southeast Pennsylvania, examples of these are taking place from small townships to urban areas. All indications are that the rate of demolitions and thus, the potential supply of value building materials are on the rise.

Lower Merion Township (pop. 59,850) in Montgomery County, for instance, has seen the number of demolition permits issued rise significantly in recent years (see figure below). In nearby Bryn Mawr (pop. 4,382), dozens of properties were recently demolished and redeveloped. The City of Chester (pop. 36,854) has demolished hundreds of abandoned homes with the assistance of Community Development Block grants. The City of Philadelphia (pop. 1,517,550), through its five-year Neighborhood Transformation Initiative (NTI), is also addressing urban blight in part by demolishing thousands of abandoned housing units that are dangerous and structurally unsound. Across the river from Philadelphia in Camden, New Jersey, under a revitalization grant from the US Department of Housing and Urban Development, the Housing Authority of the City of Camden is replacing aging public housing with new housing for 668 families.

The opportunity for deconstruction requires intervention early in the planning process when building take-downs and renovations are being determined.

Appendix B: Deconstruction Opportunities in the Greater Philadelphia Area provides more details on municipalities in the region that have considered or proceeded with demolition projects. They are presented to illustrate that the large scale removal of old buildings in this region offers opportunities for an ongoing supply of recovered materials. Policies at the municipal level can ensure that deconstruction and salvage are considered as viable, cost-effective practices.

The following section presents an assessment of the estimated inventory of recoverable materials from Philadelphia’s NTI houses. This research, a core component of ILSR’s PA DEP grant, is providing critical information for the City of Philadelphia as it decides next steps in its deconstruction efforts. It is the only available data of its kind.

Assessment of Recoverable Materials from NTI Houses in Philadelphia



Examples of abandoned houses in Philadelphia.

Mayor John Street introduced his Neighborhood Transformation Initiative (NTI) in spring 2001 as a comprehensive strategy with the goals of:

- Blight elimination,
- Blight prevention,
- Redevelopment through land assembly, and
- Housing investment and neighborhood preservation.

For the duration of the multi-year program, the City plans to issue \$275 million in bonds that will serve as core funding. Of this amount, an estimated \$137 million will pay for the demolition of condemned residential, commercial, and industrial buildings.

The City estimates that about 26,000 vacant residential buildings exist throughout Philadelphia, and, of these, about 7,000 are structurally unsound. Through its blight elimination program, NTI has worked to dramatically reduce the overall number of abandoned and structurally dangerous houses.

At the project outset, NTI's goal was the elimination of 11,000 to 14,000 of these housing units over a 5-year period at an estimated demolition cost of \$11,500 per unit. NTI projected that it would oversee the demolition of 2,000 units per year, twice the average number of abandoned houses removed through existing City programs. However, NTI experienced higher than projected demolition costs and budget reductions, and is now estimating that the program will remove 5,000 to 7,000 targeted buildings.

The average demolition cost is \$22,000 per unit and, in addition to building take-down, this amount includes the costs of asbestos removal, party wall treatments, addition of six inches of top soil, seeding, and fencing the lot. A major factor in the higher than projected demolition costs is the significant number of party wall treatments – about 64 percent of the demolitions require treatments averaging \$9,000 per wall.¹

NTI expects to finish its work by June 30, 2007, and will document best practices during fiscal year 07. The City's residential demolition efforts will become the responsibility of the Office of License and Inspections when the NTI program is completed.

One barrier to the implementation of deconstruction as part of the NTI demolition work is the lack of data about potential recoverable materials in the remaining condemned buildings and the site-specific technical and logistical issues related to their removal. To fill this information gap, the Institute for Local Self-Reliance contracted with the Hamer Center for Community Design at Penn State University, to inventory a significant sampling of NTI properties marked for demolition and to estimate the amount and types of materials that could be recovered from them. From March 2005 to October 2005, Brad Guy and Nicholas Ciarimboli, from the Hamer Center for Community Design, documented 311 abandoned homes earmarked for demolition under the City of Philadelphia's NTI program. Buildings were selected from the City's NTI demolition bid packages issued during that time frame. The original project goal was to survey 100 buildings, and supplemental EPA funding enabled the Hamer Center staff to survey the much larger sampling.

For each of the 311 homes inventoried, a site visit was made to the building, photographs were taken and multiple aspects of the buildings' condition and both intermediate and neighborhood context were visually noted. In addition, the University of Pennsylvania Neighborhood Information System (NIS) and the City Bureau of Taxes Parcel databases were

¹NTI FY05 Program Statement and Budget.

used to research quantitative information about the buildings. This qualitative and quantitative information was recorded, sorted, analyzed and extrapolated in order to project the feasibility of and potential for materials recovery if building deconstruction were to be implemented at a wide-scale in Philadelphia. The 125-page companion report, *Vanishing Points: An Inventory of Abandoned Homes in Philadelphia*, presents all the data gathered including photos of each unit inventoried.

Of the 311 abandoned homes or units inventoried, data on condition and square footage were collected for 283. Table 3 summarizes the condition of these 283 buildings. Seventy-three percent are deemed viable for deconstruction.

If deconstructed, more than one million bricks with a potential value of more than a quarter million dollars could be salvaged. Significant quantities of lumber could also be recovered for reuse and recycling: half a million board feet with a potential value of \$200,000 plus. Salvage of architectural elements such as tiles, mantels, and ironwork could add another \$150,000 in potential market value. See Table 4. These homes represent a sampling of the abandoned structures in Philadelphia slated for demolition. Citywide the value of salvaged materials could be in the millions of dollars.

Table 3: Abandoned Units Viable for Deconstruction, Inventory Results

	Number of Units	Percentage
No. of abandoned units inventoried	283	
<i>Two-Story Units</i>		
No. of two-story units	210	74%
Avg square footage/unit [1]	1,008	
Total square footage	211,680	
In excellent condition	3	1%
In good condition	54	26%
In fair condition	103	49%
In poor condition	50	24%
<i>Three-Story Units</i>		
No. of three-story units	73	26%
Avg square footage/unit [2]	1,844	
Total square footage	134,612	
In excellent condition	5	7%
In good condition	19	26%
In fair condition	30	41%
In poor condition	19	26%
<i>Total Units Viable for Deconstruction</i>		
Total units in good condition	73	26%
Total units in fair condition	133	47%
Total units viable for deconstruction	206	73%

1] Average of all two-story units inventoried. Square footage for each unit was recorded using information available from the University of Pennsylvania Neighborhood Information System (NIS).
[2] Average of all three-story units inventoried. Square footage for each unit was recorded using information available from the University of Pennsylvania Neighborhood Information System (NIS).

Source: The Hamer Center for Community Design and the Institute for Local Self-Reliance, 2006.

Table 4: Potential Amount and Value of Recoverable Material in the 283 Abandoned Units Inventoried

	Two-Story (Good/Fair Condition)	Three-Story (Good/Fair Condition)	Total (Good/Fair Condition)
Est. no. of buildings viable for deconstruction	157	49	206
Est. avg square footage per building	1,032	1,883	1,135
Total est. square footage	162,024	92,267	254,291
Total est. square footage in good condition	55,728	35,777	91,505
Total est. square footage in fair condition	106,296	56,490	162,786
<i>Brick Reuse Potential</i>			
Salvage rate for bricks	50%	50%	
Lbs of bricks/sq ft	55.0	55.0	
Lbs of bricks	4,455,660	2,537,343	6,993,003
Number of bricks salvaged (@7 lb ea)	645,748	367,731	1,013,479
Value of bricks salvaged (@25¢ ea)	\$161,437	\$91,933	\$253,370
<i>Lumber Reuse Potential</i>			
Salvage rate for lumber in good condition buildings	59%	59%	
Salvage rate for lumber in fair condition buildings	39%	39%	
Lbs of lumber/sq ft	12.9	12.9	
Lbs of lumber salvaged	958,921	556,500	1,515,421
Board feet of lumber salvaged (@3 lb/board ft)	319,640	185,500	505,140
Value of lumber salvaged (@40¢/board ft)	\$127,856	\$74,200	\$202,056
<i>Salvaged Material Value</i>			
Total Brick and Lumber Value/283 abandoned units			\$455,426
Architectural Value (@\$750/deconstructed unit)			\$154,500
Total Salvaged Material Value/283 abandoned units			\$609,926
Avg Salvaged Market Value/abandoned unit			\$2,155
Avg Salvaged Market Value/deconstructed unit			\$2,961
Avg Salvaged Material Value/sq ft of abandoned unit			\$1.76
Avg Salvaged Material Value/sq ft of deconstructed unit			\$2.40

Notes: The above figure are based on the following assumptions:

Brick Reuse Potential: 50% salvage rate for bricks, 55 lbs of bricks/sq ft., avg 6.9 lbs/brick, 8 bricks/sq ft., and 25¢ value/reused brick.

Lumber Reuse Potential: 59% salvage rate for buildings in good condition, 39% salvage rate for buildings in fair condition, 12.9 lbs of lumber/sq ft., 3 lbs of lumber/board feet, 4.3 board ft/sq ft, 40/board ft. value of reused wood.

Architectural Salvage: \$750 avg salvage value per building deconstructed.

Square Footage of Abandoned Units: Total square footage of 283 abandoned units = 346,292; avg square footage/unit = 1,224.

Source: The Hamer Center for Community Design and the Institute for Local Self-Reliance, 2006.

Public and Private Sector Initiatives to Recover Construction Materials Are Expanding

Materials in buildings slated for the wrecking ball are not available for reuse without a dedicated effort to facilitate their salvage and recovery. Building deconstruction provides that opportunity, as does giving reuse operations salvage rights.

Bryn Mawr is one community that has provided salvage rights. In spring 2006, the Port Richmond-based ReStore was given salvage rights to remove architectural features from 40 houses prior to demolition. The ReStore removed 200 doors, and a large number of pantries, sinks, porch transoms, and other non-structural elements from the buildings.

The City of Philadelphia and the neighboring City of Camden (NJ) are piloting deconstruction projects. These initiatives, described below, are increasing the supply of reusable building materials in the region.

City of Philadelphia's Neighborhood Transformation Initiative (NTI) Pilot Deconstruction Projects

NTI officials are interested in understanding the value that still exists in many of the condemned buildings, and have supported ILSR's pilot efforts to cost-effectively recover salvageable materials.

The buildings are an important part of the City's heritage. They contain irreplaceable materials including old growth forest lumber, architectural artifacts, and old bricks that can be recovered, rather than being lost forever through disposal. Deconstruction can spur development of a local "restoration economy" – an economy based on processing and selling salvaged materials for use in new construction and renovation projects, or for remanufacture.

During its last year (July 2006-June 2007), NTI is documenting demolition best practices for incorporation by the Department of Licenses and Inspection (L&I). This department will be taking responsibility for overseeing all future city demolitions. On May 24, 2006, ILSR staff and Kevin Brooks, deconstruction pilot project contractor, met with NTI representatives to report on the success of the April 2006 pilot project (described below) and findings from this PA DEP funded market study project. As a result of the meeting, NTI officials expressed interest in receiving a proposal for an expanded deconstruction effort in this coming year.

West Philadelphia Deconstruction Project – Summer 2003

ILSR sponsored a "Job Site Recycling and Building Deconstruction Workshop," for the Delaware Valley Green Building Council on May 6, 2002 at Carpenter's Hall in Philadelphia. The next day ILSR staff met with City of Philadelphia NTI, Capital Program, and Municipal Energy Office staff to explore ways that deconstruction practices can be incorporated in the NTI's demolition bid packages. The dialogue continued through fall and winter 2002/03.

As a result of these efforts, the Sustainable Development Fund approved a \$25,000 grant for Phase I of an NTI deconstruction pilot project in West Philadelphia. The pilot aimed to document the labor costs and recovered material value, and to assess recovered material markets. During summer 2003, the City of Philadelphia contracted to ILSR the responsibility of overseeing and training two hand demolition companies for the deconstruction pilot project.

On-Site Deconstruction

ILSR supervised the two City-chosen demolition contractors in the deconstruction pilot project. The on-site activities started on June 24, 2003, with the removal of debris from three of the four houses (the fourth was too fire-damaged for entry) and ended on August 6, 2003, with the seeding of the two lots where two houses have been deconstructed. During this period, three adjacent vacant lots were cleaned, cleared, and grubbed.

Most of the deconstruction activities occurred from June 24 to July 15. During the first phase of deconstruction, the workers conducted a pre-demo “architectural” salvage, also known as a “soft skim,” a process that did not require any structural changes in the buildings. The deconstruction pilot workers successfully recovered a wide range of materials including panel doors, molding, fixtures, tiles, cabinets, and more from three of the houses. From two of the houses, the workers removed more than 6,000 board feet equivalent of floor joists and wall framing, as part of the disassembly phase. They then de-nailed the lumber on-site and assembled it for shipment to market. The workers also recovered 320 square feet of 3” yellow pine flooring from one house.

Two of the four houses scheduled for deconstruction were taken off the list. Architectural issues were raised about how the removal of the two Sansom Street houses would impact the remaining occupied houses on the block. Shared archway supports and fire escapes were the issues of most concern.

During the final weeks of the project, the workers prepared the 46th Street houses for stucco application, performed the porch support work on the adjoining buildings, cleared the remaining debris, and seeded the vacant lots.

The project resulted in higher than expected labor costs, and the project team attributes the expenses to several factors:

- Crews requiring more time to do tasks when they are performing them the first time,
- The inefficiency of having two crews on-site,
- Major inefficiencies due to subcontractors’ resistance to implementing systematic deconstruction practices, and
- On-site processing, which was not cost-effective at the high prevailing wage paid to workers on the project (\$29.84-\$33.45 per hour).

Material Recovery and Emerging Markets

As part of the pilot project, ILSR identified as many salvageable materials as possible and then researched existing markets for them. ILSR received \$2,518 from the sale of a wide range of architectural salvage items and lumber. The retail value of the materials recovered from the two deconstructed houses and a “soft skim” of the third was estimated to be about \$8,000.

No retail yards in the Greater Philadelphia metropolitan area existed then or now with the space or business structure to handle the full flow of materials from the NTI project. Some antique stores handle high-value architectural artifacts, and there are a few new and start-up architectural salvage companies. There are also informal networks of contractors, renovators, architects, and do-it-yourself homeowners who are using a wide range of recovered materials in their building projects.

Conclusions

After careful review of the project results, ILSR concluded that the incorporation of deconstruction practices as an economically viable component of the NTI demolition packages will require:

- Cooperation with the emerging architectural salvage sector interested in material recovery;
- Determination of a cost-effective means to recover marketable lumber and bricks from NTI houses;
- Creation of partnerships with companies that can process materials off-site; and
- On-going dialogue with design and building professional organizations to monitor and support market development for NTI recovered materials.

Susquehanna Deconstruction Pilot Project – Spring 2006

The US Environmental Protection Agency funded ILSR and Penn State's Hamer Center for Community Design to conduct a second Philadelphia pilot project to determine cost-effective methods to remove lumber and other materials from an NTI abandoned house.

Project Goal

The overall goal of the project was to develop a strategy for incorporating the practice of deconstruction as an economically viable approach for building removal in the City of Philadelphia. Any model created in Philadelphia likely can be adapted to meet any unique circumstances of other urban areas throughout the country. Philadelphia is the ideal place to pilot this effort because the City has such a large inventory of structurally unsound, abandoned buildings that were built with materials that still have value – lumber, bricks, metal, and architectural salvage features. At the same time, deconstruction in Philadelphia faces high labor costs (in part due to strong unions). An innovative, cost-effective approach to deconstruction in Philadelphia can likely be applied in any other metropolitan area that has building stock with recoverable materials.

Panelization

The EPA funding enabled experimentation with the use of a mechanized, panelized approach of removing lumber. The dismantling process involved cutting the roof and floor panels into sections and removing them to an off-site location for processing.

The benefits of a mechanized and panelized approach to removing roof and floor assemblies from row houses are that:

- The time on site in this very urbanized setting is minimized,
- Exposure to safety hazards is minimized,
- The higher costs of labor on-site is minimized, and
- There is potential to reduce overall costs via a smart “hybrid” of hand and mechanical techniques working together.



Kevin Brooks Salvage experimented with a mechanized, panelized approach of removing lumber (top), and prepared the material off-site for market (bottom).

On-Site Deconstruction

The Project Team selected the deconstruction contractor through a bid process. Kevin Brooks Salvage (KBS), a local minority firm, provided the lower bid and more complete bid package. KBS bid on the project because the firm is interested in developing a viable approach for housing deconstruction in Philadelphia that will expand its market. About half of KBS's salvage and deconstruction work is currently being done on commercial buildings.

The project work took place from March 27-April 7, 2006 when KBS's crew systematically disassembled the 3224 Susquehanna unit, half of a residential twin building. Originally, the Project Team intended to deconstruct the entire building, but the 3222 Susquehanna unit was removed from the plan just prior to the project start-up when that building owner was able to regain possession of the property.

Hamer Center's staff carefully documented the process through photographs and time/labor reporting forms. The Project Team is assessing the data and expects to prepare a final report for EPA by September 2006. Preliminary findings indicate that the pilot deconstruction project is cost-competitive with hand demolition. The total payment to KBS for the deconstruction work was \$24,000. As of the end of June, KBS projected \$4,500 in revenue from materials sales.

Material Recovery

The project diverted bricks, lumber, metal, and architectural features from disposal:

- Most of the bricks were used for on-site backfill.
- Lumber was sold to a reharvester for remilling, in addition to being used by a local furniture maker.
- Metal was sold to local scrap dealers.
- Architectural features were marketed through KBS's architectural salvage business, Found Matter.

The preliminary project findings were presented to City of Philadelphia's Neighborhood Transformation Initiative officials to explore ways to implement these methods on a larger scale. As this second pilot project demonstrated, deconstruction and material recovery offer many benefits including supporting local minority businesses and the local economy in Philadelphia. Deconstruction jobs and businesses are inherently locally based and cannot be shifted to overseas workers.

Preliminary Cost Data

Table 5 (on following page) compares the Susquehanna Deconstruction project preliminary data with the average cost of hand demolition for an average NTI house. At this point in time, there is very little, if any, deconstruction occurring in the removal of abandoned housing in Philadelphia. Mechanized demolition is the process for removing larger numbers of buildings at one time, and deconstruction is much more labor-intensive and costly than this form of building take-down. However, in Philadelphia, there are many units of housing attached to other structures in a row or twin, and these houses are often removed using a combination of mechanized and hand demolition, a more labor intensive process that safeguards the structural integrity of the adjoining house or houses.

In the Susquehanna Deconstruction Pilot, the Project Team of ILSR and the Hamer Center developed an innovative model technique for deconstruction that is cost-competitive with hand demolition. Table 5 compares the preliminary Susquehanna cost data with average hand demolition costs. All labor costs are based on current prevailing wage. The \$10.08 net cost per square foot for the Susquehanna project is close to, but slightly higher than the average hand demolition cost (\$7.75 - \$9.30). ILSR and Kevin Brooks Salvage, the Susquehanna Project contractor believe that the project costs could be lowered in future projects based on the following factors:

- Better dumpster removal and replacement procedures – delays in removing full dumpsters resulted in additional labor costs because workers had to handle some waste materials more than once.
- Better on-site efficiency utilizing improved removal practices based on lessons learned from the pilot.
- Improving the economy of scale by removing more than one house at a time. The original goal was the deconstruction of two adjoining housing units that would have resulted in a lower cost per unit than from removal of a single unit.

Also, the final 3224 Susquehanna data may show a lower net cost if additional recovered materials are sold.

Table 5 : Preliminary Comparison of 1 Pilot Deconstruction Vs Average Hand Demolition Costs

	Deconstruction	Demolition
Gross costs/unit [1]	\$24,000	\$15,000–\$18,000
Projected salvaged materials revenues/unit	\$4,500	\$0
Net costs/unit	\$19,500	\$15,000–\$18,000
Square footage/unit [2]	1,935	1,935
Net costs/sq ft	\$10.08	\$7.75–\$9.30

[1] Deconstruction costs are based on an actual demonstration pilot of one 3-story unit (3224 Susquehanna Ave) and exclude the costs to parge/stucco party wall. Demolition costs are based on City-provided estimate that demolition of a 3-story unit ranges between \$15,000 and \$18,000 excluding parge and stucco of any party walls.

[2] Sq footage is based on measurements of the 3224 Susquehanna Ave 3-story unit.

Source: The Hamer Center for Community Design and the Institute for Local Self-Reliance, 2006.

Deconstruction in Camden

ILSR assisted the Housing Authority of the City of Camden (HACC) in developing its HOPE VI proposal for the takedown of 38 residential buildings at the Roosevelt Manor housing complex. ILSR was named as the general contractor for deconstruction and demolition. ILSR's mission was to remove the buildings in a cost effective, environmentally sound manner with opportunities for training and placement of residents. ILSR met with residents, community leaders, demolition companies, union representatives and city officials to determine the approach that maximizes the economic, environmental and job creation goals. An environmental audit of the entire site was made per state requirements.

Prior to takedown of the entire site, one building was taken down as a pilot. Preliminary results found that each housing unit yield was worth about \$500-700 in materials. Boiler recovery is challenging, but has a potential value of \$5000. Once complete the data from this pilot will inform the plan for the takedown of the remaining 37 buildings, an additional administration building, and two underground storage tanks.

Second Chance, Inc., a non-profit deconstruction/resale enterprise based in Baltimore and Philadelphia, performed the deconstruction of the pilot building, provided an inventory of recovered building materials which were sold through Second Chance's resale facility in Baltimore, and prepared the training program for resident workers to recover the valuable building components of the remaining 37 buildings.

Cider Mill Services, Inc., a for-profit demolition company with years of experience in New Jersey and Pennsylvania demolished the remainder of the pilot building. The company graded the site for the construction of single-family homes. All cement, asphalt, cinder block and non-reusable brick were processed into a uniform aggregate per specifications agreed to by the future developer of the site.

Both the demolition company and the developers are unionized companies. ILSR has met with the local trade union council and the trade union approved apprenticeship-training organization for the South Jersey region. Arrangements for in-school training prior to site training could allow the trainees to be more productive on site from the outset of the project. ILSR estimates that between 10 and 50 workers could be trained and placed in permanent construction trade jobs as a result of the program.

Community leaders expressed interest in establishing a deconstruction service and used building materials resale enterprise. Camden is a suitable site for such an enterprise as the city is under state receivership with a mission to rebuild the city's infrastructure in preparation for a viable economy for the 21st Century.

Demand for Building Materials in Southeastern Pennsylvania

Wood

Major markets for wood from construction and demolition (C&D) sites are wood processing facilities that prepare wood chips for fuel, mulch, composting bulking agent, and animal bedding. The low moisture content of the waste wood makes it desirable for fuel. However, ILSR does not endorse the burning of C&D wood waste because of the air emission quality issues resulting from the combustion process, especially from the burning of painted and treated woods. ILSR promotes higher end uses for recovered wood.

Bob Falk, of the USDA Forest Products Laboratory, reports that much of the recoverable lumber from old houses is old-growth material and “represents a resource largely unavailable from any other source.”

Much of the higher-quality old-growth lumber is being used in timber frame construction. In addition, some of the material can be remilled into flooring and other products.

However, recovering wood from demolition projects can be challenging due to contamination from lead paint and from preservative treatments, and to the additional time required to remove and separate the uncontaminated wood.

ILSR was successful in recovering the following wood from the West Philadelphia deconstruction pilot project in 2003:

- 320 square feet of 3” yellow pine flooring were sold to Liberty Architectural Salvage Company for a retail value of \$2,163 (\$6.75 per square foot) (from one house)
- 6,360 board feet equivalent of joists and wall framing (from two housing units) were sold to the USDA Forest Products Lab for \$1,665 and shipped to Penn State University for experimentation in developing value-added products. See Table 6.

Table 6: : Quantity and Value of Salvaged Lumber (from Two Housing Units)

Dimensions	Quantity	Board Feet Equiv.	Actual Sales Price (two housing units)
3"x9"x15'6"	66	2,302	
3"x12"x15'6"	25	1,163	
3"x12"x19'	18	1,026	
3"x8"x16'	30	960	
2"x3"x9'	70	315	
2"x3"x15'6"	22	171	
3"x4"x9'	47	423	
TOTAL	278	6,360	\$1,665

Source: Institute for Local Self-Reliance, Washington, DC, 2003.



PSU converted recovered hemlock joists into sample value-added products.

USDA Forest Products Lab/PSU Report

The floor joists from the two deconstructed houses were made from eastern hemlock, an old-growth forest material. Bob Falk acknowledged that this wood species has a lower resale value than other old-growth material, but believed that the hemlock could be re-milled into value-added products. Given the large potential amount of recoverable hemlock from NTI houses throughout the City, Falk secured funding for Penn State University (PSU) in State College to process the deconstruction project lumber and document the technical feasibility of developing a variety of products.

Dr. John Janowiak, Professor of Wood Products Engineering, at PSU, in cooperation with the USDA Forest Products Lab conducted the feasibility study and prepared a draft report entitled, “Feasibility of Producing Value-Added Wood Products from Reclaimed Hemlock.” The final report is expected to be ready for public distribution fall 2006. A few Philadelphia-based entrepreneurs are interested in reviewing the final document for their consideration in expanding their business to include reclaimed wood processing. This type of venture would require a regular supply of reclaimed lumber, a capital investment in re-milling equipment, and markets for the finished products.

The draft report describes PSU’s research of the feasibility of four possible value-added products:

- Log cabin siding
- V-groove paneling
- Beadboard (wainscoting)
- Tongue and groove flooring

At the project outset, PSU noted decay, ring shake, and end splits to varying degrees in many pieces of the delivered lumber, and cut out these defects in the pre-processing phase. This assessment eliminated almost two-thirds of the material, prior to remilling.

Another challenge was determining the most efficient way to remove the residual metal contamination from old, low-grade steel nail parts that remained in the lumber. Five to ten percent of the joist members contained broken metal shanks. Metal detection devices were used during different project phases to ensure that all contamination was removed prior to millwork. Even a small piece of metal can damage molder equipment and require sharpening or replacement of profile knives.

In the end, the remilling process produced a yield of 33.5 percent of the purchased lumber. The relative value of the reclaimed lumber increased from \$1,774² (delivered lumber amount) to an estimated market value of \$2,829 (33.5 percent of delivered lumber). This did not account for labor and processing costs.

²This cost includes shipping from Philadelphia to State College, PA.

The authors suggest that cost-efficiency and yield can improve with more selectivity in purchase of material:

- Better trimming on the job-site;
- Selection of materials that are metal-free; and
- Improved treatment of lumber after removal from building (some of the decay resulted from being stored outside without cover).

Also, economies of scale can likely be achieved with a steady flow of material that will generate sufficient amount of value-added products for markets.

Although the draft document is a technical feasibility report, not a market study, the authors suggest that small niche markets are the likely outlets for deconstruction project value-added lumber. A remilling venture would not likely produce the wholesale volume levels necessary to supply products through major retail distribution channels. Wainscot, a form of paneling used on the lower part of an interior wall, is an example of a specialty product in a niche market that serves both home and business office customers.

The authors observed that the re-milled hemlock product has a “slightly darker and richer” color than hemlock that is un-aged and freshly cut, and they suggest that the more intense coloration may appeal to consumers who like vintage and antique wood products.

Current Markets

Current markets for hemlock in the Philadelphia area are very limited. Reclaimed lumber professionals work with higher-grade species including heart pine, chestnut, and oak, and do not use hemlock because it is a softer wood species and can have separation at growth rings.

The NTI housing recoverable material assessment has shown that most of the old houses have hemlock joists. This is true for most of the row houses built during the period of 1850 to the early 1900s. Some older homes, built prior to 1850, have oak and, rarely, chestnut joists.

Some recovered hemlock from this region is used for boiler fuel or reused in barns. Kevin Brooks Salvage, the Susquehanna Deconstruction contractor, sold some of the reclaimed project lumber to a reharvester for remilling, and a local craftsman is using some for furniture.

Most local furniture makers do not use reclaimed lumber because of the nail and screw holes and a “beaten up” look that does not appeal to their customers. Milled lumber gives a consistent, cleaner look and is less expensive to use. However, there is a niche market for custom furniture makers who produce a vintage look with reclaimed lumber.

Bricks

Most reclaimed bricks are used for fill, landscaping (crushed or whole), historic preservation, and other building projects. Much of the NTI brick from house demolition is used as basement backfill prior to the placement of topsoil and seeding of the lot.

According to local demolition contractors, most reclaimed bricks in the region come from commercial, rather than residential demolition. The following are major challenges facing the brick recovery process:

- Removing brick for salvage is more time-consuming than in demolition;
- Cleaning brick (removing the mortar) can be a slow process;
- Brick must be in good condition to withstand the removal, cleaning, storage, and reinstallation processes; and
- Bricks should be stored dry on wooden pallets and covered to protect them from the weather.

During the West Philadelphia Deconstruction Pilot process, ILSR contacted potential markets including a City-provided list of people who over time have requested information about obtaining recovered brick or stone. None of the contacted people had current projects that could utilize the brick from the deconstructed houses. Without an immediate buyer, the demolition contractor would not recover the brick because he believed the recovery process would be too costly at the prevailing wage. In Philadelphia, bricks are often cleaned by individuals who are paid \$.03-.05 per brick and may clean 1,000 to 1,500 in a day. The demolition contractor considered the prevailing hourly wage (\$29.84-\$33.45) too high for on-site brick processing. He also was counting on using some of the brick as basement backfill for the project sites.

The two deconstructed houses did not have any high-value face brick, but did have some Salmon brick, a lower quality material, and some common red brick. The red brick, if it had been cleaned and stored on pallets, may have been sold for walkways or home restoration projects for a price of \$.40 per brick. ILSR estimated that the value of the red brick from the two houses was about \$1,080 (5 pallets x 540 bricks @ \$.40 per brick).

At the time, a Mid-West broker of reclaimed building materials seriously considered setting up a retail yard in Philadelphia for processing both bricks and lumber. His plan was to place a dumpster for bricks at selected demolition sites and to advise the companies on how to cost-effectively handle the brick with minimum damage. After processing the material off-site, he would sell the bricks to local and regional markets. The Mid-West broker did not implement the retail yard plan because he was not able to easily find a local, qualified project manager and he did not have time to relocate to Philadelphia to set up the facility himself.

The original goal of the Susquehanna deconstruction project was to sell recovered bricks to a local brick vendor who would remove the bricks from the site without requiring processing and placement on pallets. Unfortunately, the vendor was not available to take the bricks during the two-week deconstruction time frame, and the deconstruction contractor then chose to use the bricks as basement backfill.

Timing is a critical issue when sufficient storage is not available for recovered bricks. A local demolition contractor who salvages bricks from commercial buildings has offered to present a plan for brick recovery from any future NTI deconstruction projects.

The market for recovered bricks in Philadelphia is driven by the Philadelphia Historical Commission, which has jurisdiction over the facades as well as pavements and sidewalks surrounding 12,000 properties in the City. The system is set up so that a contractor applying for a permit from L&I will be directed to the Philadelphia Historical Commission if the building falls within its jurisdiction. The Philadelphia Historical Commission requires a permit assuring that any new construction or renovation is historically accurate and matches the existing structure. The Commission requires brick samples be submitted to them for inspection before approving the building permit.

Some preservation advocates prefer historical and salvaged bricks for most projects because they believe that the dimensions and the color are better matches with the original material. The “look” is what is most important. Contractors can purchase new bricks that are customized to resemble and replace older bricks; and some choose these materials because they consider them to be more reliable in strength and availability. Reclaimed bricks must be removed with care to avoid breakage and internal damage.

Historic preservation advocates and contractors acknowledge the difficulty in finding the quantity and match of bricks for specific projects in Philadelphia, and emphasize the need for a large, city-based supply yard that could store large inventories of palletized bricks of varying size and colors. If there were more readily available, quality bricks, they would be purchased. There are some sources of recovered bricks in neighboring counties.

Some building supply stores serve as distributors for reclaimed bricks for contractors and developers. A local distributor described the limitation of used bricks:

- They are often broken, chipped, and crumbling;
- They are often improperly cleaned;
- A customer must buy twice as many used bricks as needed per project because, likely, half of them will be unusable for the above reasons;
- Matching bricks is extremely hit or miss; and
- Used bricks are hard to find in large quantities that match a particular project.

Used bricks sell in Philadelphia for about 35 to 40 cents a piece compared to 45 to 85 cents for a new brick. Due to poor material stated above, a consumer may need to spend 70-80 cents to secure one usable reclaimed brick.

Increasing recovery and reuse of bricks will require:

- Incentives for demolition contractors to recover materials;
 - A retail yard that can cost-effectively process brick into quality products, and has sizable storage area to showcase a large inventory of reclaimed products; and
 - On-going promotion to potential consumers about product availability.
-

Architectural Salvage

In this report, architectural salvage refers primarily to items that can be recovered from old buildings and reused for their originally intended purpose or used in a new way.

These materials include:

- Doors
- Windows
- Cabinets
- Kitchen and bathroom fixtures
- Lighting fixtures
- Tiles
- Thresholds
- Transoms
- Molding and trim
- Mantels
- Iron fencing
- Cast iron ornaments

For the most part, these materials can be removed without jeopardizing the structural integrity of the building. Consumer demand for these materials is growing, especially among do-it-yourself homeowners who want to replace items in older homes with like materials, add new features that have a vintage appearance, and create decorative looks using materials for a new purpose (doors as room divider, materials for wall hangings). These consumers value the quality and character of the older materials.

There are hundreds of architectural salvage businesses throughout the country. The increased popularity of internet commerce has expanded the geographical markets for the enterprises that have created web sites with digital images of their product inventory.

The following retail stores sell architectural elements in Philadelphia:

Restore – clearinghouse that offers architectural salvage, deconstruction services as well as design consultations. The privately-owned business accepts tubs, toilets, sinks, plumbing fixtures, lighting fixtures, hardware, mantles, doors, stairwell parts, iron fencing, cast iron ornaments, marble, stone, slate, and tile.

Architectural Antiques Exchange – a well-established retail operation that primarily handles high-value materials including vintage bars, fireplace mantels, antique doors, stained glass. The store also sells claw foot tubs, sinks, and high-value tiles.

Found Matter – a warehouse that opened in 2005 and specializes in reuse of distinctive building materials, with an inventory that includes doors, windows, moldings, and decorative details from houses, warehouses, factories and churches. Found Matter also sells original furniture created from re-harvested old growth timber.

Provenance – a new retail store that is open by appointment and on weekends, and sells copper roof ornamentation, hardwood doors and cabinets, Belgian block, decorative ceramic tile, stained glass, marble block and sculpture, and lighting fixtures.



Tiles (top) and doors (bottom) were recovered from the 2003 West Philadelphia deconstruction pilot project, and were sold to local markets.

There are also contractors and others who collect materials and sell them locally.

In addition, Impact Services Building Materials Exchange is an established, non-profit clearinghouse for surplus and salvaged building materials; the organization helps low-income homeowners maintain their homes.

About 340 Habitat for Humanity ReStores exist in more than 40 states for the purpose of generating revenue for the construction of local Habitat houses. These retail stores sell used and surplus building materials at lower than retail prices and generally secure their products from building supply stores, contractors, and individual donations. The ReStore of Chester County in Coatesville, opened in 2002, and is the only Habitat store in Southeastern Pennsylvania. The store accepts overstocked seconds and used and discontinued salvageable building materials. They sell doors, windows, hardware, and useful lumber (at least six feet in length). (They do not accept donations of joists and bricks.)

Architectural Elements from the Deconstruction Pilot Projects

Although some materials of value (copper pipes, mantels) have long ago been scavenged from most NTI abandoned houses, some of the items listed above have been left intact; the condition and quality of the items vary from house to house.

The retail value of the highest value recovered materials from the 2003 West Philadelphia Deconstruction project (from three houses) were:

- Tiles – \$2,264
- Doors – \$440
- Four-foot cast iron freestanding tub – \$335
- Iron gates/window covers – \$200

Additional materials with retail value totaling \$885 included: corner cabinets, radiator, molding, lighting fixtures, marble thresholds, windows, and miscellaneous smaller items.

The Susquehanna deconstruction project recovered a number of elements and the final inventory and generated revenue will be available in September 2006. PSU/Hamer Center estimated an average value of \$750 of architectural materials per housing unit based on its assessment of the 311 NTI houses.

Barriers to Further Growth of Reuse and Deconstruction Operations in the Region

ILSR created the following opportunities to interview public and private sector stakeholders to determine the current and potential demand for recovered materials and to identify barriers to industry development:

- A questionnaire at the first Market Development Advisory Committee meeting with 12 participants. These participants represent the deconstruction and architectural salvage sector; local, state, and federal government; and the Preservation Alliance, a non-profit organization (May 24, 2005).
- A two-hour focus group with seven architects, builders, and developers from the Delaware Valley Green Building Council; and one local architectural salvage/deconstruction entrepreneur to gain their perspective on barriers and opportunities for material reuse (October 17, 2005).
- PSU's Hamer Center for Community Design in-depth survey of twelve stakeholders from Southeastern Pennsylvania (Fall 2005).
- A questionnaire distributed to eight architects attending the AIA/Committee on the Environment presentation about the Susquehanna Deconstruction Pilot project and recovered material markets (April 27, 2006).

Also, ILSR arranged phone calls and conversations with 24 additional professionals to gain their perspectives on the subject and to provide specific information missing from previous interviews.

Market Development Advisory Committee

The PA Department of Environmental Protection funding supported the formation of a Market Development Advisory Committee to provide technical expertise and policy guidance in the preparation of the market study. The group met four times during the course of the project.

The first meeting was held on May 24, 2005, at the Municipal Services Building in a space provided by the City of Philadelphia. Twelve people attended the session representing a cross section of the public and private sectors:

- Industry (ReStore, Construction Waste Management, Kevin Brooks Salvage, Richard Burns and Company);
- Local, State, and Federal Government (Philadelphia Commerce Department, Recycling Office, PA DEP, US EPA, and USDA Forest Products Lab; and
- Non Profit (Preservation Alliance).

ILSR distributed a questionnaire to gain committee members' perspectives on supply and demand issues for the developing reuse and deconstruction operations in the region. The following summarizes the responses to the question of barriers to further growth of the local industry.

- All respondents expressed concern about the cost of labor including references to prevailing wage requirements on NTI projects, high labor costs relative to the value of the recovered materials, and the challenge of providing fair wages and benefits in a small, start-up business.
- Six respondents presented issues regarding the emerging industry infrastructure and need for the local businesses to become more organized and strategic in putting forth their issues.

- Five respondents are concerned by the lack of material reuse knowledge from outside the industry and expressed the need to educate architects, developers, and contractors, about the benefits of material recovery so that they will specify reused materials.
- Five respondents stated the importance of governments making material recovery a priority through policy and regulatory incentives.

Other barriers were:

- Perceived or real higher cost of deconstruction versus demolition;
- Over supply of wood materials without designated reuse options; and
- Missed opportunities for integration with large projects.

The industry representatives acknowledged the large amount of available materials that could be recovered if deconstruction and salvage practices become widespread. They also presented the local economic benefits that would occur including job training and small business development.

Focus Group Interview on Architectural Salvage and Material Reuse

ILSR invited Delaware Valley Green Building Council members to participate in the two-hour facilitated discussion session that was held on October 17, 2006, in space provided by the City of Philadelphia Commerce Department.

The eight participants represented the professions of architecture, landscape architecture, construction, deconstruction, and real estate consulting and development.

Participants described noteworthy examples of architectural salvage and reuse of significant construction materials in both residential and commercial construction in the Philadelphia area. For instance, stone salvaged from a local housing project was used in the construction of an amphitheater and gazebo at the Schuylkill Valley Nature Center. In New Jersey, the LEED-certified Willow School was constructed with structural timber salvaged from other buildings.

Although, some innovative professionals are effectively using reclaimed materials, this practice is clearly not yet mainstream. One participant noted that the nature of the existing projects is “boutique-y,” and expressed the need for volume builders to become aligned with the resources.

The barriers to greater material reuse are:

- Recovered material supply tends to be unreliable in quantity and quality;
- Reclaimed material prices are unpredictable;
- Institutional bias against anything that deviates from the usual corporate industry supply chain;
- Reclaimed materials often require additional time for use because they are not standardized in size;
- Bias within construction field against doing things that may be perceived as out of the ordinary, requiring more time and effort; and
- Lack of awareness among professionals and consumers about the opportunities and benefits of material reuse.

Suggested strategies to address the barriers are:

- Establish the supply as reliable;
- Create a clearinghouse for supply opportunities including availability and cost;
- Set up a location with a major inventory of recovered materials;
- Convince demolition contractors to salvage materials as a way of reducing costs (through education or government regulations);
- Promote the inclusion of salvaged items as a move toward higher quality; and
- Consider ways to use recovered materials in affordable housing projects.

Most members of the group believe that the direction of the trend is definitely toward more recycling and salvage. Many architects want to be involved with the “green agenda” and are getting on the “ladder of awareness” because of the US Green Building Council’s LEED program. Although they may start on the bottom rung, they can be encouraged to climb up the ladder, especially if recycling and reuse can be made easy for them. Through LEED, businesses and institutions are striving for higher levels of LEED project rating. This can create a competitive spirit that motivates others to achieve comparable or higher standards. For example, Harvard, Princeton, and Yale are making sustainability a priority and this sets a standard for other higher education institutions to follow.

The focus group participants acknowledged the value of the session and one person noted, “Anytime you can put a diverse group together you can spark some innovation; there is value in creating a forum for people who normally do not sit together and talk.”

Building Material Reuse and Recycling Survey – Summary

ILSR partnered with Penn State University’s Hamer Center for Community Design to develop a survey and interview industry, non-profit, and government spokespeople to determine current and potential demand for recovered materials and to identify barriers to industry development. Between October and December 2005, Hamer Center staff conducted phone interviews and emailed survey forms. The Hamer Center attempted to contact 98 representatives from the design, building, demolition, landfill, and recycling industries in Southeastern Pennsylvania (Bucks, Chester, Delaware, Montgomery, and Philadelphia Counties). There were 12 respondents, or a 12.2% response rate to the full survey.

In order to differentiate the responses among companies that have different roles in the continuum of construction and demolition waste creation, reuse and recycling, or as end markets, the survey was divided into three versions and targeted to:

- A “Supply” category of Demolition Contractors, Deconstruction / Salvage and Building Contractors;
- A “Processor” category of Haulers or Landfills, Brokers, Processors, Suppliers of reused or recycled materials, and Re-manufacturers; and
- A “Demand” category of Designers, Architects, Artists, and Building Contractors.

Summary of Results

In response to a list of common obstacles to building materials reuse and recycling, as either a major, moderate or minor obstacle to reuse or recycling efforts and an ‘other’ category – the most commonly cited issues by all respondent categories were:

- Lack of experience of the public and/or contractors to manage C&D waste or make use of reclaimed or recycled materials;
- Lack of building code standards or code-compliant specifications for the use of reclaimed or recycled materials; and
- Governmental restrictions or environmental regulations.

Of lesser importance overall but nonetheless cited by all three categories of respondents was the issue of time. For suppliers and processors, it was “time to source-separate materials on job sites,” for demand-side respondents it was “additional time to source and incorporate into designs.”

In response to a list of common forms of governmental assistance or industry changes, as either of major, moderate, or minor support to help the respondent overcome any obstacles to reuse and recycling of C&D waste and an ‘other’ category – the most commonly cited assistance desired by all respondent categories were:

- Education of the public and/or contractors in managing C&D waste and making use of reclaimed or recycled materials;
- Financial assistance for projects through grants, low-cost loans, tax incentives; and
- Variable disposal fees for mixed debris versus separated materials.

In an attempt to connect these two responses as a basis for opportunities for actions that would be well-received by the industry, the Hamer Center further aggregated responses and determined that the following items appear to be most needed and also desirable from the perspective of the survey respondent sample:

- Education of the public and/or contractors in managing C&D waste and using reclaimed or recycled building materials;
- Building code standards and code compliant specifications for reused and recycled building materials (as distinct from government purchasing policies); and
- Variable disposal fees for mixed versus separated materials at landfills.

Other Key Results or Observations

The most commonly recycled materials stated by respondents were clean lumber and timber, brick, and metals among all categories.

The “Supply” and “Demand-side” categories both cited clean lumber and brick, and the “Processor” category cited metals. There were very few companies interviewed that actively track the amount of C&D materials they reuse or recycle. For this reason the Hamer Center for Community Design was unable to obtain and quantify data for materials reclaimed of any significance directly from the survey sample.

AIA/Committee on the Environment Deconstruction Presentation Questionnaire

ILSR distributed a questionnaire to eight architects attending the presentation about the Susquehanna Deconstruction Pilot project and recovered material markets held on April 27, 2006, at the AIA/Philadelphia Chapter Office.

Three respondents affirmed that they are using recovered building materials in their projects. Heart pine flooring, radiators, and the adaptive reuse of an old mill building into new housing were specifically named.

The major barriers to using recovered materials were stated as:

- Cost;
- Knowledge of material sources;
- Inferior quality of products (decayed or damaged); and
- Scheduling and convincing contractors to plan ahead.

The main recommendation the respondents made was the need for a list of reclaimed material suppliers and prices.

Summary of Barriers

Deconstruction and reuse businesses and organizations comprise an emerging local, restoration industry in Philadelphia and Southeastern Pennsylvania as more and more people recognize the value of recovered materials and the need to reduce the amount of C&D debris in the waste stream.

The emerging restoration industry representatives present the following as obstacles they face in developing their enterprises:

- The high cost of labor in Philadelphia – this is labor intensive work, and being profitable on a job site that requires prevailing wage requires astute awareness of the value and markets for potential materials and the ability to accurately estimate time required for material removal.
- The need for improved markets and greater demand for their products.
- The lack of knowledge and experience with deconstruction and reuse among key stakeholders including architects, contractors, government policy makers, and consumers.
- The need for government support to make deconstruction, salvage, and C&D recycling a priority.
- Resistance in offering salvage rights to buildings prior to demolition by both the public and private sectors.
- The lack of organization of local restoration businesses in putting forth their needs for policy and other support in a strategic manner.

On the demand side, there is a growing number of leading-edge architects, designers, and contractors interested in incorporating recovered materials in their projects. As noted earlier, a major motivator for following a green agenda is the LEED rating system that gives credits for construction waste management and material reuse.

One of the overriding messages from these stakeholders is the need for consistent, quality material supply at predictable prices. Construction is a complex, manufacturing process that requires an efficient flow of materials to accomplish the tasks on schedule. Contractors usually order surplus materials because they cannot afford to run short when

they have the workers on-site to do a particular phase of construction. Damaged or defective materials can disrupt the flow of work causing higher labor costs if workers do not have the materials they need when they need them.

A major commercial developer in the Greater Philadelphia area expressed openness to using recovered materials if the quantity and quality are readily available. He explained the importance of the reuse businesses having strong delivery capabilities so that their customers experience an ease of doing business. In his business, contractors establish on-going relationships with suppliers who can be counted on to deliver product on time, for an acceptable price, and with an ease of payment process. The suppliers also must be able to guarantee the reliability of their products.

There are more opportunities for recovered products with small-scale contractors who do not require the same volume of materials. However, smaller contractors do need to know that there is a consistent quality material supply for them at predictable prices.

A second major concern is the lack of awareness about deconstruction and reuse opportunities, and about product information and availability. Many do not have the time to research this information and require that it is readily available for them.

A third major obstacle is the bias that exists in all size businesses, from small contractors to major institutions, against doing something innovative that is going to require more time and effort. This is especially a serious issue in Philadelphia with the city's high labor costs. Why risk changing tried and true practices for new methods and materials that will require additional time in the learning curve? In most cases, innovation occurs as the result of advocates who are willing to put forth extra efforts for some potential gain. The expansion of deconstruction and building material reuse will require incentives that will persuade more and more practitioners to try new ideas, methods, and materials.

Model Policies in Place Elsewhere

In recent years, a variety of government policies have been implemented to promote the recovery of construction and demolition (C&D) materials. Several states provide outreach to contractors with practical information about waste recovery practices, local processors, and markets for materials. In 2004, the California Integrated Waste Management Board developed a model C&D recovery ordinance and since then has encouraged municipalities to adapt it at the local level (see Appendices C and D). As a result, more than one hundred California municipalities have passed local ordinances requiring contractors to develop and implement waste management plans for the recovery of C&D materials on construction, renovation, and demolition sites. Massachusetts is also taking a leadership role. It is the first state in the nation to pass a landfill ban on specific C&D materials. Its policy went into effect on July 1, 2006.

While the initiatives focus mostly on C&D material recycling, the attention given to overall C&D material recovery can lead to opportunities for greater material reuse. For example, a first step often cited in construction waste management plans is determining what materials can be reused on-site or be removed by local salvage businesses.

The State of Pennsylvania is in an excellent position to learn from the varied approaches and experiences of other states and to develop a program tailored to meet the specific needs of the Commonwealth. This section provides a summary of the following important existing policy initiatives:

- California strategy to support increased municipal diversion rates;
- Massachusetts statewide C&D landfill ban; and
- Architectural salvage contracts in place in King County, Washington, and Baltimore, Maryland.

California – Supporting Increased Municipal Diversion Rates

To assist jurisdictions in meeting and maintaining landfill diversion goals, the State of California is actively promoting the recycling and reuse of C&D materials. Some jurisdictions have surpassed the 50% diversion goal (2000), and have established more ambitious goals, with some striving to achieve Zero Waste:

- San Francisco – 75% diversion goal by 2010; Zero Waste by 2020
- Oakland – 75% diversion goal by 2010; Zero Waste by 2020
- Los Angeles – 70%
- Alameda County – 75%
- Del Norte County and San Luis Obispo Integrated Waste Management Authority – Zero Waste goals.

C&D materials represent a significant percentage of the state's waste stream. Concrete, asphalt paving, asphalt roofing, lumber, gypsum board, rock, soil, fines, and composite materials are included in California's definition of C&D debris. According to the 2003/2004 statewide waste composition study, C&D materials comprise 21.7 percent of the commercial, residential, and self-hauled waste disposed at solid waste facilities in the state. Serious efforts to support C&D recovery are expected to result in increased diversion rates within local jurisdictions.

Senate Bill 1374 (Kuehl, Chapter 501, Statutes 2002), signed into law in 2002, mandates that the California Integrated Waste Management Board provide educational and outreach support to jurisdictions and local contractors on C&D recovery methods. The legislation also required the Board to develop a model C&D diversion ordinance for interested jurisdictions to review, revise, and adopt to address their specific needs related to local infrastructure and waste stream.

Cities were encouraged to review their building and demolition permits and target project types that produced the most waste. Since the Board's formal adoption of its C&D model ordinance in March 2004, more than 100 jurisdictions have passed some form of local resolution. Individual ordinances vary from town to town (or in some cases from county to county).

The model ordinance addresses the following:

- **Diversion requirements** – suggesting that at least 50 to 75 percent of C&D be targeted for diversion. The specific goals will vary based on the capability of the local infrastructure to handle materials.
- **Thresholds for covered projects** – determining the projects that will be required to comply with the law. Threshold options may take the form of project cost, square footage, or may be progressive, phasing in projects by type or size over a period of time.
- **Waste Management Plans** – requiring building, renovation, and demolition contractors to submit plans for proper disposal and/or reuse of building materials and waste. Plans include the projected amounts of materials reused, recycled, and disposed, along with the contact information for the hauler and the recycling and disposal facilities.
- **Deposit Requirements** – posting a deposit based on estimated waste diversion, prior to approval of a construction or demolition permit. Deposit is returned to contractor upon proof of success in meeting recycling and reuse expectations.
- **Reporting** – stipulating submission of written documentation of recovery results in form of tonnage or weight receipts from recycling and reuse facilities, prior to final project inspection.
- **Enforcement** – assessing fines and penalties for non-compliance.

In addition, the model ordinance has a sample provision that directly supports architectural salvage and deconstruction. It states, “Every covered demolition project shall be made available for deconstruction, salvage, and recovery prior to demolition,” and sets aside a period of time to provide for material recovery.

Implementation Challenges

The California Integrated Waste Management Board encourages cities to carefully assess their existing C&D recycling infrastructure before developing and implementing their policies. Understanding materials currently recycled, those with recovery potential, and the capacity of local facilities to handle C&D materials is important.

According to Zane Poulson, California Integrated Waste Management Board/Office of Local Assistance, the major barriers to creating effective C&D policies and programs are:

- Lack of infrastructure to handle the waste,
- Insufficient knowledge about C&D material disposal patterns,
- Resistance of contractors to use local diversion facilities, and
- Inability of cities to enforce C&D diversion requirements.

In California, in order to meet local ordinance requirements, some cities may need to encourage the construction of new C&D facilities. Some C&D facility operators may not be willing to build new facilities unless they have assurances that materials will be delivered. This is the result of past negative experiences with local landfills lowering tipping fees to a point that new C&D facilities could not compete and were forced out of business. Some cities have addressed this issue through their local C&D ordinances. For example, the City of San Diego's ordinance will not go into effect until the new C&D diversion facility comes on-line.

To better understand C&D disposal patterns, some cities are reviewing their building and demolition permits or are surveying C&D loads at local landfills. They are working to identify the types of generated C&D materials and the level of source separation that is possible. This information is essential in determining policy and infrastructure needs.

Some cities distribute information about local C&D requirements and facilities and are actively engaged in outreach campaigns to contractors as a way to increase contractors' compliance with the law.

Cities have been most effective in enforcement when their requirements and forms are straightforward and easy to understand. This involves working with local C&D facilities to make sure that receipts are simple and clearly state the amount of recycled material. Cooperation between the city's building department and recycling department is also important.

As of June 2006, the California Integrated Waste Management Board does not have specific data on material diversion resulting specifically from the enactment of C&D ordinances.

**Massachusetts C&D
Landfill Ban
(310 CMR 19.017
Waste Ban Amendment)**

In December 2000, Massachusetts issued its Beyond 2000 Solid Waste Management Plan – A Policy Framework, which established a new waste reduction milestone to be achieved by 2010: 70 percent reduction of municipal solid waste (MSW) and construction and demolition debris. By including C&D materials, the state recognized the necessity of proper management of non-MSW materials. The 70 percent rate combines a 60 percent MSW reduction rate and an 88 percent C&D waste reduction rate. By 2004, the C&D recycling level had reached 71 percent.

Beginning in 1991, the Massachusetts DEP has been using disposal bans of targeted materials as a regulatory tool. The list of banned materials includes lead-acid batteries, leaf and yard waste debris, bottles, cans, paper, white goods, tires, and cathode-ray tubes. The DEP restricts disposal of these materials at transfer and disposal facilities. These facilities are required to submit compliance plans to DEP that outline their method for inspecting incoming loads and for responding to unacceptable levels of banned materials.

The 2000 Plan calls for the banning of unprocessed C&D from transfer and disposal facilities as a way to increase recycling of these materials. April 1, 2006, was the deadline for Waste Ban Compliance submissions to DEP. Facilities comply with the ban by rejecting unacceptable loads or by diverting the materials to C&D processing facilities. The 2000 Plan also includes provisions for the hiring of more staff to monitor and enforce waste bans.

Effective July 1, 2006, the waste ban will go into effect for the following C&D materials:

- Asphalt pavement
- Brick
- Concrete
- Metal
- Wood

DEP considers these materials to have existing or developing markets.

Exemptions include loads that are in small vehicles or containers (with less than five cubic yard capacity), are from small transfer stations, and/or contain 20 percent or less of these materials by volume.

Implementation

DEP worked to involve stakeholders in the process of establishing the C&D waste ban plan, beginning with the convening of an advisory committee in April 2001 with more than 60 building owners, contractors, architects, engineers, C&D processors, landfill owners, environmental groups, law firms, trade associations, and consultants.³

Work groups were formed and have addressed several key issues such as C&D processing and market development. In addition, the DEP and the Solid Waste Advisory Committee explored enforcement options and decided to place the responsibility with the transfer and disposal facilities rather than the localities.

The DEP has made available recycling industry reimbursement credit (RIRC) grants to support C&D processing capacity. Loans are also available through the Recycling Loan Fund. To support the ban, the DEP has held trainings on the ban and will review and approve revised facility waste ban plans. Interestingly, under the ban, wood is allowed to be disposed at municipal waste combustion facilities. (ILSR recommends policies that promote higher value end uses for reclaimed materials.)

Over time, the DEP plans to explore adding other C&D materials to the list of banned materials as markets for those materials develop and grow. Potential additional banned materials include asphalt shingles, gypsum wallboard, and carpet.

The effectiveness of the July 1st state ban on C&D materials is not yet known. However, successful waste management efforts such as Consigli Construction, Inc.'s (*see sidebar on page 32*) serve as impressive models for Massachusetts companies to use in complying with the new public policy. And the state reports that the ban has already stimulated C&D processing investments in Massachusetts.

³Resource Recycling Reprint, "Diverting C&D Debris," by Peter Allison, Jim McCade, and Stephen Long.

Reuse enterprises have been preparing to take advantage of the increase in recovered materials that will be available as a result of the ban. For example, the ReStore Home Improvement Center, a non-profit store in Springfield, is developing a lumber recovery service for contractors, waste haulers, and other businesses to provide them with an outlet for some of their materials.⁴ ReStore is working with contractors and haulers in designing the program so that it meets the needs of all of the involved entities.

Neighboring States' Concerns

Neighboring states are monitoring the progress of the C&D ban implementation and the potential impacts on their states. For instance, the New Hampshire Governor recently signed House Bill 1433 that prevents C&D waste from being incinerated, effective June 30, 2006 – December 31, 2007. The moratorium was established due to public concern about proposed new incineration facilities in New Hampshire.

In Maine, proposed legislation to ban the importation of C&D debris for disposal within the state led to the recent passage of a law that limits the amount of C&D wood waste substituted for conventional fuel in a boiler to 50 percent of the total combusted fuel weight per year. In addition, the law requires the Department of Environmental Protection to:

- explore source separation and processing options that will maximize the removal of toxic materials from C&D waste prior to use as boiler fuel;
- examine economic and technological considerations of mandating the most effective control technology for boilers using C&D fuel in order to minimize air pollution; and
- review conditions for allowing C&D fuel use to exceed the current 50 percent limit in boilers.

Maine's wood-fired power plants are one of the largest end users of wood waste from C&D recycling projects in New England.⁵ Currently, half of the state's plants burn C&D waste. Many citizens oppose the burning of these materials because they are concerned about air emissions and do not believe that the boilers were designed to handle chemically treated materials such as pressure-treated and lead-painted lumber. Plans for a new incinerator that would burn out-of-state C&D wood waste are being challenged by citizens in Athens, Maine, who have had serious problems with a wood-burning facility that was previously located in their town.

⁴The Recorder (Greenfield, MA), "Do-it-Yourselfers' Delight," by Richie Davis, February 15, 2006.

⁵The Institution Recycling Network, "Maine DEP to Study C&D Imports and Impacts," 7 South State Street, Concord, New Hampshire.

Consigli Construction, Inc. Saves Money By Recycling

Consigli Construction, Inc. has taken seriously the issue of construction waste management within its own company. Its successes are now serving as models for other businesses. Consigli, with offices in Milford, Massachusetts, and Portland, Maine, is a leader in the New England construction industry with an annual volume of more than \$125 million. The Boston Business Journal recently ranked the company number 15 in a listing of the area's largest general contractors.

Consigli set a goal to recover 50 percent of its construction waste and established a system for achieving it by:

- Developing waste management plans for each project,
- Conducting orientation and training programs for employees and subcontractors, and
- Monitoring waste activities via monthly meetings of the "environmental protection committee."

The waste management plans require specific project recovery goals, communication plans for general contractor employees and subcontractors, and an outline of projected waste and handling methods.

In June 2004, DEP and the US Environmental Protection Agency acknowledged Consigli Construction with the "Massachusetts Waste Wise Construction Recycling Leadership Award." In accepting the award, Vice-President of Operations, Matthew Consigli acknowledged the economic value of this effort, "We have been able to reduce our overall disposal costs, demonstrating that green practices can also be good business practices."

Case studies of several Consigli projects are highlighted on the Massachusetts DEP web site. The table below provides a summary of select project data showing impressive cost savings ranging from \$21,638 to \$259,043. These savings are calculated by subtracting the recycling costs from the avoided disposal costs. Brick, concrete, wood, metal, asphalt roofing, ceiling tiles, cardboard, wood, wallboard, and slate are among the materials reused and recycled.

Consigli Construction Saves Money Through Material Recovery: Data from Four Case Studies

Name	Nature of Project	Materials Reused/ Recycled	Tons Reused/ Recycled	Tons Disposed	Recycling Cost	Avoided Disposal Cost	Savings
Cambridge City Hall Annex, Cambridge, MA	renovation	brick, concrete, wood, metal, asphalt roofing	688	173	\$37,035	\$92,192	\$55,167
Clarke Distribution Corp., Milford, MA	renovation & addition	ceiling tiles, asphalt, concrete, metal, cardboard	2,263	233	\$7,974	\$267,017	\$259,043
Douglas School Douglas, MA,	New const., renovation & addition	concrete, metal, wallboard, cardboard, wood	444	338	\$16,652	\$48,464	\$31,812
Milford Fire Station Milford, MA	Renovation & new const.	asphalt paving, concrete, wood, metal, cardboard, slate	569	118	\$2,979	\$24,617	\$21,638

Source: Massachusetts DEP, available at www.mass.gov/dep/recycle/priorities/dswmpu01.htm.

Architectural Salvage Rights

Architectural salvage rights give permission for salvage companies or organizations to remove non-structural elements from a building prior to demolition. This provides the opportunity to remove recoverable materials (doors, fixtures, architectural elements) without placing a burden on the demolition company. Demolition companies benefit from reduced disposal charges, good public relations, and, in some cases, extra general revenue from salvage right fees.

Memo of Understanding – King County and RE Sources

In June 2004, the King County WasteWise Program (Washington state) established a one-year agreement with RE Sources offering the non-profit organization the opportunity to collect unwanted building materials, furnishings and fixtures from county construction, renovation, and demolition projects. RE Sources operates the RE Store, which sells used building materials in Seattle. The no-fee contract was created to divert waste materials from landfills and support reuse efforts that provide community benefits.

Upon notification from King County, RE Sources is allowed 72 hours (not including weekends) to remove desired materials from a project. Sometimes other time arrangements are made. RE Sources has the option to turn down an offer.

King County on-site requirements for RE Sources are:

- At least 90 percent of collected materials are recoverable,
- Presence of King County employee during material removal process,
- Non-interference with King County staff or contractor operations,
- Maintaining clean and neat job site, and
- Insurance coverage.

Material ownership is transferred to RE Sources when it removes the items from the job site. At that point, the organization has the authority to sell the materials to support community and environmental programs. King County is responsible for unwanted materials left on site.

RE Sources reports the following information to King County:

- Types and estimated weight of recovered materials,
- Most prevalent materials,
- Condition of a sampling of items,
- Problems encountered, and
- Suggestions for addressing issues and improving process.

This salvage effort has been so successful that the contract was extended for an additional two years (June 2005 – June 2007), and amended to allow RE Sources to do minor deconstruction on work sites. This may take the form of prying off wooden trim, unscrewing doorknobs, removing cabinets, and similar activities.

As of June 2006, RE Sources has diverted 43,488 pounds (almost 22 tons) of materials. About five tons of this amount have been recovered since November 2005, when RE Sources received authorization to do minor deconstruction.⁶

⁶Email correspondence with Tom Watson, King County Solid Waste Division, July 10, 2006.

Programmatic Agreement – Includes Salvage Rights for Second Chance

In 2002, Baltimore's Mayor O'Malley announced plans for a \$200 million, 80-acre East Baltimore development project to include a 22-acre biotechnology park, which will provide space for 30 to 50 companies serving the John Hopkins Medical Institution.

The development project requires the removal of more than 1,000 houses, many of which are currently unoccupied. Second Chance, Inc., a non-profit deconstruction/resale enterprise based in Baltimore negotiated architectural salvage rights on the buildings prior to their demolition. Second Chance provides job salvage and deconstruction job training, and operates a 100,000-square-foot retail store featuring architectural antiques, building materials, and related items. Second Chance was written into a programmatic agreement among several entities including the City of Baltimore, Baltimore Commission for Historical and Architectural Preservation, and the Maryland Historical Trust.

The agreement addresses issues regarding the impact of the proposed development project on historic buildings in the targeted area. The agreement includes a provision for the salvage and reuse of historic building components:

“In order to maximize opportunities for salvage and reuse of historic building components (e.g. cornices, stairs, balustrades, mantles, windows, etc.) during implementation of the Biotech Park Initiative, the City/EBDI shall provide written notification to Second Chance Inc., a 501(c)(3) salvage corporation located in Baltimore, of any properties which the Trust has approved for demolition at least thirty (30) days prior to the date of demolition.”

Second Chance has been given access to buildings that are not in imminent danger, as long as the organization does not delay demolition start-up.

In Phase One, according to Second Chance Executive Director Mark Foster, workers conducted a salvage of 20 row houses and recovered an estimated \$15,000 to \$20,000 in retail value of materials including mantels, marble steps, staircases, cornices, clawfoot tubs, and doors.

Phase Two of the project will begin in summer 2006 with the goal of salvaging materials from 500 houses. Phase Three will include an additional 500 homes. The entire project is expected to take six to nine months to complete.

Recommendations

This report shows that the potential supply of recoverable building materials is abundant as a result of the revitalization efforts occurring in Philadelphia and near-by communities. At the same time, deconstruction and material salvage are happening only on a very limited basis, and this limited activity is due to the innovative efforts of local entrepreneurs in the emerging restoration economy. Expansion of these initiatives into mainstream practice will require:

- **Major education and outreach** to raise awareness among all public and private stakeholders about recovered material opportunities and success stories;
- **Public and private sector incentives** to strengthen the infrastructure including more material recovery opportunities, support for expanding material processing, and expanded markets for value-added materials;
- **Organization of local businesses** into a trade group that can effectively voice its policy needs and can promote its products and services; and
- **Creation of partnerships** among deconstruction/reuse businesses and green building designers and contractors in exploring expanded opportunities for recovered material reuse in local projects.

A repeated theme in the interview process was the need for a large Philadelphia-based retail yard that can process recovered materials and offer a consistent, wide inventory of products to contractors, homeowners, and other customers. This facility could:

- Selectively accept reclaimed lumber and make it into value-added products. This would provide an opportunity to remill hemlock joists and other recovered lumber into wainscoting and other products suggested by the Penn State research.
- Collect, clean, and sort reclaimed bricks by type and quality, and palletize them for sale. This would require a large area for processing and for storing the bricks.
- Collect, clean, and present architectural elements in an organized and attractive manner.

The materials would come from business/organizations' deconstruction and salvage efforts and from donations.

This type of retail facility may develop from the expansion of one of the existing Philadelphia businesses or may be set up as a new, non-profit operation, which could offer tax deductions for donated materials. The Baltimore-based Second Chance, Inc. and other non-profit reuse centers have effectively used job training funding to upgrade workers' skills while providing valuable staffing support for their organization.

Government Policies

Pennsylvania has established itself as a recycling leader among states throughout the country, and is now in a unique position to evaluate the C&D initiatives in other leading recycling states and to develop a program that will meet the specific needs of the Commonwealth.

Government policies that actively promote C&D material recovery create an environment conducive to architectural salvage and deconstruction. Waste management plans are a key to the success of C&D recovery because they require consideration of material reuse and recycling during the planning process. Waste management plans should consider reuse of materials on-site, salvage rights to reuse centers, and donation of recovered material to a qualified non-profit organization.

Waste management plans require written documentation of recovered and disposed materials. This presents a much-needed opportunity to establish a data collection system for tracking C&D waste disposal and recovery practices in the state.

What the state can do:

- Lead by example. Require state contracts to include waste management plans and architectural salvage opportunities. These strategies have been effectively implemented in other locations. Leading-edge companies such as Consigli Construction in Massachusetts have demonstrated significant cost savings and material diversion from a corporate commitment to implement waste management plans in all projects. King County, Washington, has had success in providing architectural salvage rights to a local non-profit organization, and has expanded the scope of the contract and extended the contract for two additional years.
- Encourage municipalities to promote C&D recovery, and develop a model ordinance that municipalities can adopt at the local level. Construction, renovation, and demolition permitting is established at the municipal level and varies from town to town. Following the California example, Pennsylvania can develop a model ordinance that municipalities can tailor to address their local needs.
- Develop policies that encourage or require transfer stations and landfills to divert C&D materials from the waste stream through recycling and reuse. As more and more states adopt stricter C&D disposal regulations, it is critical that Pennsylvania, a major waste importer, has strong policies in place. Important considerations are assessing the C&D recycling infrastructure and making sure that appropriate material processing facilities are in place. Also, careful monitoring of Massachusetts' experiences with the state's new C&D landfill ban will offer valuable information in this process.
- Set up a stakeholder group as a forum for discussion about effective ways to tailor policies to address the unique circumstances in the Commonwealth. Participants would include representatives from C&D recycling firms, the waste industry, demolition firms, deconstruction companies, reuse centers, in addition to architects, contractors, and developers involved in the green building movement.
- Promote deconstruction, salvage, waste management, and material reuse as strategies for architects and developers to gain credits in the LEED rating system. For example, the Environmental Business Association of New York State recently took the lead in organizing one-day educational programs entitled, "Deconstruction and Beneficial Use: The Other Side of Building Green." Also, the New York City Department of Sanitation has established a web site (NYCWasteLe\$\$) that presents construction waste management plans and deconstruction as basic green building principles.
- Promote "best practices" through special public acknowledgment and award programs. For instance, the State of Massachusetts and US EPA presented Consigli Construction Company with the "Massachusetts Waste Wise Construction Leadership Award" for its effective system of construction waste management. Consigli's waste management case studies with documented savings appear on the MA DEP web site.

What municipalities can do:

- Gain an understanding of the C&D waste issues in their jurisdictions including the nature of the debris, local processors, and markets. A starting point for this is review of the types of permits that contractors have been securing. Construction activities tend to produce cleaner waste than demolition, and renovation can produce a combination of the two.
- Educate contractors about waste management strategies. One way to do this is to provide information about waste management plans, architectural salvage and deconstruction opportunities, and local contacts during the permit application process.
- Establish local policies that support C&D waste diversion. This includes the passage of local ordinances that require waste management plans as a requirement for securing construction, renovation, and demolition permits. Another form is using waste management plans and architectural salvage in municipal projects.

Next steps:

- **Organization of enterprises to continue addressing issues in strengthening the local infrastructure:** Local deconstruction, salvage, and reuse businesses have met four times during the past year as part of the Market Advisory Committee funded by DEP. At the last meeting, the participants acknowledged that this was a worthwhile experience for them and they decided to continue meeting on an on-going basis as a sub-group (called a building block) of the Sustainable Business Network of Philadelphia (SBN). SBN is a non-profit organization that supports the development of an economy based on locally-owned businesses that seek profit while treating workers fairly and practicing environmentally sustainable practices.
- **Continue dialogue of local businesses with green designers and builders regarding expanding opportunities for material reuse in new construction and renovation projects:** Through the DEP funding, the Market Advisory Committee began this discussion when a Habitat for Humanity representative presented plans for the Stiles Project, the construction of seven row houses in a West Philadelphia neighborhood. Although Habitat has a strong bias to using new, standardized materials, the Philadelphia chapter is open to considering the use of reclaimed materials in this prototype project. As a result of the Market Advisory Committee meeting, the Habitat representative produced a list of project materials that Market Advisory committee members will circulate to determine the availability of reclaimed materials for the project. This type of outreach and partnership is essential in expanding market opportunities.
- **Prepare a proposal to NTI for an expanded deconstruction effort:** ILSR is assessing the Susquehanna Deconstruction Project results and considering options for the next proposed phase. This may take the form of a request for NTI to put together a package of a group of abandoned houses that it would sole source or put out to bid for deconstruction. ILSR is currently researching this possibility.

Finally, ILSR encourages the Pennsylvania DEP to carefully review this document with special attention to the recommendations presented above, and to set a priority to put policies and programs in place that will support C&D recovery and the emerging restoration economy in Southeastern Pennsylvania and throughout the Commonwealth.



Appendix A: Market Development Advisory Committee

The PA DEP grant provided funding for the formation of a Market Development Advisory Committee to provide technical expertise and policy guidance in the preparation of the market study. The four meeting summaries are presented below. The process was very beneficial to ILSR in preparing the market study. Between meetings, committee members provided project assistance as needed.

At the last Market Advisory session, the participants acknowledged the value of meeting regularly as an industry group, and they decided to continue meeting on an on-going basis as a sub-group (called a building block) of the Sustainable Business Network of Philadelphia (SBN). SBN is a non-profit organization that supports the development of an economy based on locally-owned businesses that seek profit while treating workers fairly and practicing environmentally sustainable practices.

MEETING ONE – May 24, 2005

City of Philadelphia Commerce Department

Twelve people attended the session representing a cross section of the public and private sectors:

- Industry (ReStore, Construction Waste Management, Kevin Brooks Salvage, Richard Burns and Company)
- Local, State, and Federal Government (Philadelphia Commerce Department, Recycling Office, PA DEP, US EPA, and USDA Forest Products Lab)
- Non Profit (Preservation Alliance)

The meeting agenda included a project overview and a general discussion of challenges facing the used building materials industry in Southeastern Pennsylvania. Two major barriers are the high cost of labor in Philadelphia and the real or perceived higher cost of deconstruction compared to demolition. The group expressed the need to address the demand side by encouraging architects, developers, and government to specify the use of recovered materials. Several members noted that there is an extensive supply of available recoverable materials. At the same time, there is a strong need to put more structure into an industry that has been unstructured.

MEETING TWO – September 20, 2005

US EPA Region III Headquarters

Presentations and discussions focused on specific policy options that promote deconstruction and the use of recovered building materials.

- Mark Foster described the architectural salvage rights that Second Chance, his Baltimore-based non-profit organization, has been granted as part of the East Baltimore Development Project.
- Avi Golen gave an overview of the Massachusetts C&D landfill ban expected to go into effect within the year. Avi served on the working committee that examined gypsum recycling.

- Michael Pavelksy, ReVision Architecture, briefly presented an overview of construction waste management and recovered building material incentives in the US Green Building Council's Leadership in Energy and Environmental Design (LEED) rating system. He commented that many architects are not using the recovered material credits because LEED requires a high percentage of their usage.

ILSR staff provided a Market Study Project report including an update on the survey process and the October deconstruction/recovered building materials discussion group.

MEETING THREE – May 22, 2006

City of Philadelphia Commerce Department

The main meeting focus was Kevin Brooks' Power Point presentation of the recently completed Susquehanna Deconstruction pilot project. The presentation visually presented the step-by-step process of disassembling the NTI house from March 27 – April 7, 2006. Advisory committee members asked many technical questions as they were very interested in the entire process, including the experimentation with panelizing in removing some of the flooring.

The group also discussed options for next steps in convincing NTI to support deconstruction on a larger scale. Kevin Brooks and Linda Knapp informed the committee of their plans to meet with NTI representatives on May 26 to present both the Susquehanna Project Results and Market Study findings. As part of the presentation to NTI, one advisory committee member agreed to loan his scrap book that showcases beautiful photographs of custom furniture made from reclaimed lumber.

MEETING FOUR – July 12, 2006

Restore in Port Richmond, Philadelphia

Jacob Hellman, Habitat for Humanity, presented an overview of the organization's plans to construct the City's first, low-income green home that will be LEED-certified. He explained his organization's preference for working with new materials, but was open to a discussion about use of recovered building materials. As a follow-up to the meeting, he agreed to prepare a list of project materials so that Advisory Committee members can circulate the information and work to identify reclaimed materials for this innovative project.

Bob Bylone, PA Recycling Markets Center (RMC) Recycling Program Manager, gave an informative presentation about the Center's resources and services for Pennsylvania businesses involved in recycling and reuse.

Appendix B: Deconstruction Opportunities in the Greater Philadelphia Area

Buildings being torn down or renovated represent an enormous potential supply of reusable building materials. Opportunities for deconstruction and architectural salvage can be found where there are plans for demolition, redevelopment and renovation of residential, industrial or commercial infrastructure. This appendix details demolition activities that represent deconstruction or salvage opportunities. Indeed in Bryn Mawr, Chester, and Camden, planners have already moved in this direction.

Bryn Mawr

Sometime around 2000, Bryn Mawr and Lankenau Hospitals, through their conglomerate “Main Line Health” began to seriously pursue the expansion and modernization of their facilities, in the heart of Bryn Mawr Village. Main Line Health Realty plans called for the purchase of 75 properties, including 44 houses, to redevelop the area into medical offices, retail spaces, apartments and two large parking garages. Central Avenue and portions of Summit Grove Avenue in Bryn Mawr were targeted for the redevelopment project.⁷

The oldest of these homes were reported to have been built in the early 1920s to the 1950s.⁸

Discussions with the residents began privately in October 2002,⁹ and by July 2003, agreements¹⁰ had been reached with about two-thirds of the homeowners in the area. After acquiring the homes, the hospital and Main Line Health let them stand, mostly empty as plans for redevelopment seemed to stall.¹¹

Unsecured many of the homes were damaged by the weather of two winters, and significant water damage. Public meetings were held in December 2005 to outline Main Line Health Realty’s plans to demolish homes and other structures on the properties.

In spring 2006, the Port Richmond-based ReStore was given salvage rights to remove architectural features from 40 houses prior to demolition. ReStore staff spent the equivalent of one month over a two month span in spring 2006 period removing 200 doors, and a large number of pantries, sinks, porch transoms, and other non-structural elements from the buildings.

City of Chester

The City of Chester has seen its population decline from a peak of 66,039 in 1950 to 36,854 in 2000. Thousands of buildings, from factories to twin homes, have been left empty. Often vandalized and stripped of any materials with value, the structures deteriorated, blighting blocks and, sometimes, entire neighborhoods. Empty row houses gave shelter to stray cats and drug activity.

The 1990 census identified 1,975 of the city’s residential units as vacant. At 12 percent, Chester’s vacancy rate was triple the figure for the rest of Delaware County. The city’s population would drop by more than 1 percent per year in the 1990s, fueling even more abandonment.

⁷ Main Line Life, “Bryn Mawr neighbors balk - on merit,” Oct. 18, 2002.

⁸ Ibid, Main Line Life, “ ‘Another way,’ Bryn Mawr Civic pleads,” by Cheryl Allison, Dec. 9, 2004.

⁹ Ibid, “Bryn Mawr neighbors balk - on merit,” Oct. 18, 2002.

¹⁰ Ibid, “Bryn Mawr expansion plans leave some residents unconvinced,” by Richard Ilgenfritz, July 24, 2003.

¹¹ Ibid, “It hit her again after the big snowstorm a few weeks later,” by Cheryl Allison, March 3, 2005.

Using its general police powers under public-nuisance laws and funding from the U.S. Department of Housing and Urban Development's Community Development Block Grant program, from 1994 to 2000, Chester has spent more than \$3.3 million to demolish 656 residential units and 12 commercial structures. Separate from the city's work, the federal-receiver-controlled Chester Housing Authority has torn down 700 units in the former McCaffery and Lamokin villages at a cost of \$3.8 million. That work was funded through HUD's public-housing arm.

Over the years, public officials had expected or planned for ways to reverse the population trends, hoping for the day when people would return and increase the population. The properties demolished were blight, eliminated to make the city more attractive for residents and people who would consider moving to Chester.¹²

Between 1999 and 2002, PennDOT also oversaw demolition in Chester. Two hundred properties were demolished to support the expansion of Route 291.¹³

Events affirming Chester's development aspirations began to take form in 2001 and continue to the present:

- The City of Chester was awarded a \$1.4 million federal grant in October 2001 supporting a redevelopment project on the Delaware River that has come to be known as Rivertown Wharf: a waterfront walkway; with trees, benches, new curbing and lighting and repave.
- A former abandoned PECO power-generating station at the site was renovated into 300,000 square feet of office space.
- A \$2.5 million grant from the state Infrastructure Development Program for a new main street -- Seaport Drive -- that now stretches the entire 10 blocks north to south through the middle of the development.¹⁴
- In April 2003, Pennsylvania Harness Racing Commission approved the Chester Downs and Marina,¹⁵ a proposed harness-racing track/entertainment venue to be constructed on the former Sun Shipbuilding and Dry Dock Co. site.
- In 2004 Harrah's Entertainment Inc. partnered with Chester Downs and Marina, L.L.C., and committed to spending about \$275 million on the project.¹⁶ Legislative approval of slot machines for the City of Chester added an additional \$130 million to construct a four-level Casino, administrative building and eight-story parking garage scheduled to open in October 2006.

The Chester Housing Authority announced a plan in June 2004 to relocate the tenants of two multi-level buildings for the elderly and disabled, build an arts center and renew an east-side neighborhood. A \$20 million HOPE VI grant from the U.S. Department of Housing and Urban Development provided the initial block of funding for demolishing and rebuilding the Chester Towers public housing development.

The core of the plan provided for the demolition of the Chester Towers with 300 units that have lead paint, asbestos, tiny apartments and aged plumbing, heating and electrical systems. These buildings would be replaced with newly constructed facilities next to other Housing

¹² Delaware County Times, "Noise of a numbers game" by Erik Schwartz. May, 7, 2001

¹³ Ibid, "Road Watch: PennDOT continues Route 291 expansion, September 2001"

¹⁴ Ibid, "\$1.4M fed grant tagged for Chester revitalization," by Matt Zager, Oct. 1, 2001.

¹⁵ Ibid, "2003, Part I: A look at the year that was," Dec. 28, 2003.

¹⁶ Ibid, "Editorial: Chester's future gets another big boost," June 24, 2004.

Authority developments in Chester's West End. Another facet of the plan calls for buying up vacant lots and buildings in the blighted neighborhood east of the Towers, followed by construction of at least 36 low-cost homes.¹⁷

As of July 2006, most of the homes in Highland Gardens are targeted for demolition, 53 percent of the homes acquired. In the first phase of the project, which will cost \$25 million, nearly 100 homes will be demolished and two to three years projected for new homes to be built. The redevelopment is being funded by the city, the Chester Economic Development Authority, the Chester Housing Authority and federal grant money.¹⁸

Chester Towers will be the last of the city's five housing developments to be either remodeled or revamped. McCaffery Village was razed to make way for Wellington Ridge; Lamokin Village was demolished and Chatham Estates rose up. Ruth Bennett Homes became Matopos Hills and improvements were done at William Penn.¹⁹

Located in Chester, the Bernardine Center received a grant in July 2006 in the amount of \$25,000 for a four parted Deconstruction Training Program including training for deconstruction, interpersonal skills, English as a second language and job placement. Founded in February 1986 by the Bernardine Franciscan Sisters, the Bernardine Center works to address the many challenges of low-income Chester residents.

The Bernardine Center will use a training model developed by Second Chance, Inc. of Baltimore, Maryland, a non-profit deconstruction/salvage organization. The model includes the recruitment, selection, training and development of a group of personnel who successfully complete specific core competency training during the 12-week training period. This includes achieving and demonstrating identified training competencies. In addition, each person will acquire skills in teamwork, mentoring and training skills. Up to six trainees will participate in a 2-week "Boot Camp" Program for a screening and qualifying period before being allowed to move on to the field instructions.

The Delaware County Office of Employment and Training is administering the funding being provided by Harrahs. The original request of \$55,000 was for two trainings of six individuals each. Funding will support one training as a test.

Camden, NJ

Camden has changed dramatically in the past half century, as industrial plants have moved or shut down, homes have been abandoned, and crime has risen. Once a city of more than 120,000, Camden now counts less than 80,000 residents. In June 2002 former Governor James E. McGreevey announced a three-year \$175 million program to rebuild the city's infrastructure, improve public safety and create a higher level of fiscal and governmental accountability. The next month, a \$4.6 million program began to tear down more than 300 of the city's most unsafe buildings.²⁰ The financing for the work came from New Jersey's Demolition Bond Loan Program, a \$20 million revolving loan fund established by voters in a 1996 referendum to tear down unsafe buildings in urban and rural centers. The program, administered by the New Jersey Department of Community Affairs, authorizes low-interest loans ranging from 0 to 4 percent for up to 20 years.²¹

¹⁷ Ibid, "Federal grant earmarked for Chester Towers," By William Bender, June 7, 2004.

¹⁸ Ibid, "Gardens of Despair: Even with Boyle Street gang gone, drugs still ravage Chester neighborhood," by Cindy Scharr, July 9, 2006.

¹⁹ Ibid, "Editorial: Unrealistic optimism of Chester's past is history," April 25, 2005.

²⁰ Department of Community Affairs Press Release, "Program Razes To Help Camden Rise," issued July 17, 2002.

²¹ Ibid, "State Awards \$8.5 Million In Demolition Funds 13 Municipalities to Benefit," issued April 15, 2002.

In June 2004, The U.S. Department of Housing and Urban Development awarded a \$20 million HOPE VI Revitalization grant to the Camden Housing Authority to replace aging public housing with new housing for 668 families. The grant was to replace 268 older public housing units with 198 public housing units. It will also develop 368 other rental units and 102 homes for sale. The redevelopment plan will incorporate traditional architectural and landscape features of the surrounding residential neighborhoods. The revitalized development will provide housing and programs that will foster self-sufficiency among residents, including computer training and job readiness programs.²²

Ardmore

In 2000, members of the Ardmore business community approached the Township about the need to revitalize the downtown area. A public "visioning process" that included ideas and design workshops with stakeholders, elected officials, consultants and Township staff culminated in a September 2003 final presentation, the Ardmore Transit Center Master Plan. The visioning process was inclusive and resulted in six proposed projects geared toward the revitalization of Ardmore.

The Ardmore Redevelopment Plan features mixed-use development on several public parking lots, a new train station with nearby commuter and public parking, new public plazas, several major traffic improvements, property acquisition and the designation of the Schaufele Parking lot on the south side of Lancaster Avenue as a village green available for public use.

In January 2005, the Township approved the controversial "Option B," which the Montgomery County Planning Board in turn approved in May. Option B calls for the demolition of nine long-time Ardmore establishments occupying ten buildings. The plan drew national attention as the district is designated historic on the National Register of historic places and taking down the buildings would have proceeded by eminent domain consistent with an equally controversial Supreme Court ruling. In the year that followed, the controversy came to a peak. Township elections were held and the opponents of eminent domain were elected. The Township voted not to invoke eminent domain. The final outcome of the project is yet to be determined.

Coatesville

Coatesville has seen considerable commitment of public and private monies for demolition project uses since 2003. A HOPE VI Plan, shaped in mid-1997 through community design workshops, listed "major public housing demolition" among its nine components. In May 2003, the U.S. Department of Housing and Urban Development awarded a total grant of \$16,434,000, toward a \$55,000,000 project. HOPE VI activities were contained in a focus area covering a portion of Coatesville and South Coatesville, bounded by the Amtrak line on the north side, the Brandywine on the west side, Montclair Avenue on the south side, and Woodland Avenue on the east side.²³

Several months later, the private demolition of existing structures was considered in a 550 home development in nearby Caln Township. According to developer Rick Sudall of Radnor Associates, \$11,000 was spent studying the structures including a structural review by the Pennsylvania Historic and Museum Commission. While the review proved that the degree of modification and deterioration to the structures required demolition, architectural features that could be saved were to be donated to the

²² The U.S. Department of Housing and Urban Development Press Release, "HUD awards \$20 million Hope VI Grant to Camden to transform public housing, help residents," issued June 3, 2004.

²³ Coatesville Ledger, "What is the Coatesville Area HOPE VI Program?" May 29, 2003.

township. Mr. Sudall commented, “The floor boards would make a nice addition to the new township building.”

In all, Coatesville has acquired over \$13 million in federal, state and county grants and loans for demolishing blighted buildings, seed money to develop community policing programs, planning grants, and economic programs to develop the business community.²⁴ The city has designated from Route 340 to the Brandywine Creek between Third Avenue and Church Street following the contours of the current business district as the TIF District.

The purpose of TIF financing is to strengthen and broaden the city's economic base to remove blighted or distressed areas and to attract private development and new businesses. TIF works by assessing the current property within the TIF district. After development, all of the increased tax revenue from that development would return to the city for a time period. The time is typically 20 years. This means the school district would need to forfeit any tax revenue increases during this time, but would receive the same revenue base money as it presently does. Before TIF is finalized, it would need school district, county and city approval.²⁵

Related funding came to Coatesville from Chester County in 2004 who received \$1 million of Brownfields Economic Development Initiative (BEDI) funds and \$4 million in Section 108 loan²⁶ funds to acquire and clean up a 46-acre vacant parcel adjacent to a former landfill in the city of Coatesville. The remediated site is to be transferred to the Oliver Tyrone Pulver Corporation, which will construct a 125-room hotel, along with a 5,000 square foot restaurant and a 90,000 square foot office building as the first phase of a larger development. The first phase is estimated to create 333 full-time jobs and cost in excess of \$36 million. The Section 108 loan will be used to offset construction costs and all the BEDI funds will be put into a debt reserve account to provide security for the loan.²⁷

The County will also receive \$2 million in BEDI funds and \$5 million in Section 108-guaranteed loan funds for Phase I of another project, the Whitebrooke Hills brownfields redevelopment project. The project will develop 112,000 square feet of retail space and create a 250-car parking garage in East Whiteland township. The site is the location of a former Worthington Steel processing and manufacturing facility. The county estimates that the project will create 280 new jobs. The BEDI grant will fund site clearance and preparation, as well as construction. The Section 108 loan will fund demolition and construction. Approximately \$24 million in private funds have been leveraged for the project.²⁸

Norristown

Montgomery County will receive \$1.5 million in Brownfields Economic Development Initiative (BEDI) funds and \$3.0 million in Section 108-guaranteed loan funds to help clean up the heavily contaminated Nicolet industrial site located in the city of Norristown. The O'Neill Properties Group, L.P. will develop the site into 120,000 square feet of light industrial and commercial space. Total cost of the project at completion is expected to be \$6.9 million. Both the BEDI and 108 funds will fund infrastructure improvements, site preparation and building construction. A total of 120 new jobs are slated to be created as a result of the project.

²⁴ Ibid.

²⁵ Coatesville Ledger, “What tax increment financing means to city and residents,” by Joan Thompson, May 5, 2005.

²⁶ Section 108 is the loan guarantee provision of HUD'S Community Development Block Grant (CDBG) program. Section 108 provides communities with a source of financing for economic development, housing rehabilitation, public facilities, and large-scale physical development projects. (<http://www.hud.gov/offices/cpd/communitydevelopment/programs/108/>)

²⁷ The U.S. Department of Housing and Urban Development Press Release, “HUD awards \$24.6 million in grants to redevelop brownfields and to create thousands of jobs in 17 communities,” issued Oct. 14, 2004.

²⁸ Ibid.

Appendix C: Model C&D Diversion Ordinance

To use the form online, you may fill in the blanks. Please use the Tab key to advance to the next fillable blank.

To modify the text of the form, unprotect the form by clicking on the tools menu bar and choosing the unprotect option.

You may then change text, remove instructions, or add rows to tables. If you have the Forms tool bar active, you can also click on the “Protect Form” icon on the forms tool bar.

If you have any questions, please contact your OLA representative at (916) 341-6199.

California Integrated Waste Management Board Available on the web page: www.ciwmb.ca.gov/Iglibrary/CandDModel

ORDINANCE NO. *(Insert ordinance number)*

ORDINANCE OF THE CITY/COUNTY OF *(Insert jurisdiction name)*

AMENDING THE *(Insert jurisdiction name)* MUNICIPAL CODE,
ADDING CHAPTER *(Insert chapter number)* RELATING TO RECYCLING
AND DIVERSION OF CONSTRUCTION AND DEMOLITION WASTE

The Governing Body of the City/County of *(insert jurisdiction name)* does hereby enact as follows:

Chapter *(insert chapter number)* [Recycling and Diversion of Construction and Demolition Waste] is hereby added to Title [] *(insert title number)* of the City/County of 's *(insert jurisdiction name)* Municipal Code to read as follows:

Chapter : *(insert chapter number)* Recycling and Diversion of Construction and Demolition (C&D) Waste

Section .01. : *(insert section number)* Findings and Statement of Intent

Section .02. : *(insert section number)* Definitions

Section .03. : *(insert section number)* Diversion Requirement

Section .04. : *(insert section number)* Diversion Requirement Exemption

Section .05. : *(insert section number)* Threshold

Section .06. : *(insert section number)* Waste Management Plan

Section .07. : *(insert section number)* Deposit Required

Section .08. : *(insert section number)* On-Site Practices

Section .09. : *(insert section number)* Reporting

Section .10. : *(insert section number)* Fines/Penalties

Section .11. : *(insert section number)* Appeals

Section .12. : *(insert section number)* Option to Revise

Section .13. : *(insert section number)* Severability

Section .04.: Diversion Requirement Exemption

- a. Application: If an Applicant for a Covered Project experiences circumstances that the Applicant believes make it infeasible to comply with the Diversion Requirement, the Applicant may apply for a diversion requirement exemption at the time that he or she submits the Waste Management Plan (WMP) required under Section .06. (Waste Management Plan) of this Ordinance.
- b. Meeting with Compliance Official: The WMP Compliance Official shall review the information supplied by the Applicant and may meet with the Applicant to discuss feasible ways of meeting the diversion requirement. Upon request of the jurisdiction, the WMP Compliance Official may request that staff from *(insert agency name)* attend this meeting or may require the Applicant to request a separate meeting with this agency. *(Note to jurisdictions: this will be a local agency that provides waste diversion assistance.)* Based on the information supplied by the Applicant and, if applicable, the *(insert agency name)* agency listed above, the WMP Compliance Official shall determine whether it is feasible for the Applicant to meet the Diversion Requirement.
- c. Granting of Exemption: If the WMP Compliance Official determines that it is infeasible for the Applicant to meet the Diversion Requirements, he or she shall determine the maximum feasible diversion rate for waste generated by the project and shall indicate the new diversion requirement the Applicant shall be required to meet, and will inform the Applicant in writing of the new requirement. The Applicant shall then have *(insert number of days)* days to resubmit another WMP, which is in compliance with the new diversion requirement. If the Applicant fails to resubmit, or if the resubmitted WMP does not comply with Section .06 (Waste Management Plan), the WMP Compliance Official shall disapprove the WMP in accordance with Section .06 (Waste Management Plan).

Section .05.: Thresholds for Covered Projects

(Note to jurisdictions: Consider options one through three. In addition to the options presented, many other variations are included in the sample ordinances on the Board's Web page. For example, some jurisdictions include multi-family structures only over a certain number of units. As a general rule, demolition activities generate significantly larger amounts of C&D waste per dollar than new construction activities, so you should consider setting a lower threshold for demolition projects and a higher one for projects not including demolition. However, in some areas of the state, demolition contractors routinely recycle their project waste, so you may want to first determine if that is true for your jurisdiction, and for what size of project, before requiring that demolition projects be subject to the ordinance.)

Option One (Threshold Based on Project Cost)

A. Covered Projects (Construction and Renovation): All construction and renovation projects within the City/County, the total costs of which are projected to be greater than or equal to \$ *(insert threshold dollar amount)* shall comply with Chapter *(insert chapter number)*, shall submit a Waste Management Plan prior to beginning any construction or renovation activities, and shall be subject to the provisions of this Chapter. *(For ordinances including Fines or Penalties, insert the following text)* Failure to comply with any of the terms of Chapter shall subject the Project Applicant to the full range of enforcement mechanisms set forth in Section .10 (Fines/Penalties) below.

B. Covered Projects (Demolition): All demolition projects within the City/County, the total costs of which are projected to be greater than or equal to \$ *(insert threshold dollar amount)* shall comply with Chapter *(insert chapter number)*, shall submit a Waste Management Plan prior to beginning any demolition activities, and shall be subject to the provisions of this Chapter. *(For ordinances including Fines or Penalties, insert the following text)* Failure to comply with any of the terms of Chapter shall subject the Project Applicant to the full range of enforcement mechanisms set forth in Section .10 (Fines/Penalties) below.

C. Non-Covered Projects (Construction and Renovation): Applicants for construction and renovation projects within the City/County whose total costs are less than \$ (insert threshold dollar amount) are not required, but shall be encouraged, to divert at least (insert diversion requirement percentage) of all project- related construction and demolition waste.

D. Non-Covered Projects (Demolition): Applicants for demolition projects within the City/County whose total costs are less than \$ (insert threshold dollar amount) are not required, but shall be encouraged, to divert at least (insert diversion requirement percentage) of all project- related demolition waste.

E. City/County-sponsored Projects (Construction and Renovation): All City/County-sponsored construction and renovation projects whose total costs are equal or greater than \$, (insert threshold dollar amount) shall be considered “Covered Projects” for the purposes of this Chapter, shall submit a Waste Management Plan prior to beginning any construction or demolition activities, and shall be subject to the provisions of this Chapter. City/County sponsored projects whose total costs are less than \$ (insert threshold dollar amount) shall be considered Non-Covered projects and are not required, but shall be encouraged, to divert at least (insert diversion requirement percentage) of all project- related construction and demolition waste.

F. City/County-sponsored Projects (Demolition): All City/County-sponsored demolition projects whose total costs are equal or greater than \$, (insert threshold dollar amount) shall be considered “Covered Projects” for the purposes of this Chapter, shall submit a Waste Management Plan prior to beginning any demolition activities, and shall be subject to the provisions of this Chapter. City/County sponsored projects whose total costs are less than \$ (insert threshold dollar amount) shall be considered Non-Covered projects and are not required, but shall be encouraged, to divert at least (insert diversion requirement percentage) of all project- related demolition waste.

G. Deconstruction/Recovery Interval for Covered Demolition Projects - Optional (use in conjunction with covered demolition projects language B or F): Every Covered demolition project shall be made available for deconstruction, salvage, and recovery prior to demolition. It shall be the responsibility of the applicant to recover the maximum feasible amount of designated recyclable and reusable materials prior to demolition. In order to provide sufficient time for deconstruction, salvage, and recovery, no demolition may take place until a period of (insert number of working days) working days has elapsed from the date of issuance of the demolition permit. Recovered and salvaged designated recyclable and reusable material from every project shall qualify to be counted in meeting diversion requirements of Section .03 (Diversion Requirement). Recovered or salvaged designated recyclables and reusable materials may be given away or sold on the premises, or may be removed to reuse facilities for storage or sale.

H. Compliance with this Chapter shall be listed as a condition of approval on any construction, renovation and or demolition permit issued for a Covered Project.

Option Two (Threshold Based on square footage)

A. Covered Projects (Construction and Renovation): All construction and renovation projects within the City/County that are (insert threshold size) square feet or greater shall comply with Chapter , shall submit a Waste Management Plan prior to beginning any construction or demolition activities, and shall be subject to the provisions of this Chapter. (For ordinances including Fines or Penalties, insert the following text) Failure to comply with any of the terms of Chapter shall subject the Project Applicant to the full range of enforcement mechanisms set forth in Section .10 (Fines/Penalties) below.

B. Covered Projects (Demolition): All demolition projects within the City/County that are (insert threshold size) square feet or greater shall comply with Chapter , shall submit a Waste Management Plan prior to beginning any demolition activities, and shall be subject to the provisions of this Chapter. (For ordinances including Fines or Penalties, insert the following text) Failure to comply with any of the terms of Chapter shall subject the Project Applicant to the full range of enforcement mechanisms set forth in Section .10 (Fines/Penalties) below.

C. Non-Covered Projects (Construction and Renovation): Applicants for construction and renovation projects within the City/County whose projects are (insert threshold size) square feet or less are not required, but shall be encouraged, to divert at least (insert diversion requirement percentage) of all project-related construction and demolition waste.

D. Non-Covered Projects (Demolition): Applicants for demolition projects within the City/County whose projects are (*insert threshold size*) square feet or less are not required, but shall be encouraged, to divert at least (*insert diversion requirement percentage*) of all project-related demolition waste.

E. City/County-sponsored Projects (Construction and Renovation): All City/County-sponsored construction and renovation projects that are (*insert threshold size*) square feet or greater, shall be considered “Covered Projects” for the purposes of this Chapter, shall submit a Waste Management Plan prior to beginning any construction or demolition activities, and shall be subjected to the provisions of this Chapter. City/County sponsored construction and renovation projects that are less than (*insert threshold size*) shall be considered Non-Covered projects and are not required, but shall be encouraged, to divert at least (*insert diversion requirement percentage*) of all project-related construction and demolition waste.

F. City/County-sponsored Projects (Demolition): All City/County-sponsored demolition projects that are (*insert threshold size*) square feet or greater, shall be considered “Covered Projects” for the purposes of this Chapter, shall submit a Waste Management Plan prior to beginning any demolition activities, and shall be subjected to the provisions of this Chapter. City/County sponsored demolition projects that are less than (*insert threshold size*) shall be considered Non-Covered projects and are not required, but shall be encouraged, to divert at least (*insert diversion requirement percentage*) of all project-related construction and demolition waste.

G. Deconstruction/Recovery Interval for Covered Demolition Projects - Optional (*use in conjunction with covered demolition projects language B or F*): Every Covered demolition project shall be made available for deconstruction, salvage, and recovery prior to demolition. It shall be the responsibility of the applicant to recover the maximum feasible amount of designated recyclable and reusable materials prior to demolition. In order to provide sufficient time for deconstruction, salvage, and recovery, no demolition may take place until a period of (*insert number of working days*) working days has elapsed from the date of issuance of the demolition permit. Recovered and salvaged designated recyclable and reusable material from every project shall qualify to be counted in meeting diversion requirements of Section .03 (Diversion Requirement). Recovered or salvaged designated recyclables and reusable materials may be given away or sold on the premises, or may be removed to reuse facilities for storage or sale.

H. Compliance with this Chapter shall be listed as a condition of approval on any building or demolition permit issued for a Covered Project.

Option Three (Progressive Threshold):

(*Note to jurisdictions: In this approach, a jurisdiction can choose to establish a threshold in phases, by first targeting specific types and sizes of projects to be subject to the ordinance, in order to stimulate markets for the recovered materials and divert materials from projects that generate the most waste. Then, once markets have been established, the types or sizes of projects covered by the ordinance can be expanded. For example, a jurisdiction may choose to: First target only large projects to allow C&D markets time to develop, and then expand the types of projects subject to the ordinance to include smaller projects by gradually decreasing the minimum square footage threshold or dollar amount threshold for complying with the ordinance.*)

A. Covered Projects (Construction and Renovation): The (*insert time frame*) the ordinance is in effect, all construction and renovation projects within the City/County that are (*insert threshold amount here*) shall be considered Covered Projects, shall comply with Chapter , shall submit a Waste Management Plan prior to beginning any construction or demolition activities, and shall be subject to the provisions of this Chapter. (*For ordinances including Fines or Penalties, insert the following text*) Failure to comply with any of the terms of this Chapter shall subject the Project Applicant to the full range of enforcement mechanisms set forth in Section .10 (Fines/Penalties), below.

B. Covered Projects (Construction and Renovation): The (*insert time frame*) the ordinance is in effect, all construction and renovation projects within the City/County that are (*insert threshold amount here*) shall be considered Covered Projects, shall comply with Chapter , shall submit a Waste Management Plan prior to beginning any construction or demolition activities, and shall be

subject to the provisions of this Chapter. (For ordinances including Fines or Penalties, insert the following text) Failure to comply with any of the terms of this Chapter shall subject the Project Applicant to the full range of enforcement mechanisms set forth in Section .10 (Fines/Penalties), below.

C. Covered Projects (Construction and Renovation): The *(insert time frame)* the ordinance is in effect, all construction and renovation projects within the City/County that are *(insert threshold amount here)* shall be considered Covered Projects, shall comply with Chapter , shall submit a Waste Management Plan prior to beginning any construction or demolition activities, and shall be subject to the provisions of this Chapter. *(For ordinances including Fines or Penalties, insert the following text)* Failure to comply with any of the terms of this Chapter shall subject the Project Applicant to the full range of enforcement mechanisms set forth in Section .10 (Fines/Penalties), below.

D. Covered Projects (Construction and Renovation): The *(insert time frame)* the ordinance is in effect, all construction and renovation projects within the City/County that are *(insert lowest final threshold amount here)* shall be considered Covered Projects, shall comply with Chapter , shall submit a Waste Management Plan prior to beginning any construction or demolition activities, and shall be subject to the provisions of this Chapter. *(For ordinances including Fines or Penalties, insert the following text)* Failure to comply with any of the terms of this Chapter shall subject the Project Applicant to the full range of enforcement mechanisms set forth in Section .10 (Fines/Penalties), below.

E. Covered Projects (Demolition): The *(insert time frame)* the ordinance is in effect, all demolition projects within the City/County that are *(insert threshold amount here)* shall be considered Covered Projects, shall comply with Chapter , shall submit a Waste Management Plan prior to beginning any demolition activities, and shall be subject to the provisions of this Chapter. *(For ordinances including Fines or Penalties, insert the following text)* Failure to comply with any of the terms of this Chapter shall subject the Project Applicant to the full range of enforcement mechanisms set forth in Section .10 (Fines/Penalties), next page.

F. Covered Projects (Demolition): The *(insert time frame)* the ordinance is in effect, all demolition projects within the City/County that are *(insert threshold amount here)* shall be considered Covered Projects, shall comply with Chapter , shall submit a Waste Management Plan prior to beginning any demolition activities, and shall be subject to the provisions of this Chapter. (For ordinances including Fines or Penalties, insert the following text) Failure to comply with any of the terms of this Chapter shall subject the Project Applicant to the full range of enforcement mechanisms set forth in Section .10 (Fines/Penalties), below.

G. Covered Projects (Demolition): The *(insert time frame)* the ordinance is in effect, all demolition projects within the City/County that are *(insert threshold amount here)* shall be considered Covered Projects, shall comply with Chapter , shall submit a Waste Management Plan prior to beginning any demolition activities, and shall be subject to the provisions of this Chapter. *(For ordinances including Fines or Penalties, insert the following text)* Failure to comply with any of the terms of this Chapter shall subject the Project Applicant to the full range of enforcement mechanisms set forth in Section .10 (Fines/Penalties), below.

H. Covered Projects (Demolition): The *(insert time frame)* the ordinance is in effect, all demolition projects within the City/County that are *(insert lowest final threshold amount here)* shall be considered Covered Projects, shall comply with Chapter , shall submit a Waste Management Plan prior to beginning any demolition activities, and shall be subject to the provisions of this Chapter. *(For ordinances including Fines or Penalties, insert the following text)* Failure to comply with any of the terms of this Chapter shall subject the Project Applicant to the full range of enforcement mechanisms set forth in Section .10 (Fines/Penalties), below.

I. Deconstruction/Recovery Interval for Covered Demolition Projects - Optional *(use in conjunction with covered demolition projects language E, F, G & H)*: Every Covered demolition project shall be made available for deconstruction, salvage, and recovery prior to demolition. It shall be the responsibility of the applicant to recover the maximum feasible amount of designated recyclable and reusable materials prior to demolition. In order to provide sufficient time for deconstruction, salvage, and recovery, no demolition may take place until a period of *(insert number of working days)* working days has elapsed from the date of issuance of the demolition permit. Recovered and salvaged designated recyclable and reusable material from every project shall qualify to be counted in meeting diversion requirements of Section .03 (Diversion Requirement). Recovered or salvaged designated recyclables and reusable materials may be given away or sold on the premises, or may be removed to reuse facilities for storage or sale.

J. Compliance with this Chapter shall be listed as a condition of approval on any building or demolition permit issued for a Covered Project.

Exemptions:

A diversion deposit and a Waste Management Plan shall not be required for the following (select from the following samples and/or include your own):

1. Work for which a building or demolition permit is not required.
2. New residential projects of less than \$ (insert dollar amount) in value.
3. New non-residential construction projects of less than \$ (insert dollar amount) in value.
4. Residential alterations of less than \$ (insert dollar amount) in value.
5. Non-residential alterations of less than \$ (insert dollar amount) in value.
6. Roofing projects that do not include tear-off of existing roof.
7. Work for which only a plumbing, only an electrical, or only a mechanical permit is required.
8. Seismic tie-down projects.
9. Projects where no structural building modifications are required.
10. Emergency demolition required to protect the public health and safety.

While not required, it shall be encouraged, that at least (insert diversion requirement percentage) of all project-related construction and demolition waste from Exempt projects be diverted.

Section 06.: Waste Management Plan

Prior to starting the project, every applicant shall submit a properly completed “Waste Management Plan” (WMP) to the WMP Compliance Official, in a form as prescribed by that Official, as a portion of the building or demolition permit process. The completed WMP shall contain the following:

- A. The estimated volume or weight of project waste to be generated by material type;
- B. The maximum volume or weight of such materials that can feasibly be diverted via Reuse or Recycling by material type;
- C. The vendor(s) that the applicant proposes to use to haul the materials;
- D. Facility(s) the materials will be hauled to, and their expected diversion rates by material type;
- E. Estimated volume or weight of construction and demolition waste that will be disposed.

Because actual material weights are not available in this stage, estimates are used. In estimating the volume or weight of materials as identified in the WMP, the Applicant shall use the standardized conversion rates approved by the City/County of (insert jurisdiction name) for this purpose. Approval of the WMP as complete and accurate shall be a condition precedent to the issuance of any building or demolition permit. If the applicant calculates the projected feasible diversion rate as described above, and finds the rate does not meet the diversion goal, the applicant must then submit information supporting the lower diversion rate. If this documentation is not included, the WMP shall be deemed incomplete.

a. Approval: No building or demolition permit shall be issued for any Covered Project unless and until the WMP Compliance Official has approved the WMP. Approval shall not be required, however, where emergency demolition is required to protect public health or safety. The WMP Compliance Official shall only approve a WMP if he or she determines that all of the following conditions have been met:

- i. The WMP provides all of the information set forth in this section.
- ii. The WMP indicates that (insert required diversion goal) percent of all C&D waste generated by the project shall be diverted (or new diversion goal set in accordance with the Applicant’s approved Diversion Exemption request); and
- iii. The Applicant has submitted an appropriate Deposit for the project (If a deposit is required by the ordinance).

b. Non-Approval: If the WMP Compliance Official determines that the WMP is incomplete or fails to indicate that at least (insert required diversion goal) percent (or new diversion goal set in accordance with the Applicant's approved Diversion Exemption request) of all C&D waste generated by the project will be diverted, he or she shall either:

- i. Return the WMP to the Applicant marked "Disapproved", including a statement of reasons, and will notify the building department, which shall then immediately stop processing the building or demolition permit application, or
- ii. Return the WMP to the Applicant marked "Further Explanation Required."

Section 07.: Deposit Required

(Note to jurisdictions: Some jurisdictions base the deposit amount on project type, e.g., new construction, demolition, or renovation. In deciding whether to utilize a deposit as part of your ordinance, be aware that general law cities and counties may have some limitations on their use of this enforcement mechanism. You should check with your city attorney's office or county counsel's office before making any decisions on how to proceed.)

As a condition precedent to the issuance of any permit for construction or demolition for a Covered Project, the Applicant shall post a deposit (cash, letter of credit, performance or surety bond, money order) in the amount of \$ (insert deposit amount) for each estimated (insert applicable standard of measurement; e.g., ton of waste, square footage, project cost, fixed amount, etc.) waste, but not less than (insert minimum deposit amount). The deposit shall be returned, without interest, in total or pro-rated, upon proof of satisfaction by the WMP Compliance Official that no less than the required percentage of construction and demolition waste tonnage generated by the Covered project has been diverted from disposal and has been recycled or reused or stored for later reuse or recycling. If a lesser percentage of construction and demolition waste tonnage than required is diverted, a proportionate share of the deposit shall be returned. The deposit shall be forfeited entirely or to the pro-rated extent that there is a failure to comply with the requirements of this chapter. The City/County may, by formal resolution, modify the amount of the required deposit.

Section .08. : On-site Practices

During the term of the Covered project, the Applicant shall recycle and reuse the required percentage of waste, and keep records of the tonnage or other measurements approved by the City/County that can be converted to tonnage amounts. The WMP Compliance Official will evaluate and may monitor each Covered project to determine the percentage of waste salvaged and recycled or reused from the Covered project. For Covered projects including both construction and demolition, diversion of materials shall be tracked and measured separately. To the maximum extent feasible, project waste shall be separated on-site if this practice increases diversion. For construction and/or demolition projects, on-site separation shall include salvageable materials (e.g., appliances, fixtures, plumbing, metals, etc.,) and dimensional lumber, wallboard, concrete and corrugated cardboard.

Section .09. : Reporting

Within (insert number of days) days following the completion of the demolition phase of a Covered project, and again within (insert number of days) days following the completion of the construction phase of a Covered project, the applicant shall, as a condition precedent to final inspection and to issuance of any certificate of occupancy or final approval of project, submit documentation to the WMP Compliance Official that proves compliance with the requirements of Sections .06 (Waste Management Plan) and .03 (Diversion Requirement). The documentation shall consist of a final completed WMP showing actual waste tonnage data, supported by original or certified photocopies of receipts and weight tags or other records of measurement from recycling companies, deconstruction contractors, and/or landfill and disposal companies. Receipts and weight tags will be used to verify whether waste generated from the Covered project has been or are to be recycled, reused, salvaged or disposed. The applicant shall make reasonable efforts to ensure that all designated recyclable and reuse waste salvaged or disposed are measured and recorded using the most accurate method of measurement available.

To the extent practical, all construction and demolition waste shall be weighed in compliance with all regulatory requirements for accuracy and maintenance. For construction and demolition waste for which weighing is not practical due to small size or other considerations, a volumetric measurement shall be used. For conversion of volumetric measurements to weight, the applicant shall use the standardized conversion rates approved by the City/County for this purpose.

If a Covered project involves both demolition and construction, the report and documentation for the demolition project must be submitted and approved by the WMP compliance official before issuance of a building permit for the construction phase of a Covered project. Alternatively, the applicant may submit a letter stating that no waste or recyclable materials were generated from the Covered project, in which case this statement shall be subject to verification by the WMP Compliance Official. Any deposit posted pursuant to Section .07 (Deposit Required) shall be forfeited if the applicant does not meet the timely reporting requirements of this section

Section 10.: Fines/Penalties

(Note to jurisdictions: Some jurisdictions have adopted C&D ordinances that do not include mechanisms for fines or penalties. Others have initially implemented an ordinance without the use of fines or penalties and then added them after a specified time period, or added them when it was determined that compliance with the ordinance could be more effective with fines or penalties used as an enforcement mechanism. General law cities and counties need to consult Government Code sections 25132 and 36901, as well as their respective legal counsel, prior to determining the dollar amounts to use in this section.)

Option One. Fines According to Degrees of Infraction

Violation of any provision of this Chapter may be enforced by civil action including an action for injunctive relief. In any civil enforcement action, administrative or judicial, the City/County shall be entitled to recover its attorney's fees and costs from an Applicant who is determined by a court of competent jurisdiction to have violated this Chapter.

A. Violation of any provision of this Chapter shall constitute an infraction punishable by a fine not to exceed \$ *(insert dollar amount)* for the first violation, a fine not to exceed \$ *(insert dollar amount)* for the second violation within *(insert time frame)*, a fine not to exceed \$ *(insert dollar amount)* for each additional violation within *(insert time frame)*. There shall be a separate infraction for each day on which a violation occurs. Where the violation is the failure to achieve the diversion requirement applicable to the project and the construction and demolition materials from the project have already been disposed, the violation shall be deemed to have ceased after a period of *(insert time frame)* days. The City/County shall recover costs and attorneys' fees incurred in connection with enforcement of this Chapter.

B. Enforcement pursuant to this section shall be undertaken by the City/County through its *(insert compliance official)* and the City/County Attorney.

Option Two- Misdemeanor Violation

Each violation of the provisions of this Chapter shall constitute a misdemeanor, and shall be punishable by imprisonment in the County jail for a time period not to exceed *(insert time frame)* months, or by fine not exceeding *(insert fine amount)*, *(insert fine amount)* or by both such fine and imprisonment. Each day that a violation continues shall be deemed a new and separate offense.

Section 11.: Appeals

(Note to Jurisdictions: Cities/Counties may want to provide for appeals of any determinations made under this Article pursuant to their existing procedures and those of the department responsible for making WMP determinations. Determinations subject to appeal would include, but not necessarily be limited to: (1) the granting or denial of an exemption; (2) whether the applicant has acted in good faith; and (3) the amount of deposit to be released.)

Section 2.: Option to Revise

Beginning , *(insert date)* the City/County will evaluate the Recycling and Diversion of Construction and Demolition Waste Ordinance to determine its effectiveness in reducing the amount of C&D waste disposed. In this determination, the City/County will consider issues such as the amount of C&D waste disposed, volume of C&D activity, markets for C&D waste, and other barriers encountered by applicants. If the City/County determines the C&D disposed had the potential for diversion, then the City may amend these provisions and implement the necessary measures to divert more C&D waste

Section 13.: Severability

If any section, subsection, subdivision, paragraph, sentence, clause, or phrase of this ordinance, or any part thereof, is for any reason held to be unconstitutional, invalid, or ineffective by any court of competent jurisdiction, such decision shall not affect the validity or effectiveness of the remaining portions of this ordinance or any part thereof. The City/County Governing Body hereby declare that it would have passed each section, subsection, subdivision, paragraph, sentence, clause, or phrase of this Ordinance irrespective of the fact that one or more sections, subsections, subdivisions, paragraphs, sentences, clauses, or phrases be declared unconstitutional, invalid, or ineffective. To this end, the provisions of this Ordinance are declared severable.

1. This ordinance is hereby PASSED and ADOPTED by the Governing Body of the City/County of *(insert jurisdiction name)* at a regular meeting on the *(insert day)* day of , *(insert month)* 200 *(insert year)*.

Mayor/Chair, Board of Supervisors

City/County Clerk

ORDINANCE CERTIFICATION

2. STATE OF CALIFORNIA

COUNTY OF *(insert County name)*

CITY OF *(insert jurisdiction name)*

ORDINANCE NO. *(insert ordinance number)*

3. I, , *(insert clerk's name)* City/County Clerk of the City/County of *(insert jurisdiction name)* do hereby certify that the foregoing ordinance was introduced at a regular meeting of the Governing Body held on the *(insert day)* day of 200 *(insert year)* and adopted thereafter at a regular meeting of the Governing Body held on the *(insert day)* day of 200 *(insert year)* by the following vote:

Ayes:

Noes:

Abstained:

Absent:

City/County Clerk *(insert date)*

Published: *(insert date)*

Appendix D: Examples of C&D Ordinances

Examples of C&D Ordinances

Compiled by the California Integrated Waste Management Board

Alameda— Unincorporated, Castro Valley Sanitary District

The sanitary district is located within the Unincorporated Alameda County. The ordinance became effective September 3, 2004. The district's ordinance applies to all construction and demolition projects within the district and all district-sponsored projects. The ordinance distinguishes between large and small projects. Large projects are all construction and renovation projects equal to or greater than \$75,000, and demolition projects with a total area of 1,000 square feet, and all district-sponsored projects, regardless of size. All large project applicants must submit final report forms (FRF) within 30 days of completion of the project, which show they have diverted 50 percent of the waste generated. Small projects are required to be serviced either by the district's franchise hauler or to transport the materials, via self-haul, to a designated C&D facility. Violation of the C&D ordinance may result in fines of at least \$1,000 but not to exceed 3 percent of the total project cost. More information on the ordinance is available at: <http://www.stopwaste.org/docs/cvsd-cb.pdf>

Contra Costa- Unincorporated

The County's C&D ordinance became effective July 8, 2004. The County's C&D ordinance applies to all construction, renovation, or demolition projects that are 5,000 square feet in size or greater. Covered projects are required to reuse, recycle or otherwise divert at least 50 percent of the construction and demolition debris generated on the jobsite. Permit applicants must submit a Debris Recovery Plan prior to receiving a construction or demolition permit and they must submit a Debris Recovery Report prior to receiving a final inspection. If the project fails to meet the diversion requirement or the applicant fails to make a good-faith-effort to meet the diversion requirement, the applicant may be subject to fines and civil penalties. Copies of the County's ordinance, forms, and related information are available at: <http://www.co.contra-costa.ca.us/depart/cd/recycle/debris.htm>

South Lake Tahoe

The City's C&D ordinance applies to all demolition work or activity that exceeds 5,000 sqft and construction-related activities that exceed 5,000 sqft. All permit applicants are required to submit a Debris Recycling Acknowledgment with the permit application. Within 60 days of completion of the project the applicant must submit a Debris Recycling Report demonstrating they have diverted at least 50 percent of the waste generated. If a permit applicant has failed to submit an approved Debris Recycling Report (demonstrating compliance with the diversion goal) for a project within the past 2 years, the permit applicant is required to submit a Performance Security of the lesser of 3 percent of the total project cost or \$10,000 with the Debris Recycling Acknowledgment for the next covered project. Failure to meet the diversion goal may result in forfeiture of the security deposit. For more information see Chapter 8 Section 8-50.1 of the City's Municipal code found at: <http://www.codepublishing.com/municodes.html#CA>

Laguna Niguel

The city adopted a C&D ordinance on October 21, 2003. The city's ordinance applies to all renovations of \$10,000 or greater in value, additions of 250 square feet or \$10,000 in value, all new construction, all demolition projects, and re-roofing projects that involve the removal of an existing roof. Each applicant who applies for a permit for a covered project shall post a security deposit to guarantee performance of the diversion requirements. The security deposit amounts are as follows: \$250 for re-roofing projects that involve the removal of an existing roof, \$500 for renovation projects, \$750 for an addition of an existing structure, and \$1,000 for new construction and demolition projects. Applicants can meet the diversion requirements of the C&D ordinance by either obtaining the services of the city's franchise hauler, which utilizes a C&D material recovery facility (MRF) to separate and recycle the material, or the applicant can submit a waste reduction and recycling plan (WRRP) demonstrating how the applicant will divert 50 percent of the waste generated by the project. If the applicant chooses to submit a WRRP the applicant will be charged a fee for review of the WRRP and the C&D compliance officer shall make available a current approved list of qualified recycling facilities. At the conclusion of a covered project the applicant may apply for a refund of the security deposit. In order to receive a refund the applicant must supply documentation that the applicant used the franchise hauler for all C&D waste services, or that the applicant achieved a 50 percent diversion rate of all C&D waste materials. The city may authorize a partial refund if less than the minimum diversion requirement has been met. For more information see Title 6, Division 3, Article 6 of the city's municipal code located at: <http://www.municode.com/services/mcs-gateway.asp?sid=5&pid=12544>

San Juan Capistrano

The city's C&D ordinance applies to demolition, remodeling, and construction projects over 250 square feet in size and have a value of \$10,000 or more and to roofing projects where the removal of the old roof is required. Single-family dwellings, on a single lot, and not part of a subdivision project, which obtains a C&D demolition drop off box service for the project from a solid waste hauler that holds a franchise for solid waste disposal issued by the City, and using the service for the disposal of all construction and demolition waste from the project that is not reused or recycled at the site of the project are exempt from the requirements of the C&D ordinance. The exemption does not apply to projects of \$500,000 or more, or 5,500 or more square feet. The ordinance requires the diversion of 50 percent of waste from construction and remodeling projects, 50 percent from re-roofing projects, and 50 percent demolition waste including concrete and asphalt and 15 percent of demolition projects excluding concrete and asphalt. Permit applicants are required to submit a completed recycling and waste reduction form and a security deposit valued at 1 percent of the value of the project. As a condition of final inspection and certificate of occupancy builders must submit a final recycling and waste reduction form demonstrating compliance with the diversion requirements. For more information see Title 6, Chapter 3, Sections 6-3.08.01 of the city's municipal code, at: <http://municipalcodes.lexisnexis.com/codes/sanjuancap/> or for an information sheet see: [http://www.sanjuancapistrano.org/uploads/cdinfo.pdf#search='demolition percent20debris percent20amounts percent20per percent20project'](http://www.sanjuancapistrano.org/uploads/cdinfo.pdf#search='demolition%20percent%20debris%20percent%20amounts%20percent%20per%20percent%20project')

Laguna Hills

The city adopted a C&D ordinance in October 2003. The city's ordinance applies to all residential construction, additions, re-models, demolition, and alterations of 1,000 square feet or greater and the similar types of commercial projects of 2,000 square feet or greater, and encroachment permits with projects of 5 cubic yards or greater of debris. All covered projects must submit a waste reduction and recycling plan demonstrating that they will divert at least 50 percent of the waste generated by the project before they can receive a permit. Permit applicants must also submit a security deposit of \$0.20 per square foot not to exceed \$2,500 for residential projects, \$0.35 per square foot not to exceed \$5,000 for commercial projects, and \$500 for encroachment permits. Within 60 days of completion of the project the applicant must submit documentation consisting of a construction and demolition waste recycling and disposal report summary showing that they have met the 50 percent diversion requirement, or have made a good faith effort to meet the requirement to receive a refund of their security deposit. The city may refund only a portion of the security deposit if the applicant fails to meet the diversion requirement. All forms pertaining to the C&D waste recycling program can be accessed on the City's website. For more information see "C&D recycling program" on the city's web site at: http://www.ci.laguna-hills.ca.us/Forms_Documents.asp or Title 5, Chapter 5-48 of the city's municipal code at: <http://municipalcodes.lexisnexis.com/codes/laguna/>

Walnut Creek

The City adopted a C&D ordinance that became effective January 1, 2001. The City's C&D ordinance applies to all construction, demolition, and renovation projects within the City, the total cost of which are, or are projected to be, greater than or equal to \$50,000, or which involve the construction, demolition or renovation of 5,000 square feet or more. No building, site development or demolition permit shall be issued for a covered project unless and until a Waste Management Plan (WMP) has been approved for the project. The WMP must indicate that the required diversion percentage will be achieved (as such percentage may be established from time to time by the WMP Compliance Official) for all C&D debris generated by the project. Within 30 days from completion of any covered project, the applicant shall submit documentation showing the project has met the diversion requirement for the project. If the WMP Compliance Official determines the applicant has not met the diversion goal, or has not made a good-faith-effort to meet the goal, or if the applicant fails to submit the required documentation within the required time frame, they shall be liable to the City for a civil penalty of \$1,000 or 1 percent of the project's cost, whichever is greater. No certificates of occupancy or other permits or approvals relating to the project site shall be issued by the City until the civil penalty has been paid in full. For more information see Title 5, Article 6 of the City's Municipal Code at: http://www.amlegal.com/walnut_creek_ca/
To view WMP and report forms go to: <http://www.ci.walnut-creek.ca.us/header.asp?genericId=2&catId=10&subCatId=834>

For More Information:

The California Integrated Waste Management Board plans to publish a more complete list on the Board's web site in the near future.

The Board's C&D web page is available at: <http://www.ciwmb.ca.gov/ConDemo/>

The Board's C&D web page lists example C&D ordinances, including the Board's model C&D ordinance, a list of C&D recyclers in California, information on sustainable building practices, publications on C&D diversion, and other helpful C&D diversion information.

Appendix E: Consigli's Waste Management Plan

General Contractor:

Project:

Designated Waste Management Coordinator:

WASTE MANAGEMENT GOALS:

- This project will recycle, reuse, or salvage at least XX% of the waste generated on-site.

COMMUNICATION PLAN:

- Waste prevention and recycling activities will be discussed at each job site meeting with GENERAL CONTRACTOR employees and subcontractors.
- All GENERAL CONTRACTOR employees have been notified of GENERAL CONTRACTOR'S Source Separation & Recycling Plan on all GENERAL CONTRACTOR'S projects and are obligated to comply with the plan.
- All GENERAL CONTRACTOR employees and subcontractors will receive a copy of this Waste Management Plan (WMP) for PROJECT NAME.
- The subcontract used for this project clearly requires all subcontractors to comply with GENERAL CONTRACTOR'S Source Separation and Recycling Plan.
- Any incidence of contamination of source separated waste materials by a subcontractor will result in a \$XXX fine (per the subcontract.)
- All recycling containers will be clearly labeled.
- GENERAL CONTRACTOR will submit detailed monthly reports documenting types and quantities (tons) of materials recycled, reused, salvaged, and disposed.

Expected Project Waste & Handling Method:

The following chart identifies the expected waste materials and their expected methods of handling. The handling methods include but are not limited to the following: recycling, reuse, salvage, and disposal. The expected handling methods and/or plan may change if necessary. If additional materials are encountered, they will be added to this chart.

MATERIAL	HANDLING METHOD	PLAN
Asphalt	Recycle	
Brick	Recycle Reuse/Salvage	
Concrete	Recycle	
Concrete with Rebar	Recycle	
Ledge	Recycle	
Metal (steel, aluminum, copper, beverage containers, others)	Recycle	
Metal Doors (36"x70")	Salvage	
Metal Dock Overhead Doors (8'x10')	Salvage	
	Recycle	

MATERIAL	HANDLING METHOD	PLAN
Metal Dock Levelers	Salvage	
	Recycle	
Clean Wood	Recycle	
Wood Stumps	Recycle	
Wood Doors	Salvage	
Gypsum Board (10,000 SF Old Demo)	Dispose	
Gypsum Board – (100,000 SF New generates 10,000 SF Scrap)	Recycle	
Cardboard	Recycle	
Lighting Fixtures (Halide/Sodium Lamps & Recessed Fluorescent Boxes)	Recycle	
Electrical (Conduit & Wiring)	Recycle	
Ceiling Tiles	Recycle	
Carpet	Recycle	
Glass (Glass Block & Windows)	Recycle	
Office Furniture (Panel Desk Cubicles, Metal File Cabinets, Metal Bookcases)	Salvage	
HVAC Duct	Recycle	
HVAC Duct Insulation	Dispose	
Other Insulation	Recycle	
VCT/Linoleum	Dispose	
Other Packaging Material (Plastics, Foam, etc.)	Recycle	
White Paper	Recycle	
Hazardous Materials	Dispose	Disposed by authorized hazardous wastes handler
Misc. Materials & Any Non-recyclable material from above	Dispose	

Appendix F: Directory

ILSR prepared this directory of architectural salvage, reuse, deconstruction, and related firms in Southeastern Pennsylvania for placement on the Unbuild/Rebuild web site (www.unbuild-rebuild.org).

Inclusion of a listing does not constitute ILSR's or DEP's recommendation or endorsement.

The photographs are from the business web sites.



Architectural Antiques Exchange

712 N. 2nd Street
Philadelphia, PA 19123
County: Philadelphia

Phone: 215 922 3669
Fax: 215 922 3680
E-mail: aaexchange@aol.com
Website: www.architecturalantiques.com

Business Description: Retail warehouse offers a large selection of Architectural Antiques dating from the late 1700's through the 1930's. The inventory features architectural elements and antique interior components salvaged from houses of the Metropolitan Northeast, including: fireplace mantels created from wood, marble and other stone, ironwork, lighting fixtures, stained glass, room panels and doors.

Bambi Used Brick

520 E. Fornance Street
Norristown, PA 19401
County: Montgomery

Phone: 610 275 5777

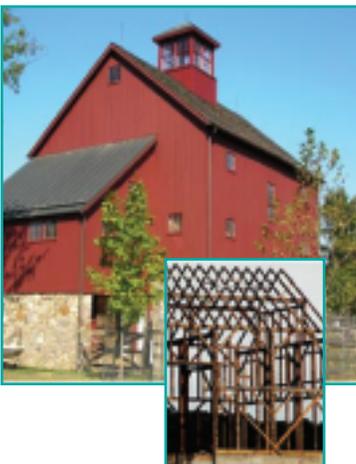
Business Description: Used brick and other building material retail sales.

Brian Murphy Barn Restorations, Inc.

8 Annawanda Road
Ottsville, PA 18942
County: Bucks

Phone: 610 847 2616
E-mail: thebarnguy@aol.com
Website: www.barnguys.com

Business Description: Preserves old barns and timberframed outbuildings. Constructs new frames from recycled wood. Accepts recycled/reused timbers, hardware, stone.





Bucks County TimberCraft Inc.

PO Box 4
Carversville, PA 18938
County: Bucks

Phone: 215 249 3916
E-mail: barnguy1@aol.com
Website: www.buckscountytimbercraft.com



Business Description: Custom design contracting firm specializing in adaptive reuse of old barns into unique homes, pool houses, commercial buildings and community centers throughout the United States. Purchases barns that must be taken down and barnwood from those structures. Maintains a large inventory of antique building materials that includes weathered antique barn siding, wide random width flooring and hand-hewn beams and rustic fireplace mantels.

Construction Waste Management

7333 Milnor Street, Suite 220
Philadelphia, PA 19136
County: Philadelphia

Phone: 215-333-5077
Fax: 215-331-9866
Website: www.cwmanagement.net

Business Description: Full service recycling company for the building industry. Services include: planning, containers, trucking, labor, management, effective material handling equipment, and innovative material collection techniques.





Found Matter

1320 N. 5th Street
Philadelphia, PA 19122
County: Philadelphia

Phone: 215 701 3949

Phone: 866 763 6863

Fax 215 848 1669

E-mail: kbs@foundmatter.com

Website: www.foundmatter.com

Business Description: Retail warehouse that specializes in reuse of distinctive building materials. Architectural salvage inventory includes doors, windows, moldings, and decorative details from houses, warehouses, factories and churches. Also sells original furniture created from re-harvested old growth timber.



Kevin Brooks Salvage

1320 N. 5th Street
Philadelphia, PA 19112
County: Philadelphia

Phone: 215 848 5029

Fax: 215 848 1669

E-mail: kbsalvage@verizon.net

Website: www.kevinbrookssalvage.com

Business Description: Full service materials management company that works with interior and exterior demolition projects. Develops innovative, earth-friendly and cost effective approaches to remove and reuse discarded materials. Identifies the most practical environmental disposal methods for items that cannot be recycled or salvaged.





Provenance

1610 Fairmount Ave.
Philadelphia, PA 19130
County: Philadelphia

Phone (215) 236-6677

E-mail: info@americansoil.net

Website: <http://www.americansoil.net/salvage/index.html>

Business Description: Architectural salvage retail store, open by appointment and on weekends. Items for sale include copper roof ornamentation, hardwood doors and cabinets, Belgian block, decorative ceramic tile, stained glass, marble block and sculpture, and lighting fixtures.

Restore

3016 E. Thompson Street
Philadelphia, PA 19134
County: Philadelphia

Phone: 215 634 3474

Website: www.re-store-online.com



Business Description: Clearing house that offers architectural salvage, deconstruction services as well as design consultations. Accepts tubs, toilets, sinks, plumbing fixtures, lighting fixtures, hardware, mantles, doors, stairwell parts, iron fencing, cast iron ornaments, marble, stone, slate, and tile.

Sable Construction Inc.

1609 N. Delaware Ave
Philadelphia, PA 19125
County: Philadelphia

Phone: 215 427 1462

Fax: 215 427 1796

E-mail: rcw@sableinc.com

Website: www.sableinc.com



Business Description: Mid-size trade contractor whose specialties include: selective demolition, building cleanouts, mechanical and HVAC demolition, and laborer services such as hand excavation and general requirements.



Woodfinder

PO Box 493
Springtown PA 18081
County: Bucks

Phone: 877 933 4637
E-mail: info@woodfinder.com
Website: www.woodfinder.com

Business Description: Web site that lists sources, throughout the United States, of lumber for recycling and reuse. Includes search engine that retrieves information about recycled wood suppliers, organized by geographical area.



Frank's Demolition Salvage

169 Fairview Road
Woodlyn, PA 19094-1808
County: Delaware

Phone: 610 833 5167
Website: www.demolition-salvage.com



Business Description: Salvages architectural artifacts and building materials for resale. Material is obtained from old and historic buildings in Chester County. Pieces for sale include granite horses, steps and caps, marble steps, cast iron radiators, claw foot tubs, blue stone slabs and curbs, keystones, posts, roofs, molded brick, and medium to large stones. Delivery available. A portion of the inventory is posted on the web site.

Building Materials Exchange

124 East Indiana Ave
Philadelphia, PA 19134
County: Philadelphia

Phone: 215 423 3613
E-mail: bme@impactservices.org
Website: www.impactservices.org

Business Description: Nonprofit clearinghouse for surplus and salvage building materials helps needy homeowners rehabilitate, improve, and maintain their homes; makes local pickups free.

HomeStore - Habitat for Humanity of Chester County

1853 E. Lincoln Highway (Caln Plaza)

Coatesville, PA 19320

County: Chester

Phone: 610 466 1890

E-mail: homestore@hfhcc.org

Website: www.hfhcc.org/HomeStoreHome.htm

Business Description: Retail store that offers a variety of building materials for exterior and interior home improvements including windows, appliances, doors, plumbing fixtures, paint, cabinets and furniture.

McHugh Dismantlement Services

PO Box 109

Berwyn, PA 19312

County: Chester

Phone: 610 640 1444

Fax: 610 640 1457

E-mail: mchughdemo@comcast.net

Business Description: Deconstruction company that practices building disassembly for the purposes of recovering building materials for reuse.

Appendix G: Training and Outreach

The DEP grant funded ILSR to prepare a workshop training session based on the project findings and to offer it at least two locations in the state.

Pittsburgh

The first session, Finding Value in Recovered Building Materials, was sponsored in cooperation with Construction Junction, Western Pennsylvania's largest retail warehouse for used and surplus building materials. The event was held on June 8, 2006 (4-7pm) at Construction Junction in Pittsburgh.

ILSR assisted Construction Junction (CJ) in preparing a press announcement that was distributed by the organization to its network of local contacts. Also, PROP emailed the announcement to its membership and posted an event notice on its web site.

Workshop Agenda:

- Welcome/Introductions – Mike Gable
- DEP Project Overview/Philadelphia Challenges – Linda Knapp
- Potential Amount of Recoverable Materials from Remaining NTI houses – Brad Guy
- PSU Research: Value-added products from recovered wood – Brad Guy
- Potential Recoverable Materials from other locations: Camden case study – Neil Seldman
- Policies that support deconstruction/use of recovered materials – Linda Knapp
- Other recommendations – Linda Knapp
- Construction Junction Products and Services – Mike Gable
- Open Discussion with Audience

About twenty people attended the event. Construction Junction staff acknowledged the value of the event in assisting the organization as it explores opportunities for deconstruction and the recovery of more reclaimed materials (see attached letter).

Philadelphia

ILSR decided that it would be most effective in its outreach efforts by giving presentations at specific events for targeted individuals and organizations, rather than inviting a broad range of people to one workshop.

May 19, 2006 – Wallace Robert Todd, LLC (WRT) -- Linda Knapp met with Joe Healy and Maarten Pesch to explore the possibility of including reclaimed building materials in the architecture firm's Stile project, new construction of seven 3-story rowhouses that are expected to be the City's first LEED-certified affordable housing. As a result of the meeting, Jacob Hellman, Habitat for Humanity, gave a presentation to the Market Advisory Committee in July, and the members are working to identify possible reclaimed materials for the project.

May 24, 2006 – Neighborhood Transformation Initiative (NTI) -- Kevin Brooks, the deconstruction project contractor, and Linda Knapp gave a presentation to Tumar Alexander, City of Philadelphia Managing Directors Office; Paulose Isaac, License and Inspection (L&I); and Ben Lewitt, Hill International. The presentation focused on the Susquehanna Deconstruction Project preliminary results and the Market Study findings. ILSR will follow-up with a proposal for the next phase of deconstruction.

June 13, 2006 – Sustainable Business Network (SBN) Steering Committee Meeting – Members responded favorably to the ILSR presentation and are interested in doing future programming that will support the local reuse and deconstruction businesses. They also agree to include a building material recovery section in their next White Paper Policy Report.

June 15 and July 20, 2006 – Delaware Valley Green Building Council (DVGBC) Board Meeting – Several members have expressed interest in being a part of the on-going dialogue between the material recovery businesses and the green building designers to figure out more ways to use reclaimed materials.

June 20, 2006 – Recycling Advisory Council of Philadelphia – the presentation was informational in nature and no immediate follow-up is expected.

CONSTRUCTION JUNCTION

Used & Surplus Building Materials

PROMOTING CONSERVATION THROUGH THE REUSE OF BUILDING MATERIALS

Finding Value in Recovered Building Materials

Presentation at Construction Junction

4:00pm Thursday, 8 June 2006 at Construction Junction

The Institute for Local Self-Reliance (ILSR) in Washington D.C. in partnership with Penn State's Hamer Center for Community Design Assistance has been conducting market development research to assess barriers and opportunities for reusing recovered residential building materials in southeastern Pennsylvania.

The Market Study focuses on:

- The need for an infrastructure that can produce a consistent, steady supply of materials.
- Incentives and promotion to encourage demand for materials by designers, builders, and homeowners.

The study, funded by the PA Department of Environmental Protection, is intended to serve as a resource for the City of Philadelphia and other urban areas interested in exploring ways to increase the recovery of building materials from renovation and demolition for reuse and recycling. Expanding the markets for reclaimed wood, bricks, and other architectural elements will support emerging deconstruction and reuse companies in the region and throughout the state.

Construction Junction, Western Pennsylvania's largest retail warehouse for used and surplus building materials, will provide examples of the operation's successes and challenges in both securing a consistent supply of recovered building materials and marketing that material to homeowners, architects, and contractors.

The presentation of the findings and research will be held at Construction Junction's Gallery on Thursday, June 8, 2006. The presenters include:

- Neil Seldman, ILSR President,
- Linda Knapp, ILSR Senior Program Manager,
- Brad Guy, Director of Operations at Penn State's Hamer Center for Community Design and President of the Building Materials Reuse Association.
- Mike Gable, Executive Director of Construction Junction

Please contact Deb Elliott at Construction Junction, 412-243-5025, with any questions.

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CONSTRUCTION JUNCTION

Used & Surplus Building Materials

PROMOTING CONSERVATION THROUGH THE REUSE OF BUILDING MATERIALS

15 July 2006

Attention: Linda Knapp, ILSR Senior Program Manager
Institute for Local Self Reliance
129 West Gorgas Lane
Philadelphia, PA 19119

Hello Linda,

Your presentation at Construction Junction titled "Finding Value in Recovered Building Materials" was certainly enlightening and well presented. I would like to thank you, Neil Seldman, and Brad Guy for the opportunity to share this information and leave materials behind for us to 'digest'.

The Construction Junction staff was particularly interested in the information and findings concerning lumber and brick. We have been struggling with how best to try to tackle this venue and make it sustainable.

While we have not actually worked through a complete and true "Deconstruction" project, several attendees of the presentation have expressed interest in working with us on a pilot project. These contacts may not have been made so easily, or quickly, had the study not been commissioned, and then presented in this manner. We are pursuing these connections and opportunities. It may take some time for us to develop, nonetheless, the buzz is spreading!

Thank you again for presenting your findings at our facility. We look forward to a continued relationship with the Institute for Local Self Reliance!

My best,



Deborah Elliott, Associate Director
Construction Junction
214 North Lexington Street
Pittsburgh, PA 15208

412-243-5025 (phone)
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