Residential Deconstruction in Buffalo:

A viable alternative to demolition

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Spring 2007

Introduction

The problem of vacancy and abandonment manifests itself in many different ways. Whether it is crime, decreasing property values, loss of tax revenue, neighborhood eyesores, or removing the condemned structures, the City of Buffalo is facing a monumental challenge both in resources and policy. The deconstruction of abandoned homes offers opportunities for cost savings, environmental benefits, and economic development.

An alternative to demolition, deconstruction is the disassembling of buildings in order to salvage and reuse building materials. When used properly, the deconstruction of abandoned homes can be done at a significantly cheaper cost than demolition. Also, deconstruction can limit the amount of harmful air pollutants where the homes are removed in addition to reducing the amount of debris at landfills. Deconstruction is a labor intensive enterprise that creates jobs within the deconstruction crew as well as fosters small businesses selling the salvaged material. Moreover, deconstruction can provide opportunities for youths, job training, and other positive community development programming.

A new local not for profit known as Buffalo ReUse, Inc. has won a request for proposal to deconstruct twenty homes in the upcoming year. Their work this year will provide a demonstration of the numerous benefits deconstruction offers. The City of Buffalo should work closely with Buffalo ReUse to develop an accurate assessment of the costs of deconstruction and a guide to what buildings in Buffalo are ripe for

deconstruction. Also, the City should take this summer as an opportunity to create a more useful analysis of the demolition costs for various homes in the City.

In order for deconstruction to be effective, the right buildings must be identified. Currently, homes in Buffalo are sent to the demolition list after city inspection or through the housing court. The proper training of the inspectors and education of the community can enable the creation of a deconstruction list of buildings where deconstruction is likely to be successful.

Buffalo's Housing Stock

While some neighborhoods in Buffalo remain attractive and stable, most of the neighborhoods have suffered from a loss of population and neglect. The Buffalo Comprehensive Plan attributes this to a loss of jobs in the city, out migration into the suburbs, and an increase in the number of families living below the poverty line. This has left Buffalo's housing stock in a desperate state.

In 2000, Buffalo had 145,574 housing units, of which nearly 84,000 or 58% were built prior to 1940.[1] Many are of frame construction, but have been subject to dilapidation, blight, and abandonment. In 2000 the city had 8,684 abandoned residential structures.[2] Since 1995, the City of Buffalo has spent 30 million dollars to demolish 4,500 homes.[3] The City has planned 1000 demolitions each year for the next ten years.

[1] City of Buffalo Comprehensive Plan

[2] Id

[3] Blueprint Buffalo. National Vacant Properties Campaign. (2006)

Without a doubt, the City of Buffalo will be spending an incredible amount of money to continue to address the issue of abandoned residential buildings. Any opportunity to reduce those costs deserves a serious and thorough examination. Any opportunity to reduce the costs while providing environmental, economic, social and community benefits should already have been examined.

Deconstruction

In contrast to demolition, where buildings are knocked down and materials are either land filled or recycled, deconstruction involves carefully taking apart portions of buildings or removing their contents with the primary goal of reuse. Deconstruction can take place prior to standard demolition, be an integral part of demolition, or largely take the place of conventional building removal.[4]

The different materials available for reuse include both structural and non-structural. Structural materials are building components such as framing, sheathing, roof systems, brick and masonry, wood timbers, beams, rafters, and floor joists.

Any community should seek the potential and opportunities offered with deconstruction: (1) creating job training and job opportunities for unskilled and unemployed workers, (2) fostering the creation and expansion of small businesses to handle the salvaged material from deconstruction projects, (3) benefiting the environment by diverting valuable resources from crowded landfills into profitable uses, which in turn

[4] A Guide to Deconstruction. US Department of Housing and Urban Development. NAHB Research Center, Inc. Upper Marlboro, MD. (2000).

enables deconstruction to pay for itself by generating revenues and reducing landfill and disposal costs, and (4) reuse of salvaged material for new affordable housing projects. [5]

Despite all of the potential and benefits of deconstruction, most cities, like Buffalo, still employ only demolition as a means of removing abandoned residential structures. Deconstruction must be considered as a viable alternative.

Buffalo ReUse

Deconstruction efforts in Buffalo were non-existent until Buffalo ReUse arrived. Buffalo ReUse, Inc is a new community development organization offering job training, material reclamation, and community development organization. Buffalo ReUse hopes to offer deconstruction as a competitive alternative to the demolition currently employed by the City of Buffalo. Buffalo ReUse will operate a deconstruction crew as well as a retail warehouse for salvaged materials.

Michael Gainer, founder of BR, arrived in Buffalo a little over a year ago with the intention of initiating a leadership and job training program for young people, ages 18 – 24. After a few months in Buffalo, he began to more thoroughly understand the complex challenges of vacant properties. The lack of alternatives to demolition combined with an urgent need created the right ingredients to launch Buffalo ReUse in May 2006. Since

[5] A Report on the Feasibility of Deconstruction: an investigation of deconstruction activities in four cities. US Department of Housing and Urban Development. NAHB Research Center, Inc. Upper Marlboro, MD. (2001).

then, a committed team of volunteers have been networking with city officials and community organizations, training with a re-use consultant with extensive experience and cutting edge techniques in deconstruction, and developing an organizational structure that will facilitate the start-up of business operations.

Buffalo ReUse recently was awarded a $200,000 grant from New York State in order to conduct a "Research and Development" phase. This phase will be accomplished through a City of Buffalo "request for proposals" for the deconstruction of twenty abandoned homes that Buffalo ReUse expects to win. The results of the yearlong phase will serve as evidence of the jobs likely to be created from the deconstruction, the expected quantity and value of materials salvaged from each building deconstructed, and the approximate cost of deconstructing each building.

Demolition vs. Deconstruction in Buffalo

Direct Economic Costs

The City of Buffalo is expected to send tens of millions of dollars on addressing the abandonment crisis. How that money is spent is not immutable; however it appears at this point that nearly of all will be spent on the demolition of structures. Unless there is evidence of feasible deconstruction opportunity, it is unlikely that the City will change its course.

The City's current cost for demolition averages $17,000[6] for each residence. However, that cost includes both asbestos contaminated and non-contaminated homes. Buildings requiring the removal of asbestos cost an average $35,000.[7] Buildings without asbestos average a demolition cost of only $8,000.[8] The different numbers make a simple comparison of demolition to deconstruction impossible. The real approach is to create accurate assessment of demolition costs of the specific homes to be deconstructed and/or locate comparable structures and record the costs.

Buffalo ReUse has prepared a conservative budget indicating the expected costs of the deconstruction of twenty homes. The expected direct cost for the deconstruction is $15,096.35 per house.[9] The direct cost includes labor, supplies, and equipment type expenses and does not include the amount recovered from salvage. Within the ReUse budget is a net per structure organizational cost of $24,670.55, which includes every

[6] City of Buffalo Citistat

[7] Id

[8] Id

[9] Buffalo ReUse State Grant Budget (2007)

expenditure the organization will have.[10] The expected salvage material revenue is a total of $80,000 or $4,000 per building.

The Buffalo ReUse budget is a conservative expected budget and should be treated merely as a "worst case scenario" guide, when in reality, the project's outlook is much more favorable. For instance, the state grant was for 200,000, not the 100,000 dollars the budget is based on. Also, as is explained below, the revenue from salvaged materials may be higher than 80,000 dollars because Buffalo's housing stock includes so many wooden framed homes built prior to 1940. In addition, the case study below demonstrated an average salvage value of $3.28 per square foot of deconstructed structure. If that is true for Buffalo ReUse, the revenue for salvaged material would be $131,200.

Provided with the support of public dollars, Buffalo ReUse has an opportunity to keep this year's deconstruction efforts competitive with demolition. Without the continued public financial support, any deconstruction effort will have to find a way to deconstruct the homes for less than $15,000 or $24,000 and recover more than $4,000 from the resale of materials. Based on deconstruction case study, both of those goals are likely to be met.

From August 1999 through May of 2000, the University of Florida's Center for Construction and Environment (CCE) deconstructed six wood framed residential

[10] Id

structures in Gainesville, Florida.[11] Each building was estimated for demolition costs by local demolition contractors in order to provide a comparison to deconstruction and salvage. The buildings ranged from 1000 to 2000 square feet and were both one and two story homes. Three buildings required removal of asbestos floor tile and one required the removal of asbestos gypsum wall board.

The six properties were available for deconstruction for several reasons. Two were on property planned for immediate new commercial or residential development. Two were on property that was part of a long-term redevelopment plan. Two were abandoned homes on land not slated for any redevelopment.

The CCE analyzed the economic vitality of the deconstruction of each house. The demolition costs were estimated based on observations of demolitions, case studies, the EPA Report, "Characterization of Construction and Demolition Wastes in the United States" and information provided by local demolition contractors. The cost comparison included disposal costs, labor and equipment, and supplies. Each house comparison was done by an estimated net demolition cost and a gross deconstruction cost, before salvage, and net deconstruction cost, post salvage. The net deconstruction cost for each house was the gross cost minus the amount recovered with salvageable material.

[11] Guy, B. Building Deconstruction: Reuse and Recycling of Building Materials. Center for Construction and Environment. Gainesville, FL (2000).

While the average initial cost for deconstruction was 26% higher than the demolition costs, *after salvaging material the net deconstruction cost were an average 37% less*. The six different buildings produced vastly different comparisons, but each deconstruction was cheaper than the estimated demolition costs. Of the six houses, one had a very high salvaged material profit. Another had almost none. One house had a net deconstruction cost of almost zero and another had a cost almost equal to the demolition cost. The different outcomes on the houses are indicative of the importance of building assessment to determining where to use deconstruction.

For instance, the first house, 2930 NW 6th Street, had an estimated salvaged material amount of $9,415.00 or $4.67 per square foot. Meanwhile, another house, 711 NW 7th Ave, had an estimated salvaged amount of $555.73 or $0.39 per square foot. The reasons for this discrepancy are that 711 NW 7th was in the poorest condition of any of the structures and also had the lowest amount of salvage. It was not considered an economically viable deconstruction and was used in the study only because of availability and to remove a hazard to the nearby owner and the neighborhood.

In addition, the buildings net deconstruction costs ranged from just under the estimated demolition costs to dramatically less at nearly zero. Specifically, 2812 NW 6th Street, had nearly equal demolition and deconstruction costs. The demolition costs were $5316.73 or $4.29 per square foot, and the net deconstruction cost was $4829.31 or $3.90 per square foot. The savings from deconstruction at this house is estimated at merely $487.42 or $0.39 per square foot. However, other houses indicated incredible savings via deconstruction. For instance, 901 SR 301 had an estimated demolition cost of $4506.96

or $4.54 per square foot. The net deconstruction cost was a remarkable $390.88 or $0.39 per square foot. In this instance the deconstruction almost made money instead of costing over five thousand to demolish.

Importantly, the CCE study identified a potential concern with deconstruction. That is the grading of the reused lumber. Most building codes require a certain grade lumber to be used in construction. So, having a method to grade the salvaged lumber will make the resale significantly more profitable. The CCE study produced over 500 pieces of 2x4, 2x6, and 2x8 lumber which was regraded by the Southern Pine Inspection Bureau. While noting that the sample, 500, was too small to make broad conclusions, the implications were less than promising. Only 17% of the pieces received the top two grades of dense structural select or structural select. However, 92% of the pieces were able to upgraded with cleaning and trimming to a number 2 or better, which the CCE claims makes them usable in some part of every construction. Also, terminate damage is a very common problem in Florida and may not be here in Buffalo. At the very least, the CCE grading demonstrates that it is possible to re-grade the salvaged wood.

Environmental and Health Benefits

Structural demolition results in an increase in air pollution.[12] The demolitions in Buffalo currently occur much more frequently in Buffalo's minority, low-income, urban

[12] Scheff, Peter. (2006) Demolition of high-rise public housing increases particulate matter air pollution in communities of high-risk asthmatics. Journal of Air and Waste Management Association. July 2006.

communities, where the incidence of asthma is the highest. Where demolition by implosion is used there have been peaked increases in local concentrations of particulate matter.[13] Mechanical demolition of structures is accomplished using heavy equipment, such as the wrecking ball, pneumatic jack, and excavator. Although this would be expected to produce lower peak exposures, structural demolition takes place over weeks, compared with the near-instantaneous implosion method. This may increase local concentrations of particulate matter over an extended period of time in areas where residents of adjacent buildings continue to reside.[14] The inhalation of particulate matter has been found to cause higher rates of respiratory conditions such as asthma. Continuing to use this type of demolition will further the negative health impacts on Buffalo's communities, many of which are already suffering.

Deconstruction, by contrast, does not implode or use heavy wrecking equipment on the homes it hopes to salvage. While there will be some demolition associated with each deconstruction, the amount of containments and particulate matter will decrease.

Also, deconstruction can address the large amounts of construction and demolition waste going to the landfills and help federal, state, and local governments achieve recycling and solid waste diversion goals. As more and more space is being taken by landfills there is more and more pollution of the soil, air and ground water.

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[13] Id.

[14] Id.

[16] Id

Salvaging materials instead of throwing them in a landfill offers vital long term environmental benefits.

Community and Economic Benefits

Deconstruction has the potential to turn the liability of abandoned homes into a community and economic development opportunity. There are possible benefits to a city's use of deconstruction that make the enterprise cost effective even where the direct costs exceed the demolition costs.

Demolition is much less labor intensive than deconstruction. This means that when deconstruction is conducted the public funds go toward jobs instead of tipping fees at a landfill. Deconstruction activity has served as job training when partnered with building labor organizations to create "pre-apprenticeship" programs. The training can be targeted at segments of the population unemployed and most in need of job skills. Many skills from deconstruction can easily be transferred into other professions such as construction, electricians, and skilled laborers.

Deconstruction also can serve as a youth development program. Processing materials for salvage requires a great deal of unskilled labor. For instance, the denailing of lumber and sorting of materials both can be accomplished by youth. Americorps volunteers have performed these roles in some deconstruction experiences.

Adopting more deconstruction also will foster the creation of small business involved in the resale of the materials. While the material can often be sold right at the deconstruction site, there still must be a retail location to place the materials into the

market. Like all small businesses, deconstruction retail stores would help drive the local economy. In addition to jobs, retail operations have performed social work as well. For instance, one was able to use a work release program to run the store and processing warehouse. This program was successful in replacing convicted persons back into the workplace and the community.

In January of 2001 the NAHB Research Center, INC, (NAHB) prepared a report for the United States Department of Housing and Urban Development on the feasibility of deconstruction as an economic development tool.[17] NAHB examined the deconstruction activity in four cities, El Paso, Texas; Miami, Florida; Milwaukee, Wisconsin; and Nashville, Tennessee. The report demonstrates how deconstruction could complement community objectives as well what circumstances create successful deconstruction

Milwaukee, Wisconsin

Of the four cities, Milwaukee was noted for having the most deconstruction related activity. Several factors created the environment for deconstruction. There exist strong reuse markets in and near the city. Milwaukee has a large number of vacant properties deconstructionists can choose from and an extensive network of not-for- profit

[17] A Report on the Feasibility of Deconstruction: an investigation of deconstruction activities in four cities. US Department of Housing and Urban Development. NAHB Research Center, Inc. Upper Marlboro, MD. (2001).

organizations focusing on housing related issues. In Milwaukee an organization called REEhouse INC has been able to use community service workers to deconstruct residential structures and reuse the material for new affordable housing.

Importantly, public sector support was very high in Milwaukee. Milwaukee has built deconstruction and resale of salvaged materials into the Community Development Block Grant money, via the Hope VI HUD program, and has since been able to sustain successful deconstruction and resale organizations. Deconstruction training programs were usually dependent on state, local government or private foundation funding support. A combination of state or local government support covered transportation, supervision, and other administrative costs related to one non-profit structural deconstruction-related training program in Milwaukee. Non-structural deconstruction training programs were seen to be slightly less reliant on local government financial support than structural deconstruction.

Milwaukee also incorporated training in high skilled professions. Through a collaboration of local Laborers Union and the Community Service Corps, a pre-apprenticeship program was established for the deconstruction projects. Many of those participants are now laborers within the union.

Miami, Florida

In Miami, the Miami-Dade Public Schools has used a deconstruction approach for their adult education programs in restoration and renovation. Primarily non-structural deconstruction techniques were incorporated as a component of these training programs.

While Miami was successful in using a population with high unemployment to perform the low-skill, non-structural deconstruction, the high priority for job training was in the skilled professions, like construction, technology, or service industries.

El Paso, Texas

The experience in El Paso has been very successful with non-structural deconstruction. Non-structural deconstruction is salvaging items for demolished homes such as doors, fixtures and other more cosmetic items. Housing preservation policies made structural deconstruction quite rare. Also, local officials strongly discouraged reuse of materials in new construction due to questions about the standard of housing.

Nashville, Tennessee

In Nashville, one resale not for profit was able to offer tax credits to contractors who donated used materials. Also, the same organization used a work release program to provide opportunities for convicted criminals while securing affordable and reliable labor. However, due to housing preservation policies, most of the material is non-structural. One exception was brick, which was used for new residential construction. The report noted that the market for used brick was strong locally and nationally for all cities.

The conclusions of the report include that there are a limited number of metropolitan areas where structural deconstruction is feasible as an economic

development program. Housing preservation policy, environmental contamination, code issues, reuse markets, and project time constraints all impact the feasibility of structural deconstruction. Structural deconstruction is highly dependent on the demolition market. Only high-end structural deconstruction used material markets, in rare, high quality brick and timbers, were seen to be consistent. The best candidates for structural deconstruction initiatives were metropolitan areas with a surplus of vacant, deteriorated properties, many of which were constructed prior to 1950.

The information provided by the four cities demonstrates that deconstruction occurs in metropolitan areas with one or more of the following conditions; (1) a large number of vacant, deteriorated properties that are constructed prior to 1950; (2) a strong accessible reuse market including export markets and large metropolitan areas with a consistent demand for used building materials; and (3) non-profit programs that are focused on achieving both social and environmental objectives.

Conclusion: Building Assessment

The case studies and estimates on the demolition costs versus deconstruction costs lead to one key conclusion: the feasibility of deconstruction depends on the individual building. Therefore, it is essential that buildings be assessed for deconstruction. This assessment can come from deconstruction contractors in order to bid on deconstruction "requests for proposals," or cities can train their inspectors on how to look for buildings viable for deconstruction and offer RFPs for deconstruction of those buildings.

The types of buildings that make good candidates for deconstruction are easily distinguishable with some training for inspectors. These buildings are best if they are wood framed with heavy timbers or beams, or with some kind of unique wood that will be marketable.[18] Also, the better deconstruction buildings include some specialty materials such as hardwood flooring, multi-paned windows, architectural moldings, or unique doors and fixtures. Another valuable asset the building can possess is high quality brick with mortar that is easily removed without breaking the brick. Lastly, the building must have been structurally sound enough to keep the elements from causing rot and decay of valuable materials.

When examining a potential building for deconstruction, the examiner should be aware of the local circumstances in order to provide an accurate assessment. For instance, knowledge of what the salvaged material market is like for different products is essential to understanding the likelihood of successful deconstruction. Beyond the market, the examiner should be aware of the methods and materials associated with residential construction.

Sadly, every deconstruction attempt will be forced to rely on speculation as to the salvaged material value. However, trained and systematic assessment can provide enough information to make large scale deconstruction a successful cost savings or even profitable enterprise.

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[18] A Guide to Deconstruction. US Department of Housing and Urban Development. NAHB Research Center, Inc. Upper Marlboro, MD. (2000).

One way for deconstruction to be truly successful in Buffalo is for the City to build deconstruction into the whole demolition process. Specifically, city inspectors or the housing court should assess the viability of deconstruction when there is a home that is beyond rehabilitation and needs to be removed. Ideally, the City of Buffalo would have a "deconstruction list" of homes that require removal and after inspection appear to be a good candidate for deconstruction.

Deconstruction is a more effective use of public money than demolition when practiced on the right house. Although deconstruction will have a higher initial investment on each house, after the revenue from salvaged material it can be significantly cheaper than demolition. Deconstruction also has environmental benefits a government should feel obligated to seize. Limiting the amount of demolition will decrease air pollutants in lower income communities most troubled by the pollutants impact. Also, the reuse of building materials will slow the amount of demolition debris at landfills and resulting air, water, and soil contamination. Finally, deconstruction can serve as a tool of social progress and economic development. Deconstruction creates jobs, provides job training, engages youth, fosters small business, and creates a new market for reused material. The potential benefits of deconstruction clearly outweigh any unlikely increase in cost. The potential certainly warrants an exploration of deconstruction by the City.

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