TECHNICAL MEMORANDUM
BROWNFIELDS SUSTAINABILITY PILOT
CITY OF CLEVELAND
May 12, 2009

1.0 OVERVIEW

The U.S. Environmental Protection Agency (EPA) Brownfields Program empowers states, communities, and other stakeholders to work together to prevent, assess, safely clean up, and sustainably reuse brownfields. Under this program, EPA's Brownfields Sustainability Pilots are providing technical assistance to support communities in achieving greener, more sustainable assessment, cleanup, and redevelopment at their brownfields projects. EPA selected the City of Cleveland, Ohio, for a Brownfields sustainability pilot. As part of this pilot, Tetra Tech EM Inc., (Tetra Tech), through a subcontract to SRA International, Inc., provided assistance to the City of Cleveland (the City) to address demolition and deconstruction, site preparation, and cleanup issues at specific sites in the Cleveland area and to document the lessons learned at these sites relevant to demolition and deconstruction planning and implementation.

The City has identified as many as 1,700 abandoned and vacant buildings for demolition in 2009, an increase from the 1139 properties demolished in 2008. In fact, demolitions have increased by an order of magnitude since 2005 when 195 properties were demolished. (Totals for 2006 and 2007 were 225 and 950, respectively).

The purpose of this pilot was to examine lessons learned in Cleveland about the feasibility of deconstruction as an alternative to demolition of abandoned and vacant buildings in the City. Tetra Tech worked with David Ebersole and Nate Hoelzel from the Cleveland Department of Economic Development Brownfields program to establish goals for the pilot and to set up meetings and interviews with appropriate stakeholders involved with brownfields sites in the City. EPA Headquarters and EPA Region 5 also participated in project planning. Stakeholders interviewed included:

- City staff in the Office of Sustainability (Andrew Watterson), and the Department of Health (Annie Snyder and Willie Bess)
- Representatives from Hard-Hatted Women (HHW) (Kelly Kupcak and Shelly Richmond), a non-profit workforce development program for women in trades and technical careers
- The owners of C and J contracting (Randy and Jim Crawford), experienced demolition contractors

- A representative of Rosby Resource Recycling (Joe Rettman), a for-profit company in the post-deconstruction building materials reuse market
- Two deconstruction contractors, Chris Kious, owner of A Piece of Cleveland, and David Bennink, owner of Re-Use Consulting of Bellingham, Washington.[1]

Discussions during the stakeholder interviews focused on identifying options for maximizing reuse and recycling at future deconstruction sites while ensuring sound environmental management of all materials. Also explored during the stakeholder meetings were the following:

- Overcoming regulatory challenges to deconstruction
- Integrating demolition and deconstruction planning into Requests for Proposals for site developers and designers
- Identifying potential vendors to support demolition and deconstruction in the Cleveland area.

In addition, Tetra Tech toured city sites where deconstruction had been completed or was underway, including one of the City's deconstruction initiative sites in an urban, residential neighborhood.

This technical memorandum presents (1) an overview of Cleveland's current deconstruction initiative goals and (2) lessons learned (in the Cleveland area) and potential strategies for addressing lessons learned. The lessons learned and potential strategies are organized into five general categories:

1. Procurement.
2. Contract specifications.
3. Participation.
4. Portfolio management.
5. Materials marketplace.

Attachment A contains a photolog from the brownfields deconstruction site visit.

[1] Inclusion of vendor names in this report does not constitute endorsement by the EPA or the City of Cleveland.

2.0 DECONSTRUCTION INITIATIVE GOALS

Initial discussions between David Ebersole, Nate Hoelzel, and Tetra Tech focused on the City's short- and long-term goals for the City's Deconstruction Initiative, which was initiated in summer 2007. The City's most important short-term goal was to begin applying deconstruction methodologies to Cleveland's rapidly growing 2009 brownfields and abandoned structures portfolio. Along with construction waste, demolition debris constitutes one of the largest waste streams entering Cleveland area landfills, and local landfill space is dwindling quickly. Diverting demolition debris from landfills through deconstruction is an action that City can take to preserve landfill space for non-recyclable municipal refuse.

Increasing the number of successful deconstruction projects in 2009 will provide the City with data to seek additional grants and other sources of funding for more deconstruction projects, a second goal for the deconstruction initiative. Additional funding will result in a wider array of deconstruction experience, which the City plans to publicize in order to attract community interest and additional participants both locally and regionally. Despite the current depressed state of the real estate development industry, an established deconstruction program will be a critical part of the City's sustainable growth goals when the market recovers.

The City's long-term goals for the deconstruction initiative include incorporating deconstruction methods into all aspects of brownfields redevelopment and into citywide demolition strategies. Addressing vacant buildings (through removal) and thus stabilizing Cleveland neighborhoods is also an initiative goal. A future long-term goal may also include establishing numerical landfill diversion targets for construction and demolition debris. Deconstruction pilot data will help to determine annual targets, which should increase incrementally each year. To support an effective deconstruction program, the City may need to consider development or revision of relevant regulations, ordinances, or administrative policies. Such revisions may take time to establish formally; however, some may be informally applied through the ongoing deconstruction initiative. Compelling data from the pilots may ease adoption of these institutional actions.

Another long-term goal discussed was the City's desire to provide educational materials and other technical resources to residents for their own residential remodeling projects. Teaching homeowners how to salvage and reuse building materials can save residents money on materials and disposal costs; it will also incorporate citizens as partners in achieving the City's landfill diversion goals.

Education is also an important part of another long-term City goal, which is to introduce "design for deconstruction" for new buildings. A slowly growing, nationwide school of construction thought is showing architects and developers how to build structures while planning for their ultimate deconstruction. If the City is successful in encouraging deconstruction and incorporating more recovered materials into new buildings, landfill disposal of some materials could be delayed or conceivably avoided altogether.

Based on these goals and the data collected from stakeholder interviews, site visits, and additional research, Tetra Tech identified five "Lessons Learned" in various categories specific to the City of Cleveland's current deconstruction program and plans for further progress. Several potential strategies for addressing each of these lessons learned and accomplishing the City's deconstruction objectives were also developed. Deconstruction methods are rapidly changing and improving, so effectiveness of any implemented strategies must be periodically re-evaluated.

3.0 LESSONS LEARNED AND POTENTIAL MITIGATING STRATEGIES

The following sections describe five "lessons learned" during the evaluation of the City of Cleveland's deconstruction program, and provide potential strategies for mitigating the lessons. Table 1 provides a narrative summary of the lessons learned and their corresponding strategies.

3.1 PROCUREMENT

Lesson Learned: Some City procurement procedures can prevent wide use of deconstruction on City projects.

City staff have identified hurdles in the City's procurement program, particularly an antiquated procurement approach originally established for conventional construction projects such as bridges or structures. Only a decade ago, waste management and disposal were not considered major cost items on construction or demolition projects because of the low tipping fees at local landfills. Now, waste management and disposal take up a significant proportion of a project's cost due to stringent waste characterization requirements and increasing transportation costs to distant landfills. Only recently have municipalities included requirements for waste management plans in construction/demolition bid packages, and the plans still typically focus on removal and disposal of waste. Bid instructions have typically pushed responsibility for compliance with state and local waste regulations to the bidders, forcing the bidder to default to the cheapest approach: disposal of all materials in permitted landfills rather than segregation of contaminated materials from reusable materials.

Table 1
Summary of Lessons Learned and Potential Mitigating Strategies

LESSONS LEARNED	POTENTIAL MITIGATING STRATEGIES
1. PROCUREMENT	
Some City procurement procedures can prevent deconstruction from being widely used on City projects.	• Establish a City construction and demolition (C&D) waste management plan that would set policy (including deconstruction goals) for all City and non-City projects. • Benchmark language from other cities' C&D procurement regulations. • Ensure all City contracts include a requirement for contractor submittal of waste management plans. • Include deconstruction goals and requirements for reporting and tracking diverted or recycled material in every City construction, remodeling, and demolition contract. • Base deconstruction requirements on project threshold levels to prioritize City resources and engage participants.
2. CONTRACT SPECIFICATIONS	
City contract specifications can reduce incentives for or practicality of deconstruction.	• Ensure all contracts or contract templates are reviewed by City Department of Sustainability or Economic Development for (1) inclusion of deconstruction requirements and (2) removal of language that may discourage deconstruction. • Explore project "bundling" to create economies of scale for contractors to more efficiently perform deconstruction. • Encourage additional pilots and innovative methods by providing permitting and regulatory flexibility.
3. PARTICIPATION	
Many stakeholders are interested in improving deconstruction, but their energy and efforts need integration.	• Initiate a deconstruction/demolition roundtable with industry to develop the materials aftermarket and invite founding companies (e.g. Rosby's) to facilitate regional brainstorming sessions or charettes. • Identify or train deconstruction specialists to help contractors inventory reusable material prior to bidding or to bid the deconstruction project separately from the demolition. • Establish and support a local "Waste to Profit Network" to explore synergies and material exchange. • Establish a list of prequalified contractors to bid for deconstruction projects. • Provide incentives for participation of low-income and minority training entities in deconstruction projects. • Improve participation of local foundations.
4. PORTFOLIO MANAGEMENT	
The City's universe of deconstruction candidate sites need better management to improve custodianship of the buildings, minimize vandalism and stripping of reusable material, and prioritize property with the greatest potential and interest for deconstruction.	• Consider a new mechanism for City portfolio management ("custodianship") by benchmarking other cities' "abandoned building" programs. • Map future "opportunity areas," designate "pre-approved sites," and conduct preliminary deconstruction assessments and materials inventories before need for managing diverted materials arises. • Prevent vandalism of abandoned sites and create a method to allow immediate salvage.
5. CREATING A MARKETPLACE FOR MATERIALS	
The market for reusable materials is volatile, making deconstruction projects time-sensitive and financially risky.	• Establish and maintain a directory of recyclers or entities that will receive reusable materials (or contribute to and support the Ohio Environmental Protection Agency's directory). • Use financial incentives to encourage recycling and reuse businesses to operate in the region. • Integrate deconstruction with the City's long-term real estate development and stimulus plans. • Create a local market for reused materials through City purchasing policies.

Potential Mitigating Strategies

- **Establish a City construction and demolition (C&D) waste management plan that would set policy (including deconstruction goals) for all City and non-City projects.** A C&D waste management plan would specify the City's goals for reduction and reuse of C&D wastes, and would include policies and programs to achieve the overall goals. Most importantly, the plan would describe the City's intent to raise its own reduction and reuse percentages through its procurement procedures.

  The C&D waste management plan would be posted on the City website and would be updated periodically as City needs evolve. For example, the section of the plan that describes and encourages deconstruction could present the City's numerical targets for percentage of deconstruction projects undertaken each year in the City. Additionally, the plan could contain a Construction and Demolition Debris Recycling Directory to help users locate reuse, recycling, and composting businesses; the plan also could include a C&D recycled product guide. The C&D plan would be particularly applicable to programs such as the Cleveland vacant properties initiative and the Brownfields development program.

- **Benchmark language from other cities' C&D procurement regulations**. Many examples of C&D ordinances exist, and several contain procurement requirements for addressing C&D debris reuse in order to comply with municipal diversion goals. These regulations and requirements could be adopted or modified for use in the City's procurement program. For example, communities in the State of California have adopted a wide variety of ordinances and policies in order to achieve the State's required 50 percent waste diversion goal. In addition, many communities require demolition contractors to (1) register with the city and (2) certify in contractor bid proposals contractor qualifications and equipment for safely recovering recyclables from C&D debris while minimizing adverse effects of these operations on the surrounding environment.

- **Ensure all City contracts include a requirement for contractor submittal of waste management plans.** Best management practices for waste can be applied to almost every type of contracted service the City may procure. Demolition contracts are obvious candidates, but a waste management plan should be required for every construction (and remodeling) contract. For example, conventions and festivals necessitate extensive temporary construction and generate large amounts waste such as shipping and packaging materials, carpeting, and timbers. Waste management plans should be required for all these activities to widen the range of opportunities for achieving the City's diversion goals. Templates for waste management plans are available from several municipalities that implement them. Attachment B contains a Waste Management Plan template and a planning checklist used in King County, Washington, to meet the County's C&D diversion goals (Solid Waste Division, King County, Washington [SWD King County] 2004).

  Requirements for contract reviews of City projects for waste management plans can be incorporated into the City's regulations. Existing City regulations specifically address demolition contract requirements but do not mention deconstruction. Recommended changes for Title XIII, Chapter 3115 – "Demolition and Moving" include adding a requirement that the permit holder submit a waste management and disposal plan for proposed construction or demolition projects, and that the plan include a description of opportunities for deconstruction if possible. Subcontractors should also be required to make good faith efforts to conform to the contractor's waste management plan.

- **Include deconstruction goals and requirements for reporting and tracking diverted or recycled material in every City construction, remodeling, and demolition contract.** As part of their waste management plans, City contractors would complete inventories of potentially reusable materials and propose diversion goals for their projects. To set preliminary deconstruction goals for a project, the City could also apply a material inventory tool such as that developed for the EPA Brownfield deconstruction pilot program (Tetra Tech 2009). Using the inventory tool would provide the City with an estimate of the potential value of reclaimed materials for negotiating demolition contracts.

  During the project, contractors would track progress toward meeting the goals through manifests or load tickets from haulers or by counting the number of roll-off boxes or recycling containers removed from the project. Tracking the amount of recyclable material coming onto the site is a good way to confirm diversion rates using mass balance calculations.

  Although keeping hard copy logs of waste diversion amounts is the simplest means for contractors to track compliance with their diversion goals, the City could consider Web-based, real-time reporting by contractors who could upload data from mobile devices. This would provide frequent feedback to program participants on the success of the projects, and could serve future, real-time material exchange programs.

- **Base deconstruction requirements on project threshold levels to prioritize City resources and engage participants.** Costs of deconstruction methods are decreasing relative to conventional demolition methods. Depending on the reuse market, deconstruction can even save money for a project. The City should consider establishing a minimum project size for requiring waste management plans with deconstruction goals and including that threshold in the City's C&D plan. The size of a project (based, for example, either on square footage or cost of project) would determine whether the project meets the threshold, and this threshold should be included in the City's master C&D plan. Establishing a project threshold would help the City prioritize staff and resources for review, and help contractors expedite their projects.

  Moreover, the City should encourage and support building materials reuse whenever project owners are willing to do so. In fact, a project threshold notwithstanding, requiring deconstruction on smaller projects such as household remodeling should not create barriers to community redevelopment. Financial incentives for deconstruction could still be made available to projects under the threshold.

  Several California cities provide examples of deconstruction project thresholds:

  - City of Oakland, CA: C&D project planning and reporting is required for all projects with costs over $150,000.

  - Hawthorne, CA: All private and city projects encompassing a gross floor area exceeding 10,000 square feet must comply with the city C&D recycling resolution.

  - Alameda County (California) Waste Management Authority (ACWMA): Municipalities within the County are encouraged to adopt the ACWMA model ordinance, which recommends that all construction, demolition, and renovation projects equaling or exceeding $50,000 in total costs should comply with the C&D planning and reporting requirements.

3.2 CONTRACT SPECIFICATIONS

Lesson Learned: City contract specifications can reduce incentives for or practicality of deconstruction.

Demolition contractors rely almost exclusively on contract specifications when providing cost estimates for demolition work. Even if the City has policies in place providing incentives or encouragement to perform deconstruction, unless these are specifically referenced in a bid specification, contractors will not include deconstruction costs in their bids, except as contingencies. If the City subsequently requests an awardee to add deconstruction to the scope of work, an expensive change order is more than likely because few demolition contractors are currently equipped to perform deconstruction. In addition, bid specifications sometimes default to referencing codified regulations or ordinances, such as the ordinance below from Chapter 321 of Title V – Community Development Code pertaining to City demolition contracts. If referenced in a bid specification, this ordinance would appear to discourage deconstruction on City projects (note underlined sentence).

> ***321.08 Contracts for Demolition of Existing Buildings and Structures***
>
> *It is hereby determined that the public improvement of the site clearance by the demolition of existing buildings and structures upon lands acquired, or in the process of being acquired, pursuant to the plan for the development, renewal, rehabilitation or conservation of an area in the City, shall be made by contract duly let to the lowest responsible bidder after competitive bidding for a gross price in accordance with the provisions of the Charter and these Codified Ordinances. More than one building, structure or premises may be included in the invitation to bid, and in such event, the bidder shall be asked to submit a proposal on each, all or any combination thereof. <u>The specifications for such work shall provide that no building or structure shall be removed from the premises in whole or in substantially whole condition but shall be demolished on the premises</u>, that the bidder shall furnish evidence of sufficient equipment and personnel for the speedy performance of the work, that the time for completion of the work shall be fixed by the City and that the City reserves the right to limit the number of contracts awarded to any one bidder in order to insure the speedy completion of the site clearance of any such area. The Director of Community Development is hereby authorized and directed to enter into such contracts as are awarded by the Board of Control in conformity herewith.*

Potential Mitigating Strategies:

- **Ensure all contracts, contract templates, or bid specifications are reviewed by the City Department of Sustainability or Economic Development for (1) inclusion of deconstruction requirements and (2) removal of language that may discourage deconstruction.** To the extent that adequate staff resources are available, each City contract should be reviewed to assure that it meets the intent of the City Construction and Demolition plan (above). If templates for the most commonly awarded contracts can be developed as part of the City C&D plan, reviewers

would not need to review an entire contract, instead focusing on the specific contract section and thus streamlining their review.

One source of ideas for contract review criteria are the demolition contractors themselves. City contractors have already identified inconsistencies in past City demolition contracts that attempted to encourage deconstruction and the contractors have offered to help the City establish deconstruction specifications for future efforts. Two examples of how standardized specifications can hinder deconstruction were identified at the recent deconstruction pilot at the Stanard Elementary School:

- First, demolition contracts have typically given the contractor possession of all salvaged materials from a demolition project. This has allowed the contractor to balance the financial benefit of salvaging marketable materials against the cost of time and labor for quick demolition. The Stanard Elementary contract specified that high-quality materials such as bricks and timbers were to be distributed free to the local residents. This removed the financial incentive for bidding contractors to carefully deconstruct the building and decreased the potential number of bidders for the less-profitable job. Contract specifications could be written to pay the contractor for the time needed to salvage clean, usable wood, timbers, and brick, but require the contractor to bear disposal costs for any materials the contractor could not salvage. This would encourage the contractor to carefully deconstruct a building and also ensure that the maximum volume of waste is diverted from landfills.

- Second, contract specifications called for a "clean site" at completion, so bricks, concrete, and timbers unwanted by the community had to be hauled from the site. The specification also called for "clean backfill and topsoil." The better alternative might have been to build flexibility into the final site conditions based on likely future use of the property. In some cases, clean topsoil may be unnecessary at properties designated for future excavation and redevelopment. Instead of mounting two costly and polluting transportation efforts (one to remove brick, concrete, and timbers, and another to import clean fill material), the contractor could crush the bricks and concrete on site and use the material to level the site. Likewise, timbers could be shredded into mulch for reuse on site.

Attachment C contains a building deconstruction specification used by the Solid Waste Division, King County, Washington that details requirements for contractors' deconstruction activities (SWD King County 2004). The specification mandates that the contractor submit a deconstruction plan; inventory salvageable material before beginning work; and report the amounts of material salvaged, reused, and disposed of at project conclusion. This specification also indicates that all salvaged material becomes the possession of the contractor. Another useful specification is "WasteSpec" developed by the Triangle J Council of Governments (Triangle J) near Research Triangle Park, North Carolina (Triangle J 1995). This detailed specification (122 pages) covers all divisions of the Construction Specifications Institute. Although the WasteSpec program is currently inactive, the WasteSpec document provides a comprehensive resource for deconstruction stakeholders (ftp://ftp.tjcog.org/pub/tjcog/regplan/solidwst/wastspec.pdf).

- **Explore project "bundling" to create economies of scale for contractors to more efficiently perform deconstruction.** Because abandoned or troubled properties tend to accumulate in neighborhoods, the City should consider letting demolition contracts for "bundles" of several buildings, increasing potential for significant material salvage by contractors and ensuring stronger competition. When several adjacent buildings are candidates for deconstruction, the contractor can lower costs significantly by taking down one building, then using the vacant

property to stage and accumulate reusable material—demonstrated at the Cleveland deconstruction initiative site where large roll-off boxes were placed on a vacated lot and used to segregate salvaged material as the remaining building was deconstructed. Representatives from A Piece of Cleveland and Re-Use Consulting both noted the improved flexibility to deconstruct buildings when on-site accumulation space was available. Deconstruction crews could work freely on the building knowing that the site did not have to be "picked up" at the end of each day. Accumulating reusable materials into full loads reduces the number of trips from the project, decreasing transportation costs and environmental impact on the neighborhood. Securing multi-property deconstruction sites with fencing or on-site security may be necessary to prevent vandalism and theft of valuable materials. Neighborhood residents also recognize that benefits of deconstruction exceed those of demolition, including less noise and dust.

- **Encourage additional pilots and innovative methods by providing permitting and regulatory flexibility.** The City has increased its deconstruction knowledge base significantly since initiating deconstruction pilots in 2007. However, more pilots are needed to collect waste diversion data and identify additional approaches and associated efficiencies. For example, permit exemptions and innovative deconstruction techniques at the Cleveland deconstruction pilot site in 2008 revealed that the time to deconstruct an abandoned home can be reduced from several weeks to as little as one or two weeks. In addition, this pilot encouraged allowance for one-time exemptions from waste disposal regulations in order to utilize on-site materials scheduled for removal, such as crushing concrete and bricks for backfill and non-structural quality timbers for hardscaping. Data from successful pilots can be used to determine principles to be included in the City's C&D plan, as well as needed changes to city demolition, construction, and procurement ordinances.

  In Cleveland, few health regulations directly pertain to deconstruction. However, improper handling or storage of deconstruction materials can trigger nuisance codes administered by the Department of Public Health (DPH). If a contractor plans to accumulate and store deconstructed materials on site for future use, DPH should participate in the review of the project waste management plan to ensure the plan contains responsible, long-term storage techniques that avoid the spread of contaminants in lead-based paint or friable asbestos, as well as eliminate potential for mold growth.

3.3 PARTICIPATION

Lesson Learned: Many stakeholders are interested in improving deconstruction, but their energy and efforts need integration.

A common theme during the stakeholder interviews was that each group wanted to contribute more to the deconstruction initiative, but that individually, they lacked the influence or authority to bring other stakeholders to the table. Most stakeholders looked to the City for additional integration of the various groups.

Potential Mitigating Strategies

- **Initiate a deconstruction/demolition roundtable with industry and other stakeholders to develop the materials aftermarket and invite founding companies (e.g. Rosby's) to facilitate regional brainstorming sessions or charettes.** Most stakeholders in the Cleveland area deconstruction market know each other, and several have established business relationships with one another. However, an extended meeting or workshop with all stakeholders has not been attempted. With the City as facilitator, several of the more troublesome deconstruction issues could be discussed and all participants could be surveyed for their solutions. Joe Rettman, of Rosby's Resource Recycling, has significant experience speaking to and educating others in the development, construction, and demolition industry; he is a potential candidate to help facilitate such an event. If successful, the stakeholder meeting could become a regular event and could provide the City with a source of advice as it develops its C&D policies, goals, policies and plans. The roundtable could also share resources and ideas within the group and promote and educate new members in an ongoing manner.

- **Identify or train deconstruction specialists to assist contractors to inventory reusable material prior to bidding, or bid the deconstruction project separately from the demolition.** Demolition contractors find it expensive to maintain and deploy the knowledge for recognizing reusable material, as well as the experience for deconstructing and sorting the material for transport and sale. One model for addressing this issue has been developed by the Land of Sky Regional Council in the Asheville, North Carolina area. The Council administers the Waste Reduction Partners program, which is a volunteer team of engineers, architects, and scientists who help businesses and industries in the region with no-cost waste and energy reduction assessments and technical assistance (http://www.landofsky.org/wrp/index.htm). Another approach suggested by stakeholders is to train and rely upon historical preservation specialists or representatives from the Architectural Board as resources and possible overseers of deconstruction projects.

- **Establish and support a local "Waste to Profit Network" to explore synergies and material exchange.** Cleveland could encourage C&D diversion by using a materials exchange model that has been successful in other cities and regions. In the Chicago metropolitan area, reuse and recycling businesses collaborate with local manufacturers in the Waste to Profit network (www.wastetoprofit.org). The program is a collaboration of the City of Chicago's Department of Environment and the Chicago Manufacturing Center, a nonprofit consulting group. Close to 200 participating companies have identified synergies for converting large amounts of waste material from one or more companies into useable products. City of Chicago departments also participate in these efforts. An example of material synergies is diverting rubber and plastics from waste streams and converting them into rubber sidewalks, curb stops, and soundproofing walls.

- **Establish a list of prequalified contractors to bid for deconstruction projects.** The contractor's cost to prepare demolition bids can sometimes be significant, particularly when the contractor must submit extensive proof of qualifications, experience, and a long list of general business requirements such as insurance, training, and commitments to minority business partners. Prequalification of several contractors can speed mobilization of deconstruction crews to sites—important for deconstruction at sites vulnerable to theft of salvageable materials or that are subject to rapid redevelopment goals. The prospect of a steady stream of deconstruction work associated with prequalification as a demolition contractor can also encourage a contractor to develop and maintain staff deconstruction training and experience.

The City of Chicago Department of Buildings "Fast Track Abatement" program prequalifies contractors and then rotates assignment of demolition projects to contractors, avoiding a lengthy procurement process. Contractors are required to periodically recompete for prequalification status. The added benefit to the City of Chicago is that this program can be used for "buy ins" from other City of Chicago departments lacking resources to conduct their own procurements.

- **Provide incentives for participation of low-income and minority training entities in deconstruction projects.** Currently, the Cleveland deconstruction market is not broad enough for low-income and minority training entities like Cleveland's HHW to develop a specialized deconstruction training track for low-income/minority programs. Such groups rely heavily on funding from foundations such as the Cleveland Foundation, and their focus is generally to provide low-income and minority workers with support and job-placement assistance to start them on well-paid, construction trade tracks. HHW graduates can perform demolition activities, but specialized funding from a foundation or a joint venture agreement with a qualified demolition contractor would be needed to train deconstruction specialists. Incentives the City could provide might include subsidizing on-the-job training for program graduates on City deconstruction projects or offering the contractor a bid preference for including the minority training entity (much like a subcontractor) in the contractor's bids. However, the barriers that the City has historically faced when trying expand these programs must still be overcome, including:

    - Union issues
    - Living Wage regulations for all City work
    - State and federal "prevailing wage" requirements when deconstruction is bundled with Economic Development activities.

- **Improve participation of local foundations.** A good number of innovative and pilot programs like the City of Cleveland's deconstruction initiative are supported by local foundations, but continuing participation often requires evidence of a sustainable program that will serve a long-term purpose. The City and other stakeholders can utilize pilot program data and results to make a business case that deconstruction is one long-term approach to Cleveland's landfill capacity crisis. Without far-reaching, non-disposal waste options, it will be difficult for Cleveland to attract new development or sustain redevelopment efforts at Brownfields.

3.4 PORTFOLIO MANAGEMENT

Lesson Learned: The City's universe of deconstruction candidate sites needs better management to improve custodianship of the buildings, minimize vandalism and stripping of reusable material, and prioritize property with the greatest potential and interest for deconstruction.

The City of Cleveland has developed an extensive portfolio of abandoned or financially-distressed properties that are candidates for deconstruction, and this portfolio is likely to increase given the current economic situation and housing market. City procedures to establish ownership and custodianship of abandoned properties are sometimes time-consuming and impose barriers to quick action. Abandoned, unsecured buildings are quickly vandalized and stripped of valuable reusable material, reducing the

building's value to demolition or deconstruction contractors. The vandalism can also create unsafe operating conditions for deconstruction crews entering the property to salvage any remaining reusable material.

The City's regulations pertaining to demolition of property may create barriers to deconstruction. For example, Section 321.09 of the Community Development Code insists that an unsafe building be demolished (see underlined text):

> *321.09 Demolition of Unsafe Buildings*
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> *Any building or structure within a community development area upon premises included in the program of acquisition by the City pursuant to a community development plan adopted and approved, which constitutes a hazard to the public health and safety by reason of noncompliance with the provisions of these Codified Ordinances relating to building and housing, or by reason of non-occupancy, abandonment or otherwise shall be demolished in the manner prescribed in Section 321.08. (Ord. No. 1492-66. Passed 12-12-66, eff. 12-14-66)*

Potential Mitigating strategies:

- **Consider a new mechanism for City portfolio management ("custodianship") by benchmarking other cities' "abandoned building" programs.** The City of Chicago's Fast Track Abatement program (also known as the Fast Track Demolition or FTD ordinance), is one example of a program that could be evaluated for application in Cleveland. Through the ordinance, Chicago is authorized to address buildings that are vacant, open, or a community hazard while avoiding the time-consuming process of seeking court-ordered demolition. Using these powers, the City of Chicago can board, repair, or demolish residential and commercial buildings up to three stories. To facilitate the actions, Chicago maintains a pre-qualified group of "Fast Track" demolition contractors that can mobilize within a day after receiving a notice-to-proceed.

- **Map future "opportunity areas," designate "pre-approved sites," and conduct preliminary deconstruction assessments and materials inventories before need for managing diverted materials arises.** As the result of several national catastrophes, disaster management planning has moved to the forefront of most municipalities' planning exercises. This new and intensive planning provides an opportunity to incorporate deconstruction as a waste management strategy in the City's disaster plan. The Department of Economic Development could work with the City's disaster management planner to identify neighborhoods or other areas in the City most vulnerable to property damage on a large scale and thus potential sites of large amounts of debris and deconstructed building materials after a catastrophe. More importantly, the Department could work to ensure that ***diversion***, not disposal, is the first priority in the appropriate disaster management plan sections. Having a policy in place as part of the disaster plan would (1) encourage deconstruction and reuse of building materials and (2) establish and advance the City's response priorities so that the City would be more likely to receive Federal Emergency Management Agency (FEMA) reimbursement for these activities. The California Integrated Waste Management Board (CIWMB) has developed an extensive planning document for integrating waste diversion into disaster planning. Chapter 2 of this document provides a step-by-

step planning process to identify the kinds of debris generated by a particular disaster and proposes debris diversion programs for cities to consider (http://www.ciwmb.ca.gov/disaster/disasterplan/chp2.htm). In addition, FEMA has issued *Debris Removal Guidelines for State and Local Officials from FEMA and Debris Management Course, Reference Manual* (FEMA 1991), which can help the City incorporate its waste diversion goals into its disaster plan. Federal requirements for Disaster Assistance – Debris Removal can be found in Chapter 44, Part 206.224 of the *Code of Federal Regulations*.

The City of Los Angeles offers an interesting approach to debris management after disasters that devastate large city areas or neighborhoods. Dubbed the "Ghost Town policy," City of Los Angeles regulations allow for Los Angeles to assume liability for private property that has been abandoned by the owner; Los Angeles exercised this authority after the Northridge earthquake in 1994. The City of Los Angeles boarded up, cleaned, and fenced abandoned properties in entire neighborhoods soon after the earthquake to address public health, safety, and vandalism issues. The actions also thwarted any urban blight that might have taken hold when so many properties were unoccupied. Specific to debris management, Los Angeles further developed a training guide for waste haulers and educated them on City of Los Angeles preferred sites to which debris would be hauled and deposited. Recycling facilities were given higher preference than facilities that accepted mixed wastes. The training emphasized this preference to the haulers because despite the recyclability of the material they were hauling and the fact that the City bore the brunt of disposal costs, they may have preferred to haul to disposal facilities on familiar routes with available truck scales.

- **Prevent vandalism of abandoned sites and create a method to allow immediate salvage.** Like many other cities, Cleveland struggles to prevent stripping of valuable materials from unsecured and abandoned homes and other buildings while administrative processes are implemented to notify owners and enforce code violations. The City of Chicago uses its Vacant Buildings Program to address troubled buildings. Chicago concluded that any vacant buildings in a neighborhood can create problems, but that "open" or unsecured buildings created the worst public safety issues. Under the program, a group of city departments (Police, Buildings, Law, and Housing) work together to secure open buildings while legal ownership issues are worked out. The process starts with citations issued to owners for failure to secure the building and subsequent inspections by Department of Buildings staff. Citations on multiple dates increase potential penalties on owners and often compel action. If the building is not secured, the Department of Law prosecutes through administrative hearings, seeking fines and orders to secure the buildings, which the City can carry out itself while the Housing and Law departments proceed with their legal actions.

3.5 CREATING A MARKETPLACE FOR MATERIALS

Lessons Learned: The market for reusable materials is volatile and fluctuates with the real estate market, making deconstruction projects time-sensitive and financially risky. The marketplace for reclaimed materials generally follows the real estate and development markets—evidenced in the downturn since late 2008. A lack of ongoing development has resulted in decreased need for ***any*** building materials, including reclaimed building materials. However, planning for a recovering economy provides an excellent opportunity to plan for new redevelopment techniques, such as deconstruction and materials reuse, to replace the old established techniques of using virgin materials on greenfield sites.

Potential Mitigating Strategies:

- **Establish and maintain a directory of recyclers or entities that will receive reusable materials (or contribute to and support the Ohio Environmental Protection Agency's directory).** The Ohio Environmental Protection Agency maintains a directory of recycling businesses or non-profit agencies in the State of Ohio that will receive recycled materials. For example, the Habitat for Humanity ReStore accepts donated building materials and tools and sells them at reasonable prices to the community (http://www.clevelandhabitat.org/Restore/). Because of Cleveland's size and regional impact, it may be more cost-effective for the City to contribute to and participate on the State's site, rather than create a new and separate Cleveland recycler list (www.epa.state.oh.us/ocapp/p2/recyc/debris.html).

- **Use financial incentives to encourage recycling and reuse businesses to operate in the region**. The success of the deconstruction industry directly relates to the success of other recycling and reuse businesses in Cleveland. Local recycling and reuse markets are necessary to make deconstruction financially viable, because if recycling costs are significantly higher than local disposal costs, commercial and private haulers will make disposal their primary waste management strategy.

  Several municipalities have used waste hauling fee structures to reduce landfilled waste and to improve outcomes for new recycling and reuse businesses. In San Jose, California, the permit for one landfill requires the landfill to offer lower rates for source-separated materials than for mixed loads, providing the waste generators with incentive to render their loads more recyclable. Other municipalities and regions with exclusive waste hauling franchises have required that recycling rates be lower than comparable landfill rates (as much as 25 percent in some communities). Franchise contracts can also be structured to maximize waste diversion for exclusive and non-exclusive franchisees. For example, in Monrovia, California, the fee for non-exclusive haulers is directly proportional to the level of recycling achieved by the franchisee: the higher the diversion rate, the lower the franchise fee charged to the company. Use of this structure in other cities would result in submittal of more disposal and reuse information by waste haulers to cities, giving the cities more information upon which to base new franchise contracts.

- **Integrate deconstruction with the City's long-term real estate development and stimulus plans.** The current state of the economy is directly reflected in a sagging real estate market. This provides Cleveland with an opportunity to review all new initiatives, including those for planned stimulus funds, for their deconstruction potential. New construction, renovation, and demolition will all be part of the City's redevelopment strategy, and all three activities provide opportunities for incorporating deconstruction and building material reuse. Moreover, integrating deconstruction methods into projects underway in Cleveland may reduce capital costs and free funds for additional property development.

- **Create a local market for reused materials through City purchasing policies.** The City of Cleveland's purchasing power can be put to use to create an increasing market for reused materials through the initiation of an environmentally preferential purchasing program (EPP). The program could encompass all City procurement ranging from office supplies to heavy equipment from the outset but a more manageable approach might be to institute a pilot purchasing program just for building materials. An interim policy could require that City purchasing departments and City contractors track and report the purchase of reclaimed building materials. This would generate information to develop an effective City-wide purchasing policy that could include increasing goals for purchases of reclaimed building materials. Two excellent resources for establishing sustainable purchasing policies are the California Integrated Waste

Management Board's State Agency Buy Recycled Campaign (http://www.ciwmb.ca.gov/BuyRecycled/StateAgency/Creating.htm) and the U.S. EPA's Environmentally Preferable Purchasing program (http://www.epa.gov/epp/pubs/products/construction.htm).

4.0 REFERENCES

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ATTACHMENT A

PHOTOGRAPH LOG
CLEVELAND DECONSTRUCTION INITIATIVE
NOVEMBER 11, 2008

Photo 1 – Cleveland Deconstruction Initiative – Removal of House Panel

Photo 2 – Cleveland Deconstruction Initiative – Removal of House Panel

Photo 3 – Cleveland Deconstruction Initiative – Panel Placement for Hand Dismantling

Photo 4 – Cleveland Deconstruction Initiative – Floor Removal

Photo 5 – Cleveland Deconstruction Initiative – Wall Removal

Photo 6 – Cleveland Deconstruction Initiative – Wall Panel Placement for Dismantling

Photo 7 – Cleveland Deconstruction Initiative – Reclaimed Material Storage

Photo 8 – Cleveland Deconstruction Initiative – Hand Dismantling

ATTACHMENT B

WAST MANAGEMENT PLAN TEMPLATE AND PLANNING CHECKLIST
SOLID WASTE DIVISION
KING COUNTY, WASHINGTON

Waste Management Plan Checklist

- **Analyze project waste**
  - Estimate types and quantities of waste the project will generate at different stages

- **Check to see what can be recycled/reused onsite (wood, soil, rock, concrete, etc.)**

- **Decide how you will recycle**
  - Can you arrange the job site to accommodate several containers?
  - Do you have the equipment to self haul?
  - How often might you need your containers picked- up?

- **Research recycling options**
  - Check out the Construction Recycling Directory
  - Call recyclers and ask them:
    - What materials do you accept?
    - Is co-mingled recycling available?
    - What are my collection options & costs?
    - If I self-haul, can I drop off, and if so, what about tipping fees?
    - Do you provide receipts to track recyclables?
    - Do you set up and provide training?

- **Decide what you will recycle at the jobsite**

- **Determine your costs**
  - Compare the cost of disposing waste with the cost of recycling

- **Write out the waste management plan**
  - Which materials will be salvaged or reused on site
  - Which materials will be recycled
  - How materials will get to the recycler
  - Names of responsible crew member/team
  - Your projected savings

- **Set up and monitor**
  - Clearly designate recycling bins
  - Post list of what is recyclable and what is not
  - Keep bins close to where waste is generated but not in traffic pattern
  - Provide hauler and crew with site plan
  - Check recycling bins daily for contamination
  - Check garbage dumpsters daily for misplaced recyclables
  - Call for pick-up before boxes are full
  - Require quantity and cost tickets to track results and savings

- **Make your program work**
  - Start early: Incorporate a recycling program from the start to guarantee success
  - Communicate your waste management plans to crews, subs and suppliers as they come on-site
  - Include recycling requirements in all subcontracts and purchase orders
  - Post quantities of materials reused and recycled
  - Track your savings
  - Encourage suggestions from supervisors and crew
  - Reward employees
  - Make use of available resources and directories

Construction Works

Recognizing jobsites that recycle and reduce waste

King County
Department of
Natural Resources and Parks

Resource Venture

For jobsites in King County, outside Seattle:
Kinley Deller – King County Solid Waste Division
206-296-4434 kinley.deller@metrokc.gov

For jobsites in Seattle:
Karen Price – Resource Venture
206-389-7281 karenp@resourceventure.org

WASTE MANAGEMENT PLAN

Company:
Project:

Designated Recycling Coordinator:

Waste Management Goals:

- ❑ This project will recycle or salvage for reuse ___% [e.g. 75%] by weight of the waste generated on-site.

Communication Plan:

- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____

Expected Project Waste, Disposal, and Handling:

The following charts identify waste materials expected on this project, their disposal method, and handling procedures.

Deconstruction/Demolition Phase

Material	Quantity	Disposal Method	Handling Procedure

Construction Phase

Material	Quantity	Disposal Method	Handling Procedure

ATTACHMENT C

MASTER CONSTRUCTION SPECIFICATION
SOLID WASTE DIVISION
KING COUNTY, WASHINGTON

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Deconstruction and removal of **[selected portions of] [entire]** building or structure for salvage.
   2. Deconstruction and removal of **[selected]** site elements for salvage.
   3. Demolition and removal of selected portions of building or structure for disposal.
   4. Salvaging items for reuse by Owner.

B. Related Sections:
   1. Division 01 Section "Construction Waste Management and Disposal" for disposal of demolished materials.

1.2 DEFINITIONS

A. Full Deconstruction: Removal by disassembly of a building in the reverse order in which it was constructed.

B. Selective Deconstruction: Disassembly and removal of selected portions of building or structure.

C. Salvage: Removal of disassembled building materials for the purpose of reuse or recycling.

D. Demolish: Remove and legally dispose of off-site.

1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, deconstruction waste becomes property of Contractor.

1.4 SUBMITTALS

A. Qualification Data: For deconstruction firm.

B. Schedule of Deconstruction Activities: Indicate the following:
   1. Detailed sequence of deconstruction and removal work, with starting and ending dates for each activity.
   2. Interruption of utility services. Indicate how long utility services will be interrupted.
   3. Coordination for shutoff, capping, and continuation of utility services.
   4. Use of elevator and stairs.
   5. Locations of proposed dust- and noise-control temporary partitions and means of egress.
   6. Means of protection for items to remain and items in path of material removal from building.

C. Inventory: After deconstruction is complete, submit a list of items that have been salvaged, recycled and disposed of and documentation (receipts/scale tickets/waybills) showing the quantities.

D. Deconstruction Photographic Documentation: Document general condition of materials to be salvaged prior to removal.

E. Submit deconstruction plan prior to start of work.

1.5 QUALITY ASSURANCE

A. Deconstruction Firm Qualifications: Company(ies) experienced and specializing in performing the Work of this Section with documented experience in similar types of deconstruction work.

B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
   1. Comply with noise and dust regulations of authorities having jurisdiction.

C. Pre-Deconstruction Conference: Conduct conference at Project site. Review methods and procedures related to deconstruction including, but not limited to, the following:

1. Inspect and discuss condition of building to be deconstructed.
2. Review structural load limitations of existing structure.
3. Review and finalize deconstruction schedule and verify availability of materials, personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by deconstruction operations.
5. Review areas where existing construction is to remain and requires protection.
6. Review method for removing materials from the site.
7. Review staging area for materials on the site.

1.6 PROJECT CONDITIONS

A. Hazardous Materials: It is unknown whether hazardous materials will be encountered in the Work.
   1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.

B. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during deconstruction operations.
   1. Maintain fire-protection facilities in service during deconstruction operations.

1.7 DECONSTRUCTION PLAN

A. Material Identification: Indicate anticipated types and quantities of materials to be salvaged, recycled, and disposed of. Indicate quantities by weight or volume, but use same units of measure throughout.

B. Procedure: Describe deconstruction methodology, sequencing, and materials handling and removal procedures. Include the anticipated final destination of each material.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of deconstruction required.

C. Inventory and record the condition of items to be removed and salvaged.

D. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during deconstruction operations.

E. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or videotapes.

F. Perform surveys as the Work progresses to detect hazards resulting from deconstruction activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during deconstruction operations. **<omit for complete building removal>**

B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct deconstruction operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to workers and damage to salvageable materials.
   1. Provide protection to ensure safe passage of workers around deconstruction area.
   2. Provide weather protection for all salvage materials (and items to remain) before, during and after deconstruction.

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required [to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain] **<omit for complete building removal>**, [and/or to prevent unexpected or uncontrolled movement or collapse of construction being deconstructed].
   1. Strengthen or add new supports when required during progress of deconstruction.

3.4 DECONSTRUCTION

A. General: Deconstruct and remove existing construction in accordance with the materials identified for removal in the deconstruction plan. Use methods required to complete the Work within limitations of governing regulations and as follows:
   1. Proceed with deconstruction systematically, from higher to lower level. Complete deconstruction operations above each floor or tier before disturbing supporting members on the next lower level.
   2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing, prying or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain **<omit for complete building removal>.**
   3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
   4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
   5. Maintain adequate ventilation when using cutting torches.
   6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site in accordance with all federal, state and local regulations.
   7. Remove structural framing members in such a way as to maintain their highest value.
   8. Locate deconstruction equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
   9. Dispose of demolished items and materials promptly.

B. Salvaged Items:
   1. Sort and organize salvaged materials as they are removed from the structure.
   2. Pack, crate or band materials to keep them contained and organized.
   3. Store items in a secure and weather protected area until removed from the site or transferred to Owner.
   4. Transport items to Owner's long-term storage area [**on-site**] [**off-site**] [**designated by Owner**] [**indicated on Drawings**] **<if Owner is to maintain ownership of salvaged materials>**.
   5. Protect items from damage during transport and storage **<if Owner is to maintain ownership of salvaged materials>**.

C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during deconstruction activities. When permitted by Architect, items may be removed to a suitable, protected storage location during deconstruction and cleaned and reinstalled in their original locations after deconstruction operations are complete. **<omit for complete building removal>**

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them.
   1. Do not allow demolished materials to accumulate on-site.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
   3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
   4. Comply with requirements specified in Division 01 Section "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by deconstruction operations. Return adjacent areas to condition existing before deconstruction operations began.

3.7 SALVAGED MATERIALS FOR REUSE BY OWNER SCHEDULE

A. Existing Items to Be Removed and Salvaged: <**Insert description of items to be removed and salvaged for reuse by Owner.**>

END OF SECTION