

U.S. Forest Service: Urban Wood Disposition Pay-for-Success Feasibility Report

PREPARED BY QUANTIFIED VENTURES | APRIL 26, 2018

1875 Connecticut Avenue, 10th Floor
Washington, D.C. 20009
www.quantifiedventures.com

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1.0 Executive Summary

For the past eight months, Quantified Ventures, with support from the U.S. Forest Service (USFS), has worked to assess the feasibility of Pay for Success (PFS) financing to help scale an urban wood economy in Baltimore, which would focus on market creation for wood waste from “fresh cut” of trees for utility maintenance, public, and private purposes, and reclaimed wood from deconstruction of vacant houses, as well as on reclamation of vacant land for beneficial environmental and community purposes. It is through the scaling of deconstruction, that an incorporation of “fresh cut” material into the business model can be explored. The proposed intervention would produce other social and environmental outcomes as well, particularly related to workforce development opportunities targeted at a prison population in pre-release, the most critical time for human services support to ensure inmates are set up to succeed, find employment, and avoid going back to prison once released.

The PFS approach offers a number of benefits over traditional financing, because payments are tied to the successful achievement of social or environmental outcomes, allowing multiple beneficiaries to share in the financing and transfer risk of performance to investors, and because it allows for an evidence base to be built for interventions as a necessary component of the transactions. These benefits, and our analysis of the scope of the blight problem in Baltimore, the intervention, and the economic valuation and cost-benefit analysis of the expected outcomes it would produce, successfully compelled three Maryland State Departments to participate in issuing a Social Impact Bond (SIB) using the PFS approach. We have obtained their commitment and interest and are on track to commence transaction structuring. Details of the proposed transaction are listed in Table 1 below. The proceeds from the SIB would allow Humanim to explore the feasibility of incorporating a “fresh cut” line of business, following the frameworks we have provided here, and with an estimated 12 of the 186 people supported through the intervention capable of being brought into a new “Slab + Stone” fresh cut enterprise beginning in year two.

Table 1. Proposed Social Impact Bond (SIB) Transaction Terms

Intervention:	Workforce development through deconstruction of vacant houses and urban blight, access to stable housing
Geography:	Baltimore, MD
Target Population:	Pre-release prison population
Service Providers:	Humanim Habitat for Humanity Chesapeake
Payors:	MD Department of Housing and Community Development MD Department of Labor, Licensing, and Regulation MD Department of Public Safety and Correctional Services
Transaction Term:	5 years
Transaction Size:	\$ 27,000,000 (est.)
Performance Metric(s):	Sustained employment Reduced recidivism Qualification for housing Vacant houses deconstructed Reduced crime in blighted neighborhoods

2.0 Project Overview

2.1 Objective

In 2010, 70.7 million tons of urban wood waste were generated in the United States, including 36.4 million tons from 'Construction and Demolition Waste' (e.g., construction, remodeling or demolition of residential and commercial structures) and 34.3 million tons from 'Municipal Solid Waste' (e.g., tree trimmings, durable and non-durable goods, containers, storm debris, etc.). Of this 70.7 million tons, the U.S. Forest Service (USFS) estimates that nearly 29 million tons of wood waste was suitable for recovery rather than being disposed in landfills, representing an enormous opportunity to realize financial and environmental efficiencies.¹ The amount of recoverable urban wood waste varies by region, with some cities presenting a large opportunity due to the number of blighted properties slated for demolition or deconstruction.

This report assesses the feasibility of employing a Pay-for-Success (PFS) approach to raise private financing to scale an urban wood economy as the U.S. Forest Service's Baltimore Wood Project, a multi-partner approach to help cities like Baltimore better account for urban wood materials and be more efficient with their re-use and reclamation in ways that also provide environmental, social, and economic benefits. The objective is to increase the substantial benefits that are already occurring, while providing a model for more sustainable management of urban wood waste that could be replicated nationally.

The proposed intervention would be to use a Social Impact Bond (SIB), a form of PFS financing, to scale the operations of Details, a social enterprise focused on deconstructing vacant houses through the employment of formerly incarcerated or otherwise un- or under-employed people. Details is part of Humanim, a Baltimore-based non-profit committed to social and economic empowerment, and the SIB would allow Humanim to provide workforce development training and other human services for 186 people in the pre-release prison population, when these services are most critical for successful post-prison outcomes. Most of these people would be employed by Details to deconstruct vacant houses, with others receiving employment opportunities with Slab + Stone (a new potential enterprise to aggregate and process "fresh cut" material), other Humanim social enterprises, or with the HabiCorps program of the Chesapeake chapter of Habitat for Humanity, which would also create a path to access stable housing.

The key questions we addressed through the feasibility assessment were:

- What is the scale of the blight problem in Baltimore and how might the proposed intervention help?
- Who are the key stakeholders involved and which entities might benefit from the intervention?
- How much capital would be required for the intervention, and what is the economic value of the outcomes it could produce?
- What are the benefits of using a PFS approach to bring capital to and finance the intervention?
- What might the PFS transaction look like?

¹ Falk and McKeever, 'Generation and Recovery of Solid Wood Waste in the U.S.', BioCycle, August 2012

- How might the project team think about maximizing the impact of their operations and scaling to other geographies?

2.2 About Quantified Ventures and Project Team

Quantified Ventures advises governments, non-profit organizations, for-profit social enterprises, and impact investors who demonstrate capacity for transformative social good. Quantified Ventures provides feasibility analysis, due diligence, transaction structuring, and fundraising services for social enterprises and social impact projects in the environmental, health, education and workforce development sectors across the United States. By negotiating purposeful, efficient partnerships across sectors, we accelerate funding to outcomes that result in greater social benefits. We empower clients with the confidence to make informed, evidence-based decisions - knowing exactly what investments will and will not work, and why. We support the public and social sectors by connecting organizations that demonstrate capacity for transformative social good to impact investors with the financial resources needed to scale social, environmental, and health impacts.

The project team consisted of members from Humanim, U.S. Forest Service, as well as Quantified Ventures.

Humanim leadership:

- **Project Executive:** **Henry Posko**, President and CEO
- **Project Managers:** **Jeff Carroll**, Vice President, and **Cindy Plavier-Truitt**, Chief Business Officer
- **Financial lead:** **Eric Booth**, CFO

U.S. Forest Service leadership:

- **Project Executive:** **Lauren Marshall**, National Program Manager, Urban and Community Forestry
- **Project Managers:** **Morgan Grove**, Research Social Scientist and Team Leader, Baltimore Field Station, Northern Research Station; and **Sarah Hines**, Development, Communication, and Science Delivery Coordinator for Urban Field Stations, Northern Research Station

The team from Quantified Ventures consisted of:

- **Project Executives:** **Eric Letsinger**, President and CEO and **Todd Appel**, COO
- **Project Managers:** **Dipa Sharif**, Associate Director and **Ben Cohen**, Senior Associate

2.3 Project Approach

This project was designed to deliver an assessment of the viability of pursuing a PFS project, with the findings and recommendations driving toward fulfilling USFS's long-term vision of promoting an urban wood economy and generating lasting benefits to Humanim, Baltimore City, and the State of Maryland. The team worked towards and achieved the following project milestones:

- Define the scope of the project that would be financed including specific processes and operations, target geography, and roles of partner organizations
- Analyze evidence base of outcomes
- Prepare economic model that evaluates:
 - Costs
 - Cost savings and new revenues
 - Other qualitative benefits
 - Mapping of benefits to specific organizations who could act as payors
- Develop initial concepts of transaction structure, including:
 - Definition of roles and responsibilities between service provider, payor(s) and investor(s)
 - Selection of payors
 - Specification of outcome measures and outcome payment triggers
 - Financing structure and strategy
- Confirm interest and feasibility from investors and other key stakeholders
 - Pitch opportunity to potential investors to gauge interest and refine PFS design
 - Present economic model, PFS design and investor feedback to all stakeholders to get approvals to proceed to transaction structuring and execution
- Develop transaction structuring plan
 - Specify timeline and roles to finalize PFS contracts

3.0 Business Case for Deconstruction in Baltimore

Given the scale of blight in Baltimore, and its concentration in areas that are also marked by persistent poverty and high incarceration rates, we believe that the proposed intervention has a high potential for impact that can be linked to real economic value for potential payors and other beneficiaries. In selecting the target geography for the intervention, the project team should consider neighborhoods such as Sandtown-Winchester and Harlem Park, which experience high need for both blight reduction and workforce development.

3.1 Need for blight reduction

Like many Rust Belt cities in the U.S., Baltimore's population has dwindled significantly over the past several decades, amounting to a loss of about 34.5% – over one third of its population – since its peak in 1950.² At the same time, the City's poverty rate has increased from about 18% in 1970³ to 22% in 2016,⁴ over twice the average rate of about 10% across the State of Maryland. As a result of these economic and demographic changes, the City experiences high levels of urban blight, marked by, among other things, vacant houses and buildings. Officially, there are 16,577 vacant houses and buildings in the City that have been identified.⁵ However, the total number of vacants is estimated to be as high as 46,000⁶ – identifying properties that are vacant

² US Census Bureau data

³ <http://mgaleg.maryland.gov/pubs/budgetfiscal/2016-geography-of-poverty.pdf>

⁴ US Census Bureau data

⁵ <https://data.baltimorecity.gov/Housing-Development/Vacant-Buildings/qqcv-ihn5>

⁶ <http://www.baltimoresun.com/news/maryland/baltimore-city/bs-md-ci-dollar-house-hearing-20171025-story.html>

remains a challenge, but the City Department of Housing and Community Development has begun to employ novel methods such as developing algorithms derived from astrophysics to predict the location of vacant houses or those vulnerable of becoming vacant.⁷

Vacant houses are both a symptom of economic depression as well as a cause. When families move out – whether they are pushed out because they can no longer afford to maintain their households or pulled out to pursue better economic conditions – their houses are boarded up and start falling into disrepair. They often become sites for criminal activities and pose other public safety hazards – such as increasing risk of fire, injury, and pest and rodent infestation for nearby residents.⁸ Further, vacant houses present eyesores that stifle community development and investment, dissuading new residents and businesses from moving in or opening up, or causing them to move out, and can depress surrounding property values up to a 700 foot- (or 3.5 block-) radius⁹ away. Finally, the presence of vacant houses has a negative impact on mental health, promoting a feeling of hopelessness, anxiety, and depression among surrounding residents, and eroding social ties, capital, and cohesion within communities.^{10,7} Together, these impacts from vacant houses of increased public safety risks, stifled (or reversed) economic development, and despair can exacerbate cycles of poverty, trapping communities in worsening conditions of urban blight. Therefore, interventions targeting the removal of vacant houses and the reclamation of land for purposes that increase community cohesion and development present a highly attractive opportunity to invest in social and environmental impact.

3.1.1 Target geography

Urban blight and economic depression are not spread uniformly throughout the City of Baltimore. Instead, due to the cycles of poverty addressed above, these blighted areas tend to concentrate within certain neighborhoods. In 1990, about 33% of poor people in Baltimore lived in “concentrated poverty areas”, or those with overall poverty rates of 40% or greater. While this concentration has eased in recent years (to 19%), 80% of Baltimore’s poor are still concentrated in “poverty areas” (those with overall poverty rates of 20% - 40%), and 51% live in “persistent poverty areas” (those with at least 20% overall poverty for the past 30 years). This contrasts with poverty across Maryland generally, with 83% of the poor population distributed among “non-poverty areas” (those with overall poverty rates of less than 20%).¹¹

These economically depressed areas are also linked to high levels of blight and incarceration – two targets of the proposed intervention. In our analysis of Baltimore neighborhoods (presented in Figures 1 and 2 below,¹² with more details in Appendix D), we find high levels of correlation between the presence of the vacant and abandoned buildings, incarcerated population, unemployment rates, and to a lesser extent, the number of families living in poverty. Sandtown-Winchester and Harlem Park – the neighborhood with the highest population of people in prison – also has the greatest presence of vacant and abandoned houses (according to official vacancy

⁷ <https://www.wired.com/story/baltimore-vacant-houses-astrophysicist-algorithm/>

⁸ https://www.urban.org/sites/default/files/publication/89491/2017.04.03_urban_blight_and_public_health_vprn_report_finalized.pdf

⁹ Klein, 2017

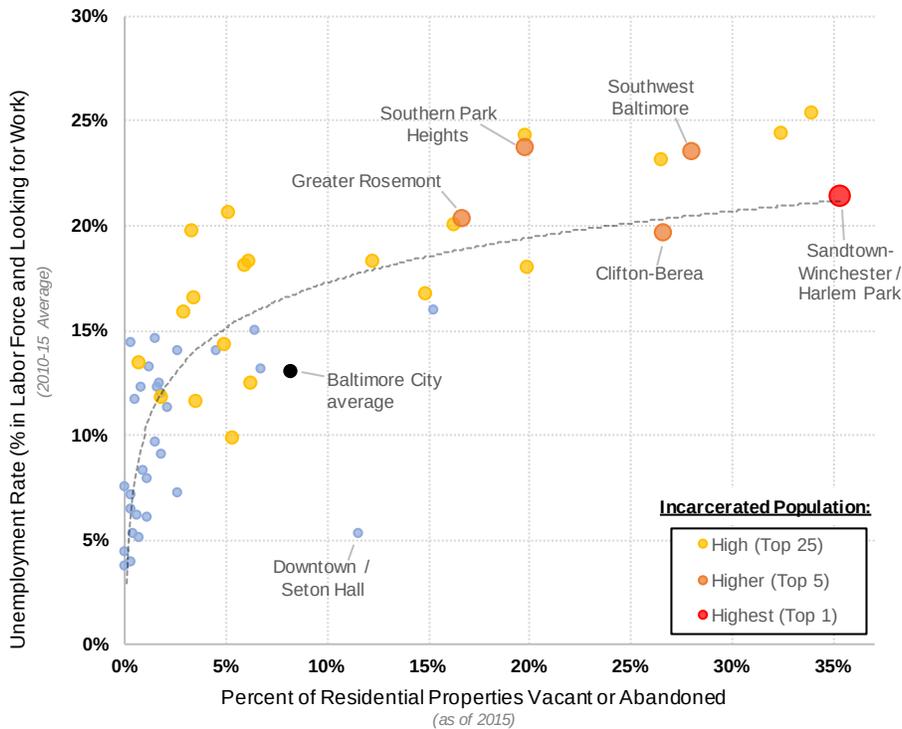
¹⁰ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3665973/>

¹¹ <http://mgaleg.maryland.gov/pubs/budgetfiscal/2016-geography-of-poverty.pdf>

¹² Quantified Ventures analysis based on data from BNIA and http://www.justicepolicy.org/uploads/justicepolicy/documents/rightinvestment_design_2.23.15_final.pdf

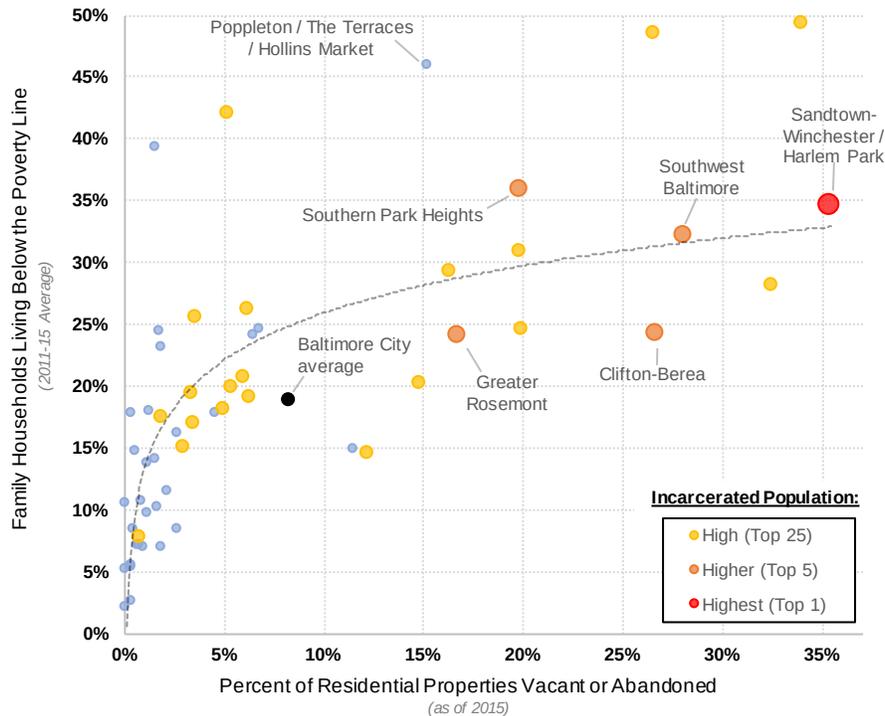
counts). This neighborhood and others with high vacancy, incarceration, and economic depression should be chosen as target geographies for the prospective Social Impact Bond.

Figure 1. Vacancy, incarceration, and unemployment* among Baltimore neighborhoods



* Does not include those unemployed or not in labor force by circumstance or choice.

Figure 2. Vacancy, incarceration, and family poverty among Baltimore neighborhoods



3.1.2 Target population

While the City of Baltimore comprises just 10.7% of the total population of Maryland, 7,795 of the 22,087 people in prison in Maryland, or 35.3%, are from Baltimore (as of 2010).¹³ This is equivalent to an incarceration rate of about 1.3%, 2.8 times greater than the national average, 3.3 times greater than that for Maryland overall. People who are formerly incarcerated often struggle to adjust once they are released, driven primarily by a lack of employment opportunities available to them, and therefore experience high rates of recidivism and unemployment.

Studies indicate that the “pre-release” period immediately before people leave prison is one of the most critical times to set inmates up for sustained success on the outside.¹⁴ Through the proposed Social Impact Bond, Humanim case managers will target this “pre-release” population, providing support, workforce development, and training services immediately before and after release, before providing employment opportunities at Details, other Humanim social enterprises, Habitat for Humanity HabiCorps, and elsewhere. The SIB will serve 186 people in annual cohorts over 5 years, brought in to the employment opportunities illustrated in Table 2. In particular, the SIB will also provide Humanim the working capital to better evaluate the opportunity for a “fresh cut” line of business, prospectively called “Slab + Stone”, which may accommodate up to 12 people over the 5-year period beginning in Year 2 of the intervention. Through these workforce development services and immediate employment opportunities, recidivism and unemployment rates of the target population are expected to be lower than the counterfactual in the formerly incarcerated population in Baltimore at large.

Table 2. Employment by Cohort for Proposed Intervention

	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
Details Deconstruction	12	12	12	12	12	60
Other Humanim enterprises	12	15	15	18	16	76
<i>Slab+Stone</i>	0	2	2	4	4	12
<i>Brick+Board</i>	2	3	3	4	4	16
<i>ReStore</i>	4	4	4	4	2	18
<i>City Seeds</i>	4	4	4	4	4	20
<i>IScan</i>	2	2	2	2	2	10
Habitat for Humanity	10	10	10	10	10	50
TOTAL	34	37	37	40	38	186

Source: Humanim

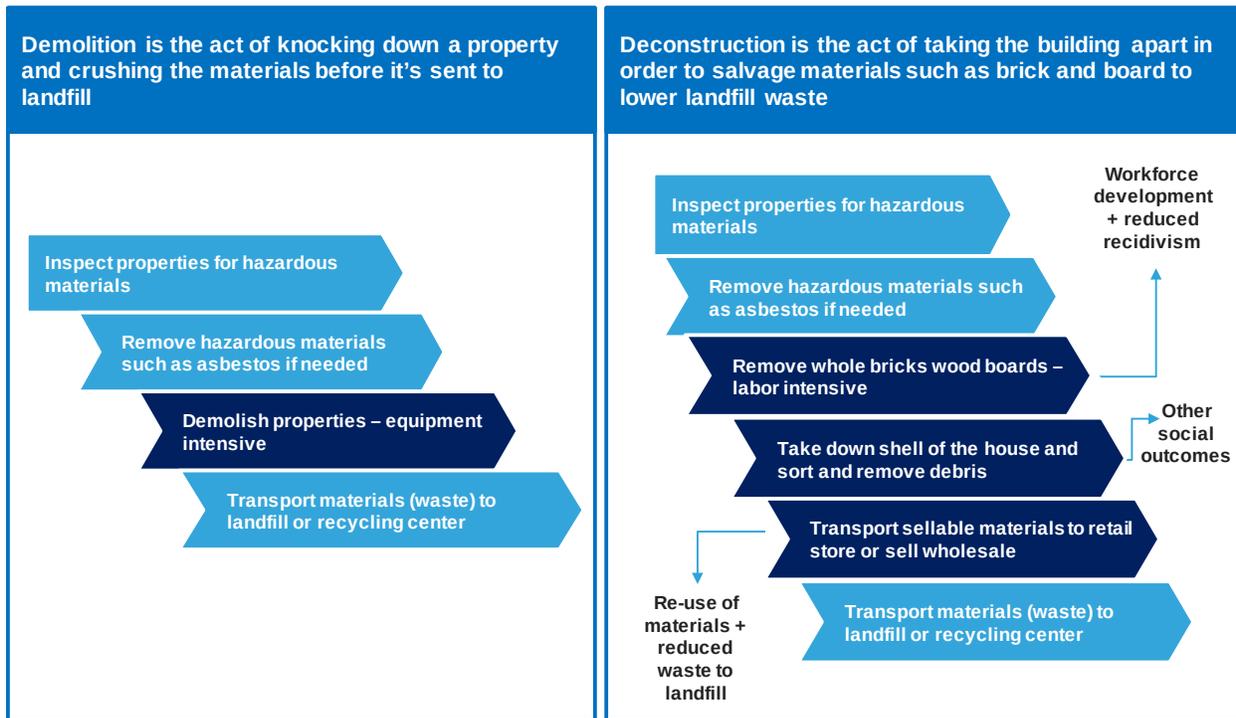
3.2 Demolition vs. Deconstruction

Deconstruction, as opposed to demolition, relies more on manual labor to take down houses piece by piece rather than knocking an entire structure down mechanically at once. As a result, while deconstruction is often more time-intensive and on average more expensive than standard demolition, it allows for materials taken out of buildings to be reclaimed, resold, and reused, and its higher labor requirements create more opportunities for workforce development. Figure 3 below illustrates some of the key differences in the processes and outcomes for demolition and deconstruction.

¹³ http://www.justicepolicy.org/uploads/justicepolicy/documents/rightinvestment_design_2.23.15_final.pdf

¹⁴ <https://www.urban.org/sites/default/files/publication/32056/411767-Release-Planning-for-Successful-Reentry.PDF>

Figure 3. Process and Value Chain for Demolition versus Deconstruction



3.3 Benefits of deconstruction

The benefits of deconstruction can be categorized as follows:

- Material sales:** While as stated above, deconstruction is often more expensive than traditional demolition, some of this extra cost may be offset through the sale of reclaimed materials. Brick and wood board are the primary materials that can be reclaimed through deconstruction of a typical Baltimore row house, with other materials ranging from cornices, to marble steps, to claw-foot tubs salvaged on a house-by-house basis. From an average house, our analysis estimates that Details can earn \$945 from sale of brick, \$625 from sale of wood board, and an average expected value of about \$200 from sale of other materials. If these materials are in good condition, Details sends them to Brick + Board, another Humanim social enterprise, to be refurbished and sold. Demand for reclaimed materials is growing, with Brick + Board products now being sold at large regional retailers like Room and Board, and Brick + Board currently has to supplement Humanim's own materials with purchases from wholesalers. Therefore, increased size and reliability of supply by scaling Details deconstruction can help Humanim reduce this need and save on its expenses. The use of "fresh cut" materials (laid out in Section 4) can also supplement the reliability of supply of materials and increase value captured.

- **Workforce development:** Deconstruction can be over two times as labor-intensive as standard demolition.¹⁵ While this adds to the costs of deconstruction, it also creates meaningful workforce opportunities. As part of Humanim’s overall human services and workforce development strategy, Details primarily serves individuals who are formerly incarcerated, or are otherwise un- or under-employed, and provides them with the training and support services that set them up to find sustainable employment. Many Details employees eventually move on to jobs in construction or elsewhere. In addition to benefits to families, communities, and society at large from getting these individuals sustainably employed, there are monetizable benefits to city and state governments primarily through avoided costs of incarceration from reduced recidivism, as well as greater income tax revenue and avoided payments for unemployment programs like SNAP and TANF. Once again, the incorporation of a “fresh cut” line of business can increase the opportunities for employment as indicated in Table 2.
- **Landfill:** Across the United States, about 65% of the total waste generated (including municipal solid waste), 505.1 million tons per year, comes from demolition alone, and much of this material ends up in landfills.¹⁶ At the same time, about 75% of materials in a house or building can be reclaimed, reused, or recycled.¹⁷ Because deconstruction salvages much of this material, it reduces the waste that is sent to landfill, saving precious space in overcrowded municipal landfills, and reducing methane and other greenhouse gas emissions released from decomposing landfill waste, as well as transportation costs and emissions.
- **Crime and Fire:** Vacant houses pose lucrative havens for criminals, and have in numerous studies been demonstrated to be positively correlated with crime rates. At least two of these studies go further, establishing that increases in crime are in fact caused by foreclosure and vacancy.^{18,19} Vacant houses can be both direct bases for criminal activity, as well as contribute to the “broken windows theory” that crime may be induced, at least partially, by a prevailing and surrounding sense of disorder in neighborhoods. Similarly, vacant and derelict houses pose increased risk of fire, particularly caused by arson. The U.S. Fire Administration estimates that there are roughly 20,000 fires from vacant houses every year. While for about 44% of these incidents the cause is unknown, arson accounts for over a third of fires in vacant houses with known causes.²⁰ Taking vacant houses down through deconstruction or otherwise can improve crime and fire rates, reducing direct costs to city governments for policing and firefighting, as well as loss of life and livelihood for individuals and communities.
- **Economic Development and Property Values:** Increased crime and fire rates, as well as the aesthetic impacts of vacant houses, dissuade new businesses and residents from moving into neighborhoods with vacants, hampering economic development and trapping current residents in low-income and low-resource neighborhoods. This effect is reflected

¹⁵

https://www.researchgate.net/publication/228759250_Deconstruction_and_materials_reuse_in_the_United_States

¹⁶ https://www.epa.gov/sites/production/files/2016-11/documents/2014_smmfactsheet_508.pdf

¹⁷

https://www.researchgate.net/publication/228759250_Deconstruction_and_materials_reuse_in_the_United_States

¹⁸ <http://www.nber.org/papers/w20593>

¹⁹ <https://www.sciencedirect.com/science/article/pii/S0094119012000617>

²⁰ <https://www.usfa.fema.gov/downloads/pdf/statistics/v18i9.pdf>

in property values, which are shown to decrease up to an eight of a mile away from just one vacant house.²¹ This depression of property values also has direct impacts on state and local governments by reducing property tax revenues. Removing vacant houses through deconstruction or otherwise can help reverse some of these effects, encouraging the economic development of neighborhoods, inviting new businesses and amenities, and increasing tax revenues to governments.

- **Health:** Deconstruction may improve health outcomes both directly (i.e. compared to standard demolition), as well as through the removal of vacant houses. While dust and contaminant control practices have improved for traditional demolition, their consistent application and effectiveness may be variable, potentially causing release of dust, lead, and other materials into air and water. Because deconstruction removes materials piece by piece, dust and contaminant control is more reliable, and thus may result in better public health outcomes. Whether vacant houses are removed through deconstruction or demolition, public health outcomes may be improved through the removal of garbage, injury hazards, allergens, and rat, mosquito, and other pest infestations. Further, the removal of vacant houses may be associated with improved mental health outcomes, particularly for residents who have lived in blighted neighborhoods for a long time.
- **Land Reclamation:** Further benefits and outcomes may come from reclamation or repurposing of land following the removal of vacant houses. The land could be used for new housing developments, productive uses like community solar or urban farms, or simply left as open parks or greenspace. We explored some of these options, and expect that additional positive community, health, economic, and environmental benefits would result.
- **Stable Housing:** The U.S. Department of Housing and Urban Development estimates that on any given night, 2,669 people in the City of Baltimore, or roughly 1 out of every 200, is homeless.²² On an annual basis, this may amount to ten times as many people who experience homelessness at some point in a given year.²³ In addition, 53.4% of households rent their homes,²⁴ half of which spend more than 35% of their income on rent.²⁵ With Habitat for Humanity of the Chesapeake's involvement the intervention, access to stable housing in Baltimore can be improved.

3.3.1 Outcomes Analysis

In order to determine which benefits accrue to which stakeholders that might act as potential payors in the transaction, we constructed an outcome logic chain, which helps organize the outcomes and establishes the causal logic for the transaction to drive them. Figure 4 below illustrates the outcome logic chain for the proposed intervention. We expect some potential payors (e.g. Departments of Labor and Public Safety) to primarily benefit from workforce development

²¹ Klein 2017

²² https://www.hudexchange.info/resource/reportmanagement/published/CoC_PopSub_CoC_MD-501-2017_MD_2017.pdf

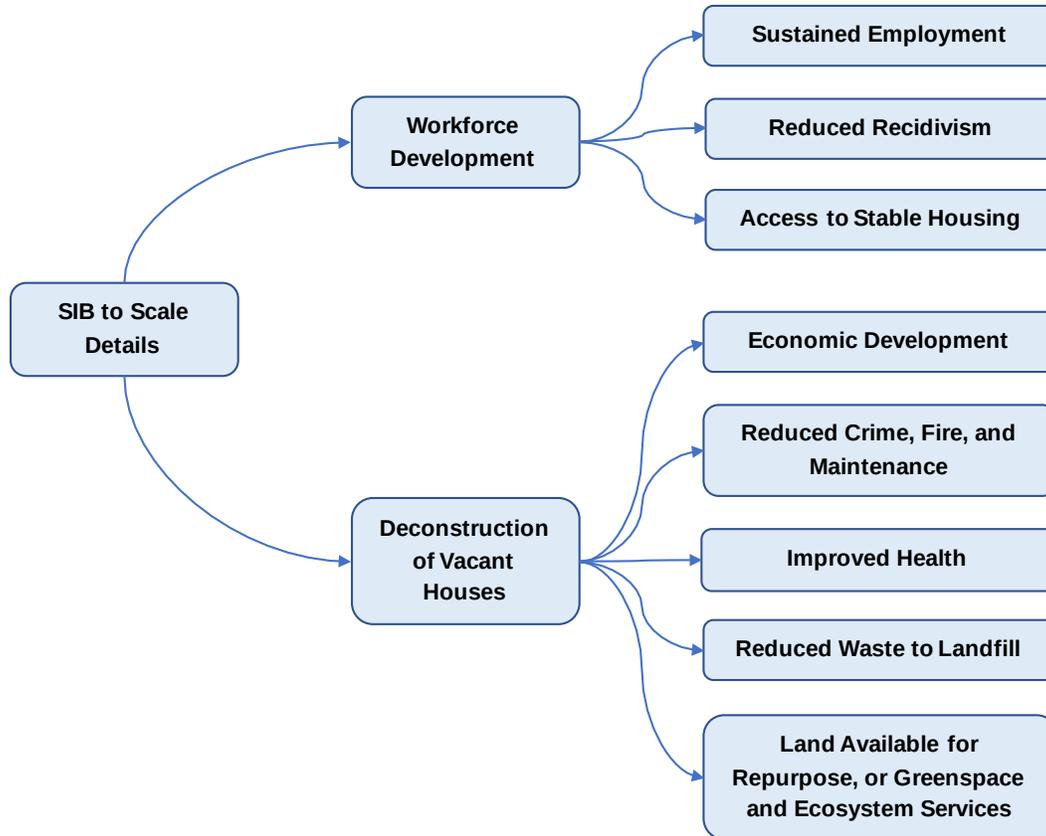
²³ https://www.washingtonpost.com/local/baltimore-has-more-than-16000-vacant-houses-why-cant-the-homeless-move-in/2015/05/12/3fd6b068-f7ed-11e4-9030-b4732caefe81_story.html

²⁴ <https://www.census.gov/quickfacts/fact/table/baltimorecitymarylandcounty/RHI125216>

²⁵ <http://www.hchmd.org/homelessness-baltimore>

and reduced recidivism, while others (e.g., Department of Housing) benefit from deconstruction itself.

Figure 4. Outcome Logic Chain for the Proposed Intervention



3.3.2 Beneficiaries

In addition to the diffuse benefits of the proposed intervention that accrue to individuals, communities, and society at large, we consider the benefits described above to accrue to the following entities:

- The **State government of Maryland** and the **City government of Baltimore** are the primary beneficiaries. Within those governments, various benefits accrue to individual departments (e.g., labor, housing and community development, public safety, public works, public health, police and fire, etc.).
- **Private companies in Baltimore**, particularly construction companies, may benefit from having a greater skilled labor pool through the workforce development outcomes.
- **Real estate developers**, or **other major entities like Johns Hopkins University**, may have a vested interest in increased access to land through the removal of vacant houses.
- Finally, the scaled supply of reclaimed materials supports **secondary industries** that manufacture and sell products made from those materials.

3.4 Regulatory environment

Having a strong regulatory environment that supports demolition or deconstruction as a solution to economic development plays an important role in creating demand for this type of intervention. In Baltimore, Governor Larry Hogan and Mayor Stephanie Rawlings-Blake announced an initiative known as Project C.O.R.E. (Creating Opportunities for Renewal and Enterprise) in January 2016. Under this initiative, the State has committed to invest \$75 million²⁶ over four years to demolish vacant buildings as a means to stabilize Baltimore and revitalize the local economy.

Public sector support is key, and it can come either through policies, as addressed above, or through public education in terms of the following:

- Concerns or awareness around building material reuse related to environmental contamination
- Local housing policies that support deconstruction and make the benefits of deconstruction known
- Support of used building materials market
- Reducing constraints around tight project deadlines for deconstruction
- Workforce development and training programs

4.0 Incorporation of “Fresh Cut” Material

The National Renewable Energy Lab (NREL) estimates that around 76,000 tons of urban wood waste is generated by the City of Baltimore every year, and this material is categorized into three different sources:

1. Municipal Solid Waste (MSW) wood – wood chips, pallets, and yard waste
2. Utility tree trimming and/or private tree companies
3. Construction/demolition wood

The proposed SIB currently only directly addresses this third source of urban wood material through the deconstruction intervention (avoiding demolition waste through reclamation of materials). However, as part of the broader goal of supporting a holistic and integrated urban wood economy, there is potential to incorporate the first two sources, which comprise “fresh cut” material into the deconstruction efforts.

4.1 Scaling a Camp Small type model

Currently, much of Baltimore’s “fresh cut” waste from public sites and operations ends up in Camp Small, a five-acre property a few miles north of City Hall²⁷. Currently, given the minimal staffing and equipment resources invested at Camp Small, there are several areas to increase impact opportunistically:

²⁶ [https://planning.baltimorecity.gov/sites/default/files/brochure_CORE_final%20\(2\).pdf](https://planning.baltimorecity.gov/sites/default/files/brochure_CORE_final%20(2).pdf)

²⁷ Silveira, Kristen “Camp Small Case Study” in Opp *et al.* 2018, *Performance Measurement in Local Sustainability Policy*

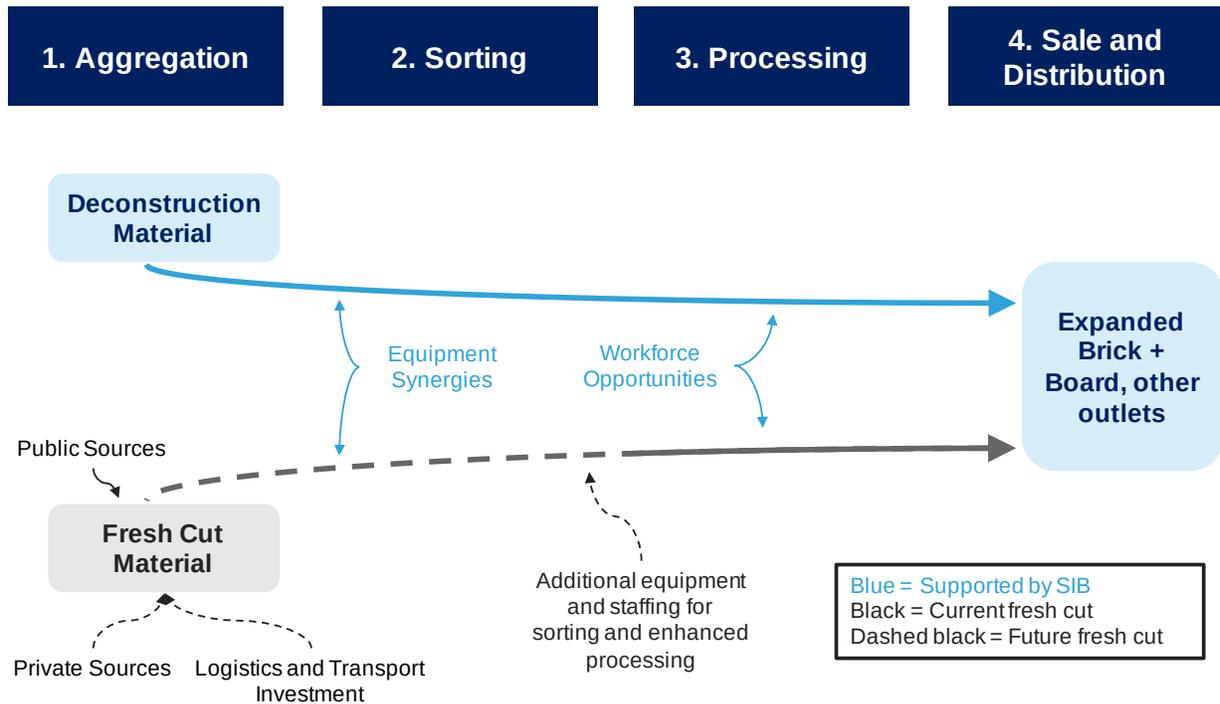
- **Processing and Sorting:** Without proper staffing and equipment, material is currently either chipped or composted into low-value products, despite the high quality of some of the incoming material that could be turned into higher value products with greater capital investment
- **Retail Channels:** Without a means to resell the processed “fresh cut” material to generate revenue, the City of Baltimore Department of Recreation & Parks instead spends as much as \$103,000 annually to remove and dispose of the material, and further exacerbating negative landfilling impacts
- **Aggregation:** Currently the Camp Small facility only accepts waste from public sites and operations. Greater logistical or shipping investments, such as a logging truck, would help the facility aggregate “fresh cut” material from private operations as well, particularly from utility line maintenance or the Maryland Zoo, to achieve economies of scale

Several of the opportunities listed above for “fresh cut” may be addressed by the proposed SIB, in the following ways:

1. Some of the existing or acquired equipment for sorting and processing of deconstruction waste may also be used for “fresh cut”.
2. High-value products processed from “fresh cut” may augment the increased supply of deconstruction material sent to Brick + Board, providing channels for retail, and helping to increase the reliability of supply without needing to purchase supplemental products wholesale to fulfill larger orders.
3. As part of the intervention financed by the SIB, Humanim will further evaluate, the viability of establishing a social enterprise line dedicated to the collection, sorting, and processing of “fresh cut” at Camp Small. This enterprise, provisionally called “Slab + Stone”, will have the ability to accommodate up to 12 beneficiaries of the 186 total supported in the intervention over the 5-year time period.

An illustrative model of the urban wood economy that may be supported by both deconstruction and “fresh cut” collection, sorting, and processing is presented in Figure 5 below.

Figure 5. Illustrative Model for Incorporating “Fresh Cut” into the Deconstruction Process



We expect the hiring of people into a prospective “Slab + Stone” enterprise to generate similar workforce development outcomes as those addressed above for deconstruction. In addition, we expect the full range of beneficial outcomes from improved handling of “fresh cut” material to include the following:

Table 3. Potential Benefits Created from “Fresh Cut”

Monetary	Environment	Social
Material sales (highest value for tree)	Reduced CO2 emissions	Local jobs
Taxes to city and state (sales, income)	Methane reduction	Job creation in secondary markets
Tax credits to property owners (where wood waste is generated)	Improved air quality	
Secondary market creations		

4.2 Framework to evaluate inclusion of “fresh cut”

According to the U.S. Forest Service, reclaimed wood from all dead and diseased community trees could equal nearly 4 billion board feet or about 30% of annual hardwood consumption in the United States and hence, there is a huge potential for positive impact. The following is a framework to evaluate the inclusion of “fresh cut” into the operations of a deconstruction

business model. It has currently been populated with data from Camp Small operations with the goal of gathering more data as new sources of material are acquired:

	Municipal operations	Utilities	Other
Source of material	Currently, the majority of the logs coming into Camp Small are from the City Forestry Division's tree pruning and removal activities	Materials from surrounding utilities such as BG&E that arise due to line maintenance or expansion of transmission grids	There is an opportunity to source trees from private sources (e.g. disposal of wood chips, leaves, and manure from the Maryland Zoo)
Quality of material	The logs are chipped and turned into mulch. Many of these logs have a higher value for their potential as lumber, but Rec and Parks does not have the capacity for sorting and selling them to sawmills. Establishing such a system could create a revenue stream for the Department conservatively estimated at \$75,000 annually	Usually higher quality material from this source	Quality varies depending on source
Total volume of material	~25,000 cubic yards or 15K tons ²⁸	n/a	n/a
Potential cost savings	\$103,000 per year for the Dept. of Rec and Parks	n/a	\$141,800 per year for the City ²⁸

Type of product	Value of material (range / unit)	Potential end uses / users for product
Logs	<p>"Firsts" – Priced based on market report (Appalachian hardwood center)</p> <p>"Seconds" – \$0.30 per board foot → greatest opportunity to maximize value with high end users such as Room and Board</p> <p>"Thirds" – bulk of production (80-90%) – \$1 per truck load (buyer needs to load and haul)</p>	<p>"Firsts" – lumber yards, whiskey barrels, flooring, wall cladding</p> <p>"Seconds" also known as "character wood" – furniture (interest from Room & Board)</p> <p>"Thirds" – Mulch, pulp, or biofuel</p>
Firewood	\$60-\$225 per cord (4 ft. x 4 ft. x 8 ft.) ²⁹	Saw mills, artists, landscapers and residents
Chips	1-20 yards at \$10/yard If in bulk, 25 cents per yard	DPW, DOT, City Schools for landscaping,

²⁸ This number is an estimation that includes \$56,400 in tipping fees for 1,200 tons of leaves at BRESKO, \$80,000 average for wood grinding and removal at Camp Small, and \$5,400 in fuel and labor costs for hauling 2,340 tons of manure from the Maryland Zoo to Quarantine Road Landfill.

²⁹ <http://www.woodheat.org/cord-wood.html>

	With better separation, can double value \$10-\$20/yard For landscape \$25/yard	horticulture, city garden paths, etc.
Pellets	\$245 per ton ³⁰	Fuel for power generation, commercial or residential heating, and cooking
Wood pallets	\$0.5 to \$4 each ³¹	Local manufacturers, furniture companies
Compost	\$30 dollars per cubic yard or \$50 per ton ³²	Compost is in high demand by gardeners and landscapers throughout Baltimore City: The Office of Sustainability runs two programs that will have compost needs in the immediate future – The Growing Green Initiative and the Homegrown Baltimore Land Lease Initiative
Slabs / cross-cut slabs	\$14 per board foot	Flooring Cabinetry Furniture Architecture

Equipment list	Equipment capital cost	Equipment maintenance	Type of product processed
Metal detectors	\$20-\$300 for hand-held metal detectors	Low maintenance	Metal detectors can save on costly damage to blades, planers, cutter heads, and jointers by detecting nails, screws, staples, or other metal objects in wood
Horizontal grinder	\$400K-\$1MM or rent for \$50K per month	Horizontal grinders tend to have a more complex feeding mechanism, which can make maintenance more challenging	Helps to maintain a consistent processing rate for a variety of raw materials, from whole pallets to wood chips to slab wood creating higher valued products
Kiln	\$500-\$3000	Moderate maintenance required	Kiln drying lumber is a simple, cost effective method to increase profits by selling dried lumber

³⁰ <https://www.pellet.org/wpac-news/global-pellet-market-outlook-in-2017>

³¹ <https://moneypantry.com/recycle-wood-pallets-for-money/>

³² http://www.waste360.com/mag/waste_growing_compost_profits

Logging truck	\$80K-\$100K	Fuel and annual maintenance	Hauling logs
Logging grapple truck	\$150K-\$250K	Fuel and annual maintenance	Grapple trucks are commonly used by municipal sanitation or public works departments, and by waste collection companies
Wood mizer	\$5K-\$30K depending on capacity	Relatively low maintenance requirement	Process logs into lumber
Screening equipment	\$60K or rent for \$10K per month	Relatively low maintenance requirement	Removes plastic film from mulch & compost material
Track log loader	\$150K	\$20K annual fuel and repair costs	Sorts and feeds grinder

Source: Camp Small grant and enhancement proposals and interview conducted

Adding information on the following to the data points above, will help determine the profitability of a “fresh cut” business line:

- Costs to scale i.e. equipment, maintenance, land and labor costs for increased volume
- Efficiencies gained by scaling i.e. increasing margins
- Increased revenues i.e. higher prices attained due to better sorting and processing of material
- Additional distribution channels that could potentially lower costs and increase revenues
- Increased value of social and environmental benefits due to scale and efficiencies

Furthermore, answering the following questions will help evaluate the long-term sustainability of the business model:

- What is the potential market size of the different types of materials in the immediate locality and beyond?
- Who are the target customers for these materials? What is their demand or need? Are there possibilities of long-term contracts that create a more stable source of demand?
- What is the industry trend? i.e. who are the competitors, prices being offered, etc.
- What are the distribution channels?
- What is the potential margin for the different materials?
- What are potential cost saving opportunities?

We believe that incorporating “fresh cut” either as a part of a larger deconstruction business operation or as a separate line of business on its own, provides a value creation opportunity for cities that need to be explored more deeply – and this SIB provides an opportunity to do so.

5.0 Overview of Humanim’s work as a solution

A key success factor for any PFS transaction is a service provider with a track record of executing the intervention, evidence of the impact they have generated, ability to scale, and established partnerships with other key stakeholders.

Track record and evidence of impact

Humanim has a 46-year history of providing workforce development and support services to individuals with barriers to employment throughout Maryland. Humanim has innovated and delivered workforce development and support services as part of a methodology to alleviate poverty to over 4,000 people a year.

Humanim launched Details, a deconstruction and innovative reuse social enterprise in July 2012. To date, Details has trained and employed over 165 Baltimore City low-income residents with barriers to employment of which 75% were formerly incarcerated. Details successfully leveraged foundation dollars to change the landscape of Baltimore blight removal by successfully completing the first city Deconstruction pilot project. Details was awarded Innovator of the Year as well as the Building Material Reuse Associations annual training award.

Brick and Board grew as its own unique social enterprise out of Details Deconstruction to process and handle the material extracted through the deconstruction process making sure that the material of the past is preserved for the future. Brick and Board hires and trains the next generation of sawyers, salvage experts and craftspeople from Baltimore neighborhoods that have experienced the greatest levels of disinvestment. Through Details and Brick and Board, Humanim has developed one of the largest wholesale markets in the US for reclaimed brick from Baltimore City.

Partnerships and Initiatives

Humanim has forged strong strategic partnerships with public-sector entities, allied community-based organizations, as well as institutions and businesses with a presence in Baltimore City.

- Partnership with Baltimore City of Housing and Community Development: Details was awarded a three-year Deconstruction Master Services contract from the City of Baltimore. Additionally, the success of the partnership between Baltimore Housing and Details, influenced the addition of deconstruction to Governor Hogan's Project C.O.R.E.
- Partnership with the U.S. Forest Service (USFS): A key player in the development and growth of Details Deconstruction and Brick and Board is the USFS. The USFS's interest in urban wood harvesting and the subsequent job creation and land conservation has resulted in many benefits for Humanim's construction related enterprises. USFS's partnership with Room & Board supports the secondary materials market by creating a consistent and sustainable demand, and also opens up the path for Details to be scaled nationally.
- Partnership with the USFS and City of Baltimore: The Baltimore Wood Project is an initiative of the USFS, in partnership with the City of Baltimore, Humanim, and others.³³ The project is re-engineering management of urban wood waste streams. Specifically, wood is salvaged from building deconstruction and tree care operations and taken to a facility dedicated to sorting and processing wood rather than to a landfill or other waste facility. From there, the wood is re-purposed and sold locally. The project saves the city money, creates jobs, provides new revenue streams, and promotes sustainability. For example, according to Humanim, as much as 90% of building waste is diverted from the

³³ <http://www.baltimorewoodproject.org/>

local landfills through recovery and re-purposing of wood, while a deconstruction project creates 6-8 jobs for every 1 job in a standard demolition.³⁴ Further, there is substantial scope for additional scaling of the project as thousands more vacant homes in Baltimore are slated for demolition in the coming years and about 200,000 ash trees are at risk due to the emerald ash borer insect.

- Partnership with Camp Small: Camp Small is the wood waste collection yard run by the Baltimore City Department of Recreation and Parks. The 12-acre site is located in the Jones Falls Valley just north of Cold Spring Lane. Every day, City crews and contractors bring logs, chips, and brush to the site for processing. In early 2016, the Recreation & Parks Forestry Division, in collaboration with the Baltimore Office of Sustainability, began the Camp Small Zero Waste initiative in an effort to sort and distribute the variety of wood products at the site.

6.0 Why Pay for Success (PFS)?

6.1 PFS Overview

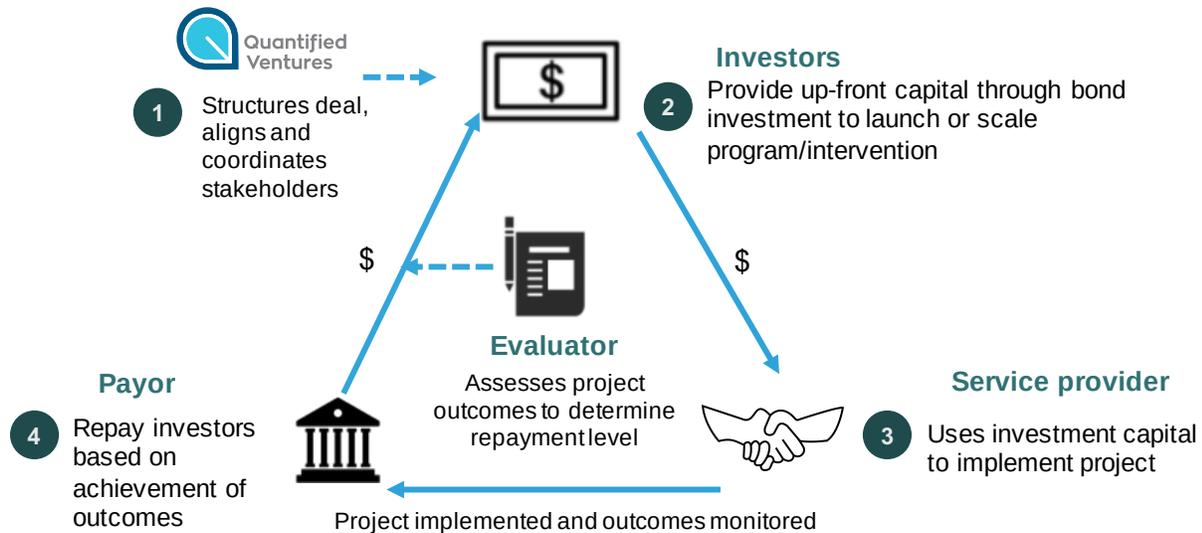
PFS is a contracting and financing mechanism in which investors provide up-front capital for a program or intervention, with payments tied to the achievement of specific measurable outcomes. It is a useful tool for aligning the incentives of project developers or service providers with those of payors, shifting risk to the private sector, and integrating multiple parties in a complex transaction. It is also consistent with existing U.S. Forest Service programs and approaches of constructing public-private partnerships to maximize efforts in pursuing strategic goals.

PFS deals are multi-party transactions that align incentives amongst stakeholders from multiple sectors with seemingly different or conflicting priorities and goals. While each transaction is different, most projects involve the following parties:

- **Investors** provide up-front, at-risk capital to enable the program to scale. If the project outcomes are successful, the investor receives a higher return on their investment.
- **Payors** are the entities that realize cost savings, revenue increases and/or other positive outcomes resulting from the scaled program, and can be either private or public entities, such as municipal or state governments. They use PFS to shift the risk to investors that the program will achieve the desired outcomes.
- **Service Providers** (nonprofit or for-profit) deliver the selected service or solution to the target population and geography, with the goal of achieving both improved social, health, or environmental outcomes to the target population and the projected financial benefits to the payor.
- **Evaluators** are independent entities that measure the impact of the program against the agreed-upon outcomes as well as the financial impact to the payor.

Figure 6. Generalized Pay for Success Model

³⁴ <http://www.baltimorewoodproject.org/>



6.2 Benefits of PFS to Scale Deconstruction

PFS transactions provide several benefits when compared to traditional financing methods:

1. **Access to Impact Capital:** Private investors who are interested in the outcomes of the project provide the upfront capital and are willing to take on some of the risk. The upfront payment provides cash flow timing relief for servicers and hence, increases the success of the project and impact from it.
2. **Reduced Risk:** Private investors take on the downside risk if the intervention is less effective than expected, protecting the capital budget of the City or State agency.
3. **Link to Outcomes:** The PFS model links payments to social outcomes (such as job creation) which aligns incentives and reduces risk.
4. **Improved Data Collection:** Through the evaluation process, valuable data is gained on the cost-effectiveness and scalability of deconstruction in this case which can help in future planning and reporting.
5. **Stakeholder Engagement Support:** This model requires stakeholder engagement across multiple entities and presents opportunities to engage new partners.
6. **Promote Sustainable Practices:** Through this process, more sustainable practices such as deconstruction will be promoted for the benefit of the local community.

Based on the fact that the outcomes of the proposed intervention benefit multiple entities, that their magnitude may be uncertain, and with considerations for conserving limited public budgets, we believe that a PFS transaction would be a highly efficient and impactful method to finance the intervention when compared to traditional financing.

While we understand that the State of Maryland has had a mixed experience with outcomes-based financing for recidivism through the recent Public Safety Compact, we distinguish that

approach (performance-based contracting) from the PFS approach for this intervention using a Social Impact Bond in Appendix C. More general details on PFS and the growing source of impact capital are provided in Appendix F.

7.0 Cost-Benefit Analysis

To assess the feasibility of a SIB transaction, we conducted a cost-benefit analysis on the economic value of outcomes coming from the proposed transaction and compared them to the capital required for the intervention. Unlike standard demolition, deconstruction generates direct revenues through the sale of reclaimed materials, which may offset greater labor or other costs of deconstruction compared to demolition. While we estimated the value from these sales of brick, board, and other materials – at approximately \$1,069 to \$2,465 per vacant house – we did not include these as part of the potential transaction. Unlike traditional equity investments, returns on Social Impact Bond (SIB) investments are not typically generated by direct revenues produced by the service provider or project. Instead, returns are allocated based on the implied realization of avoided costs or revenues generated elsewhere, indirectly from the service provision. Further, to force Humanim to provide direct returns from its material revenues would add another layer of negotiation, may impair its ability to cover its costs and provide quality services, overcomplicate an already complex transaction, and might risk its falling through.

Instead, we considered the “financial sustainability” of the proposed SIB to be based on the economic value of the intervention as provided by the outcomes discussed above to the primary beneficiaries who could act as potential payors – namely the State of Maryland and City of Baltimore. In approaching our economic valuation, we considered that the intervention would bring broad-sweeping value to the City and State through indirect and induced economic “multiplier” effects created by revitalizing blighted communities and lifting people out of poverty and the prison system, for example through increased disposable income and visitation. Further, even beyond these values, we believe the intervention provides an inherent, unquantifiable public and social good that should merit consideration even if a cost-benefit analysis does not prove favorable.

However, we also recognized a tradeoff in considering which values to include in our analysis. While adding in more indirect and intangible or less researched benefits would increase the estimated value of the intervention and bring it closer to its true value, these benefits also become harder to attribute, quantify, and/or monetize, making them less compelling to potential payors. We therefore chose a fairly conservative approach, choosing only to include benefits that are directly linked between the intervention and potential payors, and confidently quantifiable, attributable, and monetizable. Table 4 summarizes the benefits that were included or excluded in our economic valuation. Note that the analysis also excludes benefits that do not accrue to either the State or City (e.g., avoided tipping fees).

Table 4. Benefits Included and Excluded in Economic Analysis

	STATE	CITY
Included	<ul style="list-style-type: none"> • Workforce development <ul style="list-style-type: none"> ○ Reduced recidivism ○ Increased income taxes ○ Avoided unemployment benefit costs (e.g., SNAP, TANF, etc.) • Property taxes <ul style="list-style-type: none"> ○ Increased homeownership through Habitat for Humanity ○ Rebound of surrounding property values following blight removal 	<ul style="list-style-type: none"> • Property taxes <ul style="list-style-type: none"> ○ Increased homeownership through Habitat for Humanity ○ Rebound of surrounding property values following blight removal • Landfill <ul style="list-style-type: none"> ○ “Opportunity cost” of space • City services <ul style="list-style-type: none"> ○ Direct policing costs ○ Direct firefighting costs
Excluded	<ul style="list-style-type: none"> • Broader economic multiplier effects <ul style="list-style-type: none"> ○ Greater economic participation ○ Community development ○ Value of property and livelihood lost from fire and crime • Lower carbon footprint (compared to demolition) • Increased greenspace <ul style="list-style-type: none"> ○ Pervious surface and other ecosystem services ○ Recreation value ○ Social and neighborhood cohesion • Improved physical and mental health • Reclamation of land for productive uses (green infrastructure, redevelopment, urban agriculture, community solar, etc.) 	<ul style="list-style-type: none"> • Broader economic multiplier effects <ul style="list-style-type: none"> ○ Greater economic participation ○ Community development ○ Value of property and livelihood lost from fire and crime • Lower carbon footprint (compared to demolition) • Increased greenspace <ul style="list-style-type: none"> ○ Pervious surface and other ecosystem services ○ Recreation value ○ Social and neighborhood cohesion • Improved physical and mental health • Reclamation of land for productive uses (green infrastructure, redevelopment, urban agriculture, community solar, etc.)

We evaluated two options for a 5-year Social Impact Bond (SIB) with the State of Maryland (or State Departments) as payors – one based on the original proposal scoped around human services and workforce development alone, and the other including the actual cost of deconstruction within the SIB to be allocated upfront. While the State would still realize some of the economic value of deconstruction in the former option, we excluded these monetized benefits in our calculation because without a dedicated funding pipeline, deconstruction outcomes cannot be guaranteed, and because any investment that is allocated toward deconstruction would fall outside the scope of the SIB. Table 5 below summarizes our findings from the two options.

Table 5. Economic Model Results for Two State-Payor Options

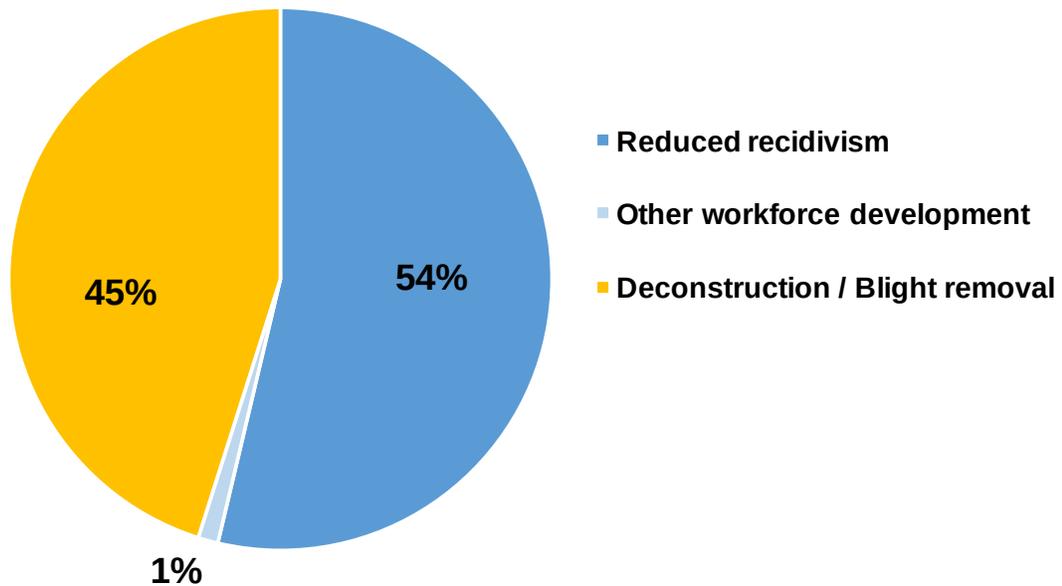
	Workforce Development	Workforce Dev. Plus Decon
Estimated Transaction	\$9,000,000	\$27,000,000
Net Capital Required *	\$7,494,567	\$20,169,652
Benefits (if Success), PV	\$12,500,717	\$22,643,500
Economic ROI (simple) **	66.80%	12.27%
Benefits per year	\$2,500,143	\$4,528,700
Benefits per participant	\$67,208	\$121,739

* Does not include evaluation, legal, or other transaction costs; includes estimated remaining funding from first phase of Project C.O.R.E. that could be counted toward the transaction

** Does not include interest and other financing costs

With the second option, which includes deconstruction, we determined the breakdown of outcomes value by category, as illustrated in the chart below.

Figure 7. Breakdown of Estimated Value (\$22.6M) of Workforce Plus Decon Option by Benefit Category



While we have not approached the City of Baltimore to be a payor in the SIB transaction, our valuation and model nonetheless calculates monetizable benefits to City government, as well as other non-monetized outcomes.

Table 6. Monetizable Benefits to City of Baltimore and Other Non-Monetized Benefits

Monetizable benefits to City of Baltimore (Present Value)	
Opportunity cost of landfill space	\$59,857
City services (police and fire)	\$17,767,999
Taxes from increased property values	\$205,005,148
Other Benefits	
Avoided landfill waste	2,813 tons
Avoided emissions (excl. transport)	968 tons CO₂e
New land for redevelopment or reclamation	24 acres
Reduced number of fire incidents	244
Reduced number of crime incidents	5,525
<i>Homicide</i>	65
<i>Other violent crime</i>	3,308
<i>Property crime</i>	2,152

7.1 Key Assumptions

To build the base case financial model, we outline the major drivers to the projected performance:

Table 7. Key Assumptions and Model Drivers

Key assumptions underlying SIB financial and economic projections		
Metric	Base case assumption	Rationale
Cohort sizes and workforce assignments, number of houses per year, and human services, deconstruction, and Habitat for Humanity Costs	From Humanim team	<ul style="list-style-type: none"> All of these values came directly from the Humanim team
Use of counterfactual for workforce development outcomes	Yes	<ul style="list-style-type: none"> To properly value workforce development outcomes, we compared to a counterfactual since not all participants would simply remain in prison or stayed unemployed indefinitely were it not for the intervention
Recidivism rate (counterfactual)	51%	<ul style="list-style-type: none"> A 2010 sample of 472 recent parolees in Baltimore³⁵ found that on average, they had served about 7,436 days, or 20.4 years in prison over the course of their lives. Dividing by an average age of 40.3 yields an estimated steady state recidivism rate – here defined as the long-term probability of a participant being incarcerated for any given year – of 51%. Note

³⁵ http://choiceresearchassoc.com/documents/psc_recidivism_final_april_2014.pdf

Key assumptions underlying SIB financial and economic projections		
Metric	Base case assumption	Rationale
		that this differs from other measures of recidivism measured within 1 (16% ³⁶) or 3 years (73% ³⁷) post-release only, since it approximates long-term dynamics. See Appendix E for a nuanced discussion of recidivism and unemployment modeling.
Employment rate (counterfactual)	26%	<ul style="list-style-type: none"> About 76% of prisoners from Baltimore come from just 25 “high incarceration areas”, which experience overall levels of employment of 53% (of population aged 16-64).³⁸ Assuming former inmates return to these areas, and those who don’t recidivate mirror the general population, the expected counterfactual employment rate is estimated as $53\% * (1 - 51\%) = \text{about } 26\%$.
Unemployment rate (counterfactual)	23%	<ul style="list-style-type: none"> The remaining hypothetical counterfactual population that has neither recidivated nor is sustainably employed is considered to be unemployed, either in the labor force and looking or not in the labor force by circumstance or choice. $1 - (51\% + 26\%) = 23\%$.
Recidivism rate (modeled intervention)	25%	<ul style="list-style-type: none"> Humanim estimates that of those participants who begin any given year employed, only 75% will remain employed by the end of that year, for the first 2-3 years post-release. While the remaining 25% is likely not all going back to prison, we used that as a conservative assumption, one that reflects longer-term steady state likelihood, and a target at roughly half the counterfactual rate.
Employment rate (modeled intervention)	53%	<ul style="list-style-type: none"> The goal of intervention is to equip people who were formerly incarcerated to sustainably re-enter the workforce and re-integrate into society. We therefore took as the target the overall employment levels reflected in the 25 “high incarceration areas”, which is still a conservative assumption considering that it is less than the overall employment level across Baltimore (60%) and does not account for differences in demographics between the target population and the overall population (e.g., with regard to age, gender, marital status, health status, etc.)
Unemployment rate (modeled intervention)	22%	<ul style="list-style-type: none"> The remaining percentage of the cohorts is $1 - (25\% + 53\%) = 22\%$. This number also makes

³⁶ *Ibid.*

³⁷ <http://www.baltimoresun.com/news/opinion/readersrespond/bs-ed-prisoners-letter-20151002-story.html>

³⁸ http://www.justicepolicy.org/uploads/justicepolicy/documents/rightinvestment_design_2.23.15_final.pdf

Key assumptions underlying SIB financial and economic projections		
Metric	Base case assumption	Rationale
		sense since it is only slightly less than that estimated for the counterfactual, which reflects that people who are not going back to prison but are remaining unemployed may be offset by people who would have remained unemployed but find sustainable employment through the workforce development intervention
Sunk cost of deconstruction	-\$6,250,000	<ul style="list-style-type: none"> The State has already allocated funding for deconstruction and demolition of vacant houses through Project CORE. In discussions with the City, State, and Humanim, we expect that given the slower-than expected pace of the CORE program, there will be an estimated 500 houses remaining in the pipeline that will not be taken down by the program ends in 2019. At an average estimated cost of \$12,500, we expect that there will be approximately \$6.25M left in Project CORE's budget that can be used to help finance the SIB. We therefore subtracted the \$6.25M out of the overall deconstruction costs for the transaction.
Discount rate	5%	<ul style="list-style-type: none"> This reflects the State's cost of borrowing, which is the coupon rate of most State of Maryland general obligation bonds no matter the term.³⁹ Note that coupon rates for bonds issued by special State agencies, such as the Community Development Administration, may differ.
Time horizon to value benefits	10 years post-transaction	<ul style="list-style-type: none"> Most of the benefits valued here, such as annual income and property taxes, occur in perpetuity. That is, once people are integrated sustainably into the workforce and property values and neighborhoods revitalize when blight is removed, they will continue to occur into the foreseeable future. Accounting for these in perpetuity benefit flows through a terminal value calculation adds significantly to the economic value that can be realized by the intervention. However, State government administrations and departments can only plan so far in the future. Therefore, we chose 10 years as a balance between the State's planning horizon and the fact that benefits will be ongoing into the future.

³⁹ Maryland State Treasurer's office. More information and official documents at <http://www.treasurer.state.md.us/debtmanagement/faq-on-bonds.aspx>

7.2 Sensitivity Analysis

In analyzing the business and financial model, we identified several key drivers of performance that have a significant impact on the overall project's value. Mainly, these are:

- **Whether deconstruction is included in the SIB**
- **Number of houses actually taken down per year (vs. proposed 250)**
- **Unemployment and recidivism rates of program beneficiaries**
- **Time horizon for valuing outcomes**

Table 8 below presents a sensitivity analysis around these key value drivers, based on the present value of outcomes benefits per program participant, which should be compared to the estimated costs per program participant of \$40,293 (workforce development alone) and \$108,439 (workforce development plus deconstruction). We find that though including deconstruction in the SIB adds to the costs and transaction size, it also significantly adds to the value created by the program by a multiple of about 1.5 to 2.5 times. In both options, success of the program in terms of actual unemployment and recidivism rates experienced by the target population are significant drivers of economic value. However, the economic value varies much more significantly depending on the time horizon these outcome benefits can be captured and realized. Finally, we find that with the deconstruction option, our model is fairly insensitive to discrepancies in how many houses are actually taken down compared to the proposed 250 per year, with changes in value of 10% or less given differences of 50 houses per year.

Table 8. Sensitivity Analysis of Economic Value per Program Participant (n = 186, \$ 000s)

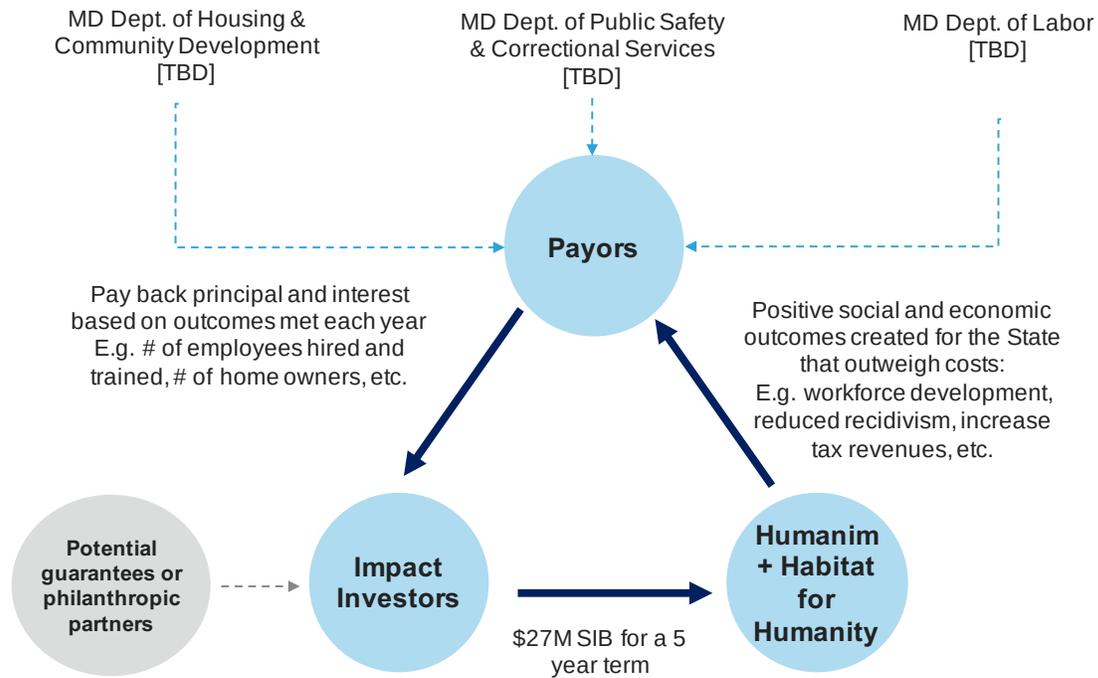
WORKFORCE DEVELOPMENT ONLY					WORKFORCE PLUS DECONSTRUCTION (200 houses per year average)					WORKFORCE PLUS DECONSTRUCTION (250 houses per year average)					WORKFORCE PLUS DECONSTRUCTION (300 houses per year average)				
Outcomes valued for 5 years beyond transaction																			
Unemployment Rate					Unemployment Rate					Unemployment Rate					Unemployment Rate				
17% 22% 27%					17% 22% 27%					17% 22% 27%					17% 22% 27%				
Recidivism Rate	20%	\$56.2 k	\$55.1 k	\$54.0 k	Recidivism Rate	20%	\$80.9 k	\$79.8 k	\$78.7 k	Recidivism Rate	20%	\$87.1 k	\$86.0 k	\$84.9 k	Recidivism Rate	20%	\$93.3 k	\$92.2 k	\$91.1 k
	25%	\$47.3 k	\$46.2 k	\$45.1 k		25%	\$72.0 k	\$70.9 k	\$69.8 k		25%	\$78.2 k	\$77.1 k	\$76.0 k		25%	\$84.4 k	\$83.3 k	\$82.2 k
	30%	\$38.3 k	\$37.2 k	\$36.1 k		30%	\$63.1 k	\$62.0 k	\$60.9 k		30%	\$69.3 k	\$68.2 k	\$67.0 k		30%	\$75.4 k	\$74.3 k	\$73.2 k
Outcomes valued for 10 years beyond transaction																			
Unemployment Rate					Unemployment Rate					Unemployment Rate					Unemployment Rate				
17% 22% 27%					17% 22% 27%					17% 22% 27%					17% 22% 27%				
Recidivism Rate	20%	\$81.8 k	\$80.2 k	\$78.6 k	Recidivism Rate	20%	\$125.4 k	\$123.8 k	\$122.2 k	Recidivism Rate	20%	\$136.3 k	\$134.7 k	\$133.1 k	Recidivism Rate	20%	\$147.2 k	\$145.6 k	\$144.0 k
	25%	\$68.8 k	\$67.2 k	\$65.6 k		25%	\$112.4 k	\$110.8 k	\$109.2 k		25%	\$123.3 k	\$121.7 k	\$120.1 k		25%	\$134.3 k	\$132.6 k	\$131.0 k
	30%	\$55.8 k	\$54.2 k	\$52.6 k		30%	\$99.5 k	\$97.8 k	\$96.2 k		30%	\$110.4 k	\$108.8 k	\$107.1 k		30%	\$121.3 k	\$119.7 k	\$118.0 k
Outcomes valued in perpetuity																			
Unemployment Rate					Unemployment Rate					Unemployment Rate					Unemployment Rate				
17% 22% 27%					17% 22% 27%					17% 22% 27%					17% 22% 27%				
Recidivism Rate	20%	\$167.4 k	\$164.1 k	\$160.8 k	Recidivism Rate	20%	\$280.3 k	\$277.0 k	\$273.7 k	Recidivism Rate	20%	\$308.6 k	\$305.3 k	\$302.0 k	Recidivism Rate	20%	\$336.8 k	\$333.5 k	\$330.2 k
	25%	\$140.9 k	\$137.6 k	\$134.3 k		25%	\$253.8 k	\$250.5 k	\$247.2 k		25%	\$282.0 k	\$278.7 k	\$275.4 k		25%	\$310.3 k	\$307.0 k	\$303.7 k
	30%	\$114.3 k	\$111.0 k	\$107.7 k		30%	\$227.3 k	\$224.0 k	\$220.7 k		30%	\$255.5 k	\$252.2 k	\$248.9 k		30%	\$283.7 k	\$280.4 k	\$277.1 k

Sensitivity based on number of houses per year, long-term unemployment rate of participants, long-term recidivism rate of participants, inclusion of deconstruction, and number of years post-transaction of outcomes valuation. Boxed values indicate base case assumptions.

8.0 Potential Transaction Options

Transaction options for a deconstruction PFS will depend on factors including buy-in from key stakeholders, budgetary constraints, and political dynamics. As mentioned previously in this report, the transaction structure that we are working toward is the following:

Figure 8. Potential PFS transaction with State departments



However, we also want to outline a few alternative transaction options that could have worked in Baltimore and that could work in other cities:

Figure 9. Potential PFS transaction with City Departments (instead of State in the above option)

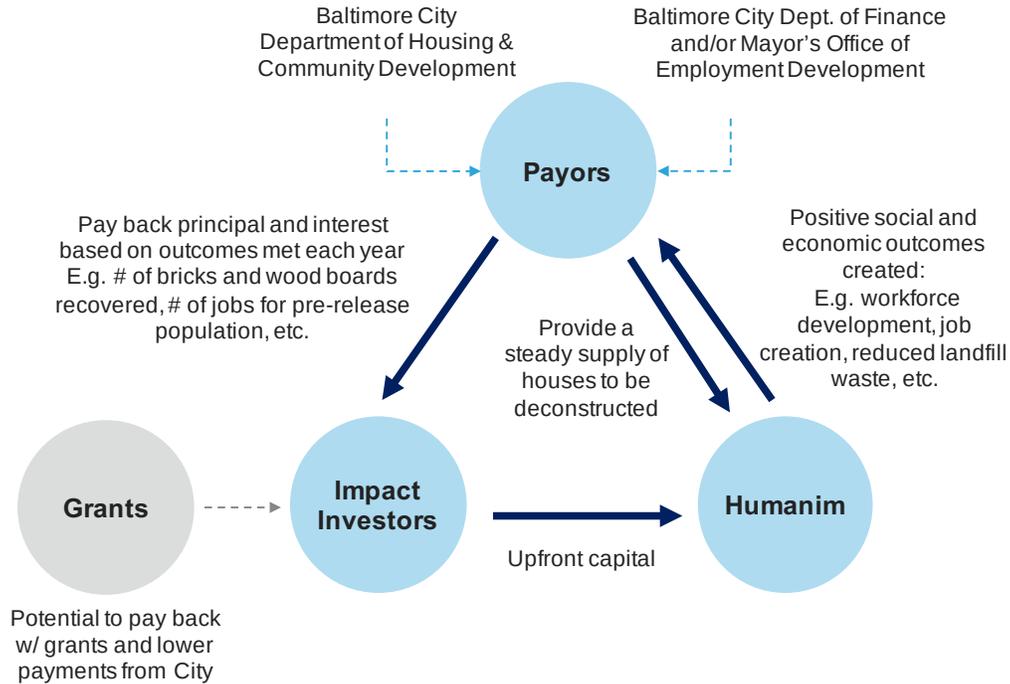


Figure 10. Potential PFS transaction with City Housing Department & Department of Public Works (this option considers installation of green infrastructure on vacant land to manage stormwater runoff)

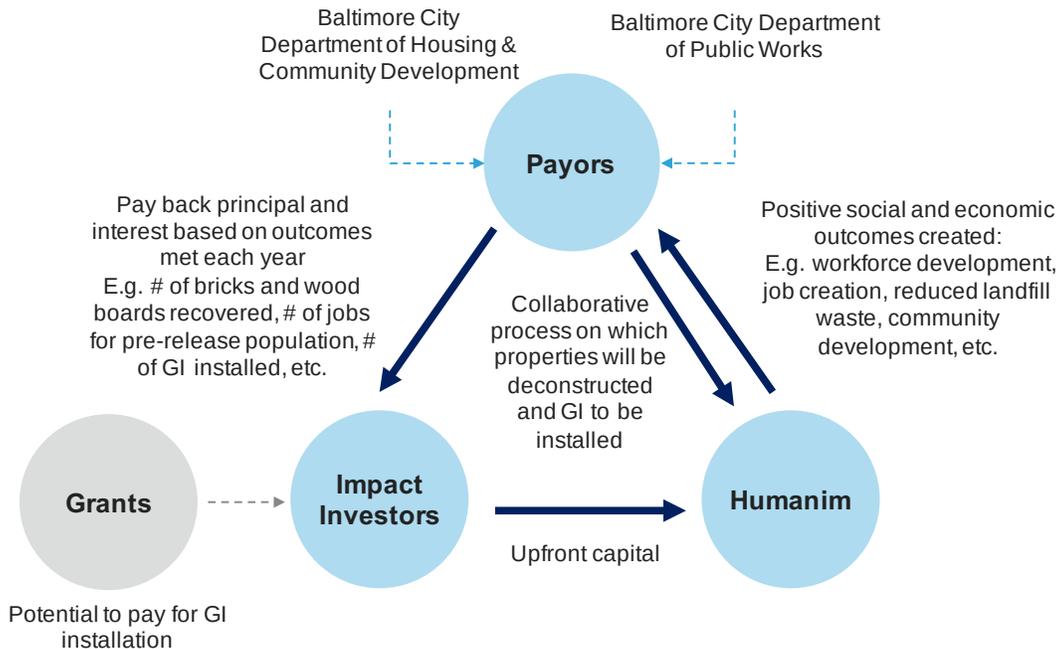
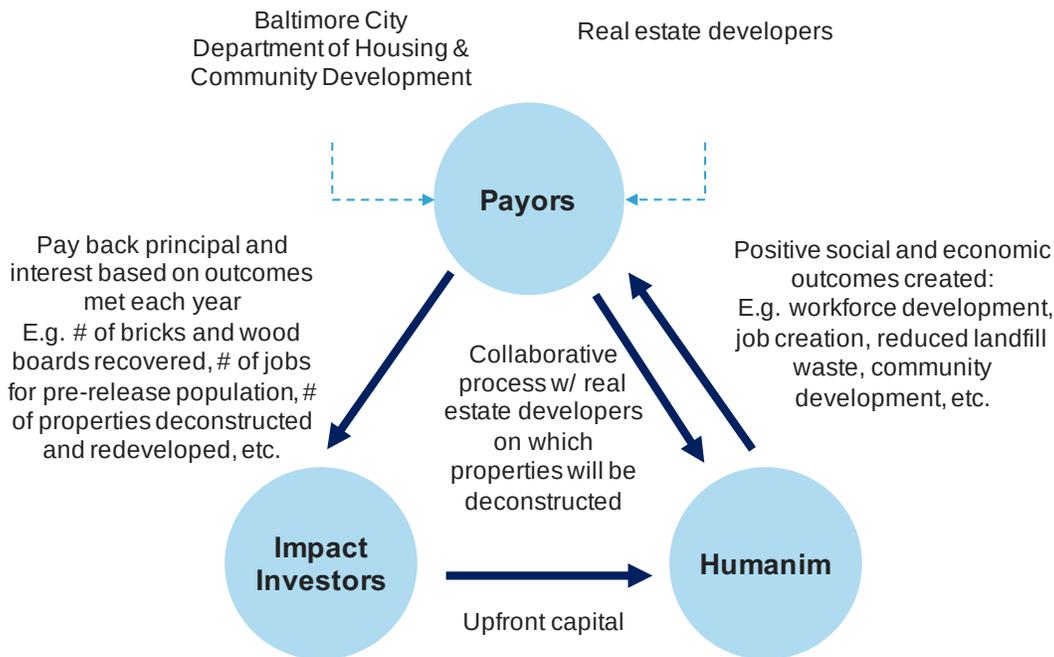


Figure 11. Potential PFS transaction with City Housing Department & Real Estate Developer
(this option considers real estate development on the vacant land created after deconstruction)



9.0 Potential Investors

Quantified Ventures constantly monitors the investor landscape and engages impact investors to develop strategic relationships for the benefit of its clients. With only a handful of PFS projects in the United States to date, investors are approaching the space from varied levels of interest and experience. In deals that have launched to-date, there have been a number of different investor types, including large commercial financial institutions, CDFIs, high net worth individuals, philanthropic foundations, corporations, and insurance companies, among others. Over \$160M has been invested in U.S. deals, but this new asset class has the potential to unlock billions in uncommitted capital over the coming years.

In our discussions with potential investors, this project's social and environmental impact and an opportunity for financial return resonated with several notable impact and philanthropic investors. Below, we summarize the highlights and major takeaways from investor conversations:

Table 9. Summary of Discussions with Potential Investors

Investor	Rationale	Highlights and feedback
Kresge Foundation	Private, national foundation that works to expand opportunities in America's cities through grant-making and social investing in arts and culture, education, environment, health, human services and community development.	<ul style="list-style-type: none"> ▪ Clear interest in the intersection of climate resilience with social and financial outcomes. ▪ Would be interested in a grant or PRI opportunity.
Calvert Impact Capital	Nonprofit investment firm that lends to organizations working in areas like climate change, education, microfinance, workforce development, affordable housing, and gender equity.	<ul style="list-style-type: none"> ▪ Clear interest in workforce development specifically in underserved neighborhoods. ▪ Prior relationship with Quantified Ventures via the DC Water transaction. ▪ Prior relationship with Humanim ▪ Signed LOI received (Appendix B).
Goldman Sachs	Impact investment arm of the investment bank has invested heavily in Baltimore.	<ul style="list-style-type: none"> ▪ Clear interest in geographic location and economic development focus. ▪ Prior relationship with Quantified Ventures via the DC Water transaction.
Barclays	Impact investment arm of the investment bank has shown interest in this type of innovative projects.	<ul style="list-style-type: none"> ▪ Fits with their investment focus and strategy.
Surdna Foundation	The Surdna Foundation seeks to foster sustainable communities in the United States -- communities guided by principles of social justice and distinguished by healthy environments, strong local economies, and thriving cultures.	<ul style="list-style-type: none"> ▪ Fits with their investment focus and strategy.
Living Cities	Work with cross-sector leaders in cities to develop and scale new approaches geared at achieving dramatically better results for low-income people.	<ul style="list-style-type: none"> ▪ Fits their investment focus and strategy.
Maycomb Capital	Provide financing across asset classes to fund strategies and enterprises that transform communities.	<ul style="list-style-type: none"> ▪ Fits their investment focus and strategy.

Investor	Rationale	Highlights and feedback

10.0 Maximizing Impact Via Land Reclamation

We have focused on the positive outcomes created via deconstruction thus far in the report. However, even greater impact can be created if re-use of newly created vacant land is evaluated as well. The following table highlights several options for land use.

Table 10. End-Use Options for Land Reclamation

	Description	Examples of uses
Stormwater management / Reduction in heat island effect	<ul style="list-style-type: none"> Land used to reduce runoff, filter stormwater, and decrease impervious surfaces to meet Baltimore's requirements for improving water quality of streams and harbors 	<ul style="list-style-type: none"> Cisterns and/or green infrastructure Green Parking: land that can accommodate neighborhood parking needs while keeping greening and stormwater considerations in mind Urban Forest and Buffer: trees planted and maintained on vacant lots, buffers along railroads and highways, and existing forest patches
Redevelopment	<ul style="list-style-type: none"> Land used to improve real estate in the neighborhood or city by adding more marketable properties 	<ul style="list-style-type: none"> Residential development Commercial development (could include work with small business owners)
Commercial green space	<ul style="list-style-type: none"> Land converted into green space that yields revenues 	<ul style="list-style-type: none"> Urban Agriculture: land leased to urban farmers to grow food commercially
Other green space (Green Pattern Book guidelines)	<ul style="list-style-type: none"> Land converted into green space for recreation, aesthetical and other non-commercial purposes 	<ul style="list-style-type: none"> Clean and Green: temporary greened spaced meant as a short-term holding strategy for future redevelopment Community-Managed Open Space: vacant lots maintained by a community used for vegetable gardens, orchards, and small recreational spaces Neighborhood Park Mixed Greens: land that can combine the uses described

		above to achieve a greater number of goals
Solar energy	<ul style="list-style-type: none"> Land used for solar energy project 	<ul style="list-style-type: none"> Solar plant: produces solar energy for the community Solar array parking lot: provides solar energy for the community as well as space for parking
Grow center (Green Resources and Outreach for Watersheds)	<ul style="list-style-type: none"> Land used to develop Baltimore communities 	<ul style="list-style-type: none"> “Waste to Wealth” Initiative: store and distribute reclaimed and recycled materials for community members to use

11.0 Expansion to Other Cities

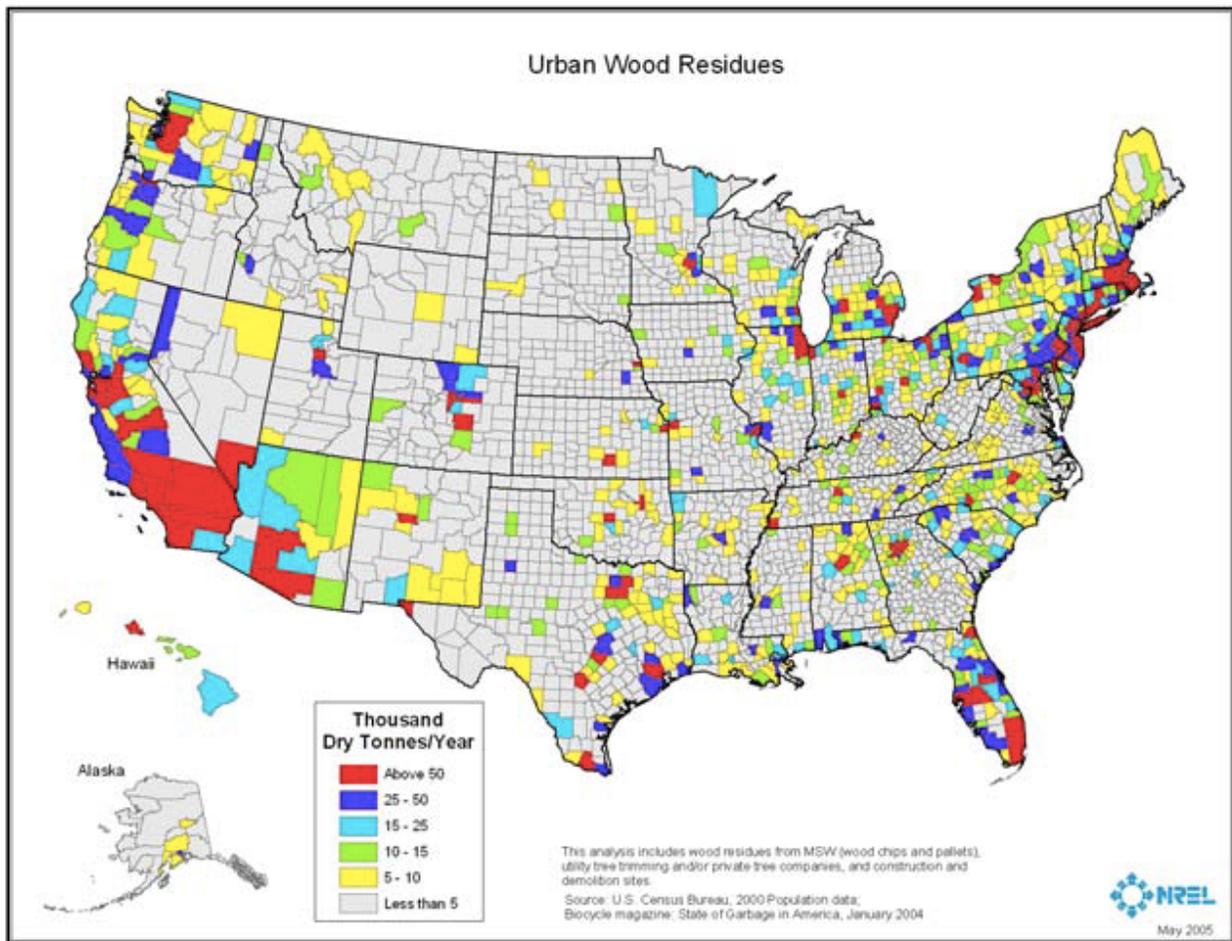
Our objective of scaling deconstruction and exploring the “fresh cut” business model in Baltimore is to scale and replicate this in other cities. There is a huge need and potential across the U.S. – according to the U.S. Forest Service, reclaimed wood from all dead and diseased community trees could equal nearly 4 billion board feet or about 30% of annual hardwood consumption in the United States. According to NREL’s report⁴⁰, the 10 states with the highest urban wood waste (MSW wood that includes wood chips, pallets, and yard waste, utility tree trimming and/or private tree companies, construction/demolition wood) are the following:

Table 11. Top 10 Urban Wood Residue States

State	Urban Wood Residues (Thousand Dry Tonnes)
California	3,901
Texas	2,307
New York	2,041
Florida	1,678
Illinois	1,337
Ohio	1,272
Pennsylvania	1,238
Michigan	1,196
Georgia	924
New Jersey	894

⁴⁰ A. Milbrandt, “A Geographic Perspective on the Current Biomass Resource Availability in the United States”, NREL, December 2005

Figure 12. Estimated Urban Wood Residues by County



Source: A. Milbrandt, "A Geographic Perspective on the Current Biomass Resource Availability in the United States", NREL, December 2005

The above list is a good place to start, overlaid with factors for scaling deconstruction as shown in the next paragraphs. The Urban Wood Network⁴¹ is also another resource that helps support the case for a "fresh cut" business model and the innovative cities that are already a part of this network are the following: Illinois, Michigan, and Wisconsin.

⁴¹ <http://urbanwoodnetwork.org/members>

According to our analysis, there are also several cities beyond Baltimore that have the necessary factors to make a deconstruction PFS transaction successful:

Table 12. Criteria for Expansion to Other Cities

Physical factors	Economic factors
<ul style="list-style-type: none"> ▪ Building type ▪ Building materials ▪ Property condition ▪ Limited landfill space 	<ul style="list-style-type: none"> ▪ Demolition needs and deconstruction opportunities ▪ Secondary market for used building materials (e.g. direct retail sales, Brick + Board in Baltimore) ▪ Neighborhood economic infrastructure (e.g. recycling centers, neighborhood grow centers) ▪ Neighborhood economic condition (e.g. incarceration rates, poverty levels) ▪ Increasing landfill costs ▪ Employment market ▪ Neighborhood housing conditions

Deconstruction is typically seen in areas with one or more of the following conditions:

- Large number of vacant, deteriorated properties
- Vacant properties that are old and therefore have valuable wood boards
- Strong and accessible materials reuse market – could include export markets and large metropolitan areas with a consistent demand for used building materials
- Nonprofit programs that are focused on achieving both social and environmental objectives

Table 13. Analysis of Potential Cities for Expansion

	Strong used materials market	Pipeline of vacant properties	Type & condition of building material	Landfill rates / landfill space	Public sector involvement / support
Milwaukee, WI	Yes	Large supply	Large structural deconstruction market	Moderate tipping fees	Local code system that is supportive of building material reuse
Miami, FL	Yes; export to Latin America	Moderate supply	Dade County pine is valuable & rare; Non-structural market due to termite	Moderate tipping fees	Miami-Dade Public Housing Authority supports used material reuse
El Paso, TX	Yes; export to Mexico	Low supply	Large non-structural deconstruction market	Low tipping fees	El Paso Housing Authority supports used material reuse
Nashville, TN	Yes	Moderate supply	Large structural deconstruction market	Moderate tipping fees	Strong support for housing preservation
Baltimore, MD	Yes	Large supply	Large structural deconstruction market	High tipping fees	Strong support for housing workforce development

While it is beyond the scope of the analysis for this report, additional cities that could be considered include: U.S. Cities With The Highest Rate Of Vacant Homes

- Detroit, MI: Number of vacant residential properties: 52,947; Vacancy rate: 18.6%
- Flint, MI: Number of vacant residential properties: 9,793; Vacancy rate: 16.5%
- Youngstown, OH: Number of vacant residential properties: 4, 063; Vacancy rate: 6.7%
- Jackson, MS: Number of vacant residential properties: 3,474; Vacancy rate: 6.3%
- Toledo, OH: Number of vacant residential properties: 6,598; Vacancy rate: 6.2%
- Macon, GA: Number of vacant residential properties: 3,278; Vacancy rate: 5.7%
- Montgomery, AL: Number of vacant residential properties: 3,638; Vacancy rate: 5.4%
- St. Petersburg, FL: Number of vacant residential properties: 7,481, Vacancy rate: 5.4%
- Saginaw, MI: Number of vacant residential properties: 2,785; Vacancy rate: 5.2%

12.0 Conclusion

Based on our analysis, we believe there is a strong impact and economic potential for the proposed intervention. A PFS approach through a Social Impact Bond presents an opportune method to finance the intervention by leveraging the value of the outcomes generated to compel multiple parties to contribute, spreading the financing responsibility rather than relying on a single party (e.g., the Department of Housing and Community Development) to bear sole responsibility as blight removal activities are typically funded. At the same time, these entities are protected in the event the outcomes are not met as expected, since performance risk is shared with investors, while the project team and payors build an evidence base for the intervention that helps inform future expansion and planning decisions. By aligning financing towards outcomes and sharing

risk with investors, our work and analysis has successfully secured interest and commitment from three Maryland State Departments (Housing and Community Development; Labor, Licensing, and Regulation; and Public Safety and Correctional Services) to act as payors, and we are ready to begin the transaction structuring process.

Given that Baltimore is just one city in the U.S. that experiences high levels of blight, incarceration, urban wood waste, and unemployment, we believe there is high potential for scalability across the country, and by using the frameworks laid out here, we encourage the project team to strategically consider where best to scale and how to maximize the impact of deconstruction and a “fresh cut” line of business to promote a sustainable urban wood economy nationally.

13.0 Appendices

- Appendix A: Performance metrics and checklist
- Appendix B: Calvert Letter of Interest (LOI)
- Appendix C: Comparison to Maryland’s Public Safety Contract
- Appendix D: Target Geography – Neighborhood Indicators
- Appendix E: Economic Valuation Methodology
- Appendix F: Background on PFS and Impact Capital
- Appendix G: PFS process and timeline

Appendix A: Performance metrics and checklist

Metric	Frequency of measurement
Number of houses deconstructed	Every year
Number of employees hired and trained	Every year
Number of months of employment	Every year
Number of wood boards	Every year
Pounds of bricks	Every year
Property tax increase	Every 3 years
Reduced CO2 emissions	Every year
Income tax increase	Every year
Home ownership rate increase (for employees)	Every 3 years
Number of narcotics calls for service per 1,000 residents	Every 3 years
Reduced recidivism	Every 3 years

Performance metrics – evaluating success and pricing checklist

- ✓ What is the benchmark for success? How likely is success?
- ✓ Is success absolute (each individual is achieving benchmark) or relative (each individual who would not otherwise have achieved benchmark is now achieving it)?
- ✓ Are perverse incentives possible?
- ✓ What is the value of intangible economic benefits?
- ✓ What is the value of tangible costs avoided?
- ✓ What is the value of other tangible economic benefits?
- ✓ How large a total repayment is the City / State or others willing or able to pay?
- ✓ Is the total expected repayment high enough to motivate funders?

Appendix B: Calvert Letter of Interest (LOI)



February 26, 2018

Eric Letsinger, CEO
Quantified Ventures, LLC
1875 Connecticut Avenue, 10th floor
Washington, DC 20009

Dear Mr. Letsinger,

Calvert Impact Capital is pleased to submit this letter of interest in support of the Pay-for-Success (PFS) project that provides an opportunity to scale workforce development and homeownership via deconstruction in the City of Baltimore.

Should this project continue to the transaction structuring phase, we would be interested in considering this project as a potential investor. Any such investment would be subject to our internal risk review and approval process.

The State of Maryland should be commended for its commitment to PFS projects that can bring transformational change to communities in need, highlight evidence-based practices and direct funds to interventions that work. We particularly like that this project has the potential to change the way cities resolve blight issues – by using a more sustainable and long-term cost savings approach via deconstruction instead of demolition.

We look forward to the opportunity to engage in this promising initiative.

Sincerely,

A handwritten signature in black ink, appearing to read "Catherine Godschalk", with a long horizontal flourish extending to the right.

Catherine Godschalk
Vice President, Investments
Calvert Impact Capital

Appendix C: Comparison to Maryland’s Public Safety Compact

	Public Safety Compact	This Opportunity
Transaction structuring, contracting, and evaluation costs borne by:	Private parties (philanthropy)	Private parties
Risk shifted to:	Service provider	Investors
Contractual agreements:	Loose and flexible, more uncertainty	Strict and binding, less uncertainty
Cost savings accrue to:	Split between State and service provider, unfavorable toward State	All to State, a portion may be used to pay back investors
Concrete performance goals:	None; cost savings continuously validated based on days out of prison, seen as unreliable/confusing	Yes; used as a benchmark for a one-time validation by a 3 rd party to assess performance payment
Core recidivism reduction intervention:	Substance abuse treatment	Workforce development, sustainable employment, housing ex-offenders

Appendix D: Target Geography – Neighborhood Indicators

<i>Sources for Data: Baltimore Neighborhood Indicators Alliance and Justice Policy Institute</i>								
Community	Percent of Residential Properties Vacant or Abandoned, as of 2015	Unemployment Rate (In Labor Force and Seeking), 2010-15 average	Unemployment Rate (Overall, Including those not in Labor Force by Circumstance or Choice), 2010-15 average	Median Household Income, 2010-15 average	Percent of Family Households Living Below the Poverty Line, 2011-15 average	Est. Incarcerated Population (State Prison + City Jail), as of 2010	Est. Incarceration Rate (State Prison + City Jail) per 1,000 residents, as of 2010	Crime Rate (Violent + Property) per 1,000 residents, 2010-15 average
Sandtown-Winchester/Harlem Park	35.4%	21.4%	53.0%	\$24,142	34.6%	669	44.9	66.9
Upton/Druid Heights	34.0%	25.4%	62.3%	\$15,194	49.4%	393	38.0	82.7
Greenmount East	32.5%	24.3%	55.0%	\$23,120	28.1%	377	46.0	74.2
Southwest Baltimore	28.1%	23.5%	52.0%	\$26,608	32.2%	603	33.7	82.3
Clifton-Berea	26.7%	19.6%	53.6%	\$26,359	24.3%	435	44.1	59.0
Oldtown/Middle East	26.6%	23.1%	61.5%	\$14,178	48.4%	356	35.5	94.6
Midway/Coldstream	20.0%	17.9%	46.7%	\$32,212	24.6%	423	44.0	71.6
Madison/East End	19.9%	24.2%	56.8%	\$29,940	30.9%	410	52.7	76.4
Southern Park Heights	19.9%	23.7%	54.8%	\$26,655	35.8%	429	32.3	56.0
Greater Rosemont	16.8%	20.3%	50.7%	\$28,773	24.0%	600	31.2	63.2
Penn North/Reservoir Hill	16.4%	20.0%	50.6%	\$30,760	29.3%	301	31.1	63.9
Poppleton/The Terraces/Hollins Market	15.3%	16.0%	48.2%	\$19,253	45.9%	156	30.7	82.1
Pimlico/Arlington/Hilltop	14.9%	16.7%	49.0%	\$31,419	20.2%	352	29.8	57.5
Greater Mondawmin	12.3%	18.2%	48.4%	\$37,298	14.6%	251	26.9	103.2
Downtown/Seton Hill	11.6%	5.3%	39.4%	\$40,837	14.9%	64	10.0	312.2
City of Baltimore Average	8.2%	13.0%	40.2%	\$40,782	18.8%	11,376	18.5	62.6
Washington Village/Pigtown	6.8%	13.1%	38.4%	\$46,886	24.6%	98	17.8	131.5
Westport/Mount Winans/Lakeland	6.5%	15.0%	40.7%	\$41,710	24.1%	175	24.6	74.8
Forest Park/Walbrook	6.3%	12.4%	43.4%	\$37,409	19.1%	244	24.8	49.0
Brooklyn/Curtis Bay/Hawkins Point	6.2%	18.3%	44.4%	\$34,503	26.2%	188	13.2	66.8
Allendale/Irvington/S. Hilton	6.0%	18.1%	43.5%	\$35,172	20.6%	409	25.2	49.0
Greater Charles Village/Barclay	5.4%	9.9%	48.6%	\$30,631	19.9%	190	11.6	70.1
Cherry Hill	5.2%	20.6%	50.8%	\$21,934	42.1%	225	27.4	57.5
Greater Govans	5.0%	14.3%	42.7%	\$36,185	18.2%	219	20.5	42.3
The Waverlies	4.6%	14.0%	35.4%	\$34,888	17.8%	159	20.5	78.7
Patterson Park North & East	3.6%	11.6%	34.7%	\$53,731	25.6%	279	19.2	83.3
Dorchester/Ashburton	3.5%	16.5%	43.9%	\$38,091	17.0%	226	19.2	52.3

Community	Percent of Residential Properties Vacant or Abandoned, as of 2015	Unemployment Rate (In Labor Force and Seeking), 2010-15 average	Unemployment Rate (Overall, Including those not in Labor Force by Circumstance or Choice), 2010-15 average	Median Household Income, 2010-15 average	Percent of Family Households Living Below the Poverty Line, 2011-15 average	Est. Incarcerated Population (State Prison + City Jail), as of 2010	Est. Incarceration Rate (State Prison + City Jail) per 1,000 residents, as of 2010	Crime Rate (Violent + Property) per 1,000 residents, 2010-15 average
Edmondson Village	3.4%	19.7%	40.3%	\$37,779	19.4%	196	24.8	38.5
Belair-Edison	3.0%	15.8%	40.5%	\$42,633	15.1%	368	21.1	54.4
Howard Park/West Arlington	2.7%	14.0%	42.2%	\$38,573	16.2%	183	16.8	49.5
Midtown	2.7%	7.3%	35.8%	\$37,764	8.5%	95	6.3	92.0
Morrell Park/Violetville	2.2%	11.3%	38.4%	\$40,831	11.4%	76	8.5	61.8
Cedonia/Frankford	1.9%	11.8%	34.6%	\$39,066	17.5%	320	13.6	49.5
Dickeyville/Franklintown	1.9%	9.1%	36.6%	\$33,312	23.0%	60	14.6	38.2
Lauraville	1.9%	11.9%	32.6%	\$60,841	6.9%	107	8.7	41.9
Southeastern	1.8%	12.4%	42.7%	\$31,072	24.4%	107	17.0	72.7
Chinquapin Park/Belvedere	1.7%	12.2%	30.4%	\$44,946	10.1%	102	13.2	44.1
Harbor East/Little Italy	1.6%	14.6%	40.7%	\$33,002	39.2%	76	14.0	149.4
Orangeville/East Highlandtown	1.6%	9.6%	34.4%	\$40,229	14.1%	99	10.9	90.6
Glen-Fallstaff	1.3%	13.2%	37.7%	\$38,434	18.0%	128	8.6	54.2
Harford/Echodale	1.2%	7.9%	28.2%	\$53,304	9.7%	117	6.9	44.6
Highlandtown	1.2%	6.1%	24.2%	\$65,659	13.8%	72	9.9	84.1
Hamilton	1.0%	8.3%	27.0%	\$60,532	7.0%	96	7.4	45.5
Beechfield/Ten Hills/West Hills	0.9%	12.2%	34.6%	\$50,887	10.7%	140	11.4	37.7
Fells Point	0.8%	5.1%	20.3%	\$73,300	7.1%	48	5.3	78.4
Northwood	0.8%	13.4%	44.6%	\$55,963	7.7%	212	12.7	41.1
Medfield/Hampden/Woodberry/Remington	0.7%	6.1%	24.2%	\$56,073	7.0%	120	6.9	51.0
Loch Raven	0.6%	11.7%	35.1%	\$47,690	14.6%	137	9.0	40.1
Inner Harbor/Federal Hill	0.5%	5.3%	22.4%	\$83,511	8.5%	50	3.9	96.3
Canton	0.4%	3.9%	16.7%	\$86,626	2.6%	31	3.8	56.3
Claremont/Armistead	0.4%	14.4%	39.2%	\$32,694	17.8%	128	15.6	51.6
North Baltimore/Guilford/Homeland	0.4%	6.4%	41.9%	\$77,886	5.5%	22	1.3	30.0
South Baltimore	0.4%	7.1%	19.9%	\$84,398	5.3%	26	4.1	45.3
Cross-Country/Cheswolde	0.1%	7.5%	30.4%	\$55,053	10.5%	20	1.6	16.9
Greater Roland Park/Poplar Hill	0.1%	3.7%	25.1%	\$105,672	2.0%	4	0.6	29.5
Mount Washington/Coldspring	0.1%	4.4%	18.7%	\$78,124	5.1%	6	1.1	32.4

Appendix E: Economic Valuation Methodology

[TO BE PROVIDED]

Appendix F: Background on PFS and Impact Capital

First conceived and launched in the United Kingdom in 2010, Pay for Success (PFS) provides an innovative way to tie payments to the delivery of expected outcomes. In PFS contracts, payments are based on the outcomes the payor hopes to achieve rather than on service volumes or inputs. Examples of this include recidivism reduction contracts in which payments are based on the number of individuals who stay out of prison, rather than on delivery of counseling or training sessions; or in the case of green infrastructure (GI), paying for reducing stormwater runoff and improving water quality, rather than just the successful, on-time deployment of specific GI solutions per requirements specifications.

In a PFS approach, the Investor assumes financial risk by providing up-front capital for a solution or service that has the potential to deliver outcomes benefitting specific organizations. These organizations are obligated to repay the investors a pre-negotiated rate of return depending on the achievement of the outcomes, as determined by an independent evaluation.

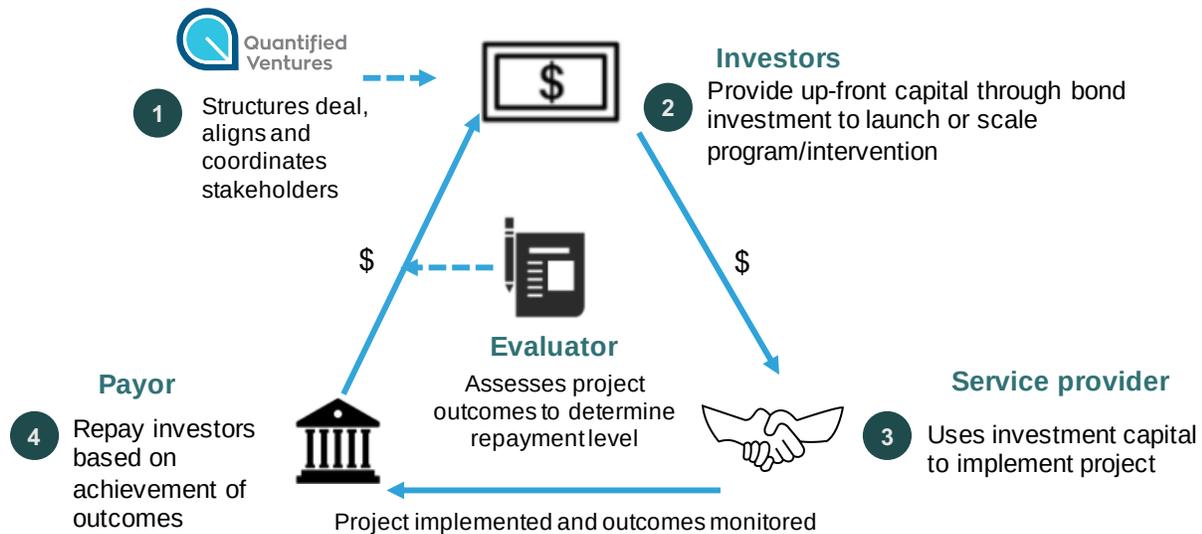
Typically, PFS transactions focus on programs that deliver positive social, economic, or environmental outcomes while driving predictable and direct savings or revenues to the payor. Some of the common issue areas addressed include prison recidivism, homelessness, education, workforce development, chronic health conditions, and mental illness. More recently, PFS has moved to the conservation arena, with projects completed or under development to finance environmental interventions such as green infrastructure for stormwater management, agricultural best management practices on private farms, and forestry restoration.

Who is Involved?

PFS deals are multi-party transactions that align incentives amongst stakeholders from multiple sectors with seemingly conflicting priorities and goals. While each transaction is different, most projects involve the following parties:

- **Investors** provide up-front, at-risk capital to enable the program to scale. If the project outcomes are successful, the investor receives a return on their investment.
- **Payors** are the entities that realize cost savings, revenue increases and/or other positive outcomes resulting from the scaled program, and can be either private or public entities, such as municipal or state governments. They use PFS to shift the risk to investors that the program will achieve the desired outcomes.
- **Service Providers** (nonprofit or for-profit) deliver the selected service or solution to the target population and geography, with the goal of achieving both improved social, health, or environmental outcomes to the target population and the projected financial benefits to the payor.
- **Evaluators** are independent entities that measure the impact of the program against the agreed-upon outcomes as well as the financial impact to the payor.

Figure A1: How Pay for Success Works



Financial Structure

PFS financing, also referred to as Social or Environmental Impact Bonds (SIBs/EIBs), is how impact investors deliver upfront capital to service providers, with remuneration from the payors based on achievement of outcomes. Despite the terminology, most PFS deals thus far have not involved actual bond financing, with the potential for securitization and secondary-market trading. The exceptions are the \$25M tax-exempt EIB issued by DC Water for its green infrastructure PFS program (for which Quantified Ventures was the Transaction Coordinator), and the 'Forestry Resilience Bond' a project developed in California through grant funding from the USDA and various philanthropic foundations.

For other PFS projects, the financing has involved loans that are tied to expected receivables and in which payments are based on achievement of performance metrics. In many deals, there is a layered capital stack, with senior lenders receiving first lien whereas subordinate lenders have the opportunity to earn a higher return. The capital stack sometimes also includes philanthropic organizations who seek to de-risk the transaction for investors or payors by providing grants, agreeing to lower rates of return, or guaranteeing some of the senior lenders' principal and expected return.

Benefits

PFS is a financing mechanism used to improve outcomes, while providing a measurable social and financial return to investors. Faced with resource constraints and rising demands for services and performance, payors can use PFS to scale and/or test promising solutions, with the resulting savings and other benefits used to pay for the initial funding. In general, PFS deals have the potential to:

- Deploy the fast-growing pool of impact capital, now sized at \$17.7B,⁴² into worthy programs across the country;
- Reallocate some or all of the funding risk to impact investors, enabling payors to buy measurable outcomes;
- Scale proven or high potential programs to expand their impact and reach;
- Enable procurement of outputs to drive true social, environmental or health outcomes vs. traditional procurement of outputs which may or may not move the needle
- Prioritize spending for evidence-based social, health, and environmental services, and;
- Increase funding for rigorous evaluations to grow the evidence base on what works;

PFS deals also have the potential to bring together multiple organizations to act as the payor, in those instances when the benefits of a solution or service flow to more than one party. Such a multi-party approach can improve the viability and scalability of a project, yet without the PFS deal the parties may not have the risk appetite or framework to come together. Similarly, PFS deals can enable a payor to fund solutions or services that are outside its immediate purview but that would result in monetizable benefits. Examples include a hospital using a PFS framework to fund delivery of meals to seniors in their homes, or a Sewer Authority funding implementation of conservation practices on private farms.

PFS transactions provide several benefits when compared to traditional financing methods:

1. **Access to Impact Capital:** Private investors who are interested in the outcomes of the project provide the upfront capital and are willing to take on some of the risk. The upfront payment provides cash flow timing relief for servicers and hence, increases the success of the project and impact from it.
2. **Reduced Risk:** Private investors take on the downside risk if the intervention is less effective than expected, protecting the capital budget of the City or State agency.
3. **Link to Outcomes:** The PFS model links payments to social outcomes (such as job creation) which aligns incentives and reduces risk.
4. **Improved Data Collection:** Through the evaluation process, valuable data is gained on the cost-effectiveness and scalability of deconstruction in this case which can help in future planning and reporting.
5. **Stakeholder Engagement Support:** This model requires stakeholder engagement across multiple entities and presents opportunities to engage new partners.
6. **Promote Sustainable Practices:** Through this process, more sustainable practices such as deconstruction will be promoted for the benefit of the local community.

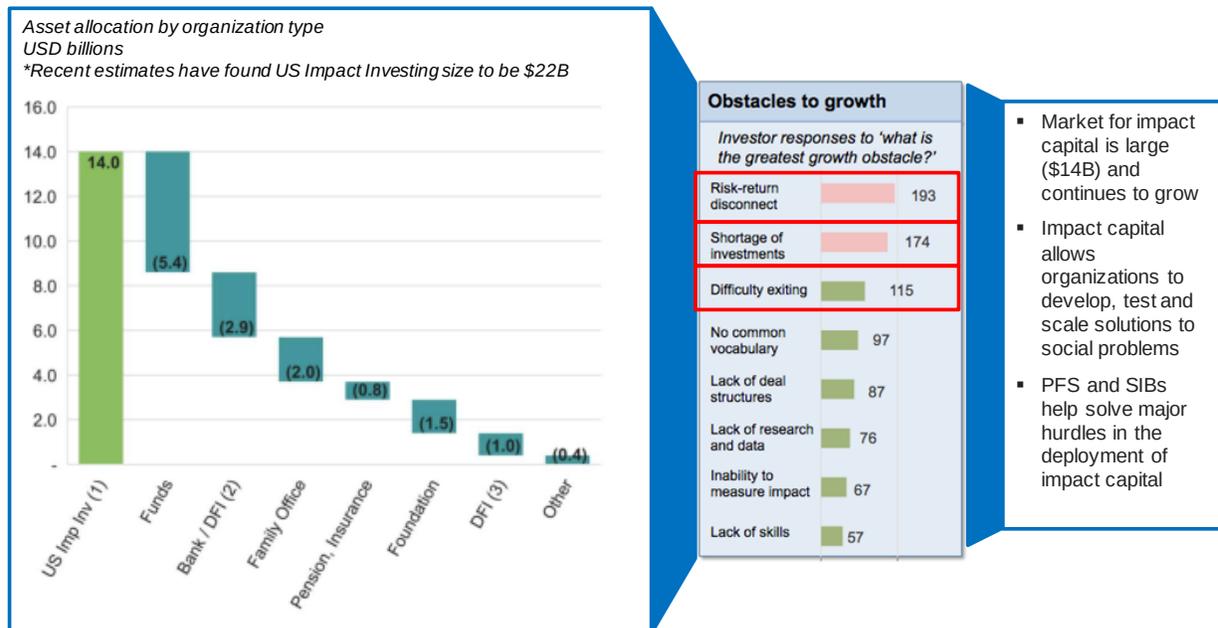
Growing Appetite for Impact Capital

⁴² In 2015, Impact Investors committed \$15B to over 7000 'impact' deals, with plans to increase capital spend by 16% to \$17.7B in 2016 (Global Impact Investor Network, 2016 Annual Survey).

Impact capital is a new and growing source of funding that seeks to achieve both financial and social or environmental returns. High net worth investors are increasingly seeking to have their values reflected in their investment portfolios. This focus on seeking a social or environmental return will only grow as an estimated \$40T transfers from baby boomers to millennials over the next three decades, representing the largest wealth transfer in history.

According to the Global Impact Investing Network and JP Morgan, the amount of net new impact capital invested worldwide has increased from \$8B in 2012 to an estimated \$12B in 2015. This figure, which represents a survey of 146 global financial institutions, captures those investors who deliberately target social and financial returns, making them a subset of the aforementioned SRI group. The most significant barrier to growth in impact capital is a lack of investable deals. There are additional barriers around lack of research & data, and an inability to measure impact.

Figure A2: Pay for success vehicles can address the top challenges for deploying impact capital in the US



Source: GIIN Annual Impact Investor Survey (2016); National Philanthropic Trust; GIIN; JP Morgan
 (1) Excludes ESG- and negative screening-related capital
 (2) Diversified financial institutions
 (3) Development finance institutions

Appendix G: PFS process and timeline

An end-to-end transaction typically takes about 9-12 months:

