

**NeighborWorks® America Symposium**  
**A New Era in Affordable Housing:**  
**Investing for Impact in Sustainable Communities**  
**Philadelphia, PA • August 18, 2010**

To Symposium Participants:

What follows is A Thought Experiment, authored by SVT Group, funded by NeighborWorks America (NeighborWorks) and developed with the Stewards of Affordable Housing for the Future (SAHF). NeighborWorks, SAHF and the Housing Partnership Network co-sponsor STRENGTH MATTERS®, with the goal of expanding investment in strong nonprofits in order to increase the supply of affordable housing that makes a positive difference to its residents and communities. Therefore, the growing discipline of “Impact Investing” is of great interest.

*Can the full impact of well run affordable housing, beyond its service as shelter, be better understood and communicated? If so, how might we bundle that social return for investors? Could private, philanthropic, and public parties invest to create impactful, diverse portfolios or join us to change the ecosystem to incentivize systemic investment in housing as infrastructure for sustainable communities.*

At some point, one must take a first leap. SVT Group is an expert in helping organizations and industries identify key indicators, determine baselines, and facilitate ongoing measurement and management of total return – both social and financial. They have worked with many businesses, investors, and nonprofit organizations; and have begun to become familiar with the complex world of affordable housing.

So we posed this question: Would SVT Group take a run at quantifying the social and environmental impact of affordable rental housing and show us some of the ways to present that impact to investors? SVT Group courageously took on this challenge, reviewing over 100 academic studies and papers which documented, to greater or lesser extents, the impacts of various types of affordable rental housing. Some could be quantified; others could not. Working with the available evidence, SVT Group developed the analysis, using estimates if necessary, and then generated bold sample proposals for how to deliver that full impact to investors.

*Perhaps we could solve the entire housing problem in America! Or, more conservatively, perhaps we could develop \$1bn portfolios – packages of diversified properties that optimize financial returns, risk and social impact.*

Many of your organizations do just that every day. If you had access to more capital invested in your ability to deliver that total return, you could make a greater difference. Many of your cities are seeking “sustainability”; it would be a great opportunity if public leaders better understood the full power of affordable rental housing as one key to that more sustainable future.

Our intent is to find pathways for action, and identify new partners for change. The work of SVT Group provides a look at what is known and how we might use it. Today it spurs our speakers from various impact investment perspectives to advise us on what the opportunities and challenges could be for affordable housing.

August 18, 2010

Dear Investor:

SVT Group is pleased to present the attached hypothetical Public Private Placement Memorandum for the Development of Quality, Deconcentrated Affordable Rental Housing and Strategic Services. Our intent with the Memorandum is to stimulate both thought and action within the housing, planning and investment industries about the opportunity, and optimal investment strategies, to create and maintain human resources, environmentally sustainable communities, and quality of life.

Hundreds of billions of dollars are invested each year in the creation and preservation of America's housing stock. U.S. financial and land use policies and financial incentives have driven development that segregates uses and incomes, which in turn has led to a system of housing that drives myriad social and environmental costs. As we reconfigure our communities to be more sustainable with respect to land, fuel, water and air quality — a question arises: how should we realign the incentives that drive this hundred-billion dollar annual engine?

This thought experiment is designed to bring out a number of questions:

- What are the multiple reasons to invest in affordable housing, beyond affording shelter?
- What are the actual returns, financial and societal, from investing in the housing asset alone and with related services?
- How do those returns, and how does tracking them, affect the potential invest-ability of this asset?

We hope that it will stimulate multiple additional questions as well.

The Memorandum will inform the NeighborWorks<sup>®</sup> Symposium, A New Era in Affordable Housing: Investing for Impact in Sustainable Communities, August 18, 2010 in Philadelphia, PA, which will bring together leaders from the fields of impact investment, sustainable community design, and affordable housing to explore how to expand resources for affordable housing in sustainable communities. The goal is to both build bridges between these fields and create the opportunity for new insights on how to make affordable housing more attractive to investors.

The Memorandum represents "version 1.0" of an approach to articulating and indeed managing the financial and social value of assets. Much like a concept car at the Detroit Auto Show, our goal is to help people experience the near future. We invite you to sit in our concept car, and even take it for a spin... Tell us what works and doesn't appeal to you. If together we make the right adjustments and have a critical mass of drivers, this concept may be coming soon to streets near you.



Sara Olsen  
Founding Partner  
SVT Group

## Acknowledgements

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**A THOUGHT EXPERIMENT:  
“PUBLIC AND PRIVATE PLACEMENT MEMORANDUM” (“PPPM”)**

**8.4 MILLION UNITS (ENTIRE U.S. DEMAND) OF QUALITY AFFORDABLE  
RENTAL HOUSING AND STRATEGIC SERVICES**

**\$1,197,380,000,000**

by Sara Olsen and Pin Kwok of SVT Group for Stewards of Affordable Housing for the Future and the NeighborWorks® America Symposium: A New Era in Affordable Housing: Investing for Impact in Sustainable Communities, Philadelphia, PA, August 18, 2010

*This paper was written for discussion purposes of the symposium. The opinions expressed are therefore those of the authors and do not represent the opinions, thoughts or positions of NeighborWorks® America.*



## PLEASE READ THESE NOTES AND DISCLAIMERS

THIS PUBLIC AND PRIVATE PLACEMENT MEMORANDUM (THE “MEMORANDUM”) IS BEING CIRCULATED ON A NON-CONFIDENTIAL BASIS TO INVESTORS, POLICY MAKERS AND OTHERS FOR THE PURPOSE OF ILLUSTRATING THE SOCIAL AND ENVIRONMENTAL BENEFITS ALONGSIDE THE FINANCIAL BENEFITS OF INVESTING A HYPOTHETICAL FUND IN A SET OF HYPOTHETICAL INVESTMENTS (THE “PORTFOLIO”), AND TO SYSTEMATICALLY ASSESS THE OPPORTUNITY COST OF NOT MAKING SUCH INVESTMENTS.

THE PORTFOLIO DESCRIBED HERE IS NOT AN ACTUAL INVESTMENT OFFERING; IT IS A HYPOTHETICAL INVESTMENT OFFERING WITH THE FOLLOWING CHARACTERISTICS.

### I. GENERAL METHOD, SCOPE AND LIMITATIONS OF ANALYSIS

WE HAVE USED THE SOCIAL RETURN ON INVESTMENT (“SROI”) ANALYSIS METHOD TO VALUE THE IMPACTS IN QUESTION. SPECIFICS OF THE WAY IN WHICH THIS METHOD HAS BEEN APPLIED HERE INCLUDE THE FOLLOWING.

THE CALCULATIONS HERE ARE BASED ON OVER 60 RESEARCH REPORTS DESCRIBING MORE THAN 100 EXISTING STUDIES THAT INVESTIGATED OVER 270 SPECIFIC ECONOMIC, ENVIRONMENTAL AND SOCIAL IMPACTS OF: NEW CONSTRUCTION OF AFFORDABLE HOUSING; REHABILITATION OF EXISTING HOUSING; PROVISION OF SPECIFIC TYPES OF SERVICES TO RESIDENTS OF AFFORDABLE HOUSING; AND RENTAL ASSISTANCE PROGRAMS THAT ENABLED LOW-INCOME FAMILIES TO MOVE OUT OF CONCENTRATED POVERTY INTO BETTER QUALITY HOUSING IN SAFER NEIGHBORHOODS. THE STUDIES USED REPRESENT THE RESULTS OF 15 DAYS OF SECONDARY LITERATURE REVIEW AND SEVERAL WEEKS OF ANALYSIS, AND INCLUDE ALL STUDIES CONTAINING QUANTITATIVE IMPACTS THAT WE FOUND DURING THIS REVIEW, WHETHER THE IMPACTS WERE POSITIVE OR NEGATIVE, AND WHETHER THE IMPACTS WERE INTENDED BY THE HOUSING/SERVICE PROVIDER OR UNINTENDED. SOME EXISTANT RESEARCH MAY HAVE BEEN LEFT OUT THAT COULD BE INTEGRATED WITH MORE TIME, AND ADDITIONAL NEW RESEARCH COULD BE DONE TO CREATE A MORE COMPLETE AND ACCURATE PICTURE OF THE POTENTIAL IMPACTS TO BE GENERATED.

ALL THE OF THE IMPACTS GENERATED BY AFFORDABLE HOUSING, OR BY SERVICES TO RESIDENTS OF AFFORDABLE HOUSING, ARE NOT INCLUDED IN THE MODEL. ONLY THOSE IMPACTS THAT IT IS POSSIBLE TO TRANSLATE INTO MONETARY VALUE BASED ON EVIDENCE FROM EXISTING PUBLISHED RESEARCH HAVE BEEN INCLUDED. QUANTITATIVE AND QUALITATIVE IMPACTS WHERE MONETIZATION WAS NOT POSSIBLE WITHIN THE SCOPE OF THIS EFFORT ARE NOT INCLUDED. FOR THOSE IMPACTS, THIS MODEL UNDERESTIMATES THE ACTUAL POTENTIAL VALUE.

THE STUDIES FROM WHICH WE OBTAINED THESE VALUES WERE NOT DESIGNED FOR THE PURPOSE OF MODELING THE POTENTIAL IMPACTS OF NEW INVESTMENTS. IF DEVELOPER/MANAGER/SERVICE PROVIDERS TRACK AND ESTABLISH THE VALUE OF THE SOCIAL, ENVIRONMENTAL AND ECONOMIC IMPACTS THEIR ACTIVITIES CREATE, AND REPORT THIS INFORMATION, IT WILL BECOME POSSIBLE TO MAKE MORE REALISTIC AND ACCURATE SROI MODELS.

FOR THE PROPOSED PORTFOLIO OF INVESTMENTS TO DELIVER THE RESULTS MODELED HERE, THE PARTIES IMPLEMENTING THESE INVESTMENTS (DEVELOPERS, MANAGERS AND SERVICE PROVIDERS) WOULD NEED TO DO SO IN A WAY THAT HAS HIGH FIDELITY TO THE INTERVENTIONS IN THE RESEARCH LITERATURE. THESE PARTIES WOULD NEED TO WORK WITH THE RESEARCH COMMUNITY TO ACCOUNT OVER TIME FOR THE COSTS AND IMPACTS RELATIVE TO THE BASE CASE SCENARIO(S) TO DETERMINE WHAT ACTUAL RESULTS ARE OR WILL BE GENERATED.

THE OPPORTUNITY FOR CERTAIN IMPACTS TO BE GENERATED IS PREMISED UPON AND LEVERAGES CERTAIN EXISTING CONDITIONS, SUCH AS THE AVAILABILITY OF PUBLIC TRANSPORTATION, PLACES OF EMPLOYMENT, QUALITY SCHOOLS, HEALTHCARE AND CHILDCARE PROVIDERS, AND OTHERS. THE INVESTMENTS REQUIRED TO PROVIDE THESE CONDITIONS, AND THE SOCIAL AND ENVIRONMENTAL



IMPACTS THEY GENERATE (ABOVE AND BEYOND IMPACTS RELATED TO THE TYPES OF AFFORDABLE HOUSING AND SERVICES THAT ARE MODELED HERE), ARE OUTSIDE THE SCOPE OF THIS ANALYSIS AND HAVE NOT BEEN INCLUDED. THE DEGREE TO WHICH THE IMPACTS MODELED HERE DEPEND UPON OR ARE ATTRIBUTABLE TO THESE FACTORS IS NOT KNOWN OR INCLUDED.

THE VALUES MODELED HERE INCLUDE THE COSTS AND BENEFITS ASSOCIATED WITH RENTAL UNITS DESIGNATED FOR AFFORDABILITY, EVEN THOUGH IT IS ASSUMED THAT SOME OR ALL OF THE PROPERTIES MODELED WOULD ALSO CONTAIN OTHER UNITS WHOSE RENTS ARE MARKET RATE (I.E. ARE NOT COUNTED AMONG THE AFFORDABLE HOUSING UNITS IN THIS ANALYSIS). THOSE HOUSING UNITS ARE NOT INCLUDED IN OUR INVESTMENT COST FIGURES. THE SOCIAL RETURNS ASSOCIATED WITH THOSE UNITS ARE EITHER ALREADY ACCOUNTED FOR IN THE BASE CASE SCENARIOS, OR WOULD BE IN ADDITION TO WHAT IS SHOWN HERE. THE FINANCIAL RETURNS ASSOCIATED WITH THOSE UNITS WOULD BE IN ADDITION TO WHAT IS SHOWN HERE.

WE HAVE INCLUDED IMPACTS EXPERIENCED BY MULTIPLE STAKEHOLDERS. STAKEHOLDERS CONSIDERED IN THIS ANALYSIS ARE THOSE WHO HAVE EXPERIENCED SIGNIFICANT CHANGES THAT HAVE BEEN CAPTURED IN THE RESEARCH LITERATURE. THEY INCLUDE INVESTORS, THOSE EMPLOYED DURING CONSTRUCTION, HOUSING RESIDENTS (I.E. SENIORS, AND PARENTS AND CHILDREN IN FAMILIES), COMMUNITY MEMBERS, SCHOOL CLASSMATES OF HOUSING RESIDENTS, AND THE GOVERNMENT (I.E. THE TAXPAYER). IMPACTS CONSIDERED INCLUDE ECONOMIC, HEALTH, EDUCATIONAL, AND ENVIRONMENTAL. SPECIFICS OF THE IMPACTS FOUND TO BE MATERIAL ARE DETAILED IN THE IMPACT MAP IN APPENDIX TO THIS DOCUMENT.

VALUES ARE MODELED FORWARD OVER 10 AND 20 YEARS AND TAKE ACCOUNT OF CHANGES EXPERIENCED BY A GIVEN POPULATION OF RESIDENTS OVER THAT TIME, AS WELL AS CHANGES THAT RESULT IN OUTCOMES THAT MANIFEST AFTER THE 10- OR 20-YEAR PERIOD.

DISPLACEMENT (WHERE THE OUTCOMES DO NOT REPRESENT A NET CHANGE BUT RATHER ARE SIMPLY SHIFTED FROM OR TO OTHER PARTIES ELSEWHERE) IS NOT CONSIDERED SIGNIFICANT FOR THE IMPACTS THAT ARE DIRECTLY ASSOCIATED WITH THE PHYSICAL HOUSING UNITS, BUT MAY BE SIGNIFICANT IN THE CASE OF OTHER IMPACTS. THOSE DISPLACEMENT EFFECTS HAVE NOT BEEN MODELED.

THE RESULTS OF THIS ANALYSIS MAY NOT BE GENERALIZABLE TO THE ACTUAL POPULATIONS WHO WOULD IN REALITY BE AFFECTED BY THE TYPES OF AFFORDABLE HOUSING AND SERVICES MODELED HERE. SHOULD THE HYPOTHETICAL INVESTMENTS WE DESCRIBE HERE BE MADE IN REALITY, ACTUAL RESULTS MAY BE DIFFERENT. OUR ASSUMPTIONS MAY BE WRONG AND OUR CALCULATIONS MAY CONTAIN ERRORS. WE HAVE MADE SEVERAL SIMPLIFYING ASSUMPTIONS THAT MAY AFFECT THE ACCURACY OF THE VALUATION.

### III. BASE CASE ASSUMPTIONS FOR DIFFERENT TYPES OF INVESTMENT

IN GENERAL THE RESULTS MODELED REFLECT THE IMPACT OF SPECIFIC KINDS OF AFFORDABLE HOUSING AND SERVICES ABOVE AND BEYOND THE ENVIRONMENTAL, ECONOMIC AND SOCIAL IMPACT THAT WOULD BE GENERATED BY CONVENTIONAL REAL ESTATE HOUSING INVESTMENTS, IF THE BASE CASE SCENARIO IS THAT SUCH INVESTMENTS WOULD OTHERWISE BE MADE.

FOR EACH OF THE THREE TYPES OF INVESTMENTS OUR MODEL IS BASED UPON, WE HAVE MADE ASSUMPTIONS ABOUT THE SPECIFIC BASE CASE SCENARIO, MEANING WHAT OUTCOMES WOULD OCCUR IF THE INVESTMENTS MODELED HERE WERE NOT MADE. THE BASE CASE SCENARIO ASSUMPTIONS ARE AS FOLLOWS.

IN INVESTMENT TYPE 1 (RETROFITTING EXISTING SENIOR HOUSING, AND ADDING RESIDENT SERVICE COORDINATION) AND TYPE 2 (PRESERVATION, ENERGY EFFICIENCY RETROFITTING AND CONVERSION TO HOUSING OF EXISTING BUILDINGS), THE BASE CASE SCENARIO IS THAT VIRTUALLY NO REHABILITATION OR RETROFITTING OF THE UNITS IN QUESTION WOULD OTHERWISE



BE DONE. IN TYPE 1, IT IS ASSUMED THAT SENIORS WOULD HAVE AFFORDABLE HOUSING BUT NOT ACCESS TO RESIDENT SERVICE COORDINATORS OR ENERGY EFFICIENCY RETROFITS. IN TYPE 2, WE ASSUME THAT CURRENTLY OWNED, UNOCCUPIED UNITS WOULD BE REHABILITATED AND RE-USED, BUT AT A RATE MUCH SLOWER THAN WOULD BE NEEDED TO MAKE ANY DENT IN THE AFFORDABLE HOUSING GAP.

IN INVESTMENT TYPE 3 (NEW CONSTRUCTION IN TRANSIT-ORIENTED SITES, COMPACT MIXED-INCOME DEVELOPMENT), THE BASE CASE SCENARIO IS THAT OTHER, NON-AFFORDABLE REAL ESTATE DEVELOPMENTS WOULD BE BUILT BUT THAT NOT ENOUGH WOULD BE AFFORDABLE TO MAKE ANY DENT IN THE AFFORDABLE HOUSING GAP. THEREFORE THE ENVIRONMENTAL IMPACT OF THE NEW CONSTRUCTION IS NOT CONSIDERED AN IMPACT OF THE INVESTMENT, SINCE THE SAME ENVIRONMENTAL OUTCOMES WOULD HAVE OCCURRED REGARDLESS.

THE IMPACT AND VALUES USED IN THE PORTFOLIOS MODELED HERE ARE BASED PRIMARILY ON EXTRAPOLATION USING THE IMPACTS FROM THE ABOVE RESEARCH AS PROXIES. WE HAVE MODELED VALUES THAT REFLECT WHAT HAPPENED FOR A SUBJECT GROUP THAT WOULD NOT OTHERWISE HAVE HAPPENED IN THE ABSENCE OF THE PARTICULAR INTERVENTION STUDIED (THAT IS, WE HAVE TAKEN ACCOUNT OF THE BASE CASE SCENARIO AND SUBTRACTED THE OUTCOMES THAT WOULD HAPPEN IN THAT SCENARIO FROM THE OUTCOMES THAT OCCUR IN THE INTERVENTION SCENARIO TO ARRIVE AT IMPACT). ALL SIGNIFICANT IMPACTS DEMONSTRATED IN THE LITERATURE ARE INCLUDED WHETHER THEY ARE POSITIVE OR NEGATIVE.

WE HAVE NOT TAKEN ACCOUNT OF POSSIBLE MACRO-LEVEL IMPACTS THAT MIGHT OCCUR IF THESE INVESTMENTS WERE TO BE MADE AT THE SCALE INDICATED. UNINTENDED CONSEQUENCES OF PROVIDING MILLIONS OF AFFORDABLE RENTAL HOMES AND TARGETED SERVICES MAY OCCUR.

#### **IV. OTHER DISCLAIMERS**

POTENTIAL INVESTORS AND POLICY MAKERS ARE ADVISED TO READ THE MEMORANDUM DATED AUGUST 18, 2010, AND THE RELEVANT SOCIAL AND ENVIRONMENTAL IMPACT MODEL (THE "PROSPECTUS") AND TO DO THEIR OWN RESEARCH AND ANALYSIS BEFORE MAKING ANY INVESTMENT OR POLICY DECISION.

THESE HYPOTHETICAL INVESTMENTS HAVE NOT BEEN RECOMMENDED BY ANY U.S. FEDERAL OR STATE SECURITIES COMMISSION OR REGULATORY AUTHORITY. FURTHERMORE, THE FOREGOING AUTHORITIES HAVE NOT CONFIRMED THE ACCURACY OR DETERMINED THE ADEQUACY OF THIS DOCUMENT.

THE HYPOTHESIZED OFFERING IS NOT A PUBLIC OFFERING. FOR THIS REASON, SHOULD THESE SECURITIES BE SOLD THEY WOULD BE SOLD ONLY TO DEBT AND EQUITY INVESTORS AND GRANT MAKERS WHO MEET CERTAIN MINIMUM SUITABILITY QUALIFICATIONS.



## I. Investment Proposition

Hundreds of billions of investment and subsidy dollars are currently invested each year to provide affordable housing, but still approximately 8.4 million renter households in the United States today spend more than 50% of their income on housing.<sup>1</sup> As a consequence, these individuals, their families and communities, the businesses they might patronize, and the US taxpayer are currently paying for costs or missing out on value worth the equivalent of at least two trillion dollars—value that, if measured, could be captured by taxpayers and mission-driven investors.

These costs are driven by the dysfunctional ecosystem that has arisen because of the sheer numbers of people in the United States today who lack affordable housing and appropriate services. Those who are living in this ecosystem contend with more limited access to transportation and jobs, illness and lead exposure, barriers to quality education, and lost income than others as a result of lack of access to quality schools and services, stress and disruption due to repeated moves, crime victimization and involvement in the criminal justice system, and many other deficits. All US residents bear some share of these costs.

This seemingly dire situation presents a major opportunity. Strategically designed and placed housing with targeted services have been shown over the past two decades to correct this dysfunction, providing numerous net environmental, economic, health and educational benefits in these areas.

These proven interventions are ready to be scaled up to meet the entire “demand” for these social and environmental goods. We refer to this unmet demand (above and beyond the existing pool of affordable housing) as the “total addressable impact.”

**We estimate the total addressable impact over the next 20 years for quality affordable housing and services of serving the 8.4 million renter householders facing an extreme housing cost burden today to be worth a net present value of at least \$2.663 Trillion.**

Our analysis of the rigorous research finds roughly 270 instances of proven impacts in the areas of energy, health, education, crime, property values, and taxpayer costs, compared to what happens without these specific types of housing and services.

By systematically assessing the material costs and benefits that such strategic housing and services produce, and estimating the value of these impacts in monetary terms where possible, we have calculated the net present social value. Our analysis is detailed in this document.

To capture this total addressable impact, we propose a portfolio of 8.4 million units in a metaphorical “layer cake” portfolio that includes rehabilitation, retrofits, new construction; ongoing maintenance; and targeted services.

**To provide a sufficient scale of funding to capture the entire opportunity, investors must obtain market risk-adjusted rates of return for the majority of the investment dollars required.** A conventional financial risk-adjusted return for investment in housing might be a combination of 7% for fixed 30-year mortgage-backed debt (based on an average debt yield between 6-8%), and 5-20% for equity holders. If 50% of the financing for this hypothetical portfolio is debt yielding 7%, a layered investment structure is required to unlock the remaining billions of investment dollars needed.

One or more concessionary tranches of investment and/or grants will be made that either allocate some or all financial returns after principal to the other tranche(s), guarantee returns to reduce risk, or provide grants to enable the targeted market risk-adjusted financial return for the remainder of the required financing. The size of the concessionary tranche(s) has not yet been determined but will be with further analysis. Based upon our preliminary calculations, we estimate that this tranche would represent approximately 26.3% of the investment required.

The social ROI<sup>2</sup> of the overall \$1.2 Trillion investment hypothesized is estimated to be 2.66 and the overall social IRR<sup>3</sup> is estimated to be 51% over a 20-year horizon. Were all SROI to be assigned to the concessionary investment position, it would be higher. For example, if 26.3% of the total funding package were concessionary, and all of the SROI accrued to that concessionary position, the SROI would increase by a factor of nearly four to \$10.12 dollars for each dollar invested.

To build to \$1.2 Trillion in investment will take proof of the ability to deliver this social, economic and environmental value proposition while simultaneously delivering a financial value proposition. Therefore we propose a set of smaller investments as a pilot program which if successful would be replicated until the entire addressable impact has been captured. The proposed Investment Portfolio is described further below.

<sup>1</sup> “State of the Nations’s Housing 2010,” Joint Center for Housing Studies of Harvard University.

<sup>2</sup> Return On Investment (“ROI”) is net income relative to investment, or book income relative to net book value. Similarly, Social Return On Investment (“SROI”) is net social value relative to (financial) investment.

<sup>3</sup> Internal Rate of Return (“IRR”) is the interest rate (or discount rate) that will bring a series of cash flows (positive and negative) to a net present value (NPV) of zero (or to the current value of cash invested). Similarly, Social Internal Rate of Return (“SIRR”) is the rate that would bring social cash flows to zero NPV.



**“PUBLIC AND PRIVATE PLACEMENT MEMORANDUM” (“PPPM”)**

**\$1,000,000,000**

<b>Portfolio Mix: Layers of Quality Affordable Housing and Targeted Services</b>			
Total Units Required (Millions)	Type	Assumption / Source	Units Built in \$1Bn Portfolio
1.4	Senior Retrofit + Resident Coordination Services	1.4 million elderly renters and 3.2 million elderly owners pay in excess of 50 percent of their incomes for housing or live in severely inadequate housing (American Association of Homes and Services for the Aging, 2010)	11,475
1.8	Preservation + Energy Retrofit	Historic buildings: 3 million vacant units should be brought back to reuse and approximately 60% of buildings are in census tracts with a poverty level of 20% or more = 1.8 million units. (National Trust for Historic Preservation, 2002).	1,788
3.5	New Construction without Services	Remaining # units calculated from a total gap of 8.4 million net of items above. We assume these units will not provide services.	2,291
1.7	New Construction with Services	We assume that 1/3 of households with children have preschool age kids, and hence the need for the Early Childhood Programs.	1,054
8.4	Total Rental Units	18.6M households pay >50% of household income on housing, 45% of which are renters. State of the Nation’s Housing 2010.	16,608

This portfolio is deliberately conceptualized as a “layer cake” made up of four types of investments, and allocates the total investment amount in proportions that, if scaled roughly 1200X, would meet the entire 8.4 million-unit demand for rental affordable housing.



## II. Opportunity

Many discoveries that seemed obvious once they were made went unnoticed for generations. Due to its sheer scale and immediacy in our lives, the opportunity to profitably invest in energy-efficient, well-placed and well-stewarded housing that people can afford can easily be overlooked despite its very significant social IRR and stable, low-risk financial IRR. This critical infrastructure, upon which rests our society's ability to pursue our basic rights is due for an overhaul on the scale of our nation's electrical grid or bridges and highways. Today housing located near jobs, decent schools and human services, and transportation costs more money than one-third of Americans can afford to pay.<sup>4</sup>

Almost all housing segregates residents by income. Noted urban developer and Fannie Mae Boardmember Egbert Perry has observed:

“Highest and best use supposedly maximizes [the property's] dollar value. If you maximize that value, you're putting that property to its highest and best use. Well, I live in Atlanta, and Atlanta has had a lot of property developed pursuant to a highest and best use strategy. And, today, we're creating regional authorities to take on issues like schools, affordable housing, transportation, both on the overland, road transportation and mass transit, water and sewer issues, etc. Well, if all those highest-and-best use developments were, in fact, highest-and-best use, why are we bearing the cost of trying to fix this very broken regional infrastructure that we have?”<sup>5</sup>

Effectively, as the private sector ignores social and environmental returns in its solution design and resource allocation decisions, it outsources more and more of the work of restoring, maintaining and growing the social and environmental assets our lives depend upon to the government.

Nearly all affordable housing built prior to approximately 1990 — and the majority built since — is income-segregated, and most lacks resident services. Although income-segregated affordable housing was built with good intentions, as weak social networks have weakened further in this environment, this type of housing has generated or fed multiple unintended consequences. These include economic dependency, poor health, poor schools, crime, and a lack of normal business formation and the correlated tax base. Conversely— since in any crisis there lies opportunity— this approach to housing has also set the stage for investors and the public sector to work together to unleash significant potential gains in economic, social and environmental value.

Social value, defined as human and environmental health and well-being, is an asset that drives financial opportunity. The potential to create social value in exchange for revenue effectively constitutes market demand.

The unmet demand<sup>6</sup> for housing that costs less than 50% of household income in the United States is at least 12 million units and may be as high as 18.6 million. A household that pays more than 30 percent of its annual income on housing is “considered cost burdened and may have difficulty affording necessities such as food, clothing, transportation and medical care.”<sup>7</sup> While the United States Department of Housing and Urban Development (HUD) estimates that roughly 12 million households spend more than 50% of their income on housing, Harvard University's Joint Center for Housing Studies, which does an annual survey of the state of the nation's housing puts the figure at 18.6 million households in 2008 — an increase of nearly 4.8 million (32%) since 2001.

While the demand for affordable housing represents a full third of all US households, in recent decades conventional market forces have been blind to a great deal of social and environmental value. As such they have not only overlooked the opportunity inherent in serving this demand, they have created momentum that nudges this proportion ever higher. When quality affordable housing is built, these historic market pressures generally drive its cost out of range over time for low-and middle-income earners. This creates ever-greater costs for society, as the entry and middle class earners who provide vital services find their ability to grow or maintain their wealth increasingly limited.

4 Of all 113,101 US households in 2008, 18,588 (16.4%) had a severe burden defined as >50% of household income going to housing, and 21,668 (19.2%) had a moderate burden defined as 30-50% of household income going to housing, for a total of 35.6% households with a housing cost burden. “The State of the Nation's Housing 2010” (p. 38).

5 Perry, Egbert, “Is Affordable Housing a Part of the American Dream?” Luncheon Keynote in Mixed-Income Housing's Greatest Challenge: Strengthening America's Neighborhoods While Reaching Our Lowest-Income Families, Edited proceedings of the Neighborhood Reinvestment Corporation Symposium at the Neighborhood Reinvestment Training Institute Hosted by the NeighborWorks® Multifamily Initiative, Chicago, Illinois (April 4, 2002).

6 Demand is used to refer to the need of affordable housing.

7 US Department of Housing and Urban Development website, June 2010 <http://www.hud.gov/offices/cpd/affordablehousing>.



“Every thriving economy depends on entry level and middle class earners provide vital services. These are workers who teach our children, provide healthcare and security, staff restaurants, work in retail stores, deliver commodities, maintain streets and buildings, and provide countless other services. High housing costs often require these employees to pay more than a third of their incomes for housing, which limits their ability to build savings or pay for other necessary expenses. Financial pressures drive them to seek better paying opportunities and shorter commutes, and even small improvements can be enough to encourage them to change jobs. This leads to frequent turnover in entry-level positions that are basic to functioning economies.”<sup>8</sup>

Fed by the un-affordability of housing, concentrated poverty damages the lives, liberty and pursuit of happiness of not just poor people, but their fellow neighbors, citizens and taxpayers. However, concentrated poverty is not inevitable.

**Although in the past several decades market forces have worked at odds with quality shelter for a third of the population, the actual value of the social and environmental assets rooted in housing is becoming more and more visible to investors today, and this is shifting the market’s incentives to invest in these assets.**

In today’s information-rich, technology-enabled and crisis-ridden age, consumers and citizens are beginning to appreciate in a new way the need to sustain human well-being for generations to come. As these members of the spending and voting public begin to see how investment here drives social and environmental outcomes there, so too are investors beginning to recognize their own self-interest in these previously unaccounted for assets.

Since 1990 three types of affordable housing solutions have proved that concentrated poverty can be de-concentrated, stopping the vicious cycle and shifting it onto a different track that provides the opportunity for residents and community members alike to live healthier, safer, more stable, more sustainable, and higher-potential lives. We propose to scale these solutions by tapping into the shift in investor demand toward fair returns coupled with social and environmental value.

### III. Solution

Three “experiments” over the past two decades have demonstrated results at significant scale from the placement of affordable housing in mixed-income settings: HOPE VI, a public investment begun in 1992; tax credit financing, a 25-year old public incentive for private investment; and market-driven gentrification. In each case, the mixing of incomes and de-concentration of poverty have led to net positive outcomes in most health, education, economic and civic factors. SVT researchers plumbed the scientific evidence of impact from these types of developments and found over 270 instances of proven benefits in terms of independence, health, education, crime reduction, property value appreciation, and avoided taxpayer costs. Furthermore, gains in energy-efficient design and construction and simple retrofits have been shown to improve the energy efficiency of buildings by over 20% from pre-1990 levels. Negative environmental impacts from new construction and preservation, and negative or mixed social impacts such as those caused by the disruption of moving and the loss of income streams dependent on the previous system, are more than outweighed when impacts are viewed holistically.

We propose that when social return is taken into consideration the effective opportunity cost of not investing in quality Affordable Housing is higher than most investors will pass up.

**By demonstrating the SROI of well-designed and strategically located and served housing, we intend to drive demand for this investment in a manner that will result in the 8.4 million-unit gap being closed by market forces.**

The portfolio of investments we propose is based on estimates of the value to be captured in four key areas.

<sup>8</sup> Strengthening Santa Fe Through Affordable Home Ownership: a Study by Homewise, Inc. (October 1, 2007)



Quality Affordable Housing and Targeted Services Investment Portfolio: A “Layer Cake”		
Units (millions)	Type	Assumption / Source
1.4	Senior Retrofit + Resident Coordination Services	1.4 million elderly renters and 3.2 million elderly owners pay in excess of 50 percent of their incomes for housing or live in severely inadequate housing (American Association of Homes and Services for the Aging, 2010)
1.8	Preservation + Energy Retrofit of Historic <sup>9</sup> Buildings	Historic buildings: 3 million vacant units should be brought back to reuse and approximately 60% of buildings are in census tracts with a poverty level of 20% or more = 1.8 million units. (National Trust for Historic Preservation, 2002)
3.5	New Construction without Services	Total 8.4 million-unit gap net of two buckets above, and assuming that 2/3 of these units are occupied by families without preschool age children.
1.7	New Construction with Services	We assume 1/3 of households with children have preschool age kids, and hence the need for the Early Childhood Programs.
8.4	Total gap = total demand for quality affordable rental housing	

Serving this demand will generate approximately \$2.66 in social value and cost savings per dollar invested by both market-rate and concessionary investors, and an internal rate of social return (“SIRR”) of 51% — separate from and in addition to the financial IRR of this portfolio, and also separate from and in addition to the social returns that would be generated from a conventional real estate investment.

## IV. We Know How to Deliver Both Social Value and ROI

The affordable housing industry for nearly two decades has successfully de-concentrated poverty and generated related social benefits. The research community has demonstrated that these benefits are real. Furthermore, there is a clear case for energy retrofits, rehabilitation and transit-oriented development to reduce the environmental costs of existing and new housing. In short, the industry knows how to deliver both financial and social results.

It is absolutely critical that both public and private sector investors recognize that the solution must not be done willy-nilly in whatever is the most expedient way; instead it must be informed by experience, knowledge about what works, and quality site selection, design and execution.

The industry is also beginning to develop another capacity of cardinal importance: that of tracking, managing and communicating its impact (as opposed to merely the amount of money it spends, the activities it does, or the number of outputs it generates). Efforts such as Success Measures<sup>10</sup>, SROI analysis<sup>11</sup>, Impact Reporting and Investment Standards (IRIS)<sup>12</sup> and myriad public-private partnerships to create tailored information technology solutions exist and can be used to facilitate the communication to the capital markets of the critical information.

Without the ability to determine whether net social and environmental value is being generated, investors and policy makers can not compensate organizations for producing this value, nor can they accurately assess and price risk. But with this competency in place, conventional and impact investors, policy makers, philanthropists and developers can coordinate their efforts around shared goals.

<sup>9</sup> “There are more than 11,000 historic districts in the country, which include over 850,000 buildings. About 60 percent of those buildings are in census tracts with a poverty level of 20 percent or more. Over the last five years over 44,000 units of housing have been created (27,851 of them low and moderate income apartments). Over 40 percent of the housing units came from historic buildings that weren’t originally built as residential structures – warehouses, factories, department stores, office buildings, previously vacant upper floors of downtown buildings. Additionally there are nearly 3 million vacant older and historic housing units that ought to be brought back into use.” National Trust for Historic Preservation, 2002.

<sup>10</sup> Success Measures is a social enterprise at NeighborWorks® America that has developed a range of outcome-focused evaluation services and tools over the past decade for community development organizations and their funding and intermediary partners. See [www.successmeasures.org](http://www.successmeasures.org).

<sup>11</sup> Social return on investment (SROI) analysis is a method designed for use by philanthropists, investors and enterprises to assess and value their extra-financial impacts. Derived from cost-benefit analysis and first articulated for this purpose in 2000 by REDF, a US-based venture philanthropy organization, a number of private, public and academic sector organizations have since expanded upon the method. A global membership organization, the SROI Network, was founded in 2008 to develop the methodology, ensure the principles and standards of SROI are adhered to, disseminate information, train SROI practitioners and provide peer support. The Scottish Government has funded “The SROI Project” to develop, promote and support the use of Social Return on Investment across the third sector in Scotland. The UK Government Office of the Third Sector has written a guide to SROI. See <http://www.thesroinetwork.org>.

<sup>12</sup> Impact Reporting and Investment Standards (IRIS) is an effort to create a common framework for defining, tracking and reporting the performance of impact capital. This framework will create a “common language” that will allow comparison and communication across the breadth of organizations that have social or environmental impact as a primary driver. See <http://iris-standards.org/>.



**The success of the effort is premised on these two capabilities of the affordable housing industry:**

- 1. The ability to design and execute solutions that embody the design criteria that have been demonstrated to create positive impact.**
- 2. The ability to account for social and environmental impact over time.**

**With these skills, the industry is ready to demonstrate its ability to deliver high-SROI affordable housing through a \$1 Billion pilot program.**

Our research has uncovered studies that suggest that there are a number of key points of leverage to generate high social returns. These points of leverage include the following:

<b>Design Criteria for High-SROI Affordable Housing and Services</b>	
Driver	Benefits
Skilled management team	Quality developments, maintained properties, quality services Social, environmental and financial value Known risk: In addition to delivering a hit to financial return, poorly maintained housing has been shown to depress nearby property values
Transit-oriented location	Increased property values for non-affordability constrained units Avoided concentration of poverty Reduced transportation costs Reduced carbon emissions (and potential financial gain from voluntary carbon trading) Known risks: Non-transit oriented locations cost residents more in transportation and time, and generally have higher environmental costs.
Steady proximity to quality school systems	Increased educational attainment and graduation rates Increased lifetime earnings Known risks: multiple moves disrupt school performance and reduce educational attainment and thus potential future earnings.
Energy retrofits	Energy cost savings Reduced emissions Potential voluntary emission reduction credit trading = enhanced grant funding to developer or cash flows to investor
Lead removal from older buildings	Increased IQ Increased lifetime earnings Decreased crime participation, victimization Decreased crime-associated costs
Resident service coordinators for seniors	Increased quality of life Avoided premature nursing home costs
Provision of early childhood programming	Reduced crime participation and victimization as children grow up Reduced crime-associated costs Improved eventual earnings

Investments should be mindful of the critical importance of incorporating these known drivers of value in order to achieve the desired social returns. Additionally, developer/manager/service providers and the research community should coordinate efforts to track both short-term and longer-term indicators that allow them to establish the social, economic and environmental value of these activities conclusively.

By using both individualized effort, and by driving to consensus on outstanding social measurement and valuation questions, the industry can lift up its social, economic, environmental and financial value proposition to garner the investment that seeks these full returns.



## V. Unique Moment of Opportunity

Arguably there has never been a riper moment of opportunity to leverage the value of positive social and environmental impact in investment. The Monitor Institute defines Impact Investors as follows:

- “FINANCIAL FIRST INVESTORS, who seek to optimise (sic) financial returns with a floor for social/environmental impact. This group tends to consist of commercial investors who search for investment vehicles that offer market-rate returns while yielding some social/environmental good.
- “IMPACT FIRST INVESTORS, who seek to optimise (sic) social or environmental returns with a financial floor. This group uses social/environmental good as a primary objective and may accept a range of returns, from return of principal to market rate. This group is willing to accept a lower than market rate of return in investments that may be perceived as higher risk in order to help reach social/environmental goals that cannot be achieved in combination with market rates of financial return.<sup>13</sup>”

Those entities capable of deploying the scale of capital we seek here are ultimately accountable to the individual investors whose assets they steward, and individual investors’ interest in “investments with a social bonus” is growing rapidly. A Hope Consulting survey in 2010 of 4,000 individuals gauged interest in impact investing and found that 48% of respondents said they were interested in impact investing. Those who have already made impact investments are willing to invest 2.3x more than those who are new to impact investing. This implies that growth in impact investing will accelerate.<sup>14</sup>

Structured impact investment that combines concessionary and market rate returns is a “disruptive innovation” that provides the block upon which the cycle of poverty will be broken.

## VI. The Full Return on Investment

*Note: Tables showing the calculations, assumptions and sources underpinning our social and environmental impact are in the Appendix.*

A place to live is one of our most basic necessities. It allows us to live the rest of our lives. Without a stable, safe, affordable place to live, our health, education, work and civic participation suffer.

A survey of research (nearly all having to do with projects operating during the 1990s and 2000s) into the demonstrated impacts of Affordable Housing proves a range of benefits and a handful of negative impacts that are summarized here and feed our model. The subset of these impacts that are translatable into monetary values is used in our calculation of social return on investment.

If we were to build new Affordable Housing developments in transit-oriented locations, the social and environmental impacts would represent net present value of at least 90 cents for each dollar of investment in 20 years. This is in addition to market rate returns for both debt and equity investors whose investments would represent the majority of the capital required (the balance in this simplified hypothetical would be grants). This SROI is based on increased educational achievement of children, decreased incidence of lead poisoning, improved mental health of heads of household that leads to increased productivity, decreased vehicle miles traveled due to transit-oriented locations, and economic impacts of construction.

These quantified returns are only a subset of the true return as they do not include impacts that have been documented but were not monetizable within the parameters of this analysis, such as decreased crime and increased walk-ability of neighborhoods and physical fitness of residents.

Separate from new construction, there are existing vacant buildings that can be rehabilitated that reduce the need to build from scratch to meet demand. For reclamation and preservation of housing, the social returns in the form of improved educational outcomes, decreased lead exposure, improved mental health and job creation are at least \$0.43 for every dollar spent (NPV over 10 years), or \$0.67 for every dollar spent (NPV over 20 years).

<sup>13</sup> “Investing for Social and Environmental Impact: A Design for Catalyzing an Emerging Industry,” The Monitor Institute, January 2009.

<sup>14</sup> 4,000 individuals with household incomes greater than \$80,000 per year were surveyed. 48% of respondents said they were interested in impact investing but wanted to learn more (38%), or were very interested (10%), and another 40% were not yet sure. Forty six percent indicated an interest in “investments with a social bonus.” Those who understood impact investments as investment (i.e. return of capital plus), rather than grantmaking opportunities (i.e. no return of capital) were 50% more likely to be “very interested” in impact investing, and would put almost twice as much money into such investments. Hope Consulting, “Money for Good,” 2010.



Additional resident services such as Early Childhood Programs and Senior Resident Service Coordination (amongst other services) can enhance social returns many times over, with SROI ranging from \$4.14 to \$25.01 (20-year NPV of early childhood programming and senior resident service coordinators, respectively) for every dollar invested in these accompanying programs.

There are some desired impacts from placing families in neighborhoods with less concentrated poverty that have not (or not yet) been demonstrated in existing studies. The most significant of these is sustained, increased employment for adults. In the studies we identified, employment has either not increased at all or increased employment dropped off to previous levels within 5 years, with a few isolated exceptions. Top barriers to sustained employment are physical health and mobility, and access to childcare.

Affordable housing alone cannot solve all problems of concentrated poverty. Accompanying programs, especially those seeking to improve physical health and mobility and childcare programs, are critical to capturing the social impacts of affordable housing.

## METHODOLOGY BRIEF

We reviewed existing literature on the impacts of affordable housing. A list of these was obtained from interviews with leading figures in this field and bibliographies of other research efforts, and supplemented by internet research. The bibliography can be found in the Appendix.

For the actual model and SROI calculations, we used value estimates based on the research literature in every possible instance. Where we had to make an assumption not rooted in research evidence we noted our logic and assumptions.

**A number of significant impacts that have been documented in the literature but that studies do not quantify adequately are not included in the SROI model. These include savings from decreased crime rates, increased commercial activity in revitalized neighborhoods, and decreased medical debt-related bankruptcies. Impacts we did not include are noted in the Impact Map (see Appendix).**

We incorporated as many studies that examined impacts for a large portion of the U.S. as we found. However, some studies, especially those that used randomized control trials, focused on specific regions and cities. We have noted the sources of our statistics and assumptions we have made in the detailed tables in the Appendix.

## OVERALL FINDINGS

### The Impact Map

We have charted the inputs and activities associated with quality affordable housing and strategic services, and how they lead to outputs and longer-term outcomes. We cross-referenced this with impacts found in the research literature as follows:

- Impacts with monetized values that are included in our SROI model are in bold.
- Impacts that had mixed results in the research literature (either inconclusive results in a study or varying results in different studies) are in blue.
- Impacts that were hypothesized but not borne out in the research are in red.

See the Impact Map in the Appendix for details.

## PORTFOLIO ALLOCATION

We have modeled three distinct possible types of investments in our hypothetical portfolio, where the third has two variants, as follows.

### Type 1: Retrofitting Existing Senior Housing, and Adding Resident Service Coordination

Type 1 offers the biggest ‘bang for the buck’ of any of the types of investments modeled here. The average cost to make energy efficiency retrofits to existing senior housing developments, and provide Resident Service Coordinators (who presumably would work with whatever existing services are already provided) is much lower (and offers much larger monetizable impacts) than Types 2 and 3. **While it is tempting to segregate this chunk of the layer cake into its own independent investment, doing so would leave large chunks of other kinds of social and environmental value unrealized.**



**Type 1: Retrofitting Existing Senior Housing, and Adding Resident Service Coordination**

**Per Unit Costs**

Energy Retrofit	\$4,000	upfront
Resident Service Coordinators (RSCs)	\$4,000	upfront
	\$769	annual

**Per Unit Returns (20-yr NPV of “social cash flows”)**

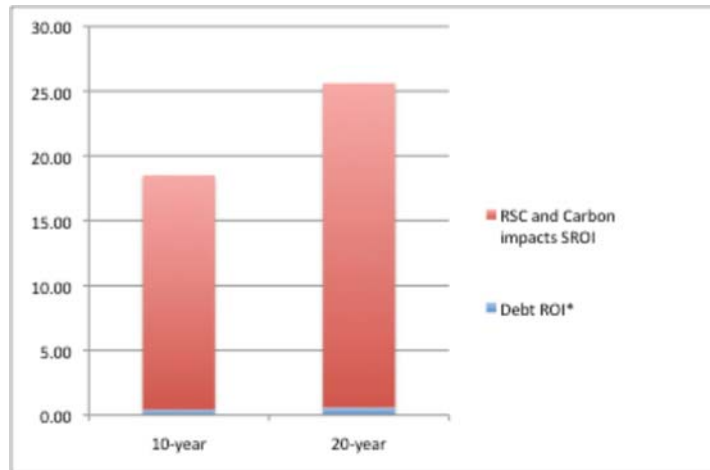
Energy Efficiency Gains	\$11,788
Energy & Carbon Cost Impacts	\$558
Delay in Institutionalization	\$106,045
Job Creation	\$656

Note: The “per unit” key performance indicators shown are based on overall costs and benefits to overall units built, and are not meant to imply that each individual unit will in fact accrue every benefit in this exact amount.

Service coordination for seniors is crucial because they do not necessarily know about the services available. “The service coordinator becomes a trusted confidant who empowers the residents.”<sup>15</sup> The role of the service coordinator is also to facilitate social cohesion among residents and staff and to keep residents engaged. An evaluation of the HUD Service Coordinator Program found that the program increased resident physical and emotional well-being, understanding of and access to services and social interaction among residents, and reduced the number of residents needing nursing home placements.<sup>16</sup>

There are approximately 1.4 million very low-income (earning below 50% of the area median income) elderly household renters that spend more than 50% of their income for housing, including 2.5 million that have disabilities.<sup>17</sup> Our model assumes that without the intervention of resident service coordination, existing senior housing would remain as-is, and 36% of the resident seniors (those aged over 80, and with disabilities) would move into nursing homes prematurely.

Energy retrofitting for senior affordable housing typically includes new windows and insulation roofing, replacement of electric heaters with gas-fired boilers, CFL fixtures & bulbs, and low-flow fixtures. Energy retrofitting results in an average 25% to 50% energy efficiency gain, with more extreme cases at 75%.<sup>18</sup>



\*This Type has no physical assets, instead it assumes the energy cost savings can be captured by the investor.

15 Levine, Cheryl A., “Multifamily Property Managers’ Satisfaction with Service Coordination”, U.S. Department of Housing and Urban Development (December 2008)  
 16 Research on Affordable Senior Housing with Services Strategies, Prepared by American Association of Homes & Services for the Aging, Prepared for the National Summit on Affordable Senior Housing with Services, Washington, DC (May 25, 2010).  
 17 “Of the 12.5 million elderly households with very low incomes, an estimated 3.8 million are renters (Haley and Gray, 2008). About 1.4 million pay more than 50 percent of their incomes for housing or live in severely inadequate housing, with nearly all suffering from a high rent burden.” “Affordable Senior Housing: The Case for Developing Effective Linkages with Health-Related and Supportive Services”, American Association of Homes and Services for the Aging (AAHSA) (2010).  
 18 Efficiency gained depends on initial state. Thirty to seventy-five percent range provided by the Energy Programs Consortium report on “Energy Efficiency in Multi-Family Housing: A Profile and Analysis” (2007). Thirty to fifty percent range provided by New Ecology Inc. presentation on “Costs and Benefits of Green Affordable Housing” (2006). Twenty-five plus percent provided by Stewards of Affordable Housing for the Future Presentation “Greening of Affordable Housing,” the Office of Affordable Housing Preservation (2008)



Here is the 10-year and 20-year SROI of these initiatives:

Value Driver	10-year	20-year
Debt ROE*	0.43	0.60
RSC and Carbon impacts SROI	18.05	25.01
<b>Blended ROI (weighted by dollar returns of each value driver)</b>	<b>9.08</b>	<b>12.58</b>

\*This Type has no physical assets, instead it assumes the energy cost savings can be captured by the investor.

**Type 2: Preservation, Energy Efficiency Retrofitting and Conversion to Housing of Existing Buildings**

There are at least 1.8 million units<sup>19</sup> that we can retrofit rather than building new developments. These existing units are to be found in currently unoccupied, old buildings that are typically in historic neighborhoods. We have prioritized including a mix of preservation and rehabilitation along with new construction in the layer cake because of the benefits associated with these buildings’ locations, as delineated here:<sup>20</sup>

- Over 40% of residents in older and historic neighborhoods are within five miles of work. Less than one resident in four in new housing is this close to his/her place of employment.
- Over two-thirds of older and historic neighborhoods have an elementary school within one mile. Less than 40% of new construction does.
- Over 60% of houses in older and historic neighborhoods have shopping within one mile. Barely 40% of new houses do.
- Public transportation is available to residents in nearly 60% of older and historic neighborhoods. Three quarters of new housing has no public transportation available nearby.

Without this intervention, we assume currently unoccupied units would be rehabilitated and re-used, but at a rate much slower than would be needed to make any dent in the affordable housing gap. Such units have been remodeled at a rate of 5,500 units/yr.<sup>21</sup> This means it would take 327 years to remodel all available 1.8 million units at the current rate.

**Type 2: Preservation, Energy Efficiency Retrofitting and Conversion to Housing of Existing Buildings**

Per Unit Costs		
Acquisition, Preservation	\$90,000	upfront
Ongoing Maintenance Costs	\$3,524	upfront
Per Unit Returns (20-yr NPV of “social cash flows”)		
Energy & Carbon Cost Impacts	\$840	
Increased Educational Outcomes	\$15,159	
Increased Mental Health & Productivity	\$14,011	
Economic Impacts of Remodeling	\$60,190	

Note: The “per unit” key performance indicators shown are based on overall costs and benefits to overall units built, and are not meant to imply that each individual unit will in fact accrue every benefit in this exact amount.

Such good locations would result in a decrease of 6% to 13% in fuel usage and related emissions<sup>22</sup>.

19 There are over 850,000 buildings in historic districts, with about 60 percent in census tracts with a poverty level of 20 percent or more. Nearly 3 million vacant older and historic housing units ought to be brought back into use. 60% \* 3 million = 1.8 million historic units that are in concentrated poverty areas. National Trust for Historic Preservation, 2002.  
 20 “Historic Preservation and Affordable Housing- The Missed Connection,” National Trust for Historic Preservation, 2003  
 21 “An interesting pattern has emerged in the development of rental housing under the Historic Rehabilitation Tax Act. Over the last five years over 44,000 units of housing have been created (27,851 of them low and moderate income apartments).” “Historic Preservation and Affordable Housing: The Missed Connection,” National Trust for Historic Preservation (2003).  
 22 Range provided by the National Research Council study (2009)



Moving children out of poor quality housing on a sustained basis typically results in a better and more stable environment for studying, and less incentive to engage in illegal activities, resulting in increased educational achievement.

Stability is crucial to a child’s education: “When students were administered a measure of stressful life events, researchers found that students reported changing schools being as stressful as the hospitalization or incarceration of a parent”<sup>23</sup>

Increased high school and college graduations result in increased lifetime earnings for the children, especially young children. However, these impacts are realized only in the longer term. A high school graduate will earn \$270,000 more over his/her lifetime than a high school dropout. College graduates earn nearly twice (177%) the amount earned by students who have received only a high school diploma. And these benefits carry over into future generations – children from parents with higher levels of education do better than those without.<sup>24</sup>

The most significant result of moving children from existing, older poor quality housing to better Affordable Housing is the reduced risk of lead poisoning, especially with children under the age of six. While lead removal and treatment costs in the range of \$1,200 to \$10,800, lead-poisoned children also result in costs to society via IQ reductions and decreased lifetimes earnings. Removing lead from old units would prevent the IQ loss associated with lead poisoning – often in the range of 2.5 to 5.5 IQ points<sup>25</sup> — and lead to improved educational outcomes as well. Each IQ point loss represents a loss of some \$17,815 in net present value of lifetime earnings.<sup>26</sup>

Another related benefit is driven by the connection between lead exposure in childhood and future criminal activity. “Medical and economic research has established a connection between early childhood lead exposure and future criminal activity, especially of a violent nature.”<sup>27</sup> We were not able to monetize decreases in criminal activity and related costs in our model for lack of evidence in the research literature found.

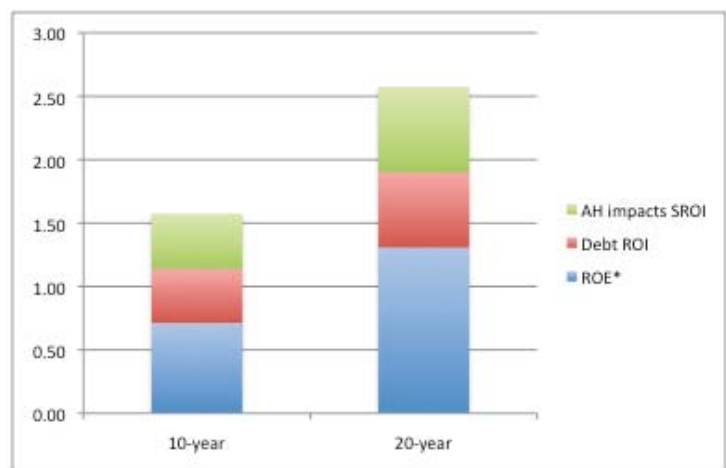
Heads of households tend to experience more calm and peace when they move to affordable housing in safer neighborhoods. Cost savings to society include decreased psychiatric treatment costs, decreased absenteeism from work and increased productivity.

Lastly, the remodeling of units on average provides 0.12 jobs and income generated of \$10,350 per unit<sup>28</sup>, assuming an average remodeling cost of \$15,000.

Here is the 10-year and 20-year SROI of reclaiming and remodeling well-located old units to make them affordable, safe, and green. We have assumed a potential average 131% cash return (on top of a 7% equity ownership stake in the property) for the equity investor and 60% debt yield in 20 years based on 7% Debt Service Contant (DSC).

Value Driver	10-year	20-year
ROE*	0.71	1.31
Debt ROI	0.43	0.60
AH impacts SROI	0.43	0.67
<b>Blended ROI (weighted by dollar returns of each value driver)</b>	<b>0.69</b>	<b>1.06</b>

\*Note that ROI is calculated using the cash returns over the original investment, so this excludes the value of the actual equity shares in the Layer Cake portfolio itself.



The 20-year SROI is higher because the impacts on children and their education are not realized until they have graduated from school.

23 Gariss-Hardy, Beth and Vrooman, Cheryl, “School Stability and School Performance: A Review of the Literature,” National Center for Homeless Education (January 2005).  
 24 Andrews, Nancy O., Kramer, Christopher, Low Income Investment Fund, “Coming Out as a Human Capitalist: Community Development at the Nexus of People and Place,” Community Development Investment Review (January 2010).  
 25 2.5 from Environmental Health Perspectives (2002). 5.5 from Pediatric Academic Societies (2001).  
 26 Gould, Elise, “Childhood Lead Poisoning: Conservative Estimates of the Social and Economic Benefits of Lead Hazard Control”, Economic Policy Institute (July 2009).  
 27 Gould, Elise, “Childhood Lead Poisoning: Conservative Estimates of the Social and Economic Benefits of Lead Hazard Control”, Economic Policy Institute (July 2009).  
 28 NAHB study (2009) found 78 jobs and \$6.9 million of income for every \$10 million spent on remodeling.



**Type 3: New Construction in Transit-oriented Sites, Compact Mixed-income Development**

Given how many American renter households currently spend more than 50% of their income on housing, new construction is needed even as we preserve and retrofit old housing stock.

Without the investment we propose, we assume there would be new construction to meet the country’s growing housing needs, but it would not necessarily be affordable or in transit-oriented locations. Looking at the rate at which LIHTC units have been built (75,000 LIHTC units in 2006), it would take 69 years to close the gap of 5.2 million units (assuming 1.8 million units of that gap is met by remodeling existing housing stock), therefore we project that most of the housing in the base case scenario would not have the additional benefits driven by the quality affordable housing that our model illustrates.

It is roughly twice as expensive to build from scratch than remodel old units. Part of that cost is the price of land in a transit-oriented site.

In this layer of our portfolio, we look at:

- The impacts of newly constructed affordable housing, and
- Increased impacts from additional investment in Early Childhood Programs for residents with preschool-age children

**Type 3: New Construction in Transit-oriented Sites, Compact Mixed-income Development**

**Per Unit Costs**

Land, New Construction	\$150,000	upfront
Ongoing Maintenance Costs	\$3,524	annual
Early Childhood Program	\$17,198	

**Per Unit Returns (20-yr NPV of “social cash flows”)**

AH Impacts		
Energy & Carbon Cost Impacts	\$840	
Increased Educational Outcomes	\$20,614	
Increased Mental Health & Productivity	\$14,011	
Early Childhood Program Impacts*	\$64,691	

\*These impacts were not broken out in the study referenced. A lifetime impact value was provided which includes increased earnings of high school graduates, increased taxes, decreased crime victim costs.  
 Note: The “per unit” key performance indicators shown are based on overall costs and benefits to overall units built, and are not meant to imply that each individual unit will in fact accrue every benefit in this exact amount.

Transit-oriented locations have been shown to result decreases for residents of between 6% and 13% in fuel usage and carbon emissions. For the same reasons (decreased mobility, better environment, no lead poisoning), children experience improved education outcomes and increased lifetime earnings. Similarly, heads of households experience improved mental health and job productivity.

In this type, we include an additional investment in Early Childhood Programs in Multifamily Housing for the subset of residents with young children. These programs focus on improving children’s cognitive, psychological and social-emotional development. Many programs also provide family services and parenting education. Since “[c]hildren who come to school hungry or poorly nourished, who suffer from chronic illnesses, or who missed out on preschool enrichment opportunities all face learning challenges,”<sup>29</sup> such early interventions result in increased earnings of high school graduates, increased taxes, and decreased crime victimization costs.

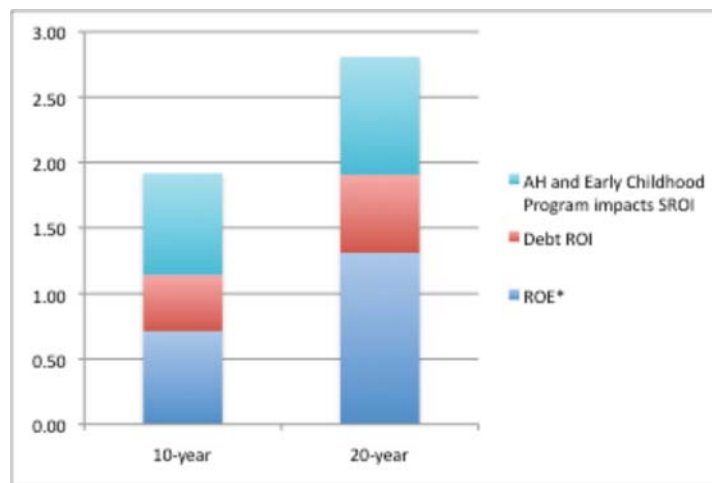
29 Turner, Margery Austin and Berube, Alan, “Vibrant Neighborhoods, Successful Schools”, The Urban Institute, (July 2009)



Here is the 10-year and 20-year SROI of constructing new well-located affordable units. We have assumed a potential average 5.5% per annum of financial returns (based on the presumed weighted average cost of capital for a mix of market-rate equity at 13% return, market-rate mortgage debt at 7% yield, and grant financing).

<b>Value Driver</b>	<b>10-year</b>	<b>20-year</b>
ROE*	0.71	1.31
Debt ROI	0.43	0.60
AH and Early Childhood Program impacts SROI	0.77	0.90
<b>Blended ROI (weighted by dollar returns of each value driver)</b>	<b>1.01</b>	<b>1.26</b>

\*Note that ROI is calculated using the cash returns over the original investment, so this excludes the value of the actual equity shares in the Layer Cake portfolio itself.



Similar to the Preservation layer of our portfolio, the 20-year SROI is significantly higher here because the impacts on children and their education are not realized until they have graduated from school.

IMPACT SENSITIVITY ANALYSIS & KEY ASSUMPTIONS

Certainly not all impacts of affordable housing been quantified and monetized here. Hence the SROI figures presented here are in general an underestimation of the true social and environmental returns of investing in sustainable affordable housing communities.

We have performed a sensitivity analysis of the impacts shown in our model. Where possible, we used ranges of quantified impact obtained from studies: these we used to establish Conservative and Aggressive values. Where there was only one study with one value for a particular impact, we have made that the Realistic value and used 0.8x for the Conservative value and 1.2x for the Aggressive value.

In summary:

Type 1: Retrofitting Senior Housing, and Adding Resident Coordination Services – Conservative estimates are 89% and Aggressive estimates are 135% of the Realistic value used to calculate the SROI. This indicates that the range in which the social and environmental impacts can be realized is rather tight, and we are rather confident of the Realistic value used.

Type 2: Reclamation and Preservation and of Existing Buildings, with Energy Efficiency Retrofitting — Conservative estimates are 56% and Aggressive estimates are 251% of the Realistic value used to calculate the SROI. The impacts with the largest ranges (meaning the values of which we are least confident) were increases in employment, increases in the value of surrounding properties, and increases in lifetime earnings of children. The first two are highly dependent on the initial state of the neighborhood. The increase in lifetime earnings is dependent on how much the move (and



instability) negatively impacts the child, and how quickly the child overcomes it. These impacts in particular merit further tracking and analysis.

Type 3: New Construction in Transit-oriented Sites, Compact Mixed-Income Development — Conservative estimates are 75% and Aggressive estimates are 125% of the Realistic value used to calculate the SROI of new affordable housing with Early Childhood Education programming. The impacts of different early childhood programs found in the literature vary considerably due to the length of time each one has been tracked and studied. We do not include increases in employment for adults as various studies have shown no sustained increase in employment for adults (other than when the neighborhoods were blighted – this has been captured in Type 2). The value of surrounding properties also does not increase in this SROI calculus, as we found no studies of property values for brand new affordable development. Each item will need to be tracked by developer/managers and tied to control group data for greater precision in practice.

Please refer to the Appendix for details of the sensitivity analysis and associated assumptions for each Type.

### **Additional considerations**

Some impacts will occur almost immediately, others will take longer to manifest (i.e., differential earnings later in life due to children avoiding lead poisoning and the concomitant impact on mental functioning and learning). This has been taken into account in our 10- and 20-year projections.

Drop-off is what occurs when the benefits wane over time (i.e., some percentage of residents of quality affordable housing might leave their well-designed developments and return to high-poverty areas). We have assumed that benefits do not drop off since we are factoring in the cost of ongoing property maintenance and services where services are modeled.

In addition to the assumptions about what would happen in the absence of the investment proposed here, all of the research reports we analyzed considered “deadweight,” that is, what would have happened anyway, through research design features such as control group comparison, etc.

While for the sake of having a reasonable basis to make these calculations we have not factored into account the myriad other resources that contribute to the opportunity to create these social returns, the value shown here is partially dependent upon the existence of certain conditions such as the presence of reasonably engaged parents, quality schools, and businesses with jobs (not to mention basic security, roads, electricity and other infrastructure). While it is beyond the scope of this analysis to determine to what extent these resources contribute to the outcomes, it must be said that silo-ed affordable housing and services programs will not accomplish close to what can be accomplished when resources and policies are viewed holistically. For the purposes of this analysis, we draw the line at the impacts to which our interventions most directly relate.

### **Discount rate**

While discount rates in finance have substantial precedent and rationale, those in social and environmental impact valuation do not. There is an emerging discussion of discount rates among SROI practitioners. The SROI Network's 2009 SROI Guide comments as follows :

In order to calculate the net present value (NPV) the costs and benefits paid or received in different time periods need to be added up. In order that these costs and benefits are comparable a process called discounting is used. Discounting recognises [sic] that people generally prefer to receive money today rather than tomorrow because there is a risk (e.g., that the money will not be paid) or because there is an opportunity cost (e.g. potential gains from investing the money elsewhere). This is known as the ‘time value of money’. An individual may have a high discount rate – for example, if you would accept £2 in one year's time, instead of £1 now, that implies a discount rate of 100%. This is a controversial area and one where there is ongoing research and discussion.

The main problem with using discounting in SROI is that it encourages short-termism by discounting the future. This is especially problematic for environmental outcomes, where the value may even increase. This betrays the extent to which people actually value their future and their children's future.

There is a range of different rates. For the public sector, the basic rate recommended in HM Treasury's Green Book is 3.5%. The Stern Review on the economics of climate change argued that it was



not ethically defensible for pure time preference to be applied to cost-benefit calculations where these involved significant wealth transfers from the future to the present and used lower rates. Following the Stern Review, HM Treasury published supplementary guidance on intergenerational wealth transfers, in which a reduced discount rate of 3%, which eliminates the pure time preference element, is applied alongside the usual discount rate.<sup>30</sup>

This issue is under review by the Measuring Social Value consortium, and the aim is to produce further guidance on discounting in due course.

While we agree the government's cost of capital seems a reasonable figure (in the absence of anything better) to use to reflect the cost of capital associated with past social value (on the theory that had the intervention not been done and produced the social goods, the government presumably could have used the money to do so), we believe for future values a different discount rate should apply because the probability of the value actually being generated must be factored into account. Much the way startup companies garner a higher cost of capital from their investors than established businesses do since startups are more likely than mature businesses to fail, so too is investment in social value contingent upon both the investment's success as a going concern. Further, there is also the risk that, even if the entity operates, it does not actually achieve the desired social or environmental performance. As such a higher discount rate is in our opinion warranted and here we have used 10%.

We recognize the inherent tension in translating two different impacts into monetary value and adding them up, since this obscures the inherent value of each. While monetization of social value in SROI gives the capital markets access to information about social and environmental value that it otherwise would clearly lack, we must still hold in mind that the different impacts that make up the aggregate social returns each have their own innate and often location-specific value.

## IMPACTS THAT THE STUDIES HAVE NOT (OR NOT YET) PROVED

### Health

Mixed results have been found with respect to the impact of Affordable Housing on physical health. Some studies conclude that adults face a lower risk of obesity due to improved ventilation and increased physical activity within neighborhoods. The results are mixed for other health conditions. In drilling down into sub-groups, it seems like younger adults experience significant improved physical health but older adults do not.

### Economic

The one result that various studies of affordable housing programs expected to see that is not borne out in the impact research is the improved economic self-sufficiency of residents.

- Hope VI impact analysis reveals that while there have been dramatic improvements in quality of life, there have been no overall changes in employment.<sup>31</sup> There were a couple of Hope VI redevelopments that saw significant increases in employment but these were in neighborhoods that were previously very distressed and as such are not considered representative.
- Five years after random assignment, the families offered housing vouchers through MTO (Moving To Opportunity) lived in safer neighborhoods that had significantly lower poverty rates than those of the control group not offered vouchers. However there were no significant overall effects on adult employment, earnings, or public assistance receipt.<sup>32</sup>
- The literature did yield four cases where there was increased employment for residents of the AH development; these cases were all in developments in previously distressed neighborhoods. Hence, we have included the impact on employment in the Preservation Type and not the New Construction Type.

Top barriers to sustained employment are physical health and mobility, and access to childcare. This highlights the fact that affordable housing alone cannot solve all problems of concentrated poverty and complementary initiatives should be invested in as well.<sup>33</sup>

<sup>30</sup> A Guide to Social Return on Investment," Cabinet Office, Office of the Third Sector (2009).

<sup>31</sup> Popkin, Susan J., "Testimony of Susan Popkin, Urban Institute, prepared for the hearing on S. 829 HOPE VI Improvement and Reauthorization Act (June 20, 2007)

<sup>32</sup> Kling, Jeffrey R., Liebman, Jeffrey B., Katz, Lawrence F., Sanbonmatsu, Lisa, "Moving To Opportunity And Tranquility: Neighborhood Effects On Adult Economic Self-Sufficiency And Health From A Randomized Housing Voucher Experiment" (October 2004)

<sup>33</sup> Popkin, Susan J., "Testimony of Susan Popkin, Urban Institute, prepared for the hearing on S. 829 HOPE VI Improvement and Reauthorization Act", (June 20, 2007)



## CONCLUSION

In short the value in monetary terms that is created for society is significantly greater when invested in well-designed, well-located affordable housing and strategic resident services than would be created with the same amount of investment in conventional housing developments.

We offer the evidence and frameworks used in this analysis as an opportunity for impact investors to innovate solutions that will unlock appropriate amounts of public and private investment to ensure the availability of affordable housing for all who require it.

## VII. Optimizing Both Social and Financial Returns

There is a financial opportunity cost when developers, and even policy makers (due to lost tax revenues) do not allow housing to migrate up the affordability curve due to natural, historic market pressures. While significant wealth would be created for the owners/developers, this wealth would accrue to only a few parties, while its creation consumed environmental capital and generated social opportunity costs, effectively resulting in the outsourcing of their restoration to the government. This is inefficient to say the least.

In short, in cases where investors are externalizing social and environmental costs, financial opportunity comes with corresponding social opportunity cost. In the current climate in which investors are increasingly interested in investments with a social bonus, and the abundance of information means that more and more people are questioning the right of companies to exploit the assets of the environment, communities and individuals without compensation, it is no longer sufficient for investors to consider financial returns as the only relevant criterion of performance.

**Social, economic and environmental value from well-designed, located and served affordable housing can be deliberately created alongside financial ROI.**

The portfolio proposed here does not presume a design that is the quickest and easiest or even most financially expedient, but rather an intelligent design based on what has been proven to work. It is worth the skill, effort and time it takes to arrange the development and services in a way that yields these benefits and avoids the costs of either market-rate housing or less-well-designed affordable housing alone. The social investment opportunity is highly leveraged, and yields multifaceted benefits.

**This value can be measured with sufficient confidence.**

Spurred by the macro-level impact investing (and impact philanthropy) trend, impact investors, developers, managers and service providers have been developing the ability to measure, manage and communicate the social, economic and environmental outcomes their efforts produce. These outcomes can be cross-referenced with rigorous research to ascertain what would happen in the absence of these efforts and thus their added value.

Investors are making large-scale investments on the basis of this demonstrated social, economic and environmental value today. For example, the California Public Employees Retirement System, the nation's largest public pension fund, for the past several years has been tracking the net environmental and job creation benefits (compared with the industry standard practices that represent the base case scenario) of over \$1 billion dollars of its private equity investments.<sup>34</sup>

While we expect reasonable methodological issues to be raised with the analysis we have built here, a body of appropriate experts, given sufficient resources and authority, can and should resolve them rapidly. The perfect is not the enemy of the good in conventional investment decision-making, nor should it be when the opportunity is the creation of both financial and social returns.

**By making social, economic and environmental value visible, the systemic forces that permit its loss when it is invisible will instead preserve and create it.**

Every situation is created by a system that is perfectly designed to produce it. When only financial return is measured, the systemic incentives that are created: a) foist costs off onto individuals and the public, such as health care costs; b) unsustainably extract environmental and social capital, such as clean air and climate stability; and c) lose potential value, such as the earnings individuals might have made had they had stable housing and access to the opportunities it enables.

<sup>34</sup> See CalPERS AIM Environmental Technology Program and California Initiative, <http://www.calpers.ca.gov/index.jsp?bc=/investments/environ-invest/aim-environ-tech-prog/home.xml> and <http://www.calpers.ca.gov/index.jsp?bc=/about/press/pr-2008/feb/initiative-program-deploys.xml>



The mechanisms the capital markets currently use to price risk do not accurately reflect the way social benefits reduce risk. By improving the affordable housing industry's ability to measure the creation of social value, the capital markets will price this risk effect more accurately.

Once the industry accounts for its social impact as a matter of regular business operations, the currently-siloed and uncoordinated participants within the affordable housing, regulatory, investment and other sectors can have a more rational conversation resulting in better value for each and overall.

## VIII. Team: Public and Private Partners

The parties qualified to achieve the outcomes proposed here, and the actions they will undertake, include the following.

### *Government*

- Modify housing finance policy to support income-inclusionary development.
- Modify housing finance policy to support energy efficiency and allow investors to capture the financial benefits.
- Modify planning policy to incent development that is mixed use and is platted to allow for many housing types and income levels, rather than the typical “all the same” lots size development patterns.
- Align affordable housing with policies regarding location-specific transportation, energy, health and human services, and education to create sustainable communities.
- Buy “social credits” premised upon the creation of social, economic and environmental value.

### *Owner/ Asset Manager/Servers and Entrepreneurs*

- Develop facilities capable of building, operating and serving 5.2 million units of new affordable housing and preserving and/or retrofitting, operating and serving 3.2 million units of existing affordable housing.
- Specifically, coordinate efforts to produce and manage a portfolio consisting of 16,608 units of quality affordable housing with targeted services:
  - 11,475 existing senior units, energy retrofitting and provision of resident service coordinators;
  - 1,788 preserved and rehabilitated units in historic neighborhoods;
  - 2,291 units of transit-oriented, new affordable housing construction;
  - 1,054 units of transit-oriented, new affordable housing construction with early childhood programming; and
  - Ongoing measurement, management and communication of social and environmental impact.

### *Investors*

- Assist the above with the financial engineering of the offering and with capital formation.
- Co-invest with the philanthropic sector in value chain management information technology.

### *Philanthropists*

- Fund the coordination of developer and academic efforts to agree about valid methods of measuring and valuing impact.
- Co-invest with the private sector in value chain management information technology.
- Fund project management of the formation of the \$1 Billion program described here.



## IX. The Ask: Proof of Concept

To demonstrate the concepts articulated here, we propose to facilitate the coordination of players capable of designing and executing a \$1 Billion portfolio to build, preserve, improve and/or serve quality affordable housing for 16,608 households.

We invite property owners and managers committed to stewarding the affordability of their properties to engage with us in what we consider a pilot of the portfolio that, once scaled, would address the entire \$2.66 trillion opportunity defined at the outset of this Memorandum. These managers will commit to tracking the SROI of each project in terms of the environmental, social and economic factors described here and any others they may consider important; it goes without saying they will account for financial performance as well.

Critically, these property managers will be trained in the skill of “impact management” so that if and as unexpected impacts arise, these can be seen and integrated into tracking systems and management decision-making. The goal is to avoid recreating the results that played out with concentrated public housing, where negative outcomes abounded but for far too long did not influence new investment and policy decisions.

**Our motto will be “Plan, Do, Check, Adjust.”**

We also seek fund management partners to help develop the social-financial model, articulate the deal structure and raise the investment funds.

With ready partners, by year 5 we expect to have sufficient data to demonstrate whether costs and financial and social benefits are accruing as projected. This pilot program will offer a proof of concept that could be scaled up to meet the full demand for US affordable housing can be met in a manner that optimizes both financial and social returns per dollar invested.



## Appendix

### to the Public Private Placement Memorandum: Analysis of the Social Return on Investment of a Hypothetical Portfolio of Quality Affordable Housing and Targeted Services

August 2010

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# Analysis of the Social Return on Investment of a Hypothetical Portfolio: Quality Affordable Housing and Targeted Services

## The Impact Map of Affordable Housing

This map includes all impacts found in SVT's literature review of more than 60 articles (which summarized more than 100 studies detailing roughly 270 instances of impact). The subset of this list for which we found monetizable statistics in the literature has been modeled to produce estimates of Social Return on Investment (subsequent tabs).

Color-coding key:

Significant evidence of the impact (**monetizable in bold**)

Mixed / neutral / not statistically significant evidence of the impact

The intervention studied did not lead to the hypothesized impact

Individual (I)  
Community (C)

Dwelling Unit (DU)  
Public (P)

Neighborhood Effects (NE)  
Environment (E)

Inputs	Activities	Outputs	Outcomes	Impact Area	Indicators	Ability to monetize and include in modeling?	Output as a result of	Stakeholder
<b>AH Alone</b>								
Investment in Affordable Housing	Construction of properties	<b>Jobs are created during construction and for ongoing post-construction activities</b>	<b>Increased income &amp; increased taxes</b>	<b>Economic</b>	<b># jobs created per unit</b>	<b>Y - Income generated; Taxes associated with income</b>	DU	I, P
		Housing units are created	People have homes	Economic; health	# individuals with homes	N- the inherent value of shelter, period, was not explicitly studied	DU	I
	Families move from unhealthy, poorly located housing to new or refurbished multifamily housing units	<b>Decreased energy consumption from old housing stock</b>	<b>Increased energy efficiency</b>	<b>Economic; environment</b>	<b>Energy efficiency gained</b>	<b>Y - decreased energy costs</b>	DU	I, E
		<b>Increased ability to car pool, take public transportation or walk</b>	<b>Decreased transportation fuel consumed &amp; CO2 emitted</b>	<b>Economic; environment</b>	<b>Decreased Vehicle Miles Travelled (VMT)</b>	<b>Y - decreased energy and CO2 costs</b>	DU	I, E
		<b>Decreased exposure to lead</b>	<b>Decrease in lead poisoning, especially in young children, leading to improved educational outcomes and decreased crime</b>	<b>Health</b>	<b>% decrease in morbidity rates</b>	<b>Y - decreased treatment costs and costs to remove lead from existing units*; increased lifetime earnings of children</b>	DU	I
	Children whose parents can afford their housing move less & live in less crowded environments	<b>Increased stability and less crowded and noisy home environment</b>	<b>Improved study environment &amp; performance in school</b>	<b>Education</b>	<b>Increased likelihood of high school graduation</b>	<b>Y - Higher lifetime earnings</b>	Both	I
		<b>Better air ventilation and higher quality living environment</b>	<b>Decrease in respiratory-related diseases</b>	<b>Health</b>	<b>Decreased asthma rates</b>	<b>Y - decreased treatment costs; increased productivity</b>	DU	I
	Children whose families move from unhealthy, poorly located housing switch to better quality schools	Increased exposure to better teachers & school programs	Improved performance in school	Education	Increased likelihood of high school graduation	N - mixed results, depending on frequency of move and if children have recovery time to overcome the stress of moving	Both	I
		Increased stress from moving	Decreased performance in school	Education	Decreased likelihood of high school graduation	See above on mixed results.	Both	I
		Non-movers are exposed to new students, especially during the school year	Decreased school quality and resulting impact on non-movers	Education	Decreased average results for schools	N	NE	C
		Increased motivation to do better in school due to exposure to peers and reduced motivation to engage in illegal activities	Decreased crime perpetration, decreased involvement in criminal justice system, and decreased crime victimization	Economic	Decreased crime rates	N - monetization multipliers not available	NE	I, C, P



Inputs	Activities	Outputs	Outcomes	Impact Area	Indicators	Ability to monetize and include in modeling?	Output as a result of	Stakeholder
<b>AH Alone</b>								
Investment in Affordable Housing	Heads of households have more available income after housing expenses, and spend on other basic necessities	Increased expenditure on food for adults	Improved nutrition & overall health	Health	Decreased morbidity rates	N - mixed results	DU	I
		Increased expenditure on food for children	Increased ability to learn in school	Education	See above on Increased likelihood of high school graduation	Effectively included in higher lifetime earnings (above)	DU	I
		Increased access to and expenditure on healthcare	Increased detection and early prevention and treatment of diseases; Increased cost to healthcare systems for treatment	Health	Decreased morbidity rates	N - mixed results	DU	I, C, P
		Increased expenditure on health insurance	Availability of insurance for medical events; Less burden on emergency rooms	Economic	Decreased bankruptcies related to medical debt; % decrease in usage of ER facilities	N - no statistics on impact	DU	I, C, P
Adults with stable housing have more job stability		Increased tenure in jobs	Increased wages	Economic	Increased employment rates; increased median household incomes	Y - mixed results: increased median household incomes proven when neighborhoods were previously distressed	NE	I
		Decreased perceived need to engage in illegal money-making activities	Decreased crime; Decreased involvement in the criminal justice system; Decreased income from illegal streams;	Economic	Decreased crime rates	N - monetization multipliers not available	NE	I, C, P
Neighborhoods have deconcentrated poverty & are revitalized		Heads of households have less exposure to illegal activities & increased safety	Improved mental health of adults, and decreased associated behavioral problems with children; Improved performance in school	Health	% of adults reporting feeling calm and peaceful	Y - savings from decreased treatment costs, increased productivity and decreased absenteeism	NE	I, C, E
		Community members exposed to less criminal victimization	Decreased crime victimization; Decreased death; Increased lifetime earnings; Increased environmental impact due to longer life	Health, Economic	Decreased death rates from crimes	N - no statistics on impact	NE	I, C, E
		Social norms that are more supportive of educational attainment and regular employment, and less supportive of teen fertility and illegal forms of income generation	Improved performance in school	Education	See above on Increased likelihood of high school graduation	Included in higher lifetime earnings (above)	NE	I
		Commercial activities & public services are revitalized or added	Decreased distances to public services, such as schools and medical facilities, and also retailers, such as grocery stores	Environment; Economic	Decreased transportation costs & less transportation energy consumed; Increased productivity & free time (quality of life); Increased property values	Average distance reduced	N - no statistics on impact	NE

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Inputs	Activities	Outputs	Outcomes	Impact Area	Indicators	Ability to monetize and include in modeling?	Output as a result of	Stakeholder
<b>Other services and programs</b>								
Investment in early childhood programs	Children (and their parents) attend such programs	<b>Increased preparation for pre-school children; Parents educated on how to support their children's development</b>	<b>Improved educational performance</b>	<b>Education</b>	<b>Increased graduation rates</b>	<b>Y - increased lifetime earnings, decreased incidences of crime</b>	NE	I, C, P
Investment in Senior Resident Services Coordination program	Seniors use such services	<b>Increased independence for seniors; increased participation in social and physical activities</b>	<b>Delayed need for institutionalization</b>	<b>Health</b>	<b>Average months tenure is lengthened</b>	<b>Y - Value of decreased utilization of nursing homes</b>	DU	I, P
		Jobs created for such positions	Income for Senior Resident Coordinators	Economic	# jobs created	N - no statistic on how many Senior AH developments use such services currently	DU	I
Investment in relocation service program	Heads of households use Relocation counseling	Increased tenure in new neighborhood	Decreased possibility of return to welfare or old neighborhoods	Economic	Rates of return	N- mixed results	DU	I, P
Investment in energy retrofits	Minor physical modifications & replacement of appliances	<b>Increased energy efficiency</b>	<b>Decreased energy costs</b>	<b>Economic; environment</b>	<b>Decreased utility costs &amp; replacement costs</b>	<b>Y - decreased costs</b>	DU	I, E



# Analysis of the Social Return on Investment of a Hypothetical Portfolio: Quality Affordable Housing and Targeted Services

Investment portfolio:

## What would it take to meet all needs for affordable rental housing for those currently spending >50% of their household income on rental housing?

The social value per dollar invested (SROI) is essentially what it is *costing* all of us stakeholders collectively today because we don't meet all of this need. As of 2010, 18.6 total households spend >50% of their income on housing, 45% of which are renters<sup>1</sup>.

Given this, the portfolio that addresses the entire need might have the following makeup:

Type	Description	Need today (# million of units)	Source / Assumptions	% of total units needed	Total Cost per unit (20-yr NPV)	20-yr SROI	Total Cost (millions)	Total Cost (billions)	Total Cost (trillions)
1	Senior Retrofit + Resident Coordination Services	1.4	1.4 million elderly renters pay in excess of 50% of their incomes for housing or live in severely inadequate housing (American Association of Homes and Services for the Aging, 2010)	17%	\$14,544	12.58	\$20,361.64	\$20.36	\$0.0204
2	Preservation + Energy Retrofit	1.8	Historic buildings: 3 million vacant units should be brought back to reuse & approximately 60% of buildings are in census tracts with a poverty level of 20% or more = 1.8 million units (National Trust for Historic Preservation, 2002) <sup>2</sup>	21%	\$120,004	0.67	\$216,007.64	\$216.01	\$0.2160
3	New Construction	5.2	Remaining # units from a total gap of 8.4 million						
3a	New Construction without Services	3.5	Assume that 1/3 of households with children have preschool kids, hence the need for the Early Childhood Programs.	41%	\$180,004	0.57	\$622,646.67	\$622.65	\$0.6226
3b	New Construction with Services	1.7		21%	\$195,639	0.90	\$338,363.80	\$338.36	\$0.3384
	<b>Total Units<sup>1</sup></b>	<b>8.4</b>		<b>100%</b>			<b>\$1,197,379.75</b>	<b>\$1,197.38</b>	<b>\$1.1974</b>

### Notes

1. "All told, 40.3 million households spent more than 30 percent of their incomes on housing in 2008, while 18.6 million of these households spent more than half—up from 13.8 million in 2001. Of those with such severe housing cost burdens, fully 45.1 percent are renters in the bottom income quartile." State of the Nation's Housing (2010), by The Joint center for Housing Studies of Harvard University. We assume that this gap is not closing despite what is otherwise happening in the affordable housing industry.

2. We assume in this model that all 3 million currently vacant units will be used for rentals.



# Analysis of the Social Return on Investment of a Hypothetical Portfolio: Quality Affordable Housing and Targeted Services

## Optimal portfolio allocation by type of investment, assuming total investment of \$1 billion

Questions to be answered:

What would the benchmark “market rate” financial returns be?

What amount of incentive is needed in order to get the yields on this portfolio to market rates?

Investment amount:	\$1,000	millions
Total investment needed:	\$1,197,380	millions
% of what is needed	0.08%	

Based on % of need (by units)

Type	Description	Need today (# million of units)	Source / Assumptions	% of total need, by units	Total Cost per unit (20-yr NPV)	20-yr SROI <sup>1</sup>	20-yr SIRR <sup>2</sup>	Economic, Environmental and Social Value per unit	% of Funds Assigned	Amount assigned (millions)	# units built / preserved / retrofitted	Total Economic, Environmental and Social Return (millions)	% of total needs met
1	Senior Retrofit + Resident Coordination Services	1.4	1.4 million elderly renters and 3.2 million elderly owners pay in excess of 50 percent of their incomes for housing or live in severely inadequate housing (American Association of Homes and Services for the Aging, 2010)	17%	\$14,544	12.58	1.35	\$182,923	16.7%	\$167	11,475	\$2,099	0.82%
2	Preservation + Energy Retrofit	1.8	Historic buildings: 3 million vacant units should be brought back to reuse & approx. 60% of buildings are in census tracts with a poverty level of 20% or more = 1.8 million units (National Trust for Historic Preservation, 2002) <sup>3</sup>	21%	\$120,004	0.67	0.36	\$80,537	21.5%	\$215	1,788	\$144	0.10%
3	New Construction	5.2	Remaining # units from a total gap of 12 million (HUD website) <sup>4</sup>										
3a	New Construction without Services	3.5	We assume that 1/3 of households with children have preschool kids, hence the need for the Early Childhood Programs.	41%	\$180,004	<b>0.57</b>	0.33	\$101,914	41.2%	\$412	2,291	\$233	0.07%
3b	New Construction with Services	1.7		21%	\$195,639	0.90	0.33	\$176,720	20.6%	\$206	1,054	\$186	0.06%
	<b>Total Units<sup>1</sup></b>	<b>8.4</b>		<b>100%</b>					<b>100%</b>	<b>\$1,000</b>	<b>16,608</b>	<b>\$2,663</b>	<b>0.20%</b>

### Notes and definitions:

1. SIRR: The IRR is the interest rate (also known as the discount rate) that will bring a series of cash flows (positive and negative) to a net present value (NPV) of zero (or to the current value of cash invested). As such, the Social IRR is the rate that would bring social cash flows to zero NPV.
2. SROI: Generally, Return On Investment (ROI) means net income relative to investment. Or, book income relative to net book value. As such, SROI means net social value relative to (financial) investment.
3. Assume that all 3 million units are used for rentals.
4. “State of the Nation’s Housing 2010,” Joint Center for Housing Studies of Harvard University. “All told, 40.3 million households spent more than 30 percent of their incomes on housing in 2008, while 18.6 million of these households spent more than half—up from 13.8 million in 2001. Of those with such severe housing cost burdens, fully 45.1 percent are renters in the bottom income quartile.”

<b>overall 20-yr SROI:</b>	<b>2.66</b>
<b>overall 20-yr SIRR:</b>	<b>51%</b>
<b>Comments:</b>	<b>Conceptually this portfolio could fill entire gap if replicated 1200x</b>

continued next page...



# Optimal portfolio allocation by type of investment, assuming total investment of \$1 billion

Alternative scenarios considered by not chosen:

Based on meeting at least 0.1% of each Type (since we have 0.1% of total funds needed), then highest Total Return

Based on equal distribution								Based on largest Total Return					Based on meeting at least 0.1% of each Type (since we have 0.1% of total funds needed), then highest Total Return				
Type	Description	Need today (# million of units)	% of Funds Assigned	Amount assigned (millions)	# units built / retrofitted	Economic, Environmental and Social Return (millions)	% of total needs met	% of Funds Assigned	Amount assigned (millions)	# units built / retrofitted	Economic, Environmental and Social Return (millions)	% of total needs met	% of Funds Assigned	Amount assigned (millions)	# units built / retrofitted	Economic, Environmental and Social Return (millions)	% of total needs met
1	Senior Retrofit + Resident Coordination Services	1.4	25.0%	\$250	17,189	\$3,144	1.23%	34.0%	\$340	23,377	\$4,276	1.67%	8.0%	\$80	5,501	\$1,006	0.39%
2	Preservation + Energy Retrofit	1.8	25.0%	\$250	2,083	\$168	0.12%	40.0%	\$400	3,333	\$268	0.19%	22.0%	\$220	1,833	\$148	0.10%
3	New Construction	5.2															
3a	New Construction without Services	3.5	25.0%	\$250	1,389	\$142	0.04%	16.0%	\$160	889	\$91	0.03%	46.0%	\$460	2,555	\$260	0.07%
3b	New Construction with Services	1.7	25.0%	\$250	1,278	\$226	0.07%	10.0%	\$100	511	\$90	0.03%	24.0%	\$240	1,227	\$217	0.07%
	<b>Total Units<sup>1</sup></b>	<b>8.4</b>	<b>100%</b>	<b>\$1,000</b>	<b>21,939</b>	<b>\$3,679</b>	<b>0.26%</b>	<b>100%</b>	<b>\$1,000</b>	<b>28,111</b>	<b>\$4,726</b>	<b>0.34%</b>	<b>100%</b>	<b>\$1,000</b>	<b>11,116</b>	<b>\$1,631</b>	<b>0.13%</b>

Comments:	overall 20-yr SROI:	3.68	overall 20-yr SROI:	4.73	overall 20-yr SROI:	1.63
	overall 20-yr SIRR:	59%	overall 20-yr SIRR:	69%	overall 20-yr SIRR:	42%
	Might not ultimately fill entire gap if replicated 1200x		Too few units (<1000)		Too low SROI	



# Analysis of the Social Return on Investment of a Hypothetical Portfolio: Quality Affordable Housing and Targeted Services

## Breakdown by Portfolio Layer

Note: The “per unit” key performance indicators shown are for conceptual analysis, and based on overall costs and benefits to overall units built. They are not meant to imply that each individual unit will in fact accrue every benefit in this exact amount. Benefits would be generated on an overall basis when many units are built.

### Type 1:

#### Per Unit Costs

Energy Retrofit	\$4,000	upfront
Resident Service Coordinators (RSCs)	\$4,000	upfront
	\$769	annual

#### Per Unit Returns (20-yr NPV of “social cash flows”)

Energy Efficiency Gains	\$11,788
Energy & Carbon Cost Impacts	\$558
Delay in Institutionalization	\$106,045
Job Creation	\$656

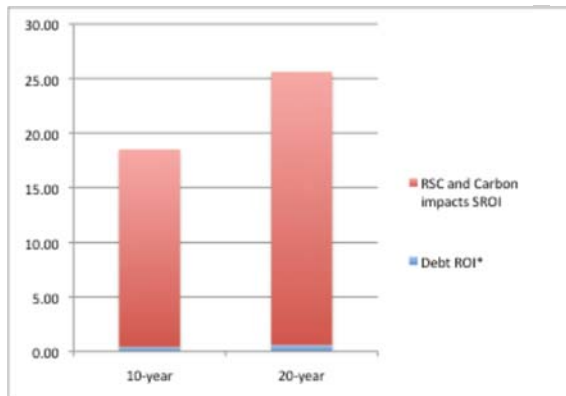
#### Value Driver

Value Driver	10-year	20-year
Debt ROI*	0.43	0.60
RSC and Carbon impacts SROI	18.05	25.01

#### Blended ROI (weighted by dollar returns of each value driver)

**9.08 12.58**

\*This Type has no physical assets, instead it assumes the energy cost savings can be captured by the investor.



### Type 2:

#### Per Unit Costs

Acquisition, Preservation	\$90,000	upfront
Ongoing Maintenance Costs	\$3,524	annual

#### Per Unit Returns (20-yr NPV of “social cash flows”)

Energy & Carbon Cost Impacts	\$840
Increased Educational Outcomes	\$15,159
Increased Mental Health & Productivity	\$14,011
Economic Impacts of Remodeling	\$60,190

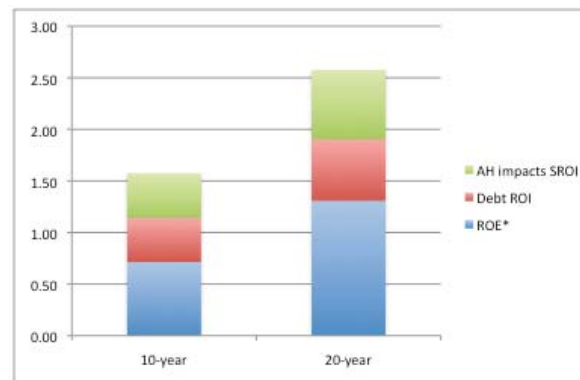
#### Value Driver

Value Driver	10-year	20-year
ROE*	0.71	1.31
Debt ROI	0.43	0.60
AH impacts SROI	0.43	0.67

#### Blended ROI (weighted by dollar returns of each value driver)

**0.69 1.06**

\*Note that ROI is calculated using the cash returns over the original investment, so this excludes the value of the actual equity shares in the Layer Cake portfolio itself.



### Type 3:

#### Per Unit Costs

Land, New Construction	\$150,000	upfront
Ongoing Maintenance Costs	\$3,524	annual
Early Childhood Program	\$17,198	

#### Per Unit Returns (20-yr NPV of “social cash flows”)

AH Impacts	
Energy & Carbon Cost Impacts	\$840
Increased Educational Outcomes	\$20,614
Increased Mental Health & Productivity	\$14,011
Economic Impacts of Construction	\$79,236
Early Childhood Program Impacts*	\$64,691

\*Note that these impacts were not broken out in the study referenced. A lifetime impact value was provided which includes increased earnings of high school graduates, increased taxes, decreased crime victim costs.

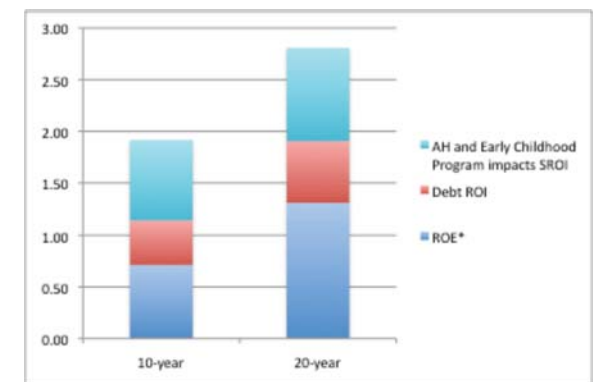
#### Value Driver

Value Driver	10-year	20-year
ROE*	0.71	1.31
Debt ROI	0.43	0.60
AH and Early Childhood Program impacts SROI	0.77	0.90

#### Blended ROI (weighted by dollar returns of each value driver)

**1.01 1.26**

\*Note that ROI is calculated using the cash returns over the original investment, so this excludes the value of the actual equity shares in the Layer Cake portfolio itself.



# Analysis of the Social Return on Investment of a Hypothetical Portfolio: Quality Affordable Housing and Targeted Services

2010, Projected 2011-2030

## Type 1: Retrofitting Senior Housing, and Adding Resident Service Coordination

There are approximately 1.4 million very low income (earning below 50% of the area median income) elderly household renters that spend more than 50% of their income for housing, including 2.5 million that have disabilities<sup>1</sup>

Without this intervention, we assume that existing Senior housing would remain as-is and Resident Service Coordinators would be employed at equivalent pay elsewhere.

Not all the impacts listed in the Impact Map have been monetized. For each impact that is monetizable, sometimes there are different ranges provided by different studies or different approaches used. These are explained in the Assumptions / Sources column.

The “per unit” analysis shown is based on overall costs and benefits to overall units built, and is not meant to imply that each individual unit will in fact accrue every benefit in this exact amount. Benefits would be generated when large numbers of units are built with the proper design criteria, as elaborated in the PPPM.

PER UNIT IMPACT		Discount rate for financial and “social cash flows” <sup>2</sup> = 10%		
Impact Area	Impact (outcome net of base case scenario, attribution considerations, and dropoff)	Annual Impact (using Realistic Value)	NPV (10 yrs)	NPV (20 yrs)
(We assume that cost savings from energy efficiency gains are captured by the project manager.)				
<b>Financial Impacts (that accrue to owners/investors)</b>				
Upfront costs	Retrofitting	\$4,000	\$4,000	\$4,000
	Resident Service Coordinators	\$4,000	\$4,000	\$4,000
	Total upfront costs	\$8,000	\$8,000	\$8,000
	100% Debt (7% DSC, 30-yr fixed fully amortized)			
	Energy efficiency gains from retrofitting	\$1,385	\$8,508	\$11,788
	Operating costs, retrofitting	\$0	\$0	\$0
	Operating costs, Resident Service Coordinators	\$769	\$4,723	\$6,544
	Debt Servicing (100%)	\$560	\$3,441	\$4,768
	<b>ROI on Debt</b>		<b>0.43</b>	<b>0.60</b>
	<b>IRR on Debt</b>		<b>-6%</b>	<b>3%</b>
	Net Cash Flow to Project		\$344	\$476
<b>Environment</b>				
Emissions reductions from energy efficiency gains	Value of decreased carbon emissions	\$66	\$403	\$558
<b>Health</b>				
Delayed unnecessary institutionalization — due to increased independence	Avoided annual cost (Federal & State) of senior facility	\$12,353	\$75,903	\$105,167
	Annual cost savings for Seniors with supportive services who were more stable, with reduced property vacancy loses, legal fees, and bad debt.	\$103	\$634	\$878
	Income Resident Service Coordinator jobs created per unit	\$656	\$4,030	\$5,584

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<b>PER UNIT IMPACT</b>				
<b>Impact Area</b>	<b>Impact (outcome net of base case scenario, attribution considerations, and dropoff)</b>	<b>Annual Impact (using Realistic Value)</b>	<b>NPV (10 yrs)</b>	<b>NPV (20 yrs)</b>
<b>Total social impacts per unit</b>		<b>\$12,522</b>	<b>\$76,940</b>	<b>\$106,603</b>
<i>Upfront costs</i>	<i>Resident service coordinators</i>	\$4,000	\$4,000	\$4,000
<i>Operating costs</i>	<i>Resident service coordinators</i>	\$769	\$4,723	\$6,544
<i>Total costs</i>			\$8,723	\$10,544
<b>SROI</b>			<b>18.05</b>	<b>25.01</b>
Costs per dollar of impact			\$0.11	\$0.10
<b>SIRR</b>			<b>294%</b>	<b>294%</b>
<b>Total impacts of retrofitting and services per unit</b>		<b>\$12,587</b>	<b>\$77,343</b>	<b>\$107,161</b>
<i>Upfront costs</i>	<i>Energy Retrofit, Resident Service Coordinators</i>	\$8,000	\$8,000	\$8,000
<i>Operating costs</i>	<i>Resident Service Coordinators</i>	\$769	\$4,723	\$6,544
<i>Total costs</i>			\$12,723	\$14,544
<b>SROI</b>			<b>9.08</b>	<b>12.58</b>
Costs per dollar of impact			\$0.16	\$0.14
<b>SIRR</b>			<b>135%</b>	<b>135%</b>

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## Notes

1. Of the 12.5 million elderly households with very low incomes, an estimated 3.8 million are renters (Haley and Gray, 2008). About 1.4 million pay more than 50 percent of their incomes for housing or live in severely inadequate housing, with nearly all suffering from a high rent burden. Among the 8.9 million very low-income elderly homeowner households, 3.2 million pay in excess of 50 percent of their incomes for housing or live in severely inadequate housing, again nearly all bearing a high cost burden. "Affordable Senior Housing: The Case for Developing Effective Linkages with Health-Related and Supportive Services", American Association of Homes and Services for the Aging (AAHSA), (2010)
2. The discount rate for social value projections is based on a) the business risk, i.e., whether the organization will in fact be able to deliver the projected units of housing, and b) the "impact risk", i.e. whether the social and environmental impacts will in fact be generated, regardless of whether the housing is built.



**PER UNIT IMPACT**

Impact Area	Impact (outcome net of base case scenario, attribution considerations, and dropoff)	Projections																				Notes on changes over time (see sensitivity analysis for sources not noted here)
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(We assume that cost savings from energy efficiency gains are captured by the project manager.)

Financial Impacts (that accrue to owners/investors)		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
Upfront costs	Retrofitting																							Energy Retrofit \$4K (SAHF members)
	Resident Service Coordinators																							Energy Retrofit \$4K (SAHF members)
	Energy efficiency gains from retrofitting		1,385	1,385	1,385	1,385	1,385	1,385	1,385	1,385	1,385	1,385	1,385	1,385	1,385	1,385	1,385	1,385	1,385	1,385	1,385	1,385	Assume 20-year full savings	
	Operating costs, retrofitting		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Assume no significant additional ongoing maintenance costs for the retrofits (ongoing maintenance costs already exist for the units)	
	Operating costs, Resident Service Coordinators		769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	Includes salary and benefits for Resident Service Coordinators, quality assurance, training, industry memberships, etc. Source: (National Church Residences)	
	Debt Servicing (100%)	-8,000	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560		
	Net Cash Flow to Project		56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56		
<b>Environment</b>																								
Emissions reductions from energy efficiency gains	Value of decreased carbon emissions		66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66		
<b>Health</b>																								
Delayed unnecessary institutionalization — due to increased independence	Avoided annual cost (Federal & State) of senior facility		12,353	12,353	12,353	12,353	12,353	12,353	12,353	12,353	12,353	12,353	12,353	12,353	12,353	12,353	12,353	12,353	12,353	12,353	12,353	12,353	Assume unit continues to rotate Seniors through the lifetime of the unit. Assume 36% of Seniors will be institutionalized at any point in time without Services (those aged over 80, with disabilities)	
	Annual cost savings for Seniors with supportive services who were more stable, with reduced property vacancy losses, legal fees, and bad debt.		103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103		
	Income Resident Service Coordinator jobs created per unit		656	656	656	656	656	656	656	656	656	656	656	656	656	656	656	656	656	656	656	656		Source: Mark Ricketts (National Church Residences, Ohio)

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PER UNIT IMPACT																								
Impact Area	Impact (outcome net of base case scenario, attribution considerations, and dropoff)		Projections																				Notes on changes over time (see sensitivity analysis for sources not noted here)	
			0	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522		
<b>Total social impacts per unit</b>			0	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522	12,522		
Upfront costs	Resident service coordinators																							Upfront program implementation costs. Assume:- 4 week full-time effort (for program definition, resourcing, marketing & community awareness training and implementation) - FTE @ \$50k/yr (SVT assumption)
Operating costs	Resident service coordinators		769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	Source: Mark Ricketts (National Church Residences, Ohio) & HUD
<b>SIRR</b>		(4,000)	11,753	11,753	11,753	11,753	11,753	11,753	11,753	11,753	11,753	11,753	11,753	11,753	11,753	11,753	11,753	11,753	11,753	11,753	11,753	11,753		
<b>Total impacts of retrofitting and services per unit</b>				12,587	12,587	12,587	12,587	12,587	12,587	12,587	12,587	12,587	12,587	12,587	12,587	12,587	12,587	12,587	12,587	12,587	12,587	12,587		
<b>Total impacts of retrofitting and services per unit</b>																								
Upfront costs	Energy Retrofit, Resident Service Coordinators																							Energy Retrofit \$4K (SAHF estimate)
Operating costs	Resident Service Coordinators		769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	Includes salary and benefits for Resident Service Coordinators, quality assurance, training, industry memberships, etc. Source: (National Church Residences)
<b>SIRR</b>		(8,769)	11,818	11,818	11,818	11,818	11,818	11,818	11,818	11,818	11,818	11,818	11,818	11,818	11,818	11,818	11,818	11,818	11,818	11,818	11,818	11,818	11,818	



# Analysis of the Social Return on Investment of a Hypothetical Portfolio: Quality Affordable Housing and Targeted Services

## Sensitivity Analysis of Impacts of Type 1: Retrofitting Senior Housing, and Adding Resident Service Coordination

There are approximately 4.6 million very low income (earning below 50% of the area median income) elderly households that pay more than 50% of their income for housing, including 2.5 million that have disabilities<sup>1</sup>.

For modeling purposes, we have organized the impact and sensitivity analysis around one unit of housing. “Per unit” costs and impacts are based on overall costs and benefits to overall units built, and are not meant to imply that each individual unit will in fact accrue every cost or benefit in this exact amount.

Not all the impacts listed in the Impact Map have been monetized. For each impact that is monetizable, sometimes there are different ranges provided by different studies or different approaches used. These are explained in the Assumptions / Sources column.

### Summary, for Impacts of AH plus Services:

**Conservative estimates amount to 89% of the Realistic value.**

**Aggressive estimates amount to 135% of the Realistic value.**

Just AH alone						
Energy & Environment		Conservative	Realistic	Aggressive	Assumptions / Sources	
<b>Energy efficiency gains from retrofitting</b>	Efficiency gains — from energy retrofitting	25%	35%	75%	Efficiency gained depends on initial state. 30% to 75% range provided by the Energy Programs Consortium report on “Energy Efficiency in Multi-Family Housing: A Profile and Analysis” (2007). 30% to 50% range provided by New Ecology Inc presentation on “Costs and Benefits of Green Affordable Housing” (2006) 25%+ provided by Stewards of Affordable Housing for the Future Presentation “Greening of Affordable Housing” the Office of Affordable Housing Preservation (2008) Took weighted average for Realistic — Assumed 80% of cases are closer to the Conservative estimate, and 20% closer to the Aggressive estimate, based on all the sources above.	
	Average % of income the typical low-income HH spends on energy at home		20%		“U.S. Multifamily Energy Efficiency Potential BY 2020” - The Benningfield Group (2009)	
	Median AH household income	\$14,868	\$26,373	\$37,879	Conservative value from State of the Nation’s Housing (2010). Aggressive value from Center for Housing Policy “Something’s Gotta Give” report (2005) Took the average for Realistic.	
	Median AH Senior income as a % of Median AH household income	50%	75%	100%	SVT assumption.	
	<b>Decrease in home energy costs / yr</b>	<b>\$372</b>	<b>\$1,385</b>	<b>\$5,682</b>		
	Current CO2 emissions per year (tons)		12.50		“We could avoid the emission of at least 50 to over 100 million tons of CO2 per year – equivalent to the emissions associated with the current energy use of 4-8 million U.S. households.” (The Benningfield Group 2009). Used 50 million / 8 million households for low energy users (Seniors).	
	Decrease in emissions of CO2 per unit (tons)	3.13	4.38	9.38	Assume % decrease in CO2 is the same as % efficiency gains	
	Carbon price per ton forecast in 2012	6.00	14.99	28.24	Investor Responsibility Research - \$28.24 forecast for 2012 European Climate Exchange - \$14.99 Dec12 Futures contract Montreal Climate Exchange - \$6 Mar2012 Futures contract	
	<b>Value of decreased carbon emissions</b>	<b>\$19</b>	<b>\$66</b>	<b>\$265</b>	Note that there is no market for offsets provided by individual homes, unless buildings participate in ‘net metering’, where they can feed surplus energy produced back into the grid and actually get paid by the utility for producing energy. The value is only in avoided costs to utilities.	
<b>TOTAL ONGOING AH ENVIRONMENTAL BENEFITS (impact per unit per year)</b>		<b>\$390</b>	<b>\$1,450</b>	<b>\$5,947</b>		

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## AH with Additional Services & Neighborhood Investments

Health		Conservative	Realistic	Aggressive	Assumptions / Sources
<b>Services Coordination</b>					
<b>Delayed unnecessary institutionalization — due to increased independence</b>	Avoided annual cost (Federal & State) of senior facility	\$31,923	\$34,797	\$43,148	<p>Massachusetts Supportive Housing Program (3,205 saved every month nursing home placement is avoided) for Realistic value - Research on Affordable Senior Housing with Services Strategies, Prepared by American Association of Homes &amp; Services for the Aging, (May 25, 2010)</p> <p>Albany nursing home average daily rate (Physical A&amp;B): \$131.06 Annual \$47,836 / Monthly \$3,986 = Annual \$38,460</p> <p>“Empowering Communities for Successful Aging: Housing, Neighborhood Support, and Services” - The Institute for the Future of Aging Services and The Center for Senior Living and Community Services</p> <p>MA and NY are in the top quartile for cost of living. Adjusted to the national average for Realistic value.</p> <p><a href="http://www.top50states.com/cost-of-living-by-state.html">http://www.top50states.com/cost-of-living-by-state.html</a></p> <p>(data were compiled from the Federal Cost of Living Index, the Bureau of Labor Statistics, and various official economic websites for individual states)</p> <p>Used 0.8x for Conservative, used 1.2x for Aggressive</p>
	Annual cost savings for Seniors with supportive services who were more stable, with reduced property vacancy loses, legal fees, and bad debt.	\$225	\$291	\$356	<p>Overall, the residents in properties with supportive services were more stable, with reduced property vacancy loses, legal fees, and bad debt. In the first year of the study, residents saved as much as \$225 per unit. In the second year of the study, this number increased to \$356 in savings, out performing properties without residential services by 17 percent and benefiting the affordable rental properties fiscally - “Housing as an Engine of Local Economic Development”, Center for Housing Policy, Draft 12/06</p> <p>Took the average for Realistic value.</p>
	Estimated % of Seniors that will need to be institutionalized without help		36%		<p>71% age 80 and over reporting a disability - “Affordable Senior Housing: The Case for Developing Effective Linkages with Health-Related and Supportive Services”</p> <p>Approximate* % of residents above age 80 - approx. 50%, based on 3 different studies (1/3 - Haley and Gray, 2008; An IFAS survey of residents in four subsidized senior housing properties in the San Francisco Bay area with a large culturally diverse population and median age of 78 years old; An independent assessment of residents of a senior housing property in Burlington, Vermont with a predominantly white population and median age of 81 years old - American Association of Homes &amp; Services for the Aging, 2010)</p>
	# Seniors per unit per year		2		<p>“[T]he average length of occupancy was 6 months longer among residents of properties with HUD funded service coordination as compared to residents of similar developments without service coordination.” - Research on Affordable Senior Housing with Services Strategies, Prepared by American Association of Homes &amp; Services for the Aging, (May 25, 2010)</p> <p>“we found that the length of occupancy at developments with the SCP (Service Coordination Program) was 10 percent (more than 6 months) greater than at those developments without service coordination” - Levine, Cheryl A., “Multifamily Property Managers’ Satisfaction with Service Coordination”, U.S. Department of Housing and Urban Development (December 2008)</p>
	Annual Resident Service Coordinator costs per unit	\$466	\$656	\$846	<p>Source: Mark Ricketts (National Church Residences, Ohio) 35,000 annual salary + 33% in Benefits = 46,550</p> <p>For 100 units (Conservative value)</p> <p>“This finding is consistent with HUD’s guidelines that suggest a full-time service coordinator serves about 50 to 60 frail, at-risk low-income elderly or nonelderly people with disabilities” - Levine, Cheryl A., “Multifamily Property Managers’ Satisfaction with Service Coordination”, U.S. Department of Housing and Urban Development (December 2008)</p> <p>(Aggressive value - 1 Coordinator to 55 Units)</p> <p>Also, assumed that OH is near the national average cost of living so have not adjusted.</p>

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<b>AH with Additional Services &amp; Neighborhood Investments</b>					
<b>Health</b>		<b>Conservative</b>	<b>Realistic</b>	<b>Aggressive</b>	<b>Assumptions / Sources</b>
<b>Services Coordination</b>					
<b>Delayed unnecessary insitutionalization — due to increased independence</b>	Annual Fixed Costs	\$80	\$113	\$145	Source: Mark Ricketts (National Church Residences, Ohio) Annual fees: 3,000 for Quality Assurance Fees 2,000 for training 3,000 for software, memberships, industry associations 8,000 for 100 units are Conservative, and 55 units as Aggressive. Took the average for Realistic
<b>TOTAL AH+ SOCIAL &amp; ENVIRONMENTAL BENEFITS (impact per unit per year)</b>		<b>\$32,313</b>	<b>\$36,247</b>	<b>\$49,095</b>	
% of Realistic Value		89%		135%	

1. "Affordable Senior Housing: The Case for Developing Effective Linkages with Health Related and Supportive Services"; American Association of Homes and Services for the Aging (AAHSA), (2010)

Of the 12.5 million elderly households with very low incomes, an estimated 3.8 million are renters (Haley and Gray, 2008). About 1.4 million pay more than 50 percent of their incomes for housing or live in severely inadequate housing, with nearly all suffering from a high rent burden. Among the 8.9 million very low-income elderly homeowner households, 3.2 million pay in excess of 50 percent of their incomes for housing or live in severely inadequate housing, again nearly all bearing a high cost burden.

On disability:  
37% ages 65 - 69 reporting a disability  
71% age 80 and over reporting a disability



# Analysis of the Social Return on Investment of a Hypothetical Portfolio: Quality Affordable Housing and Targeted Services

2010, Projected 2011-2030

## Type 2: Reclamation and Preservation of Existing Buildings, with Energy Efficiency Retrofitting

There are at least 1.8 million units<sup>1</sup> that we can look to retrofit, as we build new developments.

Without this intervention, we assume that the gap will not be closed, given the current supply of affordable housing units and growing demand. (Even though unoccupied historic units would eventually be rehabilitated and re-used, they have been remodeled at a rate of 5,500 units/yr<sup>3</sup>. It would take 327 years to remodel all available 1.8 million units at the current rate.)

Not all the impacts listed in the Impact Map have been monetized. For each impact that is monetizable, sometimes there are different ranges provided by different studies or different approaches used. These are explained in the Assumptions / Sources column.

The “per unit” analysis shown is based on overall costs and benefits to overall units built, and is not meant to imply that each individual unit will in fact accrue every benefit in this exact amount. Benefits would be generated when large numbers of units are built with the proper design criteria, as elaborated in the PPPM.

PER UNIT IMPACT		Discount rate for financial and “social cash flows” <sup>2</sup> =10%			
Impact Area	Impact (outcome net of base case Type, attribution considerations, and dropoff)	Annual Impact (using Realistic Value)	10-yr value	20-yr value	
<b>Financial Impacts (that accrue to owners/investors)</b>					
Upfront costs	Acquisition, Preservation	\$90,000	\$90,000	\$90,000	
	43% Grant	\$38,700			
	50% Debt (7% DSC, 30-yr fixed fully amortized)	\$45,000			
	7% Equity (target 13% IRR)	\$6,300			
	Net Operating Income (assume 4% of cost)	\$3,600			
	Debt Servicing (50% of financing)	\$3,150	\$19,355	\$26,818	
	Net Cash Flow to Equity Holder	\$450	\$4,496	\$8,243	
	<b>ROE</b> (Cash Returns, excludes 9.5% stake in the fund)			<b>0.71</b>	<b>1.31</b>
	<b>IRR on Equity</b>			<b>4%</b>	<b>13%</b>
	<b>ROI on Debt</b>			<b>0.43</b>	<b>0.60</b>
<b>IRR on Debt</b>			<b>-6%</b>	<b>3%</b>	
<b>Non-Financial Impacts: Provision of AH without additional services</b>					
<b>Economic<sup>4</sup></b>					
One-time impact	Income generated as a result of renovating AH development	\$10,350	\$9,409	\$9,409	
	Taxes and other revenue for local governments as a result of a new AH development	\$866	\$787	\$787	
Ongoing impact	Increase in values of surrounding properties	\$5,991	\$21,913	\$36,106	
	Increase in employment for adult residents	\$1,631	\$10,023	\$13,888	

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<b>PER UNIT IMPACT</b>		<b>Discount rate for financial and “social cash flows”<sup>22</sup> =10%</b>		
<b>Impact Area</b>	<b>Impact (outcome net of base case Type, attribution considerations, and dropoff)</b>	<b>Annual Impact (using Realistic Value)</b>	<b>NPV (10 yrs)</b>	<b>NPV (20 yrs)</b>
<b>Non-Financial Impacts: Provision of AH without additional services</b>				
<b>Environment</b>				
<b>Energy efficiency gains — from moving out of pre-1980 housing stock</b>	Decrease in home energy costs / yr	\$0	\$0	\$0
	Value of decreased carbon emissions associated with home energy use	\$0	\$0	\$0
<b>Decrease in Vehicle Miles Travelled</b>	Decrease in transportation fuel costs / yr	\$91	\$560	\$776
	Value of decreased carbon emissions from transportation	\$7	\$46	\$64
<b>Environmental Costs</b>	Carbon costs associated with remodeling	\$25	(\$25)	(\$25)
<b>Health</b>				
<b>Reduced risk of lead poisoning (children)</b>	Increased annual earnings per child with no/reduced lead poisoning	\$7,162	\$0	\$5,022
	Annual cost savings per child from decreased need for special education	\$12,207	\$23	\$23
<b>Decreased incidences of asthma</b>	Cost savings per person (from reduced prescription drugs, hospitalizations, missed work days, missed school days, etc)	\$857	\$166	\$230
<b>Improved mental health for household heads</b>	Total treatment cost savings & increased productivity per person	\$6,190	\$10,112	\$14,011
<b>Total economic, environmental and social impacts per unit</b>		<b>\$64,631</b>	<b>\$60,316</b>	<b>\$90,405</b>
<i>Upfront costs</i>	<i>Acquisition, Preservation</i>	\$90,000	\$90,000	\$90,000
<i>Operating costs</i>	<i>Maintenance costs</i>	\$3,524	\$21,655	\$30,004
<i>Total costs</i>			\$111,655	\$120,004
<b>SROI</b>			<b>0.43</b>	<b>0.67</b>
Costs per dollar of impact			\$1.85	\$1.33
<b>SIRR</b>			<b>35%</b>	<b>36%</b>
<b>Blended Value Return</b>				
<b>Total Financial, Economic, Environmental and Social Returns per unit</b>			\$84,167	\$125,466
<i>Total Upfront Costs</i>		\$90,000	\$90,000	\$90,000
<i>Total Ongoing Costs</i>		\$3,524	\$21,655	\$30,004
<i>Total costs</i>			\$111,655	\$120,004
<b>Blended ROI</b>			<b>0.69</b>	<b>1.06</b>
Cost per dollar of impact			\$1.33	\$0.96
<b>Blended IRR</b>			<b>38%</b>	<b>38%</b>

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PER UNIT IMPACT																							
Impact Area	Impact (outcome net of base case Type, attribution considerations, and dropoff)		Projections																			Notes on changes over time (see sensitivity analysis for sources not noted here)	
(We assume that cost savings from energy efficiency gains are captured by the project manager.)																							
Financial Impacts (that accrue to owners/ investors)		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
Upfront costs	Net Operating Income (assume 4% of cost)		3,600	3,672	3,745	3,820	3,897	3,975	4,054	4,135	4,218	4,302	4,388	4,476	4,566	4,657	4,750	4,845	4,942	5,041	5,142	5,245	Assume 2% increase/yr. Estimated net operating income = rental minus operating costs = 4% for AH when the residents are at 60% AMI (David Smith, Recap.)
	Debt Servicing (50% of financing)		3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	Used 7% as the Debt Service Constant on a 5.5% 30-year mortgage
	Net Cash Flow to Equity Holder		450	522	595	670	747	825	904	985	1,068	1,152	1,238	1,326	1,416	1,507	1,600	1,695	1,792	1,891	1,992	2,095	
	IRR on Equity	(\$6,300)	450	522	595	670	747	825	904	985	1,068	1,152	1,238	1,326	1,416	1,507	1,600	1,695	1,792	1,891	1,992	2,095	
	IRR on Debt	(\$45,000)	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	3,150	
Non-Financial Impacts: Provision of AH without additional services		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
Economic <sup>4</sup>																							
One-time impact	Income generated as a result of renovating AH development		10,350	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	One-time impact
	Taxes and other revenue for local governments as a result of a new AH development		866	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	One-time impact
Ongoing impact	Increase in values of surrounding properties		0	0	0	5,991	5,991	5,991	5,991	5,991	5,991	5,991	5,991	5,991	5,991	5,991	5,991	5,991	5,991	5,991	5,991	5,991	Assume appreciation after 3 years. SVT assumption.
	Increase in employment for adult residents		1,631	1,631	1,631	1,631	1,631	1,631	1,631	1,631	1,631	1,631	1,631	1,631	1,631	1,631	1,631	1,631	1,631	1,631	1,631	1,631	Note that employment impacts have only been observed when neighborhoods were previously distressed. We assume that this is the case for the Preservation scenario.

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<b>Non-Financial Impacts: Provision of AH without additional services</b>		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	<b>Notes on changes over time</b> (see sensitivity analysis for sources not noted here)	
<b>Environment</b>																								
<b>Energy efficiency gains — from moving out of pre-1980 housing stock</b>	Decrease in home energy costs / yr		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	There is no net efficiency gained because moving someone from crowded housing with poor energy efficiency to a rehabilitated and energy retrofitted previously unused building with better efficiency adds a new building to the grid, and net increases energy consumed as there is more space per person in the new type.
	Value of decreased carbon emissions associated with home energy use		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Decrease in Vehicle Miles Travelled</b>	Decrease in transportation fuel costs / yr		91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	Source: Mark Ricketts (National Church Residences, Ohio)
	Value of decreased carbon emissions from transportation		7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
<b>Environmental Costs</b>	Carbon costs associated with remodeling																							23% of new construction carbon costs. Percentage based on cost of renovation versus new construction
<b>Education</b>																								
<b>Better study environment and decreased exposure to illegal activities</b>	Increased annual earnings per child																							9% increase in likelihood of graduation
	Preschool children (avg. 50% of all children per unit)		0	0	0	0	0	0	0	0	0	270,000	0	0	0	0	0	0	0	0	0	0	270,000	Assume that each family stays in the unit an average of 10 years.
	Elementary and Middle school children (avg. 30% of all children per unit)		0	0	0	0	0	0	0	0	0	270,000	0	0	0	0	0	0	0	0	0	0	270,000	Lifetime benefits of \$270k (source: "Coming Out As A Human Capitalist" - Nancy Andrews) realized for the first family in year 10, and the 2nd family realizes the benefit in year 20.
	High school children (avg. 20% of all children per unit)		0	0	0	0	0	0	0	0	0	270,000	0	0	0	0	0	0	0	0	0	0	270,000	

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<b>Non-Financial Impacts: Provision of AH without additional services</b>		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	<b>Notes on changes over time</b> (see sensitivity analysis for sources not noted here)	
<b>Health</b>																								
<b>Reduced risk of lead poisoning (children)</b>	Increased annual earnings per child with no/reduced lead poisoning		0	0	0	0	0	0	0	0	0	0	0	0	0	7,162	7,162	7,162	7,162	7,162	7,162	7,162	7,162	Only for children under 6. Assume the impact will materialize only after 12 years. No impact for 10-yr NPV
	Annual cost savings per child from decreased need for special education		12,207	12,207	12,207	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Special Ed for 3 years. Only 0.077 % of all children need special ed.
<b>Decreased incidences of asthma</b>	Cost savings per person (from reduced prescription drugs, hospitalizations, missed work days, missed school days, etc)		857	857	857	857	857	857	857	857	857	857	857	857	857	857	857	857	857	857	857	857	Note: this does NOT include increased lifetime earnings of children who have improved asthmatic health	
<b>Improved mental health for household heads</b>	Total treatment cost savings & increased productivity per person		6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	Annual value of decreased treatment costs of \$726 & increased productivity of \$5,419 per person. 13% of adults reported improved mental health 1.7 adults per dwelling unit of 2.8 people.	
<b>Total economic, environmental and social impacts per unit</b>			32,199	20,983	20,983	14,768	14,768	14,768	14,768	14,768	14,768	824,768	14,768	14,768	21,930	21,930	21,930	21,930	21,930	21,930	21,930	21,930	831,930	<b>Notes on changes over time</b> (see sensitivity analysis for sources not noted here)
<i>Upfront costs</i>	<i>Acquisition, Preservation</i>	(90,000)																					Acquaiation \$75,000(David Smith) Preservation \$15K (David Smith) Assume Lead Removal average \$6K (President's Task Force 2000) and Energy Retrofit \$4K (SAHF members) included in overall Preservation costs	
<i>Operating costs</i>	<i>Maintenance costs</i>		3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	Assume that ongoing maintenance cost is needed after units have been rehabilitated. Assume same amount as ongoing costs for new construction	



SIRR	(90,025)	28,675	17,459	17,459	11,244	11,244	11,244	11,244	11,244	11,244	11,244	821,244	11,244	11,244	18,405	18,405	18,405	18,405	18,405	18,405	18,405	828,405	
Blended Value Return	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Notes on changes over time (see sensitivity analysis for sources not noted here)	
Total Financial, Economic, Environmental and Social Returns per unit		35,799	24,655	24,729	18,588	18,665	18,743	18,822	18,903	18,986	829,070	19,156	19,244	26,495	26,587	26,680	26,775	26,872	26,970	27,071	837,174		
Total Upfront Costs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total Ongoing Costs		3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	
Blended IRR	(90,025)	32,275	21,131	21,205	15,064	15,140	15,218	15,298	15,379	15,462	825,546	15,632	15,720	22,971	23,062	23,155	23,250	23,347	23,446	23,547	833,650		

## Notes

1. "Additionally there are nearly 3 million vacant older and historic housing units that ought to be brought back into use."

"The phrase older and historic neighborhoods refers to those buildings constructed prior to 1950. Certainly not every structure built before 1950 has been designated historic, and many do not merit that formal identification. ... Historic preservation now encompasses more than the mansions of the rich and the homes of the famous. Historic preservation today celebrates and champions the neighborhoods, downtowns, and rural areas that are less grand architecturally, but perhaps even more significant in the building of America." "Historic Preservation and Affordable Housing: The Missed Connection" - National Trust for Historic Preservation (2003).

Assumptions/Calculations: 3 million historic units total.  $60\% * 3 \text{ million} = 1.8 \text{ million}$  historic units that are in concentrated poverty areas. We assume in this model that all 3 million units will be used for rentals."

2. The discount rate for social value projections is based on a) the business risk, i.e., whether the organization will in fact be able to deliver the projected units of housing, and b) the "impact risk," i.e. whether the social and environmental impacts will in fact be generated, regardless of whether the housing is built.

3. An interesting pattern has emerged in the development of rental housing under the Historic Rehabilitation Tax Act. Over the last five years over 44,000 units of housing have been created (27,851 of them low and moderate income apartments). "Historic Preservation and Affordable Housing: The Missed Connection" - National Trust for Historic Preservation (2003).

4. Note that in the New Construction Type, there are no ongoing economic impacts of increased employment & wages for adults. The existing literature shows that there have been inconclusive findings of affordable housing's impact on employment. In a number of the Hope VI and Moving to Opportunity cases, adults were not necessarily able to find jobs or hold on to them for sustained periods of time. Newer studies have pointed to the fact that physical mobility and childcare are the largest barriers to increased employment.

Having said that, the literature did have 4 cases where there was increased employment with residents of the AH development - these were developments in previously distressed neighborhoods. Hence, we have included the impact on employment in the Preservation Type (Type 2) and not the New Construction Type (Type 3).



# Analysis of the Social Return on Investment of a Hypothetical Portfolio: Quality Affordable Housing and Targeted Services

## Sensitivity Analysis of Impacts of Type 2: Reclamation and Preservation of Existing Buildings, with Energy Efficiency Retrofitting

There are at least 1.8 million units<sup>1</sup> that we can look to retrofit.

For modeling purposes, we have organized the impact and sensitivity analysis around one unit of housing. “Per unit” costs and impacts are based on overall costs and benefits to overall units built, and are not meant to imply that each individual unit will in fact accrue every cost or benefit in this exact amount.

Not all the impacts listed in the Impact Map have been monetized. For each impact that is monetizable, sometimes there are different ranges provided by different studies or different approaches used. These are explained in the Assumptions / Sources column.

### Summary:

**Conservative estimates amount to 56% of the Realistic value.**

**Aggressive estimates amount to 251% of the Realistic value.**

Financial					
Increase in value of AH development (based on costs)	Appreciation in AH units	Park Du Valle: 16% in 8 yrs	Murphy Park: 25% in 7 years	Centennial Place: 66% in 9 years	Used the appreciation rates of redeveloped sites Different cases in the same Brookings Institution 2005 study Brookings Institution 2005 study (new, economically integrated developments were created on former public housing sites, 4 cases, mostly in the decade of the 90s)
	Derived CAGR	1.87%	3.24%	5.79%	
	Baseline value per unit	\$83,000	\$128,000	\$150,000	Assume same baseline value as a new construction unit
	% of non-AH units in development	50%	50%	50%	The realized value is only for market rate units. Assume 50%.
	<b>Impact Per Unit</b>	<b>\$777</b>	<b>\$2,073</b>	<b>\$4,345</b>	Values are not counted in financial ROI in our model since we assume property is not converted to market rate. However, values drive increase in surrounding property values, below.
<b>Non-Financial Impacts: Provision of AH without additional services</b>					
<b>ONE-TIME IMPACT</b>					
<b>Economic</b>		<b>Conservative</b>	<b>Realistic</b>	<b>Aggressive</b>	<b>Assumptions / Sources</b>
Income generated as a result of renovating AH development	Remodeling costs	\$12,000	\$15,000	\$50,000	Realistic value source: David Smith, Founders Recap Real Estate Advisors. “A recent HUD sponsored study estimated that the cost of repairing an older home with severe physical problems at \$75,000 and one with moderate physical problems at \$25,000 ... only 11 percent of the older housing stock suffers from moderate or severe physical problems” - National Trust for Historic Preservation (2002) Took the average for Aggressive value. Took 0.8x of Realistic for Conservative value
	# units remodeled with \$10 million	833	667	200	NAHB study (2009) found 78 jobs, \$6.9 million of income for every \$10 million spent on remodeling
	Number of jobs generated during construction Per Unit	0.09	0.12	0.39	
	<b>Income generated per unit</b>	<b>\$8,280</b>	<b>\$10,350</b>	<b>\$34,500</b>	
Taxes and other revenue for local governments as a result of a new AH development	<b>Impact Per Unit</b>	<b>\$692</b>	<b>\$866</b>	<b>\$2,885</b>	NAHB study (2009) for Realistic \$577,000 of income for every \$10 million spent on remodeling Used 0.8x for Conservative, used 1.2x for Aggressive
		<b>80.00%</b>		<b>333.33%</b>	

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ONGOING IMPACT						
Economic		Conservative	Realistic	Aggressive	Assumptions / Sources	
<b>Increase in values of surrounding properties</b>	Appreciation in surrounding properties, over the average appreciation in the rest of the city / region	Virginia: 5% in 5 years	Park Du Valle: 58% in 10 yrs	Murphy Park: 131% in 10 yrs	Virginia: from Center for Housing Policy Talking Points and Richmond office of Local Initiatives Support Corporation (LISC), (2005) Park Du Valle and Murphy Park: from The Brookings Institution Metropolitan Policy Program, (September 2005)	
	Baseline value of homes	\$83,000	\$128,000	\$150,000	Assume to be equal to the AH units	
	Derived CAGR	1%	4.68%	8.73%		
	<b>Impact Per Unit</b>	<b>\$814</b>	<b>\$5,991</b>	<b>\$13,099</b>	Assumed same starting unit value as AH property. Used average for Realistic Value.	
		<b>13.59%</b>		<b>218.65%</b>		
<b>Increase in employment for adult residents</b>	Increase in median household income	Murphy Park: 15% in 10 yrs		Park Du Valle: 183% in 10yrs	Different cases in the same Brookings Institution 2005 study Brookings Institution 2005 study (new, economically integrated developments were created on former public housing sites, 4 cases, mostly in the decade of the 90's). Took the average of the extreme values for Realistic value.	
	Derived CAGR	1.41%	6.19%	10.96%		
	Median AH household income	\$14,868	\$26,373	\$37,879	Conservative value from State of the Nation's Housing (2010). Aggressive value from Center for Housing Policy "Something's Gotta Give" report (2005) Took the average for Realistic.	
	<b>Impact Per Unit</b>	<b>\$209</b>	<b>\$1,631</b>	<b>\$4,153</b>		
		<b>12.83%</b>		<b>254.57%</b>		
Energy & Environment						
<b>Energy efficiency gains from retrofitting</b>	Efficiency gains — from energy retrofitting	25%	35%	75%	"Efficiency gained depends on initial state. 30% to 75% range provided by the Energy Programs Consortium report on "Energy Efficiency in Multi-Family Housing: A Profile and Analysis" (2007). 30% to 50% range provided by New Ecology Inc presentation on "Costs and Benefits of Green Affordable Housing" (2006) 25+% provided by Stewards of Affordable Housing for the Future Presentation "Greening of Affordable Housing," The Office of Affordable Housing Preservation (2008) Took weighted average for Realistic - Assumed 80% of cases are closer to the Conservative estimate, and 20% closer to the Aggressive estimate, based on all the sources above."	
	Average % of income the typical low-income household spends on energy at home		20%		"U.S. Multifamily Energy Efficiency Potential BY 2020" — The Benningfield Group (2009)	
	Median AH household income	\$14,868	\$26,373	\$37,879	Conservative value from State of the Nation's Housing (2010). Aggressive value from Center for Housing Policy "Something's Gotta Give" report (2005) Took the average for Realistic.	
	<b>Decrease in home energy costs / yr</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	There is no net efficiency gained because moving someone from crowded housing with poor energy efficiency to a rehabilitated and energy retrofitted previously unused building with better efficiency adds a new building to the grid, and net increases energy consumed as there is more space per person in the new Type.	
	Current CO2 emissions per year (tons)		25		"We could avoid the emission of at least 50 to over 100 million tons of CO2 per year – equivalent to the emissions associated with the current energy use of 4-8 million U.S. households." (The Benningfield Group 2009) Used 100 million / 4 million households for high energy users (Families)	
	Decrease in emissions of CO2 per unit per unit (tons)	6.25	8.75	18.75	Assume % decrease in CO2 is the same as % efficiency gains	
	Carbon price per ton in 2012	6.00	14.99	28.24	Investor Responsibility Research - \$28.24 forecast for 2012 European Climate Exchange - \$14.99 Dec12 Futures contract Montreal Climate Exchange - \$6 Mar2012 Futures contract	
	<b>Value of decreased carbon emissions associated with home energy use</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	Note that there is no market for offsets provided by individual homes, unless buildings participate in 'net metering', where they can feed surplus energy produced back into the grid and actually get paid by the utility for producing energy. The value is only in avoided costs to utilities.	

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ONGOING IMPACT					
Energy & Environment		Conservative	Realistic	Aggressive	Assumptions / Sources
<b>Decrease in Vehicle Miles Travelled</b>	% Decrease in fuel use	6%	10%	13%	Range provided by the National Research Council study (2009)
	Average % of income the typical low-income household spends on energy for transportation		4%		Working families (who spend more than 50% of their income on housing) expenditure shares for transportation are nearly 24% of their household budget (Center for Housing Policy, 2005) Fuel constitutes 10-20% of the full cost of driving (Scott Bernstein, 2009)
	Median AH household income	\$14,868	\$26,373	\$37,879	Conservative value from State of the Nation's Housing (2010). Aggressive value from Center for Housing Policy "Something's Gotta Give" report (2005) Took the average for Realistic.
	<b>Decrease in transportation fuel costs / yr</b>	<b>\$34</b>	<b>\$91</b>	<b>\$176</b>	
	% Decrease in CO2 emissions	6%	10%	13%	Range provided by the National Research Council study (2009)
	Avg. annual CO2 emissions (lbs) per car (assume 1 car per unit)		11,450		US Environmental Protection Agency
	Decrease in emissions (lbs)	721	1,099	1,477	
	Decrease in emissions (tons)	0.33	0.50	0.67	
	Carbon price per ton in 2012	6.00	14.99	28.24	Investor Responsibility Research - \$28.24 forecast for 2012 European Climate Exchange - \$14.99 Dec12 Futures contract Montreal Climate Exchange - \$6 Mar2012 Futures contract
	<b>Value of decreased carbon emissions from transportation</b>	<b>\$2</b>	<b>\$7</b>	<b>\$19</b>	Note that there is no market for offsets provided by individual homes, unless buildings participate in 'net metering', where they can feed surplus energy produced back into the grid and actually get paid by the utility for producing energy. The value is only in avoided costs to utilities.
<b>Environmental Costs</b>	<b>Carbon emissions associated with new construction (assumed to be single family (kg))</b>		89,907		"Over a typical building's life time, embodied energy amounts for approximately 16% of a building's total life cycle energy consumption; in contrast, 74% of energy use is attributed to building operations (see Figure 1)...The hypothetical new home emits about 89,907 kg of carbon over its life span of 50 years." - Frey, Patrice, 'Making the Case: Historic Preservation as Sustainable Development', A DRAFT White Paper presented in advance of the Sustainable Preservation Research Retreat Hosted by the National Trust for Historic Preservation (Discussion Draft Released October 15, 2007)
	Carbon emissions associated with new construction of multifamily units (kg)	28,770	35,963	43,155	"Households in buildings with over five apartments use only about 40% as much energy per household as those in single-family detached housing." - The Benningfield Group Inc., "U.S. Multifamily Energy Efficiency Potential by 2020", Prepared for The Energy Foundation (October 19, 2009) Applying the same percentage to construction emissions.
	Renovation costs as a percentage of new construction costs	10%	10%	28%	Percentage based on cost of renovation versus new construction
	Carbon emissions associated with renovation of multifamily units (kg)	2,877	3,596	11,988	
	Carbon price per ton in 2012	6.00	14.99	28.24	Investor Responsibility Research - \$28.24 forecast for 2012 European Climate Exchange - \$14.99 Dec12 Futures contract Montreal Climate Exchange - \$6 Mar2012 Futures contract
	<b>Carbon costs associated with remodeling</b>	<b>\$8</b>	<b>\$25</b>	<b>\$154</b>	

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ONGOING IMPACT						
Education		Conservative	Realistic	Aggressive	Assumptions / Sources	
<b>Better study environment and decreased exposure to illegal activities</b>	Increased annual earnings per child	\$21,600	\$27,000	\$32,400	Realistic value from 2010 study "Coming Out as a Human Capitalist". \$270K lifetime value, used perpetuity formula @ 10% discount rate Used 0.8x for Conservative, used 1.2x for Aggressive	
	Increase in likelihood of graduation	6%	9%	11%	Different % for females vs males in the same 2001 study from Citizen's Housing and Planning Council. Used average for Realistic Value	
	<b>Impact Per Unit</b>	<b>\$1,069</b>	<b>\$1,893</b>	<b>\$2,940</b>		
		<b>56.47%</b>		<b>155.29%</b>		
Health						
<b>Reduced risk of lead poisoning (children)</b>	<b>Methodology</b>					
	IQ reduction per child, prevented	2.54	4.02	5.5	Realistic value from 2002 Environmental Health Perspectives article.. Aggressive value from Pediatric Academic Societies (2001). Took the average for Realistic value.	
	Lifetime earnings associated with 1 IQ point reduction		\$17,815		2009 Economic Policy Institute study	
	Increased annual earnings per child with no/reduced lead poisoning	\$4,525	\$7,162	\$9,798		
	<b>Total Annual earnings Per Unit</b>	<b>\$1,867</b>	<b>\$2,954</b>	<b>\$4,042</b>	Assume 50% of all children per unit are under 6.	
	National average for % of children with BLL > 10 µg/dL		4.4%		CDC - Interpreting and Managing Blood Lead Levels <10 µg/dL in Children and Reducing Childhood Exposures to Lead (2007)	
	% of children with BLL > 25 µg/dL out of all children with BLL > 10 µg/dL		8.72%		City of Omaha analysis (2003)	
	National average for % of children with BLL > 25 µg/dL		0.38%			
	% of children with BLL > 25 µg/dL needing special education (3 yrs)		20%		Nebraska Crime Commission on Law Enforcement and Criminal Justice 2009.	
	National average % of children who need special education due to lead poisoning		0.077%			
	Annual cost savings per child from decreased need for special education	\$9,030	\$12,207	\$15,383	Conservative value from City of Omaha analysis (2003). Aggressive value from Elise Gould Economic Policy Institute 2009 study). Took average for Realistic value. All in 2010 dollars.	
	<b>Annual cost savings per unit from decreased need for special education</b>	<b>\$2.86</b>	<b>\$3.86</b>	<b>\$4.87</b>	Assume 50% of all children per unit are under 6.	
	<b>Impact Per Unit</b>	<b>\$1,869</b>	<b>\$2,958</b>	<b>\$4,047</b>	Note that in preservation, we do not save the costs of treating lead (unlike in the New Construction Type)	
		<b>63.20%</b>		<b>136.80%</b>		

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ONGOING IMPACT						
Health		Conservative	Realistic	Aggressive	Assumptions / Sources	
<b>Decreased incidences of asthma</b>	Annual cost of asthma to society		\$19,700,000,000		American Academy of Asthma & Immunology: Asthma accounts for approximately 500,000 hospitalizations each year. 1.3 million school days are missed each year due to asthma. Asthma accounts for about 10.1 million missed work days for adults annually. Asthma was responsible for 3,384 deaths in the United States in 2005. The annual economic cost of asthma is \$19.7 billion. Direct costs make up \$14.7 billion of that total, and indirect costs such as lost productivity add another \$5 billion. Prescription drugs represented the largest single direct medical expenditure related to asthma, over \$6 billion	
	# of people with asthma nationwide		23,000,000			
	Cost savings per person (from reduced prescription drugs, hospitalizations, missed work days, missed school days, etc)		\$857			
	Asthma in children living below the federal poverty level		10.3%		"asthma rates are higher among children living in low-income communities (Mannino et al. 2002). From 2001 to 2004, asthma in children living below the federal poverty level was 10.3%, compared with 6.4–7.9% for those at or above the poverty level (Moorman et al. 2007)." - Jacobs, David, Wilson, Jonathan, Dixon, Sherry L., Smith, Janet, Evens, Anne, "The Relationship of Housing and Population Health: A 30-Year Retrospective Analysis", Environmental Health Perspectives • volume 117 number 4 (April 2009)	
	Those at or above the poverty level	7.9%	7.2%	6.4%		
	% decrease of children with asthma if moved out of poverty	23.3%	30.6%	37.9%		
	% decrease per unit	2.4%	3.2%	3.9%	30.6% of 10.3%	
	<b>Annual cost savings per unit</b>	<b>\$8</b>	<b>\$11</b>	<b>\$14</b>	<b>Assume impact realizable for children under 6 (50% of all children per unit)</b>	
		<b>76.19%</b>		<b>123.81%</b>		
<b>Improved mental health for household heads</b>	Increase in % of adults reporting feeling calm and peaceful		13%		Realistic value from 2004 MTO study	
	Annual savings from decreased treatment costs per person	\$936	\$1,170	\$1,404	Realistic value derived from 2005 Financial Distress Among American Workers Final Report. Used 0.8x for Conservative, used 1.2x for Aggressive	
	Annual savings from decreased absenteeism and increased productivity	\$3,435	\$5,021	\$6,606	Conservative value from 2009 Research Works - Employee Personal Financial Distress article. Aggressive value from 2005 Financial Distress Among American Workers Final Report. Took the average for Realistic value.	
	Total treatment cost savings & increased productivity per person	\$4,371	\$6,190	\$8,010		
	<b>Impact Per Unit</b>	<b>\$1,162</b>	<b>\$1,646</b>	<b>\$2,129</b>		
		<b>70.61%</b>		<b>129.39%</b>		
<b>TOTAL ONGOING AH ECONOMIC, ENVIRONMENTAL &amp; SOCIAL BENEFITS (impact per unit per year)</b>		<b>\$14,124</b>	<b>\$25,409</b>	<b>\$63,794</b>		
	% of Realistic Value	56%		251%		

1. "There are more than 11,000 historic districts in the country, which include over 850,000 buildings. About 60 percent of those buildings are in census tracts with a poverty level of 20 percent or more." "Over the last five years over 44,000 units of housing have been created (27,851 of them low and moderate income apartments). Over 40 percent of the housing units came from historic buildings that weren't originally built as residential structures – warehouses, factories, department stores, office buildings, previously vacant upper floors of downtown buildings." "Additionally there are nearly 3 million vacant older and historic housing units that ought to be brought back into use." National Trust for Historic Preservation (2002).

Assumptions/Calculations: 3 million historic units total. 60% \* 3 million = 1.8 million historic units that are in concentrated poverty areas. We assume in this model that all 3 million units will be used for rentals.'



# Analysis of the Social Return on Investment of a Hypothetical Portfolio: Quality Affordable Housing and Targeted Services

2010, Projected 2011-2030

## Type 3: New Construction, in Transit-oriented Sites, Compact Mixed-income Development

There are an estimated 8.4 million<sup>1</sup> American renter households currently spending more than 50% of their income on housing. Beyond preserving historic buildings and retrofitting old housing stock, new construction is needed. Without this intervention, we assume that the gap will not be closed, given the current supply of affordable housing units and growing demand.

Approximately 75,000 LIHTC units were built in 2006. At this rate, it would take 69 years to meet the gap of 5.2 millions (assuming 1.4 million units are for Seniors and the gap of 1.8 million units is met by remodeling existing housing stock).

Without this intervention, the base case scenario is that other, non-affordable real estate developments would be built. Therefore the environmental impact of the new construction is not considered an impact of the investment, since the same environmental outcomes would have occurred regardless.

*Notes: Not all the impacts listed in the Impact Map have been monetized. For each impact that is monetizable, there are sometimes different ranges provided by different studies or different approaches used. These are explained in the Assumptions / Sources column.*

*The “per unit” analysis shown is based on overall costs and benefits to overall units built, and is not meant to imply that each individual unit will in fact accrue every benefit in this exact amount. Benefits would be generated when large numbers of units are built with the proper design criteria, as elaborated in the PPPM.*

PER UNIT IMPACT		Discount rate for financial and “social cash flows” <sup>2</sup> =10%			
Impact Area	Impact (outcome net of base case scenario attribution considerations, and drop-off)	Annual Impact (using Realistic Value)	10-yr value	20-yr value	
<b>Financial Impacts (that accrue to owners/investors)</b>					
Upfront costs	Cost of Acquisition, New Construction	\$150,000	\$150,000	\$150,000	
	Grant (43%)	\$64,500			
	50% Debt (7%, 30-yr fixed fully amortized)	\$75,000			
	7% Equity	\$10,500			
	Net Operating Income (assume 4% of cost)	\$6,000			
	Debt Servicing (50% of financing)	\$5,250	\$32,259	\$44,696	
	Net Cash Flow to Equity Holder	\$750	\$7,493	\$13,738	
	<b>ROE</b> (Cash Returns, excludes 9.5% stake in the fund)			<b>0.71</b>	<b>1.31</b>
	<b>IRR on Equity</b>			<b>4%</b>	<b>13%</b>
	<b>ROI on Debt</b>			<b>0.43</b>	<b>0.60</b>
	<b>IRR on Debt</b>		<b>-6%</b>	<b>3%</b>	
<b>Non-Financial Impacts: Provision of AH without additional services</b>					
<b>Economic<sup>4</sup></b>					
One-time impact	Income generated as a result of a new AH development	\$78,890	\$71,718	\$71,718	
	Taxes and other revenue for local governments as a result of a new AH development	\$8,270	\$7,518	\$7,518	

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<b>PER UNIT IMPACT</b>		<b>Discount rate for financial and “social cash flows”<sup>22</sup> =10%</b>		
<b>Impact Area</b>	<b>Impact (outcome net of base case Type, attribution considerations, and dropoff)</b>	<b>Annual Impact (using Realistic Value)</b>	<b>NPV (10 yrs)</b>	<b>NPV (20 yrs)</b>
<b>Non-Financial Impacts: Provision of AH without additional services</b>				
<b>Environment</b>				
<b>Energy efficiency gains — from moving out of pre-1980 housing stock</b>	Decrease in home energy costs / yr	\$0	\$0	\$0
	Value of decreased carbon emissions associated with home energy use	\$0	\$0	\$0
<b>Decrease in Vehicle Miles Travelled</b>	Decrease in transportation fuel costs / yr	\$91	\$560	\$776
	Value of decreased carbon emissions from transportation	\$7	\$46	\$64
<b>Education</b>				
<b>Better study environment and decreased exposure to illegal activities</b>	Increased annual earnings per child	\$27,000		
	Preschool children (avg. 50% of all children per unit)		\$3,650	\$5,057
	Elementary and Middle school children (avg. 30% of all children per unit)		\$2,190	\$3,034
	High school children (avg. 20% of all children per unit)		\$1,460	\$2,023
<b>Health</b>				
<b>Reduced risk of lead poisoning (children)</b>	Increased annual earnings per child with no/reduced lead poisoning	\$7,162	\$0	\$5,022
	Annual cost savings per child from decreased need for special education	\$12,207	\$23	\$23
	Cost savings per unit from treating lead in existing properties*	\$6,000	\$5,455	\$5,455
<b>Decreased incidences of asthma</b>	Cost savings per person (from reduced prescription drugs, hospitalizations, missed work days, missed school days, etc)	\$857	\$166	\$230
<b>Improved mental health for household heads</b>	Annual savings from decreased absenteeism and increased productivity	\$6,190	\$10,112	\$14,011
<b>Total economic, environmental and social impacts per unit</b>		<b>\$146,575</b>	<b>\$102,898</b>	<b>\$114,931</b>
<i>Upfront costs</i>	<i>Construction</i>	\$150,000	\$150,000	\$150,000
<i>Operating costs</i>	<i>Maintenance costs</i>	\$3,524	\$21,655	\$30,004
<i>Total costs</i>			\$171,655	\$180,004
<b>SROI</b>			<b>0.54</b>	<b>0.57</b>
Costs per dollar of impact			\$1.67	\$1.57
<b>SIRR</b>			<b>33%</b>	<b>33%</b>

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<b>Additional Services &amp; Investments</b>				
<b>Education</b>				
<b>Investment in early childhood programs</b>	Average Annual Benefits: Increased earnings of high school graduates, increased taxes, decreased crime victim costs	\$29,358	\$46,689.81	\$64,690.75
<i>Upfront cost</i>	<i>Program costs</i>	\$17,198	\$15,634.55	\$15,634.55
<i>Ongoing Costs</i>		\$0	\$0	\$0
<i>Total Costs</i>			\$15,635	\$15,635
<b>SROI</b>			<b>2.99</b>	<b>4.14</b>
Cost per dollar of impact			\$0.33	\$0.24
<b>SIRR</b>			<b>33%</b>	<b>34%</b>
<b>AH+ (Housing &amp; Additional Services)</b>				
<b>Total Economic, Environmental and Social Returns per unit</b>		<b>\$175,933</b>	<b>\$149,588</b>	<b>\$179,621</b>
<i>Total Upfront Costs</i>		\$167,198	\$165,635	\$165,635
<i>Total Ongoing Costs</i>		\$3,524	\$21,655	\$30,004
<i>Total Costs</i>			\$187,290	\$195,639
<b>SROI</b>			<b>0.77</b>	<b>0.90</b>
Cost per dollar of impact			\$1.25	\$1.09
<b>SIRR</b>			<b>33%</b>	<b>33%</b>
<b>Blended Value Return (Financial and Social)</b>				
<b>Total Financial, Economic, Environmental and Social Returns per unit</b>			\$189,340	\$238,056
<i>Total Upfront Costs</i>		\$167,198	\$165,635	\$165,635
<i>Total Ongoing Costs</i>		\$3,524	\$21,655	\$30,004
<b>Total costs</b>			<b>\$187,290</b>	<b>\$195,639</b>
<b>Blended ROI</b>			<b>1.01</b>	<b>1.26</b>
Cost per dollar of impact			\$0.99	\$0.82
<b>Blended IRR</b>			<b>34%</b>	<b>34%</b>

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PER UNIT IMPACT																									
Impact Area	Impact (outcome net of base case scenario attribution considerations, and drop-off)		Projections																			Notes on changes over time (see sensitivity analysis for sources not noted here)			
Financial Impacts (that accrue to owners/investors)			2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
Upfront costs	Net Operating Income (assume 4% of cost)		6,000	6,120	6,242	6,367	6,495	6,624	6,757	6,892	7,030	7,171	7,314	7,460	7,609	7,762	7,917	8,075	8,237	8,401	8,569	8,741		Assume 2% increase/yr. Estimated net operating income = rental minus operating costs = 4% for AH when the residents are at 60% AMI (David Smith, Recap.)	
	Debt Servicing (50% of financing)		5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250		Used 7% as the Debt Service Constant on a 5.5% 30-year mortgage
	Net Cash Flow to Equity Holder		750	870	992	1,117	1,245	1,374	1,507	1,642	1,780	1,921	2,064	2,210	2,359	2,512	2,667	2,825	2,987	3,151	3,319	3,491			
	IRR on Equity	(\$10,500)	750	870	992	1,117	1,245	1,374	1,507	1,642	1,780	1,921	2,064	2,210	2,359	2,512	2,667	2,825	2,987	3,151	3,319	3,491			
	IRR on Debt	(\$75,000)	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250	5,250		
Non-Financial Impacts: Provision of AH without additional services			2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
Economic <sup>4</sup>																									
One-time impact	Income generated as a result of a new AH development		78,890	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	One-time impact
	Taxes and other revenue for local governments as a result of a new AH development		8,270	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	One-time impact
Environment																									
Energy efficiency gains — from moving out of pre-1980 housing stock	Decrease in home energy costs / yr		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	There are no net efficiency gains even though new buildings are more efficient than older housing stock. Reasons: - New construction is for increasing population - individuals who are currently living at home with their parents or with many room-mates to save cost (the current housing stock will continue to exist and the new construction does not replace any older housing stock) - New construction replaces old housing stock that was demolished (there are environmental costs to demolition)
	Value of decreased carbon emissions associated with home energy use		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

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PER UNIT IMPACT																								
Impact Area	Impact (outcome net of base case scenario attribution considerations, and drop-off)	Projections																				Notes on changes over time (see sensitivity analysis for sources not noted here)		
Non-Financial Impacts: Provision of AH without additional services		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
<b>Environment</b>																								
<b>Decrease in Vehicle Miles Travelled</b>	Decrease in transportation fuel costs / yr		91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91		
	Value of decreased carbon emissions from transportation		7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7		
<b>Education</b>																								
<b>Better study environment and decreased exposure to illegal activities</b>	Increased annual earnings per child																						9% increase in likelihood of graduation	
	Preschool children (avg. 50% of all children per unit)		0	0	0	0	0	0	0	0	0	270,000	0	0	0	0	0	0	0	0	0	270,000	Assume that each family stays in the unit an average of 10 years.	
	Elementary and Middle school children (avg. 30% of all children per unit)		0	0	0	0	0	0	0	0	0	270,000	0	0	0	0	0	0	0	0	0	270,000	Lifetime benefits of \$270k (source: "Coming Out As A Human Capitalist" - Nancy Andrews) realized for the first family in year 10, and the 2nd family realizes the benefit in year 20.	
	High school children (avg. 20% of all children per unit)		0	0	0	0	0	0	0	0	0	270,000	0	0	0	0	0	0	0	0	0	270,000		
<b>Health</b>																								
<b>Reduced risk of lead poisoning (children)</b>	Increased annual earnings per child with no/reduced lead poisoning		0	0	0	0	0	0	0	0	0	0	0	0	7,162	7,162	7,162	7,162	7,162	7,162	7,162	7,162	Only for children under 6. Assume the impact will materialize only after 12 years. No impact for 10-yr NPV	
	Annual cost savings per child from decreased need for special education		12,207	12,207	12,207	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Special Ed for 3 years. Only 0.077 % of all children need special ed.
	Cost savings per unit from treating lead in existing properties*		6,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	One-time savings

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PER UNIT IMPACT																									
Impact Area	Impact (outcome net of base case scenario attribution considerations, and drop-off)		Projections																				Notes on changes over time (see sensitivity analysis for sources not noted here)		
<b>Health</b>																									
<b>Decreased incidences of asthma</b>	Cost savings per person (from reduced prescription drugs, hospitalizations, missed work days, missed school days, etc)		857	857	857	857	857	857	857	857	857	857	857	857	857	857	857	857	857	857	857	857	857	Note: this does NOT include increased lifetime earnings of children who have improved asthmatic health	
<b>Improved mental health for household heads</b>	Annual savings from decreased absenteeism and increased productivity		6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	Annual value of decreased treatment costs of \$726 & increased productivity of \$5,419 per person. 13% of adults reported improved mental health 1.7 adults per dwelling unit of 2.8	
<b>Total economic, environmental and social impacts per unit</b>			112,512	19,352	19,352	7,146	7,146	7,146	7,146	7,146	7,146	14,307	14,307	14,307	14,307	14,307	14,307	14,307	14,307	14,307	14,307	14,307	14,307		
<i>Upfront costs</i>	<i>Construction</i>	(150,000)																						“\$150k for new construction Source: “More than just real estate: Investing in housing enterprises and the whole delivery system” - David A. Smith (July, 2010) This is the cost of building in a well-located area, and building green.  Carbon emissions sourced from Frey, Patrice, ‘Making the Case: Historic Preservation as Sustainable Development’ (2007) Carbon prices from 3 different exchanges.	
<i>Operating costs</i>	<i>Maintenance costs</i>		3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	Average of 2 different examples in NAHB study	
<b>SIRR</b>		(150,000)	108,988	15,828	15,828	3,621	3,621	3,621	3,621	3,621	3,621	3,621	813,621	3,621	3,621	10,783	10,783	10,783	10,783	10,783	10,783	10,783	10,783	820,783	

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Additional Services & Investments																								
Impact Area	Impact (outcome net of base case scenario attribution considerations, and drop-off)	Projections																				Notes on changes over time (see sensitivity analysis for sources not noted here)		
<b>Education</b>																								
Investment in early childhood programs	Average Annual Benefits: Increased earnings of high school graduates, increased taxes, decreased crime victim costs		0	0	0	0	0	0	0	0	0	0	293,579	0	0	0	0	0	0	0	0	0	293,579	Lifetime benefits of \$294k (source: "The Dollars and Cents of Investing Early: Cost-benefit Analysis in Early Care and Education" (2006)) realized for the first family in year 10, and the 2nd family realizes the benefit in year 20. Assume this applies only to and all children 6 and under (50% of children per unit)
Upfront cost	Program costs		17,198																					Total program costs of Perry Preschool - assumed upfront in year 1
Ongoing Costs			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>SIRR</b>		(17,198)											293,579										293,579	
<b>AH+ (Housing &amp; Additional Services)</b>																								
<b>Total Economic, Environmental and Social Returns per unit</b>		112,512	19,352	19,352	7,146	7,146	7,146	7,146	7,146	7,146	1,110,725	7,146	7,146	14,307	14,307	14,307	14,307	14,307	14,307	14,307	14,307	1,117,886		
Total Upfront Costs		17,198	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Total Ongoing Costs		3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524		
<b>SIRR</b>		(167,198)	108,988	15,828	15,828	3,621	3,621	3,621	3,621	3,621	3,621	1,107,200	3,621	3,621	10,783	10,783	10,783	10,783	10,783	10,783	10,783	1,114,362		
<b>Blended Value Return (Financial and Social)</b>																								
<b>Total Financial, Economic, Environmental and Social Returns per unit</b>		118,512	25,472	25,595	13,513	13,640	13,770	13,903	14,038	14,176	1,117,895	14,460	14,606	21,917	22,069	22,224	22,382	22,544	22,709	22,877	1,126,627			
Total Upfront Costs		17,198	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Total Ongoing Costs		3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524	3,524		
<b>Blended IRR</b>		(167,198)	97,790	21,948	22,070	9,989	10,116	10,246	10,378	10,513	10,651	1,114,371	10,935	11,082	18,392	18,545	18,700	18,858	19,020	19,184	19,352	1,123,103		

- Notes**
- State of the Nation's Housing (2010), by The Joint center for Housing Studies of Harvard University  
 "All told, 40.3 million households spent more than 30 percent of their incomes on housing in 2008, while 18.6 million of these households spent more than half—up from 13.8 million in 2001. Of those with such severe housing cost burdens, fully 45.1 percent are renters in the bottom income quartile."
  - The discount rate for social value projections is based on a) the business risk, i.e., whether the organization will in fact be able to deliver the projected units of housing, and b) the "impact risk", i.e. whether the social and environmental impacts will in fact be generated, regardless of whether the housing is built.
  - State of the Nation's Housing (2010), by The Joint center for Housing Studies of Harvard University  
 "Multifamily starts dropped from 284,000 units in 2008 to 109,000 in 2009—their lowest level on record. But because completions lagged starts, falling only from 301,000 to 274,000, the rental market has yet to register the full effects of the near-cessation of production"
  - Note that in the Preservation Type, there are ongoing economic impacts of increased employment & wages for adults. The existing literature shows that there have been inconclusive findings of affordable housing's impact on employment. In a number of the Hope VI and Moving to Opportunity cases, adults were not necessarily able to find jobs or hold on to them for sustained periods of time. Newer studies have pointed to the fact that physical mobility and childcare are the largest barriers to increased employment.  
 Having said that, the literature did have 4 cases where there was increased employment with residents of the AH development — these were developments in previously distressed neighborhoods. Hence, we have included the impact on employment in the Preservation Type and not the New Construction Type.

# Analysis of the Social Return on Investment of a Hypothetical Portfolio: Quality Affordable Housing and Targeted Services

## Sensitivity Analysis of Impacts of Type 3a: New Construction, in Transit-oriented Sites, Compact Mixed-income Development

There is an estimated 8.4 million<sup>1</sup> American households currently spending more than 50% of their income on housing, and in concentrated poverty. Beyond preserving historic buildings and retrofitting old housing stock, new construction is needed.

For modeling purposes, we have organized the impact and sensitivity analysis around one unit of housing. “Per unit” costs and impacts are based on overall costs and benefits to overall units built, and are not meant to imply that each individual unit will in fact accrue every cost or benefit in this exact amount.

Not all the impacts listed in the Impact Map have been monetized. For each impact that is monetizable, sometimes there are different ranges provided by different studies or different approaches used. These are explained in the Assumptions / Sources column.

### Summary, for Impacts of AH plus Services:

**Conservative estimates amount to 72% of the Realistic value.**

**Aggressive estimates amount to 129% of the Realistic value.**

### Non-Financial Impacts: Provision of AH without additional services

ONE-TIME IMPACT					
Economic		Conservative	Realistic	Aggressive	Assumptions / Sources
<b>Income generated as a result of a new AH development</b>	Cost per unit	\$120,000	\$150,000	\$180,000	Realistic value from “More than just real estate: Investing in housing enterprises and the whole delivery system” By David A. Smith (Draft Jul 2, 2010) Used 0.8x for Conservative, used 1.2x for Aggressive
	# units remodelled with \$10 million	83	67	56	NAHB study (2009) found 122 jobs, \$7.9 million of income for every \$10 million spent on remodeling
	Number of jobs generated during construction Per Unit	0.94	1.17	1.40	
	<b>Income generated per unit</b>	<b>\$63,112</b>	<b>\$78,890</b>	<b>\$94,668</b>	Used 0.8x for Conservative, used 1.2x for Aggressive
<b>Taxes and other revenue for local governments as a result of a new AH development</b>	<b>Impact Per Unit</b>	<b>\$6,616</b>	<b>\$8,270</b>	<b>\$9,924</b>	NAHB study (2009) for Realistic. Used 0.8x for Conservative, used 1.2x for Aggressive

ONGOING IMPACT					
Economic		Conservative	Realistic	Aggressive	Assumptions / Sources
<b>Increase in employment for adults</b>	Methodology	No change in employment	No change in employment	No change in employment	Hope VI and MTO studies show no sustained increase in employment rate.
	<b>Impact Per Unit</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	

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**ONGOING IMPACT**

<b>Energy &amp; Environment</b>		Conservative	Realistic	Aggressive	Assumptions / Sources
<b>Energy efficiency gains — from moving out of pre-1980 housing stock</b>	Efficiency gains	0%	0%	0%	There are no net efficiency gains even though new buildings are more efficient than older housing stock. Reasons: - New construction is for increasing population - individuals who are currently living at home with their parents or with many room-mates to save cost (the current housing stock will continue to exist and the new construction does not replace any older housing stock) - New construction replaces old housing stock that was demolished (there are environmental costs to demolition)
	Average % of income the typical low-income household spends on energy at home		20%		"U.S. Multifamily Energy Efficiency Potential BY 2020" - The Benningfield Group (2009)
	Median AH household income	\$14,868	\$26,373	\$37,879	Conservative value from State of the Nation's Housing (2010). Aggressive value from Center for Housing Policy "Something's Gotta Give" report (2005) Took the average for Realistic.
	<b>Decrease in home energy costs / yr</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	
	Current CO2 emissions per year (tons)	13.33	16.67	20.00	"We could avoid the emission of at least 50 to over 100 million tons of CO2 per year – equivalent to the emissions associated with the current energy use of 4-8 million U.S. households." (The Benningfield Group 2009)  Used 100 million / 4 million households for high energy users (Families) Used 0.8x for Conservative, used 1.2x for Aggressive
	Decrease in emissions of CO2 per unit (tons)	0.00	0.00	0.00	Assume % decrease in CO2 is the same as % efficiency gains
	Carbon price per ton in 2012	6.00	14.99	28.24	Investor Responsibility Research - \$28.24 forecast for 2012 European Climate Exchange - \$14.99 Dec12 Futures contract Montreal Climate Exchange - \$6 Mar2012 Futures contract
	<b>Value of decreased carbon emissions associated with home energy use</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	Note that there is no market for offsets provided by individual homes, unless buildings participate in 'net metering', where they can feed surplus energy produced back into the grid and actually get paid by the utility for producing energy. The value is only in avoided costs to utilities.
<b>Decrease in Vehicle Miles Travelled</b>	% Decrease in fuel use	6%	10%	13%	Range provided by the National Research Council study (2009)
	Average % of income the typical low-income HOUSEHOLD spends on energy for transportation		4%		Working families (who spend more than 50% of their income on housing) expenditure shares for transportation are nearly 24 % of their household budget (Center for Housing Policy, 2005) Fuel constitutes 10-20% of the full cost of driving (Scott Bernstein, 2009)
	Median AH household income	\$14,868	\$26,373	\$37,879	Conservative value from State of the Nation's Housing (2010). Aggressive value from Center for Housing Policy "Something's Gotta Give" report (2005). Took the average for Realistic.
	<b>Decrease in transportation fuel costs / yr</b>	<b>\$60</b>	<b>\$91</b>	<b>\$122</b>	
	% Decrease in CO2 emissions	6%	10%	13%	Range provided by the National Research Council study (2009)
	Avg. annual CO2 emissions (lbs) per car (assume 1 car per unit)		11,450		US Environmental Protection Agency
	Decrease in emissions (lbs)	721	1,099	1,477	
	Decrease in emissions (tons)	0.33	0.50	0.67	
	Carbon price per ton in 2012	6.00	14.99	28.24	Investor Responsibility Research - \$28.24 forecast for 2012 European Climate Exchange - \$14.99 Dec12 Futures contract Montreal Climate Exchange - \$6 Mar2012 Futures contract
Value of decreased carbon emissions from transportation	\$2	\$7	\$19	Note that there is no market for offsets provided by individual homes, unless buildings participate in 'net metering', where they can feed surplus energy produced back into the grid and actually get paid by the utility for producing energy. The value is only in avoided costs to utilities.	

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ONGOING IMPACT						
Education		Conservative	Realistic	Aggressive	Assumptions / Sources	
<b>Better study environment and decreased exposure to illegal activities</b>	Increased annual earnings per child	\$21,600	\$27,000	\$32,400	Realistic value from 2010 study "Coming Out as a Human Capitalist". \$270K lifetime value, used perpetuity formula @ 10% discount rate Used 0.8x for Conservative, used 1.2x for Aggressive	
	Increase in likelihood of graduation	6%	9%	11%	6% for females vs 11% for males - 2001 study from Citizen's Housing and Planning Council. Used average for Realistic Value	
	<b>Impact Per Unit (annual earnings)</b>	<b>\$1,069</b>	<b>\$1,893</b>	<b>\$2,940</b>	Based on an average of 0.83 children per unit for all units - State of the Nation's Housing (2010)	
Health		Conservative	Realistic	Aggressive	Assumptions / Sources	
<b>Reduced risk of lead poisoning (children)</b>	<b>Methodology</b>					
	IQ reduction per child, prevented	2.54	4.02	5.5	Realistic value from 2002 Environmental Health Perspectives article. Aggressive value from Pediatric Academic Societies (2001). Took the average for Realistic value.	
	Lifetime earnings associated with 1 IQ point reduction		\$17,815		2009 Economic Policy Institute study	
	Increased annual earnings per child with no/reduced lead poisoning	\$4,525	\$7,162	\$9,798		
	<b>Total Annual earnings Per Unit</b>	<b>\$1,867</b>	<b>\$2,954</b>	<b>\$4,042</b>	Assume 50% of all children per unit are under 6.	
	National average for % of children with BLL > 10 µg/dL		4.4%		CDC - Interpreting and Managing Blood Lead Levels <10 µg/dL in Children and Reducing Childhood Exposures to Lead (2007)	
	% of children with BLL > 25 µg/dL out of all children with BLL > 10 µg/dL		8.72%		City of Omaha analysis (2003)	
	National average for % of children with BLL > 25 µg/dL		0.38%			
	% of children with BLL > 25 µg/dL needing special education (3 yrs)		20%		Nebraska Crime Commission on Law Enforcement and Criminal Justice 2009.	
	National average % of children who need special education due to lead poisoning		0.077%			
	Annual cost savings per child from decreased need for special education	\$9,030	\$12,207	\$15,383	Conservative value from City of Omaha analysis (2003). Aggressive value from Elise Gould Economic Policy Institute 2009 study). Took average for Realistic value. All in 2010 dollars.	
	<b>Annual cost savings per unit from decreased need for special education</b>	<b>\$2.86</b>	<b>\$3.86</b>	<b>\$4.87</b>	Assume 50% of all children per unit are under 6.	
	<b>Cost savings per unit from treating lead in existing properties*</b>	<b>\$1,200</b>	<b>\$6,000</b>	<b>\$10,800</b>	Range provided in 2009 Economic Policy institute study. Took the average for Realistic value.	
	<b>Impact Per Unit</b>	<b>\$3,069</b>	<b>\$8,958</b>	<b>\$14,847</b>		

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ONGOING IMPACT						
Health		Conservative	Realistic	Aggressive	Assumptions / Sources	
<b>Decreased incidences of asthma</b>	Annual cost of asthma to society		\$19,700,000,000		American Academy of Asthma & Immunology: Asthma accounts for approximately 500,000 hospitalizations each year. 13 million school days are missed each year due to asthma. Asthma accounts for about 10.1 million missed work days for adults annually. Asthma was responsible for 3,384 deaths in the United States in 2005. The annual economic cost of asthma is \$19.7 billion. Direct costs make up \$14.7 billion of that total, and indirect costs such as lost productivity add another \$5 billion. Prescription drugs represented the largest single direct medical expenditure related to asthma, over \$6 billion	
	# of people with asthma nationwide		23,000,000			
	Cost savings per person (from reduced prescription drugs, hospitalizations, missed work days, missed school days, etc)		\$857			
	Asthma in children living below the federal poverty level		10.3%		"[A]sthma rates are higher among children living in low-income communities (Mannino et al. 2002). From 2001 to 2004, asthma in children living below the federal poverty level was 10.3%, compared with 6.4–7.9% for those at or above the poverty level (Moorman et al. 2007)." - Jacobs, David, Wilson, Jonathan, Dixon, Sherry L., Smith, Janet, Evens, Anne, "The Relationship of Housing and Population Health: A 30-Year Retrospective Analysis", Environmental Health Perspectives • volume 117 number 4 (April 2009)	
	Those at or above the poverty level	7.9%	7.2%	6.4%		
	% decrease of children with asthma if moved out of poverty	23.3%	30.6%	37.9%		
	% decrease per unit	2.4%	3.2%	3.9%	30.6% of 10.3%	
	<b>Annual cost savings per unit</b>	<b>\$8</b>	<b>\$11</b>	<b>\$14</b>	<b>Assume impact realizable for children under 6 (50% of all children per unit)</b>	
<b>Improved mental health for household heads</b>	Increase in % of adults reporting feeling calm and peaceful		<b>13%</b>		Realistic value from 2004 MTO study	
	Annual savings from decreased treatment costs per person	\$935.78	\$1,170	\$1,403.67	Realistic value derived from 2005 Financial Distress Among American Workers Final Report. Used 0.8x for Conservative, used 1.2x for Aggressive	
	Annual savings from decreased absenteeism and increased productivity	\$3,435	\$5,021	\$6,606	Conservative value from 2009 Research Works — Employee Personal Financial Distress article. Aggressive value from 2005 Financial Distress Among American Workers Final Report. Took the average for Realistic value.	
	Total treatment cost savings & increased productivity per person	\$4,371	\$6,190	\$8,010		
	<b>Impact Per Unit</b>	<b>\$1,162</b>	<b>\$1,646</b>	<b>\$2,129</b>		
<b>TOTAL ONGOING AH ECONOMIC, ENVIRONMENTAL &amp; SOCIAL BENEFITS (impact per unit per year)</b>		<b>\$75,090</b>	<b>\$99,756</b>	<b>\$124,650</b>		
	% of Realistic Value	<b>75%</b>		<b>125%</b>		

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# Sensitivity Analysis of Impacts of Type 3b: New Construction, in Transit-oriented Sites, Compact Mixed-income Development with Investment in Services

We have made a simplifying assumption that 1/3 of households with children in the Type 3: New Construction layer of our portfolio have preschool kids, and hence the need for the Early Childhood Programs.

<b>AH with Additional Services</b>					
<b>Education</b>		<b>Conservative</b>	<b>Realistic</b>	<b>Aggressive</b>	<b>Assumptions / Sources</b>
<b>Investment in early childhood programs</b>		Elmira Prenatal/Early Infancy Project	Abecedarian Project	Perry Preschool (had outcomes recorded over a longer duration)	
Benefits: Increased earnings of high school graduates, increased taxes, decreased crime victim costs	Lifetime value of benefits per child	\$38,296	\$147,149	\$293,579	"The Dollars and Cents of Investing Early: Cost-benefit Analysis in Early Care and Education" (2006)
	Annual impact per child	\$3,830	\$14,715	\$29,358	
	Impact per unit (lifetime value)	\$15,797	\$60,699	\$121,101	Avg. lifespan: 78.43902 years - 2008 Source: World Bank, World Development Indicators Assume impacts get realized from age 18, therefore 60 years of impact for those age 6 and under. Assume 50% of children per unit under 6.
	<b>Impact per unit per year</b>	<b>\$1,580</b>	<b>\$6,070</b>	<b>\$12,110</b>	
<b>TOTAL ONGOING AH+SERVICES BENEFITS (impact per unit per year)</b>		<b>\$76,670</b>	<b>\$105,826</b>	<b>\$136,760</b>	
	% of Realistic Value	72%		129%	
<b>ENHANCEMENT OF IMPACT</b>	% of AH alone impact	<b>102%</b>	<b>106%</b>	<b>110%</b>	



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