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Integrating the Basic Systems Repair and
Weatherization Assistance Programs:
A Pilot Program Plan

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Abstract

This study explores how elements of the City of Philadelphia’s two major programs for home improvement, the Basic Systems Repair Program (BSRP) and the Weatherization Assistance Program (WAP), can be systematically coordinated to produce a more robust housing preservation service targeted to transitional neighborhoods.

The study concludes with a framework for a pilot demonstration program, providing recommended methods of program integration, targeted in two middle market neighborhoods designated by the City as Neighborhood Preservation Areas.¹ The study offers recommendations for evaluating the pilot experience to help City policy makers discern the neighborhood preservation impact of investing a higher level of housing preservation services in a geographically targeted way, to provide guidance on the future feasibility of a broader integration of WAP and BSRP, and to determine the efficacy of a “preservation as development” policy that can lead to the creation of new high quality affordable housing from Philadelphia’s existing supply of affordable owner-occupied housing.

Executive Summary

Between Crisis & Opportunity

Philadelphia housing policy is at the crossroads: its aging housing stock is occupied by increasingly poorer residents, federal funding for new affordable housing has remained stagnated at the same levels for the past decade, while new federal stimulus initiatives are providing resources for buildings retrofits at level not seen since the late 1970s. This convergence of circumstances argues for an immediate and robust effort to stabilize the city’s ample stock of affordable housing, to avert the displacement of low income families due to building failures and untenable operating costs, to create a new model for the development of “new” affordable housing through a significant permanent commitment to housing preservation.

Recent studies show that decades of deferred maintenance and capital repairs have brought the decline of over 40,000 affordable housing units. Over 13,000 of those have declined severely enough that if left in disrepair would almost certainly be lost within the next 3- 5 years.

The City’s two primary instruments for housing preservation are the Basic Systems Repair Program (BSRP) and Weatherization Assistance Program (WAP). These programs, run by

¹ Neighborhood Preservation Areas are described by TRF as “High Leverage Preservation areas, middle market areas that are experiencing market pressure from the surrounded block groups the pressure can be positive (surrounding area values are increasing) or negative (values of properties are declining) surrounding the block group. The pressure may be caused by increased crime, high levels of foreclosure, social stress, and/or reduction in the quality of education. Preservation areas though have assets and are places where a minimal amount of public subsidy may dramatically improve the perception by existing and potential residents on the quality of life available in the neighborhood. The goal is to stem further deterioration of the market by demonstrating there is a public commitment to improving the quality of services in the area.”

the Philadelphia Housing Development Corporation (PHDC) have kept thousands of properties from being abandoned in the last 15 years. And yet, both programs have struggled to meet the demand for their services while no careful evaluation has been done to determine their effectiveness or to provide recommendations for how they may have an even greater impact.

Such an evaluation is beyond the scope of this study. The authors of this study have reviewed the operations of these programs purely to establish the context for how BSRP's home repair services can be better aligned with the WAP's energy conservations. However, in seeking to learn how it might be possible to offer a more targeted approach than is currently allowed by a citywide, first-come-first-served approach, and how the enormous oversubscription of BSRP – currently with a waiting list of 2 ½ years – can be factored into alternative strategies, evidence for broader scale improvements in the core programs is offered.

Likewise, the authors of this study have sought to uncover the inherent synergies between BSRP and WAP, especially in light of WAP's four-fold increase in federal funding through the American Recovery and Reinvestment Act (ARRA) and the expansion of its allowable measures to include basic systems retrofits that naturally integrate with BSRP systems repairs. Here again, such synergies are discussed in the contexts of an alternative pilot program, but can provide direction for further study of the potential for improving the coordination of the core programs.

Finally, the authors of the study have kept ever-present the implications of the pilot program for the demand for a more comprehensive approach to housing preservation implicit in the commissioning of this study and the outcomes discussed herein.

Summary of Inherent Challenges and Opportunities:

The challenges to integration are many. BSRP is perennially oversubscribed making it difficult to add new WAP customers to its roles. BSRP's work scope precludes conservation measures such as roof cavity insulation and ceiling replacements in conjunction with roof repair. WAP rules that typically preclude home repairs integral to a comprehensive service that BSRP does not offer such as the installation of ceilings, windows and doors. WAP intake requires the use of list provided by the State of high energy users who are also LIHEAP recipients and are not likely to align with current and future BSRP applicants. Also, WAP requires State certifications of all inspectors and installers whereas BSRP does not. WAP requires sub-grantees and their subcontractors pay their workers wages at the prevailing wage as per federal Davis Bacon wage determinations whereas BSRP does not. Finally, 51% of BSRP applicants have already received Weatherization making them ineligible to receive WAP again.

However, there are a number of inherent synergies between the programs. BSRP does not currently, but has in the past and can again, use identical income eligibility limits as WAP. BSRP's current repair guidelines require a whole-house inspection to support the idea of comprehensive services. There also is a preexisting level of coordination and cross discipline training of field staff at PHDC. PHDC WAP emphasizes roof cavity and blower door guided air sealing and insulation, dovetailing with BSRP measures, in particular with the program's normally expedient roof repairs. With the advent of ARRA funding, WAP will give a much higher priority to heater replacement—the single highest energy saving measure and one that

can also lower demand on BSRP for heater replacements. WAP “Health and Safety” guidelines allow for heating system replacement and water heater replacement when the system presents a health or safety risk, allowing for the installation new systems using WAP funding. Other ARRA enhancement to the program include:

- Increased from \$2,500.00 to an average of \$6,500 per home.
- A nearly 400% budget increase.
- WAP guidelines allow the kind of geographic targeting recommended in the pilot.
- New WAP measure selection protocols and higher budgets can, based on a recent Philadelphia Gas Works evaluation of virtually identical measures for its high users, can reduce energy cost by 60%.

A New Housing Preservation Model

This study shows how a more comprehensive housing preservation strategy can be crafted and implemented using the existing funding and program apparatuses. It will require both the use of both new approaches and time-tested practices used by PHDC in the administration of BSRP and WAP. But more than any change in the modes of service delivery, it recommends a change in the way of thinking about the nature of the services being provided.

The underlying emphasis of both BSRP and WAP is to produce safe, comfortable and housing for its occupants. More specifically, the programs’ services seek to create housing that is free of life safety concerns, with all major systems in sound operating conditions, with building enclosure and mechanical systems that perform to high energy efficiency standards, a home that is made less costly to operate and stabilized for the long-term.

With these pre-existing goals in mind, the priorities and measures of pilot program elements should include:

Priorities / Measures (underlined represent changes from the current program protocols)

① *Health & Safety*

- ☑ Eliminate collapsed and unlined masonry chimneys and all sources of depressurization that can backdraft flues and cause potentially deadly flue gas spilling.
- ☑ Correct all frayed, exposed and overload wiring
- ☑ Seal leaking roofs (and other sources of water infiltration); where possible use white foam strategies that both improve energy efficiency and provide long-term roof protection.
- ☑ Correct structural failures
- ☑ Install hard-wired smoke and CO detectors in all homes
- ☑ Improve indoor air quality, specifically address sources of mold such as condensation and water infiltration
- ☑ Reduce lead hazards per City Health guidelines
- ☑ Abate friable (dust producing) asbestos

② *Maximum Energy Efficiency*

(WAP requires the use of the National Energy Audit Tool (NEAT) performance metrics created by DOE to guide priority selection of measures)

- ☑ Bower-door guided air sealing plus “base measures”
- ☑ Roof cavity insulation and air sealing
- ☑ Replace inefficient heating systems and all unsafe, non-functioning heating and those using the natural chimney draft to exhaust flue gases
- ☑ Energy education and setback thermostat installation
- ☑ Electric “base load” measures (e.g. CFL bulbs, refrigerator replacements, etc.)

③ *Attention to Occupant Comfort*

- ☑ Reconnect disconnected ducts; seal all accessible ducts with mastic and mesh
- ☑ Insulate heating system distribution lines in crawlspaces and other accessible locations outside the thermal barrier
- ☑ Solve distribution imbalances/correct distribution temperature settings
- ☑ Use white reflective membranes for flat roof replacements and repairs; white elastomeric coating for low cost repair of salvageable roof membrane
- ☑ Identify sources of condensation due to thermal shorts and air leakage to help prevent moisture transport through the building enclosure
- ☑ Educate consumers to promote good ventilation, sound space temperature control, and methods of passive cooling and warming

④ *Preservation of Exterior Elements*

- ☑ Prepare, repair and painting (or capping) of exposed wood elements
- ☑ Point and/or stucco coat exposed and deteriorated exterior masonry elements
- ☑ Stabilize porch and kitchen sheds elements
- ☑ Stabilize fencing and exterior retaining walls

⑤ *Produce 20 -Year Capital Needs Metric*

- ☑ Use tools similar to those used by multi-family and commercial building owners to predict large capital expenses remaining and quantify the future value of repairs avoided by the investment.

Pilot Administration and Geographic Targeting

The suggested model for the pilot also employs several approaches for targeting and program administration that diverge from programs’ current mode of operation. Because the pilot is will focus on two neighborhoods, neither program’s existing intake can be used as is. To meet the requirements of DCED and the goals of the pilot, participating homeowners must be high users of energy who are enrolled in the Low-Income Home Energy Assistance Program (LIHEAP) while addressing 5,000 BSRP applicants who are currently awaiting service, the following protocol is recommended for the pilot’s customer intake:

- Create a “dual list” of applicants who are on both the DCED WAP list and on the BSRP waiting list.
- Overlay the “dual list” with the maps of those neighborhoods that demonstrate a high proportion of high users of energy and are located in Neighborhood Preservation Areas.
- Target blocks from those with peak density of high users of energy identified on the TRF maps and from the dual list.
- Check all pilot applicants for proof of ownership using BRT database.
- Identify current BSRP applicants who are also high users but cannot be found on the DCED list and seek to have them certified as LIHEAP (and therefore WAP) eligible.
- Screen the dual list for client eligibility for LIHEAP “Crisis” heating system replacements and for anyone identified as having participated in WAP previously (and therefore ineligible for new WAP)

Workflow:

DCED rules require that WAP certified auditors perform the WAP work write up and quality control inspection. BSRP will need to be trained and certified at a DCED approved training facility. The pilot will require hybrid inspection forms that satisfy the needs of both programs while allowing for the expanded scope that is contemplated for the pilot.

Per Home Budget:

The effective cost cap for the pilot will be \$24,700 (\$6,500 WAP, \$700 WAP repair and \$17,500 BSRP), however the goal should be to maintain an average of \$18,000 to promote the reasonableness for the future replication of the program.² We suggest that a rigid upper limit not be established in order to facilitate the block-centric investment strategy contemplated as part of the targeting aspect of the pilot.

Contracting

Contractors selected for the pilot should come from the same pool of contractors used for WAP and BSRP. The combined audit/whole house inspection will need to be compartmented to allow it to be broken down into several discrete work orders for specialty trade subcontractors. Given the extensive nature of the combined treatments and the geographic focus of the work, the use of general contractors would seem to make the most sense for the pilot.³ PHDC is expert at acting as GC on its work projects, offering flexibility in its contracting for the pilot.

² The \$18,000 target is based on the average for WAP of \$7,200 (\$6,500 plus \$700 in repairs), the current average for BSRP Tier 2 services of \$8,300, and an additional \$2,500 to account for the impact of health and safety items plus exterior preservation not currently covered by either program.

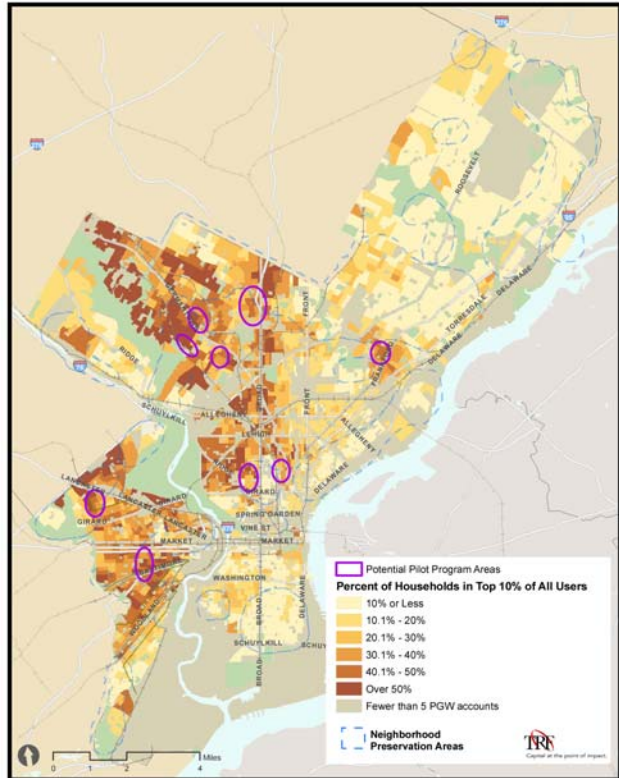
³ WAP requires both DCED certification of contractors and Prevailing wages be paid. WAP contractors used for BSRP work will need to have the facility of bi-furcating their wages if they do not already pay prevailing wages to their workers.

Pilot Neighborhood Selection

It is recommended that the pilot will serve two neighborhoods with between fifty to seventy-five households in each neighborhood.

The selection of two neighborhoods to implement an effort centered in preservation and energy efficiency should hinge on two factors: the energy burden (lowest income/highest energy use) of the homeowners *and* the economic and social “stressors” that lead to neighborhood destabilization. Geographic targeting should also consider trends, conditions and investments that may also have an impact upon the stability of the neighborhood.

To aid in the overlay of these neighborhood conditions with the energy burden experienced by the neighborhood’s residents, the project team engaged The Reinvestment Fund (TRF) to map the economic and social stress factors with high-energy use data provided by PGW covering the last 3 years. The seven areas that consistently surfaced through this process have been middle market neighborhoods that share boundaries with stronger markets. According to TRF, the points where these markets intersect represent targets where public investment can influence the market in a positive way. While the maps of seven potential pilot areas presented can aid the City in its final block selection, it is worth noting the final selection should seek to achieve a diversity of types and size of housing, market transitions (e.g. growing or declining), the degrees of inherent assets and social stressors.



TRF mapped the top 10% of residential energy users (therms/sq.ft.) and overlaid these data on a map with Neighborhood Preservation Areas. The inset map shows seven potential Pilot areas within the Neighborhood Preservation Areas, transitional middle market neighborhoods where public investment in housing, infrastructure, and supports service can make the difference between transitional up or transitional down.

Policy Implications

The efficacy of the recommended measures selection methodology is easily evaluated. The outcomes are all measurable as are their associated costs. Given that the nature of a pilot is to test the efficacy of an idea, a follow on evaluation minimally of these ideas would seem to be integral to the establishment of the pilot itself. However, the pilot’s use of alternative modalities of program administration, client intake, neighborhood targeting suggest that it may offer lessons for local housing policy beyond those provided by the impacts on household affordability, comfort and safety.

Introduction

Rising costs of energy and housing, stagnating low and moderate incomes and an increasing number of city residents living in poverty, help explain the high level of deferred maintenance in the stock of workforce, owner-occupied housing in Philadelphia. Nearly a third of all owners spend more than 30% of their gross income on housing costs.⁴ High operating costs and the advanced age of the housing (nearly 80% of owner-occupied properties are 40 years or older),⁵ put tens of thousands of homeowners and the social fabric of their neighborhoods in a vulnerable state. Recent housing surveys indicate that 43,000 owner-occupied households in the city have significant unmet repair needs, a third of those having severe needs that, if left uncorrected, they can lead to the ultimate abandonment of the home.⁶

Homes on the verge of abandonment affect more than the housing markets in the neighborhoods in which they are located;⁷ when buildings fail families may be placed in shelters and children in foster care, faulty electrical systems and space heaters cause deadly fires, children experience elevated blood leads from deteriorate finishes, and school attendance and performance are affected by uninhabitable conditions in the home. As the city continues to lose population, as the housing stock continues to age, as the percentage of city residents living in poverty continues to increase, the problem of nascent vacancy will surely worsen.

The City runs a number of housing preservation programs to address the problem of aging properties and their high cost of operation. Chief among these are the Basic Systems Repair Program (BSRP) and the Weatherization Assistance Program (WAP). In various forms, BSRP has been in operation for more than 30 years and has demonstrated effectiveness in preventing abandonment.⁸ It is the City's primary housing preservation instrument, accounting for nearly half of the total allocation for programs the City categorizes under the heading of "housing preservation."⁹

The BSRP experience has shown that it takes a relatively modest amount of funding to stabilize these properties. In fact, BSRP and WAP can repair and weatherize more than 15

⁴ *Empirical Results On The Barriers-To-Affordability Study*; Presentation to WCRP, Kevin Gillen and Ira Goldstein, Slide 39.

⁵ Green Works Philadelphia reports that 260,000 of 325,000 (over 80%) were built before 1940.

⁶ *Reclaiming Abandoned Pennsylvania II. From Liability to Viability: A Technical Resource Guide for Action*, Housing Alliance of Pennsylvania, (2005).

⁷ Researchers in Philadelphia found that "Houses within 150 feet of a vacant or abandoned property experienced a net loss of \$7,627 in value." Temple University Center for Public Policy and Eastern Pennsylvania Organizing Project, *Blight Free Philadelphia: A Public-Private Strategy to Create and Enhance Neighborhood Value*, (2001), 21. Hereafter cited as "Temple".

⁸ "Of 12,000 houses that received Basic Systems Repair Grants from 1995 to 2000, only 117 (less than 1%) were abandoned in 2000." Temple, iv

⁹ The combined budget for BSRP Tier 1, Tier 2, and Heater Hotline for 2008-09 is \$15,535,000 of a total Preservation budget of \$34,953. Support for all other "Home Improvement Programs" which include the above-mentioned programs plus Weatherization, SHARP Home Repair, UESF, and ECA equals \$19,226,000.

homes for the same money that is typically spent to produce a single unit of new affordable housing.¹⁰

These facts have recently gotten the attention of policy analysts studying the housing preservation challenges facing Philadelphia. A recent William Penn Foundation-funded Issue Brief on preservation begins with the following problem statement:

Philadelphia should invest in the preservation of occupied existing homes that are affordable to Philadelphia's working families....Home repair is a critical city neighborhood revitalization, private investment attraction and workforce housing strategyInvesting more public dollars and improving existing repair and code enforcement programs will help to ensure an adequate housing stock.¹¹

The data used to lay the foundation for the policy brief's recommendations show that the vast majority of the city's owner occupied housing stock is very old; a significant portion is "structurally inadequate," and many "homeowners can not afford to make needed repairs to their homes."

Referring specifically to BSRP data, the William Penn policy brief make the compelling point that "\$5,300 is the average cost to fix an occupied home ...25 or more existing occupied homes can be repaired and preserved through BSRP for the cost of building a single new row home."

The brief builds on other recent studies that show how many more low-income households can benefit from these vital programs with simple and achievable changes in the way in which the services are offered and delivered.¹² Finally, the brief identifies a present opportunity to take these disparately operated housing investments and programs and combine them in a way that produces a model for a genuine housing preservation program.

The present study is an outgrowth of that William Penn policy brief. In reconsidering the roles of BSRP and WAP, it makes plain that although BSRP and WAP are vital tools of the City to treat dire occupied housing problems, neither program, individually, constitutes a comprehensive housing preservation approach. The study intends to show that when these programs are considered as a coordinated and unified set of measures, they can yield the foundational structure for a comprehensive housing preservation strategy; a structure that can inform the future means to increase the supply of high quality affordable housing in a city that has such an abundant supply of affordable housing in poor condition

¹⁰ Assumes the average cost of a newly constructed unit is \$250,000, as compared to the average of BSRP Tier 2 cost of \$8,300 and the new WAP average of \$6,500

¹¹ William Penn Foundation Policy Brief, *Effectively Preserving Philadelphia's Workforce Housing Stock*, 2008.

¹² Jeffrey Allegretti, Court Daspit and Anthony Neri, *Expanding Capacity and Speeding Production*. Women's Community Revitalization Project, (2005).

A Review of BSRP and WAP

The following is a review of the current operations of BSRP and WAP. It is intended to illustrate the challenges and opportunities that exist to crafting an integrated repair and retrofit service within the context of programs' current frameworks. It is therefore only provided as necessary context for the pilot plan, and is not meant to provide an evaluative look at the programs' systems or effectiveness, as this is outside the purview of this report.

Program Description

BSRP

BSRP is funded by the City of Philadelphia using Community Development Block Grant funds from federal and state sources. It is operated by the Philadelphia Housing Development Corporation (PHDC) under contract with the City. Services provided in the homes of the programs' clients are performed by private contractors under contract to PHDC.¹³

The purpose of BSRP is to repair the major systems in the homes of low income homeowners, remedying building flaws that are often complex and even dangerous, free of charge.¹⁴ These services include the repair and replacement of structural, heating, electric and plumbing systems. Repairs and replacement of roofs are also provided in cases where major interior damage has occurred as a result of roof leaks. Items outside of the house, such as porches, sidewalks, trees, are not covered, nor are energy efficiency improvements as stand-alone measures.

Notwithstanding BSRP's status as the City's primary instrument in its program of housing preservation, the program is designed to operate more like an emergency repair service than a comprehensive housing preservation program, with its point of entry being a telephone "Hotline" and its first tier of service being a rapid response low cost repair service.¹⁵

BSRP Process / Workflow

The BSRP workflow is administered by PHDC. A review of this work sequence reveals a multi-step process (see *BSR Operational Flow Chart* on page 8) for client access and service delivery.

¹³ Each PHDC contractor responds to an RFP. Once approved, the contractors are given an 18-month contract for a specific dollar amount based on their financial capacity and the manpower they propose for the work. Assignment of jobs is based on who is busy or not, how much work they have left in their contract, or who might have the right temperament or personnel to deal with a particular job. Contractors wanting to sign on for another 18 months are reassessed as to their capacity and reliability and reassigned another contract. Most contractors in the program have worked for PHDC for many years.

¹⁴ PHDC reports that the "free of charge" Tier 1 will remain free, Tier 2 will add a deed restriction to properties in the amount of repairs, to be repaid when the property passes out of the hands of all household members, as defined on the application.

¹⁵ PHDC is clear to state that due to the perennial backlog of applicants that it never refers to PHDC as an "emergency" program.

Each case begins with a Telephone Hotline call (except in the case of internal referrals from WAP and other programs). Callers are deemed eligible for the program using an over-the-phone self-declaration of income, a check of the owner records from the Board of Revision of Taxes (BRT) database, and a determination that the callers repair request is consistent with the program guidelines. Once approved by the Hotline service representative, each case is then evaluated in the field by either a PHDC inspector or, in the case of roof repairs, by a PHDC roofing contractor. Depending on the amount of money needed to address the requested repair *and* all other major repair needs in the home identified by the inspector, cases determined to be eligible for the program are assigned to one of the programs tiers of service: Tier 1 being a low-cost rapid response services; or Tier 2 offering higher cost more comprehensive services.

Tier 1. Homes treated through Tier 1 can receive up to \$4,000 of work. Roofing repairs are treated differently than all others at the outset. Roof-only cases, when costing \$4,000 or less are rapidly assigned to PHDC roofing contractors for immediate inspection and, if possible, repair. These are the only BSRP cases referred to a contractor directly from a phone call and consequently are the most expedited cases in the system; according to PHDC staff, Tier 1 roof repairs typically take one month or less to complete.

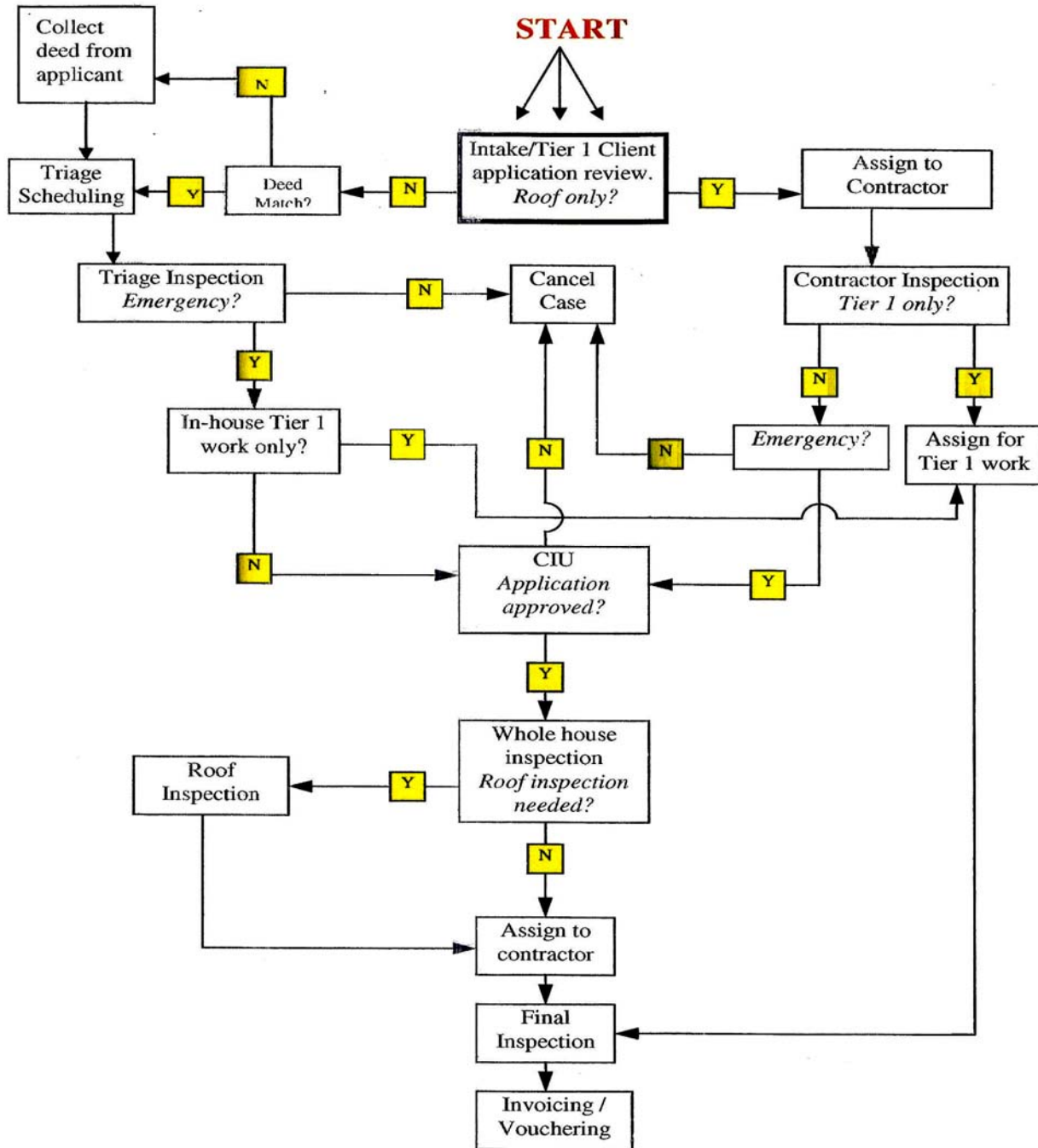
Low cost non-roofing cases are assigned for work at the Tier 1 stage only after a PHDC has determined that all housing needs in the home can be completed within the \$4,000 cost limits. When the inspector determines that the cost is under \$4,000, the case is assigned to a contractor for repairs. Once assigned to contractor for Tier repairs, rapid response is typical. However, because the demand for such repairs far outstrips the capacity of the PHDC inspection staff to perform such inspections, the elapsed time between a Hotline call and an assignment to a Tier 1 contractor for non-roofing cases is, according to PHDC, longer than one year. Even then, for the vast majority of cases, the inspector's review precludes services at the Tier 1 level due to cost, and the client must be referred for service under the program's second tier.

Tier 2. Tier 2 addresses repairs costing between \$4,001 and \$17,500.¹⁶ Where Tier 1 cases can be completed on the basis of the owner's self-declared income, the higher cost limits for Tier 2 cases require that a PHDC financial specialist interviews the applicant to confirm his/her income eligibility using a more carefully documented process. According to PHDC staff, the process requirements for service under Tier 2 of BSRP account for a 2 to 2 ½ year wait for applicants.

As shown on the PHDC process map on the following page, there are multiple pathways to BSRP services, some rapid and direct, others much more time consuming for both applicants and staff. At the Tier 1 level the workflow is streamlined and fairly simple, especially for roof-only cases. At the Tier 2 level, the workflow becomes much more involved.¹⁷ Although the process is set up to identify all applicants who can be served through the Tier 1 process to avoid the more onerous and lengthy intake and building evaluation processes that go along with the Tier 2 services, little more than 20% of all BSRP cases are served at the Tier 1 level.

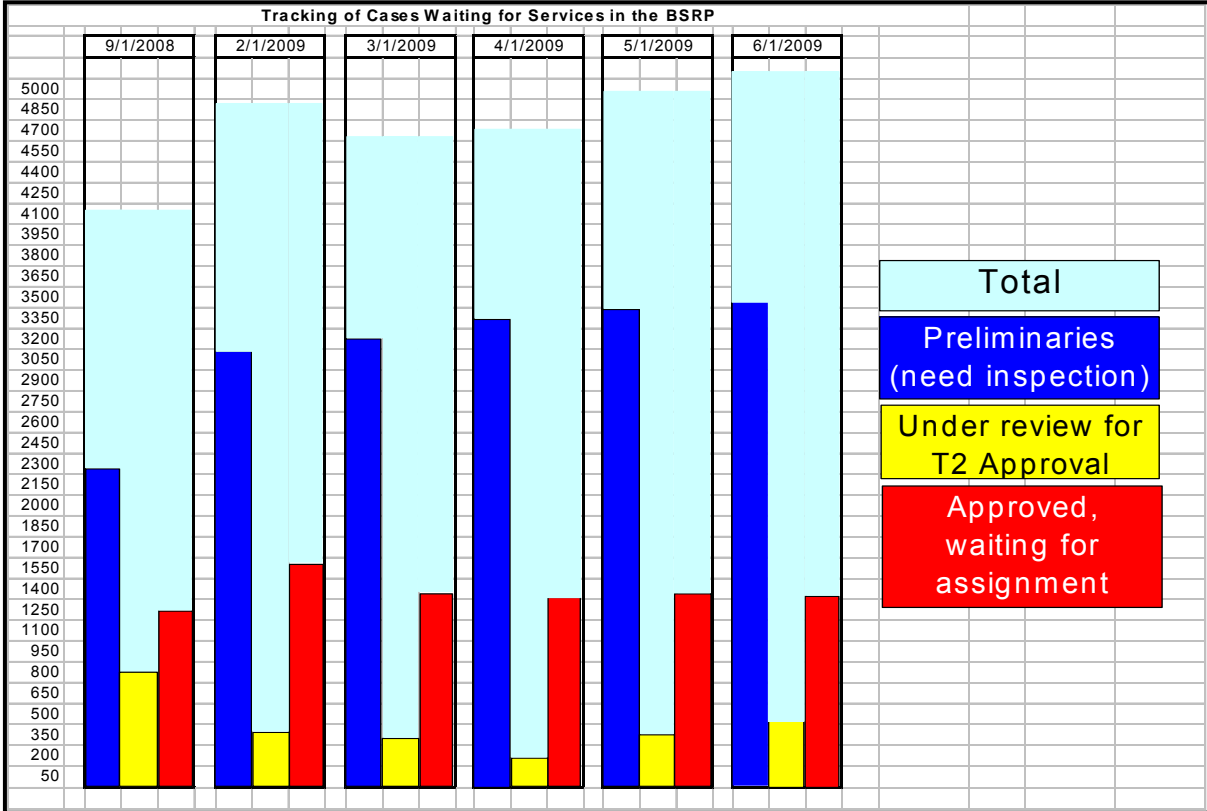
¹⁶ Homes requiring more than \$17,500 to become safe and functional are not eligible to be treated under the program.

BSR Operational Flow Chart



As illustrated below, the vast majority of the backlog of cases occurs within the process preceding the Tier 2 intake process, at the Tier 1 review stage through to Tier 2 intake.

The following graph, provided by PHDC, illustrates the current backlog in BSRP:



PHDC staff readily acknowledge that the process can be made more efficient, but it is clear that the fundamental cause of this wait is the enormous oversubscription of the program due to insufficient funding to meet the demand. The oversubscription problem is exacerbated by the weight of new referrals from other programs like WAP, utility conservation programs, the Heater Hotline, and the City’s Water Department HELP program.

BSRP Production Trends

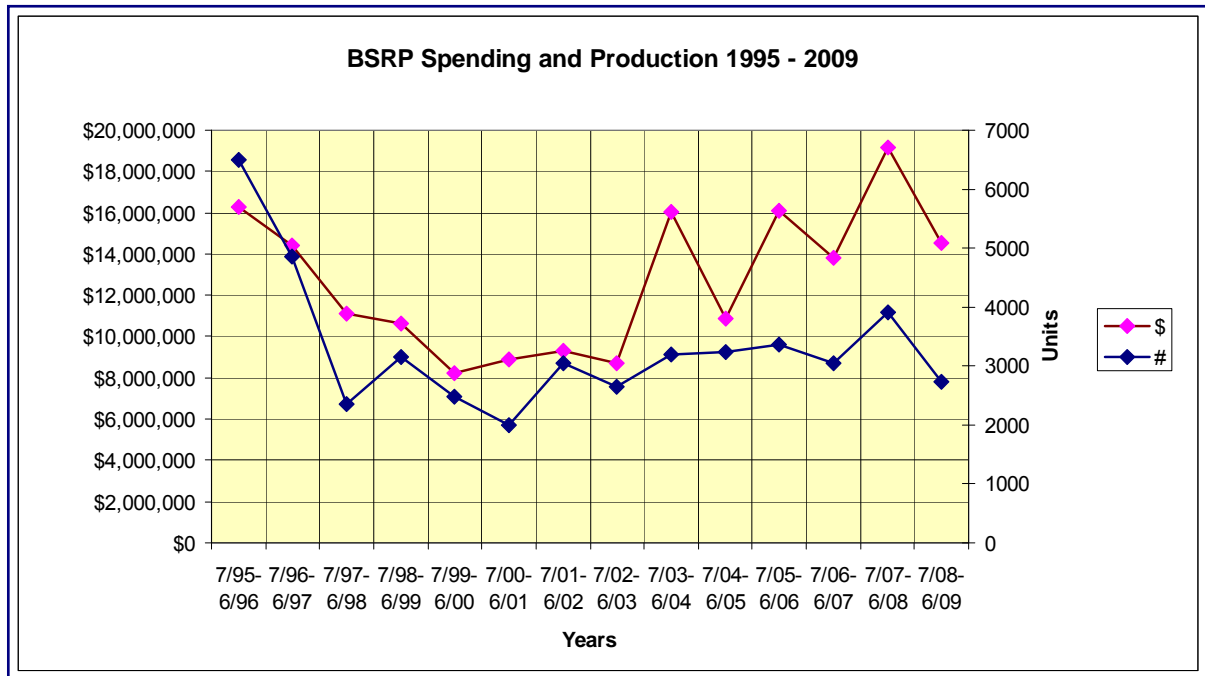
A review of the BSRP funding during the last 13 years shows that funding has rarely kept pace with the demand for the program’s services nor has it allowed the program to meet the rapid response demanded by clients with genuine home emergencies. The scale of the need coupled with a mismatched level of funding has resulted in severe and persistent oversubscription. It is worth pointing that during several of those years when the funding was dramatically increased, the program showed a roughly proportional increase in its production, reinforcing the evidence that the program’s oversubscription has less to do with staff capacity and administrative efficiency than it does with money.

The chart below demonstrates how when PHDC receives major spikes in funding, as it did in 2003, 2005 and 2007, it responds with substantial increases in production.

Basic Systems Repair Program Funding and Production

YEAR	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	7/08-4/09	Total
FUNDING (in millions \$)	\$16.28	\$14.43	\$11.10	\$10.62	\$8.25	\$8.88	\$9.32	\$9.80	\$15.06	\$10.88	\$16.12	\$13.79	\$19.14	\$14.51	\$130.74
Tier 1 (units)	3910	2465	1165	1607	930	742	1106	713	671	930	810	761	751	586	17,147
Tier 2 (units)	2527	2332	1142	1471	1510	1225	1927	1924	2533	2298	2553	2291	3155	2139	29,027
Tier 3 (units)	66	61	55	75	47	32	25	22	N/A	N/A	N/A	N/A	N/A	N/A	383
Total Units	6503	4858	2362	3153	2487	1999	3058	2659	3204	3228	3363	3050	3906	2725*	46,557

Still, it must be noted that, historically, BSRP’s production has not been purely a function of its funding. As the chart below illustrates, there were years when production was nearly double that of other years with essentially the same funding.¹⁸



The primary reason for this was a policy shift that changed the program’s emphasis from being a rapid responder for home emergencies to a program that focuses on “whole house” needs. This policy change to spend more per home in order to achieve a deeper benefit for the homeowner, inevitably results in a program that makes fewer low-cost minor repairs, and therefore makes fewer repairs overall. Coupled with the change in focus to “whole house” treatments, the program appropriately raised the per-house spending limits, from a maximum of \$5,500 in 1995 to its current level of \$17,500. The result is that the average cost per unit has gone from \$2,503 in 1995 to \$4,898 in 2008. The effect on overall production notwithstanding, this policy shift comports well with the aims of this study: it seeks to offer a more comprehensive housing preservation service.

¹⁸ In 1995-96 BSRP produced 6,503 units spending \$16.28 million; ten years later in 2005-06 the program produced 3,363 units spending \$16.11 million.

WAP

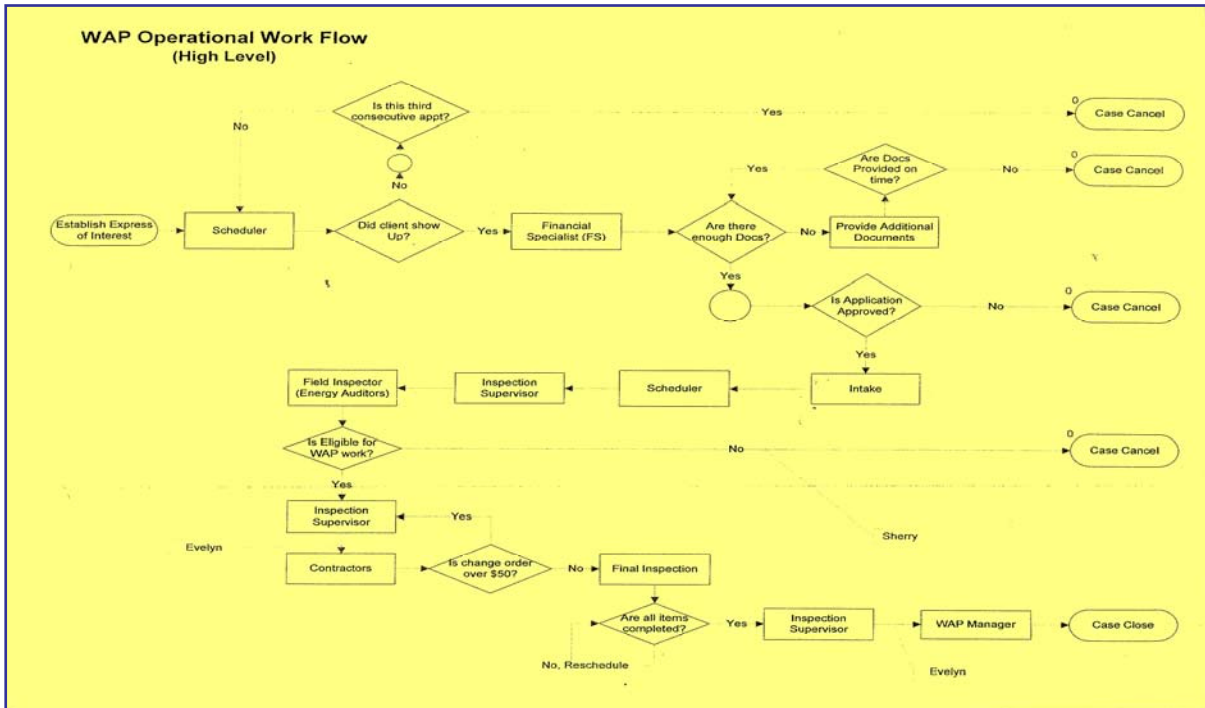
WAP is funded by the Pennsylvania Department of Community Economic Development (DCED) from federal sources. PHDC, under contract with the DCED, operates WAP using its in-house energy auditors (Energy Efficiency Specialists) to develop the work scopes, and WAP trained and certified private subcontractors to perform the work in the homes of low-income homeowners and renters.

The purpose of WAP is to increase the energy efficiency of the home's building enclosure and its heating systems in order to reduce the cost of heating and cooling, and to mitigate health and safety issues in the home. The program gives priority to applicants who are most vulnerable, particularly the elderly and the disabled, families with children, high residential energy users and households with "high-energy burden" (i.e. a high ratio of energy cost to income).

WAP Process / Workflow

Like BSRP, the WAP work sequence is a multi-step process. However, it differs from BSRP in several key ways:

- WAP is not structured in tiers. WAP applies its full scope of services as a package to each eligible household.
- A triage inspection is not need prior to intake and approval of a case.
- Secondary sources of documentation for income eligibility are allowed (i.e. a client's presence on the LIHEAP list suffices for income eligibility determination).
- Under last year's program rules, the time required from a client's initial request for service to the completion of the work is, according to PHDC, between 63 to 162 days.



As the PHDC process map above illustrates, the WAP intake process does have a number of discreet steps, each designed to test the eligibility of the household and home for the service.

Even so, the WAP process is faster and simpler than BSRP's, due primarily to WAP's historically smaller volume of cases and the lower demand for the program's services. An important part of the explanation for this simpler process and shorter timeframe is that WAP is allowed to apply simpler documentation tests for eligibility than is BSRP; methods that are worthy of examination for replication by BSRP.¹⁹

WAP's lower level of service comes at price, however: WAP services are often precluded by home repair needs which WAP is statutorily prohibited from handling. For example, PHDC program managers say that about 30% of all WAP homes require a roof repair – a cost not allowed under the WAP guidelines –and those cases become “in-house referrals” to BSRP, adding significantly to BSRP's oversubscription problem. Further, the City's other WAP sub-grantee, the Energy Coordinating Agency (ECA), also makes referrals to PHDC for both its WAP customers and its utility conservation program customers, adding still more to BSRP's subscriptions.

Furthermore, as with roof repairs, WAP consumers with unsafe or non-functioning heating systems were, until the recent ARRA changes in WAP rules, internally referred to City's heater repair hotline, operated by the ECA. Ironically, if ECA could not achieve a repair, it would in turn refer the case back to BSRP (or to a separate program, LIHEAP Crisis) for replacement – a service not allowed under the heater repair hotline rules – creating a circular and time-consuming process for homeowners in need, *and* adding still more BSRP subscriptions.²⁰

WAP Production Trends ...the advent of ARRA

The demand for WAP production has remained relatively steady over the past decade, although there was a doubling of production in 2008. With the advent of the the American Recovery and Reinvestment Act (ARRA) in the fall of 2009, funding for WAP has increased this year by more than four times its traditional level of funding and is expected to remain at those levels for at least three years.²¹

Prior to the increase in per home expenditures allowed by the recent changes in the American Recovery and Reinvestment Act (ARRA) funding for WAP, the program's \$2,500 cost cap forced WAP auditors to focus on retrofits to the building enclosure (e.g. caulking, weather stripping, door sweeps, roof cavity insulation, window repairs and blower door guided air

¹⁹ PHDC says it would welcome this simple documentation for BSRP but believes that HUD would object.

²⁰ It should be noted that although this policy is about to change, the heating systems installed as result of WAP referrals are conventional atmospheric boilers and furnaces exhausted through a chimney (80% efficient heaters). No 95% direct vent heaters are currently being installed. The reason given is that it is unsafe to abandon the water heater as the lone appliance venting up the large sized chimney, and there has not been sufficient WAP money to install a new horizontally vented water heater so that the chimney can be abandoned.. PA WAP protocols may soon acknowledge this quandary and allow the water heater to be replaced along with a condensing furnace/boiler on “health and safety” grounds.

²¹ ARRA Funding Allocation Plan: Base allocation for Philadelphia is \$3,308,906; extrapolated full funding under ARRA is \$33,089,060, with at least 50% of this allocation to be spent by September 30, 2010; 80% by the end of FY2010-11; remainder by March 31, 2011.

sealing), ignoring the richer savings potential of heating systems retrofits. Traditionally, PHDC's Weatherization program provided a greater emphasis on the home repair features of WAP, such as window and door replacements.²²

Because ARRA funding now allows WAP to spend up to an average of \$6,500 per home, its energy audit protocols allows for heating system replacements when justified by a cost-benefit analysis – inarguably the single retrofit capable of producing the greatest energy savings. The ability of WAP to focus on heating system replacements suggests, at first blush, that the program may provide some much needed relief on BSRP for these repairs, however it must be noted that WAP precludes the treatment of homes previously treated by WAP.²³ PHDC estimates that 51% of all current BSRP applicants are former WAP recipients. This has serious implications not only for the level of relief the more robust WAP budget will provide for BSRP, it also provides a serious impediment to the development of the pilot program requiring a fuller integration of these two programs.²⁴

ARRA funding has also produced significant changes in both the outreach and intake processes and in the scope of allowable measures. PHDC must now use a list of “high-users” provided to it by DCED as its primary means of client selection, in keeping with the program's restated goals to serve those with the greatest need. While this method reduces PHDC's ability to self-generate its own client pool (and to refer BSRP cases to WAP), it does have the advantage of simplifying further the intake processes, as now only the combination of the DCED list and the LIHEAP list are needed as evidence of client eligibility, obviating a number of steps illustrated in the process map above.

BSRP/WAP Integration - Challenges and Opportunities

To discern how a systematic coordination of BSRP and WAP can be achieved, it is necessary to examine the challenges and the opportunities for integration inherent in the current methods of organization.²⁵ That is, we must first delineate those elements of the programs' respective administrative methods and their allowable work scopes²⁶ that appear to align well with each other as well as those that are mutually at odds.

Summary of Challenges to Program Integration

The central challenge to crafting a comprehensive housing preservation strategy from the current program models for BSRP and WAP is their currently separated administrative structures, staffing and program rules. Additional challenges include:

- BSRP's perennial oversubscription
- BSRP's documentation requirements for client intake
- BSRP's city-wide, first-come first-serve intake approach

²² Window and door replacements have been deemphasized under the current DCED guidelines.

²³ All homes treated after 1993 are excluded from the program, except in the case of homes receiving LIHEAP Crisis heater repairs.

²⁴ The fact that half of all BSRP applicants are also WAP beneficiaries is a testament to PHDC's success in creating a de-facto integration of the two programs.

²⁵ See Appendix B for a listing of challenges and opportunities to integration with recommendations.

²⁶ See Appendix A for a side-by-side comparison of allowable measures in BSRP and WAP.

- BSRP’s rules that preclude conservation measures such as roof cavity insulation and ceiling replacements in conjunction with roof repair
- WAP’s rules that typically preclude home repairs integral to a comprehensive service that BSRP does not offer such as the installation of ceilings, windows and doors.
- WAP’s requirement that PHDC must use the DCED list with the highest energy users who are also LIHEAP recipients, that may not align with current and future BSRP applicants.
- WAP serves renters as well as homeowners, BSRP serves only homeowners.
- WAP’s requirement for State certifications of all inspectors and installers (BSRP does not)
- WAP’s requirement that sub-grantees and their subcontractors pay their workers wages at the prevailing wage as per federal Davis Bacon wage determinations (BSRP does not).
- WAP’s production goals that are a fraction of what BSRP traditionally achieves
- 51% of BSRP applicants have already received Weatherization making them ineligible to receive WAP again.²⁷

Summary of WAP-BSRP Synergies

Although these challenges are formidable, there are also a number of elements of the design and administration of BSRP and WAP that offer synergistic opportunities to create a comprehensive approach to housing preservation. These include:

- Until recent changes due to ARRA funding, BSRP used identical income eligibility limits as WAP– the LIHEAP guidelines. BSRP eligibility can be changed by the City.
- BSRP’s current repair guidelines require a whole-house inspection to support the idea of comprehensive services.
- There is a preexisting level of coordination and cross discipline training of field staff at PHDC; intake staff are already integrated.
- BSRP has historically been able to increase its production whenever funding has increased, suggesting that the program administration is capable of increasing production without a significant retooling of its delivery systems.
- PHDC has increased emphasis in WAP for roof cavity and blower door guided air sealing and insulation, dovetailing nicely with BSRP measures, in particular with the program’s normally expedient roof repairs.
- WAP energy audit protocols give greater emphasis to heating system replacement. With the advent of ARRA funding, WAP will give a much higher priority to heater replacement–the single highest energy saving measure (and one that can also lower demand on BSRP for heater replacements).
- WAP “Health and Safety” guidelines allow for heating system replacement and water heater replacement when the system presents a health or safety risk, such as collapsed

²⁷ Except as LIHEAP “Crisis” heating system replacements administered by WAP

chimneys and cracked heat exchangers, opening the way for new systems using WAP funding.

- WAP allowances for per home spending have been increased from \$2,500.00 to an average of \$6,500 per home, with no per home upper limit so long as the average is maintained program wide.
- WAP allows for \$700 per home for “weatherization related repairs” that need not be justified by energy savings (e.g. roof repairs or electric circuits in insulation cavities) and do not count toward the \$6,500 average.
- PHDC WAP’s four-fold budget increases production goals to more closely aligned with BSRP production.
- WAP guidelines allow sub grantees to select program participants using geographic targeting in addition to the DCED high energy users list.

Beyond these inherent program characteristics, there are also examples of efficiencies and flexibility in WAP that deserve exploration for replication in BSRP.

- WAP is not structured in tiers and does not require a triage inspection before work is assigned (i.e. inspections follow rather than precede an applicant’s approval).
- WAP can rely on LIHEAP eligibility documentation – a secondary source of information that is readily available electronically to document proof of income.
- WAP allows for automatic eligibility for LIHEAP recipients – any client on the prior year’s LIHEAP list need not provide new income documentation, speeding the entry to service.

The Compelling Case for Integration

WAP has not been recently evaluated to measure its effectiveness, however the Philadelphia Gas Works (PGW) runs the Conservation Works Program (CWP) that employs the same interventions as WAP. CWP is annually evaluated to measure savings and cost effectiveness. The table below is taken from the most recent CWP evaluation and shows projected energy savings per type of intervention for items covered under the CWP (and its pilot program that included heating system replacements). These CWP measures virtually mirror those called for by WAP as modified by ARRA funding.

Cost Savings Metric - Expected Savings (in ccf of gas and \$ of income) for Integrated Weatherization Measures

	CCF/yr	Cost, \$/yr	Cost, \$/month
<i>Pre-measure usage</i>	1540	\$3,311.00	\$275.92
Measure	Savings, CCF/yr	Savings, \$/yr	Savings, \$/month
Roof insulation	122	\$262.30	\$21.86
Blower door-guided air sealing	30	\$64.50	\$5.38
Core weatherization treatments	51	\$109.65	\$9.14
<i>SUBTOTAL</i>	203	\$436.45	\$36.37
Add:			
Setback Thermostats	141	\$303.15	\$25.26
Condensing heating system	584	\$1,255.60	\$104.63
TOTAL	928	\$1,995.20	\$166.27

The energy savings achieved by the full range of CWP (above disaggregated into the component measures) reveals how a comprehensive program that includes building enclosure measures as well as heating system replacements can dramatically lower energy costs for low income customers.²⁸ The combination of all CWP resulted in nearly a 60% savings at a cost of less than \$5,000, well within the current WAP budget.²⁹ ***Although these savings can be achieved by WAP alone, as we have seen, the fallout of WAP cases due to roofs and heating systems is very large, and is ever growing for all Weatherization providers in Philadelphia. In this light, 60% savings will be an empty promise for nearly half of all WAP applicants without the ability to simultaneously access BSRP services.***

Pilot Program Description

The pilot will incorporate the goals of the WAP to lower energy costs and consumption and of BSRP to repair dangerous and complex problems with the home's major systems. It will also seek to highlight the broader preservation goals that are inherent in the individual scopes of services – and amplified by their integration – but are not specifically articulated in the programs' missions.

Purpose and Priorities

The purpose of the pilot is to address issues of health and safety, produce a substantial increase in energy efficiency and reduce long-term maintenance and capital needs of the homes to support a preservation approach that is sustainable. A secondary goal is to craft a replicable method of integrated service delivery that takes into account the historical methods of operation, production capacity, and opportunities provided by recent changes in federal funding.

The vision at the center of the recommended scope underscores that preexisting goals of the programs: that the homes treated in the pilot will achieve HUD housing quality standards, be energy efficient, provide for occupant comfort, be safe and healthy, and offer long term occupancy with minimal risk of a major replacement of major systems. In this context, the priorities for the pilot services can be ordered as follows:

- Priority 1: Assure occupant health and safety
- Priority 2: Maximize energy efficiency
- Priority 3: Attend to occupant comfort
- Priority 4: Preserve exterior elements
- Priority 5: Minimize the need for long-term capital investments in major systems

²⁸ *Impact Evaluation of Philadelphia Gas Works' Conservation Works Program Calendar Year 2006 and Comprehensive Treatment Pilot, Draft Final Report*, M. Blasnik & Associates, June, 2008

²⁹ It is important to note that CWP contractors report that about 30% of all customers fall out of the program due to home repair needs, corroborating the PHDC estimate and supporting the rationale for integration of home repair with weatherization.

Workflow and Measures Integration

Scope of services

Priority 1: Health and Safety

The overarching goal of any home repair or affordable housing redevelopment project is the health and safety of the occupants. Therefore, the Pilot will set at its first priority measures those items that address occupants' health and safety, including the following:

1. Collapsed and unlined masonry chimneys/back spilling flues
2. Frayed, exposed and overload wiring
3. Leaking roofs and other sources of water infiltration
4. Structural failures
5. Failed heating systems and water heaters
6. Interior plumbing, main drains and water service failures
7. Smoke and CO detectors
8. Indoor air quality improvements such as the elimination of mold producing problems (condensation and water infiltration),³⁰ proper ventilation to both provide sufficient fresh air for occupancy and eliminate depressurization that can cause flue gas back spilling
9. Friable asbestos and lead dust contamination abatement.

BSRP currently addresses as its core mission items 1 through 6, it addresses item 7, but only in the context of house rewiring project. Its core services do not address items 8 or 9.

WAP "Healthy and Safety" guidelines now allow for replacement of heating systems when these represent a health or safety risk. The Pilot will target the use of WAP funds for "health and safety" to heater/water heater replacement; chimney abandonment work and stretch BSRP funds for other basic systems work. Although WAP requires lead training for its field staff, it does not include lead abatement or stabilization as an allowable measure.³¹ Similarly, WAP specifically lists the suspicion of the presence of friable asbestos as a condition under which blower door guided air sealing work cannot proceed. For the purposes of the pilot, we recommend that asbestos abatement be considered as part of the Pilot protocol, added to the BSRP allowable costs, within some reasonable cost range, when such abatement is required to perform a BSRP or WAP related measure (such as heating system replacements).³²

³⁰ Although both WAP and BSRP address the root causes of bugs, rot and mold, neither addresses these health matters as issues to be addressed independently.

³¹ Efforts are now underway to link WAP treatments with lead poisoning concerns, with the ultimate goal of integration lead safety with core WAP services.

³² The most common source of friable asbestos in a home is insulation of heating pipes and ducts. Such limited presence can often be very affordably abated.

It is important to emphasize that such recommendations should not be seen as precedent-setting or outside the norm for such programs. In fact, the Building Performance Institute (BPI) protocols for performing an Energy Audit, which Pennsylvania is using as the standard for training and certification standard for WAP Energy Auditors, require that the WAP energy auditor determine if there are indoor air quality risks. BPI trained auditors are to assess with test instruments the presence of carbon monoxide, or if any combustion appliance is back-spilling flue gases into the home. The issue is so important to the WAP protocol that the auditor is required to check the chimney draft while operating depressurizing devices (exhaust fans, dryers, etc.) to establish “worst case” scenarios. BPI also requires auditors to check for the presence of Volatile Organic Compound containing materials in the occupied space. In short, WAP has elevated health and safety to the highest level for its field auditors and *the priorities listed above are consistent with the joint health and safety priorities of both WAP and BSRP.*

Priority 2: Maximize energy savings

WAP guidelines require that an energy audit be conducted using the performance metrics devised by the Department of Energy (DOE) National Energy Audit Tool (NEAT) protocols, and these guidelines serve well as the model for choosing pilot measures. Generally speaking, WAP protocols give priority, in the following order, to the following measures:

1. Blower door guided air sealing plus “base measures” such as weather-stripping windows and doors, and insulating the jackets for in place water heaters. Replacement of missing wall finishes at the building enclosure (exterior surfaces) such as drywall installation where ceiling and walls have collapsed due to water infiltration is also included in the air sealing priority. Likewise, the replacement of missing or irreparable windows and doors is included in these highest priority measures.
2. Roof cavity insulation and air sealing, where little or no insulation currently exists.
3. Energy education and set-back thermostat installation
4. Replacement of inefficient heating systems. In practice, this applies to all atmospherically aspirated heating systems (those using the natural draft of chimney to exhaust flue gases) plus all unsafe and non-functioning/irreparable systems.
5. Electric “Base load” Measures, such as replacing incandescent bulbs with compact fluorescent bulbs and replacing refrigerators that are known (by serial number or testing) to be inefficient.

As we have seen, the combination of all of those measures yield substantial energy savings, the largest being derived from the replacement of the heater. The heating system replacement has the added advantage of removing from the list of future major home improvements one of the homes most costly capital improvements. Here again, *all measures contained within this priority listing are included in one or both programs, here entirely within WAP.*

Priority 3: Comfort

Due to their respective focus on energy efficiency and emergency repairs, neither WAP nor BSRP explicitly include measures addressing occupant comfort. For example, both BSRP and WAP allow for heating system replacements, but neither correct poor heat distribution as an isolated matter. Likewise, both programs allow for roof repairs (albeit for WAP, at the typically inadequate level of \$700) but neither addresses the “hot-box” effect caused by the use of traditional black roof membranes on masonry row homes.

Because these comfort issues (and others) are directly linked to the systems that both WAP and BSRP address, it is recommended that, for the Pilot, they be considered as items distinct from their root causes (e.g. distribution flaws and black roof radiant absorption). Therefore, the Pilot will set as a priority measures addressing occupant comfort, including the following:

1. Reconnect disconnected ducts; seal all accessible ducts with mastic and mesh.
2. Insulate heating system distribution lines in crawlspaces and other accessible locations outside the thermal barrier.
3. Solve distribution imbalances/correct distribution temperature settings.
4. Use white reflective membranes for flat roof replacements and repairs; use white elastomeric coating for low cost repair of salvageable roof membrane.
5. Identify sources of condensation due to thermal shorts and air leakage to help prevent moisture transport through the building enclosure. Use education to promote good ventilation, sound space temperature control, and methods of passive cooling and warming.

WAP currently allows for all of the above examples of occupant comfort repairs, and BSRP currently performs item #1 in connection with its heating systems replacement work. *All of the measures listed as comfort priority items are allowable by the combination of WAP and BSRP.*

Priority 4: Preserve Exterior Elements

Neither BSRP nor WAP allow for repairs to the exterior elements of the building other than the roof, windows and doors. Often exterior deterioration leads to interior failures, but even when it does not, deferring maintenance of the exterior is bound to have a long-term effect on the soundness of the structure and the stability of the block. Therefore, the pilot will set at a priority measures that address exterior preservation, including the following:

1. Preparation, repair and painting (or capping) of exposed wood elements.
2. Pointing and or stucco coating of exposed and deteriorated exterior masonry elements.
3. Stabilization of bay overhangs and bay cladding.
4. Stabilization of porch and kitchen sheds elements.
5. Stabilization of fencing and exterior retaining walls.

The pilot will need to seek a rule change for BSRP to allow for these items to be done within the budget limits of the program in conjunction with the full range of comprehensive measures. Alternately, the pilot could seek additional outside funding for this purpose.

Priority 5: Establish a 20-year capital needs metric

Owners of large multi-family and commercial buildings establish a plan for their capital expenditures that typically looks out 20 years.

While such planning is not normal for the individual homeowner, the underlying goal of preservation and the research aspect of this project recommend that such a process be considered for the pilot participants. Not only will it help to predict and quantify the large capital expenditures that remain, it will quantify the future value of repairs avoided by the investment.

Item Description	Expected Life	Age	Remain Life	Preserv. Investmt	YEAR									
					1 2010	2 2011	3 2012	4 2013	5 2014	6 2015	7 2016	8 2017	9 2018	10 2019
SITE														
Sanitary System	50	45	5	\$0	\$0	\$0	\$0	\$0	\$0	\$3,188	\$0	\$0	\$0	\$0
Storm System	50	45	5	\$0	\$0	\$0	\$0	\$0	\$0	\$3,188	\$0	\$0	\$0	\$0
Concrete Curbs	35	22	13	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Concrete Walks - Replacement	30	22	8	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,040	\$0
MASONRY														
Brick Pointing	40	30	10	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
METALS														
Fences and Railings	30	24	6	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,582	\$0	\$0	\$0
CARPENTRY														
Kitchen cabinetry/ countertops	20	12	8	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,547	\$0
THERMAL/MOISTURE PROTECTION														
Exterior Cornice and Soffit	30	25	5	\$0	\$0	\$0	\$0	\$0	\$0	\$742	\$0	\$0	\$0	\$0
Attic Insulation	50	0	50	\$2,500	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Roofing	20	0	20	\$3,750	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Gutters and downspouts	25	15	10	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DOORS and WINDOWS														
Windows	20	0	20	\$7,665	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Exterior Unit Entry Doors	50	0	50	\$1,500	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Interior Unit Entry Doors	40	20	20	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
FINISHES														
Unit Carpeting	10	8	2	\$0	\$0	\$0	\$3,649	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Ceramic Tile (Kitchen and Bath)	15	12	3	\$0	\$0	\$0	\$0	\$2,754	\$0	\$0	\$0	\$0	\$0	\$0
Painting Exterior	10	7	3	\$0	\$0	\$0	\$0	\$2,459	\$0	\$0	\$0	\$0	\$0	\$0
Siding	30	15	15	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
SPECIALTIES														
Bathroom vanities	15	6	9	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$652
EQUIPMENT														
Range	15	7	8	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$633	\$0
Refrigerator	15	9	6	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$955	\$0	\$0	\$0
MECHANICAL														
Toilet	15	4	11	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Underfloor Plumbing	20	0	20	\$950	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Kitchen sinks	15	8	7	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$492	\$0	\$0
Bath lavs	15	8	7	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$492	\$0	\$0
Water Heater	10	0	10	\$1,350	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
HVAC	15	0	15	\$6,250	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
ELECTRICAL														
Rewire house/new service and panel	30	0	30	\$4,500	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
New Lighting	20	0	20	incl	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Smoke detectors - interconnected	20	0	20	incl	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL PRESERVATION INVESTMENT				\$23,965										
DATE OCCUPIED: 2009 M (PROJECTED VALUE):					\$0	\$0	\$3,649	\$5,212	\$0	\$7,118	\$4,537	\$984	\$7,221	\$652
# OF UNITS: 1 SUM (PRESENT VALUE):					\$0	\$0	\$3,340	\$4,631	\$0	\$5,961	\$3,689	\$777	\$5,534	\$485
BEGINNING YEAR FOR 20 YEAR PROJECTION: 2009 AL RFR CONTRIBUTION:					\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
INVESTMENT RATE OF RETURN: 3.0% I PLUS CONTRIBUTIONS					\$0	\$0	\$0	(3,649)	(8,862)	(8,862)	(15,980)	(20,517)	(21,501)	(28,722)
INFLATION RATE 3.0% H 3% RATE OF RETURN:					\$0	\$0	\$0	(3,649)	(8,862)	(8,862)	(15,980)	(20,517)	(21,501)	(28,722)
FUTURE CAPITAL INVESTMENT NEEDED - MAJOR SYSTEMS					\$0	\$0	(\$3,649)	(8,862)	(8,862)	(15,980)	(20,517)	(21,501)	(28,722)	(29,374)

The example above is a truncated version of the full sample provided in Appendix E.

Although this priority does not have an impact on the allowable measures for WAP and BSRP, it does require that the home inspectors working in the pilot develop the work scopes that consider the goal of long term maintainability. This could mean, for example, that a non-leaky roof that is at or near the end of its useful life is replaced – a decision not permitted currently by either WAP or BSRP, to avoid the need to return to the home after the preservation investment has been made.

The Pilot Operational Structure

The operational structure of the pilot incorporates elements of the WAP and BSRP programs that dovetail well with the goals of an integrated, more simplified approach.

Pilot Participant Outreach and Intake.

The means of application for the pilot must necessarily fall outside of the exact methods now employed by both programs. Because the pilot is intended to focus on two neighborhoods, neither the citywide, first-come-first-serve approach of BSRP nor the list-dependent approach of WAP will allow for the careful selection of a small group of contiguous (or nearly so) homeowners. It is nonetheless essential that all statutory requirements for the use of the funds are met, which means that the pilot must apply the same eligibility requirements used by DCED to determine the eligibility of all pilot participants (i.e. 50 households per neighborhood).

To meet the requirements of DCED and the goals of the pilot, participating homeowners must be high users of energy who are enrolled in the Low-Income Home Energy Assistance Program (LIHEAP). On the BSRP side of the equation, although the City has flexibility in establishing intake methods that conform with WAP's, there is the inescapably policy matter of how to address the 5,000 applicants who are currently awaiting service.³³ In considering these issues, we recommend the following protocol for the pilot's customer intake:

- Create a “dual list” of applicants who are on both the DCED WAP list and on the BSRP waiting list.
- Overlay the “dual list” with the maps of those neighborhoods that demonstrate a high proportion of high users of energy and are located in Neighborhood Preservation Areas identified by TRF (see “Neighborhood Selection” description below).
- Target blocks from those with peak density of high users of energy identified on the TRF maps and from the dual list.³⁴
- All pilot applicants must be checked for proof that they are the owner of record of their homes. A check of BRT records will suffice when there is a match between the applicant and the BRT record. Where there is a discrepancy, other documentary proof will need to be provided by the applicant.

³³ WAP income guidelines were raised to allow for the expenditure of the ARRA funds, and pending guidance by DCED may be set for Philadelphia above the current WAP-BSRP limits of 150% of the Federal Poverty level. BSRP income guidelines are governed by HUD affordability requirements, however they are set, as a matter of local policy, far below the minimum HUD guidelines, and may therefore be, for the pilot by local policy, made identical with those used for WAP in order to facilitate the integration of the programs.

³⁴ This will require permission from PGW to use the data at an individual rather than aggregate level.

- If the number of applicants selected by these criteria is insufficient to meet the production goals of the target, the first course of action should be to identify current BSRP applicants who are also high users but cannot be found on the DCED list. For these applicants, the pilot administrators should establish linkages with neighborhood LIHEAP intake centers, CDCs/neighborhood energy centers to expedite the client's approval for LIHEAP and therefore for WAP and the pilot.
- It may be necessary still to fill out the pilot group with applicants who are on neither the WAP list nor have applied for BSRP. While that is not ideal, the pilot should be allowed the flexibility to include some number of applicants who are solicited specifically to fulfill the geographic targeting requirements of the pilot so long as those applicants meet all of the other criteria for eligibility for WAP and BSRP (i.e. high energy use, LIHEAP eligibility, and needing major systems repairs).³⁵
- Pilot staff should screen the dual list for client eligibility for LIHEAP "Crisis" heating system replacements and for anyone identified as having participated in WAP after 1993 (currently ineligible to receive new WAP services) so that these prior WAP recipients may also be included in the pilot, if they are needed.

Intake and Income Eligibility Documentation

The Pilot should not require more income eligibility documentation than what is now required by WAP. That is, all homeowners on the DCED list will, for the purposes of the pilot, be automatically eligible to receive both WAP and BSRP. Homeowners on the BSRP list who are not on the DCED list will be asked only for proof of LIHEAP eligibility (or be encouraged to become LIHEAP eligible), and will, for the purposes of the pilot, be approved for participation in both programs on that basis.

It must be noted that a significant number of BSRP applicants have their cases cancelled for failure to comply with the program's requirements, whether income eligibility, ownership, occupancy status or because they have requested work that is not provided by the program (the PHDC database lists over sixty different cancellation codes). Although the outreach and intake process contemplated for the pilot should prevent this level of cancellation, some fallout must be anticipated. To expedite the pilot implementation, the number of eligible participants should be larger than the goal set for the total number of participants in the program per neighborhood. For example, it would be prudent to process 10% - 15% more applicants than the program is intending to serve.

Service Delivery/Inspections.

In order to facilitate the intake and work assignment functions for the pilot, we believe it is necessary that PHDC place the pilot administration within either the WAP or BSRP program administration structure.

It will be necessary too that PHDC will have cross-trained its WAP and BSRP inspections staff – a process that PHDC says is firmly underway – and that the requirements of PHDC's collective bargaining agreement be confirmed regarding the appropriate job classes to

³⁵ DCED's WAP plans, as submitted and approved by DOE, allows for an exception to the use of the high-users list in the specific case of geographic targeting.

perform all of the work needed to be done for both programs.³⁶ However this arrangement is made, DCED rules for WAP require that a WAP certified auditor perform the WAP work write up and quality control inspection. If BSRP inspectors are to be assigned to the pilot, they will need to have been trained and certified at a DCED approved training facility. High demand for such training may limit PHDC's ability to get enough Rehab Inspectors trained and certified and it may be necessary to use both a WAP inspector and a Rehab inspector for this work.

The pilot will likely require hybrid inspection forms that satisfy the needs of both programs while allowing for the expanded scope that is contemplated for the pilot. Because PHDC inspection documents form the basis for work orders to contractors, consideration of the WAP requirement to adhere to Davis Bacon wage requirements will need to be made to allow for the splitting of work between prevailing rate and non prevailing rate items depending on the source of funds used for each work items. For example, installing HVAC, roof cavity insulation, performing air sealing using WAP Davis Bacon contractors; replacing roofs, ceilings, plumbing, electrical using BSRP non-Davis Bacon contractors.

Cost Caps

The effective cost "cap" for the pilot will be \$24,700 (\$6,500 WAP, \$700 WAP repair and \$17,500 BSRP), however the goal should be to maintain an average of \$18,000 to promote the reasonableness for the future replication of the program. The \$18,000 target is based on the average for WAP of \$7,200 (\$6,500 plus \$700 in repairs), the current average for BSRP Tier 2 services of \$8,300, and an additional \$2,500 to account for the impact of health and safety items plus exterior preservation not currently covered by either program.

The geographic targeting contemplated by the pilot makes a compelling argument for not establishing a rigid upper limit. If, for example, only one home on a block being treated is over the limit, the harm done to the overall effort on the block by not treating the one home would seem to outweigh the legitimate concerns about cost containment. We suggest that PHDC be allowed to spend whatever is needed to make a case work, so long as it adheres to the cost averages required by WAP and can maintain the overall cost average of \$18,000. That would mean that in rare cases PHDC inspectors may determine a work scopes in excess of the defacto cap of \$24,700. However, City policy makers may wish to have a secondary approval for such cases to prevent inadvertent violation of cost containment rules by field staff. In that case, so long as there is a compelling reason to spend in excess of the cost cap, the case can be reviewed by PHDC executive staff before the work order is issued.

We further recommend that the Pilot institute a fund leveraging component that provide ombudsman services to help homeowners navigate the process of obtaining other home repair resources, such as RDA and PHFA loan funds, to minimize the number of homes that will need to be denied services.

³⁶ PHDC has three classes of inspectors working in these two programs: Energy Efficiency Specialist, Housing Rehab Inspector II and Housing Rehab Inspector III. The latter is the highest paid class and likely to be the one required to the full scope of inspection work for the pilot. If there are not a suitable number of Inspector IIIs to perform energy audits for WAP and to perform the rehab scope for the remainder of the work, then it would be necessary to bifurcate the functions to allow two classed of inspectors to perform the full scope.

Contracting

PHDC uses an open bidding process to select contractors participating in the weatherization and basic systems programs. The contractors selected for the pilot should come from the same pool of contractors used currently based on skills sets needed to perform and ability to comply with program requirements, prevailing wages and other rules.

It would make sense, however, to use a smaller selected pool of contractors to perform the Pilot services to ensure consistency of approach and optimize the potential to economize that is brought by the geographic clustering of projects.

The combined audit/whole house inspection will need to be compartmented to allow it to be broken down into several discrete work orders for PHDC's specialty trade subcontractors. However, given the extensive nature of the combined treatments and the geographic focus of the work, it would seem ideal to use general contractors to perform the work for the pilot, assuming that GCs existing in sufficient numbers with DCED certification and the administrative acumen to be able to account for both Davis Bacon and non Davis Bacon work on the same project. However, due to certification for WAP and insurance requirements for environmental work, it may be necessary to use specialty contractors for some portion of the work even when there is a GC available to do the majority of the measures. A distinct advantage of PHDC operations is that is expert in filling the role of GC on its work projects and that option will undoubtedly need to be exercised at some point during the tenure of the pilot.

Contractors should be required to meet inspectors prior to the start of work to "de-scope" the job; to go over all work items, all costs, and to reestablish the priorities for work. Given the complexity of the work scope, it will be necessary to establish clear project controls for work scope clarifications, change order requests and documentation of performance (e.g. blower door and duct blaster testing, furnace balancing, and under-floor plumbing and other "closed in" elements behind new finishes). Such processes should allow for photo documentation when field visits by an inspector are not possible so that the work may proceed unimpeded.

Likewise, contractors should be required to start the work within ten days of receiving the notice to proceed and should complete all work within 45 days of the start (excepting when delays are caused by L & I inspection or permitting requirements).

Quality Control

The whole house audit needs to be followed by the whole house performance evaluation at the final inspection. That is, mechanical and thermal integrity should be tested with instruments (manometers, duct blasters, blower doors, CO testers, voltage drop tests, etc.). The integrity of the work is key to its longevity and to meeting the preservation goal of the program.

Pilot Neighborhood Selection

A pilot is small by definition. In this case it is recommended that the pilot will serve two neighborhoods with about fifty (50) households in each neighborhood.

Need and Geography

The selection of two neighborhoods to implement an effort centered in preservation and energy efficiency should hinge on two factors: the energy burden (lowest income/highest energy use) of the homeowners *and* the economic and social “stressors” that lead to neighborhood destabilization, such as:

- Financial stressors – foreclosures, property tax delinquency and utility delinquency
- Social stressors – family services interventions
- Physical stressors – deteriorated housing and infrastructure

Geographic targeting should consider trends, conditions and investments that may also have an impact upon the stability of the neighborhood. These include:

- Recent and planned public/private investment, support and strength of community based organizations, existence or state of neighborhood planning efforts
- Physical conditions, including the quality of the housing mix, the condition of public space and structures, access to transportation
- Neighborhood trends, including public safety, amenities such as retail, eateries, etc.

Investing strategically

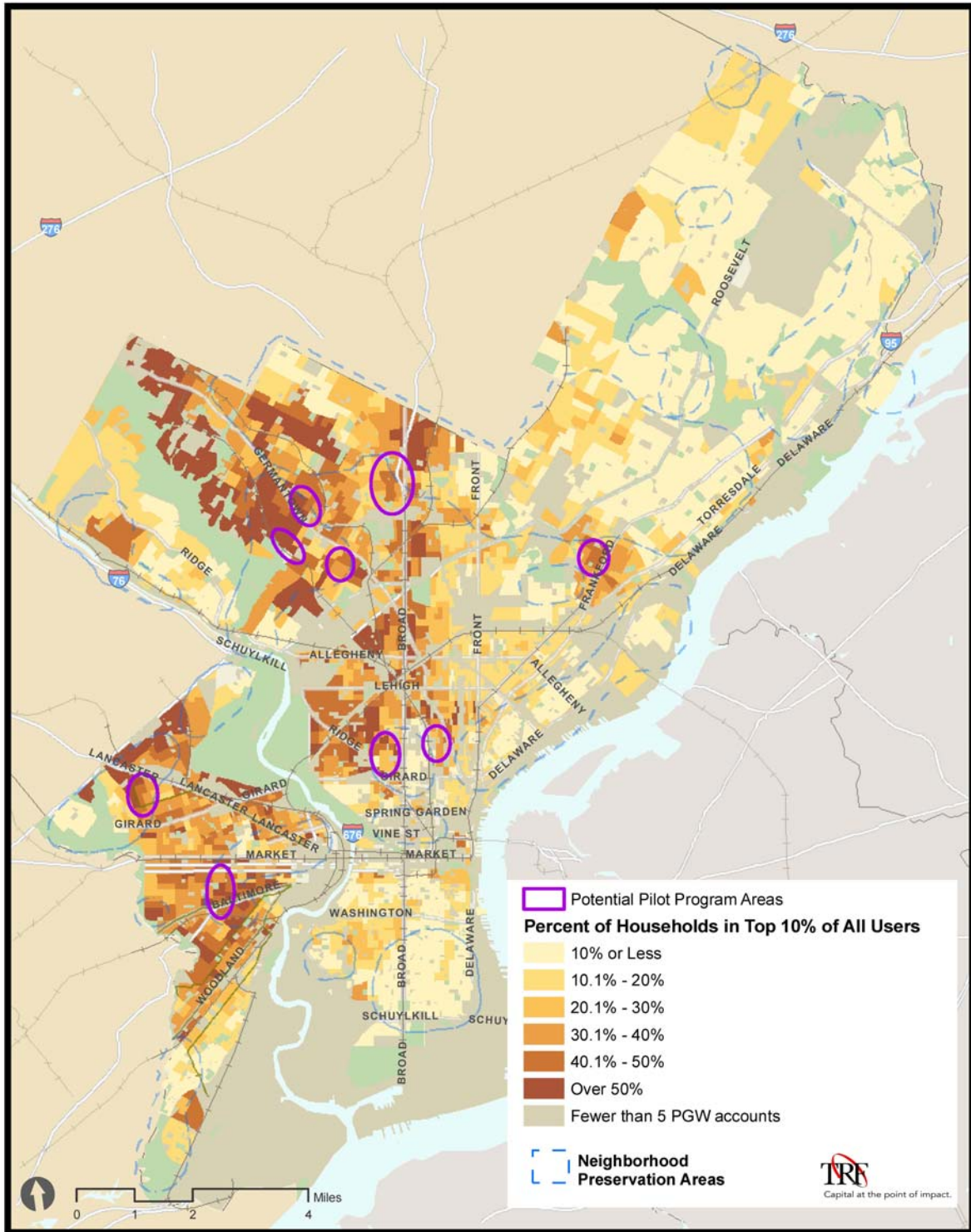
The methodology used to identify seven potential Pilot areas generally aligns with these strategic considerations. To aid in the overlay of these neighborhood conditions with the energy burden experienced by the neighborhood’s residents, the project team engaged The Reinvestment Fund (TRF) to map the economic and social stress factors with high-energy use data provided by PGW covering the last 3 years (see map below).³⁷

The seven areas that consistently surfaced through this process have been middle market neighborhoods that share boundaries with stronger markets. According to TRF, the points where these markets intersect represent targets where public investment can influence the market in a positive way. While the maps of seven potential pilot areas presented can aid the City in its final block selection, it is worth noting the final selection should seek to achieve a diversity of types and size of housing, market transitions (e.g. growing or declining), the degrees of inherent assets and social stressors.

Obviously, the higher the concentration of stressors the more challenging the process of neighborhood stabilization will be, particularly through a strategy that focuses primarily on housing preservation. Conversely, when these neighborhoods show modest levels of vacancy or foreclosures, high owner occupancy, are close to strong commercial corridors and other amenities, they represent significant fiscal and economic opportunities for the City to invest in their potential transition to stability.

³⁷ See attached memorandum from TRF describing the methodology used by TRF in Appendix C

TRF mapped the top 10% of residential energy users (therms/sq.ft.) and overlaid these data on a map with Neighborhood Preservation Areas. ³⁸



³⁸ See Appendix D for additional TRF maps showing energy use in proximity to Neighborhood Preservation areas.

Narrowing the field

The map above shows seven potential Pilot areas within the Neighborhood Preservation Areas, transitional middle market neighborhoods where public investment in housing, infrastructure, and supports service can make the difference between transitional up or transitional down. These seven areas provide a reasonable place to start the process of neighborhood selection for the pilot.

Beyond the preservation/middle market factors that help indicate suitability for the pilot, research questions about the effect of targeted preservation on neighborhood stability warrant a more focused targeting within smaller sections of the neighborhoods. To do this, the mapping data used to generate the city map has been applied on a house-by-house basis to show the clustering of high users.

Ideally, the block selection for the Pilot will include neighborhoods that are close to transit hubs, schools, libraries, or have seen recent private or public investment. Again, for the sake of comparative analysis, the selected neighborhood should have different types and sizes of housing.

For example, two of the neighborhoods, West Kensington area (east of Temple and north of Northern Liberties) and West Oak Lane fit nicely within these criteria. Both are in proximity to stable and high value areas, with amenities and socio economic strengths. Both also offer diversity in the styles of housing, and important criterion for evaluating the pilot's efficacy in addressing the needs of the City's diverse housing stock: West Kensington with owner-occupied row homes and West Oak Lane with larger semi-detached homes.

West Kensington



West Oak Lane



This level of cartographic granularity will also enable the pilot to target, within the selected neighborhood, the homes (and blocks) with the highest energy usage.

The TRF maps do not account for vacancy levels, and therefore it will be necessary that the decisions about inter-neighborhood targeting be done on the ground, through visual inspections and in partnership with local civic and community development groups. We recommend a four step process to refine and complete the final selection of the blocks being targeted for the Pilot:

1. Map the addresses on the BSRP waiting list overlapping with the WAP list of eligible properties in the potential Pilot areas identified by TRF and create an overlay of these properties. This will help obtain the highest concentrations of eligible cases in block groups that is on record and distinguish blocks for preliminary targeting using an inset of single block high-energy users to narrow down the more likely blocks to target.³⁹
2. Identify the addresses of the income-eligible, high-energy user data obtained by TRF from PGW to identify other potentially eligible households not showing in either of the above mentioned lists. This will require permission from PGW to use the data at an individual rather than aggregate level.⁴⁰
3. Visually inspect the areas showing highest density of eligible addresses to determine physical conditions on the ground such as vacancy types and levels,⁴¹ whether smaller investments planned or considered could further stabilize the area and the visual value to be added by these. This will help discern the stabilization value and potential to improve the visual quality that is likely to be added.
4. Review and explore the potential for collaboration with community groups, leaders and institutions in the community surrounding the block areas to do outreach and expedite automatic program eligibility of residents in the targeted blocks.

Other investment opportunities

Housing preservation and other investments can complement each other. Future, planned investments could be of great significance to any of the seven neighborhood areas identified in this study. Therefore, the neighborhood selection decisions, as well as intra-neighborhood targeting decisions, should seek to account for recent and planned investments known in order to take advantage of leveraging opportunities.

³⁹ It is worth noting that although PGW clients move frequently, PGW data used by TRF was based on an address-to-account table. So, beyond the effect of building conditions on energy use, differing customer behavior in the same house may have skewed some of the mapping results.

⁴⁰ Agreements made with PGW to obtain access to usage data restricts the display of information to only the aggregated level. However, PHDC may wish to seek PGW permission to individual household data, under PGW's privacy terms, to aid in targeting.

⁴¹ TRF did not evaluate factors of vacancy, which may become an important factor in the selection of the pilot neighborhood.

Performance and evaluation indicators

The purpose of a pilot is to demonstrate the efficacy of a policy idea. Therefore, it is important that the pilot include an evaluation component to measure its impact and to develop the metrics for performance for any eventual expansion of the program. Although the development of the evaluation instrument is beyond the scope of this study, the foregoing analysis suggests certain key elements that the pilot evaluation component should consider.

Measuring performance

Administrative Metrics: The pilot implementation will result in a number changes in the modes of service delivery and the retrofits and repair items offered.

1. *Timeliness of service:* The pilot evaluation then will need to focus on measurable performance metrics of program administration, (i.e. elapsed times between key events in the processing of each job, such as, intake, eligibility determination, work write-ups/audits, installation of repairs/retrofits, quality control inspections and contractor payment).
2. *Implications for the effectiveness of core programs:*
 - a. **Implications for the neediest BSRP and WAP customers.** It should be readily determinable how many of the households in the Pilot would have been cancelled by BSRP and/or WAP based on current rules. Extrapolating this information can offer guidance to policy makers about the effect of an integrated approach on the larger universe of BSRP and WAP applicants.
 - b. **Impact on Core Program performance.** Presumably, the pilot program households will experience higher energy savings and longer term housing stability than their counterparts in PHDC's WAP and BSRP programs, but this key assumption should be measured. For example, by measuring and comparing energy savings from pilot homes that received significant BSRP home repair investments along with the full range of WAP measures, with WAP-only homes in PHDC's larger program, the effect of integration on energy can be estimated. Likewise, comparing the future maintenance costs of pilot cases vs. core program cases by applying the 20 year life cycle analysis, can provide a quantifiable estimate of difference in future maintenance cost avoidance.

Household Stabilization Metrics: The desired results from the pilot interventions include: energy savings, abatement of health and safety risks, and impact on operating costs (e.g. maintenance cost avoidance). These are outcomes only observable over time. What are the effects of the work on the quality of life of the occupants of homes receiving services?

1. *Energy efficiency and cost reduction.* Customer accounts from PGW, PECO and fuel oil dealers will need to be obtained for at least two years before participants enrolled in the Pilot and reviewed for at least one full season after retrofits and repairs are made. These will need to be normalized for changes in weather (i.e. heating and

cooling degree days) and be compared against the disaggregated cost of measures that contributed to the changes in usage.

2. *Household income maintenance.* Lowering energy and maintenance costs improve housing affordability, but is it enough to mitigate economic pressures in the household? Information obtained during the intake process can illustrate changes in payment patterns relative to mortgage, tax and utilities status. This will provide insights on the need for credit, financial or additional energy counseling. Since the program gives priority access for those who are most vulnerable (the elderly, the disabled, families with children, high residential energy users and households with high-energy burden), it should be expected that the effect of services would be greater for such recipients than for the universe of eligible customers. However, such an outcome is not certain, i.e. those with the highest burden may require even more services than the pilot can deliver in order to realize a persistent benefit, and so the effect of the pilot interventions on such differing segments among pilot participants should be sought to be evaluated.
3. *Avoided future capital improvements.* Using the life cycle analysis previously discussed, the pilot evaluators should seek to quantify the impact of these investments over a 20 year life cycle of the home.

Neighborhood Stabilization Metrics: Longer term and less easily quantifiable measures of performance include the stabilizing effect on blocks and neighborhood enclaves where targeted investments, changes in the social stressors such as changes in the performance in school by children in stabilized homes, domestic disturbance interventions by police and social services agencies, and family/household cohesion.⁴² Neighborhood stabilization indicators include:

1. *The relation of pilot investment to other investments; effect on market conditions.* To what extent does preserving individual homes, or even a group of individual homes in a small area, have an impact on the neighborhood housing market? To answer this question, at least some of the following elements should be examined:
 - a. Discern whether investing in preservation coincides with or is a factor in inducing or attracting new investment in the neighborhood. For example, tracking building permits, new investment in other property renovations or retrofitting, investment in commercial activity, vacancy and demolitions, changes in homeownership rate over time.⁴³
 - b. In real estate terms for example, keep track of changes in real estate pricing; equity built for properties in the Pilot, sales activity including foreclosures.

⁴² As indicated above, irrespective of whether experiencing upward or downward pressure, High Leverage Preservation areas have innate assets that can be leveraged by a public investment resulting in dramatically improve the public perception of the quality of life available in the neighborhood.

⁴³ Anecdotal information from PHDC's Homeowner Rehabilitation Program's investments in a South Philadelphia Neighborhood Preservation Area suggests that such an impact is possible even during a real estate slump. In 2009, after a PHDC developer rehabbed two homes on one block, three others were purchased by small local investors, rehabbed, and put on the market at "top of the market" prices.

2. *Effect of preservation investment on social stressors.* The stressor indicators used by TRF to establish the Neighborhood Preservation Areas are all readily quantifiable. Although the impact of relatively small investments in physical improvements may not have a discernable impact in the near term, the long term effect may be perceivable and should be looked at.

Policy Implications for Preservation as Affordable Housing Development

A modest investment, as provided by the piloted integration of WAP and BSRP, may offer a new way of looking at affordable housing production in a city with an ample supply of affordable housing in need of improvement. The evaluation should compare the cost of producing a unit of preserved affordable housing with the cost to produce a new of affordable housing while considering the qualitative differences between the two approaches. It should examine further the neighborhood redevelopment impact of producing larger numbers of lower cost housing units.

Because any assessment of the pilot's effect will need to be made on the basis of observable information, it will be necessary to develop a set of outcome and impact indicators that are readily observable and recordable over time. Not only will the collection and evaluation of such data offer valuable information about the effectiveness of the pilot and the feasibility of its expansion, it will also establish the benchmarks and means of measuring the performance for any such expansion.

Some of the administrative and building integrity performance indicators are already routinely performed by PHDC as part of its management of the BSRP and WAP and can be easily captured by the Pilot evaluators. Others such as the impact on household finances and the effect of environmental interventions will need to be added to the pilot's quality control and evaluation protocols.

APPENDIX

- Appendix A Side-by-side Comparison of Allowable Measures in BSRP and WAP.
- Appendix B Listing of Challenges and Opportunities to Integration, with recommendations.
- Appendix C Memorandum from TRF Describing the Mapping Methodology
- Appendix D Additional TRF Maps Showing Energy Use in Proximity to Neighborhood Preservation areas.
- Appendix E 20 Year Life Cycle Analysis