Status of HUD-Insured (or Held) Multifamily Rental Housing in 1995

Final Report

Prepared for:
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Prepared by:
Abt Associates, Inc.
Meryl Finkel
Donna DeMarco
Deborah Morse
Sandra Nolden
Karen Rich

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We also appreciate the input from HUD staff who provided guidance and assistance for this study, including Arthur Reiger, Judith May, and especially Laurent Hodes, the Government Technical Monitor. The report benefited greatly from their input.

FOREWORD

By insuring mortgages for private multifamily properties, HUD has made a significant long-term investment in providing decent and affordable rental housing. This report profiles the physical and financial condition as of l995 of over 12,000 properties in this stock, home to some 1.4 million predominantly low- and moderate-income families in communities across America. The report also highlights major changes since 1989, the year covered by HUD's initial assessment of this stock.

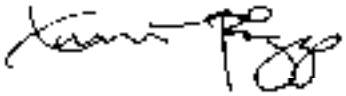
As of 1995 most HUD-insured properties continued to provide good housing. A portion of properties, however, had developed physical or financial problems that could impair their viability as well as residents' quality of life. Overall the stock's financial condition improved between l989 and 1995, but during the same period its physical condition declined. Repair and replacement needs increase as housing ages, so some decline was not unexpected. Nevertheless, the physical needs of most properties remained relatively modest.

The report focuses on the 10,000 properties that benefit from housing assistance in addition to mortgage insurance. Mortgage interest subsidies or rental assistance payments helped keep these properties affordable for their residents. Many of these assisted properties, however, had rents that were *much higher* than those of comparable housing in their local markets, making them heavily reliant on public subsidies to remain financially viable. At the same time, other assisted properties had *below-market* rents and may need additional resources over time to address their capital needs and remain affordable to future residents.

Since the advent of the HUD 2020 Management Reform Plan in 1997, the Department has restructured its resources to better maintain and improve the quality of the multifamily rental stock. Most notably, HUD has refocused its asset management and enforcement programs. HUD's Real Estate Assessment Center creates a new national capability to identify systematically properties' physical and financial weaknesses so that HUD can work with capable property owners and managers to improve the stock. At the same time HUD's Enforcement Center puts new teeth in HUD's regulations. It provides a mechanism to remove owners that are chronically unable or unwilling to meet their obligation to provide decent housing.

HUD has begun a "mark-to-market" program designed to restore to market levels rents in assisted properties that are currently above market. Recaptured budget authority will soon be available to address capital needs of at least some assisted properties. HUD is also exploring how additional resources could be provided to maintain the affordability of assisted properties located in neighborhoods that provide access to opportunity, including quality schools and more jobs. Together with recent procedural changes in renewing housing assistance contracts, HUD's new policies are aimed at using subsidy dollars more effectively while at the same time assuring properties' physical and financial condition.

The report notes that, while much has been done or is underway to improve the multifamily stock, more tough decisions are still ahead. Illuminating research such as this report will help HUD and its colleagues in Congress and the housing industry find solutions that work for owners, residents, and taxpayers alike.



Xavier de Souza Briggs
Deputy Assistant Secretary for Research, Evaluation
and Monitoring

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EXECUTIVE SUMMARY

Overview

This study describes the physical, financial, and market condition in 1995 of the stock of multifamily properties with mortgages insured (or held) by HUD. It also highlights changes in condition since 1989, the year covered by HUD's first multifamily stock study. The study universe of 12,243 properties, home to 1.4 million families, includes most properties with mortgages that were insured before 1990 and that were still insured (or held) in 1995. The study excludes properties that were newly insured after 1989, properties outside the contiguous states, properties in remote rural areas, and HUD-acquired, Section 202, non-residential, non-rental, or single family properties.

The study universe—the pre-1990 stock—includes both insured properties that receive no HUD subsidy and those that receive project-based subsidies. For ease of presentation, this report divides this stock into three "assistance categories:"

> ***Unassisted properties*** have mortgages insured under any HUD mortgage insurance program and receive no HUD subsidy—neither rental assistance nor mortgage interest subsidy. Most unassisted mortgages are insured under the Section 221(d)(4) program. The study stock includes 2,224 unassisted properties housing over 354,000 families.
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> ***Older assisted properties*** have mortgages insured under any HUD mortgage insurance program and receive either ***mortgage interest subsidies*** (under the Section 236 or 221(d)(3) Below Market Interest Rate insurance programs) or ***rental assistance*** under the Section 8 Loan Management Set Aside, Rent Supplement, Rental Assistance Payment, Section 8 Property Disposition, or Preservation programs. They were generally insured between the late 1960s and mid-1970s. The study stock includes 5,943 older assisted properties housing over 686,000 families. Nearly 80 percent of these properties receive Section 8 for at least some of their apartment units, with a total of nearly 425,000 Section 8 units.
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> ***Newer assisted properties*** have mortgages insured under any HUD mortgage insurance program and receive rental assistance under the Section 8 New Construction, Substantial Rehabilitation, or Moderate Rehabilitation programs. They were generally insured between the late 1970s and mid-1980s. Most newer assisted properties have mortgages insured under the Section 221(d)(4) program. The study stock includes 4,076 newer assisted properties housing nearly 365,000 families. All of these properties and nearly 344,000 of these families are assisted through Section 8.

The *assisted portion* of the study stock reflects the full universe of insured properties with project-based assistance (with the exclusions noted above) because prior to 1989 HUD stopped insuring new mortgages that were linked with project-based assistance. The *unassisted portion* of the study stock does not reflect all of the unassisted stock because HUD continues to insure new mortgages on unassisted properties.

The size, importance, and budgetary impacts of the HUD-insured multifamily stock provide the context for this study. On the one hand, the study stock is a vital housing resource:

- This stock of over 12,000 properties provides homes for over 1.4 million families.
- Over 10,000 of these properties and over a million families rely on HUD's assistance programs.
- Most households living in assisted properties have very low incomes and two-thirds have annual incomes of under $10,000.

On the other hand, this stock poses potential costs to HUD and local communities:

- This stock has over $30 billion of outstanding mortgage principal, a substantial contingent Federal liability.
- Rental assistance contracts on most assisted properties will expire over the next few years. Renewals to preserve this important affordable housing resource will require new commitments of Federal funds.
- Most older assisted properties have affordable below-market rents, but many also have physical or financial problems that could impair their ability to provide decent housing.
- Many newer assisted properties have been supported at above-market rents. This has been costly to the government and inefficient for properties, and is being addressed by the Multifamily Assisted Housing Reform and Affordability Act of 1997 (MAHRAA). The MAHRAA "mark-to-market" program, which will move assisted rents to market rates, includes provisions to help keep these properties viable.
- Some properties with expiring Section 8 contracts may choose to convert to market-rate housing and may no longer be available to current and future low-income residents. Federal, state, and local governments may need to provide additional incentives to maintain affordability of some of these properties—those located in neighborhoods that provide access to quality schools, jobs, and other important amenities.

This study is based on physical inspections, assessments of market rents, and secondary data on a representative national sample of 621 multifamily properties. This sample consists of 504 of the 570 properties that were included in the 1989 stock study supplemented by 117 additional properties. To facilitate comparing physical needs and financial condition across properties having *different numbers of units* or *different sized units*, all property revenues and costs are expressed per "2-bedroom equivalent" unit. To facilitate comparing revenues and costs *over time*, all dollar amounts are expressed in 1995 dollars.

Highlights

Current physical condition: *Physical needs backlogs increased between 1989 and 1995—total national backlog rose from $2.2 billion to $4.2 billion (in constant 1995 dollars). Backlogs increased most sharply in newer assisted properties, but remained highest in older assisted properties. The 15 percent of older assisted properties with the highest backlogs account for more than a quarter of the total national backlog.*

Current financial condition: *While overall, the stock's financial condition improved since 1989, cash flow remained weak among many older assisted properties. Both older and newer assisted properties became more reliant on HUD subsidies as tenant-paid rents declined during this period.*

Adequacy of property reserves: *Most properties' reserves were insufficient to cover their backlogs. Between 1989 and 1995 the gap grew as properties' backlogs increased more rapidly than did reserves. This gap was greatest among older assisted properties.*

Current financial ability to cover physical needs from cash flow and property reserves: *Although most properties lacked sufficient reserves, two thirds of the stock would be financially able to cover physical backlogs if they borrowed funds and repaid the loans from annual cash flow—their annual revenues at current rents exceeded operating expenses, mortgage debt service, annual deposits to replacement reserves, and a hypothetical loan to cover backlogs net of property reserves. However, nearly a quarter of the stock, including a third of older assisted properties, would face annual shortfalls of more than $250 per unit.*

Financial ability of assisted properties to operate at market rents: *Most older assisted properties had below-market rents while most newer assisted properties had above-market rents.*

- *Were assisted rents marked down or up to market, 45 percent of older assisted properties, but only 13 percent of newer assisted properties, would be able to cover all financial and physical needs—operations, debt service, physical need backlogs, and annual accruals of physical needs.*

- *Mortgage restructuring to reduce properties' debt service would enable another third of older assisted properties and another two thirds of newer assisted properties to cover all remaining financial and physical needs.*

- *Nearly a quarter of assisted properties still would not be able to cover operations and physical needs even with no mortgage. For many of these properties, it might not be cost effective for HUD to further subsidize their operation.*

- *Most families in assisted properties have low incomes and would not be able to afford market rents. Thus, even if HUD discontinued property-based assistance, most families in these properties would require continued HUD rental assistance.*

Summary of Findings

The condition of the HUD-insured stock has several dimensions. We begin this report by presenting separately two critical dimensions, ***physical condition*** and ***financial condition***. We next present findings that combine physical and financial condition—properties' ***ability to cover current and future physical needs using project reserves and cash flow***. We conclude with findings, for assisted properties only, that explore ***effects of moving properties' rents to market levels***—how current property rents compare with local market rents, how cash flow would change if rents and expenses moved to market levels, and whether mortgages would remain "performing" at market operation.

1) Properties' need for repairs and replacements—Backlog of Physical Needs.

The study inspected each property to assess its ***total backlog of physical needs,*** defined as the cost of repairs and replacements beyond ordinary maintenance required to restore all property systems to original working condition. A property's backlog is important because it can affect residents' housing quality, its physical and financial viability, and its neighborhood. Backlog may also be an indicator of the quality of property management.

High backlogs may not *immediately* affect residents or property viability. For example, a property with a heavily patched, worn-out roof may operate for years with little or no adverse effect on residents, property vacancies, or expenditures. Given time, however, backlogs affect both residents and property viability.

- Mean backlog was $3,236 per unit. The total national backlog was nearly $4.2 billion, $3.6 billion of which was in assisted properties.

  - Older assisted properties had the highest mean backlog ($3,929 per unit), followed by newer assisted properties ($3,214) and unassisted properties ($1,427).

- Most properties were keeping up with physical needs.

  - The median backlog was only $1,452, far below the mean and only somewhat above the $1,100 range, the average amount of physical needs that a property accrues over a year.

  - Using $1,500, an approximation of the median, as a yardstick for low backlog, 66 percent of unassisted properties, 65 percent of newer assisted properties, and 42 percent of older assisted properties had low backlogs. (Of course, by definition, stock-wide, half of all properties had below median backlogs.)

- Portions of the stock had high backlogs of more than $3,000 per unit, particularly a large minority of older assisted properties.

  - Among older assisted properties, 26 percent had high backlogs of $3,000 to $7,500 per unit and another 15 percent had very high backlogs exceeding $7,500 per unit.

  - Among newer assisted properties, 16 percent had high backlogs and another 9 percent had very high backlogs.

  - Among unassisted properties, only 7 percent had high backlogs and another 4 percent had very high backlogs.

  - Alone, the 15 percent of older assisted properties with very high backlogs exceeding $7,500 accounted for more than a quarter of the total national backlog.

- Between 1989 and 1995, backlogs increased substantially even after controlling for inflation. The total national backlog increased from $2.2 billion to $4.2 billion (in constant 1995 dollars).

  - Mean backlog rose by 50 percent in unassisted properties, 40 percent in older assisted properties, and nearly 160 percent in newer assisted properties (in constant 1995 dollars).

  - The large increase in backlog of newer assisted properties is also reflected in the absolute dollar increase between 1989 and 1995. Their mean backlog increased by more than $1,700 per unit compared with increases of $1,100 for older assisted properties and $500 for unassisted properties (in constant 1995 dollars).

- The first multifamily stock study projected that backlog would increase, based on our finding for 1989 that properties' future annual accruals of physical needs would exceed available income. However, the dramatic backlog increase among newer assisted properties, which had extremely low backlogs in 1989, was not expected. It is not clear to what extent the increase in backlog of newer assisted properties reflects their aging and need for first time replacement of long lived systems such as roofs or boilers.

- Worsening backlogs among newer assisted properties is also revealed by the decrease in low-backlog properties and increase in high-backlog properties.

  - In 1989, nearly three quarters of newer assisted properties had low backlogs below $1,500 per unit in 1995 dollars. By 1995, the proportion with low backlogs had fallen to slightly more than half.

  - At the other extreme, in 1989, only 10 percent of newer assisted properties had high backlogs greater than $3,000 per unit in 1995 dollars. By 1995, the portion with high backlogs had increased to a quarter of the newer assisted stock.

Many newer assisted properties will be required to address backlogs as part of the restructuring process of the MAHRAA "mark-to-market" program. However, most older assisted properties have below-market rents and will not be eligible for restructuring under current law.

2) Properties' ability to cover operations, mortgage payments, and replacement reserve deposits from rental income—Annual Net Cash Flow

The study computed each property's ***annual net cash flow*** per unit, defined as total annual revenue less expenses for operations and maintenance, mortgage payments, and deposits to the reserve for replacement. To level out abnormalities that might occur in any single year, the study used three-year weighted averages (with all years' values expressed in 1995 dollars), with recent years weighted most heavily.

- Three quarters of all properties had positive annual net cash flow—they could cover all expenses. Annual net cash flow averaged nearly $600 per unit.

- For each of the three assistance categories, annual net cash flow improved from 1989 to 1995 even after adjusting for inflation. Increased revenue and decreased debt service (in constant 1995 dollars) generally offset increases in other expenses.

- Unassisted properties experienced the largest improvement in mean cash flow, which doubled to $487 per unit in 1995 (in constant 1995 dollars). The proportion of properties with negative cash flow declined from 44 percent to only 25 percent.

- In both years, newer assisted properties had the strongest mean cash flow, which increased by 29 percent to $1,100 per unit in 1995 (in constant 1995 dollars). This increase reflects, in part, an increase from 1989 to 1995 in the proportion of properties with very high cash flow (above $1,000) from a third to 44 percent. The proportion of properties with negative cash flow remained stable at 13 percent.

- Older assisted properties had the weakest cash flow in both 1989 and 1995. From 1989 to 1995 mean cash flow increased by 6 percent to $283 per unit (in constant 1995 dollars). The proportion of properties with negative cash flow decreased slightly, from 39 percent to 33 percent.

• In assisted properties, revenues from tenants' rent payments decreased from 1989 to 1995 (in constant 1995 dollars).

- Tenants' rent payments decreased by 10 percent to $3,287 per unit in older assisted properties and by 26 percent to $2,593 per unit in newer assisted properties (in constant 1995 dollars).

- It is not clear whether this decrease reflects lower incomes of existing residents or poorer residents moving into the properties upon turnover.

3) Properties' ability to cover current and future physical needs using property reserves and cash flow

The study combined data on physical and financial condition to examine properties' financial ability to cover current backlogs and ongoing accruals of physical needs using property reserves and annual net cash flow. This set of analyses assumed that properties' rents, assistance levels, and operations would continue into the future.

Ability to cover current physical backlog from property reserves—Unfunded Backlog. Properties generally have reserve funds that may be used to cover physical backlogs. Property reserves may include replacement reserves, special purpose funds such as painting reserves, and in some cases residual receipts accounts, which owners may use for repairs. A convenient measure of ability to cover backlog is the ***unfunded backlog of physical needs***—total backlog less available reserves. Unfunded backlog provides a snapshot of backlog less property reserves.

- Mean unfunded backlog in 1995 was $2,630 per unit. The total national unfunded backlog was nearly $3.5 billion.

  - Almost two-thirds (64 percent) of properties had insufficient reserves to cover backlogs.

  - The shortfall in reserves was small for much of the stock—half of all properties had unfunded backlogs well below $700.

- Unfunded backlogs were most severe and particularly concentrated among half of the older assisted stock.

  - For older assisted properties mean unfunded backlog was about triple that of unassisted properties and almost 1½ times that of newer assisted properties.

  - Among older assisted properties, unfunded backlogs were further concentrated, with 22 percent having unfunded backlogs of $2,000 to $5,000 per unit, and with another 22 percent above $5,000 per unit.

- Between 1989 and 1995, the portion of properties having adequate reserves declined from 45 percent to only 35 percent.

  - This decline occurred because backlogs increased by over 60 percent while reserves increased by about 40 percent.

Ability to cover unfunded physical backlog from annual cash flow—Backlog-Adjusted Cash Flow. Properties having unfunded backlogs—backlogs that exceed reserve funds—may be able to cover remaining physical needs from annual cash flow. The study computed a measure of the adequacy of cash flow to cover unfunded backlog—the ***backlog-adjusted cash flow index***. This index is basically annual cash flow reduced by the cost of amortizing a 20-year loan in the amount of the unfunded backlog.

Mean backlog-adjusted cash flow was $392. This signifies that the average property would have $392 of positive annual net cash flow after paying all operating expenses and debt service, making reserve fund deposits, and undertaking a program to remedy its backlog.

- **Nearly a quarter of the stock was classified as "distressed"**—they had annual backlog-adjusted cash flow ***deficits*** **exceeding $250 per unit**. These properties' operating and physical needs would significantly outstrip available revenues and reserves.

  - More than half of distressed properties would still be distressed even without paying for any of their unfunded backlogs. This means that even if they were given grants to cover unfunded backlogs, they would still have large cash flow deficits because they could not cover operations and debt service.

  - Nearly a third of older assisted properties were distressed, compared with 15 percent of newer assisted and 19 percent of unassisted properties.

- At the other extreme, **nearly two thirds of the stock was classified as "sound"**—they had **positive or break-even annual backlog-adjusted cash flow**.

  - Less than half of older assisted properties were sound, compared with 78 percent of newer assisted or older assisted properties.

- **Remaining properties were classified as "stressed"**—they had annual **backlog-adjusted cash flow deficits of no more than $250 per unit**.

The backlog-adjusted cash flow index measures a property's financial ***potential*** to cover all expenses and physical needs. As part of the study, we compared this potential to properties' actual physical condition: Of properties classified as sound, 14% actually had high backlogs exceeding $3,000 per unit. Despite their financial potential, these properties were failing to keep up with physical needs. This may indicate management problems rather than financial problems.

Ability to cover ongoing annual accrual of physical needs—Unfunded Annual Accrual. Apart from any current physical needs *backlog*, properties continue to *accrue* additional physical needs each year. This study computed each property's ***average annual accrual of physical needs***, their future need for repairs and replacements beyond normal maintenance, based on physical inspections and expected useful lives of property systems. The study also computed ***unfunded annual accrual***, which is accrual less resources available from annual reserve fund deposits and positive annual net cash flow. Unfunded accrual measures a property's ability to cover ongoing annual physical accrual from expected annual revenues.

- Full annual accrual for the stock averaged around $1,100 per unit per year, with little difference across assistance categories. Over half of all insured properties would have sufficient resources from annual revenues to keep up with physical needs accruals—their unfunded accruals were $0.

- Mean unfunded annual accrual was $225 per unit, which signifies that for the stock as a whole, physical condition is likely to deteriorate over time.

- Older assisted and unassisted properties had higher mean unfunded accrual ($288 and $273, respectively) than did newer assisted ($107) properties.

  - Older assisted properties had fewer annual resources for funding accruals than did newer assisted or unassisted properties—while their annual deposits to replacement reserves exceeded those of other properties, their net cash flow was much lower.

  - Sixty-two percent of older assisted properties could not cover ongoing accruals, compared with 28 percent of newer assisted, and 52 percent of unassisted properties.

4) Market Scenario Analyses

The discussions above all assumed that properties' rents, assistance levels, and operations would continue as in the past. In fact, the stock is in transition, and HUD has already implemented a number of initiatives that are moving assisted properties closer to market operations. These initiatives include not only the MAHRAA "mark-to-market" program, but also market ceilings on annual rent increases for assisted properties, and ceilings on rents for Section 8 contract renewals.

In this section, therefore, we conducted several analyses to examine how the assisted stock would fare under market operation.

Properties' Current Assisted Rents Relative to Market Rents

For each property, the study's market analysts estimated unrestricted local market rent, assuming that physical backlog were remedied. For the assisted portion of the stock, we compared each property's current assisted rent with its estimated market rent.

- Overall, the assisted stock was evenly divided between properties with current assisted rents above or below estimated market levels.

- Most older assisted properties (78 percent) had rents below market, including 38 percent with rents below 75 percent of market.

  - Most older assisted properties have subsidized mortgages that enable (and require) owners to maintain low, affordable rents.

- In contrast, the vast majority of newer assisted properties (86 percent) had rents at or above market levels, including 40 percent with rents above 140 percent of market.

  - When these properties were developed, assisted rents were often set above market levels to help promote housing development. Rents have continued to rise annually

based on HUD's Annual Adjustment Factor, which often exceeded inflation in expenses.

Properties' ability at market rents to cover operations, mortgage payments, and physical needs—Market Scenario Cash Flow Index

We developed a ***market scenario cash flow index*** to assess impacts on property finances of remedying backlogs and moving properties to market rents. In computing market scenario cash flow we assumed:

- rents moved from current assisted rent up or down to market,
- vacancies and operating costs moved toward market,
- deposits to replacement reserves equaled average annual accrual of physical needs,
- backlogs were remedied and financed with 10-year market-rate loans,
- full HUD-insured mortgages continued, and
- Section 236 properties would pay *full* debt service and interest reduction payments would be eliminated.

Using this market scenario cash flow index:

- ***Nearly a third of the assisted stock would have positive annual net cash flow at market rents***. This is a large drop from the current situation with assisted rents, where 60 percent of assisted properties would have positive backlog-adjusted cash flow.
- ***Only 13 percent of newer assisted properties would have positive annual net cash flow, due to revenue decreases at market rents***. This is a major drop from the current situation, where 78% would have positive backlog-adjusted cash flow.
- ***Almost half (45 percent) of older assisted properties would have positive annual net cash flow. Revenue increases at market rents would largely compensate for cost increases, particularly debt service increases for Section 236 properties*** . This is little different, in the net, from the current situation, where 48 percent of older assisted properties would have positive backlog-adjusted cash flow.

This market scenario cash flow index highlights major potential impacts of adjusting rents and expenses to market levels. In the portion of the stock with *current assisted rents above market,*

properties would require substantial expense reductions to remain viable at market. Even with rents marked down to market, this stock would not be affordable to very low income renters without continued assistance. *The amount of tenant assistance payments would go down, but the need to provide subsidies would remain*.

In the portion of the stock with *current assisted rents below market, raising rents to market would generally improve properties' financial and physical prospects, but at the cost of increased HUD subsidies*.

Properties' performance at market rents—Market Scenario Debt Coverage Ratio

Properties' performance at market operation can also be examined using a ***market scenario debt coverage ratio***. This indicator measures how well a property can meet all its financial obligations. A ratio of 1.0 or more indicates that a property can cover all expenses including current and future physical needs and debt service.

One can compute this ratio from market scenario cash flow simply by adding back the amount of debt service (***yielding net operating income*** or NOI) and then dividing the result by the amount of debt service. Dividing NOI by debt service "scales" NOI into fractions or multiples of the debt service amount. A market scenario debt coverage ratio of one or more means a property can cover debt service.

Using market scenario debt coverage ratio, we divided properties into three categories:

- **Full Coverage—market scenario debt coverage ratio 1.0 or more**. A ratio of 1 or more indicates that a property can cover all expenses including current and future physical needs and debt service. The higher this ratio, the more secure is the mortgage and the more financially viable the property.

  - Nearly a third of all assisted properties would have full coverage.

  - This category includes 45 percent of older assisted and only 13 percent of newer assisted properties.

- **Debt Restructure—market scenario debt coverage ratio 0 to 1.0**. A non-negative ratio smaller than 1 indicates that property revenues can cover operations including current and future physical needs, but not full debt service. These properties could be viable at market with partial or full debt reduction under a mark-to-market program.

  - Forty-four percent of assisted properties would require debt restructuring to remain viable.

- This category includes nearly a third of older assisted and nearly two-thirds of newer assisted properties.

- **Non-Performing—market scenario debt coverage less than 0**. A negative ratio indicates that even in the absence of debt service, a property cannot cover ongoing operations. The more negative the ratio, the greater the need for ongoing subsidy beyond debt restructuring.

  - Nearly a quarter of older and a quarter of newer assisted properties would be non-performing, and many may not be cost-effective to subsidize for market rate operation.

  - Nearly half of all non-performing properties would require substantial annual subsidies of $1,000-or-more per unit ***in addition to full mortgage write-off*** to cover all expenses including backlogs and accruals.

  - Many provide worse-than-average environments for residents, based on their current poor physical condition, low neighborhood quality ratings, and high neighborhood vacancies (which indicates that market-rate tenants choose to live elsewhere).

  - Residents of these properties, who are disproportionately very low income and Black households, may need assistance to facilitate their relocation to sound, affordable housing in good neighborhoods.

CHAPTER ONE
INTRODUCTION

This study describes the physical, financial, and market condition in 1995 of the stock of multifamily properties with mortgages insured (or held) by the Federal Housing Administration (FHA). It also highlights changes in condition since 1989, the year covered by HUD's first multifamily stock study.[1] The study universe of 12,243 properties, home to 1.4 million families, includes nearly all properties with mortgages that were insured before 1990 and that were still insured (or held) in 1995. The study excludes properties that were newly insured after 1989, properties outside the contiguous states, properties in remote rural locations, HUD-acquired properties, properties with Section 202 direct loans or capital grants for elderly households, and non-residential, non-rental, or single family properties.

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1 Wallace et al, *Assessment of the HUD-Insured Multifamily Housing Stock*, 1993.

assisted properties housing nearly 365,000 families. All of these properties and nearly 344,000 of these families are assisted through Section 8.

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- HUD insures the mortgages for this stock of over 12,000 properties, providing homes for over 1.4 million families.

- Over 10,000 of these properties and over a million families rely on HUD's assistance programs.

- Most households living in assisted properties have very low incomes and two-thirds have annual incomes of under $10,000.

On the other hand, this stock poses potential costs to HUD and local communities:

- This stock has over $30 billion of outstanding mortgage principal, a substantial contingent Federal liability.

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- Most older assisted properties have affordable below-market rents, but many also have physical or financial weaknesses that could impair their ability to provide decent housing.

- Many newer assisted properties have been supported at above-market rents. This situation, which has been both costly to the government and inefficient for properties, is being addressed by the Multifamily Assisted Housing Reform and Affordability Act of 1997 (MAHRAA). The MAHRAA "mark-to-market" program, which will move assisted rents to market rates, includes provisions to help keep these properties viable.

This study is based on physical inspections, assessments of market rents, and secondary data on a representative national sample of 621 multifamily properties. This sample consists of 504 of the 570 properties that were included in the 1989 stock study supplemented by 117 additional properties. To facilitate comparing physical needs and financial condition across properties having *different numbers of units* or *different sized units*, all property revenues and costs are expressed per "2-bedroom equivalent" unit. To facilitate comparing revenues and costs *over time*, all dollar amounts are expressed in 1995 dollars.

The remainder of this chapter presents basic descriptions of the multifamily stock and of residents in the assisted portion of the stock. Chapter 2 describes the physical condition of the stock, including physical needs backlogs and annual accrual of physical needs. Chapter 3 assesses the financial condition of the stock, including annual cash flow, reserve accounts, and Section 8 assistance. Chapter 4 provides an overall measure of property condition that takes into account both the physical and financial condition. Finally, Chapter 5 describes the market position of assisted properties.[2]

Appendices describe sampling procedures (Appendix A), data collection methodology (Appendix B), and the system used for estimating the physical needs backlog and accrual costs (Appendix C). The last appendix provides supplementary tables (Appendix D).

1.1 Attributes of HUD-Insured (or Held) Properties

Exhibit 1-1 describes basic characteristics of the stock of multifamily properties with HUD-insured (or held) mortgages. These data were compiled from HUD computerized data systems for 1995.[3]

- ***Assistance Category:*** Overall, 82 percent of the stock was assisted, receiving some sort of HUD assistance beyond mortgage insurance. Assisted properties contained over 1 million units and unassisted properties contained over 350 thousand units.

2 Because this study presents the 1995 status of the stock, it does not reflect possible impacts of program activities since 1995 such as additional funding for Preservation initiatives, lifting of the moratorium on prepayment of older assisted mortgages, sale of HUD-held mortgages on partially assisted properties, or "mark-to-market" demonstrations.

3 Tests were conducted to determine whether differences between unassisted/assisted and older/newer were statistically significant. In all the tables we denote where significance tests were conducted with an "a". Where distributions were reported, we conducted tests of specific ranges. For example, looking at the distribution of property sizes we compared the proportion that were below 50 units, and the proportion above 200 units. In tests of a two-way variable (e.g. family/elderly occupancy) significance of the tested variable also means significance of the other option. Differences that were significant at the 95 percent confidence level were noted with "**" and those that were significant at the 90 percent level were noted with "*". Variables that were tested, but not found to be different, have an "a" next to the variable name or range, but no "*" or "**". The formula used for calculating significance between the mean values between two groups "x" and "y" was the was $t = (Mean_x - Mean_y)/\text{square root } [(Se_x)^2+(SE_y)^2]$. If $t>1.645$ the difference is significant at the 90 percent confidence level. If $t>1.96$ the difference is statistically significant at the 95 percent confidence level.

Exhibit 1-1
ATTRIBUTES OF THE HUD-INSURED MULTIFAMILY HOUSING STOCK

Characteristic	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Sample Properties	621	81	540	364	176
Total Properties	12,243	2,224	10,019	5,943	4,076
Percent of Total Properties	100%	18%	82%	59%	41%
Number of Units	1,405,240	354,083	1,051,157	686,309	364,848
Percent of Total Units	100%	25%	75%	65%[b]	35%[b]
Property Size—Number of Units					
<50 Units[a]	17%	6%**	19%	17%	22%
50-99 Units	35%	31%	36%	32%	43%
100-199 Units	36%	42%	35%	39%	29%
>=200 Units[a]	12%	21%*	10%	13%*	6%
Mean # of Units[a]	115	159**	105	115**	90
Median # of Units	96	120	88	100	76
Unit Size—Number of Bedrooms					
<2.25 br[a]	80%	98%*	76%	73%*	80%
>=2.25 br	20%	2%	24%	27%	20%
Mean Unit Size (brs)[a]	1.7	1.6	1.8	1.8	1.7
Designated Occupancy Type					
Family[a]	75%	88%**	72%	80%**	61%
Elderly/disabled	25%	12%	28%	20%	39%
Sponsor Type					
Non-profit/coop[a]	18%	4%**	21%	35%**	2%
Limited Dividend	40%	6%	48%	62%	26%
For Profit[a]	42%	90%**	31%	3%**	72%
Production Method					
New Construction/ Subrehab[a]	87%	86%	87%	89%	84%
Existing	13%	14%	13%	11%	16%

Exhibit 1-1 *(continued)*
ATTRIBUTES OF THE HUD-INSURED MULTIFAMILY HOUSING STOCK

Characteristic	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Building Type					
High Rise[a]	26%	28%	25%	18%**	35%
Walk-up	44%	56%	42%	47%	33%
Single-Family Attached[a]	31%	16%*	33%	35%	32%
Mortgage Start Year					
Pre-1970[a]	5%	5%	5%	9%**	0%
1970-1979	55%	43%	57%	86%	15%
1980 or Later[a]	40%	52%*	37%	5%**	85%

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.
**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.
[a] Significance test conducted.
[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Sums may not add to 100% due to rounding.

Source: HUD FOMNS and MIDLIS systems, 1995 Physical Inspections.

- Fifty-nine percent of assisted properties were older assisted, receiving HUD assistance through interest subsidies (Section 236 or Section 221(d)(3)BMIR) or rental assistance (Section 8 Loan Management Set Aside (LMSA), Rent Supplement/Rental Assistance Payments (RAP), Preservation, or Property Disposition Section 8).

- Forty-one percent of assisted properties were newer assisted, receiving assistance through the Section 8 New Construction or Substantial Rehabilitation programs, or in a few cases, the Section 8 Moderate Rehabilitation program.[4]

• ***Property Size:*** Assisted properties had 105 units on average; 10 percent had 200 or more units, and 19 percent had fewer than 50 units. Older assisted properties tended to be larger than newer assisted properties, but smaller than unassisted properties. Older assisted properties had 115 units on average compared with 90 units in the

4 All tables show the stock total; then unassisted/assisted which total to the stock total; then older assisted/newer assisted, which total to the assisted stock total.

newer assisted portion of the stock and 159 units in the unassisted portion of the stock.

- ***Unit Size:*** Unassisted properties had smaller units (fewer bedrooms) than did assisted properties. Only two percent of unassisted properties had an average unit size of 2.25 or more bedrooms, with an overall average unit size of 1.6 bedrooms.[5] In contrast, 24 percent of assisted properties had average unit sizes of 2.25 or more bedrooms, and the overall average size was 1.8 bedrooms. Older assisted properties included more properties with an average size of at least 2.25 bedrooms (27 percent) than did newer assisted properties (20 percent).

- ***Occupancy type:*** Unassisted properties were more likely to have been designated for "family occupancy" at mortgage origination (88 percent) than were either older assisted (80 percent) or newer assisted (61 percent) properties.[6]

- ***Sponsor type:*** Nearly all unassisted (96 percent) and newer assisted (98 percent) properties had profit-motivated or limited-dividend owners. In contrast, 35 percent of the older assisted stock was owned by non-profit entities.

- ***Production Method:*** The predominant production method across all assistance categories was new construction or substantial rehabilitation (87 percent). The remaining 13 percent were insured as part of the purchase of an existing property.

- ***Building Type:*** In both unassisted and older assisted properties the predominant building type was walk-up (56 percent and 47 percent, respectively). Newer assisted properties, however, were nearly equally split among high rise (35 percent), walk-up (33 percent), and single-family attached (32 percent).

- ***Mortgage Start Year:*** Most of the HUD-insured stock was insured in 1970 or later. Mortgages of unassisted properties are spread roughly equally across the 1970s and 1980s. Many of the oldest FHA mortgages have already matured or been prepaid. Mortgages of the vast majority of older assisted properties (86 percent) were insured between 1970 and 1979, while those of newer assisted properties (85 percent) date primarily from 1980 onward.

5 For this study we defined properties with at least 2.25 bedrooms on average per unit as being able to house large families. For calculating average unit size, studios were treated as "0" bedroom units.

6 The figures regarding designated occupancy type at origination are from HUD's MIDLIS system. They differ from the actual tenant characteristics reported in TRACS, which was the source for Exhibit 1-2.

1.2 Tenants in Assisted Properties

The assisted stock provides an important source of housing for low-income families and elderly households. Virtually all of the households living in these properties had very-low or low-incomes and on average one third of households were headed by the elderly. HUD assistance plays a crucial role in maintaining these units as affordable housing.

Tenant characteristics for residents in the assisted portion of the stock were obtained from HUD's Tenant Rental Assistance Certification System (TRACS), which tracks tenant characteristics in assisted HUD-insured properties.[7] This chapter of this report excludes residents of unassisted properties because HUD has no data on residents of unassisted properties.

Exhibit 1-2 presents 1995 characteristics of tenants by assistance category.

- ***Race and Ethnicity:*** The racial and ethnic composition of properties was similar in newer and older assisted properties. On average, 58 percent of residents were white, 37 percent were black, and most (89%) considered themselves non-Hispanic regardless of race.

- ***Household Size:*** Newer assisted properties had a higher proportion of single person households (49 percent) than did older assisted properties (39 percent). This is consistent with the higher portion of elderly residents in the newer assisted stock.

- ***Elderly and Disability Status:*** A higher proportion of households in newer assisted properties were classified as elderly—40 percent compared with 28 percent in older assisted properties. In both types of properties about 11 percent of households were classified as handicapped.

- ***Income Distribution:*** Nearly all residents of assisted housing had low incomes (below 80 percent of local median for their household size).

    - Newer assisted properties had a higher proportion of residents with very low incomes (below 50 percent of local median for their household size) (95 percent) than did older assisted properties (67 percent).
    - In absolute dollars, 90 percent of residents in newer assisted properties, and 80 percent of residents in older assisted properties, had annual incomes below $15,000.

7 Data were received on 460 of the 540 assisted properties (150 newer assisted and 310 older assisted). These represent 8,536 of the 10,019 assisted properties in the study universe. Income, household size and elderly/handicap status of the remaining properties were imputed based on assistance category and occupancy type. Race and ethnicity were imputed based on assistance category, occupancy type and characteristics of the property's neighborhood.

- ***Source of Income:*** While about a fourth of households received some public assistance, residents of older assisted properties were more likely to be working (39 percent) than residents of newer assisted properties (23 percent). Conversely, residents of newer assisted properties were more likely to receive Social Security or Supplemental Security Income (55 percent) than were residents of older assisted properties (42 percent). This is consistent with older assisted properties having a higher proportion of working age residents.

- ***Tenant Paid Rents:*** As shown above most residents in assisted housing have very low incomes. The local Fair Market Rent (FMR) is one commonly used proxy for moderate priced rental units. In nearly all assisted properties (96 percent) tenant paid rents were below 75 percent of the local FMR.

Exhibit 1-2
TENANT CHARACTERISTICS IN ASSISTED HUD-INSURED MULTIFAMILY HOUSING

	All Assisted	Older Assisted	Newer Assisted
Total Properties	10,019	5,943	4,076
Percent of Total Properties	100%	59%	41%
Race			
White [a]	58%	57%	60%
Black	37%	37%	37%
Native American	1%	1%	1%
Asian	4%	5%	3%
Ethnicity			
Hispanic [a]	11%	12%	9%
Non-Hispanic	89%	88%	91%
Household Size			
1 Person [a]	42%	39%*	49%
2 Person	25%	26%	22%
3 Person	17%	17%	16%
4 + Person	16%	17%	13%
Other Demographic Characteristics			
Percent Elderly [a]	33%	28%**	40%
Percent Disabled [a]	11%	10%	12%
Income Distribution			
Under $5,000	18%	17%	18%
$5,000-<$10,000	48%	43%	55%
$10,000-<$15,000	19%	20%	17%
$15,000-<$20,000	8%	9%	6%

Exhibit 1-2 *(continued)*
TENANT CHARACTERISTICS IN ASSISTED HUD-INSURED MULTIFAMILY HOUSING

	All Assisted	Older Assisted	Newer Assisted
Total Properties	10,019	5,943	4,076
Percent of Total Properties	100%	59%	41%
Income Distribution *(Continued)*			
$20,000-<$25,000	3%	4%	2%
$25,000+	4%	6%	1%
Other Income Characteristics			
Very low income (<50% of median)[a]	78%	67%**	95%
Low income (<80% of median)	20%	31%	5%
Not low income (>80% of median)	1%	2%	0
Percent with some public assistance	24%	25%	24%
Percent with some SS/SSI income [a]	47%	42%**	55%
Percent with some wage income [a]	32%	39%**	23%
Tenant Paid Rents/ Local FMR			
< 0.25[a]	28%	16%**	45%
0.25 - < 0.5	47%	53%	38%
0.5 - < 0.75	21%	27%	11%
0.75 - < 1	3%	4%	2%
1+	2%	0%	5%

* Difference between older/newer assisted significant at the 90% level.
**Difference between older/newer assisted significant at the 95% level.
[a] Significance test conducted.
Note: Column sums may not add to 100% due to rounding.
Source: HUD TRACS, FMR data, financial data.

1.3 Neighborhoods of HUD-Insured (or Held) Properties

Characteristics of the local neighborhood may be as important to residents' quality of life as characteristics of the property itself. This section describes dimensions of the neighborhoods in which multi-family properties with HUD insured (or held) mortgages are located:

- Neighborhood characteristics
- Neighborhood conditions
- Neighborhood demographics
- Neighborhood trends
- Neighborhood vacancy rates

Neighborhood Characteristics

We obtained information on neighborhood characteristics from windshield surveys conducted for this study and from the U.S. Census. The same inspectors who inspected properties' physical condition also surveyed property neighborhoods using a structured windshield survey instrument, tabulating key information such as land use, type of residential structure, age of most of the residential structures, and type of construction. Central city status was obtained from U.S. Census files on Central City tracts and MSA status.

Neighborhoods where insured properties were located differed little across assistance categories (Exhibit 1-3):

- ***Land Use:*** Across all assistance categories, properties' neighborhoods were primarily residential—at least 66 percent of the land was in residential use.

- ***Residential Structure Type:*** On average, about half of residential structures in these neighborhoods were single-family homes. Large multifamily structures, (22 percent of residential structures on average) were the second most common structure type.

- ***Construction Type:*** Construction type was also similar across assistance categories, with almost half of residential buildings being wood structures.

- ***Residential Property Age:*** Unassisted properties, compared with assisted properties, tended to be located in neighborhoods with newer buildings. On average, 70 percent of residences in neighborhoods of unassisted properties were built after 1961, compared with 50 percent in neighborhoods of assisted properties. In addition, one quarter of the properties in the neighborhoods of assisted properties were built prior to 1945 compared with only 11 percent in neighborhoods of unassisted properties.

- ***Central City Status:*** Overall, most properties (90 percent) were located in metropolitan statistical areas (MSAs). Older assisted properties were more likely to be located in central city portions of MSAs (46 percent) than were either newer assisted (38 percent) or unassisted properties (36 percent). Newer assisted properties were more likely to be located in non-MSA locations (14 percent) than were older assisted (9 percent) or unassisted properties (5 percent). It is important to note that this study ***understates*** the portion of all properties in non-MSA areas because the study universe was limited to properties in MSAs and adjacent non-MSA counties thereby excluding insured properties in rural areas remote from MSAs.

Exhibit 1-3
NEIGHBORHOOD CHARACTERISTICS FOR THE HUD-INSURED MULTIFAMILY HOUSING STOCK

	Total	Total		Assisted	
		Unassisted	Assisted	Older	Newer
Total Properties	12,243	2,224	10,019	5,943	4,076
Percent of Total Properties	100%	18%	82%	59%[b]	41%[b]
Land Use					
Residential[a]	66%	69%	66%	66%	66%
Commercial	21%	22%	21%	19%	22%
Industrial	5%	3%	5%	6%	4%
Institutional	6%	5%	6%	6%	6%
Other	2%	1%	2%	3%	2%
Residential Structure Type					
Single-Family Detached[a]	49%	47%	49%	49%	50%
Garden/Row/Townhouse	14%	16%	14%	16%	12%
Multifamily 2-4 Units	7%	6%	7%	7%	7%
Multifamily 5-10 Units	8%	5%	9%	9%	8%
Multifamily ≥ 11 Units	22%	26%	21%	19%	23%
Construction Type					
Wood Frame	46%	43%	47%	48%	44%
Masonry	34%	30%	34%	32%	38%
Mixed	20%	27%	19%	20%	18%
Residential Property Age					
Pre-1945	23%	11%	25%	23%	28%
1946-1960	24%	19%	25%	25%	25%
1961- Present[a]	53%	70%**	50%	52%	47%
Central City Status[c]					
MSA - Central City[a]	42%	36%	43%	46%*	38%
MSA - Not Central City	48%	59%	46%	45%	47%
Non-MSA[a]	10%	5%*	11%	9%*	14%

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.

**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.

[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

[c] The study universe excluded non-MSA areas that are remote from MSAs, thereby understating slightly the portion of non-MSA properties in the full stock.

Note: Sums may not add to 100% due to rounding.

Source: Inspector Windshield Survey and Special Census Tabulation on Central City Status.

Neighborhood Conditions

Neighborhood condition of the HUD-insured (or held) stock is summarized in Exhibit 1-4. Data on neighborhood conditions were compiled from the study's Inspector Windshield Survey and Market Valuation Summary. For the Inspector Windshield Survey, inspectors rated each neighborhood on several dimensions such as condition of streets and curbs, street maintenance, owner housekeeping, and general condition of housing. For the Market Valuation Summary, market analysts obtained a description of the neighborhood economy from discussions with local real estate professionals.

- Unassisted properties were much more likely to be located in neighborhoods having an economy rated "high" (43 percent) by the market analysts than were assisted properties (11 percent). Conversely, unassisted properties were much less likely to be in neighborhoods having a "depressed economy" (2 percent) than were assisted properties (20 percent).

- Across all the dimensions, the inspectors rated the neighborhood conditions of unassisted properties as "better" than those of the assisted properties. Across most quality characteristics, about ninety percent of the neighborhoods of unassisted properties were related as "good" or "excellent", compared with about three fourths of neighborhoods of assisted properties.

- More than half of the neighborhoods of unassisted properties were judged to be of "better quality" or "much better quality" than were other neighborhoods in the local housing market. On the other hand, assisted properties were more likely to be in neighborhoods judged to be of "poorer quality" or "much poorer quality" than were other neighborhoods in the local housing market (38 percent).

Neighborhood conditions of newer and older assisted properties were described as similar to each other.

Exhibit 1-4

NEIGHBORHOOD CONDITIONS FOR THE HUD-INSURED MULTIFAMILY HOUSING STOCK

	Total	Total		Assisted	
		Unassisted	Assisted	Older	Newer
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Description of Neighborhood Economy					
Depressed[a]	17%	2%**	20%	21%	18%
Average	38%	35%	39%	39%	40%
High[a]	17%	43%**	11%	11%	11%
Mixed	28%	20%	30%	29%	31%
General Condition of Housing					
Sound Condition[a]	68%	83%**	64%	64%	65%
Minor Deterioration	24%	14%	26%	27%	26%
Major Deterioration	6%	2%	7%	7%	6%
Dilapidated/Abandoned[a]	2%	1%**	3%	2%	3%
Condition of Streets/Curbs					
Excellent/Good[a]	80%	93%**	77%	76%	78%
Fair/Poor	20%	7%	23%	24%	22%
Street Maintenance					
Excellent/Good[a]	80%	96%**	77%	78%	76%
Fair/Poor	20%	4%	23%	22%	24%
Owner Housekeeping					
Excellent/Good[a]	76%	93%**	72%	71%	74%
Fair/Poor	24%	7%	28%	29%	26%
Quality as Residential Neighborhood					
Excellent/Good[a]	67%	90%**	62%	63%	61%
Fair/Poor	33%	10%	38%	37%	39%
Comparison of Neighborhood with Other Residential Areas in Local Housing Market					
Better or Much Better Quality[a]	24%	51%**	19%	17%	20%
About Average Quality	43%	38%	43%	44%	43%
Poor or Much Poorer Quality[a]	33%	11%**	38%	39%	37%

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.
**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.
[a] Significance test conducted.
[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.
Note: Sums may not add to 100% due to rounding.
Source: Inspector Windshield Survey and Market Valuation Summaries.

Demographic Characteristics

Demographic data for the neighborhoods of HUD-insured properties were obtained from the 1990 Census at the census tract level. Property neighborhoods differed between unassisted and assisted properties, but not between newer and older assisted properties. Exhibit 1-5 presents the following demographic information for property neighborhoods:[8] [9]

- ***Race/Ethnicity:*** On average, insured properties were located in neighborhoods that were 63 percent white non-Hispanic, 24 percent black non-Hispanic, and 4 percent other non-Hispanic groups. The average neighborhood percentage of Hispanic households regardless of race was 9 percent.

- Unassisted properties were generally in neighborhoods with higher concentrations of white non-Hispanic residents (77 percent) than were assisted properties (60 percent).

- ***Income Distribution:*** Unassisted properties tended to be located in areas with higher incomes ($40,492 area median income) than were assisted properties ($28,273 area median income) (1990 Census figures reported in 1995 dollars). This difference held both in terms of absolute income levels and in terms of income relative to the metropolitan area median.

- In neighborhoods where unassisted properties were located, 39 percent of households earned ***more than the local area median income***[10], compared with 28 percent in neighborhoods where assisted properties were located. At the other end of the income distribution, only 33 percent of households in neighborhoods where unassisted properties were located had ***incomes below 50 percent of the local median***, compared with 45 percent of households in neighborhoods where assisted properties were located.

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8 All Census dollar values were inflated to 1995 dollars using the CPI for Urban Consumers. (i.e. multiplied by 153.4/126.1= 1.2173, the CPI-U for the end of 1995 divided by the CPI-U for the end of 1989) and then rounded to the nearest $1000. For example, the 1990 Census ranges for income distribution include "0 - $9,999". On average across the stock neighborhoods 25 percent of households fell into that income category. "0 - $9,999) translates into $12,172 in 1995 dollars (9999 x 1.2173), which gets rounded to $12,000. Thus the bottom income range in the table was "0-$12,000) and included 25% of households in the neighborhoods of the insured stock.

In later chapters of this report, we use the Housing Component of the CPI as the inflation factor, because we are dealing with housing costs and rents. Here, since the overall income distribution is used, the overall CPI is preferred.

9 The source for the neighborhood characteristics in the 1990 Study was the 1980 Census, thus there are reported differences in neighborhood characteristics across the two studies.

10 As computed by HUD Office of Policy Development and Research based on 1990 Census data.

Exhibit 1-5
DEMOGRAPHIC CHARACTERISTICS OF PROPERTY NEIGHBORHOODS FOR THE HUD-INSURED MULTIFAMILY HOUSING STOCK

	Total	Total		Assisted	
		Unassisted	Assisted	Older	Newer
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Neighborhood Race/Ethnicity					
White, non-Hispanic[a]	63%	77%**	60%	58%	61%
Black, non-Hispanic	24%	13%	26%	26%	26%
Other, non-Hispanic	4%	5%	4%	5%	4%
Hispanic (regardless of race)	9%	5%	10%	11%	9%
Neighborhood Income Distribution—1995 Dollars					
$0 - $11,999[a]	24%	16%**	26%	26%	26%
$12,000 - $17,999	10%	9%	11%	11%	11%
$18,000 - $29,999	18%	16%	19%	19%	18%
$30,000 - $42,999	15%	16%	14%	14%	14%
$43,000 - $60,999	16%	19%	15%	15%	15%
$61,000 +[a]	17%	24%**	15%	15%	15%
Average Median Income	$30,492	$40,492	$28,273	$27,569	$29,299
Average Median Renter Income	$21,236	$28,645	$20,001	$20,096	$19,863
Neighborhood Income Distribution—Relative to Local Area Median					
Percent < 50% Median [a]	43%	33%**	45%*	46%	44%
Percent 50-80% Median	12%	11%	12%	12%	13%
Percent 80-100% Median	15%	17%	15%	15%	14%
Percent > Median	30%	39%	28%	27%	29%
Other Neighborhood Demographic Characteristics					
Average Household Size	2.5	2.5	2.6	2.6	2.6
% Population in Poverty[a]	21%	13%**	23%	23%	23%
Other Demographic Characteristics:					
% Households Headed by Women[a]	18%	12%**	19%	19%	18%
% Households Headed by Elderly[a]	22%	19%**	22%	21%*	23%
% Single Person Households[a]	30%	32%**	30%	30%	30%
% Owner Occupied[a]	45%	49%*	44%	42%*	47%

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.
** Difference between unassisted/assisted or older/newer assisted significant at the 95% level.
[a] Significance test conducted.
[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe. Note: Sums may not add to 100% due to rounding.
Source: 1990 U.S. Census Data, HUD Median Income Data for 1995.

- ***Poverty:*** The portion of the population with incomes below the poverty level was lower in neighborhoods of unassisted properties (13 percent) than in neighborhoods of assisted properties (23 percent).

- ***Other Demographic Characteristics:*** Average household size was slightly lower in neighborhoods where unassisted properties were located (2.5 versus 2.6).

- Households in neighborhoods of assisted properties were also less likely than those of assisted properties to be headed by women (12 percent versus 19 percent) or the elderly (19 percent versus 22 percent).

- Insured properties were located in neighborhoods that averaged 45 percent owner occupants. Neighborhoods of unassisted properties had the highest proportion of owner occupants (49 percent) and neighborhoods of older assisted properties had the lowest proportion (42 percent).

Trends in the Neighborhoods

As part of the process of determining the market value of the HUD-insured properties, the study's market analysts discussed with local real estate professionals the kinds of changes that were occurring in the neighborhoods. These neighborhood changes are presented in Exhibit 1-6.

- Neighborhoods of most assisted and unassisted properties were expected to either "stay the same" (58 percent) or "improve" (37 percent). Five percent of neighborhoods with assisted properties were expected to "decline" compared with 1 percent of neighborhoods of unassisted properties.

- Fifty-eight percent of the neighborhoods of the unassisted properties were experiencing new construction, compared with only 32 percent of the neighborhoods of assisted properties. On the other hand, significant rehabilitation was reported more often in neighborhoods of assisted properties (32 percent) than in those of unassisted properties (26 percent).

- Neighborhoods of assisted properties were more likely to be showing evidence of disinvestment (17 percent) than were those of unassisted properties (1 percent).

Exhibit 1-6
NEIGHBORHOOD TRENDS FOR THE HUD-INSURED MULTIFAMILY HOUSING STOCK

	Total	Total		Assisted	
		Unassisted	Assisted	Older	Newer
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Expected Neighborhood Change					
Improve[a]	37%	35%	38%	37%	39%
Stay the Same	58%	64%	57%	59%	54%
Decline	5%	1%	5%	4%	7%
Occurrence of Significant New Construction Evident					
Yes [a]	37%	58%**	32%	30%	35%
No	63%	42%	68%	70%	65%
Occurrence of Significant Rehabilitation Evident					
Yes[a]	31%	26%	32%	33%	31%
No	69%	74%	68%	67%	69%
Occurrence of Disinvestment Evident					
Yes[a]	14%	1%**	17%	17%	17%
No	86%	99%	83%	83%	83%

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.
**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.
[a] Significance test conducted.
[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.
Note: Sums may not add to 100% due to rounding.
Source: Market Valuation Summaries.

Neighborhood Vacancy Rates

Exhibit 1-7 provides indicators of neighborhood vacancy rates that were collected by the study's market analysts through their discussions with local real estate professionals. The exhibit shows:

- Forty-six percent of properties were in low-vacancy neighborhoods (vacancy rates below 4 percent), 36 percent in moderate-vacancy neighborhoods (vacancy rates between 4 and 7 percent), and 18 percent in higher-vacancy neighborhoods (vacancy rates over 7 percent).

- Newer assisted properties were most likely to be located in low-vacancy neighborhoods (52 percent compared with 43 percent for both older assisted and unassisted).

- Older assisted properties were most likely to be located in higher-vacancy neighborhoods (21 percent compared with 14-16 percent for newer assisted and unassisted properties).

- Across all assistance categories market analysts judged that most (82 percent) properties were in neighborhoods that had vacancy rates similar to or lower than rates in other parts of their jurisdictions. However, 23 percent of older assisted properties were in neighborhoods that had higher vacancy rates than other parts of their local housing markets compared with only 12 percent of unassisted, and 15 percent of newer assisted properties.

- Across all assistance categories, market analysts judged that future vacancy rates in the neighborhoods would likely remain the same (78 percent).

Exhibit 1-7
NEIGHBORHOOD VACANCY INDICATORS

	Total	Total		Assisted	
		Unassisted	Assisted	Older	Newer
Total Properties	12,243	2,224	10,019	5,943	4,076
Percent of Total Properties	100%	18%	82%	59%[b]	41%[b]
Neighborhood Vacancy Rates					
< 4%[a]	46%	43%	47%	43%*	52%
4% - 7%	36%	41%	35%	36%	34%
7% +[a]	18%	16%	18%	21%*	14%
Vacancy Rates in Neighborhood vs. Other Areas in Local Housing Market					
Above Average[a]	18%	12%*	20%	23%**	15%
Average	63%	62%	63%	61%	66%
Below Average[a]	19%	26%*	17%	16%	19%
Future Vacancy Trends					
Likely to Increase[a]	10%	15%	9%	8%	10%
Likely to Remain the Same	78%	74%	79%	80%	78%
Likely to Decrease[a]	12%	11%	12%	12%	12%

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.
**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.
[a] Significance test conducted.
[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.
Source: Market Valuation Summaries

CHAPTER TWO
PHYSICAL CONDITION OF HUD-INSURED (OR HELD) PROPERTIES

This chapter presents measures of the physical condition of the stock of multifamily properties with HUD-insured (or held) mortgages. Two primary measures are discussed. Section 2.1 describes the 1995 backlog of physical needs in the stock. Section 2.2 describes the annual accrual of future repair and replacement needs.

2.1 1995 Backlog of Physical Needs

A property's physical condition (physical needs backlog) was measured by the cost of repairs and replacements beyond ordinary maintenance required to restore all systems to original working condition. Property systems still in good working order (requiring "no action") by definition, had no associated costs.

Trained inspectors evaluated the condition of all physical systems in each property and determined, for each property element, the action level (if any) needed to restore that element to original working condition. For example, a severely deteriorated window might require an action of "replacement." A computerized costing routine then calculated the cost of correcting defects by multiplying the quantity and action levels for the property by a standardized set of unit costs. Thus, for windows needing replacement, the number of windows in the property needing replacement was multiplied by the cost of replacing a window of the appropriate type and size.

The inspection protocol included observing conditions of 119 mechanical, electrical, and architectural systems, organized by major property elements (site, building, or unit). The 119 specific systems were combined into 17 major system groups for costing and reporting purposes. The systems and their groupings are presented in Exhibit 2-1. For each system, the inspector judged and recorded the level of remedial action.

As with the 1990 Study, the A.M. Fogarty Company supplied the per-unit costs for each of the repair and replacement items.[1] Property costs were then multiplied by location-specific adjustment factors to obtain the local cost of repair needs for each property. Using the same data sources (described in Appendix B) and costing procedures (described in Appendix C) helped to assure the consistency of cost comparisons between the 1989 and 1995 outcomes.

1 The cost file was also reviewed by three external experts, and all costs were considered reasonable.

In this report, to permit comparing costs across properties having different numbers of units, each property's costs were expressed on a "per-unit basis". Furthermore, to permit comparisons across properties having different sized units (since a property of predominantly efficiency units will have lower costs per unit than an otherwise identical property of 3-bedroom units), all property-level costs were normalized on the basis of unit square footage, using each property's "2-bedroom equivalent" rather than its actual number of units. This serves to normalize data for comparisons across assistance categories that have different unit-size mixes. Throughout this report when per-unit values are presented, they are actually per 2-bedroom equivalent unit.[2]

All tables in the chapters of this report present data on a "per 2 BR equivalent unit" basis at the ***property*** level. In other words, the text tables answer questions such as what is the average backlog per 2-bedroom unit across ***all properties***. In contrast, Appendix Exhibit D-1 presents key statistics on a "per 2-bedroom unit" basis ***for the stock as a whole***. Exhibits in that appendix answer questions such as what is the average (per 2-bedroom unit) backlog across ***all (2 bedroom equivalent) units*** in the stock (which is calculated as the sum of the backlog across all properties divided by the total number of 2 bedroom equivalent units across all properties).

For ease of reference, we present physical needs backlog in four categories defined relative to the median backlog for the stock as a whole, which was $1,452 per unit. These categories are descriptive, not normative, and clearly other breaks could have been used.

- Low backlog: Under $1,500 per unit. These properties have below median backlogs.
- Moderate backlog: $1,500 to $3,000. These properties have up to twice the median backlog.
- High backlog: $3,000 to $7,500. These properties have up to 5 times the median backlog.

2 This normalization is not a perfect solution because it may overstate costs and revenues in properties having a preponderance of smaller sized units. The per 2-bedroom rent and costs in small units often exceed those in large units because of certain fixed elements. For example, efficiency apartments bear a higher per square foot cost of kitchens and bathrooms. However, considering the two alternative normalization approaches—dividing by number of units or by number of 2-bedroom equivalent units—we felt that the latter introduced less bias. The number of "2 bedroom equivalent" units (2BR) was calculated by dividing the total square feet of living space by 844. This was the national average square footage of a 2 bedroom unit in the 1990 Study. For consistency we used the same number in the current study. The estimated numbers of 2BR units and actual units by assistance category are as follows:

	Number of 2-bedroom Equivalent Units	**Number of Actual Units**
Unassisted	350,815	354,083
Older Assisted	643,468	686,309
Newer Assisted	319,714	364,848
Total	**1,314,026**	**1,405,240**

Exhibit 2-1
SYSTEM GROUPS AND KEY SYSTEMS INSPECTED

Site Areas—landscaping, roadways, parking, paved pedestrian areas, curbing, fencing, retaining wall, site drainage, pole mounted site lighting. **Site Amenities**—site furniture, yards and enclosures, dumpsters, pool, tennis courts, basketball courts. **Site Distribution Systems**—emergency generator, site electrical distribution, hot water distribution, domestic hot& cold water lines, main water service, gas lines, site sanitary lines, septic system, sewage ejectors, hydrants.
Building Mechanical & Electrical—heating risers, gas distribution, sanitary distribution, fire sprinkler system, sump pump, compactors, switchgear, building wiring, emergency lights, building smoke detector, communication system. **Building Heating & Cooling—**central vent/exhaust, central air conditioning, furnace, boiler, boiler room piping, boiler room equipment, boiler room controls. **Building Elevators**—shaftways, shaftway doors, cabs, machinery. **Building Exterior Closure**—foundation, slab, exterior wall, insulation. **Building Roofs**—roof covering, parapet wall, chimney, roof hatches, skylight, roof drainage. **Building Windows & Doors**—windows, window security grates, exterior common doors, unit entry doors, storm/screen doors. **Building Exterior Features**—canopies, exterior stairs, building mounted site lights, fire escapes, balconies, porches, decks, sheds. **Building Common Areas**—vestibules, corridors, stairways, interior lights, mail facilities.
Unit Interior Construction—interior walls-partitions (excluding kitchen and bathroom), floor sub-base. **Unit Interior Finishes—**interior walls-surface, floor covering, interior doors & frames, kitchen walls, kitchen floor, bathroom walls, bathroom floor. **Unit Kitchen Fixtures**—kitchen cabinet/counter, range and hood, refrigerator, garbage disposal, dishwasher, microwave, trash compactor. **Unit Bathroom Fixtures—**bathroom fixtures, bathroom accessories, vanities. **Unit Heating & Cooling—**HVAC units, radiation, boiler (unit level), furnace (unit level), temperature control, wall air conditioner. **Unit Electrical—**electrical panel, electrical wiring, bell/intercom, smoke detector.

- Very high backlog: $7,500 or more. This category includes the group of properties (11 percent) with the highest backlogs of physical needs.

Exhibit 2-2 shows the backlog of physical needs for the full multifamily housing stock by assistance category. Exhibit 2-3 shows this information graphically. The exhibits show that:

- The total physical needs backlog for the stock was $4.17 billion, $3.6 billion of which was in assisted properties.

  - The mean backlog over all properties was $3,236 per unit—more than twice the median, and as will be discussed later, nearly three times the average annual accrual of physical needs. The mean backlog was highest in assisted properties, averaging $3,638 and lowest in unassisted properties, averaging $1,427. The mean backlog was not statistically different between older and newer assisted properties ($3,929 and $3,214 respectively). These means are far above the actual backlog for most properties because a small portion of the stock has very high backlogs.

  - The median backlog over all properties was $1,452 per unit. Median backlogs for the individual assistance categories followed the same pattern as did the means, with older assisted properties being in worst condition (median $2,096) followed by newer assisted (median $1,324) and unassisted ($545) properties.

- As noted above, about half of the stock had backlogs that were defined as low—under $1,500 per limit. This level of physical need does not seem problematic, since it is within the normal cycle of accumulation of physical needs in a property.

  - The proportion of unassisted and newer assisted properties with low backlogs (66 percent and 65 percent respectively) was considerably higher than the proportion of older assisted properties with low backlogs (42 percent).

  - Thirteen percent of the stock had virtually no backlog of physical needs (under $10 per unit). Unassisted properties were more likely to have no backlog. Twenty-one percent of the unassisted stock had no backlog. Fewer older assisted properties had no backlog (8 percent) than did newer assisted properties (15 percent).

Exhibit 2-2

PHYSICAL CONDITION—BACKLOG OF PHYSICAL NEEDS

(IN 1995 DOLLARS PER 2-BEDROOM EQUIVALENT UNIT)

Characteristic	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Distribution of Backlog of Physical Needs					
Low Backlog[a]	**51%**	**66%****	**47%**	**42%****	**65%**
< $10	13%	21%	11%	8%	15%
$10 to < $500	15%	27%	13%	14%	11%
$500 to < $1,000	12%	6%	13%	11%	16%
$1,000 to < $1,500	11%	12%	10%	9%	13%
Moderate Backlog[a]	**19%**	**22%**	**19%**	**17%**	**21%**
$1,500 to < $2,000	8%	11%	8%	7%	9%
$2,000 to <$2,500	6%	5%	6%	5%	7%
$2,500 to <$3,000	5%	6%	5%	5%	5%
High Backlog[a]	**19%**	**7%****	**22%**	**26%****	**16%**
$3,000 to < $4,000	7%	5%	7%	8%	6%
$4,000 to < $5000	5%	0%	7%	8%	5%
$5,000 to < $7,500	7%	2%	8%	10%	5%
Very High Backlog[a]	**11%**	**4%**	**13%**	**15%****	**9%**
$7,500 to < $10,000	3%	2%	3%	4%	1%
$10,000 to < $15,000	5%	1%	6%	7%	3%
$15,000 to < $20,000	1%	0%	2%	2%	1%
≥ $20,000	2%	0%	3%	2%	4%
Statistics on Backlog of Physical Needs					
Mean[a]	$3,236	$1,427**	$3,638	$3,929	$3,214
Standard Error	203	255	240	276	430
Median	$1,452	$545	$1,661	$2,096	$1,324

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.

**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.

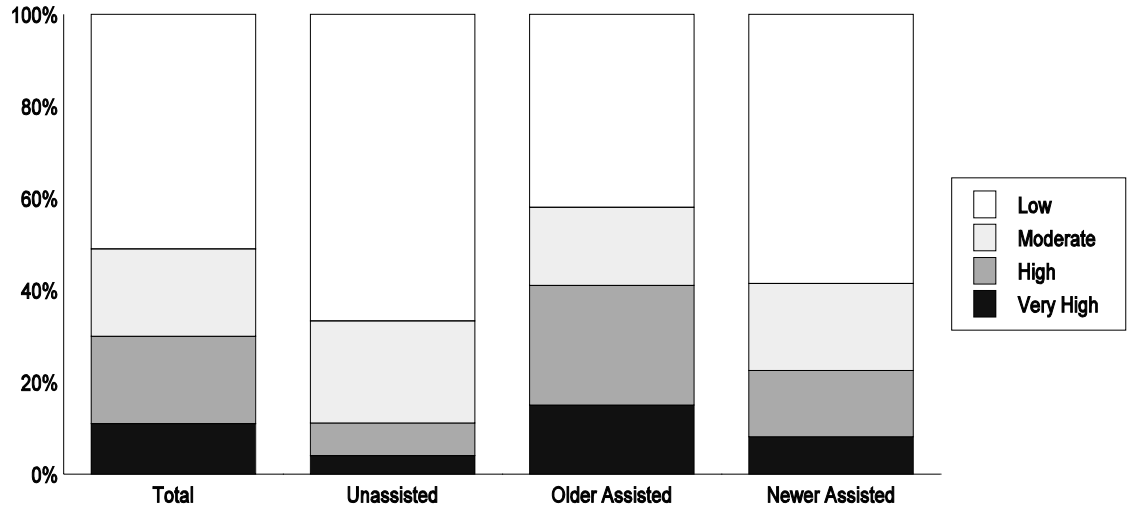
[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Column sums may not add to 100% due to rounding.

Source: 1995 Physical Inspection Data and Costing Programs.

Exhibit 2-3
BACKLOG DISTRIBUTION BY LEVEL



Source: Exhibit 2-2

- Nineteen percent of the properties had moderate backlogs of $1,500-$3,000 per unit —up to about twice the median and about three years' accrual.

  - There was no significant difference in the incidence of moderate backlog across assistance categories.

- Another 19 percent of the stock had high backlogs of $3,000-$7,500 per unit. This level likely indicates problems in the property that will affect residents, marketability of the property and ultimately the financial viability of the property.

  - High backlogs were most common in older assisted properties (26 percent) and least common in unassisted properties (7 percent).

- About 10 percent of the stock had very high backlogs of over $7,500 per unit. These properties are likely not providing adequate housing to residents.

  - Fifteen percent of older assisted properties had very high backlogs, including 4 percent with over $15,000 backlogs per unit.

- Nine percent of newer assisted properties had very high backlogs, including 5 percent with over $15,000 backlogs per unit.

- Over 4 percent of unassisted properties had backlogs over $7,500 per unit, and none had backlogs over $15,000.

Components of Physical Needs Backlogs

Exhibit 2-4 shows how backlogs were distributed over major property elements (site, building, or unit) and over 17 major system groups. Looking at the three major property elements, most of the backlogs (54 percent) were attributed to unit-level systems, followed by building systems (31 percent) and sites (14 percent). The distribution of physical needs across property elements was similar across all assistance categories.

Looking at the 17 system groups:

- The largest component of backlog need was Kitchen Fixtures (23 percent of total backlog). Kitchen Fixtures, which include cabinets, counters, ranges, and refrigerators, are subject to a high level of resident use and rapid wear.

- The second largest component of backlog need was unit Interior Finishes (21 percent of the total backlog). Interior Finishes, largely surface elements such as wall and ceiling surfaces and interior doors, are also subject to a high level of resident use and more rapid wear than most systems.

- The third largest component of backlog need was site areas (12 percent of backlog), which include landscaping, roadways, and other paved areas.

The distribution of costs by system group varied little across assistance categories.

Unit interior finishes and kitchen fixtures were also the two largest cost components in 1989 (their shares were 37 percent and 14 percent respectively).

Costs Associated with Health and Safety Systems

The effect of a property's physical backlog depends on the systems affected and the repairs and replacements required. Backlogs that are in systems that directly affect resident health and safety—such as interior construction, heating and cooling, and building mechanical systems—are of special concern. The immediate threat to resident safety is diminished to the extent that the needed repairs are in systems that are more cosmetic, such as site amenities or interior finishes.

Exhibit 2-4
DISTRIBUTION OF BACKLOG OF PHYSICAL NEEDS BY SYSTEM GROUP[a]

Characteristic	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Site Costs	**14%**	**15%**	**14%**	**15%**	**14%**
Site Areas	12%	13%	11%	12%	11%
Site Amenities	3%	2%	3%	3%	3%
Site Distribution	0%	0%	0%	0%	0%
Building Costs	**31%**	**36%**	**31%**	**31%**	**30%**
Mechanical & Electric	1%	1%	2%	2%	1%
Heating & Cool	3%	5%	3%	3%	3%
Elevators	0%	0%	0%	0%	0%
Exterior Closure	6%	10%	5%	5%	6%
Roofs	7%	10%	7%	6%	7%
Windows & Doors	8%	5%	8%	10%	5%
Exterior Features	2%	1%	2%	2%	2%
Common Areas	4%	5%	4%	3%	4%
Unit Costs	**54%**	**49%**	**55%**	**54%**	**56%**
Interior Construction	1%	0%	1%	1%	0%
Interior Finishes	21%	18%	22%	21%	23%
Kitchen Fixtures	23%	26%	23%	21%	25%
Bath Fixtures	5%	3%	5%	5%	5%
Heating & Cooling	3%	1%	3%	4%	1%
Electrical	1%	1%	1%	1%	1%
Total	100%	100%	100%	100%	100%
Mean	$3,236	$1,427	$3,638	$3,929	$3,214

[a] Percents are calculated only for properties with backlog greater than 0.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Column sums may not add to 100% due to rounding.

Source: 1995 Physical Inspection Data and Costing Program.

For the purposes of this study, we identified the subset of the system groups that are most likely to affect residents' health and safety:

- Unit Interior Construction
- Unit Bathroom Fixtures
- Unit Heating and Cooling
- Unit Electrical
- Building Heating and Cooling
- Building Mechanical and Electrical

The mean and median backlog costs for these health and safety systems are shown in Exhibit 2-5. The backlog associated with health and safety systems was about a fifth of the total backlog regardless of assistance category. Therefore, in absolute dollars, health and safety backlogs were highest in older assisted properties (mean $850 per unit), followed by newer assisted properties (mean $592), and unassisted properties (mean $273).

As with total backlogs, health and safety backlogs were concentrated in only a portion of the stock. This is illustrated by the median health and safety backlogs: half of all properties had health and safety backlogs of $65 or less, and even for the worst case, half of all older assisted properties had health and safety backlogs of $150 or less.

It is important to note that health and safety backlogs provide the cost to remedy associated problems, but do not reflect the degree of health and safety risk. A particular electrical problem might be almost cost-free to remedy, but could cause serious injury or death; while a particular plumbing problem might be very costly to remedy, but cause no more than inconvenience to residents.

Comparing health and safety backlogs over time, we find that while the ***dollar cost*** of health and safety backlogs ***increased*** by 46 percent between 1989 and 1995 (in constant 1995 dollars)[3], the ***relative share of total backlog*** due to health and safety systems ***decreased*** by 20 percent over this period. This decrease in the percent of all physical needs that are due to health and safety systems can be attributed primarily to the change in the relative distribution of backlog of physical needs between unit-level and non unit-level systems from 1989 to 1995. Most health and safety systems are unit level systems. In 1989, unit level systems accounted for 59 percent of the total backlog, whereas in 1995 these systems accounted for only 55 percent of the total backlog.

3 Backlog costs for 1989 were inflated by 1.1986 (the Housing Component of the Consumer Price Index) to express them in 1995 dollars. The next section of this report discusses change over time in general.

Exhibit 2-5
BACKLOG OF PHYSICAL NEEDS FOR HEALTH & SAFETY SYSTEMS
(IN 1995 DOLLARS PER 2-BEDROOM EQUIVALENT UNIT)

Characteristic	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Mean Total Backlog (All Property Systems)	$3,236	$1,427	$3,638	$3,929	$3,214
Backlog for Health and Safety Systems					
Mean[a]	$659	$273**	$745	$850*	$592
Standard Error	66	97	77	101	119
Median	$65	$0	$105	$150	$72
Health & Safety as a % of Total Backlog	20%	19%	20%	22%	18%

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.
**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.
[a] Significance test conducted.
[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.
Source: 1995 Physical Inspection Data and Costing Program.

Changes in the Physical Condition of the Stock

One of the most significant, but expected, findings of this study is that the physical condition of many HUD-insured properties has gotten worse between 1989 and 1995. Property owners and managers were apparently not keeping up with accruing physical needs. Even after controlling for inflation, the mean backlog of physical needs across the stock rose by over 60 percent between 1989 and 1995. As described below, while mean backlog increased across all categories of properties, the increase was most dramatic in newer assisted properties.[4]

Exhibit 2-6 presents indicators of change in the mean, median and distribution of physical needs backlogs between 1989 and 1995. These numbers differ slightly from those in Exhibit 2-2 because they were computed using the "comparison sample"—the 504 properties that were common to both the 1989 sample of 570 properties and the 1995 sample of 621 properties. Relying on the comparison sample eliminates the possibility that changes in the estimated

4 Property-level physical condition data was not intended to be measured with sufficient precision to provide property-level estimates. Therefore, we only compare changes in the means and distribution at the level of assistance category.

backlog of physical needs result from using different properties. All numbers were weighted to reflect the stock of properties that was still insured in 1995.[5]

- Across the entire stock, mean backlog rose by $1,176, or 62 percent, as measured in constant 1995 dollars. The increase was greatest, however, in the newer assisted stock.

  - Backlog was lowest in unassisted properties in both years. Between 1989 and 1995, their mean backlog rose by less than $500, or about 50 percent.

  - Backlog was highest in older assisted properties in both years. Between 1989 and 1995, their mean backlog rose by nearly $1,100, or 40 percent.

  - Mean backlog rose most dramatically in newer assisted properties by over $1,700, or nearly 160 percent.

- Across the stock as a whole, the portion of properties with moderate or high backlogs increased. The portion of properties with low backlogs (under $1,500 per unit) decreased from 63 percent to 49 percent. The portion with moderate backlogs ($1,500 to $3,000 per unit) increased from 15 percent to 21 percent. The portion with high backlogs ($3,000 to $7,500 per unit) increased from 17 percent to 21 percent. The properties with very high backlogs ($7,500 or more per unit) doubled, going from 5 to 10 percent of the stock. This pattern of change followed in each of the assistance categories:

  - From 1989 to 1995, the portion of ***unassisted properties*** with low backlogs (< $1,500 per unit) declined from 81 percent to 67 percent. In contrast, the proportion with moderate backlogs more than doubled from 9 percent to 22 percent. The proportion with high or very high backlogs stayed nearly constant at 7 percent and 4 percent respectively.

5 The overall reported differences in backlog reflect both changes in actual property condition and changes in several system definitions and costs (beyond controlling for inflation). Unit cost estimates for repairing some systems increased since 1989 and decreased for others. Definitions of actions associated with some systems changed as well. As shown in a separate analytic memorandum, the reported change in mean backlog appears to be a true result of deterioration in condition rather than a result of changes in specific cost components. Comparing the mean backlog in 1989 with the calculated mean using 1989 condition and the 1995 cost files shows that the changes in costs had almost no effect on the estimated mean backlog. The mean backlog in 1989 was $1,882 per unit. Using the 1995 cost file and 1989 condition yields an overall mean backlog of $1,876.

Exhibit 2-6
COMPARISON OF BACKLOG OF PHYSICAL NEEDS BETWEEN 1989 AND 1995
(IN 1995 DOLLARS PER 2-BEDROOM EQUIVALENT UNIT)
BASED ON COMPARISON SAMPLE OF 504 PROPERTIES COMMON TO '89 AND '95 STUDIES

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties	12,243	2,224	10,019	5,943	4,076
% of Properties	100%	18%	82%	59%[a]	41%[a]
Mean Backlog of Physical Needs					
1995	$3,058	$1,427	$3,420	$3,845	$2,800
1989	$1,882	$960	$2,086	$2,769	$1,091
Median Backlog of Physical Needs					
1995	$1,551	$545	$1,823	$2,280	$1,390
1989	$787	$117	$982	$1,580	$373
Percentage of Properties with Backlog of Physical Needs < $1,500 (Low Backlog)					
1995	49%	67%	45%	44%	52%
1989	63%	81%	59%	56%	75%
Percentage of Properties with Backlog of Physical Needs $1,500 to $3,000 (Moderate Backlog)					
1995	21%	22%	21%	19%	24%
1989	15%	9%	17%	18%	15%
Percentage of Properties with Backlog of Physical Needs $3,000 to $7,500 (High Backlog)					
1995	21%	7%	24%	28%	18%
1989	17%	7%	19%	25%	9%
Percentage of Properties with Backlog of Physical Needs $7,500 or more (Very High Backlog)					
1995	10%	4%	11%	14%	7%
1989	5%	3%	6%	9%	1%

[a] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Measures presented in this table may differ slightly from those presented elsewhere in this report because they are computed using the comparison sample subset of the full sample.

Source: 1995 Data: 1995 Physical Inspection Data and Costing Program.
1989 Data: 1990 Study Analysis File, with dollar amounts inflated to 1995 dollars.

- From 1989 to 1995, the portion of ***older assisted properties*** with low backlogs decreased from 56 percent to 46 percent, while the portion with high or very high backlogs each increased slightly. In 1995, 28 percent of older assisted properties had high backlogs versus 25 percent in 1989, the properties with very high backlogs rose from 9 to 14 percent. The portion with moderate backlogs stayed stable.

- Shifts in the distribution of backlogs of ***newer assisted properties*** were most dramatic, as might have been surmised from examining the large increase in means. From 1989 to 1995, the portion with low backlogs fell from 75 percent to 52 percent. At the same time, the portion with moderate backlogs increased from 15 percent to 24 percent and the portion with high backlogs doubled from 9 percent to 18 percent. The properties with very high backlogs rose from 1 to 7 percent.

2.2 Projected Future Physical Needs - Physical Needs Accrual Costs

A property's physical need accruals indicate its expected need for resources in the future. Physical needs accruals are estimates of the average annual costs over the next 20 years (1996 to 2015) to cover expected ongoing repairs and replacements beyond ordinary maintenance. As with backlog costs, accrual costs were computed based upon inspectors' examination of the age, quantity, and condition of each observable system. For each system a set of standardized costs was applied, incorporating timing information based on the system's remaining useful life (or required action interval in the case of systems, such as interior walls, which need periodic refurbishment of framing and plasterboard rather than full replacement).

Each property system was assigned an expected useful life (or required action interval) and an accrual action.

- Useful life (or action interval) is the expected age when a system must be replaced or overhauled because it has worn out or is approaching failure.

- Accrual action is the level of repair or overhauling the system requires at the end of its useful life or at its action interval.

Appendix Exhibit C-5 shows expected useful lives and accrual actions for all systems.

For example, a unit boiler is expected to last 25 years and the associated accrual cost is the cost of a new boiler. Some items are not expected to wear out, but will need periodic major action. For these items, the "expected life" is the action interval, and the accrual cost is the repair cost.

For example, brick chimneys or walls are not expected to wear out at any known interval, but every 25 years must have the mortar joints raked out, repointed, and be waterproofed. The associated accrual cost is the cost of raking, repointing, and waterproofing.

For most systems, inspectors recorded system age as part of their on-site inspections. For other systems, the study assigned system age equal to the age of the buildings. To prevent double-counting of a property's physical needs, age was set to zero for any system that needed replacement or major overhaul as part of the remediation of the physical needs backlog. In other words, for computing accrual, the study assumes that the physical needs backlog was fully remedied at the end of 1995.[6]

The study's accrual costing program determined, for each of the next 20 years, whether the observed system would reach the end of its useful life that year (based on its expected useful life and on the system age), and if so, added the repair/replacement cost to the accrual total for that year. Short-lived systems, such as storm-doors in family-occupied properties, could undergo more than one replacement over the 20 years.

As shown in Exhibit 2-7, the mean annual accrual cost over the next 20 years was $1,104 per unit, with a median of $1,031 (expressed in 1995 dollars). As can be seen, 46 percent of all properties are expected to have average annual accrual needs under $1,000 per unit with another 41 percent between $1,000 and $1,500 per unit per year. There was no significant difference in the mean annual accrual or the distribution across assistance categories.[7,8]

6 Specifically, we assume that if a "moderate", "major" or "replace" action is required to remedy the physical needs backlog, then the system age is reset to zero. Exceptions to this rule are pole mounted lighting, emergency generators, hot air furnaces, sheds, porches, and decks where only major or replace actions reset the system age to zero.

7 The accrual cost estimates developed for this study are somewhat higher than other estimates, such as those developed by Ernst & Young and presented in a May, 1996 slide presentation to HUD. In Abt Associates' consultations with external experts it became clear that practice regarding accrual cost estimation is very varied. Practices range from including only large non-routine expenses such as roof repairs, to inclusion of ***all*** capital expenditures, which is what this study does. Given the rules of inclusion for accrual, the outside experts all agreed the study's accrual cost estimates were reasonable.

8 Abt Associates' annual accrual estimates computed for this study relied on slightly different assumptions regarding useful lives and accrual actions compared with the 1989 estimates. The changes in assumptions did not cause statistically significant differences in the estimates. This was tested as follows. For the comparison sample of 504 properties, the stock-wide estimate of average 20-year annual accrual was $1,057 in 1989 (expressed in 1995 dollars) using the 1989 estimation approach. Using the 1995 methodology but with the 1989 data yields an estimate of $1,145, which is not statistically different. The 1995 accrual estimate for the comparison sample was $1,098.

Exhibit 2-7
PROJECTED AVERAGE ANNUAL ACCRUAL OF PHYSICAL NEEDS OVER 20 YEARS
(IN 1995 DOLLARS PER 2-BEDROOM EQUIVALENT UNIT)

Characteristic	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties	12,243	2,224	10,019	5,943	4,076
Percent of Total Properties	100%	18%	82%	59%[b]	41%[b]
Average Annual Accrual					
<$500	2%	0%	2%	3%	0%
<$500 to <$999	44%	35%	46%	46%	45%
$1000 to <$1499	41%	48%	39%	38%	40%
$1500 to <$1999	12%	15%	11%	11%	12%
$2,000 or more	2%	2%	2%	3%	2%
Statistics on Annual Accrual					
Mean[a]	$1,104	$1,206	$1,081	$1,075	$1,090
Standard Error	16.3	45.7	17.2	22.2	27.1
Median	$1,031	$1,151	$1,016	$1,002	$1,025

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.
**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.
[a] Significance test conducted.
[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Column sums may not add to 100% due to rounding.

Source: 1995 Physical Inspection Data and Costing Program.

CHAPTER THREE
FINANCIAL CONDITION OF HUD-INSURED (OR HELD) PROPERTIES

This chapter examines properties' financial condition in terms of their net cash flow and reserve funds. The chapter presents annual net cash flow, including sources of income, nature of expenditures, and changes between 1989 and 1995; and ability to cover physical needs backlog with property reserve funds and to cover annual physical needs accrual with cash flow. This chapter also examines the role of Section 8 assistance in supporting assisted properties. As in the chapter on physical needs, we present all financial information in 1995 dollars on a per 2-bedroom equivalent unit basis to allow comparisons across properties of different sizes (unit counts) and unit compositions (distribution of units by bedroom counts).

3.1 Annual Net Cash Flow

Annual net cash flow is a key indicator of a property's viability, showing the extent to which it is meeting ongoing obligations. Specifically, annual net cash flow (before income taxes) shows the degree to which a property can cover current operations and routine maintenance, mortgage debt service, and annual deposits to its replacement reserve fund (to cover future physical replacements). Positive annual net cash flow is also requisite for making distributions to owners—i.e., owners receive distributions only after all other costs are covered.

A property's annual net cash flow equals its revenues less expenses. For unassisted properties, the primary revenue source is apartment rents paid by residential tenants. By contrast, for assisted properties, subsidies paid by HUD often equal or exceed tenant-paid rents. Other revenue sources may include commercial rent, financial revenue (such as interest income from reserve accounts), or forfeited tenant deposits. Property operating expenses include operating and maintenance costs, debt service, and deposits to the replacement reserve account.

For this report we define ***annual net cash flow*** as:

1. Weighted average of property revenue over most recent three years

2. *Minus* Weighted average of total operating expenses over most recent three years

3. *Minus* Weighted average deposits to replacement reserve account (maximum of actual and required deposit) over most recent two years

4. *Minus* Mortgage debt service (including interest and principal on mortgage and any supplementary loans and operating loss loans) and mortgage insurance premium.

Where:

1. The 3-year weighted average of property revenues includes actual rental income (potential rent less vacancy losses) from tenant paid apartment rents and tenant assistance payments plus any commercial or financial income.[1] A weighted average over the most recent 3 years was used, with the more recent years receiving higher weights.[2] By averaging over 3 years, the measure focused on long-term revenue flows in a property, and reduced the effect of one-time outliers. The application of a higher weight to more recent years incorporated trends into the measure.

2. The 3-year weighted average operating expenses equals the sum of the cost components reported in the project financial statements—administrative expenses, utility expenses, operating and maintenance expenses, and tax and insurance expenses.[3]

3. The 2-year weighted average of deposits to the reserve for replacement account equals the maximum of actual deposits as reported on the annual financial statements and required deposits, either as reported on the annual financial statements or computed as 0.5 percent of the original mortgage amount.[4]

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1 Total Revenues come from HUD form 92410. The Total Revenue line from the form was adjusted when it appeared that tenants paid their own utilities. In order to have comparable income and expense numbers across properties, we added in utility costs to both the revenue and expense sides when it appeared, based on the value of utilities in the utility expense line that tenants paid their own utilities. Adjustments were based on the average cost per square foot reported in the 1996 IREM Income/Expense Analysis reports by receipt of assistance, region and building type. Financial data came from several sources. HUD supplied us with Annual Financial Statement files for 1993 - 1995. The 1993 and 1994 files contained more complete information (including reserves). We also obtained information from HUD's Data Warehouse for 1992 - 1994, and from backup HUD tapes for 1992-1994. Interest Reduction Payments (IRPs) in Section 236 properties are not reflected on form 92410. IRPs therefore, are not reflected in reported total revenues.

2 For properties with three years (or more) of data, the most recent data received a weight of 0.5, the second most recent year 0.3 and the third most recent 0.2. When four years of data were available, only the most three years were used. For properties with two years of data, the most recent data received a weight of 0.6 and the oldest year a weight of 0.4. For properties with only one year of data, the weight was 1. For the properties that were missing financial data, values were imputed based on median values by assistance category and building type. HUD data files were fairly complete. For example, 354 sample properties had four years of total revenue data, 186 had three years, 53 had two years, 16 had one year, and 12 had no financial data. For other financial variables the coverage was similar. The most recent year of available data was 1995, for which 354 properties had at least some financial data.

3 Line 6200 and 6300 from HUD form 92410 for administrative expenses, Line 6400 for utilities, Line 6500 for operating and maintenance, and Line 6700 for taxes and insurance. As discussed above, for consistency across properties, utility expenses were adjusted when it appeared that tenants paid their own utilities for their apartments.

4 As of 1968 the required deposits to the replacement reserve account were 0.6 percent of the total replacement costs of structure for new construction properties, and 0.4 percent of the mortgage amount for rehab properties. Information on deposits to the reserve for replacement account were apparently not entered into HUD's automated data systems. These data are only available for 1993 and 1994, in the Annual Financial Statement file provided by HUD. 563 properties had information for both years, 38 for one year, and 20 provided no information. Where two years of data were available the weights were 0.6 for the more recent year and 0.4 for the earlier year. For about 64 percent of properties the actual amount was used. For 9 percent, the reported required amount was used, and for 27 percent, .5 percent of the mortgage was used.

4. Debt service was computed from the mortgage amount, term and interest rate. As computed here, debt service also includes payments for supplementary loans and operating loss loans.[5] Mortgage insurance premium (0.5 percent of the outstanding principal balance) was added to the debt service costs for all properties except those insured under Section 236 or Section 221(d)(3) BMIR (which pay no insurance premium). Section 236 properties make debt service payments based on a 1 percent interest rate, with HUD making the remaining debt service payments (interest reduction payments, or IRP) directly to the mortgagee. Therefore, IRP amounts are not included here as either property income or expenses.

Property Revenues

Exhibit 3-1 shows the components of annual revenue by assistance category. All data are presented in 1995 dollars.[6] Total revenues include rent revenues, tenant assistance payments, commercial, financial and "other" revenues, net of vacancy losses. The exhibit shows that:

- For all HUD-insured properties, mean annual revenues were $7,646 per 2-bedroom unit, with a median of $6,541.

- Mean revenues for unassisted properties ($7,978) were about midway between revenues for older assisted ($5,868) and newer assisted ($10,057) properties.

- Tenant paid rents accounted for nearly all revenues (96 percent) in unassisted properties. The balance came from commercial or financial income.

- Tenant paid rent accounted for a much smaller portion of revenues in assisted properties—56 percent in older assisted properties and only 26 percent in newer assisted properties. Almost all of the balance came from tenant assistance payments.

  - Older assisted properties' receiving higher average tenant paid rents ($3,287) than newer assisted properties ($2,593) is consistent with the higher tenant incomes in older assisted properties.

  - Conversely, in newer assisted properties, mean tenant assistance payments ($7,448) were significantly higher than those in older assisted properties ($2,576). This difference resulted from three factors: First, all newer assisted

5 Our sample included 4 properties that received operating loss loans (which are generally provided at or near the time of origination) and 21 properties that received Section 241 supplementary loans at some point after origination.

6 All values were converted to 1995 dollars using the CPI for Urban Consumers for Housing (1992 = 138.5, 1993 = 142.3, 1994=145.4, and 1995 = 149.7).

Exhibit 3-1
COMPONENTS OF PROPERTY REVENUES
(IN 1995 DOLLARS PER 2-BEDROOM EQUIVALENT UNIT)

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties	12,243	2,224	10,019	5,943	4,076
Percent of Total Properties	100%	18%	82%	59%[b]	41%[b]
Total Revenues (Net of Vacancies)					
Mean[a]	$7,646	$7,978	$7,572	$5,868**	$10,057
Standard Error	156	562	144	150	279
Median	$6,541	$6,363	$6,663	$5,183	$9,128
Tenant Paid Rents					
Mean[a]	$3,846	$7,632**	$3,005	$3,287**	$2,593
Standard Error	121	584	84	89	161
Median	$3,213	$5,976	$2,791	$3,186	$2,124
Tenant Assistance Payments[c]					
Mean[a]	$3,730	$0**	$4,558	$2,576**	$7,448
Standard Error	103	0	127	137	239
Median	$3,083	0	$3,868	$2,310	$7,106
Vacancy Loss (As a Percent of Rent Revenue)					
Mean[a]	3.12%	5.76%**	2.53%	3.37%**	1.30%
Standard Error	0.015	0.0059	0.0014	0.0022	0.001
Median	1.78%	4.50%	1.47%	2.28%	0.91%

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.

**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.

[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

[c] Tenant Assistance Payments include only Section 8 assistance, and do not include interest reduction payments (IRP) on subsidized and below market interest rate loans. If IRPs were included as tenant assistance payments, the average tenant assistance payment across all older assisted properties would be $3,171, and total revenues would average $6,462. As reported in this table, Tenant Assistance Payments are the average over ***all*** units, and not the average over ***all assisted*** units.

Source: Annual Financial Statements for 1992 - 1995.

properties received Section 8 assistance compared with only 79 percent of older assisted properties (many of which had only assisted mortgages). Second, on average, a higher percentage of units received rental assistance in newer assisted properties (which usually had assistance for nearly all units) than in older assisted properties (which were more likely to have partial rental assistance). Third, property rents (and total revenues) were much higher in newer assisted than in older assisted properties.[7]

- Vacancy losses were low across all categories of insured properties, averaging 3.12 percent (with a median of 1.78 percent).

  - Mean vacancy losses were highest in unassisted properties (5.76 percent) and lowest in newer assisted properties (1.3 percent). Extremely low vacancy rates are expected in assisted properties because project-based assistance helps them attract and retain lower-income renters.

Property Expenses

Exhibit 3-2 shows the components of total property expenses. Total annual expenses (including operating expenses, replacement reserve deposits and debt service) averaged $7,052 per year.

- Mean expenses were highest in newer assisted properties ($8,952), lowest in older assisted properties ($5,585), and midway between the two in unassisted properties ($7,491).

- These differences in annual expenses across assistance categories resulted primarily from differences in debt service costs— $3,760 in newer assisted properties, $2,930 in unassisted properties, and only $859 in older assisted properties. The difference in debt service costs reflects both the timing of the loans—newer assisted properties generally have higher mortgage principal and interest payments—and the below market interest rates provided to most of the older assisted properties.[8]

- Operating expenses differed little across assistance categories, averaging $4,540 per unit per year. As in 1989, however, newer assisted properties had higher operating expenses ($4,928) than did either older assisted ($4,349) or unassisted properties ($4,338).

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7 In this analysis interest reduction payments (IRPs) for the Section 236 properties were excluded both from revenues and expenses. If IRPs were included in tenant assistance payments the average tenant assistance payment across all older assisted properties would be $3,171 per unit rather than $2,576. Total revenues in older assisted properties would then average $6,462 per unit.

8 As indicated above, IRPs were excluded from both revenues and expenses. Had IRPs been included in expenses, debt service in older assisted properties would have averaged $1,454 per unit instead of $859, and total expenses would have averaged $6,179.

Exhibit 3-2
COMPONENTS OF ANNUAL EXPENSES
(IN 1995 DOLLARS PER 2-BEDROOM EQUIVALENT UNIT)

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Total Annual Expenses					
Mean[a]	$7,052	$7,491	$6,955	$5,585**	$8,952
Standard Error	146	555	130	129	257
Median	$6,184	$6,019	$6,265	$5,071	$8,066
Operating Expenses					
Mean[a]	$4,540	$4,338	$4,585	$4,349**	$4,928
Standard Error	84	267	85	100	148
Median	$4,035	$3,751	$4,114	$3,901	$4,396
Replacement Reserve Deposit [max(actual, required)]					
Mean[a]	$311	$222**	$331	$376**	$264
Standard Error	11	25	12	19	13
Median	$219	$160	$244	$263	$230
Total Debt Service (including MIP, supplementary loans and op loss loans)[c]					
Mean	$2,201	$2,930*	$2,039	$859**	$3,760
Standard Error	80	359	57	36	130
Median	$1,512	$1,859	$1,334	$614	$3,359

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.

**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.

[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

[c] Debt Service was calculated based on mortgage interest rate and does not include interest reduction payments (IRP) on Section 236 properties. Including IRPs in debt service would increase average debt service in older assisted properties to $1,454, and total expenses to $6,179.

Source: Annual Financial Statements for 1992-1995.

Annual Net Cash Flow

Exhibit 3-3 brings together revenues and expenses to display annual net cash flow which equals revenues less operating expenses, replacement reserve deposits, and debt service.

Exhibit 3-3
FINANCIAL CONDITION—ANNUAL NET CASH FLOW
(IN 1995 DOLLARS PER 2-BEDROOM EQUIVALENT UNIT)

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Negative Net Cash Flow[a]	**25%**	**25%**	**25%**	**35%****	**13%**
<-$1,000	3%	9%	2%	3%	1%
-$1,000 to <-$500	4%	6%	4%	6%	1%
-$500 to < -$250	6%	6%	5%	6%	4%
-$250 to <$0	12%	4%	14%	19%	7%
Positive Net Cash Flow [a]	**75%**	**75%**	**75%**	**66%****	**87%**
$0 to <$250	17%	10%	19%	26%	7%
$250 to <$500	15%	14%	15%	16%	15%
$500 to <$1,000	16%	17%	16%	12%	22%
$1,000 to <$2,500	20%	27%	18%	10%	30%
$2,500 or more	7%	7%	7%	2%	13%
Statistics on Annual Net Cash Flow					
Mean[a]	$594	$487	$617	$283**	$1,105
Standard Error	74	341	49	47	98
Median	$388	$521	$347	$162	$742

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.
**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.
[a] Significance test conducted.
[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Column sums may not add to 100% due to rounding.

Source: Calculated from Financial Data.

Annual net cash flow averaged $594 per unit. However, there were substantial differences in cash flow across assistance categories. Newer assisted properties were in the best financial condition, older assisted properties were in the worst, and a significant minority of unassisted properties had extremely weak cash flow:

- In newer assisted properties mean annual net cash flow was $1,105 (median $742).
  - Eighty-seven percent of newer assisted properties had positive annual net cash flow, including over 40 percent with more than $1,000 per unit.
  - On the negative cash flow end, only 1 percent had annual cash flow ***deficits*** worse than $1,000, and another 1 percent had cash flow ***deficits*** between $500 and $1,000.
- In unassisted properties mean annual net cash flow was $487 (median $521).
  - Three quarters of unassisted properties had positive annual net cash flow, including over 30 percent with more than $1,000 per unit.
  - However, 9 percent had annual cash flow ***deficits*** worse than $1,000, and another 6 percent had cash flow ***deficits*** between $500 and $1,000.
- Older assisted properties, in the worst financial condition, had mean annual net cash flow of $283 (median $162).
  - Over one third (35 percent) of older assisted properties had negative annual net cash flow.
  - Three percent had annual cash flow ***deficits*** worse than $1,000, and another 6 percent had cash flow ***deficits*** between $500 and $1,000.

Change in Cash Flow Since 1989

In this section, we examine changes in the stock's financial condition between 1989 and 1995, using average annual net cash flow as the indicator of financial condition. Then, we analyze the components of revenue and expenses to identify the sources of change in cash flow between the two periods. The numbers differ slightly from Exhibit 3-3 because this analysis is based on the ***comparison sample*** of 504 properties that were common to both the 1989 and 1995 studies. All data were weighted to reflect the universe of properties that were still insured in 1995, and all 1989 dollars were inflated to 1995 based on the change in the CPI over this interval.[9]

9 We have adjusted the 1989 data for inflation using an adjustment factor of 1.1986, which is based on changes in the housing component of the CPI from 1989 to 1995.

Exhibit 3-4 shows annual net cash flow for 1995 and 1989. For both time periods, the table presents mean and median cash flow per 2-bedroom unit as well as the percentage of properties that had negative annual net cash flow, low positive annual net cash flow ($0-$500), high positive annual net cash flow ($500-$1,000), and very high positive annual net cash flow (≥$1,000).

Exhibit 3-4
COMPARISON OF NET CASH FLOW
(IN 1995 DOLLARS PER 2-BEDROOM EQUIVALENT UNIT)
BASED ON COMPARISON SAMPLE OF 504 PROPERTIES COMMON TO '89 AND '95 STUDIES

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **% of Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[a]	4,076 41%[a]
Mean Cash Flow per 2 BR					
1995	$594	$487	$618	$281	$1,110
1989	$444	$158	$507	$265	$859
Median Cash Flow per 2 BR					
1995	$362	$521	$338	$144	$732
1989	$232	$57	$246	$69	$708
Percentage of Properties with Negative Cash Flow (<$0 per 2 BR)					
1995	25%	25%	24%	33%	13%
1989	30%	44%	27%	39%	10%
Percentage of Properties with Low Positive Cash Flow ($0-$500 per 2 BR)					
1995	32%	23%	34%	42%	23%
1989	36%	22%	38%	45%	29%
Percentage of Properties with High Positive Cash Flow ($500-$1,000 per 2 BR)					
1995	17%	17%	16%	14%	21%
1989	15%	9%	17%	9%	28%
Percentage of Properties with Very High Positive Cash Flow (≥$1,000 per 2 BR)					
1995	27%	35%	25%	12%	44%
1989	19%	25%	18%	7%	33%

[a] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Column sums may not add to 100% due to rounding.

Source: 1995 data: Annual financial statement data for 1992-1995.
1989 data: 1990 Study Analysis File.

For the stock as a whole, financial condition improved, with mean annual net cash flow increasing by 34 percent (from $444 to $594) and median by 56 percent (from $232 to $362), all in constant 1995 dollars. The proportion of properties with negative cash flow dropped from 30 percent to 25 percent while the proportion with very high positive cash flow increased from 19 percent to 27 percent.

- Unassisted properties had the biggest improvement in financial condition. Mean cash flow more than tripled (from $158 to $487) and the median increased by more than ninefold (from $57 to $521). The proportion of properties with negative cash flow dropped (from 44 percent to 25 percent) while the proportion with high or very high positive cash flow increased (from 34 percent to 52 percent).

- Older assisted properties had only a small increase (6 percent) in mean cash flow (from $265 to $281), but a doubling in median cash flow (from $69 to $144). The improved median is due to a moderate decrease in the proportion of properties with negative cash flow (from 39 percent to 33 percent) and larger increase in properties with high or very high positive cash flow (from 16 percent to 26 percent).

- Newer assisted properties had almost a 30 percent increase in mean cash flow (from $859 to $1,110), but little change in median cash flow. This change reflects a mixed pattern across properties— a sizeable ***increase*** in the proportion of ***properties with very high cash flow*** coupled with a ***smaller increase*** in ***properties with negative cash flow*** and small reductions in the proportion of properties in the middle categories.

Exhibit 3-5 shows the property-level change in net cash flow, adjusted for inflation. It shows how financial condition changed for ***individual properties***.[10]

- Overall, 37 percent of properties experienced a decrease in net cash flow from 1989 to 1995, while 63 percent saw an increase.

  - A greater proportion of assisted properties than unassisted properties experienced decreases in cash flow (39 percent vs. 30 percent).

  - Among assisted properties, older and newer assisted properties showed similar patterns of change in cash flow.

- A greater proportion of unassisted than assisted properties experienced large changes in cash flow (increases or decreases of $800 or more).

10 As noted in Chapter 2, property-level physical condition data was not intended to be measured with sufficient precision to provide reliable property-level change estimates. In contrast, the financial data are based on actual data and thus, property-level change in financial condition can be analyzed.

- Among unassisted properties, 15 percent had large cash flow decreases and 32 percent large increases.

- Among assisted properties, only 7 percent had large cash flow decreases and 17 percent large increases.

Exhibit 3-5
CHANGE IN ANNUAL NET CASH FLOW FROM 1989 TO 1995
(IN 1995 DOLLARS PER 2-BEDROOM EQUIVALENT UNIT)
BASED ON COMPARISON SAMPLE OF 504 PROPERTIES COMMON TO '89 AND '95 STUDIES

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **% of Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[a]	4,076 41%[a]
Annual Net Cash Flow Decreased	37%	30%	39%	40%	38%
By $800+ per 2 BR	9%	15%	7%	8%	6%
By $400 to <$800 per 2 BR	8%	6%	9%	8%	10%
By $200 to <$400 per 2 BR	8%	4%	9%	8%	9%
By <$200 per 2 BR	13%	5%	15%	16%	13%
Annual Net Cash Flow Increased	63%	70%	61%	60%	62%
By <$200 per 2 BR	15%	6%	17%	18%	14%
By $200 to <$400 per 2 BR	13%	10%	14%	11%	18%
By $400 to <$800 per 2 BR	15%	22%	14%	15%	13%
By $800+ per 2 BR	29%	32%	17%	16%	18%

[a] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Column sums may not add to 100% due to rounding.

Source: 1995 data: Annual financial statement data for 1992-1995.
1989 data: 1990 Study Analysis File.

Changes in Components of Revenues and Expenses

In this section, we examine changes in the components of income and expenses to better understand the changes in cash flow. Exhibit 3-6 shows the percentage change in the mean values of components of revenues and expenses across all properties between 1989 and 1995.[11]

EXHIBIT 3-6
CHANGES IN COMPONENTS OF REVENUE AND EXPENSES BETWEEN 1989 AND 1995
(%'S =CHANGE UP OR DOWN IN COMPONENT MEAN, MEASURED IN 1995 DOLLARS)
BASED ON COMPARISON SAMPLE OF 504 PROPERTIES COMMON TO '89 AND '95 STUDIES

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties	12,243	2,224	10,019	5,943	4,076
% of Properties	100%	18%	82%	59%[a]	41%[a]
Total Revenues (net of vacancies)					
% Change '89-'95	5%	6%	4%	7%	2%
Tenant-Paid Rents					
% Change '89-'95	-10%	5%	-16%	-10%	-26%
Tenant Assistance Payments					
% Change '89-'95	37%	N/A	38%	44%	22%
Vacancy Loss (As a Percent of Rent Revenue)					
% Change '89-'95	-7%	-27%	8%	10%	1%
Total Annual Expenses					
% Change '89-'95	3%	2%	4%	7%	-1%
Operating Expenses					
% Change '89-'95	14%	19%	13%	11%	16%
Replacement Reserve Deposit, max (actual, required)					
% Change '89-'95	16%	4%	18%	29%	0%
Total Debt Service (including MIP, supplementary loans, and op loss loans) per 2 BR*					
% Change '89-'95	-16%	-16%	-17%	-16%	-17%

[a] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

* This decrease in constant 1995 dollars reflects the fact that debt service, ***in current dollars***, generally remained constant.

Source: 1995 data: Annual financial statement data for 1992-1995.
1989 data: 1990 Study Analysis File.

11 Percent changes were calculated using the comparison sample of 504 properties common to both the 1989 and 1995 studies. The mean values for 1989 and 1998 across all properties were compared (both expressed in 1995 constant dollars).

Revenues

Across the entire stock, average revenues rose (in real terms) by 5 percent between 1989 and 1995. This reflects two, quite different patterns in unassisted and assisted properties.[12]

- In unassisted properties, a small increase in tenant-paid rents (5 percent) and a larger decrease in vacancy losses (27 percent) produced a six percent increase in total revenues.

- In assisted properties, a large increase in tenant assistance payments (38 percent) more than offset a decrease in tenant paid rents and an increase in vacancy losses, to produce a modest 4 percent increase in total revenues.

    - In newer assisted properties the decrease in tenant paid rents was dramatic. Mean tenant paid rents decreased by 26 percent, likely reflecting a decrease in real incomes among residents in these properties. In older assisted properties, tenant-paid rents decreased by 10 percent.

    - The percentage increase in tenant assistance payments was twice as high in older assisted as in newer assisted properties. This difference may reflect the addition in older properties of more assisted units through the Section 8 LMSA and Preservation programs, and not just increased assistance per unit.

Expenses

Average total expenses stayed nearly the same over the period, increasing (in real terms) by 3 percent. This is a result of expense increases (primarily in operations) being largely offset by decreases in the real cost of debt service. Debt service payments dropped substantially in real terms, even though remaining constant in nominal dollars, because of the 20 percent inflation factor used to express 1989 expenses in 1995 dollars.

- Unassisted properties experienced only a two percent increase in expenses. This resulted from a decrease in debt service (16 percent) nearly offsetting a large increase in operating expenses (19 percent) and a small increase in deposits to the reserve for replacement (4 percent).

- Older assisted properties experienced a 7 percent increase in total expenses, resulting from the decline in real debt service (16 percent) offsetting most of the increase in operating expenses (11 percent) and in replacement reserve deposits (29 percent).

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12 We have recalculated 1989 values to exclude interest reduction payments (IRPs) in the Section 236 properties. In the 1990 study report IRPs had been included as part of the revenue and debt service. This recalculation permits comparison between 1989 and 1995 revenues and expenses.

- Newer assisted properties actually experienced a one percent drop in total expenses because a 17 percent real drop in debt service more than offset a 16 percent increase in operating expenses.

In summary, the stock as a whole showed a moderate increase in cash flow, with a decrease in the number of properties with negative cash flow and an increase in properties with high or very high positive cash flow. Nearly two-thirds of properties saw an increase in cash flow. The stronger cash flow was the result of increased total revenues (from HUD's providing higher tenant assistance payments in assisted properties and from reduced vacancy loss in unassisted properties) which outweighed modest increases in expenses (resulting from higher operating expenses less lower debt service).

Unassisted properties experienced the strongest increase in cash flow, reflecting a large decrease in the percentage of properties with negative cash flow and a large increase in properties with high positive cash flow. Seventy percent of unassisted properties experienced increased cash flow. The higher cash flow resulted from an increase in revenues from higher tenant-paid rents and lower vacancy losses, which more than offset a small increase in expenses.

Older assisted properties saw a small increase in mean cash flow, reflecting a moderate decrease in the number of properties with negative cash flow and an increase in properties with high or very high cash flow. The increased average cash flow was the result of higher revenues from higher tenant assistance payments, which offset higher expenses.

Among newer assisted properties, mean cash flow increased moderately, with 62 percent of properties showing an increase in cash flow. However, the number of newer assisted properties with negative cash flow also increased. The increased average cash flow resulted from increased revenues—increased tenant assistance payments more than offset large decreases in tenant rents—and decreased expenses from lower real debt service.

3.2 Resources Available to Fund Physical Needs Backlog and Annual Physical Needs Accrual

Having adequate reserves for capital repairs and replacements is important to a property's long-term viability. This section examines the size of a property's reserve fund balances relative to its backlog of physical needs. Properties may have resources available for major repairs and replacements in three categories of accounts:

- **Reserve for Replacement.** All HUD-insured (or held) properties are required to establish and fund a reserve for replacements account. This is their primary resource for funding major repairs and replacements.

- **Special-Purpose Reserves.** Some properties have established painting or other special-purpose reserve accounts. Few properties in our sample reported special-purpose reserves.

- **Residual Receipts Accounts.** Owners that are either non-profit or limited-dividend for-profit owners are required to deposit some or all profits— "non-distributable surplus cash"— into residual receipts accounts. This may also apply to other owners who have received Flexible Subsidies or are operating under a mortgage workout. While residual receipts accounts are not reserves for the property, HUD may require owners to contribute residual receipts funds (if any) for repairs in the case of physically deteriorated properties.

Exhibit 3-7 shows available balances in these funds.[13]

- For most properties, the replacement reserve was the primary source of funds available to cover physical needs backlogs, with an average balance of $1,303 per unit. Average balances in assisted properties ($1,424 per unit) were nearly double those in unassisted properties ($755).

- Residual receipts accounts are required in only about a third of the assisted stock. Therefore, while the mean balance for all assisted properties is only $206 per unit, for properties subject to distribution restrictions this amount may be significant.

- Few properties reported any special reserves, so the mean for this category is not listed separately in Exhibit 3-7. However, for particular properties, special reserves may be a significant resource, and are included in "Total Reserves" in the exhibit.

- Total reserve balances averaged $1,643 per unit. As expected, given that most reserves were in the reserve for replacement account, the pattern for total reserves is similar; average total reserves for assisted properties ($1,831) were more than double those of unassisted properties ($797).

Low reserve balances in themselves may not indicate problems, for example, in low-backlog properties that have just used reserves to complete major repair programs. Problems may be indicated, however, in properties having both low reserves and high physical needs backlogs; or those having significant backlogs and yet available reserves. (This second situation may indicate management problems.) It is important, therefore, to examine reserves in conjunction with backlogs.

13 The values for all reserve balances were obtained using the most recent year of data available from the Annual Financial Statement file provided by HUD. Data on residual receipts were available only for 1993 and 1994.

EXHIBIT 3-7
RESOURCES FOR COVERING PHYSICAL NEEDS—PROPERTY RESERVES
(IN 1995 DOLLARS PER 2-BEDROOM EQUIVALENT UNIT)

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Reserve for Replacement Balance					
Mean[a]	$1,303	$755**	$1,424	$1,327*	$1,565
Standard Error	55	97	64	83	101
Median	882	$456	$1,065	$994	$1,171
Residual Receipts					
Mean[a]	$206	0**	$252	$247	$260
Standard Error	32	0	128	50	62
Median	0	0	0	0	0
Percent >$0	27%	0	31%	38%	18%
Total Reserves					
Mean[a]	$1,643	$797**	$1,831	$1,766	$1,924
Standard Error	75	97	89	119	131
Median	$1,129	$479	$1,293	$1240	$1,363

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.

**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.

[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Source: Annual Financial Statements.

We present two indicators of properties' financial ability to cover physical needs backlogs:

- **Backlog Coverage Ratio.** This ratio compares a property's available resources with its physical needs backlog. We define available resources as the sum of any amount by which the reserve for replacement balance exceeds two years' worth of annual reserve

deposits,[14] plus residual receipts balance, plus special reserve balances. The coverage ratio equals available resources divided by the backlog cost.

- **Unfunded Backlog.** This is the total backlog reduced by available resources (as defined above).

Exhibit 3-8 shows the backlog coverage ratio for the insured stock. A large proportion of the stock had insufficient resources to cover their backlog needs.

- **The majority of properties (64 percent) across all assistance categories had insufficient resources to cover their physical needs backlogs.**

  - This includes 13 percent of properties with backlogs and no available resources, and 30 percent of properties with insufficient resources to cover even a quarter of their backlogs.

  - The problem was most severe in older assisted properties (69 percent insufficient resources) and least severe in newer assisted properties (57 percent).

- **Thirty-six percent of the stock had sufficient resources to cover their backlogs, including 13 percent with no backlogs, and 23 percent with positive backlogs, but with sufficient resources.**

  - While the proportion of properties with sufficient resources was similar in unassisted and assisted properties the reasons were different. In unassisted properties, 21 percent had no backlog, and 15 percent had backlogs but sufficient resources. In contrast, in assisted properties, only 11 percent had no backlog and 24 percent had backlogs with sufficient resources.

  - Twenty-seven percent of newer assisted properties had backlogs and sufficient resources, as did 22 percent of older assisted properties. Fifteen percent of newer assisted properties had no backlog as did 8 percent of older assisted properties.

- **Ability to cover backlogs has declined since 1989.** The proportion of the stock with sufficient resources fell from 45 percent in 1989 to only 35 percent in 1995.

  - Driving this decreased ability to cover backlogs was the dramatic increase in backlogs (See Section 2.1 above) rather than a decrease in resources. On average,

14 Retaining two years' worth of deposits is in keeping with HUD's general loan servicing practices. Had we instead assumed that properties could use their entire reserves, it would have added only a small amount on average and made little difference in most properties' ability to cover their backlogs.

available resources increased by over 40 percent, but backlogs increased by over 60 percent.

EXHIBIT 3-8
ABILITY TO COVER PHYSICAL BACKLOGS—BACKLOG COVERAGE RATIO[c]

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Backlog Coverage Ratio = Available Resources/Backlog					
Insufficient Resources[a]	**64%**	**64%**	**65%**	**69%****	**57%**
Backlog > 0 & no available resources	13%	15%	13%	16%	7%
Ratio 0 to < 0.25	30%	32%	30%	34%	24%
Ratio 0.25 to < 0.5	11%	10%	11%	8%	15%
Ratio 0.5 to < 1	10%	7%	11%	11%	11%
Sufficient Resources[a]	**36%**	**36%**	**35%**	**30%****	**42%**
Ratio ≥ 1	23%	15%	24%	22%	27%
Backlog < $10	13%	21%	11%	8%	15%

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.
**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.
[a] Significance test conducted.
[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.
[c] Backlog coverage ratio = available resources after deposits to reserve accounts ÷ backlog of needs if resources and backlog > 0.

Note: Column sums may not add to 100% due to rounding.
Source: 1995 Physical Inspection Data and Costing Program, Financial Data.

Exhibit 3-9 shows the unfunded physical needs backlog.

- **Most of the mean backlog was unfunded**. The mean unfunded backlog was $2,630—81 percent of the total backlog.

- **A small proportion of the stock was responsible for a large proportion of the unfunded backlog**. Half of the stock had unfunded backlogs below $684 (the median).

- **Almost a third of the stock had unfunded backlogs of $2,000 or more per unit**.

- As with most other resource problems, older assisted properties had higher mean unfunded backlogs ($3,323) than did newer assisted properties ($2,437) or unassisted properties ($1,134).

- Forty-four percent of older assisted properties had unfunded backlogs of $2,000 or more, compared with 25 percent of newer assisted properties and 15 percent of unassisted properties.

EXHIBIT 3-9
ABILITY TO COVER BACKLOG—UNFUNDED BACKLOG
(IN 1995 DOLLARS PER 2-BEDROOM EQUIVALENT UNIT)

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
$0 [a]	35%	36%	35%	30%*	41%
$0 to <$500	12%	22%	9%	10%	9%
$500 to <$1,000	9%	5%	9%	7%	13%
$1,000 to <$2,000	12%	21%	10%	9%	12%
$2,000 to <$5,000	17%	11%	19%	22%	13%
$5,000 to <$7,500	6%	2%	7%	9%	3%
$7,500 or more	9%	2%	11%	13%	9%
Statistics on Unfunded Backlog					
Mean[a]	$2,630	$1,134**	$2,962	$3,323*	$2,437
Standard Error	194	233	231	270	410
Median	$684	$332	$817	$1,324	$540
Statistics on Total Backlog of Physical Needs					
Mean[a]	$3,236	$1,427**	$3,638	$3,929	$3,214
Standard Error	203	255	240	276	430
Median	$1,452	$545	$1,661	$2,096	$1,324

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.
**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.
[a] Significance test conducted.
[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Sums may not add to 100% due to rounding.

Source: 1995 Physical Inspection Data, Costing Program and Financial Data.

Ability to Cover Annual Accrual—Unfunded Accrual of Physical Needs

Another important factor in a property's long-term viability is its ability to cover ongoing accrual of physical needs. As discussed in Chapter 2 above, we have estimated the average annual accrual of physical needs for each property. Discussions with industry experts revealed that practices regarding funding of accruals—capital replacements and overhauls—vary considerably across properties. Common practices include funding physical needs accruals from the replacement reserve, from ongoing operating budgets, and from residual cash, but also include periodic refinancing of the property to obtain funds for addressing repair needs. This study assumes that accruals are paid for from three potential sources:

- **Annual Deposits to the Reserve for Replacement Accounts:** All HUD-insured (or held) properties are required to make monthly deposits to the reserve for replacement account. As discussed above, the amount assumed to be available to cover ongoing needs is the maximum of actual deposits as reported in the annual financial statements and the required deposits, which we approximated as 0.5 percent of the original mortgage.

- **Positive Annual Net Cash Flow:** Properties that have positive net cash flow after covering all operating and maintenance expenses, mortgage repayment and deposits to reserve accounts may use remaining funds to cover ongoing accruals.

- **A Portion of Operating and Maintenance Expenses:** Properties fund a portion of ongoing capital repairs through their ordinary operating and maintenance budget. Based on our analysis of financial data, we assume for this study that 20 percent of operating and maintenance expenses are used to fund physical needs that are considered accrual items.[15]

Exhibit 3-10 shows these resources by assistance category.

- Surplus positive cash flow is the largest source of funds for covering ongoing accruals across all assistance categories, averaging $767 per unit. As shown in Exhibit 3-3, three quarters of all properties had positive cash flows. For properties with negative cash flows the available funds equal zero. Newer assisted properties had the highest level of cash available ($1,172 on average) and older assisted properties had the lowest level ($407).

15 Based on our analysis of 1995 project financial data we calculated that on average 75 percent of total operating and maintenance expenses (line 6500 on form 92410) are spent on items relating to repairs. If we assume that about 25 percent of repair funds are spent on items counted here as accruals, then .75 x .25 = 18.75, or approximately 20 percent, of total operating and maintenance expenses can be assumed to be spent on accruals.

- Reserve deposits and funds from operating maintenance were similar in magnitude (averaging $311 and $284 respectively). Assisted properties had more funds from these two sources compared with unassisted properties.

Exhibit 3-10
RESOURCES FOR COVERING ANNUAL ACCRUALS
(IN 1995 DOLLARS PER 2-BEDROOM EQUIVALENT UNIT)

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Deposits to the Reserve for Replacement					
Mean[a]	$311	$222**	$331	$376**	$264
Standard Error	11	25	12	19	13
Median	$218	$160	$244	$247	$230
Positive Cash Flow					
Mean[a]	$767	$989	$718	$407**	$1,172
Standard Error	47	175	42	40	86
Median	$388	$521	$347	$162	$742
20% of Operating and Maintenance Expenses					
Mean[a]	$284	$238**	$295	$286	$308
Standard Error	6	12	7	9	13
Median	$245	$202	$252	$247	$267
Total Resources					
Mean	$1363	$1,449	$1,344	$1,069**	$1,744
Standard Error	51	181	48	53	89
Median	$1009	$1,038	$986	$787	$1,410

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.
**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.
[a] Significance test conducted.
[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.
Source: Annual Financial Statements for 1992-1995.

We define unfunded annual accrual as the full accrual less the resources available to cover accruals—the sum of annual deposits to the reserve for replacements, positive annual cash flow (if any) and a portion of operating and maintenance expenses. Exhibit 3-11, which describes unfunded accrual, shows that about half of insured properties would be able to keep up with their ongoing physical needs. The mean unfunded accrual was $225, and the median was $0. Over time, the other half of insured properties will deteriorate physically. Differences across assistance categories in ability to cover accruals result from different resources, not from different levels of accrual.

- About half the unassisted properties (48 percent) had no unfunded accruals.

- Nearly three quarters (72 percent) of newer assisted properties had no unfunded accruals, largely due to their high levels of cash flow.

- Only 38 percent of older assisted properties had no unfunded accruals. While older assisted properties contribute more on average to their replacement reserve accounts, they have much lower levels of annual cash flow, which results in their higher unfunded accrual.

To further explore relationships between accruals and property finances, Exhibit 3-12 presents an alternative net cash flow measure that assumes that properties' annual reserve fund deposits increase to cover average accruals (reduced by a portion of operating and maintenance expenses, as explained above). As can be seen by comparing annual accrual estimates in Exhibit 2-7 with reserve deposits in Exhibit 3-2, current reserve deposits average less than a third of accruals. Exhibit 3-12 shows that increasing annual reserve fund deposits to a level that fully covers annual accruals would result in over half (52 percent) of properties having negative net cash flow, rather than one quarter, as is the case under actual conditions.

As with many other financial indicators, newer assisted properties were in the best position and older assisted properties in the worst.

- Sixty-seven percent of older assisted properties would have negative cash flow if they funded their reserve for replacement to fully cover accrual, compared with 29 percent of newer assisted properties, and 52 percent of unassisted properties.

3.3 Section 8 Assistance

Exhibit 3-1 above showed the financial importance of tenant assistance payment associated with the project-based Section 8 Programs, which include the New Construction and Substantial and Moderate Rehabilitation Programs, Loan Management Set Aside (LMSA) Program, Property Disposition Program, and Preservation Program. Under these Section 8 Programs HUD pays

Exhibit 3-11

ABILITY TO COVER ACCRUAL—UNFUNDED ACCRUAL OF PHYSICAL NEEDS (IN 1995 DOLLARS PER 2-BEDROOM EQUIVALENT UNIT)

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties	12,243	2,224	10,019	5,943	4,076
Percent of Total Properties	100%	18%	82%	59%[b]	41%[b]
Unfunded Accrual					
$0[a]	51%	48%	52%	38%	72%
$0 to <$500	29%	26%	30%	36%	20%
$500 to <$1,000	16%	20%	16%	23%	6%
$1,000 to <$2,000	3%	6%	3%	3%	2%
Statistics on Unfunded Accrual					
Mean[a]	$225	$273	$215	$288**	$107
Standard Error	13.2	39.5	13.6	18.4	19
Median	$0	$29	$0	$187	$0
Statistics on Annual Accrual					
Mean[a]	$1,104	$1,206	$1,081	$1,075	$1,090
Standard Error	16.3	45.7	17.2	22.2	27.1
Median	$1,031	$1,151	$1,016	$1,002	$1,025

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.
**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.
[a] Significance test conducted.
[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Sums may not add to 100% due to rounding.
Source: 1995 Physical Inspection Data, Costing Program and Financial Data.

Exhibit 3-12
ALTERNATIVE CASH FLOW
(ANNUAL RESERVE DEPOSIT RAISED TO COVER ANNUAL ACCRUAL)
(IN 1995 DOLLARS PER 2-BEDROOM EQUIVALENT UNIT)

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Negative Alternative Net Cash Flow[a]	**52%**	**52%**	**52%**	**67%**	**29%**
< -$1,000	10%	19%	8%	10%	4%
-$1,000 to < -$500	17%	12%	18%	25%	8%
-$500 to < -$250	12%	9%	12%	17%	6%
-$250 to < $0	13%	12%	14%	15%	11%
Positive Alternative Net Cash Flow [a]	**49%**	**28%**	**49%**	**34%**	**71%**
$0 to < $250	12%	15%	12%	8%	16%
$250 to < $500	9%	6%	9%	9%	10%
$500 to < $1,000	12%	17%	11%	9%	14%
$1,000 to < $2,500	12%	5%	13%	6%	24%
≥ $2,500	4%	5%	4%	2%	7%
Statistics on Alternative Annual Cash Flow					
Mean[a]	$87	-$260	$164	-$126**	$587
Standard Error	72.8	332.8	49.4	55.6	90.7
Median	-$37	-$28	-$41	-$256	$365

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.
**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.
[a] Significance test conducted.
[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Sums may not add to 100% due to rounding.
Source: Calculated from Financial Data.

owners the difference between the HUD-approved rent and 30 percent of tenants' adjusted income. Overall, 8,744 properties with HUD-insured (or held) mortgages receive project-based Section 8 assistance.

Exhibit 3-13 presents information on properties that receive Section 8 assistance. Properties with New Construction/Substantial Rehabilitation or Property Disposition generally receive assistance for nearly all property units. In contrast, LMSA assistance often covers only a proportion of units (mean is 80 percent, median 98 percent).

Across all categories of Section 8, assistance contracts are being renewed for shorter periods of time. In 1995, over half of all contracts (61 percent) were up for renewal within four years (through 1999). This includes over a quarter of Section 8 New Construction/Substantial Rehabilitation properties to 95 percent of properties with LMSA assistance.

Exhibit 3-13
PROPERTIES WITH HUD-INSURED (OR HELD) MORTGAGES AND SECTION 8 ASSISTANCE
(IN 1995 DOLLARS PER 2-BEDROOM EQUIVALENT UNIT)

	New Construction/ Substantial Rehabilitation	LMSA (including Rent Supplement/ RAP conversions)	Preservation	Property Disposition	Rent Supple-ment/Rental Assistance Payments (RAP)[16]
No. of Properties	4,076	4,011	257	134	265
Percent of Units Assisted					
Mean	96%	80%	92%	100%	54%
Median	100%	98%	99%	100%	63%
Next Renewal Year					
1995-1996	1%	40%	39%	34%	17%
1997-1999	25%	55%	31%	50%	46%
2000-2004	73%	6%	30%	0%	0%
2005 or later	1%	0%	0%	16%	38%

Source: Multifamily Data Warehouse, Contracts File, 1992-1995 Annual Financial Statements.

16 Reflects 154 properties that were reported as Rent Supplement/RAP in 1995 and 111 properties that were reported as active Rent Supplement/RAP in 1989 and had no Section 8 information in 1995.

CHAPTER FOUR
COMBINING PHYSICAL AND FINANCIAL CONDITION MEASURES

This section develops a ***backlog-adjusted cash flow index*** that examines properties' financial capacity to meet all physical needs as well as normal operations and debt service.

After presenting our development of the backlog-adjusted cash flow index, we apply the index to the stock of multifamily rental housing with HUD-insured (or held) mortgages, use it to classify properties as "sound," "stressed," or "distressed," and describe the characteristics of properties in each of these categories. We then describe changes in the multifamily stock since 1989, as measured by the backlog-adjusted cash flow index.[1,2]

Backlog-Adjusted Cash Flow Index

The backlog-adjusted cash flow index combines physical and financial condition by measuring a property's financial capacity to meet current expenses, set aside reserves for future physical needs, and undertake a repair program to address its backlog of physical needs. This index incorporates each property's annual net cash flow, physical needs backlog, and reserves and other financial resources. For ease of presentation, we used this index, which provides a continuous quantitative measure of overall condition, to classify properties as "sound," "stressed," or "distressed."

Development of the Backlog-Adjusted Cash Flow Index

The backlog-adjusted cash flow index is computed by taking:

(a) Net Cash Flow
(b) *Minus* the annual amortized cost of remedying the Unfunded Backlog of Physical Needs
(c) *Plus* added rent from improving vacancy losses

1 This measure has been used for comparability with the 1989 data (presented in Wallace, et al., *Assessment of the HUD-Insured Multifamily Housing Stock*, 1993) but was termed "Distress Index" in the earlier study.

2 As a test of the backlog-adjusted cash flow index defined in the text, we looked at the 1995 mortgage insurance status of properties that were included in both studies. In 1989 25 percent were categorized as distressed, 15 percent stressed and 61 percent sound. In 1995, 15 percent of the properties that had been categorized as distressed in 1989 were HUD-held, as were 8 percent of the stressed properties and 6.5 percent of the sound properties. The difference in the HUD-held status in 1995 is statistically significant at the 95 percent confidence level. In other words, properties that were classified as distressed in 1989 were significantly more likely to be HUD-held in 1995 than were properties that had been classified as sound.

We began the computation with net cash flow, which measures a property's capacity to meet current expenses including debt service, and make deposits to its replacement reserve account. We then reduce net cash flow by the amortized cost of remedying the unfunded backlog of physical needs, which represents the annual cost of undertaking a repair program. This simulates an owner's likely attempt to spread the remedial costs over time by spreading the work over time or by spreading payments by borrowing. Our final step in computing the backlog-adjusted cash flow index is to add back a portion of a property's excess vacancy loss to represent higher revenues resulting from improved operations and physical condition. We present this computation of the backlog-adjusted cash flow index below.

Annual Net Cash Flow

We begin with annual net cash flow, as computed in Chapter Three, by taking a weighted average over the most recent three years (expressed in 1995 dollars per 2 Bedroom unit) of revenues and expenses.

Annual Net Cash Flow (Weighted 3-Year Average) =

Total Revenue (Weighted 3-Year Average)

Minus ***Operating Expenses*** (weighted 3-year average, including expenses for administration, operations and maintenance, utilities, taxes, and insurance)

Minus ***Mortgage Debt Service*** (Interest, Principal and Mortgage Insurance Premium as required by mortgage)

Minus ***Replacement Reserve Deposit*** (using the greater of the property's actual deposit or an amount equal to 0.5 percent of the original mortgage)

Amortized Cost of Remedying the Unfunded Backlog of Physical Needs

At this step of computing the backlog-adjusted cash flow index, we account for a property's unfunded physical backlog. As explained in Chapter Two, a property's unfunded backlog is its total backlog less available resources from the replacement reserve, special reserves, and residual receipts accounts. Properties whose resources exceed their total backlogs have no unfunded backlogs.

Amortized cost of remedying the unfunded backlog =

Annual debt service on a loan amount equal to the unfunded backlog
(20-year term at 9 percent interest)

where ***Unfunded Backlog = Total Backlog Cost - Available Resources***
(or 0 if resources exceed the total backlog)

and where ***Available Resources =***

Replacement Reserve Balance in excess of 2 years' annual deposits
Plus ***Residual Receipts Account Balance***
Plus ***Other Reserve Account Balances*** (such as painting reserves)

Added Rent from Improving Vacancy Losses

In computing the backlog-adjusted cash flow index, we further modify net cash flow by adding back a portion of the property's excess vacancy loss. This represents the additional income that would result if improved management and physical condition brought a property's excessive vacancy loss closer to the norm for the property's assistance category.

This computation is based on the assumption that properties whose vacancy losses rank in the highest 25 percent among properties in their assistance category will be able to reduce their vacancy losses to the 75th percentile; that properties with vacancies between the median and the 75th percentile will be able to reduce vacancy losses to the median; and that all other properties will continue with current, vacancy losses .[3]

Added rent from improving vacancy loss =

(1) ***For properties with vacancies in excess of the 75th percentile*** of vacancy losses for properties in the same assistance category

Current vacancy loss - 75th Percentile Vacancy Loss (for properties in the same assistance category); i.e., reduce vacancy losses to the 75th percentile

(2) ***For properties with vacancies between the median and 75th percentile*** of vacancy losses for properties in the same assistance category

Current vacancy loss - Median Vacancy Loss (for properties in the same assistance category); i.e., reduce vacancy losses to the median

(3) ***For all other properties—No adjustment***

The net result of these adjustments yields the backlog-adjusted cash flow index, which is a modified version of net cash flow. A positive backlog-adjusted cash flow index indicates a "sound" property that could meet ongoing operations and cover physical needs from reserves and other internal funds. A property with a negative backlog-adjusted cash flow index (a cash flow ***deficit***) could not cover all ongoing operations and physical needs from internal funds. This

3 For unassisted properties, the top quartile of vacancy loss was 7.0 percent and the median was 4.5 percent; for older assisted properties, the top quartile was 3.9 percent and the median was 2.2 percent; for newer assisted, the top quartile was 1.6 percent and the median was 0.9 percent.

situation is not sustainable over time because the property is either falling behind in its financial obligations (mortgage payments) or in physical condition. As we did in our study of the stock in 1989, we have labeled properties with a small negative index (backlog-adjusted cash flow index deficit of -$250 to $0) as "stressed", and properties with a highly negative index (backlog-adjusted cash flow index deficit <-$250) have been categorized as a "distressed."[4][5]

Application of the Backlog-Adjusted Cash Flow Index

Exhibit 4-1 shows the result of applying the backlog-adjusted cash flow index to the full stock of multifamily rental housing with HUD-insured (or held) mortgages. The mean value of this index was highly positive for newer assisted properties ($888), intermediate for unassisted ($515), and close to zero ($5) for older assisted properties. This shows that newer assisted properties, after covering ongoing operations, replacement reserve deposits, and payments to amortize unfunded backlogs, would still have had available an average of $888 of cash flow per unit. Similarly, unassisted properties, after covering ongoing operations and amortizing unfunded backlogs, would still have had available an average of $515 of cash flow per unit. In contrast, older assisted properties, with an average index of $5, could barely cover ongoing operations and amortize their unfunded backlogs.

- Overall, nearly a quarter of properties were classified as "distressed"—they had annual backlog-adjusted cash flow *deficits* of more than $250 per unit (backlog-adjusted cash flow index < -$250). These properties' financial and physical needs outstripped resources available from revenues and reserves. Older assisted properties were most likely to be classified as distressed (32 percent), compared with newer assisted properties (15 percent) or unassisted properties (19 percent).

- At the other extreme, nearly two thirds of the stock was classified as "sound"—they a had break-even or positive backlog-adjusted cash flow. These properties' revenues and reserves were sufficient to meet financial and physical needs. Over three quarters of both unassisted and newer assisted properties were classified as sound, compared with under half of older assisted properties.

- The remaining stock was classified as "stressed"—they had small annual backlog-adjusted cash flow deficits of no more than - $250 per unit (backlog-adjusted cash flow index between -$250 and $0). One fifth of older assisted properties were stressed, compared with only 6 percent of newer assisted and 4 percent of unassisted properties.

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4 Clearly, the cutoff between distressed and stressed was arbitrary, and could be set at another point. Essentially any negative index is an indicator that the property will potentially have trouble in the long run.

5 One could argue that a comprehensive measure would incorporate average annual unfunded accrual into the backlog-adjusted cash flow index as well. We did test such a version of the backlog-adjusted cash flow index. As might be expected, the mean value of this alternative index relative to the original dropped by $500 and the proportion of properties classified as "distressed" increased from 24% to 46%.

Exhibit 4-1
BACKLOG-ADJUSTED CASH FLOW INDEX BY ASSISTANCE CATEGORY
(IN 1995 DOLLARS PER 2-BEDROOM EQUIVALENT)

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 49%[b]	4,076 33%[b]
Distressed[a]	**24%**	**19%**	**26%**	**32%****	**15%**
< -$1,000	9%	10%	8%	10%	6%
-$1,000 to <-$500	8%	5%	9%	12%	4%
-$500 to <-$250	8%	4%	9%	11%	6%
Stressed[a]	**12%**	**4%****	**14%**	**20%****	**6%**
-$250 to $0	12%	4%	14%	20%	6%
Sound[a]	**63%**	**78%****	**60%**	**48%****	**78%**
$0 to < $250	12%	10%	13%	16%	8%
$250 to <$500	12%	17%	10%	9%	12%
$500 to <$1,000	15%	16%	15%	12%	20%
$1,000 to <$1,500	9%	17%	8%	6%	10%
$1,500 to <$2,000	5%	9%	5%	1%	10%
≥$2,000	10%	9%	10%	4%	18%
Statistics on Backlog-Adjusted Cash Flow Index					
Mean[a]	$392	$515	$364	$5**	$888
Standard Error	79	347	59	57	117
Median	$275	$511	$199	-$25	$712

* Signifies that the differences between unassisted and assisted, or older and newer assisted, properties are statistically significant at the 90% confidence level.

** Signifies that the differences between unassisted and assisted, or older and newer assisted, properties are statistically significant at the 95% confidence level.

[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Column sums may not add up to 100% due to rounding.

Source: Derived from 1995 Financial and Physical Condition Data.

The backlog-adjusted cash flow index focuses on the ***financial capacity*** to meet current and future expenses. It does not distinguish between properties that are, in fact, using available resources to address their backlog of physical needs from those that do not. Exhibit 4-2 compares properties' backlog-adjusted cash flow index with their backlogs of physical needs.

- **For most properties, financial *capacity to cover backlogs* were in accord with *actual backlogs*—***properties were using available resources to deal with physical needs.*

  - Most sound properties (64 percent) had low backlogs, and most low backlog properties (80 percent) were sound.

  - At the other extreme, most distressed properties (68 percent) had high or very high backlogs, and most "high- and very-high-backlog" properties (72 percent) were distressed or stressed.

- **For a significant minority of properties, however, actual backlogs differed from what would be expected based on their financial capacity.**

  - Fourteen percent of sound properties had high or very high backlogs. These properties had the financial resources to address their backlogs with internal property resources, but apparently were not doing so. This may indicate management problems.

  - A fifth of low-backlog properties were distressed ro stressed. While these properties were generally keeping up with their repairs, they were apparently not keeping up with other financial obligations.

Exhibit 4-2
PHYSICAL BACKLOG BY BACKLOG-ADJUSTED CASH FLOW INDEX

		Distressed	Stressed	Sound	Total By Backlog Category
Low Backlog (<$1,500 per unit)	**Total Properties**	663	581	4,966	6,210
	Row Percent	11%	9%	80%	51%
	Column Percent	22%	39%	64%	
Moderate Backlog ($1,500 to <$3,000 per unit)	**Total Properties**	283	350	1,700	2,333
	Row Percent	12%	15%	73%	19%
	Column Percent	10%	23%	22%	
High Backlog ($3,000 to <$7,500 per unit)	**Total Properties**	920	487	959	2,266
	Row Percent	39%	21%	41%	19%
	Column Percent	31%	32%	12%	
Very High Backlog ($7,500+ per unit)	**Total Properties**	1,101	89	144	1,334
	Row Percent	83%	7%	11%	
	Column Percent	37%	6%	2%	11%
Total by Distress Category		2,967	1,507	7,769	12,243
Column Percent		24%	12%	63%	100%

Source: Derived from 1995 Financial and Physical Condition data.

Characteristics of Distressed Properties

Characteristics of properties by their backlog-adjusted cash flow index category are presented below in Exhibit 4-3 (tenant characteristics) and Exhibit 4-4 (property and neighborhood characteristics):

- **Distressed and stressed properties, compared with sound properties, had proportionately fewer tenants with very low incomes.** This finding reflects the high percentage of sound properties that are newer assisted, which include more very low-income tenants than do older assisted properties.[6]

6 Data on tenant characteristics are available only for assisted properties.

- **The proportion of white residents is highest in sound properties (61 percent), lower in stressed properties (55 percent), and lowest in distressed properties (54 percent).** Distressed properties had more households headed by Hispanics than either stressed or sound properties.

Exhibit 4-3
TENANT CHARACTERISTICS BY BACKLOG-ADJUSTED CASH FLOW INDEX FOR ASSISTED PROPERTIES

	Total	Distressed (Index <-$250)	Stressed (Index between -$250 and $0)	Sound (Index >$0)
Total Properties	10,019	2,556	1,425	6,038
Percent of Properties	100%	26%	14%	60%
Race/Ethnicity				
Hispanic[a]	11%	14%	8%	10%
Non-Hispanic	89%	86%	92%	90%
White[a]	58%	54%*	55%	61%
Black[a]	37%	42%*	40%	35%
Other	5%	4%	5%	4%
Household Size				
1 Person[a]	43%	34%**	38%**	48%
2 People	24%	26%	25%	23%
3 People	17%	19%	19%	15%
4 People	10%	13%	11%	9%
5 People	4%	4%	4%	3%
Elderly Head of Household Percent[a]	33%	24%**	23%**	38%
Household Income				
Very low income[a]	78%	76%**	68%**	82%
Low income	20%	22%	31%	17%

* Signifies that the differences between distressed and sound, or stressed and sound, properties are statistically significant at the 90% confidence level.
** Signifies that the differences between distressed and sound, or stressed and sound, properties are statistically significant at the 95% confidence level.
[a] Significance test conducted.
Note: Column sums may not add up to totals due to rounding.
Source: TRACS.

Exhibit 4-4
NEIGHBORHOOD AND PROGRAM CHARACTERISTICS BY BACKLOG-ADJUSTED CASH FLOW INDEX CATEGORY MULTIFAMILY RENTAL HOUSING WITH HUD-INSURED (OR HELD) MORTGAGES

	Total	Distressed (Index Less than -$250)	Stressed (Index between -$250 and $0)	Sound (Index ≥$0)
Total Properties	12,243	2,968	1,507	7,768
Percent of Properties	100%	24%	12%	63%
Assistance Category				
Unassisted	18%	14%	5%	22%
Older Assisted	49%	65%	78%	37%
Newer Assisted	33%	21%	17%	41%
Sponsor Type				
Non-Profit/Coop	18%	24%	23%	15%
Limited Dividend	40%	52%	60%	32%
For-Profit	42%	24%	18%	53%
Mortgage Start Year				
Before 1970	5%	9%	7%	4%
1970-1979	55%	60%	73%	49%
1980 or later	40%	32%	20%	47%
Property Size				
<50 units[a]	17%	23%**	18%	14%
50 to <99 units	35%	30%	25%	39%
100 to <199 units	36%	35%	46%	35%
≥ 200 units[a]	12%	12%	11%	12%
Mean Units[a]	115	112	117	115
Standard Error	3.9	7	8	5
Median	96	90	100	96
Average Unit Size				
<2.25 bedrooms[a]	80%	76%**	66%**	84%
≥2.25 bedrooms[a]	20%	24%**	34%**	16%
Mean Unit Size[a]	1.7	1.8**	1.9**	1.6
Standard Error	0.02	0.04	0.07	0.03
Median	1.8	2.0	2.0	1.7
Building Type				
High rise[a]	26%	27%	10%**	28%
Walk up[a]	44%	40%	53%	44%
SF attached	31%	34%	35%	28%
SF detached	0%	0%	2%	0%

Exhibit 4-4 *(continued)*
NEIGHBORHOOD AND PROGRAM CHARACTERISTICS BY BACKLOG-ADJUSTED CASH FLOW INDEX CATEGORY MULTIFAMILY RENTAL HOUSING WITH HUD-INSURED (OR HELD) MORTGAGES

	Total	Distressed (Index Less than -$250)	Stressed (Index between -$250 and $0)	Sound (Index ≥$0)
Total Properties	12,243	2,968	1,507	7,768
Percent of Properties	100%	24%	12%	63%
Neighborhood Quality Relative to City				
Better than Average	36%	30%	35%	39%
Average	39%	38%	33%	41%
Worse than Average	23%	33%	30%	19%
Quality as Residential Neighborhood				
Excellent/Good	67%	53%	71%	72%
Fair/Poor	33%	47%	29%	28%
Property Rents/Local FMR				
<0.5	4%	12%	1%	2%
0.5 to <1.0	51%	57%	79%	42%
1.0 to <1.5	34%	26%	20%	40%
1.5 or more	12%	5%	0%	16%
Neighborhood Vacancy				
<4%	45%	43%	41%	48%
4-7%	36%	41%	35%	35%
>7%	18%	16%	24%	17%

* Signifies that the differences between distressed and sound, or stressed and sound, properties are statistically significant at the 90% confidence level.
** Signifies that the differences between distressed and sound, or stressed and sound, properties are statistically significant at the 95% confidence level.
[a] Significance test conducted.

Note: Column sums may not add up to totals due to rounding.
Source: Inspections, windshield survey, Census, HUD, market evaluations.

- **Distressed properties had proportionately fewer single-person households or households headed by elderly persons** and more family households (again, reflecting the difference between older and newer assisted properties).

- **Distressed and stressed properties had slightly larger units (higher number of bedrooms) on average than did sound properties.** This is consistent with the higher concentration of single and elderly households in sound properties.

- **Distressed and stressed properties, compared with sound properties, were more likely to be older assisted and less likely to be newer assisted**. Older assisted properties accounted for 49 percent of the insured (or held) stock, but accounted for 65 percent of the distressed properties and 78 percent of the stressed properties. By contrast, newer assisted properties accounted for 33 percent of the stock but only for 21 percent of the distressed properties and 17 percent of the stressed properties.

- **Distressed and stressed properties tended to be located in neighborhoods that were in worse condition than those in which sound properties were located and were more likely than sound properties to be located in central cities**.

- **Distressed and stressed properties were more likely than sound properties to have non-profit/cooperative or limited dividend owners and were less likely to have for-profit owners.** These findings are consistent with the fact that for-profit owners predominate among newer assisted properties and non-profits are concentrated in older assisted properties.

- **Distressed and stressed properties were more likely than sound properties to have rents below the local Section 8 fair market rent (FMR) levels**. This is consistent with the large proportion of sound properties that are newer assisted, many of which have rents above FMR levels, and the large proportion of distressed properties that are older assisted, many of which have rents below FMR levels.

- **Distressed and stressed properties were less likely than sound properties to be located in neighborhoods with tight rental markets** (vacancy rates under 4 percent). However, the difference between property vacancy loss and neighborhood vacancy varied little by distress category.

- **Mean property size (number of units) was fairly even across distress categories.**

- There were few differences in the types of buildings that were distressed versus sound. However, stress was more common in walk ups and less common in high rises.

Comparison of Backlog-Adjusted Cash Flow Index 1989 - 1995

Exhibit 4-5 compares the backlog-adjusted cash flow index in 1989 and 1995 for the multifamily stock with insured or held mortgages. This exhibit is based on the comparison sample of 504 properties that were assessed for both years. In both years, 64 percent of the stock was sound and

less than a quarter was distressed.[7] While overall, the distribution of properties by distress level did not change, changes did occur within the newer assisted and unassisted categories.

- **Among newer assisted properties, the percentage of distressed properties nearly doubled** (from 7 percent in the 1989 to 13 percent in 1995) **while the percentage of sound properties decreased** (from 87 percent to 80 percent). Thus, while newer assisted properties are still the least distressed portion of the stock, the situation in these properties has deteriorated over the last six years, largely as a result of the deterioration in physical condition.

- **Among unassisted properties, the percentage of distressed and stressed properties decreased substantially over the six-year period, while the percentage of sound properties increased.** In 1989, 58 percent of unassisted properties were classified as sound and 31 percent were classified as distressed. In 1995, 78 percent of the unassisted stock was classified as sound, and only 19 percent were classified as distressed. This is largely a result of the significant improvement in the financial condition of this portion of the stock.

- Almost no change occurred in the older assisted portion of the stock, which continued to include the largest proportion of distressed properties.

Exhibit 4-5
COMPARISON OF BACKLOG-ADJUSTED CASH FLOW INDEX IN 1989 AND 1995
BASED ON COMPARISON SAMPLE OF 504 PROPERTIES COMMON TO '89 AND '95 STUDIES

	Total	Un-assisted	Older Assisted	Newer Assisted	Total	Un-assisted	Older Assisted	Newer Assisted
	1989				1995			
Distressed	22%	31%	30%	7%	23%	19%	32%	13%
Stressed	14%	11%	21%	7%	12%	4%	20%	7%
Sound	64%	58%	50%	87%	64%	78%	48%	80%

Note: Column sums may not add up to totals due to rounding.
Source: 1995 data: Annual Financial Statements and 1995 Physical Inspection Data and Costing Program.
1989 data: 1990 Analysis File.

7 As was indicated in Chapter 2 on the physical condition of the stock, the study's estimation of physical condition was not intended to provide reliable property-level estimates, but rather reliable assistance category-level estimates. Thus, we do not compare the backlog-adjusted cash flow index at a property level between the two time periods.

CHAPTER FIVE
MARKET POSITION OF ASSISTED PROPERTIES

All of previous analyses assumed that properties' rents, assistance levels, and operations would continue as in the past. In fact, the stock is in transition and HUD has already implemented a number of initiatives that are moving assisted properties closer to market operations. These initiatives include not only the MAHRAA "mark-to-market" program, but also market ceilings on annual rent increases for assisted properties, rent ceilings on Section 8 contract renewals, and preservation programs for many older assisted properties.

In this chapter, therefore, we conduct several market scenario analyses to examine how the assisted stock would fare under market operation. Section 5.1 compares property financial indicators (rents, vacancy losses, and operating expenses) with those of the local market and conventionally financed properties. Section 5.2 presents a modified cash flow analysis assuming properties operate at market-rate rent and operating cost levels. Section 5.3 extends this analysis by applying a debt service coverage ratio to assess which portions of the stock could operate at market rents either with or without mortgage write-off. This section also presents characteristics of properties' neighborhoods and residents based on properties' ability to operate at market rents.

5.1 Property Finances Relative to Neighborhood and Industry Data

To help place the HUD stock into its broader market context, we compared properties's rent levels and vacancies with those of their local markets, and their operating costs with regional industry data for similar building types. This section shows that:

- Older assisted properties tended to have lower rents, lower vacancies, but higher operating costs than did conventional unassisted properties in similar locations and similar building types.

- Newer assisted properties tended to have significantly higher rents, lower vacancies, and higher operating expenses than did conventional unassisted properties in similar locations and similar building types.

Current Assisted Rents Compared with Market Rents

Exhibit 5-1 compares current assisted property rents in the assisted stock[1] with comparable rents in their neighborhoods. These comparable rents are estimates by the study's market analysts of properties' "as is" local market rents—what property rents would be in an unrestricted market, assuming that physical backlog were remedied but no physical upgrades were undertaken to reposition the property[2]. Exhibit 5-2 summarizes this information graphically.

While overall, the assisted stock was evenly divided between properties with current assisted rents above or below estimated market levels, older and newer assisted properties dramatically from each other:

- **Most older assisted properties (78 percent) had rents below market level, including 38 percent with rents below 75 percent of their estimated market level.**

- **In contrast, the vast majority of newer assisted properties (86 percent) had rents above market level, including 40 percent with rents above 140 percent of their estimated market level**. These properties are the focus of HUD's MAHRAA "mark-to-market" program to bring property rents in line with rents in their surrounding markets.

1 Current assisted rents are gross rents as reported on owners' annual financial statements with an estimate of utility costs added in when it appeared that tenants paid for their own utilities.

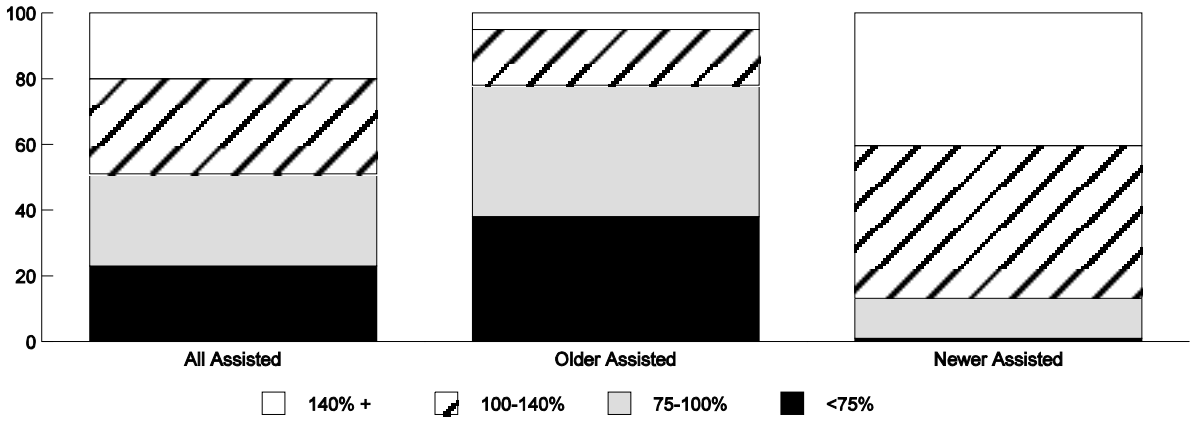
2 The study collected information on properties' market potential for physical upgrades to higher use. The study's market analysts concluded that for 95 percent of assisted properties, physical upgrades beyond remedying backlogs were unlikely. The study also estimated whether properties' optimal market position would be for a low, moderate, or high end market. For 83 percent of assisted properties, optimal market position would be low market, and for another 15 percent moderate market.

Exhibit 5-1
CURRENT ASSISTED RENT RELATIVE TO LOCAL "AS IS" MARKET RENT

		Assisted	
	All Assisted	**Older Assisted**	**Newer Assisted**
Total Properties **Percent of Total Properties**	10,019 82%	5,943 59%	4,076 41%
Current Assisted Rent Relative to Local Market "As Is"			
Assisted Rent <75% of Market	23%	38%	1%
Assisted Rent 75 to <90% of Market	18%	28%	5%
Assisted Rent 90 to <100% of Market	10%	12%	7%
Assisted Rent 100 to <120% of Market	15%	12%	20%
Assisted Rent 120 to <140% of Market	14%	5%	26%
Assisted Rent 140 to <175% of Market	10%	4%	20%
Assisted Rent ≥ 175% of Market	9%	1%	20%

Source: Financial Data, Market Valuation Summary.

Exhibit 5-2
CURRENT ASSISTED RENT RELATIVE TO "AS IS" MARKET RENT



Source: Derived from Exhibit 5-1.

Changes in Rents Relative to Market, 1989 - 1995

Exhibit 5-3 shows changes between 1989 and 1995 in ratios of current assisted to local "as is" market rents for assisted properties. The 1995 figures differ slightly from those in Exhibit 5-1 above because they rely on the comparison sample of 504 properties that were included in both the 1989 and 1995 studies.

- **Rents for older assisted properties dropped relative to local market rents.** In 1989, the proportion of older assisted properties with rents ***below*** market levels increased from 67 percent in 1989 to 77 percent in 1995.

- **Rents in newer assisted properties rose relative to local market rents**. The proportion of newer assisted properties with rents ***above*** market levels rose from 81 percent in 1989 to 86 percent in 1995.

Exhibit 5-3
CURRENT ASSISTED RENT RELATIVE TO "AS IS" MARKET RENT, 1989 AND 1995
BASED ON COMPARISON SAMPLE OF 504 PROPERTIES COMMON TO '89 AND '95 STUDIES

	Older Assisted	Newer Assisted	Older Assisted	Newer Assisted
Current Assisted Rent as % of Market Rent	**1989**		**1995**	
Assisted Rent < Market Rent	67%	18%	77%	14%
Assisted Rent <75% of Market	30%	3%	38%	1%
75 to <90% of Market	23%	3%	27%	6%
90 to <100% of Market	14%	12%	12%	7%
Assisted Rent ≥ Market Rent	33%	81%	23%	86%
100 to <120% of Market	17%	21%	12%	18%
120 to <140% of Market	6%	18%	5%	28%
140 to <175% of Market	6%	19%	4%	19%
Assisted Rent ≥ 175% of Market	4%	23%	2%	21%

Note: Column sums may not add up to 100% due to rounding.
Source: 1995: 1992-1995 Financial Data, Market Valuation Summaries.
1989: 1990 Analysis File.

Property Vacancies Compared with Local Vacancies

Exhibit 5-4 compares current property vacancy losses with the vacancy rates in the surrounding neighborhood. Vacancy losses, as reported on properties' annual financial statements, include both losses from vacant units and from uncollected rents. Neighborhood vacancy rates were collected by the study's market analysts as part of the market valuation process, and were provided in ranges of "under 4 percent," "4-to-7 percent," and "7 percent-or-above."

- The vast majority of assisted properties (90 percent) had vacancy rates that were at or below neighborhood rates. This is expected because their project-based assistance helps attract and retain lower-income renters.

- Only 3 percent of newer assisted properties and 15 percent of older assisted properties had higher vacancy rates than did their neighborhoods.

Exhibit 5-4
CURRENT PROPERTY VACANCY RELATIVE TO LOCAL MARKET VACANCY

		Assisted	
	Assisted	**Older Assisted**	**Newer Assisted**
Total Properties	10,019	5,943	4,076
Percent of Total Properties	82%	59%[a]	41%[a]
Property Vacancy Relative to Local Market			
Property Vacancy less than Neighborhood	43%	40%	47%
Property Vacancy Same Range as Neighborhood	47%	45%	51%
Property Vacancy Greater than Neighborhood	10%	15%	3%

Source: Financial Data, Market Valuation Summary.

Operating Expenses Compared with Regional Operating Expenses

Exhibit 5-5 compares property operating expenses (including administrative costs, operating and maintenance costs, utilities, and tax and insurance expenses) with private industry medians for for conventional apartments in the same region and of the same building type.[3]

3 Private industry medians were computed by taking the 1995 median values of operating expenses per square foot of living space by region and building type for conventional apartments as compiled by the Institute of Real Estate Management (IREM), multiplied by the property square footage of living space. IREM divides the United States into ten regions for reporting its statistics.

- **Eighty-five percent of assisted properties had operating expenses above industry medians (compared, of course, with 50 percent of conventional properties in the same region and of the same building type).**

- A higher proportion of newer assisted properties had above median, operating costs (89 percent) compared with older assisted properties (82 percent).

About 17 percent of all properties had operating costs that were close to the industry medians for their region and building type (between 90 and 110 percent of median).

Exhibit 5-5
PROPERTY OPERATING EXPENSES RELATIVE TO INDUSTRY MEDIANS BY BUILDING TYPE AND REGION

		Assisted	
	Assisted	**Older Assisted**	**Newer Assisted**
Total Properties **Percent of Total Properties**	10,019 82%	5,943 59%[a]	4,076 41%[a]
Operating Expenses Relative to Industry Medians			
Property < Industry Median	15%	18%	11%
Property > Industry Median	85%	82%	89%
Property expenses 90-110% of Industry Median	17%	19%	14%

Source: Financial Data & *1996 Income/Expense Analysis: Conventional Apartments*, Institute of Real Estate Management, Chicago

5.2 Market Scenario Cash Flow Index

All of the analyses in previous chapters that emphasized the strong financial position of newer assisted properties were based on properties' current assisted rents, which were typically well above market. As is obvious from the ongoing policy initiatives, the "current" situation has changed. In particular, in Section 8-assisted properties with above-market rents, the MAHRAA "mark-to-market" program will reduce rents to market levels and at the same time reduce debt service payments so that owners can still cover expenses.

Similarly, all of the analyses in previous chapters that emphasized the weaker physical and financial condition of the older assisted stock were based on properties' current assisted rents, which were often below market. This situation, too, may change because some owners of below-market properties may be able to opt-out of HUD rental assistance or prepay assisted mortgages, and then move their properties up to market rent. Furthermore, proposals have been put forward to "mark rents up to market," which could provide many properties with added income to remedy physical backlogs and bolster financial viability.

To explore impacts on the assisted stock, were property rents set to market levels, we modified the ***backlog-adjusted cash flow index***, discussed in Chapter Four, to create a ***market scenario cash flow index***. This index provides a simple model to assess financial effects of setting property rents to market levels (allowing for both increases and decreases in rents), eliminating Section 236 interest rate subsidies, and moving operating costs toward industry medians. The index takes into account the cost of remedying the physical needs backlog, but does not consider any other transition costs to convert to market rate operation.

Computing the market scenario cash flow index begins with standard net cash flow, which measures a property's capacity to meet expenses and make deposits to its replacement reserves account. However, we ***substitute market rents*** for ***current assisted rents*** in computing property revenues and we ***increase*** the amount of ***reserve deposits to cover fully annual accrual***. We further ***reduce net cash flow by the amortized cost of remedying the unfunded physical backlog***, which represents the annual cost of undertaking a comprehensive repair program.

In more detail, we compute the market scenario cash flow index as follows:

Market Scenario Cash Flow Index =

Total Revenue (gross potential market rent less vacancy loss. Gross rent is based on market analysts' estimate of "as is" market rents, where "as is" assumes that backlogs are remedied, but no physical upgrades are undertaken. We assume that the vacancy loss would move 80 percent of the way from the historic property vacancy loss toward the local market vacancy loss estimated by the study's market analysts.)

Minus ***Operating Expenses*** (including expenses for administration, operations and maintenance, utilities, taxes, insurance. We assume that at market operation, operating costs would move 20 percent of the way from historic property operating costs toward the IREM industry median for conventional properties of the same building type and located in the same region.)

Minus ***Debt Service on Current Mortgage*** (full interest, principal and mortgage insurance premium as required by current mortgage. For Section 236 properties this means that the interest rate subsidy is eliminated and the property must cover the full debt service costs.

For Section 221(d)(3)BMIR properties this means that the below-market interest rate remains).

Minus ***Deposits to the Replacement Reserve to Cover Accruals*** (we assume that annual deposits to the replacement reserve are increased to cover ***fully*** the portion of annual physical needs accrual not covered by ordinary operating expenses.[4])

Minus ***Amortized Annual Cost of Remedying Unfunded Backlog*** (we assume that the property amortizes a 10-year loan at 9 percent interest with principal amount equal to the unfunded backlog.[5])

Exhibit 5-6 presents the results of applying the market scenario cash flow index to the assisted portion of the stock of multifamily rental housing with HUD-insured or HUD-held mortgages.[6]

- **Only 13 percent of newer assisted properties would have positive market scenario cash flow.** The main reason for this decline among newer assisted properties is the substantial reduction of income for the large majority of properties (86 percent), whose current assisted rents exceed local market rents. Other factors contributing to newer assisted properties' financial decline would be increased vacancy losses (relative to current, extremely low rates of only 1.3 percent of gross potential rent) and increased reserve deposits to cover full accrual. These large decreases in income and increases in expenses would be only partially offset by reducing historic property operating expenses toward market levels.

- **In contrast, 45 percent of older assisted properties would have positive market scenario cash flow.** The reason older assisted properties would fare better than newer assisted properties is that most older assisted properties (78 percent) would receive higher income at local market rents than under current assisted operation. Reverting to market rents in these cases would mean higher rents and more revenue to deal with physical backlog and annual accrual. In addition to the higher rents, many older assisted properties would benefit from reduced operating expenses . These gains in cash flow would help cover increased reserve deposits, increased debt service for properties with Section 236 mortgages, and the heavy burden of amortizing the large unfunded backlogs.

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4 Our analysis of property expense data showed that about 23 percent of total operating expenses are spent on repair and replacement items that could be used to cover capital expenses. As noted in Chapter 3, assuming that 25 percent of these expenses are actually used to cover capital expenses, overall .23 x .25 = .0575, or about 6 percent of total operating expenses can be assumed to be used to cover accrual costs.

5 In contrast with the Backlog-Adjusted Cash Flow Index, which used a 20 year amortization period, we use a 10 year amortization here because we assume that properties must rely on market financing, which is typically shorter term.

6 As noted previously, assisted properties include some properties that have no rental assistance (neither Section 8, Rent Supplement, nor Rental Assistance Payments), but that do have mortgage assistance through either the Section 236 or 221(d)(3) BMIR programs.

Exhibit 5-6
MARKET SCENARIO CASH FLOW INDEX BY ASSISTANCE CATEGORY[b]
(ASSUMES OPERATION AT "AS IS" MARKET RENTS)
(IN 1995 DOLLARS PER 2-BEDROOM EQUIVALENT UNIT)

	All Assisted	Older Assisted	Newer Assisted	Current Assisted Rent > Market	Current Assisted Rent ≤ Market
Total Properties **Percent of Properties**	10,014 100%	5,943 59%[b]	4,076 41%[b]	4,826 48%	5,193 52%
Negative Cash Flow[a]	**68%**	**56%****	**87%**	**95%**	**44%**
< -$3,000	19%	8%	35%	38%	2%
-$3,000 to < -$2,000	10%	7%	15%	17%	4%
-$2,000 to < -$1,000	18%	16%	22%	27%	11%
-$1,000 to < -$500	8%	10%	7%	7%	10%
-$500 to < $0	12%	15%	8%	6%	18%
Positive Cash Flow (≥$0)[a]	**31%**	**45%****	**13%**	**5%****	**57%**
$0 to < $500	8%	11%	4%	4%	12%
$500 to <$1,000	8%	12%	3%	0%	15%
$1,000 or more	15%	22%	6%	0%	30%
Statistics on Market Scenario Cash Flow Index					
Mean[a]	-$1,135	-$187**	-$2,516	-$2,879**	$487
Standard Error	115	125	216	163	114
Median	-$899	-$254	-$1,998	-$2,217	$291

* Signifies that the differences between above and below market rent, or older and newer assisted, properties are statistically significant at the 90% confidence level.

** Signifies that the differences between above and below market rent, or older and newer assisted, properties are statistically significant at the 95% confidence level.

[a] Significance test conducted.

[b] Assumes:
- Rents are set at "as is" market levels
- 20% of the gap between property and IREM operating costs is closed.
- 80% of the gap between property and neighborhood vacancy losses is closed.
- Deposit to the reserve account equals annual accrual
- IRPs are eliminated
- Unfunded backlog loan at 9% for 10 years.

Note: Column sums may not add to 100% due to rounding.

Another way to look at Market Cash Flow Index is to separate properties into those with current assisted rents above market rents (properties that are the focus of "mark-to-market" proposals) and those with current assisted rents below market rents. As Exhibit 5-6 shows, nearly all properties (95 percent) with current rents above market levels would have negative market scenario cash flow. Unless additional changes are made such as reducing debt service, these properties would not remain financially viable. On the other hand, for properties with current rents below market, moving to the market scenario would allow 57 percent to experience positive cash flow. These may also be properties that could benefit from a "mark-up-to market" program. These are also properties for which opting out of assistance programs—from Section 8 or assisted mortgages—could be financially attractive to owners.

As in all modeling, the results of the market scenario cash flow index depend on the assumptions used. While we have used what we believe to be the most plausible estimates for each parameter, other estimates would yield different results.

For example, we made plausible assumptions regarding the degree to which, at market operations, properties' operating costs and vacancy rates would move from historic levels toward prevailing market levels, and other assumptions about terms for amortizing the loan to remedy the unfunded backlog. To illustrate the sensitivity of the market scenario cash flow index to these assumptions, we present in Exhibit 5-7 results that would be obtained using more extreme, but still plausible values, for several key assumptions. The exhibit shows that the results are sensitive to assumptions regarding operating cost changes and less sensitive to assumptions regarding vacancy rates.[7]

- **Operating Costs**

  - Assuming that at market operation, properties' operating costs moved 50 percent of the way from their historic levels toward the IREM median, the mean market scenario cash flow index would ***improve*** by 30 percent (from -$1,135 to -$794) and the percent of properties with positive cash flow would ***increase*** from 31 percent to 36 percent.

  - At the other extreme, assuming that at market operation, properties' operating expenses remained at their historic levels, the mean market scenario cash flow index would ***decline*** by 20 percent (from -$1,135 to -$1,362) although the percent of properties with positive cash flow would stay almost the same.

7 Results are also, of course, sensitive to the group of properties being examined. For example, if instead of focusing on all older assisted properties, we focused on the subset of 4,155 HUD insured (not-held) older assisted properties having Section 8 assistance, then the mean market scenario cash flow index would be -$446 and the percent with positive cash flow would be 38 percent.

Exhibit 5-7
SENSITIVITY TO ASSUMPTIONS
MARKET SCENARIO CASH FLOW INDEX (MSCFI)

	Best Assumption on All Parameters (from Ex. 5-6)	Operating Expenses		Vacancy Rates	
		Close 50% Gap	Close none of Gap	Close 50% of Gap	Close All of Gap
Older Assisted					
Mean	-$187	$116	-$389	-$128	-$226
% Properties with positive MSCFI (≥ $0)	45%	50%	42%	45%	45%
Newer Assisted					
Mean	-$2,516	-$2,120	-$2,780	-$2,429	-$2,575
% Properties with positive MSCFI (≥ $0)	13%	17%	13%	14%	13%
All Assisted					
Mean	-$1,135	-$794	-$1,362	-$1,062	-$1,182
% Properties with positive MSCFI (≥ $0)	31%	36%	30%	33%	31%

Source: Derived from 1995 Financial and Inspection data.

- **Vacancy Rates**

  - Assuming that at market operation, properties' vacancy rates moved only 50 percent of the way from their historic levels toward the local area average, instead of 80 percent, the mean market scenario cash flow index would ***improve*** by 6 percent (from -$1,135 to -$1,064) and the percent of properties with positive cash flow would remain almost the same.

  - Assuming that at market operation, properties' vacancy rates were equal to local area averages, the mean market scenario cash flow index would ***decline*** by 4 percent (from -$1,135 to -$1,182), and the percent of properties with positive cash flow would stay almost the same.

It is also important to look at the impact on residents of moving current assisted rents to market. As discussed in Chapter 3, current tenant-paid rents account for only 26 percent of total revenues in newer assisted properties, and 56 percent in older assisted properties. Almost all of the balance comes from HUD's tenant assistance payments. Were assisted rents moved to market, this stock would still not be affordable without some form of continued assistance.

With rents in most newer assisted properties reduced to market levels, current tenant paid rents would still cover on average only 35 percent of market rents. The amount of tenant assistance payments could be reduced, but the need for subsidies to residents would remain.

With rents in most older assisted properties increased to market, current tenant paid rents would still cover on average only 48 percent of market rents. Tenant assistance payments would be even more necessary and the amount of total subsidies would have to increase.

5.3 Market Scenario Debt Coverage Ratio

Properties' performance at market operation can also be examined by converting the ***market scenario cash flow index*** into a ***market scenario debt coverage ratio***. This conversion is accomplished simply by adding back to market scenario cash flow the amount of debt service (***yielding net operating income*** (NOI)) and then dividing the result by the amount of debt service.

NOI under the market scenario is the amount of funds a property will have available for debt service after making all payments for operating expenses, remedying the physical backlog, and fully funding physical accrual. Dividing NOI by debt service "scales" NOI into fractions or multiples of the debt service amount. A market scenario debt coverage ratio of one or more means a property can cover debt service, and the higher this ratio is, the more secure is the mortgage and the more financially viable the property.

As shown in Exhibit 5-8, properties can be divided into three categories based on their market scenario debt coverage ratio:

- **Full Coverage—market scenario debt coverage ratio $\geq$ 1.0.** A ratio of 1 or more indicates that a property can cover all expenses including current and future physical needs and debt service. The mortgage may be considered "performing." This is identical to a property's having a market scenario cash flow index of $0 or better.

- **Debt Restructure—market scenario debt coverage ratio $\geq$ 0 and < 1.0.** A non-negative ratio smaller than 1 indicates that revenues can cover fully operations including current and future physical needs, but not full debt service. These properties could be viable at market with partial or full debt reduction under a mark-to-market program.

- **Non-Performing—market scenario debt coverage ratio < 0**. A negative ratio indicates that even in the absence of debt service payments, a property cannot cover ongoing operations. These properties may be considered non-performing.

Exhibit 5-8
MARKET SCENARIO DEBT COVERAGE RATIO [b]

	Total	Older Assisted	Newer Assisted	Current Assisted Rent > Market	Current Assisted Rent ≤ Market
Total Properties **Percent of Properties**	10,019 100%	5,943 59%[b]	4,076 41%[b]	4,826 48%	5,193 52%
Non-Performing— Ratio < 0[a]	24%	24%	24%	39%**	11%
Debt Restructure— Ratio≥ 0 and <1[a]	44%	31%**	63%	56%**	33%
0 to <0.25	10%	5%	16%	16%	4%
0.25 to <0.50	13%	8%	22%	20%	7%
0.50 to <0.75	12%	10%	15%	13%	11%
0.75 to <1.00	9%	8%	10%	7%	11%
Full Coverage— Ratio ≥ 1[a]	31%	45%**	13%	5%**	57%
1 to <1.25	8%	10%	6%	4%	12%
1.25 to <1.50	4%	5%	3%	0%	9%
1.50 or more	19%	30%	3%	1%	36%
Statistics on Market Scenario Debt Coverage Ratio					
Mean	0.72	0.95	0.37	0.00	1.38
Median	0.54	0.81	0.38	0.15	1.17

* Signifies that the differences between below market and above market, or older and newer assisted, properties are statistically significant at the 90% confidence level.

** Signifies that the differences between below market and above market, or older and newer assisted, properties are statistically significant at the 95% confidence level.

[a] Significance test conducted.

[b] Market Scenario Debt Coverage Ratio =

["As Is" rent - (vacancy loss + operating expenses + deposit to reserve + loan on unfunded backlog)] ÷ debt service

Assumes:

Rents are set at "as is" market levels

20% of the gap between property and IREM operating costs is closed.

80% of the gap between property and neighborhood vacancy losses is closed.

Deposit to the reserve account equals annual accrual

IRPs are eliminated

Unfunded backlog loan at 9% for 10 years.

Note: Column sums may not add to 100% due to rounding.

The exhibit shows that at market operation:

- Nearly a third (31 percent) of assisted properties would have **full coverage**—sufficient resources to cover all expenses including operations, physical needs backlogs and accruals, and debt service.

  - As we saw with the market scenario cash flow index, newer assisted properties would fare much worse than older assisted properties. Only 13 percent of newer assisted properties would have full coverage, compared with 45 percent of older assisted properties.

  - Among these full coverage properties, 8 percent would have ratios between 1 and 1.25. For some of these properties, this would leave little cushion for contingencies or for profit.

- Forty-four percent would require **debt restructure**—they could cover most costs, but at best, only a portion of debt service. This includes 10 percent of properties that could cover less than one quarter of their debt service, and 9 percent that could cover at least three quarters.

  - Nearly two-thirds (63 percent) of newer assisted properties but less than one third (31 percent) of older assisted properties would be in this debt restructure category.

- Nearly a quarter (24 percent) would be **non-performing**—under market operation, they would not be able to cover operations and physical needs from revenues, even if all mortgage debt were written off. This percentage non-performing would be the same for both older and newer assisted properties.

Exhibit 5-8 also shows separately the market debt coverage ratio for properties with above market rents and for properties with below market rents. As expected, properties with above market rents fare much worse in a market scenario, because rents, and therefore revenues, are reduced.

Exhibit 5-9 shows that among non-performing properties (those having negative market scenario debt coverage ratios), cash flow deficits could be substantial evan after full mortgage write off.

Over half of these properties (53 percent) would have annual cash flow deficits of between $0 and $1,000 per unit. Another 21 percent would have deficits between $1,000 - $2,000, 13 percent would have deficits of between $2,000 - $3,000, and 13 percent would have deficits of more than $3,000.

Clearly, for many of these properties, it might not be cost-effective for HUD to pursue a strategy of complete debt write-off coupled with additional grants or operating subsidies.

Exhibit 5-9
PROJECTED CASH FLOW DEFICITS FOR NON-PERFORMING PROPERTIES
(ASSUMING FULL DEBT WRITE-OFF)
(IN 1995 DOLLARS PER 2-BEDROOM EQUIVALENT UNIT)

	Total	Older Assisted	Newer Assisted	Current Assisted Rent > Market	Current Assisted Rent ≤ Market
Total Properties	2,448	1,452	996	1,899	549
Percent of Properties	100%	59%	41%	78%	22%
Cash Flow Deficit					
0 to <1,000	53%	56%	49%	45%	80%
1,000 to <2,000	21%	20%	23%	25%	8%
2,000 to <3,000	13%	12%	14%	14%	8%
≥ 3,000	13%	12%	14%	15%	4%

Source: 1995 Financial Data.

Exhibit 5-10 shows characteristics of properties categorized by their market scenario debt coverage ratio. Non-performing properties tend to have the following characteristics:

- High backlogs of physical needs (mean of $7,390, with 31 percent having backlogs of over $7,500).
- High operating costs (88 percent had operating costs that were over the industry median for their building type and region).
- Located in neighborhoods within central cities (55 percent), that were rated “fair” or “poor” (66 percent), were worse than average for their city (44 percent), and had relatively high vacancies (32 percent in neighborhoods with over 7 percent vacancies). Nearly 35 percent had market rents below 75 percent of the local FMR.
- More likely to be older assisted than newer assisted.

Full coverage and debt restructure properties tend to be similar to each other on most dimensions. They tend to:

- Have medium-level backlogs of physical needs (mean of $2,516 for debt restructure properties and $2,298 for full coverage properties, with only 6 to 7 percent having backlogs of over $7,500).

- Be in non-central city neighborhoods (66 percent for debt restructure properties and 55 percent for full coverage properties) that are rated as excellent or good (69 percent for debt restructure properties and 74 percent for full coverage properties). Over half these properties (51 percent) were in neighborhoods with vacancies under 4 percent, and only 13 percent were in neighborhoods with vacancies over 7 percent.

Debt restructure properties are more likely to be newer assisted while full coverage properties, overwhelmingly, are more likely to be older assisted. Debt restructure properties tended to have higher operating costs relative to industry medians compared with full coverage properties.

Exhibit 5-10
NEIGHBORHOOD AND PROPERTY CHARACTERISTICS BY MARKET SCENARIO DEBT COVERAGE RATIO FOR ASSISTED PROPERTIES[b]

	Total	Non-Performing (Ratio < 0)	Debt Restructure (Ratio ≥ 0 and < 1)	Full Coverage (Ratio ≥1)
Total Properties	10,019	2,448	4,392	3,178
Percent of Properties	100%	24%	44%	31%
Assistance Category				
Older Assisted	59%	59%	42%	83%
Newer Assisted	41%	41%	58%	17%
Backlog Per Unit				
<$1,500[a]	47%	24%*	53%	57%
$1,500 to <$3,000[a]	18%	15%	21%	17%
$3,000 to < $7,500[a]	22%	29%	21%	18%
≥$7,500[a]	12%	31%*	6%	7%
Mean[a]	$3,638	$7,390**	$2,516	$2,298
Median	$1,661	$4,560	$1,395	$1,191
Property Operating Costs Relative to Industry Median				
Property ≤ Industry Median[a]	15%	12%	12%	23%**
Property > Median[a]	85%	88%	89%	78%**
Mortgage Balance				
Mean[a]	$21,382	$21,750**	$26,203*	$14,438**

Exhibit 5-10 *(continued)*
NEIGHBORHOOD AND PROPERTY CHARACTERISTICS BY MARKET DEBT COVERAGE RATIO FOR ASSISTED PROPERTIES[b]

	Total	Non-Performing (Ratio < 0)	Debt Restructure (Ratio ≥ 0 and < 1)	Full Coverage (Ratio ≥1)
Sponsor Type				
Non-Profit/Coop	21%	17%	11%	38%
Limited Dividend	48%	56%	43%	48%
For-Profit	31%	27%	46%	13%
Median	$15,734	$13,231	$24,655	$9,669
Mortgage Start Year				
Before 1970	5%	3%	2%	12%
1970-1979	57%	58%	45%	72%
1980 or later	47%	39%	52%	16%
Property Size				
<50 units[a]	19%	22%**	20%	16%
50 - 99 units	36%	34%	38%	35%
100 - 199 units	35%	30%	35%	37%
≥ 200 units[a]	10%	13%	7%	12%
Mean Units[a]	105	110*	95	115**
Median	88	86	80	98
Average Unit Size				
<2.25 bedrooms[a]	76%	77%	76%	74%
≥2.25 bedrooms[a]	24%	23%	24%	26%
Mean Unit Size[a]	1.8	1.8	1.8	1.8
Median	1.9	1.9	1.9	2.0
Building Type				
High rise[a]	24%	30%	24%	21%
Walk up[a]	42%	41%	40%	44%
SF attached	34%	28%	36%	35%
SF detached	0%	1%	0%	0%

Exhibit 5-10 *(continued)*
NEIGHBORHOOD AND PROPERTY CHARACTERISTICS BY MARKET DEBT COVERAGE RATIO FOR ASSISTED PROPERTIES[b]

	Total	Non-Performing (Ratio < 0)	Debt Restructure (Ratio ≥ 0 and < 1)	Full Coverage (Ratio ≥1)
Neighborhood Quality Relative to City				
Better than Average	31%	18%	33%	37%
Average	41%	38%	43%	42%
Worse than Average	27%	44%	23%	21%
Central City Status				
Central City	43%	55%	34%	45%
Non Central City	57%	45%	66%	55%
Quality as Residential Neighborhood				
Excellent/Good	62%	34%	69%	74%
Fair/Poor	38%	66%	31%	26%
Neighborhood Vacancy				
<4%	46%	33%	51%	51%
4 to <7%	35%	35%	35%	36%
≥7%	18%	32%	14%	13%
Property "As Is" Market Rent/FMR				
<75%	15%	35%	13%	3%
75 to <90%	29%	36%	30%	23%
90 to <100%	22%	18%	19%	31%
100 to <120%	24%	10%	29%	28%
120 to <140%	7%	0%	9%	8%
≥140%	7%	0%	1%	7%

* Signifies that the differences between non-performing, debt restructure, and full coverage properties are statistically significant at the 90% confidence level.

** Signifies that the differences between non-performing, debt restructure, and full coverage properties are statistically significant at the 95% confidence level.

[a] Significance test conducted.

[b] Market Scenario Debt Coverage Ratio =
["As Is" rent - (vacancy loss + operating expenses + deposit to reserve + loan on unfunded backlog)] ÷ debt service
Assumes: Rents are set at "as is" market levels
20% of the gap between property and IREM operating costs is closed.
80% of the gap between property and neighborhood vacancy losses is closed.
Deposit to the reserve account equals annual accrual
IRPs are eliminated and unfunded backlog loan at 9% for 10 years.

Note: Column sums may not add up to totals due to rounding.
Source: Inspections, windshield survey, Census, HUD, market evaluations.

Exhibit 5-11 shows several differences in the tenancy of these properties. In particular, non-performing properties are most likely to house Black residents and households with very low incomes and least likely to house families headed by the elderly.

The only difference found between residents in full coverage and debt restructure properties was in the concentration of very low income households. Residents in full coverage properties were less likely to have very low incomes and more likely to have low incomes. This is consistent with full coverage properties being overwhelmingly older assisted.

Exhibit 5-12 presents several issues relating to residents' housing options, were their current housing assistance converted to Section 8 vouchers or certificates. The exhibit first reports on how easy or difficult it would be for low-income residents of assisted properties to find alternative housing if current property-based subsidies were converted to tenant-based vouchers or certificates. The study's market analysts obtained this information from local Public Housing Agency (PHA) contacts.

- **Non-performing properties were more likely to be in neighborhoods where finding Section 8 qualified units was "very easy" or "easy" according to PHA contacts, and full-coverage properties were more likely to be in neighborhoods where it was "difficult" or "very difficult".**

  - Fifty-nine percent of non-performing properties were in neighborhoods where finding Section 8 qualified units was "very easy" or "easy" according to PHA contact. These households might be able to find alternative housing if property-based assistance were converted to tenant-based vouchers or certificates.

  - However 41 percent of non-performing properties and most full coverage properties (55 percent) were in neighborhoods where it was "difficult" or "very difficult" according to PHA contacts. If property-based assistance was converted to tenant-based assistance in any of these properties (either due to HUD or owner decisions) residents would likely have difficulties finding alternative housing.

  - Changes in the ease of finding units over the last 5 years were similar in neighborhoods of non-performing and debt restructure properties. In both cases, it was easier for about 20 percent, the same for about 46 percent of properties, and more difficult for about 35 percent of properties.

  - It had become more difficult to find Section 8 housing in 49 percent of full coverage properties' neighborhoods, and easier in only 15 percent.

Exhibit 5-11
TENANT CHARACTERISTICS BY MARKET DEBT COVERAGE RATIO FOR ASSISTED PROPERTIES[b]

	Total	Non-Performing (Ratio < 0)	Debt Restructure (Ratio ≥ 0 and < 1)	Full Coverage (Ratio ≥1)
Total Properties	10,019	2,448	4,392	3,178
Percent of Properties	100%	24%	44%	32%
Race/Ethnicity				
Hispanic[a]	11%	9%	9%	13%
Non-Hispanic	89%	91%	90%	87%
White[a]	58%	42%**	64%	63%
Black[a]	37%	55%**	31%	31%
Other	5%	2%	5%	6%
Household Size				
1 Person[a]	42%	42%	43%	40%
2 People	25%	23%	24%	26%
3 People	17%	18%	17%	17%
4 People	10%	11%	10%	11%
5+ People	6%	6%	5%	6%
6+ People	2%	2%	2%	2%
Elderly Head of Household Percent[a]	33%	29%*	35%	32%
Household Income				
Very low income[a]	78%	89%**	83%	63%**
Low income	20%	11%	15%	35%
Not low income	1%	1%	1%	2%

* Signifies that the differences between full coverage and debt restructure or debt restructure and non-performing properties are statistically significant at the 90% confidence level.

** Signifies that the differences full coverage and debt restructure or debt restructure and non-performing properties are statistically significant at the 95% confidence level.

[a] Significance test conducted.

[b] Market Debt Coverage Ratio=
["As Is" rent - (vacancy loss + operating expenses + deposit to reserve + loan on unfunded backlog)] ÷ debt service
Assumes:
Rents are set at "as is" market levels
20% of the gap between property and IREM operating costs is closed.
80% of the gap between property and neighborhood vacancy losses is closed.
Deposit to the reserve account equals annual accrual
IRPs are eliminated
Unfunded backlog loan at 9% for 10 years.

Note: Column sums may not add up to totals due to rounding.
Source: TRACS.

Exhibit 5-12
HOUSING OPTIONS FOR LOW-INCOME TENANTS

	Total	Non-Performing (Ratio <0)	Debt Restructure (Ratio ≥ 0 and < 1)	Full Coverage (Ratio ≥1)
Total Properties	10,019	2,448	4,392	3,178
Percent of Properties	100%	24%	44%	32%
Difficulty in Finding Section 8 Qualified Units				
Easy/Very Easy[a]	52%	59%	53%	45%
Difficult/Very Difficult	48%	41%	47%	55%
Change in Ease of Finding Units Over Last 5 Years				
Easier[a]	18%	20%**	17%	15%
Same	42%	45%	47%	36%
More Difficult[a]	40%	35%	36%	49%

* Difference between older/newer assisted significant at the 90% level.
**Difference between older/newer assisted significant at the 95% level.
[a] Significance test conducted.

Note: Sums may not add to 100% due to rounding.
Source: PHA Context Guide, Financial Data, FMR Data, Market Value Summary.

Many residents of previously assisted properties might be able to stay in their current units after subsidy conversion to tenant-based vouchers or certificates, assuming that the units met the program's housing quality requirements. As shown in exhibit 5-10 above, the market rents in 64 percent of assisted properties were below the local FMR. This would be particularly important for frail elderly residents, for whom moving might be a major trauma.

APPENDIX A
SAMPLING

This appendix describes the approach to estimating the numbers of properties insured by HUD in 1989/90 and in 1989/95 and setting appropriate weights for five relevant samples (i.e., the Initial, Monitoring, Analysis, Augmented, and Comparison Samples).[1]

Section A.1 describes the samples, sampling weights, and initial population estimates, taking into account current information on property types. It is sequential, developing Monitoring Sample weights from the Initial Sample weights, and Analysis Sample and Augmented Sample weights from the Monitoring Sample weights. Section A.2 discusses revised population estimates and Monitoring Sample weights, taking into account 1996 HUD data on properties insured in 1989/90 and 1989/95. Revised Analysis and Augmented weights can then be obtained by completing the steps described in Section A.1, using the revised Monitoring Sample weights.

Thus, the methodology for developing the weights involves essentially carrying the steps in Section A.2 first, and then using the revised monitoring sample weights to complete the steps in Section A.1. (However, the approach is presented in the order it is because it is helpful to understand the full approach before going into the details).

A.1 The Five Samples

Sections A.1.1 to A.1.4 describe in turn the Initial and Monitoring Samples, the Analysis Sample, the Augmented Sample, and the Comparison Sample and their sampling weights.

A.1.1 The Initial and Monitoring Samples (the 1989 stock)

In 1989, Abt developed a list of the 13,667 insured properties in HUD's MIDLIS data base that appeared to meet certain criteria. Abt drew a two-stage sample of 1000 of these properties, allocated over six strata. The first stage was a Probability Proportional to Size (PPS) sample of 53 Primary Sampling Units (PSUs), using the number of properties in each PSU as the measure of size. The second stage included samples of properties within each sampled PSU, stratified by property type. Sampling rates differed among the strata. Within each stratum, sampling rates for PSU properties were inversely proportional to the PSU probability of selection, so that every property in a given stratum had the same probability of selection.

Data collected from HUD computer files and Field Offices for this sample early in 1990 revealed that 974 of the sampled properties were in fact eligible (met the criteria). This sample of 974 population properties is the "Monitoring Sample". In addition, in reviewing discrepancies between 1990 and 1996 HUD data on property types and between these data and inspection data,

1 Discussion of the sample drawn for the 1989 Study is described in detail in Appendix A of Wallace et al, *Assessment of the HUD-Insured Multifamily Housing Stock*, 1993.

we recently determined that some of the 1989 data base property type classifications were incorrect. (One unassisted property was mistakenly coded as older assisted non-family. Inspection results indicated that 16 older assisted family properties were originally classified as older assisted non-family. Three older assisted non-family properties were originally classified as older assisted family). Thus, it is useful to carry three separate property type classification variables—one for the original classification (which determined initial sampling rates), one for the corrected classification, and one for the 1996 classification.

The relevant universes, sampling fractions, and population estimates are shown in Exhibit A-1. As indicated in the exhibit, there is a choice about sample weights. Most obviously, the original weights as shown in the third row (titled "weights") of Exhibit A-1 can be used[2], so that the weights would be:

(1) $$w_{ij}^{MO} = w_{ij}^{O} \delta_{ij}$$

where

w_{ij}^{MO} = the adjusted original weight for the jth property in the ith true property type in the Monitoring Sample;

w_{ij}^{O} = the initial sample weight for the jth property in the ith true property type (a function of the property's 1989 data base property type, as shown in the third row of Table 1); and

δ_{ij} = a dummy variable indicating that the (i,j)th property in the Initial Sample was included in the Monitoring Sample (that is, was determined to be in the study population).

However, since the goal is to estimate means for each true category, retention of the original weights poses some problems. First, because of the reclassification, there will be some mild variation in weights within category. Second, and probably more importantly in this case, equal weights within strata means that we could avoid the analytic complication needed to estimate weighted analytic models.

The equal weight version for the Monitoring Sample weights would be[3]:

(2) $$w_{ij}^{ME} = \frac{1}{n_{Mi}} \sum_{j} w_{ij}^{O} \delta_{ij} \qquad n_{Mi} = \sum_{j} \delta_{ij}$$

2 These were adjusted to produce integral numbers of properties in the last row of Table 1.

3 In fact, we will never use the equal weight version of the Monitoring Sample weights, so this discussion is really to introduce the topic, which will come up again in discussing Analysis and Augmented Sample weights.

where

w_{ij}^{ME} = the equal weight for the jth property in the ith true property type in the Monitoring Sample;

n_{Mi} = the number of ith property type properties in the Monitoring Sample;

w_{ij}^{O} = the initial sample weight for the jth property in the ith true property type (a function of the property's 1989 data base property type, as shown in the third row of Table 1); and

δ_{ij} = a dummy variable indicating that the (i,j)th property in the Initial Sample was included in the Monitoring Sample (that is, was determined to be in the study population).

For all analyses in the report we have used the equal weight versions for each of the six sampling strata, yielding six analytic weights. Since we were not interested in reporting NHP and non-NHP results separately, we had hoped to collapse these strata for each of the two older assisted categories[4]. However key outcomes (such as 1995 cash flow) were sufficiently different between the NHP and non-NHP strata that we decided we could not assign equal weights to the two sub-categories of each of the two older assisted strata. Thus, we were required to develop special programs to calculate standard errors for the variables.

It is worth noting that the 1989 HUD list appeared to be quite accurate in the sense that it included very few properties that were not actually in the population. Not only were few listed properties ineligible, but most of the ineligible properties reflected changes in insurance status. From 19 to 21 of the 26 ineligible properties in the sample were properties that were no longer insured at the time of data collection (reasons for ineligibility were not given for two properties). We expect such discrepancies due to lags in updating data bases. Indeed, some of these properties may have been insured when the list was drawn, but have changed status by the time that we began data collection—that is, our actual population is not certain types of properties insured in 1990, but those insured in 1989 that were still insured in June of 1990.

A.1.2 The Analysis Sample

A sub-sample of 598 of the 974 eligible projects was drawn as the 1989 "Analysis Sample".[5] The Analysis Sample properties were allocated across PSUs in proportion to the Monitoring Sample. Interview and inspection data collection was completed for 570 of these (95 percent). Exhibit A-2 provides details on the analysis sample. Assuming that observations were missing

4 Part of the original sample derived from a random sample originally drawn by HUD (Hodes et al, *HUD/FHA-Insured Rental Housing*, 1987) and later used in another study for the National Housing Partnership (NHP).

5 A sample of 600 of 976 apparently eligible projects was fielded, but it later turned out that two of these were in fact ineligible. Thus, in fact attempts were made to collect information for a sample of 598 eligible projects.

at random within strata and across PSUs, the weights for completed cases reflect the overall domain sampling fractions for completed cases. This gave the Analysis Sample weights shown on page A-21 of the 1993 Report.

In preparing for the 1995/96 study, we obtained additional information on misclassifications in the 1989 data base. This needs to be accounted for so that the Analysis Sample would project to our estimated totals for the true classifications. Again, we have two obvious choices. First, we can retain the original sampling weights, inflating or deflating them so that the sum of the weights of completed Analysis Sample cases match the population totals for each true property category:

(3)
$$w_{ij}^{(AO)} = w_{ij}^{O}\,\alpha_{ij}\,\frac{\sum_{j\in MS} w_{ij}^{O}}{\sum_{j\in MS} w_{ij}^{O}\,\alpha_{ij}}$$

where the sums are over the Monitoring Sample, and

$w_{ij}^{(AO)}$ = the adjusted original weight for the jth completed Analysis Sample property in the ith true property type category;

w_{ij}^{O} = the original sampling weight for the jth property in the ith true property type category;

MS = the Monitoring Sample;

α_{ij} = a dummy variable indicating that the jth property in the ith true property type was a completed Analysis Sample property.

Alternatively, we could give equal weights to all completed Analysis Sample properties within a given true category—i.e.,

(4)
$$w_{ij}^{(AE)} = \frac{1}{n_{Ai}} \sum_{j\in MS} w_{ij}^{O}, \qquad n_{Ai} = \sum_{j} \alpha_{ij}$$

where

$w_{ij}^{(AE)}$ = the equal weight for the jth completed Analysis Sample property in the ith true property type category;

n_{Ai} = the number of ith true property type properties in the completed Analysis Sample;

and other terms are as in EQ(3).

A.1.3 The Augmented Sample (for 1995 study)

The new study is intended to determine the current (1995) insurance status of the 1990 population, as well as the current characteristics of the projects in that population that were still insured by HUD in 1995. It is based on 1995 information for an Augmented sample, which is a sub-sample of the 1989 Monitoring sample (specifically, the 1990 Analysis sample, less 22 that were determined to have no longer been insured in the spring of 1995, augmented by a sub-sample of other assisted Monitoring sample projects).

The Augmented sample was drawn as follows. Using data available in early 1995, HUD sorted the 974 monitoring properties into two classes—those that were recorded as still active (926 properties)—and those that were recorded as no longer active (48 properties)

Thirty of the 48 properties listed as no longer active were part of the original analysis sample. A HUD intern called to verify the status of these 30 properties. Eight were determined to still be active (6 had been refinanced and were active under a new FHA number and 2 properties were acquired by HUD and resold to new owners with HUD purchase money mortgages). Thus 22 former analysis sample properties were eliminated from the augmented sample at this stage.

Abt drew a supplementary sample of 125 properties from among the 327 assisted monitoring sample properties that were listed as active on HUD's file (18 monitoring sample properties were listed as no longer active including 14 unassisted properties and 4 assisted properties. The supplementary sample did not include any unassisted properties. HUD did not check the true status of the 4 assisted properties listed as no longer active but they were excluded from the sampling frame for the supplementary sample). Exhibit A-3 details the analysis, supplementary and augmented samples by stratum.

Consider first the weights for estimating 1995 insurance status. For this purpose, the weights are based on adjusting the Initial Sample weights. Thus, the weights for the "no longer active" sample are constructed by inflating the Monitoring Sample weights for these properties so that, for each true property type category, the sample weights sum to the weights of all the properties in this group—that is:

(5)
$$w_{(OTHij)} = w_{ij}^{MO} \frac{\sum_{j \in OTH} w_{ij}^{MO}}{\sum_{j \in OTHS} w_{ij}^{MO}}$$

where $w_{OTHij} = 0$ if the insurance status has not been verified in the "no longer active" sample, the numerator sum is over all Monitoring Sample properties in the "no longer active" class, the denominator sum is over cases in the "no longer active" sample where insurance status was verified, and

w_{OTHij} = the weight for the jth property with insurance status verified in the ith true property type category in the "no longer active" sample; and

w_{ij}^{MO} = equals the original weight for the jth Monitoring Sample property in the ith true property type (see EQ(1)).

The fact that the Augmented sample of properties recorded as still active consists of the Analysis sample plus a further sample of other Monitoring sample properties is irrelevant. Being drawn for the Augmented Sample is simply a two stage lottery. Since the sampling rates at each stage is equal for all properties within a 1989 data base property type category, the overall sampling rate is also equal within 1989 data base property type—that is,

(6) $$R(DBi, j \in AUG \mid SI) = r_{(A|M)} + (1 - r_{(A|M)})\, r_{(S,DBi)}$$

where

$R(DBi, j \in AUG \mid SI)$ = the overall sampling rate for the jth Monitoring Sample property in the ith 1989 data base property type category in selecting properties for the Augmented Sample, given that it was recorded as still insured in early 1995;

$r_{(A|M)}$ = the sampling rate for the Analysis Sample ($r_{(A|M)} = 0.6$ for all properties in the Monitoring Sample); and

$r_{(S,DBi)}$ = the Augmented Sample sampling rate for the jth Monitoring Sample property in the ith 1989 data base property type category, given that it was recorded as still insured and was not in the Analysis Sample ($r_{(S,DBi)}$ is the same for all properties in a given 1989 data base property type category).

The weights can be computed in the same way as the weights for the "no longer active" sample—viz.

(7) $$w_{(RSIij)} = w_{ij}^{MO} \frac{\sum_{j \in RSI} w_{ij}^{MO}}{\sum_{j \in RSIS} w_{ij}^{MO}}$$

where $w_{RSIij} = 0$ if the insurance status of the property was not verified in the 'recorded as still insured" sample, the numerator sum is over all Monitoring Sample properties in the "recorded as still insured" class, and the denominator sum is over all completed cases in the "recorded as still insured" sample.

The estimate of the number of properties still insured in 1995 is:

(8) $$\hat{N}_{SIi} = \sum_{j \in RSIS} w_{(RSIij)} \eta_{ij} + \sum_{j \in OTHS} w_{(OTHij)} \eta_{ij}$$

where

$\hat{N}_{SIi}$ = the estimated number of ith true property type properties insured in 1989/90 that are still insured in 1995;

η_{ij} = a dummy variable indicating that the (i,j)th property was still insured in 1995;

and other terms are as defined earlier.

These weights can be retained in estimating results for properties determined to still be insured in 1995. However, they need to be adjusted to take account of missing inspections. Again, there are two versions that could be considered. The first simply adjusts the original weights by true property type:

$$\textbf{(9)} \qquad w_{ij}^{AUGO} = \begin{cases} w_{(RSIij)}\eta_{ij}\varepsilon_{ij}\left[\dfrac{\sum_{j\in RSIS} w_{(RSIij)}\eta_{ij} + \sum_{j\in OTHS} w_{(OTHij)}\eta_{ij}}{\sum_{j\in RSIS} w_{(RSIij)}\eta_{ij}\varepsilon_{ij} + \sum_{j\in OTHS} w_{(OTHij)}\eta_{ij}\varepsilon_{ij}}\right] & if\ (i,j) \in RSIS \\ w_{(OTHij)}\eta_{ij}\varepsilon_{ij}\left[\dfrac{\sum_{j\in RSIS} w_{(RSIij)}\eta_{ij} + \sum_{j\in OTHS} w_{(OTHij)}\eta_{ij}}{\sum_{j\in RSIS} w_{(RSIij)}\eta_{ij}\varepsilon_{ij} + \sum_{j\in OTHS} w_{(OTHij)}\eta_{ij}\varepsilon_{ij}}\right] & if\ (i,j) \in OTHS \end{cases}$$

where

ε_{ij} = a dummy variable indicating that inspections were completed; and

other terms are as defined earlier.

The equal weight version collapses the "no longer active" and "recorded as still insured" strata, giving equal weight to all properties within each true property type category that are still insured in 1995 (with the sum of the weights in each category adding up to the sum of the weights for properties in that category in the "no longer active" and "recorded as still insured" samples that were determined to be still insured in 1995):

$$\textbf{(10)} \qquad w_{ij}^{AUGE} = \frac{1}{n_{AUGi}}\left[\sum_{j\in RSIS} w_{(RSIij)}\eta_{ij} + \sum_{j\in OTHS} w_{(OTHij)}\eta_{ij}\right], \quad n_{AUGi} = \sum_{j\in RSIS} \varepsilon_{ij}\eta_{ij} + \sum_{j\in OTHS} \varepsilon_{ij}\eta_{ij}$$

The equal weight version is the most appropriate for characterizing the still insured properties. However, we were not able to collapse the NHP and non-NHP strata because they appear to differ on at key measures.

A.1.4 The Comparison Sample (properties common to both 1989 and 1995 samples)

The Augmented Sample properties that were still insured in 1995 are a sample of 1989 properties still insured in 1995. We will often want to compare 1989 and 1995 conditions for these properties. To do this, we would start with still insured Augmented Sample properties for which 1995 inspections were completed, using the weights shown in EQ(9). Comparison 1990 data is available for the subset of these that were also in the Analysis Sample. Accordingly the adjusted original weights for the Comparison sample would be:

$$\mathbf{(11)} \qquad w_{ij}^{COMPO} = \begin{cases} \gamma_{ij} w_{ij}^{AUGO} & if\ (i,j) \in OTHS \\ \gamma_{ij} w_{ij}^{AUGO} \dfrac{\sum_{j \in RSIS} w_{ij}^{AUGO}}{\sum_{j \in RSIS} \gamma_{ij} w_{ij}^{AUGO}} & if\ (i,j) \in RSIS \end{cases}$$

where

γ_{ij} = a dummy variable indicating that the jth property in the ith true property category was in both the Augmented and Analysis samples, was determined to be still insured in 1995, and was inspected in 1995.

The equal weight version would be:

$$\mathbf{(12)} \qquad w_{ij}^{COMPE} = \frac{\gamma_{ij}}{n_{COMPi}} \sum_{j} w_{ij}^{COMPO}, \qquad n_{COMPi} = \sum_{j} \gamma_{ij}$$

A.2 Taking Account of New Information on the 1989 Population

The 1989 HUD list from which the 1990 sample was drawn was no longer available when work began on the 1995 study. HUD constructed a new listing of the 1990 population, which we call the 1996 list. (Note that both the 1989 list and the 1996 list are lists of 1989 insured properties —that is, the dates refer to when the list was created, not to when the properties in it existed). Comparison of the 1989 and 1996 lists for the initial 1990 sample suggests that the two lists are quite similar, but that there are some differences. In particular, we estimate that the 1996 list excludes about 3 percent of the properties in the 1989 list and that some of these properties were in fact members of the eligible 1990 population. (Most of the exclusions are properties that had become ineligible between the time the 1989 list was drawn and the time insurance status was verified—usually due to prepayment of the mortgage). Conversely, we estimate that the 1989 list excludes about 1 percent of the properties in the 1996 list, and that almost all of these properties were in fact members of the eligible 1990 population, but were excluded to due deficiencies in the 1989 MIDLIS database, the primary source of data used to classify properties

in 1989. In addition, the 1996 list reclassifies a small number of properties in terms of property type. We have confirmed most of these reclassifications, though some are incorrect[6].

We want to estimate the number of properties in the 1989/90 population, the number still insured in 1995, and specify appropriate weights for the Augmented and Analysis samples in estimating the characteristics of these two populations. The differences between the 1989 and 1996 lists create two problems. First, while the differences are quite modest, HUD would like the population estimates to reflect the information from both lists. Second, since the sample is based on the 1989 list, there are no direct estimates for properties not included in that list, and we need to decide how to treat these properties in our estimates of population characteristics.

Of our initial sample of 1000 properties, 24 were not in the 1996 list - 5 original analysis sample properties, 4 original monitoring sample properties, and another 15 properties from among the 26 properties that were excluded from the 1989 monitoring sample. (All five of the analysis sample properties that were not in the 1996 list were included in the group of 30 analysis sample properties recorded as "no longer active" in mid-1995. Three were reclassified as "active" following the intern's calls. Three of the 4 monitoring sample properties that were not in HUD's 1996 list were included in the group of 18 monitoring sample properties that were listed as "no longer active". No follow-up occurred).

The basic approach adopted for taking the 1996 list information into account involved the following steps:

1) Define nine 1996 strata, consisting of the four 1996 property types, each further stratified by the 1995 insurance status recorded in the 1996 data base, plus a ninth stratum for 1989 properties not in the 1996 data base. This allows us to use the 1996 information on both the 1989/90 population and its 1995 insurance status.

2) Use the initial sample to estimate how many of the 1989 listed properties were in the 1996 data base. This is primarily to reassure ourselves that using estimates based on the 1989 sample involve extrapolation to a relatively small number of properties that were not included in the 1989 sample frame. We can do this by estimating:

(13)
$$\hat{O}_k = \sum_{i,j \in S_k} w_{ij}^{O}$$

where the sum is over all Initial Sample properties in the kth stratum of the 1996 data base, and

$\hat{O}_k$ = the estimated number of 1989 listed properties included in the kth stratum of the 1996 data base; and

6 This was the source of the corrected property type categories, discussed in Section A.1.

w_{ij}^{O} = the initial sample weight for the jth property in the ith true property type (a function of the property's 1989 data base property type, as shown in the third row of Table 1).

Exhibit A-4 presents these results.

3) We then assume that the relatively small number of properties not included in the 1989 sample frame can be treated as a random sample of properties in each stratum, so that we can project estimates from the 1989 sample to the entire 1996 data base. Our estimate the proportion of the properties in each of the nine 1996 strata that were in fact in the 1989 population is:

(14)
$$w_{ikj}^{RMO} = \begin{cases} w_{ikj}^{O}\delta_{ikj}\dfrac{\hat{r}_k N_k}{\sum_{ij\in S_k} w_{ikj}^{O}\delta_{ikj}} & if\ k\le 8 \\ w_{ikj}^{O}\delta_{ikj} & if\ k=9 \end{cases}$$

where the sum is over Initial Sample properties listed in the kth stratum of the 1996 data base, and

w_{ikj}^{O} = the initial sample weight for the jth property in the ith true property category and the kth 1996 stratum; and

δ_{ikj} = a dummy variable indicating that the (i,k,j)th property was included in the Monitoring Sample (i.e., found to be eligible).

4) We can now create revised Monitoring Sample weights, reflecting the information in the 1996 data base. As usual, there are two versions. The adjusted weight version is the one that gets used; it is

(15)
$$w_{ikj}^{RME} = \frac{1}{n_{Mi}}\sum_k\sum_j w_{ikj}^{RMO}, \qquad n_{Mi} = \sum_k\sum_j \delta_{ikj}$$

where

N_k = the number of properties in the kth stratum of the 1996 data base (which is known for k < 9).

The equal weight version would be:

(16)
$$\hat{r}_k = \frac{\sum_{ij \in S_k} w^{O}_{ikj} \delta_{ikj}}{\sum_{ij \in S_k} w^{O}_{ikj}}$$

Exhibit A-5 shows the revised Monitoring Sample weights. For comparison, Exhibit A-5a presents the Monitoring Sample weights used in the 1989 study.

Exhibit A-6 shows the revised estimate of the 1989 universe taking into account the 1996 list as well as information from the 1989 list. For comparison, the exhibit also shows the 1989 estimate of the 1989 universe, and the 1996 list information.

We can then use these revised Monitoring Sample weights in carrying out the weighting for the Analysis Sample and Augmented Sample, as described in Section A.1.

Exhibit A-7 shows the revised Analysis Sample weights. For comparison, Exhibit A-7a presents the Analysis Sample weights used in the 1989 study.

Exhibit A-8 shows the estimate of the 1995 universe based on the estimate of the 1989 universe and the survival rates by stratum obtained for the original Analysis Sample and the Supplementary Sample. For comparison, Exhibit A-8a also shows the estimate of the 1995 universe using only the 1996 list information.

Exhibit A-9 shows the Augmented Sample Weights. As can be seen, within the Unassisted and Newer Assisted categories the weights are very close, and should certainly be combined to provide equal weights. Within the two Older Assisted categories there is more variation in the weights. This is because within each Older Assisted category, properties were sampled at different rates (NHP and non-NHP properties). The NHP sample was a subsample of the older assisted properties. It included older assisted properties in the continental US, eligible to pre-pay on their twentieth anniversary, insured prior to 1975, and with the same SOA exclusions as the current study.

Further, several properties that were originally sampled as Non-Family properties were reclassified as Family properties and several that were originally sampled as Family were reclassified as Non-Family.

Exhibit A-9a shows the Augmented Sample Weights under the equal weight option. As indicated above, key indicators for NHP and non-NHP properties were sufficiently different that separate weights were kept.

Finally, Exhibit A-10 shows the Comparison Sample Weights.

Exhibit A-10a shows the Comparison Sample Weights under the equal weight option.

Exhibit A-1
INITIAL SAMPLE AND MONITORING SAMPLE:
WEIGHTS AND POPULATION ESTIMATES

	1989 LISTED STRATUM							
	Unasst	Older Asst.Non-Family		Older Asst.Family		Newer Asst.	Total	
		NHP	Non NHP	NHP	NonNHP			
Listed Universe	3,357	202	4,546	73	1,319	4,170	13,667	
Initial Sample	205	30	310	20	180	255	1,000	
Eligible Sample	188	30	304	20	178	254	974	
Weight	3357/205	202/30	4546/310	73/20	1319/180	4170/255	Est. Pop.[7]	Alt. Wgt.[8]
True Prgr Type	ELIGIBLE PROPERTIES SAMPLE							
Unasst	188	0	1	0	0	0	3,094	3094/189
Older Non-Fam, NHP	0	29	0	0	0	0	195	195/29
Older Non-Fam, Non-NHP	0	0	288	0	3	0	4,245	4245/291
Older Fam, NHP	0	1	0	20	0	0	80	80/21
Older Fam, Non-NHP	0	0	15	0	175	0	1,502	1502/190
Newer Asst	0	0	0	0	0	254	4,154	4154/254
Est Pop Prop: Number Percent	3,079 91.7%	202 100%	4,458 98.1%	73 100%	1,304 98.9%	4,154 99.6%	13,270 97.1%	NA
Pop. Wgt.[9]	3079/188	202/30	4458/304	73/20	1304/178	4154/254	NA	NA

7 Estimate is based on population weights from last row.

8 Alt. Wgt. = (Est. Pop.)/(Total Sample In Row)

9 Pop. Wgt. = (Listed Stratum Properties in Pop.)/(Listed Stratum Sample in Pop.).

Exhibit A-2
1990 STUDY ANALYSIS SAMPLE

Stratum	Monitoring Sample Size	Initial Analysis Sample Size	Expected Comple-tion Rate	Expected Props. with Req'd Data	Actual Comple-tion Rate	Actual Props with Req'd Data
Unassisted	188	123	96%	118	93%	115
Older Asstd-Family	198	120	96%	115	96%	115
Old.Asstd Non-Fam	334	204	96%	195	95%	194
Newer Assisted	254	153	96%	147	96%	146
Total	974	600	96%	575	95%	570

Exhibit A-3
DEVELOPMENT OF THE AUGMENTED SAMPLE OF 621 PROPERTIES

Column	A	B	C	D	E	F
Stratum	**1990 Analysis Sample**	**Less: No Longer Active**	**Plus: Supplementary Sample**	**Less: Inspection Not Complete**	**Plus: Stratum Changes**	**=: Aug-mented Sample**
Unassisted	115[10]	16	0	19	+1	81
Older Asstd Non-Fam	194	0	48	16	10[11]	216
Older Asstd-Family	115	4	36	8	+9	148
Newer Assisted	146	2	41	9		176
TOTAL	570	22	125	52		621
Source:		1995 F47 plus phone calls	Non-analysis monitoring sample still active in 1995 F47	Includes 23 props. no longer ins'd; 14 not found; 9 refusals; 6 "other"	Data Collec-tion	Equals A-B+C-D+E

10 Includes one property where the owner owned both a newer assisted and an unassisted property. The newer assisted property was sampled, but the owner took us to the unassisted property for the inspection. In the 1989 analysis we recoded and reweighted this property as unassisted, when in fact it should have been deleted from the sample.

11 Older assisted properties were classified as "family" or "non-family" based on the unit size distribution in HUD's databases. Properties with no unit size distribution were coded as non-family. Inspectors' unit counts resulted in reclassifying 13 older assisted non-family properties to family, and 3 older assisted family properties to non-family. Thus, the net decrease in the number of older assisted non-family properties is 10, and the net increase in the number of older assisted family properties is 9. (One unassisted property was originally miscoded as older assisted family)

Exhibit A-4
ESTIMATED NUMBER OF 1989 LISTED PROPERTIES INCLUDED IN THE 1996 DATA BASE BY STRATUM

1996 Listed Stratum
1989 List of all Properties
1989 List of Universe

Unassisted
3,142
3,028
Good 1995
2,373
2,291
Not Good 1995
769
737

Older Assisted Non-Family
4,583
4,540
Good 1995
4,568
4,525
Not Good 1995
15
15

Older Assisted Family
1,474
1,466
Good 1995
1,423
1,415
Not Good 1995
51
51

Newer Assisted
4,121
4,121

Good 1995
4,072
4,072
Not Good 1995
49
49

Not on 1996 List
346
115

TOTAL
13,667 13,270

Exhibit A-5
REVISED MONITORING SAMPLE WEIGHTS TAKING INTO ACCOUNT
1996 LIST INFORMATION BY 1996 LIST CATEGORY
(INCLUDING 1996 LIST RECORDED INSURANCE STATUS AND ASSISTANCE CATEGORY)

Weight	Unassisted		Older Assisted Non-Family		Older Assisted Family		Newer Assisted		Not in 1996 List
	Good 95	Not Good 95	Good 95	Not Good 95	Good 95	Not Good 95	Good 95	Not Good 95	
3.5714						7			
3.7822					20				
6.8369			29						
6.9773					1				
7.3278									3
7.5932					168				
14.4190	1								
14.6645									3
14.8901			293						
15.1958					6				
15.6170		45							
16.0791	1								
16.1014	138								
16.3655							249		
16.3756									3
16.6275			2						
16.9454					1				
23.6667								3	
56				1					
TOTAL	140	45	324	1	196	7	249	3	9

Exhibit A-5a
1989 MONITORING SAMPLE WEIGHTS (BASED ON 1989 RECORDED STRATUM)
(WEIGHTS SUM TO 1989 ESTIMATE OF UNIVERSE)

Weight	Unassisted	Older Assisted Non-Family	Older Assisted Family	Newer Assisted
3.650			20	
6.733		30		
7.328			178	
14.665		304		
16.353				254
16.376	188			

Exhibit A-6
REVISED ESTIMATE OF 1989 UNIVERSE USING REVISED MONITORING SAMPLE WEIGHTS

Takes into account 1989 and 1996 information. For comparison the estimate using only 1989 information (used in the "Blue Book[12]", and the 1996 list-based estimate are also presented.

Stratum	Estimate of 1989 Universe Using 1996 and 1989 Information	Estimate of 1989 Universe Using Only 1989 Information	Estimate of 1989 Universe Using Only 1996 List
Unassisted	3,021	3,080	3,067
Older Assisted Non-Family	4,550	4,660	4,695
Older Assisted Family	1,608	1,506	1,499
Newer Assisted	4,179	4,154	4,146
TOTAL	13,358	13,270	13,407

12 Wallace, et al, op cit.

Exhibit A-7: REVISED ANALYSIS SAMPLE WEIGHTS TAKING INTO ACCOUNT 1996 INFORMATION (WEIGHTS SUM TO REVISED ESTIMATE OF 1989 UNIVERSE)

Weight	Unassisted	Older Asstd Non-Family	Older Asstd Fam.	Newer Assted
4.1634			18	
6.4601			3	
7.6258		26		
7.6804			1	
13.2547			3	
13.7348			89	
14.0431		2		
23.7110	1			
25.6811	27			
26.4777	85			
26.9286	2			
26.9336			7	
27.4865			2	
27.2122		157		
27.6760				1
28.1688				142
29.1670				1
40.7359				3
TOTAL	115	185	123	147 [13]

Exhibit A-7a: 1989 ANALYSIS SAMPLE WEIGHTS (BASED ON 1989 RECORDED STRATUM) (WEIGHTS SUM TO 1989 ESTIMATE OF UNIVERSE)

Weight	Unassisted	Older Asstd Non-Family	Older Asstd Fam.	Newer Assted
4.056			18	
7.481		27		
13.446			97	
26.694		167		
26.782	115			
28.450				146

13 See footnote number 9.

Exhibit A-8
ESTIMATE OF 1995 UNIVERSE
(= PROPERTIES THAT WERE INSURED IN 1989 AND STILL INSURED IN 1995)
AND SURVIVAL RATE

Stratum	Estimate of 1989 Universe	Estimate of 1995 Universe (1989 Universe still active in 1995)	Survival Rate
Unassisted	3,021	2,224	73.62%
Older Assisted Non-Family	4,550	4,388	96.44%
Older Assisted Family	1,608	1,554	96.64%
Newer Assisted	4,179	4,076	97.51%
TOTAL	13,358	12,242	91.65%

Exhibit A-8a
1996 LIST-BASED ESTIMATE OF 1995 UNIVERSE
(= PROPERTIES THAT WERE IN HUD'S 1996 LIST AS INSURED IN 1989
AND STILL INSURED IN 1995)

Stratum	1989 Universe based on 1996 list	1995 Universe (1989 universe still active in 1995) based on 1996 list	Survival Rate
Unassisted	3,067	2,333	76.07%
Older Assisted Non-Family	4,695	4,639	98.81%
Older Assisted Family	1,499	1,474	98.33%
Newer Assisted	4,146	4,076	98.29%
TOTAL	13,407	12,522	93.39%

Exhibit A-9
AUGMENTED SAMPLE WEIGHTS
(WEIGHTS SUM TO ESTIMATE OF 1995 UNIVERSE)

Weight	Unassisted	Older Asstd Non-Family	Older Asstd Family	Newer Assisted
4.1634			18	
7.6258		26		
7.6804			1	
8.9926			2	
10.5602			116	
11.3324		3		
20.7083			9	
21.1334			2	
22.2225		187		
23.1527				175
23.9731				1
24.6561	1			
26.7047	4			
27.5330	75			
28.0019	1			
TOTAL	81	216	148	176

Exhibit A-9a
AUGMENTED SAMPLE WEIGHTS, USING EQUAL WEIGHTS WITHIN STRATA
(SEPARATE WEIGHTS FOR NHP/NON-NHP SUB-STRATA)

Weight	Unassisted	Older Asstd Non-Family	Older Asstd Family	Newer Assisted
4.3684			19	
7.61538		26		
11.4109			129	
22.0526		190		
23.1591				176
27.4568	81			

Exhibit A-10
COMPARISON SAMPLE WEIGHTS
(WEIGHTS SUM TO ESTIMATE OF 1995 UNIVERSE)

Weight	Unassisted	Older Asstd Non-Family	Older Asstd Family	Newer Assisted
4.1634			18	
7.6258		26		
7.6804			1	
12.1157			2	
14.2278			84	
14.6315		2		
24.6561	1			
26.7047	4			
27.5330	75			
27.9003			7	
28.0019	1			
28.4730			2	
28.6901		145		
29.9605				135
31.0222				1
TOTAL	81	173	114	136

Exhibit A-10a
COMPARISON SAMPLE WEIGHTS, USING EQUAL WEIGHTS WITHIN STRATA
(SEPARATE WEIGHTS FOR NHP/NON-NHP SUB-STRATA)

Weight	Unassisted	Older Asstd Non-Family	Older Asstd Family	Newer Assisted
4.3684			19	
7.61538		26		
15.4947			95	
27.4568	81			
28.5034		147		
29.9706				136

APPENDIX B
DATA COLLECTION SUMMARY

Data collection on HUD-insured (or held) multifamily properties was conducted in three phases, under three separate task orders plus an interagency agreement between HUD and the US Army Corps of Engineers (USACE). Under the first task order (Task Order 5 under contract HC-5964) and through the interagency agreement with the USACE, data on the physical condition of properties were collected. Under a second task order (Task Order 6 under contract HC-5964) data on the market position of the properties were collected. Under the third task order(Task Order 7 under contract HC-5964), data on property finances, mortgages, tenants, assistance contracts, and neighborhoods were assembled from a range of HUD and other data files. For completeness, this appendix describes the data collection procedures for all three tasks. Section B.1 describes the procedures for collecting physical condition data, Section B.2 describes the market data collection, and Section B.3 describes the secondary data used.

B.1 Physical Condition

The physical condition of the stock was assessed on-site by the U.S. Army Corps of Engineers (USACE). The purpose of the on-site physical inspections was to obtain current information on the physical condition of FHA-insured (or held) multifamily housing at a level of detail sufficient to indicate the nature of physical deficiencies and the costs that would be required to remedy the current backlog of physical needs as well as to estimate the ongoing accrual of physical needs over the next 20 years.

The backlog of physical needs was estimated using the Observable Systems Method, which was initially developed by Abt Associates for the 1985 Modernization Needs Study of Public Housing[1]. Under this method, the condition of each property's systems is observed, evaluated, and assessed on-site; and then costed in a consistent manner off-site using a regionalized data base of repair costs and a computerized costing program. The inspection protocol included observing conditions of 119 mechanical, electrical, and architectural systems. For each system, the inspector judged and recorded the level of remedial action needed to restore the system to its original condition. The action levels were "No Action", "Minor Action", "Moderate Action", "Major Action", and "Replace", based on the observed condition. Minor defects that could be corrected through routine maintenance (e.g. faucet washer replacement) were excluded.

The USACE inspectors used a standard set of seven inspection booklets (developed by Abt Associates)—Site, Building Envelope, Building Mechanical and Electrical, Unit, Takeoff, Property Quality Distribution (PQD) and Inspection Building Type and Quality (IBTQ)—to

1 Dixon Bain et al., *Study of the Modernization Needs of the Public and Indian Housing Stock* (Cambridge, MA: Abt Associates Inc., March 1988). This inspection method proved sufficiently cost-effective that it has subsequently been adapted and used by at least one commercial inspection firm.

collect all relevant system-level information. For each observable system, the inspector noted presence or absence of the system; age; type, if appropriate (e.g., battery or hard-wired smoke detectors); number, if appropriate (e.g., the number of windows); and action level associated with the observed condition.[2] Using architectural drawings, when available, or "pacing off" when no plans were available, the inspectors calculated take-off measurements for site areas and distribution systems, average unit square footage for all unit sizes present at the property, and key building dimensions for up to three predominant types/sizes of buildings. These measurements were recorded in the Takeoff booklet.

The inspectors were responsible for gathering three kinds of information on each property: 1) current condition—observations that were used in the study to estimate the backlog of needs (the cost to bring all systems up to their original condition); 2) upgrade feasibility—whether a property could be physically upgraded to a higher market use, and information needed to estimate costs of upgrading; 3) property take-offs—a measurement inventory of average units, typical building dimensions, and certain systems, used by the study both in costing backlog needs and estimating future accruals of repair/replacement costs. The inspectors also conducted neighborhood windshield surveys and collected preliminary information that was used as input for the market assessment team (discussed below).

For each system, the inspector judged and recorded the level of remedial action needed to restore the system to its original condition. The action levels assigned to each observable system condition were provided to all inspectors in training sessions and a series of manuals. This uniform set of instructions assured consistency across individual inspectors. Exhibits B-1 and B-2 are samples of an inspection booklet and the action level description from the Inspector Manual. The examples are taken from the "Full Bathroom" section of the "Unit Inspection" booklet. (Exhibit B-1 is a page from this booklet.) Under the section labeled "Full Bathrooms," are the seven systems observed in the bathroom inspection. Some systems (walls and ceilings, accessories) require only an action level in order to estimate repair cost; others require a type (i.e., the materials in use or size) as well as an action level for the repair estimate. For example, under the Bathroom Floor Cover and Subbase System, "Type" is necessary because replacing a ***ceramic*** tile floor would be more costly than replacing a ***resilient*** tile floor or linoleum. Exhibit B-2 is taken from the ***Inspector's Manual*** of conditions and action levels. For each system, the manual defines the system, explains where and how to observe the system, and then describes the repair needs associated with each action level.

Two other forms—Project Quality Distribution and Inspection Building Type and Quality—were used to obtain overall descriptions of the building stock and the relative quality of units and buildings at the property.

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2 In this study, our assessment of physical needs *excludes* three categories of expenditures that many owners will be required to make: modifications for accessibility for the disabled, as required by Section 504 of the Rehabilitation Act of 1973, as amended; measures taken solely to mitigate hazards of lead paint or asbestos; and improvements for increasing energy efficiency. The only exception to this is that the replacement of, for example, a heating system or appliance, assumes installing a standard quality replacement according to current practice, and not simply replacing the old system.

In advance of the site visit, the inspector sent a Project Quality Distribution form to the site manager. The manager completed the information on the number of units by size (bedrooms and bathrooms) and condition, as well as the number of buildings by type (high-rise, walk-up, etc.) and condition. A definition guide on conditions was attached to the form to make it easier for the manager to categorize the units and buildings. When the inspectors arrived on-site, they reviewed the Project Quality Distribution form with the site manager and discussed the general characteristics of the property, including:

- Number, type (high rise or elevator buildings, low-rise, garden/townhouses, or single-family detached), and age of buildings,[3]

- Number of units by bedroom and bathroom size,[3] and

- The property manager's assessment of overall condition of buildings and units, i.e., what proportion the manager estimated were in excellent, good, fair, or poor condition.[4]

From this composite of the property, inspectors selected up to three buildings and three units to inspect, based on predominant quality categories and predominant building and unit types. If multiple quality buildings were present, inspectors were instructed to inspect the lowest quality building. Inspectors were also told to inspect at least one building containing an elevator if one existed at the property, regardless of its likelihood to be inspected under the guidelines based on predominant quality and type. For example, if the property had one high rise building and twenty townhouse buildings, the inspector would inspect the high rise and two townhouses.

For units, inspectors were instructed to inspect units from the predominant sizes with the provision that they select units that, in the manager's opinion, were in worst physical condition.[5] If all units at the property were in good condition, then the inspector made the selection based solely on predominant unit size. If, however, there were units ranging in quality from poor to excellent, the inspector would select poor, fair, and good units, and not inspect units in excellent condition. This protocol was followed to obtain direct observations of elements most costly to repair. Adjustments to property-level repair costs for the relatively less expensive repairs of better quality units are described in Appendix C.

In addition to assessing the current physical condition, inspectors provided information on the physical (but not market) feasibility of upgrading certain observable systems for a market conversion to highest use. They recorded this information in the inspection booklets, as shown

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3 Inspector recorded this information on the Inspector Building Type and Quality (IBTQ) form.

4 Manager and inspector recorded this information on the Project Quality Distribution (PQD) form.

5 The value to the study of the manager's rating of units and buildings by overall condition depended primarily on the manager's ***consistency***, rather than on the manager's use of the exact definition of excellent, good, fair, or poor. The inspector conducted quick "walk-throughs" of units in the various categories, in addition to conducting the actual inspections, to verify the consistency of the manager's ratings. If discrepancies existed, the inspector adjusted the distribution to reflect the differences.

UNIT BOOKLET

KITCHENS (CONTINUED)

	ABSENT	AGE	ACTION LEVEL				
			N/A	MIN	MOD	MAJ	REP
Refrigerator	☐	____	☐				☐
Garbage Disposal	☐	____	☐				☐
Dishwasher	☐	____	☐				☐
Microwave	☐	____	☐				☐
Trash Compactor	☐	____	☐				☐

KITCHEN UPGRADE FEASIBILITY

Is an upgrade necessary for market conversion?

	NO	PARTIAL	FULL	REHAB	Rehab Feasible? NO	YES
Kitchen	☐	☐	☐	☐	☐	☐

FULL BATHROOMS

NUMBER OF FULL BATHS PRESENT: _____

	ABSENT	TYPE	AGE	ACTION LEVEL				
				N/A	MIN	MOD	MAJ	REP
Walls & Ceilings - Partitions & Surfaces				☐	☐	☐	☐	___%
FloorCover & Sub-base		☐ Ceramic ☐ Resilient	____	☐			☐	☐
Fixtures - Sink	☐		____	☐	☐			☐
Fixtures - Toilet	☐		____	☐	☐			☐
Fixtures - Tub/Shower	☐	☐ Porcelain ☐ Fiberglass	____	☐	☐			☐
Accessories			____	☐		☐	☐	☐
Vanities (single = 24" double = 36")	☐	☐ Single ☐ Double	____	☐				☐

Exhibit B-2

103. Bathroom Floor Covering and Sub-base

Definition: The floor sub-base refers to a rough floor, laid on joists, which serves as a base for the finished floor. The floor covering could consist of tile, sheetgood, or carpet. There are two types of floor covering:

- ☐ Ceramic tile
- ☐ Resilient sheetgoods

Where to Observe: The floor located in the inspected unit bathrooms should be observed.

Inspection Method:

- ☐ Record whether the floor covering is ceramic or resilient.
- ☐ Record the age of the floor.
- ☐ The actual floor sub-base cannot be observed directly, but the inspector can note if the floor is warped or buckled.

Rating of Repair Needs - Action Levels:

Minor Action: Not applicable.
Moderate Action: Not applicable.
Major Action: The sheetgoods are severely deteriorated and need to be replaced.
Replace: The floor is buckling, warped, or splintered, requiring the replacement of the floor covering and sub-base.

104. Bathroom Fixtures

Definition: There are two types of fixtures for a tub/shower (full bath):

- ☐ Porcelain
- ☐ Fiberglass

Common Elements: Bathroom fixtures include the sink, toilet and tub.

Where to Observe: These fixtures can be observed in the bathroom.

Inspection Method:

- ☐ Each fixture is rated separately.
- ☐ Record the age of the fixtures.
- ☐ Record whether the tub/shower is porcelain or fiberglass (porcelain includes tile and/or enamel on cast iron).

Rating of Repair Needs - Action Levels:

Sink:
Minor Action: The fittings need to be repaired or replaced.
Moderate Action: Not applicable.
Major Action: Not applicable.
Replace: The sink needs to be replaced.

Toilet:
Minor Action: The fittings need to be repaired or replaced.
Moderate Action: Not applicable.
Major Action: Not applicable.
Replace: The toilet needs to be replaced.

Tub/Shower:

Minor Action: The fittings need to be repaired or replaced.
Moderate Action: Not applicable.
Major Action: Not applicable.
Replace: The tub/shower needs to be replaced.

105. Bathroom Accessories

Common Elements: Common bathroom accessories include a medicine cabinet, towel bar, shower rod, and a wall-attached soap dish.

Where to Observe: These items can be observed in the bathroom.

Inspection Method:
- ☐ Record the age of the bathroom accessories.
- ☐ Observe the condition of these items directly.
- ☐ Ask the residents if the accessories are stable and operate properly.

Rating of Repair Needs - Action Levels:

Minor Action: Not applicable.

Moderate Action: Two to three accessories are broken or missing and need to be replaced (excluding the medicine cabinet).

Major Action: Replace medicine cabinet only.

Replace: A majority of the accessories and the medicine cabinet are broken or missing and need to be replaced.

106. Vanities

Definition: This item refers to the vanity structure itself and not to the sink. There are two types of vanities:
- ☐ Single = 24" long
- ☐ Double = 36" long

Where to Observe: The vanity can be observed in the bathroom.

Inspection Method:
- ☐ Record whether the vanity in the inspected unit is a single or double vanity.
- ☐ Record the age of the vanity.
- ☐ Observe the structure of the vanity by opening and closing the vanity doors; observe the condition of the vanity directly.

Rating of Repair Needs - Action Levels:

Minor Action: Not applicable.
Moderate Action: Not applicable.
Major Action: Not applicable.
Replace: The vanity is beyond repair and needs to be replaced.

in the example in Exhibit B-1 for "Kitchen Upgrade Feasibility." (This information is needed to ascertain net market value—that is, to subtract upgrade costs from capitalized net operating income for market-level unassisted rents.) In some cases, upgrading meant adding a system if one did not currently exist (e.g., a swimming pool). If the system already existed, upgrading it would involve replacing it with better quality materials.[6]

A total of 1,248 buildings and 1,563 units were inspected across the 621 properties of the Augmented Sample.

B.2 Local Market Conditions

As was the case in the 1990 Study, Applied Real Estate Analysis, Inc. (AREA), a firm specializing in market analysis, conducted local market assessments for all 621 properties in the sample. The local market assessments provided several types of key data:

- Potential unrestricted market rents under current condition and with moderate and major upgrades, and potential value as condominiums
- Likely use of the property in an unrestricted market
- Local market characteristics: vacancy rates, property appreciation rates, condominium absorption rates, capitalization rates
- Local Section 8 success rates, and changes in success rates

For properties that had also been included in the 1990 Study, AREA started out with contact lists from that study. For all properties, the inspectors provided AREA with important information about the properties and their neighborhoods. The inspectors photographed the sample properties, nearby potentially competitive properties, and some views of the neighborhood surrounding the property to aid in defining the neighborhood context. They also conducted a brief windshield survey, recording observations about the neighborhood such as age of residential structures, density, non-residential uses, major amenities (such as a park or shopping area), and any neighborhood elements that would detract from the market value (such as an old, rundown industrial area). The inspectors also provided contact information for local potentially comparable buildings. Abt provided AREA with 1990 Census data on each property's neighborhood.

6 This discussion refers to our estimates of "optimal market value and rents" and not "as-is" market rents. Our "as-is" estimates assume full remedying of backlogs, but no system upgrades.

AREA staff conducted all surveys by telephone. They gathered information from Realtors, public housing and community development officials, and others knowledgeable about the local market on possible alternative uses (such as condominiums, market-rate rental, or nonresidential) and current rental market position (i.e., is the property currently a low-rent property, a moderate rental, or a high-end luxury complex?), vacancy rates, and trends in supply and demand. The final assessment of the possible rents and local market context of each property was summarized on a Market Valuation Summary Guide form.

B.3 Data Collection from Secondary Data Sources

Data for this study were also extracted from secondary sources, including HUD automated data bases and other existing data bases. For numerous categories of variables, multiple data sources were available and hierarchies were developed for prioritizing sources. In addition, when key data elements were missing, we developed procedures to impute variables. For each category of data, the sources and imputation procedures are described below.

B.3.1. Property Income and Expenses

Three separate data sources were used to assemble information on property finances. Financial data are derived directly from annual statements of income and expense provided by each property owner as required by HUD mortgage regulatory agreements. These data include multiple years of income and expense statements for most properties in the sample. HUD supplied us with Annual Financial Statement files for 1993 - 1995. The 1993 and 1994 files contained more complete information (including reserves). As backup to the annual financial statement files we used the financial statement file from HUD's Multifamily Data Warehouse. The file contained income and expense data for 1992 through 1994. In addition we obtained backup tapes for 1992 through 1994.

HUD financial data files were fairly complete. For example 540 of the 621 properties had ***total revenue*** data for three or four of the possible four years, 53 properties had two years of data, 16 had one year, and 12 had no financial data. For other financial variables the coverage was similar. The most recent year of available data was 1995, for which 354 properties had at least some financial data.

When financial variables were missing, they were imputed by assigning the median value (per unit) of the three year weighted average for all properties of the same building type and assistance category. This method was used to impute gross revenue, tenant paid rents, tenant assistance payments and total operating and maintenance costs. Vacancy losses were imputed based on the median of the three year weighted average percent vacancy loss (rather than the median dollar vacancy loss). Replacement reserve balances were imputed based on the median per unit values by assistance category and building type.

B.3.2 Property Mortgage Information

Data on mortgages including, original mortgage amount; mortgage date, term, and interest rate; and current status of the mortgage were obtained from files on HUD's Multifamily Data Warehouse. Information on additional loans (operating loss loans and Section 241 supplementary loans) was obtained from the Multifamily Data Warehouse and from the 1990 analysis file. From the data we computed annual mortgage payments and outstanding principal balances.

B.3.3. Assistance Contracts

Obtaining information on assistance contracts was especially important in order to verify the classification of properties as unassisted or older or newer assisted, to determine the percentage of property units that were covered by assistance contracts, the amount of assistance, and the next (and ultimate) renewal dates of assistance contracts. Several of the files provided by HUD were maintained at the contract level, and others were aggregated to the project level. Data were taken from all files to calculate the total number of contracts, contract amounts, assisted units and dates. Contract amounts were often missing and were imputed using the median contract amount per year per assisted unit by building type and type of Section 8 assistance. For properties that were missing Section 8 contract start dates or renewal dates, we used the median date by Section 8 type.

B.3.4 Tenant Characteristics

Tenant Characteristics information was obtained from a HUD file that aggregated at the project level data from HUD's Tenant Rental Assistance Certification System (TRACS). TRACS is a household-level file that tracks characteristics of residents of properties that receive project-based assistance. Data were received on 460 of the 540 assisted properties in the sample (150 newer assisted and 310 older assisted) representing 8,536 of the 10,019 assisted properties in the study universe. No tenant characteristics data were available for the unassisted portion of the stock.

Imputation rules were developed for each category of tenant characteristics data. Income distributions were imputed based on assistance category. For older assisted properties we assigned the mean income distribution based on the proportion of assisted units (under 50 percent assisted, or over 50 percent assisted) in the property. For newer assisted properties, we assigned the overall mean income distribution, since nearly all newer assisted properties received assistance for all units.

Race and ethnicity were imputed based on the composition of properties in racially similar census tracts. For each property we created a flag, which indicated the dominant group in its census tract (white non-Hispanic, Black non-Hispanic, Hispanic regardless of race, other). Then, we calculated the mean racial and ethnic composition for all properties that

provided data by assistance by dominant group in the Census tract. For properties that were missing racial and ethnic composition we assigned the mean distribution based on properties located in tracts with the same predominant group, by assistance category.

Household size distribution, other income characteristics (percent with some public assistance, percent with some SSI, percent with some wages), and percent elderly and percent handicapped households were imputed based on the reported occupancy type (family/elderly/handicapped) and assistance category. For each of these variables we calculated the mean distribution by assistance category and occupancy type among properties that had data. These means were assigned to properties with missing data.

B.3.5 Neighborhood Characteristics

In addition to the information obtained from inspectors and market analysts, characteristics of property neighborhood data included two additional categories of variables. In describing characteristics of the properties' neighborhoods, we used the characteristics of their 1990 Census tracts (or zip codes when addresses could not be geocoded), as well as FMRs and HUD median incomes.

All properties were geocoded using MapMarker version 2.0. Properties with very incomplete address information could not be geocoded (e.g. addresses such as "Orleans & Illinois" and "Kershaw St") and therefore, for 103 properties 1990 Census zip code-level data were used instead of the tract-level data. All 1990 Census dollar values were inflated to 1995 dollars using the CPI for Urban Consumers (i.e. multiplied by 153.4/126.1=1.2173), and then were rounded to the nearest $1,000. For example, the 1990 Census ranges for income distribution include "0- $9,999". On average across the stock neighborhoods 25 percent of households fell into that income category. "0 - $9,999 translates into $12,172 in 1995 dollars (9999 x 1.2173), which gets rounded to $12,000. Thus the bottom income range in the table is "0-$12,000 and includes 25 percent of households in the neighborhoods of the insured stock.

Data on 1996 Fair Market Rents (FMRs) and 1995 and 1996 local median incomes were downloaded from HUD's Web Page based on State, County and MSA.

B.3.6. Other Sources

As backup to the data sources listed above, we also used the 1990 analysis and monitoring files as well as HUD's 1996 and 1989 Multifamily Insurance and Direct Loan Information system (MIDLIS).

APPENDIX C
SYSTEM FOR ESTIMATING PHYSICAL NEEDS BACKLOG AND ACCRUAL COSTS FROM INSPECTIONS

This appendix outlines the approach used to relate observations made by inspectors to costs of repairs and replacements. The first section describes the methods for arriving at costs of the ***backlog of currently needed repairs and replacements*** ("physical needs backlog costs"). The second section describes the method to obtain ***upgrade feasibility costs***, that is, costs that would have to be expended in order to convert a property to higher quality ("upgrade costs"). The third section addresses the method for estimating ***future accrual of major repair and replacement costs*** ("accrual costs").

C.1 Estimating Physical Needs Backlog Costs from Property Inspections

The process of estimating repair costs based on the property inspections involved five steps:

- Conducting a ***physical inspection*** of the overall site and up to 3 buildings and units within each project in the sample;
- Generating a system-level ***cost file*** (119 systems or groupings of physical features were inspected in the properties);
- Calculating system-level ***costs for the site and inspected units and buildings***;
- Computing ***property-level costs*** by inferring costs for uninspected units and buildings from inspected units and buildings;
- ***Regionally adjusting*** the property-level costs.

Physical Inspection of the Property

The physical inspection method—the Observable Systems Method—was described previously in "Appendix B: Data Collection Summary." The inspection produces information for each property on: the current condition and required repair action level for each of 119 systems for the site and for the buildings and units that were inspected; upgrade feasibility to higher market use; and property take-offs—a complete inventory of the presence, count, age, type, and dimensions of components.

System Level Cost File for Computing Physical Needs Backlog

As was discussed in Appendix B, under the Observable Systems Method, the costs of carrying out the repair actions recorded by the inspector were computed off-site using a computerized cost file and program. The first step in generating the cost file was developing up to five system-specific, categorized levels of repair, ranging from no action to replacement of a system, to correspond to action levels the inspector would use to describe the repairs needed to bring the system up to a safe, sound, marketable condition. The action level groups are:

- NA for no action
- MIN for minor repair
- MOD for moderate repair
- MAJ for major repair, and
- REP for replace

For any system, each action level denotes a specific repair action. For example, for Kitchen Cabinets/Counters/Sinks (a dwelling unit system), the MIN action is to replace counter top or sink faucet; the MOD action is to refinish existing cabinets, or repair doors and drawer hinges as well as replacing anything covered under MIN; MAJ includes the components of MOD as well as replacing the counter top ***and*** sink; and REP includes all MAJ components plus replacing counter top, cabinets and sink. In the above example for cabinets/counter tops/sinks, the MIN cost is $732 for each kitchen requiring MIN action. MOD costs are $800 for each kitchen requiring a MOD level of repair. MAJ costs are $1,532 for each kitchen. REP costs are $2,500 per kitchen. Costs for each action level for each system are presented in Exhibit C-1. Not all systems have 5 action levels. The ***Inspection Handbook*** for this study details each allowable action level for each system.

As in the 1990 Study, we obtained the services of A.M. Fogarty and Associates, a firm with extensive experience in costing for private housing construction and modernization, to review the cost file developed for the 1990 Study and to update cost elements which corresponded to each system and action level combination.

System Level Costs for the Site and Inspected Units and Buildings

In this step, the inspector's observations and the cost files are combined to calculate, for each property, costs for repair actions on items that have been inspected. A mathematical algorithm is applied to each system the inspector checked off as needing some level of repair. The basic concept is multiplying unit cost by a quantity measure, where the quantity measure may be scaled by a percentage of the item affected.

		Exhibit C-1				
SYSTEMS	**MINOR**	**MODERATE**	**MAJOR**	**REPLACE**	**UNIT OF MEASURE**	**ASSUMPTIONS**
***SITE SYSTEMS**						
Landscape	0.11	0.26	0.78	1.05	Landscape-SF	
Roadways	0.15	0.35	0.70	1.74	Road-SF (min 1000)	
Parking Areas-Lots	0.10	0.50	1.00	1.74	Parking-SF;# of new spaces	
Parking Areas-Garages	0.02	0.70	1.00	1.74	360 SF per space	
Paved Pedestrian Areas	0.30	0.76	1.89	3.73	Park-SF (min 1000)	
Curbing-Bituminous	N/A	N/A	N/A	4.41	PvdPed SF (min 1000)	
Curbing-Concrete	N/A	N/A	7.57	15.24	Curbing LF	
Curbing-Granite	N/A	2.18	7.88	N/A	Curbing LF	
Fencing-Chain Link	N/A	N/A	N/A	14.50	Curbing LF	
Fencing-Wrought Iron	N/A	N/A	N/A	57.84	Fencing LF	
Fencing-Wood Stockade	N/A	N/A	N/A	15.27	Fencing LF	
Retaining Walls-Concrete	N/A	2.99	N/A	34.04	Fencing LF	
Retaining Walls-RR Ties	N/A	0.67	N/A	24.17	Retain Wall-LF	
Site Drainage-Underground	N/A	900.00	2670.00	4500.00	Retain Wall-LF	
Site Drainage-Surface	N/A	0.33	2.50	N/A	# Catch Basin	
Pole Mounted Site Lighting	500.00	800.00	1350.00	3500.00	Landscape SF	
Site Furniture	36.00	120.00	120.00	120.00	# Poles	
Private Yards and Enclosures	N/A	485.00	N/A	970.00	# Units	Min 10% of units, Mod 25%, Maj 66%, Replace 100%
Dumpsters and Enclosures	1000.00	2500.00	4300.00	5700.00	# Yards	
Swimming Pool	5140.00	7864.00	10588.00	34475.00	# Dumpsters	
Tennis Courts	2678.00	2940.00	11655.00	24194.00	# Pools	
Basketball Courts	2248.00	3094.00	N/A	10024.00	# Courts	Double Court
Site Electrical Distribution-Over	N/A	N/A	95.00	130.00	# Courts	
Site Electrical Distribution-Under	N/A	N/A	115.00	150.00	Site Elec Dist-LF	
Heating Water Distribution-Steam	N/A	N/A	N/A	325.00	Site Elec Dist-LF	
Heating Water Distribution-Hot	N/A	N/A	N/A	175.00	Heat Water Dist-LF	
Water	N/A	N/A	N/A	40.00	Heat Water Dist-LF	
Domestic Hot Water Lines	N/A	N/A	N/A	25.00	Dom Hot Water -LF	
Domestic Cold Water Lines	N/A	N/A	N/A	45.00	Dom Cold Water-LF	
Main Water Service	N/A	N/A	N/A	30.00	Main Water Serv-LF	
Gas Lines	N/A	N/A	N/A	40.00	Gas Lines-LF	
Site Sanitary Lines	N/A	N/A	350.00	8000.00	Site Sanitary-LF	
Septic System	800.00	1400.00	2000.00	3500.00	Units	
Sewage Ejectors	N/A	N/A	N/A	2000.00	# Ejectors	
Hydrants	200.00	500.00	7500.00	16000.00	# Hydrants	
Emergency Generator					1 per project	

Exhibit C-1 ***(continued)***

		Exhibit C-1				
SYSTEMS	**MINOR**	**MODERATE**	**MAJOR**	**REPLACE**	**UNIT OF MEASURE**	**ASSUMPTIONS**
***UNIT SYSTEMS**						
Walls & Ceilings: Partions (not K&B)	N/A	N/A	N/A	3.00	SF	
Floor Sub-base (not K&B)	N/A	N/A	N/A	3.35	SF	
Walls & Ceilings: Surfaces (not K&B)	0.58	1.08	N/A	1.58	SF	
Floor Covering-Carpet (not K&B)	N/A	N/A	N/A	1.65	SF	
Floor Covering-Resilient (not K&B)	N/A	N/A	N/A	2.43	SF	
Interior Doors & Frames	N/A	50.00	256.00	400.00	# Doors need act	
Kitchen Walls & Ceilings: Partions & Surfaces	0.70	1.25	N/A	3.00	SF	
Kitchen Floor Covering & Sub-base	N/A	N/A	3.30	6.65	SF	
Cabinets/Counter Top/Sink	732.00	800.00	1532.00	2500.00	# needing replacement	
Range	50.00	N/A	500.00	N/A	# needing replacement	
Range & Hood	100.00	258.00	500.00	758.00	# needing replacement	
Refrigerator	N/A	N/A	N/A	768.00	# needing replacement	
Garbage Disposal	N/A	N/A	N/A	180.00	# needing replacement	
Dishwasher	N/A	N/A	N/A	522.00	# needing replacement	
Microwave	N/A	N/A	N/A	275.00	# needing replacement	
Trash Compactor	N/A	N/A	N/A	516.00	# needing replacement	
Bathroom Walls & Ceilings: Partions & Surfaces	0.58	4.20	8.80	12.00	SF	
Bathroom Flr Cvr & Sub-base-Tile	N/A	N/A	9.24	12.59	SF	
Bathroom Flr Cvr & Sub-base-Resil			3.30	6.65	SF	
Bathroom Fixtures-Sink	N/A	N/A	N/A	393.00	# needing replacement	
Bathroom Fixtures-Toilet	150.00	N/A	N/A	361.00	# needing replacement	
Bathroom Fixtures-Tub/Shower	200.00	N/A	N/A	821.00	# needing replacement	
Bathroom Accessories	N/A	100.00	160.00	230.00	# needing replacement	
Bathroom Vanities-24"	N/A	N/A	N/A	24" 387.00	# needing replacement	
Bathroom Vanities-36"	N/A	N/A	N/A	36" 552.00	# needing replacement	
HVAC Unit-Heat Only	N/A	400.00	N/A	972.00	# needing replacement	
HVAC Unit-Heat/Cool	N/A	700.00	N/A	5370.00	# needing replacement	

Exhibit C-1 ***(continued)***

		Exhibit C-1				
SYSTEMS	**MINOR**	**MODERATE**	**MAJOR**	**REPLACE**	**UNIT OF MEASURE**	**ASSUMPTIONS**
***UNIT SYSTEMS (Continued)**						
Radiation-Hydronic	N/A	9.72	N/A	19.44	LF	
Radiation-Electric	N/A	N/A	N/A	10.54	LF	
Unit Boiler	N/A	800.00	N/A	2730.00	# needing replacement	
Unit Furnace	N/A	500.00	N/A	1110.00	# needing replacement	
Unite Dom Hot Water Generation	N/A	150.00	N/A	450.00	# needing replacement	
Temperature Controls	N/A	N/A	N/A	64.80	# Temp Controls	
Wall/Window Air Conditioner	N/A	N/A	N/A	750.00	# Wall/Window AC's	
Unit Electrical Panel	N/A	N/A	N/A	1260.00	1 per Unit	
Unit Electrical Wiring	N/A	N/A	N/A	3.50	Total Unit SF	
Bell/Intercom System	N/A	N/A	N/A	182.00	# needing replacement	
Closed Circuit TV	N/A	N/A	N/A	100.00	# needing replacement	
Emergency Call Alarm System	N/A	N/A	N/A	125.00	# needing replacement	
Smoke/Fire Detection-Battery	N/A	N/A	N/A	100.00	# needing replacement	
Smoke/Fire Detection-Hard Wire	N/A	N/A	N/A	153.00	# needing replacement	

Exhibit C-1 ***(continued)***

		Exhibit C-1				
SYSTEMS	**MINOR**	**MODERATE**	**MAJOR**	**REPLACE**	**UNIT OF MEASURE**	**ASSUMPTIONS**
*****BUILDING ENVELOPE**						
Foundation-4 Foot	0.65	N/A	12.52	N/A	Perimeter-LF	
Foundation-8 Foot	N/A	5.30	21.17	N/A	Perimeter-LF	
Slab--Slab	N/A	0.45	2.23	5.65	Footprint-SF	
Slab-Basement	N/A	0.45	2.46	6.40	Footprint-SF	
Exterior Wall-Masonry	1.00	N/A	3.94	14.70	Masonry-SF	
Exterior Wall-Plaster	1.00	N/A	1.44	7.20	Plaster-SF	
Exterior Wall-Wood	1.00	1.25	1.17	5.83	Wood-SF	
Exterior Wall-Vinyl/Aluminum	1.00	1.25	0.74	3.84	Vinyl/Aluminum-SF	
Insulation-Wall	N/A	N/A	0.42	N/A		
Insulation-Ceiling	N/A	N/A	0.88	N/A		
Roof Covering-EDPM	0.25	1.00	1.95	4.21		
Roof Covering-Shingle	0.18	0.80	1.46	2.10		
Roof Covering-Built-Up	0.23	1.20	1.87	4.67		
Roof Covering-Tile	0.95	1.80	7.20	8.02		
Roof Covering-Metal	1.20	2.40	9.60	10.56		
Parapet Wall	N/A	72.00	N/A	72.00	Perimeter-LF	3 ft high
Chimney (Brick)	115.75	N/A	N/A	1064.88	# Chimneys	2'x2'x4' high
Roof Hatches-Small	N/A	N/A	N/A	600.00	# Roof Hatches	< 10 SF
Roof Hatches-Medium	N/A	N/A	N/A	786.00	# Roof Hatches	10-20 SF
Roof Hatches-Large	N/A	N/A	N/A	1434.00	# Roof Hatches	20-30 SF
Skylights-Small	N/A	N/A	N/A	474.00	# Skylights	< 10 SF
Skylights-Medium	N/A	N/A	N/A	606.00	# Skylights	10-20 SF
Skylights-Large	N/A	N/A	N/A	795.00	# Skylights	20-30 SF
Penthouses-Small	N/A	N/A	2534.00	4540.00	# Penthouses	4'x10'x8'
Penthouses-Medium	N/A	N/A	5300.00	10300.00	# Penthouses	8'x14'x10'
Penthouses-Large	N/A	N/A	9600.00	19600.00	# Penthouses	20''x20'x10'
Roof Drainage-Exterior	N/A	N/A	N/A	2.00	SF	
Roof Drainage-Interior	N/A	N/A	1.00	N/A	SF	
Windows-Small	180.00	230.00	250.00	420.00	# Windows (need act)	<15 SF
Windows-Medium	360.00	410.00	500.00	630.00	# Windows (need act)	<30 SF
Windows-Large	540.00	590.00	650.00	1080.00	# Windows (need act	>30SF
Window Security Grates	N/A	N/A	75.00	297.00	# Grates (need act)	
Exterior Common Doors-Wood	200.00	N/A	605.00	747.00	# Doors (need act)	
Exterior Common Doors-Metal	200.00	N/A	670.00	812.00	# Doors (need act)	
Exterior Common Doors-Glass	200.00	N/A	845.00	987.00	# Doors (need act)	

Exhibit C-1 ***(continued)***

		Exhibit C-1				
SYSTEMS	**MINOR**	**MODERATE**	**MAJOR**	**REPLACE**	**UNIT OF MEASURE**	**ASSUMPTIONS**
***BUILDING ENVELOPE**						
Unity Entry Doors-Wood	200.00	N/A	605.00	747.00	# Doors (need act)	
Unity Entry Doors-Metal	200.00	N/A	670.00	812.00	# Doors (need act)	
Unity Entry Doors-Glass	200.00	N/A	845.00	987.00	# Doors (need act)	*See Note 1
Storm/Screen Doors	N/A	N/A	N/A	325.00	# Doors (need act)	
Canopies-Small	N/A	230.00	N/A	830.00	# Canopies (need act)	6'x4'
Canopies-Medium	N/A	921.00	N/A	3321.00	# Canopies (need act)	6'x16'
Canopies-Large	N/A	2880.00	N/A	10380.00	# Canopies (need act)	10'x30'
Exterior Stairways-Wood	350.00	N/A	750.00	1980.00	# Flights need act	
Exterior Stairways-Concrete	550.00	N/A	1100.00	4550.00	# Flights need act	
Building Mounted Site Lights	N/A	300.00	N/A	600.00	# Lights (need act)	
Fire Escapes	N/A	350.00	N/A	7260.00	# escps*#stories	
Balconies-Wrought Iron	30.80	111.62	N/A	N/A	# Balconies (need act)	
Balconies-Wood	38.50	50.65	1250.00	2570.00	# Balconies (need act)	
Balconies-Masonry	36.00	120.00	N/A	N/A	# Balconies (need act)	
Porches (w/roof)	N/A	900.00	N/A	6400.00	# Porches need act	
Decks (without roof)	N/A	800.00	N/A	3840.00	# Decks need act	
Attached Storage Sheds	N/A	400.00	N/A	1100.00	# Sheds need act	
Vestibules	2..25	N/A	4.20	N/A	Vestibules SF	
Corridors	2.25	3.25	5.75	6.75	Corridors SF	
Stairways	2.75	3.75	9.00	30.85	SF^2	
Interior Lighting	N/A	1.00	N/A	2.75	SF^3	
Mail Facilities-Kiosk	N/A	N/A	N/A	1200.00	# Mail Facilities	16 per mount
Mail Facilities-Box	N/A	N/A	N/A	70.80	# Mail Boxes	
Laundry Rooms	2.25	4.75	7.00	25.00	SF	
Laundry Equipment	N/A	200.00	600.00	1000.00	# pieces of equip	
Common Rooms	2.25	4.20	N/A	7.00	Common Room -SF	
Common Kitchens	4.20	7.00	N/A	40.00	Common Kitchen -SF	
Underground Garage	0.02	0.70	1.00	N/A		

Exhibit C-1 ***(continued)***

		Exhibit C-1				
SYSTEMS	**MINOR**	**MODERATE**	**MAJOR**	**REPLACE**	**UNIT OF MEASURE**	**ASSUMPTIONS**
****BME**						
Heating Risers	100.00	125.00	175.00	250.00	Units	
Gas Distribution	100.00	175.00	275.00	350.00	Units	
Dom. Hot & Cold Water Distribution	125.00	225.00	350.00	450.00	Units	
Sanitary Distribution-PVC	50.00	100.00	200.00	300.00	Units	
Sanitary Distribution-Cast Iron	125.00	225.00	350.00	450.00	Units	
Fire Sprinkler System	0.25	0.50	2.00	35000.00	SF for minor-major; 1 for replace	
Sump Pumps-Residential	N/A	200.00	N/A	500.00	# Sump Pumps	
Sump Pumps-Commercial	N/A	400.00	N/A	1600.00	# Sump Pumps	
Compactors-Small	N/A	1000.00	N/A	5000.00	# Compactors	
Compactors-Large	N/A	1060.00	N/A	10000.00	# Compactors	
Central Vent & Exhaust	N/A	0.75	1.25	2.00	Area SF	
Central Air Conditioning	N/A	1.50	N/A	4.50	Area SF	
Switchgear	N/A	N/A	0.35	1.50	Area SF	
Building Power Wiring	N/A	N/A	N/A	2.25	Area SF	
Emergency Lights	N/A	N/A	N/A	425.00	Bldg Units / 6	
Smoke/Fire Detection-Battery	N/A	N/A	N/A	100.00	Bldg Units / 4	
Smoke/Fire Detection-Hardwire	N/A	N/A	N/A	153.00	Bldg Units / 4	
Communication System	N/A	N/A	N/A	225.00	Bldg Units / 6	
Emergency Call Alarm System	N/A	N/A	N/A	310.00	Bldg Units / 6	
Master TV Antenna	N/A	N/A	2000.00	4500.00	Bldg Units / 6	
Closed Circuit TV	N/A	N/A	N/A	1200.00	Bldg Units / 6	
Hot Air Furnace	N/A	225.00	675.00	1500.00	Units	
Boilers	N/A	350.00	550.00	1500.00	Units	
Boiler Room-Piping	172.50	287.50	460.00	759.00	Units	
Boiler Room-Equipment	200.00	500.00	1000.00	1500.00	Units	
Boiler Room-Controls	N/A	150.00	N/A	600.00	Units	
DHW Generation	50.00	N/A	200.00	250.00	Units	
Elevator Shaftways-Hoist	2500.00	3000.00	5000.00	10000.00	Num Elevators	
Elevator Shaftways-Hydraulic	3000.00	4000.00	6000.00	12000.00	Num Elevators	
Shaftway Doors	500.00	1500.00	2000.00	3000.00	Num Floors	
Cabs	1000.00	2500.00	2500.00	3500.00	Num Elevators	
Machinery-Hoist	2000.00	4000.00	6000.00	20000.00	Num Elevators	
Machinery-Hydraulic	5000.00	10000.00	15000.00	25000.00	Num Elevators	

For example, for Roadways the algorithm first checks to see if the Roadway square feet (SF) noted on the Takeoff form is larger than 1,000—the minimum SF allowed by the calculation. The algorithm then multiplies the larger of Roadway SF or 1,000 SF by the cost element associated with the Roadway action level noted on the Site booklet. In addition, if the action level is MIN, then only 10 percent of the SF is used (still keeping 1,000 as a minimum however), as the definition of the MIN action for Roadways is to "patch, pave and re-gravel up to 10 percent of the roadway." Thus to calculate the MIN cost for a 25,000 SF Roadway, the algorithm would be: $0.15 (cost per SF/minimum action) * 25,000 (# of SF) * 0.10 (% of system affected) = $375. For a MOD action on the same system and property, the inspector would have noted on the Site form the percentage (between 10 and 50 percent) of the Roadway that needs to be resurfaced, regraded as well as repaved or re-graveled. Thus, if the inspector estimated that 35 percent of the roadway needed repair, then the algorithm would be: $0.35 * 25,000 sq.ft. * 0.35 = $3,062.50.

A COBOL program was written to process the clean database by relating all the inspection data collection instruments to each other via the HUD Project ID. A physical needs backlog cost is then calculated for each system that required some repair or replace action. Some of the algorithms make use of the takeoff data as in the above example on Roadways. This cost element is on a per square foot basis. Other cost algorithms are based on the number, such as the number of windows, that required the action. Exhibit C-1 shows the multiplier for each cost element in addition to showing the cost for each action level.

After the per system costs are calculated, they are grouped together to form analysis groups. For example, the Envelope system group called ***Windows and Doors*** includes the inspection systems: Windows, Window Security Grates, Exterior Common Doors, Unit Entry Doors, and Storm/Screen Doors. Exhibit C-2 shows which Observable systems are included in each analysis group.

Property Level Costs

In order to generate costs for the property as a whole, costs for buildings and units that were not inspected needed to be estimated.[1]

For each property, costs were generated for the buildings and units that were *not inspected* based on their relationship to buildings and units that were inspected. During the inspection, the inspector filled out an additional form—the ***Inspector Building Type and Quality Form*** (IBTQ). For each building in the project (whether inspected or not), the inspector recorded the age, overall building quality, the building type (High rise, Walk-up, Garden, Single family

1 This is not true for Site systems because all site elements were inspected.

Exhibit C-2
System Groups and the Associated System Components for Backlog Repair Cost Estimates

System Group Name	System Component
Unit Interior Construction	Interior Walls-Partitions
	Floors: Sub-base
Unit Interior Finish	Interior Walls-Surface
	Floor Covering: Carpet
	Floor Covering: Resilient
	Interior Doors
	Kitchen Walls
	Kitchen Floor
	Bathroom Walls
	Bathroom Floor
Kitchen Fixtures	Kitchen Cabinet/Counter
	Kitchen Range
	Refrigerator
	Garbage Disposal
	Dishwasher
	Microwave
	Trash Compactor
Bathroom Fixtures	Bathroom Fixtures
	Bathroom Accessories
	Vanities
Unit Heating and Cooling	HVAC units
	Radiation
	Boiler (Unit level)
	Furnace (Unit level)
	DHW Generation (Unit level)
	Temperature Control
	Wall Air Conditioner
Unit Electric	Electrical Panel
	Electrical Wiring
	Bell/Intercom
	CCTV
	ECAS
	Smoke Detector
Building Exterior Closure	Foundation
	Slab
	Exterior Wall
	Insulation

Exhibit C-2 (*continued*)

Roofs	Roof Covering Parapet Wall Chimney Roof Hatches Skylight Penthouse Roof Drainage
Windows and Doors	Windows Security Grates Exterior Common Doors Unit Entry Doors Storm/Screen Doors
Exterior Features	Canopies Exterior Stairs Bldg Mounted Site Lights Fire Escapes Balconies Porches Decks Sheds
Common Areas	Vestibules Corridors Interior Stairways Interior Lights Mail Facilities Laundry Rooms Laundry Equipment Common Rooms Common Kitchens Underground Garages
Building Mechanical and Electric	Heating Risers Gas Distribution Domestic Hot/Cold Water Dist Sanitary Distribution Fire Sprinkler System Sump Pump Compactors Switchgear Building Wiring Emergency Lights Building Smoke Detector Communication System Building ECAS Master TV Antenna Building CCTV

Exhibit C-2 *(continued)*

Building Heating and Cooling	Central Vent/Exhaust Central Air Conditioning Furnace (Building level) Boiler (Building level) Boiler Room Piping Boiler Room Equipment Boiler Room Controls DHW Generation
Elevators	Shaftways Shaftway Doors Cabs Machinery
Site Areas	Landscaping Roadways Parking Lots Parking Garages Paved Pedestrian Area Curbing Fencing Retaining Wall Site Drainage Pole Mounted Site Lighting
Site Amenities	Site Furniture Yards and Enclosures Dumpsters Pool Tennis Courts Basketball Courts
Site Distribution	Emergency Generator Site Electrical Distribution Hot Water Distribution Domestic Hot Water Lines Domestic Cold Water Lines Main Water Service Gas Lines Site Sanitary Lines Septic System Sewage Ejectors Hydrants

detached), and a count of units in each size category (0BR/1Bath, 1BR/1Bath, 2BR/1Bath, 2BR/1+Baths, 3BR/1Bath, 3BR/1+Baths, 4BR/1Bath, 4BR/1+Baths) in the building. Another form, the ***Project Quality Distribution Form***, (PQD) was completed by the property manager and reviewed by the inspector. The purpose of the PQD form was to collect data, at a property level, on how many units overall (without a breakdown at the building level) in each size category (bedrooms and baths) fell into each quality category (Excellent, Good, Fair, and Poor).

In order to estimate the backlog cost for the *uninspected* units, the first step was to compute per square foot costs for each *inspected* dwelling unit (the physical needs backlog costs for the inspected units divided by the overall square feet for the particular units). The estimated backlog costs for the uninspected units was then simply their square footage multiplied by the average repair costs of inspected units of the same quality category. This was straightforward because inspectors had recorded average size in square feet of each unit size.

Estimating the backlog cost for uninspected buildings was similar, but more complex because inspectors did not collect square footages of uninspected buildings. In order to be able to apply costs from the inspected sample to the uninspected sample, the costs for the inspected buildings had to be normalized to account for differences in building sizes. We chose to normalize building costs to a per 2-bedroom equivalent. The computation to normalize the inspected building costs was as follows:

1) Overall national average square feet for each unit size category were calculated as a weighted average of the square footage of all units in all buildings in the analysis sample properties, regardless of whether the building was inspected. The weights were the unit size distributions in each building.

2) The number of 2BR/1Bath equivalent units in each building was calculated as the total square footage of living space in each building divided by the 1990 national average square footage of a 2BR/1 bath unit (843.9 sq. ft.).[2] The total square footage of living space was calculated by multiplying the national average square feet for each unit size by the number of units of that size in the building.

3) Building costs for each inspected building were normalized to a per-2BR cost equivalent by dividing total costs by the number of 2BR equivalent units in the building, thus generating a normalized cost for the inspected building which could then be applied to the uninspected buildings.

For example, Project X has 3 buildings. Building 1 is composed of 10 studio apartments, 20 1BR/1 Bath, and 10 3BR/1+ Bath. Building 2 has 20 2BR/1+ Bath. Building 3 has 10 4BR/1+ Bath. Based on the full sample of projects, the average square feet for a studio is 460.4; a 1BR/1

2 For comparability, the 1990 average square footage was used.

Bath is 640.3; a 2BR/1+ Bath is 1016.9; a 3BR/1+ Bath is 1160.3; and a 4BR/1+ Bath is 1342.7. The *national average* square feet for a 2BR/1 Bath used is 843.9. Thus, the number of 2BR equivalents for Building 1 was ((10*460.4) + (20*640.3) + (10*1160.3)) / 843.9 or 34.38. Building 2 has (20*1016.9) / 843.9 or 24.1 2BR equivalents. Building 3 has (10*1342.7) / 843.9 or 15.91 2BR equivalents. Building 1's costs were divided by 34.38; Building 2's by 24.1; and Building 3's by 15.91, to obtain cost per 2 bedroom equivalent for each building.

Based on the assumption that buildings or units of the same type within the project will have similar costs, costs for the uninspected units and properties were generated in one of three ways:

- ***Same type-same quality***. If the inspection included a building of the same type and quality as the uninspected building, the normalized 2BR equivalent cost (in the inspected building) was multiplied by the number of 2BR equivalent units in the uninspected building to produce the uninspected building's cost. Similarly, if the inspection included a unit of the same size and quality as the uninspected unit, its per square foot cost was multiplied by the total square feet of the uninspected unit to generate the cost for that uninspected unit.

- ***Same type-different quality.*** Ratios between quality categories within type were calculated using the normalized costs for the inspected buildings or units. If multiple inspected buildings (or units) of the same type but with different quality existed for the project, the inspected building (or unit) with the closest quality was used as a cost reference point. (Inspected buildings or units with poorer qualities were chosen if a choice needed to be made. In other words, if a Good high rise needed to be costed and both an Excellent and a Fair high rise had been inspected, the Fair high rise would have been chosen as the reference point.) Once the inspected reference point was chosen, the normalized cost was first multiplied by the national average ratio between the costs for the uninspected and inspected qualities for that building or unit type. In the above example, the normalized cost for the Fair high rise would have been multiplied by the ratio between the national average for a Good high rise to the national average for a Fair high rise. Next, the cost was multiplied by the appropriate factor[3] for the uninspected building or unit.

- ***Different type***.[4] If the inspection included no building of the same type (or unit of the same size), the ratio between the project cost and the national average cost for inspected buildings (or units) was applied to the national average cost for the type being costed. This ratio equals the sum of the actual inspected costs for the

3 For buildings, the factor is the number of 2BR equivalents discussed above. The factor for units is the total square feet for the unit.

4 Based on the inspection protocol, this occurrence was rare, arising only when a property contained a great diversity of building types and quality levels. The occurrence was greater for units, however, due to the limit of 3 unit inspections per property.

project divided by the sum of the national weighted costs (i.e., the costs for the inspected buildings using national average costs.). To cost buildings or units with different types than those inspected in the project, the national averages for the uninspected type and quality were multiplied first by this project-to-national ratio, and then by the appropriate factor (either number of 2BR equivalent units or square feet) for the uninspected building or unit being costed. For example, if a Good high rise existed in a project for which only Poor walk-ups had been inspected, a project-to-national ratio would have been calculated by dividing the sum of the inspected Poor walk-up building costs by the national average for a Poor walk-up multiplied by the number of 2BR equivalents for each inspected building in the project. The national average for a Good high rise would then be multiplied by this project-to-national ratio, and then multiplied by the number of 2BR equivalents in the Good high rise being costed.

Regional Adjustment to the Property Level Cost numbers

The cost element numbers created by A.M. Fogarty and Associates were based on current costs for the Washington D.C. area. Using the R.S. Means "Location Factors" from the Means Square Foot Costs Book for 1995, the property level physical needs backlog costs were adjusted by multiplying them by the ratio of the R.S. Means Index for the city where the property is located to the R.S. Means index for Washington D.C. (which is 0.95). For example, the computed cost for a New York City property would be multiplied by 1.4105 (which is the New York-to-Washington index ratio, 1.34 / 0.95).

C.2 Upgrade Feasibility Costs

In addition to assessing the current physical condition of the properties, the inspectors recorded in the inspection booklets, information on the *physical* feasibility of upgrading certain observable systems for both a moderate and major market conversion. This information is needed to ascertain net market value—that is, to subtract upgrade costs from capitalized net operating income for market-level unassisted rents. The inspector rated the feasibility of upgrading the property market level by adding amenities or improving the quality of materials in an existing system in order to make the property and its units marketable at a higher rent level. Two levels of upgrading were possible: upgrading the property to a "moderate" market quality, and upgrading the property to a high or "major" market quality. A "moderate" market quality is defined as an average quality unit, generally in good condition, with average amenities. A "major" market quality unit would command a high rent and may include such amenities as tennis courts, swimming pools, and central air conditioning.

If the current condition and amenities already positioned the property into the "moderate" market category, the upgrade feasibility rating was limited to "major" market feasibility. If the property was already at a high-end market rent, no upgrade feasibility analysis was necessary. In addition, if the layout or size of the buildings or units was not conducive to the upgrades needed, the property was deemed infeasible for that upgrade level.

Upgrade actions could also be affected by physical needs backlog. In some cases, upgrading meant adding a system if it did not currently exist (e.g., adding a swimming pool). If the system already existed, upgrading it would involve replacing it with better quality materials than would be used for repair. Some upgrade system costs are "additive" to the backlog repair cost—the backlog repair would still have to occur before upgrading the system. An example is Landscaping. If the backlog repair action requires a portion of the current Landscaping to be reseeded, this would have to occur regardless of the Landscaping upgrade.

Other systems have "instead of" costs. This means that the backlog repair action would not occur if the property were being upgraded. For example, there would be no reason to repair windows that were being replaced with better quality materials. Exhibit C-3 lists for each Upgrade system, whether its associated cost is additive to, or replaces the physical needs backlog cost.

The method of calculating upgrade costs is similar to that used for physical needs backlog costs. Cost elements were derived by A.M. Fogarty and Associates. Exhibit C-4 lists these elements for each Upgrade system as well as the dimensional multiplier. For most systems two levels of upgrade are possible. For units there is a further distinction: to Partial and Full for Moderate Upgrade, and Rehab for Major Upgrade. Site and BME systems only allow for moderate upgrades. If the system is present, then the upgrade is Moderate Yes; if the system is not present, then the upgrade is Moderate Add. Envelope systems also break down Moderate upgrade to Yes, for present systems, and Add when the system is not present. In addition, major Yes is an upgrade option for Envelope systems.

Exhibit C-3
Upgrade Systems—Additive to Repair Backlog vs Instead of Repair Backlog

Additive Systems	Instead of Systems
Landscaping	Parking
Emergency Generator	Site Lighting
	Yards and Enclosures
	Swimming Pool
	Tennis Court
	Basketball Courts
Exterior Stairs	Exterior Wall
Bldg Mounted Site Lights	Windows
Porches	Exterior Common Doors
Decks	Vestibules
Sheds	Interior Lights
Corridors	Mail Facilities
Stairways	Laundry Facilities
	Common Rooms
Central Vent/Exhaust	Electrical Service
Central Air	Emergency Lights
Smoke Detector	Furnace
Communication System	Boiler
ECAS	DHW Generation
CCTV	Elevator Cabs
	Unit Interiors
	Unit Kitchen
	Unit Bathroom

		Exhibit C-4: Upgrade System Elements				
UPGRADE COSTS	**MODERATE**	**ADD**	**MAJOR**	**REHAB**	**UNIT OF MEASURE**	**ASSUMPTIONS**
*****SITE UPGRADES**						
Landscape	0.65		0.65		Landscape-SF	
Parking	1.75	735.00	1.75		Parking-SF;# of new spaces	360 SF per space
Site Lighting-Upgrade	1400.00	3500.00	1400.00		# Poles for UPG; # site units/12 for add	
Site Furniture	180.00	180.00	180.00		# Sites/UPG; # site units divided by 6 for add	
Yards-Upgrade	485.00		485.00		# Yards or # Site Units	400 SF
Yards-Add		970.00			# Site Units	
Swimming Pool	30000.00	65000.00	30000.00		1 per project	20'x40'x6' deep
Tennis Courts		25000.00			1 per project	
Basketball Courts		20000.00			1 per project	
Emergency Generator	16000.00	20000.00	16000.00		1 per project	
*****ENVELOPE UPGRADES**						
Ext Wall-Plaster	7.20		7.20		Ext Wall-Plaster:SF	
Ext Wall-Wood	5.83		5.83		Ext Wall-Wood:SF	
Ext Wall-Vinyl	3.84		3.84		Ext Wall-Vinyl: SF	
Windows-Small	483.00		546.00		# Small Windows	
Windows-Medium	725.00		819.00		# Medium Windows	
Windows-Large	1242.00		1404.00		# Large Windows	
Common Doors	2000.00		3000.00		# Common Doors	
Exterior Stairs	2000.00		2000.00		# Stairs	
Bldg Mtd Site Lights	400.00	800.00	400.00		# Bldg Units divided by 6	
Porches		6400.00			# Bldg Units	8'x16'
Decks		3840.00			# Bldg Units	8'x16'
Storage Sheds		1100.00			# Bldg Units divided by 6	
Vestibules	10.00		45.00		Vestibule-SF	10'x12'
Corridors	6.00		6.00		Corridor-SF	6' wide
Stairs	10.00		10.00		If Avail: Int Stair-SF; Else 160 times # Stories	
Int Lights	2.00		2.00		Bldg Footprint-SF	
Mail Facilities	2500.00		2500.00		# Bldg Units/16	
Laundry Room	3500.00		3500.00		# Laundry Rooms	3 washers, 3 dryers
Laundry Equipment	600.00	800.00	600.00		# Pieces Laundry equipment (Add: # site units divided by 20 net # existing pieces of equipment)	
Common Rooms	10.00		10.00		Common Room-SF	

Exhibit C-4: Upgrade System Elements

UPGRADE COSTS	MODERATE	ADD	MAJOR	REHAB	UNIT OF MEASURE	ASSUMPTIONS
***BME UPGRADES						
Central Vent & Exhaust	1.50	4.50	1.50		Bldg Gross Area-SF	
Central Air Conditioning		7.50	2.50		Bldg Gross Area-SF	
Electrical Service	2.25		2.25		Bldg Gross Area-SF	
Emergency Lights	159.00	425.00	159.00		Bldg Units divided by 6	
Smoke Detection	153.00		153.00		Bldg Units/4	
Communication System	115.00	340.00	115.00		Bldg Units/6	
Emer Call Alarm System		310.00			Bldg Units/6	
Closed Circuit TV		1200.00			Bldg Units/6	
Hot Air Furnaces	1500.00		1500.00		Bldg Units	
Boilers	1500.00		1500.00		Bldg Units	
DHW Gneration	250.00		250.00		Bldg Units	
Elevator Cabs	3000.00		3000.00		Number Elevators	
***UNIT UPGRADES						
Interior (ex kitchen, bath)	3.00	7.00	12.00	36.00	Total Unit SF-(kit, bath SF)	
Kitchen	3000.00	7000.00	12000.00		1 per unit	
Full Baths	1500.00		2500.00	5000.00	# Full baths	
Half Baths	1000.00		1500.00	3000.00	# Half baths	

After the costs are calculated for the inspected site, units, and buildings, costs are generated for the full property (including uninspected units and buildings) using the same procedures followed for costing physical needs backlogs:

- Building upgrade costs for inspected buildings are normalized to a per 2 bedroom equivalent, and unit upgrade costs are normalized to a per square foot cost;
- Costs are generated using one of the three methods[5] that were outlined above for physical needs backlog costs; and
- Regional adjustments are applied as discussed above.

C.3 Estimating Accrual of Repair and Replacement Costs

Accrual cost estimates are the total amount a property will need to cover expected repairs and replacements for each Observable System over each of the next 20 years. Each system was given either a repair or a replacement cost depending upon the standard wear of the system. For example, boilers are expected to be replaced after a certain number of years, but landscaping only needs periodic major maintenance. Some systems were deemed inappropriate for accrual estimates because they generally will not need replacement or standard maintenance over the 20-year horizon used for this study. An example is the Site-level Domestic Hot Water Lines. Over time, a portion of the lines may need to be replaced, but this is not an expected occurrence. The repair or replacement system cost is based on the same algorithm used for the physical needs backlog costings.

In addition to a repair/replacement cost, each accrual system is assigned an expected useful lifetime (or in the case of items which will be repaired, "action-intervals" are assigned).[6] For systems requiring replacement over time, the useful life is the age the system is expected to be when it must be replaced because it is worn-out or approaching failure. Boilers are expected to last 25 years. This is the expected life for the Boiler systems. Site Landscaping is not expected to wear out, but will need to be reseeded and replanted every 5 years. This is the action interval (rather than expected life) for Landscaping. Exhibit C-5 lists for each system involved in accrual, the action level appropriate to accrual, and the useful life (or action interval).

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5 Same type-same quality; same type-different quality; different type.

6 The basic reference for expected lives was Appendix B, "Accrual Actions and Expected Lives" from *Future Accrual of Capital Repair and Replacement Needs of Public Housing, Final Report*, prepared for HUD by ICF, Inc., April 1989 as an update of the Abt public housing study (Bain, 1988). Abt staff experienced in conventional residential building construction and management altered these lifetimes for some systems.

For each of the next 20 years, for each Accrual system, we test whether the system will reach the end of its useful life (or action interval) that year. As the starting point, we used the system ages where they were collected by the Inspector; otherwise, we estimated system age to be the average age of the buildings in the project. We assume, however, that any system that needed to be replaced as part of the physical needs backlog, was indeed replaced: therefore, the age of such systems is set back to zero. In addition, we assume that if a moderate or major repair action occurred as part of the repair of the backlog, then the system age is also reset to zero. (Exceptions to this rule are pole mounted lighting, emergency generators, hot air furnaces, sheds, porches, and decks, where only major repairs or system replacement reset age to zero.) The age is then increased for each accrual year. In any year that a system's accrual age equals its expected life, then the repair/replace cost is added into the accrual total for that year.

The accrual yearly totals are calculated on the sites, units, and buildings that were actually inspected. These costs are then scaled up to reflect the total property. Unit level accrual costs are scaled to property totals based on the proportion of the property's total square footage the inspected units represent. Building level accrual costs are scaled to property totals based on the proportion of the property's total units the inspected buildings represent. The property totals are then regionally adjusted as discussed previously. Accrual costs are based on 1995 current dollars.

Exhibit C-5
Life Expectancies and Repair/Replace Action Levels for Accrual Systems

SYSTEM	LIFE EXPECTANCY		REPAIR ACTION LEVEL
Site Systems			
Landscaping	8		MIN
Roadways	20		MAJ
Parking Lots	20		MAJ
Parking Garages	20		MAJ
Paved Pedestrian	20		MAJ
Curbing	20		MAJ
Fencing-Chain Link	20		REP
Fencing-Wrought Iron	30		REP
Fencing-Wood	15		REP
Fencing-Concrete	30		REP
Retaining Walls-Concrete	20		MOD
Retaining Walls-RR Ties	15		MOD
Site Drainage	20		MOD
Pole Mntd Lighting	20		MAJ
Site Furniture	15		REP
Yards	20		REP
Dumpster	15		REP
Pool	15		MAJ
Tennis	15		MAJ
Basketball	15		MOD
Domestic Hot Water Dist	40		REP
Domestic Cold Water Dist	40		REP
Sewage Ejector	25		REP
Emergency Generator	35		REP
Unit Systems			
Unit-Carpet	10	(7)[1]	REP
Unit-Floor Resilient	25	(20)	MAJ
Kitchen Floor	15	(10)	MAJ
Kitchen Cabinet	25	(20)	REP
Kitchen Range	20		REP
Refrigerator	18	(12)	REP
Garbage Disposal	7		REP
Dishwasher	15	(10)	REP
Microwave	10		REP
Trash Compactor	15		REP
Bath Floor-Ceramic	50	(35)	REP

1 Numbers in parenthesis are life expectancies for family occupied units and buildings

Exhibit C-5 *(continued)*

Bath Floor-Resilient	20	(10)	MAJ
Bath Fixtures	40	(25)	REP
Bath Accessories	40	(25)	REP
Bath Vanities	30	(15)	REP
Unit HVAC	20		REP
Radiation[2]	30	(25)	REP
Unit Boiler	25		REP
Unit Furnace	20		REP
Unit DHW Generation	10		REP
Temperature Control	25		REP
Wall Air Conditioner	15		REP
Bell/Intercom	30		REP
Unit CCTV	30		REP
Unit ECAS	30		REP
Unit Smoke Detector	40	(15)	REP
Building Systems			
Building Foundation	50		MIN
Exterior Wall	10		MIN
Roof-Membrane	25		MAJ
Roof-Shingles	25		MAJ
Roof-Builtup	25		MAJ
Roof Covering-Tile	30		MAJ
Roof Covering-Metal	30		MAJ
Parapet Wall	10		MOD
Chimney	25		MIN
Penthouse	25		MAJ
Roof Drainage	25		REP
Windows	40		REP
Security Grates	40		REP
Ext Common Door	30	(20)	MAJ
Unit Entry Door	30	(20)	MIN
Storm/Screen Door	15	(12)	REP
Canopies	20		MOD
Exterior Stairs	20		MIN
Bldg Mtd Site Lights	15	(10)	MOD
Fire Escapes	8		MOD
Balconies	40		REP
Porches	40		REP
Decks	25		REP
Sheds	40		REP

2 Electric only.

Exhibit C-5 *(continued)*

Vestibules	10		MIN
Corridors	10		MAJ
Stairways	10		MIN
Interior Lights	25		MOD
Mail Facilities	35	(20)	REP
Laundry Rooms	15	(10)	MOD
Common Rooms	10		MOD
Common Kitchen	25	(15)	MOD
Underground Garage	20		MAJ
BME Systems			
Heating Riser	30		MOD
Gas Distribution	40		MOD
Dom Hot/Cold Water	30		MAJ
Sanitary Dist	10		MIN
Fire Sprinkler System	20		MIN
Sump Pump	10		REP
Compactor	20	(10)	REP
Central Vent/Exhaust	25		MAJ
Central Air	25	(20)	REP
Emergency Lights	35		REP
Smoke Detector	40	(20)	REP
Communication System	30		REP
Building ECAS	30		REP
Building CCTV	30		REP
Building Furnace	25		REP
Building Boiler	25		REP
Boiler Room Piping	50		REP
Boiler Equipment	25		REP
Boiler Room Controls	25		REP
DHW Generation	20		REP
Shaftway Doors	20	(15)	REP
Elevator Cabs	30	(15)	REP
Elevator Machinery	30	(25)	REP

APPENDIX D
CHARACTERISTICS OF UNITS IN THE HUD-INSURED (OR HELD) MULTIFAMILY STOCK

All tables in the body of this report present data on a "per 2 BR equivalent unit" basis at the ***property*** level. In other words, the text tables answer questions such as what is the average backlog per 2-bedroom unit across ***all properties***. In contrast, Appendix Exhibit D-1 presents key statistics on a "per 2-bedroom unit (2BR)" basis ***for the stock as a whole***. Exhibits in this appendix answer questions such as what is the average (per 2-bedroom unit) backlog across ***all (2 bedroom equivalent) units*** in the stock (which is calculated as the sum of the backlog across all properties divided by the total number of 2 bedroom equivalent units across all properties).

Exhibit D-1
CHARACTERISTICS OF UNITS IN THE HUD-INSURED (OR HELD) MULTIFAMILY STOCK BY ASSISTANCE CATEGORY (IN 1995 DOLLARS PER 2BR UNIT)

Characteristic	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Number of 2BR Units	1,314,026	350,815	963,211	643,468	319,743
Percent		27%	73%	67%	33%
Number of Units	1,405,240	354,083	1,051,157	686,309	364,848
Percent		25%	75%	65%	35%
Physical Needs Backlog per 2BR Unit					
< $10	13%	23%	9%	7%	13%
$10 to < $1,500	39%	44%	38%	39%	36%
$1,500 to < $3,000	17%	21%	16%	14%	17%
$3,000 to < $7,500	20%	7%	25%	26%	22%
≥ $7500	11%	4%	13%	15%	10%
Mean	$3,172	$1,488	$3,785	$3,917	$3,520
Average Annual Accrual per 2BR Unit					
< $500	9%	0%	4%	5%	0%
$500 to < $1,000	46%	37%	49%	50%	48%
$1,000 to < $1,500	40%	47%	37%	36%	38%
$1,500 to < $2,000	11%	15%	9%	8%	11%
≥ $2,000	1%	1%	2%	1%	2%
Mean	$1,070	$1,196	$1,024	$1,003	$1,065

Exhibit D-1, *(continued)*
CHARACTERISTICS OF UNITS IN THE HUD-INSURED MULTIFAMILY STOCK BY ASSISTANCE CATEGORY (IN 1995 DOLLARS PER 2BR UNIT)

Characteristic	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Cash Flow per 2BR Unit					
< -$500	9%	15%	7%	9%	3%
-$500 to < $0	16%	8%	19%	24%	10%
$0 to < $500	34%	27%	36%	42%	25%
$500 to < $1,000	15%	13%	16%	13%	22%
$1,000 to < $2,500	20%	30%	16%	10%	29%
≥ $2,500	6%	6%	5%	3%	11%
Mean	$407	$72	$529	$278	$1,034
Unfunded Backlog per 2BR Unit					
$0	35%	40%	33%	29%	40%
$0 to < $1,000	19%	21%	18%	18%	18%
$1,000 to < $2,000	14%	24%	10%	9%	11%
$2,000 to < $5,000	16%	8%	19%	21%	17%
≥ $5,000	16%	6%	20%	23%	14%
Mean	$2,634	$1,212	$3,152	$3,335	$2,784
Unfunded Accrual per 2BR Unit					
$0	50%	52%	49%	40%	69%
$0 to < $500	30%	25%	32%	37%	22%
$500 to < $1,000	17%	19%	16%	21%	7%
$1,000 to < $2,000	3%	5%	2%	2%	2%
Mean	$222	$242	$216	$265	$117
Property Size in Actual Units (not 2BR Units)					
< 50 Units	5%	1%	6%	4%	8%
50 to 99 Units	22%	15%	25%	20%	34%
100 to 199 Units	42%	39%	43%	44%	41%
≥ 200 Units	31%	45%	26%	31%	17%
Mean	115	157	105	108	78

Exhibit D-1, *(continued)*
CHARACTERISTICS OF UNITS IN THE HUD-INSURED MULTIFAMILY STOCK BY ASSISTANCE CATEGORY (IN 1995 DOLLARS PER 2 BR UNIT)

Characteristic	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Designated Occupancy Type					
Family	84%	93%	81%	87%	67%
Elderly/Handicapped	16%	7%	19%	13%	32%
Fair Market Rent per 2BR Unit					
< $500	31%	31%	32%	31%	34%
$500 to < $750	44%	47%	42%	45%	38%
≥ $750	25%	22%	26%	24%	29%
Mean	$623	$599	$632	$634	$626
"As Is" Market Rent per 2BR Unit					
< $500	39%	23%	44%	46%	41%
$500 to < $750	41%	51%	37%	38%	34%
≥ $750	21%	26%	19%	16%	24%
Mean	$640	$773	$591	$580	$612
Current Gross Rent per 2BR Unit					
< $500	42%	24%	32%	49%	19%
$500 to < $750	34%	46%	42%	29%	30%
≥ $750	24%	30%	26%	22%	51%
Mean	$619	$714	$584	$467	$822
Outstanding Mortgage Principal Balance Per 2BR Unit					
< $10,000	36%	13%	44%	65%	0%
$10,000 to < $25,000	34%	46%	29%	30%	27%
$25,000 to < $50,000	21%	21%	21%	4%	55%
$50,000 to < $100,000	8%	16%	6%	0%	17%
≥ $100,000	1%	3%	0%	0%	1%
Mean	$23,301	$35,694	$18,787	$10,388	$35,689

Source: 1995 Physical Inspections & Costing Programs, 1992-95 financial data, MIDLIS, HUD Fair Market Rents (FMRs).