U.S. Department of Housing and Urban Development
Office of Policy Development and Research

Study of the Modernization Needs of the Public and Indian Housing Stock

National, Regional and Field Office Estimates: Backlog of Modernization Needs

Prepared by
Abt Associates Inc.
Cambridge, Massachusetts

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FOREWORD

In 1983 the Congress directed the Department of Housing and Urban Development to undertake a study of the renovation needs of the nation's public and Indian housing stock, and the cost of meeting the needs identified. The research was also expected to provide estimates of the annual accrual of physical depreciation in this housing stock, and the cost of making needed repairs and replacements in the future.

The public housing program, created by the U.S. Housing Act of 1937, has over 1.3 million housing units, and is home to over 3 million people. Over 3,000 public housing agencies nationwide administer the program with 11,000 public housing projects. Information about the physical condition of that stock, and work needed to bring it up to good condition and maintain it over time, is essential for decision-making about both appropriate levels of funding for public housing modernization and the appropriate program design for making those funds available to public housing agencies.

This report by Abt Associates, Inc., "Study of the Modernization Needs of the Public Housing Stock: National, Regional and Field Office Estimates: Backlog of Modernization Needs" is the first in a series of four reports. It presents national, regional and HUD Field Office estimates of the cost of correcting the backlog of physical deficiencies in the public and Indian housing stock identified during an inspection of a representative sample of public and Indian housing projects during the summer of 1985. Other reports are scheduled to be completed this year.

The second report, "Accrual Needs in the Public Housing Stock," to be prepared by ICF, Inc., will estimate the need for capital repairs and replacements for this housing stock through the year 2000.

The third report, "Project Characteristics Associated with Modernization Needs," will analyze the relationship of the level of repair and replacement needs to characteristics of housing projects. Among the characteristics to be examined are age, type of building, location and type of occupancy. This report will be prepared by HUD's Office of Policy Development and Research.

The fourth and final report, "Evaluation of the Comprehensive Improvement Assistance Program," also to be prepared by the Office of Policy Development and Research, will present information on the current program for providing modernization funds to Public and Indian Housing Agencies.

The Department expects the information in this report and those to follow to serve an important role in the deliberations by the Congress and the Administration on such key questions about public housing modernization as the level of rehabilitation work necessary to assure that the public housing program continues to serve effectively the housing needs of the poor, and the appropriate roles of Federal, State and local governments in providing the resources necessary to perform this rehabilitation work.

C. Duncan MacRae
General Deputy Assistant Secretary
for Policy Development and Research

ACKNOWLEDGEMENTS

The preparation of this report reflects the work of many staff members over the last year in which the inspection data collected in the study's field component were processed, costed and analyzed. In addition to the efforts of the principal authors listed above, special thanks are also due to Louise Hadden who organized the project's extremely complex database; to Dennis Redfield, Karen Rich, David Warner, James McIntosh, and Gregory Bryant whose advanced programming skills were of crucial importance in preparing the cost estimates; and to Elisabeth Griffin, whose administrative capabilities and report preparation were of great assistance throughout.

Great appreciation is also due to the other firms and individuals who made this effort possible. Thomas Nutt-Powell of On-Site Insight assisted in all aspects of design; John Lane and Gayle Epp of Lane Frenchman and Associates contributed in particular to the Redesign and Handicapped studies; Dana Larson Roubal, Bradfield Associates, and Stull & Lee were responsible for the nation-wide data collection; the R.S. Means company provided data and assistance in the design of costing procedures; and Vanderweil Engineers assisted in developing the Energy Study.

LIST OF EXHIBITS

LIST OF EXHIBITS (continued)

LIST OF EXHIBITS (continued)

EXECUTIVE SUMMARY OF THE NATIONAL MODERNIZATION BACKLOG NEEDS ESTIMATES

This Congressionally mandated study of the current (or "backlog") modernization needs of the public and Indian housing stock is one of the most complex research and cost estimation projects ever funded by the Department of Housing and Urban Development. New methods of measuring and costing modernization needs were specially developed for this project. These methods were tested, refined, and validated before conducting the full scale study, which involved data collection at more than 1,000 housing developments. Scientific sampling techniques were used to select representative developments, including a variety of project building types (e.g., high rises, townhouse-type buildings) and dwelling units.

To be exact, 2,194 dwelling units and 3,120 residential buildings at 1,000 public housing developments were inspected by more than 80 architects and engineers. Special subsamples were also selected for an Energy study at 241 developments, an intensive study of Redesign needs at 75 developments and a special study of the Indian housing program conducted at 31 developments in 20 Indian Housing Agencies (IHAs). Finally, a companion study to assess needs for lead-based paint abatement involved inspections at 131 developments in 34 cities, where 262 dwelling units, 94 residential buildings, and 33 site-wide facilities, such as recreation centers, were tested for lead-based paint.

This report presents nation-wide, regional, and field office estimates for each of seven types of modernization.[1] These categories are:

1. <u>FIX Costs</u>. The costs of capital repairs and replacements in the nation's 11,000 public housing projects. FIX actions repair or replace <u>existing</u> architectural, mechanical and electrical systems.

2. <u>ADDs Costs</u>. The costs of additions and upgrades selected by PHAs from a list of over 150 actions that may be needed at a particular project

[1] Note that these estimates are for current (or "backlog") modernization needs. A future HUD-sponsored report will estimate the accrual of physical depreciation in public housing.

to meet specific standards or to insure long-term viability. ADDs were evaluated for appropriateness by the field inspection teams.

3. Redesign. The costs of architectural reconfiguration to improve projects with serious problems in order to make them viable in the long term.

4. Energy Conservation. The cost of capital improvements to reduce energy consumption in public housing projects.

5. Accessibility for the Handicapped. The costs of retrofitting public housing units and common spaces to make them accessible to handicapped people.

6. Indian Housing Program. The costs of modernization of the nation's Indian housing stock. The estimates include FIX, ADDs and energy conservation needs.

7. Lead-based Paint Abatement. The costs of implementing HUD regulations (effective September 23, 1986) that require the abatement of lead based paint hazards in public housing.

FIX COST ESTIMATES

Starting in June 1985, more than 1,000 public housing developments were inspected by specially trained teams of architects and engineers. In cooperation with the PHA staff, these inspectors performed a detailed assessment of the architectural, mechanical and electrical systems involved in dwelling units, residential and non-residential buildings at each development, and the overall site itself. Completion of up to 10 separate inspection booklets was required at each site as inspectors examined and rated the condition of the 101 possible architectural and engineering systems on a five point scale, ranging from "No Action Required" to "Replace."

Typically, the inspectors were accompanied by a knowledgeable expert from the PHA in order to access secure areas and to provide technical information about the condition of the development's facilities and equipment. Elements of the FIX Inspection are shown below.

Exhibit i.1
Modernization Needs Study: FIX Inspection Elements

Location	Nation-Wide	At Each Sampled Development	Illustrative Major Systems Inspected At these Locations
DWELLING UNITS	2,194 units	1-4 units	• All interior rooms • Unit-based mechanical & electrical (M&E) systems including furnaces, electric distribution panel, etc.
BUILDINGS	3,120 buildings	1-8 buildings	• Exterior walls, roof, windows • Interior common areas including lobbies, halls, basements, etc. • M&E systems including boilers, water and waste lines, elevators, electric distribution systems, exterior lighting, etc.
SITES	1,000 sites	Entire site or one or more subsites in a scattered site development	• Landscaping and site equipment such as seating, playgrounds and site lighting • Paved areas including streets, parking and walks • M&E distribution lines • Site-wide facilities such as management office, day-care center, community rooms, etc. • Central boiler and mechanical rooms

The field data collection was completed in September 1985, following on-site inspections in each of HUD's 51 field offices, including Alaska, Hawaii, and the Caribbean. Inspectors went to 45 states in all.

The results of the field inspections have been converted into cost estimates. Costs are as of January 1986. Note that these estimates are for capital needs only. Thus, normal maintenance and normal repair needs, which have always been conceived as being handled through normal operating budgets, have been purposely excluded from this study.

The national estimate of the modernization needs for FIX, as defined above, is $9,307 million. Taking into account the sample design, the 95 percent confidence interval of the estimate is plus or minus $701 million.

ADDs COST ESTIMATE

This component of the study was developed to identify needed additions and upgrades. A special ADDs Catalog and ADDs Form containing detailed information on a "menu" of more than 150 different additions and upgrades that might be needed at a development, were mailed in advance to each sampled PHA. The definition of ADDs is:

> To add, upgrade, or change existing features in order to modernize the quality of existing developments; to enhance long-term viability; or to achieve other specific standards, including standards mandated by law or by HUD regulation.

Examples of potential ADDs include heavy duty lock sets, metal doors and doorframes, energy efficient windows, kitchen cabinets and sinks, electric service, roof insulation, fire escapes, fire alarms, sprinkler systems and road drainage.

At the close of the inspection visit at a sampled PHA development, the inspection team reviewed the ADDs identified for the project, based upon PHA's selections from the special catalog. The review enabled the inspector to answer questions, check for consistency with the inspector's own observation and experience and to provide a "second opinion" about the appropriateness of the request.

Based on the Inspector's Second Opinion (ISO) rating, the PHA's reason for the requested ADD, and the nature of the ADD, each item was classified into one of the types of ADDs, each of which has a separate cost estimate.

Exhibit i.2
ESTIMATED ADDs COST, BY COST CATEGORY

Cost Category	Estimate ($millions)	Percent of Total	95 Percent Confidence Interval ($millions)
ADDs Required by Code or Modernization Standards*			
ISO=1	389.4	3.01	93.1
ISO=2	491.6	3.80	192.3
ISO=3	408.3	3.15	439.9
ISO=4	170.3	1.32	214.1
ISO=5	105.7	0.82	162.2
	1,565.3	12.10	
Project Specific ADDs			
ISO=1	2,675.2	20.66	383.3
ISO=2	2,795.6	21.59	340.9
ISO=3	2,028.1	15.66	427.7
ISO=4	1,211.9	9.36	553.9
ISO=5	584.1	4.51	235.2
	9,294.9	71.78	
Energy ADDs**			
ISO=1	780.8	6.03	131.4
ISO=2	305.4	2.36	76.5
ISO=3	149.5	1.15	42.5
ISO=4	74.9	0.58	41.7
ISO=5	84.2	0.65	52.4
	1,394.8	10.77	
Handicapped Accessibility ADDs**			
ISO=1	17.0	0.13	12.1
ISO=2	37.7	0.29	28.3
ISO=3	5.2	0.04	3.1
ISO=4	3.8	0.03	5.5
ISO=5	1.5	0.01	1.3
	65.2	0.50	
Other Categories			
No ISO	515.4	3.98	149.3
Other (Not in ADDs Catalog)	6.1	0.05	6.2
Currently prohibited by HUD	104.8	0.81	61.9
	626.3	4.84	
TOTALS	12,946.5	100%	

* Mod Standards consist of items required for health and safety or systems integrity.

** Energy Conservation and Handicapped ADDs overlap the findings of the Energy Conservation Study and Handicapped Estimate. See the discussion on Page xvi.

The ADDs data collection and inspector's second opinion (ISO) are discussed in detail in Section 6.2. In summary, however, an ISO of 1 or 2 indicates that an item is appropriate, 3 indicates that there was not sufficient information to provide an opinion, and 4 or 5 indicate disagreement with the need for the item. As is evident, inspectors agreed with the appropriateness of the majority of identified ADDs: about 60 percent of the items received an ISO of 1 or 2.

Redesign Cost Estimate

Relatively few public housing developments are in need of substantial structural changes to ensure their continued viability--the definition of redesign which was used in this study. A first count of developments that might be redesign candidates was determined from the preliminary Mod Needs Data Form survey, and further refinement of projects meeting the definition of redesign was identified by a second data gathering effort, the Redesign Mail Survey. A sample of 75 developments in need of Redesign was then selected for in-depth three-day site visits, interviews, inspections, and related data gathering activities. The Redesign Study was conducted by 20 senior architects familiar with redesign solutions to address a variety of problems.

These senior design architects, selected from the three architectural firms that Abt Associates had chosen as subcontractors for the main study field data collection effort, were given additional special training in the conduct of the Redesign assessment. Review of condition data from the prior FIX inspection at each of these developments was part of the preparation process that each Redesign inspector undertook before an intensive on-site design assessment of the needs of each Redesign candidate project. These inspections took place between September 1985 and January 1986.

The national estimate of Redesign costs totals $2,063 million. The 95 percent confidence interval of the estimate is plus or minus $120 million. We estimate that PHAs would like to have redesign work performed at a total of 883 projects containing approximately 160,000 units.

This cost estimate has been adjusted to net out FIX actions already identified and presumably to be taken at the 75 developments so as to avoid any "double counting" of modernization needs. However, the estimate does not net out ADD actions because it is not clear which of them would be done during redesign. An accurate estimate of redesign net of ADDs is therefore not feasible.

Energy Conservation Improvements Cost Estimate

In order to gather more information about energy conservation opportunities at the nation's public housing stock, a subsample of 241 developments were visited for additional data collection.

For each of the developments selected for the energy study, one building of each major type if present (high-rise, low-rise, and site-wide facility) was identified and specific data were collected for the energy substudy. Prior to the arrival of the inspection team, PHAs were asked to complete an historical Energy Usage Data Form. The architects and engineers conducting the main study also administered an Energy Practices Interview with appropriate PHA staff and completed an Energy Inspection for each of the identified buildings in the selected projects. In all, the inspectors conducted energy-related interviews and additional inspections in a sample of 346 buildings. The energy data collection effort began in July, 1985 and was completed in September of that year.

Using current HUD regulations that require energy conservation capital improvements that are cost effective using a test of a 15-year simple payback period, the public housing stock requires energy conservation capital improvements estimated to cost $939 million. The 95 percent confidence interval of the estimate is plus or minus $60 million. These improvements would save $211 million in energy costs yearly for an average simple payback period of 4½ years.

Costs of Providing Accessibility for the Handicapped

The process of collecting the relevant data on modernization needs for handicapped accessibility resembles that used for the ADD requests. The PHA was the source of the data, providing information in the study's Project Characteristics form on the current provisions for handicapped accessibility at the sampled project as well as estimating present needs for that development. Data were requested in terms of wheelchair and non-wheelchair (sensory or other impairments) requirements.

The Project Characteristics forms were mailed out in advance to the sampled project and completed forms were checked by the inspectors during his visits. Not all PHAs were successful in completing the forms in time for on site review by the inspectors. Some of these forms were subsequently mailed to Abt Associates; others were never received. As a consequence, handicapped accessibility information was obtained for 745 of the 1,000 developments sampled for inspection.

The national estimate for the cost of handicapped accessibility modernization required by law totals $232 million. The 95 percent confidence interval is plus or minus $59 million.

Indian Housing Program Needs

Architects with specialized experience in designing Indian housing and in working with Indian Housing Authorities (IHAs) were designated to perform the Indian housing FIX/ADDs inspections. The inspectors visited 354 units in 31 Indian housing projects. These projects were located in 20 IHAs scattered throughout HUD's six Indian housing regions. Both rental and homeownership developments were included in the sample. However, the emphasis was on rental housing because HUD contributes modernization funds to rental units just as it does in non-Indian public housing, but funds only some types of modernization in the homeownership program.

The national estimates of modernization costs for the Indian housing stock are:

- Rental Indian stock FIX costs: $161 million. The 95 percent confidence interval is plus or minus $42 million.
- Homeownership Indian stock FIX costs: $223 million. Only part of these costs are eligible for funding under the CIAP program. The 95 percent confidence interval is plus or minus $166 million.
- Rental Indian stock ADDs that are rated by appropriateness by the study inspectors
  - Required by local code or HUD regulation:
    - (ISO 1 and 2): $48.6 million. The 95 percent confidence interval is plus or minus $51 million.
    - (ISO 3, 4 and 5): $4.9 million. The 95 percent confidence interval is plus or minus $8 million.

Project Specific:
(ISO 1 and 2): \$234.9 million. The 95 percent confidence interval is plus or minus \$58 million.
(ISO 3, 4 and 5): \$24.4 million. The 95 percent confidence interval is \$19 million.
Energy:
(ISO 1 and 2): \$57.2 million. The 95 percent confidence interval is \$36 million.
(ISO 3, 4 and 5): \$3.7 million. The 95 percent confidence interval is \$2 million.

- Rental Indian ADDs currently prohibited by HUD: \$38 million. The 95 percent confidence interval is \$32 million.

Lead Based Paint Abatement Estimate

The data were collected during 1984-85 in family public housing projects by local lead poisoning prevention programs in 34 cities. The local programs used X-ray fluorescence analyzers to detect the amount of lead in the paint of 131 public housing projects. The detectors measure the amount of lead in paint surfaces in milligrams per square centimeter, expressed as mg/cm^2. Inspectors visited 262 units plus their associated common areas (such as halls and entries) and site wide facilities (such as day care centers). Using standard procedures and reporting forms, the inspectors reported whether lead was found in the paint, the location and amount of the lead, and the condition of the paint. These data were combined with estimates of abatement costs from a cost engineering firm and multiplied by the number of units in the whole nation to produce national abatement costs. Based on HUD regulations that require abatement when the lead level in defective paint or chewable surfaces exceeds 1.0 mg/cm^2, we estimate national abatement costs at \$446 million.

Summary of Backlog Estimates

Exhibit i.3 summarizes for the reader's convenience backlog estimates of all of the components of modernization addressed by this study.

For several reasons, however, a total estimate is not listed. First, the component estimates are based on different methodologies and in several instances the categories overlap. These cases are discussed below and rough estimates of the overlap are given. Second, the appropriate total is to some

Exhibit i.3

Summary of National Estimates of Modernization Costs

Cost Category	Estimate ($millions)	95 Percent Confidence Interval ($millions)
FIX	$9,307	$701
ADDs Required by Code or Modernization Standards*		
ISO=1	389.4	93.1
ISO=2	491.6	192.3
ISO=3	408.3	439.9
ISO=4	170.3	214.1
ISO=5	105.7	162.2
	1,565.3	
Project Specific ADDs		
ISO=1	2,675.2	383.3
ISO=2	2,795.6	340.9
ISO=3	2,028.1	427.7
ISO=4	1,211.9	553.9
ISO=5	584.1	235.2
	9,294.9	
Energy ADDs**		
ISO=1	780.8	131.4
ISO=2	305.4	76.5
ISO=3	149.5	42.5
ISO=4	74.9	41.7
ISO=5	84.2	52.4
	1,394.8	
Handicapped Accessibility ADDs**		
ISO=1	17.0	12.1
ISO=2	37.7	28.3
ISO=3	5.2	3.1
ISO=4	3.8	5.5
ISO=5	1.5	1.3
	65.2	
Other Categories		
No ISO	515.4	149.3
Other (Not in ADDs Catalog)	6.1	6.2
Currently prohibited by HUD	104.8	61.9
	626.3	
ADDs TOTALS	12,946.5	
REDESIGN	$2,063	$120
ENERGY (Payback Method)	$939	$60
HANDICAPPED ACCESSIBILITY	$232	$59

* Mod Standards consist of items required for health and safety or systems integrity.

** Energy Conservation and Handicapped ADDs overlap the findings of the Energy Conservation Study and Handicapped Estimate.

Exhibit 1.3 (continued)

Summary of National Estimates of Modernization Costs

Cost Category	Estimate ($millions)	95 Percent Confidence Interval ($millions)
INDIAN		
Rental FIX	$161	$42
Homeowner FIX	$223	$166
Rental ADDs		
• Required		
(ISO 1, 2)	$48.6	$51
(ISO 3, 4, 5)	4.9	
• Project Specific		
(ISO 1, 2)	$234.9	$58
(ISO 3, 4, 5)	$24.4	
• Energy		
(ISO 1, 2)	$57.2	$36
(ISO 3, 4, 5)	$3.7	
LEAD BASED PAINT ABATEMENT	$446	N.A.

extent a policy question that is outside the scope of this research. For example, certain ADDs are currently prohibited in the HUD Modernization Standards Handbook and thus a separate estimate has been prepared for this category.

As discussed in greater detail in Part II of the report, great care was taken in developing the computerized costing procedures to avoid double counting in the estimates of modernization costs. Thus, where appropriate, FIX actions are "netted out" of ADDs, REDESIGN, and Handicapped Accessibility; in addition, FIX actions provide the beginning blueprint for assessment of energy conservation opportunities in the Energy Study. Thus, in the great majority of instances overlap has been carefully avoided.

There are, however, three categories in which some amount of overlap exists: Energy ADDs and the Energy Study; Handicapped ADDs and the Handicapped estimate, and ADDs requested for developments requiring Redesign. In each case, some adjustment should be made to avoid double counting.

The estimates from the Energy Study, as described in Chapter 8, are based on state-of-the-art procedures for determining energy costs and savings. Two different estimates have been made for the capital costs of implementing energy conservation opportunities: the payback method, estimated to cost $939 million and the net present value approach estimated to cost $1,209. In both approaches, estimates of savings and costs already take into account FIX actions at that development.

Energy ADDs, for all ISO categories total $1,395 million; the estimate for ISO categories 1 and 2 is $1,086. Again, FIX actions have already been considered in costing the ADDs. Clearly, the estimates from the two sources--that is the Energy study and Energy ADDs are roughly comparable. However, because the methodology for the Energy Study was very carefully developed, the Energy Study provides consistent estimates for comparable developments and the interactions among multiple energy actions. For these reasons, it is suggested that only the Energy Study estimate be included in any national total.

The potential overlap between handicapped costs and Handicapped ADDs is less straightforward. The Project Characteristics form asked PHAs to list their needs for accessibility of units. Handicapped ADDs, however, include site as well as unit accessibility. Thus, it is assumed that accessibility needs for units overlap but that site requirements do not. An exact measure of the overlap would require a detailed analysis of individual ADDs items; this is not now available. A rough estimate therefore suggests that approximately one-half of the Handicapped ADDs estimate should be included along with the Handicapped Accessibility estimate.

Finally, there is some possibility of overlap between ADDs and Redesign. As mentioned, FIX estimates are netted out from the Redesign estimates. It is not clear, however, which ADD requests should be netted out, if any. Some ADDs would remain perfectly relevant after redesign was undertaken and some might become unnecessary. Only a case-by-case examination of specific ADDs and specific redesign suggestions would provide an exact solution; therefore, no assumptions about overlap are made here and both categories could be included.

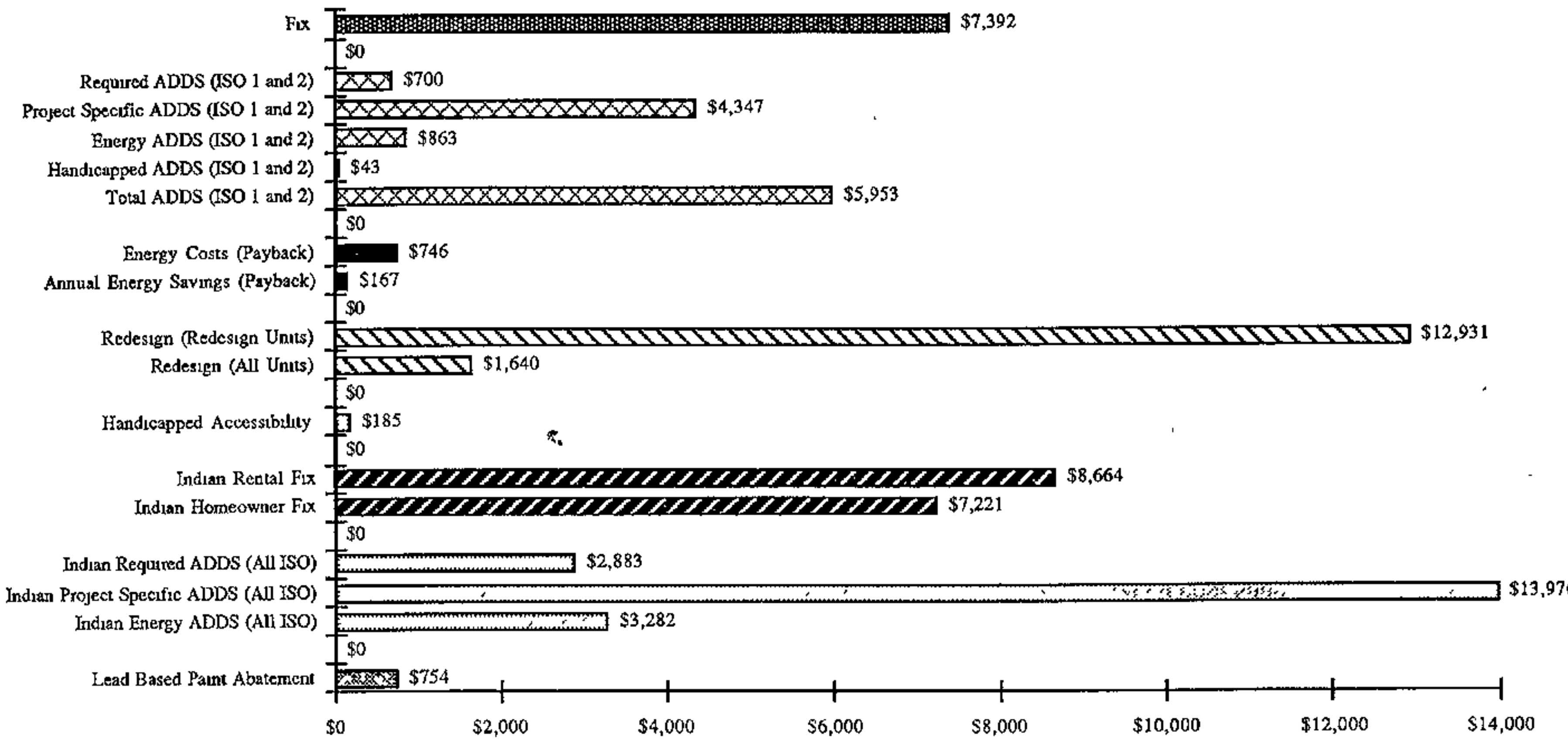
Per Unit Costs

In order to provide a better understanding of the magnitude of the various modernization estimates, per unit costs for each component are presented in Exhibit i.4. Average per unit FIX costs are $7,392. As discussed in Chapter 5, however, there is considerable variation around this average. Indian FIX costs are comparable: $8,664 for Indian Rental FIX and $7,221 for Indian Homeowner FIX costs.

As might be expected, Redesign costs per unit ($12,931 for those units needing redesign) represent the highest single category of per unit costs for public housing. Since only a portion of the housing stock needs redesign, however, costs per unit are only $1,640 when all units are considered.

ADDs per unit costs represent the second highest category. For the public housing stock, all ADD categories for ISO 1 and 2 total $5,953 per unit. For the Indian housing stock, the total is $18,364. There is a substantial amount of variation among ADDs categories, however. Of the ADDs

Exhibit i.4
Components of Modernization: Per Unit Costs



categories, project specific ADDs show the largest per unit costs for both public and Indian housing, $5,959 and $13,976, respectively.[1]

For Indian housing only, total ADDs are shown since almost no ADDs were categorized as ISO 3, 4, or 5. Refer to the discussion in Chapter 10; ADDs estimates were obtained by different procedures for Indian housing.

With regard to energy, Chapter 8 details a variety of energy conservation savings and their associated costs. Figure i.2 presents per unit costs ($746) and annual savings ($167) calculated according to the payback approach. In addition, the net present value (of future energy savings) is estimated to be $2,892 per unit.

Costs for Handicapped Accessibility, as listed by the PHAs on the Project Characteristics Form, require $185 per unit on average. Handicapped Accessibility ADDs, at $42 per unit, provide a somewhat lower estimate.

Finally, the average per unit cost of lead based paint abatement is $754. The number of units used to derive this figure is all family units built prior to 1973. About half of all pre-1973 family units need abatement. The average cost per abated unit is about $1,450.

Regional Modernization Costs

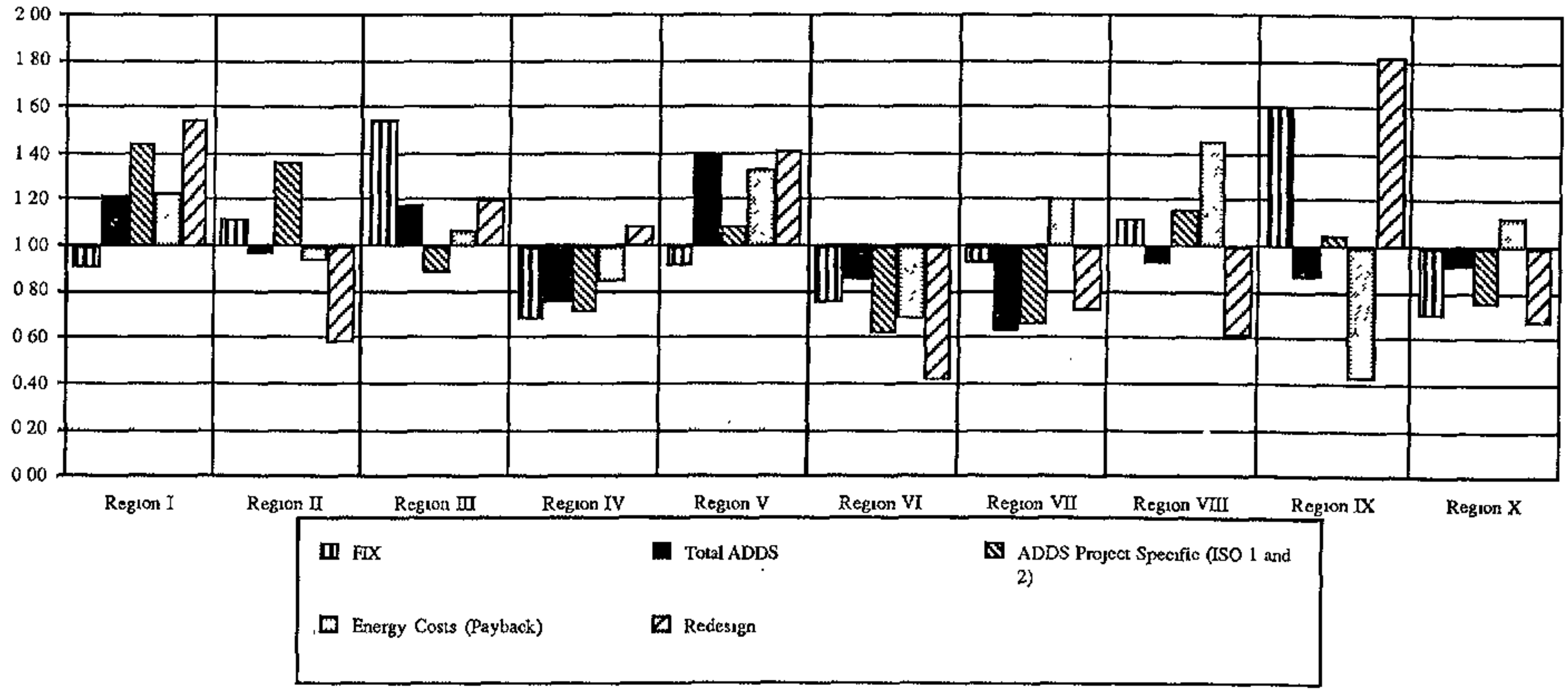
Exhibit i.5 presents modernization costs by region. Additional details presented in Part II of this report and in Appendix I, including an explanation of the procedures used to allocate each component to the HUD regions and field offices. Exhibit i.5 also indicates the share of total public units by region and the shares of modernization costs for each component. Clearly, the regions vary greatly in size and an obvious question is how the distribution of modernization costs compares with the distribution of units. Exhibit i.6 is designed to help answer that question graphically: each bar in the chart represents the ratio of the percent of modernization costs to the percent of units in that region. If the value of this ratio is close to one, the region received a share just proportional to size; if the

[1] Note that Exhibit i.4 shows the public housing ADDs components for ISO categories 1 and 2; comparable figures for all ISOs are $1,243 for Required; $7,386 for Project Specific; $1,109 for Energy; and $46 for Handicapped. Chapter 6 and Appendix I provide details for each category.

Exhibit 1.5
Modernization Costs by Region
($ millions and % of total)

Region	FIX	ADDs (Total of all Categories)	ENERGY (Payback Costs)	REDESIGN	HANDICAPPED ACCESSIBILITY	LEAD PAINT ABATEMENT	% of Total Units
I	$495.6 5.32%	$923.8 7.2%	$67.9 7.23%	$188.4 9.13%	$13.7 5.88%	$23.9 5.4%	5.88%
II	$2,440.2 26.22%	$2,868.5 22.6%	$207.2 22.06%	$268.5 13.01%	$54.4 23.44%	$184.5 25.4%	23.44%
III	$1,689.1 18.%15%	$1,787.6 13.8%	$118.2 12.58%	$288.9 14.0%	$27.2 11.71%	$59.3 13.3%	11.71%
IV	$1,376.4 14%.79%	$2,104.1 16.3%	$181.3 19.30%	$487.0 23.6%	$50.1 21.55%	$123.7 22.5%	21.55%
V	$1,417.8 15.23%	$3,034.3 23 4%	$208.7 22.23%	$488.8 23.7%	$38.6 16.64%	$71.1 15.9%	16.64%
VI	$693.5 7.45%	$1,098.2 8.5%	$63.5 6.76%	$86.8 4.21%	$23.1 9.94%	$46.1 10.4%	9.94%
VII	$285.5 3.07%	$275.3 2.1%	$37.5 4.0%	$49.4 2.4%	$7.7 3.31%	$9.2 2.1%	3.31%
VIII	$134.6 1.45%	$149.1 1.2%	$17.6 1.88%	$16.3 0.79%	$3.0 1.29%	$3.3 0.7%	1.29%
IX	$653.2 7 02%	$491.2 3.8%	$17.5 1.86%	$163.7 7.94%	$10.2 4.37%	$22.5 5.1%	4.37%
X	$120.9 1.30%	$214.5 1.7%	$19.8 2.11%	$25.5 1.24%	$4.3 1.86%	$5.7 1.3%	1.86%
Total	$9,306.9 100%	$12,946.5 100%	$939.1 100%	$2,063.4 100%	$232.3 100%	$446.0 100%	100%

Exhibit i.6
Distribution of Modernization Costs
Relative to Share of Total Units:
FIX, ADDS, ENERGY, REDESIGN



ratio is much greater (lesser) than one, a share of modernization funds is allocated that exceeds (is less than) the share suggested by size alone.

Several comments can be made regarding the results shown in Exhibit i.6. There is a great deal of variation in all modernization components in the relative shares allocated to regions as compared with regional size. Also, several regions capture a rather large relative share, for all or most components, several receive a lesser relative share, and the others simply show a mixture of results. Regions I & V, for example, are allocated a relatively higher share of all components except FIX while Regions IV, VI, VII and X capture a relatively lesser share. Note also that FIX and Redesign show greater variation in distribution across regions than ADDs and Energy costs.

Finally, Exhibit i.6 is merely illustrative and not meant to indicate what shares "should" be distributed by region. Clearly, number of units is only one of a myriad of factors that determine relative need for modernization. Other important factors include age of stock, climate, urban/rural location, type of buildings, family/elderly tenancy and construction materials. A great deal of additional analysis will be required to understand the major determinants of need.

PART I

STUDY PROCEDURES AND BACKGROUND

I. INTRODUCTION

The physical condition and viability of the public housing stock is of concern to HUD, to Congress, and to the Public Housing Agencies (PHAs) and Indian Housing Authorities (IHAs) that own and operate public housing. The dimensions of the problem are not adequately known and thus the mechanisms for planning appropriate levels of funding are not in place. Much of the public housing stock is in adequate condition, requiring only relatively minior repair. Another segment of the stock, however, shows the effects of deferred maintenance and modernization backlog. And, unfortunately, a small proportion of the stock--chronically troubled projects or those projects requiring substantial redesign in order to remain viable--capture a disproportionate share of public attention and tend to cloud our understanding of the actual dimensions of the problem.

1.1 MAJOR PURPOSES OF THE STUDY

The major purpose of this study is to assess the current (backlog) level of modernization required for the health, safety, and building integrity and viability of the public housing stock. In addition, in order to continue to respond to a variety of policy concerns, a computerized data base containing our inspection results and documentation of modernization cost estimation is a major product of the study. A future, related study will develop an estimate of future needs for modernization funding; that is, to determine the rate at which modernization needs accrue over time.

Our assessment of Modernization Needs addresses the full scope of needs, ranging from repairs and replacement, for example, to energy conservation and redesign of specific types of projects. The research categories defined for the study were chosen in order to maximize the ability to understand and measure modernization need. As is described below, each category has a unique analytical approach, sample design, and data collection procedure. While not constrained by any particular set of standards, the research categories can be placed into current HUD policy categories. However, this report is designed to be policy neutral and thus avoids making judgements about whether or not particular groups of items are needed. It is intended to be an objective source of data that can be used by HUD, Congress, PHAs, and others as background data for policy choices.

1.2 ORGANIZATION OF THE REPORT

This study of the modernization needs of the public and Indian housing stock is one of the most complex research and cost estimation projects ever funded by the Department of Housing and Urban Development. New methods of measuring and costing modernization needs had to be specially developed for this project. These methods were tested, refined, and validated before conducting the full scale study, which involved data collection at more than 1,000 housing developments. Scientific sampling techniques selected representative developments, kinds of project buildings (e.g., high rises, townhouse) and dwelling units.

To be exact, 2,194 dwelling units and 3,120 residential buildings were inspected at 1,000 public housing developments by more than 80 architects and engineers. Special subsamples were also selected for an Energy study at 241 developments, a study of the Comprehensive Assistance Improvement Program (CIAP) at 155 developments, and an intensive study of Redesign needs at 75 developments. Furthermore, a special study of the Indian housing program was conducted at 31 developments in 20 IHAs. Finally, a companion study to assess lead-based paint abatement needs involved inspections at 131 developments in 34 cities where 262 dwelling units, 94 residential buildings, and 33 site-wide facilities were tested for lead-based paint.

1.3 COST ESTIMATION COMPONENTS

This report presents the estimated costs of modernization actions required to restore the public and Indian housing stock to a variety of possible standards, including standards established by the Department of Housing and Urban Development. It includes modernization costs at the national, regional, and field office levels.

Included in this report is not only the national cost estimate total but the components which make it up. These components provide an important insight into the range and nature of the stock's modernization needs and suggest a variety of possible remedial approaches. The components used in constructing the estimates are:

- FIX -- Actions at this level are required to repair or replace in accordance with contemporary standards architectural or engineering systems that are already present at a particular public housing development. Examples range from roofs to boilers, floor finishes to storm windows, landscaping to roadways. In all, there are 101 architectural and engineering systems that cover all the possible combinations found in public housing today. The condition of each of these systems was determined by a team of specially-trained architects and engineers.

- ADD -- Actions at this level add equipment or features that do not presently exist at a particular development but are identified by PHAs for code compliance, project integrity, long-term viability or efficient operations. Upgrades of components are also included here. Examples include the addition of a fire alarm system, increasing the size of a recreational facility or changing from well water supply to a municipal tie-in. Such actions, chosen by the PHA staff from a catalog of more than 150 possible additions or upgrades, were reviewed and evaluated for appropriateness by the professional inspectors at each development.

- REDESIGN -- Actions at this level include substantial structural change in order to ensure continued viability at a particular development. Included here might be such measures as reconfiguration of buildings and/or dwelling units to make them more suitable for their current use. Special inspections for the developments selected as Redesign candidates by PHAs were performed by senior architects with extensive design experience and provided for PHA input at each stage of the process.

- ENERGY -- Actions here are based on energy conservation measures involving cost effective changes to the housing stock as determined jointly by the inspection team and the PHA.

- ACCESSIBILITY -- Actions in this area are based on PHA assessments of needed improvements at sampled developments to increase accessibility for the handicapped;

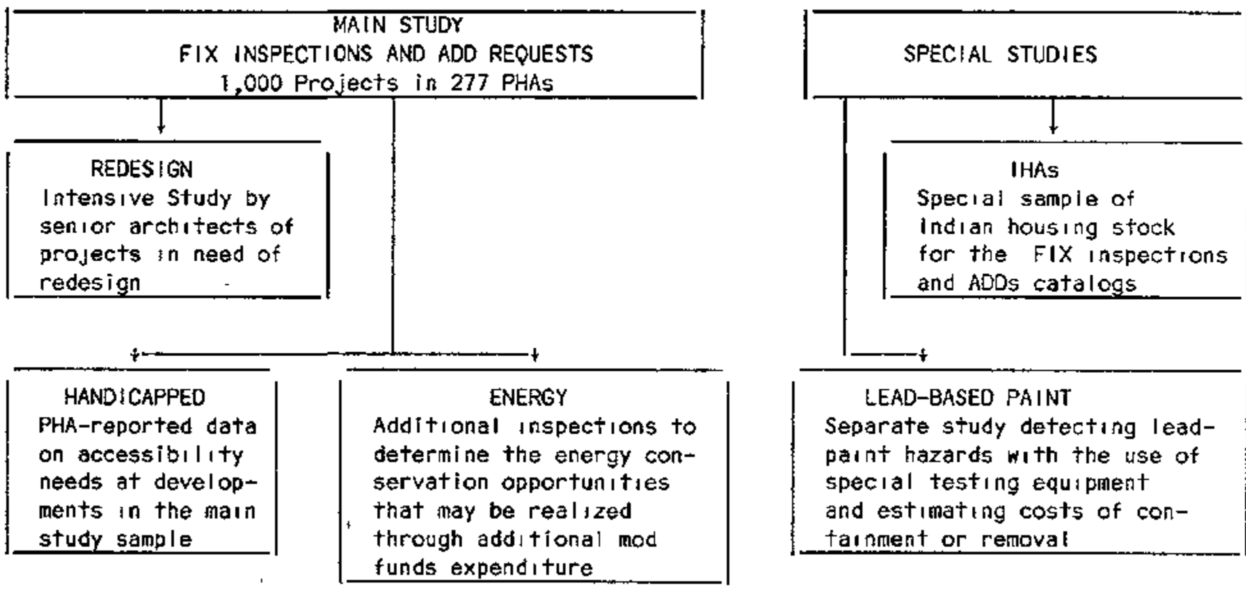
- ABATEMENT OF LEAD BASED PAINT -- In a related study conducted under this contract, staff from local lead poisoning prevention centers used specially designed data collection forms to report the incidence of lead paint in family PHA projects sampled separately. These incidence data were then analyzed to determine abatement costs.

- MODERNIZATION NEEDS OF INDIAN HOUSING -- A sample of rental and homeownership IHA developments was inspected using the same methods involved in the FIX and ADDs assessments for the main PHA modernization needs estimate, with resultant costs derived in the same manner.

Graphically, the components of the Modernization Needs study can be presented as shown in Exhibit 1-1 below.

Exhibit 1-1

COMPONENTS OF THE MODERNIZATION NEEDS STUDY



1.4 ORGANIZATION OF THE REPORT

The remainder of this report covers the following:

Chapter II--Program and Policy Context, provides important background information on the nation's present public housing programs, modernization funding efforts, and why the study is needed.

Chapter III--Overview of Data Collection Operations, introduces the critical techniques developed for estimating modernization costs, and discusses field operations--inspections, interviews, performing takeoffs (e.g., recording of building dimensions) in the field and from building plans.

Chapter IV--A Summary of Sampling and Estimation Procedures, presents further details on the statistical aspects of the study and the associated analytical files.

Part II--National Modernization Estimates gives national modernization estimates for each of the seven types of needs studied.

Appendices--Consists of technical material giving details of how each type of need was measured and estimated.

II. PROGRAM AND POLICY CONTEXT

2.1 SCOPE OF THE PUBLIC AND INDIAN HOUSING PROGRAM

The Public Housing Program is the nation's oldest and most visible program for sheltering the poor. Today, it houses about three and a half million people in nearly 1.3 million rental units. The program is highly decentralized, with about 3,000 Public Housing Authorities (PHAs) administering local housing programs. Despite the number of PHAs, about two-thirds of the program units are administered by the 134 large PHAs that have over 1,250 units each. In addition to rental units, PHAs operate about 10,000 units that are intended for sale to occupant families under the Turnkey III Homeownership Program.

Under the Public Housing Program, HUD pays debt service on capital costs of the project and provides operating subsidies to make up the difference between the rental income and the expenses of operating the project. Families are generally required to pay 30 percent of their income toward rent. They are eligible for entry into the program if their family income is 50 percent or less of the area's median income, as adjusted for family size. HUD also pays for the development or acquisition of the project.

Most public housing units (63 percent) are occupied by families, with an average of 1.9 children. According to survey data, 76 percent of the families have a female head of household, 75 percent are minority, and 59 percent receive welfare payments. Public housing for the elderly has a somewhat different set of characteristics. Only 39 percent of its residents are minority, households consist primarily of one person, the age of the head of household averages 74, and 38 percent of the households receive welfare. Like family households, about three-quarters of the elderly households (73 percent) are headed by women.[1]

The Indian Housing Program has been operated for over 20 years, and is the primary housing assistance program for Native Americans. It is administered by 163 Indian Housing Authorities (IHAs) which manage about 50,000

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[1] Loux, Suzanne B. and Robert Sadacca, "Comparison of Public Housing Tenant Characteristics: 1976 to 1979." Washington, D.C., The Urban Institute, Working Paper 1279-01, 1980.

units. About 29,000, or 58 percent of HUD assisted Indian housing units are in the Mutual Help Homeownership Opportunity Program. Under this program, the homebuyer occupies the home under a lease-purchase contract and is expected to maintain the home, pay utility and maintenance costs, and make a monthly payment. The homebuying family generally obtains title after 25 years. IHAs also operate the Turnkey III Program, which is similar to the Mutual Help Program, and which includes 2,000 Indian units. The other major program for Indian housing is rental public housing, which includes about 19,000 units. The program operates much the same way as it does in non-Indian PHAs.

About 70 percent of housing built on Indian lands in the past two decades has been sponsored by HUD. This is because of the very low income level of most Native Americans and because restrictions regarding land titles on Indian trust lands makes home purchases using conventional mortgages impossible.

Both the Public Housing Program and the Indian Housing Program obtain annual operating subsidies from HUD to make up the difference between the rents that occupants can afford and the expenses of operating the units. These subsidies enable PHAs and IHAs to pay for utilities, normal maintenance, administration and other day to day activities. Rental income and operating subsidies, however, have not been adequate to fund major repairs, system replacements, or the correction of major design deficiencies. As a result, some projects have deteriorated over time, endangering the health, safety, and well-being of the residents.

In response to this need, in 1968, the Modernization Program began funding selected capital improvements (alterations, additions, betterments, and replacements) at projects. In 1981, the Comprehensive Improvement Assistance Program (CIAP) replaced the Modernization Program and provided a comprehensive approach to improving both physical and management deficiencies in existing public and Indian housing projects.

Funding under the Modernization Program and the CIAP has been significant, totalling $7.9 billion since 1975. Funding in recent years has ranged from $707.4 million in 1986 to $1,259.9 million in 1983. (See Exhibit 2-1.) Despite these expenditures, there is evidence of a significant unmet need for the renovation of many of the ten thousand public and Indian housing projects in the inventory.

Exhibit 2-1

MODERNIZATION FUNDING, 1975 TO 1986
CAPITAL COST APPROVALS

Year	Funding (Millions)
1975	$423.4
1976	213.9
1977	324.0
1978	448.1
1979	544.1
1980	545.2
1981	926.9
1982	854.8
1983	1,259.9
1984	786.9
1985	822.9
1986	754.5*
Total	7,904.6

* Includes use of development funds for major reconstruction of obselete projects

Estimates of this "backlog" of unmet needs are substantial, but not well-defined. One of the major tasks of this research is to provide estimates of those needs based on careful inspections and accurate statistics. Among the problems with estimating the unmet needs is that the amount is a moving target: hundreds of millions are spent yearly to modernize projects while physical depreciation of the public housing stock creates a new need for large amounts of additional rehabilitation. Thus, the backlog estimate will be made for a single point in time, but renovation needs will continue indefinitely.

2.2 PREVIOUS ESTIMATES OF MODERNIZATION NEEDS

The most significant previous attempt to deal with the issue of modernization needs was completed in 1980, when the results of the previous review of the Public Housing Program's modernization needs were published. That review was prepared by a joint venture of two architectural firms, Perkins & Will and The Ehrenkrantz Group (PW/E). The review sent inspectors to over 300 public housing projects and produced a series of reports on rehabilitation needs, energy conservation measures, and handicapped accessibility.

The PW/E report divided the cost of upgrading public housing into three levels:

- Level I, the cost of correcting basic health and safety needs, was estimated to cost $260 million.
- Level II, the cost of correcting violations of HUD Minimum Property Standards (including Level I needs) was estimated at $1.506 billion.
- Level III, the additional cost of making projects more habitable and easier to maintain, was estimated at $6.791 billion (net of Levels I and II).

The cost of making projects fully accessible to the handicapped was estimated at $307 million. Energy conservation measures with simple payback periods of up to 15 years were estimated to cost $2.2 billion. The total cost added to $10.8 billion in 1980 dollars. Because some of the estimates were not clearly defined, especially the Level III estimates, and the statistical reliability of the estimates was in doubt, the total estimate was open to varying interpretations. Furthermore, since the data were not computerized or documented, additional analysis of the information was not possible. Thus, the ambiguity of the PW/E results was one of the reasons that the current research was started.

2.3 THE COMPREHENSIVE IMPROVEMENT ASSISTANCE PROGRAM (CIAP)

The Comprehensive Improvement Assistance Program was established by the Housing and Community Development Act of 1980 and implemented beginning in Federal Fiscal Year 1981. CIAP replaced the Public Housing Modernization Program, and in contrast was intended to provide for a more comprehensive approach toward the physical improvement needs of projects, more advance planning by PHAs including the use of a five-year modernization plan for the entire PHA, and the funding of management improvements.

Under CIAP, Modernization Standards are set forth in a HUD Handbook. Work items are categorized by that handbook into (1) mandatory standards that apply to all projects throughout the country, and (2) project specific work that is necessary or highly desirable for the long-term viability of a particular project. There is also a relatively short list of luxury items that are prohibited, including swimming pools, atriums, dishwashers, and dwelling unit trash compactors.

Four types of project modernization are funded under the CIAP regulations:

1. Comprehensive Modernization. Complete funding for all required physical and management improvements at a project.

2. Emergency Modernization. Funding of physical improvements to correct immediate threats to the life, health, and safety of tenants, including fire safety.

3. Special Purpose Modernization. Funding of cost-effective energy conservation work items.

4. Homeownership Modernization. Funding of limited physical improvements for Turnkey III and Mutual Help projects. Eligible improvements relate to health and safety, energy conservation, and the correction of development deficiencies.

Starting in 1985, a new requirement was initiated for a viability review of each project being considered for funding other than emergency. The purpose was to assure that identified physical and management problems at the project will be solved by the proposed modernization and that the project after modernization will be suitable for operation as public housing for at least 20 years. Relatively few projects have failed this test, perhaps because few nonviable projects have been proposed for funding by the PHAs. Projects that cannot be made viable through physical and management improvements are ineligible for modernization other than emergency unless no alternative housing is available for the tenants.

Because the Modernization Needs Study report is intended to help guide CIAP program policies, a set of cross-references was developed that places each of the research inspection categories into policy related categories. In general, it puts modernization actions into the following categories:

1. "HUD modernization standards," consisting of repairs and replacements (FIX), and code-required or HUD-required additions and upgrades (Required Adds).

2. "Project specific items," consisting of additions or upgrades that are regarded as needed by particular developments for their longterm viability, not required by local code or universally required by HUD. Also, architectural redesign (Redesign) of projects that need reconfiguration to solve fundamental operational problems is included in this category.

3. "Further PHA requested additions," consisting of additions and upgrades that PHAs would like to see at their projects, but which are currently prohibited by HUD (currently prohibited Adds), or for which the research inspectors found less than clear-cut evidence of need (Lower ISO). Also, Adds with no ISOs and Other Adds (not in Adds catalog) are found here.

4. Energy conservation measures that are cost-effective.

5. Handicapped accessibility as required by Federal regulations.

6. Lead-based paint abatement required by HUD regulation.

7. Indian housing modernization.

Under CIAP, 98 percent of funding available is assigned by HUD Headquarters to the ten Regional Public Housing Offices. Regional Offices make funding decisions based on recommendations from the 51 Field Offices. Exhibit 2-2 presents the allocation by Regional Office for FY 1986. The remaining 2 percent of funding available is assigned by HUD Headquarters to the Regional Offices, specifically earmarked for the six Indian Field Offices. The Public Housing assignments are based on a weighted allocation formula. That formula gives 45 percent weight to needs determined by Levels I and II of the PW/E study (health and safety and compliance with HUD Minimum Property Standards), and 55 percent weight to PHA utility costs in each Region, which is regarded as a reasonable proxy for energy conservation needs. The share of funding ranges from a low of 0.61 percent for region VIII (Denver) to a high of 35.20 percent in Region II (New York). The appropriateness of these allocations will be evaluated by HUD on the basis of the present study of modernization needs.

Exhibit 2-2

CIAP ALLOCATIONS TO HUD REGIONS FOR PUBLIC HOUSING
YEARLY DISTRIBUTION FORMULA USED IN 1986*

	Region	Percentage of Funds	Percentage of Public Housing Units
I	Boston	8.24	5.69
II	New York	35.20	22.79
III	Philadelphia	14.34	11.42
IV	Atlanta	15.07	20.15
V	Chicago	11.65	16.37
VI	Ft. Worth	8.77	10.59
VII	Kansas City	1.23	3.05
VIII	Denver	0.61	2.39
IX	San Francisco	4.01	5.42
X	Seattle	0.88	2.30
		100.00	100.00

* Excludes Indian Housing Program

2.4 NEED FOR THIS STUDY

In 1983, HUD, the Congress, and the public housing interest groups all concluded that it was necessary to begin a new study of the modernization needs of the public and Indian housing stock. The 1980 PW/E study, while making a contribution to our knowledge of modernization needs, was not sufficient. In addition to the ambiguities of the Level III estimate, many other questions remained, including:

- The PW/E study inspections were performed in 1979. Massive changes in the stock, including billions of dollars in modernization expenditures and further aging of projects, have occurred since then. What are the current needs of the stock?

- At what rate does the public housing stock undergo physical depreciation? What amount of funding will be necessary to keep projects in good physical condition, and what is the distribution needed for that funding? (This issue will be evaluated in a future HUD-sponsored study.)

- What are the details of the modernization needs of public housing? How reliable are the estimates? Reports with detailed results of inspections and statistical procedures plus the computerized data will be made available. Thus, other researchers can create modified estimates based on alternative assumptions.

- What are the additional needs of the public housing stock in several areas that were not evaluated in PW/E study, specifically project additions and upgrades ("ADDs"), redesign of projects where needed, lead-based paint abatement, and needs of the Indian Housing Program?

- What is the most appropriate way to distribute CIAP funds to the HUD Regional and Field Offices? The current allocation formula, based on a combination of findings from the PW/E report and estimates of needs for energy conservation, needs to be improved.

III. OVERVIEW OF DATA COLLECTION OPERATIONS

The diversity of the public and Indian housing stock presented unique challenges for the Modernization Needs Study. The design of the study and the data collection operations had to take into account both small public housing developments with fewer than 12 dwelling units and huge projects containing well over 1,000 units. The study had to consider the architectural features of older projects built in the 1940s in the northeast as well as newer projects built in the late 1970s in the southwest; central heating plants that served several hundred apartments and small heaters serving a single unit; project sites with substantial open space and landscaping to sites with little more than a sidewalk leading into the development's building. Section 3.1 discusses the prelimary data collection needed to design the study. Section 3.2 introduces the critical measurement concepts for determining modernization needs at these different types of housing developments. Section 3.3 presents an overview of the main study and various substudies that required different kinds of data collection. The remainder of the chapter is devoted to discussions of the specific data collection operations for the study.

3.1 PRELIMINARY MOD NEEDS SURVEY

As noted in Chapter 1, the Modernization Needs Study involved detailed inspections of a sample of the nation's public housing developments, including inspections at representative residential buildings and dwelling units. In order to select the required samples, accurate information was needed on the number of dwelling units and buildings at all public housing developments. Unfortunately, no data base existed with the necessary up-to-date information.

In addition, in order to design an efficient sample that was representative of developments' modernization needs, it was important to identify projects with relatively high modernization needs so that they could be sampled more heavily and, thus, improve the accuracy of the final modernization estimates. Also, an updated listing of specific developments that had been funded under CIAP was needed for selecting the subsample for the special CIAP study. Furthermore, the Energy Study could be greatly improved upon if the special sample for that substudy focused on developments with the greatest energy conservation potential. In essence, a considerable amount of data was needed before the full scale study could be efficiently designed, much less implemented.

Accordingly, a preliminary survey of modernization needs was designed and conducted. There are approximately 3,000 PHAs (containing over 11,000 projects and roughly 1,200,000 dwelling units). 2,600 PHAs are classified as "small," having less than 500 units. For the mail survey, all PHAs classified as "medium" or larger were included in the survey, and a sample of approximately 600 smaller PHAs was selected. In all, 954 PHAs were mailed Mod Needs Data Forms requesting information on approximately 6,670 developments.

This mail survey gathered general information to create an updated sampling frame for the full scale study. Questions also were included to determine the PHAs own estimate of modernization needs so that this data could be used to stratify the full sample. Detailed information concerning the number and types of residential buildings and the number of dwelling units in each building were needed to select the associated samples for the full study. Information on recent modernization activity at each development was also collected so that the CIAP sample could be selected, and energy-related questions were included to identify appropriate developments for the Energy substudy. Lastly, questions on the form served to identify potential candidates for the Redesign study.

The results of this first data collection effort provided Abt Associates with data for an updated sampling frame. In addition, it offered HUD an improved count of PHAs, developments, buildings, and dwelling units, thus updating HUD's internal FORMS data base.

3.2 APPROACH TO MEASURING MODERNIZATION NEEDS

To understand how the Modernization Needs Study was conducted, it is critical that the study's approaches to measurement be explained.

First, we needed to develop a classification scheme to capture the range of modernization that might be required at any given development. Three operational categories of modernization were developed for data collection purposes--FIX, ADD, REDESIGN. In other words, the modernization needed was to <u>FIX</u>--that is, repair or replace something that already existed at the development; or to ADD--that is, add something that did not presently exist or to upgrade with something different. REDESIGN could also be needed--that is, substantial structural changes were needed in units, and/or buildings, and/or the project's site. Exhibit 3-1 illustrates the interconnected nature of these three concepts.

Second, modernization costs could always be attributed to one of three basic elements at a development. Modernization could be needed in units (e.g., kitchens, bathrooms, living rooms), in buildings (e.g., lobbies, elevators, foundations, roofs), or at the sites (e.g., sidewalks, parking areas, central heating plants, community centers).

Third, using these basic "building blocks," a representative sample of public housing developments was selected. The sites of these developments were all inspected; a sample of buildings was inspected, and a sample of dwelling units within those buildings was inspected. Based on our estimation techniques, it would then be possible to aggregate the costs of site modernization needs, with the costs of building modernization, and the costs of dwelling unit modernization needs to arrive at overall national estimates of capital improvement needs. Exhibit 3-2 provides examples of FIX, ADD, and REDESIGN for dwelling units, buildings, and sites.

Exhibit 3-1

Categories of Modernization Actions

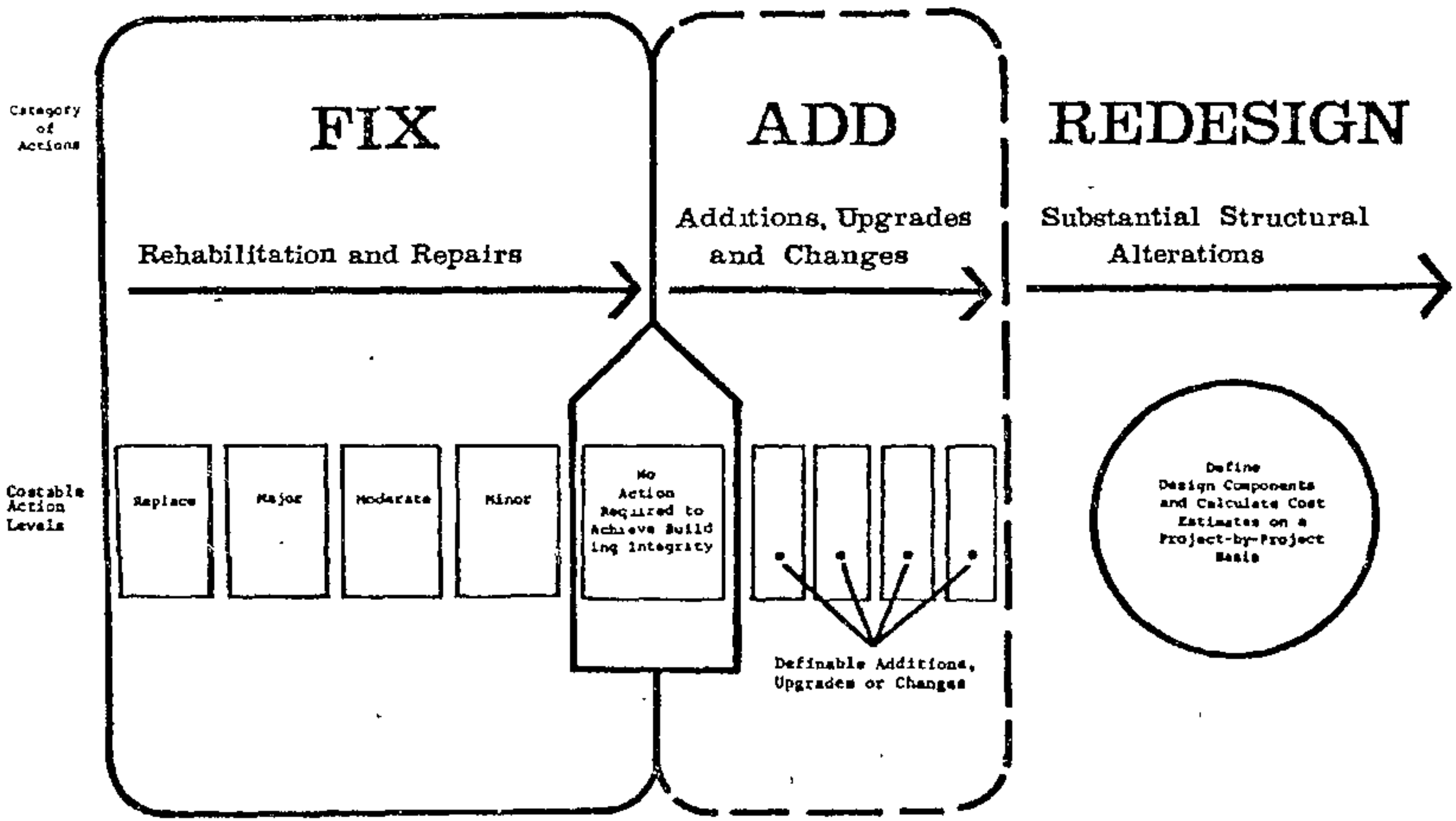

Exhibit 3-2
Examples of FIX, ADD, REDESIGN
For Units, Buildings, and Sites

Location	FIX	ADD	REDESIGN
Dwelling Units	• Replace kitchen stoves	• Add washer & dryer hookups	• Combine two small units into one larger unit
	• Repair ceiling water damage	• Add smoke detectors	
Buildings	• Replace floor coverings in corridors	• Add fire alarm system	• Redesign building entries to improve security
	• Repair damaged walls in lobby	• Add weather vestibule	
Sites	• Restore landscaping	• Increase capacity of central heating system	• Redesign roadways to enable access by fire-fighting equipment
	• Repave parking areas	• Change from well water supply to municipal tie-in	

The fourth important measure concept in the study is that a systems approach was utilized. A capital budgeting approach to cost estimation, based on a set of 101 architectural, mechanical and electrical systems and an "action level" for each system element formed the basis for our inspection and costing procedures. Further discussions of the systems approach and our other measurement concepts are presented in Chapter 4.

3.3 Components of the Main Study and Various Substudies

More than 1,000 public housing projects/developments throughout the nation were visited during the data collection phase of the Modernization Needs Study. The inspection teams--consisting of an architect and an engineer--usually began each assignment at the central office of the PHA where they picked up and reviewed the ADDs Form and other self-administered forms completed by the PHA staff, performed takeoffs of measurements from site and building plans, selected samples of dwelling units to be inspected, and coordinated inspection scheduling details with the PHA liaison.

At each sampled project, detailed inspections were made of the architectural, mechanical and electrical components of dwelling units, buildings, and sites. In nearly all cases, both architect and engineer were accompanied by a knowledgeable escort from the PHA who enabled access to secured areas and who usually was able to provide additional information about the development's conditions. Exhibit 3-3 depicts the sampling of units, buildings, and sites in the main study.

Exhibit 3-3

Modernization Needs Study: FIX Inspection Elements

Location	Nation-Wide	At Each Sampled Development	Illustrative Major Systems Inspected At these Locations
DWELLING UNITS	2,194 units	1-4 units	• All interior rooms • Unit-based mechanical & electrical (M&E) systems including furnaces, electric distribution panel, etc.
BUILDINGS	3,120 buildings	1-8 buildings	• Exterior walls, roof, windows • Interior common areas including lobbies, halls, basements, etc. • M&E systems including boilers, water and waste lines, elevators, electric distribution systems, exterior lighting, etc.
SITES	1,000 sites	Entire site or one or more subsites in a scattered site development	• Landscaping and site equipment such as seating, playgrounds and site lighting • Paved areas including streets, parking and walks • M&E distribution lines • Site-wide facilities such as management office, day-care center, community rooms, etc. • Central boiler and mechanical rooms

In addition to the main study of 1,000 developments where the FIX and ADD inspections were conducted, there were three substudies in the main sample, plus two separate special studies, namely:

1. Redesign Study. Relatively few public housing developments were in need of substantial structural changes to ensure their continued viability--the definition of redesign which was used in this study. A first count of developments that might be redesign candidates was determined from the preliminary Modernization Needs Data Form survey, and further refinement of projects meeting the definition of redesign was identified by a second data gathering effort, the Redesign Mail Survey. A sample of 75 developments in need of Redesign was then selected for in-depth three-day site visits, interviews, inspections, and related data gathering activities. The Redesign Study was conducted by senior architects familiar with redesign solutions to address a variety of problems.

2. Energy Conservation Study. In order to gather more information about energy conservation opportunities at the nation's public housing stock, a subsample of 241 developments from the main sample was selected for additional data collection. Prior to the inspection visit, the PHAs were requested to complete various self-administered forms concerning historical energy usage. The inspectors conducted energy-related interviews and additional inspections in a sample of 346 buildings.

3. Handicapped Accessibility Study. Each PHA sampled for the main study was requested to provide detailed background information on each of the characteristics of each of its developments selected for inspection, including an estimate of the current number of wheelchair-accessible dwelling units as well as the current number for individuals with sensory or other impairments. The PHA was then requested to state the number of additional units needed for persons with mobility, sensory, or other impairments. These requests were analyzed and their costs estimated as part of the overall study.

4. Indian Subsample. Since Indian Housing Authorities (IHAs) are funded separately in the CIAP program and have their own Field Offices, a special separate study of IHA housing was conducted. FIX and ADD inspections were conducted at 20 IHAs covering 31 developments where 322 buildings and 354 units were inspected.

5. Lead-Based Paint Study. Accurate detection of lead-based paint requires specialized equipment--XK-3 flourescence analyzers--and it was not feasible to conduct such measurements during the regular field inspections. In cooperation with the staff of local Childhood Lead Paint Poisoning Preven-

tion Programs, a special separate study of 131 developments in 34 cities was conducted where tests were conducted in samples of dwelling units, buildings, and site-wide facilities for the presence of lead paint hazards.

3.4 SUMMARY OF FIELD ACTIVITIES

The site visits to the PHAs/IHAs and the associated sampled projects were generally divided into three distinct phases:

Pre-inspection Activities--these activities (or tasks) normally were conducted at the PHA central office prior to the inspections. They included a visit with the Executive Director (or other person in charge of the agency), meeting with the liaison person designated by the PHA, drawing a sample of the dwelling units that were to be inspected, recording measurements from the plans/drawings provided by the PHA, reviewing the Project Characteristics Form, ADDs Form, and other forms completed by the PHA for this study, and finalizing last-minute details for escorts, scheduling, and related matters.

Inspection Activities--this was the core of the data collection phase and involved the inspection of a sample of the project's dwelling units, a sample of the residential buildings, all of the site-wide facilities, including central boiler and electrical rooms, and site surface.

Post-Inspection Activities--this last phase involved the inspector's providing a "second opinion" concerning the PHA's requested ADDs (additions and upgrades); the activities also included a variety of "housekeeping" and recordkeeping tasks that were completed before continuing to the next assigned project.

Exhibit 3-4, Summary of Tasks for a Sample Project, lists the specific activities that usually occurred during each phase of the field visit. It also outlines the additional tasks that were conducted when the sampled project was also included in the special Energy Study and/or the CIAP Study.

3.5 OPERATIONAL HIGHLIGHTS OF THE FIELD INSPECTION PROCESS

An account of the measurement techniques used in the study would not be complete without some mention of the operational components involved. Some of those we consider to be most significant are briefly mentioned below.

Exhibit 3-4

Summary of Tasks for a Sampled Project

	MAIN STUDY TASKS (FIX & ADD)	ADDITIONAL TASKS IF PROJECT IS IN ENERGY STUDY
PRE-INSPECTION ACTIVITIES	Meet with Executive Director Meet/coordinate w/PHA/IHA Liaison Obtain completed forms & review (If necessary, clarify/correct forms) AT LARGE & EXTRA-LARGE PHAs Draw sample of DUs Arrange for tenant advance notice Obtain Project Plans/Drawings Site Takeoffs Bldg. Takeoffs DU Takeoffs Confirm tenant advance notice Finalize escort & scheduling details w/PHA/IHA Liaison	Obtain completed forms & review (If necessary, clarify/correct forms.) Identify Site-wide facilities for inspections. AT L&XL PHAs* Draw DU sample
INSPECTION ACTIVITIES	DU FIX Inspections Bldg. FIX Inspections Site-Wide Facilities FIX Inspections Site FIX Inspections	Energy Practices Interviews Bldg ENERGY Inspections DU ENERGY Inspections
POST-INSPECTION ACTIVITIES	ADDs Second Opinion Ratings (If necessary, add'l takeoffs at central office) Protocol wrap up Administrative Tasks Mail completed work for project back to Abt Associates.	Administrative Tasks

Inspector Training and Quality Control

Architectural and engineering (A&E) inspectors were selected from a number of highly qualified firms in New England, the Southeast, and the Western regions of the country. Each of the some 100 inspectors selected was trained in a five-day intensive session focusing on the 101 observable systems and the associated action levels. The training staff included senior technical instructors from the project team as well as staff with special expertise in working in the PHA environment. Extensive audio/visual materials, a 140-page training manual and carefully supervised field inspection trials were used to ensure that all material was properly understood. Training sessions were held in May 1985 in Atlanta and Boston, and in Omaha during June of that year. Actual inspection began in the week directly following training.

Subsequent quality control was provided in several forms. During the first week or two of actual field inspections, project managers from the A&E firms reinspected portions of developments just inspected by their respective staff members to ensure uniform compliance with the training materials. During the succeeding months, these same senior managers, who had themselves participated in the training, reviewed inspection forms submitted by their field teams prior to sending them to Abt Associates for data processing. Where necessary, corrective actions were implemented, ranging from brief corrective coaching to two instances where inspectors who failed to respond to warnings on the quality of their performance were terminated.

The Field Inspection Staff

Abt Associates selected the field architects and engineers from the following A&E firms, each of which is highly regarded in the field of public housing design. Senior redesign inspectors were also drawn from these companies:

Bradfield Associates, Atlanta, Georgia
Dana Larson Roubal and Associates, Omaha, Nebraska and Seattle, Washington
Lane Frenchman and Associates, Inc., Boston, Massachusetts
On-Site Insight, Inc., Norwood, Massachusetts
Stull & Lee, Boston, Massachusetts

The Boston-based firm of R.G. Vanderweil Engineers, Inc. also provided important technical assistance in the preparation of inspector training materials.

PHA Involvement in the Field Effort

PHA staff were involved in many aspects of the study, including responding to early questionnaires to determine the number and condition of their various developments. Regarding the field inspections, however, their major contributions included the following:

PHA Action	Typical PHA Person Responsible
• Arrange for knowledgeable escorts for the inspection team to allow access to roofs, secured rooms, day-care centers, boiler rooms, site-wide facilities, as well as to provide any clarifying information concerning the condition/history/special situations at the project	Executive Director or Project Director
• Fill out the Project Characteristics form	Planning Director
• Fill out ADDs form	Planning Director
• Fill out Energy forms	Planning Director
• Have site and building plans/drawings available for the inspectors upon arrival (for taking measurements from plans and for selecting the dwelling unit sample)	Modernization Coordinator
• Arrange notification of tenants whose units have been sampled for inspection	Project Manager
• If elevator building, have an elevator escort who can arrange for brief shutdown to allow for adequate inspection.	Project Manager or Maintenance Director

Cooperation by PHA staff in filling out the research forms, preparing for the field visits, and assisting during the inspection visit was a crucial element in the success of the inspection process, the largest ever undertaken by the federal government in the field of multi-family housing. PHAs were, of course, not reimbursed for their considerable efforts.

IV. A SUMMARY OF SAMPLING AND ESTIMATION PROCEDURES

As has become clear from the previous chapters, the Modernization Needs Study is not one single study but many studies, each focusing on a different aspect of capital repair and improvement. Thus, the overall sample design is quite complicated and includes a large "main" sample of 1,000 developments, where FIX and ADD data were obtained, and special subsamples for the study of energy conservation, redesign and CIAP. Furthermore, entirely separate sampling plans were utilized for Indian Housing and Lead-Based Paint. This chapter very briefly describes the sample design for the main study and the special studies, outlines the approach used for estimation, and summarizes the estimates that will be provided by the study.[1]

Exhibit 4-1 summarizes the samples used for inspection in the main study of FIX, ADD, and handicapped accessibility, the subsamples (that is, the developments used to analyze energy, redesign, and CIAP drawn from among the 1,000 developments), and the separate special study samples.

The main sample is best described as a "multi-stage cluster sample" of PHAs, developments within PHAs, and buildings and units within these developments. The sample was allocated to the 51 HUD Field Offices, with the goal of obtaining individual modernization estimates for each field office.

In the first stage of sampling, 277 PHAs were selected from the universe of PHAs. Then, 1,000 developments were sampled from these PHAs and 3,120 buildings were sampled from each development. Finally, 2,194 dwelling units

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[1] For the details of the sampling and estimation plan, refer to <u>The Modernization Needs of Public Housing: Sample Design for the Main Analysis Sample</u>, Cambridge, Mass., Abt Associates Inc., March 1985; Memorandum dated April 28, 1986, "Main Sample Estimation Formulae for Estimation of Public Housing Modernization Costs," by Chuck Wolters, Michael Battaglia, and Sally Merrill; and Memodanum dated March 25, 1986, "Weighting the Modernization Needs Study Inspection Sample," by Michael Battaglia and Chuck Wolters.

were sampled from these buildings.[1] These stages are the "building blocks" for the estimate of total national modernization costs, for once the field inspections are completed and costed, an estimate of total modernization costs for the nation will be developed by taking:

1) Site level cost observations (e.g., site power distribution) at each sample project, and aggregating up to the universe of projects in the national public housing stock.
2) Building level cost observations (e.g., roofing) at each sample building, and aggregating up to the universe of buildings.
3) Unit level cost observations (e.g., kitchens) at each sample housing unit, and aggregating up to the universe of units.

Exhibit 4-1
Inspection Samples Used in the Modernization Needs Study

Sample	Purpose	Developments	Buildings	Units
I. Main Study Sample	FIX, ADD & Handicapped Estimates	1,000 developments in 277 PHAs[2]	3,120	2,194
A. Energy Subsample	Energy Conservation Estimate	241	346	N.A.
B. Redesign Subsample	Redesign Estimate	75	N.A.	N.A.
II. Special Samples				
A. IHAs	Indian Housing Estimates	31 developments in 20 IHAs	322	354
B. Lead-Based Paint	Lead-Based Paint Estimate	131	94	262

1 There was oversampling at each stage of sampling to take into account nonresponse, inaccessibility of some sampled buildings and dwelling units, and other attrition factors.

2 ADDs data was completed for 843 of the 1,000 developments, while handicapped data was obtained for 746 developments. The ADDs data include the ISOs, determined by the inspectors.

Unique weights exist for each stage of the sampling process (again, units, buildings, developments, and PHAs) and for each field office. These weights will be used to "expand" each level of the sample to the next highest level and ultimately to the field office level. Thus, conceptually, the following types of "weighting up" occur: (1) The modernization costs of development sites are "expanded" from the development through the PHA to the field office level. (2) Each inspected building in a development will have its building modernization cost "expanded" to the development level and then through the PHA to the field office level. (3) Each inspected unit will have its modernization cost first "expanded" through the building in which it is located then to the development, and then through the PHA to the field office level. A ratio estimator is then used to produce a total modernization need estimate for each field office. The sum of the field office estimates is the national estimate.

The main study sample is designed to provide estimates of FIX and ADD costs at the national, HUD regional, and individual field office level. Refer to Exhibit 4-2 for a summary of these and other estimates. Thus, direct estimates of FIX and ADD costs will be provided for each of the 51 field offices and ten HUD regions as well as for the nation.[1]

Direct estimates will also be provided at the national level for Energy, Redesign, and Indian Housing. However, since these samples are too small to provide direct regional and field office estimates, we developed special procedures to allocate these funds geographically.

The national estimates in this report are based on samples and are therefore accompanied by standard errors and 95-percent confidence intervals. The standard error of an estimate is a measure of the reliability of the estimate, that is, the variation that occurred by chance because a sample rather than

[1] Direct estimates are those for which, by design, are directly available from the sample at the chosen level of reliability. Direct subclass estimates are also statistically reliable estimates directly available from the sample, but the sample design did not explicitly incorporate these characteristics. Allocated estimates, in contrast, may be derived from models as well as from simple, non-statistical rules, but are not direct estimates of the sample, usually because the sample size is too small to permit precise estimates.

Exhibit 4-2

Summary of Estimates by Type of Estimate

MOD COMPONENT \ TYPE OF ESTIMATE OR ANALYSIS	NATIONAL	REGIONAL	FIELD OFFICE
FIX	Direct	Direct	Direct
ADD	Direct	Direct	Direct
ENERGY	Direct	Allocated	Allocated
REDESIGN	Direct	Allocated	Allocated
ACCESSIBILITY	Direct	Allocated	Allocated
INDIAN	Direct	Allocated	N.A
LEAD	Allocated	Allocated	Allocated

Key:

Direct Estimate. A direct estimate is one which by design, is directly available from the sample.

Allocated. Allocated estimates are provided when sample sizes are insufficient to provide reliable, direct estimates. The allocation will be based on as much information as possible.

the entire population of developments was inspected. The sample estimates and their standard errors enable one to derive confidence intervals. Confidence intervals are ranges that would include the average result of all possible samples with a known chance. We constructed 95-percent confidence intervals by multiplying the standard error by 1.96. The 95-percent confidence interval should be interpreted as follows:

> Approximately 95 percent of the intervals from 1.96 standard errors below the estimate to 1.96 standard errors above the estimate would include the average result of all possible samples.

That is, one can say with 95-percent confidence that the average estimate derived from all possible samples is included in the interval represented by the sample estimate plus or minus the confidence interval value provided in the report.

Standard errors and 95-percent confidence intervals were also computed for the FIX and ADDs field office and HUD region estimates.

PART II

MODERNIZATION BACKLOG COSTS: NATIONAL AND REGIONAL ESTIMATES

The previous section of this report has presented the background of the study and an overview of the data collection procedures. This Section will present the national and regional backlog estimates for each of the seven study components. Field Office estimates are presented in Appendix I. In keeping with the nature of this report, no conclusion is reached about the need for the types of modernization studied. This study simply reports the measured need and describes how the need was estimated. For each type of modernization, there is also a statistical appendix that provides details of how the cost estimation was performed.

The chapters of this section will, in turn, provide estimates of national needs for 1) FIX; 2) ADDs, 3) Redesign, 4) Energy Conservation, 5) Handicapped Accessibility, 6) Indian Housing, and 7) Lead-Based Paint Abatement.

V. FIX ESTIMATES

5.1 SUMMARY OF FIX COST ESTIMATES

Starting in June 1985, more than 1,000 public housing developments were visited by specially trained teams of architects and engineers. In cooperation with the PHA staff, these inspectors performed a detailed assessment of the architectural, mechanical and electrical systems involved in dwelling units, residential and non-residential buildings at each development as well as the overall site itself. Completion of up to 10 separate inspection booklets was required at each site as inspectors examined and rated the condition of the 101 possible architectural and engineering systems on a five point scale, ranging from "No Action Required" to "Replace."

Typically, the inspectors were accompanied by a knowledgeable expert from the PHA in order to access secure areas and to provide technical information about the condition of the development's facilities and equipment. Elements of the FIX Inspection are shown below.

Exhibit 5-1
Modernization Needs Study: FIX Inspection Elements

Location	Nation-Wide	At Each Sampled Development	Illustrative Major Systems Inspected At these Locations
DWELLING UNITS	2,194 units	1-4 units	• All interior rooms • Unit-based mechanical & electrical (M&E) systems including furnaces, electric distribution panel, etc.
BUILDINGS	3,120 buildings	1-8 buildings	• Exterior walls, roof, windows • Interior common areas including lobbies, halls, basements, etc. • M&E systems including boilers, water and waste lines, elevators, electric distribution systems, exterior lighting, etc.
SITES	1,000 sites	Entire site or one or more subsites in a scattered site development	• Landscaping and site equipment such as seating, playgrounds and site lighting • Paved areas including streets, parking and walks • M&E distribution lines • Site-wide facilities such as management office, day-care center, community rooms, etc. • Central boiler and mechanical rooms

The field data collection was completed in September 1985, following on-site inspections in each of HUD's 51 Field Offices, including Alaska, Hawaii, and the Caribbean. Inspectors went to 45 states in all.

The results of the field inspections were converted into backlog cost estimates and weighted up to national estimates. The estimates are for capital needs only. Thus, normal maintenance and normal repair needs, which have always been conceived as being handled through normal operating budgets, have been purposely excluded from this study. Anticipated future modernization needs will be separately evaluated in a HUD sponsored report on the accrual of depreciation.

The national estimate of the modernization needs for FIX, as defined above, is $9,307 million.[1] The 95 percent confidence interval is plus or minus $701 million.

Exhibits 5-2 and 5-3 present the distribution of FIX costs by region. The regional share of FIX costs relative to the share of total units in the region is indicated in the last column of Exhibit 5-3. A ratio greater (smaller) than one indicates a share of FIX costs relatively larger (smaller) than the region's share of units. Regional size is only one of many factors determining the need for modernization funds; nevertheless, it is interesting to note some rather substantial differences in regional shares. For example, Region IX and Region III have the largest FIX needs per unit.

Another approach to examining the distribution of FIX costs is to look at per unit costs. The national average FIX cost is $7,392. Exhibits 5-4 and 5-5 show average per unit FIX costs by region and the distribution of per unit costs by field office (refer to Appendix I for details). Regional per unit cost range from approximately $5,000 in Regions IV and X to over $11,000 in Regions III and IX. Similarly, substantial variation is seen across field offices. The modal value for the field offices shown in Exhibit 5-5 is per unit costs between $5,000 and $6,000; however, one field office shows per unit costs between $1,000 and $2,000 while others have per unit costs exceeding $12,000.

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1 This estimate includes $500,000 to account for the total modernization needs of the Guam PHA which was not included in the PHA sampling frame.

Exhibit 5.2
Total Fix Costs by Region
($ millions)

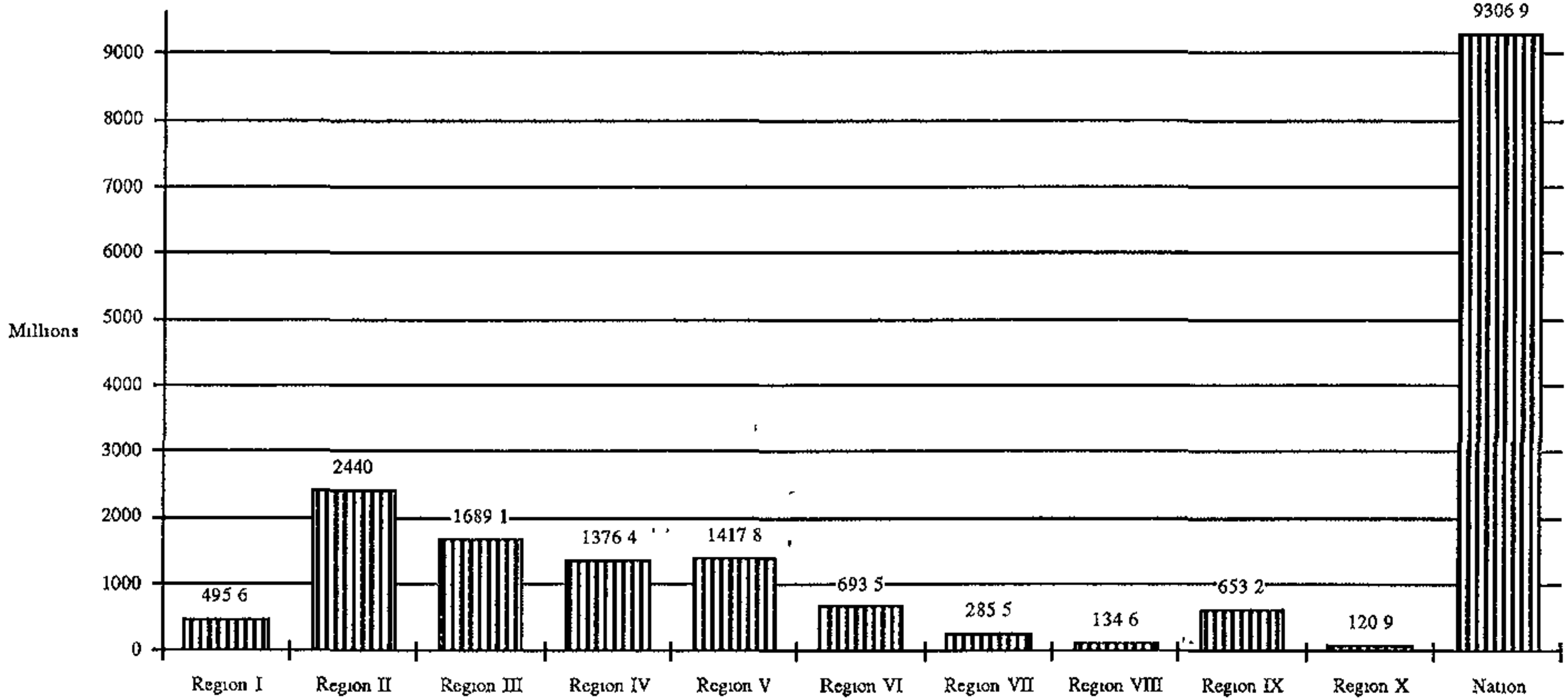


Exhibit 5.3

Total FIX Costs by Region
($ millions)

Region	(1) Total FIX Costs	(2) % of Total	(3) % of Total Units	(4) Ratio of (2) to (3)
I	$495.6	5.32	5.88	.905
II	$2,440.2	26.22	23.44	1.119
III	$1,689.1	18.15	11.71	1.550
IV	$1,376.4	14.79	21.55	.686
V	$1,417.8	15.23	16.64	.915
VI	$693.5	7.45	9.94	.749
VII	$285.5	3.07	3.31	.927
VIII	$134.6	1.45	1.29	1.124
IX	$653.2	7.02	4.37	1.606
X	$120.9	1.30	1.86	.699
Nation	$9,306.9	100%	100%	

Exhibit 5.4
Average Per Unit Fix Costs
By Region and For the Nation

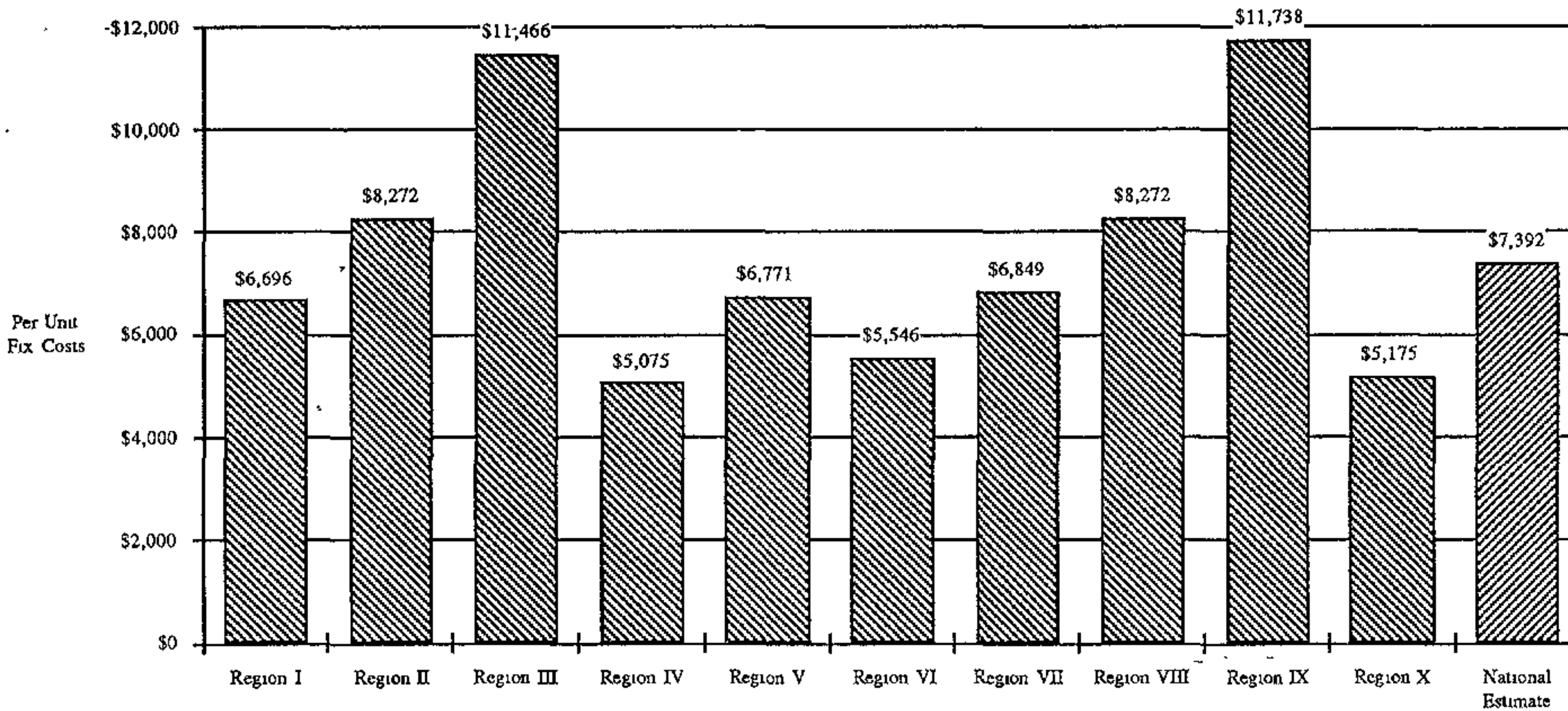
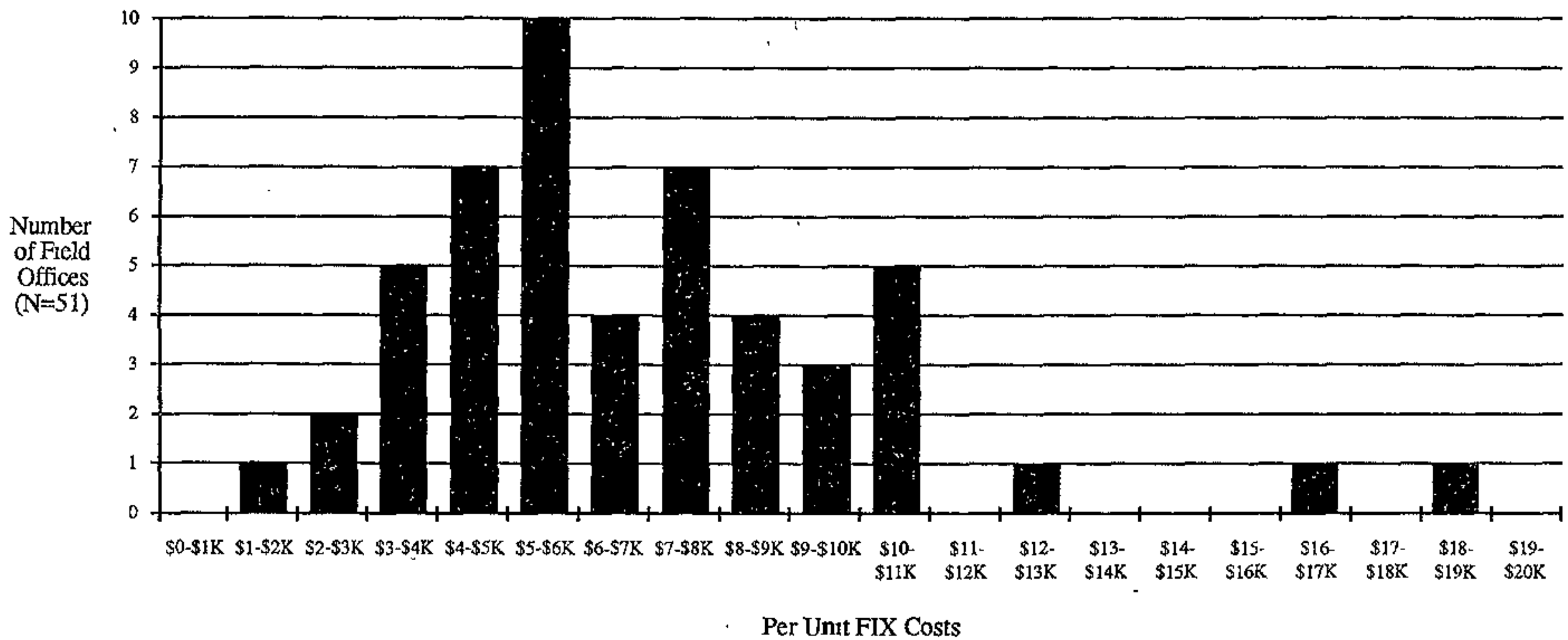


Exhibit 5.5
Distribution of FIX Per Unit Costs
by Field Office



Nationwide Mean = $7,392

5.2 FIX ESTIMATION PROCEDURES

The three-part classification of modernization needs along the FIX/ADD/REDESIGN continuum defines FIX as follows:

> to repair or replace existing architectural, mechanical, and electrical systems at a development to contemporary standards.

Modernization costs for rehabilitation (FIX) are based on observable actions and the associated costs for these actions for a set of 101 mechanical, electrical, and architectural systems. These Observable Systems are listed in Exhibit 5-6.

Observable Systems Concept

The term "Observable System" (OS) is used to indicate that the physical condition of the system is capable of being observed and or otherwise assessed in the field, by either an architect or engineer. In certain instances the observation is indirect--that is, it is based on professional knowledge of conditions and performance of such systems, modified by whatever data (either inferred or provided) is available at the development from the escort, repair logs, and so forth.

The term "action level" refers to the level or nature of repair required to restore the system to its original condition. For each Observable System, the inspector will choose among five action levels, each of which has a specific set of modernization activities associated with it. The five levels of FIX activity are:

(1) No action required
(2) Minor action required
(3) Moderate action required
(4) Major action required
(5) Replacement required

The Observable System concept is specifically designed for capital budgeting purposes. Rather than prepare a "work item list," the observations

Exhibit 5-6

List of Observable Systems

ARCHITECTURAL SYSTEMS

1. Foundations
2. Stairs
3. Exterior Closure
4. Exterior Common Doors
5. Storm/Screen Doors
6. Windows
7. Storm/Screen Windows
8. Window Security
9. Canopies
10. Parapet Wall
11. Fire Escapes
12. Railings
13. Appurtenant Structures
14. Roof Structure
15. Roof Covering
16. Ceilings, Soffits
17. Roof Drainage
18. Chimneys
19. Matches/Skylights
20. Penthouses
21. Walls
22. Ceilings
23. Unit Interior Doors
24. Floor Finish
25. Interior Construction
26. Radiation
27. Local HVAC Unit or Wood Stove
28. Air Terminals
29. Temperature Controls
30. Dwelling Unit Electrical
31. Building Lighting
32. Signalling/Communications/Security
33. Master TV Distribution
34. Fire/Smoke Detection
35. Kitchen Cabinets/Sink
36. Kitchen Stoves
37. Kitchen Refrigerators
38. Bathroom Fixtures
39. Bathroom Accessories
40. Laundry Facilities
41. Mail Facilities
42. Compactor
43. Incinerators
44. Management Office Equipment Package
45. Maintenance Facilities Equipment Package
46. Earthwork
47. Roadways
48. Parking
49. Pedestrian Paving
50. Retaining Walls
51. Soft Site Development
52. Site-Wide, Free Standing Structures (exterior)
53. Waterproofing
54. Slab
55. Wood Frame

MECHANICAL/ELECTRICAL SYSTEMS

56. Elevator/Shaft and Doorways
57. Elevator/Cab
58. Elevator
59. Fuel Oil Storage
60. Fuel Oil Transfer System
61. Purchased Steam Supply Station
62. Solid Fuel Storage and Conveyance
63. Bottled Gas System
64. Heat Exchanger for Space Heating
65. Boilers/Hydronic Packaged Unit
66. Hot Air Furnace System
67. Flue Exhaust System
68. Combustion Air System
69. Boiler Room Piping
70. Boiler Room Pipe Insulation
71. Plant Hot Water Circulation
72. Blowdown and Water Treatment
73. Condensate and Feedwater System
74. Central Space Temperature Control
75. Building Heating Zone Valve
76. Building Heating Risers and Distribution
77. Ventilation and Exhaust System
78. Air Conditioning
79. Gas Supply Station
80. Building Gas Distribution
81. Domestic Hot Water Generation
82. Building Domestic Hot and Cold Water Distribution
83. Domestic Cold Water Supply Station
84. Sewage Ejectors
85. Sump Pumps
86. Building Sanitary Waste and Vent Distribution
87. Fire Pumps
88. Fire Suppression System
89. Smoke and Ventilation Control
90. Power Transformer Station
91. Electric Distribution Center
92. Building Power Wiring
93. Emergency Lights and Power
94. Site Heating Distribution
95. Site Gas Distribution
96. Site Domestic Cold Water Distribution
97. Site Domestic Hot Water Distribution
98. Well Water System
99. Site Power Distribution, Wiring
100. Site Sanitary
101. Water Tank

define action levels which, in turn, link to costs. These final costs create a budget range adequate to do work at the action level needed, including variations of specific work tasks which might occur at the observed level and given the variations in materials and structure types. Note again that this study focuses only on capital improvement work items and not on work items typically taken care of as routine maintenance via the PHA's operating budget.

The 101 observable systems are nested within ten major systems that reflect the major components of a building or development: foundation, exterior closure, roofing, mechanical, and so on. Further, the systems are clustered into those used on the study's architectural inspection forms, and those used on engineering inspection forms.

Exhibit 5-7 presents the Observable Systems concept. Each observable system is numbered and named. Sub-systems are defined within each observable system when there is a identifiable cost difference between types (materials, fuel source, etc.) or sizes. The observations are generic to all sub-systems, as a basis for establishing the action level necessary for remedy. The cost variations occur as a result of the range of necessary sub-systems.

Exhibit 5-8 presents Observable System 23--Unit Interior Doors. There are four types of doors. Note that type #1 includes both wood solid and metal doors. Since they have similar costs, these two types need not be differentiated for capital budget purposes. Action at the MINOR level for this system was determined to be, by both description and cost, in the maintenance category and therefore has no capital improvements action level (and cost) associated with it. For example, a broken lock is normally a maintenance rather than a capital item. The other three levels of action have an associated set of generic observations which would prompt action at each level. The action levels in turn have a set of general descriptions of the sort of action involved. The associated costs reflect the degree of action needed to remedy such conditions for each door type. Note that for many other systems, minor repairs are regarded as capital costs.

Exhibit 5-9 presents the cost file with the three action levels for Type #1--Interior Doors. The pricing unit for interior doors is "Each." (Other systems have appropriate pricing units--square feet and so on.) After

Exhibit 5-7

Observable System Concept

(#) OBSERVABLE SYSTEM NAME
Materials/Components: a.
b.
c.
d.
e.

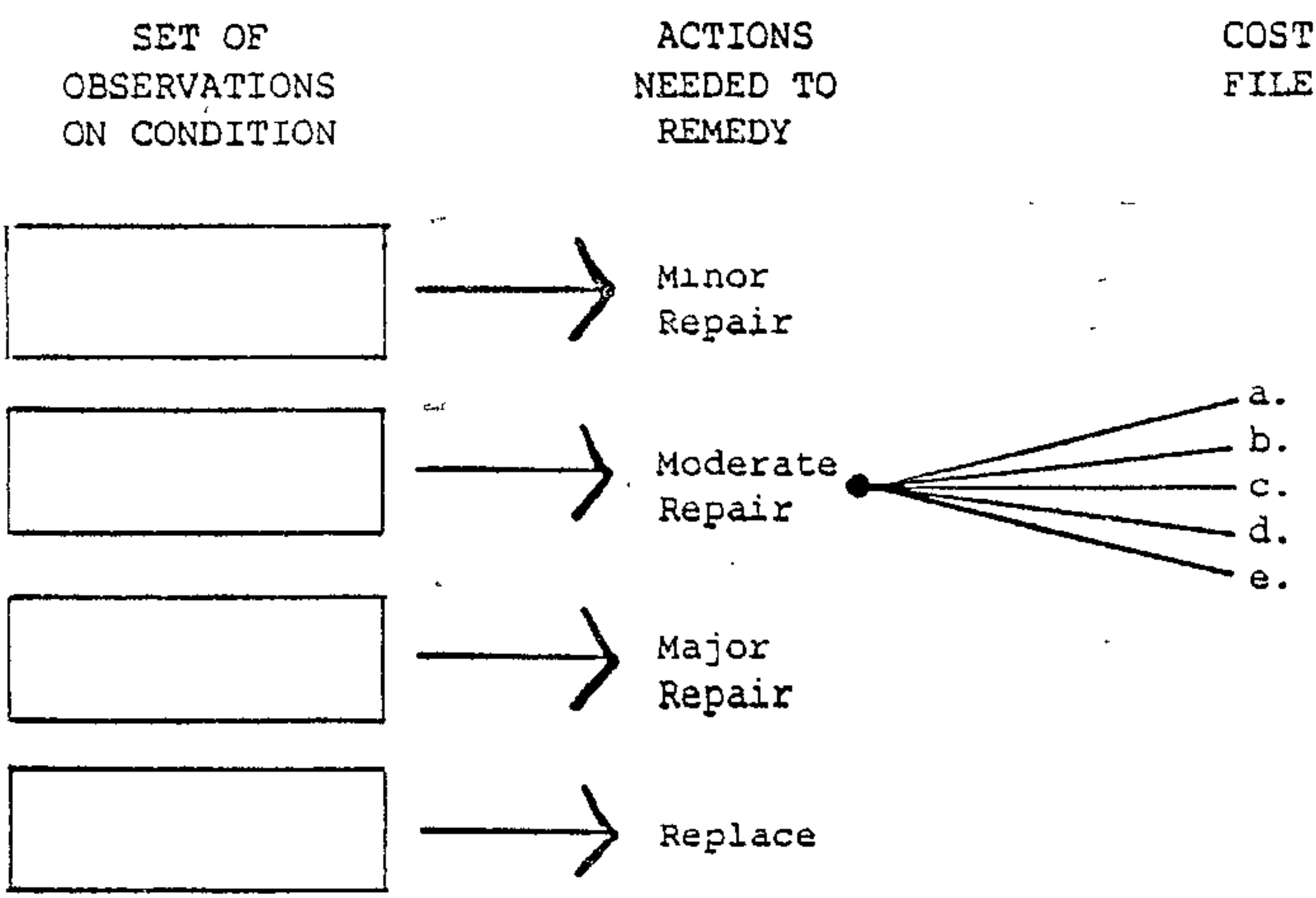


Exhibit 5-8

Observable System 23 -- Unit Interior Doors

23

Unit = Each

(23) OBSERVABLE SYSTEM: UNIT INTERIOR DOORS

Types:
1= Wood Solid Core/Metal
2= Wood Hollow Core
3= Extra-Wide Closet
4= Sliding Glass

OBSERVATIONS	ACTION LEVEL	ACTIONS
NA	MINOR	NA
Door intact but ajar in frame; some hardware damaged or missing.	MODERATE	Replace hardware and rehang door.
Door has lost its integrity as a result of fire or water damage, vandalism, or deterioration (buckling, holes, cracks, surface scars). Jamb intact.	MAJOR	Replace hardware and door (frame is retained); paint wood doors.
Jamb has lost its integrity--broken, warped, deteriorated, buckled, etc.	REPLACE	Replace frame, door and hardware; paint wood doors.

Exhibit 5-9

Cost Files Associated with Type #1--Interior Doors

SUB SYSTEM#: 60 023 010 2

INTERIOR DOORS - WOOD SOLID, METAL - MODERATE

	FACTOR:	MATERIAL	INSTALL	TOTAL
	4.000	17.24	35 42	52 67

LINE ITEMS FOLLOW:

		QUANTITY	MATERIAL	INSTALL	TOTAL
010 900 0100	REMOVE, REPAIR, REINSTALL DOOR	0.126	0 00	32 14	32 14
087 340 1510	SPCIAL HNGE.NON TEMPLATE FULL MORTISE-AVG	1.500	35.31	0.00	35.31
087 400 1720	LOCKSET,RESIDNTL,INTERIOR DOOR, MAX	1.000	27.07	31 28	58 35
098 170 2400	DOOR&WINDOW,PANL DOOR/FRM PER SIDE OIL BS	2.000	6.61	78.28	84.89

SUB SYSTEM#: 60 023 010 3

INTERIOR DOORS - WOOD SOLID, METAL - MAJOR

	FACTOR:	MATERIAL	INSTALL	TOTAL
	1.250	55.19	138.67	193.86

LINE ITEMS FOLLOW:

		QUANTITY	MATERIAL	INSTALL	TOTAL
010 900 0100	REMOVE, REPAIR, REINSTALL DOOR	0.250	0 00	63.78	63 78
087 340 1510	SPCIAL.HNGE.NON TEMPLATE FULL MORTISE-AVG	1.500	35.31	0 00	35 31
087 400 1720	LOCKSET,RESIDNTL,INTERIOR DOOR, MAX	1.000	27.07	31.28	58 35
098 170 2400	DOOR&WINDW,PANL DOOR/FRM PER SIDE OIL BS	2.000	6 61	78 28	84 89
081 210 1060	COMRCL.ST DOOR,FLUSH HOLLW.CORE,1-3/4" T,	1.000	0.00	0 00	0 00
081 100 0100	STEEL FRANCS, KNOCK DOWN, 7'-0" HIGH, 3'-	1.000	0.00	0.00	0.00

SUB SYSTEM#: 60 023 010 4

INTERIOR DOORS - WOOD SOLID, METAL - REPLACE

	FACTOR:	MATERIAL	INSTALL	TOTAL
	1.500	179.38	142.17	321.55

LINE ITEMS FOLLOW:

		QUANTITY	MATERIAL	INSTALL	TOTAL
010 900 0100	REMOVE DOOR & FRAME	0 163	0.00	41 58	41 58
087 340 1510	SPCIAL HNGE NON TEMPLATE FULL MORTISE-AVG	1.500	35.31	0 00	35 31
087 400 1720	LOCKSET,RESIDNTL,INTERIOR DOOR, MAX	1.000	27.07	31 28	58.35
098 170 2400	DOOR&WINDW,PANL DOOR/FRM PER SIDE OIL BS	2.000	6.61	78.28	84 89
081 210 1060	COMRCL.ST DOOR,FLUSH HOLLW.CORE,1-3/4" T,	1.000	147.12	29.97	177 09
081 100 0100	STEEL FRANCS, KNOCK DOWN, 7'-0" HIGH, 3'-	1 000	52.96	32.15	85.11

costs are estimated the estimation procedures then account for variations in local wage rates, using price adjusters from the R.S. Means Co., a nationally recognized construction cost estimating firm.

The capital budget for Interior Doors would be generated in the following fashion:

1. Inspector observes an Interior Door. The door "has lost its integrity;" it has holes and cracks but the frame is in good condition.

2. The inspector enters "Major" repair as the action level on the appropriate inspection form.

3. The inspection form data is entered into the appropriate file. A cost of $193.86 is generated as the budget level for this level of action on this door type. Totals of individual line items do not always equal the total cost because they have been adjusted by R.S. Means using actual bid results to produce a best final estimate of actual total costs, based on bid results.

The same process is repeated for each Observable System present in each dwelling unit, building, and site inspected.

The inspection process was identical at all of the 1,000 sampled developments. Our specially-trained architects and engineers first inspected the entire site. Some number of sampled buildings were then inspected, with the number dependent on the size of the development, and the range of building types at that project. Other facilities were rated and their required action levels noted on the appropriate inspection booklet. Finally, a sample of dwelling units were inspected, using similar procedures.

Inspection Forms

There were a total of ten different inspection forms used for the FIX data collection effort:

For Use by the Architects Only

- Dwelling Unit (DU)

- Building Architectural (BA)
- Single Family Detached/Attached (SFD/A)
- Single Building Project Architectural (SBA)
- Site Surface (SS)
- Site Wide Facilities (SWF)

For use primarily by the Engineers, and occasionally by the Architects at smaller, less complex projects.

- Building Mechanical and Electrical (BME)
- Central Electrical Room (CER)
- Central Mechanical Room (CMR)
- Site Mechanical and Electrical (SME)

Exhibit 5-10 indicates the types of PHA projects at which these forms generally were used. The ten inspection booklets for collection of field data were developed from these systems and actions. The inspection instruments allow the inspectors to record their evaluation of condition by indicating which of five ordinal categories most accurately describes the nature of the improvement needed. Each action level for each system is associated with a specific cost. These costs, based on restoring the system to contemporary standards, have been developed by Abt Associates and its subcontractors in conjunction with the R.S. Means Co.

In Exhibit 5-11, illustrative pages from the inspection booklets used to gather modernization needs data on <u>building</u> level locations--Building Corridors, and Building Roofs--are presented. Note that in this exhibit it can be seen that not all Observable Systems used all five levels of possible modernization--for instance, for OS22 on the exhibit, Ceilings, the "Major Repair" category is not an allowable code. The operational definition of various action levels was predicated on differences in capital repair costs: if there was little or no difference between adjacent modernization cost levels, that particular action level was excluded.

Exhibit 5-10

Examples of Project Types and Applicable Inspection Forms

	ARCHITECTURAL						ENGINEERING			
PROJECT TYPES	DU	BA	SFD/A	SBA	SS	SWF	BME	CMR	CER	SME
1. Single high-rise structure for the elderly	*			1	1		1			1
2. Attached townhouses/duplexes with unit-level M&E systems on a single parcel of land	*		*		1	1				1
3. Individual single family houses on scattered sites	*		*		*	1				*
4. Multi-family walk-up apartments with a central boiler plant	*	*			1	1	*	1	*	1
5. Private-entry units clustered in several buildings on a single site; central boiler plant with heat exchangers in the basement of each building	*		*		1	1		1		1

*Multiple forms required depending on specific sample

Exhibit 5-11

Illustrative Recording Forms for the-FIX Inspection

Location: BUILDING CORRIDORS

1-5/
6-7/04
8-9/
10-12/232

Is this location present? Yes ☐

Floor # ____________ No ☐ -> SKIP TO NEXT PAGE.

13-14/	15-17/		Present? Yes 27/1	Present? No 2	No Action 28/0	Minor Repair 1	Mod Repair 2	Major Repair 3	Replace 4	Unobsv. Cond.
01	(021) Walls	Partition 18/____ Surface 19/____	☐		☐	☐	☐	☐	☐	
02	(022) Ceilings	Type 18/___	☐		☐	☐	☐		☐	
03	(024) Floors	Type 18/___	☐		☐	☐	☐	☐	☐	
04	(012) Railings	18/ 3	☐	☐	☐	☐	☐	☐	☐	
05	(006) Windows .... #1	Size 18/____	☐	☐	☐				☐	
06	(006) #2	18/____	☐	☐	☐				☐	
07	(006) #3	18/____	☐	☐	☐				☐	

Location: BUILDING ROOF

1-5/
6-7/05
8-9/
10-12/422

Is this location present? Yes ☐

13-14/	15-17/		Present? Yes 27/1	Present? No 2	No Action 28/0	Minor Repair 1	Mod Repair 2	Major Repair 3	Replace 4	IF 0,1: Age 32-33/	IF 0,1: Old Age 34-35/	Unobsv. Cond.
01	(014) Roof Structure	Type 18/___	☐	☐	☐				___% 29-31/			
02	(015) Roof Coverings	Type 18-19/___	☐	☐	☐		☐	☐	☐	____	____	
03	(017) Roof Drainage	Type 18/___	☐	☐	☐			☐	☐			
04	(018) Chimney	#1	☐	☐	☐	☐			☐			
05	(018)	#2	☐	☐	☐	☐			☐			
06	(018)	#3	☐	☐	☐	☐			☐			

5.3 DEVELOPING THE MODERNIZATION ESTIMATES

Once the field data collection process was completed, the study focused on calculating the actual estimates of PHA modernization needs. Conceptually, the process is relatively straightforward, involving three principal steps:

1. Cost File Linkage. Each field observed condition of an architectural or mechanical system requiring a modernization action (minor, moderate, major, or replace) must be computer linked to the appropriate cost file and calculation algorithm in order to calculate the initial raw cost involved. These costs are identified as either site, building, or dwelling unit related.

2. Calculation of Adjusted Costs. Once the raw costs for each such system in a development are calculated and summed in terms of site, buildings, and dwelling unit costs for the HUD Field Office of which they are a part, these raw costs must be adjusted to reflect:

   - typical builder overhead and profit margins;
   - regional construction cost variations; and
   - inflation in construction costs over time.

3. Weighting the Adjusted Costs to Develop Final Modernization Estimates. Finally, once the adjusted costs are available, the individual site, building and dwelling unit costs are precisely linked to their counterparts in the sampling plan. That is, each "location"--site, building and dwelling unit--sampled for inspection has a distinct weight value to reflect its relative position in the overall sample. Once the adjusted cost for that location has been calculated, it is statistically manipulated using its associated weight to determine national, regional, and field office cost estimates.

VI. ADDs COST ESTIMATE

6.1 SUMMARY OF THE ADDs COST ESTIMATES

This component of the study was developed to identify potential additions and upgrades. Special ADDs Catalogs and ADDs Forms containing detailed information on a "menu" of more than 150 different additions and upgrades that might be needed at a development, were mailed in advance to each sampled PHA. The working definition of ADDs is:

> To add, upgrade, or change existing features in order to modernize the quality of existing developments; to enhance long-term viability; or to achieve other specific standards, including standards mandated by law, local codes, or HUD regulations.

At the close of the inspection visit at a sampled PHA development, the inspection team reviewed the PHA's ADD requests for the project, based upon PHA's selections from the special catalog. The review enabled the inspector to answer questions and to provide a "second opinion" on the extent to which the request seemed warranted in the light of the inspector's observation at the particular development and his experience.

Based on the inspector's second opinion (ISO) rating, the PHA's reason for the requested ADD, and the nature of the ADD, each item was classified into one of twenty-three types of ADDs, each of which has a separate cost estimate. The costs of individual ADDs are based on the cost estimation process described in Sections 5.3 above and 6.4. The ISOs, explained in more detail in Section 6.3, give the relative appropriateness of the ADDs. Exhibit 6-1 presents the national estimates. A discussion of estimates by region and by type of ADD is presented in Section 6.5.

Exhibit 6-1
Estimated ADDs Cost, by Cost Category

Cost Category	Estimate ($millions)	Percent of Total	95 Percent Confidence Interval ($millions)
ADDs Required by Code or Modernization Standards*			
ISO=1	389.4	3.01	93.1
ISO=2	491.6	3.80	192.3
ISO=3	408.3	3.15	439.9
ISO=4	170.3	1.32	214.1
ISO=5	105.7	0.82	162.2
	1,565.3	12.10	
Project Specific ADDs			
ISO=1	2,675.2	20.66	383.3
ISO=2	2,795.6	21.59	340.9
ISO=3	2,028.1	15.66	427.7
ISO=4	1,211.9	9.36	553.9
ISO=5	584.1	4.51	235.2
	9,294.9	71.78	
Energy ADDs**			
ISO=1	780.8	6.03	131.4
ISO=2	305.4	2.36	76.5
ISO=3	149.5	1.15	42.5
ISO=4	74.9	0.58	41.7
ISO=5	84.2	0.65	52.4
	1,394.8	10.77	
Handicapped Accessibility ADDs**			
ISO=1	17.0	0.13	12.1
ISO=2	37.7	0.29	28.3
ISO=3	5.2	0.04	3.1
ISO=4	3.8	0.03	5.5
ISO=5	1.5	0.01	1.3
	65.2	0.50	
Other Categories			
No ISO	515.4	3.98	149.3
Other (Not in ADDs Catalog)	6.1	0.05	6.2
Currently prohibited by HUD	104.8	0.81	61.9
	626.3	4.84	
TOTALS	12,946.5	100%	

* Mod Standards consist of items required for health and safety or systems integrity.

** Energy Conservation and Handicapped ADDs overlap the findings of the Energy Conservation Study and Handicapped Estimate.

6.2 THE ADDs DATA COLLECTION

The ADDs cost estimate is based on data collected from local PHA managers about additions and upgrades that they identified for their projects. The PHAs filled out a data instrument called the ADDs Form, and each item was classified by the Abt inspectors in level of appropriateness (see Section 6.3). Each item was then costed using computerized cost files developed in conjunction with R.S. Means.

The 150 potential additions and upgrades included a variety of types of potential needs, as shown in Exhibit 6-2.

Exhibit 6-2
Examples of ADDs and ADDs Justifications

Purpose of ADD	Example
Building Integrity	#011, Add gutter and leader system
Fire safety	#057, Add fire alarm system
Security	#003, Add heavy duty lockset to exterior door
Energy Conservation	#017, Add storm windows
Handicapped accessibility	#075, Add interior railings
Sanitation	#136, Increase sanitary pipe capacity
Tenant convenience	#521, Add/increase laundry facilities
Meet needs of families	#184, Add playgrounds
Increase durability	#019, Change windows to non-breakable material
Project viability	#154, Add/increase community center
Decrease maintenance costs	#072, Change floor finish in lobby

Illustrative parts of the ADDs Form is presented as Exhibit 6-3. Note that on the recording form, the PHA was asked to indicate their justification for each addition, upgrade, or other change. Many of the items are required by the HUD Modernization Standards Handbook or by local code. Depending upon their rationale for a particular ADD, one or more other following justification codes was to be recorded in the spaces provided:

Exhibit 6-3

Illustrative Page from the ADDs Form

13-14/

CHECK IF NEEDED	Fire Fighting Equipment/Systems	Type of Materials or Quantities At This Development	JUSTIFICATION* Main	JUSTIFICATION* Other	For Office Use
[ ]	053 Add fire extinguishers 15-18/ 19-22/B	# of fire extinguishers # [ ] 23-27/	[ ] 28-29/	[ ] 30-31/	[ ] 32/
[ ]	054 Add fire pumps 15-18/ 19-22/B	All Bldgs. or # Bldgs. [ ] [ ] 23-27/	[ ] 28-29/	[ ] 30-31/	[ ] 32/
[ ]	055 Add sprinkler/standpipe system 15-18/ 19-22/B	All Bldgs. or # Bldgs. [ ] [ ] 23-27/	[ ] 28-29/	[ ] 30-31/	[ ] 32/
[ ]	056 Add standpipe system 15-18/ 19-22/B	All Bldgs. or # Bldgs. [ ] [ ] 23-27/	[ ] 28-29/	[ ] 30-31/	[ ] 32/
	Fire/Smoke Alarms				
[ ]	057 Add fire alarm system 15-18/ 19-22/B	All Bldgs. or # Bldgs. [ ] [ ] 23-27/	[ ] 28-29/	[ ] 30-31/	[ ] 32/
[ ]	058 Add smoke detectors in common areas 15-18/ 19-22/B	# of smoke detectors # [ ] 23-27/	[ ] 28-29/	[ ] 30-31/	[ ] 32/
	Other Fire Safety				
[ ]	059 Add smoke and ventilation controls 15-18/ 19-22/B	All Bldgs. or # Bldgs. [ ] [ ] 23-27/	[ ] 28-29/	[ ] 30-31/	[ ] 32/
[ ]	060 Add smoke hatches 15-18/ 19-22/B	# of smoke hatches # [ ] 23-27/	[ ] 28-29/	[ ] 30-31/	[ ] 32/
	Signalling/Communications				
[ ]	061 Add Signalling/ communications 15-18/ — Communication System Code F* [ ] 19-22/	All Bldgs. or # Bldgs. [ ] [ ] 23-27/	[ ] 28-29/	[ ] 30-31/	[ ] 32/
	Window Security				
[ ]	062 Add security devices to windows 15-18/ — Device to be used: Used: Code J* [ ] 19-22/	# needed [ ] 23-27/	[ ] 28-29/	[ ] 30-31/	[ ] 32/
[ ]	063 Block-up basement windows for security 15-18/ 19-22/B	# windows to be blocked blocked up # [ ] 23-27/	[ ] 28-29/	[ ] 30-31/	[ ] 32/
[ ]	064 Add child guards 15-18/ 19-22/B	# of child guards # [ ] 23-27/	[ ] 28-29/	[ ] 30-31/	[ ] 32/

*See last page for code categories to be used.

01	=	Reduce the need for maintenance/increase durability
02	=	Improve security
03	=	Comply with local or state codes
04	=	Other health and safety reasons
05	=	Comply with HUD Modernization Standards
06	=	Reduce vandalism/tenant abuse
07	=	Energy conservation
08	=	Maintain or increase occupancy
09	=	For accessibility by the handicapped
10	=	Meet needs or requests of elderly occupants
11	=	Meet needs or requests of large family occupants
12	=	Convenience/lack of availability in the neighborhood
13	=	Faulty original design/construction
14	=	Obsolete system/materials; replacement parts unavailable
15	=	Other ____________________

The other entries listed on the ADDs Form were specific to the particular items being proposed by the PHA and were necessary for costing purposes. Each PHA was mailed an instructional booklet--called the ADDs Catalog--that provided step-by-step directions on the completion of the form. Exhibit 6-4 presents a page from the booklet illustrating how to complete the various entries on the ADDs Form.

The ADDs Form was reviewed at two different times: first, the form was reviewed for completeness (and any corrections or clarifications noted) before the inspections began; then, after the development was inspected, the inspectors again reviewed the form and gave their second opinion concerning the appropriateness of the PHA's proposed changes, additions, and upgrades. Both architect and engineer had responsibilities for reviewing the ADDs Form--the architect for the architectural systems, the engineer for the M&E systems.

6.3 GUIDELINES FOR GIVING A SECOND OPINION

Inspector's professional opinions of the appropriateness of the ADDs items took into account everything they learned about the project--whether from the Project Characteristic Form, conversations with PHA personnel, information that may have been gathered from the escort during the inspections,

Exhibit 6-4

Illustrative Instructions on Completing Entries on the ADDs Form

Example #1

As part of the modernization work needed at this development you need to install an upgraded intercom and buzzer system between the lobby and apartments in your five high-rise buildings (but not needed at the townhouse-type buildings).

Step #1: Locate the appropriate listing by:

a. looking at the various listings in the "FIRE SAFETY/SECURITY" section of the Catalog listings, until you find "Add signalling/-communications" (Listing 061);

OR

b. referring to the index at the end of the catalog under "intercom", "signalling equipment", or "communications".

Step #2: Turn to Listing 061 on page 7 of the ADDs Form, and complete that listing.

				JUSTIFICATION*		For Office Use
				Main	Other	
[X]	061 Add signalling/ communications	All Bldgs [ ] or # Bldgs 005	Communications system Type Code F 01	02	03	[ ]

Leave This Blank

Step #3: Check this box to indicate you need this item.

Step #4: If your ADDs need is applicable to all your residential buildings at the development, you simply check the box "All Bldgs." In this case, you record "005" since this item applies only to your five high-rise buildings, not to the row-house type buildings (which have individual exterior entries to each dwelling unit).

Step #5: Refer to Code F on the inside back cover of the ADDs Form. In this case, code "01" means that you feel that an "intercom & buzzer" system is the most appropriate kind of system for your high-rise buildings.

Step #6: Main Justification for this kind of mod work is code "02", "Improve Security". Refer to the inside back cover of the ADDs Form for a complete listing of all the Justification Codes. If you fill out a listing, you must record your main justification for why that item is needed.

Step #7: Other Factor justifying this ADDs need is entered here, using the same set of justification codes. In this case, the one other reason justifying this need is code "03", "Comply with local or state codes."

observations during inspections, and so forth. Visual evidence of the need for certain changes, additions, and upgrades was, of course, the strongest corroboration for the item listed by the PHA. However, visual evidence may not always be present, and the inspectors might have to use several pieces of information in trying to determine the appropriateness of an ADDs item that was indicated by the PHA.

In illustration, a request to change glazed windows to a non-breakable material (Item 019) may be readily evident by observing many cracked or broken windows. However, none of the windows may be broken because the PHA is constantly replacing them, and their request for this change is to reduce maintenance costs; in such a situation, the inspectors would have to ask the escort about the need for changing glazed windows to a non-breakable material, and the second opinion rating would, thus, be based not only on direct observations at the development but also on the additional information provided by the escort.

Inspectors were alerted to the potential confusion of PHAs/IHAs between FIX and ADD when reviewing the ADDs Form. Although the ADDs Catalog and information flyer sent to the PHA attempted to clarify the distinction between FIX and ADD, there undoubtedly would be some confusion where the PHA used the ADDs Form to indicate needed repairs, renovations and replacements of systems/equipment that were already present at the development. Thus, there might be requests for "Add Storm/Screen Windows," when, in fact, the PHA really wanted to replace the present storm/screen windows because they were at the end of their normal useful lives. In this instance a nonconcurrence would be noted, unless the justification involved premature upgrade. ADD items filled out on the forms that were confused with FIX received a second opinion rating indicating that the ADD was not needed because the needed replacement was already found and budgeted for in the FIX estiamte.

Inspectors also assessed the feasibility of ADD items (these are the ISOs). For example, adding roof insulation was only feasible at buildings with pitched roofs (Observable System #15, Types 5-10); pitched roofs can only be added to buildings with flat roofs. The addition of parking or playgrounds was dependent on the availability of PHA-owned land and so forth. Examples of the use of the ISO ratings can be seen in Exhibit 6-5. The ISOs varied according to locality and project characteristics. For example, add #062, add

Exhibit 6-5

Examples of the Use of ISO Codes

ISO 1 Examples

ADD #	ITEM	REASON
020	Install showers in bathtubs	Improved sanitation
012	Add roof insulation	Energy Conservation
070x	Remove or cover hazardous asbestos insulation on ceiling	Health and Safety
117	Full upgrade of electric service	Solve brown outs/safety
016	Install energy efficient windows	Energy Conservation
131x	Add cathodic protection to water distribution system	extend life of existing distribution system
063	block up basement windows	Security
179	Add drain to parking areas	Solve drainage problem

ISO 2 Examples

034	Add washer/dryer laundry hookups	Would be useful and increase tenant convenience, but common facilities available elsewhere.
173	Add landscaping	Marginal landscaping on site, more would add to site viability
038	Change bedroom floor finish	Present finish has persistent maintenance problems.
103	Add exhaust fans in kitchens	Present ventilation marginal
027	Add self-contained radiator valves	Increases energy conservation

ISO 3 Examples

073	Change floor finish in corridor	Present finish looked shabby but functional, couldn't tell if change was needed.
035	Add closet space inside DUs	Present storage seemed ok.
021	Add bathroom vanities	Current storage ok
183	Add walls along streets to protect pedestrians	Walls needed but not possible due to lack of space on site.

Exhibit 6-5 (continued)

Examples of the Use of ISO Codes

095	Change type of elevator door	Current doors functional, although they are beaten up.
029	Change or upgrade kitchen cabinet	Current cabinets ok, although shabby in appearance.

<u>ISO 4 Examples</u>

010	Change exterior wall materials	Present wall ok, request access for aesthetic reasons only
138	Add water conditioning equipment	PHA in hard water area butno an excessive problem.
175	Add carports	Present parking lot adequate but exposed
030	Change/upgrade kitchen stoves	Present stoves appear functional
065	Add video surveillance	Low crime area; can see entrance from office
037	Construct exterior storage shed for each unit	Present storage is adequate

<u>ISO 5 Examples</u>

031	Change/upgrade kitchen refrigerators	Present refrigerators are very good, request is excessive.
171	Add fencing to define private yards	Present yards in excellent condition.
028	Add cabinets and counter space in kitchens	Present storage is quite adequate and in good condition.
062	Add window security devices	Low crime area, unneeded.
116	Add master TV distribution	Present reception good within dwelling units.

window security devices was coded #1 (clear evidence of need) in several Northeast urban projects, but coded #5 (clear evidence that items is not needed) in a small town PHA with a low crime rate.

Inspectors used one of five codes to indicate their professional opinions as to the appropriateness of the ADDs items recorded by the PHA:

1	=	Definitely Appropriate; clear evidence of need
2	=	Probably Appropriate; some evidence of need
3	=	No Second Opinion; unable to determine appropriateness; insufficient information; no information pro or con
4	=	Probably Inappropriate; some evidence that item is not needed
5	=	Definitely Inappropriate; clear evidence that item is not needed.

After the ADDs forms were returned to the search staff for computer processing, the ADDs were divided into 23 separate categories based on program needs. This typology, dubbed the "crosswalk," took into account the inspector's second opinion, the justification of the PHA in listing the item, and the nature of the item requested. The categories and their meanings are explained here:

1. <u>ADDs Required by Local Code or Modernization Standards (Required ADDs)</u>. These are items that are identified by the PHAs as required at all projects under the HUD public housing modernization standards handbook. Since the handbook requires PHAs to meet local codes, most of these items are included here because the PHA has noted the item as code required its main justification. There are also a few items that are required in order to preserve building integrity, health, and safety, such as roof drainage gutters, chimney flue liners, emergency lights, and enclosure walls for refuse.

   The inspectors agreed with the need for most of these items. However, some of these ADDs were rated low by the inspectors. In some cases, the current condition of the building was good, and no additions to preserve building integrity were needed. For example, it would be unnecessary to add a gutter and leader system to a roof if existing drainage was good. In other cases, inspectors disagreed with the need for items that were identified as code required, either because the PHA made an error in its justification, or because the inspector disagreed with the need for the items even though it was code required. Of all the items coded as "Definitely inappropriate," 86 percent were found in one small field office that had an extremely high ADDs budget request. Thus, most of the ADDs items rated very low are concentrated in only a few PHAs.

2. Project Specific ADDs. The HUD Modernization Standards Handbook allows PHAs to list items that are not on the required list when justified by the conditions at the individual project. Project specific work is necessary or highly desirable for the long-term viability of a particular project. For example, additional security is needed at some projects in high crime areas while it is unnecessary at other projects. Specific vandalism or maintenance problems may call for the use of especially sturdy materials to reduce operating costs. Marketing problems and tenant needs may require other items.

3. Energy Conservation ADDs. These ADDs are items that have clear energy conservation purposes, such as adding insulation, storm windows, and flue heat exchangers. As has been indicated, it is expected that the Energy ADDs overlap with the findings of the Energy Study described in detail in Chapter 8. Since the estimates from the Energy analysis are based on state-of-the-art procedures for determining costs and savings (including careful consideration of modernization undertaken as a result of the FIX inspection), they are regarded as more accurate.

4. Handicapped Accessibility ADDs. These are items that were justified by the PHA for the purpose of accessibility for the handicapped.

5. Supplemental ADDs.

A. No ISO. These are ADDs for which there is no ISO recorded. In some cases the inspector simply neglected to complete the form, while in other cases the forms were mailed in to Abt after the inspector had left the project and it was impossible to conclude whether or not the item was appropriate.

B. Other. These are ADDs that were not listed on the inspection form, but which PHAs wrote in on the form. The cost estimates were prepared by hand.

C. Currently Prohibited ADDs. These are items that the HUD program handbook has on a list of items that are currently prohibited, such as garages, swimming pools, dishwashers, and individual unit trash compactors.

6.4 USE OF COST FILES FOR ADDs

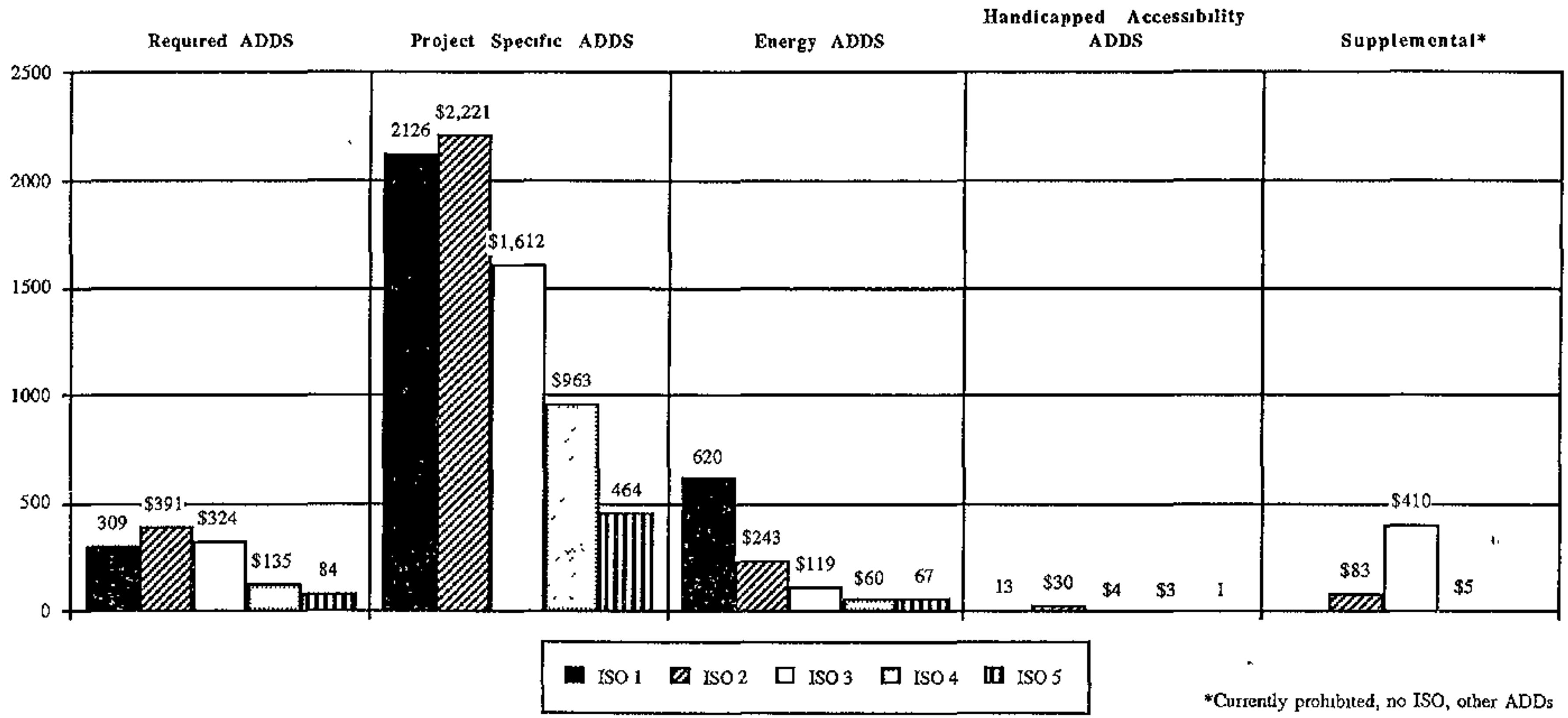
In the computerized calculation of costs associated with requested ADDs, a program feature was developed to "net out" any ADD that may be requested if the FIX inspection has already called for the same action. Thus, the cost estimate for a PHA request for an upgrade of a development's heating plant (ADD #146) would be reduced by the FIX amount if the FIX inspection had called for repair of the same facility, since this action by definition would be in accordance with contemporary standards of heating plant design. This netting out is an important safeguard against double counting capital needs and thereby introducing an upward bias into the modernization estimates.

Each ADD item was costed using cost files developed in conjunction with the R.S. Means Company, a nationwide cost engineering firm. The cost programs were applied in a way analogous to those used in the FIX cost files.

6.5 ANALYSIS OF ADDs ESTIMATE

Exhibit 6-1 presented estimates of total ADDs costs by category and ISO. Average per unit costs for these groups are shown in Exhibit 6-6. One interesting aspect of the ADDs estimates is the dominance of project specific ADDs: for all ISO categories project specific ADDs considerably exceed the other categories. ADDs required by local code or universally required by HUD

Exhibit 6.6
Per Unit ADDS Costs
by Component by ISO



*Currently prohibited, no ISO, other ADDs and energy conservation Adds are also important categories. However, relatively few requests were made for handicapped accessibility ADDs or for the miscellaneous categories of ADDs.

Total ADDs costs for any combination of categories and ISOs can be obtained from adding the individual components in Exhibit 6-1. Similarly, average per unit costs can be obtained by adding the desired components in Exhibit 6-6. Indeed, the overview of modernization costs presented in the introduction, indicated average per unit costs by category for ISOs 1 and 2, $700 for Required ADDs, $4,347 for Project Specific, $863 for Energy ADDs, and $43 for Handicapped ADDs.

Exhibit 6-7 provides the regional distribution for these groups of ADDs. Other totals can be calculated using data in Appendix I. As for FIX costs, there is considerable variation in the distribution of ADDs costs by region relative to the size of the region. Regions I, III, and IV identified a relatively large share while Region VII identified a relatively smaller amount.

Finally, Exhibit 6-8 lists the most frequently requested ADDs. Clearly ADDs requests cover numerous aspects of building, unit, and site needs and represent a wide variety of justifications.

Exhibit 6-7
ADDs Components by Region
($ millions) (ISO 1 and 2) (% of column total)

ADDs Component / Region	(1) MANDATORY ADDs (ISO 1,2)	(2) PROJECT SPECIFIC ADDs (ISO 1,2)	(3) ENERGY ADDs (ISO 1,2)	(4) HANDICAPPED ADDs (ISO 1,2)	(5) TOTAL (1) to (4)	(6) TOTAL ADDS All Categories ($ millions) & all ISOs	(7) % of Total Units	(8) Ratio of Percentage in Column (6) to Column (7)
I	$76.7	$467.4	$51.8	$1.55	$597.5	$923.8		
	8.7%	8.5%	4.8%	2.8%	8.0%	7.2%	5.88	1.22
II	257.7	1,734.6	271.8	10.3	2,274.4	2,868.5		
	29.3	31.8	25.0	18.7	30.3	22.6	23.44	.964
III	110.49	567.9	137.1	4.8	820.2	1,787.6		
	12.5	10.4	12.9	8.7%	10.9	13.8	11.71	1.178
IV	128.3	838.3.0	161.1	10.02	1,137.7	2,104.1		
	14.6	15.3	14.8	18.1	15.2	16.3	21.55	.756
V	201.6	994.5	247.5	26.8	1,470.4	3,034.3		
	22.9%	18.2	22.8	48.5	19.6	23.4	16.64	1.406
VI	62.53	336.9	76.9	.8	477.1	1,098.2		
	7.1	6.2	7.0	1.4	6.4	8.5	9.94	.855
VII	20.26	118.4	33.4	.12	172.2	275.3		
	2.3%	2.2	3.1	.22	2.3	2.1	3.31	.634
VIII	.7	83.6	24.1	0	109.1	149.1		
	.08	1.5	2.2	0	1.5	1.2	1.29	.93
IX	14.9	252.6	62.1	.006	329.6	491.2		
	1.7	4.6	5.7	.01	4.4	3.8	4.37	.87
X	7.69	74.9	19.2	.86	102.6	214.5		
	.87	1.4	1.8	1.6	1.4	1.7	1.86	.914
Total	$881.7	$5,469.1	$1,084.9	$55.2	$7,490.8	$12,946.5		
	100%	100%	100%	100%	100%	100%	100%	

Exhibit 6-8

ADDs Most Frequently Identified

	# of Requests
Security Features	
Security Devices	428
Heavy Duty Locks	864
Metal Doors and Frames	747
Building Mounted Site Lighting	483
Electricity	
Site Electricity Upgrade	1,208
DU Electricity Upgrade	410
Unit Features	
Shower in Tubs	427
Vanity	437
Upgrade Sinks and Cabinets	848
Refrigerators	778
Stoves	812
Energy Efficiency	
Energy Efficient Windows	1,057
Other	
Gutter/Leaders	477
Bedroom Floor Finish	413
Other Floor Finish	437

VII. REDESIGN

7.1 SUMMARY OF REDESIGN COST ESTIMATES

Relatively few public housing developments are in need of substantial structural changes to ensure their continued viability--the definition of redesign which was used in this study. A first count of developments that might be redesign candidates was determined from the preliminary Mod Needs Data Form survey, and further refinement of projects meeting the definition of redesign was identified by a second data gathering effort, the Redesign Mail Survey. A sample of 75 developments in need of Redesign was then selected for in-depth three-day site visits, interviews, inspections, and related data gathering activities. The Redesign Study was conducted by 20 senior architects familiar with redesign solutions to address a variety of problems.

These senior design architects, selected from the three A&E firms that Abt Associates had chosen as subcontractors for the main study field data collection effort, were given additional special training in the conduct of the Redesign assessment. Review of condition data from the prior FIX inspection at each of these developments was part of the preparation process that each Redesign inspector undertook before an intensive on-site design assessment of the needs of each Redesign candidate projects. These inspections took place between September 1985 and January 1986.

The surveys did not include HUD field office opinions regarding the need for redesign. Thus, the estimates are an indication of PHA-perceived redesign needs.

The national estimate of Redesign costs totals $2,063 million. The 95 percent confidence interval of the estimate is plus or minus $120 million. We estimate that PHAs would like to have redesign work performed at 883 projects containing 160,000 units.

This cost estimate has been adjusted to net out FIX actions already identified and presumably to be taken at the 75 developments so as to avoid any "double counting" of modernization needs. However, the estimate does not net out ADD actions because not all of them would be done during redesign. An accurate estimate net of ADDs is therefore not feasible. Exhibit 1.2 in the introduction indicated that average per unit redesign costs for units requiring redesign is $12,931 (as compared with an average of $1,640 per unit when all units are used in the denominator). Substantial variation exists across the redesign sample in both the problems at the developments and in the design solutions called for by architects, however, and further analysis is needed to indicate the types of modifications that are needed.

Exhibits 7-1 and 7-2 indicate redesign costs by region. The redesign component of modernization, perhaps more than any other, is unevenly distributed relative to the size of the region. Clearly, many additional factors need explanation to further our understanding of this distribution.

7.2 REDESIGN INSPECTIONS

Although most public housing developments are well-designed to meet the needs of their tenants, some projects may be in need of redesign to ensure long-term viability. Some redesign needs may stem from inadequacies of the initial design. In other cases, the redesign may be necessitated by problems associated with elderly/family mix, overall density, neighborhood or internal security.

In one of the preliminary data collection efforts in the Modernization Needs Study,[1] PHAs indicated which, if any, of their developments were in need of redesign. A "Redesign Questionnaire" was then mailed to those developments reporting such needs in order to gather further detailed information on these needs from the responding PHAs. Based on the results of this preliminary Redesign Mail Survey, a sample of 75 developments was selected for intensive three-day inspections by senior architects who had been given special additional training for this task. The working definition used as a guide in these inspections was that:

> Redesign indicates substantial structural changes in units, buildings, and/or site are needed. A project is considered to require REDESIGN when, if simply restored

[1] The Modernization Needs Survey, a four page questionnaire mailed by Abt Associates to some 6,670 PHA developments in about 1,000 PHAs in 1984 to gather preliminary information needed to design the inspection sampling plan.

Exhibit 7.1
Redesign Costs by Region

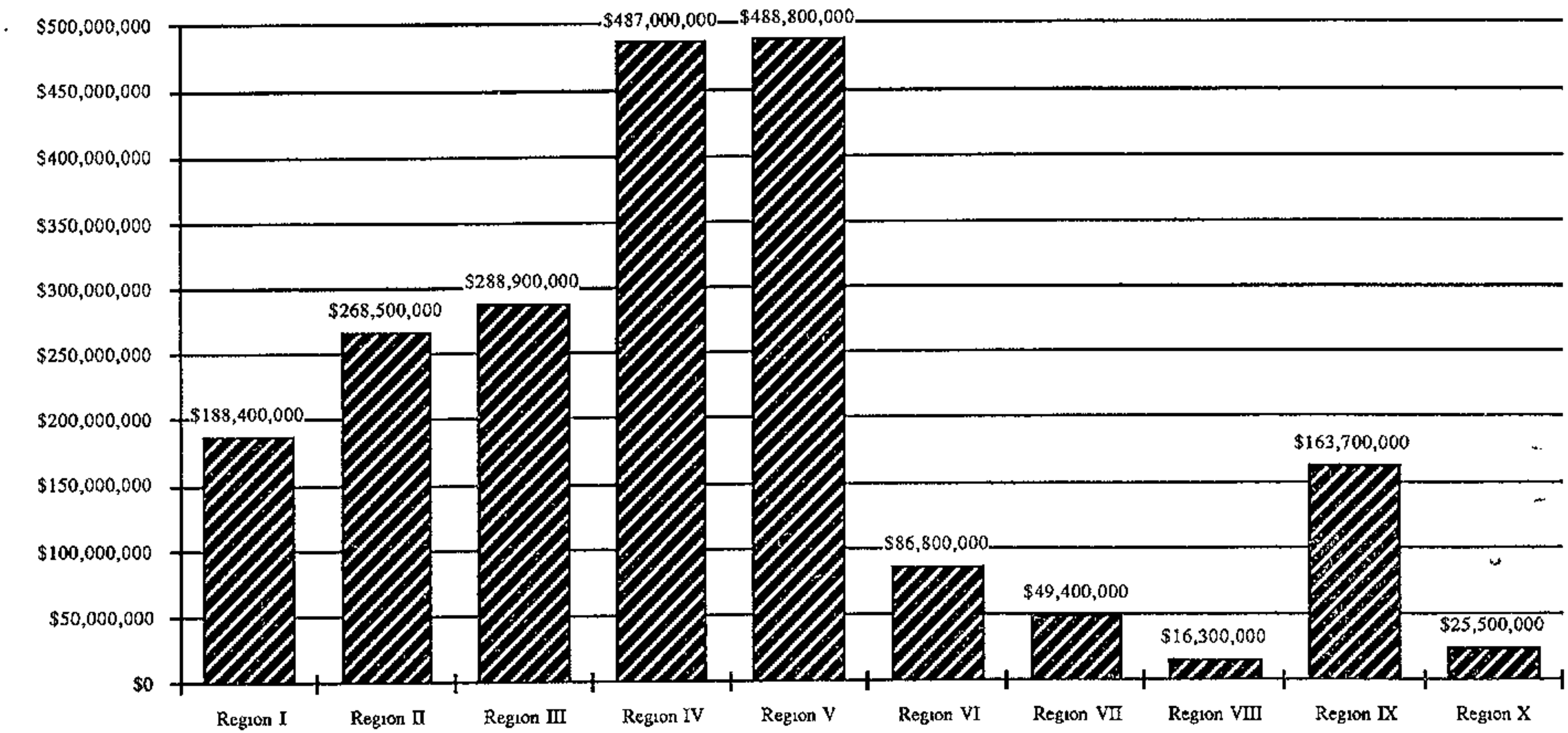


Exhibit 7-2

Redesign Costs by Region
($ millions)

Region	(1) Redesign Costs	(2) % of Total	(3) % of Total Units	(4) Ratio of (2) to (3)
I	$188.4	9.13	5.88	1.55
II	$268.5	13.01	23.44	.58
III	$288.9	14.0	11.71	1.20
IV	$487.0	23.6	21.55	1.10
V	$488.8	23.7	16.64	1.42
VI	86.8	4.21	9.94	.42
VII	$49.4	2.4	3.31	.73
VIII	$16.3	0.79	1.29	.61
IX	$163.7	7.94	4.37	1.82
X	$25.5	1.24	1.86	.67
Nation	$2,063.4	100%	100%	

to good condition without redesign the development would become increasingly vacant, continue to deteriorate, or fail to serve the needs of the tenants.

Clearly, modernization of a housing development might involve actions in all three of these categories of FIX, ADD and REDESIGN, or just in one or two of them.

Our purpose in surveying the 75 projects that comprised the redesign sample was threefold:

- to determine the nature of redesign needs, as distinct from these projects' modernization needs that have been measured in the FIX and ADD component of the study;
- to estimate the costs associated with projects in need of redesign; and
- to determine the prevalence of the need for redesign, by relating the redesign sample to the larger universe of public housing projects (or developments) that are in need of redesign.

In order to gather this data, we developed a set of procedures and data gathering instruments that senior architects used to analyze existing problems and to scope initial design interventions for projects during three-day site visits. This method was standardized so that different architects in different sections of the country could reach comparable decisions on the level of work and scale of change necessary in each project. Exhibit 7-3 presents a typical page from the REDESIGN Diagnostic Interview guide where the architect sought to identify potential problems at the site that would be indicative of the need for redesigning that component of the development. Analysts then estimated the costs of the various redesign proposals for inclusion in the National Estimates Report.

More specifically, we offer this definition of Redesign:

Exhibit 7-3

Illustrative Page from Redesign Diagnostic Interview Guide

CD4 CONT

SITE

B23. Which, if any, of these design concerns contribute to the site problems? SHOW EXHIBIT #10 AND CODE ALL THAT APPLY.

Streets and Parking			
a. Isolated parking lots or streets	[ ]	1	65/
b. Too few parking spaces	[ ]	2	
c. Too many parking spaces	[ ]	3	
d. Parking spaces not close enough to units	[ ]	4	
e. Dead-end streets	[ ]	5	
f. Lack of through-access	[ ]	6	
g. Inability to control through traffic	[ ]	7	
Sidewalks, Pathways			
h. Indirectly routed sidewalks	[ ]	8	66/
i. Sidewalks not visible from units or streets	[ ]	9	
j. Insufficient quantity	[ ]	0	
k. Proximity of sidewalks to unit windows reduces privacy	[ ]	1	
Recreation Areas			
l. Isolated play or recreation areas	[ ]	2	67/
m. Isolated sitting areas	[ ]	3	
n. Insufficient recreation areas	[ ]	4	
o. Insufficient sitting areas	[ ]	5	
p. Inappropriate play equipment	[ ]	6	
q. Poorly located play space	[ ]	7	
Trash Disposal			
r. Inappropriate dumpster location for truck pick-up	[ ]	8	68/
s. Inconvenient dumpster or incinerator location for tenants	[ ]	0	
t. Insufficient number of dumpsters	[ ]	1	
u. Lack of space for trash cans	[ ]	2	
Site Layout			
v. Lack of private yards	[ ]	3	69/
w. Areas of site that do not appear to belong to anyone	[ ]	4	
x. Areas which invite tresspassing and/or mischief by outsiders	[ ]	5	
y. Hiding places	[ ]	6	
z. Areas of site not accessible to handicapped	[ ]	7	
aa. Proximity to "attractive nuisance" or incompatible land use	[ ]	8	
Equipment and materials			
ab. Poorly functioning or poorly designed site furniture	[ ]	9	70/
ac. Inappropriate site furniture for current residents or lack of site furniture	[ ]	0	
ad. Inappropriate materials which are easily damaged	[ ]	1	
ae. Poor initial construction	[ ]	2	
af. Other? (PLEASE DESCRIBE) ____________	[ ]	3	71/
ag. No design concerns in site (SKIP TO B28)	[ ]	4	72/

73/
74/
75/

1. Redesign involves substantial structural changes in the units, buildings, and/or the site. For example, redesign might involve: 1) removal of partitions to reconfigure or expand apartments; 2) change in the size or layout of the existing entry system; or 3) removal of buildings or parts of buildings to reduce density.

2. Redesign of a project does not require that the entire site, all units or all buildings be redesigned. It is possible to have only portions of a project redesigned; for example, only some units or areas of some buildings may call for this approach. The remaining buildings, units, and site would be rehabilitated as necessary, consistent with the original design.

3. Redesign should not be confused with repairs, rehabilitation, or additions, no matter how extensive these may be. Consequently, it is possible for a project to have a very large FIX cost without needing redesign. For example, remodelling to restore units to their "like-new" condition is rehabilitation; adding cabinet space to the kitchen without reconfiguring the unit is an "addition." In contrast, transforming a three-bedroom unit to a two-bedroom unit is redesign.

From the above definition, it is clear that there are many actions that could be done at a public housing development--e.g., renovating kitchens and bathrooms with new appliances and fixtures, refurbishing the site's landscaping, or replacing inadequate wiring or plumbing systems--that, by themselves, would not fall in the definitions of "redesign."

The purpose of the redesign scoping performed by the architects was to ascertain the level of capital expenditure or redesign budget judged to be adequate to address the design problems, rather than a detailed design solution for that particular project. Given only a three day site visit, it was not feasible for an architect to develop a detailed design solution for a project. To respond to this constraint, the redesign protocol included a series of redesign actions which the architect could specify for different locations or "elements" in the project. These redesign actions represented a spectrum of design intervention from "refurbish" (fix what exists) to "renovate" (enhance and modify what exists while respecting the basic structure) to "reconfigure" (fundamentally change the original design). These actions are defined generically for seven project elements: Units, Common Entries and Exits, Common Circulation, Building Envelope, Site, Community Facilities and Mechanical and Electrical Systems. Exhibit 7-4 illustrates the standard guidelines used by the senior architects in determining the level of intervention required for site redesign. By specifying the type of redesign action appropriate for each redesign element and by calibrating to the level of problem which had been described by the PHA, the redesign inspector defined a level of physical intervention at each location or element commensurate with the scale of the observed problems. This will allow calculation of gross per square foot cost budgets for each recommended action level of each element to achieve an overall scale of costs specific to the particular conditions at each project.

Three additional factors distinguish REDESIGN from the FIX and ADD components of the Modernization Needs Study. First, in REDESIGN, the unit of observation is the entire project. Although the project will be analyzed in terms of various components--units, common entries, common circulation, and so forth--the solutions proposed attempted to address problems of the entire project, taking into account the interrelationship of the components. In contrast, the FIX/ADD inspections will produce separate estimates for units, buildings, and the site.

Second, for REDESIGN, the goal of the site visit is for the inspector to scope the appropriate level of redesign intervention commensurate to the severity of the problems. In FIX/ADD, the emphasis is on correctly observing and recording each work item needed.

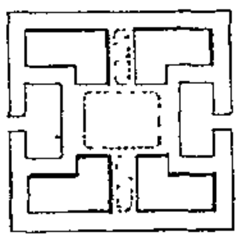
Finally, the cost files for the two surveys have been constructed differently. The FIX/ADD cost file, developed from the R.S. Means system, is made up of literally thousands of costs estimates for specific work items, such as replacing a standard 2 x 3 window or reconditioning a closet door. In contrast, the redesign cost are based on levels of renovation, estimated on a square foot basis. Cost estimates are further refined by asking for specific quantities for high ticket items, such as the replacement of a kitchen or roof.

Exhibit 7-4

Standard Guidelines Used by Architects in REDESIGN Inspections

5 SITE
REDESIGN ACTIONS

A. REFURBISH

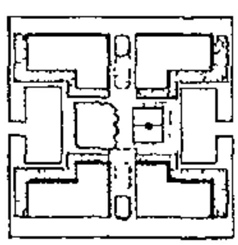


Restore site facilities and areas in existing locations to original condition.

Refurbishment implies some or all of the following types of actions

- o refinish and/or replace site furniture and equipment
- o replant, regrade landscaped areas
- o repair or repave pedestrian and vehicular circulation

B. RENOVATE

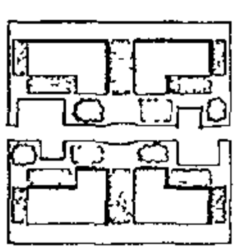


Change portions of the site while retaining the overall site circulation and layout.

Renovation accepts the general function and location of spaces -- but tries to make them work better For typical subareas on a site, the following types of actions may be implied

- o for building-related spaces -- define activity areas or private outdoor space through fencing, curbs, and/or changes in grade or materials
- o for common recreation spaces -- change patterns of use by installing new equipment, providing (or removing) fencing, and/or altering ground surfaces
- o for parking and circulation areas -- provide features such as curbs lighting, and landscaping

C. RECONFIGURE



Change the overall site layout, or large portions thereof.

This action is specified to alter patterns of site use and may imply the following types of subactions

- o changes to street layout to allow for or prevent through-access
- o changes to parking configuration or location to increase or decrease number of spaces and to alter its relationship to units
- o changes to pedestrian circulation to link, separate or privatize adjacent spaces
- o construction of new recreation or other activity areas in new locations.

When all or a portion of the site is reconfigured, it implies redesign, within the new layout, of grading, equipment, materials, lighting, landscaping, and all other related sitework

The cost assigned to each redesign action is a composite of the square foot costs associated with specific construction activities which would typically be performed under that task. These subactions include, for example, demolition and cartage, sheetrock and taping, overhead and profit, and so forth and are unique to each redesign action. The redesign action costs will be further refined by three descriptors:

1) construction type ('heavy' masonry construction or 'light' wood frame construction)

2) building type (low-rise, mid-rise, or high-rise), and

3) physical condition (excellent, good, fair, or poor).

Each cost estimate for the redesign of a project is net of the FIX costs. However, because it is unclear which ADDs costs would actually be funded and done in the context of redesign, the Redesign costs are not adjusted for ADDs at those projects. After these costs have been estimated for the 75 sample redesign projects, they were weighted in order to provide the required national estimates.

VIII. ENERGY CONSERVATION COST ESTIMATES

8.1 SUMMARY OF ENERGY CONSERVATION IMPROVEMENTS COST ESTIMATE

In order to gather more information about energy conservation opportunities at the nation's public housing stock, a subsample of 241 developments was visited for additional data collection.

For each of the developments selected into the energy study sample component, one building of each major type where present (high-rise, low-rise, and site-wide facility) was identified and specific data collected for the energy substudy. Prior to the arrival of the inspection team, PHAs were asked to complete an historical Energy Usage Data Form. The architects and engineers conducting the main study also administered an Energy Practices Interview with responsible PHA staff while at the development and completed an Energy Inspection for each of the identified buildings in the selected projects. In all, the inspectors conducted energy-related interviews and additional inspections in a sample of 346 buildings. The energy data collection effort began in July, 1985 and was completed in September of that year.

Using current HUD regulations that require energy conservation capital improvements that are cost effective using a test of a 15 year single payback period, the public housing stock needs energy conservation capital improvements estimated to cost $939 million. The 95 percent confidence interval of the estimate is plus or minus $60 million. These improvements would save $211 million in energy costs yearly for an average single payback period of 4½ years.

8.2 USING THE ENERGY DATA

From the energy study data, supplemented by the FIX inspections conducted for the main study, cost-effective energy conservation actions were identified. Using the HUD energy audit (provided by Perkins and Will/The Ehrenkrantz group,[1]) the potential energy conservation action and resulting

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[1] "An Evaluation of the Physical Condition of the Public Housing Stock--Energy Conservation, Volume 4, H2850, March 1980, with corrections provided by HUD's Office of Housing.

energy savings is computed for each of nearly 50 energy conservation opportunities (ECOs).

Energy conservation opportunities applying to operating and maintenance items are regarded as part of the operating budget and not part of the capital budget. Thus, unless it was clear from the data collection forms that the PHA already had implemented the operating and maintenance actions, the energy savings resulting from these actions were computed and subtracted from the energy cost totals.

Next, some of the FIX actions indicated in the main study have an impact on energy conservation. For example, window replacement that is indicated because the present ones are rotten will achieve an energy savings as well. Thus, the next step is to estimate this by-product energy saving and revise the energy usage schedule accordingly. Finally, many of the energy savings computations are based on a percentage savings of the total energy used; obviously, once energy use is reduced by an energy conservation action the total energy used from that source is reduced and the absolute savings achievable from other actions is also reduced. Thus, the most cost-effective energy conservation action is regarded as being implemented first, with its resulting reduction in energy use, then the second most cost effective, and so on. ECOs were estimated using both a 15 year simple payback method and using a net present value method.

Selection of Energy Conservation Actions based on Payback Period

The simple payback method of evaluating energy conservation actions was evaluated as indicated in the PWE workbook and HUD regulations. This method simply divides the cost of implementation by the estimated first-year energy cost savings and regards the result as the payback period, that is, how long it will take for the savings to add up to the cost of implementation, disregarding energy inflation rates and the time value of money. Energy conservation actions are to be implemented as long as the payback period does not exceed 15 years or the expected lifetime of the action, whichever is shorter. In the current study, energy conservation actions are implemented sequentially, starting with the action with the shortest payback period and continuing until all actions satisfying the 15-year/lifetime criterion have been exhausted.

Selection of Energy Conservation Actions Based on Net Present Value

A cost-effectiveness calculation is performed taking into account the cost of implementing the action and the lifetime energy cost savings expected (including allowances for increases in energy costs over time and discounting future years' savings to compute their present value). Energy conservation actions are regarded as cost-effective as long as the present value of the savings is greater than or equal to the cost (or present value of the cost, if the action is financed) of implementation.[1]

Energy conservation actions are implemented beginning with the action with the highest net present value (excess of discounted present value over the cost of implementation) and continuing until all actions with positive net present value have been exhausted. Energy inflation rates were taken as the simple average over the period 1987 through 1998 of the Personal Consumption Deflators for fuel oil, electricity, and natural gas, while the discount rate was taken as the simple average over the same period of the 30-year Treasury bond and Treasury bill rates as published by Data Resources Inc., "U.S. Long-term Review," Fall 1986.

8.3 THE FINDINGS

The study finds that, using the 15 year payback method, energy conservation capital improvements costing $939 million are needed. These actions are estimated to save $211 million annually, for an average payback period of about 4½ years.

Using the net present value approach, energy conservation capital needs are $1,209 million, while the annual cost savings are $221 million annually, slightly more than the savings obtained in the simple payback method. The present value of energy cost savings discounted over the lifetime of energy conservation actions, net of implementation costs is estimated to be $3,639 million.

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[1] See Kevin Neels and James Wallace, "Energy Analysis Plan for the Modernization Needs Study," Abt Associates Inc., Cambridge, Massachusetts. November 1984.

The energy cost savings from the FIX actions, such as repairing or replacing windows, is $29 million. The model also estimates that improved operating and maintenance practices would cost $98 million total and would save $83 million annually. Many of these items such as weatherstripping and caulking last about three to five years.

Exhibit 8-1 summarizes the estimated savings per unit in energy costs and per-unit costs of implementation of energy conservation actions. Annual per-unit energy savings of $23 is estimated to result as a by-product of implementing the FIX actions--at no further cost of implementation. If all the applicable operating and maintenance (O&M) actions were taken, we estimate that annual per-unit savings of $66 would result. Our O&M implementation cost estimates were based on somewhat arbitrary scale factors against project size or other measures. Estimated annual expenditures, presumably out of operating and maintenance budgets, average $78 per unit.

A project by project assessment more closely fitting the savings available and costs of implementation should be made to identify those operating and maintenance actions actually worth doing, although the value of implementing them (for example maintaining a reliable provision of heat) may not be reflected in energy savings.

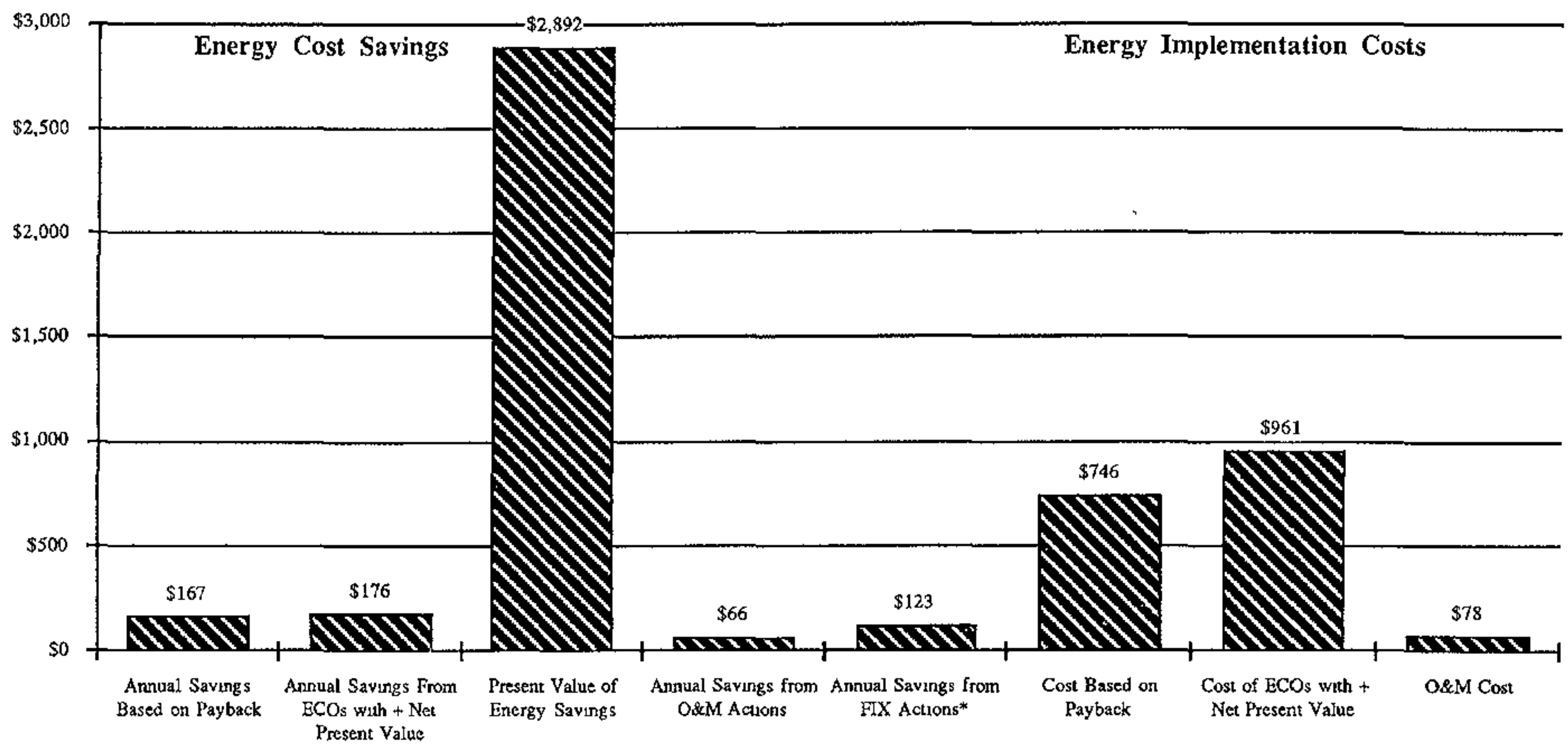
Energy conservation opportunities were evaluated in two ways.

1. Accepting any Energy Conservation Opportunity (ECO) with a payback period within 15 years (implementation cost divided by annual energy cost savings equal to or less than 15 years).

2. Accepting ECOs as long as the discounted present value of the stream of energy cost savings equalled or exceeded the implementation cost, that is, for all positive net present values.

As Exhibit 8-1 indicates, the payback criterion justifies an average of $746 per unit in ECO implementation costs to achieve per-unit annual energy cost savings of $167, for an average payback period of 4.5 years. For ECOs jusitified on the basis of positive net present value, implementation costs of

Exhibit 8.1
Per Unit Energy Savings & Implementation Costs



*No marginal costs for FIX actions, covered under FIX Costs

$961 per unit are estimated to achieve $176 in annual energy cost savings, amounting to a discounted present value of $2,892 per unit in energy cost savings.

8.4 DETAILS OF ENERGY STUDY PROCEDURES

Components of public housing that do not require repair or replacement for reasons of physical deterioration may yet have capital improvements that should be made for reasons of energy conservation. The special Energy Conservation study builds upon the data and results of the main modernization cost study of modernization backlog to identify cost-effective energy conservation actions that should be taken in addition to other modernization actions. Previous work for HUD by Perkins and Will/The Ehrenkrantz Group produced a workbook[1] for PHAs on energy conservation opportunities that provides part of the basis for the current study.

As indicated above, as part of the effort to design the main study and the various substudies, PHAs were mailed a brief self-administered questionnaire, the Modernization Needs Data Form. This project-specific data form obtained basic project configuration descriptions and indicated the extent to which basic energy conservation actions already had been taken in such areas as insulation, installation of window replacement, and improvements in heating systems. The Modernization Needs Data Form gathered this information on 6,670 public housing projects, comprising the sampling frame from which the main study sample of more than 1,000 projects was scientifically selected.

In combination with the energy use and potential savings computations performed by Perkins and Will/The Ehrenkrantz Group,[2] estimates of potential energy savings were made for each of the projects in the main sample. A total of 241 projects for the special Energy Substudy was selected from within each of four strata of ranges of estimated per-dwelling-unit energy savings.

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1 See Energy Conservation for Housing: A Workbook, HUD-PDR-700(3), April 1983.

2 (See An Evaluation of the Physical Condition of the Public Housing Stock--Energy Conservation, Volume 4, H2850, March 1980)

For each of the 241 projects in the Energy Substudy, one building of each major type, where present (high rise, low rise, single family, townhouse, or site-wide facility), was identified as a subset of the buildings inspected for the main study of FIX and ADD needs. PHAs were mailed and asked to complete an Energy Usage Data Form, a self-administered questionnaire that gathered historical data on use of various types of fuels and their costs. To the extent that such data were available for the sampled 346 buildings in which we were especially interested, the PHAs were asked to report data on the Energy Usage Data Form for those specific buildings; otherwise, project-level usage data were requested instead. Exhibit 8-2 presents a typical page from the form, requesting detailed usage and cost data on heating oil (provided this was the source of heat at the development).

When the architects and engineers who were conducting the main study arrived on site, they first reviewed the Energy Usage Data Form for completeness and, if needed, obtained clarifications to the form's entries. In conjunction with the main study's FIX/ADD inspections, the field staff also conducted Energy Practices Interviews on the buildings selected into the Energy Study. Questions asked in the Energy Practices Interview covered such topics as the PHA's maintenance practices with respect to heating equipment, typical day/night temperature settings, and previous efforts to minimize energy usage at the sampled buildings.

The field architects and engineers also conducted a focused inspection on the energy characteristics of the sampled buildings and dwelling units. Exhibit 8-3 illustrates one page of the Energy Inspection Form, in this case for the first floor common areas of apartment buildings.

From this set of data, supplemented by the inspections conducted for the main study, cost-effective energy conservation actions can be identified. Using the PWE workbook, the potential energy conservation action and resulting energy savings is computed for each of approximately 50 energy conservation opportunities, listed in Exhibit 8-4. The energy saving for each energy conservation opportunity first is computed as though accomplished in isolation from all the others. If these savings were simply added up, they would overestimate actual potential savings for two reasons. First, some of the FIX actions indicated in the main study will have an impact on energy conservation; for example, window replacement indicated because the present ones are

Exhibit 8-2

Illustrative Page from the Energy Usage Data Form

B4. What is the energy source used for? (CIRCLE ALL THAT APPLY.)

PIPED-IN GAS			OTHER (As Above)		
Space Heating	1	56/	Space Heating	1	57/
Hot Water	2		Hot Water	2	
Cooking	3		Cooking	3	
Power Generation	4		Power Generation	4	

B5. Please indicate the time period covered by these data.

	PIPED-IN GAS	OTHER (As Above)
Period Beginning	____/____/198__	____/____/198__
	month day year	month day year
	58-62/	63-67/
Period Ending	____/____/198__	____/____/198__
	month day year	month day year
	68-72/	73-77/

C. Energy Sources Delivered in Bulk -- Available Only at the Project Level

CARD #06
ID 1-12/
13-14/06

This section covers other energy sources that may be used by your project that are delivered in bulk--for instance, deliveries of coal, bottled gas, or wood. (If this project uses these types of energy and they are available for the specific residential building(s) and free standing site wide facilities listed on the cover page, please enter these data in Part III of this booklet.)

Fuel Oil

15/

C1. Is fuel oil used? (CIRCLE ONE)

Yes....................1 42/
No (SKIP TO QUESTION C5)....................2

C2. Please provide data by delivery for all deliveries during the most recently completed PHA fiscal year.

FUEL OIL				
DELIVERY NUMBER	MONTH/YEAR RECEIVED	COST	AMOUNT (Gallons)	INDICATE GRADE #'S 2, 4, or 6
1	/198 16-18/	$ 19-25/	# 26-30/	2, 4, 6 31/
2	/198 32-34/	$ 35-41/	# 42-46/	2, 4, 6 47/
3	/198 48-50/	$ 51-57/	# 58-62/	2, 4, 6 63/
4	/198 64-66/	$ 67-73/	# 74-78/	2, 4, 6 79/
5	/198 15-17/	$ 18-24/	# 25-39/	2, 4, 6 30/
6	/198 31-33/	$ 34-10/	# 41-45/	2, 4, 6 46/

CARD #07
ID 1-12/
13-14/07

Exhibit 8-3

Illustrative Content of the Energy Inspection Form

MUB: MULTI-UNIT BUILDING (with Internal Common Areas)

CD 02 CONT

C. First Floor Circulation Areas

1. Openable Windows

Present.......[ ] 1 Not Present..... [ ] 2 → SKIP TO QUESTION 3 → 60/

a. Are storm windows present?

Yes. ....[ ] 1 → SKIP TO ITEM c No.....[ ] 2 61/

b. Indicate window glazing:

Single pane...[ ] 1
Double pane ....[ ] 2 62/
Triple pane...[ ] 3

c. Window fit

Loose (frame rattles, large air gaps)..........................[ ] 1
Average (some looseness, no large gaps)....................[ ] 2 63/
Tight (no frame movement or drafts)..........................[ ] 3

d. What percentage of windows are weatherstripped? |_|_|_| % 64-66/

e. Enter percentage of windows with missing or deteriorated putty? |_|_|_| % 67-69/

2. Air Conditioning

a. Is this space air conditioned?

Yes.......[ ] 1 No.......[ ] 2 → SKIP TO QUESTION 3 → 70/

b Window tinting

Clear..[ ] 1
Tinted..[ ] 2 71/

c. Interior Window covering

Thermal shutters, blinds or shades...................[ ] 1
None of the above.......................................[ ] 2 72/

d. Are east, south, and west-facing windows well shaded by trees, vegetation, or exterior overhangs, sunshades, awnings, or canopies?

Yes ....[ ] 1 73/
No. ....[ ] 2

74-80/B

Exhibit 8-4

Energy Conservation Opportunities

ARCHITECTURAL ECOs

#1: Improve Architectural O&M
#2: Install Replacement Windows
#3: Install Storm Windows
#4: Weatherstrip Windows and Doors
[#5: Install Insulating Window Shades--engineering subcontractor indicates usual choice is either storm windows or thermopane glass and shades often are tenant responsibility]
#6: Install Window Sun Shades
#7: Install Storm Doors
#8: Construct Vestibules
#9: Install or Increase Attic Insulation
#10: Install Roof Insulation
#11: Install Wall Insulation
#12: Install Passive Solar Collectors

HEATING ECOs

#13: Install Setback Thermostats
#14: Improve Space Heating O&M
#15: Install Flue Dampers
#16: Convert to Electric Ignition
[#17: Reduce Burner Nozzle Size--engineering subcontractor indicates that although PWE workbook indicates flat 7 percent saving on heating fuel, in practice there is much less potential because PHAs will have already done this if it is feasible]
#18: Install Tenant Fuel Meters
#19: Improve Central Heating O&M
[#20: Install Modulating Burners--engineering subcontractor indicates that most large boilers already have these and that the number of cases where they might be installed does not justify the cost of data collection]
#21: Install Flue Heat Recovery
[#22: Install Turbulators--engineering subcontractor indicates these might actually decrease energy efficiency; unless turbulators are cleaned twice a year the carbon buildup around them reduces the efficiency of heat transfer--they are not often used]
#23: Install Summer-time Domestic Hot Water (DHW) Heaters
#24: Replace Obsolete Heating Plant
#25: Improve Central Distribution O&M
#26: Insulate Hot Water or Steam Pipes
[#27: Install Radiator or Zone Controls--engineering subcontractor suggests removing this one because equipment is difficult to shield from tenant tampering; PHAs installing these often take them out.]

Exhibit 8-4 (continued)

Energy Conservation Opportunities

SECONDARY SYSTEMS ECOs

#28: Improve Domestic Hot Water (DHW) O&M
#29: Install Flow Restrictors
#30: Insulate DHW Tanks
#31: Convert DHW Systems to Solar
#32: Install DHW Off-peak Controls
#33: Install Cold Water Saving Devices
#34: Convert Water Supply Pumps
#35: Convert Laundry to Cold Rinse
#36: Improve Ventilation/AC O&M
[#37: Install Ventilation Warm-up Cycle--engineering subcontractor suggests that this ECO is applicable to so few cases that it does not justify the cost of data collection.]
#38: Replace Obsolete AC Equipment

ELECTRICAL SYSTEMS ECOs

#39: Improve Electrical/Lighting O&M
#40: Convert Incandescent Lamps (Dwellings)
#41: Convert Incandescent Lamps (Circulation)
#42: Convert Incandescent Lamps (Public Areas)
#43: Replace Fluorescent Bulbs
#44: Install High-efficiency Ballasts
#45: Install Daylighting Controls
#46: Convert Site Lighting Lamps
#47: Install Site Lighting Photo-controls
#48: Install Tenant Metering
#49: Correct Low Power Factor
[#50: Install Load-shedding Controls--engineering subcontractor indicates that in most residential applications the number of loads that can be shed is too small to justify the costs of installing the necessary instrumentation and controls. Other engineering firms have indicated to HUD that such controls can be quite cost effective in all-electric buildings.]

rotten will achieve an energy savings as well. Thus a first step is to estimate this by-product energy saving and revise the energy usage schedule accordingly. The second consideration is that many of the energy savings computations are based on a percentage savings of the total energy used; obviously once energy use is reduced by an energy conservation action the total energy used from that source is reduced and the amount of savings achievable from other actions is also reduced. Thus the most cost-effective energy conservation action is regarded as being implemented first, with its resulting reduction in energy use, then the second most cost effective, and so on. We tested the results of three types of energy conservation approaches: the simple payback method, the net present value (NPV) method, and a special NPV case where energy cost inflation equals the Federal discount rate.

The NPV approach is a cost-effectiveness calculation that takes into account the cost of implementing the action, the lifetime cost savings expected (including allowances for increases in energy costs over time and discounting future years' savings to compute their present value). Energy conservation actions are regarded as cost-effective as long as the present value of the savings is greater than the cost (or present value of the cost, if the action is financed) of implementation.

The conventional "payback" method currently used by HUD for evaluating energy conservation actions simply divides the cost of implementation by the estimated annual energy cost savings and uses the result in computing the payback period, that is, how long it will take for the annual savings to add up to the cost of implementation. The payback method of evaluation has some important drawbacks, however. It ignores the value of the savings that accrue in the years after the payback period until the end of the useful life of the energy conservation action. (When applied with care the payback method limits the effective payback period to be no more than the useful life of the energy conservation action.) The payback method also essentially ignores the issue of relative inflation in energy costs (hence, increases in annual savings) and the difference in value between current year savings and future year savings. Although the payback method of evaluating energy conservation opportunities has these drawbacks, it, too, is used in our study for an alternative computation of justifiable actions, because this method is the one called for in current HUD regulations. Energy conservation actions are regarded as cost effective under the payback method if the payback period is less than 15 years or the life of the conservation measure, whichever is smaller. While the simple payback method is less elegant, it has the advantage of computational simplicity and is therefore used by many PHAs. Another advantage of the simple payback approach is that it does not identify conservation measures that have such long payback periods that they exceed the useful lifetimes of the buildings. Also, tests of the method have shown that the results are quite similar to those obtained by more complex energy audits.

Even if the more elegant net present value approach is not used, another approach with some of its advantages is to use the result of the net present value formula for the case where energy cost inflation equals the federal discount rate (cost of money). In this case net present value is:

$$NPV = E_o L - C$$

where E_o is the first-year energy cost savings
L is the expected lifetime of the energy conservation action
and C is the cost of implementation.

Conservation actions should be undertaken starting with the one with the largest NPV for which budget is available and continuing to implement others in order of NPV until the energy conservation budget is exhausted or further possible actions would have negative NPV. This is the same as saying that an action is justified only if its expected lifetime is at least as long as the payback period. This can be seen by rewriting the equation for NPV as

$$NPV - E_o \ (L-P)$$

where $P = \frac{C}{E_o}$

or the payback period.

Once the cost effective energy actions are compiled for each of the buildings in the energy substudy sample, the probability of selection of each building is used to form sample weights for projecting these results to national totals. The substudy results in the following national totals:

- costs of implementation of all cost-effective energy conservation actions;
- estimated energy cost savings, by type of energy source;
- frequencies of occurrence of each of the cost-effective energy conservation opportunities in the public housing stock;

and, for purposes of comparison,

- distributions of cost-effective payback periods associated with each of the energy conservation opportunities.

The results of the simulations are displayed in Exhibit 8-5, which shows the results of the simple payback analysis and of the four different simulations using the net present value approach. In each of the cases, we assume that the projects have first gained energy savings by fixing items needing repair (such as broken windows) and by implementing improved operating and maintenance practicies such as weatherstripping and caulking (see Section 8.3). Once these repairs and maintenance items have been done, the simulations estimate the cost and savings due to making energy conservation capital improvements.

In the 15-year simple payback analysis, all energy conservation opportunities (ECOs) are chosen that save more than their implementation costs in a 15-year period. In this case, the implementation costs are calculated at \$939 million and the annual savings are estimated to be \$211 million, for an average payback period of 4½ years.

Using the net present value approach, the nominal case is based on standard assumptions about the rate of inflation in energy prices and the Federal government's discount rate (cost of borrowing money). The inflation rate estimates are taken from the 12 year average for the personal consumption deflator in the U.S. Long Term Review published by Data Resources Inc. The

Exhibit 8-5

Variation in Energy Conservation Results by Inflation Parameter for Net Present Value Analysis

	Payback Analysis	Inflation Parameter			
		Low	Nominal	High	Zero
Annual Energy Cost Savings					
• per Dwelling Unit	$167	$168	$176	$180	$175
• National Estimate (millions)	$211	$211	$221	$226	$219
Implementation Cost					
• per Dwelling Unit	$746	$788	$966	$1,126	$999
• National Estimate (millions)	$939	$987	$1,209	$1,417	$1,257
Net Present Value of Cost Savings					
• per Dwelling Unit	--	$1,949	$2,892	$4,870	$3,511
• National Estimate (millions)	--	$2,453	$3,639	$6,128	$4,418

Notes:

1. The inflation parameter (n-r) is evaluated at ± 0.03 around the nominal case, where n = energy inflation = 0.0725 Fuel Oil
   0.0380 Electricity
   0.0639 Natural Gas
   from the 12-year average for the personal consumption deflator from the Data Resources Inc. U.S. Long-Term Review, Fall 1986. The discount rate, r, is 0.07, averaging Treasury Bills and 30-year Treasury Bonds.

2. The case (n-r) = 0 results in the simplified net present value equation

$$NPV = E_0 L - C$$

   where E_0 is first-year energy savings, L is lifetime in years of the energy conservation action, and C is the cost of implementation or NPV = E_0 (L-P) where P is the payback period, C/L.

inflation rates are fuel oil = .0725, electricity = .0380 and natural gas = .0639. The Federal discount rate is assumed to be .07.

In the nominal case, the implementation costs are $1,209 million and the annual cost savings are $221 million, just 6 percent more than the simple payback case. The net present value of the cost savings over the lifetime of the conservation measures is $3,639 million.

Energy inflation estimates have been subject to several shocks over the past several years and it is possible or even likely that energy prices will undergo other shocks over the coming years. What if energy price inflation is 3 percentage points lower than expected while the discount rate remains the same? In the low inflation simulation, implementation costs are estimated at $987 million and annual cost savings are estimated at $211 million. If energy price inflation is 3 percent higher than the nominal case, the implementation cost rises to $1,417 million and the net present value of cost savings increases to $6,128 million. Thus, the estimates for energy cost savings based on the net present value method are sensitive to the assumed rates of energy inflation and government cost of money (discount rate).

The special case of energy inflation equal to the discount rate (inflation parameter equals zero) is also shown and gives results quite comparable to the nominal inflation case. Because it is a simple extension of payback analysis that takes into account the magnitude of annual savings and the lifetime of an energy conservation action, the zero inflation analysis has advantages over the simple payback analysis. The per dwelling unit energy cost savings and implementation costs are higher for both the zero inflation case and the nominal inflation case than for the simple payback analysis.

8.5 Energy Costs by Region

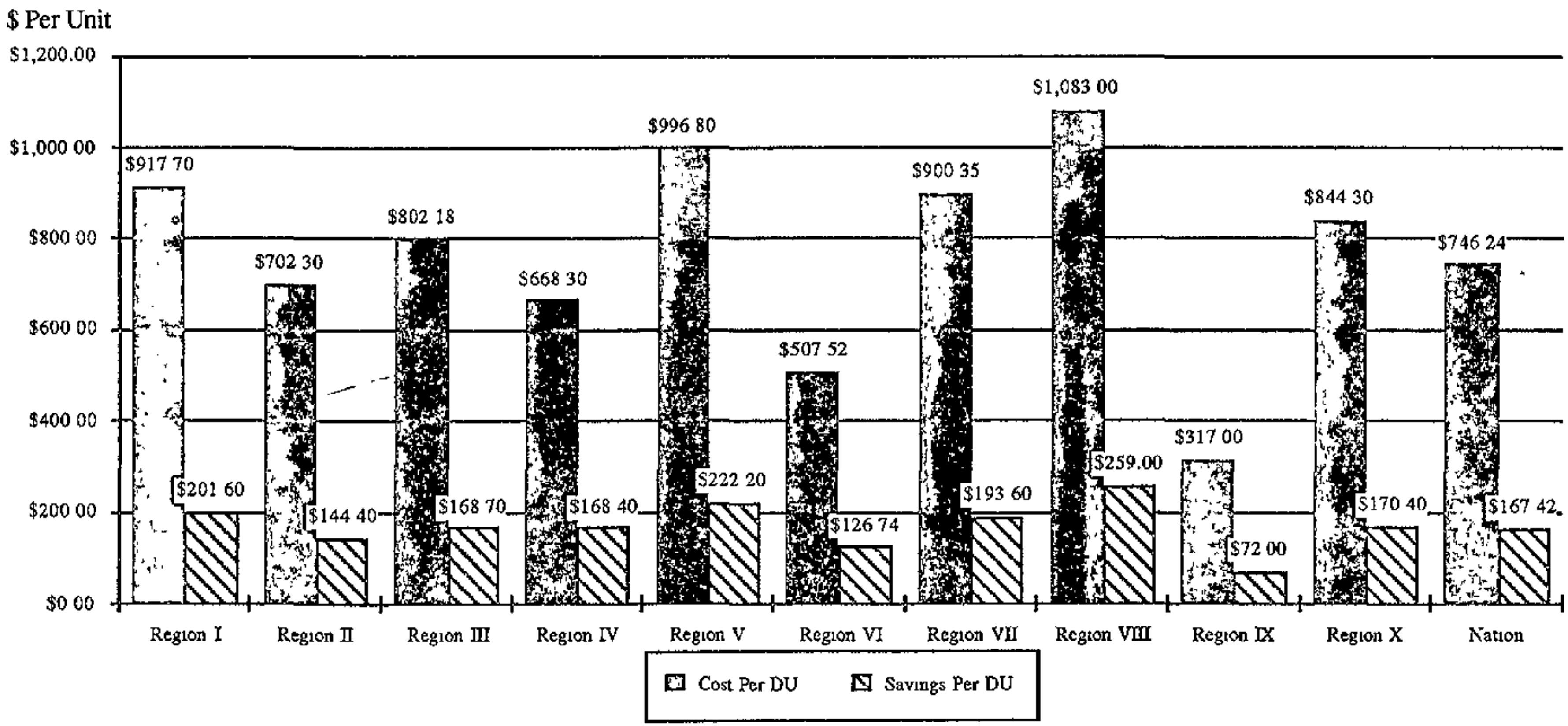
The statistical procedures used to allocate energy costs and savings to regions and field offices and detailed listings of the estimates are presented in Appendix I. The regional distribution of selected energy variables is summarized in Exhibit 8-6; per unit costs and savings by region are presented in Exhibit 8-7. Like other types of modernization, the allocation of Energy costs by region varies fairly widely relative to region size. In addition, however, the distribution of energy savings varies by region and it appears undertaking energy conservation actions is a particularly "good deal" in

Exhibit 8-6

Energy Costs and Savings by Region
($ millions)

(1) Region	(2) Net Present Value of Savings	(3) % of Savings	(4) Ratio of % of Savings in (2) to % of Units in (7)	(5) Annual Savings Based on Payback	(6) Implementation Cost Based on Payback	(7) % of Total Costs	(8) % of Total Units	(9) Ratio of (6) to (7)
I	$312.3	9%	1.459	$14.9	$67.9	7.23	5.88%	1.23
II	668.1	18%	.713	$42.6	$207.2	22.06	23.44	.941
III	391.2	11%	.918	24.9	118.2	12.58	11.71	1.074
IV	647.4	18%	.826	45.7	181.3	19.30	21.55	.896
V	1,021.5	28%	1.687	46.5	208.7	22.23	16.64	1.336
VI	217.3	6%	.60	15.8	63.5	6.76	9.94	.68
VII	159.2	4%	1.32	8.1	37.5	4.0	3.31	1.21
VIII	108.4	3%	2.31	4.2	17.6	1.88	1.29	1 46
IX	51.2	1%	.26	4.0	17.5	1.86	4.371	4.26
X	63.0	2%	.93	4.0	19.8	2.11	1.86	1.134
Nation	$3,639.5	100%	1.00	210.7	939.1	100%	100%	1.0

Exhibit 8.7
Energy Costs and Savings
Per Dwelling Unit by Region
(Payback Method)



certain regions. From Exhibit 8-6, for example, a comparison of the net present value of savings to implementation costs suggests that in Regions I, V, VII, and VIII, the returns to energy conservation are well above the national average.

IX. ACCESSIBILITY FOR THE HANDICAPPED

9.1 SUMMARY OF THE STUDY OF COSTS OF ACCESSIBILITY FOR THE HANDICAPPED

The process of collecting the relevant data on modernization needs for handicapped accessibility resembles that used for the ADD requests. The PHA was the source of the data, providing information in the study's Project Characteristics form on the current provisions for handicapped accessibility at the sampled project as well as estimating present needs for that development. Data were requested in terms of wheelchair and non-wheelchair (sensory or other impairments) requirements.

The Project Characteristics forms were mailed out in advance to the sampled project and completed forms were picked up during the FIX inspection visit. Not all PHAs were successful in completing the forms in time for on site review by the inspectors. Some of these forms were subsequently mailed to Abt Associates; others were never received. As a consequence, handicapped accessibility information was obtained for 745 of the 1,000 developments sampled for inspection.

The national estimate for handicapped accessibility modernization requirements totals \$232 million. The 95 percent confidence interval is plus or minus \$59 million.

Exhibit 9-1 presents the regional distribution of handicapped accessibility costs. As shown in Appendix I, the distribution is made proportional to the share of public housing units.

9.2 ANALYSIS PROCEDURES FOR ACCESSIBILITY FOR THE HANDICAPPED

This special analysis called for in the Modernization Study focusses on the extent and cost of needs associated with providing access for those with special needs, such as individuals confined to wheelchairs as well as those who are sensory impaired or have other limitations on their mobility. To accomplish this, each PHA in the main sample was asked for summary information on the prevalence of wheelchair and other mobility impaired households, the number and kind of existing facilities designed for these individuals and the PHA's view of how many additional dwelling units were required to deal with the needs of this special population. Exhibit 9-2 illustrates a page from the

Exhibit 9-1

Handicapped Accessibility Costs by Region[1]

Region	(1) Handicapped Costs	(2) % of Total
I	$13.7	5.88
II	$54.4	23.44
III	$27.2	11.71
IV	$50.1	21.55
V	$38.6	16.64
VI	$23.1	9.94
VII	7.7	3.31
VIII	3.0	1.29
IX	10.2	4.37
X	4.3	1.86
Nation	$232.3	100%

[1] Handicapped Accessibility Costs are distributed by region based on the region's share of units.

Exhibit 9-2

Illustrative Page from the Project Characteristics Form Addressing Issue of Accessibility

SECTION D: ACCESSIBILITY

This section discusses the accessibility of units in this development. Our definition of accessibility distinguishes wheelchair accessibility, including wheelchair accessibility to the kitchen and bathroom, and handicaps other than wheel chair handicapped (such as sensory and mobility impaired persons). Please keep this definition in mind when responding to the questions.

Wheelchair Accessibility

D1. How many households in this development have members who use wheelchairs? How many are in elderly households? Family households? (IF NONE, RECORD ZERO.)

	# Households	
Total households with wheelchair users..................#	________	22-24/
Elderly households...........#	________	25-27/
Family households...........#	________	28-30/

D2. How many units in this development are accessible to wheelchair users? How many elderly units? Family units? (IF NONE, RECORD ZERO.)

	# Units	
Total wheelchair accessible units......#	______	31-34/
Elderly units....................#	______	35-37/
Family units.....................#	______	38-40/

D3. What is the bedroom distribution of the wheelchair accessible units?

	# Accessible Units	
Efficiency units............#	________	41-43/
1 Bedroom...................#	________	44-46/
2 Bedroom...................#	________	47-49/
3 Bedroom...................#	________	50-52/
4 Bedroom...................#	________	53-55/
5+ Bedroom..................#	________	56-58/
CHECK IF NOT APPLICABLE....................................NA [ ] 6		59/

Project Characteristics form, which included a series of questions addressing the issues of accessibility. (Also, the ADDs form (see discussion above in Chapter 6) provided PHAs with the opportunity to indicate their needed additions, upgrades, and changes for handicapped accessibility.)

Based on the project data, and using the Redesign cost files to provide cost elements for differing interventions required for each type of handicap, cost estimates were developed in much the same manner as for the other components of the study. Under current HUD regulations (24 CFR Part 40) and the Handbook for the Public Housing Comprehensive Improvement Assistance Program (Handbook 7485.1 Rev-2), PHAs are expected to assess, on a PHA-wide basis, the needs of current tenants and applicants on the waiting list for units that are accessible for physically handicapped individuals. The PHA is given some flexibility to decide, in consultation with the HUD Field Office, whether to provide accessible units at a project being modernized, to provide accessible units through other means such as modernization of another project, or that there is no need to provide accessible units. Because the PHA performs its own self-assessment of its needs for accessible units, the assessment of the modernization needs to provide these units in the research study was also left to the PHAs. Thus, the estimate of the number of units to be made accessible was taken directly from the PHA's assessments and extrapolated to a national number. The costs per unit were estimated by architects and planners familiar with housing renovation for handicapped people, and these costs include estimate of the costs of renovating ramps, entrances and corridors to be accessible as well.

X. INDIAN HOUSING MODERNIZATION NEEDS

10.1 SUMMARY OF INDIAN HOUSING PROGRAM NEEDS

Architects with experience in designing Indian housing and in working with Indian Housing Authorities (IHAs) were designated to perform the Indian housing FIX/ADDs inspections. The inspections visited 354 units in 31 Indian housing projects. These projects were located in 20 IHAs scattered through HUD's six Indian housing regions. Both rental and homeownership developments were included in the sample. However, the emphasis was on rental housing because HUD contributes modernization funds to rental units just as it does in non-Indian public housing, but funds only some types of modernization in the homeownership program.

The national estimates of modernization costs for the Indian housing stock are:

- Rental Indian stock FIX costs: $161 million. The 95 percent confidence interval is plus or minus $42 million.

- Homeownership Indian stock FIX costs: $223 million. Only part of these costs are eligible for funding under the CIAP program. The 95 percent confidence interval is plus or minus $166 million.

- Rental Indian stock ADDs that are rated by appropriateness by the study inspectors:

  Required by Code or HUD Modernization Standards:

  (HUD labels this category as "mandatory.")

  (ISO 1 and 2): $48.6 million. The 95 percent confidence interval is plus or minus $51 million.

  (ISO 3, 4 and 5): $4.9 million. The 95 percent confidence interval is plus or minus $8 million.

Project Specific:

(ISO 1 and 2): $234.9 million. The 95 percent confidence interval is plus or minus $58 million.

(ISO 3, 4 and 5): $24.4 million. The 95 percent confidence interval is $19 million.

Energy:

(ISO 1 and 2): $57.2 million. The 95 percent confidence interval is $36 million.

(ISO 3, 4 and 5): $3.7 million. The 95 percent confidence interval is $2 million.

- Rental Indian ADDs currently prohibited by HUD: $38 million. The 95 percent confidence interval is $32 million.

10.2 INDIAN HOUSING FIX DATA COLLECTION AND ESTIMATES

The Indian Housing Authority sample consisted of 27 rental developments and 4 homeownership developments in locations from Maine to Alaska. The Indian Housing stock primarily consists of single family homes or townhouses for families and townhouses or small low-rise developments for the elderly. Many developments have units scattered over a wide area, including remote sites. Unlike the public housing developments of the same vintage, few site amenities or community facilities exist as part of the IHA developments.

The same FIX forms used for public housing was used to inspect the 354 units and 322 buildings. On average, more interior and building inspections were conducted per development than were inspected in the public housing. Few sitewide or central mechanical and electric systems were observed.

Where available, the Project Characteristics and takeoff information were gathered by the staff of HUD's Office of Indian Programs in each region. The inspector assigned to the development supplemented this information while at the housing authority and, whenever possible, worked with the IHA director in completing the ADDs form.

Once completed, the Indian housing inspection data were costed in essentially the same manner as the public housing inspection data in the main sample of 1,000 developments.

The national estimates of modernization costs for the Indian housing stock are as follows:

	National FIX Estimate	95% Confidence Interval (Plus or Minus)
Rental Units	$161 million	$42 million
Homeownership Units	$223 million	$166 million

10.3 INDIAN HOUSING NATIONAL ADDs ESTIMATE

ADDs costs by categories are presented below, based on evaluation at 22 of the 27 rental developments visited. The data presented below are for the national Indian rental program only. Insufficient data are available to develop a national ADDs estimate for homeownership developments. Like the FIX estimate, the national estimate was obtained by estimating costs for non-remote projects (the "restricted universe") and extrapolating to the entire population.

Because of time and cost restrictions, the study excluded especially remote projects from the sample. However, cost estimates are provided for the entire program including remote locations. We use the assumption that remote projects are in similar condition to non-remote projects, but that the cost of repairs and replacements is 10 percent greater per unit because of higher transportation costs.

Under the CIAP program, HUD contributes modernization funds for rental units just as it does for non-Indian rental public housing. For homeownership units, the homeowner family is responsible for normal repairs and replacements of worn-out components. HUD provides modernization funding only for emergency health and safety needs, the correction of design deficiencies, and energy conservation improvements. The portion of these needs that are eligible for CIAP funding depends on policy judgements of HUD and the Indian Housing Authorities and are not estimated here. Instead, based on a limited sample of

Exhibit 10-1

Indian Rental Housing ADDs Requests Cost

Category	National Estimate	95% Confidence Interval (plus or minus)
A. High ISO* Ratings (ISO = 1 or 2)		
1. Mandatory	$49 million	$51 million
2. Handicapped Accessibility	0	0
3. Project Specific	$235 million	$109 million
4. Energy Conservation	$57 million	$36 million
B. Lower ISO* Ratings (ISO = 3 to 5)		
5. Mandatory	$5 million	$8 million
6. Handicapped Accessibility	0	0
7. Project Specific	$24 million	$19 million
8. Energy Conservation	$4 million	$2 million
C. Other Categories		
9. No ISO*	0	--
10. Other (Not in ADDs Category)	0	--
11. Prohibited by HUD	$38 million	$32 million

* ISO = Inspector's second opinion. See Chapter 6 for an explanation.

XI. LEAD-BASED PAINT ABATEMENT

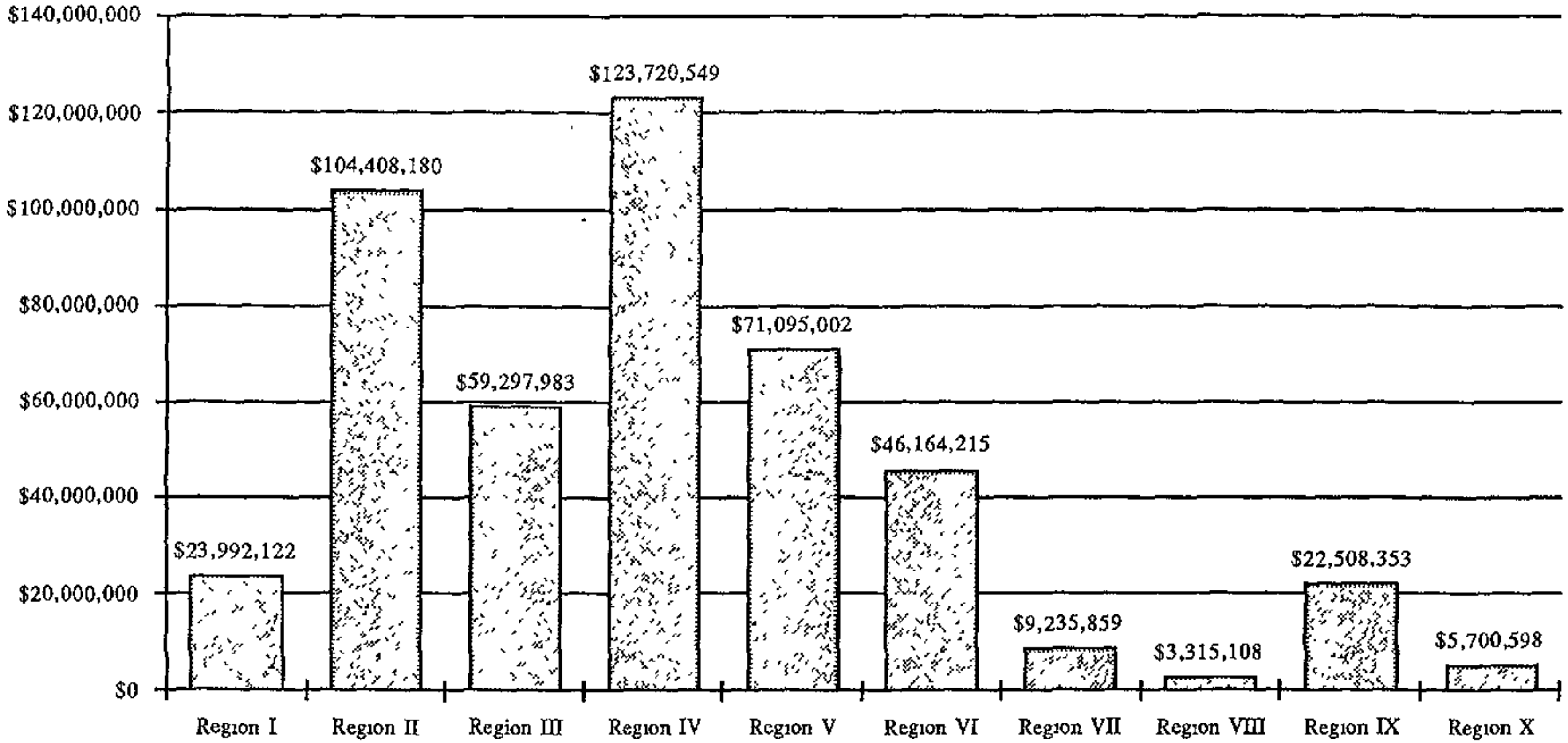
11.1 SUMMARY OF THE LEAD-BASED PAINT ABATEMENT ESTIMATE

Regulations requiring the abatement of lead-based paint in the Public and Indian Housing Programs were published on Auust 1, 1986. These regulations generally require that PHAs test for lead based paint in family units built before 1973 and abate such paint if it is either defective (peeling, blistering, etc.) or chewable (on protruding woodwork or corners). The threshold at which abatement is required is 1.0 mg/cm^2 of lead in the paint. Testing and abatement usually occurs at the time of comprehensive modernization.

It is estimated that approximately 300,000 units of public housing require abatement for a total of $446 million, or an average of about $1,450 per dwelling unit abated, including testing, cleanup and relocation where needed. Exhibit 11-1 presents the regional distribution of these costs. The estimate is only for abating those elements where the lead levels exceed the abatement threshold. The cost estimates are therefore lower than abatement costs obtained where the PHA abates all woodwork in the unit, even if the lead level for some components is beneath the 1.0 mg/cm^2 threshold.

The data were collected during 1984-85 in family public housing projects by local lead poisoning prevention programs in 34 cities. The local programs used X-ray fluorescence analyzers to detect the amount of lead in the paint of 131 public housing projects. The detectors measure the amount of lead in paint surfaces in milligrams per square centimeter, expressed as mg/cm^2. Inspectors visited 262 units plus their associated common areas (such as halls and entries) and site wide facilities (such as day care centers). Using standard procedures and reporting forms, the inspectors reported whether lead was found in the paint, the location and amount of the lead, and the condition of the paint. These data were combined with estimates of abatement costs from a cost engineering firm and multiplied by the number of units in the whole nation to produce national abatement costs. Based on HUD regulations that require abatement when the lead level in defective paint or chewable surfaces exceeds 1.0 mg/cm^2, we estimate national abatement costs at $446 million.

Exhibit 11.
Lead Paint Abatement Costs
By HUD Region



Note Allocation based on pre-1973 family units abated at the 1 0 mg threshold

11.2 THE DETAILED STUDY FINDINGS

As expected from previous studies, more lead paint is found in old units than in new units. The figures reported below show the percentage of units that have defective lead-based paint anywhere in the unit or that have leaded paint over the threshold on the chewable surface (such as a window sill). Local lead poisoning prevention programs use a variety of different standards, generally ranging from 0.7 mg to 2.0 mg/cm^2. HUD regulations published in 1986 use the threshold level of 1.0 mg/cm^2. The percentage of units with lead paint is smaller as the threshold increases, as seen in Exhibit 11-2.

Exhibit 11-2

Construction Year	Sample	Percent of Units in Family Projects with Lead (mg/cm^2) On Surfaces with Defective or Chewable Paint 0.5	0.7	1.0	1.5	2.0
1950 or before	99	86%	79%	69%	50%	43%
1951 to 1959	96	72%	60%	48%	30%	24%
1960 to 1977	52	61%	52%	41%	11%	9%
1978 to 1983	15	33%	13%	7%	0%	0%

Cost estimates were made for abating lead hazards in public housing at several potential standards. The text of the detailed report[1] shows a cost for a variety of abatement strategies. The following figures give estimates for procedures that would remove leaded paint from surfaces that are chewable by children, and cover defective (chipped or peeling) paint on flat surfaces such as walls. Because HUD regulations forbade any further use of lead-based paint in Federally-assisted housing, the fundamental abatement cost estimate is for units built before 1973. However, the manufacture and sale of paint with significant amounts of lead became illegal in 1977, so that estimates are also made in the report for abatement of units built before 1978. Estimates are for family units and buildings only. The figures give estimates for abatement work done alone. To the extent that the work was done in conjunction with other modernization work, abatement costs would be lower.

[1] Wallace, James E., "The Cost of Lead Based Paint Abatement in Public Housing," prepared for the Office of Policy Development and Research, U.S. Department of Housing and Urban Development, July 1986 (HUD-1024-PDR, August 1986).

The estimates are for the current public housing stock. Abatement costs will decline to the extent that non-viable, older projects are removed from the inventory. However, the estimates are useful in showing the magnitude of the budget needed and the difference across potential abatement threshold standards.

National Cost Estimates Lead Paint Abatement of Units
with Either Defective or Chewable Paint for Units Built Before 1973

Abatement Threshold Standard (mg/cm^2)	% of Units Needing Abatement (Pre 1973)*	Abatement Cost ($ million)	Additional Diagnostic Testing ($ million)
0.7	60	546	$40
1.0	49	380	47
1.5	25	209	57
2.0	21	162	60

* Universe of family dwelling units (2 bedroom or larger) is 629,000.

The abatement cost column includes the cost of testing the abated units for lead paint to identify parts of the unit that need abatement. The column shown as Additional Diagnostic Testing refers to the additional costs of testing all unabated units to assure that they are lead-free. Note that administrative and relocation expenses also must be added. Based on the 1984 Department set-asides for lead paint hazard identification and abatement, administrative costs would add 3 percent of abatement costs and relocation expenses would add 2 percent of abatement costs.

According to these assumptions, the budget for abating lead paint hazards in family dwellings and associated buildings in the public housing stock built before 1973 would be

Abatement Threshold Standard (mg/cm^2)	Estimated Total Cost of Abatement Project ($ million)	Number of Units Needing Abatement	Average Total Cost Per Unit
0.7	614	378,912	$1,620
1.0	446	307,654	1,450
1.5	277	159,207	1,740
2.0	230	131,427	1,750

If the total budget for hazard abatement (including residential buildings and site-wide facilities) is divided by the number of family units to be abated, the average total cost per family dwelling unit ranges from $1,450 to $1,750 depending upon the abatement threshold standard.

11.3 LEAD-BASED PAINT ABATEMENT INSPECTION PROCEDURES

This substudy addressed the concern about lead paint hazards in public housing, especially in projects where children would be exposed. It differs from the other substudies in that it was not related to the projects selected into the main sample of the Modernization Needs Study. Instead, data were obtained by staff from 34 Local Childhood Lead Poisoning Prevention Programs around the country. Public housing projects in the 34 areas were divided into four categories, based on the year of construction: (a) built before 1951, (b) built between 1951 and 1959, (c) built between 1960 and 1977, and (d) built 1978 or later. The sample was concentrated among older projects, where prior evidence indicated that lead hazard problems were more likely. Only projects having at least one-third of the dwelling units with two bedrooms or more were sampled, as a proxy for projects with children.

Using x-ray fluorescence analyzers to measure lead concentrations on painted surfaces, the Lead Paint Poisoning Prevention Program staff inspected a total of 262 dwelling units, 94 residential buildings, and 33 site-wide facilities. Exhibit 11-3 depicts the kinds of surfaces that were tested for the presence of lead-based paint. When in the dwelling units, the inspectors tested these various surfaces in the dining room, living room, kitchen, bath, bedrooms, hallways, and so on. In the common areas of the residential buildings and site-wide facilities, similar locations were tested (e.g., common area staircases, public restrooms, laundry rooms, community rooms, child care centers, recreation center locker rooms). The inspectors used specially-developed recording forms, and Exhibit 11-4 shows the form used to indicate the results of testing surfaces in kitchens.

The observations permit presentation of the incidence of lead hazards by location, according to the level of lead concentration considered hazardous. Using data about all of public housing, weights were developed to project the study observations to the national stock of public housing--all family dwelling units (those of two-bedrooms or larger), residential buildings in

Exhibit 11-3

Surfaces Tested for Lead Paint

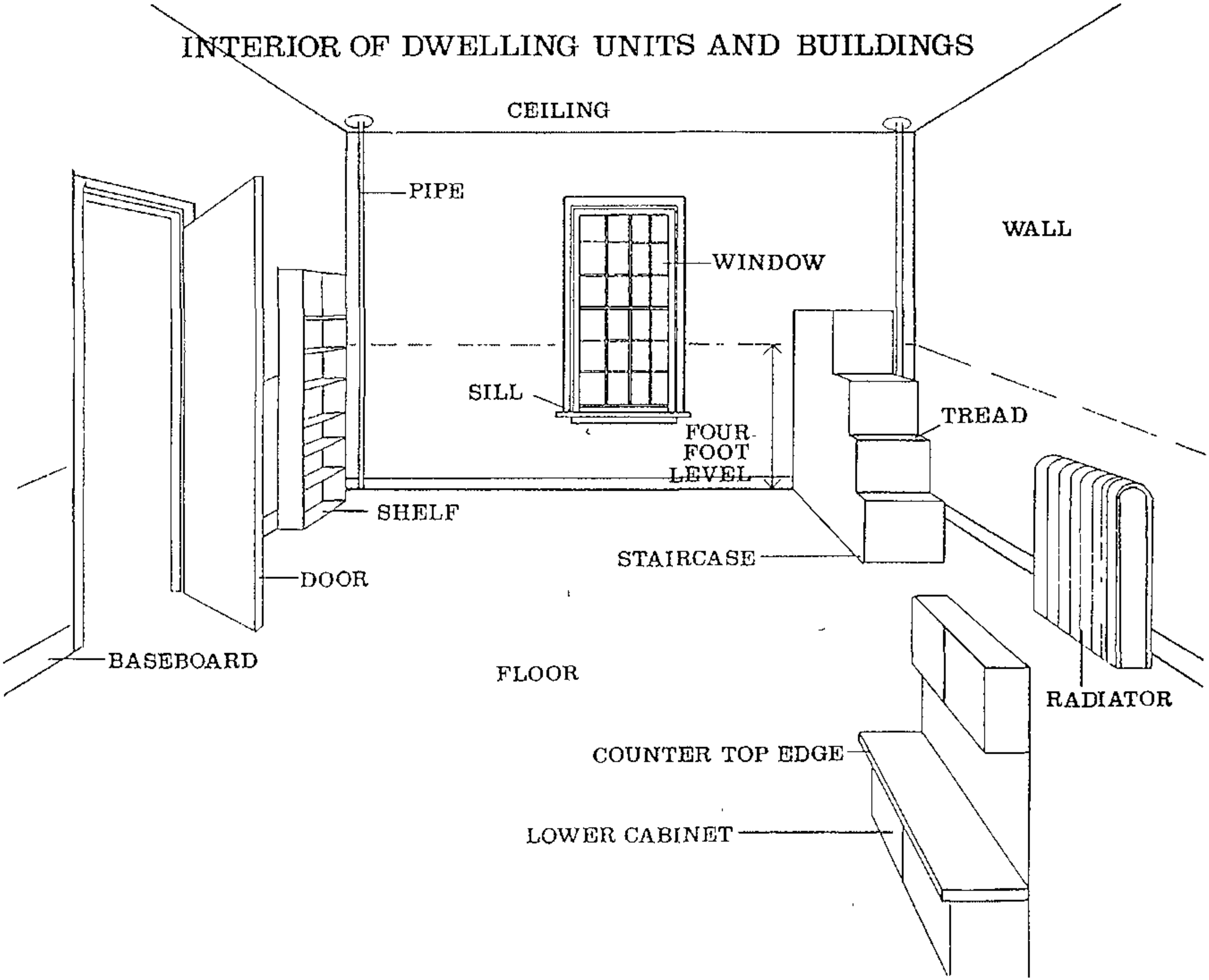
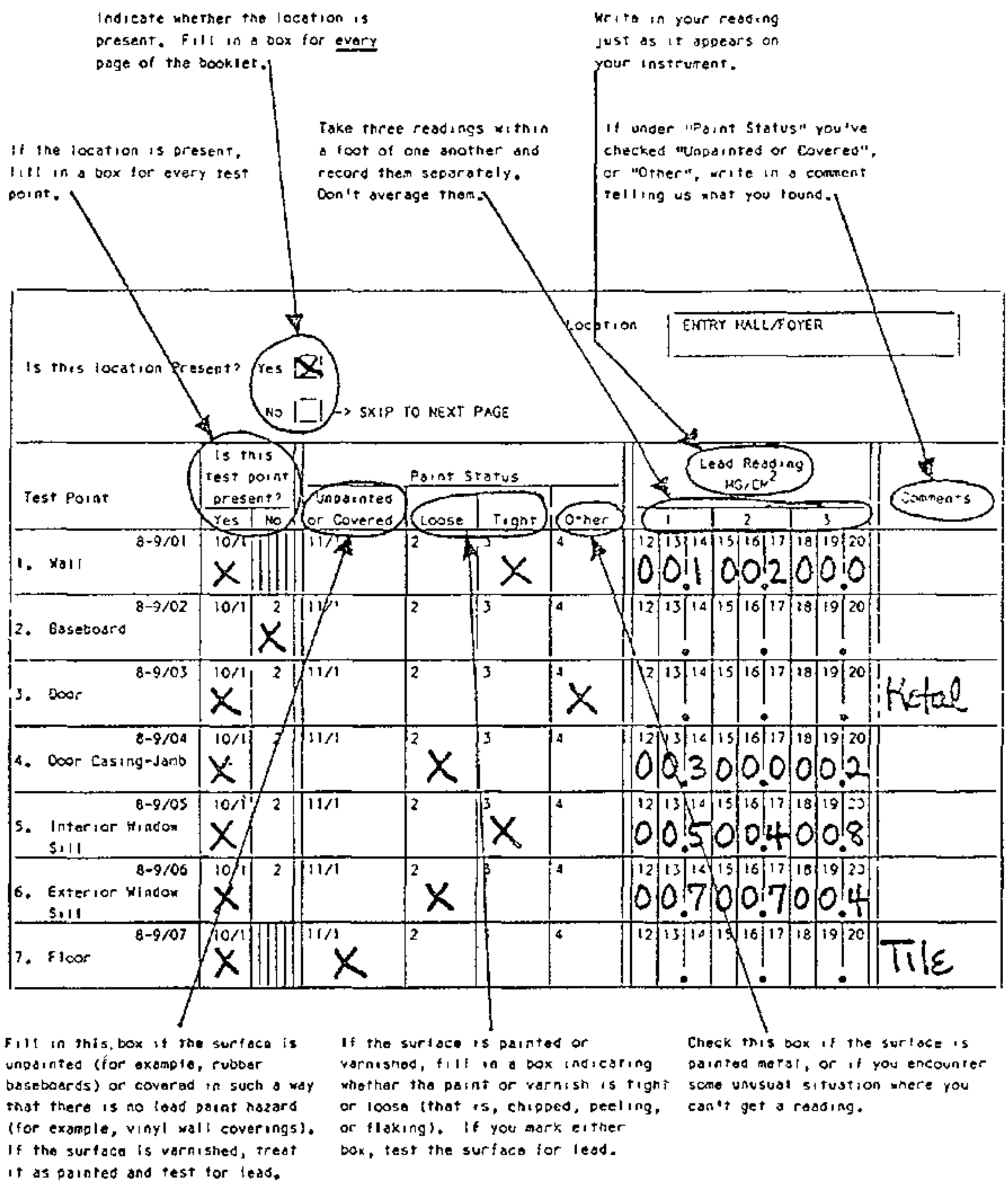


Exhibit 11-4

Illustrative Page from the Lead Paint Inspection Form



family projects (having at least a third of the dwelling units two-bedroom or larger), and family projects having site-wide facilities. The results are presented in four project-age categories--pre-1951, 1951-59, 1960-77, and 1978-83.

Cost files adapted from those developed using the R. S. Means Company construction cost data are used to develop estimates of costs of lead paint hazard abatement, including testing to identify hazardous elements, protecting surfaces from lead paint particles, and performing commercial vacuuming and wet-washing of the rooms or other areas treated. The typical abatement action is softening the paint with chemicals or heat, scraping off the lead-based paint, preparing and priming the surface, sanding, and applying a finish coat of paint. A sample of the dimensions recorded on the main study inspection forms is used to develop necessary dimensions, for example, for typical area of wall by type of room.

APPENDIX A

THE FIX COST ESTIMATING PROCESS

The main objective of the sample design was to produce HUD Field Office estimates of total FIX as well as the overall national FIX total. The process of developing a sample to accomplish this involved several design steps.[1] It began with the selection of a sample of 954 PHAs stratified by Field Office and PHA size.[2] All extra-large, large, and medium PHAs were included in this sample with certainty. A sample of small and very small PHAs was also drawn from each Field Office. These sample PHAs were requested, in the Modernization Needs Survey questionnaire, to provide an estimate of the modernization need per unit for each of their developments, as well as to provide other development characteristics such as total dwelling units and total buildings. This information was then used to select a subsample of 277 PHAs which included all extra-large PHAs. Within each Field Office the remaining PHAs were stratified by PHA size and PHA-estimated modernization need per unit. This made it possible to oversample high modernization need per unit PHAs using probability proportional to size (pps) sampling.

The next stage of constructing the FIX sample involved the selection of 1,000 sample developments that were inspected for FIX. The developments located in each of the 277 sample PHAs were stratified on the basis of the developments' modernization need per unit. The highest modernization need per unit developments in a PHA were selected with certainty and the remainder of the development sample from each PHA was selected using probability proportional to size sampling. The measure of size was the development's modernization need per unit. The distribution of the 1,000 sample developments by Field Office is shown in Exhibit A-1.

The next two stages in the FIX sample design involved sampling residential buildings and dwelling units from each of the 1,000 developments. In

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[1] For the details of the sampling plan, refer to The Modernization Needs of Public Housing: Sample Design for the Main Analysis Sample, Abt Associates, Inc., Cambridge, Mass., March 1985.

[2] The PHA size categories are: Extra Large, Large, Medium, Small, and Very Small.

Exhibit A-1

Distribution of Sample Developments by Field Office

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	NUMBER OF DEVELOPMENTS
1	011	BOSTON, MA	53
2	012	HARTFORD, CT	22
3	013	MANCHESTER, NH	12
4	014	PROVIDENCE, RI	15
5	021	BUFFALO, NY	8
6	022	SAN JUAN, PR	42
7	023	NEW YORK, NY	71
8	024	NEWARK, NJ	53
9	031	BALTIMORE, MD	15
10	032	PHILADELPHIA, PA	57
11	033	PITTSBURGH, PA	30
12	034	RICHMOND, VA	16
13	035	WASHINGTON, DC	22
14	036	CHARLESTON, WV	7
15	041	ATLANTA, GA	28
16	042	BIRMINGHAM, AL	19
17	043	COLUMBIA, SC	6
18	044	GREENSBORO, NC	40
19	045	JACKSON, MS	9
20	046	JACKSONVILLE, FL	17
21	047	KNOXVILLE, TN	17
22	048	LOUISVILLE, KY	12
23	049	NASHVILLE, TN	10
24	051	CHICAGO, IL	55
25	052	COLUMBUS, OH	5
26	053	DETROIT, MI	32
27	054	INDIANAPOLIS, IN	24
28	055	MILWAUKEE, WI	20
29	056	MINN/ST PAUL, MN	12
30	057	CINCINNATI, OH	10
31	058	CLEVELAND, OH	26
32	059	GRAND RAPIDS, MI	10
33	061	DALLAS, TX	7
34	062	LITTLE ROCK, AR	8
35	063	NEW ORLEANS, LA	15
36	064	OKLAHOMA CITY, OK	7
37	065	SAN ANTONIO, TX	15
38	066	HOUSTON, TX	7
39	071	KANSAS CITY, KS	11
40	072	OMAHA, NE	18
41	073	ST LOUIS, MO	16
42	074	DES MOINES, IO	9
43	081	DENVER, CO	10
44	091	HONOLULU, HI	10
45	092	LOS ANGELES, CA	14
46	093	SAN FRANCISCO, CA	22
47	094	PHOENIX, AZ	11
48	095	SACRAMENTO, CA	4
49	101	ANCHORAGE, AK	5
50	102	PORTLAND, OR	10
51	103	SEATTLE, WA	26
			======
			1,000

selecting buildings a simple random sample was drawn if only one building type existed in a development. If a development had a mix of building types, then the building sample was generally selected based on a stratified random sample. In total, 3,120 residential buildings were inspected. The sample of dwelling units was drawn from the residential buildings that had been selected. In all cases, simple random sampling or systematic random sampling was used to select the sample dwelling units from a building. The field staff of architects and engineers that conducted the FIX inspections was not allowed to arbitrarily decide which dwelling units would be inspected in a development. Similarly, no PHA staff person was allowed to specify which building or dwelling units should be inspected. Random selection in accordance with the sample design was maintained throughout the field period. In total, 2,194 dwelling units were inspected.

In order to estimate total FIX cost for each Field Office it is necessary to first properly weight the inspected developments, buildings and dwelling units.[1] This process involved first assigning a weight to each of the 1,000 developments that equaled the reciprocal of the product of the probabilities of selection of the PHA and the development within the PHA. For the 1,000 developments, each inspected building was assigned a weight equal to the reciprocal of the within-development selection probability of that building. The weight assigned to each dwelling unit equaled the reciprocal of the product of the building selection probability and the within-building dwelling unit selection probability. The dwelling unit weights were then ratio-adjusted on a development basis, so that the sum of the dwelling unit weights for the inspected dwelling units equaled the total dwelling unit count of that development.

Once the weight calculations had been completed, the Field Office and national estimates of total FIX were derived using a weighted mean cost per

[1] For details of the weighting methodology, refer to the memorandum dated March 25, 1986, Weighting the Modernization Needs Study Inspection Sample," by Michael Battaglia and Charles Wolters.

unit type estimator because it was expected to result in estimates with reduced sampling error.[1] The first step in the estimation process involved forming an intermediate development level FIX cost per unit estimate for each of the $j = 1, \ldots, 1{,}000$ sample developments:

$$\hat{c}_j = \frac{1}{U_j}\left[s_j + \sum_k w_{jk} b_{jk} + \sum_k \sum_l w_{jkl} d_{jkl} \right]$$

where

$\hat{c}_j$ = the intermediate development FIX cost per unit estimate for the j-th development.

U_j = total dwelling units in the j-th development.

s_j = FIX site cost for the j-th development.

w_{jk} = the within development building weight associated with the k-th building in the j-th development.

b_{jk} = the FIX building cost for the k-th building in the j-th development.

w_{jkl} = the within-development dwelling unit weight associated with the l-th dwelling unit in the k-th building in the j-th development.

d_{jkl} = the FIX dwelling unit cost for the l-th dwelling unit in the k-th building in the j-th development.

After deriving the $\hat{c}_j$ estimates, a weighted mean value of $\hat{c}_j$ was computed for each Field Office, $i = 1, \ldots, 51$:

$$\bar{c}_i = \sum_j DEVWT4_{ij} (U_j \hat{c}_j) / \sum_j DEVWT4_{ij} U_j$$

$$= \widehat{TOTCOST}_i / \hat{U}_i$$

where

[1] For details of the estimation plan, refer to the memorandum dated April 28, 1986, "Main Sample Estimate Formulae for Estimation of Public Housing Modernization Costs," by Charles Wolters, Michael Battaglia, and Sally Merrill.

$DEVWT4_{ij}$ = the previously discussed development weight assigned to the j-th development in the i-th Field Office,

$\hat{U}_i$ = the sample estimate of the number of dwelling units in the i-th Field Office, and

$\widehat{TOTCOST}_i$ = the simple expansion estimator of the total FIX cost of the i-th Field Office.

Designating U_i as the total dwelling unit count for the i-th Field Office, the total FIX estimate for the i-th Field Office was computed using the combined stratum ratio estimator:

$$\hat{c}_i = \left(\frac{U_i}{\hat{U}_i}\right) \widehat{TOTCOST}_i = U_i \bar{c}_i$$

The Field Office dwelling unit counts were provided by HUD and represent the most up-to-date dwelling unit counts available. The U_i values are shown in Exhibit A-2.

The national FIX estimate was then derived as the sum of the Field Office estimates:

$$\hat{c} = \sum_i \hat{c}_i \, .$$

Data from complex sample designs such as this one require special consideration, with regard to standard error estimation, because of design components that include stratification, clustering, and unequal selection probabilities. Several methods for approximating standard errors, which incorporate the components of a complex sample design have been developed. The Taylor series linearization method was selected for this study because of accuracy of variance estimates, software availability and computing efficiency

Exhibit A-2

Number of Dwelling Units, by Field Office

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	NUMBER OF DWELLING UNITS
1	011	BOSTON, MA	35,172
2	012	HARTFORD, CT	19,148
3	013	MANCHESTER, NH	9,839
4	014	PROVIDENCE, RI	9,855
5	021	BUFFALO, NY	25,359
6	022	SAN JUAN, PR	62,770
7	023	NEW YORK, NY	159,289
8	024	NEWARK, NJ	47,575
9	031	BALTIMORE, MD	23,605
10	032	PHILADELPHIA, PA	49,890
11	033	PITTSBURGH, PA	31,288
12	034	RICHMOND, VA	20,302
13	035	WASHINGTON, DC	15,409
14	036	CHARLESTON, WV	6,825
15	041	ATLANTA, GA	56,158
16	042	BIRMINGHAM, AL	42,009
17	043	COLUMBIA, SC	15,633
18	044	GREENSBORO, NC	37,681
19	045	JACKSON, MS	12,365
20	046	JACKSONVILLE, FL	41,732
21	047	KNOXVILLE, TN	15,671
22	048	LOUISVILLE, KY	24,985
23	049	NASHVILLE, TN	24,994
24	051	CHICAGO, IL	76,876
25	052	COLUMBUS, OH	10,191
26	053	DETROIT, MI	19,518
27	054	INDIANAPOLIS, IN	17,183
28	055	MILWAUKEE, WI	12,884
29	056	MINN/ST PAUL, MN	21,194
30	057	CINCINNATI, OH	13,166
31	058	CLEVELAND, OH	29,603
32	059	GRAND RAPIDS, MI	8,786
33	061	DALLAS, TX	34,459
34	062	LITTLE ROCK, AR	14,883
35	063	NEW ORLEANS, LA	30,985
36	064	OKLAHOMA CITY, OK	12,782
37	065	SAN ANTONIO, TX	23,126
38	066	HOUSTON, TX	8,822
39	071	KANSAS CITY, KS	15,418
40	072	OMAHA, NE	7,453
41	073	ST LOUIS, MO	14,575
42	074	DES MOINES, IO	4,244
43	081	DENVER, CO	16,271
44	091	HONOLULU, HI	5,718*
45	092	LOS ANGELES, CA	18,456
46	093	SAN FRANCISCO, CA	21,885
47	094	PHOENIX, AZ	5,198
48	095	SACRAMENTO, CA	4,395
49	101	ANCHORAGE, AK	1,124
50	102	PORTLAND, OR	6,531
51	103	SEATTLE, WA	15,781
			=========
TOTAL			1,259,061

*The Guam PHA which was not included in the PHA sampling frame accounts for 595 of the 5,718 dwelling units in the Honolulu field office.

when compared with other methods.[1] For the national FIX total estimate, the standard error and coefficient of variation was computed. These accompany the national FIX estimate presented in this report.

[1] The software employed for standard error estimation is the RATIOTEST program: RATIOTEST: Standard Errors Program for Computing of Ratio Estimates from Sample Survey Data, B.V. Shah, Research Triangle Institute, April, 1981.

APPENDIX B

THE ADDs COST ESTIMATING PROCESS

The 1,000 developments inspected for FIX were intended to serve as the sample from which the Field Office and national ADDs totals were to be estimated. However, not all PHAs supplied the required information; in total, ADDs information was provided for 843 sample developments in 239 PHAs. (See Exhibit B-1 for the distribution of sample developments by Field Office.) To compensate for this reduction in sample size in the estimation process it was necessary to ratio-adjust the development weight (DEVWT4) values of the 843 ADDs developments so that they summed to the total of DEVWT4 for all 1,000 FIX developments. This ratio-adjustment process was carried out within cells formed by the cross-classification of Field Office and four development size categories.

ADDs differed from FIX in one other major aspect. Rather than a single cost number, HUD requested that ADDs be disaggregated into 23 cost categories based on type of ADD and ISO (see Chapter 6). In other words, each ADDs item associated with the site, a sample building or a sample dwelling unit in a development was classified as belonging to one of 23 ADDs categories, as noted above. The process detailed above for the FIX estimator was then used for each of these 23 categories. The intermediate development level cost per unit estimates for these 23 categories were then summed to form a total ADDs intermediate developments level estimate. In all other respects, the estimation of totals by Field Office and for the nation proceeded the same as for FIX. The Taylor series linearization method was also used to estimate standard errors. Figure B.1 presents these estimates.

Exhibit B-1

Number of Developments in ADDs Analysis, by Field Office

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	NUMBER OF DEVELOPMENTS
1	011	BOSTON, MA	45
2	012	HARTFORD, CT	19
3	013	MANCHESTER, NH	8
4	014	PROVIDENCE, RI	9
5	021	BUFFALO, NY	8
6	022	SAN JUAN, PR	36
7	023	NEW YORK, NY	63
8	024	NEWARK, NJ	42
9	031	BALTIMORE, MD	7
10	032	PHILADELPHIA, PA	46
11	033	PITTSBURGH, PA	30
12	034	RICHMOND, VA	16
13	035	WASHINGTON, DC	18
14	036	CHARLESTON, WV	7
15	041	ATLANTA, GA	27
16	042	BIRMINGHAM, AL	11
17	043	COLUMBIA, SC	6
18	044	GREENSBORO, NC	33
19	045	JACKSON, MS	7
20	046	JACKSONVILLE, FL	7
21	047	KNOXVILLE, TN	16
22	048	LOUISVILLE, KY	10
23	049	NASHVILLE, TN	4
24	051	CHICAGO, IL	37
25	052	COLUMBUS, OH	5
26	053	DETROIT, MI	30
27	054	INDIANAPOLIS, IN	21
28	055	MILWAUKEE, WI	20
29	056	MINN/ST PAUL, MN	10
30	057	CINCINNATI, OH	9
31	058	CLEVELAND, OH	26
32	059	GRAND RAPIDS, MI	10
33	061	DALLAS, TX	3
34	062	LITTLE ROCK, AR	8
35	063	NEW ORLEANS, LA	14
36	064	OKLAHOMA CITY, OK	7
37	065	SAN ANTONIO, TX	10
38	066	HOUSTON, TX	7
39	071	KANSAS CITY, KS	9
40	072	OMAHA, NE	17
41	073	ST LOUIS, MO	16
42	074	DES MOINES, IO	9
43	081	DENVER, CO	9
44	091	HONOLULU, HI	10
45	092	LOS ANGELES, CA	7
46	093	SAN FRANCISCO, CA	22
47	094	PHOENIX, AZ	11
48	095	SACRAMENTO, CA	4
49	101	ANCHORAGE, AK	2
50	102	PORTLAND, OR	9
51	103	SEATTLE, WA	26
			====
			843

APPENDIX C

THE REDESIGN COST ESTIMATING PROCESS

The Modernization Needs Survey questionnaire allowed PHAs to indicate which of their developments were candidates for redesign. Redesign candidate developments falling in the 1,000 development FIX sample were then mailed a Redesign Questionnaire which requested additional details on the scope of the proposed redesign as well as an estimate of the redesign cost per unit. Developments requiring mechanical and electrical redesign only were excluded from the redesign sampling frame because the redesign survey looked soley at architectural redesign. Mechanical and electrical redesign, where needed, is included in the FIX inspection results.

Four redesign strata were created -- three strata sorted the developments into low, medium and high redesign cost per unit developments based on data from the Redesign Questionnaire. The fourth strata consisted of those developments that indicated a definite need for redesign in the Redesign Questionnaire but failed to provide a redesign cost per unit estimate.

Exhibit C-1 indicates the estimated total number of redesign developments in each of the four strata, as well as the total number of dwelling units by stratum. The sample size of redesign developments selected from each stratum is also shown in Exhibit 9. Within each stratum, developments were selected using simple random sampling. In total, 75 developments were inspected. PHAs proposed 143 of the 1,000 developments in the base sample for redesign.

The first step in estimating the national redesign total involved assigning a weight to each of the 75 developments. This weight equaled the product of DEVWT4 and reciprocal of the within-stratum selection probability. Designate this weight as $REDESIGNWT_{hj}$ (h = 1, . . . 4 strata; j references development within strata). For each development, an adjusted redesign cost per unit value was computed from

$$ADJCOST/UNIT_{hj} = \frac{TOTREDESIGNCOST_{hj} - FIX_{hj}}{TOTUNITS_{hj}}$$

where

Exhibit C-1

The Redesign Population and Sample

Redesign Stratum	Estimated Total Number of Redesign Developments = N_h	Development Sample Size = n_h	Estimated Total Number of Dwelling Units = U_h
Low Redesign Cost Per Unit	530	36	85,836
Medium Redesign Cost Per Unit	157	11	40,733
High Redesign Cost Per Unit	29	10	6,880
Redesign Needed but Cost Estimate Not Provided	117	18	26,122
	883*	75	159,571

* This estimate is of the total number of developments that PHAs perceive need redesign out of the 11,000 in the total public housing stock.

$TOTREDESIGNCOST_{hj}$ = the gross redesign cost for the j-th development in the h-th redesign stratum

FIX_{hj} = the FIX cost estimate for the j-th development in the h-th stratum.

$TOTUNITS_{hj}$ = the total number of dwelling units in the j-th development in the h-th stratum.

The national estimates of total redesign cost was then derived from:

$$TOTREDESIGN = \sum_{h=1}^{4} U_h \left[\frac{\sum_j REDESIGNWT_{hj} \times ADJCOST/UNIT_{hj}}{\sum_j REDESIGNWT_{hj}} \right]$$

where

U_h = the estimated total number of dwelling units in the h-th redesign stratum.

The standard error of TOTREDESIGN was approximated using the formula:

$$\sqrt{\sum_{h=1}^{4} W_h^2 \, U_h^2 \, (s_h^2 / n_h) \, (1 - \frac{n_h}{N_h})}$$

were

W_h = the estimated proportion of total redesign developments in the h-th stratum.

N_h = the estimated total number of redesign developments in the h-th stratum.

n_h = the sample size of developments in the h-th redesign stratum.

s_h = the weighted stratum standard deviation of the $ADJCOST/UNIT_{hj}$ values.

This standard error approximation method ignores the clustering of the FIX development sample within PHAs and will therefore provide slight underestimates of the actual standard error.

APPENDIX D

THE ENERGY CONSERVATION IMPROVEMENTS ESTIMATING PROCESS

The energy inspection sample was selected as a subsample of the 1,000 FIX developments. The 1,000 developments were first sorted into four estimated energy savings potential strata. To make this estimate, we used information about each development that PHAs had provided on the Modernization Needs survey questionnaire, particularly Section E on energy conservation actions already taken, combined with results from the earlier study by Perkins and Will/The Ehrenkrantz Group (An Evaluation of the Physical Condition of the Public Housing Stock--Energy Conservation, Volume 4, H2850, March 1980). Annual energy cost per dwelling unit was estimated for each development based on Table 1.2 of PWE Volume 4, which takes into account climate zone, building type, and energy source for heat.

Potential energy cost savings for a series of energy conservation actions were estimated from Table 1.8 of PWE Volume 4, scaled by the extent of work in that category the PHA indicated on the Modernization Needs survey had already been performed. These savings were summed to provide a rough estimate of potential energy cost savings for each development, called ESCORE. The ESCORE value for each development was then divided by the development's total dwelling unit count to form an ESCORE per unit estimate. The distribution of the 1,000 FIX developments by the four strata is shown in Exhibit D-1. This exhibit also shows the sample size of inspected energy developments by stratum.

The next step in the design of the energy inspection sample involved the random selection of one free-standing site wide facility (SWF) from each of the 124 energy developments with one or more SWFs. Because the energy use and potential savings differ across residential building types, within each of the developments drawn for the energy study, one of each residential building type appearing the the FIX sample was also drawn randomly from each of three categories:

High rise (multi-family buildings of 4 or more stories)

Low rise and Combination (multi-family buildings of 3 or fewer stories and buildings on a common foundation that fall into two or more categories)

Exhibit D-1

The Energy Sample Strata

Stratum	Estimated ESCORE/Unit* Stratum Boundaries	Distribution of 1,000 FIX Developments	Distribution of Energy Inspection Sample Developments
1	$241 or lower	495	116
2	$242 to $327	246	17
3	$328 to $521	186	57
4	$521 or higher	73	51
		1,000	241

* Prior estimate of potential energy savings, based on questionnaire data.

Single family (either attached or detached)

In total, 254 residential buildings received an energy inspection along with 92 SWFs.

The first step in the development of national estimates involved assigning a weight, reflecting the reciprocal of the probability of selection, to each residential building and SWF. For the residential buildings we first multiplied the development weight (DEVWT4) from FIX times the ESCORE per unit stratum development sampling ratio. A within development selection probability was then computed for each inspected residential building. Its reciprocal was multiplied by the development's energy weight to form the weight, W_{hij} (h = ESCORE/unit stratum, i = development, j = residential building), assigned to the inspected residential buildings. Assigning weights to the inspected SWFs first involved an accounting of the failure to inspect a SWF in 32 energy developments out of 124 that had one or more SWFs. This was accomplished by ratio-adjusting the development energy weights by ESCORE per unit stratum for the 92 developments with SWFs where one was inspected to compensate for the lack of data from the 32 developments. A within development SWF selection probability was then computed for each of the 92 developments. The product of the ratio-adjusted development energy weight and the reciprocal of the within development SWF selection probability formed the weight, W_{hik} (h = ESCORE/unit stratum, i = development, k = SWF), assigned to the inspected SWFs.

National estimates were computed for eight key variables:

FIX-EXT	Annual Energy Cost Savings from FIX Actions
OMS-EXT	Annual Energy Cost Savings from Operating and Maintenance (O&M) Actions
OMS-COST	Implementation Costs of Operating and Maintenance Actions
NPV-EXT	Cost Effective Annual Energy Cost Savings Available after O&M and FIX Actions
NPVALUE	Net Present Value of Cost Effective Annual Energy Cost Savings Available after O&M and FIX Actions (evaluated as a

function of the energy and discount rate parameter, INFLATE)

NPV-COST Implementation Costs of Cost Effective Annual Energy Cost Savings Available after O&M and FIX Actions

PAY-EXT Annual Energy Cost Savings from ECOs Justified by Payback Criterion

PAY-COST Implementation Costs of ECOs Justified by Payback Criterion

These national estimates were formed separately for residential buildings and SWFs. The national totals were then obtained by adding the two estimates together. For the residential building estimate, the estimation process involved dividing the value of each of the eight variables of interest by the number of dwelling units in the building. Using the W_{hij} weights, a weighted mean cost per unit was computed for each of the eight variables of interest for each of the four ESCORE per unit strata. An estimate of the total number of dwelling units in each stratum was obtained using the 1,000 development FIX sample. The stratum cost per unit means were multiplied by their corresponding dwelling unit totals to form stratum total estimates for each of the eight variables of interest. By summing over the four strata, the national estimate for residential buildings was obtained. The standard error for each of these eight national totals was estimated by:

$$s.e.(\hat{Y}_{RES}) = \sqrt{\sum_{h=1}^{4} U_h^2 W_h^2 \ (s_h^2/n_h) \ (1 - \frac{n_h}{N_n})}$$

where

U_h = the total dwelling unit count for the h-th stratum

W_h = the proportion of the total residential buildings in the h-th stratum

n_h = the stratum sample size of buildings

N_h = the total number of residential buildings in the h-th stratum.

The estimation process for SWFs followed the same exact lines as for residential buildings. However, because a SWF does not contain any dwelling units and serves an entire development, the value of each of the eight variables of interest were divided by the total number of dwelling units in the development.

As noted above, the national estimate, $\hat{Y}$, for each of the eight variables of interest was formed by adding the residential building national estimate, $\hat{Y}_{RES}$, with the SWF national estimate, $\hat{Y}_{SWF}$. The standard error of $\hat{Y}$ was obtained from:

$$s.e.(\hat{Y}) = \sqrt{s.e.(\hat{Y}_{RES})^2 + s.e.(\hat{Y}_{SWF})^2}$$

This standard error approximation ignores the clustering of the FIX development sample within PHAs and will therefore provide slight under estimates of the actual standard errors.

Net Present Value Method Formula

In calculating energy conservation capital improvements using the present value approach, the following formulas were used. The relationship between first-year annual savings (E_0), expected lifetime of the action (L), cost of implementation (C), real energy inflation rate (n) and real discount rate (r), is, as shown in the Energy Analysis Plan,

$$\text{Net Present Value of Energy Savings} = E_0\{\exp(n-r)L - 1\}/(n-r) - C.$$

For the special case n = r, this expression collapses to

$$\text{Net Present Value of Energy Savings} = E_0(L - C/E_0),$$

where the term C/E_0 is just the payback period.

APPENDIX E

ACCESSIBILITY FOR THE HANDICAPPED: THE COST ESTIMATING PROCESS

The 1,000 developments inspected for FIX were intended to serve as the sample from which the Field Office and national handicapped totals were to be estimated. However, not all PHAs supplied the required information (i.e., for some of the 1,000 developments the handicapped request section of the Project Characteristics form was not filled out or no form was ever submitted by the PHA). In total, handicapped request information was obtained for 745 sample developments in 228 PHAs (see Exhibit E-1 for the distribution of sample developments by Field Office). To compensate for this reduction in sample size in the estimation process it was necessary to ratio-adjust the development weight (DEVWT4) values of the 745 developments so that they summed the total of DEVWT4 for all 1,000 FIX developments. This ratio-adjustment process was carried out within cells formed by the cross-classification of Field Office and four development size categories.

Handicapped cost estimation differed from that used for FIX in one other major respect. The PHAs provided handicapped requests for the entire development and not just the sample buildings and dwelling units that were inspected for FIX. Denoting these development level total costs by H_j for the $j = 1, \ldots, 745$ developments, a cost per unit value was obtained from:

$$H_j \text{ per unit} = \frac{H_j}{U_j} ,$$

where

U_j = total dwelling units in the j-th development.

After obtaining the H_j per unit values, the estimation process proceeded in a way similar to the FIX estimation process in order to develop the Field Office and national handicapped cost totals. The Taylor series linearization method was also used to estimate standard errors. The standard error and coefficient of variation of the national handicapped total cost accompanies the estimate presented in this report.

APPENDIX F

THE INDIAN HOUSING PROGRAM COST ESTIMATION PROCESS

FIX Estimates -- Rental Developments

The population of Indian housing developments consists of rental and homeownership developments. The rental population contains 18,559 dwelling units, while the homeownership population consists of 30,884 dwelling units. The primary objective of this component of the study was to provide national estimates of FIX and ADD for the rental population. That is because only rental units are fully eligible for modernization in the CIAP program. For the homeownership population it was determined that a small sample of developments would be employed to provide a national FIX estimate subject to a fairly high sampling error. Less emphasis was put on homeownership developments since the homeowner occupants are responsible for the repair of normal wear and tear. HUD is responsible for modernization costs needed to repair design deficiencies, for emergency health and safety needs, and for cost-effective energy conservation opportunities. (These restrictions on CIAP spending are identical for the Turnkey III Program, which is found in both IHAs and non-Indian PHAs.)

In order to proceed with the selection of both samples it was first necessary to create a sampling frame of IHAs that excluded distant and isolated Indian Housing Authorities (IHAs). Restricting the sampling frame and therefore the target population to IHAs located in relatively accessible areas of the country was necessary in order to conserve field data collection resources. Exhibit F-1 compares the dwelling unit counts for the entire population with those for the restricted population that formed the sampling frame.

For each IHA in the target population an estimate of the modernization cost per unit was obtained from the Indian Field Offices. This information was used to select a probability proportional to size sample of 20 IHAs containing rental developments. A total of 27 rental developments were selected from the sample IHAs using probability proportional to size sampling. For this second stage of sampling the measure of size was total dwelling units since an estimate of modernization need could not be obtained for rental developments. For each of the 27 rental developments, probability samples of

Exhibit F-1

Population Dwelling Unit Counts

Entire Population	
Dwelling Unit Total	49,443
Rental Units	18,559
Homeownership Units	30,884

Restricted Target Population	
Dwelling Unit Total	19,541
Rental Units	7,884
Homeownership Units	11,657

residential buildings and dwelling units were drawn. In general, a simple random sample of buildings was drawn since most developments only had single-family detached buildings. For those developments with a mix of building types, stratified sampling was employed. In total, 322 sample buildings were inspected for FIX. The dwelling unit sample was drawn from the selected residential buildings. For single-family detached buildings there is a one-to-one correspondence between the building and dwelling unit and therefore no random selection is required. In buildings containing two or more dwelling units, the sample dwelling units were selected using simple random sampling. A total of 332 rental dwelling units were inspected for FIX.

The weighting of the Indian rental sample and the estimation of total Indian rental FIX for the nation proceeded in a way similar to the FIX estimation process for public housing. Two national FIX estimates, however, were produced. The first applied to the restricted target population of 7,884 dwelling units. The standard error of this total was also estimated using the Taylor series linearization method. In order to approximate the total FIX cost for the entire population, an estimate was also formed for the entire population of 18,559 rental dwelling units. The standard error of this estimate was also derived. This total and its standard error should be viewed as descriptive estimates since the rental sample actually excluded a portion of the entire population.

ADDs Estimate -- Rental Developments

ADDs request forms were obtained from the IHAs for 22 of the 27 rental developments. It was therefore necessary to ratio-adjust the development weights for these 22 developments so that they summed to the total of the development weights for all 27 sample developments. This ratio adjustment process was carried out at the level of each Indian Housing Region. As with public housing ADDs, the Indian ADDs data were distributed across the 15 categories requested by HUD, as shown in Exhibit 8 for ADDs. The estimation process proceeded in a way similar to the estimation process for public housing ADDs. A national ADDs estimate for each ADDs category as well as the total was produced both for the entire population and the restricted target population. Standard errors were computed for both sets of estimates using the Taylor series linearization method. As with the rental FIX estimates, the ADDs estimates for the entire population should be regarded as descriptive in nature.

FIX Estimate -- Homeownership Developments

The homeownership FIX sample consisted of four IHAs, four developments, 21 residential buildings, and 21 dwelling units. The sample was not a true probability sample of all IHAs containing homeownership developments for two reasons. First, isolated and remote IHAs were excluded. Second, the sampling frame of homeownership IHAs was limited to those with one or more rental developments. Thus, the four sample IHAs were IHAs that had been selected as part of the rental sample. In selecting developments, residential buildings and dwelling units, probability sampling procedures were employed. Because the homeownership sample size is very small the standard error computed for the national FIX total is fairly large. As with the rental sample, an estimate of total FIX was also computed for the entire homeownership population. No estimate of ADDs was possible from the homeownership sample due to lack of data from the IHAs involved.

APPENDIX G

THE LEAD PAINT ABATEMENT COST ESTIMATION PROCESS

Because data collection was to be provided by Childhood Lead Poisoning Prevention Programs (CLPPPs), the universe from which the sample of projects for this study was selected was limited to those in Public Housing Authorities located within CLPPP jurisdictions. In addition, because the study focuses on lead hazards for children, the projects sampled were to be family projects. Although HUD sometimes uses other designations, for purposes of this study a project was defined as "family" if more than a third of the dwelling units in the project are two-bedroom or larger. Most projects tend to be predominantly for elderly occupancy or for family occupancy, so this division provides a reasonable separation.

Sample Assignment

Because lead paint is more likely to be found in older projects, the sample was stratified on project age. Using estimated lead incidence data at 1.5 milligram per square centimeter from Pittsburgh (Shier and Hall, 1977) as reported in Billick and Gray (1978, Figure 6-1), a sample of 220 projects was distributed across age strata as follows:

Year of Construction	Est. % with Lead		Project Sample
Pre 1951	56		77
1951-1959	37		72
1960-1975	21		46
Post 1975	10 or lower		25
		TOTAL	220

Although the intention was to increase the project sample in each stratum to allow for some nonresponse, the project samples assigned actually were smaller by one project in each age stratum, for two reasons. First, the total number of CLPPPs was 55, but only 34 were able to cooperate with the requested data collection, either for lack of operating equipment, available staff, or discontinuance of the program. Secondly, HUD had obtained agreement with the CLPPPs for their cooperation on the basis that no CLPPP would have to inspect more than five projects. Some smaller PHAs (18) had fewer than five projects total, and all of those projects were sampled, 57 projects in total.

For each of the assigned projects, the CLPPP was asked to complete a Sample Control Booklet with basic information on the distribution of units in the project according to number of bedrooms and on the calibration of the fluorescence instrument used for the lead tests. Each of the selected Public Housing Authorities was contacted to ascertain the composition of the project in terms of number of buildings, made a random selection of a residential building for inspection. Within the selected building, information was obtained on apartment numbering and made a random selection of two dwelling units plus two replacement units in the event the inspectors were unable to inspect the assigned dwelling units. The CLPPP then was asked to complete a Residential Building booklet and a Dwelling Unit booklet (containing space for entries on two dwelling units). For single family detached buildings two Residential Building booklets were provided. CLPPPs also were asked to complete a Site-wide Facilities booklet for any such facilities associated with the project.

Of the 216 projects assigned to CLPPPs for inspection, inspection booklets were returned for a total of 94 buildings, representing a return rate of 44 percent. Dwelling Unit booklets for 262 dwelling units were returned, representing a return rate of 61 percent of the 432 assigned. A total of 33 Site-wide Facilities Booklets were returned.

Of the 216 Sample Control Booklets 100 were returned. For projects with no Sample Control Booklet returned, auxiliary data were used for the distribution of units over number of bedrooms in the unit--either the Modernization Needs Data Form collected from PHAs by Abt Associates in connection with the main study on modernization costs or from the HUD data file on public housing projects known as FORMS. When unit distribution data were available from no data source, a distribution was imputed to the sample project using first the PHA average, if available, then the HUD Region average, within the age stratum of the assigned project. Lacking calibration data on the fluorescence analyzers for these projects, the instruments were assumed to provide true readings as recorded in the inspection booklets.

Sample Weights

In a strict sense no inference beyond the "family" developments in the cooperating CLPPP jurisdictions can be made for the sample of observations, because PHAs outside CLPPP jurisdictions had zero probability of being selected as did "non-family" developments. However, it is important to obtain some estimates of the occurrence and costs of abatement of lead hazards in the national public housing stock based on the observations from the inspections conducted for this study. The approach is to develop pseudo-weights as though the sample observations had been drawn from the national stock of public housing, assuming that the age (construction year) of the project is the only criterion determining the incidence of lead.

In designing this study we also were concerned about taking into account dwelling units that had already had abatement orders issued and, presumably, carried out. The sampling design was organized to obtain information from the CLPPPs and PHAs about abatement activities in the selected developments. The Sample Control Booklet provided space to record the number of units for which abatement had already been carried out in the selected buildings, and the inspectors were instructed to skip over any units drawn for the dwelling unit sample that already had been abated. As it turned out, none of the buildings selected for this study had had any known abatement activity, so no correction for previous abatement activity is made in the sample weights. Apparently the number of units on which specific abatement orders have been carried out is quite small. Some lead paint abatement activity may, of course, have taken place in the selected buildings or dwelling units in the course of redecorating or remodeling work, but we have no record of such activity and cannot attempt to correct for it in the sample weights.

In that observations were made only at projects within the jurisdiction of cooperating Childhood Lead Poisoning Prevention Programs, this assumption raises some caution. Not only were there no CLPPPs returning data from west of the Mississippi, but one can make arguments in opposing directions about the possible bias of selecting CLPPP jurisdictions. CLPPP jurisdictions may exist primarily in areas in which lead incidence is high and the incidence may remain high in PHAs situated in those areas. Conversely, if lead abatement activities have been pursued aggressively by the CLPPP, the current incidence of lead may be much lower than it otherwise would have been. Thus, the estimates reported here may be biased either upward or downward. They are, however, the best estimates available under the circumstances.

The boundary between the two most recent age strata was moved for weighting purposes to 1977/1978 because July 1977 is actually the date specified in HUD regulations after which lead-based paint was not to be used in HUD-related housing. The construction year of the projects in the sample was used to reallocate them to the redefined strata. As Federal rulemaking proceeded, HUD also requested a separate stratification for 1960 through 1972, the year in which HUD regulations forbade the use of lead-based paint in federally assisted housing. While the weighting and population tables in this appendix carry out this substratification, neither the main text or other appendices attempt to present the 1973-1977 substratum because it would rest on a sample of 6 dwelling units and 2 residential buildings.

A further caution about construction year must be made. This study used the project completion date recorded in HUD data files (the FORMS data base) as the estimate of construction year. However, when a number of projects in the most recent age stratum indicated presence of lead, individual telephone contacts were made with the PHAs for each of the projects in Stratum 4 (Post 1977), and it was discovered that some projects that were acquired as scattered sites or FHA-repossessions actually were constructed at an earlier year than the "completion date" kept in the HUD records. The result was to change the construction year to an earlier age stratum for 8 of the 16 Residential Building inspections returned. Because of this significant change, projects in the next age stratum were checked if there was an indication that they were acquired property; the result was to change two of the four projects checked into an earlier age category.

Using data from the Modernization Needs Data Form and from the HUD FORMS data base, population totals have been computed within each age stratum for the three samples of lead paint inspections made--family dwelling units (two-bedroom or larger) in all developments, residential buildings in family projects (having at least a third of the dwelling units two-bedroom or larger), and family projects having site-wide facilities. Because neither of the data sources contains unit size distributions within buildings, all buildings in a family project were designated family buildings. From the data sources used, the number of "family" projects is 6,811 out of a total of 11,430.

For site-wide facilities, no distinction was made for weighting purposes about the number or type of facilities present. A special follow-up telephone contact with PHAs having projects selected for the sample in the main study on modernization needs was used to determine the presence of site-wide facilities. The population of family projects with site-wide facilities was estimated within each age stratum using the development weights calculated for the primary inspection sample in the main study.

Exhibit G-1 presents the resulting weights as applied to the actual sample returns for dwelling units, residential buildings and site-wide facilities. No standard errors were computed for this component of the study because probability sampling procedures were not employed (i.e., a national probability sample of family developments was not drawn).

Exhibit G-1
WEIGHTS BY AGE STRATUM

	Pre-1951	1951-1959	1960-1977	1978-1983	Special Substratum 1960-1972
FAMILY DWELLING UNITS IN PROJECTS OF ALL TYPES					
Returned Sample	99	96	52	15	46
Population	118,479	233,088	352,236	70,337	277,437
Population weight ($\frac{\text{Population}}{\text{Returned Sample}}$)	1,196.76	2,428.0	6,774.77	4,689.13	6,031.25
RESIDENTIAL BUILDINGS IN FAMILY PROJECTS					
Returned Sample	41	31	16	6	14
Population	18,433	40,082	102,438	20,578	79,529
Population weight	449.58	1,292.97	6,402.38	3,429.67	5,680.64
90% Confidence Interval Half-Width	±10%	±15%	±16%	±25%	±18%
FAMILY PROJECTS WITH SITE-WIDE FACILITIES					
Returned Sample	18	11	4	0	4
Population	676	935	2,472	167	1830
Population weight	37.555	85.0	618.0	No Observation	457.38

APPENDIX H

SELECTION OF FIX AND ADDs ESTIMATOR

FIX and ADDs are the two types of modernization needs for which direct estimates for the 51 field offices were developed. One part of this process involved selecting an estimator to use. Another aspect involved reviewing the data for outliers. Each of these processes is described in turn.

The selection of an estimator for FIX and ADDs took three criteria into account. The magnitude of the standard error, the bias of the estimator and the need to select the single overall best estimator to be applied in all field offices. Although one estimator might not perform best in all 51 field offices for both FIX and ADDs, it was felt that it was important to be consistent in the choice of the estimator.

The following three field office estimators were examined in detail:

<u>Simple Unbiased Expansion</u>

$$\sum_j \text{DEVWT4}_{ij}\, U_j\, \hat{c}_{jF} \qquad \text{for FIX}$$

$$\sum_j \text{DEVWT5}_{ij}\, U_j\, \hat{c}_{jA} \qquad \text{for ADDs}$$

<u>Cost Per Unit Estimator</u>

$$U_i \frac{\sum_j \text{DEVWT4}_{ij}\, \hat{c}_{jF}}{\sum_j \text{DEVWT4}_{ij}} \qquad \text{for FIX}$$

$$U_i \frac{\sum_j \text{DEVWT5}_{ij}\, \hat{c}_{jA}}{\sum_j \text{DEVWT5}_{ij}} \qquad \text{for ADDs}$$

Combined Stratum Ratio Estimator

$$U_i \frac{\sum_j DEVWT4_{ij} U_j \hat{c}_{jF}}{\sum_j DEVWT4_{ij} U_j} \qquad \text{for FIX}$$

$$U_i \frac{\sum_j DEVWT5_{ij} U_j \hat{c}_{jA}}{\sum_j DEVWT5_{ij} U_j} \qquad \text{for ADDs}$$

where

$DEVWT4_{ij}$ = the FIX development weight assigned to the j-th development in the i-th field office

$DEVWT5_{ij}$ = the ADDs development weight assigned to the j-th development in the i-th field office,

U_j = total dwelling units in the j-th development,

$\hat{c}_{jF}$ = the intermediate development FIX cost per unit estimate for the j-th development,

$\hat{c}_{jA}$ = the intermediate development ADDs cost per unit estimate for the j-th development, and

U_i = the total number of dwelling units in the i-th field office.

To address the issue of precision, we estimated the coefficient of variation for each of the three estimators for each field office for both FIX and ADDs. To examine the bias issue we reviewed the FIX and ADDs sample size of developments for each field office and examined the correlation between $\hat{c}_{jF}$ and U_j, $\hat{c}_{jA}$ and U_j, $U_j \hat{c}_{jF}$ and U_j and $U_j \hat{c}_{jA}$ and U_j. We found that the cost per unit estimator and the ratio estimator displayed the lowest coefficient of variation in about the same number of the 51 field offices. However, there were a sufficient number of field offices that exhibited a high correlation between $\hat{c}_{jF}$ and U_j and $\hat{c}_{jA}$ and U_j (i.e., between cost per unit and development size) to cause a non-negligible bias when the cost per unit estimator was used. Furthermore, in those field offices where the cost per unit estimator had a lower coefficient of variation than the ratio estimator, it was generally only slightly lower. The ratio estimator was therefore selected over the cost per unit estimator, and the simple unbiased expansion estimator, because it provided a lower coefficient of variation than the simple expansion in almost all of the field offices (due to the high positive correlation between total cost and development size). There are a small number of field offices with small development sample sizes where the ratio estimator may have a non-negligible bias, however these field offices have low total FIX and ADDs costs in relation to other field offices. Taking into account the need to have a single estimator for both FIX and ADDs in all 51 field offices, the ratio estimator is clearly the best choice overall.

The second aspect of the process of producing field office estimates using the ratio estimator involved checking each of the 51 field offices for outlier weight values. Three types of outliers were identified -- developments with a high development weight, reflecting a low cost per unit estimate from the PHA in the Modernization Needs Survey, that had a high FIX development cost estimate; developments with a low development weight, reflecting a high cost per unit estimate from the PHA in the Modernization Needs Survey, that had a low FIX development cost estimate; and developments with a development size very different from the average of all other developments in their modernization cost per unit stratum.

The effect of the first type of outlier development is to cause the field office estimate from the sample to overestimate the true population value. The effect of the second type of outlier development is to cause the field office estimate from the sample to underestimate the true population value. For the third type of outlier development the sample can overestimate or underestimate the true population value depending on whether the developments' size is higher or lower than the average size and the relationship between the development's size and its FIX and ADDs intermediate estimates.

Outlier developments were located in 11 out of 51 field offices. To reduce/increase the influence of the effected developments, adjustments were made to the FIX and ADDs weights (DEVWT4 and DEVWT5, respectively). The weight adjustment process involved using the DEVWT2 value, which equals the reciprocal of the development's selection probability prior to the post-stratification adjustment by development size within field office, if the DEVWT2 value was lower than the DEVWT4 value. For those developments where the DEVWT2 value was greater than or equal to the DEVWT4 value, a modernization cost per unit development stratum adjustment factor was developed by comparing the sample proportion of dwelling units accounted for by each modernization cost per unit development stratum in the field office with the corresponding population proportion. All sample developments in the stratum that exhibited a high overrepresentation or high underrepresentation had their DEVWT4 values adjusted so that the sample proportion of dwelling units for the stratum agreed with the population proportion.

The new DEVWT4 values for all effected developments were also used as new DEVWT5 values in the ADDs estimation process. We should also note that two very large F.H.A. scattered site developments in the Philadelphia field office had extremely high intermediate FIX development costs. These developments were selected with a high probability but were however not included with certainty. Because these developments are atypical of the public housing stock, we reduced their influence on the FIX estimate by reducing their DEVWT4 value to one so that they only represented themselves in the estimate. In no case were actual intermediate development costs ever adjusted or changed.

The weight adjustment process had a very small effect on the overall national FIX estimate -- a 2.1 percent decline from $9,507 million to $9,307 million. The total national ADDs estimate increased to $12,947 million from $10,072 million, however most of this increase is due to the fact that the $10,072 million total ADDs estimate in the draft final report failed to incorporate ADDs requests associated with dwelling units.

Exhibit H-1: Sampled Developments Ordered by Field Office

FIELD OFFICE=11 OFFICE NAME=BOSTON, MA

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
1	11	BOSTON, MA	25001	LOWELL HA	4	03574	MA001001	NORTH COMMON VILLAGE	536
2	11	BOSTON, MA	25001	LOWELL HA	4	03582	MA001002	G W FLANAGAN PROJ	166
3	11	BOSTON, MA	25001	LOWELL HA	4	03599	MA001003	BISHOP MARKHAM PROJ	366
4	11	BOSTON, MA	25001	LOWELL HA	4	03606	MA001004	FAULKNER PROJ	28
5	11	BOSTON, MA	25001	LOWELL HA	4	03614	MA001007	HARTWELL PROJ	25
6	11	BOSTON, MA	25001	LOWELL HA	4	03622	MA001012	SCATTERED SITES	45
7	11	BOSTON MA	25002	BOSTON HA	5	03639	MA002001	CHARLESTOWN	1149
8	11	BOSTON, MA	25002	BOSTON HA	5	03647	MA002003	MISSION HILL	1023
9	11	BOSTON, MA	25002	BOSTON HA	5	03655	MA002004	LENOX ST	304
10	11	BOSTON, MA	25002	BOSTON HA	5	03663	MA002006	SOUTH END	508
11	11	BOSTON, MA	25002	BOSTON HA	5	03671	MA002007	HEATH ST	327
12	11	BOSTON, MA	25002	BOSTON HA	5	03688	MA002008	MAVERICK	414
13	11	BOSTON, MA	25002	BOSTON HA	5	03696	MA002009	FRANKLIN HILL	373
14	11	BOSTON, MA	25002	BOSTON HA	5	03703	MA002013	BEECH ST	274
15	11	BOSTON, MA	25002	BOSTON HA	5	03711	MA002014	MISSION HILL EXT	581
16	11	BOSTON, MA	25002	BOSTON HA	5	03728	MA002019	BROMLEY PARK	730
17	11	BOSTON, MA	25002	BOSTON HA	5	03744	MA002032	GROVELAND ST	64
18	11	BOSTON, MA	25002	BOSTON HA	5	03752	MA002042	WALNUT PARK	168
19	11	BOSTON, MA	25002	BOSTON HA	5	03769			857
20	11	BOSTON, MA	25002	BOSTON HA	5	03777			1016
21	11	BOSTON, MA	25003	CAMBRIDGE HA	4	03785	MA003001	WASHINGTON ELMS	324
22	11	BOSTON, MA	25003	CAMBRIDGE HA	4	03793	MA003003	PUTNAM GARDENS	123
23	11	BOSTON, MA	25003	CAMBRIDGE HA	4	03809	MA003004	J F KENNEDY APTS	88
24	11	BOSTON, MA	25003	CAMBRIDGE HA	4	03817	MA003005	NEWTOWNE COURTS	294
25	11	BOSTON, MA	25003	CAMBRIDGE HA	4	03825	MA003006	HARRY S TRUMAN APTS	67
26	11	BOSTON, MA	25003	CAMBRIDGE HA	4	03833	MA003007	DANIEL F BURNS APTS	199
27	11	BOSTON, MA	25003	CAMBRIDGE HA	4	03841	MA003014	UDIC	26
28	11	BOSTON, MA	25005	HOLYOKE HA	3	03858	MA005002	JACKSON PARKWAY	219
29	11	BOSTON, MA	25005	HOLYOKE HA	3	03866	MA005006	FALCETTI TOWERS	100
30	11	BOSTON, MA	25006	FALL RIVER HA	4	03874	MA006001	SUNSET HILL	355
31	11	BOSTON, MA	25006	FALL RIVER HA	4	03882	MA006002	HARBOR TERRACE	223
32	11	BOSTON, MA	25006	FALL RIVER HA	4	03899	MA006003	HILLSIDE MANOR	300
33	11	BOSTON, MA	25006	FALL RIVER HA	4	03906	MA006007	ARRUDA APTS	140
34	11	BOSTON, MA	25006	FALL RIVER HA	4	03914	MA006008	HIGHLAND HEIGHTS APTS	208
35	11	BOSTON, MA	25006	FALL RIVER HA	4	03922	MA006015	JARABEK APTS	36
36	11	BOSTON, MA	25012	WORCESTER HA	4	03939	MA012002	ADDISON ST APT	50
37	11	BOSTON, MA	25012	WORCESTER HA	4	03947	MA012003	MILL POND APT	50
38	11	BOSTON, MA	25012	WORCESTER HA	4	03955	MA012004	MAYSIDE APT	50
39	11	BOSTON, MA	25012	WORCESTER HA	4	03963	MA012007	MILL POND APT EXT	24
40	11	BOSTON, MA	25012	WORCESTER HA	4	03971	MA012008	LINCOLN PARK TOWER APT	199
41	11	BOSTON, MA	25012	WORCESTER HA	4	03988	MA012011	HOOPER ST APT	26
42	11	BOSTON, MA	25012	WORCESTER HA	4	03996	MA012014	JACKSON APT	60
43	11	BOSTON, MA	25012	WORCESTER HA	4	04002	MA012016	PROVIDENCE NORTH ST AP	29
44	11	BOSTON, MA	25020	QUINCY HA	3	04019	MA020001	RIVERVIEW	180
45	11	BOSTON, MA	25020	QUINCY HA	3	04027			275
46	11	BOSTON, MA	25022	MALDEN HA	3	04035	MA022001	NEWLAND ST	250
47	11	BOSTON, MA	25022	MALDEN HA	3	04043	MA022006	PLEASANT ST	172
48	11	BOSTON, MA	25035	SPRINGFIELD HA	4	04076	MA035003	JOHN L SULLIVAN APT	96
49	11	BOSTON, MA	25035	SPRINGFIELD HA	4	04084	MA035010	PENDLETON APT	19

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

FIELD OFFICE=11 OFFICE NAME=BOSTON, MA

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
50	11	BOSTON, MA	25035	SPRINGFIELD HA	4	04092	MA035011	MARBLE APT	48
51	11	BOSTON, MA	25035	SPRINGFIELD HA	4	04108	MA035013	CENTRAL APT	44
52	11	BOSTON, MA	25035	SPRINGFIELD HA	4	04116	MA035016	JOHNNY APPLESEED APT	60
53	11	BOSTON, MA	25043	DRACUT HA	1	04124	MA043001	CLUSTER GDN APT	44
OFFNAME									13332
FIELDOFF									13332

FIELD OFFICE=12 OFFICE NAME=HARTFORD, CT

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
54	12	HARTFORD, CT	09001	BRIDGEPORT HA	4	00885	CT001001	FATHER PANIK VILLAGE	1082
55	12	HARTFORD, CT	09001	BRIDGEPORT HA	4	00893	CT001005	P T BARNUM APTS	482
56	12	HARTFORD, CT	09001	BRIDGEPORT HA	4	00909	CT001006	CHARLES F GREENE HOME	280
57	12	HARTFORD, CT	09003	HARTFORD HA	4	00917	CT003002	DUTCH POINT COLONY	222
58	12	HARTFORD, CT	09003	HARTFORD HA	4	00925	CT003005	STOWE VILLAGE	598
59	12	HARTFORD, CT	09003	HARTFORD HA	4	00933	CT003010	REHAB HOUSING	3
60	12	HARTFORD, CT	09004	NEW HAVEN HA	4	00941	CT004003	QUINNIPIAC TERRACE	244
61	12	HARTFORD, CT	09004	NEW HAVEN HA	4	00958	CT004006	ROCKVIEW	195
62	12	HARTFORD, CT	09004	NEW HAVEN HA	4	00966	CT004007	ELM HAVEN EXTENSION	366
63	12	HARTFORD, CT	09004	NEW HAVEN HA	4	00974	CT004009	NEWHALL GARDENS	36
64	12	HARTFORD, CT	09004	NEW HAVEN HA	4	00982	CT004017	ROBERT T WOLFE APTS	93
65	12	HARTFORD, CT	09004	NEW HAVEN HA	4	00999	CT004026	VALENTINA MACRI COURT	18
66	12	HARTFORD, CT	09004	NEW HAVEN HA	4	01005	CT004030	WAVERLY TOWNHOUSES	52
67	12	HARTFORD, CT	09004	NEW HAVEN HA	4	01013	CT26P004035	MCCONAUGHY TERRACE	291
68	12	HARTFORD, CT	09006	WATERBURY HA	3	01021	CT006001	BERKLEY HEIGHTS	344
69	12	HARTFORD, CT	09006	WATERBURY HA	3	01038	CT006004	OAK TERRACE	54
70	12	HARTFORD, CT	09006	WATERBURY HA	3	01046	CT006007	TRUMAN APTS	80
71	12	HARTFORD, CT	09013	HARTFORD HA	3	01054	CT013001	HOCKANUM PARK	100
72	12	HARTFORD, CT	09013	HARTFORD HA	3	01062	CT013004	MEADOW HILL APTS	120
73	12	HARTFORD, CT	09013	HARTFORD HA	3	01079	CT013007	MILLER GARDENS	84
74	12	HARTFORD, CT	09029	WEST HAVEN HA	2	01095	CT029002	SURFSIDE 200	200
75	12	HARTFORD, CT	09029	WEST HAVEN HA	2	01102	CT26P029004	WEST HAVEN	9
OFFNAME									4953
FIELDOFF									4953

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

-- FIELD OFFICE=13 OFFICE NAME=MANCHESTER, --

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
76	13	MANCHESTER,	23003	PORTLAND HA	3	03258	ME003002	KENNEDY PARK	46
77	13	MANCHESTER,	23003	PORTLAND HA	3	03266	ME003003	BAYSIDE TERRACE	24
78	13	MANCHESTER,	23003	PORTLAND HA	3	03274	ME003005	BAYSIDE EAST	100
79	13	MANCHESTER,	23003	PORTLAND HA	3	03282	ME003010	FRONT STREET	50
80	13	MANCHESTER,	23004	PRESQUE ISLE HA	2	03299	ME004001	PLEASANT HILL	110
81	13	MANCHESTER,	23009	BANGOR HA	3	03322	ME009001	CAPEHART	348
82	13	MANCHESTER,	23009	BANGOR HA	3	03339	ME009002	SCATTERED SITES	88
83	13	MANCHESTER,	23009	BANGOR HA	3	03347	ME009005	GRIFFIN PARK	50
84	13	MANCHESTER,	33001	MANCHESTER HA	3	05348	NH001001	ELMWOOD GARDENS	200
85	13	MANCHESTER,	33001	MANCHESTER HA	3	05356	NH001002	RIMMON HEIGHTS	189
86	13	MANCHESTER,	33001	MANCHESTER HA	3	05364	NH001003	BENOIT HOMES	150
87	13	MANCHESTER,	33001	MANCHESTER HA	3	05372	NH001004	SCATTERED SITES	150
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OFFNAME									1505
FIELDOFF									1505

-- FIELD OFFICE=14 OFFICE NAME=PROV --

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
88	14	PROV	44001	PROVIDENCE HA	4	08945	RI001001	CHAD BROWN	154
89	14	PROV	44001	PROVIDENCE HA	4	08953	RI001004	HARTFORD PARK	632
90	14	PROV	44001	PROVIDENCE HA	4	08961	RI001005	MANTON HEIGHTS	330
91	14	PROV	44001	PROVIDENCE HA	4	08978	RI001006	HARTFORD PRK EXTENSION	116
92	14	PROV	44001	PROVIDENCE HA	4	08986	RI001007	SUNSET VILLAGE	36
93	14	PROV	44001	PROVIDENCE HA	4	08994			201
94	14	PROV	44003	WOONSOCKET HA	4	09033			300
95	14	PROV	44003	WOONSOCKET HA	4	09041			198
96	14	PROV	44005	NEWPORT HA	3	09058	RI005001	PARK HOLM	262
97	14	PROV	44005	NEWPORT HA	3	09066	RI005003	TONOMY HILL	502
98	14	PROV	44005	NEWPORT HA	3	09074			170
99	14	PROV	44005	NEWPORT HA	3	09082			76
100	14	PROV	44009	JOHNSTON HA	2	09099	RI009003	SCATTERED SITES	14
101	14	PROV	44009	JOHNSTON HA	2	09106			74
102	14	PROV	44020	SMITHFIELD HA	1	09114	RI020001	GREENVILLE MANOR	50
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OFFNAME									3115
FIELDOFF									3115

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

FIELD OFFICE=21 OFFICE NAME=BUFFALO, NY

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
103	21	BUFFALO, NY	36001	SYRACUSE HA	4	05948	NY001001	PIONEER HOMES	632
104	21	BUFFALO, NY	36001	SYRACUSE HA	4	05956	NY001002	JAMES GEDDES	331
105	21	BUFFALO, NY	36011	NIAGARA FALLS HA	3	06425	NY011004	LASALLE CTS	250
106	21	BUFFALO, NY	36028	SCHENECTADY HA	3	06466	NY028003	MACGATHAN TOWNHOUSES	50
107	21	BUFFALO, NY	36028	SCHENECTADY HA	3	06474	NY028007	MARYVALE TOWNHOUSES	8
108	21	BUFFALO, NY	36041	ROCHESTER HA	4	06482	NY041012	CAPSULE DWELLING	32
109	21	BUFFALO, NY	36041	ROCHESTER HA	4	06499	NY041018	HUDSON RIDGE	396
110	21	BUFFALO, NY	36068	ONEONTA HA	2	06741	NY068001	ALBERT NADER TOWERS	112
OFFNAME									1811
FIELDOFF									1811

FIELD OFFICE=22 OFFICE NAME=SAN JUAN, PR

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
111	22	SAN JUAN, PR	72001	PRURHC	4	10734	RQ001002	SANTAGO IGLESIAS	280
112	22	SAN JUAN, PR	72001	PRURHC	4	10742	RQ001008	DR PILA IGLESIAS	586
113	22	SAN JUAN, PR	72001	PRURHC	4	10759	RQ001010	DR JOSE N GANDARA	270
114	22	SAN JUAN, PR	72001	PRURHC	4	10767	RQ001014	ARISTIDES CHAVIER	480
115	22	SAN JUAN, PR	72001	PRURHC	4	10775	RQ001015	EXT MANUEL DE LA PILA	120
116	22	SAN JUAN, PR	72002	PRURHC	4	10783	RQ002001	LAS CASAS	420
117	22	SAN JUAN, PR	72002	PRURHC	4	10791	RQ002003	PUERTA DE TIERRA	484
118	22	SAN JUAN, PR	72002	PRURHC	4	10807	RQ002009	LUIS LLORENS TORRES	2594
119	22	SAN JUAN, PR	72002	PRURHC	4	10815	RQ002010	VISTA HERMOSA	894
120	22	SAN JUAN, PR	72003	PRURHC	5	10823	RQ003020	LIBORIO ORTIZ	160
121	22	SAN JUAN, PR	72003	PRURHC	5	10831	RQ003023	FERNANDO LUIS GARCIA	200
122	22	SAN JUAN, PR	72003	PRURHC	5	10848	RQ003028	DR VICTOR BERRIOS	144
123	22	SAN JUAN, PR	72003	PRURHC	5	10856	RQ003044	PADRE NAZARIO	120
124	22	SAN JUAN, PR	72003	PRURHC	5	10864	RQ003052	LA RIVERA	100
125	22	SAN JUAN, PR	72003	PRURHC	5	10872	RQ003059	TOMAS SOROLLA	74
126	22	SAN JUAN, PR	72003	PRURHC	5	10889	RQ003063	LOS FLAMBOYANAS	70
127	22	SAN JUAN, PR	72003	PRURHC	5	10897	RQ003066	JOSE H RAMIREZ	80
128	22	SAN JUAN, PR	72003	PRURHC	5	10904	RQ003086	JOSE AGUSTIN APONTE	300
129	22	SAN JUAN, PR	72003	PRURHC	5	10912	RQ003087	ANDRES MENDEZ LICEAGA	150
130	22	SAN JUAN, PR	72003	PRURHC	5	10929	RQ003088	LAS PALMAS	120
131	22	SAN JUAN, PR	72003	PRURHC	5	10937	RQ003093	NARCISO VARONA	260
132	22	SAN JUAN, PR	72004	PRURHC	4	10945	RQ004005	MARINI FARM	100
133	22	SAN JUAN, PR	72004	PRURHC	4	10953	RQ004006	CUESTA DELAS PIEDRAS	142
134	22	SAN JUAN, PR	72004	PRURHC	4	10961	RQ004010	CARMEN	252
135	22	SAN JUAN, PR	72004	PRURHC	4	10978	RQ004011	RAFAEL HERNANDEZ	274
136	22	SAN JUAN, PR	72005	PRURHC	5	10986	RQ005001	JUAN C CORDERO DAVILA	508
137	22	SAN JUAN, PR	72005	PRURHC	5	10994	RQ005009	SABANA ABAJO	500
138	22	SAN JUAN, PR	72005	PRURHC	5	11009	RQ005019	BRISAS DEL TURABO	122
139	22	SAN JUAN, PR	72005	PRURHC	5	11017	RQ005020	DR PEDRO J PALOU	150
140	22	SAN JUAN, PR	72005	PRURHC	5	11025	RQ005066	TURABO HEIGHTS	254
141	22	SAN JUAN, PR	72005	PRURHC	5	11033	RQ005069	LOS LAURELES	194
142	22	SAN JUAN, PR	72005	PRURHC	5	11041	RQ005083	LOMA LINDA	94

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

FIELD OFFICE=22 OFFICE NAME=SAN JUAN, PR

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
143	22	SAN JUAN, PR	72005	PRURHC	5	11058	RQ005084	LOS CRISANTEMOS I II	416
144	22	SAN JUAN, PR	72005	PRURHC	5	11066	RQ005103	TORRES DE SABANA	452
145	22	SAN JUAN, PR	72005	PRURHC	5	11074	RQ005133	VILLA DEL RIO	100
146	22	SAN JUAN, PR	72005	PRURHC	5	11082	RQ005158	LA MONTANA	220
147	22	SAN JUAN, PR	78001	VIHA	4	11106	VI001006	RALPH DECHABERT	264
148	22	SAN JUAN, PR	78001	VIHA	4	11114	VI001011	LUCINDA MILLIN HOME EL	85
149	22	SAN JUAN, PR	78001	VIHA	4	11122	VI001014	MONBIJOU	111
150	22	SAN JUAN, PR	78001	VIHA	4	11139	VI001019	BOVONI COMMUNITY	364
151	22	SAN JUAN, PR	78001	VIHA	4	11147	VI001026	WARREN E BROWN I	128
152	22	SAN JUAN, PR	78001	VIHA	4	11155	VI001031	ESTATE TAARNEBERG ROSS	34
OFFNAME									12670
FIELDOFF									12670

FIELD OFFICE=23 OFFICE NAME=NEW YORK, NY

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
153	23	NEW YORK, NY	36003	YONKERS HA	4	05964	NY003001	EMMETT BURKE GARDENS	550
154	23	NEW YORK, NY	36003	YONKERS HA	4	05972	NY003002	HALLS HOMES/LOEHR COUR	156
155	23	NEW YORK, NY	36003	YONKERS HA	4	05989	NY003003	WM A SCHLOBOHM	411
156	23	NEW YORK, NY	36003	YONKERS HA	4	05997	NY003004	WM A WALSH HOMES	300
157	23	NEW YORK, NY	36003	YONKERS HA	4	06003	NY003005	ROSS CALCAGNO HOMES	278
158	23	NEW YORK, NY	36003	YONKERS HA	4	06011	NY003006	CURRAN CT/KRISTENSEN	218
159	23	NEW YORK, NY	36003	YONKERS HA	4	06028	NY003007	JOHN E FLYNN MANOR	140
160	23	NEW YORK, NY	36003	YONKERS HA	4	06036	NY36P003009	COTTAGE PLACE GARDENS	256
161	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06044	NY005003	VLADECK	1531
162	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06052	NY005004	SOUTH JAMAICA I	448
163	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06069	NY005006	KINGSBOROUGH	1166
164	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06077	NY005012	BARUCH	2194
165	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06085	NY005013	VAN DYKE I	1603
166	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06093	NY005015	THROGGS NECK	1185
167	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06109	NY005017	BREVOORT	896
168	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06117	NY005018	SOUTH JAMIACA II	600
169	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06125	NY005031	MC KINLEY	619
170	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06133	NY005038	BAISLEY PARK	386
171	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06141	NY005040	WEST BRIGHTON I & II	634
172	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06158	NY005046	TOMPKINS	1046
173	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06166	NY005047	LAFAYETTE	882
174	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06174	NY005051	HARLEM RIVER II	116
175	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06182	NY005054	ELEANOR ROOSEVELT I	763
176	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06199	NY005055	VAN DYKE II	112
177	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06206	NY005056	UPPER WEST SIDE UR	396
178	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06214	NY005064	SEN ROBERT A TAFT	1470
179	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06222	NY005068	303 VERNON AVENUE	234
180	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06239	NY005074	WYCKOFF GARDENS	529
181	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06247	NY005090	1010 E 178 ST	220
182	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06255	NY005093	LATIMER GARDENS	423

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

-- FIELD OFFICE=23 OFFICE NAME=NEW YORK, NY --

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
183	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06263	NY005095	2440 BOSTON ROAD	235
184	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06271	NY005096	DAVIDSON	354
185	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06288	NY005121	DR RAMON E BETANCES	309
186	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06296	NY005135	DR BETANCES IV	282
187	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06328	NY005164	HOE AVE/E 173 ST	65
188	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06336	NY005175	BORINQUEN PLAZA STAGE	509
189	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06352	NY005184	RAVENSWOOD	2166
190	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06369	NY36P005275	NYCHA	422
191	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06377			1187
192	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06385			1255
193	23	NEW YORK, NY	36005	NEW YORK CITY HA	5	06393			1791
194	23	NEW YORK, NY	36008	TUCKAHOE HA	2	06409	NY008002	SANFORD GARDENS	99
195	23	NEW YORK, NY	36008	TUCKAHOE HA	2	06417	NY008003	JEFFERSON GARDENS	52
196	23	NEW YORK, NY	36042	WHITE PLAINS HA	3	06506	NY042001	LAKEVIEW	95
197	23	NEW YORK, NY	36042	WHITE PLAINS HA	3	06514	NY36P042003	SCHUYLER-DEKALB	167
198	23	NEW YORK, NY	36042	WHITE PLAINS HA	3	06522	NY36P042006	WINBROOK APTS	415
199	23	NEW YORK, NY	36045	KINGSTON HA	2	06539	NY045001	RONDOUT GARDENS	131
200	23	NEW YORK, NY	36045	KINGSTON HA	2	06547	NY045003	REHABILITATED HOUSES	15
201	23	NEW YORK, NY	36046	HEMPSTEAD TOWN HA	4	06555	NY046001	NEWBRIDGE GARDENS	84
202	23	NEW YORK, NY	36046	HEMPSTEAD TOWN HA	4	06563	NY046002	GREEN ACRES	120
203	23	NEW YORK, NY	36046	HEMPSTEAD TOWN HA	4	06571	NY046004	BAYVIEW GARDENS	45
204	23	NEW YORK, NY	36046	HEMPSTEAD TOWN HA	4	06588	NY046005	INWOOD GARDENS	50
205	23	NEW YORK, NY	36046	HEMPSTEAD TOWN HA	4	06596	NY046006	BROOKSIDE GARDENS	78
206	23	NEW YORK, NY	36046	HEMPSTEAD TOWN HA	4	06603	NY046007	MEADOWBROOK GARDENS	80
207	23	NEW YORK, NY	36046	HEMPSTEAD TOWN HA	4	06611	NY046008	MILL RIVER GARDENS	106
208	23	NEW YORK, NY	36046	HEMPSTEAD TOWN HA	4	06628	NY046009	BELLMORE GARDENS	98
209	23	NEW YORK, NY	36046	HEMPSTEAD TOWN HA	4	06636	NY046012	EASTOVER GARDENS	144
210	23	NEW YORK, NY	36055	OYSTER BAY TOWN HA	3	06669	NY055003	PLAINEDGE SENIOR CZNS	36
211	23	NEW YORK, NY	36055	OYSTER BAY TOWN HA	3	06677	NY055004	MASSAPEQUA SENIOR CZNS	75
212	23	NEW YORK, NY	36055	OYSTER BAY TOWN HA	3	06685	NY055007	PLAINVIEW SENIOR CZNS	69
213	23	NEW YORK, NY	36055	OYSTER BAY TOWN HA	3	06693	NY055008	MASSAPEQUA FAM/SNR CZN	172
214	23	NEW YORK, NY	36056	SPRING VALLEY VILLAGE HA	2	06709	NY056001	HARVEST HOUSE	50
215	23	NEW YORK, NY	36056	SPRING VALLEY VILLAGE HA	2	06717	NY056002	GESNER GARDENS	75
216	23	NEW YORK, NY	36056	SPRING VALLEY VILLAGE HA	2	06725	NY056003	FRANKLIN COURT	20
217	23	NEW YORK, NY	36082	PEEKSKILL HA	2	06758	NY082002	PEEKSKILL HA	11
218	23	NEW YORK, NY	36082	PEEKSKILL HA	2	06766	NY082003	PEEKSKILL HA	33
219	23	NEW YORK, NY	36082	PEEKSKILL HA	2	06774	NY36P082004	BOHLMANN TOWERS	240
220	23	NEW YORK, NY	36088	NEW ROCHELLE HA	3	06814	NY088001	QUEEN CITY TOWER	112
221	23	NEW YORK, NY	36088	NEW ROCHELLE HA	3	06822	NY088002	LA ROCHELLE MANOR	91
222	23	NEW YORK, NY	36088	NEW ROCHELLE HA	3	06839	NY088003	BRACEY APTS	100
223	23	NEW YORK, NY	36088	NEW ROCHELLE HA	3	06847	NY088004	HARTLEY HOUSES	240
OFFNAME									31440
FIELDOFF									31440

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

-- FIELD OFFICE=24 OFFICE NAME=NEWARK, NJ --

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
224	24	NEWARK, NJ	34002	NEWARK HA	5	05389	NJ002001	SETH BOYDEN CT	529
225	24	NEWARK, NJ	34002	NEWARK HA	5	05397	NJ002002	PENNINGTON COURT	234
226	24	NEWARK, NJ	34002	NEWARK HA	5	05404	NJ002006	STEPHEN CRANE	354
227	24	NEWARK, NJ	34002	NEWARK HA	5	05412	NJ002007	HYATT COURT	399
228	24	NEWARK, NJ	34002	NEWARK HA	5	05429	NJ002008	FELIX FULD	296
229	24	NEWARK, NJ	34002	NEWARK HA	5	05437	NJ002009	ROOSEVELT HOMES	273
230	24	NEWARK, NJ	34002	NEWARK HA	5	05445	NJ002010	KRETCHMER HOMES	730
231	24	NEWARK, NJ	34002	NEWARK HA	5	05453	NJ002011	WALSH HOMES	628
232	24	NEWARK, NJ	34002	NEWARK HA	5	05478	NJ002013	COLUMBUS HOMES	1453
233	24	NEWARK, NJ	34002	NEWARK HA	5	05486	NJ002015	STELLA WRIGHT	1204
234	24	NEWARK, NJ	34002	NEWARK HA	5	05494	NJ002017	KRETCHMER HOMES	198
235	24	NEWARK, NJ	34002	NEWARK HA	5	05501	NJ002019	SCUDDER HOMES	1674
236	24	NEWARK, NJ	34002	NEWARK HA	5	05518	NJ002030	NEWARK HA	360
237	24	NEWARK, NJ	34002	NEWARK HA	5	05526	NJ002031	NEWARK HA	200
238	24	NEWARK, NJ	34005	TRENTON HA	4	05534	NJ005001	LINCOLN HMS	118
239	24	NEWARK, NJ	34005	TRENTON HA	4	05542	NJ005002	DONNELLY HOMES	376
240	24	NEWARK, NJ	34005	TRENTON HA	4	05559	NJ005003	PROSPECT VILLAGE	120
241	24	NEWARK, NJ	34005	TRENTON HA	4	05567	NJ005004	KERNEY HOMES	101
242	24	NEWARK, NJ	34005	TRENTON HA	4	05575	NJ005005	CAMPBELL HMS	81
243	24	NEWARK, NJ	34005	TRENTON HA	4	05583	NJ005006	WILSON HMS	219
244	24	NEWARK, NJ	34005	TRENTON HA	4	05591	NJ005008	HAVERSTICK HMS	112
245	24	NEWARK, NJ	34005	TRENTON HA	4	05607	NJ005010	MILLER HOMES	256
246	24	NEWARK, NJ	34005	TRENTON HA	4	05615	NJ005011	JAMES J ABBOTT	108
247	24	NEWARK, NJ	34007	ASBURY PARK HA	3	05623	NJ007002	WASHINGTON VLG	60
248	24	NEWARK, NJ	34007	ASBURY PARK HA	3	05631	NJ007004	LINCOLN VLG	62
249	24	NEWARK, NJ	34007	ASBURY PARK HA	3	05648	NJ007005	COMSTOCK CT	50
250	24	NEWARK, NJ	34007	ASBURY PARK HA	3	05656	NJ007007	DR E A ROBINSON TWS	110
251	24	NEWARK, NJ	34010	CAMDEN HA	4	05664	NJ010001	BRANCH VLGE	279
252	24	NEWARK, NJ	34010	CAMDEN HA	4	05672	NJ010002	ABLETT VLG	306
253	24	NEWARK, NJ	34010	CAMDEN HA	4	05689	NJ010003	ROOSEVELT MANOR	268
254	24	NEWARK, NJ	34010	CAMDEN HA	4	05697	NJ010004	MCGUIRE GRDNS	367
255	24	NEWARK, NJ	34010	CAMDEN HA	4	05704	NJ010005	CHELTON TERR	200
256	24	NEWARK, NJ	34010	CAMDEN HA	4	05712	NJ010006	WESTFIELD ACRES	514
257	24	NEWARK, NJ	34010	CAMDEN HA	4	05729	NJ010007	KENNEDY TWRS	99
258	24	NEWARK, NJ	34010	CAMDEN HA	4	05737	NJ010011	ROYAL CT TWHS	93
259	24	NEWARK, NJ	34011	LODI HA	2	05745	NJ011001	DE VRIES PARK	100
260	24	NEWARK, NJ	34011	LODI HA	2	05753	NJ011004	LODI BORO HA	40
261	24	NEWARK, NJ	34014	ATLANTIC CITY HA	4	05761	NJ014001	JOHNATHAN PITNEY VLGE	333
262	24	NEWARK, NJ	34014	ATLANTIC CITY HA	4	05778	NJ014002	HOLMES VLGE EXTENSION	164
263	24	NEWARK, NJ	34014	ATLANTIC CITY HA	4	05786	NJ014003	BUZBY HOMES VLGE	122
264	24	NEWARK, NJ	34014	ATLANTIC CITY HA	4	05794	NJ014004	HOLMES VLGE	279
265	24	NEWARK, NJ	34014	ATLANTIC CITY HA	4	05801	NJ014005	ALTMAN TERR/INLET TWR	346
266	24	NEWARK, NJ	34014	ATLANTIC CITY HA	4	05818	NJ014006	SHORE PARK & SHORE TER	404
267	24	NEWARK, NJ	34014	ATLANTIC CITY HA	4	05826	NJ014007	ATLANTIC CITY HA	300
268	24	NEWARK, NJ	34015	HOBOKEN HA	4	05834	NJ015001	ANDREW JACKSON GRDNS	598
269	24	NEWARK, NJ	34015	HOBOKEN HA	4	05842	NJ015002	C COLUMBUS GRDNS	97
270	24	NEWARK, NJ	34015	HOBOKEN HA	4	05859	NJ015003	HARRISON GRDNS	208
271	24	NEWARK, NJ	34015	HOBOKEN HA	4	05867	NJ015004	MONROE & ADAMS GRDNS	250
272	24	NEWARK, NJ	34015	HOBOKEN HA	4	05875	NJ015005	FOX HILL GRDNS	200

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

FIELD OFFICE=24 OFFICE NAME=NEWARK, NJ

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
273	24	NEWARK, NJ	34063	VINELAND HA	3	05907	NJ063001	PARKVIEW & WEST HAVEN	125
274	24	NEWARK, NJ	34063	VINELAND HA	3	05915	NJ063004	AXTELL ESTATES	50
275	24	NEWARK, NJ	34063	VINELAND HA	3	05923	NJ063005	VINELAND HA	27
276	24	NEWARK, NJ	34063	VINELAND HA	3	05931	NJ063010	HOMEOWNERSHIP	36
OFFNAME									16110
FIELDOFF									16110

FIELD OFFICE=31 OFFICE NAME=BALTIMORE, M

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
277	31	BALTIMORE, M	24001	ANNAPOLIS HSNG AUTH	3	03355	MD001003	BLOOMSBURY SQUARE	51
278	31	BALTIMORE, M	24001	ANNAPOLIS HSNG AUTH	3	03363	MD001008	NEWTOWNE #20	77
279	31	BALTIMORE, M	24001	ANNAPOLIS HSNG AUTH	3	03371	MD001010	BOWMAN COURT	50
280	31	BALTIMORE, M	24002	BALTIMORE CITY HSNG AUTH	5	03388	MD002004	POE HOMES	298
281	31	BALTIMORE, M	24002	BALTIMORE CITY HSNG AUTH	5	03396	MD002006	GILMOR HOMES	587
282	31	BALTIMORE, M	24002	BALTIMORE CITY HSNG AUTH	5	03403	MD002011	CHERRY HILL HOMES	600
283	31	BALTIMORE, M	24002	BALTIMORE CITY HSNG AUTH	5	03411	MD002014	CLAREMONT HOMES	292
284	31	BALTIMORE, M	24002	BALTIMORE CITY HSNG AUTH	5	03428	MD002021	BROOKLYN HOMES	500
285	31	BALTIMORE, M	24002	BALTIMORE CITY HSNG AUTH	5	03436	MD002022	WESTPORT HOMES	200
286	31	BALTIMORE, M	24002	BALTIMORE CITY HSNG AUTH	5	03444	MD002031	ROSEMONT/DUKELAND	136
287	31	BALTIMORE, M	24002	BALTIMORE CITY HSNG AUTH	5	03452	MD002059	VACANT HOUSE	646
288	31	BALTIMORE, M	24003	FREDERICK HSNG AUTH	2	03469	MD003002	LINCOLN APARTMENTS	50
289	31	BALTIMORE, M	24003	FREDERICK HSNG AUTH	2	03477	MD003004	JOHN HANSEN HOMES	78
290	31	BALTIMORE, M	24018	ANNE ARUNDEL CO HSNG AUT	3	03558	MD018002	MEADE VILLAGE	200
291	31	BALTIMORE, M	24018	ANNE ARUNDEL CO HSNG AUT	3	03566	MD018004	FREETOWN VILLAGE	154
OFFNAME									3919
FIELDOFF									3919

FIELD OFFICE=32 OFFICE NAME=PHILADELPHIA

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
292	32	PHILADELPHIA	10001	WILMINGTON HOUSING AUTH	4	01119	DE001001	EASTLAKE	201
293	32	PHILADELPHIA	10001	WILMINGTON HOUSING AUTH	4	01127	DE001003	EASTLAKE EXTENSION	200
294	32	PHILADELPHIA	10001	WILMINGTON HOUSING AUTH	4	01135	DE001004	SOUTHBRIDGE EXTENSION	180
295	32	PHILADELPHIA	10001	WILMINGTON HOUSING AUTH	4	01143	DE001005	RIVERSIDE	400
296	32	PHILADELPHIA	10001	WILMINGTON HOUSING AUTH	4	01151	DE001006	CRESTVIEW APTS	149
297	32	PHILADELPHIA	10001	WILMINGTON HOUSING AUTH	4	01168	DE001008	SCATTERED SITES	142
298	32	PHILADELPHIA	10001	WILMINGTON HOUSING AUTH	4	01176	DE001011	THOMAS HERLIHY JR APTS	126
299	32	PHILADELPHIA	10001	WILMINGTON HOUSING AUTH	4	01184	DE001013	KENNEDY TOWERS - EVANS	42
300	32	PHILADELPHIA	10001	WILMINGTON HOUSING AUTH	4	01192	DE001015	MADISON GARDENS	184
301	32	PHILADELPHIA	42002	PHILADELPHIA HSNG AUTH	5	08256	PA002003	ALLEN HOMES	1313
302	32	PHILADELPHIA	42002	PHILADELPHIA HSNG AUTH	5	08264	PA002004	SCATTERED SITES	2415
303	32	PHILADELPHIA	42002	PHILADELPHIA HSNG AUTH	5	08272	PA002008	TASKER HOMES ADDITION	77

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

--- FIELD OFFICE=32 OFFICE NAME=PHILADELPHIA ---

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
304	32	PHILADELPHIA	42002	PHILADELPHIA HSNG AUTH	5	08289	PA002013	WILSON PARK	743
305	32	PHILADELPHIA	42002	PHILADELPHIA HSNG AUTH	5	08297	PA002018	ARCH HOMES	74
306	32	PHILADELPHIA	42002	PHILADELPHIA HSNG AUTH	5	08304	PA002021	SCHUYLKILL FALLS	714
307	32	PHILADELPHIA	42002	PHILADELPHIA HSNG AUTH	5	08312	PA002045	MANTUA HALL	153
308	32	PHILADELPHIA	42002	PHILADELPHIA HSNG AUTH	5	08329	PA002046	HAVERFORD HOMES	24
309	32	PHILADELPHIA	42002	PHILADELPHIA HSNG AUTH	5	08337	PA002053	SOUTHWARK PLAZA	886
310	32	PHILADELPHIA	42002	PHILADELPHIA HSNG AUTH	5	08345	PA002069	SCATTERED SITES	1456
311	32	PHILADELPHIA	42002	PHILADELPHIA HSNG AUTH	5	08353	PA002081	SCATTERED SITES	945
312	32	PHILADELPHIA	42002	PHILADELPHIA HSNG AUTH	5	08361	PA002091	SCATTERED SITES	137
313	32	PHILADELPHIA	42002	PHILADELPHIA HSNG AUTH	5	08378			298
314	32	PHILADELPHIA	42002	PHILADELPHIA HSNG AUTH	5	08386			118
315	32	PHILADELPHIA	42003	SCRANTON HOUSING AUTH	4	08394	PA003001	VALLEY VIEW TERRACE	240
316	32	PHILADELPHIA	42003	SCRANTON HOUSING AUTH	4	08401	PA003002	HILLTOP MANOR	250
317	32	PHILADELPHIA	42003	SCRANTON HOUSING AUTH	4	08418	PA003004	ADAMS APARTMENTS	64
318	32	PHILADELPHIA	42003	SCRANTON HOUSING AUTH	4	08426	PA003006	JACKSON HEIGHTS	101
319	32	PHILADELPHIA	42003	SCRANTON HOUSING AUTH	4	08434	PA003007	WASHINGTON WEST APTS	150
320	32	PHILADELPHIA	42003	SCRANTON HOUSING AUTH	4	08442	PA003008	RIVERSIDE APARTMENTS	90
321	32	PHILADELPHIA	42003	SCRANTON HOUSING AUTH	4	08459	PA003009	WASHINGTON PLAZA APTS	60
322	32	PHILADELPHIA	42007	CHESTER HOUSING AUTH	4	08467	PA007001	LAMOKIN VILLAGE	350
323	32	PHILADELPHIA	42007	CHESTER HOUSING AUTH	4	08475	PA007002	WILLIAM PENN HOMES	278
324	32	PHILADELPHIA	42007	CHESTER HOUSING AUTH	4	08483	PA007003	MCCAFFERY VILLAGE	350
325	32	PHILADELPHIA	42007	CHESTER HOUSING AUTH	4	08491	PA007005	RUTH L BENNETT HOMES	390
326	32	PHILADELPHIA	42007	CHESTER HOUSING AUTH	4	08507	PA007006	CHESTER TOWERS	300
327	32	PHILADELPHIA	42007	CHESTER HOUSING AUTH	4	08515	PA007008	SCATTERED SITES	28
328	32	PHILADELPHIA	42008	HARRISBURG HOUSING AUTH	4	08523	PA008001	W HOWARD DAY HOMES	225
329	32	PHILADELPHIA	42008	HARRISBURG HOUSING AUTH	4	08531	PA008002	GEO A HOVERTER HOMES	236
330	32	PHILADELPHIA	42008	HARRISBURG HOUSING AUTH	4	08548	PA008003	JOHN A F HALL MANOR	550
331	32	PHILADELPHIA	42008	HARRISBURG HOUSING AUTH	4	08556	PA008004	HILLSIDE VILLAGE	70
332	32	PHILADELPHIA	42008	HARRISBURG HOUSING AUTH	4	08564	PA008005	M W SMITH HOMES	80
333	32	PHILADELPHIA	42008	HARRISBURG HOUSING AUTH	4	08572	PA008006	JACKSON LICK APTS	364
334	32	PHILADELPHIA	42008	HARRISBURG HOUSING AUTH	4	08589	PA008007	MORRISON TOWERS	126
335	32	PHILADELPHIA	42022	YORK HOUSING AUTH	3	08759	PA022001	CODORUS HOMES	54
336	32	PHILADELPHIA	42022	YORK HOUSING AUTH	3	08767	PA022002	WELLINGTON HOMES	72
337	32	PHILADELPHIA	42022	YORK HOUSING AUTH	3	08775	PA022003	PARKWAY HOMES	188
338	32	PHILADELPHIA	42022	YORK HOUSING AUTH	3	08783	PA022004	PARKWAY-HOMES EXTENSIO	86
339	32	PHILADELPHIA	42030	CARBONDALE HOUSING AUTH	2	08807	PA030001	RUSSELL PARK	74
340	32	PHILADELPHIA	42030	CARBONDALE HOUSING AUTH	2	08815	PA030002	CANAAN STREET	72
341	32	PHILADELPHIA	42036	LANCASTER HOUSING AUTH	3	08848	PA036001	SUSQUEHANNA COURT	75
342	32	PHILADELPHIA	42036	LANCASTER HOUSING AUTH	3	08856	PA036002	FRANKLIN TERRACE	124
343	32	PHILADELPHIA	42036	LANCASTER HOUSING AUTH	3	08864	PA036003	CHURCH STREET TOWERS	98
344	32	PHILADELPHIA	42036	LANCASTER HOUSING AUTH	3	08872	PA036004	FARNUM STREET EAST	169
345	32	PHILADELPHIA	42036	LANCASTER HOUSING AUTH	3	08889	PA036007	REHAB PROJECT	96
346	32	PHILADELPHIA	42038	LACKAWANNA CO HSNG AUTH	3	08897	PA038005	FELL TWP HOUSING	26
347	32	PHILADELPHIA	42038	LACKAWANNA CO HSNG AUTH	3	08904	PA038008	OLD FORGE HOUSING	124
348	32	PHILADELPHIA	42038	LACKAWANNA CO HSNG AUTH	3	08912	PA038010	DICKSON CITY HOUSING	69
OFFNAME									16606
FIELDOFF									16606

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

-- FIELD OFFICE=33 OFFICE NAME=PITTSBURGH, --

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
349	33	PITTSBURGH,	42001	PITTSBURGH HSNG AUTH	5	08142	PA001001	ADDISON TERRACE	802
350	33	PITTSBURGH,	42001	PITTSBURGH HSNG AUTH	5	08159	PA001003	ALIQUIPPA TERRACE	1851
351	33	PITTSBURGH,	42001	PITTSBURGH HSNG AUTH	5	08167	PA001004	ARLINGTON HEIGHTS	588
352	33	PITTSBURGH,	42001	PITTSBURGH HSNG AUTH	5	08175	PA001006	BROADHEAD MANOR	448
353	33	PITTSBURGH,	42001	PITTSBURGH HSNG AUTH	5	08183	PA001007	ST CLAIR VILLAGE	969
354	33	PITTSBURGH,	42001	PITTSBURGH HSNG AUTH	5	08191	PA001008	BEDFORD DWELLINGS	460
355	33	PITTSBURGH,	42001	PITTSBURGH HSNG AUTH	5	08207	PA001009	NORTHVIEW HEIGHTS	963
356	33	PITTSBURGH,	42001	PITTSBURGH HSNG AUTH	5	08215	PA001012	GARFIELD HEIGHTS	632
357	33	PITTSBURGH,	42001	PITTSBURGH HSNG AUTH	5	08223	PA001014	KELLY STREET APTS	165
358	33	PITTSBURGH,	42001	PITTSBURGH HSNG AUTH	5	08231	PA001020	HOMEWOOD NORTH	135
359	33	PITTSBURGH,	42001	PITTSBURGH HSNG AUTH	5	08248	PA001031	MURRAY TOWERS	70
360	33	PITTSBURGH,	42014	BEAVER COUNTY HSNG AUTH	4	08604	PA014004	HARMONY DWELLINGS	50
361	33	PITTSBURGH,	42014	BEAVER COUNTY HSNG AUTH	4	08612	PA014012	JOHN F KENNEDY APTS	62
362	33	PITTSBURGH,	42014	BEAVER COUNTY HSNG AUTH	4	08629	PA014013	JOSEPH S EDWARDS APTS	56
363	33	PITTSBURGH,	42014	BEAVER COUNTY HSNG AUTH	4	08637	PA014018	AMBRIDGE TOWERS	100
364	33	PITTSBURGH,	42015	FAYETTE COUNTY HSNG AUTH	4	08645	PA015003	GIBSON TERRACE	150
365	33	PITTSBURGH,	42015	FAYETTE COUNTY HSNG AUTH	4	08653	PA015004	LEMON WOOD ACRES	150
366	33	PITTSBURGH,	42015	FAYETTE COUNTY HSNG AUTH	4	08661	PA015006	FT MASON VILLAGE	100
367	33	PITTSBURGH,	42015	FAYETTE COUNTY HSNG AUTH	4	08678	PA015007	DUNLAP CREEK VILLAGE	100
368	33	PITTSBURGH,	42015	FAYETTE COUNTY HSNG AUTH	4	08686	PA015012	WHITE SWAN APTS	78
369	33	PITTSBURGH,	42017	WASHINGTON CO HSNG AUTH	3	08694	PA017001	MAPLE TERRACE	100
370	33	PITTSBURGH,	42017	WASHINGTON CO HSNG AUTH	3	08701	PA017004	HIGHLAND TERRACE	105
371	33	PITTSBURGH,	42018	WESTMORELAND CO HSG AUTH	4	08718	PA018001	EAST KEN MANOR I	126
372	33	PITTSBURGH,	42018	WESTMORELAND CO HSG AUTH	4	08726	PA018004	KENSINGTON MANOR	160
373	33	PITTSBURGH,	42018	WESTMORELAND CO HSG AUTH	4	08734	PA018009	ARNOLD MANOR	80
374	33	PITTSBURGH,	42018	WESTMORELAND CO HSG AUTH	4	08742	PA018016	EAST KEN MANOR II	52
375	33	PITTSBURGH,	42027	HUNTINGDON CO HSNG AUTH	2	08791	PA027001	CHESTNUT TERRACE	100
376	33	PITTSBURGH,	42031	ALTOONA HSNG AUTH	3	08823	PA031005	EAST MAPLE AVENUE	30
377	33	PITTSBURGH,	42031	ALTOONA HSNG AUTH	3	08831	PA031006		12
378	33	PITTSBURGH,	42039	ARMSTRONG CO HSNG AUTH	2	08929	PA039007	FRIENDSHIP APTS	50
OFFNAME									8744
FIELDOFF									8744

-- FIELD OFFICE=34 OFFICE NAME=RICHMOND, VA --

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
379	34	RICHMOND, VA	51003	NEWPORT NEWS RED & HSNG	4	09941	VA003003	ORCUTT HOMES	148
380	34	RICHMOND, VA	51003	NEWPORT NEWS RED & HSNG	4	09958	VA003004	RIDLEY PL	259
381	34	RICHMOND, VA	51003	NEWPORT NEWS RED & HSNG	4	09966	VA003005	DICKERSON CT	340
382	34	RICHMOND, VA	51003	NEWPORT NEWS RED & HSNG	4	09974	VA003006	LASSITER CTS	350
383	34	RICHMOND, VA	51005	HOPEWELL RED & HSNG AUTH	3	10012	VA005003	BLAND CT	24
384	34	RICHMOND, VA	51005	HOPEWELL RED & HSNG AUTH	3	10029	VA005005	LANGSTON PARK	40
385	34	RICHMOND, VA	51007	RICHMOND RED & HSNG AUTH	4	10037	VA007002	GILPIN CT EXT	338
386	34	RICHMOND, VA	51007	RICHMOND RED & HSNG AUTH	4	10045	VA007004	HILLSIDE CT	402
387	34	RICHMOND, VA	51007	RICHMOND RED & HSNG AUTH	4	10053	VA007010	REHAB SMALL HSG PROG	100
388	34	RICHMOND, VA	51007	RICHMOND RED & HSNG AUTH	4	10061	VA007015	SOUTH RICHMOND	18

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

FIELD OFFICE=34 OFFICE NAME=RICHMOND, VA

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
389	34	RICHMOND, VA	51007	RICHMOND RED & HSNG AUTH	4	10078	VA007016	USED HOUSE PROGRAM	60
390	34	RICHMOND, VA	51007	RICHMOND RED & HSNG AUTH	4	10086	VA007017	OVERLOOK < MIMOSA	10
391	34	RICHMOND, VA	51014	HARRISONBURG RED & HSNG	2	10094	VA014001	FRANKLIN HEIGHTS	60
392	34	RICHMOND, VA	51017	HAMPTON RED & HSNG AUTH	3	10101	VA017002	LINCOLN PARK	300
393	34	RICHMOND, VA	51017	HAMPTON RED & HSNG AUTH	3	10118	VA017003	PINE CHAPEL	450
394	34	RICHMOND, VA	51020	PETERSBURG RED & HSNG AU	2	10126	VA020001	PECAN ACRES	150
OFFNAME									3049
FIELDOFF									3049

FIELD OFFICE=35 OFFICE NAME=WASHINGTON,

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
395	35	WASHINGTON,	11001	NATIONAL CAPITAL HSNG AU	5	01208	DC001001	FORT DUPONT DWELLINGS	315
396	35	WASHINGTON,	11001	NATIONAL CAPITAL HSNG AU	5	01216	DC001007	CARROLLSBURG DWELLINGS	314
397	35	WASHINGTON,	11001	NATIONAL CAPITAL HSNG AU	5	01224	DC001013	LINCOLN HEIGHTS	440
398	35	WASHINGTON,	11001	NATIONAL CAPITAL HSNG AU	5	01232	DC001016	HIGHLAND ADDITION	246
399	35	WASHINGTON,	11001	NATIONAL CAPITAL HSNG AU	5	01249	DC001017	RICHARDSON DWELLINGS	190
400	35	WASHINGTON,	11001	NATIONAL CAPITAL HSNG AU	5	01257	DC001019	KENILWORTH COURTS	422
401	35	WASHINGTON,	11001	NATIONAL CAPITAL HSNG AU	5	01265	DC001021	GREENLEAF GARDENS	456
402	35	WASHINGTON,	11001	NATIONAL CAPITAL HSNG AU	5	01273	DC001022	BENNING TERRACE	274
403	35	WASHINGTON,	11001	NATIONAL CAPITAL HSNG AU	5	01281	DC001025	LANGSTON TERRACE	306
404	35	WASHINGTON,	11001	NATIONAL CAPITAL HSNG AU	5	01298	DC001038	EASTGATE GARDENS	230
405	35	WASHINGTON,	11001	NATIONAL CAPITAL HSNG AU	5	01305	DC001053	HIGHLAND DWELLINGS	208
406	35	WASHINGTON,	11001	NATIONAL CAPITAL HSNG AU	5	01313	DC001062	HORIZON HOUSE	105
407	35	WASHINGTON,	11001	NATIONAL CAPITAL HSNG AU	5	01321	DC39P001101		4
408	35	WASHINGTON,	24007	ROCKVILLE HSNG AUTH	2	03485	MD007001	LINCOLN TERRACE	65
409	35	WASHINGTON,	24007	ROCKVILLE HSNG AUTH	2	03493	MD007002	DAVID SCULL COURTS	76
410	35	WASHINGTON,	24011	GLENARDEN HSNG AUTH.	1	03517	MD011001	HAWKINS MANOR I	28
411	35	WASHINGTON,	24015	PR GEORGES CO HSNG AUTH	3	03525	MD015003	MALBROUGH TOWNE	63
412	35	WASHINGTON,	24015	PR GEORGES CO HSNG AUTH	3	03533	MD015006	COTTAGE CITY TOWERS	99
413	35	WASHINGTON,	24015	PR GEORGES CO HSNG AUTH	3	03541	MD015008	MCGUIRE HOUSE	187
414	35	WASHINGTON,	51004	ALEXANDRIA RED & HSNG AU	3	09982	VA004003	SAMUEL MADDEN HOMES	166
415	35	WASHINGTON,	51004	ALEXANDRIA RED & HSNG AU	3	09999	VA004006	CAMERON VILLEY HOMES	264
416	35	WASHINGTON,	51004	ALEXANDRIA RED & HSNG AU	3	10004	VA004009	ALEX ELDERLY HOUSING	170
OFFNAME									4628
FIELDOFF									4628

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

--- FIELD OFFICE=36 OFFICE NAME=CHARLESTON, ---

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
417	36	CHARLESTON,	54001	CHARLESTON HOUSING AUTH	4	10434	WV001005	JARRETT TERRACE	102
418	36	CHARLESTON,	54001	CHARLESTON HOUSING AUTH	4	10442	WV001007	HILL CREST VILLAGE	104
419	36	CHARLESTON,	54001	CHARLESTON HOUSING AUTH	4	10459	WV001008	SOUTH PARK VILLAGE	84
420	36	CHARLESTON,	54004	HUNTINGTON HOUSING AUTH	3	10467	WV004003	MARCUM TERRACE	284
421	36	CHARLESTON,	54004	HUNTINGTON HOUSING AUTH	3	10475	WV004005	RIVERVIEW EAST	100
422	36	CHARLESTON,	54016	WEIRTON HSNG AUTH	2	10507	WV016001	WYLES TERRACE	130
423	36	CHARLESTON,	54018	BLUEFIELD HOUSING AUTH	2	10515	WV018003	TIFFANY MANOR	142
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OFFNAME									946
FIELDOFF									946

--- FIELD OFFICE=41 OFFICE NAME=ATLANTA, GA ---

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
424	41	ATLANTA, GA	13002	SAVANNAH HA	4	01565	GA002001	FELLWOOD HOMES	176
425	41	ATLANTA, GA	13002	SAVANNAH HA	4	01573	GA002002	YAMACRAW VILLAGE	480
426	41	ATLANTA, GA	13002	SAVANNAH HA	4	01581	GA002003	GARDEN HMS EST	314
427	41	ATLANTA, GA	13002	SAVANNAH HA	4	01598	GA002004	FRED WESSELS HMS	250
428	41	ATLANTA, GA	13002	SAVANNAH HA	4	01605	GA002006	GARDEN HMS ANNEX	66
429	41	ATLANTA, GA	13002	SAVANNAH HA	4	01613	GA002007	R M HITCH VILLAGE	337
430	41	ATLANTA, GA	13002	SAVANNAH HA	4	01621	GA002010	H L KAYTON HMS	164
431	41	ATLANTA, GA	13004	COLUMBUS HA	4	01638	GA004002	B T WASHINGTON APTS	288
432	41	ATLANTA, GA	13004	COLUMBUS HA	4	01646	GA004005	WARREN WMS HOMES	160
433	41	ATLANTA, GA	13004	COLUMBUS HA	4	01654	GA004007	L T CHASE HOMES	108
434	41	ATLANTA, GA	13004	COLUMBUS HA	4	01662	GA004009	ELIZ F CANTY ADDIT	116
435	41	ATLANTA, GA	13004	COLUMBUS HA	4	01679	GA004011	GEORGE RIVERS HMS	24
436	41	ATLANTA, GA	13004	COLUMBUS HA	4	01687			192
437	41	ATLANTA, GA	13006	ATLANTA HA	5	01695	GA006002	JOHN HOPE	606
438	41	ATLANTA, GA	13006	ATLANTA HA	5	01702	GA006003	CAPITOL HOMES	815
439	41	ATLANTA, GA	13006	ATLANTA HA	5	01719	GA006004	GRADY HOMES	616
440	41	ATLANTA, GA	13006	ATLANTA HA	5	01727	GA006005R	JJ EAGAN/HERDON HMS	520
441	41	ATLANTA, GA	13006	ATLANTA HA	5	01735	GA006006	CARVER HOMES	990
442	41	ATLANTA, GA	13006	ATLANTA HA	5	01743	GA006007	HARRIS HOMES	510
443	41	ATLANTA, GA	13006	ATLANTA HA	5	01751	GA006008	PERRY HOMES	944
444	41	ATLANTA, GA	13006	ATLANTA HA	5	01768	GA006010	UNIVERSITY HOMES	675
445	41	ATLANTA, GA	13006	ATLANTA HA	5	01776	GA006015	PERRY ANNEX	128
446	41	ATLANTA, GA	13006	ATLANTA HA	5	01784	GA006032	JONESBORO NORTH	100
447	41	ATLANTA, GA	13006	ATLANTA HA	5	01792	GA006040	PROJECT UNNAMED	18
448	41	ATLANTA, GA	13006	ATLANTA HA	5	01808	GA006056	MARTIN STREET PLAZA	60
449	41	ATLANTA, GA	13124	BUCHANAN HA	1	01873	GA124001	BUCHANAN HA	10
450	41	ATLANTA, GA	13124	BUCHANAN HA	1	01881	GA124002	BUCHANAN HA	36
451	41	ATLANTA, GA	13231	WOODLAND HA	1	01898	GA231001	WOODLAND HA	16
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OFFNAME									8719
FIELDOFF									8719

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

FIELD OFFICE=42 OFFICE NAME=BIRMINGHAM,

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
452	42	BIRMINGHAM,	01001	BIRMINGHAM HA	5	00017	AL001001	ELYTON VILLAGE	860
453	42	BIRMINGHAM,	01001	BIRMINGHAM HA	5	00025	AL001006	CHARLES P MARKS VILLAG	500
454	42	BIRMINGHAM,	01001	BIRMINGHAM HA	5	00033	AL001007	JOSEPH H LOVEMAN VILLA	500
455	42	BIRMINGHAM,	01001	BIRMINGHAM HA	5	00041	AL001010	TOM BROWN VILLAGE	250
456	42	BIRMINGHAM,	01001	BIRMINGHAM HA	5	00058	AL001013	COLLEGEVILLE CENTER	550
457	42	BIRMINGHAM,	01001	BIRMINGHAM HA	5	00066	AL001015	ESSEX HOUSE	136
458	42	BIRMINGHAM,	01001	BIRMINGHAM HA	5	00074	AL001018	RALPH KIMBROUGH HOMES	230
459	42	BIRMINGHAM,	01004	ANNISTON HA	3	00082	AL004002	COOPER HOMES	102
460	42	BIRMINGHAM,	01004	ANNISTON HA	3	00099	AL004003	NORWOOD HOMES	101
461	42	BIRMINGHAM,	01004	ANNISTON HA	3	00106	AL004005	BARBER TERRACE HOMES	60
462	42	BIRMINGHAM,	01006	MONTGOMERY HA	4	00114	AL006003	VICTOR-TULANE CT	216
463	42	BIRMINGHAM,	01006	MONTGOMERY HA	4	00122	AL006008	PATERSON COURT	156
464	42	BIRMINGHAM,	01006	MONTGOMERY HA	4	00139	AL006009	VICTOR-TULANE CT	248
465	42	BIRMINGHAM,	01006	MONTGOMERY HA	4	00147	AL006012	GIBBS VILLAGE	500
466	42	BIRMINGHAM,	01006	MONTGOMERY HA	4	00155	AL006013	SMILEY COURT	374
467	42	BIRMINGHAM,	01054	FLORENCE HA	3	00163	AL054003	HANDY HOMES	50
468	42	BIRMINGHAM,	01066	REFORM HA	1	00171	AL066002	REFORM	40
469	42	BIRMINGHAM,	01094	GEORGIANA HA	2	00188	AL094002	SEDGEFIELD	20
470	42	BIRMINGHAM,	01143	SLOCOMB HA	1	00196	AL143001	SLOCOMB HA	14
OFFNAME									4907
FIELDOFF									4907

FIELD OFFICE=43 OFFICE NAME=COLUMBIA, SC

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
471	43	COLUMBIA, SC	45002	COLUMBIA HA	4	09122	SC002001	GONZALES GARDENS	280
472	43	COLUMBIA, SC	45002	COLUMBIA HA	4	09139	SC002003	HENDLEY HOMES	300
473	43	COLUMBIA, SC	45002	COLUMBIA HA	4	09147	SC002008	OAK READ APTS	111
474	43	COLUMBIA, SC	45004	GREENVILLE HA	3	09155	SC004001	MOUNTAIN VIEW HOMES	88
475	43	COLUMBIA, SC	45004	GREENVILLE HA	3	09163	SC004002	WOODLAND HOMES	252
476	43	COLUMBIA, SC	45021	MARION HA	2	09171	SC16P021006	LAKE VIEW	5
OFFNAME									1036
FIELDOFF									1036

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

-- FIELD OFFICE=44 OFFICE NAME=GREENSBORO,N --

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
477	44	GREENSBORO,N	37001	WILMINGTON HA	4	06871	NC001003	PROJECT UNNAMED	250
478	44	GREENSBORO,N	37001	WILMINGTON HA	4	06888	NC001004	PROJECT UNNAMED	150
479	44	GREENSBORO,N	37001	WILMINGTON HA	4	06896	NC001005	PL849	216
480	44	GREENSBORO,N	37001	WILMINGTON HA	4	06903	NC001007	PROJECT UNNAMED	151
481	44	GREENSBORO,N	37002	RALEIGH HA	4	06911	NC002001	PL412	230
482	44	GREENSBORO,N	37002	RALEIGH HA	4	06928	NC002003	PROJECT UNNAMED	64
483	44	GREENSBORO,N	37002	RALEIGH HA	4	06936	NC002005	PROJECT UNNAMED	298
484	44	GREENSBORO,N	37002	RALEIGH HA	4	06944	NC002013	PROJECT UNNAMED	42
485	44	GREENSBORO,N	37003	CHARLOTTE HA	4	06952	NC003001	PL412	368
486	44	GREENSBORO,N	37003	CHARLOTTE HA	4	06969	NC003002	PL412	468
487	44	GREENSBORO,N	37003	CHARLOTTE HA	4	06977	NC003007	PROJECT UNNAMED	318
488	44	GREENSBORO,N	37003	CHARLOTTE HA	4	06985	NC003011	PROJECT UNNAMED	300
489	44	GREENSBORO,N	37006	HIGH POINT HA	4	06993	NC006001	PROJECT UNNAMED	150
490	44	GREENSBORO,N	37006	HIGH POINT HA	4	07008	NC006002	PROJECT UNNAMED	200
491	44	GREENSBORO,N	37006	HIGH POINT HA	4	07016	NC006004	PROJECT UNNAMED	160
492	44	GREENSBORO,N	37006	HIGH POINT HA	4	07024	NC006011	CITY OF HIGH POINT HA	198
493	44	GREENSBORO,N	37007	ASHEVILLE HA	4	07032	NC007004	HILL CREST	234
494	44	GREENSBORO,N	37007	ASHEVILLE HA	4	07049	NC007006	ASTON-PARK TOWERS	160
495	44	GREENSBORO,N	37007	ASHEVILLE HA	4	07057	NC007011	EASTVIEW	50
496	44	GREENSBORO,N	37007	ASHEVILLE HA	4	07065	NC007012	KLONDYKE	154
497	44	GREENSBORO,N	37010	EASTERN CAROLINA REG HA	3	07073	NC010003	E CAROLINA HA	40
498	44	GREENSBORO,N	37010	EASTERN CAROLINA REG HA	3	07081	NC010007	E CAROLINA HA	35
499	44	GREENSBORO,N	37014	LUMBERTON H A	3	07243	NC014003	PROJECT UNNAMED	150
500	44	GREENSBORO,N	37014	LUMBERTON H A	3	07251	NC014004	PROJECT UNNAMED	150
501	44	GREENSBORO,N	37019	ROCKY MOUNT	3	07268	NC019001	PROJECT UNNAMED	110
502	44	GREENSBORO,N	37019	ROCKY MOUNT	3	07276	NC019002	PROJECT UNNAMED	210
503	44	GREENSBORO,N	37019	ROCKY MOUNT	3	07284	NC019003	PROJECT UNNAMED	100
504	44	GREENSBORO,N	37019	ROCKY MOUNT	3	07292	NC019005	PROJECT UNNAMED	200
505	44	GREENSBORO,N	37020	WILSON HA	3	07308	NC020001	PROJECT UNNAMED	90
506	44	GREENSBORO,N	37020	WILSON HA	3	07316	NC020002	PROJECT UNNAMED	143
507	44	GREENSBORO,N	37020	WILSON HA	3	07324	NC020003	PROJECT UNNAMED	24
508	44	GREENSBORO,N	37020	WILSON HA	3	07332	NC020004	PROJECT UNNAMED	71
509	44	GREENSBORO,N	37022	GREENVILLE HA	3	07349	NC022001	PROJECT UNNAMED	65
510	44	GREENSBORO,N	37022	GREENVILLE HA	3	07357	NC022003	PROJECT UNNAMED	188
511	44	GREENSBORO,N	37022	GREENVILLE HA	3	07365	NC022004	PROJECT UNNAMED	40
512	44	GREENSBORO,N	37022	GREENVILLE HA	3	07373	NC022006	PROJECT UNNAMED	78
513	44	GREENSBORO,N	37032	WASHINGTON HA	2	07381	NC032001	EASTERN VILLAGE	50
514	44	GREENSBORO,N	37032	WASHINGTON HA	2	07398	NC032004	OLD FORT	82
515	44	GREENSBORO,N	37054	MADISON HA	1	07421	NC054001	PROJECT UNNAMED	50
516	44	GREENSBORO,N	37064	KINGS MOUNTAIN HA	2	07438	NC064003	KINGS MOUNTAIN H A	90
OFFNAME									6127
FIELDOFF									6127

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

FIELD OFFICE=45 OFFICE NAME=JACKSON, MS

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
517	45	JACKSON, MS	28002	LAUREL HA	3	04708	MS002001	BEACON HOMES	150
518	45	JACKSON, MS	28002	LAUREL HA	3	04716	MS002003	BEACON HOMES ADDN	174
519	45	JACKSON, MS	28040	MS REG HA VIII	4	04724	MS040002	LEWIS/BROOK HOMES	48
520	45	JACKSON, MS	28040	MS REG HA VIII	4	04732	MS040003	HYDE/GLENWILD HOMES	30
521	45	JACKSON, MS	28040	MS REG HA VIII	4	04749	MS040005	FITZP/RANDOLPH HMS	28
522	45	JACKSON, MS	28040	MS REG HA VIII	4	04757	MS040010	HILLCREST/NSIDE HOMES	20
523	45	JACKSON, MS	28040	MS REG HA VIII	4	04765	MS040026	PECAN CIRCLE HOMES	72
524	45	JACKSON, MS	28059	WEST POINT H A	2	04773	MS059004	DARLAY COURTS	26
525	45	JACKSON, MS	28059	WEST POINT H A	2	04781	MS059005	NORRIS COURT	60
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OFFNAME									608
FIELDOFF									608

FIELD OFFICE=46 OFFICE NAME=JACKSONVILLE

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
526	46	JACKSONVILLE	12001	JACKSONVILLE HA	4	01338	FL001002	JOSEPH H BLODGETT HOME	548
527	46	JACKSONVILLE	12001	JACKSONVILLE HA	4	01346	FL001004	DURKEEVILLE COMPLEX	63
528	46	JACKSONVILLE	12001	JACKSONVILLE HA	4	01362	FL001014	RAMONA PARK	200
529	46	JACKSONVILLE	12005	DADE CO HA	5	01419	FL005054	PARKSIDE	56
530	46	JACKSONVILLE	12005	DADE CO HA	5	01427	FL005058	COCOANUT GROVE	124
531	46	JACKSONVILLE	12005	DADE CO HA	5	01435	FL005007	VICTORY HOMES	166
532	46	JACKSONVILLE	12005	DADE CO HA	5	01443	FL005009	JOLLIVETTE PLAZA	66
533	46	JACKSONVILLE	12005	DADE CO HA	5	01451	FL005014	ANNIE COLEMAN GARDENS	245
534	46	JACKSONVILLE	12005	DADE CO HA	5	01468	FL005076	NAME UNKNOWN	74
535	46	JACKSONVILLE	12005	DADE CO HA	5	01476	FL005005	LIBERTY SQUARE ADDN	240
536	46	JACKSONVILLE	12005	DADE CO HA	5	01484			133
537	46	JACKSONVILLE	12005	DADE CO HA	5	01492			316
538	46	JACKSONVILLE	12006	PENSACOLA HA	3	01508	FL006004	ATTUCK COURT ADDITION	52
539	46	JACKSONVILLE	12021	PAHOKEE HA	3	01524	FL021004	FREMD VILLAGE	75
540	46	JACKSONVILLE	12021	PAHOKEE HA	3	01532			200
541	46	JACKSONVILLE	12027	LIVE OAK HA	2	01549	FL027001	HARMONY TRIANGLE	28
542	46	JACKSONVILLE	12064	VENICE HA	1	01557	FL064001	GROVE TERRACE	50
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OFFNAME									2636
FIELDOFF									2636

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

-- FIELD OFFICE=47, OFFICE NAME=KNOXVILLE T --

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
543	47	KNOXVILLE, T	47002	JOHNSON CITY HA	3	09244	TN002001	GEORGE W CARVER APTS	74
544	47	KNOXVILLE, T	47002	JOHNSON CITY HA	3	09252	TN002003	DUNBAR APARTMENTS	30
545	47	KNOXVILLE, T	47002	JOHNSON CITY HA	3	09269	TN002006	MEMORIAL PARK APTS	125
546	47	KNOXVILLE, T	47004	CHATTANOOGA HSG AUTH	4	09341	TN004001	COLLEGE HILL	497
547	47	KNOXVILLE, T	47004	CHATTANOOGA HSG AUTH	4	09358	TN004003	BOONE-HYSINGER HOMES	50
548	47	KNOXVILLE, T	47004	CHATTANOOGA HSG AUTH	4	09366	TN004008	EMMA WHEELER HOMES	340
549	47	KNOXVILLE, T	47004	CHATTANOOGA HSG AUTH	4	09374	TN004016	EDWARD F STEINER APTS	50
550	47	KNOXVILLE, T	47004	CHATTANOOGA HSG AUTH	4	09382	TN004018	REV H J JOHNSON APTS	31
551	47	KNOXVILLE, T	47004	CHATTANOOGA HSG AUTH	4	09399	TN004019	CHATTANOOGA HA	76
552	47	KNOXVILLE, T	47004	CHATTANOOGA HSG AUTH	4	09406			437
553	47	KNOXVILLE, T	47012	LAFOLLETTE HA	3	09447	TN012002	ALEXANDER HGTS ADDN	6
554	47	KNOXVILLE, T	47012	LAFOLLETTE HA	3	09455	TN012003	WORTHAM PARK	30
555	47	KNOXVILLE, T	47012	LAFOLLETTE HA	3	09463	TN012007	WORTHAM PARK	50
556	47	KNOXVILLE, T	47038	MORRISTOWN HA	3	09511	TN038001	C FRANK DAVIS HOMES	146
557	47	KNOXVILLE, T	47038	MORRISTOWN HA	3	09528	TN038005	MORRISTOWN HA	200
558	47	KNOXVILLE, T	47038	MORRISTOWN HA	3	09536			70
559	47	KNOXVILLE, T	47081	ERWIN HA	1	09544	TN081001	ERWIN HA	70
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OFFNAME									2282
FIELDOFF									2282

-- FIELD OFFICE=48 OFFICE NAME=LOUISVILLE, --

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
560	48	LOUISVILLE,	21001	LOUISVILLE HA	4	02967	KY001004	SHEPHARD SQ	422
561	48	LOUISVILLE,	21001	LOUISVILLE HA	4	02975	KY001008	COLLEGE CT	124
562	48	LOUISVILLE,	21001	LOUISVILLE HA	4	02983	KY001012	DOSKER MANOR	200
563	48	LOUISVILLE,	21002	COVINGTON HA	3	02991	KY002001	LATONIA TERRACE	235
564	48	LOUISVILLE,	21002	COVINGTON HA	3	03006	KY002003	IDA SPENCE HOMES	400
565	48	LOUISVILLE,	21004	LEXINGTON HA	4	03014	KY004005	CHARLOTTE CTS ADDITION	150
566	48	LOUISVILLE,	21004	LEXINGTON HA	4	03022	KY004006	CONNIE R GRIFFITH MANO	197
567	48	LOUISVILLE,	21008	SOMERSET HA	2	03039	KY008002	CLIFTY HOMES	7
568	48	LOUISVILLE,	21034	NICHOLASVILLE HA	1	03047	KY034001	STATTON-GROVES	50
569	48	LOUISVILLE,	21063	BOWLING GREEN HA	3	03055	KY063001	SUMMIT VIEW HOMES	190
570	48	LOUISVILLE,	21063	BOWLING GREEN HA	3	03063	KY063002	GORDON AVE	150
571	48	LOUISVILLE,	21098	OWENTON HA	1	03071	KY098001	GAINES VILLAGE	32
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OFFNAME									2157
FIELDOFF									2157

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

FIELD OFFICE=49 OFFICE NAME=NASHVILLE, T

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
572	49	NASHVILLE, T	47001	MEMPHIS HSG AUTH	5	09188	TN001001	LAMAR TERRACE	478
573	49	NASHVILLE, T	47001	MEMPHIS HSG AUTH	5	09196	TN001009	DIXIE HOMES	607
574	49	NASHVILLE, T	47001	MEMPHIS HSG AUTH	5	09203	TN001011	CLEABORN HOMES	79
575	49	NASHVILLE, T	47001	MEMPHIS HSG AUTH	5	09211	TN001012	FOWLER HOMES	320
576	49	NASHVILLE, T	47001	MEMPHIS HSG AUTH	5	09228	TN001013	BARRY HOMES	198
577	49	NASHVILLE, T	47001	MEMPHIS HSG AUTH	5	09236	TN001015	GRAVES MANOR	300
578	49	NASHVILLE, T	47005	METRO DEV HSG AGENCY	4	09414	TN005003	EDGEHILL HOMES	200
579	49	NASHVILLE, T	47005	METRO DEV HSG AGENCY	4	09422	TN005008	PRESTON TAYLOR HOMES	550
580	49	NASHVILLE, T	47010	CLARKSVILLE HSG AUTH	3	09439	TN010005	LINCOLN HOMES	70
581	49	NASHVILLE, T	47030	WAVERLY HSG AUTH	1	09471	TN030001	BROOKSIDE	38
OFFNAME									2840
FIELDOFF									2840

FIELD OFFICE=51 OFFICE NAME=CHICAGO

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
582	51	CHICAGO	17001	ROCK ISLAND COUNTY	4	02018			136
583	51	CHICAGO	17001	ROCK ISLAND COUNTY	4	02026	IL010005	WILLIAM YOUNG HOMES	192
584	51	CHICAGO	17001	ROCK ISLAND COUNTY	4	02034	IL010003	JOSEPH FULTON HOME	72
585	51	CHICAGO	17001	ROCK ISLAND COUNTY	4	02042	IL010001	OAK GROVE	29
586	51	CHICAGO	17001	ROCK ISLAND COUNTY	4	02059			264
587	51	CHICAGO	17001	ROCK ISLAND COUNTY	4	02067			300
588	51	CHICAGO	17001	ROCK ISLAND COUNTY	4	02075			300
589	51	CHICAGO	17001	ROCK ISLAND COUNTY	4	02083			100
590	51	CHICAGO	17001	ROCK ISLAND COUNTY	4	02091			592
591	51	CHICAGO	17002	CHICAGO HSG AUTH	5	02107			51
592	51	CHICAGO	17002	CHICAGO HSG AUTH	5	02115			15
593	51	CHICAGO	17002	CHICAGO HSG AUTH	5	02123			1096
594	51	CHICAGO	17002	CHICAGO HSG AUTH	5	02131			53
595	51	CHICAGO	17002	CHICAGO HSG AUTH	5	02148			985
596	51	CHICAGO	17002	CHICAGO HSG AUTH	5	02156	IL002024	JULIA LATHROP	916
597	51	CHICAGO	17002	CHICAGO HSG AUTH	5	02164			1896
598	51	CHICAGO	17002	CHICAGO HSG AUTH	5	02172			128
599	51	CHICAGO	17002	CHICAGO HSG AUTH	5	02189			1199
600	51	CHICAGO	17002	CHICAGO HSG AUTH	5	02197			442
601	51	CHICAGO	17002	CHICAGO HSG AUTH	5	02204			6
602	51	CHICAGO	17002	CHICAGO HSG AUTH	5	02212			1004
603	51	CHICAGO	17002	CHICAGO HSG AUTH	5	02229			446
604	51	CHICAGO	17003	PEORIA HOUSING AUTHORITY	4	02237			36
605	51	CHICAGO	17003	PEORIA HOUSING AUTHORITY	4	02245			95
606	51	CHICAGO	17003	PEORIA HOUSING AUTHORITY	4	02253			200
607	51	CHICAGO	17003	PEORIA HOUSING AUTHORITY	4	02261			461
608	51	CHICAGO	17003	PEORIA HOUSING AUTHORITY	4	02278			353
609	51	CHICAGO	17003	PEORIA HOUSING AUTHORITY	4	02286			418
610	51	CHICAGO	17003	PEORIA HOUSING AUTHORITY	4	02294			154
611	51	CHICAGO	17003	PEORIA HOUSING AUTHORITY	4	02301			213

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

-- FIELD OFFICE=51 OFFICE NAME=CHICAGO --

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
612	51	CHICAGO	17004	SPRINGFIELD CITY OF	4	02318			36
613	51	CHICAGO	17004	SPRINGFIELD CITY OF	4	02326			151
614	51	CHICAGO	17004	SPRINGFIELD CITY OF	4	02342			109
615	51	CHICAGO	17004	SPRINGFIELD CITY OF	4	02359			100
616	51	CHICAGO	17004	SPRINGFIELD CITY OF	4	02367			76
617	51	CHICAGO	17011	DANVILLE	3	02375			51
618	51	CHICAGO	17011	DANVILLE	3	02383			210
619	51	CHICAGO	17011	DANVILLE	3	02391			90
620	51	CHICAGO	17011	DANVILLE	3	02407			179
621	51	CHICAGO	17011	DANVILLE	3	02415			100
622	51	CHICAGO	17014	HSG AUTH OF LASALLE CNTY	3	02423			14
623	51	CHICAGO	17014	HSG AUTH OF LASALLE CNTY	3	02431			60
624	51	CHICAGO	17014	HSG AUTH OF LASALLE CNTY	3	02448			20
625	51	CHICAGO	17014	HSG AUTH OF LASALLE CNTY	3	02456			50
626	51	CHICAGO	17014	HSG AUTH OF LASALLE CNTY	3	02464			12
627	51	CHICAGO	17022	ROCKFORD HSG AUTH	4	02472			210
628	51	CHICAGO	17022	ROCKFORD HSG AUTH	4	02489			198
629	51	CHICAGO	17022	ROCKFORD HSG AUTH	4	02497			175
630	51	CHICAGO	17022	ROCKFORD HSG AUTH	4	02504			187
631	51	CHICAGO	17022	ROCKFORD HSG AUTH	4	02512			183
632	51	CHICAGO	17022	ROCKFORD HSG AUTH	4	02529			84
633	51	CHICAGO	17026	WAUKEGAN	2	02537			120
634	51	CHICAGO	17026	WAUKEGAN	2	02545			150
635	51	CHICAGO	17057	MARION COUNTY H A	2	02553			20
636	51	CHICAGO	17057	MARION COUNTY H A.	2	02561			100
OFFNAME									14837
FIELDOFF									14837

-- FIELD OFFICE=52 OFFICE NAME=COLUMBUS, OH --

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
637	52	COLUMBUS, OH	39001	COLUMBUS MHA	4	07495	OH001002.	LINCOLN PARK	318
638	52	COLUMBUS, OH	39001	COLUMBUS MHA	4	07502	OH001018	REHAB HOUSING	200
639	52	COLUMBUS, OH	39001	COLUMBUS MHA	4	07519	OH001022		271
640	52	COLUMBUS, OH	39001	COLUMBUS MHA	4	07527	OH001024	ALICE RITA	95
641	52	COLUMBUS, OH	39021	SPRINGFIELD MHA	3	07876	OH021004	SCATTERED SITE	104
OFFNAME									988
FIELDOFF									988

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

FIELD OFFICE=53 OFFICE NAME=DETROIT,MI

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
642	53	DETROIT,MI	26001	DETROIT HOUSING DEPT	5	04132	MI001001		240
643	53	DETROIT,MI	26001	DETROIT HOUSING DEPT	5	04149	MI001002	PARKSIDE HOMES	349
644	53	DETROIT,MI	26001	DETROIT HOUSING DEPT	5	04157	MI001005	CHARLES TERRACE	428
645	53	DETROIT,MI	26001	DETROIT HOUSING DEPT	5	04165	MI001008	BREWSTER-DOUGLASS	1006
646	53	DETROIT,MI	26001	DETROIT HOUSING DEPT	5	04173	MI001011	GARDEN VIEW TERRACE	258
647	53	DETROIT,MI	26001	DETROIT HOUSING DEPT	5	04181	MI001013	BREWSTER	712
648	53	DETROIT,MI	26001	DETROIT HOUSING DEPT	5	04198	MI001014	PARKSIDE ADDITION	1051
649	53	DETROIT,MI	26001	DETROIT HOUSING DEPT	5	04205	MI001015	SOJOURNER TRUTH	120
650	53	DETROIT,MI	26001	DETROIT HOUSING DEPT	5	04213	MI001026		211
651	53	DETROIT,MI	26001	DETROIT HOUSING DEPT	5	04221	MI001031	TEMPLE TOWERS	64
652	53	DETROIT,MI	26001	DETROIT HOUSING DEPT	5	04238	MI001032	LEE PLAZA	220
653	53	DETROIT,MI	26001	DETROIT HOUSING DEPT	5	04246	MI001033	WOODLAND	44
654	53	DETROIT,MI	26001	DETROIT HOUSING DEPT	5	04254	MI001034	WOLVERINE	235
655	53	DETROIT,MI	26001	DETROIT HOUSING DEPT	5	04262	MI001037		93
656	53	DETROIT,MI	26005	PONTIAC	3	04279	MI005001	LAKESIDE HOMES	364
657	53	DETROIT,MI	26005	PONTIAC	3	04287	MI005002	CARRIAGE CIRCLE APTS	234
658	53	DETROIT,MI	26005	PONTIAC	3	04295	MI005003	WOODLAND HGTS APTS	197
659	53	DETROIT,MI	26006	SAGINAW HSG COMM	3	04302	MI006003	MAPLEWOOD MANOR	98
660	53	DETROIT,MI	26006	SAGINAW HSG COMM	3	04319	MI006007	PINEWOOD MANOR	95
661	53	DETROIT,MI	26006	SAGINAW HSG COMM	3	04327	MI006008	SCATTERED SITES	49
662	53	DETROIT,MI	26009	FLINT HOUSING COMM	3	04335	MI009002	HOWARD ESTATES	96
663	53	DETROIT,MI	26009	FLINT HOUSING COMM	3	04343	MI009004	GARLAND CENTRAL	44
664	53	DETROIT,MI	26009	FLINT HOUSING COMM	3	04351	MI009005	RIVER PARK	180
665	53	DETROIT,MI	26024	BAY CITY HSG COMM	2	04368	MI024004	SCATTERED HOUSING	127
666	53	DETROIT,MI	26027	INKSTER HOUSING COMMISSI	3	04376	MI027002		100
667	53	DETROIT,MI	26027	INKSTER HOUSING COMMISSI	3	04384	MI027003	DEMBY TERRACES	200
668	53	DETROIT,MI	26027	INKSTER HOUSING COMMISSI	3	04392	MI027004	TWIN TOWERS	200
669	53	DETROIT,MI	26033	ROYAL OAK TOWNSHIP	2	04408	MI033001	PROJECT UNNAMED	80
670	53	DETROIT,MI	26039	PORT HURON HSG COMM	2	04457	MI039002	DESMOND-PERU VILLAGES	202
671	53	DETROIT,MI	26039	PORT HURON HSG COMM	2	04465	MI039003	DULHUT VILLAGE	120
672	53	DETROIT,MI	26064	ANN ARBOR HOUSING COMMIS	2	04538	MI064003	SCATTERED SITES	53
673	53	DETROIT,MI	26064	ANN ARBOR HOUSING COMMIS	2	04546	MI064005		105
OFFNAME									7575
FIELDOFF									7575

FIELD OFFICE=54 OFFICE NAME=INDIANAPOLIS

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
674	54	INDIANAPOLIS	18003	FORT WAYNE HA	3	02578	IN003005	BEACON HEIGHTS	100
675	54	INDIANAPOLIS	18003	FORT WAYNE HA	3	02586	IN003007	BROOKMILL COURT	108
676	54	INDIANAPOLIS	18003	FORT WAYNE HA	3	02594	IN003008		105
677	54	INDIANAPOLIS	18004	DELAWARE CO HA	2	02601	IN004001	MIDDLETOWN GARDENS	113
678	54	INDIANAPOLIS	18007	KOKOMO HA	2	02618	IN007001	GATEWAY GARDENS	176
679	54	INDIANAPOLIS	18007	KOKOMO HA	2	02626	IN007003	TERRACE TOWER	105
680	54	INDIANAPOLIS	18011	GARY HA	4	02634	IN011001	DELANNEY COMMUNITY	297
681	54	INDIANAPOLIS	18011	GARY HA	4	02642	IN011003	DUNELAND VILL	163

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

FIELD OFFICE=54 OFFICE NAME=INDIANAPOLIS

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
682	54	INDIANAPOLIS	18011	GARY HA	4	02659	IN011011	SCATTERED SITES	142
683	54	INDIANAPOLIS	18011	GARY HA	4	02667	IN011012	SCATTERED SITES	72
684	54	INDIANAPOLIS	18011	GARY HA	4	02675	IN011019	SCATTERED SITES	28
685	54	INDIANAPOLIS	18011	GARY HA	4	02683	IN011020	SCATTERED SITES	79
686	54	INDIANAPOLIS	18011	GARY HA	4	02691	IN011022	SCATTERED SITES	24
687	54	INDIANAPOLIS	18015	SOUTH BEND HA	3	02707	IN015007	HARBER HOMES	50
688	54	INDIANAPOLIS	18015	SOUTH BEND HA	3	02715	IN015010	SCATTERED SITES	66
689	54	INDIANAPOLIS	18015	SOUTH BEND HA	3	02723	IN015011	EDISON GRDN APTS	38
690	54	INDIANAPOLIS	18015	SOUTH BEND HA	3	02731			44
691	54	INDIANAPOLIS	18017	INDIANAPOLIS HA	4	02748	IN017007	JOHN J BARTON APTS	247
692	54	INDIANAPOLIS	18017	INDIANAPOLIS HA	4	02756	IN017020	JOHN J BARTON ANNEX	258
693	54	INDIANAPOLIS	18017	INDIANAPOLIS HA	4	02764			140
694	54	INDIANAPOLIS	18017	INDIANAPOLIS HA	4	02772			110
695	54	INDIANAPOLIS	18017	INDIANAPOLIS HA	4	02789			160
696	54	INDIANAPOLIS	18017	INDIANAPOLIS HA	4	02797			102
697	54	INDIANAPOLIS	18017	INDIANAPOLIS HA	4	02804			248
OFFNAME									2975
FIELDOFF									2975

FIELD OFFICE=55 OFFICE NAME=MILWAUKEE, W

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
698	55	MILWAUKEE, W	55002	MILWAUKEE	4	10523	WI002002	WEST LAWN	726
699	55	MILWAUKEE, W	55002	MILWAUKEE	4	10531	WI002004	HILLSIDE TERRACE	388
700	55	MILWAUKEE, W	55002	MILWAUKEE	4	10548	WI002005	LAPHAM PARK	370
701	55	MILWAUKEE, W	55002	MILWAUKEE	4	10556	WI002007	PARKLAWN	518
702	55	MILWAUKEE, W	55002	MILWAUKEE	4	10564	WI002012	COLLEGE COURT	251
703	55	MILWAUKEE, W	55002	MILWAUKEE	4	10572	WI002013	ARLINGTON COURT	230
704	55	MILWAUKEE, W	55002	MILWAUKEE	4	10589	WI002017	MITCHELL COURT	100
705	55	MILWAUKEE, W	55002	MILWAUKEE	4	10597	WI002018	BECHER COURT	100
706	55	MILWAUKEE, W	55002	MILWAUKEE	4	10604	WI002020	SCATTERED SITES	45
707	55	MILWAUKEE, W	55002	MILWAUKEE	4	10612	WI002021	SCATERED SITES	50
708	55	MILWAUKEE, W	55003	CITY OF MADISON	3	10629	WI003001	SCATTERED SITES	160
709	55	MILWAUKEE, W	55003	CITY OF MADISON	3	10637	WI003004	BJARNES-ROMNES APT	168
710	55	MILWAUKEE, W	55003	CITY OF MADISON	3	10645	WI003005	TENNEY PARK APT	40
711	55	MILWAUKEE, W	55006	LACROSSE HSG AUTH	3	10653			76
712	55	MILWAUKEE, W	55006	LACROSSE HSG AUTH	3	10661			74
713	55	MILWAUKEE, W	55006	LACROSSE HSG AUTH	3	10678			59
714	55	MILWAUKEE, W	55017	MERRILL CITY	2	10686			102
715	55	MILWAUKEE, W	55059	WOODVILLE VILLAGE	1	10701	WI059001	NORSEMAN MANOR	26
716	55	MILWAUKEE, W	55064	BELOIT CITY	2	10718	WI064001	PARKER BLUFF	41
717	55	MILWAUKEE, W	55064	BELOIT CITY	2	10726			65
OFFNAME									3589
FIELDOFF									3589

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

FIELD OFFICE=56 OFFICE NAME=MINN/ST PAUL

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
718	56	MINN/ST PAUL	27001	ST PAUL	4	04579	MN001001	ST PAUL PHA	484
719	56	MINN/ST PAUL	27001	ST PAUL	4	04587	MN001013	ST PAUL PHA	148
720	56	MINN/ST PAUL	27001	ST PAUL	4	04595	MN001020	ST PAUL PHA	34
721	56	MINN/ST PAUL	27001	ST PAUL	4	04602	MN46P001030	ST PAUL PHA	25
722	56	MINN/ST PAUL	27002	MINNEAPOLIS HRA	5	04619	MN002008	MCDA	174
723	56	MINN/ST PAUL	27002	MINNEAPOLIS HRA	5	04627	MN002013	MCDA	213
724	56	MINN/ST PAUL	27002	MINNEAPOLIS HRA	5	04635	MN002017	MCDA	151
725	56	MINN/ST PAUL	27002	MINNEAPOLIS HRA	5	04643	MN002018	MCDA	76
726	56	MINN/ST PAUL	27002	MINNEAPOLIS HRA	5	04651	MN002022	MCDA	28
727	56	MINN/ST PAUL	27002	MINNEAPOLIS HRA	5	04668	MN002036	MCDA	110
728	56	MINN/ST PAUL	27003	DULUTH HRA	3	04676	MN003001	DULUTH HRA	200
729	56	MINN/ST PAUL	27003	DULUTH HRA	3	04684	MN003002	DULUTH HRA	100
OFFNAME									1743
FIELDOFF									1743

FIELD OFFICE=57 OFFICE NAME=CINCINNATI,

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
730	57	CINCINNATI,	39004	CINCINNATI	5	07632			962
731	57	CINCINNATI,	39004	CINCINNATI	5	07649			82
732	57	CINCINNATI,	39004	CINCINNATI	5	07657			303
733	57	CINCINNATI,	39004	CINCINNATI	5	07665			271
734	57	CINCINNATI,	39004	CINCINNATI	5	07673			965
735	57	CINCINNATI,	39005	DAYTON MHA	4	07681			138
736	57	CINCINNATI,	39005	DAYTON MHA	4	07698			310
737	57	CINCINNATI,	39005	DAYTON MHA	4	07705			113
738	57	CINCINNATI,	39015	BUTLER MHA	3	07868	OH015003	UNKNOWN	129
739	57	CINCINNATI,	39038	CLERMONT MHA	2	07932	OH038001	UNKNOWN	35
OFFNAME									3308
FIELDOFF									3308

FIELD OFFICE=58 OFFICE NAME=CLEVELAND, O

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
740	58	CLEVELAND, O	39003	CUYAHOGA METRO HSG AUTH	5	07535	OH003003	OUTHWAITE HOMES	449
741	58	CLEVELAND, O	39003	CUYAHOGA METRO HSG AUTH	5	07543	OH003004	WOODHILL HOMES	548
742	58	CLEVELAND, O	39003	CUYAHOGA METRO HSG AUTH	5	07551	OH003007	CARVER PARK	1136
743	58	CLEVELAND, O	39003	CUYAHOGA METRO HSG AUTH	5	07568	OH003008	RIVERSIDE APTS	440
744	58	CLEVELAND, O	39003	CUYAHOGA METRO HSG AUTH	5	07576	OH003013	GARDEN VALLEY	402
745	58	CLEVELAND, O	39003	CUYAHOGA METRO HSG AUTH	5	07584	OH003015	OUTWAITE HOMES EXT	575
746	58	CLEVELAND, O	39003	CUYAHOGA METRO HSG AUTH	5	07592	OH003016	LAKEVIEW TERRACE	616
747	58	CLEVELAND, O	39003	CUYAHOGA METRO HSG AUTH	5	07608	OH003030	LA RONDE APTS	39
748	58	CLEVELAND, O	39003	CUYAHOGA METRO HSG AUTH	5	07616	OH003033	BELLAIRE GARDENS	285

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

FIELD OFFICE=58 OFFICE NAME=CLEVELAND, O

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
749	58	CLEVELAND, O	39003	CUYAHOGA METRO HSG AUTH	5	07624			54
750	58	CLEVELAND, O	39006	LUCAS METRO HSG AUTH	4	07713	OH006002	BRAND WHITLOCK EXT	111
751	58	CLEVELAND, O	39006	LUCAS METRO HSG AUTH	4	07721	OH006005	PORT LAWRENCE HOMES	196
752	58	CLEVELAND, O	39006	LUCAS METRO HSG AUTH	4	07738	OH006006	BIRMINGHAM TERRACE	138
753	58	CLEVELAND, O	39006	LUCAS METRO HSG AUTH	4	07746			386
754	58	CLEVELAND, O	39006	LUCAS METRO HSG AUTH	4	07754			47
755	58	CLEVELAND, O	39007	AKRON METRO HSG AUTH	4	07762	OH007002	NORTON HOMES	219
756	58	CLEVELAND, O	39007	AKRON METRO HSG AUTH	4	07779	OH007008	SCATTERED II	186
757	58	CLEVELAND, O	39007	AKRON METRO HSG AUTH	4	07787	OH007014	SCATTERED IV	362
758	58	CLEVELAND, O	39007	AKRON METRO HSG AUTH	4	07795	OH007019	SATERSTEIN TOWERS 2	210
759	58	CLEVELAND, O	39007	AKRON METRO HSG AUTH	4	07802	OH007028		268
760	58	CLEVELAND, O	39007	AKRON METRO HSG AUTH	4	07819	OH007030	COLONIAL HILLS	150
761	58	CLEVELAND, O	39012	LORAIN METRO HSG AUTH	4	07827	OH012003	WILKES-VILLA	192
762	58	CLEVELAND, O	39012	LORAIN METRO HSG AUTH	4	07835	OH012011	ALBRIGHT TERRACE	50
763	58	CLEVELAND, O	39012	LORAIN METRO HSG AUTH	4	07843	OH012012	WESTGATE APTS	12
764	58	CLEVELAND, O	39012	LORAIN METRO HSG AUTH	4	07851	OH012013	SOUTH SIDE GRDNS I	50
765	58	CLEVELAND, O	39036	WAYNE M H A	2	07924	OH036001	MADISON HEIGHTS	15
OFFNAME									7136
FIELDOFF									7136

FIELD OFFICE=59 OFFICE NAME=GRAND RAPIDS

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
766	59	GRAND RAPIDS	26038	JACKSON HSG COMM	3	04416	MI038001	CHALET TERRACE	100
767	59	GRAND RAPIDS	26038	JACKSON HSG COMM	3	04424	MI038002	REED MANOR	23
768	59	GRAND RAPIDS	26038	JACKSON HSG COMM	3	04432	MI038003	REED MANOR	145
769	59	GRAND RAPIDS	26038	JACKSON HSG COMM	3	04449	MI038004	REED MANOR	127
770	59	GRAND RAPIDS	26041	BIG RAPIDS HSG COM	2	04473	MI041002	PARKVIEW VILLAGE	75
771	59	GRAND RAPIDS	26058	LANSING HSG COM	3	04498	MI058005	LANSING PUB HSG	54
772	59	GRAND RAPIDS	26058	LANSING HSG COM	3	04505	MI058006	OLIVER TOWERS	101
773	59	GRAND RAPIDS	26058	LANSING HSG COM	3	04513	MI058007	LA ROY FROH TNHSE	100
774	59	GRAND RAPIDS	26058	LANSING HSG COM	3	04521	MI058009	LANSING PUB HSG	28
775	59	GRAND RAPIDS	26087	MENOMINEE HSG COM	2	04562	MI087002	WOODHAVEN CIRCLE	24
OFFNAME									777
FIELDOFF									777

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

FIELD OFFICE=61 OFFICE NAME=DALLAS, TX

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
776	61	DALLAS, TX	48003	EL PASO HA	4	09625	TX003028	ALEX GONZALES APTS	36
777	61	DALLAS, TX	48003	EL PASO HA	4	09633	TX003036	RAYMOND TELLES	68
778	61	DALLAS, TX	48009	DALLAS HA	5	09811	TX009002	LITTLE MEXICO VILLAGE	102
779	61	DALLAS, TX	48009	DALLAS HA	5	09828	TX009008	TURNER COURTS	294
780	61	DALLAS, TX	48009	DALLAS HA	5	09836	TX009009	RHOADS TERRACE	426
781	61	DALLAS, TX	48009	DALLAS HA	5	09844	TX009011	GEORGE LOVING PLACE	3374
782	61	DALLAS, TX	48014	TEXARKANA HA	3	09877	TX014005		50
OFFNAME									4350
FIELDOFF									4350

FIELD OFFICE=62 OFFICE NAME=LITTLE ROCK,

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
783	62	LITTLE ROCK,	05002	NORTH LITTLE ROCK HA	3	00382	AR002002		92
784	62	LITTLE ROCK,	05002	NORTH LITTLE ROCK HA	3	00399	AR002003		200
785	62	LITTLE ROCK,	05004	LITTLE ROCK HA	4	00406	AR004001		74
786	62	LITTLE ROCK,	05004	LITTLE ROCK HA	4	00414	AR004003		100
787	62	LITTLE ROCK,	05004	LITTLE ROCK HA	4	00422	AR004008		136
788	62	LITTLE ROCK,	05004	LITTLE ROCK HA	4	00439	AR004010	CUMBERLAND TOWERS	180
789	62	LITTLE ROCK,	05073	SPARKMAN HA	1	00447	AR073001		18
790	62	LITTLE ROCK,	05094	MALVERN HA	2	00455	AR094001		125
OFFNAME									925
FIELDOFF									925

FIELD OFFICE=63 OFFICE NAME=NEW ORLEANS,

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
791	63	NEW ORLEANS,	22001	NEW ORLEANS LHA	5	03088	LA001010		680
792	63	NEW ORLEANS,	22001	NEW ORLEANS LHA	5	03096	LA001014		1840
793	63	NEW ORLEANS,	22001	NEW ORLEANS LHA	5	03103	LA001021		6
794	63	NEW ORLEANS,	22001	NEW ORLEANS LHA	5	03111	LA001025		415
795	63	NEW ORLEANS,	22001	NEW ORLEANS LHA	5	03128	LA001027		19
796	63	NEW ORLEANS,	22001	NEW ORLEANS LHA	5	03136	LA001039		200
797	63	NEW ORLEANS,	22002	SHREVEPORT LHA	3	03144	LA002003	HOLLYWOOD HEIGHTS	131
798	63	NEW ORLEANS,	22002	SHREVEPORT LHA	3	03152			184
799	63	NEW ORLEANS,	22003	EAST BATON ROUGE PH LHA	4	03169	LA003004		200
800	63	NEW ORLEANS,	22003	EAST BATON ROUGE PH LHA	4	03177	LA003005		250
801	63	NEW ORLEANS,	22003	EAST BATON ROUGE PH LHA	4	03185	LA003013	PARISH HSG AUTH	50
802	63	NEW ORLEANS,	22003	EAST BATON ROUGE PH LHA	4	03193	LA003014	PARISH HSG AUTH	42
803	63	NEW ORLEANS,	22003	EAST BATON ROUGE PH LHA	4	03209	LA003015	PARISH HSG AUTH	78
804	63	NEW ORLEANS,	22075	PONCHATOULA LHA	1	03233	LA075002	LAKESIDE CIRCLE	50
805	63	NEW ORLEANS,	22094	ST CHARLES PARISH LHA	2	03241	LA094001	BOUTTE-DES ALLEMANDS	128

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

FIELD OFFICE=63 OFFICE NAME=NEW ORLEANS,

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
OFFNAME									4273
FIELDOFF									4273

FIELD OFFICE=64 OFFICE NAME=OKLAHOMA CIT

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
806	64	OKLAHOMA CIT	40015	ELK CITY HA	2	07965	OK015001	FAIRVIEW VILLAGE	70
807	64	OKLAHOMA CIT	40062	MCALESTER HA	2	07973	OK062001	RENTAL	125
808	64	OKLAHOMA CIT	40062	MCALESTER HA	2	07981	OK062003	RENTAL	63
809	64	OKLAHOMA CIT	40073	TULSA HA	4	07998	OK073003	COMANCHE PARK	300
810	64	OKLAHOMA CIT	40073	TULSA HA	4	08004	OK073007	HEWGLEY TERRACE	150
811	64	OKLAHOMA CIT	40073	TULSA HA	4	08012	OK073009	SEMINOLE HILLS ANNEX	100
812	64	OKLAHOMA CIT	40073	TULSA HA	4	08029	OK073012	PARKVIEW TERRACE	225
OFFNAME									1033
FIELDOFF									1033

FIELD OFFICE=65 OFFICE NAME=SAN ANTONIO,

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
813	65	SAN ANTONIO,	48001	AUSTIN	4	09552	TX001002A		67
814	65	SAN ANTONIO,	48001	AUSTIN	4	09569	TX001003		40
815	65	SAN ANTONIO,	48001	AUSTIN	4	09577	TX001004		160
816	65	SAN ANTONIO,	48001	AUSTIN	4	09585	TX001005		300
817	65	SAN ANTONIO,	48001	AUSTIN	4	09593	TX001007		164
818	65	SAN ANTONIO,	48001	AUSTIN	4	09609	TX001012		94
819	65	SAN ANTONIO,	48001	AUSTIN	4	09617			40
820	65	SAN ANTONIO,	48008	CORPUS CHRISTI HA	4	09763	TX008002		210
821	65	SAN ANTONIO,	48008	CORPUS CHRISTI HA	4	09771	TX008003		122
822	65	SAN ANTONIO,	48008	CORPUS CHRISTI HA	4	09788	TX008004		250
823	65	SAN ANTONIO,	48008	CORPUS CHRISTI HA	4	09796	TX008005		200
824	65	SAN ANTONIO,	48008	CORPUS CHRISTI HA	4	09803	TX008007		100
825	65	SAN ANTONIO,	48011	LAREDO	3	09852	TX011002		200
826	65	SAN ANTONIO,	48085	VICTORIA	2	09909	TX085001		102
827	65	SAN ANTONIO,	48263	MARBLE FALLS HA	2	09917	TX263002		50
OFFNAME									2099
FIELDOFF									2099

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

FIELD OFFICE=66 OFFICE NAME=HOUSTON, TX

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
828	66	HOUSTON, TX	48005	HOUSTON H A	4	09641	TX005000		204
829	66	HOUSTON, TX	48005	HOUSTON H A	4	09658	TX005004		508
830	66	HOUSTON, TX	48005	HOUSTON H A	4	09666	TX005006		339
831	66	HOUSTON, TX	48005	HOUSTON H A	4	09674			264
832	66	HOUSTON, TX	48023	BEAUMONT H A	3	09885	TX023001		150
833	66	HOUSTON, TX	48023	BEAUMONT H A	3	09893	TX023004		56
834	66	HOUSTON, TX	48340	FRANKLIN H A	1	09933	TX340001		36
OFFNAME									1557
FIELDOFF									1557

FIELD OFFICE=71 OFFICE NAME=KANSAS CITY,

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
835	71	KANSAS CITY,	20001	KANSAS CITY KS PHA	4	02901	KS001009	SCATTERED SITES	30
836	71	KANSAS CITY,	20001	KANSAS CITY KS PHA	4	02918	KS001012	CHALET MANOR	66
837	71	KANSAS CITY,	20001	KANSAS CITY KS PHA	4	02926	KS001017	GLANVILLE MANOR	108
838	71	KANSAS CITY,	20002	TOPEKA PHA	3	02934	KS002001	PINE RIDGE MANOR	210
839	71	KANSAS CITY,	20002	TOPEKA PHA	3	02942	KS002006	NORTHLAND MANOR	100
840	71	KANSAS CITY,	20054	LHA OF SABETHA	1	02959	KS054001	SABETHA PHA	26
841	71	KANSAS CITY,	29002	KANSAS CITY MO PHA	4	04895	MO002002	T B WATKINS	300
842	71	KANSAS CITY,	29002	KANSAS CITY MO PHA	4	04902	MO002010	PENNWAY PLAZA	222
843	71	KANSAS CITY,	29002	KANSAS CITY MO PHA	4	04919	MO002014	DUNBAR	65
844	71	KANSAS CITY,	29075	HA OF BROOKFIELD	1	05015	MO075001	JOYCE PLACE	90
845	71	KANSAS CITY,	29079	LEBANON PHA	2	05023	MO079002	MAPLE VILLAGE	62
OFFNAME									1279
FIELDOFF									1279

FIELD OFFICE=72 OFFICE NAME=OMAHA, NE

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
846	72	OMAHA, NE	31001	OMAHA HA	4	05064	NE001001	SOUTHSIDE TERRACE HOME	388
847	72	OMAHA, NE	31001	OMAHA HA	4	05072	NE001002	LOGAN FONTENELLE ADDIT	194
848	72	OMAHA, NE	31001	OMAHA HA	4	05089	NE001003	HILLTOP HOMES	225
849	72	OMAHA, NE	31001	OMAHA HA	4	05097	NE001005	PLEASANT VIEW HOMES	300
850	72	OMAHA, NE	31001	OMAHA HA	4	05104	NE001006	LOGAN FONTENELLE HOMES	194
851	72	OMAHA, NE	31001	OMAHA HA	4	05112	NE001009	TWO SITES	288
852	72	OMAHA, NE	31001	OMAHA HA	4	05129	NE001011	JACKSON TOWER	208
853	72	OMAHA, NE	31001	OMAHA HA	4	05137	NE001012	UNDERWOOD TOWER	105
854	72	OMAHA, NE	31001	OMAHA HA	4	05145	NE001016	OMAHA HSG	72
855	72	OMAHA, NE	31017	STROMSBURG HSG AUTH	1	05178	NE017001	SWEDE HAVEN	36
856	72	OMAHA, NE	31018	WYMORE HSG AUTH.	1	05186	NE018001	PARK LODGE	30
857	72	OMAHA, NE	31019	CLAY CENTER HSG AUTH	1	05194	NE019001	GOLDEN ROD HOUSING	30
858	72	OMAHA, NE	31040	ALBION HSG AUTH	1	05201	NE040001	HARMONY HOMES	40

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

FIELD OFFICE=72 OFFICE NAME=OMAHA, NE

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
859	72	OMAHA, NE	31049	HOOPER HSG AUTH	1	05218	NE049001	PARKVIEW APARTMENTS	25
860	72	OMAHA, NE	31072	TEKAMAH HSG AUTH	1	05226	NE072001	THE VILLAGE	26
861	72	OMAHA, NE	31075	INDIANOLA HSG AUTH	1	05234	NE075001	VALLEY VIEW	26
862	72	OMAHA, NE	31091	WOOD RIVER HSG AUTH	1	05242	NE091001	OVERLAND TRAILS OASIS	20
863	72	OMAHA, NE	31104	COLUMBUS HSG AUTH	2	05259	NE104001	HERITAGE HOUSE	100
OFFNAME									2307
FIELDOFF									2307

FIELD OFFICE=73 OFFICE NAME=ST LOUIS, MO

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
864	73	ST LOUIS, MO	29001	ST LOUIS	5	04798	MO001001	CARR SQUARE VILLAGE	658
865	73	ST LOUIS, MO	29001	ST LOUIS	5	04805	MO001002	CLINTON PEABODY	655
866	73	ST LOUIS, MO	29001	ST LOUIS	5	04813	MO001007	JOSEPH M. DARST	507
867	73	ST LOUIS, MO	29001	ST LOUIS	5	04821	MO001009	ARTHUR A BLUMEYER	1162
868	73	ST LOUIS, MO	29001	ST LOUIS	5	04838	MO001011	ST LOUIS	15
869	73	ST LOUIS, MO	29001	ST LOUIS	5	04846	MO001026	ST LOUIS CITY	10
870	73	ST LOUIS, MO	29001	ST LOUIS	5	04862	MO36P001038	ST LOUIS HSG AUTH	637
871	73	ST LOUIS, MO	29001	ST LOUIS	5	04879	MO36P001039	HSG AUTH OF ST LOUIS	632
872	73	ST LOUIS, MO	29001	ST LOUIS	5	04887	MO36P001040	ST LOUIS CITY	82
873	73	ST LOUIS, MO	29004	ST LOUIS COUNTY H A	3	04927			70
874	73	ST LOUIS, MO	29007	COLUMBIA HSG AUTH	3	04935	MO007001	STEWART PARKER	68
875	73	ST LOUIS, MO	29007	COLUMBIA HSG AUTH	3	04943	MO007003	FRANK COLEMAN	44
876	73	ST LOUIS, MO	29011	HSG AUTH OF MOBERLY	2	04951	MO011001	ALLEN+DALE COUNTRY VIE	150
877	73	ST LOUIS, MO	29011	HSG AUTH OF MOBERLY	2	04968	MO011002	MOBERLY	100
878	73	ST LOUIS, MO	29132	HSG AUTH OF OLIVETTE	1	05031	MO132001	OLIVETTE	14
879	73	ST LOUIS, MO	29145	HSG AUTH OF KIRKSVILLE	2	05048	MO145001	KIRKSVILLE	130
OFFNAME									4934
FIELDOFF									4934

FIELD OFFICE=74 OFFICE NAME=DES MOINES,

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
880	74	DES MOINES,	19014	LRHA OF ONAWA	1	02812	IA014001	CENTER HEIGHTS	62
881	74	DES MOINES,	19015	BURLINGTON LHA	2	02829	IA015001	AUTUMN HEIGHTS	201
882	74	DES MOINES,	19020	LRHA OF DES MOINES	3	02837	IA020002	ROYAL VIEW MANOR	50
883	74	DES MOINES,	19020	LRHA OF DES MOINES	3	02845	IA020003	EASTVIEW MANOR	50
884	74	DES MOINES,	19020	LRHA OF DES MOINES	3	02853	IA020004	SOUTHVIEW	200
885	74	DES MOINES,	19020	LRHA OF DES MOINES	3	02861	IA05P020010	SHELTER VISTA	71
886	74	DES MOINES,	19020	LRHA OF DES MOINES	3	02878	IA05P020013	CITY WIDE HOMES	26
887	74	DES MOINES,	19032	LRHA OF LENOX OF IOWA	1	02886	IA032001	SUNRISE APTS	30
888	74	DES MOINES,	19050	WATERLOO LOW RENT H COMM	1	02894	IA050003	RIDGEWAY TOWERS	50

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

FIELD OFFICE=74 OFFICE NAME=DES MOINES,

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
OFFNAME									740
FIELDOFF									740

FIELD OFFICE=81 OFFICE NAME=DENVER, CO

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
889	81	DENVER, CO	08001	DENVER	4	00803	C0001002	LINCOLN PARK	421
890	81	DENVER, CO	08001	DENVER	4	00811	C0001013	BENJAMIN F STAPLETON	228
891	81	DENVER, CO	08001	DENVER	4	00828	C0001021	WALSH MANOR ANNEX	100
892	81	DENVER, CO	08001	DENVER	4	00836	C0001029	EAST SIDE HSNG FOR ELD	200
893	81	DENVER, CO	08001	DENVER	4	00844	C0001031	DENVER	50
894	81	DENVER, CO	08001	DENVER	4	00852	C0001032	DENVER	16
895	81	DENVER, CO	08004	ALAMOSA	2	00869	C0004001	ALAMOSA	40
896	81	DENVER, CO	08012	LIMON	1	00877	C0012001	LIMON HEIGHTS MANOR	40
897	81	DENVER, CO	38015	MERCER CO	1	07479	ND015001	BEULAH	20
898	81	DENVER, CO	38015	MERCER CO	1	07487	ND015002	HAZEN	20
OFFNAME									1135
FIELDOFF									1135

FIELD OFFICE=91 OFFICE NAME=HONOLULU OFF

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
899	91	HONOLULU OFF	15001	HAWAII HOUSING AUTHORITY	4	01905	HI10P001001	KAMEHAMEHA HOMES	221
900	91	HONOLULU OFF	15001	HAWAII HOUSING AUTHORITY	4	01913	HI10P001003	MAYOR WRIGHT HOMES	364
901	91	HONOLULU OFF	15001	HAWAII HOUSING AUTHORITY	4	01921	HI10P001014	LANAKILA HOMES	30
902	91	HONOLULU OFF	15001	HAWAII HOUSING AUTHORITY	4	01938	HI10P001017	KAHEKILI TERRACE	82
903	91	HONOLULU OFF	15001	HAWAII HOUSING AUTHORITY	4	01946	HI10P001021	HUI O HANAMAULU	46
904	91	HONOLULU OFF	15001	HAWAII HOUSING AUTHORITY	4	01954	HI10P001026	PUUWAI MOMI	260
905	91	HONOLULU OFF	15001	HAWAII HOUSING AUTHORITY	4	01962	HI10P001029	POMAIKAI	20
906	91	HONOLULU OFF	15001	HAWAII HOUSING AUTHORITY	4	01979	HI10P001032	KAIMALINO	40
907	91	HONOLULU OFF	15001	HAWAII HOUSING AUTHORITY	4	01987	HI10P001047	PUMEHANA	139
908	91	HONOLULU OFF	15001	HAWAII HOUSING AUTHORITY	4	01995	HI10P001054	HALE NANA KAI O KEA	38
OFFNAME									1240
FIELDOFF									1240

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

FIELD OFFICE=92 OFFICE NAME=LOS ANGELES

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
909	92	LOS ANGELES	06002	LOS ANGELES COUNTY HA	4	00544	CA002001	CARMELITOS	571
910	92	LOS ANGELES	06002	LOS ANGELES COUNTY HA	4	00552	CA16P002035	VAN BUREN	64
911	92	LOS ANGELES	06002	LOS ANGELES COUNTY HA	4	00569	CA16P002036	LOS ANGELES COUNTY	300
912	92	LOS ANGELES	06004	LOS ANGELES CITY HA	5	00577	CA004005	ALISO VILLAGE	685
913	92	LOS ANGELES	06004	LOS ANGELES CITY HA	5	00585	CA004007	ESTRADA COURTS	214
914	92	LOS ANGELES	06004	LOS ANGELES CITY HA	5	00593	CA004015	PUEBLO DEL RIO EXTENSI	270
915	92	LOS ANGELES	06004	LOS ANGELES CITY HA	5	00609	CA004016	JORDON DOWNS	700
916	92	LOS ANGELES	06004	LOS ANGELES CITY HA	5	00617	CA004017	RANCHO SAN PEDRO EXTEN	194
917	92	LOS ANGELES	06004	LOS ANGELES CITY HA	5	00625	CA004021	MAR VISTA GARDENS	601
918	92	LOS ANGELES	06004	LOS ANGELES CITY HA	5	00633	CA004023	NORMONT TERRACE	395
919	92	LOS ANGELES	06008	KERN COUNTY HA	3	00674	CA008003	VALLE VISTA	62
920	92	LOS ANGELES	06008	KERN COUNTY HA	3	00682	CA008007	TERRA VISTA	35
921	92	LOS ANGELES	06027	RIVERSIDE COUNTY HA	2	00763	CA027001	BEAUMONT APTS	12
922	92	LOS ANGELES	06047	IMPERIAL COUNTY HA	1	00796	CA047003	CALEXICO HOMES	25
OFFNAME									4128
FIELDOFF									4128

FIELD OFFICE=93 OFFICE NAME=SAN FRANCISC

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
923	93	SAN FRANCISC	06001	CITY-CO SAN FRANCISCO	5	00463	CA001004	VALENCIA GARDENS	246
924	93	SAN FRANCISC	06001	CITY-CO SAN FRANCISCO	5	00471	CA001005	BERNAL DWELLINGS	208
925	93	SAN FRANCISC	06001	CITY-CO SAN FRANCISCO	5	00488	CA001015	PING YUEN	234
926	93	SAN FRANCISC	06001	CITY-CO SAN FRANCISCO	5	00496	CA001016	ALEMANY	158
927	93	SAN FRANCISC	06001	CITY-CO SAN FRANCISCO	5	00503	CA001036	BAY	50
928	93	SAN FRANCISC	06001	CITY-CO SAN FRANCISCO	5	00528			198
929	93	SAN FRANCISC	06001	CITY-CO SAN FRANCISCO	5	00536			258
930	93	SAN FRANCISC	06011	CONTRA COSTA COUNTY	3	00699	CA011003	BRIDGEMONT	36
931	93	SAN FRANCISC	06011	CONTRA COSTA COUNTY	3	00706	CA011005	EL PUEBLO	176
932	93	SAN FRANCISC	06011	CONTRA COSTA COUNTY	3	00714	CA011010	BAYO VISTA	250
933	93	SAN FRANCISC	06011	CONTRA COSTA COUNTY	3	00722	CA011015	CONTRA COSTA COUNTY	60
934	93	SAN FRANCISC	06025	HA CITY OF EUREKA	2	00747	CA025001	EUREKA	100
935	93	SAN FRANCISC	06025	HA CITY OF EUREKA	2	00755	CA025002	EUREKA	60
936	93	SAN FRANCISC	06045	HA CITY OF SAN PABLO	2	00788	CA045001	VISTA DEL CAMINO	100
937	93	SAN FRANCISC	32001	CITY OF RENO	3	05267	NV001001	MINERAL MANOR	148
938	93	SAN FRANCISC	32001	CITY OF RENO	3	05275	NV001002	TOM SAWYER VILLAGE	100
939	93	SAN FRANCISC	32001	CITY OF RENO	3	05283	NV001003	SILVERADO MANOR	150
940	93	SAN FRANCISC	32002	HA CITY OF LAS VEGAS	4	05291	NV002001	MARBLE MANOR	100
941	93	SAN FRANCISC	32002	HA CITY OF LAS VEGAS	4	05307	NV002007	HERBERT GERSON PARK	300
942	93	SAN FRANCISC	32002	HA CITY OF LAS VEGAS	4	05315	NV002009	ERNIE CRAGIN TERRACE	86
943	93	SAN FRANCISC	32002	HA CITY OF LAS VEGAS	4	05323	NV002011	ERNIE CRAGIN TERRACE	54
944	93	SAN FRANCISC	32002	HA CITY OF LAS VEGAS	4	05331	NV002017	HA CITY OF LAS VEGAS	94
OFFNAME									3166
FIELDOFF									3166

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

FIELD OFFICE=94 OFFICE NAME=PHOENIX OFFI

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
945	94	PHOENIX OFFI	04001	PHOENIX CITY HA	4	00252	AZ001001	MARCOS DE NIZA	224
946	94	PHOENIX OFFI	04001	PHOENIX CITY HA	4	00269	AZ001002	FRANK LUKE HOMES	230
947	94	PHOENIX OFFI	04001	PHOENIX CITY HA	4	00277	AZ001003	MATTHEW HENSON HOMES	150
948	94	PHOENIX OFFI	04001	PHOENIX CITY HA	4	00285	AZ001007	SIDNEY P OSBORN	174
949	94	PHOENIX OFFI	04001	PHOENIX CITY HA	4	00293	AZ001008A	A L KROHN HOMES SW	114
950	94	PHOENIX OFFI	04001	PHOENIX CITY HA	4	00309	AZ001018	SCATTERED SITES	50
951	94	PHOENIX OFFI	04003	GLENDALE CITY OF	2	00317	AZ003001	FREY FRANCISCO PORRAS	51
952	94	PHOENIX OFFI	04008	CITY OF WINSLOW	1	00341	AZ008001	NORTHWEST SQUARE	30
953	94	PHOENIX OFFI	04009	MARICOPA COUNTY	3	00358	AZ009004	H M WATSON HOMES	20
954	94	PHOENIX OFFI	04009	MARICOPA COUNTY	3	00366	AZ009006	FLORA STATLER APTS	30
955	94	PHOENIX OFFI	04009	MARICOPA COUNTY	3	00374	AZ009007	AVONDALE HOMES	30
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OFFNAME									1103
FIELDOFF									1103

FIELD OFFICE=95 OFFICE NAME=SACRAMENTO O

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
956	95	SACRAMENTO O	06005	SACRAMENTO HSG + RA	4	00641	CA005016	626 I STREET	108
957	95	SACRAMENTO O	06005	SACRAMENTO HSG + RA	4	00658	CA005018	3725 CYPRESS STREET	40
958	95	SACRAMENTO O	06005	SACRAMENTO HSG + RA	4	00666	CA30P005020	CITY SCATTERED	103
959	95	SACRAMENTO O	06024	SAN JOAQUIN COUNTY HA	3	00739	CA024006	CONWAY HOMES ANNEX	200
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OFFNAME									451
FIELDOFF									451

FIELD OFFICE=101 OFFICE NAME=ANCHORAGE, A

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
960	101	ANCHORAGE, A	02001	ASHA	3	00203	AK001001	BIRCH PARK	75
961	101	ANCHORAGE, A	02001	ASHA	3	00211	AK001002	CEDAR PARK	50
962	101	ANCHORAGE, A	02001	ASHA	3	00228	AK001003	WILLOW PARK	150
963	101	ANCHORAGE, A	02001	ASHA	3	00236	AK001008	CEDAR PARK ANNEX	25
964	101	ANCHORAGE, A	02001	ASHA	3	00244	AK001011	FAIRMOUNT	88
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OFFNAME									388
FIELDOFF									388

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

FIELD OFFICE=102 OFFICE NAME=PORTLAND, OR

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
965	102	PORTLAND, OR	16005	POCATELLO HA	1	02001	ID005001	CHRISTENSON COURT	75
966	102	PORTLAND, OR	41002	PORTLAND HA	4	08037	OR002001	COLUMBIA VILLA	440
967	102	PORTLAND, OR	41002	PORTLAND HA	4	08045	OR002003	IRIS COURT	102
968	102	PORTLAND, OR	41002	PORTLAND HA	4	08053	OR002005	HILLSDALE TERRACE	98
969	102	PORTLAND, OR	41002	PORTLAND HA	4	08061	OR002007	ROYAL ROSE COURT	36
970	102	PORTLAND, OR	41002	PORTLAND HA	4	08078	OR002014	DALHKE MANOR	115
971	102	PORTLAND, OR	41002	PORTLAND HA	4	08086	OR002018	WILLIAMS PLAZA	101
972	102	PORTLAND, OR	41007	UMATILLA COUNTY HA	2	08126	OR007001	ORCHARD HOMES	16
973	102	PORTLAND, OR	41007	UMATILLA COUNTY HA	2	08134	OR007003	BLISS HOMES	32
974	102	PORTLAND, OR	53008	VANCOUVER HA	2	10345	WA008001	SKYLINE CREST	150
OFFNAME									1165
FIELDOFF									1165

FIELD OFFICE=103 OFFICE NAME=SEATTLE WA

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
975	103	SEATTLE WA	53001	SEATTLE HA	4	10134	WA001005	YESLER TERRACE	135
976	103	SEATTLE WA	53001	SEATTLE HA	4	10142	WA001006	RAINIER VISTA	488
977	103	SEATTLE WA	53001	SEATTLE HA	4	10159	WA001016	HARVARD COURT	81
978	103	SEATTLE WA	53001	SEATTLE HA	4	10167	WA001023	ROXBURY VILLAGE	210
979	103	SEATTLE WA	53001	SEATTLE HA	4	10175	WA001029	QUEEN ANNE HEIGHTS	52
980	103	SEATTLE WA	53001	SEATTLE HA	4	10183	WA001030	BARTON PLACE	91
981	103	SEATTLE WA	53001	SEATTLE HA	4	10191	WA001033	BEACON TOWERS	108
982	103	SEATTLE WA	53002	KING COUNTY HA	4	10207	WA002005	PARK LAKE HOMES II	200
983	103	SEATTLE WA	53002	KING COUNTY HA	4	10215	WA002017	BALLINGER HOMES	110
984	103	SEATTLE WA	53002	KING COUNTY HA	4	10223	WA002021	CASA JUANITA	80
985	103	SEATTLE WA	53002	KING COUNTY HA	4	10231	WA002022	YARDLEY ARMS	67
986	103	SEATTLE WA	53003	BREMERTON HA	3	10248	WA003001	WEST PARK	582
987	103	SEATTLE WA	53004	CLALLAM COUNTY HA	2	10256	WA004003	MOUNT ANGELES VIEW	30
988	103	SEATTLE WA	53004	CLALLAM COUNTY HA	2	10264	WA004004	MOUNT ANGELES VIEW	30
989	103	SEATTLE WA	53005	TACOMA HA	4	10272	WA005004	SALISHAN	240
990	103	SEATTLE WA	53005	TACOMA HA	4	10289	WA005007	SALISHAN	50
991	103	SEATTLE WA	53005	TACOMA HA	4	10297	WA005008	1202 SOUTH 'M' STREET	77
992	103	SEATTLE WA	53005	TACOMA HA	4	10304	WA005010	602 WRIGHT	58
993	103	SEATTLE WA	53006	EVERETT HA	3	10312	WA006001	BAKERS HEIGHTS	250
994	103	SEATTLE WA	53006	EVERETT HA	3	10329	WA006002	GRANDVIEW HOMES	150
995	103	SEATTLE WA	53006	EVERETT HA	3	10337	WA006003	BAKER VIEW APTS	151
996	103	SEATTLE WA	53019	KALAMA HA	1	10361	WA019001	1020 CLOVERDALE ROAD	16
997	103	SEATTLE WA	53025	BELLINGHAM HA	3	10378	WA025002	WASHINGTON SQUARE	98
998	103	SEATTLE WA	53025	BELLINGHAM HA	3	10386	WA025003	CHUCKANUT SQUARE	101
999	103	SEATTLE WA	53036	KITSAP COUNTY CNSLDTD HA	2	10418	WA036001	GOLDEN TIDES - BROWNSV	30
1000	103	SEATTLE WA	53036	KITSAP COUNTY CNSLDTD HA	2	10426	WA19P036005	FAIRVIEW	33
OFFNAME									3518
FIELDOFF									3518

Exhibit H-1: Sampled Developments Ordered by Field Office (continued)

-- FIELD OFFICE=103 OFFICE NAME=SEATTLE WA --

OBS	FIELDOFF	OFFNAME	PHANUM	PHANAME	PHASIZEX	SEQNUM	OLDPROJ	PROJNAME	TOTALDUS
									236859

Exhibit H-2

Twenty-one Developments in Eleven Field Offices
Effected by Weight Adjustment Process

Field Office	Field Office Number	Development I.D. Number	New DEVWT4 Value	New DEVWT5 Value	Original DEVWT4 Value	Original DEVWT5 Value
Sacramento	95	00739	3.0340	3.0340	26.427	26.427
Hartford	12	01013	2.9830	2.9830	11.744	12.541
Hartford	12	01079	8.1930	8.1930	32.255	33.158
Hartford	12	01095	5.9910	5.9910	23.587	23.587
Jacksonville	46	01338	9.8212	9.8212	22.833	34.957
Chicago	51	02212	12.2940	12.2940	29.065	29.808
Chicago	51	02318	2.3890	2.3890	5.649	6.127
Chicago	51	02431	39.6160	39.6160	93.656	101.581
New Orleans	63	03233	54.2148	54.2148	145.000	145.000
Grand Rapids	59	04473	46.7731	46.7731	80.278	80.278
Kansas City	71	05023	74.1229	74.1229	91.228	101.359
Buffalo	21	06425	9.9810	9.9810	5.352	5.352
Buffalo	21	06466	47.4530	47.4530	25.444	25.444
Philadelphia	32	08264	1.0000	1.0000	2.418	2.418
Philadelphia	32	08345	1.0000	1.0000	2.418	2.418
Philadelphia	32	08353	1.0000	1.0000	2.418	2.418
San Antonio	65	09917	81.8923	81.8923	145.000	152.845
Milwaukee	55	10653	1.8720	1.8720	4 170	4.170
Milwaukee	55	10678	2.0150	2.0150	4.487	4.487
Milwaukee	55	10686	16.7170	16.7170	37.231	37.231
Milwaukee	55	10701	32.6750	32.6750	72.773	72.773

APPENDIX I

FIELD OFFICE AND HUD REGION ESTIMATES

The main study sample is designed to provide estimates of FIX and ADDs costs at the HUD region and individual field office level. Energy, redesign, accessibility, Indian housing and lead paint abatement are all based on samples that are too small to provide direct regional and field office estimates. For these study components, the national cost estimate was allocated to the regional and field office level using indirect estimation methods. Consequently, no standard errors and 95-percent confidence intervals are presented for these allocated estimates.

FIX

The FIX estimates, standard errors, and 95-percent confidence interval for each of the 51 field offices are presented in Exhibit I-1. The coefficient of variation which equals the standard error divided by the FIX estimate is also included in this exhibit. Exhibit I-2 shows the associated estimates for the 10 HUD regions.

Exhibit I-1: FIX Cost, by Region and Field Office

REGION=1

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL FIX COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	FIX COST PER DWEL-LING UNIT
1	011	BOSTON, MA	$246,745,165	2 65	25,825,810	0 10	50,618,588	7015 39
2	012	HARTFORD, CT	$154,178,463	1 66	28,690,151	0 19	56,232,696	8051.94
3	013	MANCHESTER,	$57,247,903	0 62	23,495,185	0 41	46,050,564	5818 47
4	014	PROV	$37,404,687	0.40	6,273,911	0 17	12,296,866	3795 50
SUBTOTAL			$495,576,218	5 32				

REGION=2

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL FIX COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	FIX COST PER DWEL-LING UNIT
5	021	BUFFALO, NY	$193,461,095	2 08	94,455,160	0 49	185,132,113	7628 89
6	022	SAN JUAN, PR	$770,198,997	8 28	93,614,923	0 12	183,485,249	12270 18
7	023	NEW YORK, NY	$1,050,588,949	11 29	127,676,255	0 12	250,245,459	6595 49
8	024	NEWARK, NJ	$425,977,756	4 58	46,799,505	0 11	91,727,030	8953 82
SUBTOTAL			$2,440,226,797	26 22				

REGION=3

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL FIX COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTEPVAL	FIX COST PER DWEL-LING UNIT
9	031	BALTIMORE, M	$239,740,058	2 58	37,169,611	0 16	72,852,437	10156 33
10	032	PHILADELPHIA	$912,030,359	9 80	143,474,316	0 16	281,209,659	18280 83
11	033	PITTSBURGH,	$325,452,007	3 50	32,555,982	0 10	63,809,725	10401 82
12	034	RICHMOND, VA	$102,221,567	1 10	20,712,625	0 20	40,596,745	5035 05
13	035	WASHINGTON,	$98,328,988	1 06	22,412,996	0 23	43,929,472	6381 27
14	036	CHARLESTON,	$11,344,002	0 12	4,121,018	0 36	8,077,196	1662 12
SUBTOTAL			$1,689,116,981	18.15				

Exhibit I-1: FIX Cost, by Region and Field Office (continued)

REGION=4

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL FIX COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	FIX COST PER DWEL-LING UNIT
15	041	ATLANTA, GA	$334,878,052	3 60	108,924,310	0 33	213,491,648	5963 14
16	042	BIRMINGHAM,	$173,144,200	1 86	63,356,368	0 37	124,178,482	4121 60
17	043	COLUMBIA, SC	$92,861,026	1 00	59,487,136	0 64	116,594,786	5940 06
18	044	GREENSBORO,N	$101,874,185	1 09	20,033,126	0 20	39,264,928	2703 60
19	045	JACKSON, MS	$66,254,822	0 71	13,798,207	0 21	27,044,487	5358 25
20	046	JACKSONVILLE	$234,620,309	2 52	62,758,549	0 27	123,006,756	5622 07
21	047	KNOXVILLE, T	$52,355,634	0 56	13,971,165	0 27	27,383,484	3340 92
22	048	LOUISVILLE,	$229,904,349	2 47	71,817,687	0 31	140,762,667	9201 69
23	049	NASHVILLE, T	$90,544,299	0 97	20,705,158	0 23	40,582,110	3622 64
SUBTOTAL			$1,376,436,877	14 79				

REGION=5

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL FIX COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	FIX COST PER DWEL-LING UNIT
24	051	CHICAGO	$447,390,776	4 81	130,553,988	0 29	255,885,817	5819 64
25	052	COLUMBUS, OH	$21,988,806	0 24	2,222,561	0 10	4,356,219	2157 67
26	053	DETROIT,MI	$162,042,388	1 74	24,728,802	0 15	48,468,451	8302 20
27	054	INDIANAPOLIS	$75,820,362	0 81	7,000,016	0 09	13,720,031	4412 52
28	055	MILWAUKEE, W	$60,018,796	0 64	11,665,543	0 19	22,864,464	4658 40
29	056	MINN/ST PAUL	$167,513,819	1 80	27,301,949	0 16	53,511,821	7903 83
30	057	CINCINNATI,	$128,870,214	1 38	15,620,638	0 12	30,616,451	9788 11
31	058	CLEVELAND, O	$321,328,434	3 45	70,961,471	0 22	139,084,482	10854 59
32	059	GRAND RAPIDS	$32,865,752	0 35	13,871,316	0 42	27,187,779	3740 70
SUBTOTAL			$1,417,839,347	15 23				

REGION=6

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL FIX COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	FIX COST PER DWEL-LING UNIT
33	061	DALLAS, TX	$180,989,932	1 94	46,247,366	0 26	90,644,837	5252 33
34	062	LITTLE ROCK,	$64,392,626	0 69	11,924,364	0 19	23,371,753	4326 59
35	063	NEW ORLEANS,	$230,063,341	2 47	29,878,231	0 13	58,561,332	7424 99
36	064	OKLAHOMA CIT	$40,198,910	0 43	22,868,639	0 57	44,822,532	3144 96
37	065	SAN ANTONIO,	$114,944,215	1 24	39,308,026	0 34	77,043,730	4970 35
38	066	HOUSTON, TX	$62,915,998	0 68	9,507,302	0 15	18,634,311	7131 72
SUBTOTAL			$693,505,023	7 45				

Exhibit I-1: FIX Cost, by Region and Field Office (continued)

REGION=7

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL FIX COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	FIX COST PER DWEL-LING UNIT
39	071	KANSAS CITY,	$67,795,432	0 73	14,089,452	0 21	27,615,326	4397 16
40	072	OMAHA, NE	$45,861,989	0 49	7,808,047	0 17	15,303,772	6153 49
41	073	ST LOUIS, MO	$154,680,248	1 66	28,166,111	0 18	55,205,577	10612 71
42	074	DES MOINES,	$17,187,191	0 18	2,134,728	0 12	4,184,067	4049 76
SUBTOTAL			$285,524,860	3 07				

REGION=8

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL FIX COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	FIX COST PER DWEL-LING UNIT
43	081	DENVER, CO	$134,598,811	1 45	20,689,661	0 15	40,551,735	8272 31

REGION=9

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL FIX COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	FIX COST PER DWEL-LING UNIT
44	091	HONOLULU OFF	$39,994,545	0 43	6,494,662	0 16	12,729,537	6994 50
45	092	LOS ANGELES	$299,004,215	3 21	29,303,796	0 10	57,435,441	16200 92
46	093	SAN FRANCISC	$235,698,924	2 53	57,122,413	0 24	111,959,929	10769 88
47	094	PHOENIX OFFI	$36,984,839	0 40	3,824,667	0 10	7,496,347	7115 21
48	095	SACRAMENTO O	$41,557,886	0 45	22,859,271	0 55	44,804,170	9455 72
SUBTOTAL			$653,240,410	7 02				

REGION=10

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL FIX COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	FIX COST PER DWEL-LING UNIT
49	101	ANCHORAGE, A	$8,128,451	0 09	2,897,121	0 36	5,678,357	7231 72
50	102	PORTLAND, OR	$32,673,642	0 35	17,550,100	0 54	34,398,197	5002 85
51	103	SEATTLE WA	$80,054,288	0 86	8,325,546	0 10	16,318,071	5072 83
SUBTOTAL			$120,856,380	1 30				
	TOTAL		$9,306,921,704	100 00				

Exhibit I-2: Total FIX Cost by Region

OBS	REGION	TOTAL FIX COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	FIX COST PER DWELLING UNIT
1	1	$495,576,218	5.32	45,623,272	0.09	+/- 89,421,613	6,696
2	2	$2,440,226,797	26.22	190,202,394	0.08	+/-372,796,692	8,272
3	3	$1,689,116,981	18.15	154,837,622	0.09	+/-303,481,739	11,466
4	4	$1,376,436,877	14.79	172,421,818	0.13	+/-337,946,764	5,075
5	5	$1,417,839,347	15.23	155,123,264	0.11	+/-304,041,597	6,771
6	6	$693,505,023	7.45	73,021,930	0.11	+/-143,122,983	5,546
7	7	$285,524,860	3.07	32,517,151	0.11	+/- 63,733,616	6,849
8	8	$134,598,811	1.45	20,689,661	0.15	+/- 40,551,735	8,272
9	9	$653,240,410	7.02	68,564,112	0.10	+/-134,385,660	11,738
10	10	$120,856,380	1.30	19,639,604	0.16	+/- 38,493,625	5,157
	TOTALS	$9,306,921,704	100.00				

ADDs

The 23 ADDs estimates, their standard errors, coefficients of variation and 95-percent confidence units for each field office are shown in Exhibit I-3. The associated estimates for the 10 HUD regions are provided in Exhibit I-4. No standard errors were computed for $0 estimates.

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office

COST CATEGORY=ENERGY ISO=1

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	COST PER UNIT
011	BOSTON, MA	$17,213,355	2 20	4,470,692	0 26	8,762 556	489 41
012	HARTFORD, CT	$8,711,743	1 12	4,914,367	0 56	9,632,159	454 97
013	MANCHESTER,	$7,822,996	1 00	3,522,561	0 45	6,904,219	795 10
014	PROV	$10,534,806	1 35	2,039,810	0 19	3,998,028	1068 98
021	BUFFALO, NY	$29,776,207	3 81	6,221,531	0 21	12,194,200	1174 19
022	SAN JUAN, PR	$5,286,904	0 68	3,594,197	0 68	7,044,627	84 23
023	NEW YORK, NY	$136,945,233	17 54	31,518,975	0 23	61,777,191	859 73
024	NEWARK, NJ	$28,089,740	3 60	5,772,509	0 21	11,314,118	590 43
031	BALTIMORE, M	$8,604,185	1 10	4,041,475	0 47	7,921,291	364 51
032	PHILADELPHIA	$25,113,028	3 22	14,176,544	0 56	27,786,027	503 37
033	PITTSBURGH,	$42,206,449	5 41	12,170,741	0 29	23,854,653	1348 97
034	RICHMOND, VA	$15,691,373	2 01	7,583,002	0 48	14,862,683	772 90
035	WASHINGTON,	$9,499,082	1 22	4,905,841	0 52	9,615,448	616 46
036	CHARLESTON,	$3,229,130	0 41	1,805,461	0 56	3,538,703	473 13
041	ATLANTA, GA	$42,409,940	5 43	16,749,866	0 39	32,829,737	755 19
042	BIRMINGHAM,	$5,349,003	0 69	2,468,631	0 46	4,838,516	127 33
043	COLUMBIA, SC	$8,850,801	1 13	6,638,651	0 75	13,011,756	566 16
044	GREENSBORO,N	$10,488,620	1 34	4,687,532	0 45	9,187,563	278 35
045	JACKSON, MS	$0	0 00				0 00
046	JACKSONVILLE	$4,685,331	0 60	3,698,745	0 79	7,249,540	112 27
047	KNOXVILLE, T	$44,633	0 01	48,954	1 10	95,949	2 85
048	LOUISVILLE,	$15,671,859	2 01	11,118,251	0 71	21,791,772	627 25
049	NASHVILLE, T	$0	0 00				0 00
051	CHICAGO	$62,041,324	7 95	17,558,509	0 28	34,414,679	807 03
052	COLUMBUS, OH	$3,836	0 00	6,128	1 60	12,012	0 38
053	DETROIT,MI	$11,545,400	1 48	3,563,660	0 31	6,984,773	591 53
054	INDIANAPOLIS	$34,494,844	4 42	11,382,151	0 33	22,309,016	2007 50
055	MILWAUKEE, W	$1,055,449	0 14	384,030	0 36	752,699	81 92
056	MINN/ST PAUL	$18,060,506	2 31	17,878,187	0 99	35,041,247	852 15
057	CINCINNATI,	$13,584,885	1 74	10,245,150	0 75	20,080,494	1031 82
058	CLEVELAND, O	$45,224,042	5 79	28,935,224	0 64	56,713,040	1527 68
059	GRAND RAPIDS	$2,178,581	0 28	1,094,003	0 50	2,144,246	247 96
061	DALLAS, TX	$0	0 00				0 00
062	LITTLE ROCK,	$1,043,840	0 13	986,467	0 95	1,933,476	70 14
063	NEW ORLEANS,	$10,176,003	1 30	6,870,439	0 68	13,466,060	328 42
064	OKLAHOMA CIT	$25,698,057	3 29	19,993,412	0 78	39,187,088	2010 49
065	SAN ANTONIO,	$1,134,387	0 15	1,460,167	1 29	2,861,927	49 05
066	HOUSTON, TX	$3,994,549	0 51	3,187,373	0 80	6,247,251	452 79
071	KANSAS CITY,	$5,992,580	0 77	3,597,947	0 60	7,051,977	388 67
072	OMAHA, NE	$8,828,192	1 13	1,595,742	0 18	3,127,655	1184 52
073	ST LOUIS, MO	$15,985,739	2 05	4,533,999	0 28	8,886,639	1096 79
074	DES MOINES,	$132,439	0 02	133,141	1 01	260,956	31 21
081	DENVER, CO	$16,534,266	2 12	3,526,187	0 21	6,911,326	1016 18
091	HONOLULU OFF	$15,457	0 00	16,155	1 05	31,664	3 02
092	LOS ANGELES	$5,641,845	0 72	6,163,074	1 09	12,079,624	305 69
093	SAN FRANCISC	$35,532,144	4 55	10,389,140	0 29	20,362,714	1623 58
094	PHOENIX OFFI	$4,577,934	0 59	2,196,214	0 48	4,304,580	880 71
095	SACRAMENTO O	$6,400,746	0 82	5,932,580	0 93	11,627,856	1456 37
101	ANCHORAGE, A	$2,378,310	0 30	751,114	0 32	1,472,184	2115 93
102	PORTLAND, OR	$7,423,842	0 95	2,454,949	0 33	4,811,699	1136 71
103	SEATTLE WA	$4,853,552	0 62	1,770,794	0 36	3,470,756	307 56
TOTALS		$780,757,167	100 00				

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office (continued)

COST CATEGORY=MANDATORY ISO=1

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI-DENCE INTERVAL	COST PER UNIT
011	BOSTON, MA	$5,757,832	1 48	1,647,155	0 29	3,228,423	163 71
012	HARTFORD, CT	$18,761,835	4 82	10,764,466	0 57	21,098,353	979 83
013	MANCHESTER,	$2,148,873	0 55	515,910	0 24	1,011,184	218 40
014	PROV	$1,219,094	0 31	575,479	0 47	1,127,938	123 70
021	BUFFALO, NY	$12,629,119	3 24	13,314,387	1 05	26,096,199	498 01
022	SAN JUAN, PR	$25,606,790	6 58	7,220,409	0 28	14,152,002	407 95
023	NEW YORK, NY	$7,050,414	1 81	1,205,595	0 17	2,362,966	44 26
024	NEWARK, NJ	$5,163,959	1 33	2,078,281	0 40	4,073,430	108 54
031	BALTIMORE, M	$10,759,625	2 76	5,235,469	0 49	10,261,520	455 82
032	PHILADELPHIA	$4,505,453	1 16	2,280,912	0 51	4,470,588	90 31
033	PITTSBURGH,	$17,852,462	4 58	5,401,670	0 30	10,587,273	570 58
034	RICHMOND, VA	$50,600,095	12 99	20,693,647	0 41	40,559,548	2492 37
035	WASHINGTON,	$193,126	0 05	128,391	0 66	251,647	12 53
036	CHARLESTON,	$883,732	0 23	477,812	0 54	936,512	129 48
041	ATLANTA, GA	$28,557,240	7 33	10,055,827	0 35	19,709,421	508 52
042	BIRMINGHAM,	$35,740,180	9 18	14,800,976	0 41	29,009,912	850 77
043	COLUMBIA, SC	$4,050,119	1 04	2,945,795	0 73	5,773 758	259 07
044	GREENSBORO, N	$3,594,012	0 92	3,123,963	0 87	6,122,967	95 38
045	JACKSON, MS	$1,895,900	0 49	2,978,549	1 57	5,837,956	153 33
046	JACKSONVILLE	$6,082,359	1 56	4,038,781	0 66	7,916,012	145 75
047	KNOXVILLE, T	$0	0 00				0 00
048	LOUISVILLE,	$2,169,940	0 56	1,562,284	0 72	3,062,078	86 85
049	NASHVILLE, T	$2,173,245	0 56	1,922,434	0 88	3,767,970	86 95
051	CHICAGO	$68,757,534	17 66	21,511,305	0 31	42,162,158	894 40
052	COLUMBUS, OH	$0	0 00				0 00
053	DETROIT, MI	$1,523,508	0 39	688,627	0 45	1,349,709	78 06
054	INDIANAPOLIS	$4,547,641	1 17	2,226,814	0 49	4,364,555	264 66
055	MILWAUKEE, W	$4,129,647	1 06	1,834,454	0 44	3,595,531	320 53
056	MINN/ST PAUL	$15,969	0 00	22,059	1 38	43,235	0 75
057	CINCINNATI,	$3,659,417	0 94	1,936,799	0 53	3,796,126	277 94
058	CLEVELAND, O	$1,164,939	0 30	703,478	0 60	1,378,817	39 35
059	GRAND RAPIDS	$0	0 00				0 00
061	DALLAS, TX	$16,757,727	4 30	21,437,814	1 28	42,018,115	486 31
062	LITTLE ROCK,	$4,401,718	1 13	2,278,222	0 52	4,465,315	295 75
063	NEW ORLEANS,	$10,295,051	2 64	4,975,374	0 48	9,751,733	332 26
064	OKLAHOMA CIT	$0	0 00				0 00
065	SAN ANTONIO,	$89,660	0 02	115,409	1 29	226,202	3 88
066	HOUSTON, TX	$0	0 00				0 00
071	KANSAS CITY,	$4,421,190	1 14	4,819,786	1 09	9,446,780	286 76
072	OMAHA, NE	$809,832	0 21	323,622	0 40	634,299	108 66
073	ST LOUIS, MO	$2,484,268	0 64	920,053	0 37	1,803,304	170 45
074	DES MOINES,	$0	0 00				0 00
081	DENVER, CO	$85,865	0 02	80,126	0 93	157,048	5 28
091	HONOLULU OFF	$1,186,015	0 30	1,039,742	0 88	2,037,895	231 51
092	LOS ANGELES	$499,446	0 13	365,002	0 73	715,405	27 06
093	SAN FRANCISC	$9,392,675	2 41	5,149,296	0 55	10,092,621	429 18
094	PHOENIX OFFI	$392,179	0 10	239,722	0 61	469,854	75 45
095	SACRAMENTO O	$251,217	0 06	215,630	0 86	422,635	57 16
101	ANCHORAGE, A	$0	0 00				0 00
102	PORTLAND, OR	$72,142	0 02	40,837	0 57	80,041	11 05
103	SEATTLE WA	$7,093,887	1 82	4,818,458	0 68	9,444,178	449 52
TOTALS		$389,426,928	100 00				

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office (continued)

COST CATEGORY=PROJ SPECIFIC ISO=1

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI- DENCE INTERVAL	COST PER UNIT
011	BOSTON, MA	$99,453,947	3 72	20,697,138	0 21	40,566,390	2827 65
012	HARTFORD, CT	$115,309,992	4 31	70,956,808	0 62	139,075,343	6022 04
013	MANCHESTER,	$18,833,172	0 70	2,711,761	0 14	5,315,052	1914.13
014	PROV	$35,996,544	1 35	17,894,373	0 50	35,072,972	3652 62
021	BUFFALO, NY	$100,339,946	3 75	66,687,548	0 66	130,707,593	3956 78
022	SAN JUAN, PR	$483,738,794	18 08	108,364,460	0 22	212,394,341	7706 53
023	NEW YORK, NY	$168,983,977	6 32	37,032,020	0 22	72,582,760	1060 86
024	NEWARK, NJ	$187,263,718	7 00	60,098,623	0 32	117,793,301	3936 18
031	BALTIMORE, M	$26,402,520	0 99	14,059,316	0 53	27,556,259	1118 51
032	PHILADELPHIA	$48,835,717	1 83	23,283,934	0 48	45,636,511	978 87
033	PITTSBURGH,	$187,303,220	7 00	26,412,953	0 14	51,769,387	5986 42
034	RICHMOND, VA	$50,830,633	1 90	19,418,184	0 38	38,059,640	2503 73
035	WASHINGTON, ,	$48,700,071	1 82	20,550,215	0 42	40,278,422	3160 50
036	CHARLESTON,	$10,620,552	0 40	4,180,059	0 39	8,192,916	1556 12
041	ATLANTA, GA	$48,776,373	1 82	10,771 236	0 22	21,111,622	868 56
042	BIRMINGHAM,	$98,323,458	3 68	36,906,539	0 38	72,336,816	2340 53
043	COLUMBIA, SC	$67,897,575	2 54	47,308,604	0 70	92,724,864	4343 22
044	GREENSBORO,N	$47,808,218	1 79	11,415,690	0 24	22,374,752	1268 76
045	JACKSON, MS	$1,524,672	0 06	1,690,420	1 11	3,313,224	123 31
046	JACKSONVILLE	$20,331,216	0 76	6,358,266	0 31	12,462,202	487 19
047	KNOXVILLE, T	$5,284,617	0 20	2,897,873	0 55	5,679,831	337 22
048	LOUISVILLE,	$8,756,717	0 33	1,923,707	0 22	3,770,466	350 48
049	NASHVILLE, T	$50,565,633	1 89	18,249,500	0 36	35,769,020	2023 11
051	CHICAGO	$154,208,404	5 76	35,512,582	0 23	69,604,661	2005 94
052	COLUMBUS, OH	$0	0 00				0 00
053	DETROIT,MI	$72,735,810	2 72	17,366,794	0.24	34,038,915	3726 60
054	INDIANAPOLIS	$21,575,327	0 81	8,652,758	0 40	16,959,405	1255 62
055	MILWAUKEE, W	$42,169,181	1 58	16,899,500	0 40	33,123,021	3272 99
056	MINN/ST PAUL	$30,354,147	1 13	4,183,325	0 14	8,199,317	1432 20
057	CINCINNATI,	$5,882,890	0 22	1,670,866	0 28	3,274,897	446 82
058	CLEVELAND, O	$74,753,132	2 79	32,264,236	0 43	63,237,903	2525 19
059	GRAND RAPIDS	$31,803,765	1.19	21,399,195	0 67	41,942,422	3619 82
061	DALLAS, TX	$4,405,474	0 16	5,635,831	1 28	11,046,229	127 85
062	LITTLE ROCK,	$23,011,950	0 86	8,248,402	0 36	16,166,869	1546 19
063	NEW ORLEANS,	$43,263,171	1 62	19,161,998	0 44	37,557,517	1396 26
064	OKLAHOMA CIT	$3,694,248	0 14	1,701,179	0 46	3,334,312	289 02
065	SAN ANTONIO,	$10,362,187	0 39	4,368,082	0 42	8,561,440	448 08
066	HOUSTON, TX	$190,967	0 01	152,378	0 80	298,661	21 65
071	KANSAS CITY,	$6,589,148	0 25	4,614,184	0.70	9,043,800	427 37
072	OMAHA, NE	$9,712,849	0 36	1,312,337	0 14	2,572,180	1303 21
073	ST LOUIS, MO	$25,775,944	0 96	8,789,509	0 34	17,227,437	1768 50
074	DES MOINES,	$112,540	0 00	113,136	1 01	221,747	26 52
081	DENVER, CO	$4,245,029	0 16	2,428,392	0 57	4,759,647	260 90
091	HONOLULU OFF	$14,327,849	0 54	3,142,097	0 22	6,158,510	2796 77
092	LOS ANGELES	$46,902,708	1 75	21,795,997	0 46	42,720,154	2541 33
093	SAN FRANCISC	$66,583,435	2 49	14,891,680	0 22	29,187,692	3042 42
094	PHOENIX OFFI	$4,130,092	0 15	1,304,306	0 32	2,556,439	794 55
095	SACRAMENTO O	$7,312,846	0 27	4,006,895	0 55	7,853,514	1663 90
101	ANCHORAGE, A	$367,727	0 01	371,586	1 01	728,310	327 16
102	PORTLAND, OR	$16,271,178	0 61	2,097,105	0 13	4,110,325	2491 38
103	SEATTLE WA	$22,606,401	0 85	5,807,669	0 26	11,383,032	1432 51
TOTALS		$2,675,229,680	100 00				

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office (continued)

COST CATEGORY=HANDICAP ISO=1

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI- DENCE INTERVAL	COST PER UNIT
011	BOSTON, MA	$0	0 00				0 00
012	HARTFORD, CT	$0	0 00				0 00
013	MANCHESTER,	$0	0 00				0 00
014	PROV	$50,072	0 30	52,679	1 05	103,251	5 08
021	BUFFALO, NY	$439,703	2 59	445,748	1 01	873,666	17 34
022	SAN JUAN, PR	$7,633,010	45 02	5,346,916	0 70	10,479,955	121 60
023	NEW YORK, NY	$772,940	4 56	750,624	0 97	1,471,223	4 85
024	NEWARK, NJ	$0	0 00				0 00
031	BALTIMORE, M	$0	0 00				0 00
032	PHILADELPHIA	$101,646	0 60	15,587	0 15	30,551	2 04
033	PITTSBURGH,	$0	0 00				0 00
034	RICHMOND, VA	$0	0 00				0 00
035	WASHINGTON,	$253,593	1 50	181,406	0 72	355,556	16 46
036	CHARLESTON,	$0	0 00				0 00
041	ATLANTA, GA	$0	0 00				0.00
042	BIRMINGHAM,	$214,222	1 26	135,194	0 63	264,980	5 10
043	COLUMBIA, SC	$0	0 00				0 00
044	GREENSBORO,N	$0	0 00				0 00
045	JACKSON, MS	$0	0 00				0 00
046	JACKSONVILLE	$0	0 00				0 00
047	KNOXVILLE, T	$0	0 00				0 00
048	LOUISVILLE,	$0	0 00				0 00
049	NASHVILLE, T	$0	0 00				0 00
051	CHICAGO	$211,954	1 25	193,427	0 91	379,117	2 76
052	COLUMBUS, OH	$0	0 00				0 00
053	DETROIT,MI	$1,562,966	9 22	608,859	0 39	1,193,363	80 08
054	INDIANAPOLIS	$72,028	0 42	69,796	0 97	136,800	4 19
055	MILWAUKEE, W	$203,692	1 20	158,230	0 78	310,131	15 81
056	MINN/ST PAUL	$4,745,948	27 99	2,786,226	0 59	5,461,004	223 93
057	CINCINNATI,	$0	0 00				0 00
058	CLEVELAND, O	$2,292	0 01	2,021	0 88	3,961	0 08
059	GRAND RAPIDS	$0	0 00				0 00
061	DALLAS, TX	$0	0 00				0 00
062	LITTLE ROCK,	$80,169	0 47	53,850	0 67	105,546	5 39
063	NEW ORLEANS,	$0	0 00				0 00
064	OKLAHOMA CIT	$0	0 00				0 00
065	SAN ANTONIO,	$0	0 00				0 00
066	HOUSTON, TX	$0	0 00				0 00
071	KANSAS CITY,	$0	0 00				0 00
072	OMAHA, NE	$12,864	0 08	7,885	0 61	15,454	1 73
073	ST LOUIS, MO	$0	0 00				0 00
074	DES MOINES,	$0	0 00				0 00
081	DENVER, CO	$0	0 00				0 00
091	HONOLULU OFF	$666	0 00	697	1 05	1,365	0 13
092	LOS ANGELES	$0	0 00				0 00
093	SAN FRANCISC	$0	0 00				0 00
094	PHOENIX OFFI	$0	0 00				0 00
095	SACRAMENTO O	$0	0 00				0 00
101	ANCHORAGE, A	$0	0 00				0 00
102	PORTLAND, OR	$597,544	3 52	794,537	1 33	1,557,292	91 49
103	SEATTLE WA	$0	0 00				0 00
TOTALS		$16,955,309	100 00				

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office (continued)

-- COST CATEGORY=ENERGY ISO=2 --

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI- DENCE INTERVAL	COST PER UNIT
011	BOSTON, MA	$4,967,246	1 63	1,849,325	0 37	3,624,677	141 23
012	HARTFORD, CT	$1,400,298	0 46	887,433	0 63	1,739,368	73 13
013	MANCHESTER,	$637,525	0 21	525,307	0 82	1,029,602	64 80
014	PROV	$533,764	0 17	390,198	0 73	764,788	54 16
021	BUFFALO, NY	$3,538,311	1 16	3,782,679	1 07	7,414,051	139 53
022	SAN JUAN, PR	$7,683,812	2 52	6,523,336	0 85	12,785,739	122 41
023	NEW YORK, NY	$52,153,244	17 08	26,792,842	0 51	52,513,970	327 41
024	NEWARK, NJ	$8,282,321	2 71	2,544,937	0 31	4,988,076	174 09
031	BALTIMORE, M	$3,870,713	1 27	841,590	0 22	1,649,517	163 98
032	PHILADELPHIA	$1,859,606	0 61	703,204	0 38	1,378,279	37 27
033	PITTSBURGH,	$15,092,910	4 94	9,578,909	0 63	18,774,661	482 39
034	RICHMOND, VA	$8,155,797	2 67	5,373,300	0 66	10,531,669	401 72
035	WASHINGTON,	$3,768,102	1 23	1,670,181	0 44	3,273,554	244 54
036	CHARLESTON,	$38,390	0 01	53,859	1 40	105,563	5 62
041	ATLANTA, GA	$25,959,038	8 50	6,180,420	0 24	12,113,624	462 25
042	BIRMINGHAM,	$6,831,276	2 24	3,006,818	0 44	5,893,363	162 61
043	COLUMBIA, SC	$1,898,507	0 62	1,703,938	0 90	3,339,718	121 44
044	GREENSBORO,N	$8,786,423	2 88	3,410,353	0 39	6,684,293	233 18
045	JACKSON, MS	$0	0 00		.		0 00
046	JACKSONVILLE	$0	0 00				0 00
047	KNOXVILLE, T	$10,669,591	3 49	9,579,660	0 90	18,776,134	680 85
048	LOUISVILLE,	$9,620,842	3 15	5,113,642	0 53	10,022,738	385 06
049	NASHVILLE, T	$9,849,403	3 22	851,491	0 09	1,668,923	394 07
051	CHICAGO	$21,792,235	7 13	12,316,181	0 57	24,139,714	283 47
052	COLUMBUS, OH	$1,326,207	0 43	387,605	0 29	759,706	130 14
053	DETROIT,MI	$18,488,438	6 05	8,472,143	0 46	16,605,400	947 25
054	INDIANAPOLIS	$2,077,394	0 68	1,159,681	0 56	2,272,974	120 90
055	MILWAUKEE, W	$3,350,861	1 10	1,235,350	0 37	2,421,286	260 08
056	MINN/ST PAUL	$849,061	0 28	1,155,732	1 36	2,265,236	40 06
057	CINCINNATI,	$2,502,910	0 82	1,280,304	0 51	2,509,396	190 10
058	CLEVELAND, O	$5,537,977	1 81	3,905,755	0 71	7,655,279	187 07
059	GRAND RAPIDS	$3,410,666	1 12	1,380,754	0 40	2,706,279	388 19
061	DALLAS, TX	$0	0 00				0 00
062	LITTLE ROCK,	$1,288,299	0 42	1,225,596	0 95	2,402,167	86 56
063	NEW ORLEANS,	$23,686,872	7 76	12,212,836	0 52	23,937,159	764 46
064	OKLAHOMA CIT	$0	0 00				0 00
065	SAN ANTONIO,	$3,148,213	1 03	1,219,861	0 39	2,390,928	136 13
066	HOUSTON, TX	$7,827,837	2 56	3,136,545	0 40	6,147,629	887 31
071	KANSAS CITY,	$754,785	0 25	728,835	0 97	1,428,517	48 95
072	OMAHA, NE	$1,002,813	0 33	268,008	0 27	525,295	134 55
073	ST LOUIS, MO	$647,349	0 21	284,726	0 44	558,064	44 42
074	DES MOINES,	$113,305	0 04	73,763	0 65	144,576	26 70
081	DENVER, CO	$7,571,780	2 48	3,561,893	0 47	6,981,309	465 35
091	HONOLULU OFF	$0	0 00				0 00
092	LOS ANGELES	$877,050	0 29	662,021	0 75	1,297,561	47 52
093	SAN FRANCISC	$4,000,803	1 31	2,342,135	0 59	4,590,584	182 81
094	PHOENIX OFFI	$2,921,390	0 96	1,488,612	0 51	2,917,679	562 02
095	SACRAMENTO O	$2,163,226	0 71	1,250,088	0 58	2,450,173	492 20
101	ANCHORAGE, A	$0	0 00				0 00
102	PORTLAND, OR	$0	0 00				0 00
103	SEATTLE WA	$4,496,894	1 47	1,359,547	0 30	2,664,711	284 96
TOTALS		$305,433,484	100 00				

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office (continued)

COST CATEGORY=MANDATORY ISO=2

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI- DENCE INTERVAL	COST PER UNIT
011	BOSTON, MA	$3,134,737	0 64	774,870	0 25	1,518,744	89 13
012	HARTFORD, CT	$28,703,708	5 84	25,486,071	0 89	49,952,700	1499 04
013	MANCHESTER,	$695,626	0 14	699,021	1 00	1,370,081	70 70
014	PROV	$16,266,425	3 31	12,220,188	0 75	23,951,569	1650 58
021	BUFFALO, NY	$6,532,765	1 33	4,224,917	0 65	8,280,837	257 61
022	SAN JUAN, PR	$9,355,283	1 90	4,170,235	0 45	8,173,661	149 04
023	NEW YORK, NY	$181,126,564	36 85	83,649,168	0 46	163,952,369	1137 09
024	NEWARK, NJ	$10,285,692	2 09	4,527,516	0 44	8,873,931	216 20
031	BALTIMORE, M	$1,154,436	0 23	502,461	0 44	984,824	48 91
032	PHILADELPHIA	$6,251,815	1 27	3,839,249	0 61	7,524 929	125 31
033	PITTSBURGH,	$10,716,556	2 18	6,816,365	0 64	13,360,075	342 51
034	RICHMOND, VA	$7,309,273	1 49	6,520,451	0 89	12,780,084	360 03
035	WASHINGTON,	$259,141	0 05	152,937	0 59	299,757	16 82
036	CHARLESTON,	$0	0 00				0 00
041	ATLANTA, GA	$14,213,321	2 89	3,377,835	0 24	6,620,557	253 10
042	BIRMINGHAM,	$8,932,097	1 82	4,990,161	0 56	9,780,716	212 62
043	COLUMBIA, SC	$0	0 00				0 00
044	GREENSBORO,N	$3,399,880	0 69	1,456,635	0 43	2,855,004	90 23
045	JACKSON, MS	$2,404,014	0 49	1,127,918	0 47	2,210,720	194 42
046	JACKSONVILLE	$0	0 00				0 00
047	KNOXVILLE, T	$2,452,985	0 50	1,051,960	0 43	2,061,842	156 53
048	LOUISVILLE,	$1,114,432	0 23	1,060,486	0 95	2,078,553	44 60
049	NASHVILLE, T	$11,510,636	2 34	5,475,601	0 48	10,732,177	460 54
051	CHICAGO	$80,992,174	16 48	33,759,541	0 42	66,168,701	1053 54
052	COLUMBUS, OH	$0	0 00				0 00
053	DETROIT,MI	$4,695,601	0 96	1,724,814	0 37	3,380,636	240 58
054	INDIANAPOLIS	$5,346,662	1 09	3,640,439	0 68	7,135,261	311 16
055	MILWAUKEE, W	$9,110,213	1 85	4,389,396	0 48	8,603,215	707 10
056	MINN/ST PAUL	$0	0 00				0 00
057	CINCINNATI,	$11,586,398	2 36	8,966,121	0 77	17,573,597	880 02
058	CLEVELAND, O	$4,733,718	0 96	3,027,054	0 64	5,933,026	159 91
059	GRAND RAPIDS	$1,384,734	0 28	661,878	0 48	1,297,281	157 61
061	DALLAS, TX	$0	0 00				0 00
062	LITTLE ROCK,	$2,803,068	0 57	1,882,837	0 67	3,690,361	188 34
063	NEW ORLEANS,	$8,620,290	1 75	4,631,451	0 54	9,077,643	278 21
064	OKLAHOMA CIT	$19,261,243	3 92	14,985,489	0 78	29,371,559	1506 90
065	SAN ANTONIO,	$185,073	0 04	116,159	0 63	227,672	8 00
066	HOUSTON, TX	$122,476	0 02	109,546	0 89	214,709	13 88
071	KANSAS CITY,	$1,242,280	0 25	1,103,577	0 89	2,163,011	80 57
072	OMAHA, NE	$928,400	0 19	263,246	0 28	515,962	124 57
073	ST LOUIS, MO	$10,366,382	2 11	8,918,538	0 86	17,480,335	711 24
074	DES MOINES,	$0	0.00				0 00
081	DENVER, CO	$661,066	0 13	395,776	0 60	775,722	40 63
091	HONOLULU OFF	$88,611	0 02	92,399	1 04	181,102	17 30
092	LOS ANGELES	$569,555	0 12	555,341	0 98	1,088,469	30 86
093	SAN FRANCISC	$1,386,986	0 28	1,040,045	0 75	2,038,488	63 38
094	PHOENIX OFFI	$1,155,677	0 24	510,808	0 44	1,001,183	222 33
095	SACRAMENTO O	$0	0 00				0 00
101	ANCHORAGE, A	$0	0 00				0 00
102	PORTLAND, OR	$0	0 00				0 00
103	SEATTLE WA	$492,815	0 10	384,095	0 78	752,826	31 23
TOTALS		$491,552,805	100 00				

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office (continued)

COST CATEGORY=PROJ SPECIFIC ISO=2

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI- DENCE INTERVAL	COST PER UNIT
011	BOSTON, MA	$88,975,383	3 18	22,641,947	0.25	44,378,216	2529 72
012	HARTFORD, CT	$13,541,860	0 48	5,874,468	0 43	11,513,958	707 22
013	MANCHESTER,	$58,277,862	2 08	36,368,798	0 62	71,282,844	5923 15
014	PROV	$37,068,366	1 33	9,222,217	0 25	18,075,545	3761 38
021	BUFFALO, NY	$33,071,473	1 18	17,958,253	0 54	35,198,175	1304 13
022	SAN JUAN, PR	$259,560,030	9 28	55,773,719	0 21	109,316,489	4135 10
023	NEW YORK, NY	$446,051,576	15 96	81,145,258	0 18	159,044,705	2800 27
024	NEWARK, NJ	$55,703,403	1 99	9,835,439	0 18	19,277,460	1170 85
031	BALTIMORE, M	$43,616,876	1 56	23,074,757	0 53	45,226,523	1847 78
032	PHILADELPHIA	$52,197,671	1 87	27,116,172	0 52	53,147 697	1046 26
033	PITTSBURGH,	$43,429,238	1 55	8,556,739	0 20	16,771,209	1388 05
034	RICHMOND, VA	$26,584,726	0 95	10,141,769	0.38	19,877 867	1309 46
035	WASHINGTON,	$24,640,581	0 88	9,000,152	0 37	17,640,297	1599 10
036	CHARLESTON,	$4,792,369	0 17	2,378,320	0 50	4,661,507	702 18
041	ATLANTA, GA	$87,664,516	3 14	38,403,216	0 44	75,270,303	1561 03
042	BIRMINGHAM,	$115,864,486	4 14	62,465,498	0 54	122,432,375	2758 09
043	COLUMBIA, SC	$20,617,347	0 74	13,327,359	0 65	26,121,624	1318 83
044	GREENSBORO, N	$88,907,169	3 18	22,228,813	0 25	43,568,473	2359 47
045	JACKSON, MS	$4,379,587	0 16	1,055,359	0 24	2,068,503	354 19
046	JACKSONVILLE	$40,192,043	1 44	24,360,774	0 61	47,747,116	963 10
047	KNOXVILLE, T	$42,586,578	1 52	19,787,720	0 46	38,783,931	2717 54
048	LOUISVILLE,	$65,290,569	2 34	24,649,344	0 38	48,312,715	2613 19
049	NASHVILLE, T	$23,646,162	0 85	11,034,210	0 47	21,627,052	946 07
051	CHICAGO	$244,324,855	8 74	59,546,454	0 24	116,711,050	3178 17
052	COLUMBUS, OH	$7,584,924	0 27	10,518,077	1 39	20,615,431	744 28
053	DETROIT, MI	$68,424,362	2 45	14,155,403	0 21	27,744,590	3505 71
054	INDIANAPOLIS	$68,698,401	2 46	22,468,401	0 33	44,038,065	3998 04
055	MILWAUKEE, W	$50,446,421	1 80	11,304,862	0 22	22,157,529	3915 43
056	MINN/ST PAUL	$71,957,436	2 57	29,820,389	0 41	58,447,962	3395 18
057	CINCINNATI,	$23,838,413	0 85	9,838,407	0 41	19,283,279	1810 60
058	CLEVELAND, O	$15,036,270	0 54	5,021,136	0 33	9,841,427	507 93
059	GRAND RAPIDS	$11,178,707	0 40	2,160,835	0 19	4,235,237	1272 33
061	DALLAS, TX	$8,424,219	0 30	3,401,030	0 40	6,666,018	244 47
062	LITTLE ROCK,	$3,795,172	0 14	2,798,709	0 74	5,485,470	255 00
063	NEW ORLEANS,	$100,102,991	3 58	32,312,764	0 32	63,333,017	3230 69
064	OKLAHOMA CIT	$27,901,957	1 00	18,758,421	0 67	36,766,505	2182 91
065	SAN ANTONIO,	$62,196,462	2 22	24,601,431	0 40	48,218,804	2689 46
066	HOUSTON, TX	$50,368,473	1 80	9,707,709	0 19	19,027,111	5709 42
071	KANSAS CITY,	$33,070,944	1 18	11,550,856	0 35	22,639,678	2144 96
072	OMAHA, NE	$16,479,910	0 59	2,486,380	0 15	4,873,306	2211 18
073	ST LOUIS, MO	$25,908,690	0 93	10,131,269	0 39	19,857,288	1777 61
074	DES MOINES,	$766,405	0 03	650,509	0 85	1,274,997	180.59
081	DENVER, CO	$79,438,254	2 84	21,175,342	0 27	41,503,669	4882 20
091	HONOLULU OFF	$10,861,453	0 39	5,702,099	0 52	11,176,114	2120.14
092	LOS ANGELES	$8,230,746	0 29	4,751,190	0 58	9,312,333	445 97
093	SAN FRANCISC	$76,620,639	2 74	19,716,712	0 26	38,644,755	3501 06
094	PHOENIX OFFI	$2,835,426	0 10	995,346	0 35	1,950,878	545 48
095	SACRAMENTO O	$14,708,636	0 53	9,659,871	0 66	18,933,347	3346 67
101	ANCHORAGE, A	$2,016,605	0 07	1,229,948	0 61	2,410,698	1794 13
102	PORTLAND, OR	$6,175,864	0 22	2,066,492	0 33	4,050,324	945 62
103	SEATTLE WA	$27,581,362	0 99	5,990,608	0 22	11,741,591	1747.76
TOTALS		$2,795,633,869	100 00				

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office (continued)

COST CATEGORY=HANDICAP ISO=2

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI- DENCE INTERVAL	COST PER UNIT
011	BOSTON, MA	$0	0 00				0 00
012	HARTFORD, CT	$31,326	0 08	26,322	0 84	51,591	1 64
013	MANCHESTER,	$0	0 00				0 00
014	PROV	$1,530,906	4 06	1,376,841	0 90	2,698,608	155 34
021	BUFFALO, NY	$0	0 00				0 00
022	SAN JUAN, PR	$2,691	0 01	2,539	0 94	4,976	0 04
023	NEW YORK, NY	$0	0 00				0 00
024	NEWARK, NJ	$1,526,905	4 05	786,809	0 52	1,542,145	32 09
031	BALTIMORE, M	$0	0 00				0 00
032	PHILADELPHIA	$0	0 00				0 00
033	PITTSBURGH,	$0	0 00				0 00
034	RICHMOND, VA	$0	0 00				0 00
035	WASHINGTON,	$4,471,109	11 85	4,522,469	1 01	8,864,040	290 16
036	CHARLESTON,	$0	0 00				0 00
041	ATLANTA, GA	$0	0 00				0 00
042	BIRMINGHAM,	$9,803,999	25 99	10,320,527	1 05	20,228,232	233 38
043	COLUMBIA, SC	$0	0 00				0 00
044	GREENSBORO,N	$0	0 00				0 00
045	JACKSON, MS	$0	0 00				0 00
046	JACKSONVILLE	$0	0 00				0 00
047	KNOXVILLE, T	$0	0 00				0 00
048	LOUISVILLE,	$0	0 00				0 00
049	NASHVILLE, T	$0	0 00				0 00
051	CHICAGO	$5,617,210	14 89	5,139,239	0 91	10,072,908	73 07
052	COLUMBUS, OH	$0	0 00				0 00
053	DETROIT,MI	$276,710	0 73	115,282	0 42	225,954	14 18
054	INDIANAPOLIS	$0	0 00				0 00
055	MILWAUKEE, W	$0	0 00				0 00
056	MINN/ST PAUL	$13,350,881	35 39	7,280,681	0 55	14,270,135	629 94
057	CINCINNATI,	$0	0 00				0 00
058	CLEVELAND, O	$35,897	0 10	31,654	0 88	62,043	1 21
059	GRAND RAPIDS	$809,005	2 14	502,294	0 62	984,497	92 08
061	DALLAS, TX	$0	0 00				0 00
062	LITTLE ROCK,	$0	0 00				0 00
063	NEW ORLEANS,	$0	0 00				0 00
064	OKLAHOMA CIT	$0	0 00				0 00
065	SAN ANTONIO,	$0	0 00				0 00
066	HOUSTON, TX	$0	0 00				0 00
071	KANSAS CITY,	$0	0 00				0 00
072	OMAHA, NE	$0	0 00				0 00
073	ST LOUIS, MO	$0	0 00				0 00
074	DES MOINES,	$0	0 00				0 00
081	DENVER, CO	$0	0 00				0 00
091	HONOLULU OFF	$0	0 00				0 00
092	LOS ANGELES	$0	0 00				0 00
093	SAN FRANCISC	$0	0 00				0 00
094	PHOENIX OFFI	$0	0 00				0 00
095	SACRAMENTO O	$0	0 00				0 00
101	ANCHORAGE, A	$0	0 00				0 00
102	PORTLAND, OR	$0	0 00				0 00
103	SEATTLE WA	$272,015	0 72	119,629	0 44	234,472	17 24
TOTALS		$37,728,653	100 00				

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office (continued)

COST CATEGORY=PROJ SPECIFIC ISO=3

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI- DENCE INTERVAL	COST PER UNIT
,011	BOSTON, MA	$66,476,003	3 28	11,160,680	0 17	21,874,932	1890 03
012	HARTFORD, CT	$45,807,636	2 26	30,985,590	0 68	60,731 756	2392 29
013	MANCHESTER,	$16,586,239	0 82	4,362,982	0 26	8,551,445	1685 76
014	PROV	$21,777,045	1 07	8,932,165	0 41	17,507,043	2209 75
021	BUFFALO, NY	$12,203,386	0 60	6,799,128	0 56	13,326,291	481 23
022	SAN JUAN, PR	$110,220,514	5 43	31,502,758	0 29	61,745,406	1755 94
023	NEW YORK, NY	$128,678,251	6 34	34,862,025	0 27	68,329,569	807 83
024	NEWARK, NJ	$27,084,620	1 34	7,530,226	0.28	14,759,243	569 30
031	BALTIMORE, M	$37,618,536	1 85	8,633,100	0 23	16,920,876	1593 67
032	PHILADELPHIA	$76,432,850	3 77	41,421,767	0 54	81,186,663	1532 03
033	PITTSBURGH,	$46,746,517	2 30	12,952,237	0 28	25,386,385	1494 07
034	RICHMOND, VA	$57,540,090	2 84	22,206,297	0 39	43,524 343	2834 21
035	WASHINGTON,	$11,520,880	0 57	5,610,010	0 49	10,995,619	747 67
036	CHARLESTON,	$6,123,567	0 30	3,188,005	0 52	6,248,491	897 23
041	ATLANTA, GA	$49,398,222	2 44	10,769,950	0 22	21,109 102	879 63
042	BIRMINGHAM,	$75,238,048	3 71	26,029,586	0 35	51,017,989	1791 00
043	COLUMBIA, SC	$1,788,401	0 09	1,932,012	1 08	3,786,744	114 40
044	GREENSBORO,N	$27,648,861	1 36	7,712,354	0 28	15,116,213	733 76
045	JACKSON, MS	$52,167,299	2 57	17,961,399	0 34	35,204,341	4218 95
046	JACKSONVILLE	$27,415,353	1 35	21,312,122	0 78	41,771,759	656 94
047	KNOXVILLE, T	$22,810,288	1 12	13,197,672	0 58	25,867,437	1455 57
048	LOUISVILLE,	$46,288,693	2 28	20,440,131	0 44	40,062,656	1852 66
049	NASHVILLE, T	$843,725	0 04	746,352	0 88	1,462,849	33 76
051	CHICAGO	$132,949,832	6 56	54,228,673	0 41	106,288,198	1729 41
052	COLUMBUS, OH	$3,986,856	0 20	4,200,912	1 05	8,233,788	391 21
053	DETROIT,MI	$43,154,133	2 13	16,647,394	0 39	32,628,892	2210 99
054	INDIANAPOLIS	$34,463,218	1 70	18,232,852	0 53	35,736,390	2005 66
055	MILWAUKEE, W	$26,203,495	1 29	11,735,023	0 45	23,000,646	2033 80
056	MINN/ST PAUL	$289,568,208	14 28	162,545,826	0 56	318,589,818	13662 74
057	CINCINNATI,	$45,392,790	2 24	23,526,746	0 52	46,112,422	3447 73
058	CLEVELAND, O	$95,728,910	4 72	53,495,988	0 56	104,852,136	3233 76
059	GRAND RAPIDS	$2,925,349	0 14	1,604,452	0 55	3,144,726	332 96
061	DALLAS, TX	$6,968,194	0 34	8,914,266	1 28	17,471,962	202 22
062	LITTLE ROCK,	$22,968,513	1 13	4,329,148	0 19	8,485,131	1543 27
063	NEW ORLEANS,	$56,401,621	2 78	18,428,205	0 33	36,119,283	1820 29
064	OKLAHOMA CIT	$80,061,591	3 95	61,747,462	0 77	121,025,025	6263 62
065	SAN ANTONIO,	$29,364,419	1 45	6,999,788	0 24	13,719,585	1269 76
066	HOUSTON, TX	$43,917,416	2 17	23,208,091	0 53	45,487,857	4978 17
071	KANSAS CITY,	$20,549,368	1 01	14,368,790	0 70	28,162,828	1332 82
072	OMAHA, NE	$23,361,519	1 15	3,286,781	0 14	6,442,091	3134 51
073	ST LOUIS, MO	$13,900,915	0 69	5,405,402	0 39	10,594,587	953 75
074	DES MOINES,	$790,927	0 04	587,251	0 74	1,151,012	186 36
081	DENVER, CO	$3,576,242	0 18	1,261,004	0 35	2,471,567	219 79
091	HONOLULU OFF	$1,924,438	0 09	1,017,360	0 53	1,994,026	375 65
092	LOS ANGELES	$3,393,307	0 17	2,777,489	0 82	5,443,879	183 86
093	SAN FRANCISC	$33,024,384	1 63	9,969,348	0 30	19,539,922	1509 00
094	PHOENIX OFFI	$11,125,739	0 55	5,660,045	0 51	11,093,688	2140 39
095	SACRAMENTO O	$3,093,105	0 15	1,326,806	0 43	2,600,539	703 78
101	ANCHORAGE, A	$1,431,743	0 07	320,899	0 22	628,963	1273 79
102	PORTLAND, OR	$19,083,506	0 94	24,521,685	1 28	48,062,503	2921 99
103	SEATTLE WA	$10,336,036	0 51	5,955,038	0 58	11,671,875	654 97
TOTALS		$2,028,060,802	100 00				

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office (continued)

-- COST CATEGORY=ENERGY ISO=3 --

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI- DENCE INTERVAL	COST PER UNIT
011	BOSTON, MA	$3,627,805	2 43	1,291,896	0 36	2,532,117	103 14
012	HARTFORD, CT	$3,859,133	2 58	1,824,853	0 47	3,576,713	201 54
013	MANCHESTER,	$1,189,471	0 80	83,789	0 07	164,227	120 89
014	PROV	$139,188	0 09	128,265	0 92	251,398	14 12
021	BUFFALO, NY	$10,844,016	7 25	10,967,854	1 01	21,496,993	427 62
022	SAN JUAN, PR	$3,257,662	2 18	2,962,842	0 91	5,807,171	51 90
023	NEW YORK, NY	$15,360,187	10 27	6,310,954	0 41	12,369,469	96 43
024	NEWARK, NJ	$2,061,506	1 38	842,296	0 41	1,650,901	43 33
031	BALTIMORE, M	$3,031,039	2 03	1,917,607	0 63	3,758,510	128 41
032	PHILADELPHIA	$2,800,358	1 87	422,555	0 15	828,208	56 13
033	PITTSBURGH,	$14,047,547	9 40	6,803,650	0 48	13,335,154	448 98
034	RICHMOND, VA	$5,614,967	3 76	2,378,512	0 42	4,661,883	276 57
035	WASHINGTON,	$683,214	0 46	412,414	0 60	808,331	44 34
036	CHARLESTON,	$3,562,870	2 38	1,479,443	0 42	2,899,709	522 03
041	ATLANTA, GA	$15,022,442	10 05	4,761,968	0 32	9,333,457	267 50
042	BIRMINGHAM,	$3,777,941	2 53	3,976,984	1 05	7,794,888	89 93
043	COLUMBIA, SC	$3,396,593	2 27	4,311,732	1 27	8,450,995	217 27
044	GREENSBORO,N	$7,092,511	4 74	3,181,726	0 45	6,236,182	188 23
045	JACKSON, MS	$0	0 00				0 00
046	JACKSONVILLE	$0	0 00				0 00
047	KNOXVILLE, T	$4,452,727	2 98	3,337,842	0 75	6,542,170	284 14
048	LOUISVILLE,	$0	0 00				0 00
049	NASHVILLE, T	$852,554	0 57	890,718	1 04	1,745,807	34 11
051	CHICAGO	$7,976,789	5 34	5,059,408	0 63	9,916,439	103 76
052	COLUMBUS, OH	$0	0 00				0 00
053	DETROIT,MI	$3,833,176	2 56	1,085,149	0 28	2,126,892	196 39
054	INDIANAPOLIS	$741,401	0 50	770,922	1 04	1,511,006	43 15
055	MILWAUKEE, W	$6,225,655	4 16	3,168,022	0 51	6,209,324	483 21
056	MINN/ST PAUL	$0	0 00				0 00
057	CINCINNATI,	$2,784,302	1 86	1,818,783	0 65	3,564,815	211 48
058	CLEVELAND, O	$2,737,246	1 83	1,842,903	0 67	3,612,090	92 47
059	GRAND RAPIDS	$0	0 00				0 00
061	DALLAS, TX	$0	0 00				0 00
062	LITTLE ROCK,	$138,198	0 09	137,671	1 00	269,835	9 29
063	NEW ORLEANS,	$11,269,029	7 54	9,989,429	0 89	19,579,281	363 69
064	OKLAHOMA CIT	$0	0 00				0 00
065	SAN ANTONIO,	$0	0 00				0 00
066	HOUSTON, TX	$37,129	0 02	33,209	0 89	65,090	4 21
071	KANSAS CITY,	$0	0 00				0 00
072	OMAHA, NE	$243,257	0 16	111,445	0 46	218,432	32 64
073	ST LOUIS, MO	$2,680,588	1 79	1,176,231	0,44	2,305,412	183 92
074	DES MOINES,	$470,447	0 31	234,244	0 50	459,119	110 85
081	DENVER, CO	$0	0 00				0 00
091	HONOLULU OFF	$0	0 00				0 00
092	LOS ANGELES	$182,545	0 12	141,015	0 77	276,389	9 89
093	SAN FRANCISC	$3,352,177	2 24	3,403,692	1 02	6,671,236	153 17
094	PHOENIX OFFI	$679,518	0 45	434,583	0 64	851,782	130 73
095	SACRAMENTO O	$1,475,293	0 99	974,645	0 66	1,910,304	335 68
101	ANCHORAGE, A	$0	0 00				0 00
102	PORTLAND, OR	$0	0 00				0 00
103	SEATTLE WA	$0	0 00				0 00
TOTALS		$149,500,483	100 00				

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office (continued)

COST CATEGORY=MANDATORY ISO=3

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI-DENCE INTERVAL	COST PER UNIT
011	BOSTON, MA	$4,443,871	1 09	3,373,377	0 76	6,611,820	126 35
012	HARTFORD, CT	$6,605,182	1 62	5,815,529	0 88	11,398,438	344 95
013	MANCHESTER,	$5,617,957	1 38	5,431,489	0 97	10,645,718	570 99
014	PROV	$0	0 00				0 00
021	BUFFALO, NY	$11,303,785	2 77	11,105,073	0 98	21,765,943	445 75
022	SAN JUAN, PR	$2,112,424	0 52	1,152,291	0 55	2,258,491	33 65
023	NEW YORK, NY	$278,226	0 07	171,111	0 62	335,377	1 75
024	NEWARK, NJ	$132,110	0 03	64,086	0 49	125,609	2 78
031	BALTIMORE, M	$602,871	0 15	827,234	1 37	1,621,378	25 54
032	PHILADELPHIA	$824,243	0 20	819,036	0 99	1,605,311	16 52
033	PITTSBURGH,	$70,166,788	17 18	37,076,774	0 53	72,670,478	2242 61
034	RICHMOND, VA	$243,811,742	59 71	220,207,479	0 90	431,606,659	12009 25
035	WASHINGTON,	$1,236,413	0 30	1,511,251	1 22	2,962,051	80 24
036	CHARLESTON,	$96,046	0 02	134,355	1 40	263,335	14 07
041	ATLANTA, GA	$16,290,556	3 99	13,890,865	0 85	27,226,095	290 08
042	BIRMINGHAM,	$6,189,983	1 52	3,050,944	0 49	5,979,850	147 35
043	COLUMBIA, SC	$0	0 00				0 00
044	GREENSBORO,N	$1,129,871	0 28	717,351	0 63	1,406,008	29 99
045	JACKSON, MS	$0	0 00				0 00
046	JACKSONVILLE	$705,543	0 17	601,850	0 85	1,179,626	16 91
047	KNOXVILLE, T	$966,082	0 24	600,781	0 62	1,177,531	61 65
048	LOUISVILLE,	$0	0 00				0 00
049	NASHVILLE, T	$0	0 00				0 00
051	CHICAGO	$8,488,558	2 08	4,779,073	0 56	9,366,983	110 42
052	COLUMBUS, OH	$0	0 00				0 00
053	DETROIT,MI	$1,599,647	0 39	652,340	0 41	1,278,587	81 96
054	INDIANAPOLIS	$58,017	0 01	53,601	0 92	105,057	3 38
055	MILWAUKEE, W	$0	0 00				0 00
056	MINN/ST PAUL	$0	0 00				0 00
057	CINCINNATI,	$978,077	0 24	909,558	0 93	1,782,733	74 29
058	CLEVELAND, O	$9,025,409	2 21	7,575,600	0 84	14,848,177	304 88
059	GRAND RAPIDS	$0	0 00				0 00
061	DALLAS, TX	$0	0 00				0 00
062	LITTLE ROCK,	$4,406,965	1 08	3,726,990	0 85	7,304,900	296 11
063	NEW ORLEANS,	$1,180,661	0 29	807,207	0 68	1,582,126	38 10
064	OKLAHOMA CIT	$0	0 00				0 00
065	SAN ANTONIO,	$0	0 00				0 00
066	HOUSTON, TX	$2,206,518	0 54	1,216,200	0 55	2,383,753	250 12
071	KANSAS CITY,	$1,207,718	0 30	454,154	0 38	890,142	78 33
072	OMAHA, NE	$1,318,695	0 32	252,584	0 19	495,064	176 93
073	ST LOUIS, MO	$0	0 00				0 00
074	DES MOINES,	$15,818	0 00	8,905	0 56	17,454	3 73
081	DENVER, CO	$0	0 00				0 00
091	HONOLULU OFF	$256,969	0 06	256,186	1 00	502,125	50 16
092	LOS ANGELES	$0	0 00				0 00
093	SAN FRANCISC	$3,562,853	0 87	1,036,174	0 29	2,030,902	162 80
094	PHOENIX OFFI	$639,217	0 16	685,086	1 07	1,342,769	122.97
095	SACRAMENTO O	$0	0 00				0 00
101	ANCHORAGE, A	$0	0 00				0.00
102	PORTLAND, OR	$861,104	0 21	1,144,984	1 33	2,244,169	131 65
103	SEATTLE WA	$0	0.00				0 00
TOTALS		$408,319,918	100 00				

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office (continued)

COST CATEGORY=HANDICAP ISO=3

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI-DENCE INTERVAL	COST PER UNIT
011	BOSTON, MA	$0	0 00				0 00
012	HARTFORD, CT	$0	0 00				0 00
013	MANCHESTER,	$0	0 00				0 00
014	PROV	$0	0 00				0 00
021	BUFFALO, NY	$0	0 00				0 00
022	SAN JUAN, PR	$329,141	6 30	322,366	0 98	631,837	5 24
023	NEW YORK, NY	$0	0 00				0.00
024	NEWARK, NJ	$2,234,466	42 76	1,117,297	0 50	2,189,902	46 97
031	BALTIMORE, M	$0	0 00				0 00
032	PHILADELPHIA	$0	0 00				0 00
033	PITTSBURGH,	$0	0 00				0 00
034	RICHMOND, VA	$0	0 00				0 00
035	WASHINGTON,	$0	0 00				0 00
036	CHARLESTON,	$0	0 00				0 00
041	ATLANTA, GA	$0	0 00				0 00
042	BIRMINGHAM,	$0	0 00				0 00
043	COLUMBIA, SC	$0	0 00				0 00
044	GREENSBORO,N	$0	0 00				0 00
045	JACKSON, MS	$0	0 00				0 00
046	JACKSONVILLE	$0	0.00				0 00
047	KNOXVILLE, T	$51,916	0 99	56,301	1 08	110,350	3 31
048	LOUISVILLE,	$0	0 00				0 00
049	NASHVILLE, T	$0	0 00				0 00
051	CHICAGO	$0	0 00				0 00
052	COLUMBUS, OH	$0	0 00				0 00
053	DETROIT,MI	$1,044,752	19 99	412,715	0 40	808,920	53 53
054	INDIANAPOLIS	$0	0 00				0 00
055	MILWAUKEE, W	$0	0 00				0 00
056	MINN/ST PAUL	$0	0 00				0 00
057	CINCINNATI,	$0	0 00				0 00
058	CLEVELAND, O	$0	0 00				0 00
059	GRAND RAPIDS	$0	0 00				0 00
061	DALLAS, TX	$0	0 00				0 00
062	LITTLE ROCK,	$1,475,173	28 23	990,883	0 67	1,942,130	99 12
063	NEW ORLEANS,	$0	0 00				0 00
064	OKLAHOMA CIT	$0	0 00				0 00
065	SAN ANTONIO,	$0	0 00				0 00
066	HOUSTON, TX	$0	0 00				0 00
071	KANSAS CITY,	$0	0 00				0 00
072	OMAHA, NE	$0	0 00				0 00
073	ST LOUIS, MO	$58,641	1 12	54,043	0 92	105,925	4 02
074	DES MOINES,	$32,108	0 61	19,426	0 61	38,074	7 57
081	DENVER, CO	$0	0 00				0 00
091	HONOLULU OFF	$0	0 00				0 00
092	LOS ANGELES	$0	0 00				0 00
093	SAN FRANCISC	$0	0 00				0 00
094	PHOENIX OFFI	$0	0 00				0 00
095	SACRAMENTO O	$0	0 00				0 00
101	ANCHORAGE, A	$0	0 00				0 00
102	PORTLAND, OR	$0	0 00				0 00
103	SEATTLE WA	$0	0 00				0 00
TOTALS		$5,226,197	100 00				

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office (continued)

COST CATEGORY=PROJ SPECIFIC ISO=4

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	COST PER UNIT
011	BOSTON, MA	$21,528,200	1 78	5,913,708	0 27	11,590,868	612 08
012	HARTFORD, CT	$10,640,934	0 88	6,259,584	0 59	12,268,785	555 72
013	MANCHESTER,	$10,638,011	0 88	3,222,919	0 30	6,316,922	1081 21
014	PROV	$10,160,645	0 84	2,901,270	0 29	5,686,489	1031 01
021	BUFFALO, NY	$4,028,615	0 33	3,150,712	0 78	6,175,395	158 86
022	SAN JUAN, PR	$24,912,144	2 06	13,282,234	0 53	26,033,179	396 88
023	NEW YORK, NY	$55,918,559	4 61	19,867,199	0 36	38,939,709	351 05
024	NEWARK, NJ	$9,551,437	0 79	4,694,896	0 49	9,201,996	200 77
031	BALTIMORE, M	$862,693	0 07	1,187,294	1 38	2,327,097	36 55
032	PHILADELPHIA	$38,030,222	3 14	32,753,388	0 86	64,196,640	762 28
033	PITTSBURGH,	$4,233,137	0 35	2,744,667	0 65	5,379,548	135 30
034	RICHMOND, VA	$75,423,830	6 22	46,923,979	0 62	91,971,000	3715 09
035	WASHINGTON,	$4,883,633	0 40	2,475,645	0 51	4,852,263	316 93
036	CHARLESTON,	$70,490	0 01	76,438	1 08	149,818	10 33
041	ATLANTA, GA	$42,843,045	3 54	10,764,932	0 25	21,099,267	762 90
042	BIRMINGHAM,	$47,465,366	3 92	24,078,132	0 51	47,193,139	1129 89
043	COLUMBIA, SC	$1,240,517	0 10	1,574,748	1 27	3,086,506	79 35
044	GREENSBORO,N	$8,228,635	0 68	2,663,964	0 32	5,221,370	218 38
045	JACKSON, MS	$0	0 00				0 00
046	JACKSONVILLE	$9,785,861	0 81	13,750,407	1 41	26,950,797	234 49
047	KNOXVILLE, T	$33,088,684	2 73	14,793,493	0 45	28,995,247	2111 46
048	LOUISVILLE,	$2,516,458	0 21	2,030,752	0 81	3,980,274	100 72
049	NASHVILLE, T	$0	0 00				0 00
051	CHICAGO	$10,452,578	0 86	5,728,331	0 55	11,227,529	135 97
052	COLUMBUS, OH	$0	0 00				0 00
053	DETROIT,MI	$142,907,201	11 79	13,896,612	0 10	27,237,359	7321 82
054	INDIANAPOLIS	$5,694,454	0 47	4,768,136	0 84	9,345,547	331 40
055	MILWAUKEE, W	$12,882,899	1 06	7,100,647	0 55	13,917,269	999 91
056	MINN/ST PAUL	$439,956,710	36 30	268,007,819	0 61	525,295,324	20758 55
057	CINCINNATI,	$6,283,208	0 52	3,224,558	0 51	6,320,134	477 23
058	CLEVELAND, O	$5,533,987	0 46	3,924,655	0 71	7,692,324	186 94
059	GRAND RAPIDS	$0	0 00				0 00
061	DALLAS, TX	$0	0 00				0 00
062	LITTLE ROCK,	$11,086,323	0 91	8,137,162	0 73	15,948,837	744 90
063	NEW ORLEANS,	$79,724,273	6 58	48,468,083	0 61	94,997,442	2573 00
064	OKLAHOMA CIT	$0	0 00				0 00
065	SAN ANTONIO,	$449,387	0 04	578,444	1 29	1,133,751	19 43
066	HOUSTON, TX	$14,338,424	1 18	3,954,118	0 28	7,750,071	1625 30
071	KANSAS CITY,	$7,490,782	0 62	6,086,518	0 81	11,929,576	485 85
072	OMAHA, NE	$1,307,496	0 11	523,705	0.40	1,026 462	175 43
073	ST LOUIS, MO	$3,383,982	0 28	1,293,028	0 38	2,534,335	232 18
074	DES MOINES,	$0	0 00				0 00
081	DENVER, CO	$14,916,092	1 23	9,718,511	0 65	19,048,281	916 73
091	HONOLULU OFF	$11,929	0 00	10,563	0 89	20,703	2 33
092	LOS ANGELES	$243,782	0 02	339,343	1 39	665,112	13 21
093	SAN FRANCISC	$23,412,569	1 93	4,491,159	0 19	8,802,672	1069 80
094	PHOENIX OFFI	$550,647	0 05	278,333	0 51	545,532	105 93
095	SACRAMENTO O	$5,981,690	0 49	3,059,553	0 51	5,996,725	1361 02
101	ANCHORAGE, A	$614,483	0 05	344,025	0 56	674,289	546 69
102	PORTLAND, OR	$820,527	0 07	668,198	0 81	1,309,669	125 64
103	SEATTLE WA	$7,836,901	0 65	2,448,282	0 31	4,798,633	496 60
TOTALS		$1,211,931,439	100 00				

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office (continued)

COST CATEGORY=ENERGY ISO=4

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI- DENCE INTERVAL	COST PER UNIT
011	BOSTON, MA	$627,205	0 84	308,303	0 49	604,273	17 83
012	HARTFORD, CT	$5,313,721	7 09	4,220,551	0 79	8,272,279	277 51
013	MANCHESTER,	$4,147,780	5 53	4,131,337	1 00	8,097,420	421 57
014	PROV	$215,622	0 29	161,267	0 75	316,083	21 88
021	BUFFALO, NY	$860,762	1 15	920,210	1 07	1,803,611	33 94
022	SAN JUAN, PR	$3,552	0 00	2,952	0 83	5,786	0 06
023	NEW YORK, NY	$5,217,890	6 96	4,829,121	0 93	9,465,077	32 76
024	NEWARK, NJ	$0	0 00				0 00
031	BALTIMORE, M	$0	0 00				0 00
032	PHILADELPHIA	$0	0 00				0 00
033	PITTSBURGH,	$0	0 00				0 00
034	RICHMOND, VA	$0	0 00				0 00
035	WASHINGTON,	$668,381	0 89	217,563	0 33	426,424	43 38
036	CHARLESTON,	$0	0 00				0 00
041	ATLANTA, GA	$3,690,788	4 92	2,930,547	0 79	5,743,873	65 72
042	BIRMINGHAM,	$17,452,132	23 29	15,311,041	0 88	30,009,639	415 44
043	COLUMBIA, SC	$0	0 00				0 00
044	GREENSBORO,N	$2,638,192	3 52	2,186,899	0 83	4,286,322	70 01
045	JACKSON, MS	$0	0 00				0 00
046	JACKSONVILLE	$0	0 00				0 00
047	KNOXVILLE, T	$122,771	0 16	109,664	0 89	214,941	7 83
048	LOUISVILLE,	$1,288,342	1 72	1,005,999	0 78	1,971,758	51 56
049	NASHVILLE, T	$1,663,518	2 22	2,152,967	1 29	4,219,816	66 56
051	CHICAGO	$0	0 00				0 00
052	COLUMBUS, OH	$0	0 00				0 00
053	DETROIT,MI	$9,018,403	12 03	6,221,495	0 69	12,194,131	462 06
054	INDIANAPOLIS	$1,074,034	1 43	1,383,225	1 29	2,711,121	62 51
055	MILWAUKEE, W	$0	0 00				0 00
056	MINN/ST PAUL	$0	0 00				0 00
057	CINCINNATI,	$1,844,582	2 46	1,848,202	1 00	3,622,476	140 10
058	CLEVELAND, O	$0	0 00				0 00
059	GRAND RAPIDS	$0	0 00				0 00
061	DALLAS, TX	$0	0 00				0 00
062	LITTLE ROCK,	$0	0 00				0 00
063	NEW ORLEANS,	$2,324,875	3 10	2,094,749	0 90	4,105,709	75 03
064	OKLAHOMA CIT	$0	0 00				0 00
065	SAN ANTONIO,	$135,596	0 18	174,538	1 29	342,094	5 86
066	HOUSTON, TX	$14,283,325	19 06	9,529,209	0 67	18,677,250	1619 06
071	KANSAS CITY,	$0	0 00				0 00
072	OMAHA, NE	$130,908	0 17	114,366	0 87	224,157	17 56
073	ST LOUIS, MO	$0	0 00				0 00
074	DES MOINES,	$181,977	0 24	128,352	0 71	251,569	42 88
081	DENVER, CO	$762,197	1 02	729,817	0 96	1,430,441	46 84
091	HONOLULU OFF	$247,231	0 33	257,800	1 04	505,287	48 26
092	LOS ANGELES	$0	0 00				0 00
093	SAN FRANCISC	$2,520	0 00	2,430	0 96	4,763	0 12
094	PHOENIX OFFI	$0	0 00				0 00
095	SACRAMENTO O	$0	0 00				0 00
101	ANCHORAGE, A	$0	0 00				0 00
102	PORTLAND, OR	$0	0 00				0 00
103	SEATTLE WA	$1,023,610	1 37	432,155	0 42	847,024	64 86
TOTALS		$74,939,916	100 00				

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office (continued)

COST CATEGORY=MANDATORY ISO=4

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI- DENCE INTERVAL	COST PER UNIT
011	BOSTON, MA	$252,071	0 15	151,704	0 60	297,340	7 17
012	HARTFORD, CT	$2,589,081	1 52	2,001,756	0 77	3,923,441	135 21
013	MANCHESTER,	$70,219	0 04	70,518	1 00	138,216	7 14
014	PROV	$592,872	0 35	466,015	0 79	913,390	60 16
021	BUFFALO, NY	$0	0 00				0 00
022	SAN JUAN, PR	$76,849	0 05	77,062	1 00	151,042	1 22
023	NEW YORK, NY	$1,302,611	0 76	680,546	0 52	1,333,869	8 18
024	NEWARK, NJ	$0	0 00				0 00
031	BALTIMORE, M	$1,907,722	1 12	441,275	0 23	864,899	80 82
032	PHILADELPHIA	$0	0 00				0 00
033	PITTSBURGH,	$129,776	0 08	122,022	0 94	239,163	4 15
034	RICHMOND, VA	$164,572	0 10	159,016	0 97	311,671	8 11
035	WASHINGTON,	$312,590	0 18	298,710	0 96	585,473	20 29
036	CHARLESTON,	$0	0.00				0 00
041	ATLANTA, GA	$17,839,827	10 48	14,604,925	0 82	28,625,653	317 67
042	BIRMINGHAM,	$0	0 00				0 00
043	COLUMBIA, SC	$84,013,875	49 33	106,649,617	1 27	209,033,248	5374 14
044	GREENSBORO,N	$10,796,138	6 34	4,620,801	0 43	9,056,771	286 51
045	JACKSON, MS	$0	0 00				0 00
046	JACKSONVILLE	$0	0 00				-0 00
047	KNOXVILLE, T	$7,954,718	4 67	7,642,507	0 96	14,979,314	507 61
048	LOUISVILLE,	$11,697,683	6 87	10,361,519	0 89	20,308,577	468 19
049	NASHVILLE, T,	$0	0 00				0 00
051	CHICAGO	$0	0 00				0 00
052	COLUMBUS, OH	$0	0 00				0 00
053	DETROIT,MI	$468,544	0 28	212,865	0.45	417,216	24 01
054	INDIANAPOLIS	$12,577,279	7 39	10,907,146	0 87	21,378,006	731.96
055	MILWAUKEE, W	$0	0 00				0 00
056	MINN/ST PAUL	$0	0 00				0 00
057	CINCINNATI,	$4,457,792	2 62	3,768,916	0 85	7,387,075	338 58
058	CLEVELAND, O	$0	0 00				0 00
059	GRAND RAPIDS	$0	0 00				0 00
061	DALLAS, TX	$0	0 00				0 00
062	LITTLE ROCK,	$0	0 00				0 00
063	NEW ORLEANS,	$270,572	0 16	274,863	1 02	538,731	8 73
064	OKLAHOMA CIT	$1,819,821	1.07	1,807,464	0.99	3,542,630	142 37
065	SAN ANTONIO,	$0	0 00				0 00
066	HOUSTON, TX	$3,599,630	2 11	2,356,760	0 65	4,619,250	408 03
071	KANSAS CITY,	$0	0 00				0 00
072	OMAHA, NE	$44,486	0 03	18,856	0 42	36,957	5 97
073	ST LOUIS, MO	$0	0 00				0 00
074	DES MOINES,	$0	0 00				0 00
081	DENVER, CO	$1,104,572	0 65	1,030,749	0 93	2,020,269	67 89
091	HONOLULU OFF	$0	0 00				0 00
092	LOS ANGELES	$16,672	0 01	26,468	1 59	51,877	0 90
093	SAN FRANCISC	$2,943,619	1 73	2,751,494	0 93	5,392,928	134 50
094	PHOENIX OFFI	$0	0 00				0 00
095	SACRAMENTO O	$0	0 00				0 00
101	ANCHORAGE, A	$0	0 00				0 00
102	PORTLAND, OR	$0	0 00				0 00
103	SEATTLE WA	$3,291,561	1 93	1,323,006	0 40	2,593,092	208 58
TOTALS		$170,295,150	100 00				

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office (continued)

COST CATEGORY=HANDICAP ISO=4

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI-DENCE INTERVAL	COST PER UNIT
011	BOSTON, MA	$0	0 00				0 00
012	HARTFORD, CT	$3,549,893	94 15	2,810,377	0 79	5,508,338	185 39
013	MANCHESTER,	$0	0 00				0 00
014	PROV	$0	0 00				0 00
021	BUFFALO, NY	$0	0 00				0 00
022	SAN JUAN, PR	$0	0 00				0 00
023	NEW YORK, NY	$0	0 00				0 00
024	NEWARK, NJ	$0	0 00				0 00
031	BALTIMORE, M	$0	0 00				0 00
032	PHILADELPHIA	$72,907	1 93	65,807	0 90	128,981	1 46
033	PITTSBURGH,	$0	0 00				0 00
034	RICHMOND, VA	$0	0 00				0 00
035	WASHINGTON,	$0	0 00				0 00
036	CHARLESTON,	$0	0 00				0 00
041	ATLANTA, GA	$0	0 00				0 00
042	BIRMINGHAM,	$0	0 00				0 00
043	COLUMBIA, SC	$0	0 00				0 00
044	GREENSBORO,N	$0	0 00				0 00
045	JACKSON, MS	$0	0 00				0 00
046	JACKSONVILLE	$0	0 00				0 00
047	KNOXVILLE, T	$0	0 00				0 00
048	LOUISVILLE,	$0	0 00				0 00
049	NASHVILLE, T	$0	0 00				0 00
051	CHICAGO	$0	0 00				0 00
052	COLUMBUS, OH	$0	0 00				0 00
053	DETROIT,MI	$0	0 00				0 00
054	INDIANAPOLIS	$0	0 00				0 00
055	MILWAUKEE, W	$0	0 00				0 00
056	MINN/ST PAUL	$0	0 00				0 00
057	CINCINNATI,	$0	0 00				0 00
058	CLEVELAND, O	$0	0 00				0 00
059	GRAND RAPIDS	$0	0 00				0 00
061	DALLAS, TX	$0	0 00				0 00
062	LITTLE ROCK,	$0	0 00				0 00
063	NEW ORLEANS,	$115,630	3 07	91,442	0 79	179,226	3 73
064	OKLAHOMA CIT	$0	0 00				0 00
065	SAN ANTONIO,	$0	0 00				0 00
066	HOUSTON, TX	$0	0 00				0 00
071	KANSAS CITY,	$0	0 00				0 00
072	OMAHA, NE	$0	0 00				0 00
073	ST LOUIS, MO	$0	0 00				0 00
074	DES MOINES,	$31,920	0 85	17,970	0 56	35,221	7 52
081	DENVER, CO	$0	0 00				0 00
091	HONOLULU OFF	$0	0 00				0 00
092	LOS ANGELES	$0	0 00				0 00
093	SAN FRANCISC	$0	0 00				0 00
094	PHOENIX OFFI	$0	0 00				0 00
095	SACRAMENTO O	$0	0 00				0 00
101	ANCHORAGE, A	$0	0 00				0 00
102	PORTLAND, OR	$0	0 00				0 00
103	SEATTLE WA	$0	0 00				0 00
TOTALS		$3,770,351	100 00				

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office (continued)

COST CATEGORY=PROJ SPECIFIC ISO=5

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI- DENCE INTERVAL	COST PER UNIT
011	BOSTON, MA	$40,619,971	6 95	13,445,328	0 33	26,352,842	1154 90
012	HARTFORD, CT	$12,299,520	2 11	7,620,032	0 62	14,935,262	642 34
013	MANCHESTER,	$4,258,470	0 73	877,136	0 21	1,719,186	432 82
014	PROV	$750,779	0 13	590,135	0 79	1,156,665	76 18
021	BUFFALO, NY	$0	0 00				0 00
022	SAN JUAN, PR	$33,608,185	5 75	16,261,695	0 48	31,872,923	535 42
023	NEW YORK, NY	$13,769,869	2 36	5,936,488	0 43	11,635,516	86 45
024	NEWARK, NJ	$2,385,881	0 41	1,488,429	0 62	2,917,320	50 15
031	BALTIMORE, M	$4,585,002	0 78	6,163,033	1 34	12,079,544	194 24
032	PHILADELPHIA	$5,872,971	1 01	876,276	0 15	1,717,501	117 72
033	PITTSBURGH,	$3,159,239	0 54	1,241,252	0 39	2,432,855	100 97
034	RICHMOND, VA	$9,063,835	1 55	3,007,786	0 33	5,895,261	446 45
035	WASHINGTON,	$11,456,797	1 96	10,666,944	0 93	20,907,210	743 51
036	CHARLESTON,	$45,746	0 01	64,092	1 40	125,620	6 70
041	ATLANTA, GA	$7,401,023	1 27	2,771,453	0 37	5,432,048	131 79
042	BIRMINGHAM,	$29,116,865	4 98	15,518,730	0 53	30,416,711	693 11
043	COLUMBIA, SC	$0	0 00				0 00
044	GREENSBORO,N	$69,691,921	11 93	36,862,499	0 53	72,250,497	1849 52
045	JACKSON, MS	$0	0 00				0 00
046	JACKSONVILLE	$3,298,115	0 56	2,813,397	0 85	5,514,257	79 03
047	KNOXVILLE, T	$1,549,936	0 27	1,649,525	1 06	3,233,068	98 90
048	LOUISVILLE,	$0	0 00				0 00
049	NASHVILLE, T	$0	0 00				0 00
051	CHICAGO	$1,116,543	0 19	786,860	0 70	1,542,245	14 52
052	COLUMBUS, OH	$0	0 00				0 00
053	DETROIT,MI	$26,658,722	4 56	5,260,397	0 20	10,310,378	1365 85
054	INDIANAPOLIS	$3,937,435	0 67	3,209,671	0 82	6,290,956	229 15
055	MILWAUKEE, W	$0	0 00				0 00
056	MINN/ST PAUL	$210,593	0 04	74,607	0 35	146,229	9 94
057	CINCINNATI,	$95,872	0 02	99,379	1 04	194,782	7 28
058	CLEVELAND, O	$28,535,079	4 89	17,441,357	0 61	34,185,059	963 93
059	GRAND RAPIDS	$4,340,107	0 74	3,145,176	0 72	6,164,544	493 98
061	DALLAS, TX	$0	0 00				0 00
062	LITTLE ROCK,	$27,752,726	4 75	18,310,007	0 66	35,887,615	1864 73
063	NEW ORLEANS,	$136,491,631	23 37	105,075,887	0 77	205,948,739	4405 09
064	OKLAHOMA CIT	$2,729,266	0 47	2,179,444	0 80	4,271,711	213 52
065	SAN ANTONIO,	$434,408	0 07	272,612	0 63	534,320	18 78
066	HOUSTON, TX	$956,777	0 16	623,859	0 65	1,222,763	108 45
071	KANSAS CITY,	$4,845,878	0 83	4,663,633	0 96	9,140,720	314 30
072	OMAHA, NE	$4,814,954	0 82	1,166,954	0 24	2,287,229	646 04
073	ST LOUIS, MO	$115,458	0 02	102,497	0 89	200,894	7 92
074	DES MOINES,	$182,245	0 03	102,597	0 56	201,089	42 94
081	DENVER, CO	$15,289,684	2 62	11,386,992	0 74	22,318,504	939 69
091	HONOLULU OFF	$148,255	0 03	123,453	0 83	241,967	28 94
092	LOS ANGELES	$1,400,141	0 24	1,527,859	1 09	2,994,603	75 86
093	SAN FRANCISC	$9,053,163	1 55	5,083,368	0 56	9,963,402	413 67
094	PHOENIX OFFI	$2,080,864	0 36	871,093	0 42	1,707,342	400 32
095	SACRAMENTO O	$169,736	0 03	129,172	0 76	253,178	38 62
101	ANCHORAGE, A	$26,772,098	4 58	131,297	0 00	257,343	23818 59
102	PORTLAND, OR	$1,749,566	0 30	943,792	0 54	1,849,833	267 89
103	SEATTLE WA	$31,298,402	5 36	12,558,783	0 40	24,615,215	1983 30
TOTALS		$584,113,727	100 00				

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office (continued)

COST CATEGORY=ENERGY ISO=5

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	COST PER UNIT
011	BOSTON, MA	$3,398,308	4 04	1,371,329	0 40	2,687,806	96 62
012	HARTFORD, CT	$3,895,323	4 63	3,315,347	0 85	6,498,080	203 43
013	MANCHESTER,	$0	0 00		.		0 00
014	PROV	$0	0 00				0 00
021	BUFFALO, NY	$0	0 00				0 00
022	SAN JUAN, PR	$18,759,298	22 29	14,394,354	0 77	28,212,934	298 86
023	NEW YORK, NY	$0	0 00				0 00
024	NEWARK, NJ	$158,094	0 19	102,874	0 65	201,632	3 32
031	BALTIMORE, M	$1,864,066	2 22	2,572,098	1.38	5,041,312	78 97
032	PHILADELPHIA	$21,776,386	25 88	14,648,591	0 67	28,711,238	436.49
033	PITTSBURGH,	$0	0 00				0.00
034	RICHMOND, VA	$0	0 00				0 00
035	WASHINGTON,	$0	0 00				0 00
036	CHARLESTON,	$0	0 00				0 00
041	ATLANTA, GA	$0	0 00				0 00
042	BIRMINGHAM,	$0	0 00				0 00
043	COLUMBIA, SC	$0	0 00				0 00
044	GREENSBORO,N	$21,436,683	25 47	15,954,321	0 74	31,270,470	568 90
045	JACKSON, MS	$0	0 00				0 00
046	JACKSONVILLE	$0	0 00				0 00
047	KNOXVILLE, T	$425,478	0 51	450,420	1 06	882,822	27 15
048	LOUISVILLE,	$0	0 00				0 00
049	NASHVILLE, T	$0	0 00				0 00
051	CHICAGO	$0	0 00				0 00
052	COLUMBUS, OH	$0	0 00				0 00
053	DETROIT,MI	$2,938,641	3 49	1,010,264	0 34	1,980,118	150 56
054	INDIANAPOLIS	$202,488	0 24	183,946	0 91	360,534	11 78
055	MILWAUKEE, W	$0	0 00				0.00
056	MINN/ST PAUL	$0	0 00				0 00
057	CINCINNATI,	$0	0 00				0 00
058	CLEVELAND, O	$4,509,438	5 36	3,862,605	0 86	7,570 706	152 33
059	GRAND RAPIDS	$0	0 00				0 00
061	DALLAS, TX	$0	0 00				0 00
062	LITTLE ROCK,	$642,708	0 76	357,718	0.56	701,127	43 18
063	NEW ORLEANS,	$722,415	0 86	734,115	1 02	1,438,865	23 32
064	OKLAHOMA CIT	$422,606	0 50	470,690	1 11	922,552	33 06
065	SAN ANTONIO,	$0	0 00				0 00
066	HOUSTON, TX	$1,096,436	1 30	764,453	0 70	1,498,327	124 28
071	KANSAS CITY,	$27,323	0 03	29,197	1 07	57,226	1 77
072	OMAHA, NE	$49,098	0 06	29,936	0 61	58,675	6 59
073	ST LOUIS, MO	$41,531	0 05	38,275	0 92	75,019	2 85
074	DES MOINES,	$0	0 00				0 00
081	DENVER, CO	$0	0 00				0 00
091	HONOLULU OFF	$0	0 00				0 00
092	LOS ANGELES	$0	0 00				0 00
093	SAN FRANCISC	$0	0 00				0 00
094	PHOENIX OFFI	$0	0 00				0 00
095	SACRAMENTO O	$0	0 00				0 00
101	ANCHORAGE, A	$0	0 00				0 00
102	PORTLAND, OR	$220,485	0 26	188,298	0 85	369,065	33 76
103	SEATTLE WA	$1,565,590	1 86	1,209,627	0 77	2,370,870	99 21
TOTALS		$84,152,395	100 00				

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office (continued)

COST CATEGORY=MANDATORY ISO=5

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI-DENCE INTERVAL	COST PER UNIT
011	BOSTON, MA	$655,833	0 62	436,452	0 67	855,447	18 65
012	HARTFORD, CT	$1,718,024	1 62	1,645,156	0 96	3,224,506	89 72
013	MANCHESTER,	$1,663,464	1 57	1,466,378	0 88	2,874,101	169 07
014	PROV	$0	0 00				0 00
021	BUFFALO, NY	$1,033,039	0 98	1,080,708	1 05	2,118,187	40 74
022	SAN JUAN, PR	$655,995	0 62	459,894	0 70	901,391	10 45
023	NEW YORK, NY	$0	0 00				0 00
024	NEWARK, NJ	$267,219	0 25	181,067	0 68	354,892	5 62
031	BALTIMORE, M	$0	0 00				0 00
032	PHILADELPHIA	$0	0 00				0 00
033	PITTSBURGH,	$0	0 00				0 00
034	RICHMOND, VA	$91,038,103	86 10	82,710,668	0 91	162,112,908	4484 19
035	WASHINGTON,	$0	0 00				0 00
036	CHARLESTON,	$0	0 00				0 00
041	ATLANTA, GA	$0	0 00				0 00
042	BIRMINGHAM,	$0	0 00				0 00
043	COLUMBIA, SC	$0	0 00				0 00
044	GREENSBORO,N	$589,114	0 56	530,978	0 90	1,040,717	15 63
045	JACKSON, MS	$0	0 00				0 00
046	JACKSONVILLE	$0	0 00				0 00
047	KNOXVILLE, T	$0	0 00				0 00
048	LOUISVILLE,	$0	0 00				0 00
049	NASHVILLE, T	$0	0 00				0 00
051	CHICAGO	$0	0 00				0 00
052	COLUMBUS, OH	$0	0 00				0 00
053	DETROIT,MI	$534,511	0 51	263,729	0 49	516,909	27 39
054	INDIANAPOLIS	$0	0 00				0 00
055	MILWAUKEE, W	$0	0 00				0 00
056	MINN/ST PAUL	$352,876	0 33	216,771	0 61	424,871	16 65
057	CINCINNATI,	$0	0 00				0 00
058	CLEVELAND, O	$2,066,006	1 95	1,465,981	0 71	2,873,323	69 79
059	GRAND RAPIDS	$0	0 00				0 00
061	DALLAS, TX	$0	0 00				0 00
062	LITTLE ROCK,	$0	0 00				0 00
063	NEW ORLEANS,	$0	0 00				0 00
064	OKLAHOMA CIT	$154,564	0 15	156,756	1 01	307,241	12 09
065	SAN ANTONIO,	$0	0 00				0 00
066	HOUSTON, TX	$871,385	0 82	607,544	0 70	1,190,785	98 77
071	KANSAS CITY,	$0	0 00				0 00
072	OMAHA, NE	$129,810	0 12	82,110	0 63	160,935	17 42
073	ST LOUIS, MO	$0	0 00				0 00
074	DES MOINES,	$0	0 00				0 00
081	DENVER, CO	$80,715	0 08	73,553	0 91	144,164	4 96
091	HONOLULU OFF	$0	0 00				0 00
092	LOS ANGELES	$124,296	0 12	149,241	1 20	292,513	6 73
093	SAN FRANCISC	$275,397	0 26	259,138	0 94	507,910	12 58
094	PHOENIX OFFI	$452,327	0 43	203,147	0 45	398,168	87 02
095	SACRAMENTO O	$0	0 00				0 00
101	ANCHORAGE, A	$0	0 00				0 00
102	PORTLAND, OR	$244,328	0 23	242,326	0 99	474,959	37 41
103	SEATTLE WA	$2,830,332	2 68	1,207,466	0 43	2,366,633	179 35
TOTALS		$105,737,338	100 00				

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office (continued)

COST CATEGORY=HANDICAP ISO=5

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI-DENCE INTERVAL	COST PER UNIT
011	BOSTON, MA	$0	0 00				0 00
012	HARTFORD, CT	$0	0 00				0 00
013	MANCHESTER,	$0	0 00				0 00
014	PROV	$0	0 00				0 00
021	BUFFALO, NY	$0	0 00				0 00
022	SAN JUAN, PR	$0	0 00				0 00
023	NEW YORK, NY	$0	0 00				0 00
024	NEWARK, NJ	$0	0 00				0 00
031	BALTIMORE, M	$0	0 00				0 00
032	PHILADELPHIA	$0	0 00				0 00
033	PITTSBURGH,	$0	0 00				0 00
034	RICHMOND, VA	$0	0 00				0 00
035	WASHINGTON,	$0	0 00				0 00
036	CHARLESTON,	$0	0 00				0 00
041	ATLANTA, GA	$0	0 00				0 00
042	BIRMINGHAM,	$0	0 00				0 00
043	COLUMBIA, SC	$0	0 00				0 00
044	GREENSBORO,N	$0	0 00				0 00
045	JACKSON, MS	$0	0 00				0 00
046	JACKSONVILLE	$0	0 00				0 00
047	KNOXVILLE, T	$0	0 00				0 00
048	LOUISVILLE,	$0	0 00				0 00
049	NASHVILLE, T	$0	0 00				0 00
051	CHICAGO	$0	0 00				0 00
052	COLUMBUS, OH	$0	0 00				0 00
053	DETROIT,MI	$10,970	0 74	7,961	0 73	15,603	0 56
054	INDIANAPOLIS	$0	0 00				0 00
055	MILWAUKEE, W	$0	0 00				0 00
056	MINN/ST PAUL	$0	0 00				0 00
057	CINCINNATI,	$0	0 00				0 00
058	CLEVELAND, O	$0	0 00				0 00
059	GRAND RAPIDS	$0	0 00				0 00
061	DALLAS, TX	$0	0 00				0 00
062	LITTLE ROCK,	$1,225,759	82 38	637,835	0 52	1,250,157	82 36
063	NEW ORLEANS,	$0	0 00				0 00
064	OKLAHOMA CIT	$0	0 00				0 00
065	SAN ANTONIO,	$0	0 00				0 00
066	HOUSTON, TX	$0	0 00				0 00
071	KANSAS CITY,	$0	0 00				0 00
072	OMAHA, NE	$11,093	0 75	6,799	0 61	13,326	1 49
073	ST LOUIS, MO	$0	0 00				0 00
074	DES MOINES,	$9,193	0 62	4,453	0 48	8,729	2 17
081	DENVER, CO	$0	0 00				0 00
091	HONOLULU OFF	$0	0 00				0 00
092	LOS ANGELES	$0	0 00				0 00
093	SAN FRANCISC	$0	0 00				0 00
094	PHOENIX OFFI	$0	0 00				0 00
095	SACRAMENTO D	$0	0 00				0 00
101	ANCHORAGE, A	$0	0 00				0 00
102	PORTLAND, OR	$0	0 00				0 00
103	SEATTLE WA	$230,842	15 52	101,522	0 44	198,982	14 63
TOTALS		$1,487,857	100 00				

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office (continued)

COST CATEGORY=CURRENTLY PROHIBITED

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI- DENCE INTERVAL	COST PER UNIT
011	BOSTON, MA	$1,400,632	1 34	670,896	0 48	1,314,956	39 82
012	HARTFORD, CT	$30,910	0 03	28,329	0 92	55,525	1 61
013	MANCHESTER,	$412,134	0 39	393,967	0 96	772,175	41 89
014	PROV	$0	0 00				0 00
021	BUFFALO, NY	$1,918,788	1 83	1,251,718	0 65	2,453,367	75 66
022	SAN JUAN, PR	$265,680	0 25	165,917	0 62	325,198	4 23
023	NEW YORK, NY	$1,239,777	1 18	388,634	0 31	761,722	7 78
024	NEWARK, NJ	$199,622	0 19	103,100	0 52	202,075	4 20
031	BALTIMORE, M	$281,357	0 27	398,319	1 42	780,706	11 92
032	PHILADELPHIA	$65,671	0 06	63,825	0 97	125,097	1 32
033	PITTSBURGH,	$347,006	0 33	187,936	0 54	368,354	11 09
034	RICHMOND, VA	$225,378	0 22	203,829	0 90	399,506	11 10
035	WASHINGTON,	$1,840,215	1 76	944,628	0 51	1,851,470	119 42
036	CHARLESTON,	$0	0 00				0 00
041	ATLANTA, GA	$3,863,889	3 69	3,391,575	0 88	6,647,486	68 80
042	BIRMINGHAM,	$0	0 00				0 00
043	COLUMBIA, SC	$0	0 00				0 00
044	GREENSBORO,N	$0	0 00				0 00
045	JACKSON, MS	$0	0 00				0 00
046	JACKSONVILLE	$85,191	0 08	102,976	1 21	201,833	2 04
047	KNOXVILLE, T	$0	0 00				0 00
048	LOUISVILLE,	$749,332	0 71	513,154	0 68	1,005,782	29 99
049	NASHVILLE, T	$0	0 00				0 00
051	CHICAGO	$14,907,734	14 22	10,201,315	0 68	19,994,578	193 92
052	COLUMBUS, OH	$0	0 00				0 00
053	DETROIT,MI	$5,046,151	4 81	1,946,610	0 39	3,815,355	258.54
054	INDIANAPOLIS	$21,759,010	20 76	17,844,451	0 82	34,975,124	1266 31
055	MILWAUKEE, W	$0	0 00				0 00
056	MINN/ST PAUL	$1,823,531	1 74	945,135	0 52	1,852,464	86 04
057	CINCINNATI,	$0	0 00				0 00
058	CLEVELAND, O	$18,377	0 02	19,278	1 05	37,785	0 62
059	GRAND RAPIDS	$0	0 00				0 00
061	DALLAS, TX	$0	0 00				0 00
062	LITTLE ROCK,	$0	0 00				0 00
063	NEW ORLEANS,	$2,628,687	2 51	2,039,915	0 78	3,998,233	84 84
064	OKLAHOMA CIT	$4,774,383	4 56	3,714,530	0 78	7,280,479	373 52
065	SAN ANTONIO,	$0	0 00				0 00
066	HOUSTON, TX	$402,319	0 38	309,239	0 77	606,108	45 60
071	KANSAS CITY,	$7,056,242	6 73	3,791,890	0 54	7,432,105	457 66
072	OMAHA, NE	$384,740	0 37	309,005	0 80	605,650	51 62
073	ST LOUIS, MO	$306,998	0 29	266,275	0 87	521,899	21 06
074	DES MOINES,	$0	0 00				0 00
081	DENVER, CO	$1,508,224	1 44	790,731	0 52	1,549,832	92 69
091	HONOLULU OFF	$169,819	0 16	114,147	0 67	223,729	33 15
092	LOS ANGELES	$508,314	0 49	594,225	1 17	1,164,682	27 54
093	SAN FRANCISC	$28,988,992	27 66	22,842,935	0 79	44,772,153	1324 61
094	PHOENIX OFFI	$0	0 00				0 00
095	SACRAMENTO,O	$910,785	0 87	501,397	0 55	982,737	207 23
101	ANCHORAGE, A	$0	0 00				0 00
102	PORTLAND, OR	$0	0 00				0 00
103	SEATTLE WA	$682,523	0 65	208,931	0 31	409,504	43 25
TOTALS		$104,802,411	100 00				

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office (continued)

COST CATEGORY=NO ISO

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	COST PER UNIT
011	BOSTON, MA	$2,473,359	0 48	1,104,047	0 45	2,163,933	70 32
012	HARTFORD, CT	$606,981	0 12	343,067	0 57	672,411	31 70
013	MANCHESTER,	$1,411,033	0 27	1,291,830	0 92	2,531,987	143 41
014	PROV	$1,689,936	0 33	1,503,782	0 89	2,947,412	171 48
021	BUFFALO, NY	$24,600,484	4 77	17,235,545	0 70	33,781,668	970 09
022	SAN JUAN, PR	$9,512,267	1 85	3,424,009	0 36	6,711,058	151 54
023	NEW YORK, NY	$41,158,914	7 99	14,266,544	0 35	27,962,427	258 39
024	NEWARK, NJ	$15,976,641	3 10	3,586,031	0 22	7,028,620	335 82
031	BALTIMORE, M	$729,263	0 14	406,366	0 56	796,477	30 89
032	PHILADELPHIA	$65,511,669	12 71	16,765,397	0 26	32,860,178	1313 12
033	PITTSBURGH,	$13,909,262	2 70	11,687,046	0 84	22,906,610	444 56
034	RICHMOND, VA	$5,575,729	1 08	1,535,970	0 28	3,010,501	274 64
035	WASHINGTON,	$8,358,184	1 62	4,932,119	0 59	9,666,954	542 42
036	CHARLESTON,	$11,199,272	2 17	4,105,951	0 37	8 047,664	1640 92
041	ATLANTA, GA	$46,898,709	9 10	38,731,049	0 83	75,912,857	835 12
042	BIRMINGHAM,	$2,469,155	0 48	1,417,067	0 57	2,777,451	58 78
043	COLUMBIA, SC	$1,847,663	0 36	1,494,039	0 81	2,928 316	118 19
044	GREENSBORO,N	$47,011,996	9 12	31,514,232	0 67	61,767,895	1247 63
045	JACKSON, MS	$2,059,824	0 40	613,229	0 30	1,201,930	166 59
046	JACKSONVILLE	$16,094,082	3 12	6,027,673	0 37	11,814,239	385 65
047	KNOXVILLE, T	$559,231	0 11	377,610	0 68	740,116	35 69
048	LOUISVILLE,	$40,386,696	7 84	18,234,920	0 45	35,740,443	1616 44
049	NASHVILLE, T	$2,892,260	0 56	1,470,926	0 51	2,883,015	115 72
051	CHICAGO	$35,456,448	6 88	32,175,818	0 91	63,064,603	461 22
052	COLUMBUS, OH	$65,253	0 01	31,877	0 49	62,478	6.40
053	DETROIT,MI	$802,168	0 16	556,207	0 69	1,090,166	41 10
054	INDIANAPOLIS	$7,152,359	1 39	5,417,783	0 76	10,618,854	416 25
055	MILWAUKEE, W	$903,395	0 18	622,537	0 69	1,220,173	70 12
056	MINN/ST PAUL	$3,177,898	0 62	2,022,015	0 64	3,963,149	149 94
057	CINCINNATI,	$278,354	0 05	257,621	0.93	504,938	21 14
058	CLEVELAND, O	$19,412,316	3 77	16,059,876	0 83	31,477,357	655 76
059	GRAND RAPIDS	$2,278,952	0 44	1,399,948	0 61	2,743,898	259 38
061	DALLAS, TX	$239,304	0 05	173,147	0 72	339,368	6 94
062	LITTLE ROCK,	$10,582,696	2 05	9,191,171	0 87	18,014,694	711 06
063	NEW ORLEANS,	$30,726,851	5 96	21,591,983	0 70	42,320,287	991 67
064	OKLAHOMA CIT	$4,090,974	0 79	1,983,306	0 48	3,887,279	320 06
065	SAN ANTONIO,	$2,375,089	0 46	2,629,501	1 11	5,153 822	102 70
066	HOUSTON, TX	$2,017,076	0 39	1,340,343	0 66	2,627,073	228 64
071	KANSAS CITY,	$3,550,799	0 69	2,011,879	0 57	3,943 283	230 30
072	OMAHA, NE	$2,927,990	0 57	1,344,982	0 46	2,636,165	392 86
073	ST LOUIS, MO	$1,057,751	0 21	658,163	0 62	1,289,999	72 57
074	DES MOINES,	$201,431	0 04	202,498	1 01	396,897	47 46
081	DENVER, CO	$3,276,491	0 64	2,440,167	0 74	4,782,727	201 37
091	HONOLULU OFF	$1,093,739	0 21	861,765	0 79	1,689,060	213 50
092	LOS ANGELES	$246,411	0 05	95,496	0 39	187,173	13 35
093	SAN FRANCISC	$11,871,710	2 30	3,516,576	0 30	6,892,488	542.46
094	PHOENIX OFFI	$1,967,307	0 38	1,870,439	0 95	3,666,061	378 47
095	SACRAMENTO O	$5,766,074	1 12	4,388,094	0 76	8,600,665	1311 96
101	ANCHORAGE, A	$0	0 00				0 00
102	PORTLAND, OR	$292,429	0 06	142,440	0 49	279,182	44 78
103	SEATTLE WA	$630,038	0 12	485,444	0 77	951,470	39 92
TOTALS		$515,373,913	100 00				

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office (continued)

COST CATEGORY=OTHER ADDS

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	COST PER UNIT
011	BOSTON, MA	$137,003	2 25	107,441	0 78	210,584	3 90
012	HARTFORD, CT	$0	0 00				0 00
013	MANCHESTER,	$2,097,724	34 47	2,100,387	1 00	4,116,758	213 21
014	PROV	$219,841	3 61	231,288	1 05	453,325	22 31
021	BUFFALO, NY	$146,294	2 40	120,541	0 82	236,261	5 77
022	SAN JUAN, PR	$0	0 00				0 00
023	NEW YORK, NY	$239,933	3 94	161,100	0 67	315,756	1 51
024	NEWARK, NJ	$0	0 00				0 00
031	BALTIMORE, M	$0	0 00				0 00
032	PHILADELPHIA	$402,725	6 62	391,559	0 97	767,455	8 07
033	PITTSBURGH,	$0	0 00				0 00
034	RICHMOND, VA	$679,723	11 17	586,922	0 86	1,150,368	33 48
035	WASHINGTON,	$21,951	0 36	15,707	0 72	30,785	1 42
036	CHARLESTON,	$0	0 00				0 00
041	ATLANTA, GA	$0	0 00				0 00
042	BIRMINGHAM,	$0	0 00				0 00
043	COLUMBIA, SC	$0	0 00				0 00
044	GREENSBORO,N	$10,416	0 17	10,062	0 97	19,722	0 28
045	JACKSON, MS	$0	0 00				0 00
046	JACKSONVILLE	$0	0 00				0 00
047	KNOXVILLE, T	$0	0 00				0 00
048	LOUISVILLE,	$0	0 00				0 00
049	NASHVILLE, T	$0	0 00				0 00
051	CHICAGO	$0	0.00				0 00
052	COLUMBUS, OH	$0	0 00				0 00
053	DETROIT,MI	$0	0 00				0 00
054	INDIANAPOLIS	$0	0 00				0 00
055	MILWAUKEE, W	$0	0 00				0 00
056	MINN/ST PAUL	$1,626,559	26 73	2,246,234	1 38	4,402,618	76 75
057	CINCINNATI,	$0	0 00				0 00
058	CLEVELAND, O	$33,356	0 55	29,140	0 87	57,114	1 13
059	GRAND RAPIDS	$0	0 00				0 00
061	DALLAS, TX	$0	0 00				0 00
062	LITTLE ROCK,	$0	0 00				0 00
063	NEW ORLEANS,	$0	0 00				0 00
064	OKLAHOMA CIT	$0	0 00				0 00
065	SAN ANTONIO,	$0	0 00				0 00
066	HOUSTON, TX	$0	0 00				0 00
071	KANSAS CITY,	$0	0 00				0 00
072	OMAHA, NE	$223,363	3 67	23,288	0 10	45,645	29 97
073	ST LOUIS, MO	$0	0 00				0.00
074	DES MOINES,	$0	0 00				0 00
081	DENVER, CO	$0	0.00				0 00
091	HONOLULU OFF	$0	0.00				0 00
092	LOS ANGELES	$0	0 00				0-00
093	SAN FRANCISC	$246,079	4 04	164,711	0 67	322,834	11 24
094	PHOENIX OFFI	$0	0 00				0 00
095	SACRAMENTO O	$0	0.00				0 00
101	ANCHORAGE, A	$0	0 00				0 00
102	PORTLAND, OR	$0	0 00				0 00
103	SEATTLE WA	$0	0 00				0 00
TOTALS		$6,084,968	100 00				

Exhibit I-3: Estimated ADDs Cost, by Category and Field Office (continued)

COST CATEGORY=TOTAL ADDS COST

FIELD NUMBER	OFFICE NAME	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	COST PER UNIT
011	BOSTON, MA	$365,142,760	2 82	36,147,379	0 10	70,848,864	10381 63
012	HARTFORD, CT	$283,377,099	2 19	160,000,020	0 56	313,600,040	14799 31
013	MANCHESTER,	$136,508,557	1 05	49,872,551	0 37	97,750,201	13874 23
014	PROV	$138,745,903	1 07	45,893,972	0 33	89,952,185	14078 73
021	BUFFALO, NY	$253,266,693	1 96	119,042,942	0 47	233,324,166	9987 25
022	SAN JUAN, PR	$1,002,581,025	7 74	140,178,509	0 14	274,749,877	15972 30
023	NEW YORK, NY	$1,256,248,166	9 70	115,692,645	0 09	226,757,584	7886 60
024	NEWARK, NJ	$356,367,336	2 75	54,257,470	0 15	106,344,640	7490 64
031	BALTIMORE, M	$145,890,906	1 13	52,021,048	0 36	101,961,253	6180 51
032	PHILADELPHIA	$350 654,937	2 71	134,070,668	0 38	262,778,510	7028 56
033	PITTSBURGH,	$469,340,106	3 63	48,176,899	0 10	94,426,722	15000 64
034	RICHMOND, VA	$648,309,866	5 01	368,207,849	0 57	721,687,385	31933 30
035	WASHINGTON,	$132,767,064	1 03	28,751,486	0 22	56,352,913	8616 20
036	CHARLESTON,	$40,662,164	0 31	6,550,005	0 16	12,838,010	5957 83
041	ATLANTA, GA	$450,828,930	3 48	102,035,533	0 23	199,989,644	8027 87
042	BIRMINGHAM,	$462,768,212	3 57	49,632,753	0 11	97,280,196	11015 93
043	COLUMBIA, SC	$195,601,399	1 51	129,106,605	0 66	253,048,946	12512 08
044	GREENSBORO,N	$359,258,659	2 77	78,488,573	0 22	153,837,604	9534 21
045	JACKSON, MS	$64,431,296	0 50	15,887,736	0 25	31,139,962	5210 78
046	JACKSONVILLE	$128,675,094	0 99	22,132,837	0 17	43,380,361	3083 37
047	KNOXVILLE, T	$133,020,235	1 03	53,166,284	0 40	104,205,916	8488 31
048	LOUISVILLE,	$205,551,565	1 59	45,522,595	0 22	89,224,286	8227 00
049	NASHVILLE, T	$103,997,135	0 80	25,714,770	0 25	50,400,949	4160 88
051	CHICAGO	$849,294,173	6 56	174,269,483	0 21	341,568 186	11047 59
052	COLUMBUS, OH	$12,967,075	0 10	14,810,536	1 14	29,028,651	1272 40
053	DETROIT,MI	$417,269,813	3 22	40,453,875	0 10	79,289,595	21378 72
054	INDIANAPOLIS	$224,471,991	1 73	37,597,653	0 17	73,691,399	13063 61
055	MILWAUKEE, W	$156,680,907	1 21	31,930,231	0 20	62,583,253	12160 89
056	MINN/ST PAUL	$876,050,323	6 77	449,404,455	0 51	880,832,732	41334 83
057	CINCINNATI,	$123,169,890	0 95	38,068,644	0 31	74,614 543	9355 15
058	CLEVELAND, O	$314,088,390	2 43	123,014,773	0 39	241,108 956	10610 02
059	GRAND RAPIDS	$60,309,866	0 47	19,097,906	0 32	37,431,897	6864 31
061	DALLAS, TX	$36,794,917	0 28	34,045,184	0 93	66,728,561	1067 79
062	LITTLE ROCK,	$116,703,277	0 90	19,488,743	0 17	38,197,937	7841 38
063	NEW ORLEANS,	$518,000,623	4 00	100,020,497	0 19	196,040,173	16717 79
064	OKLAHOMA CIT	$170,608,710	1 32	117,182,393	0 69	229,677,490	13347 58
065	SAN ANTONIO,	$109,874,883	0 85	21,615,257	0 20	42,365,904	4751 14
066	HOUSTON, TX	$146,230,736	1 13	29,606,582	0 20	58,028,901	16575 69
071	KANSAS CITY,	$96,799,036	0 75	45,960,733	0 47	90,083,037	6278 31
072	OMAHA, NE	$72,722,268	0 56	6,577,889	0 09	12,892,663	9757 45
073	ST LOUIS, MO	$102,714,235	0 79	27,683,598	0 27	54,259,852	7047 29
074	DES MOINES,	$3,040,754	0 02	1,596,978	0 53	3,130,077	716 48
081	DENVER, CO	$149,050,478	1 15	42,602,208	0 29	83,500,328	9160 50
091	HONOLULU OFF	$30,332,431	0 23	6,790,826	0 22	13,310,018	5920 83
092	LOS ANGELES	$68,836,819	0 53	30,746,064	0 45	60,262,286	3729 78
093	SAN FRANCISC	$310,250,146	2 40	38,297,628	0 12	75,063,350	14176 38
094	PHOENIX OFFI	$33,508,317	0 26	9,719,298	0 29	19,049,823	6446 39
095	SACRAMENTO O	$48,233,354	0 37	12,577,599	0 26	24,652,093	10974 60
101	ANCHORAGE, A	$33,580,965	0 26	47,176	0 00	92,465	29876 30
102	PORTLAND, OR	$53,812,515	0 42	26,526,527	0 49	51,991,992	8239 55
103	SEATTLE WA	$127,122,761	0 98	25,000,301	0 20	49,000,589	8055 43
TOTALS		$12,946,514,760	100 00				

Exhibit I-4: Estimated ADDs Cost, by Category and Region

COST CATEGORY=ENERGY ISO=1

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI-DENCE INTERVAL	COST PER UNIT
01	$44,282,900	5 67	7,791,492	0 18	15,271,324	598 30
02	$200,098,085	25 63	32,838,900	0 16	64,364,244	678 31
03	$104,343,247	13 36	21,219,419	0 20	41,590,061	708 28
04	$87,500,187	11 21	22,135,840	0 25	43,386,246	322 61
05	$188,188,867	24 10	41,397,325	0 22	81,138,757	898 70
06	$42,046,836	5 39	21,452,366	0 51	42,046,638	336 22
07	$30,938,949	3 96	6,005,539	0 19	11,770,856	742 12
08	$16,534,266	2 12	3,526,187	0 21	6,911,326	1016 18
09	$52,168,126	6 68	13,635,865	0 26	26,726,296	947 53
10	$14,655,704	1 88	3,118,759	0 21	6,112,768	625 35
TOTALS	$780,757,167	100 00				

Exhibit I-4: Estimated ADDs Cost, by Category and Region (continued)

--- COST CATEGORY=MANDATORY ISO=1 ---

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI-DENCE INTERVAL	COST PER UNIT
01	$27,887,634	7 16	10,917,151	0 39	21,397,615	376 79
02	$50,450,282	12 96	15,335,577	0 30	30,057,731	171 02
03	$84,794,492	21 77	22,141,873	0 26	43,398,071	575 58
04	$84,262,994	21 64	19,233,964	0 23	37,698,570	310 67
05	$83,798,654	21 52	21,812,403	0 26	42,752,310	400 18
06	$31,544,156	8 10	22,125,502	0 70	43,365,983	252 24
07	$7,715,290	1 98	4,917,475	0 64	9,638,251	185 06
08	$85,865	0 02	80,126	0 93	157,048	5 28
09	$11,721,532	3 01	5,275,747	0 45	10,340,464	212 90
10	$7,166,028	1 84	4,818,631	0 67	9,444,517	305 77
TOTALS	$389,426,928	100 00				

Exhibit I-4: Estimated ADDs Cost, by Category and Region (continued)

--- COST CATEGORY=PROJ SPECIFIC ISO=1 ---

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI- DENCE INTERVAL	COST PER UNIT
01	$269,593,655	10.08	76,097,321	0 28	149,150,750	3642 47
02	$940,326,436	35 15	145,510,481	0 15	285,200,543	3187 62
03	$372,692,713	13 93	47,479,471	0 13	93,059,762	2529 83
04	$349,268,480	13 06	65,076,584	0 19	127,550,104	1287 73
05	$433,482,655	16 20	58,672,062	0 14	114,997,241	2070 11
06	$84,927,996	3 17	22,112,853	0 26	43,341,193	679 11
07	$42,190,481	1 58	10,014,049	0 24	19,627,537	1012 00
08	$4,245,029	0 16	2,428,392	0 57	4,759,647	260 90
09	$139,256,930	5 21	26,915,735	0 19	52,754,841	2529 32
10	$39,245,306	1 47	6,185,867	0 16	12,124,299	1674 57
TOTALS	$2,675,229,680	100 00				

Exhibit I-4: Estimated ADDs Cost, by Category and Region (continued)

COST CATEGORY=HANDICAP ISO=1

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	COST PER UNIT
01	$50,072	0 30	52,679	1 05	103,251	0 68
02	$8,845,653	52 17	5,417,715	0 61	10,618,721	29 99
03	$355,239	2 10	182,074	0 51	356,866	2 41
04	$214,222	1 26	135,194	0 63	264,980	0 79
05	$6,798,879	40 10	2,863,755	0 42	5,612,960	32 47
06	$80,169	0 47	53,850	0 67	105,546	0 64
07	$12 864	0 08	7,885	0 61	15,454	0 31
08	$0	0 00				0 00
09	$666	0 00	697	1 05	1,365	0 01
10	$597,544	3 52	794,537	1 33	1,557,292	25 50
TOTALS	$16,955,309	100 00				

Exhibit I-4: Estimated ADDs Cost, by Category and Region (continued)

COST CATEGORY=ENERGY ISO=2

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI-DENCE INTERVAL	COST PER UNIT
01	$7,538,834	2 47	2,153,077	0 29	4,220,031	101 86
02	$71,657,688	23 46	27,949,878	0 39	54,781,760	242 91
03	$32,785,518	10 73	11,163,468	0 34	21,880,398	222 55
04	$73,615,081	24 10	13,431,929	0 18	26,326,581	271 41
05	$59,335,749	19 43	15,704,235	0 26	30,780,301	283 36
06	$35,951,220	11 77	12,727,193	0 35	24,945,298	287 48
07	$2,518,252	0 82	830,385	0 33	1,627,554	60 40
08	$7,571,780	2 48	3,561,893	0 47	6,981,309	465 35
09	$9,962,469	3 26	3,114,892	0 31	6,105,188	180 95
10	$4,496,894	1 47	1,359,547	0 30	2,664,711	191 88
TOTALS	$305,433,484	100 00				

Exhibit I-4: Estimated ADDs Cost, by Category and Region (continued)

COST CATEGORY=MANDATORY ISO=2

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	COST PER UNIT
01	$48,800,495	9 93	28,283,598	0 58	55,435,851	659 34
02	$207,300,304	42 17	83,981,679	0 41	164,604,092	702 73
03	$25,691,220	5 23	10,197,784	0 40	19,987,657	174 39
04	$44,027,364	8 96	8,480,502	0 19	16,621,784	162 33
05	$117,849,500	23 97	35,569,561	0 30	69,716,339	562 79
06	$30,992,151	6 30	15,798,285	0 51	30,964,638	247 82
07	$12,537,062	2 55	8,990,412	0 72	17,621,207	300 72
08	$661,066	0 13	395,776	0 60	775,722	40 63
09	$3,200,829	0 65	1,288,239	0 40	2,524,948	58 14
10	$492,815	0 10	384,095	0 78	752,826	21 03
TOTALS	$491,552,805	100 00				

Exhibit I-4: Estimated ADDs Cost, by Category and Region (continued)

COST CATEGORY=PROJ SPECIFIC ISO=2

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	COST PER UNIT
01	$197,863,470	7 08	44,214,318	0 22	86,660,063	2673 32
02	$794,386,482	28 42	100,570,847	0.13	197,118,860	2692 90
03	$195,261,461	6 98	39,121,140	0 20	76,677,434	1325 43
04	$489,148,458	17 50	88,113,239	0 18	172,701,949	1803 46
05	$561,489,789	20 08	74,198,014	0 13	145,428,108	2681 41
06	$252,789,273	9 04	45,987,638	0 18	90,135,770	2021 39
07	$76,225,950	2 73	15,577,873	0 20	30,532,632	1828 40
08	$79,438,254	2 84	21,175,342	0.27	41,503,669	4882 20
09	$113,256,900	4 05	23,197,851	0 20	45,467,787	2057 08
10	$35,773,832	1 28	6,455,273	0 18	12,652,334	1526 45
TOTALS	$2,795,633,869	100 00				

Exhibit I-4: Estimated ADDs Cost, by Category and Region (continued)

COST CATEGORY=HANDICAP ISO=2

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	COST PER UNIT
01	$1,562,232	4 14	1,377,092	0 88	2,699,101	21 11
02	$1,529,596	4 05	786,813	0 51	1,542,153	5 19
03	$4,471,109	11 85	4,522,469	1 01	8,864,040	30 35
04	$9,803,999	25 99	10,320,527	1 05	20,228,232	36 15
05	$20,089,703	53 25	8,926,740	0 44	17,496,410	95 94
06	$0	0 00				0 00
07	$0	0 00				0 00
08	$0	0 00				0 00
09	$0	0 00				0 00
10	$272,015	0 72	119,629	0 44	234,472	11 61
TOTALS	$37,728,653	100 00				

Exhibit I-4: Estimated ADDs Cost, by Category and Region (continued)

COST CATEGORY=PROJ SPECIFIC ISO=3

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI-DENCE INTERVAL	COST PER UNIT
01	$150,646,923	7 43	34,401,842	0 23	67,427,610	2035 38
02	$278,186,772	13 72	48,069,918	0 17	94,217,039	943 03
03	$235,982,440	11 64	49,928,037	0 21	97,858,952	1601 85
04	$303,598,892	14 97	47,181,534	0 16	92,475,807	1119 35
05	$674,372,792	33 25	183,152,199	0 27	358,978,311	3220 49
06	$239,681,754	11 82	69,556,926	0 29	136,331,575	1916 58
07	$58,602,730	2 89	15,710,770	0 27	30,793,109	1405 68
08	$3,576,242	0 18	1,261,004	0 35	2,471,567	219 79
09	$52,560,974	2 59	11,913,601	0 23	23,350,658	954 66
10	$30,851,284	1 52	25,236,452	0 82	49,463,446	1316 41
TOTALS	$2,028,060,802	100 00				

Exhibit I-4: Estimated ADDs Cost, by Category and Region (continued)

COST CATEGORY=ENERGY ISO=3

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	COST PER UNIT
01	$8,815,597	5 90	2,241,106	0 25	4,392,569	119 11
02	$31,523,371	21 09	13,023,435	0 41	25,525,932	106 86
03	$29,739,995	19 89	7,626,374	0 26	14,947,693	201 87
04	$34,594,768	23 14	8,896,163	0 26	17,436,480	127 55
05	$24,298,569	16 25	6,641,544	0 27	13,017,426	116 04
06	$11,444,356	7 66	9,990,433	0 87	19,581,249	91 51
07	$3,394,291	2 27	1,204,495	0 35	2,360,811	81 42
08	$0	0 00				0 00
09	$5,689,534	3 81	3,569,846	0 63	6,996,897	103 34
10	$0	0 00				0 00
TOTALS	$149,500,483	100 00				

Exhibit I-4: Estimated ADDs Cost, by Category and Region (continued)

COST CATEGORY=MANDATORY ISO=3

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	COST PER UNIT
01	$16,667,010	4 08	8,642,982	0 52	16,940,244	225 19
02	$13,826,544	3 39	11,166,191	0 81	21,885,734	46 87
03	$316,738,104	77 57	223,315,199	0 71	437,697,790	2150 02
04	$25,282,034	6 19	14,265,417	0 56	27,960,218	93 21
05	$20,149,708	4 93	9,026,903	0 45	17,692,730	96 23
06	$7,794,145	1 91	4,002,647	0 51	7,845,188	62 32
07	$2,542,231	0 62	519,744	0 20	1,018,699	60 98
08	$0	0 00				0 00
09	$4,459,039	1 09	1,268,319	0 28	2,485,904	80 99
10	$861,104	0 21	1,144,984	1 33	2,244,169	36 74
TOTALS	$408,319,918	100 00				

Appendix I

Exhibit I-4: Estimated ADDs Cost, by Category and Region (continued)

COST CATEGORY=HANDICAP ISO=3

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	COST PER UNIT
01	$0	0 00				0 00
02	$2,563,607	49 05	1,162,872	0 45	2,279,229	8 69
03	$0	0 00				0 00
04	$51,916	0 99	56,301	1 08	110,350	0 19
05	$1,044,752	19 99	412,715	0 40	808,920	4 99
06	$1,475,173	28 23	990,883	0 67	1,942,130	11 80
07	$90,748	1 74	57,428	0 63	112,560	2 18
08	$0	0 00				0 00
09	$0	0 00				0 00
10	$0	0 00				0 00
TOTALS	$5,226,197	100 00				

Exhibit I-4: Estimated ADDs Cost, by Category and Region (continued)

---------- COST CATEGORY=PROJ SPECIFIC ISO=4 ----------

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI-DENCE INTERVAL	COST PER UNIT
01	$52,967,789	4 37	9,641,520	0 18	18,897,380	715 65
02	$94,410,755	7 79	24,557,939	0 26	48,133,560	320 04
03	$123,504,005	10 19	57,356,096	0 46	112,417,948	838 34
04	$145,168,567	11 98	33,425,467	0 23	65,513,915	535 23
05	$623,711,037	51 46	268,613,245	0 43	526,481,960	2978 55
06	$105,598,406	8 71	49,308,600	0 47	96,644,857	844 40
07	$12,182,260	1 01	6,244,349	0 51	12,238,924	292 21
08	$14,916,092	1 23	9,718,511	0 65	19,048,281	916 73
09	$30,200,617	2 49	5,451,983	0 18	10,685,886	548 53
10	$9,271,910	0 77	2,561,041	0 28	5,019,639	395 63
TOTALS	$1,211,931,439	100 00				

Exhibit I-4: Estimated ADDs Cost, by Category and Region (continued)

---------- COST CATEGORY=ENERGY ISO=4 ----------

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI- DENCE INTERVAL	COST PER UNIT
01	$10,304,328	13 75	5,916,253	0 57	11,595,855	139 22
02	$6,082,205	8 12	4,916,015	0 81	9,635,390	20 62
03	$668,381	0 89	217,563	0 33	426,424	4 54
04	$26,855,743	35 84	15,920,362	0 59	31,203,909	99 02
05	$11,937,020	15 93	6,635,975	0 56	13,006,511	57 01
06	$16,743,796	22 34	9,758,292	0 58	19,126,253	133 89
07	$312,884	0 42	171,912	0 55	336,947	7 51
08	$762,197	1 02	729,817	0 96	1,430,441	46 84
09	$249,751	0 33	257,811	1 03	505,310	4 54
10	$1,023,610	1 37	432,155	0 42	847,024	43 68
TOTALS	$74,939,916	100 00				

Exhibit I-4: Estimated ADDs Cost, by Category and Region (continued)

COST CATEGORY=MANDATORY ISD=4

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI- DENCE INTERVAL	COST PER UNIT
01	$3,504,243	2 06	2,062,082	0 59	4,041,681	47 35
02	$1,379,459	0 81	684,895	0 50	1,342,394	4 68
03	$2,514,660	1 48	569,321	0 23	1,115,870	17 07
04	$132,302,241	77 69	108,510,669	0 82	212,680,912	487 79
05	$17,503,615	10 28	11,541,918	0 66	22,622,159	83 59
06	$5,690,023	3 34	2,982,750	0 52	5,846,189	45 50
07	$44,486	0 03	18,856	0 42	36,957	1 07
08	$1,104,572	0 65	1,030,749	0 93	2,020,269	67 89
09	$2,960,292	1 74	2,751,621	0 93	5,393,178	53 77
10	$3,291,561	1 93	1,323,006	0 40	2,593,092	140 45
TOTALS	$170,295,150	100.00				

Exhibit I-4: Estimated ADDs Cost, by Category and Region (continued)

COST CATEGORY=HANDICAP ISO=4

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	COST PER UNIT
01	$3,549,893	94 15	2,810,377	0 79	5,508,338	47 96
02	$0	0 00				0 00
03	$72,907	1 93	65,807	0 90	128,981	0 49
04	$0	0 00			.	0 00
05	$0	0 00				0 00
06	$115,630	3 07	91,442	0 79	179,226	0 92
07	$31,920	0 85	17,970	0 56	35,221	0 77
08	$0	0 00				0 00
09	$0	0 00				0 00
10	$0	0 00				0 00
TOTALS	$3,770,351	100 00				

Exhibit I-4: Estimated ADDs Cost, by Category and Region (continued)

COST CATEGORY=PROJ SPECIFIC ISO=5

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	COST PER UNIT
01	$57,928,739	9 92	15,490,621	0 27	30,361,617	782 67
02	$49,763,935	8 52	17,375,271	0 35	34,055,531	168 70
03	$34,183,590	5 85	12,772,084	0 37	25,033,284	232 04
04	$111,057,860	19 01	40,224,270	0 36	78,839,568	409 46
05	$64,894,351	11 11	18,780,347	0 29	36,809,479	309 90
06	$168,364,809	28 82	106,683,701	0 63	209,100,053	1346 30
07	$9,958,534	1 70	4,809,603	0 48	9,426,822	238 87
08	$15,289,684	2 62	11,386,992	0 74	22,318,504	939 69
09	$12,852,159	2 20	5,381,980	0 42	10,548,682	233 43
10	$59,820,067	10 24	12,594,881	0 21	24,685,966	2552 49
TOTALS	$584,113,727	100 00				

Exhibit I-4: Estimated ADDs Cost, by Category and Region (continued)

COST CATEGORY=ENERGY ISO=5

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	COST PER UNIT
01	$7,293,631	8 67	3,587,767	0 49	7,032,023	98 54
02	$18,917,392	22 48	14,394,722	0 76	28,213,654	64 13
03	$23,640,452	28 09	14,872,690	0 63	29,150,472	160 47
04	$21,862,162	25 98	15,960,678	0 73	31,282,929	80 60
05	$7,650,567	9 09	3,996,772	0 52	7,833,673	36 54
06	$2,884,165	3 43	1,213,599	0 42	2,378,654	23 06
07	$117,951	0 14	56,689	0 48	111,110	2 83
08	$0	0 00		.		0 00
09	$0	0 00	.			0 00
10	$1,786,075	2 12	1,224,196	0 69	2,399,423	76 21
TOTALS	$84,152,395	100 00				

Exhibit I-4: Estimated ADDs Cost, by Category and Region (continued)

-- COST CATEGORY=MANDATORY ISO=5 --

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI-DENCE INTERVAL	COST PER UNIT
01	$4,037,321	3 82	2,246,618	0 56	4,403,371	54 55
02	$1,956,254	1 85	1,188,367	0 61	2,329,200	6 63
03	$91,038,103	86 10	82,710,668	0 91	162,112,908	617 97
04	$589,114	0 56	530,978	0 90	1,040,717	2 17
05	$2,953,393	2 79	1,505,205	0 51	2,950,202	14 10
06	$1,025,949	0 97	627,441	0 61	1,229,783	8 20
07	$129,810	0 12	82,110	0 63	160,935	3 11
08	$80,715	0 08	73,553	0 91	144,164	4 96
09	$852,019	0 81	361,516	0 42	708,572	15 48
10	$3,074,660	2 91	1,231,542	0 40	2,413,823	131 19
TOTALS	$105,737,338	100 00				

Exhibit I-4: Estimated ADDs Cost, by Category and Region (continued)

COST CATEGORY=HANDICAP ISO=5

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFIDENCE INTERVAL	COST PER UNIT
01	$0	0 00				0 00
02	$0	0 00				0 00
03	$0	0 00				0 00
04	$0	0 00				0 00
05	$10,970	0 74	7,961	0 73	15,603	0 05
06	$1,225,759	82 38	637,835	0 52	1,250,157	9 80
07	$20,285	1 36	8,128	0 40	15,930	0 49
08	$0	0 00				0 00
09	$0	0 00				0 00
10	$230,842	15 52	101,522	0 44	198,982	9 85
TOTALS	$1,487,857	100 00				

Exhibit I-4: Estimated ADDs Cost, by Category and Region (continued)

COST CATEGORY=CURRENTLY PROHIBITED

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI-DENCE INTERVAL	COST PER UNIT
01	$1,843,676	1 76	778,533	0 42	1,525,924	24 91
02	$3,623,867	3 46	1,325,138	0 37	2,597,271	12 28
03	$2,759,627	2 63	1,063,917	0 39	2,085,278	18 73
04	$4,698,412	4 48	3,431,721	0 73	6,726,173	17 32
05	$43,554,802	41 56	20,668,193	0 47	40,509,658	208 00
06	$7,805,389	7 45	4,249,072	0 54	8,328,181	62 41
07	$7,747,980	7 39	3,813,767	0 49	7,474,983	185 85
08	$1,508,224	1 44	790,731	0 52	1,549,832	92 69
09	$30,577,910	29 18	22,856,448	0 75	44,798,638	555 39
10	$682,523	0 65	208,931	0 31	409,504	29 12
TOTALS	$104,802,411	100 00				

Exhibit I-4: Estimated ADDs Cost, by Category and Region (continued)

COST CATEGORY=NO ISD

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI- DENCE INTERVAL	COST PER UNIT
01	$6,181,308	1 20	2,294,951	0 37	4,498,104	83 52
02	$91,248,306	17 71	22,916,844	0 25	44,917,015	309 32
03	$105,283,379	20 43	21,479,631	0 20	42,100,077	714 66
04	$160,219,616	31 09	53,563,128	0 33	104,983,730	590 72
05	$69,527,143	13 49	36,460,499	0 52	71,462,577	332 03
06	$50,031,990	9 71	23,735,324	0 47	46,521,236	400 07
07	$7,737,970	1 50	2,516,112	0 33	4,931,579	185 61
08	$3,276,491	0 64	2,440,167	0 74	4,782,727	201 37
09	$20,945,241	4 06	5,989,322	0 29	11,739,071	380 49
10	$922,467	0 18	505,910	0 55	991,584	39 36
TOTALS	$515,373,913	100 00				

Exhibit I-4: Estimated ADDs Cost, by Category and Region (continued)

COST CATEGORY=OTHER ADDS

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI- DENCE INTERVAL	COST PER UNIT
01	$2,454,568	40 34	2,115,813	0 86	4,146,993	33 16
02	$386,227	6 35	201,205	0 52	394,361	1 31
03	$1,104,399	18 15	705,721	0 64	1,383,214	7 50
04	$10,416	0 17	10,062	0 97	19,722	0 04
05	$1,659,915	27 28	2,246,423	1 35	4,402,988	7 93
06	$0	0 00				0 00
07	$223,363	3 67	23,288	0 10	45,645	5 36
08	$0	0 00				0 00
09	$246,079	4 04	164,711	0 67	322,834	4 47
10	$0	0 00				0 00
TOTALS	$6,084,968	100 00				

Exhibit I-4: Estimated ADDs Cost, by Category and Region (continued)

COST CATEGORY=TOTAL ADDS COST

REGION	CATEGORY COST	PERCENT OF TOTAL	STANDARD ERROR OF TOTAL	COEFFICIENT OF VARIATION	95 PERCENT CONFI- DENCE INTERVAL	COST PER UNIT
01	$923,774,319	7 14	177,482,866	0 19	347,866,417	12481 08
02	$2,868,463,220	22 16	223,941,728	0 08	438,925,787	9723 83
03	$1,787,625,042	13 81	399,310,303	0 22	782,648,193	12134 38
04	$2,104,132,526	16 25	204,953,956	0 10	401,709,754	7757 80
05	$3,034,302,429	23 44	503,557,141	0 17	986,971,996	14490 39
06	$1,098,213,146	8 48	163,151,671	0 15	319,777,275	8781 70
07	$275,276,293	2 13	54,079,475	0 20	105,995,770	6602 93
08	$149,050,478	1 15	42,602,208	0 29	83,500,328	9160 50
09	$491,161,066	3 79	52,065,390	0 11	102,048,163	8920 96
10	$214,516,241	1 66	36,450,979	0 17	71,443,919	9153 28
TOTALS	$12,946,514,760	100 00				

REDESIGN

The national redesign cost estimate for $2,063 million was allocated to the 51 field offices and 10 HUD regions by first estimating the total number of dwelling units located in developments in need of redesign. To derive this estimate the Modernization Needs Survey questionnaire results were used. Developments were classified as redesign developments if they indicated a need for substantial redesign or indicated that major redesign work was needed in any of five development components or indicated that minor redesign work was needed in at least two of the five development components. The resulting field office redesign dwelling unit counts were then ratio adjusted to agree with the national count of 159,571 redesign dwelling units.

To estimate the redesign cost of each field office, the estimated number of redesign dwelling units was multiplied times the national redesign cost per dwelling unit mean of $12,931. The field office redesign estimates were then summed to form the HUD region estimates. The field office and HUD region redesign estimates are shown in Exhibit I-5.

Exhibit I-5: Total Redesign Cost, by Region and Field Office

REGION=01

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL REDESIGN COST	PERCENT OF GRAND TOTAL
1	011	BOSTON, MA	$92,564,603	4.49
2	012	HARTFORD, CT	$54,020,534	2 62
3	013	MANCHESTER,	$30,087,273	1 46
4	014	PROV	$11,735,557	0 57
SUBTOTAL			$188,407,967	9 13

REGION=02

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL REDESIGN COST	PERCENT OF GRAND TOTAL
5	021	BUFFALO, NY	$28,678,966	1 39
6	022	SAN JUAN, PR	$51,128,387	2 48
7	023	NEW YORK, NY	$33,907,548	1 64
8	024	NEWARK, NJ	$154,816,327	7 50
SUBTOTAL			$268,531,228	13 01

REGION=03

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL REDESIGN COST	PERCENT OF GRAND TOTAL
9	031	BALTIMORE, M	$53,257,246	2 58
10	032	PHILADELPHIA	$90,843,229	4 40
11	033	PITTSBURGH,	$79,101,709	3 83
12	034	RICHMOND, VA	$20,720,758	1 00
13	035	WASHINGTON,	$35,409,419	1 72
14	036	CHARLESTON,	$9,553,882	0.46
SUBTOTAL			$288,886,244	14 00

Exhibit I-5: Total Redesign Cost, by Region and Field Office (continued)

REGION=04

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL REDESIGN COST	PERCENT OF GRAND TOTAL
15	041	ATLANTA, GA	$137,968,613	6 69
16	042	BIRMINGHAM,	$60,458,393	2.93
17	043	COLUMBIA, SC	$22,822,617	1 11
18	044	GREENSBORO,N	$69,139,775	3 35
19	045	JACKSON, MS	$11,538,772	0 56
20	046	JACKSONVILLE	$58,675,797	2 84
21	047	KNOXVILLE, T	$25,403,187	1 23
22	048	LOUISVILLE,	$62,291,478	3 02
23	049	NASHVILLE, T	$38,691,161	1 88
SUBTOTAL			$486,989,794	23 60

REGION=05

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL REDESIGN COST	PERCENT OF GRAND TOTAL
24	051	CHICAGO	$212,659,265	10 31
25	052	COLUMBUS, OH	$38,295,603	1 86
26	053	DETROIT,MI	$76,528,167	3 71
27	054	INDIANAPOLIS	$15,748,784	0 76
28	055	MILWAUKEE, W	$19,124,611	0 93
29	056	MINN/ST PAUL	$46,134,642	2 24
30	057	CINCINNATI,	$36,327,751	1 76
31	058	CLEVELAND, O	$39,875,848	1 93
32	059	GRAND RAPIDS	$4,092,736	0 20
SUBTOTAL			$488,787,407	23 69

REGION=06

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL REDESIGN COST	PERCENT OF GRAND TOTAL
33	061	DALLAS, TX	$23,047,728	1 12
34	062	LITTLE ROCK,	$15,760,497	0 76
35	063	NEW ORLEANS,	$14,305,692	0 69
36	064	OKLAHOMA CIT	$4,549,168	0 22
37	065	SAN ANTONIO,	$8,664,514	0 42
38	066	HOUSTON, TX	$20,465,666	0 99
SUBTOTAL			$86,793,265	4 21

Exhibit I-5: Total Redesign Cost, by Region and Field Office (continued)

REGION=07

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL REDESIGN COST	PERCENT OF GRAND TOTAL
39	071	KANSAS CITY,	$12,967,552	0.63
40	072	OMAHA, NE	$8,589,686	0.42
41	073	ST LOUIS, MO	$26,318,040	1 28
42	074	DES MOINES,	$1,558,948	0 08
SUBTOTAL			$49,434,226	2 40

REGION-08

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL REDESIGN COST	PERCENT OF GRAND TOTAL
43	081	DENVER, CO	$16,320,773	0 79

REGION-09

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL REDESIGN COST	PERCENT OF GRAND TOTAL
44	091	HONOLULU OFF	$15,176,317	0 74
45	092	LOS ANGELES	$59,721,343	2 89
46	093	SAN FRANCISC	$68,871,858	3 34
47	094	PHOENIX OFFI	$14,955,679	0 72
48	095	SACRAMENTO O	$5,021,006	0 24
SUBTOTAL			$163,746,203	7 94

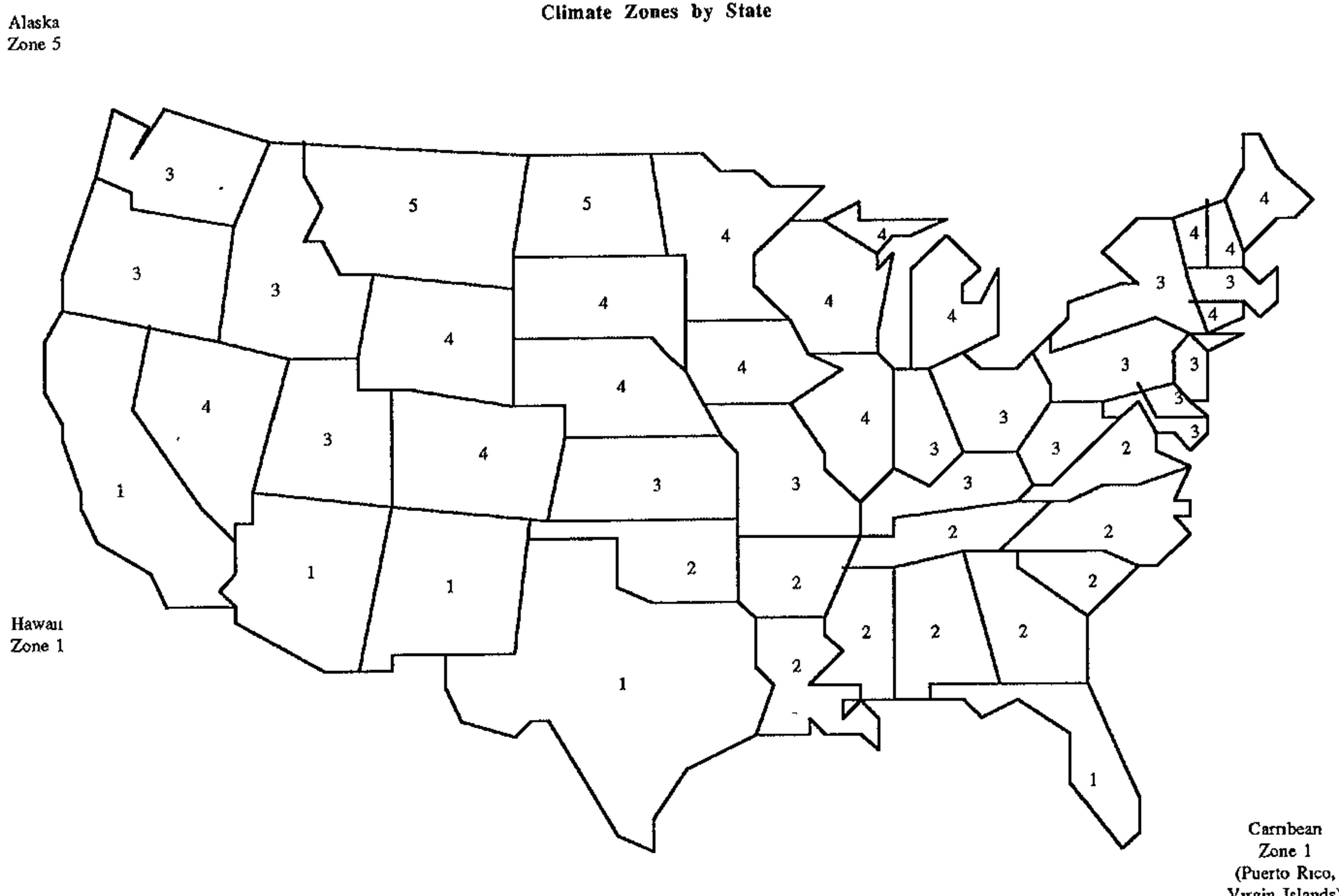
REGION-10

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL REDESIGN COST	PERCENT OF GRAND TOTAL
49	101	ANCHORAGE, A	$1,419,239	0 07
50	102	PORTLAND, OR	$12,807,937	0 62
51	103	SEATTLE WA	$11,288,318	0 55
SUBTOTAL			$25,515,494	1 24
	GRAND TOTAL		$2,063,412,601	100 00

ENERGY CONSERVATION

Each of the national total estimates for the energy variables was allocated to the field office level by first classifying each field office by climate zone. Exhibit I-6 shows which of the five climate zones each of the 51 field offices was assigned to. The energy inspection sample of residential buildings and site-wide facilities was then post-stratified on the basis of climate zone, and national estimates for each of the energy variables were calculated for the five climate zones. The mean cost per dwelling unit was then computed for each of the energy variables for the five climate zones. The total count of dwelling units in each field office was then multiplied times the appropriate climate zone mean cost per dwelling unit values for the energy variables to form field office estimates. These were then summed to form HUD region estimates. Exhibit I-7 presents the energy estimates for the 51 field offices and 10 HUD regions.

Exhibit I-6
Climate Zones by State



Climate Zone	Field Office	Field Office Name	Sampled States in Field Office
3	11	Boston	Massachusetts
4	12	Hartford	Connecticut
4	13	Manchester	New Hampshire, Maine
3	14	Providence	Rhode Island
3	21	Buffalo	New York
1	22	Carribean	Puerto Rico, Virgin Islands
3	23	New York City	New York
3	24	Newark	New Jersey
3	31	Baltimore	Maryland
3	32	Philadelphia	Pennsylvania, Delaware
3	33	Pittsburgh	Pennsylvania
2	34	Richmond	Virginia
3	35	Washington	D.C., Maryland, Virginia
3	36	Charleston	West Virginia
2	41	Atlanta	Georgia
2	42	Birmingham	Alabama
2	43	Columbia	South Carolina
2	44	Greensboro	North Carolina
2	45	Jackson	Mississippi
1	46	Jacksonville	Florida
2	47	Knoxville	Tennessee
3	48	Louisville	Kentucky
2	49	Nashville	Tennessee
4	51	Chicago	Illinois
3	52	Columbus	Ohio
4	53	Detroit	Michigan
3	54	Indianapolis	Indiana
4	55	Milwaukee	Wisconsin
5	56	Minneapolis/St. Paul	Minnesota
3	57	Cincinnati	Ohio
3	58	Cleveland	Ohio
4	59	Grand Rapids	Michigan
1	61	Dallas	Texas
2	62	Little Rock	Arkansas
2	63	New Orleans	Louisiana
2	64	Oklahoma City	Oklahoma
1	65	San Antonio	Texas
1	66	Houston	Texas
3	71	Kansas City	Kansas, Missouri
4	72	Omaha	Nebraska
3	73	St. Louis	Missouri
4	74	Des Moines	Iowa
4	81	Denver	Colorado, North Dakota
1	91	Honolulu	Hawaii
1	92	Los Angeles	California
1	93	San Francisco	California, Nevada
1	94	Phoenix	Arizona
1	95	Sacramento	California
5	101	Anchorage	Alaska
3	102	Portland	Oregon, Washington, Idaho
3	103	Seattle	Washington

Exhibit I-7: Estimated Energy Variables, All Buildings, by Region and Field Office

REGION=01

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	DU COUNT FROM HUD	% OF GRAND TOTAL	ANNUAL ENRGY SAVINGS FRM O&M ACTIONS	% OF GRAND TOTAL	COST PER DU	ANNUAL ENERGY SAVINGS FRM FIX ACTIONS	% OF GRAND TOTAL
1	011	BOSTON, MA	35,172	2.79	$3,313,107	4.00	94	$591,710	2.05
2	012	HARTFORD, CT	19,148	1.52	$1,486,452	1.80	78	$602,258	2.09
3	013	MANCHESTER,	9,839	0.78	$770,931	0.93	78	$309,469	1.07
4	014	PROV	9,855	0.78	$929,547	1.12	94	$165,794	0.57
SUBTOTAL			74,014	5.88	$6,500,037	7.85		$1,669,231	5.79

OBS	COST PER DU	O&M COST	% OF GRAND TOTAL	COST PER DU	ANNUAL SAV-INGS BASED ON PAYBACK	% OF GRAND TOTAL	COST PER DU	IMPLEMNTATON COST BASED ON PAYBACK	% OF GRAND TOTAL	COST PER DU
1	17	$2,546,693	2.59	72	$5,814,518	2.76	165	$28,624,698	3.05	814
2	31	$903,578	0.92	47	$4,916,523	2.33	257	$20,556,925	2.19	1,074
3	31	$472,039	0.48	48	$2,556,408	1.21	260	$10,685,212	1.14	1,086
4	17	$714,454	0.73	72	$1,636,379	0.78	166	$8,058,908	0.86	818
SUBTOTAL		$4,636,764	4.71		$14,923,828	7.08		$67,925,743	7.23	

OBS	ANNUAL ENER-GY SAVINGS FROM ECOS	% OF GRAND TOTAL	COST PER DU	NET PRE-SENT VALUE OF SAVINGS	% OF GRAND TOTAL	COST PER DU	COST OF ECOS	% OF GRAND TOTAL	COST PER DU
1	$6,023,251	2.73	171	$93,295,668	2.56	2,653	$36,748,288	3.04	1,045
2	$5,237,497	2.37	274	$127,096,988	3.49	6,638	$24,884,312	2.06	1,300
3	$2,721,088	1.23	277	$65,614,847	1.80	6,669	$12,914,710	1.07	1,313
4	$1,695,474	0.77	172	$26,279,520	0.72	2,667	$10,341,939	0.86	1,049
SUBTOTAL	$15,677,309	7.10		$312,287,024	8.58		$84,889,247	7.02	

Exhibit I-7: Estimated Energy Variables, All Buildings, by Region and Field Office (continued)

REGION=02

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	DU COUNT FROM HUD	% OF GRAND TOTAL	ANNUAL ENRGY SAVINGS FRM O&M ACTIONS	% OF GRAND TOTAL	COST PER DU	ANNUAL ENRGY SAVINGS FRM FIX ACTIONS	% OF GRAND TOTAL
5	021	BUFFALO, NY	25,359	2.02	$2,389,723	2.89	94	$426,623	1.48
6	022	SAN JUAN, PR	62,770	4.99	$1,558,817	1.88	25	$1,653,751	5.73
7	023	NEW YORK, NY	159,289	12.66	$14,938,087	18.04	94	$2,679,750	9.29
8	024	NEWARK, NJ	47,575	3.78	$4,491,504	5.42	94	$800,373	2.78
SUBTOTAL			294,993	23.44	$23,378,132	28.23		$5,560,496	19.28

OBS	COST PER DU	O&M COST	% OF GRAND TOTAL	COST PER DU	ANNUAL SAVINGS BASED ON PAYBACK	% OF GRAND TOTAL	COST PER DU	IMPLEMNTATON COST BASED ON PAYBACK	% OF GRAND TOTAL	COST PER DU
5	17	$1,836,865	1.87	72	$4,197,945	1.99	166	$20,668,779	2.20	815
6	26	$1,636,429	1.66	26	$4,531,993	2.15	72	$19,909,079	2.12	317
7	17	$11,485,856	11.67	72	$25,945,568	12.31	163	$127,564,006	13.58	801
8	17	$3,451,985	3.51	73	$7,923,616	3.76	167	$39,032,743	4.16	820
SUBTOTAL		$18,411,134	18.71		$42,599,121	20.22		$207,174,608	22.06	

OBS	ANNUAL ENERGY SAVINGS FROM ECOS	% OF GRAND TOTAL	COST PER DU	NET PRESENT VALUE OF SAVINGS	% OF GRAND TOTAL	COST PER DU	COST OF ECOS	% OF GRAND TOTAL	COST PER DU
5	$4,348,923	1.97	171	$67,375,720	1.85	2,657	$26,531,297	2.19	1,046
6	$5,113,985	2.31	81	$58,369,285	1.60	930	$32,041,893	2.65	510
7	$26,858,032	12.16	169	$415,045,620	11.40	2,606	$163,985,272	13.57	1,029
8	$8,210,930	3.72	173	$127,327,345	3.50	2,676	$50,076,938	4.14	1,053
SUBTOTAL	$44,531,870	20.16		$668,117,970	18.36		$272,635,400	22.55	

Exhibit I-7: Estimated Energy Variables, All Buildings, by Region and Field Office (continued)

REGION=03

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	DU COUNT FROM HUD	% OF GRAND TOTAL	ANNUAL ENRGY SAVINGS FRM O&M ACTIONS	% OF GRAND TOTAL	COST PER DU	ANNUAL ENRGY SAVINGS FRM FIX ACTIONS	% OF GRAND TOTAL
9	031	BALTIMORE, M	23,605	1.88	$2,221,015	2.68	94	$397,114	1.38
10	032	PHILADELPHIA	49,890	3.96	$4,702,622	5.68	94	$839,317	2.91
11	033	PITTSBURGH,	31,288	2.49	$2,947,589	3.56	94	$526,368	1.83
12	034	RICHMOND, VA	20,302	1.61	$704,876	0.85	35	$578,655	2.01
13	035	WASHINGTON,	15,409	1.22	$1,453,846	1.76	94	$259,231	0.90
14	036	CHARLESTON,	6,825	0.54	$643,703	0.78	94	$114,819	0.40
SUBTOTAL			147,319	11.71	$12,673,649	15.31		$2,715,504	9.42

OBS	COST PER DU	O&M COST	% OF GRAND TOTAL	COST PER DU	ANNUAL SAV-INGS BASED ON PAYBACK	% OF GRAND TOTAL	COST PER DU	IMPLEMNTATON COST BASED ON PAYBACK	% OF GRAND TOTAL	COST PER DU
9	17	$1,707,359	1.74	72	$3,887,661	1.85	165	$19,132,596	2.04	811
10	17	$3,614,617	3.67	72	$8,265,825	3.92	166	$40,700,163	4.33	816
11	17	$2,265,712	2.30	72	$5,174,434	2.46	165	$25,474,439	2.71	814
12	29	$3,045,594	3.10	150	$3,828,004	1.82	189	$14,675,689	1.56	723
13	17	$1,117,411	1.14	73	$2,561,115	1.22	166	$12,614,156	1.34	819
14	17	$494,755	0.50	72	$1,132,984	0.54	166	$5,579,648	0.59	818
SUBTOTAL		$12,245,449	12.45		$24,850,023	11.79		$118,176,692	12.58	

OBS	ANNUAL ENER-GY SAVINGS FROM ECOS	% OF GRAND TOTAL	COST PER DU	NET PRE-SENT VALUE OF SAVINGS	% OF GRAND TOTAL	COST PER DU	COST OF ECOS	% OF GRAND TOTAL	COST PER DU
9	$4,026,507	1.82	171	$62,331,129	1.71	2,641	$24,570,635	2.03	1,041
10	$8,563,445	3.88	172	$132,686,665	3.65	2,660	$52,240,454	4.32	1,047
11	$5,360,287	2.43	171	$83,031,847	2.28	2,654	$32,702,863	2.71	1,045
12	$3,971,744	1.80	196	$53,841,009	1.48	2,652	$19,036,720	1.57	938
13	$2,653,728	1.20	172	$41,138,513	1.13	2,670	$16,186,238	1.34	1,050
14	$1,173,886	0.53	172	$18,194,319	0.50	2,666	$7,160,478	0.59	1,049
SUBTOTAL	$25,749,596	11.66		$391,223,482	10.75		$151,897,388	12.57	

Exhibit I-7: Estimated Energy Variables, All Buildings, by Region and Field Office (continued)

REGION=04

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	DU COUNT FROM HUD	% OF GRAND TOTAL	ANNUAL ENRGY SAVINGS FRM O&M ACTIONS	% OF GRAND TOTAL	COST PER DU	ANNUAL ENRGY SAVINGS FRM FIX ACTIONS	% OF GRAND TOTAL
15	041	ATLANTA, GA	56,158	4.46	$1,948,607	2.35	35	$1,600,636	5.55
16	042	BIRMINGHAM,	42,009	3.34	$1,458,911	1.76	35	$1,197,356	4.15
17	043	COLUMBIA, SC	15,633	1.24	$541,999	0.65	35	$445,577	1.54
18	044	GREENSBORO,N	37,681	2.99	$1,306,728	1.58	35	$1,073,998	3.72
19	045	JACKSON, MS	12,365	0.98	$429,130	0.52	35	$352,432	1.22
20	046	JACKSONVILLE	41,732	3.32	$1,034,423	1.25	25	$1,099,479	3.81
21	047	KNOXVILLE, T	15,671	1.25	$543,696	0.66	35	$446,661	1.55
22	048	LOUISVILLE,	24,985	1.99	$2,356,699	2.85	94	$420,332	1.46
23	049	NASHVILLE, T	24,994	1.99	$868,216	1.05	35	$712,388	2.47
SUBTOTAL			271,228	21.55	$10,488,408	12.67		$7,348,858	25.48

OBS	COST PER DU	O&M COST	% OF GRAND TOTAL	COST PER DU	ANNUAL SAVINGS BASED ON PAYBACK	% OF GRAND TOTAL	COST PER DU	IMPLEMNTATON COST BASED ON PAYBACK	% OF GRAND TOTAL	COST PER DU
15	29	$8,422,495	8.56	150	$10,581,853	5.02	188	$40,529,831	4.32	722
16	29	$6,302,610	6.41	150	$7,923,151	3.76	189	$30,387,964	3.24	723
17	29	$2,343,848	2.38	150	$2,943,103	1.40	188	$11,257,807	1.20	720
18	29	$5,650,046	5.74	150	$7,095,801	3.37	188	$27,153,071	2.89	721
19	29	$1,854,625	1.88	150	$2,330,416	1.11	188	$8,928,466	0.95	722
20	26	$1,083,775	1.10	26	$2,999,619	1.42	72	$13,163,333	1.40	315
21	29	$2,350,199	2.39	150	$2,952,494	1.40	188	$11,306,236	1.20	721
22	17	$1,811,368	1.84	72	$4,148,969	1.97	166	$20,433,154	2.18	818
23	29	$3,750,213	3.81	150	$4,715,264	2.24	189	$18,091,579	1.93	724
SUBTOTAL		$33,569,179	34.12		$45,690,672	21.69		$181,251,441	19.30	

OBS	ANNUAL ENERGY SAVINGS FROM ECOS	% OF GRAND TOTAL	COST PER DU	NET PRESENT VALUE OF SAVINGS	% OF GRAND TOTAL	COST PER DU	COST OF ECOS	% OF GRAND TOTAL	COST PER DU
15	$10,979,110	4.97	196	$148,840,841	4.09	2,650	$52,585,835	4.35	936
16	$8,220,690	3.72	196	$111,437,227	3.06	2,653	$39,414,146	3.26	938
17	$3,053,558	1.38	195	$41,399,269	1.14	2,648	$14,611,174	1.21	935
18	$7,362,131	3.33	195	$99,811,501	2.74	2,649	$35,237,826	2.92	935
19	$2,417,910	1.09	196	$32,778,400	0.90	2,651	$11,583,483	0.96	937
20	$3,382,487	1.53	81	$38,635,685	1.06	926	$21,109,413	1.75	506
21	$3,063,330	1.39	195	$41,529,193	1.14	2,650	$14,670,079	1.21	936
22	$4,298,817	1.95	172	$66,631,638	1.83	2,667	$26,221,538	2.17	1,049
23	$4,892,353	2.21	196	$66,317,854	1.82	2,653	$23,463,159	1.94	939
SUBTOTAL	$47,670,387	21.58		$647,381,608	17.79		$238,896,654	19.76	

Exhibit I-7: Estimated Energy Variables, All Buildings, by Region and Field Office (continued)

REGION=05

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	DU COUNT FROM HUD	% OF GRAND TOTAL	ANNUAL ENRGY SAVINGS FRM O&M ACTIONS	% OF GRAND TOTAL	COST PER DU	ANNUAL ENRGY SAVINGS FRM FIX ACTIONS	% OF GRAND TOTAL
24	051	CHICAGO	76,876	6.11	$5,933,145	7.17	77	$2,417,944	8.38
25	052	COLUMBUS, OH	10,191	0.81	$968,162	1.17	95	$171,449	0.59
26	053	DETROIT,MI	19,518	1.55	$1,515,435	1.83	78	$613,896	2.13
27	054	INDIANAPOLIS	17,183	1.37	$1,616,895	1.95	94	$289,075	1.00
28	055	MILWAUKEE, W	12,884	1.02	$1,006,399	1.22	78	$405,242	1.41
29	056	MINN/ST PAUL	21,194	1.68	$1,718,651	2.08	81	$21,938	0.08
30	057	CINCINNATI,	13,166	1.05	$1,244,262	1.50	95	$221,497	0.77
31	058	CLEVELAND, O	29,603	2.35	$2,791,782	3.37	94	$498,022	1.73
32	059	GRAND RAPIDS	8,786	0.70	$687,863	0.83	78	$276,348	0.96
SUBTOTAL			209,401	16.64	$17,482,594	21.11		$4,915,411	17.04

OBS	COST PER DU	O&M COST	% OF GRAND TOTAL	COST PER DU	ANNUAL SAVINGS BASED ON PAYBACK	% OF GRAND TOTAL	COST PER DU	IMPLEMNTATON COST BASED ON PAYBACK	% OF GRAND TOTAL	COST PER DU
24	31	$3,590,023	3.65	47	$19,592,519	9.30	255	$81,937,680	8.73	1,066
25	17	$743,785	0.76	73	$1,732,515	0.82	170	$8,549,488	0.91	839
26	31	$921,320	0.94	47	$5,012,623	2.38	257	$20,958,604	2.23	1,074
27	17	$1,242,948	1.26	72	$2,830,746	1.34	165	$13,931,462	1.48	811
28	31	$614,737	0.62	48	$3,334,396	1.58	259	$13,938,593	1.48	1,082
29	1	$1,697,631	1.73	80	$4,633,947	2.20	219	$24,845,424	2.65	1,172
30	17	$956,224	0.97	73	$2,200,224	1.04	167	$10,841,729	1.15	823
31	17	$2,145,800	2.18	72	$4,912,866	2.33	166	$24,193,994	2.58	817
32	31	$420,911	0.43	48	$2,280,447	1.08	260	$9,532,037	1.02	1,085
SUBTOTAL		$12,333,380	12.54		$46,530,283	22.08		$208,729,011	22.23	

OBS	ANNUAL ENERGY SAVINGS FROM ECOS	% OF GRAND TOTAL	COST PER DU	NET PRESENT VALUE OF SAVINGS	% OF GRAND TOTAL	COST PER DU	COST OF ECOS	% OF GRAND TOTAL	COST PER DU
24	$20,882,383	9.45	272	$508,777,186	13.98	6,618	$99,282,626	8.21	1,291
25	$1,797,045	0.81	176	$27,953,873	0.77	2,743	$10,948,803	0.91	1,074
26	$5,339,789	2.42	274	$129,564,104	3.56	6,638	$25,369,825	2.10	1,300
27	$2,931,882	1.33	171	$45,388,044	1.25	2,641	$17,890,753	1.48	1,041
28	$3,550,150	1.61	276	$85,786,967	2.36	6,658	$16,855,492	1.39	1,308
29	$4,569,216	2.07	216	$51,206,769	1.41	2,416	$23,353,198	1.93	1,102
30	$2,280,366	1.03	173	$35,380,112	0.97	2,687	$13,905,198	1.15	1,056
31	$5,090,160	2.30	172	$78,890,100	2.17	2,665	$31,049,429	2.57	1,049
32	$2,427,522	1.10	276	$58,568,380	1.61	6,666	$11,522,462	0.95	1,311
SUBTOTAL	$48,868,513	22.12		$1,021,515,536	28.07		$250,177,786	20.70	

Exhibit I-7: Estimated Energy Variables, All Buildings, by Region and Field Office (continued)

REGION=06

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	DU COUNT FROM HUD	% OF GRAND TOTAL	ANNUAL ENRGY SAVINGS FRM O&M ACTIONS	% OF GRAND TOTAL	COST PER DU	ANNUAL ENRGY SAVINGS FRM FIX ACTIONS	% OF GRAND TOTAL
33	061	DALLAS, TX	34,459	2.74	$855,068	1.03	25	$907,864	3.15
34	062	LITTLE ROCK,	14,883	1.18	$517,051	0.62	35	$424,201	1.47
35	063	NEW ORLEANS,	30,985	2.46	$1,076,177	1.30	35	$883,146	3.06
36	064	OKLAHOMA CIT	12,782	1.02	$444,298	0.54	35	$364,317	1.26
37	065	SAN ANTONIO,	23,126	1.84	$573,320	0.69	25	$609,282	2.11
38	066	HOUSTON, TX	8,822	0.70	$219,213	0.26	25	$232,426	0.81
SUBTOTAL			125,057	9.94	$3,685,128	4.45		$3,421,235	11.86

OBS	COST PER DU	O&M COST	% OF GRAND TOTAL	COST PER DU	ANNUAL SAV- INGS BASED ON PAYBACK	% OF GRAND TOTAL	COST PER DU	IMPLEMNTATON COST BASED ON PAYBACK	% OF GRAND TOTAL	COST PER DU
33	26	$896,888	0.91	26	$2,483,238	1.18	72	$10,903,976	1.16	316
34	29	$2,233,218	2.27	150	$2,808,123	1.33	189	$10,776,231	1.15	724
35	29	$4,648,876	4.72	150	$5,844,631	2.77	189	$22,419,889	2.39	724
36	29	$1,918,369	1.95	150	$2,413,109	1.15	189	$9,268,187	0.99	725
37	26	$600,772	0.61	26	$1,662,874	0.79	72	$7,297,897	0.78	316
38	26	$230,270	0.23	26	$637,841	0.30	72	$2,802,971	0.30	318
SUBTOTAL		$10,528,393	10.70		$15,849,816	7.52		$63,469,152	6.76	

OBS	ANNUAL ENER- GY SAVINGS FROM ECOS	% OF GRAND TOTAL	COST PER DU	NET PRE- SENT VALUE OF SAVINGS	% OF GRAND TOTAL	COST PER DU	COST OF ECOS	% OF GRAND TOTAL	COST PER DU
33	$2,801,313	1.27	81	$31,983,430	0.88	928	$17,522,446	1.45	509
34	$2,913,590	1.32	196	$39,494,505	1.09	2,654	$13,975,180	1.16	939
35	$6,064,124	2.74	196	$82,202,682	2.26	2,653	$29,078,120	2.41	938
36	$2,503,759	1.13	196	$33,937,527	0.93	2,655	$12,017,006	0.99	940
37	$1,875,230	0.85	81	$21,418,031	0.59	926	$11,706,809	0.97	506
38	$719,907	0.33	82	$8,214,837	0.23	931	$4,516,171	0.37	512
SUBTOTAL	$16,877,923	7.64		$217,251,012	5.97		$88,815,732	7.35	

Exhibit I-7: Estimated Energy Variables, All Buildings, by Region and Field Office (continued)

REGION=07

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	DU COUNT FROM HUD	% OF GRAND TOTAL	ANNUAL ENRGY SAVINGS FRM O&M ACTIONS	% OF GRAND TOTAL	COST PER DU	ANNUAL ENRGY SAVINGS FRM FIX ACTIONS	% OF GRAND TOTAL
39	071	KANSAS CITY,	15,418	1.23	$1,460,195	1.76	95	$259,384	0.90
40	072	OMAHA, NE	7,453	0.59	$584,350	0.71	78	$234,421	0.81
41	073	ST LOUIS, MO	14,575	1.16	$1,381,181	1.67	95	$245,203	0.85
42	074	DES MOINES,	4,244	0.34	$327,525	0.40	77	$133,484	0.46
SUBTOTAL			41,690	3.31	$3,753,250	4.53		$872,493	3.03

OBS	COST PER DU	O&M COST	% OF GRAND TOTAL	COST PER DU	ANNUAL SAV-INGS BASED ON PAYBACK	% OF GRAND TOTAL	COST PER DU	IMPLEMNTATON COST BASED ON PAYBACK	% OF GRAND TOTAL	COST PER DU
39	17	$1,122,014	1.14	73	$2,594,665	1.23	168	$12,792,994	1.36	830
40	31	$357,972	0.36	48	$1,938,041	0.92	260	$8,100,391	0.86	1,087
41	17	$1,061,258	1.08	73	$2,457,599	1.17	169	$12,119,199	1.29	832
42	31	$198,169	0.20	47	$1,081,539	0.51	255	$4,523,104	0.48	1,066
SUBTOTAL		$2,739,413	2.78		$8,071,845	3.83		$37,535,687	4.00	

OBS	ANNUAL ENER-GY SAVINGS FROM ECOS	% OF GRAND TOTAL	COST PER DU	NET PRE-SENT VALUE OF SAVINGS	% OF GRAND TOTAL	COST PER DU	COST OF ECOS	% OF GRAND TOTAL	COST PER DU
39	$2,690,049	1.22	174	$41,780,969	1.15	2,710	$16,397,708	1.36	1,064
40	$2,062,773	0.93	277	$49,719,027	1.37	6,671	$9,789,535	0.81	1,314
41	$2,548,175	1.15	175	$39,589,154	1.09	2,716	$15,531,395	1.28	1,066
42	$1,152,748	0.52	272	$28,086,616	0.77	6,618	$5,480,630	0.45	1,291
SUBTOTAL	$8,453,744	3.83		$159,175,766	4.37		$47,199,267	3.90	

Exhibit I-7: Estimated Energy Variables, All Buildings, by Region and Field Office (continued)

REGION=08

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	DU COUNT FROM HUD	% OF GRAND TOTAL	ANNUAL ENRGY SAVINGS FRM O&M ACTIONS	% OF GRAND TOTAL	COST PER DU	ANNUAL ENRGY SAVINGS FRM FIX ACTIONS	% OF GRAND TOTAL
43	081	DENVER, CO	16,271	1.29	$1,271,627	1.54	78	$511,774	1.77

OBS	COST PER DU	O&M COST	% OF GRAND TOTAL	COST PER DU	ANNUAL SAV-INGS BASED ON PAYBACK	% OF GRAND TOTAL	COST PER DU	IMPLEMNTATON COST BASED ON PAYBACK	% OF GRAND TOTAL	COST PER DU
43	31	$777,061	0.79	48	$4,213,750	2.00	259	$17,614,175	1.88	1,083

OBS	ANNUAL ENER-GY SAVINGS FROM ECOS	% OF GRAND TOTAL	COST PER DU	NET PRE-SENT VALUE OF SAVINGS	% OF GRAND TOTAL	COST PER DU	COST OF ECOS	% OF GRAND TOTAL	COST PER DU
43	$4,486,200	2.03	276	$108,367,534	2.98	6,660	$21,298,430	1.76	1,309

Exhibit I-7: Estimated Energy Variables, All Buildings, by Region and Field Office (continued)

REGION=09

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	DU COUNT FROM HUD	% OF GRAND TOTAL	ANNUAL ENRGY SAVINGS FRM O&M ACTIONS	% OF GRAND TOTAL	COST PER DU	ANNUAL ENRGY SAVINGS FRM FIX ACTIONS	% OF GRAND TOTAL
44	091	HONOLULU OFF	5,123	0.41	$127,206	0.15	25	$134,972	0.47
45	092	LOS ANGELES	18,456	1.47	$458,397	0.55	25	$486,245	1.69
46	093	SAN FRANCISC	21,885	1.74	$543,377	0.66	25	$576,586	2.00
47	094	PHOENIX OFFI	5,198	0.41	$129,056	0.16	25	$136,948	0.47
48	095	SACRAMENTO O	4,395	0.35	$108,901	0.13	25	$115,792	0.40
SUBTOTAL			55,057	4.37	$1,366,937	1.65		$1,450,542	5.03

OBS	COST PER DU	O&M COST	% OF GRAND TOTAL	COST PER DU	ANNUAL SAVINGS BASED ON PAYBACK	% OF GRAND TOTAL	COST PER DU	IMPLEMNTATON COST BASED ON PAYBACK	% OF GRAND TOTAL	COST PER DU
44	26	$133,521	0.14	26	$369,761	0.18	72	$1,624,237	0.17	317
45	26	$481,292	0.49	26	$1,332,969	0.63	72	$5,856,210	0.62	317
46	26	$570,309	0.58	26	$1,579,333	0.75	72	$6,937,224	0.74	317
47	26	$135,448	0.14	26	$375,086	0.18	72	$1,647,537	0.18	317
48	26	$114,053	0.12	26	$315,634	0.15	72	$1,384,827	0.15	315
SUBTOTAL	132	$1,434,622	1.46		$3,972,784	1.89		$17,450,035	1.86	

OBS	ANNUAL ENERGY SAVINGS FROM ECOS	% OF GRAND TOTAL	COST PER DU	NET PRESENT VALUE OF SAVINGS	% OF GRAND TOTAL	COST PER DU	COST OF ECOS	% OF GRAND TOTAL	COST PER DU
44	$417,224	0.19	81	$4,762,314	0.13	930	$2,613,390	0.22	510
45	$1,504,225	0.68	82	$17,167,744	0.47	930	$9,427,569	0.78	511
46	$1,782,016	0.81	81	$20,340,975	0.56	929	$11,160,535	0.92	510
47	$423,218	0.19	81	$4,830,915	0.13	929	$2,650,382	0 22	510
48	$355,874	0.16	81	$4,065,483	0.11	925	$2,219,248	0.18	505
SUBTOTAL	$4,482,557	2.03		$51,167,432	1.41		$28,071,124	2.32	

Exhibit I-7: Estimated Energy Variables, All Buildings, by Region and Field Office (continued)

REGION=10

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	DU COUNT FROM HUD	% OF GRAND TOTAL	ANNUAL ENRGY SAVINGS FRM O&M ACTIONS	% OF GRAND TOTAL	COST PER DU	ANNUAL ENRGY SAVINGS FRM FIX ACTIONS	% OF GRAND TOTAL
49	101	ANCHORAGE, A	1,124	0.09	$94,068	0.11	84	$1,163	0.00
50	102	PORTLAND, OR	6,531	0.52	$619,551	0.75	95	$109,874	0.38
51	103	SEATTLE WA	15,781	1.25	$1,491,053	1.80	94	$265,490	0.92
SUBTOTAL			23,436	1.86	$2,204,671	2.66		$376,528	1.31
GRAND TOTAL			1,258,466	100.00	$82,804,435	100.00		$28,842,074	100.00

OBS	COST PER DU	O&M COST	% OF GRAND TOTAL	COST PER DU	ANNUAL SAVINGS BASED ON PAYBACK	% OF GRAND TOTAL	COST PER DU	IMPLEMNTATON COST BASED ON PAYBACK	% OF GRAND TOTAL	COST PER DU
49	1	$92,251	0.09	82	$254,184	0.12	226	$1,351,097	0.14	1,202
50	17	$476,012	0.48	73	$1,105,024	0.52	169	$5,450,806	0.58	835
51	17	$1,145,902	1.16	73	$2,635,235	1.25	167	$12,984,427	1.38	823
SUBTOTAL		$1,714,165	1.74		$3,994,443	1.90		$19,786,330	2.11	
GRAND TOTAL		$98,389,560	100.00		$210,696,563	100.00		$939,112,873	100.00	

OBS	ANNUAL ENERGY SAVINGS FROM ECOS	% OF GRAND TOTAL	COST PER DU	NET PRESENT VALUE OF SAVINGS	% OF GRAND TOTAL	COST PER DU	COST OF ECOS	% OF GRAND TOTAL	COST PER DU
49	$250,644	0.11	223	$2,805,060	0.08	2,496	$1,271,630	0.11	1,131
50	$1,145,932	0.52	175	$17,812,744	0.49	2,727	$6,983,403	0.58	1,069
51	$2,731,125	1.24	173	$42,368,780	1.16	2,685	$16,654,457	1.38	1,055
SUBTOTAL	$4,127,701	1.87		$62,986,585	1.73		$24,909,490	2.06	
GRAND TOTAL	$220,925,800	100.00		$3,639,473,949	100.00		$1,208,790,520	100.00	

HANDICAPPED ACCESSIBILITY

The national handicapped accessibility estimate of $232 million was allocated to the 51 field offices and 10 HUD regions by multiplying the national mean cost per dwelling unit of $185 by the total dwelling unit count for each field office (see Exhibit A-2). The resulting handicapped accessibility estimates are presented in Exhibit I-8.

Exhibit I-8: Total Allocated Handicap Cost, by Region and Field Office

REGION=01

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL HANDICAP COST	PERCENT OF GRAND TOTAL
1	011	BOSTON, MA	$6,491,429	2.79
2	012	HARTFORD, CT	$3,534,001	1 52
3	013	MANCHESTER,	$1,815,909	0.78
4	014	PROV	$1,818,862	0.78
REGION			$13,660,201	5 88

REGION=02

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL HANDICAP COST	PERCENT OF GRAND TOTAL
5	021	BUFFALO, NY	$4,680,318	2.02
6	022	SAN JUAN, PR	$11,584,981	4.99
7	023	NEW YORK, NY	$29,398,759	12 66
8	024	NEWARK, NJ	$8,780,556	3 78
REGION			$54,444,614	23 44

REGION=03

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL HANDICAP COST	PERCENT OF GRAND TOTAL
9	031	BALTIMORE, M	$4,356,595	1.88
10	032	PHILADELPHIA	$9,207,818	3.96
11	033	PITTSBURGH,	$5,774,588	2 49
12	034	RICHMOND, VA	$3,746,986	1 61
13	035	WASHINGTON,	$2,843,922	1.22
14	036	CHARLESTON,	$1,259,638	0 54
REGION			$27,189,547	11.71

Exhibit I-8: Total Allocated Handicap Cost, by Region and Field Office (continued)

REGION=04

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL HANDICAP COST	PERCENT OF GRAND TOTAL
15	041	ATLANTA, GA	$10,364,655	4 46
16	042	BIRMINGHAM,	$7,753,282	3 34
17	043	COLUMBIA, SC	$2,885,264	1.24
18	044	GREENSBORO,N	$6,954,496	2 99
19	045	JACKSON, MS	$2,282,114	0 98
20	046	JACKSONVILLE	$7,702,158	3 32
21	047	KNOXVILLE, T	$2,892,277	1 25
22	048	LOUISVILLE,	$4,611,291	1.99
23	049	NASHVILLE, T	$4,612,952	1.99
REGION			$50,058,489	21 55

REGION=05

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL HANDICAP COST	PERCENT OF GRAND TOTAL
24	051	CHICAGO	$14,188,419	6.11
25	052	COLUMBUS, OH	$1,880,875	0.81
26	053	DETROIT,MI	$3,602,289	1.55
27	054	INDIANAPOLIS	$3,171,336	1.37
28	055	MILWAUKEE, W.	$2,377,902	1 02
29	056	MINN/ST PAUL	$3,911,615	1.68
30	057	CINCINNATI,	$2,429,948	1.05
31	058	CLEVELAND, O	$5,463,601	2.35
32	059	GRAND RAPIDS	$1,621,565	0.70
REGION			$38,647,550	16 64

REGION=06

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL HANDICAP COST	PERCENT OF GRAND TOTAL
33	061	DALLAS, TX	$6,359,836	2.74
34	062	LITTLE ROCK,	$2,746,842	1 18
35	063	NEW ORLEANS,	$5,718,666	2 46
36	064	OKLAHOMA CIT	$2,359,077	1.02
37	065	SAN ANTONIO,	$4,268,190	1 84
38	066	HOUSTON, TX	$1,628,209	0.70
REGION			$23,080,819	9 94

Exhibit I-8: Total Allocated Handicap Cost, by Region and Field Office (continued)

REGION=07

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL HANDICAP COST	PERCENT OF GRAND TOTAL
39	071	KANSAS CITY,	$2,845,583	1.23
40	072	OMAHA, NE	$1,375,544	0 59
41	073	ST LOUIS, MO	$2,689,997	1 16
42	074	DES MOINES,	$783,283	0.34
REGION			$7,694,406	3.31

REGION=08

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL HANDICAP COST	PERCENT OF GRAND TOTAL
43	081	DENVER, CO	$3,003,015	1.29

REGION=09

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL HANDICAP COST	PERCENT OF GRAND TOTAL
44	091	HONOLULU OFF	$945,513	0.41
45	092	LOS ANGELES	$3,406,284	1.47
46	093	SAN FRANCISC	$4,039,148	1 74
47	094	PHOENIX OFFI	$959,355	0.41
48	095	SACRAMENTO O	$811,152	0.35
REGION			$10,161,452	4.37

REGION=10

OBS	FIELD OFFICE NUMBER	FIELD OFFICE NAME	TOTAL HANDICAP COST	PERCENT OF GRAND TOTAL
49	101	ANCHORAGE, A	$207,448	0.09
50	102	PORTLAND, OR	$1,205,377	0.52
51	103	SEATTLE WA	$2,912,579	1.25
REGION			$4,325,404	1 86
			$232,265,497	100 00

INDIAN HOUSING

The rental FIX estimate of $161 million was allocated to the six Indian Housing regions by taking the national estimate of $8,664 per dwelling unit and multiplying this national mean times the total number of rental dwelling units in each Indian Housing region. Exhibit I-9 contains the rental FIX estimates. The same procedures was followed for the homeownership FIX allocation to the six OIPs. Exhibit I-10 shows the homeownership FIX estimates. For rental ADDs, we first computed the mean cost per dwelling unit for the 15 ADDs categories and multiplied these times the total number of rental dwelling units in each OIP. Exhibit I-11 presents the rental ADDs estimates.

Exhibit I-9: Rental FIX OIP Cost Estimates, Indian Developments

OBS	OIP NAME	TOTAL UNIV RENTAL DUS	MEAN COST PER DU	OIP RENTAL FIX ESTIMATE
1	CHICAGO	3,165	8663 6	$27,420,292
2	OKLAHOMA CITY	2,913	8663 6	$25,237,065
3	DENVER	7,070	8663 6	$61,251,647
4	PHOENIX	3,908	8663 6	$33,857,346
5	ANCHORAGE	169	8663 6	$1,464,148
6	SEATTLE	1,334	8663 6	$11,557,241
		======		==========
		18,559		$160,787,739

Exhibit I-10: Homeowner FIX OIP Cost Estimates, Indian Developments

OBS	OIP NAME	TOTAL UNIV HOMEOWNER DUS	MEAN COST PER DU	OIP HOMEOWNER FIX ESTIMATE
1	CHICAGO	2,705	7213.99	$19,513,854
2	OKLAHOMA CITY	11,441	7213 99	$82,535,306
3	DENVER	5,178	7213.99	$37,354,061
4	PHOENIX	8,758	7213 99	$63,180,160
5	ANCHORAGE	1,056	7213.99	$7,617,978
6	SEATTLE	1,746	7213 99	$12,595,634
		======		===========
		30,884		$222,796,993

Exhibit I-11: Rental ADD OIP Cost Estimates, Indian Developments, by Category

OBS	OIP NAME	TOTAL UNIV RENTAL DUS	MEAN COST PER DU CATEG 1	ENERGY (ISO 1&2) CATEG 1	MEAN COST PER DU CATEG 2	REQUIRED (ISO 1&2) CATEG 2	MEAN COST PER DU CATEG 3	PROJECT SPECIFIC (ISO 1&2) CATEG 3
1	CHICAGO	3,165	$3,082	$9,754,789	$2,620	$8,292,818	$12,659	$40,065,233
2	OKLAHOMA CITY	2,913	$3,082	$8,978,104	$2,620	$7,632,537	$12,659	$36,875,205
3	DENVER	7,070	$3,082	$21,790,318	$2,620	$18,524,558	$12,659	$89,498,009
4	PHOENIX	3,908	$3,082	$12,044,775	$2,620	$10,239,600	$12,659	$49,470,753
5	ANCHORAGE	169	$3,082	$520,872	$2,620	$442,808	$12,659	$2,139,344
6	SEATTLE	1,334	$3,082	$4,111,497	$2,620	$3,495,298	$12,659	$16,886,895
		======		==========		==========		===========
		18,559		$57,200,355		$48,627,620		$234,935,439

OBS	MEAN COST PER DU CATEG 4	PROJECT SPECIFIC (ISO 3,4&5) CATEG 4	MEAN COST PER DU CATEG 5	ENERGY (ISO 3,4&5) CATEG 5	MEAN COST PER DU CATEG 6	REQUIRED (ISO 3,4&5) CATEG 6	MEAN COST PER DU CATEG 7	CURRENTLY PROHIBITED CATEG 7
1	$1,317	$4,169,165	$200	$633,813	$263	$833,916	$2,036	$6,443,814
2	$1,317	$3,837,212	$200	$583,349	$263	$767,519	$2,036	$5,930,752
3	$1,317	$9,313,110	$200	$1,415,817	$263	$1,862,808	$2,036	$14,394,238
4	$1,317	$5,147,897	$200	$782,604	$263	$1,029,682	$2,036	$7,956,532
5	$1,317	$222,619	$200	$33,843	$263	$44,528	$2,036	$344,077
6	$1,317	$1,757,240	$200	$267,143	$263	$351,483	$2,036	$2,715,971
		==========		==========		==========		==========
		$24,447,244		$3,716,570		$4,889,936		$37,785,385

OBS	MEAN COST PER DU CATEG 8	HANDICAPPED (ALL ISO) CATEG 8	MEAN COST PER DU CATEG 9	NO ISO CATEG 9	MEAN COST PER DU CATEG 10	OTHER ADDs CATEG 10	MEAN COST PER DU TOTAL	OIP RENTAL ADDs ESTIMATE TOTAL
1	$0	$0	$0	$0	$0	$0	$22,178	$70,193,548
2	$0	$0	$0	$0	$0	$0	$22,178	$64,604,678
3	$0	$0	$0	$0	$0	$0	$22,178	$156,798,859
4	$0	$0	$0	$0	$0	$0	$22,178	$86,671,844
5	$0	$0	$0	$0	$0	$0	$22,178	$3,748,092
6	$0	$0	$0	$0	$0	$0	$22,178	$29,585,527
		=		=				===========
		$0		$0		$0		$411,602,548

LEAD PAINT ABATEMENT

Exhibit I-12 presents Lead Paint Abatement Costs by Region and field office. Total national costs were allocated on the basis of the percentage of family units built prior to 1973. Data from the lead paint abatement research was used to allocate higher costs to the older units (pre 1951) than to the newer units.

Exhibit I-12

Lead Paint Abatement Costs
by Region and Field Office
Cost of Abatement for Family
Units Built Prior to 1973

Field Office	Field Office Abatement Costs	% Natl Family Units Built Prior to 1973	Region	Regional Abatement Costs	% Natl Family Units Built Prior to 1973
Boston	$12,904,568	2 89%			
Hartford	$6,923,501	1 55%			
Manchester	$1,835,109	0 41%			
Providence	$2,328,944	0 52%	I	$23,992,122	5 38%
Buffalo	$7,018,499	1 57%			
New York	$51,123,683	11 46%			
Newark	$19,026,623	4 27%			
San Juan	$27,239,375	6 11%	II	$104,408,180	23 41%
Baltimore	$7,969,227	1 79%			
Charleston	$1,624,003	0 36%			
Philadelphia	$22,102,730	4.96%			
Pittsburgh	$11,225,527	2 52%			
Richmond	$8,952,375	2 01%			
Washington	$7,424,123	1 66%	III	$59,297,985	13 30%
Atlanta	$23,563,880	5 28%			
Birmingham	$16,937,434	3 80%			
Columbia	$4,145,958	0 93%			
Greensboro	$12,786,198	2 87%			
Jackson	$4,328,414	0.97%			
Jacksonville	$14,331,037	3 21%			
Louisville	$9,140,107	2 05%			
Knoxville	$5,230,889	1 17%			
Nashville	$9,824,692	2 20%	IV	$123,720,548	22 49%
Chicago	$30,146,597	6 76%			
Cincinnati	$5,703,614	1 28%			
Cleveland	$10,492,690	2 35%			
Columbus	$2,986,387	0 67%			
Detroit	$8,551,274	1 92%			
Grand Rapids	$1,879,592	0 42%			
Indianapolis	$5,936,584	1 33%			
Milwaukee	$2,111,053	0 47%			
Minn/St Paul	$3,287,212	0 74%	V	$71,095,003	15 94%
Chicago Indian	$809,740	0 18%			
Dallas	$11,575,358	2 60%			
Houston	$3,848,903	0 86%			
Little Rock	$4,485,989	1 01%			
New Orleans	$14,567,777	3 27%			
Oklahoma City	$3,125,113	0 70%			
San Antonio	$8,561,076	1 92%	VI	$46,164,215	10 35%
Oklahoma City Indian	$1,307,345	0 29%			
Des Moines	$94,997	0 02%			
Kansas City	$3,768,230	0 84%			
Omaha	$1,225,919	0 27%			
St Louis	$4,146,712	0 93%	VII	$9,235,858	2 07%
Denver	$3,315,108	0 74%	VIII	$3,315,108	0 74%

Denver Indian	$1,881,099	0 42%			
Honolulu	$1,881,099	0 42%			
Los Angeles	$8,598,773	1 93%			
Phoenix	$1,730,310	0 39%			
Sacramento	$1,675,272	0 38%			
San Francisco	$8,622,899	1 93%	IX	$22,508,353	5 05%
San Francisco Indian	$2,006,255	0 45%			
Anchorage	$549,628	0 12%			
Portland	$1,289,250	0 29%			
Seattle	$3,861,720	0 87%	X	$5,700,598	1 28%
Anchorage Indian	$21,111	0 01%			
Seattle Indian	$164,361	0.04%			
National Totals	$452,189,910	101 39%			
Indian Totals	$6,189,910	1 39%			
Public Housing Total	$446,000,000	100 00%			

APPENDIX J

ADDs REQUESTS BY SYSTEM AND ISO

Exhibit J-1: Inspector Second Opinion by System

TABLE OF SYS BY SEC

SYS SYSTEM SEC INSPECTOR SECOND OPINION

FREQUENCY ROW PCT	NO ISO	1	2	3	4	5	7	TOTAL
ADD CANOPIES	9 3 08	90 30 82	99 33 90	41 14 04	24 8 22	29 9 93	0 0 00	292
ADD DECKS	2 8 70	0 0 00	10 43 48	6 26 09	0 0 00	5 21 74	0 0 00	23
HVY DUTY LOCK SE	7 0 81	336 38 89	374 43 29	92 10 65	38 4 40	17 1 97	0 0 00	864
METAL DOOR & FRA	8 1 07	266 35 61	264 35 34	145 19 41	46 6 16	18 2 41	0 0 00	747
PORCHES	0 0 00	17 14 91	27 23 68	29 25 44	28 24 56	13 11 40	0 0 00	114
STORM/SCREEN DOO	1 0 16	270 44 26	167 27 38	65 10 66	37 6 07	70 11 48	0 0 00	610
VESTIBULE	0 0 00	37 38 54	36 37 50	12 12 50	10 10 42	1 1 04	0 0 00	96
BASEMENT DOORS	21 2 42	271 31 22	327 37 67	132 15 21	76 8 76	41 4 72	0 0 00	868
EXT WALL INSULAT	8 1 16	328 47 61	218 31 64	116 16 84	19 2 76	0 0 00	0 0 00	689
EXT WALL EXP JOI	0 0 00	21 33 33	15 23 81	21 33 33	6 9 52	0 0 00	0 0 00	63
EXT WALL MAT'L	8 3 70	75 34 72	49 22 69	39 18 06	32 14 81	12 5 56	1 0 46	216
CRAWL SPACE INSU	5 2 54	85 43 15	73 37 06	25 12 69	9 4 57	0 0 00	0 0 00	197
ADD GUTTER/LEADE	10 2 10	211 44 23	140 29 35	62 13 00	25 5 24	29 6 08	0 0 00	477
ADD ROOF INSULAT	15 3 95	150 39 47	113 29 74	91 23 95	11 2 89	0 0 00	0 0 00	380
TOTAL (CONTINUED)	380	10615	8255	4941	1989	1489	13	27682

Exhibit J-1: Inspector Second Opinion by System (continued)

TABLE OF SYS BY SEC

SYS SYSTEM SEC INSPECTOR SECOND OPINION

FREQUENCY ROW PCT	NO ISO	1	2	3	4	5	7	TOTAL
ADD FLUE LINERS	0 0 00	20 22 99	13 14 94	45 51 72	4 4 60	5 5 75	0 0 00	87
ADD PITCHED ROOF	3 1 49	27 13 43	68 33 83	86 42 79	7 3 48	10 4 98	0 0 00	201
REPLACE ROOF COV	4 1 35	55 18 58	87 29 39	75 25 34	29 9 80	46 15 54	0 0 00	296
SMOKE VENT SYSTE	0 0 00	0 0 00	6 50 00	6 50 00	0 0 00	0 0 00	0 0 00	12
WINDOWS (NRG EFF	12 1 14	649 61 40	198 18 73	83 7 85	48 4 54	67 6 34	0 0 00	1057
STORM/SCREEN WIN	2 0 50	183 45 30	117 28 96	25 6 19	45 11 14	32 7 92	0 0 00	404
SCREENS ONLY	3 1 66	72 39 78	42 23 20	30 16 57	4 2.21	30 16 57	0 0 00	181
UNBRKABL GLAZING	3 3 23	34 36 56	25 26 88	22 23 66	7 7 53	2 2 15	0 0 00	93
SHOWERS IN TUBS	5 1 17	253 59 25	97 22 72	50 11 71	15 3 51	7 1 64	0 0 00	427
ADD VANITY	5 1 14	142 32 49	147 33 64	74 16 93	51 11 67	18 4 12	0 0 00	437
BATH FLOOR FINIS	3 1 50	52 26 00	68 34 00	38 19 00	26 13 00	12 6 00	1 0 50	200
BATH WALL COVER	5 2 62	44 23 04	62 32 46	43 22 51	24 12 57	13 6 81	0 0 00	191
EMERG CALL SYS	2 1 18	98 57 65	34 20 00	16 9 41	4 2 35	16 9 41	0 0 00	170
SINGLE ROOM A/C	2 1 50	48 36 09	51 38 35	25 18 80	7 5 26	0 0 00	0 0 00	133
TOTAL (CONTINUED)	380	10615	8255	4941	1989	1489	13	27682

Exhibit J-1: Inspector Second Opinion by System (continued)

TABLE OF SYS BY SEC

SYS SYSTEM SEC INSPECTOR SECOND OPINION

FREQUENCY ROW PCT	NO ISO	1	2	3	4	5	7	TOTAL
AC SLEEVE/ELEC S	1	58	86	42	7	8	0	202
	0 50	28 71	42 57	20 79	3 47	3 96	0 00	
RADIATOR VALVES	3	111	45	34	3	3	0	199
	1 51	55 78	22 61	17 09	1 51	1 51	0 00	
CABINET/COUNTERT	0	61	56	35	14	5	0	171
	0 00	35 67	32 75	20 47	8 19	2 92	0 00	
UPGRADE SINK/CAB	13	312	280	125	89	29	0	848
	1 53	36 79	33 02	14 74	10 50	3 42	0 00	
KITCH STOVES	16	205	266	198	96	31	0	812
	1 97	25 25	32 76	24 38	11 82	3 82	0 00	
WOOD STOVE	0	0	0	0	0	4	0	4
	0 00	0 00	0 00	0 00	0 00	100 00	0 00	
KITCH REFRIG	7	160	234	224	128	25	0	778
	0 90	20 57	30 08	28 79	16 45	3 21	0 00	
KIT FLOOR FINISH	0	98	93	69	61	61	0	382
	0 00	25 65	24 35	18 06	15 97	15 97	0 00	
KITCH WALL COVER	3	52	34	30	21	15	0	155
	1 94	33 55	21 94	19 35	13 55	9 68	0 00	
DISPOSAL	0	16	39	25	23	6	0	109
	0 00	14 68	35 78	22 94	21 10	5 50	0 00	
LAUNDRY HOOKUPS	1	161	93	45	41	5	0	346
	0 29	46 53	26 88	13 01	11 85	1 45	0 00	
CLOSET SPACE	0	48	46	23	3	7	0	127
	0 00	37 80	36 22	18 11	2 36	5 51	0 00	
EXT SHED	3	39	77	54	35	14	0	222
	1 35	17 5[illegible]	34 68	24 32	15 77	6 31	0 00	
BED FLOOR FINISH	2	98	90	91	53	79	0	413
	0 48	23 73	21 79	22 03	12 83	19 13	0 00	
TOTAL (CONTINUED)	380	10615	8255	4941	1989	1489	13	27682

Exhibit J-1: Inspector Second Opinion by System (continued)

TABLE OF SYS BY SEC

SYS SYSTEM SEC INSPECTOR SECOND OPINION

FREQUENCY ROW PCT	NO ISO	1	2	3	4	5	7	TOTAL
OTH FLOOR FINISH	2 0 46	92 21 05	107 24 49	93 21 28	59 13 50	84 19 22	0 0 00	437
BED WALL COVER	0 0 00	29 29 59	17 17 35	11 11 22	23 23 47	18 18 37	0 0 00	98
OTH WALL COVER	1 0 89	30 26 79	23 20 54	15 13 39	18 16 07	25 22 32	0 0 00	112
FIRE ESCAPE	0 0 00	65 57 52	27 23 89	6 5 31	0 0 00	15 13 27	0 0 00	113
EGRESS STAIRS	2 5 41	6 16 22	9 24 32	15 40 54	0 0 00	5 13 51	0 0 00	37
FIRE EXTINGUISHE	13 3 94	215 65 15	50 15 15	37 11 21	9 2 73	6 1 82	0 0 00	330
FIRE PUMPS	0 0 00	18 60 00	5 16 67	5 16 67	0 0 00	2 6 67	0 0 00	30
SPRINKLER STANDP	1 0 84	54 45 38	20 16 81	19 15 97	8 6 72	17 14 29	0 0 00	119
STANDPIPE SYSTEM	0 0 00	10 90 91	0 0 00	1 9 09	0 0 00	0 0 00	0 0 00	11
FIRE ALARM	0 0 00	247 66 04	70 18 72	28 7 49	24 6 42	5 1 34	0 0 00	374
SMOKE DETECTORS	1 0 29	260 76 47	32 9 41	20 5 88	2 0 59	25 7 35	0 0 00	340
SMOKE/VENT CONTR	0 0 00	76 48 41	51 32 48	21 13 38	7 4 46	2 1 27	0 0 00	157
SMOKE HATCHES	0 0 00	16 42 11	9 23 68	13 34 21	0 0 00	0 0 00	0 0 00	38
SIGNAL/COMM	1 0 38	103 39 02	86 32 58	42 15 91	13 4 92	19 7 20	0 0 00	264
TOTAL (CONTINUED)	380	10615	8255	4941	1989	1489	13	27682

Exhibit J-1: Inspector Second Opinion by System (continued)

TABLE OF SYS BY SEC

SYS SYSTEM SEC INSPECTOR SECOND OPINION

FREQUENCY ROW PCT	NO ISO	1	2	3	4	5	7	TOTAL
SECURITY DEVICES	0 0 00	182 42 52	150 35 05	73 17 06	17 3 97	6 1 40	0 0 00	428
BLOCKUP WINDOWS	0 0 00	43 36 13	58 48 74	14 11 76	0 0 00	4 3 36	0 0 00	119
CHILD GUARDS	0 0 00	54 51 92	30 28 85	20 19 23	0 0 00	0 0 00	0 0 00	104
TV SURVEILLANCE	0 0 00	2 28 57	3 42 86	2 28 57	0 0 00	0 0 00	0 0 00	7
ASBESTOS REMOVAL	2 2 90	33 47 83	12 17 39	21 30 43	1 1 45	0 0 00	0 0 00	69
LOBBY FLOOR FINI	0 0 00	10 24 39	12 29 27	4 9 76	7 17 07	8 19 51	0 0 00	41
STAIR FLOOR FINI	3 5 08	25 42 37	9 15 25	6 10 17	7 11 86	6 10 17	3 5 08	59
INTERIOR RAILS	0 0 00	51 62 20	23 28 05	6 7 32	1 1 22	1 1 22	0 0 00	82
PUBLIC RESTROOMS	0 0 00	30 42 86	12 17 14	18 25 71	7 10 00	3 4 29	0 0 00	70
LOBBY WALL COVER	1 4 00	3 12 00	4 16 00	5 20 00	9 36 00	3 12 00	0 0 00	25
STAIR WALL COVER	1 4 35	1 4 35	2 8 70	3 13 04	7 30 43	9 39 13	0 0 00	23
CHG SKIP STOP EL	0 0 00	16 39 02	6 14 63	15 36 59	0 0 00	4 9 76	0 0 00	41
CHG UP OUT/DOWN	0 0 00	3 11 54	2 7 69	17 65 38	0 0 00	4 15 38	0 0 00	26
CHG ELEV CAB MAT	0 0 00	39 39 39	38 38 38	17 17 17	0 0 00	5 5 05	0 0 00	99
TOTAL (CONTINUED)	380	10615	8255	4941	1989	1489	13	27682

Exhibit J-1: Inspector Second Opinion by System (continued)

TABLE OF SYS BY SEC

SYS SYSTEM SEC INSPECTOR SECOND OPINION

FREQUENCY ROW PCT	NO ISO	1	2	3	4	5	7	TOTAL
CHG ELEV DOOR TY	1 2 22	2 4 44	8 17 78	26 57 78	0 0 00	8 17 78	0 0 00	45
ADD ELEVATORS	0 0 00	5 16 67	8 26 67	9 30 00	4 13 33	4 13 33	0 0 00	30
BATT EMERG LTS	1 0 49	113 55 67	33 16 26	15 7 39	24 11 82	17 8 37	0 0 00	203
EMERG LTS/POWER	1 1 27	49 62 03	15 18 99	6 7 59	2 2 53	6 7 59	0 0 00	79
MECH RM EXHAUST	3 2 19	66 48 18	30 21 90	33 24 09	0 0 00	5 3 65	0 0 00	137
EXT ENTRY LTS	0 0 00	146 53 09	67 24 36	30 10 91	3 1 09	29 10 55	0 0 00	275
BLDG MNT SITE LT	8 1 66	292 60 46	121 25 05	42 8 70	19 3 93	1 0 21	0 0 00	483
POLE MNT SITE LT	10 4 63	104 48 15	65 30 09	24 11 11	9 4 17	4 1 85	0 0 00	216
OUTSIDE LIGHTS	1 0 36	103 36 79	132 47 14	23 8 21	12 4 29	9 3 21	0 0 00	280
BLDG MNT LTS	3 1 36	84 38 18	67 30 45	33 15 00	7 3 18	21 9 55	5 2 27	220
COMMON AREA LTS	0 0 00	108 41 70	62 23 94	57 22 01	11 4 25	21 8 11	0 0 00	259
POLE MNT LTS	1 1 02	38 38 78	34 34 69	20 20 41	5 5 10	0 0 00	0 0 00	98
MASTER TV DIST	5 1 47	23 6 74	75 21 99	154 45 16	51 14 96	33 9 68	0 0 00	341
SITE ELECT UPGRA	21 1 74	438 36 26	378 31 29	274 22 68	50 4 14	47 3 89	0 0 00	1208
TOTAL (CONTINUED)	380	10615	8255	4941	1989	1489	13	27682

Exhibit J-1: Inspector Second Opinion by System (continued)

TABLE OF SYS BY SEC

SYS SYSTEM SEC INSPECTOR SECOND OPINION

FREQUENCY ROW PCT	NO ISO	1	2	3	4	5	7	TOTAL
DU ELECT UPGRADE	21 5 12	150 36 59	112 27 32	105 25 61	15 3 66	7 1 71	0 0 00	410
BLDG/DU CIRCUIT	0 0 00	69 55 65	17 13 71	26 20 97	3 2 42	9 7 26	0 0 00	124
CHG SERVICE PANE	1 4 35	8 34 78	3 13 04	7 30 43	4 17 39	0 0 00	0 0 00	23
MUNIC WATER	0 0 00	9 23 68	15 39 47	14 36 84	0 0 00	0 0 00	0 0 00	38
DIST CATH PROTEC	1 1 45	25 36 23	25 36 23	17 24 64	1 1 45	0 0 00	0 0 00	69
WASTE CATH PROTC	0 0 00	11 35 48	10 32 26	9 29 03	1 3 23	0 0 00	0 0 00	31
STANDALONE TANKS	0 0 00	9 23 08	11 28 21	9 23 08	0 0 00	10 25 64	0 0 00	39
DU HW SYSTEM	0 0 00	19 30 65	18 29 03	11 17 74	2 3 23	12 19 35	0 0 00	62
BLDG HW SYSTEM	0 0 00	13 22 81	20 35 09	15 26 32	6 10 53	3 5 26	0 0 00	57
MORE HW	0 0 00	8 17 39	14 30 43	23 50 00	1 2 17	0 0 00	0 0 00	46
MORE SEPTIC CAPA	0 0 00	54 53 47	31 30 69	14 13 86	0 0 00	2 1 98	0 0 00	101
MORE PIPE CAPACI	1 0 50	82 41 00	64 32 00	53 26 50	0 0 00	0 0 00	0 0 00	200
MUNIC SEWER	0 0 00	0 0 00	1 50 00	1 50 00	0 0 00	0 0 00	0 0 00	2
SEP STRM/SWR SYS	0 0 00	3 60 00	0 0 00	2 40 00	0 0 00	0 0 00	0 0 00	5
TOTAL (CONTINUED)	380	10615	8255	4941	1989	1489	13	27682

Exhibit J-1: Inspector Second Opinion by System (continued)

TABLE OF SYS BY SEC

SYS SYSTEM SEC INSPECTOR SECOND OPINION

FREQUENCY / ROW PCT	NO ISO	1	2	3	4	5	7	TOTAL
H2O COND EQUIP	2 3 17	8 12 70	17 26 98	34 53 97	2 3 17	0 0 00	0 0 00	63
CENT AC (COMMON	0 0 00	13 24 53	16 30 19	7 13 21	12 22 64	5 9 43	0 0 00	53
ASBESTOS RMVL PI	0 0 00	10 47 62	6 28 57	5 23 81	0 0 00	0 0 00	0 0 00	21
BLOWDOWN/WTR TRE	1 8 33	0 0 00	6 50 00	3 25 00	0 0 00	2 16 67	0 0 00	12
WTR TREATMENT	0 0 00	4 16 00	6 24 00	13 52 00	0 0 00	2 8 00	0 0 00	25
FLUE DAMPER	3 1 66	53 29 28	60 33 15	49 27 07	9 4 97	7 3 87	0 0 00	181
FLUE HEAT XCHNGR	0 0 00	7 13 46	16 30 77	25 48 08	0 0 00	2 3 85	2 3 85	52
DU HEAT SYSTEM	0 0 00	16 23 19	31 44 93	9 13 04	1 1 45	12 17 39	0 0 00	69
CENT BOILER UPGR	2 1 02	64 32 65	46 23 47	70 35 71	7 3 57	7 3 57	0 0 00	196
TEMP SETBACK CON	2 0 78	63 24 61	65 25 39	85 33 20	22 8 59	19 7 42	0 0 00	256
DAY CARE	1 1 12	37 41 57	41 46 07	7 7 87	1 1 12	2 2 25	0 0 00	89
COMMERCIAL	0 0 00	3 14 29	2 9 52	13 61 90	2 9 52	1 4 76	0 0 00	21
LAUNDRY	1 1 75	20 35 09	24 42 11	5 8 77	4 7 02	3 5 26	0 0 00	57
COMM/REC CTR	0 0 00	52 48 15	35 32 41	15 13 89	4 3 70	2 1 85	0 0 00	108
TOTAL (CONTINUED)	380	10615	8255	4941	1989	1489	13	27682

Exhibit J-1: Inspector Second Opinion by System (continued)

TABLE OF SYS BY SEC

SYS SYSTEM SEC INSPECTOR SECOND OPINION

FREQUENCY ROW PCT	NO ISO	1	2	3	4	5	7	TOTAL
TEEN CTR	1	22	13	5	2	0	0	43
	2 33	51 16	30 23	11 63	4 65	0 00	0 00	
CENT MAIL RM	0	19	12	18	5	4	0	58
	0 00	32 76	20 69	31 03	8 62	6 90	0 00	
MAIL KIOSKS	0	13	13	21	4	2	0	53
	0 00	24 53	24 53	39 62	7 55	3 77	0 00	
MAINT SHOP	1	62	66	22	19	6	0	176
	0 57	35 23	37 50	12 50	10 80	3 41	0 00	
OFFICES	0	27	44	22	10	2	0	105
	0 00	25 71	41 90	20 95	9 52	1 90	0 00	
HEALTH FACILS	0	29	27	12	1	1	0	70
	0 00	41 43	38 57	17 14	1 43	1 43	0 00	
CENTRAL COMPACTO	1	12	8	5	0	3	0	29
	3 45	41 38	27 59	17 24	0 00	10 34	0 00	
INCIN-COMPACTOR	3	41	33	25	4	7	0	113
	2 65	36 28	29 20	22 12	3 54	6 19	0 00	
TRASH ENCLOSURE	3	72	63	18	7	1	1	165
	1 82	43 64	38 18	10 91	4 24	0 61	0 61	
YRD FENCING	2	30	64	30	27	10	0	163
	1 23	18 40	39 26	18 40	16 56	6 13	0 00	
YRD LANDSCAPING	0	21	25	12	6	1	0	65
	0 00	32 31	38 46	18 46	9 23	1 54	0 00	
PERIMETER FENCE	1	29	72	34	15	17	0	168
	0 60	17 26	42 86	20 24	8 93	10 12	0 00	
LANDSCAPING	7	103	144	30	46	20	0	350
	2 00	29 43	41 14	8 57	13 14	5 71	0 00	
REMOVE PAVING	0	20	15	12	2	2	0	51
	0 00	39 22	29 41	23 53	3 92	3 92	0 00	
TOTAL (CONTINUED)	380	10615	8255	4941	1989	1489	13	27682

Exhibit J-1: Inspector Second Opinion by System (continued)

TABLE OF SYS BY SEC

SYS SYSTEM SEC INSPECTOR SECOND OPINION

FREQUENCY ROW PCT	NO ISO	1	2	3	4	5	7	TOTAL
SITE DRAINAGE	1 1 82	21 38 18	15 27 27	11 20 00	5 9 09	2 3 64	0 0 00	55
CARPORT	0 0 00	0 0 00	4 16 67	6 25 00	11 45 83	3 12 50	0 0 00	24
GARAGE	0 0 00	0 0 00	7 23 33	3 10 00	19 63 33	1 3 33	0 0 00	30
PARKING LOT	11 6 08	58 32 04	75 41 44	29 16 02	8 4 42	0 0 00	0 0 00	181
PAVE LOT	3 4 92	19 31 15	17 27 87	14 22 95	6 9 84	2 3 28	0 0 00	61
CURB LOT	3 3 13	33 34 38	31 32 29	17 17 71	11 11 46	1 1 04	0 0 00	96
DRAIN LOT	4 9 52	17 40 48	12 28 57	6 14 29	1 2 38	2 4 76	0 0 00	42
SIDEWALKS	3 2 17	54 39 13	36 26 09	20 14 49	17 12 32	8 5 80	0 0 00	138
PEDEST WALLS	0 0 00	3 27 27	2 18 18	5 45 45	1 9 09	0 0 00	0 0 00	11
PLAYGROUND	5 2 10	122 51 26	78 32 77	19 7 98	9 3 78	5 2 10	0 0 00	238
PLAY EQUIP	5 3 25	69 44 81	64 41 56	14 9 09	1 0 65	1 0 65	0 0 00	154
TOT LOT	5 2 86	91 52 00	57 32 57	17 9 71	3 1 71	2 1 14	0 0 00	175
TOT EQUIP	0 0 00	20 44 44	21 46 67	3 6 67	0 0 00	1 2 22	0 0 00	45
PLAY COURT	5 4 07	51 41 46	41 33 33	18 14 63	5 4 07	3 2 44	0 0 00	123
TOTAL (CONTINUED)	380	10615	8255	4941	1989	1489	13	27682

Exhibit J-1: Inspector Second Opinion by System (continued)

TABLE OF SYS BY SEC

SYS SYSTEM SEC INSPECTOR SECOND OPINION

FREQUENCY ROW PCT	NO ISO	1	2	3	4	5	7	TOTAL
COURT EQUIP	1 1 85	24 44 44	24 44 44	3 5 56	2 3 70	0 0 00	0 0 00	54
SITTING AREA	2 0 97	83 40 29	77 37 38	31 15 05	12 5 83	1 0 49	0 0 00	206
SITTING EQUIP	0 0 00	29 52 73	17 30 91	2 3 64	6 10 91	1 1 82	0 0 00	55
RETAINING WALL	1 1 25	36 45 00	24 30 00	11 13 75	2 2 50	6 7 50	0 0 00	80
PAVED ROADS	0 0 00	12 42 86	5 17 86	9 32 14	2 7 14	0 0 00	0 0 00	28
CURB ROADS	0 0 00	14 51 85	5 18 52	6 22 22	1 3 70	1 3 70	0 0 00	27
DRAIN ROADS	1 5 00	12 60 00	4 20 00	3 15 00	0 0 00	0 0 00	0 0 00	20
TOTAL	380	10615	8255	4941	1989	1489	13	27682

U.S. Department of Housing and Urban Development
Washington, D.C. 20410-0000

Official Business

HUD-1130-PDR
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EQUAL HOUSING OPPORTUNITY