

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



# Construction Cost Indices

## HUD Section 202 and 811 Supportive Housing Programs



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**CONSTRUCTION COST INDICES**

**HUD SECTION 202 AND 811  
SUPPORTIVE HOUSING PROGRAMS**

**Prepared for:**

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

**Prepared by:**

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and  
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The contents of this report are the views of the contractor and do not necessarily reflect the views or policies of the U.S. Department of Housing and Urban Development or the U.S. Government.

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## EXECUTIVE SUMMARY

The U.S. Department of Housing and Urban Development (HUD) commissioned the National Association of Homebuilders (NAHB) Research Center to do a cost evaluation of the Section 202 and Section 811 supportive housing programs. The legislatively stated purpose of the Section 202 program is to provide “Supportive Housing for the Elderly,” just as the purpose of the Section 811 program is to provide “Supportive Housing for Persons with Disabilities” (including Group Homes). HUD initiated a study of these programs because of concerns about the accuracy of the project development cost limits it was using for this program. The most significant concern was that the total development cost limits under this program were inadequate to fund all development costs for projects in at least some area, and that the need for program sponsors to find other sources of grant funding often resulted in significant project development delays. HUD was also concerned about whether the cost limits had a consistent relationship with actual development costs from area to area.

Major objectives of this research were to:

- Evaluate actual Section 202 and 811 Construction and Development Costs with major industry Construction Cost Indices.
- Analyze cost accounting and processing procedures to obtain the information needed to estimate costs on a per-unit, square footage, and elevator/non-elevator basis, with adjustments for local cost variations and accessibility costs.
- Determine accuracy of past indices used to adjust program costs limits, and determine if any available alternative cost index approach would better match actual local cost variations.
- Determine if any revision in current program cost limit relationships are needed.
- Identify the most appropriate construction cost index approach for use in annual updates of program cost limit, and recommend a cost model approach for estimating costs for future Section 202 and 811 projects.

For purposes of this study, information on all Section 202 and 811 projects completed between January 2000 and December of 2002 was sought. This included detailed information on the project site, location, number of dwelling units and bedrooms, structure type and characteristics, gross finished square footage, net residential rental square footage, estimated costs of structure, land, improvements, and total replacement costs. Detailed cost breakdowns and information on actual itemized costs for total structures, land improvements, fees, and all overhead costs were also obtained.

A database was created that included Section 202/811 development cost data and different available cost indices used to measure changes in costs. The Urban Consumer Price Index (CPI-U) is currently used to update HUD Section 202/811 cost limits. The other cost indices entered into the database were the National Association of Homebuilders’ Economic Council Index (BEC), the R.S. Means Residential

Construction Cost Index, the Craftsman National Construction Cost Estimator, and the Marshall and Swift Residential Cost Handbook. All but the CPI-U provide information on material and labor costs for different types of construction.

The HUD Section 202/811 High Cost Percentage (HCP) factors were also entered into the database. These are used to adjust statutory total development cost limits for higher local costs. The normal and HCP HUD cost limits include all construction costs, including land, and are therefore not directly comparable with construction cost indices that do not consider land. Use of a valid measure of construction costs, however, permits comparisons of project costs from area to area and with industry cost standards.

## Study Limitations

This study presents a detailed analysis of Section 202 and Section 811 program costs, comparative private market costs, and relationships between program costs, private market cost data, and HUD cost limits. Of the alternatives examined, the R.S. Means Index, which is heavily relied upon for costing in the private sector and provides detailed locality cost adjustments, was found to have the best fit with actual program costs. A cost model was derived using actual program costs and the R.S. Means Index, but both the cost model and other findings in this study are subject to three major caveats:

- *There are no clear program guidelines for non-rental space.* For purposes of the cost model developed, a national average assumption was used. Actual regional HUD office practices vary widely in terms of what is permitted in the Section 202 program. This is an even more significant and complex issue for the Section 811 program, where non-rental space used to provide meals and services often significantly enhanced the ability of the project to meet the needs of its disabled population but also increased its costs.
- *Land costs were not included in the analysis or in the Cost Model.* Land costs were highly variable from area-to-area as well as within areas. A model-based approach to accurately estimating land costs with available data was not considered feasible.

In practice, land was found to have been donated for nearly all projects. This finding, however, may be due to the fact that land needs to be donated to make most projects feasible, which constrains the types and locations of projects likely to be developed. About 75% of the projects studied had a land value equal to or less than 15% of the Development Cost. In areas where land prices are highly variable and location-sensitive, as is the case with most large metropolitan areas, there is no reasonable way to model land costs in a manner that accurately reflects the potential variations likely to occur.

- *Section 811 project costs can only be roughly compared with each other or with cost index data because of “scoping differences” in project design that result in*

*differing relationships between bedrooms, bathrooms, kitchens, and common space that are not accurately captured by the HUD project data collection forms currently in use. As is noted, a method of calculating Section 811 cost limits is provided, but it is not recommended for use in the absence of changes that reflect explicit policy decisions on program design guidelines.*

## **Major Findings**

The current HUD approach to establishing development cost limits is to calculate the cost limit for any given project as the total number of units *times* the respective structure type/number of bedrooms limit *times* the area high cost percentage (if relevant). This figure is intended to cover all development costs, including land. The overall finding of this study is that neither the factors nor the fundamental approach used accurately reflect current actual development costs for the projects studied or for typical privately funded construction. More specifically, the findings of this study may be summarized as follows:

1. *Of the cost indexing approaches tested, the R.S. Means Index (Means) data had the highest correlation with HUD High Cost Percentage<sup>1</sup> (HCP) adjustments and with actual construction costs.* This index has been extensively used and relied on in the private sector for decades. Use of this index resulted in a measurably better statistical match with actual HUD program costs than the national Consumer Price Index-Urban (all items) approach currently used by HUD to update its construction cost and High Cost Percentage factors. R.S. Means Index values also can be used to convert local project construction costs into “normalized costs” (i.e., costs adjusted as if all projects were built in the same location with the same materials and labor rates). Project costs and costs per square foot were normalized using the Means index in many of the charts and tables presented in this report.
2. *Actual average costs for both Section 202 and 811 projects were generally below R.S. Means estimated per square foot costs (see Tables 4.1 and 4.2).* R.S. Means estimated that the per square foot cost of a normalized public housing project built to HUD standards was \$96.90 in 2003 dollars, as opposed to an actual average of \$87.46. The closest equivalent R.S. Means value for Section 811 is the \$114.00 per square foot estimate for “assisted living housing,” which compares with the actual program average of \$101.43. (The Section 811 costs include group home projects whose costs should have some correspondence with assisted living projects but which cannot be considered directly equivalent.) All other things being equal, these cost relationships imply that the average 202/811 project is of relatively modest construction.

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<sup>1</sup> There are national cost limits for Section 202/811 projects that are based on the number of units in the project, the number of bedrooms per unit, and structure type. High Cost Percentage (HCPs) adjustments are published for specified areas that are intended to adjust for above average development costs.



3. *Maximum HUD-allowed Section 202 costs per unit are, on average, approximately equal to R.S. Means estimated Total Construction and Development Costs, exclusive of land (see Table 4.5).* The only significant exceptions to this pattern were Anchorage, Greensboro, and Honolulu. HCPs for these areas were well in excess of construction costs. Land costs are included in the HUD costs per unit in this table but not in the R.S. Means costs, but this does not explain the magnitude of the differences.
4. *There were inconsistencies in the current HUD High Cost Percentage (HCP) indexing and other indices examined (see Chart 4.1).* Most HUD Office HCPs appeared to have a roughly equivalent relationship with R.S. Means values, Craftsman Index values, and HCPs normalized to Fort Worth levels. The Greensboro (NC), New York, and San Francisco HCPs, however, were much higher than suggested by the other indices.
5. *High cost projects reviewed at each Office had information that justified the added costs.* The relatively high cost projects examined had design features that explained their costs. For instance, most group homes were designed for special needs populations that required complete accessibility, including special ramps, porches, kitchens, and bathrooms. The highest cost 202 project examined was found to be on Nantucket Island, and had unusual additional materials, shipping, and labor costs associated with its construction. Low cost projects, especially low cost 811 projects, had “bare-bones” designs with rectangular-shaped buildings, little common space, and few amenities.
6. *There were large variations in actual project costs within and between offices, and significant differences existed even after cost normalization.* Tables 4.1 and 4.2 provide information on the range of costs for the primary R.S. Means cost areas.
7. *There were large variations in total square footage per unit. These were most apparent between different HUD Multifamily Processing Center (HUB) Offices, which have a large say in what constitutes an acceptable project (see Table 4.3).* The average Honolulu Section 202 project studied had 38 percent more square footage per dwelling unit than the average for the second highest city, and 83 percent more than projects in San Antonio. The average Columbus (OH) Section 811 project had more than twice the square footage of the average Chicago project. The additional square footage may provide desired amenities and services, but the range of variation found appears high and suggests that local HUD offices have different policies with respect to these items.
8. *There was a lower than expected relationship between project square footage and costs per unit.* Projects with large average gross square feet (rental and non-rental square footage) tended to be the most expensive on a per unit basis, but project design and configurations also played an important role. Inconsistencies in the HCPs themselves, variations in what can be afforded, and

what additional funds are available probably explain why there is not a stronger relationship between project size and cost.

9. *Current HUD cost limits and High Cost Percentages force many projects to seek supplemental sources of funding before and after initial approval of the project. In many instances it was reported that this significantly lengthened total development time frames.* There were some exceptions, but information obtained in this study strongly indicates that most projects are dependent on supplemental funding and/or site donations to be feasible, which is consistent with the industry standard construction cost comparisons made. Program requirements essentially require that any additional funding needed has to be in the form of outright grants.
  
10. *If HUD wants to include land costs in this type of model, it may wish to allow for costs up to a specified percentage of total development costs (e.g., 15 percent).* A 15-percent allowance for land would not eliminate the need for land or other donations for above-average cost sites that might offer more amenities (e.g., better access to shopping, transportation, doctors), but would set a typical cost allowance. If, however, HUD intends to include the cost of land and cover all reasonable development costs with program grants, either most HCPs or basic cost limits need to be increased. Unusually expensive sites within a metropolitan area would, by definition, need to be donated or be permitted some form of cost exception process if funded by HUD. Also, use of this model implies that Section 202 projects with unusually large amounts of non-rental space would require supplemental funding.

## **Cost Model**

One of the objectives of this effort was to evaluate HUD's current cost estimation system and, if appropriate, recommend an alternative approach. Although program costs are generally reasonable, HCPs do not provide equivalent cost constraints in different parts of the country. Cost modeling should reflect industry standards to the extent possible, and not be subject to variations that make some regions more attractive to developers than others. A more reliable cost estimating and review process would assist in identifying high costs projects earlier, and facilitate changing the design, or obtaining agreement on the need for higher costs earlier in the approval process.

An easy to use, Excel-based Cost Model was developed for HUD use under this research effort. The user enters the type of project, construction start date, bedroom mix, and elevator/non-elevator characteristics. The model then calculates a cost estimate based on HUD guidelines for apartment rental square footage for different bedroom sizes. A program average ratio of 50 percent non-dwelling space was used to estimate total square footage as the basis for the cost estimate. Section 811 costs per unit are based on typical program cost relationships for the number of residents per unit and type of service population. In practice, the ratio of dwelling to non-dwelling space

varied significantly, but use of a standardized value (which can be easily changed in the model) is needed to achieve program consistency.

HUD should review and modify the assumptions in this Cost Model to reflect intended policies. The percentage or percentage range allowed for non-dwelling space is especially important. This model offers an opportunity to more equitably administer HUD's current average approved cost levels. In the absence of policy and procedural changes, the current system will continue to result in inconsistencies in application of project cost limits in different regions.

## **CHAPTER 1. INTRODUCTION**

### **SCOPE**

Based on the Statement of Work (SOW) for Task Order #1 of HUD Contract C-OPC-22168, the Contractor (NAHB Research Center, Inc.) collected and analyzed historical and certified cost data for HUD Sections 202 and 811 Support Housing Programs. Included are actual and allowed variations in construction and development costs for the two programs. In addition, consumer price indices, industry construction cost indices, high cost percentages (geographic locality factors), maximum capital advances, inflation factors, and HUB and Field Office processing procedures, were evaluated.

### **PURPOSE**

Objectives established in the SOW are to:

- Determine actual construction and development cost variations of the 202 and 811 programs from the Builder Economic Council (BEC) Index, Consumer Price Index (CPI-U), and alternative cost indices, such as R.S. Means, Marshall & Swift, and Craftsman,
- Analyze past cost accounting and processing procedures used for actual projects to determine more accurate comparisons in certified costs, based on geographic variations in projects of similar number of units, square footage area per unit, elevator or non-elevator, accessibility requirements, and other construction markers,
- Determine relevance of past indices used to adjust program cost limits with actual historical program costs, determine how regional or special area indices can be developed, and assess whether some indices more appropriately match actual cost variations than others, and
- Recommend effective Construction Cost Indices and Cost Models to be used by HUD for future 202 and 811 projects.

Final recommendations include consideration of adjustments to account for geographic locality costs, inflation, and other factors that may include accessibility requirements, environmental conditions, building code and standard provisions, seasonal conditions, hazard mitigation, and regulatory processes.

### **BACKGROUND**

HUD's Section 202, "Supportive Housing for the Elderly," and Section 811, "Supportive Housing for Persons with Disabilities" (including Group Homes), have permitted above average additional development charges in certain metropolitan areas since 1991 (the year the Capital Advance Program was established). Basic program cost limits, as well as special high cost area factors, have been used to update these base year limits.

These programs have relied on various cost and consumer price indices to adjust costs. However, actual "as-built" certified costs and cost variations have not been compared to these indices, or to other industry construction and development cost indices.

Capital advances are provided by HUD to finance construction, rehabilitation, or acquisition with or without rehabilitation, of structures that will serve as supportive housing for very low-income elderly persons, or for persons with disabilities. Rent subsidies are also provided for projects to help make them affordable.

HUD provides interest-free capital advances to private nonprofit sponsors and nonprofit consumer cooperatives to finance development of supportive housing. Annually, HUD publishes a Notice of Funding Availability (NOFA) in the Federal Register. This NOFA specifies the maximum capital advance and number of dwelling units authorized for each HUD Field Office jurisdiction.

Section 202 (12 USC 1701q) of the National Housing Act of 1959, requires the Secretary of HUD to periodically establish development cost limitations by market area. These are published by Notice in the Federal Register for various types and sizes of supportive housing for the elderly. The Statute also requires that the Secretary adjust the cost limits not less than annually to reflect changes in the general level of construction, reconstruction, or rehabilitation costs. HUD opted to comply with the statute for updating base limits annually by using changes in the overall Consumer Price Index – Urban (CPI-U).

Total development costs of a project attributable to dwelling use (less incremental development cost and capitalized operating costs associated with any excess amenities or design features the borrower must pay for) are annually adjusted by locality for each program, using the CPI-U. Also, maximum development costs per number of bedrooms per unit for elevator versus non-elevator structures are specified. Development cost limits for Group Homes under Section 811 are published annually, and categorized for either “Physical and/or Developmental” or “Chronic Mental Illness” disabled. These costs are based on the number of bedrooms in a dwelling unit.

HUD can increase development cost limits for a geographic area where construction cost levels justify an increase, or may provide increases on a project-by-project basis. For instance, increases may be permitted for additional costs to make dwelling units accessible through rehabilitation. If HUD finds that high construction costs make it infeasible to construct dwellings without sacrificing sound standards of construction, design, and livability, the capital advance can be increased to compensate for such costs. Developmental cost limits are published annually.

Cost limits set by HUD are intended to reflect those costs reasonable and necessary to develop a project of modest design that complies with HUD Minimum Property Standards (MPS), Accessibility Requirements in the Uniform Federal Accessibility Standards (UFAS), and appropriate Design and Cost Standards (24 CFR 891.120 and 891.210).

## CHAPTER 2. CERTIFIED DEVELOPMENT AND CONSTRUCTION COSTS

### GENERAL

NAHB Research Center Staff obtained from HUD representative samples of the following forms containing data applicable to Section 202 and 811 Programs:

- HUD-92264 – Multifamily Summary Appraisal Report
- HUD-92328 – Contractor's and/or Mortgagor's Cost Breakdown
- HUD-92330 – Mortgagor's Certificate of Actual Cost
- HUD-92330-A – Contractor's Certificate of Actual Cost

During the Kick-Off Meeting held on October 1, 2003, HUD Staff explained the purpose and contents of each form. In November 2003, HUD provided a listing of over 950 Section 202 and 811 projects processed by all HUB and Field Offices for construction completed after January 2000 and through December 2002.

Following the Kick-Off Meeting, HUD requested the respective HUB and Field Offices having responsibility for processing 202 and 811 projects, to submit completed copies of the four forms. During November and December 2003, forms for the majority of 202 and 811 projects were received by the Research Center. The information required for an analysis of development and construction costs was abstracted from the forms and entered into a database during December 2003 and January 2004. Detailed analysis of this data was conducted during February and March 2004.

In March and April 2004, research analysts from NAHB Research Center and Columbia Enterprises visited Philadelphia, Atlanta, and Boston HUB Offices to review Section 202 and 811 processing procedures. These site visits were also to review files for projects with very high and very low construction costs to document reasons for variations from HUB Area median costs. Responses to several other questions were documented, including those concerning: determination of HCPs, types of contracts used (Lump Sum or Cost Plus Fixed Fee), other sources of funds used, amendment requests, construction cost estimating methods, and typical number and size of bedrooms for 202 and 811 projects. See Appendix A for a summary of findings from the site visits.

### INFORMATION CONTAINED IN FORMS AND ENTERED IN DATABASE

**HUD-92264 – Rental Housing Project Income Analysis and Appraisal.** Project Number (Program Type and HUD Office Code), Location, Planned Number of Dwelling Units and Bedrooms, Type of Building and Structure, Gross Floor Area, Net Rentable Residential Area, and Estimated Costs of Structure, All Improvements, and Total Replacement.

**HUD-92328 – Contractor's and/or Mortgagor's Cost Breakdown (Schedules of Values).** Cost and Description of Trade Items (materials), and Total Cost of Improvements, including Builder's Overhead, Profit and Other Fees.

**HUD-92330 – Mortgagor's Certificate of Actual Cost.** Actual Cost to Owner of Labor and Materials, and necessary services for construction of physical improvements for Lump-Sum or Cost-Plus Construction Contracts.

**HUD-92330-A – Contractor’s Certificate of Actual Cost.** Actual Itemized Costs for Total Structures, Land Improvements, General Requirements, General Overhead, Bond Premium, and Other Fees. [Note: A Contractor’s Certificate of Actual Cost is not required for Lump-Sum Contracts]

## DESCRIPTION OF DATABASE

Below is a list of the fields entered into the database. Each of the forms was useful in providing project cost data for analysis. Form 92264 provided much of the background data needed to analyze each project.

<b>Form 92264 - Multifamily Summary Appraisal Report</b>	<b>Form 92328 - Contractor's or Mortgagor's Cost Breakdown</b>
Project No	Project Number
Section of Act	Author's Initials
Date	Date Entered
Type of Project	Project Name
Number of Stories	Project Type (202 or 811)
Foundation	Date
Proposed or Existing	Location
Number of Units	Total Structures
Number of Buildings	Total Land Improvements
Accessory Buildings and Area	General Requirements
Recreation Facilities and Area	Builder's Overhead
Dimensions	Builder's Profit
Year Built	Bond Premium
Structural System	Total for All Improvements
Floor System	Comments
Exterior Finish	<b>Form 92330 - Mortgagor's Certificate of Actual Costs</b>
Heating-AC System	Project No
Total SF or Gross Floor Area	Project Name
Total Structures	Date
Total Land Improvements	Amt Due under Lump-Sum Construction Contract
Main Buildings	Amount due under Cost-Plus Construction Contract
Other Buildings	Allowable Builder's Profit
General Requirements	Architect's Fee - Design
Builder's General Overhead	Architect's Fee - Supervisor
Builder's Profit	Architect's Fee - Additional Services
Bond Premium	Total
Other Fees	Comments
Architect Fee Design	<b>Form 92330A - Contractor's Certificate of Actual Cost</b>
Architect Fee Supervisor	Project No
Total for all Improvements	Project Name
Cost Per GSF	Date
Developer's Fee	Total Structures
Total Estimated Development Cost	Total Land Improvement
Total Estimated Replacement Cost	General Requirements
Zero Bedrooms	General Overhead
One Bedrooms	Bond Premium
Two Bedrooms	Total Costs
Other Number of Bedrooms	Comments
Comments	



## CHAPTER 3. CONSTRUCTION COST INDICES

Various construction cost indices were used to analyze and compare historical base dwelling unit costs to actual project costs. Information on the indices follows.

### HISTORICAL BASE DWELLING UNIT COSTS

Under the Capital Advance Program, an annual Notice of Funding Availability (NOFA) announces the amount of funds that are allocated to each HUB region around the country and each key or Base City. Qualified entities submit applications at the local level to compete for the allocated funding. The size of the capital advance that each candidate can expect to receive is governed by authorized “development costs” and “high cost percentages.” Originally, development costs were published in the enabling legislation. They were deleted from the legislation in 1996 and now appear in the annual NOFA. The “development cost limits” are set forth in a schedule that specifies the maximum dollar amount that can be authorized for individual units depending on the number of bedrooms in the unit and the presence or absence of elevators in the building. Periodically, the cost limits are reviewed and updated to increase the overall authorized cost limits. The Historical Base Dwelling Unit Costs shown in Table 3.1 identify the authorized maximum capital advance amount for each dwelling unit based on the number of bedrooms for elevator and non-elevator structures. HUD also determines High Cost Percentage (HCP) adjustments that are applied to these base costs.

**Table 3.1 Historical Base Dwelling Unit Cost Limits**

EFFECTIVE DATES	6/12/1991	2/26/1999	2/24/2000	1/22/2001	5/14/04
<b>Non-Elevator Basic Limit</b>					
<b>No. Bedrooms.</b>					
0	\$28,032	\$33,638	\$33,638	\$41,238	\$42,980
1	\$32,321	\$38,785	\$38,785	\$47,548	\$49,557
2	\$38,979	\$46,775	\$46,775	\$57,344	\$59,766
3	\$49,893	\$59,872	\$59,872	\$73,400	\$76,501
4+	\$55,583	\$66,700	\$66,700	\$81,770	\$85,225
<b>Elevator Basic Limit</b>					
<b>No. Bedrooms.</b>					
0	\$29,500	\$35,400	\$35,400	\$43,398	\$45,232
1	\$33,816	\$40,579	\$40,579	\$49,748	\$51,849
2	\$41,120	\$49,344	\$49,344	\$60,493	\$63,049
3	\$53,195	\$63,834	\$63,834	\$78,257	\$81,563
4+	\$58,392	\$70,070	\$70,070	\$85,902	\$89,531

## **HISTORICAL HIGH COST PERCENTAGES (HCP)**

The High Cost Percentage (HCP) is a factor that is used to convert an overall development cost limit, as discussed above, to a local development cost limit. For example, the 2004 HCP for Boston is 202 percent. The 2004 development cost limit for a one-bedroom unit in a non-elevator building is \$49,557. Multiplying \$49,557 by 202 percent yields a development cost limit for a one-bedroom unit in Boston of \$100,105. HUB directors can choose to exceed the HCP in computing cost limits, on a case-by-case basis, up to a statutory limit of 240 percent. HCPs for each HUB and Base City are updated and published annually. The HCPs for Capital Advance Programs in several locations from 1993 to 2004 are shown in Chart 4.3. Information on changes in HCPs during those years was used by HUD to adjust allowed costs for all Capital Advance projects.

## **NAHB BUILDER ECONOMIC COUNCIL INDEX (BEC)**

The Housing Market Index produced by the National Association of Home Builders (NAHB) was reviewed for use in this study. Statistics are derived from the NAHB Builders' Economic Council (BEC) Monthly Surveys, and represent ratings for current single-family sales, single-family sales in the next six months, and buyer traffic. Components are measured on scales of good/fair/poor; or high/average/low, and provide assessments from builders about general economic and housing market conditions. While these ratings are valuable in helping to track and predict housing market conditions, they do not correlate well with data we gathered for analysis of HUD Section 202 and 811 Cost Indices.

## **CONSUMER PRICE INDEX – URBAN (CPI-U)**

Table 3.2 lists the Annual Consumer Price Index (CPI-U) values for urban areas from 1993 to 2003, as well as related annual percentage changes over time. The significance of this index is that it was the basis for updating base dwelling unit costs and HCPs.

**Table 3.2 Census CPI-U Index**

<b>Year</b>	<b>Annual CPI-U</b>	<b>CPI-U Percentage Change</b>
1993	144.5	
1994	148.2	2.6%
1995	152.4	2.8%
1996	156.9	3.0%
1997	160.5	2.3%
1998	163.0	1.6%
1999	166.6	2.2%
2000	172.2	3.4%
2001	177.1	2.8%
2002	179.9	1.6%
2003	184.0	2.3%

## R. S. MEANS RESIDENTIAL COST DATA

**General.** The R. S. Means Company, Inc. publishes Residential Cost Data (Means). Data from the 2004 – 23rd Annual Edition was used in this study. This is a comprehensive and reliable source of current construction costs and productivity rates. It is intended for use by those involved with construction cost estimating, including contractors, owners, architects, engineers, and facilities managers. The cost data can also be used to develop preliminary project cost estimates, and to measure the impact of modifying materials, methods, and structure types on cost estimates.

**Contents.** Means Residential Cost Data contains material, labor, and equipment costs, arranged in the following sections: Square Foot Costs, Assembly Costs, and Unit Prices. Material prices are based on a “national average” obtained by contacting manufacturers, dealers, distributors, and contractors throughout the U.S. and Canada. Labor costs are based on a seven-region average of open shop wage rates, including overhead and profit markups. Local cost indices that adjust for the difference between the benchmark average national costs and local area costs are provided for all major metropolitan areas and states, arranged alphabetically and by zip code.

**Square Foot Cost Section.** This section contains costs per square foot for four classes of construction (economy, average, custom, or luxury) and seven building types (one-story to tri-level). Costs are listed for various exterior wall systems and sizes of Living Area, with modification, adjustment, and alternative multipliers.

**Assembly Cost Tables.** Tables for per unit costs of materials and installation are provided for all components of nine assemblies or systems, from Site Work through Electrical Systems.

**Unit Price Section.** Unit Price tables are provided for the Construction Specification Institute’s (CSI) 16 Master Format Divisions, with itemized costs for all components and materials.

**Evaluation.** The 2004 “Means Locality Cost Adjustment Factors” are shown in Table 3.3 for HUD Base Cities that have been assigned High Cost Percentages (HCP). This table also lists the 2004 HUD-HCPs, as well as the area modification factors from the 2004 Craftsman Cost Estimator. The HUD-HCPs were normalized to compare to the factors in these two cost estimating indices. Our analysis concluded that the Means Location Factors were statistically preferable to the Craftsman Cost Indices as a means of adjusting future HUD 202 and 811 Cost Indices, since it had a higher correlation with the HUD-HCP values.

**Table 3.3 Local Cost Adjustment Factors**

<b>Base City</b>	<b>2004 HUD HCP</b>	<b>2004 Means Index</b>	<b>HUD HCP Normalized to Means Index</b>	<b>2004 Craftsman Index</b>	<b>HUD HCP Normalized to Craftsman Index</b>
<b>Boston, MA HUB</b>	202%	115.0%	121.5%	116%	122%
Hartford, CT	205%	107.6%	123.3%	109%	124%
Bangor, ME (Portland)	164%	90.0%	98.7%	94%	99%
Manchester, NH	166%	93.7%	99.9%	102%	101%
Providence, RI	202%	104.6%	121.5%	110%	122%
Burlington, VT	153%	85.1%	92.1%	97%	93%
<b>Buffalo, NY HUB</b>	183%	101.9%	110.1%	108%	111%
Albany, NY	163%	97.0%	98.1%	106%	99%
<b>New York, NY HUB</b>	240%	134.0%	144.4%	126%	145%
<b>Philadelphia, PA HUB</b>	199%	112.1%	119.7%	109%	121%
Charleston, WV	159%	94.2%	95.7%	99%	96%
Camden, NJ (Trenton)	195%	108.4%	117.3%	108%	118%
Newark, NJ	211%	111.2%	127.0%	109%	128%
Pittsburgh, PA	167%	100.5%	100.5%	102%	101%
Wilmington, DE	184%	102.7%	110.7%	104%	112%
<b>Baltimore, MD HUB</b>	165%	91.4%	99.3%	100%	100%
Washington, DC	178%	95.2%	107.1%	102%	108%
Richmond, VA	149%	83.5%	89.7%	90%	90%
<b>Greensboro, NC (WN-SLM) HUB</b>	187%	75.3%	112.5%	83%	113%
Columbia, SC	159%	74.0%	95.7%	85%	96%
<b>Atlanta, GA HUB</b>	145%	89.7%	87.2%	99%	88%
Louisville, KY	156%	90.7%	93.9%	95%	95%
Knoxville, TN	137%	78.6%	82.4%	92%	83%
Memphis, TN	137%	86.7%	82.4%	93%	83%
Nashville, TN	141%	87.2%	84.8%	91%	85%
<b>Jacksonville, FL HUB</b>	140%	81.1%	84.2%	97%	85%
Birmingham, AL	140%	86.9%	84.2%	87%	85%
Jackson, MS	134%	74.7%	80.6%	86%	81%
Miami, FL	167%	87.1%	100.5%	94%	101%
Tampa, FL	160%	87.8%	96.3%	88%	97%
<b>Chicago, IL HUB</b>	204%	112.5%	122.7%	112%	124%
Springfield, IL	175%	98.3%	105.3%	106%	106%
Indianapolis, IN	158%	94.3%	95.1%	103%	96%
<b>Columbus, OH HUB</b>	151%	95.2%	90.9%	101%	92%
Cleveland, OH	170%	102.2%	102.3%	103%	103%
Cincinnati, OH	153%	84.0%	92.1%	100%	93%
<b>Detroit, MI HUB</b>	179%	107.2%	107.7%	106%	108%
Grand Rapids, MI	151%	85.0%	90.9%	107%	92%
<b>Minneapolis, MN HUB</b>	189%	113.4%	113.7%	109%	115%
Milwaukee, WI	182%	100.7%	109.5%	104%	110%
<b>Fort Worth, TX HUB</b>	138%	81.6%	83.0%	95%	84%
Little Rock, AR	128%	81.6%	77.0%	88%	78%
New Orleans, LA	136%	86.0%	81.8%	101%	82%
Shreveport, LA	130%	79.6%	78.2%	94%	79%
Albuquerque, NM	130%	89.3%	78.2%	96%	79%

**Table 3.3 Local Cost Adjustment Factors (cont.)**

<b>Base City (cont.)</b>	<b>2004 HUD HCP</b>	<b>2004 Means Index</b>	<b>HUD HCP Normalized to Means Index</b>	<b>2004 Craftsman Index</b>	<b>HUD HCP Normalized to Craftsman Index</b>
<b>Kansas City, MO HUB</b>	165%	102.0%	99.3%	101%	100%
Des Moines, IA	142%	91.7%	85.4%	101%	86%
Topeka, KS	142%	84.0%	85.4%	95%	86%
St. Louis, MO	180%	102.2%	108.3%	105%	109%
Omaha, NE	154%	90.0%	92.7%	92%	93%
Oklahoma City, OK	134%	82.5%	80.6%	93%	81%
Tulsa, OK	133%	80.8%	80.0%	92%	81%
<b>Denver, CO HUB</b>	185%	95.8%	111.3%	100%	112%
Helena, MT	136%	88.3%	81.8%	101%	82%
Fargo, ND	129%	85.2%	77.6%	96%	78%
Sioux Falls, SD	133%	80.8%	80.0%	90%	81%
Salt Lake City, UT	148%	88.9%	89.0%	92%	90%
Casper, WY	125%	81.5%	75.2%	88%	76%
<b>Los Angeles, CA HUB</b>	194%	108.3%	116.7%	114%	118%
Santa Ana, CA (L.A.)	194%	104.4%	116.7%	113%	118%
San Diego, CA	201%	104.7%	120.9%	110%	122%
<b>San Francisco, CA HUB</b>	240%	123.6%	144.4%	124%	145%
Phoenix, AZ	148%	87.9%	89.0%	99%	90%
Sacramento, CA	197%	111.1%	118.5%	110%	119%
Reno, NV	164%	98.5%	98.7%	104%	99%
<b>Seattle, WA HUB</b>	190%	104.1%	114.3%	108%	115%
Boise, ID	138%	92.1%	83.0%	94%	84%
Portland, OR	175%	104.0%	105.3%	106%	106%
Spokane, WA	151%	96.3%	90.9%	110%	92%

## **CRAFTSMAN NATIONAL CONSTRUCTION COST ESTIMATOR**

**General.** The Craftsman Book Company publishes the National Construction Cost Estimator (Craftsman). The 2004 - 52<sup>nd</sup> Annual Edition, referenced herein, was edited by Dave Ogershok and Richard Pray. It is an encyclopedia of estimated construction costs obtained from contractors, subcontractors, architectural and engineering firms, material suppliers, material price services, mail and phone surveys, and several national estimating databases.

**Contents.** The Craftsman cost estimator contains current building costs for residential, commercial, and industrial construction, and estimated prices for every common building material. Also included are estimated labor hours, recommended crews, and installation labor costs. Contractor overhead and profit are not included, although suggested contractor markups to cover contingencies, overhead, and profit are provided, as well as subcontractor markups. A list of "Craft Codes," with appropriate "Cost Per Man-Hour" and "Crew Composition," is provided to enable preparation of labor costs for projects.

**Area Modification Factors.** Percentage adjustment factors were compiled from actual construction costs for residential, institutional, and commercial buildings in over 400 communities throughout the United States. Construction costs for individual projects in various metropolitan areas and states can then be adjusted by using these Area Modification Factors.

**Evaluation.** The 2004 Craftsman Area Modification Factors are also shown in Table 3.3 for HUD Base Cities assigned High Cost Percentages (HCP). As shown in this table, Craftsman Cost Indices were compared to Means Cost Indices. We concluded that the Means Cost Indices provided a more conceptually valid approach to meeting the objectives of the HUD-HCPs, and also resulted in higher correlations with actual HUD costs and HCP values. Therefore, the Means Location Factors are recommended for adjustment of future HUD 202 and 811 Cost Indices.

## **MARSHALL & SWIFT RESIDENTIAL COST HANDBOOK (M&S)**

**General.** The M&S Handbook is generally used to estimate replacement costs for single or multifamily residences, and was developed for Appraisers, Assessors, Adjusters, Architects, and Realtors. Current Cost Multipliers are provided for either Frame or Masonry Construction in Eastern, Central, or Western Zones. Local Multipliers for either Frame or Masonry Construction are provided for most metropolitan areas throughout the U.S. and Canada. Multipliers are updated quarterly. Two methods of estimating total replacement costs are provided: Square Foot Method, and Segregated Method.

**Square Foot Method.** Based on square footage area of a residence, with a minimal number of adjustments from a basic residence cost table, a replacement cost can be estimated. Residences are generally categorized as site-built or manufactured, and tables are provided for stud-framed walls with various exterior finishes, or masonry walls, including concrete. Separate tables are provided for One-Story, Two-Story Bi-Level, Two-Story, One and One-Half Story, and Split-Level; and for Basements, Porches, Breezeways, and Garages. There are adjustment factors for roofing materials, and for energy and foundation costs in various climates. Separate sections are provided for Low, Fair, Average, Good, Very Good, and Excellent Quality construction.

**Segregated Cost Method.** This method considers the estimated replacement costs for major building components for most types of residence. It can also be used for unique building types not included in Square Foot Method. Basic units of measure are used, which requires measurement of floor area, excavation volume, wall area and perimeter length, porch and balcony areas, and any dormer face lengths. Cost tables for the following Components are included: Foundations, Basement Foundations, Basement Floors and Interior Framing, Floor Structures, Floor Covers, Exterior Walls, Ceilings, Roofs, Interior Construction, Heating and Cooling, Electrical, Plumbing, Fireplaces, Built-In Appliances, Porches, Carports, and Garages. This method is suitable for use by Appraisers and Estimators.

**Evaluation.** The M&S Residential Cost Handbook is an excellent tool to estimate replacement costs. It also provides an alternative means of estimating relative construction and development costs. However, our conclusion is that it is not as effective as Means for developing and updating an overall cost model for 202 and 811 projects. Therefore, an analysis was not conducted to determine actual 202 and 811 construction and development cost variations from those obtained from M & S.

## CHAPTER 4. VARIATIONS ANALYSES

### GENERAL

The Project Team gathered field data on 871 new construction projects throughout the nation (retrofit projects from the original list of 950 projects were excluded). Upon analysis we found that 544 of these projects had complete project cost data, and could be included in our analysis. Of these, 338 projects were under the “202 Program” and 206 were under the “811 Program.”

### GEOGRAPHIC AREAS

**Analysis Methodology.** The actual cost data for different areas cannot be considered directly comparable because of known, and often significant, differences in local construction costs. In order to permit comparative analysis of the costs of construction for HUD projects for which data was collected, it was necessary to “normalize” actual square foot costs to a standardized level using “Means Locality Cost Adjustment Factors.” We began this process by determining the zip code for the city or town for each project. From the zip code we were able to identify a Means Area Cost Factor. Costs were divided by this factor to provide an equivalent national average cost. Each project could then be directly compared to each other once all costs were normalized in this manner.

**Section 202 Costs.** Additionally, we decided that we should compare costs on a per-square-foot basis as well as on a per-dwelling-unit basis. Table 4.1 shows the normalized cost per square foot for the Section 202 Construction Program. The first column shows the field office code. The “Avg. Bldg Cost” column is the structure cost only, with no land or site costs included. The “Avg. Total Improvement Cost” shows the actual improvement cost, without land cost. The last four columns show the highest and lowest project costs in each category within each field office.

Means provides a total average development cost estimate for Public Housing (low rise) developments of \$96.90 per square foot (in 2003 dollars) or \$84,000 per dwelling unit (DU). Public Housing and Section 202 construction standards and quality should be very similar for similar structure types. From Table 4.1, it is apparent that the average costs per square foot of the Section 202 Program are approximately 9% under the Means estimate. However, South Carolina, Mississippi, Puerto Rico, San Francisco, and Alaska all have average normalized costs that exceed the Means estimate. Additionally, most field offices have individual projects that exceed the Means estimate.



**Table 4.1**  
**Section 202 Construction Costs**  
**Actual Costs Per Square Foot by R.S. Means Regions**

Region	State	Costs Normalized with R.S. Means Locality Cost Adjustment Factors						
		No. Projects	Avg. Bldg. Cost	Avg. Total Cost	Highest Bldg. Cost	Highest Total Cost	Lowest Bldg. Cost	Lowest Total Cost
<b>ALL</b>		<b>338</b>	<b>\$61.99</b>	<b>\$88.12</b>	\$115.10	\$162.32	\$34.82	\$48.10
<b>01</b>		<b>47</b>	<b>\$62.49</b>	<b>\$89.80</b>				
012	NY	23	\$61.92	\$86.17	\$72.68	\$98.10	\$58.62	\$79.71
014	NY	11	\$60.63	\$85.14	\$61.79	\$90.18	\$56.26	\$75.64
016	RI	5	\$59.61	\$83.67	\$70.36	\$101.80	\$53.97	\$77.61
017	CT	8	\$68.48	\$110.46	\$81.08	\$155.77	\$58.04	\$82.27
<b>02</b>		<b>15</b>	<b>\$63.06</b>	<b>\$93.98</b>				
023	MA	5	\$64.89	\$88.17	\$78.60	\$104.79	\$56.50	\$77.62
024	NH/ME	10	\$62.15	\$96.88	\$75.07	\$116.29	\$56.62	\$80.71
<b>03</b>		<b>27</b>	<b>\$66.27</b>	<b>\$89.10</b>				
031	NJ	5	\$63.27	\$84.74	\$81.09	\$104.16	\$57.16	\$78.18
033	PA	7	\$59.72	\$79.42	\$69.97	\$87.05	\$55.47	\$73.09
034	PA	11	\$71.44	\$95.55	\$95.76	\$123.03	\$48.53	\$71.63
035	NJ	4	\$67.29	\$93.76	\$71.63	\$99.89	\$60.28	\$83.45
<b>04</b>		<b>36</b>	<b>\$58.11</b>	<b>\$80.76</b>				
042	OH	11	\$60.88	\$81.18	\$68.20	\$94.70	\$57.13	\$74.47
043	OH	6	\$51.67	\$73.30	\$60.46	\$84.84	\$45.11	\$66.66
044	MI	2	\$68.01	\$93.56	\$71.81	\$98.63	\$64.22	\$88.50
045	WV	4	\$67.10	\$94.84	\$79.70	\$112.40	\$54.73	\$71.19
046	OH	9	\$53.54	\$78.15	\$60.85	\$93.53	\$43.72	\$61.29
047	MI	3	\$57.64	\$76.29	\$57.92	\$80.77	\$54.23	\$70.12
048	MI	1	\$52.90	\$75.84				
<b>05</b>		<b>15</b>	<b>\$67.06</b>	<b>\$102.69</b>				
051	VA	5	\$60.24	\$94.60	\$66.37	\$98.45	\$53.30	\$88.29
052	MD	4	\$59.16	\$85.26	\$65.87	\$88.73	\$55.58	\$81.37
054	SC	3	\$76.96	\$124.01	\$86.31	\$145.61	\$72.18	\$111.51
056	PR	3	\$78.99	\$118.08	\$71.39	\$122.84	\$80.87	\$111.75
<b>06</b>		<b>29</b>	<b>\$63.27</b>	<b>\$89.49</b>				
061	GA	2	\$55.61	\$82.22	\$61.32	\$90.03	\$49.91	\$74.42
062	AL	5	\$60.03	\$83.03	\$58.25	\$88.71	\$53.94	\$75.40
063	FL	3	\$62.59	\$82.46	\$64.35	\$86.21	\$58.26	\$77.85
064	LA	12	\$62.27	\$87.38	\$69.61	\$115.09	\$39.99	\$61.13
065	MS	4	\$76.33	\$112.83	\$81.10	\$123.77	\$67.67	\$91.29
066	FL	1	\$73.37	\$94.58				
067	FL	2	\$54.85	\$86.79	\$57.02	\$98.79	\$52.68	\$74.80
<b>07</b>		<b>32</b>	<b>\$57.69</b>	<b>\$76.13</b>				
071	IL	8	\$61.60	\$79.47	\$68.13	\$89.75	\$55.96	\$70.34

**Table 4.1**  
**Section 202 Construction Costs**  
**Actual Costs Per Square Foot (cont.)**

Region	State	Costs Normalized with R.S. Means Locality Cost Adjustment Factors						
		No. Projects	Avg. Bldg. Cost	Avg. Total Cost	Highest Bldg. Cost	Highest Total Cost	Lowest Bldg. Cost	Lowest Total Cost
<b>08</b>		<b>37</b>	<b>\$62.02</b>	<b>\$87.46</b>				
081	TN	3	\$61.52	\$85.34	\$64.70	\$89.04	\$59.35	\$81.74
083	KY	6	\$53.29	\$73.57	\$62.90	\$80.46	\$34.82	\$58.77
084	MO	3	\$60.70	\$82.73	\$76.47	\$93.16	\$53.94	\$77.09
085	MO	8	\$59.77	\$79.03	\$69.70	\$90.67	\$53.10	\$68.95
086	TN	5	\$67.19	\$100.85	\$80.41	\$112.43	\$61.38	\$83.63
087	TN	12	\$66.18	\$96.16	\$78.47	\$113.18	\$62.85	\$83.18
<b>09</b>		<b>9</b>	<b>\$54.01</b>	<b>\$73.30</b>				
092	MN	9	\$54.01	\$73.30	\$68.88	\$84.53	\$48.62	\$63.63
<b>10</b>		<b>6</b>	<b>\$63.72</b>	<b>\$84.25</b>				
102	KS	1	\$55.90	\$72.94				
103	NE	5	\$65.29	\$86.51	\$78.79	\$100.65	\$57.87	\$74.29
<b>11</b>		<b>10</b>	<b>\$62.00</b>	<b>\$92.63</b>				
112	TX	5	\$63.71	\$98.12	\$72.28	\$107.07	\$60.41	\$92.38
115	TX	2	\$58.66	\$83.20	\$65.61	\$90.28	\$51.71	\$76.11
116	MN	3	\$61.38	\$89.76	\$70.49	\$109.27	\$48.27	\$65.59
<b>12</b>		<b>60</b>	<b>\$62.40</b>	<b>\$90.44</b>				
121	CA	14	\$72.58	\$108.52	\$105.86	\$143.20	\$54.95	\$79.53
122	CA	22	\$60.95	\$85.04	\$78.03	\$111.53	\$50.92	\$70.62
123	AZ	3	\$50.63	\$78.79	\$53.73	\$91.20	\$45.90	\$66.63
125	NV	2	\$60.14	\$84.61	\$62.60	\$89.59	\$57.67	\$79.63
126	OR	10	\$57.31	\$83.46	\$82.07	\$101.84	\$48.97	\$64.56
127	WA	5	\$57.97	\$86.38	\$67.65	\$91.47	\$52.25	\$77.72
129	CA	4	\$63.02	\$91.04	\$75.49	\$107.90	\$49.96	\$71.88
<b>13</b>		<b>6</b>	<b>\$63.12</b>	<b>\$101.00</b>				
136	CA	6	\$63.12	\$101.00	\$80.49	\$135.36	\$54.93	\$79.05
<b>14</b>		<b>4</b>	<b>\$57.64</b>	<b>\$94.48</b>				
140	HI	2	\$56.43	\$91.43	\$66.14	\$113.45	\$46.71	\$69.41
143	CA	2	\$58.85	\$97.53	\$66.71	\$114.31	\$51.00	\$80.76
<b>17</b>		<b>5</b>	<b>\$73.40</b>	<b>\$106.32</b>				
171	WA	1	\$51.29	\$69.87				
176	AK	4	\$78.93	\$115.44	\$115.10	\$162.32	\$65.13	\$99.13

**Section 811 Costs.** Table 4.2 shows the normalized costs per square foot for the Section 811 Construction Program. The format is the same as Table 4.1. Analysis of Section 811 program cost data, however, raised some issues.

Means provides an estimate for “Assisted Living Housing” at a total cost of \$114.00 per square foot (in 2003 dollars). Section 811 more closely corresponds with assisted living than with other types of construction. There is, however, nothing equivalent to Section 202 unit size and amenity guidelines for “Group Homes” built under the Section 811 Program. In addition, many project forms did not identify whether they were Group Homes or not. Therefore, costs for Group Homes could not be analyzed separately.

Many different configurations and use of bedrooms, bathrooms, kitchens and common space are possible. This limits the ability to apply a standard average cost per square foot comparison when evaluating and comparing specific projects. Table 4.2 shows that the average total cost per square foot for the Section 811 Program is \$101.43, which is approximately 11% under the Means cost estimate of \$114 per square foot for assisted living facilities. However, the Mid-Atlantic regional average exceeds the Means estimate, and about 3/4 of field offices have individual projects that also exceed the Means estimate.

**Table 4.2**  
**Section 811 Construction Costs**  
**Actual Costs Per Square Foot by R.S. Means Regions**

Region	State	Costs Normalized with R.S. Means Locality Cost Adjustment Factors						
		No. Projects	Avg. Bldg. Cost	Avg. Total Cost	Highest Bldg. Cost	Highest Total Cost	Lowest Bldg. Cost	Lowest Total Cost
<b>ALL</b>		<b>206</b>	<b>\$66.26</b>	<b>\$101.43</b>	<b>\$128.60</b>	<b>\$240.47</b>	<b>\$36.22</b>	<b>\$53.65</b>
<b>01</b>		<b>19</b>	<b>\$64.98</b>	<b>\$100.41</b>				
012	NY	4	\$75.50	\$126.83	\$95.91	\$154.69	\$57.38	\$84.44
014	NY	11	\$60.90	\$92.91	\$76.98	\$115.97	\$46.60	\$73.08
016	RI	3	\$57.22	\$83.07	\$60.35	\$92.90	\$52.97	\$70.41
017	CT	1	\$83.05	\$129.13				
<b>02</b>		<b>8</b>	<b>\$64.42</b>	<b>\$95.15</b>				
023	MA	4	\$60.72	\$89.93	\$87.73	\$137.88	\$38.51	\$57.80
024	ME	4	\$68.12	\$100.37	\$89.67	\$142.13	\$36.22	\$53.65
<b>03</b>		<b>21</b>	<b>\$72.30</b>	<b>\$108.63</b>				
031	NJ	8	\$73.91	\$115.18	\$104.81	\$160.47	\$62.97	\$90.15
032	DE	2	\$67.67	\$102.03	\$86.51	\$134.50	\$48.84	\$69.55
033	PA	6	\$71.15	\$102.86	\$114.33	\$150.47	\$50.88	\$73.86
034	PA	2	\$82.85	\$119.33	\$110.43	\$154.72	\$55.27	\$83.93
035	NJ	3	\$66.34	\$99.99	\$69.94	\$106.80	\$60.53	\$93.94
<b>04</b>		<b>27</b>	<b>\$64.57</b>	<b>\$93.52</b>				
042	OH	10	\$66.21	\$95.89	\$83.72	\$128.27	\$53.61	\$75.87
043	OH	5	\$53.17	\$80.92	\$60.91	\$87.73	\$47.96	\$75.15
044	MI	1	\$49.42	\$79.82				
045	WV	5	\$73.34	\$97.06	\$86.13	\$103.98	\$58.79	\$73.18
046	OH	3	\$59.12	\$95.95	\$69.53	\$119.33	\$43.24	\$79.56
047	MI	2	\$63.83	\$94.05	\$69.40	\$99.01	\$58.26	\$89.09
048	MI	1	\$94.28	\$120.41				
<b>05</b>		<b>10</b>	<b>\$90.58</b>	<b>\$136.93</b>				
051	VA	1	\$80.33	\$130.63				
054	SC	5	\$100.41	\$148.67	\$128.60	\$193.27	\$63.68	\$84.84
056	PR	4	\$80.86	\$123.82	\$100.84	\$138.35	\$68.10	\$112.04
<b>06</b>		<b>26</b>	<b>\$64.02</b>	<b>\$98.66</b>				
061	GA	3	\$64.40	\$107.00	\$71.07	\$129.61	\$59.90	\$93.80
062	AL	4	\$58.56	\$93.43	\$60.06	\$101.69	\$59.19	\$80.10
064	LA	11	\$59.82	\$87.76	\$80.38	\$117.61	\$47.41	\$73.82
065	MS	5	\$69.80	\$106.72	\$77.06	\$117.40	\$58.82	\$90.50
066	FL	3	\$80.80	\$130.92	\$90.29	\$137.55	\$74.39	\$120.65
067	FL	1	\$54.43	\$85.38				
<b>07</b>		<b>24</b>	<b>\$64.04</b>	<b>\$93.14</b>				
071	IL	6	\$77.85	\$115.46	\$102.79	\$137.48	\$60.25	\$98.05
072	IL	9	\$65.30	\$93.51	\$94.92	\$140.25	\$51.60	\$73.01
073	IN	3	\$62.55	\$96.93	\$75.07	\$114.54	\$51.60	\$77.15
074	IA	1	\$52.76	\$70.39				
075	WI	5	\$48.38	\$67.97	\$54.05	\$76.60	\$44.23	\$59.94

**Table 4.2**  
**Section 811 Construction Costs**  
 Actual Costs Per Square Foot (cont.)

Region	State	Costs Normalized with R.S. Means Locality Cost Adjustment Factors						
		No. Projects	Avg. Bldg. Cost	Avg. Total Cost	Highest Bldg. Cost	Highest Total Cost	Lowest Bldg. Cost	Lowest Total Cost
<b>08</b>		<b>21</b>	<b>\$62.58</b>	<b>\$92.78</b>				
083	KY	6	\$72.25	\$104.02	\$84.41	\$126.63	\$54.39	\$85.98
084	MO	5	\$58.65	\$87.02	\$67.54	\$106.01	\$53.10	\$76.17
085	MO	5	\$54.24	\$80.51	\$63.35	\$91.20	\$49.48	\$71.51
086	TN	1	\$71.55	\$105.61				
087	TN	4	\$61.14	\$95.22	\$71.96	\$106.60	\$53.76	\$75.35
<b>09</b>		<b>3</b>	<b>\$59.24</b>	<b>\$82.71</b>				
092	MN	3	\$59.24	\$82.71	\$65.00	\$86.61	\$54.24	\$78.77
<b>10</b>		<b>5</b>	<b>\$75.20</b>	<b>\$109.78</b>				
103	NE	5	\$75.20	\$109.78	\$95.76	\$163.47	\$47.19	\$64.18
<b>11</b>		<b>8</b>	<b>\$65.78</b>	<b>\$104.00</b>				
112	TX	2	\$63.35	\$104.81	\$67.50	\$123.31	\$59.21	\$86.32
113	TX	1	\$66.22	\$125.60				
115	TX	2	\$65.00	\$103.58	\$67.98	\$115.28	\$62.02	\$91.87
116	NM	3	\$67.78	\$96.54	\$89.00	\$122.57	\$47.93	\$70.45
<b>12</b>		<b>24</b>	<b>\$65.45</b>	<b>\$112.54</b>				
121	CA	6	\$69.91	\$120.68	\$86.80	\$148.86	\$58.16	\$91.63
122	CA	9	\$59.04	\$97.31	\$73.09	\$116.18	\$49.31	\$92.76
123	AZ	3	\$65.01	\$115.01	\$72.01	\$130.20	\$54.95	\$85.65
125	NV	1	\$72.45	\$105.65				
126	OR	2	\$51.65	\$81.83	\$64.09	\$99.75	\$39.20	\$63.91
127	WA	3	\$83.05	\$162.58	\$106.55	\$240.47	\$68.34	\$112.90
<b>13</b>		<b>3</b>	<b>\$49.61</b>	<b>\$92.36</b>				
133	TX	1	\$53.71	\$88.62				
136	CA	2	\$47.56	\$94.23	\$55.10	\$117.01	\$40.02	\$71.46
<b>14</b>		<b>3</b>	<b>\$73.56</b>	<b>\$110.30</b>				
140	HI	2	\$88.50	\$127.21	\$96.11	\$142.90	\$80.89	\$111.51
143	CA	1	\$43.70	\$76.48				
<b>17</b>		<b>2</b>	<b>\$66.36</b>	<b>\$101.40</b>				
176	AK	2	\$66.36	\$101.40	\$82.30	\$115.01	\$50.43	\$87.78

**Cost per Dwelling Unit.** Another method of analyzing cost of the programs is to divide total improvement costs by number of dwelling units constructed, to arrive at an average improvement cost per dwelling unit. Note that regional costs shown in Tables 4.3 and 4.4 are both actual local costs and normalized costs using “Means Locality Cost Adjustment Factors.” Table 4.3 also provides information on average gross square feet per dwelling unit, and the ratio of gross square feet constructed, to authorized rentable space. This provides a measure of amenities provided in addition to apartment space.

**Table 4.3 - Section 202 Construction Program  
Dwelling Unit Cost and Size**

<b>Area Number</b>	<b>Metro Area</b>	<b>Average Cost Per Dwelling Unit</b>	<b>Average Normalized Cost Per Dwelling Unit</b>	<b>Average Gross Square Feet Per Dwelling Unit</b>
<b>012</b>	<b>New York</b>	\$ 90,732	\$ 76,883	843
<b>023</b>	<b>Boston</b>	\$ 76,104	\$ 77,905	840
<b>034</b>	<b>Philadelphia</b>	\$ 76,569	\$ 73,711	834
<b>043</b>	<b>Columbus</b>	\$ 65,055	\$ 66,681	800
<b>052</b>	<b>Baltimore</b>	\$ 66,017	\$ 81,461	711
<b>061</b>	<b>Atlanta</b>	\$ 53,503	\$ 61,585	742
<b>071</b>	<b>Chicago</b>	\$ 67,815	\$ 65,622	870
<b>084</b>	<b>Kansas City</b>	\$ 55,972	\$ 64,572	739
<b>103</b>	<b>Omaha</b>	\$ 63,056	\$ 69,598	857
<b>115</b>	<b>San Antonio</b>	\$ 50,777	\$ 61,681	677
<b>122</b>	<b>Los Angeles</b>	\$ 86,305	\$ 78,634	902
<b>140</b>	<b>Honolulu</b>	\$ 135,516	\$ 110,310	1242
<b>176</b>	<b>Anchorage</b>	\$ 112,280	\$ 89,182	900
<b>ALL</b>		<b>\$ 73,396</b>	<b>\$ 72,554</b>	<b>812</b>
<b>164 TOTAL PROJECTS<sup>2</sup></b>				

<sup>2</sup> Total number of projects is less than total of 338 listed in Table 4.1 because only projects in certain metropolitan areas were selected for analysis, or information was not available from forms.

Table 4.4 shows the same information for the Section 811 Program.

**Table 4.4 - Section 811 Construction Program  
Dwelling Unit Cost and Size**

<b>Area Number</b>	<b>Metro Area</b>	<b>Average Cost Per Dwelling Unit</b>	<b>Average Normalized Cost Per Dwelling Unit</b>	<b>Average Gross Square Feet Per Dwelling Unit</b>
<b>012</b>	<b>New York</b>	\$ 87,402	\$ 87,075	934
<b>023</b>	<b>Boston</b>	\$ 84,098	\$ 85,059	884
<b>034</b>	<b>Philadelphia</b>	\$ 83,037	\$ 79,209	738
<b>043</b>	<b>Columbus</b>	\$ 102,469	\$ 105,261	1249
<b>052</b>	<b>Baltimore</b>	\$ 60,569	\$ 79,714	621
<b>061</b>	<b>Atlanta</b>	\$ 56,615	\$ 63,797	617
<b>071</b>	<b>Chicago</b>	\$ 58,186	\$ 54,444	621
<b>084</b>	<b>Kansas City</b>	\$ 58,435	\$ 65,375	677
<b>103</b>	<b>Omaha</b>	\$ 51,282	\$ 56,602	882
<b>113</b>	<b>Fort Worth</b>	\$ 43,378	\$ 56,335	636
<b>115</b>	<b>San Antonio</b>	\$ 59,722	\$ 71,560	712
<b>122</b>	<b>Los Angeles</b>	\$ 106,458	\$ 102,921	892
<b>ALL</b>		<b>\$ 77,284</b>	<b>\$ 81,131</b>	<b>808</b>
<b>93 TOTAL PROJECTS<sup>1</sup></b>				

Tables 4.3 and 4.4 show significant differences in total square footage reported for projects within the program. Differences are particularly apparent when comparing HUB Offices, which is expected, given that local offices have a large say in what constitutes an acceptable project. Some projects provide more than twice the square footage of other projects. This makes review of cost on a per square foot basis less reliable than if all projects were being built to the same scope. Cost comparisons have limited meaning if the items being compared are not similar.

<sup>1</sup> Total number of projects is less than total of 206 listed in Table 4.2 because only projects in certain metropolitan areas were selected for analysis, or information was not available from forms.

## COMPARISON OF HCP TO CONSTRUCTION COST INDICES

The HCPs were compared to other nationally accepted construction cost indices to see if they were reasonable predictors of construction costs. Chart 4.1 shows the 2004 cost indices for Means, Craftsman, HUD-HCP, and HUD-HCP normalized to Fort Worth. The normalization process matched the HCP to Means at Fort Worth and used the same scaling factor for all other cities. As the chart shows, the normalized HCP is relatively close to other indices for many cities, but cities such as Greensboro, New York, and San Francisco are more than 20% off.

**Chart 4.1**  
**Actual HCP Comparison to Other Cost Indices**

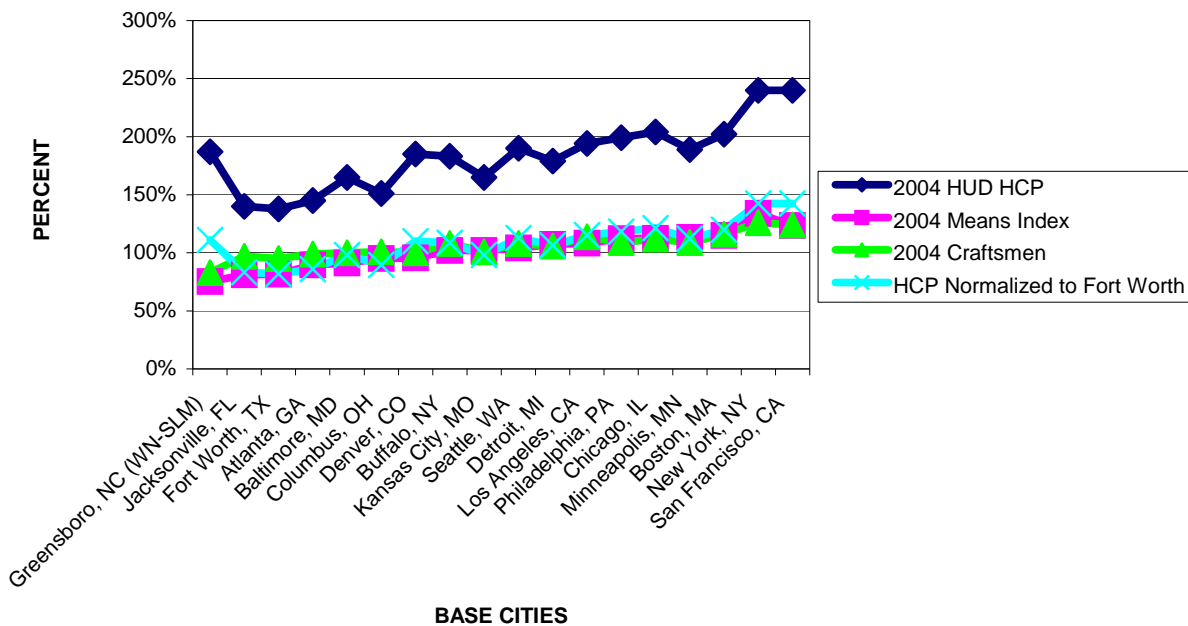
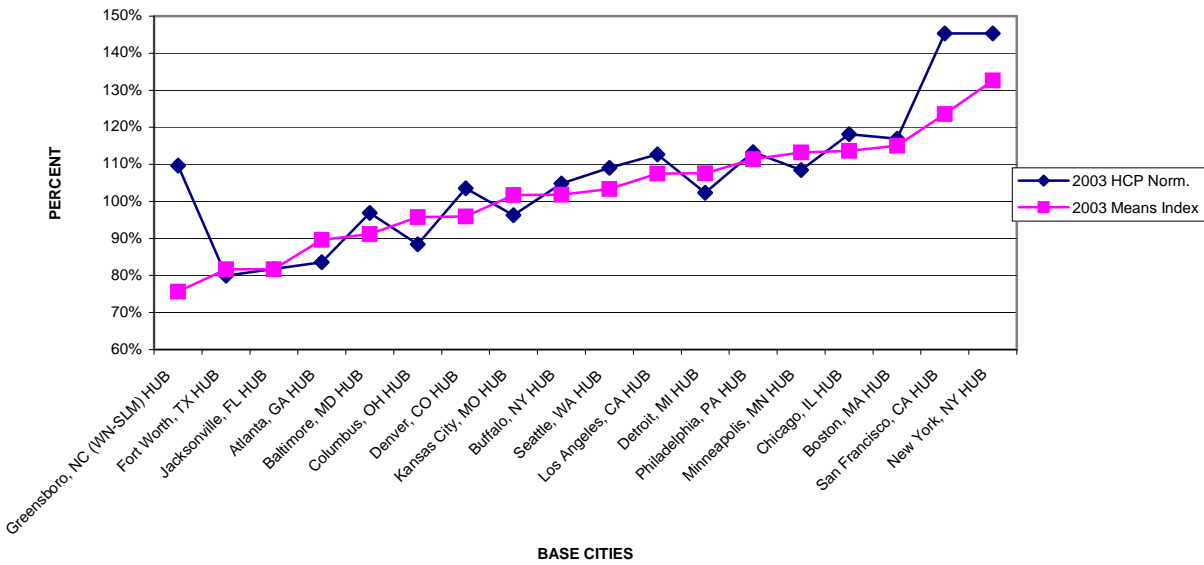




Chart 4.2 is a comparison of Means and HCP values normalized to the average of the Means Index values, which average 100% for the nation as a whole. As the chart shows, there is often a correlation within 5% between the two indices, but there is little correlation for three cities, with Greensboro being about 35% too high. Interestingly, San Francisco and New York (which are both capped at 240% HCP) are 20% and 10% above the Means average.

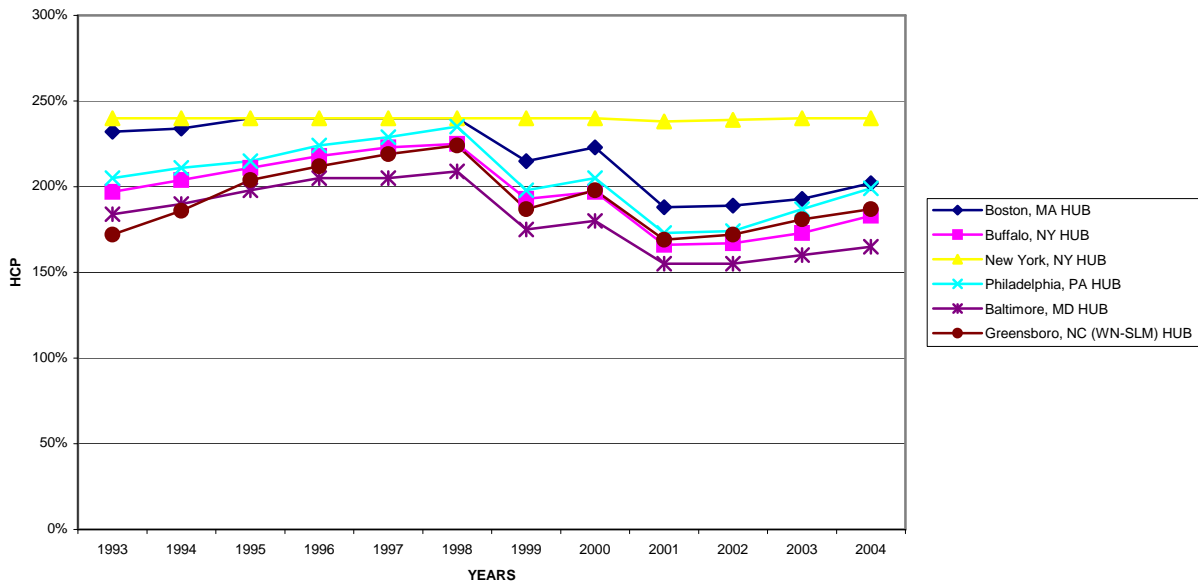
**Chart 4.2**  
**2003 Normalized HCP Comparison to Means**



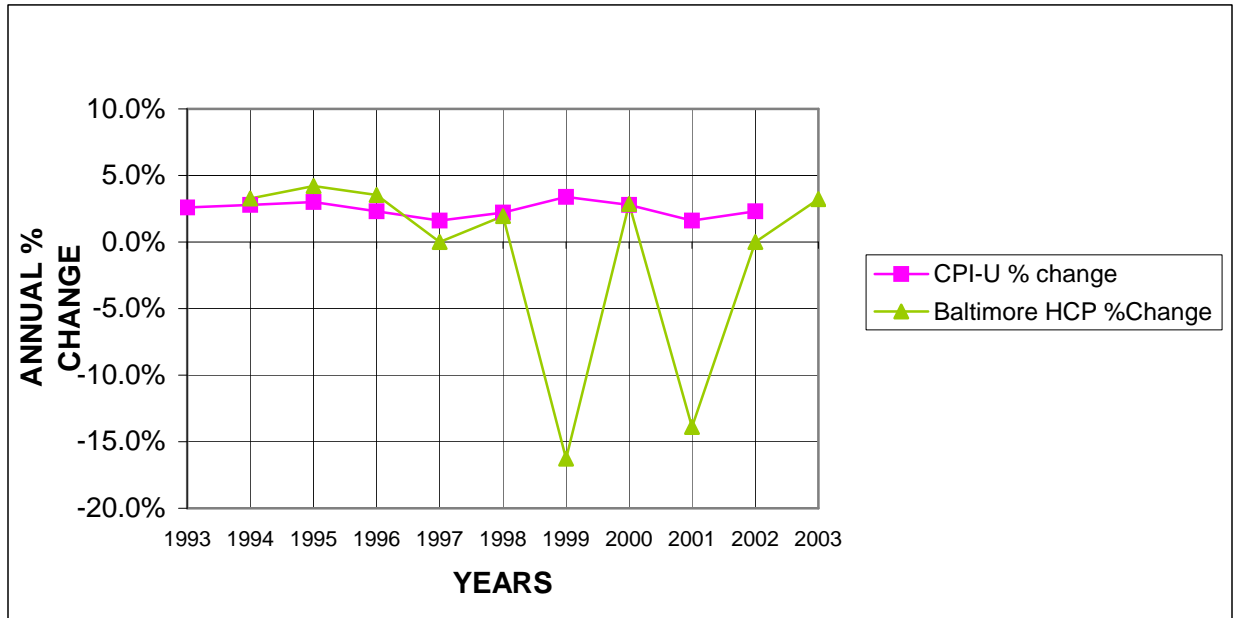
## RELEVANCE OF VARIOUS COST INDICES AND HISTORICAL HCP

The study team evaluated changes of HCP over time in relation to the Consumer Price Index-Urban (CPI-U). Chart 4.3 graphs HCP changes between 1993 and 2004 for six HUB areas. Two major adjustments were made to the HUD Base Dwelling Unit cost in 1999 and 2001, as apparent in Charts 4.4 and 4.5 that plot rates of change of HCP and CPI-U for Baltimore and Cincinnati, respectively.

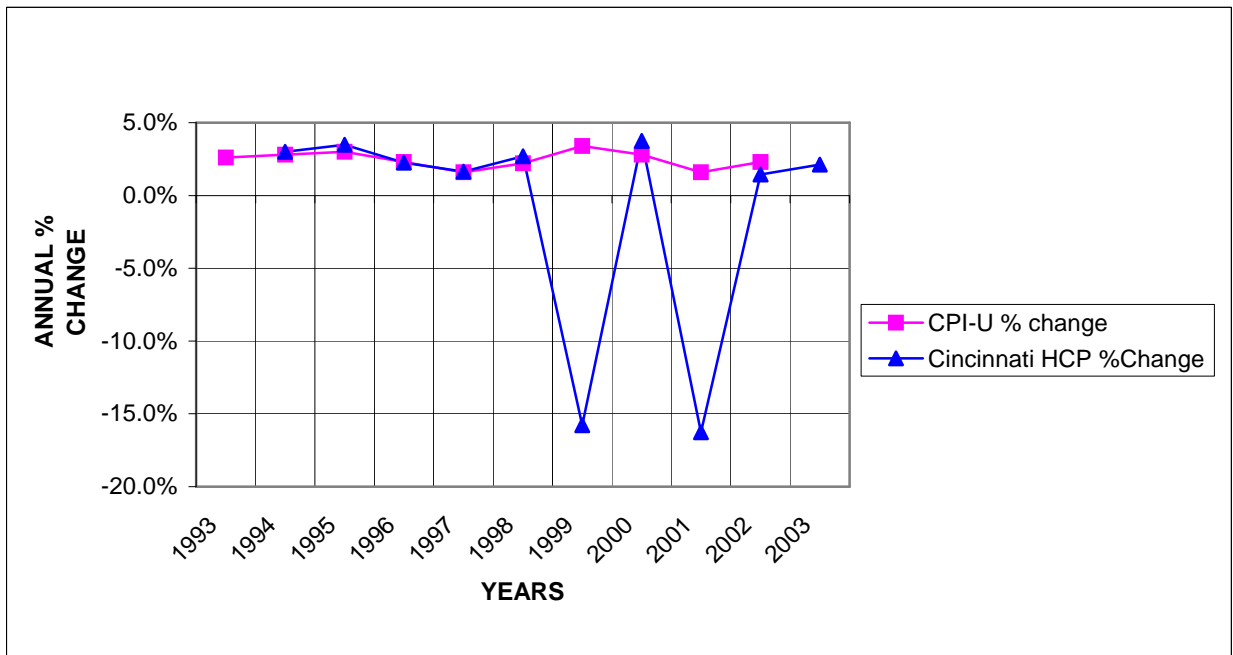
**Chart 4.3**  
**HCP Change Over Time**



**Chart 4.4**  
**CPI-U %Change vs. Baltimore HCP Rate of % Change**



**Chart 4.5**  
**CPI-U %Change vs. Cincinnati HCP Rate of % Change**



## ANALYSIS OF BASE DWELLING UNIT COSTS

HUD authorized limits for both the 202 and 811 Programs are based on a cost per dwelling unit (DU), rather than on a cost per square foot (SF) basis. The cost of \$49,748 per DU (one-bedroom, elevator unit) when marked up by a High Cost Percentage (HCP) yields the maximum allowable Total Development Cost.

Table 4.5 compares the Means total cost estimate (excluding land price) to the HUD generated Total Development Cost for 18 HUB Offices, as well as for three additional cities. The table shows that the HUD estimating procedures are roughly similar to Means-based values, except in the instance of the same three metropolitan areas identified as outliers in previous charts.

**Table 4.5 – Section 202 Construction Program  
Costs per Dwelling Unit**

City	Means Total Improvement Cost (Does not Include Land)	HUD Total Development Cost (Includes Land)	HUD Total Development Cost as % of R S Means Total Improvement Costs	Avg. Actual Replacement Cost (Includes Land)	Range of Actual Replacement Costs	No. Actual Projects	Avg. Actual Replacement Costs as % of R S Means Improvement Costs	Avg. Actual Replacement Costs as % of Total HUD Development Costs
BOSTON	\$95,634	\$96,014	100%	\$89,186	\$77K - \$99K	4	-7%	-8%
BUFFALO	\$85,512	\$86,064	101%	\$79,248	\$71K - \$86K	5	-8%	-9%
NY CITY	\$110,270	\$119,395	108%	\$98,720	\$89K - \$118K	24	-12%	-21%
PHILADELPHIA	\$90,769	\$93,029	102%	\$107,418	\$87K - \$149K	4	15%	13%
BALTIMORE	\$72,778	\$79,597	109%	\$78,702	\$78K - \$80K	2	8%	-1%
GREENSBORO	\$63,000	\$90,044	143%	N/A	N/A	0		
ATLANTA	\$73,006	\$68,652	94%	\$61,089	\$61K	2	-20%	-12%
JACKSONVILLE	\$68,628	\$67,160	98%	\$56,935	\$56K	1	-21%	-18%
CHICAGO	\$91,607	\$97,009	106%	\$78,123	\$67K - \$79K	4	-17%	-24%
COLUMBUS	\$80,472	\$72,632	90%	\$69,351	\$65K - \$77K	6	-16%	-5%
DETROIT	\$88,576	\$97,009	110%	\$98,653	\$95K - \$102K	2	10%	2%
MINNEAPOLIS	\$93,186	\$89,049	96%	\$82,328	\$82K	1	-13%	-8%
FORT WORTH	\$67,255	\$65,667	98%	N/A	N/A	0		
KANSAS CITY	\$82,865	\$79,099	95%	\$72,534	\$69K - \$76K	2	-14%	-9%
DENVER	\$78,139	\$85,069	109%	N/A	N/A	0		
LOS ANGELES	\$88,494	\$92,531	105%	\$97,748	\$82k - \$117K	14	9%	5%
SAN FRANCISCO	\$100,709	\$119,395	119%	\$144,800	\$122K - \$167K	2	30%	18%
SEATTLE	\$85,119	\$89,546	105%	\$78,919	\$76K - \$82K	2	-8%	-13%
SAN ANTONIO	\$67,443	\$61,190	91%	\$57,186	\$57K	2	-18%	-7%
HONOLULU	\$101,418	\$179,093	177%	\$130,564	\$131K	1	22%	-37%
ANCHORAGE	\$116,332	\$179,093	154%	\$129,305	\$118K - \$141K	2	10%	-39%
		<b>AVG</b>	<b>110%</b>			<b>AVG</b>	<b>-3%</b>	<b>-10%</b>

## **FACTORS AFFECTING CONSTRUCTION AND DEVELOPMENT COSTS**

Application of the existing HUD cost model for the two construction programs is based on a cost per dwelling unit (DU), rather than on a cost per square foot (SF) basis. This makes use of the model, and comparison to other estimating guides and cost indices, difficult. The cost of \$49,748 per DU (one-bedroom, elevator unit) is a cap in price, based on a former low cost area that is no longer applicable.

Commercial estimating guides are based on national average costs. Local costs are generated from this average cost by applying a Local Area Cost Factor that can be below or above the national average. The same one-bedroom elevator unit that forms the HUD standard can be built for \$84,000 at an average cost site. This difference in approach, which was originally included in mandatory legislation, is no longer required and should be corrected in the future.

Project scope is not necessarily similar for all projects, making comparative costs on a square foot basis difficult. Unless developers obtain alternative funding in some regions, it is not clear why some regions build much larger buildings than others.

Cost modeling should reflect industry standards as much as possible, and not be subject to variations that make some regions more lucrative to developers than others. On a nationwide basis, average development costs for 202 and 811 programs on a per-square-foot basis are reasonable. However, a few Field Offices are averaging higher costs, and may need assistance in keeping costs down. There also are Field Offices that have high cost projects significantly above their regional average.

A more reliable and standard cost estimating and review process would assist in identifying high cost developments earlier, and allow changing the project or justifying costs early in the approval process.

## **CHAPTER 5. RECOMMENDATIONS**

As a result of this analysis of High Cost Percentages (HCP) and Total Development Costs of Section 202 and 811 Programs, our recommendation is that HUD should adopt a Cost Model similar to the HUD 202 and 811 Construction Cost Model in Appendix B. In addition, R.S. Means Locality Cost Adjustment Factors should be used to determine capital advances and an HCP for each metropolitan area, adjusted annually to conform to R.S. Means. Adjustments can also be made annually to account for factors such as inflation, any local code, regulatory, or geographic conditions, and accessibility or historic preservation requirements.

In order to monitor total development costs of Group Homes separately from other 811 projects, they should be clearly identified on all forms. An effort should also be made to simplify and combine forms in order to have complete and specific cost information for all Section 202 and 811 projects for future analyses and cost modeling.

## APPENDIX A

### SUMMARY OF FIELD OFFICE VISITS – MARCH & APRIL 2004

HUD Construction Analysts at the three sites visited performed detailed cost analyses on construction contracts submitted as Cost Plus proposals. Analysts in the Philadelphia HUB Office utilized a historical database of funded projects; the Atlanta and Boston HUB Offices used historical square footage costs, with Boston referencing the local Marshal and Swift for cost estimating. Once Lump Sum Contracts, coupled with a cost estimate by an independent construction estimator hired by the developer, were introduced, this type of analysis was no longer required. Over the past five years the development community has generally elected the Lump Sum process as the contract of choice. As such, only Total Construction Cost and subsequent change orders are reviewed and cost certified against the original Lump Sum Construction Costs.

High cost projects reviewed at each Office had information that justified those added costs. Most Group Homes were designed for special need populations, requiring 100% accessibility: ramps, porches, kitchens, and baths. A Section 202 high cost project in Boston was constructed on Nantucket Island, and involved additional materials and labor costs. Low cost Section 811 units were “bare-bone” designs with rectangular-shaped buildings with little common space and few amenities. This was also the case for the low cost Section 202 projects. Designs were basically rectangular buildings with few architectural design amenities, or sites where existing buildings provided simple access to site utilities, thereby greatly reducing site preparation costs for new construction.

Area HCP costs were calculated and distributed by the Philadelphia and Boston HUB Offices to each local jurisdiction office. However, the Atlanta HUB Office used the Atlanta HUB HCP throughout the state, with no adjustments. There were cost adjustments that were influenced by availability of labor and materials and union influence (open or closed shops). The Philadelphia and Boston HUB Offices utilized third party or supplemental funding to cover cost overruns and any unfunded amenities and services, and requested HUD amendments for any additional allowable construction and development costs.

## **APPENDIX B**

### **HUD 202 AND 811 PROGRAM CONSTRUCTION COST MODEL**

**(The following pages show the user sheet of the model, illustrative reference worksheets, and model assumptions)**





**MODEL TABLE REFERENCES**

<b>ACF TABLE</b>		<b>INFLATION TABLE</b>		<b>SIZE TABLE</b>		
ZIP	ACF	YEAR	INFL	BR	SQ FT	
		2000	0.9525	0	415	
		2001	0.9696	1	540	
		2002	0.9774	2	800	
		2003	0.9852	3	1050	
		2004	1	3+	1150	
		2005	1.015			
		2006	1.0312			
<b>GROUP HOME COST</b>						
				<b>RESIDENTS</b>	<b>Physical or Developmental Disability</b>	<b>Chronic Mental Illness</b>
		2007	1.0488			
		2008	1.0676	2	\$ 166,022	\$ 160,262
		2009	1.0869	3	\$ 178,533	\$ 172,340
		2010	1.1064	4	\$ 191,045	\$ 183,069
		2011	1.1263	5	\$ 203,556	\$ 193,798
		2012	1.1466	6	\$ 216,054	\$ 204,527
		2013	1.1673			
		2014	1.1883			
		2015	1.2097			
<b>PROJECT SIZE FACTOR</b>				<b>RATIO OF CAPITAL ADVANCE TO TOTAL DEVELOPMENT COST</b>		
GSF	FACTOR					
0	0.00			1		
1	1.10					
18,000	1.10					
19,800	1.09					
21,600	1.08					
23,400	1.07					
25,200	1.06					
27,000	1.05					
28,800	1.04					
30,600	1.03					
32,400	1.02					
34,200	1.01					
36,000	1.00					
54,000	0.97					
72,000	0.94					
90,000	0.92					
108,000	0.91					
126,000	0.90					

## Model Assumptions

1. R. S. Means cost data is used for this model. A 1 BR Apt. in an elevator building has a cost of \$84,000 or \$103.57/SF (811 GSF). This compares to a cost in the HUD estimated system of \$49,748 or \$61.34/GSF. Means is 168.8% of HUD's costs.
2. The average GSF per unit is 811 SF and the average ratio of GSF to allowable SF is 1.5 from data analysis of submitted project data. A factor of 1.5 is therefore used in the cost model to increase allowable Apt. SF to GSF.
3. The ratio of the Capital Advance Amount to the Total Development Cost is 100%. This ratio is used to calculate the Capital Advance Amount from the Means construction cost estimate. This ratio may change from year to year so it is an input cell on the Table sheet.
4. Inflation is based on one year after the start of construction which should be approximately the of mid-point of construction. Inflation factors are from the US Military Housing construction cost inflation tables for 2004.
5. Non elevator buildings are 4.4% cheaper than elevator buildings in HUD's estimating system ( $\$47548/\$49748 = .956$ ). This differential is maintained. (e.g.,  $\$103.57/\text{SF} * .956 = \$98.99$  or  $\$99/\text{SF}$  for non-elevator buildings)
6. Yellow Cells are input cells. All other cells are locked.
7. Group home costs in the HUD estimating system already take into account the small project size associated with detached homes. No Project Size adjustment is used in the model.

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