



The Whitestone Facility Maintenance And Repair Cost Reference 2009-2010

14th Annual Edition

WHITESTONE
RESEARCH

Also available from Whitestone:

MARS 8.5 Facility Cost Forecast System

A Unique Planning Tool

To compete for limited resources, capital asset managers must have a clear and defensible view of funding and staffing needs. MARS creates a link between your facility assets and a unique library of engineering tasks and service costs to provide detailed budget requirements.

Estimate Deferred Maintenance without Costly Inspections

MARS is used by many government agencies and other large facility owners to estimate deferred maintenance costs based on life cycle principles. In a large scale (3 million square feet) test, MARS estimates were within 10 percent of those from a traditional inspection—for less than half the cost. MARS estimates meet FASAB Standard Number 6, DOE 430.1B, and Executive Order 13327 reporting requirements.

Focus on M&R Investment

Forecast your facility maintenance & repair (M&R) requirements for up to 50 years and then drill down to component level detail, year by year. Also monitor the changing value of your assets as MARS automatically calculates your current facility condition index (FCI) and net value of your capital asset portfolio. Use the included Plant Replacement Value Calculator to refine the FCI calculation.

Forecast Operations Costs

The MARS operations cost module forecasts ten facility operations costs, including: energy, water & sewer, custodial, refuse, grounds, road clearance, pest control, security, telecommunications, and management. Estimates are driven by exclusive Whitestone data for 148 asset types and 234 U.S. and Canadian metropolitan areas. Each cost is carefully defined for consistency with commercial and government charts of accounts.

Key Features in MARS 8.5

- NEW!** Recapitalization module calculates capital requirements by asset age and type
- User-defined templates assign mission dependency
- MARS Workbench creates queries and designs custom reports
- Plant Replacement Value Calculator provides default replacement costs
- Role-based security manages data access
- Project Builder bundles and prioritizes deferred tasks

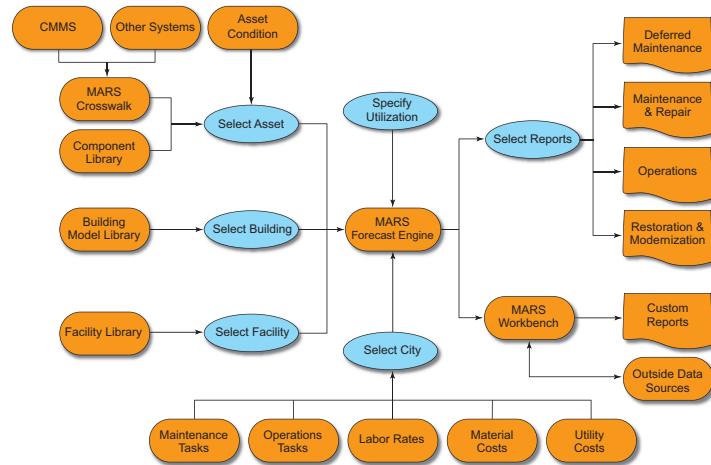
Used by Many U.S. Federal Agencies



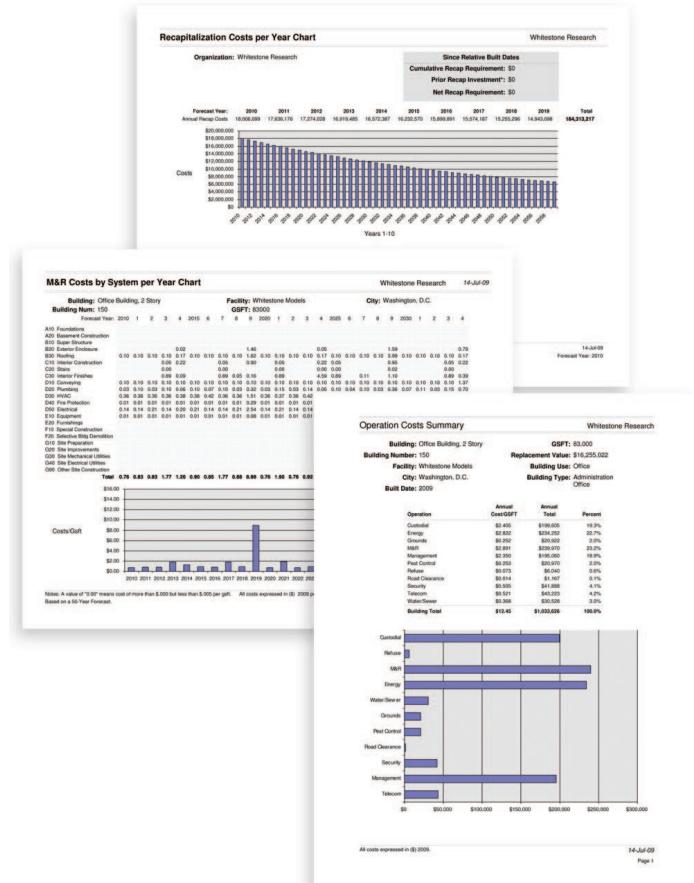
Specialized MARS models range in complexity from nuclear laboratories and launch sites to central utilities.

Missile test and launch facility
Vandenberg Air Force Base

MARS 8.5 Facility Cost Forecast System



MARS combines a powerful forecast engine with an extensive engineering and cost database. In addition to managing inventory data and forecasting requirements, MARS provides a flexible platform for custom applications and special studies.



The Whitestone Facility Maintenance And Repair Cost Reference 2009-2010

Fourteenth Annual Edition

Douglas Abate
Michael Towers
Richard Dotz
Luca Romani

Notes

Maintenance and repair (M&R) is the collection of activities necessary for keeping a building in good working order. Other tasks associated with building operation such as custodial services, landscaping, waste disposal, and the provision of central utilities are not included in our definition of M&R.

For the purposes of this book, M&R activities are divided into three types:

1. **Preventative maintenance (PM) and minor repair** consists of scheduled tasks that sustain a component's level of service during a prescribed lifetime.
2. **Unscheduled maintenance** consists of service calls, emergency response, and other tasks that cannot be individually anticipated.
3. **Renewal and replacement** consists of component overhaul or major replacement tasks. These tasks extend a component lifetime, and reset the schedule of PM and minor repair tasks.

Size is expressed in gross square feet (GSFT), and includes the entire area within the assets perimeter.

All costs throughout the book are expressed in mid-year 2009 dollars. Costs for Canadian areas are reported in Canadian dollars, unless noted otherwise.

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Preface

The *Whitestone Facility Maintenance and Repair Cost Reference* is a comprehensive source of maintenance and repair cost statistics. It provides a collection of unique tools for answering simple but important questions:

- How much does it cost to maintain a facility over its service lifetime?
- How many trade labor hours are required?
- What is the historic inflation rate of M&R construction costs?
- How do M&R costs vary across different areas?
- What is the lifetime of a specific asset component?

The *Reference* is intended for two audiences. The first group has a common need to know the long-term M&R costs of specific assets. This group consists of analysts, developers, architects, bankers, investors, and others who must account for M&R costs that, over a 50-year asset lifetime, can easily exceed the costs of construction. Forecasts of these costs are critical for justifying the expenditure of hundreds of millions of dollars—even a rudimentary business plan or benefit/cost study must recognize M&R—yet such forecasts are usually based on *ad hoc* approximation or ill-defined rules of thumb. To meet this need, we provide detailed estimates of long-term M&R requirements for selected models.

The second audience consists of facility managers and all those responsible for estimating and justifying facility maintenance budgets. Acutely aware of immediate needs, this group often does not put funding requests in a larger context: How much does funding need to rise just to keep up with inflation? What is the appropriate funding level for a facility with an inventory of particular asset types? Such information provides a benchmark, a point of reference, for demonstrating M&R requirements. For this purpose, we provide national and local M&R indexes, and forecasts of in-house and contract maintenance costs for major U.S. and Canadian areas.

Perhaps the most unique information presented in this book is the set of 50-year cost profiles for individual assets. These two-page reports are a product of the Whitestone MARS Facility Cost Forecast System, a forecast tool capable of providing asset-specific cost profiles for any region of the country. The profiles are representative of 72 common asset types, in terms of use and construction, and provide detailed estimates of M&R costs per square foot, and as a percentage of replacement value. Whitestone forecasts can be directly incorporated into life-cycle cost analyses of similar assets, or modified to include alternative components. A complete listing of the components and life-cycle data used in estimating the profiles is included. This listing is organized according to the UNIFORMAT II classification system published by the American Society of Testing and Materials (ASTM).

Also unique to the *Reference* are local and national cost indexes calculated specifically for the maintenance construction industry. A forecast of M&R costs for the same model for 234 areas provides convenient measures for interregional comparisons. Detailed labor rates for both in-house staff and contract trades are presented for the same 234 areas. Much of this information is taken from original surveys and forecasts not available elsewhere.

Whitestone M&R Cost Indexes are the only statistics we know of for analyzing M&R cost and funding trends. These are weighted composite indexes reflecting the prices of goods and services specific to commercial and public, residential, and military facilities M&R construction. Component and comparable indexes of selected goods and services related to M&R construction are also included.

Each year we make improvements to the *Reference*. In this edition we increased the number of cities, from 230 to 234, for which we provide cost statistics; we added 12 new models (including six utilities) to Chapter 2; also, the components that make up the earlier models were reviewed and in some cases changed to reflect current building practices. These revisions mean that costs presented in earlier editions are not strictly comparable. We added 75 new components and their M&R tasks to Chapter 5. And finally, we changed the title of the *Reference* slightly, replacing “Building” with “Facility,” to reflect the growing number of non-building models we added to our library.

Acknowledgments

Each year, completing this book depends on information, advice, and support from a wide variety of sources. Much of the employment, wage, and price data were provided by federal agencies, and these are credited specifically throughout the book. Many of the models were defined with the generous assistance of a panel of engineers from Jacobs Facilities, Inc. To understand new technologies and discover new data sources, we continue to rely on the patience and expertise of a wide variety of construction trade organizations and professional associations; to validate costs, we had innumerable conversations with manufacturers, wholesalers, and tradesmen. To all these individuals and organizations, we express our gratitude.

Our knowledge of facilities finance issues has grown greatly with the project support provided by various U.S. federal agencies. The Office of the Deputy Under Secretary of Defense for Installations and Environment supported basic research addressing the estimation of facility recapitalization costs—due to obsolescence, changes in use, asset safety & code, etc.—not included in this book, but a related topic of importance for capital asset management.¹ This office also underwrote much of the research leading to the operations cost forecasting capability of MARS.² While originally focused on Defense activities, this capability has been expanded to general commercial practice in later versions of MARS and described in the *Whitestone Facility Operations Cost Reference*.

We continue to be surprised at the ways in which the data from this book can be used. In 2004, a study for Johnson Controls used Whitestone asset cost profiles to estimate the market for facility M&R (over \$210 billion) in North America. The following year, a study to validate the condition of nuclear weapons sites for the National Nuclear Security Administration, U.S. Department of Energy, used Whitestone data and the MARS Facility Cost Forecast System to confirm deferred maintenance requirements and forecast future M&R costs. This data is currently being updated as part of a comprehensive model to evaluate the full life-cycle costs for alternative approaches to weapons production and storage.

In 2006, Jacobs Facilities used MARS in an extensive study of life-cycle costs of facility security components for the U.S. Internal Revenue Service. That same year, a study done in partnership with Lawrence Livermore National Laboratory used MARS to demonstrate the M&R cost savings of extending mechanical equipment service life beyond published guidelines.³ Also in 2006, a project for the Battelle Energy Alliance validated over 14,000 detailed M&R tasks and subtasks. All of these efforts have added to our component library and increased our understanding of complex facilities.

Last year, Whitestone launched Brickbits.com, an online life-cycle cost calculator for homeowners. Based on residential housing models developed in MARS, the Brickbits site provides benchmarks for twelve residential costs—from home cleaning to taxes—for zip codes in the U.S. Early in 2008, Whitestone provided life-cycle cost profiles for BIMStorm LAX, a 24-hour rapid design exercise for 420 assets in downtown Los Angeles.⁴

An ongoing project for the Agricultural Research Service, U.S. Department of Agriculture, demonstrates the utility of Whitestone models for complying with Executive Order 13327—Federal Real Property Asset Management.⁵ This Order requires improved real property data and asset management plans from major property holding U.S. federal agencies.⁶

Finally, a recent study of energy retrofits, supported by Pacific Northwest National Laboratory (PNNL), increased our knowledge of the life-cycle costs of a broad collection of energy saving options.⁷

¹ Lufkin, Desai, and Janke. "Estimating the Restoration and Modernization Costs of Infrastructure and Facilities," *Public Works Management & Policy*, July 2005.

² Janke, Jay and Lufkin, Peter. "Facility Cost Models for Real Property Management," *Military Engineer*, October 2005.

³ *Whitestone Report: Service Life Study has M&R Funding Implications*. Santa Barbara: Whitestone Research, July 2006.

⁴ See Tardiff, Michael, "BIMStorm Hits LA" posted at http://www.aia.org/aiarchitect/thisweek08/0215/0215rc_face.cfm.

⁵ Executive Order 13327, Federal Register, Vol. 69, No. 25, page 5897. Washington: Government Printing Office, February 4, 2004.

⁶ Janke, Jay, *Executive Order 13327: Moving to Green, the Unwritten Requirements*. Presented to the MARS User Conference, June 2006, Santa Barbara, CA.

⁷ *Whitestone Report: A Recent Whitestone Study of Energy-Saving Retrofits has Lessons for Other Green Projects*. Santa Barbara: Whitestone Research, January 2009.

Much of the *Reference* is produced using the MARS Facility Cost Forecast System, a software tool in its eighth version. MARS was designed by Tony Pepitone and continues to evolve under the direction of Richard Dotz and Jonathan Miller. Gage Design provided the cover design. Printing and production assistance was provided by Haagen Printing.

Disclaimer

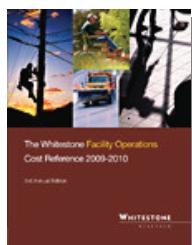
The information presented in this book is intended to provide reasonable and objective estimates of asset M&R costs and labor requirements. Such estimates should be considered only approximations—points of departure from which local knowledge of M&R practices and costs must be used to produce refined estimates. We encourage the reader to review the definitions and methodologies presented in Chapter 6. We make no warranty and assume no liability for the accuracy or completeness of the data presented.

About Whitestone Research

Whitestone Research is an employee-owned corporation with principals in economics, computer science, and operations research. Whitestone specializes in applied economic research and software development for both the public sector and corporate clients. Whitestone also offers cost data products for facility management and capital planning.

Whitestone Consulting Services:

- Life-Cycle Cost Studies
- Facility Operations Cost Modeling
- Capital Planning and Policy Development
- Index Definition and Benchmarking
- Economic Impact Studies
- National Defense Economics



Whitestone Facility Operations Cost Reference

In its third annual edition, this companion volume to the *Whitestone Facility Maintenance and Repair Cost Reference* provides detailed operation cost statistics for 72 asset types in 234 major U.S. and Canadian areas. Data is included for 3 levels of service for 11 operations including: Custodial, Energy, Grounds, Maintenance & Repair, Management, Pest Control, Refuse, Road Clearance, Security, Telecommunications, and Water & Sewer. Also included are unique national and local cost indexes.

MARS MARS 8.5 Facility Cost Forecast System

MARS 8.5 is the most recent version of the Whitestone system for forecasting facility costs. It is a capital asset management and budget tool used by many government agencies, corporations, and large individual facilities. Based on component specific tasks, MARS forecasts provide an unmatched level of detail and credibility. It is a fully configured turnkey system and comes pre-loaded with the models and extensive data library used in *The Whitestone Facility Maintenance and Repair Cost Reference* and *The Whitestone Facility Operations Cost Reference*. MARS capabilities include:

- Deferred Maintenance Estimation
- Benchmarking Operations Costs
- Level of Service Analysis
- Restoration and Modernization Forecasts
- Budget and Staffing Forecasts

MARS is used by many large facility portfolio managers to report deferred maintenance based on component life-cycle cost principles. MARS estimates fall within 10 percent of traditional assessment inspections, at less than half the cost. MARS meets Federal Accounting Standards Advisory Board (FASAB) Standard Number 6, U.S. Department of Energy Memorandum 430.1B, and Executive Order 13327 reporting requirements for deferred maintenance, sustainment, operations, and restoration and modernization.



You know what your home is worth, but do you know how much it costs to live there? Brickbits is the first home cost calculator on the web, available for no charge at www.brickbits.com.

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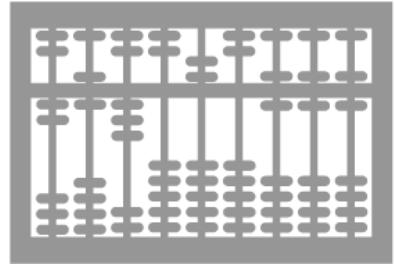
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Chapter 1

Getting Started

How to Use This Book

Frequently Asked
Questions

1. Getting Started

How to Use This Book:

Start at the beginning and work towards the back.

This book is organized around cost profiles for the models shown in Chapter 2. The subsequent chapters present the detailed data—labor rates, material costs, and component life-cycle tasks—that go into these estimates. We suggest you work your way through the book according to your required level of detail.

Everything costs more in New York.

The model cost forecasts shown in Chapter 2 are made for the Washington, D.C. area. Before these forecasts are used for other areas, they should be modified to reflect local labor costs and life-cycles. The local maintenance cost index, shown in Chapter 3.1, is based on a comparison of costs across 234 areas for the same model—the 2 Story Office Building—using Washington, D.C. as a reference point.

A facility is just a collection of assets.

Model costs can be used to approximate the M&R budget for an entire facility. Categorize your facility inventory according to the 72 Whitestone models in Chapter 2, and then multiply the actual total square footage in each category by the appropriate model's estimated cost (expressed in costs per square feet). Be sure to adjust the costs for your area using the local maintenance cost index.

Don't hesitate to mix and match.

The model cost forecasts can be used as a point of departure for making more specific estimates. All of the information necessary is provided: adjust for a different area using the local maintenance cost index in Chapter 3.1; substitute different components with the data provided in Chapter 5; or put the entire forecast in a different base year using the appropriate index from Chapter 4.

Use the right inflation rate.

The costs of roof repairs and HVAC maintenance have not grown at the same rate as milk and eggs, yet many contractors, facility managers, and even cost analysts still use a consumer price index when estimating M&R cost inflation. National-level cost indexes for three types of M&R construction—non-residential, residential, and military—are computed in Chapter 4.

Remember, it's warmer in Phoenix.

M&R requirements for HVAC equipment vary substantially across areas. More specifically, an air conditioner in Alaska is likely to experience much less demand, and have lower M&R costs, than one in Arizona. This explains the extensive listing of repair frequencies by climate zones shown in Chapter 5.2.

Frequently Asked Questions:

What is the lifetime M&R funding requirement for an individual asset?

A model 2 Story Office Building in the Washington, D.C. area will cost an annual average of \$3.12 per GSFT or 1.59 percent of replacement cost over a 50-year service life. Average costs for other asset types varied from \$87.27 to \$0.96 per GSFT. Detailed cost profiles for 72 model assets are shown in Chapter 2.

How can M&R costs be estimated for an actual asset?

The model shown in Chapter 2 can be used as a point of departure for making more specific estimates. All of the necessary information is provided: adjust for a different area using the local maintenance cost index in Chapter 3.1; substitute different components with the data provided in Chapter 5; or put the entire forecast in a different base year using the appropriate index from Chapter 4.1.

How do M&R costs vary across areas?

An index of local maintenance costs shows New York, NY has the highest average M&R cost in our 234-area sample, at \$3.93 per GSFT for a model 2 Story Office Building; San Juan, PR has the lowest rate at \$2.13 for the same asset. For a cost comparison among areas, see Chapter 3.1.

How will regional M&R costs change in 2009?

Labor costs account for over 40 percent of M&R costs. Recent wage agreements indicate that the highest wage increases in 2009, averaging 5.1 percent, will be in the Southwest Pacific. Construction wage changes are summarized by region in Chapter 6.

What will 2009 rates for construction trades be in specific areas?

The Chicago area has the highest average contract labor rates of the 234 areas studied. A contract electrician in Chicago will cost an estimated \$80.57 per hour, while a contract plumber will cost an estimated \$82.23. A listing of contract labor costs by trade for each area is shown in Chapter 3.3.

What is the inflation rate for commercial M&R costs?

In 2009, M&R costs for commercial and public assets will decrease at an estimated annual rate of 3.6 percent, military facilities costs will decrease by 5.9 percent, and residential assets costs will decrease by 8.2 percent. By comparison, new construction costs will decrease by 3.9 percent and consumer prices by 0.9 percent during the same period. Whitestone M&R construction indexes are shown in Chapter 4.

How are M&R tasks distributed between contract workers and in-house staff?

For estimation purposes, we assume in-house staff members at shop rates shown in Chapter 3.2 perform preventative maintenance, minor repairs, and unscheduled maintenance. We assume major repair and replacement tasks are done by contract workers at rates shown in Chapter 3.3.

What are the labor requirements for M&R?

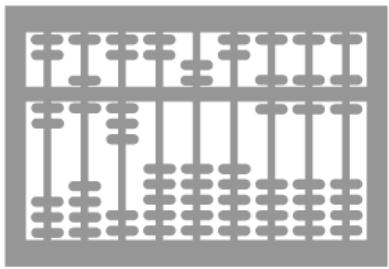
Labor requirements, like costs, vary by asset type, size, and location. A model 2 Story Office Building in the Washington, D.C. area requires an annual average of 5,394 hours over a 50-year service life. Labor requirements for other asset types are shown in Table A-2 in the Appendix.

How sensitive are Whitestone estimates?

There is no straightforward answer, as estimates of M&R costs for entire assets necessarily vary by location, components, and use. Also important are unscheduled maintenance multipliers, in-house markup rates, and types of utilization. Different values for these factors can change M&R costs substantially, as shown in the discussion of estimate sensitivity in Chapter 6.

Where does Whitestone data come from?

Data sources, key assumptions, and a complete explanation of the MARS forecast model are presented in Chapter 6.



Chapter 2

M&R Cost Profiles

2. M&R Cost Profiles

This chapter presents estimates of 50-year maintenance cost profiles for 72 models. Each two-page profile includes a description of the model, a list of major components, and forecasts of maintenance and repair (M&R) costs at various levels of aggregation. The profile estimates were made with the Whitestone MARS Facility Cost Forecast System, calibrated for the Washington, D.C. area. The profiles can be adjusted for other areas using the Local Maintenance Cost Index shown in Chapter 3, and modified to include different components shown in Chapter 5.

Table 2-1
Summary of M&R Cost Profiles

Model	GSFT	PRV	Annual M&R Cost per GSFT*	Annual M&R Cost as % of Repl. Value
Electrical Power, Backup	240	\$768,720	\$87.27	2.72%
Guard House	100	40,900	68.68	16.79
Central Plant, Boiler	1,100	691,900	40.33	6.41
Electrical Power, Substation	220	314,600	23.71	1.66
Data Center, Tier III	25,000	48,000,000	23.46	1.22
Central Plant, Chilled Water	9,175	6,927,125	20.64	2.73
Pump House	195	122,655	18.91	3.01
Central Plant, Steam	43,500	43,935,000	14.77	1.46
Laboratory, Agricultural	27,000	9,949,841	12.96	3.49
Restaurant, Fast Food	4,000	1,244,062	12.07	3.88
Laboratory, Life Science	27,400	10,732,918	11.72	2.99
Laboratory, Electronics	30,200	10,039,947	10.61	3.19
Car Wash	800	240,800	9.89	3.29
Laboratory, General	56,000	18,450,880	9.82	2.98
Apartments, 1-3 Story	22,500	4,606,183	9.72	4.75
Garage, Service Station	1,400	372,233	9.41	3.54
Restaurant	10,000	3,064,095	8.44	2.75
Bank, Branch	4,100	1,041,400	8.29	3.26
Apartments, 4-7 Story	60,000	11,900,540	8.18	4.12
Public Restroom	500	135,054	7.69	2.85
Warehouse, HAZMAT	3,680	785,003	7.59	3.56
Motel, 40 Units	18,000	3,606,280	7.32	2.89
Fire Station	6,000	1,504,190	7.25	3.39
Greenhouse, Research	2,100	447,300	7.23	3.32
Laundry, Self-Service	3,000	645,000	7.14	3.22
Motel, 18 Units	8,000	1,720,000	6.88	3.20
Clubhouse, Golf	6,000	1,628,664	6.63	2.44
Cafeteria	21,500	6,923,000	6.50	2.02
College Dormitory, 50 Room	25,000	6,429,866	6.20	2.41
Store, Convenience	4,000	812,000	5.65	2.78
Religious Education	10,000	2,673,587	5.62	2.10
Telecom Central Office	5,000	1,415,000	5.53	1.95
Hospital, Research	540,200	173,225,704	5.44	1.69
College Student Union	25,000	5,300,000	5.32	2.51
Hospital, General	125,000	47,948,865	5.28	1.38
Movie Theater	10,000	2,090,424	5.26	2.52
Visitor Center	20,700	4,812,210	5.19	2.23
Religious Assembly	17,000	4,243,987	4.95	1.98
Jail, County	318,455	63,427,887	4.91	2.46
Medical Clinic	13,000	3,995,623	4.86	1.58
Community Center	10,000	2,558,919	4.79	1.87
Store, Retail	8,000	1,624,000	4.74	2.33
Passenger Terminal	12,000	2,592,000	4.69	2.17
Apartments, 24 Story	220,000	43,615,330	4.66	2.35
College Auditorium	24,000	4,224,000	4.61	2.62
Court House	30,000	8,080,357	4.36	1.62
Municipal Building	11,000	2,860,000	4.34	1.67
Health Club w/Gymnasium	40,000	8,506,074	4.34	2.04
Mortuary	10,000	2,340,000	4.26	1.82
Post Office	13,000	1,885,000	4.10	2.83
Club, Social	22,000	5,077,313	4.02	1.74
Manufacturing Plant, Process	50,700	11,838,131	4.01	1.72
Public Library, 3 Story	60,000	13,509,303	3.79	1.68
Bowling Center	20,000	4,840,000	3.77	1.56
Skating Rink	30,000	5,090,082	3.75	2.21
Day Care Center	12,000	2,882,846	3.64	1.51
Maintenance Shop	12,100	2,528,312	3.51	1.68
College Lecture Classrooms	90,000	17,982,662	3.44	1.72
Warehouse, Temperature Controlled	8,200	1,161,509	3.42	2.42
Elementary School	47,000	9,701,531	3.37	1.63
Warehouse, Self-storage	24,000	2,760,552	3.17	2.76
Office Building, 2 Story	83,000	16,255,022	3.12	1.59
Manufacturing Plant, Light	45,000	10,668,264	2.94	1.24
Aircraft Hangar	32,000	9,170,554	2.94	1.02
Auto Salesroom	21,000	3,276,000	2.93	1.88
Manufacturing Plant, Machinery	384,000	82,856,363	2.83	1.31
Office Building, 15 Story	250,000	48,871,302	2.82	1.44
Supermarket	96,000	16,122,380	2.77	1.65
Office Park	65,000	12,782,311	2.77	1.41
Store, Department	94,000	15,118,934	2.67	1.66
Warehouse, Dry	80,000	8,306,188	2.28	2.20
Garage, Parking	110,800	11,454,275	0.96	0.93

*Average costs over 50-year lifetime, Washington, D.C. area

From the cost analyst's perspective, the most useful information in these profiles is the year-by-year total shown under the "Cost per GSFT by System" section. A projection of M&R costs is required in the financial evaluation of virtually all large construction or renovation projects. Often this trend is estimated with a simple approximation (typically 2 to 4 percent of replacement value). This simplification obscures the actual oscillations in M&R requirements, and misstates costs when expressed in terms of present value. In comparison, Whitestone estimates are based on component life-cycles that provide a more realistic and defensible projection of M&R costs.

For the purposes of the facility manager, average values for M&R costs may be more useful than detailed year-to-year estimates. Conversations about facility funding and budgeting usually dwell on average costs per square foot, or average costs as a percentage of replacement value. Among our models, the highest average cost per gross square foot is for the Electrical Power, Backup (\$87.27), while the Parking Garage had the lowest average cost (\$.96).

The reader may note the rankings in order of cost are different when expressed in terms of replacement value. The highest average M&R cost from this perspective was for the Guard House —17 percent of replacement value. A complete list of replacement costs is shown in Table A-1 in the Appendix. In general, we are wary of costs expressed in terms of replacement values because of the great variation in new construction costs and the difficulty of determining replacement costs for older assets. Replacement values have been completely revised based on a Whitestone survey of actual federal construction projects.

Profile estimates are sensitive to a variety of factors such as unscheduled maintenance rates, in-house shop rates, and types of utilization. These sensitivities are discussed in Chapter 6, Definitions and Methods.

2. M&R Cost Profiles

Aircraft Hangar

Washington, D.C.

Aircraft Hangar

Gross Square Feet:	32,000
Height in Ft:	30
Exterior:	Steel
Floor coverings:	Vinyl Tile, Carpet, Finished Concrete
HVAC:	Heat Pump, Gas Boiler, Unit Heaters
Capacity:	N/A
Occupancy:	60
Replacement Cost:	\$9,170,554

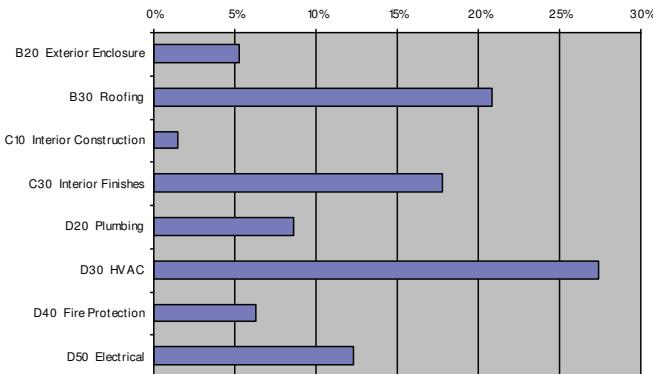
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Steel, Painted, Exterior, 1st Floor	5952	Sq Ft
Steel, Painted, Exterior, 2nd Floor	5952	Sq Ft
Steel, Painted, Exterior, 3rd+ Floor	5952	Sq Ft
Steel Frame, Painted, Operable Window, 12 sf, 1st Floor	122	Each
Steel 20'x20', Painted, Roll-up Door	5	Each
Steel, Painted, Exterior Door	4	Each
B30 Roofing	32960	Sq Ft
Metal Roof		
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	8	Each
Steel, Painted, Interior Door	10	Each
Wood, Solid Core, Painted, Interior Door	8	Each
C30 Interior Finishes		
Sheetrock, Unstippled, Interior Wall Finish	4760	Sq Ft
Steel, Painted, Interior Wall Finish	7880	Sq Ft
Vinyl, Interior Wall Finish	480	Sq Ft
Carpet, Nylon 20 oz., Low Traffic	2560	Sq Ft
Concrete, Painted Flooring	28160	Sq Ft
Vinyl Sheet Flooring	1280	Sq Ft
Metal, Painted Ceiling	32000	Sq Ft
Sheetrock, Unstippled Ceiling	4800	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	3	Each
Lavatory, Vitreous China	14	Each
Service Sink, Iron, Enamel	1	Each
Shower, Fiberglass	2	Each
Tankless Water Closet	8	Each
Urinal, Vitreous China	3	Each
Circulator Pump, 1/6 HP, Cold Water	1	Each
Circulator Pump, 1/6 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	1.1	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	1.3	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	1.5	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	1.4	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	1.2	K Ln Ft
Water Heater, Gas/Oil, 175 Gph	1	Each
Water Storage Tank, 250 Gal.	1	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.7	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.4	K Ln Ft
Pipe & Fittings, 4" PVC	0.6	K Ln Ft
Roof Drain, 4-6"	9	Each
D30 HVAC		
Pipe & Fittings, 4" Steel, Gas	0.8	K Ln Ft
Chemical Feed System	1	Each
Circulation Pump, 5 HP, Hot Water	2	Each
Expansion Tank, 60 Gal.	1	Each
Gas Boiler, 750 Mbh	2	Each
Exhaust Fan, Ceiling, 200-500 Cfm	2	Each
Heat Pump, 10 Ton	1	Each
Suspended Heater, Hot Water, 4,000 Cfm, 180 Mbh	8	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	372	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	6	Each
D50 Electrical		
Distribution Switch, Fused, <600 V	5	Each
Main Switchgear, <1,200 Amp.	1	Each
Motor Starter, 5-20 HP, <600 V	2	Each
Exit Lighting Fixture, w/ Battery	4	Each
Fluorescent Lighting Fixture, 160 w	75	Each
Incandescent Lighting Fixture, Basic, 100 w	20	Each
Metal Halide Lighting Fixture, High Bay, 1,000 w	41	Each
Receptacle, 120 V, 15 Amp.	160	Each
Wiring Device, Switch	40	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	6	Each
Heat Detector	6	Each
Manual Pull Station	6	Each
Smoke Detector	64	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$1,297,831	\$0.81	0.28%
Unscheduled Maintenance	\$1,001,551	\$0.63	0.22%
Renewal & Replacement	\$2,397,901	\$1.50	0.52%
Total	\$4,697,283	\$2.94	1.02%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Refinish Metal, Painted Ceiling	13.20	11.4%
Replace Metal Roof	10.83	9.4%
Maintain Metal Roof	8.53	7.4%
Maintain Chemical Feed System	5.81	5.0%
Maintain Suspended Heater, Hot Water, 4,000 Cfm, 180 Mbh	5.42	4.7%
Inspect & Test Gas Boiler, 750 Mbh	4.17	3.6%
Replace Suspended Heater, Hot Water, 4,000 Cfm, 180 Mbh	3.68	3.2%
Refinish Concrete, Painted Flooring	2.92	2.5%
Refinish Steel, Painted, Interior Wall Finish	2.61	2.3%
Replace Batteries & Check Operation, Smoke Detector	2.39	2.1%
Replace Metal Halide Lighting Fixture, High Bay, 1,000 w	2.12	1.8%
Refinish Sheetrock, Unstippled Ceiling	1.98	1.7%
Test Fire Sprinkler Head	1.97	1.7%
Replace Lamp, Metal Halide Lighting Fixture, High Bay, 1,000 w	1.95	1.7%
Repair Metal Roof	1.92	1.7%
Refinish Steel, Painted, Exterior, 3rd+ Floor	1.92	1.7%
Replace Ballast, Metal Halide Lighting Fixture, High Bay, 1,000 w	1.65	1.4%
Maintain Fire Sprinkler System	1.48	1.3%
Maintain Heat Pump, 10 Ton	1.46	1.3%
Refinish Sheetrock, Unstippled, Interior Wall Finish	1.45	1.3%
Replace Carpet, Nylon 20 oz., Low Traffic	1.45	1.3%
Replace Heat Pump, 10 Ton	1.44	1.3%
Refinish Steel, Painted, Exterior, 2nd Floor	1.43	1.2%
Test Gages & Valves, Fire Sprinkler System	1.36	1.2%
Repair Gas Boiler, 750 Mbh	1.17	1.0%
Replace Steel 20'x20', Painted, Roll-up Door	1.15	1.0%
Replace Gas Boiler, 750 Mbh	1.07	0.9%
Repair Metal, Painted Ceiling (2% of Ceiling)	1.04	0.9%
Refinish Steel, Painted, Exterior, 1st Floor	.93	0.8%
Replace Fire Sprinkler Head	.92	0.8%

*Task cost (\$2009) per GSFT over 50 years.

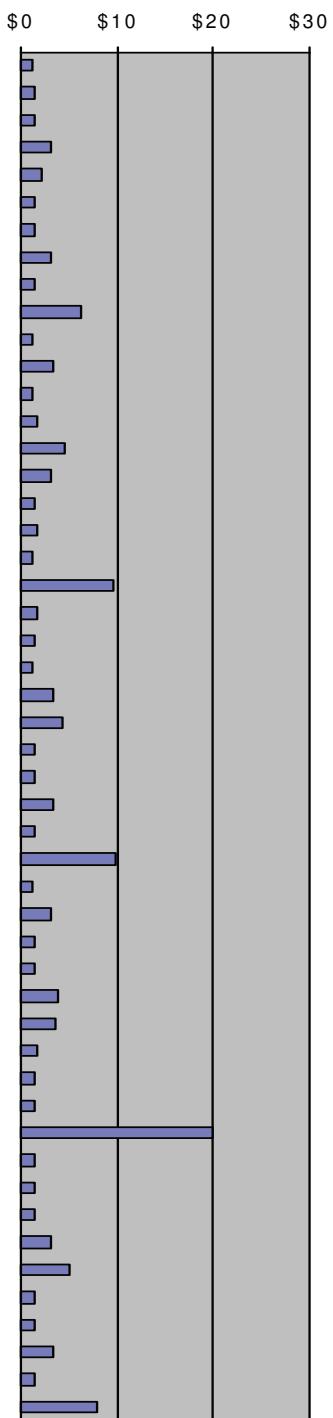
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	Interior Finishes	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.36					.11	.62	.10	.12			1.31
2		.36					.18	.64	.10	.12			1.40
3		.36					.11	.62	.10	.15			1.34
4		.36	.02	1.60			.18	.64	.10	.12			3.02
5	.01	.57	.05	.01			.18	.63	.11	.52			2.09
6		.36					.18	.64	.10	.15			1.43
7		.36					.14	.82	.10	.12			1.54
8		.36	.02	1.60			.18	.64	.10	.12			3.02
9		.36					.11	.62	.10	.15			1.34
10	1.13	.57	.22	.59			.48	.91	.77	1.58			6.25
11		.36					.11	.62	.10	.12			1.31
12		.36	.02	1.60			.36	.65	.15	.15			3.29
13		.36					.11	.62	.10	.12			1.31
14		.36					.21	.83	.10	.12			1.62
15	.03	.57	.05	.66			.16	2.04	.20	.87			4.59
16		.36	.02	1.60			.18	.64	.10	.12			3.02
17		.36					.13	.62	.11	.12			1.34
18		.36		.22			.18	.64	.10	.17			1.67
19		.36					.11	.62	.10	.12			1.31
20	1.22	.79	.43	2.21			.71	1.36	.76	2.07			9.54
21		.36					.14	.82	.10	.15			1.56
22		.36					.20	.64	.11	.12			1.43
23		.36					.11	.62	.10	.12			1.31
24		.36	.02	1.60			.36	.65	.15	.15			3.30
25	.40	.57	.05	.71			.99	.76	.11	.71			4.29
26		.36					.18	.64	.10	.12			1.40
27		.36		.00			.11	.62	.10	.15			1.34
28		.36	.02	1.60			.21	.83	.10	.12			3.25
29		.36					.13	.62	.11	.12			1.34
30	1.15	.57	.22	1.25			.55	3.10	.85	2.12			9.82
31		.36					.11	.62	.10	.12			1.31
32		.36	.02	1.60			.18	.64	.10	.12			3.02
33		.36					.11	.62	.10	.15			1.34
34		.36					.20	.64	.11	.12			1.43
35	1.20	.57	.05	.01			.66	.63	.11	.52			3.75
36		.36	.02	1.82			.31	.65	.15	.17			3.48
37		.36					.16	.82	.10	.12			1.56
38		.36					.13	.64	.10	.12			1.35
39		.36					.16	.62	.10	.15			1.39
40	1.07	10.83	.63	2.21			.59	1.47	.76	2.26			19.82
41		.36					.18	.62	.11	.12			1.39
42		.36					.16	.64	.10	.15			1.40
43		.36					.16	.62	.10	.12			1.37
44		.36	.02	1.60			.13	.83	.10	.12			3.16
45	.19	.57	.05	.67			.36	2.04	.20	.87			4.95
46		.36					.15	.64	.11	.12			1.37
47		.36					.16	.62	.10	.12			1.37
48		.36	.02	1.60			.31	.65	.15	.15			3.24
49		.36					.19	.62	.10	.12			1.40
50	1.36	.57	.22	1.29			1.12	.86	1.01	1.39			7.83
Total		7.75	30.62	2.16			26.09	12.61	40.20	9.22	18.13		146.79

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Apartments, 1-3 Story

Washington, D.C.

Apartments, 1-3 Story

Gross Square Feet:	22,500
Height in Ft:	30
Exterior:	Clay Brick
Floor coverings:	Carpet, Ceramic Tile, Vinyl Tile
HVAC:	Chilled Water, Oil Boiler, Baseboard Rad.
Capacity:	N/A
Occupancy:	100
Replacement Cost:	\$4,606,183

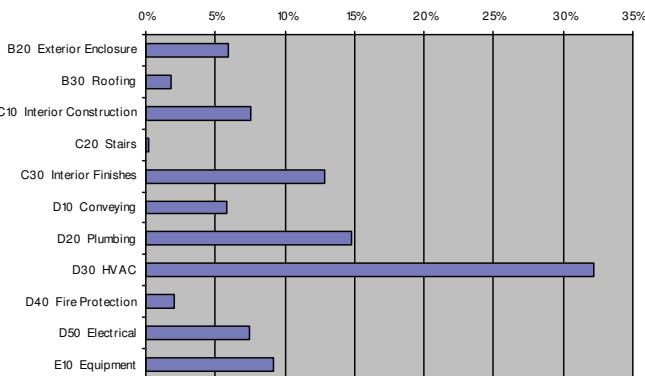
Components (Continued on Page 152)

Uniform / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	3520	Sq Ft
Clay Brick, Exterior, 2nd Floor	3520	Sq Ft
Clay Brick, Exterior, 3rd+ Floor	3520	Sq Ft
Aluminum Operable Window, 24 sf, 1st Floor	32	Each
Aluminum Operable Window, 24 sf, 2nd Floor	32	Each
Aluminum Operable Window, 24 sf, 3rd+ Floor	32	Each
Steel w/ Safety Glass, Painted, Exterior Door	4	Each
B30 Roofing		
Built-up Roof	7500	Sq Ft
C10 Interior Construction		
Wood, Hollow Core, Painted, Interior Door	239	Each
Wood, Solid Core, Painted, Interior Door	42	Each
C20 Stairs		
Metal, Painted, Interior Railing	300	Ln Ft
Metal, Painted, Interior Stairs	600	Sq Ft
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	9600	Sq Ft
Sheetrock, Stippled, Interior Wall Finish	31500	Sq Ft
Wallpaper, Interior Wall Finish	11250	Sq Ft
Carpet, Nylon 20 oz., High Traffic	13500	Sq Ft
Ceramic Tile Flooring	2250	Sq Ft
Vinyl Tile Flooring	6750	Sq Ft
Sheetrock, Unstippled Ceiling	22500	Sq Ft
D10 Conveying		
Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	1	Each
D20 Plumbing		
Bathtub & Shower Enclosure, Fiberglass	42	Each
Flush Tank Water Closet, One Piece	60	Each
Lavatory, Vitreous China	60	Each
Service Sink, Iron, Enamel	2	Each
Sink, Stainless Steel	42	Each
Circulator Pump, 1 HP, Cold Water	1	Each
Circulator Pump, 1 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	6.14	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	3.06	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	5.33	K Ln Ft
Pipe & Fittings, 4" Steel	0.92	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	6.6	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	3.32	K Ln Ft
Water Heater, Electric, 52 Gal.	24	Each
Backflow Preventer, 4"	1	Each
Pipe & Fittings, 6" Cast Iron	1.96	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.2	K Ln Ft
Pipe & Fittings, 4" PVC	0.15	K Ln Ft
Roof Drain, 4-6"	5	Each
D30 HVAC		
Chemical Feed System	1	Each
Circulation Pump, 5 HP, Hot Water	2	Each
Expansion Tank, 60 Gal.	2	Each
Gas Boiler, 1,000 Mbh	1	Each
Chiller, Reciprocal Air-Cooled Hermetic, 60 Ton	1	Each
Circulation Pump, 5 HP, Chiller & Condenser Water	2	Each
Condenser, Air-Cooled, 60 Ton	1	Each
Duct Insulation, Fiberglass Blanket	8400	Sq Ft
Ductwork	12550	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	65	Each
Fan Coil, Two-Pipe, 400 Cfm	100	Each
Thermostat	43	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	175	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	10	Each
D50 Electrical		
Circuit Breaker, 600 V, 70-100 Amp., 3 Ph.	44	Each
Main Switchgear, <1,200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	2	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	6	Each
Exit Lighting Fixture, w/ Battery	6	Each
Grounded Fault Circuit Interruptor, 15 Amp.	100	Each
Incandescent Lighting Fixture, Basic, 200 w	135	Each
Receptacle, 120 V, 15 Amp.	225	Each
TV Cable Outlet	42	Each
Wiring Device, Switch	168	Each
Annunciation Panel	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$3,045,566	\$2.71	1.32%
Unscheduled Maintenance	\$2,347,056	\$2.09	1.02%
Renewal & Replacement	\$5,539,031	\$4.92	2.41%
Total	\$10,931,653	\$9.72	4.75%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Maintain Fan Coil, Two-Pipe, 400 Cfm	27.36	7.2%
Replace Fan Coil, Two-Pipe, 400 Cfm	25.63	6.7%
Replace Carpet, Nylon 20 oz., High Traffic	21.74	5.7%
Maintain Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	15.05	3.9%
Refinish Sheetrock, Stippled, Interior Wall Finish	13.66	3.6%
Refinish Sheetrock, Unstippled Ceiling	13.20	3.5%
Replace Wood, Hollow Core, Painted, Interior Door Locks	12.57	3.3%
Replace Cooking Range, Domestic	11.45	3.0%
Replace Refrigerator, Domestic	11.21	2.9%
Renovate Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	10.11	2.7%
Maintain Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	9.48	2.5%
Maintain Cooking Range, Domestic	8.35	2.2%
Maintain Chemical Feed System	8.26	2.2%
Replace Chiller, Reciprocal Air Cooled Hermetic, 60 Ton	6.62	1.7%
Maintain Chiller, Reciprocal Air Cooled Hermetic, 60 Ton	6.01	1.6%
Replace Water Heater, Electric, 52 Gal.	5.71	1.5%
Replace Wood, Hollow Core, Painted, Interior Door	5.37	1.4%
Maintain Circuit Breaker, 600 V, 70-100 Amp., 3 Ph.	4.90	1.3%
Replace Bathtub & Shower Enclosure, Fiberglass	4.74	1.2%
Maintain Refrigerator, Domestic	4.63	1.2%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	4.58	1.2%
Clean & Reseal Clay Brick, Exterior, 3rd+ Floor	4.31	1.1%
Refinish Concrete Block, Painted, Interior Wall Finish	4.30	1.1%
Replace Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	4.27	1.1%
Repair Fan Coil, Two-Pipe, 400 Cfm	4.23	1.1%
Inspect & Test Gas Boiler, 1,000 Mbh	3.95	1.0%
Place New Membrane Over Existing, Built-up Roof	3.66	1.0%
Maintain Thermostat	3.63	1.0%
Replace Thermostat	3.62	0.9%
Repair Circuit Breaker, 600 V, 70-100 Amp., 3 Ph.	3.42	0.9%

*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

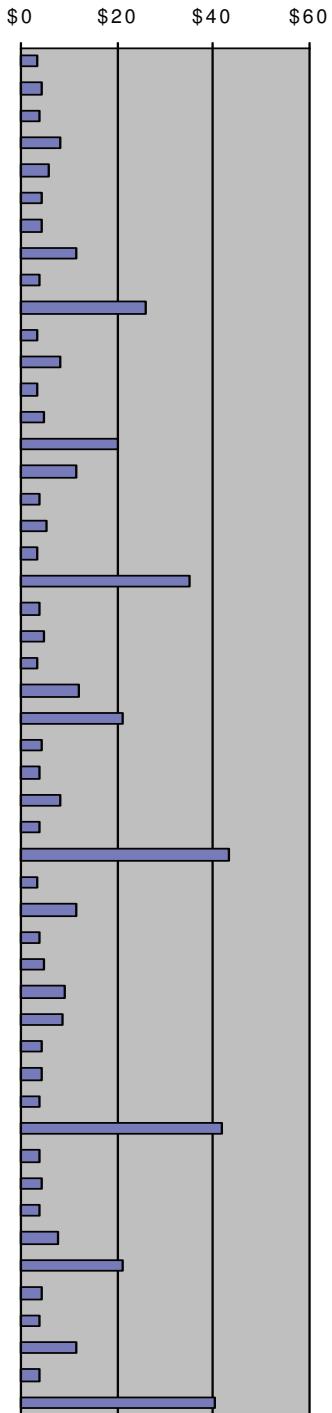
Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT	
1	.04				.38	.08	2.07	.13	.39	.49		3.59	
2	.04			.07	.38	.82	2.08	.13	.39	.49		4.41	
3	.04				.38	.20	2.07	.13	.39	.49		3.71	
4	.04	.27	.03	2.67	.38	1.44	2.08	.13	.40	.49		7.94	
5	.02	.06	1.19		.38	.92	2.09	.16	.65	.49		5.96	
6	.04			.07	.38	.94	2.08	.13	.39	.49		4.53	
7	.04				.38	.50	2.22	.13	.39	.49		4.15	
8	.04	.27	.03	6.24	.38	1.58	2.08	.13	.43	.49		11.67	
9	.04				.01	.38	.20	2.07	.13	.39	.49		3.72
10	4.78	.06	4.88		.07	.38	3.06	5.37	.59	2.16	4.53		25.90
11	.04					.38	.08	2.07	.13	.39	.49		3.59
12	.04	.27	.03	2.67	.38	1.66	2.08	.26	.39	.49		8.27	
13	.04				.38	.08	2.07	.13	.39	.49		3.59	
14	.04			.07	.38	1.24	2.23	.13	.40	.49		4.98	
15	.16	1.89	1.19	.08	.04	.38	3.06	11.47	.27	1.25	.49		20.28
16	.04	.27	.03	6.24	.38	1.58	2.08	.13	.42	.49		11.66	
17	.04				.38	.08	2.07	.15	.39	.49		3.60	
18	.04			.81	.38	.94	2.08	.13	.40	.49		5.27	
19	.04				.38	.08	2.07	.13	.39	.49		3.59	
20	4.78	.06	5.16	.03	3.50	.38	5.03	7.60	.57	3.18	4.53		34.85
21	.04					.38	.31	2.22	.13	.39	.49		3.96
22	.04			.07	.38	1.13	2.08	.15	.39	.49		4.73	
23	.04					.38	.08	2.07	.13	.39	.49		3.59
24	.04	.27	.03	6.22	.38	1.79	2.08	.26	.43	.49		11.99	
25	2.31	.06	1.19		1.47	5.06	5.26	3.65	.14	1.66	.49		21.29
26	.04			.07	.38	.82	2.08	.13	.39	.49		4.41	
27	.04			.01	.38	.20	2.07	.13	.39	.49		3.72	
28	.04	.27	.03	2.69	.38	1.55	2.23	.13	.40	.49		8.21	
29	.04				.38	.39	2.07	.15	.39	.49		3.91	
30	4.93	3.17	6.33	.08	.11	.38	4.97	15.48	.71	2.75	4.53		43.44
31	.04					.38	.08	2.07	.13	.39	.49		3.59
32	.04	.04	.03	6.22	.38	1.58	2.08	.13	.39	.49		11.38	
33	.04					.38	.20	2.07	.13	.42	.49		3.74
34	.04	.23		.07	.38	.82	2.08	.15	.40	.49		4.66	
35	.02	.06	1.19			.38	4.25	2.09	.14	.65	.49		9.26
36	.04	.04	.03	3.42	.38	1.34	2.08	.26	.39	.49		8.48	
37	.04					.38	.71	2.22	.13	.39	.49		4.35
38	.04	.23		.07	.38	.51	2.08	.13	.40	.49		4.33	
39	.04					.38	.52	2.07	.13	.39	.49		4.02
40	4.78	.06	6.45	.03	7.05	.38	5.25	9.17	.57	3.70	4.53		41.98
41	.04					.38	.40	2.07	.15	.42	.49		3.95
42	.04	.23		.07	.38	.73	2.08	.13	.39	.49		4.55	
43	.04					.38	.40	2.07	.13	.39	.49		3.90
44	.04	.04	.03	2.67	.38	1.44	2.23	.13	.40	.49		7.85	
45	.16	1.89	1.19	.08	.05	.38	3.95	11.47	.27	1.25	.49		21.19
46	.04	.23		.07	.38	.51	2.08	.15	.39	.49		4.34	
47	.04					.38	.40	2.07	.13	.39	.49		3.90
48	.04	.04	.03	6.24	.38	1.47	2.08	.26	.40	.49		11.43	
49	.04					.38	.50	2.07	.13	.42	.49		4.03
50	7.08	.06	5.11	.34	3.50	5.06	6.70	3.98	.74	3.33	4.53		40.45
Total	29.03	9.11	36.60	.98	62.57	28.46	71.86	156.34	9.99	36.32	44.60	485.85	

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT



Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Apartments, 4-7 Story

Washington, D.C.

Apartments, 4-7 Story

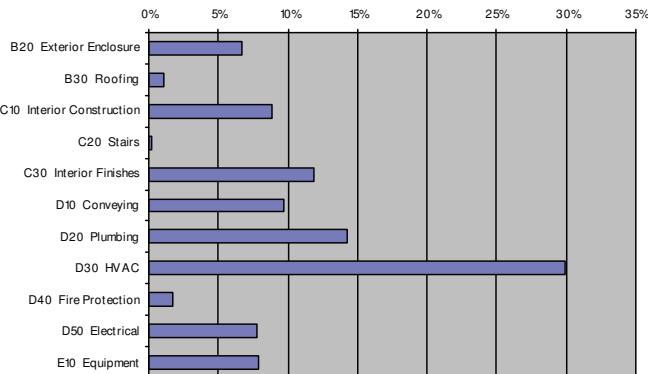
Gross Square Feet:	60,000
Height in Ft:	62
Exterior:	Clay Brick
Floor coverings:	Carpet, Ceramic Tile, Vinyl Tile
HVAC:	Chilled Water, Oil Boiler, Baseboard Rad.
Capacity:	N/A
Occupancy:	270
Replacement Cost:	\$11,900,540

Components (Continued on Page 152)

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	8884	Sq Ft
Clay Brick, Exterior, 2nd Floor	8884	Sq Ft
Clay Brick, Exterior, 3rd+ Floor	8884	Sq Ft
Aluminum Operable Window, 24 sf, 1st Floor	97	Each
Aluminum Operable Window, 24 sf, 2nd Floor	97	Each
Aluminum Operable Window, 24 sf, 3rd+ Floor	97	Each
Aluminum Frame, Fully Glazed, Exterior Door	2	Each
Steel w/ Safety Glass, Painted, Exterior Door	2	Each
B30 Roofing		
Built-up Roof	10000	Sq Ft
C10 Interior Construction		
Wood, Hollow Core, Painted, Interior Door	669	Each
Wood, Solid Core, Painted, Interior Door	81	Each
C20 Stairs		
Metal, Painted, Interior Railing	800	Ln Ft
Metal, Painted, Interior Stairs	1600	Sq Ft
C30 Interior Finishes		
Ceramic Tile, 4"x4", Interior Wall Finish	7748	Sq Ft
Sheetrock, Stippled, Interior Wall Finish	108465	Sq Ft
Wallpaper, Interior Wall Finish	38800	Sq Ft
Carpet, Nylon 20 oz., Low Traffic	36000	Sq Ft
Ceramic Tile Flooring	6000	Sq Ft
Vinyl Tile Flooring	18000	Sq Ft
Sheetrock, Unstippled Ceiling	60000	Sq Ft
D10 Conveying		
Elevator, Geared, 3,500 lbs, 6-15 Floor, 350 fpm	2	Each
D20 Plumbing		
Bathtub & Shower Enclosure, Fiberglass	81	Each
Flush Tank Water Closet, One Piece	122	Each
Lavatory, Vitreous China	122	Each
Service Sink, Iron, Enamel	5	Each
Sink, Stainless Steel	81	Each
Circulator Pump, 2 HP, Cold Water	1	Each
Circulator Pump, 2 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	16	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	9.1	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	8.831	K Ln Ft
Pipe & Fittings, 2" Copper, Hot Water	1.048	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	16.5	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	9.4	K Ln Ft
Water Heater, Electric, 52 Gal.	83	Each
Backflow Preventer, 4"	2	Each
Pipe & Fittings, 6" Cast Iron	3.884	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.2	K Ln Ft
Pipe & Fittings, 4" PVC	0.358	K Ln Ft
Roof Drain, 4"	5	Each
D30 HVAC		
Chemical Feed System	1	Each
Circulation Pump, 5 HP, Hot Water	2	Each
Expansion Tank, 60 Gal.	2	Each
Gas Boiler, 1,000 Mbh	2	Each
Chiller, Reciprocal Water-Cooled Hermetic, 100 Ton	2	Each
Circulation Pump, 5 HP, Chiller & Condenser Water	2	Each
Condenser, Air-Cooled, 60 Ton	4	Each
Duct Insulation, Fiberglass Blanket	20100	Sq Ft
Ductwork	30000	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	200	Each
Fan Coil, Two-Pipe, 400 Cfm	200	Each
Thermostat	82	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	420	Each
Fire Sprinkler System	1	Each
Fire Suppression System Water Pump, 10 HP	1	Each
Fire Standpipe System	1	Each
Fire Extinguisher	20	Each
D50 Electrical		
Circuit Breaker, 600 V, 70-100 Amp., 3 Ph.	81	Each
Motor Starter, 5-20 HP, <600 V	6	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	4	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	6	Each
Exit Lighting Fixture, w/ Battery	18	Each
Grounded Fault Circuit Interruptor, 15 Amp.	320	Each
Incandescent Lighting Fixture, Basic, 100 w	490	Each
Receptacle, 120 V, 15 Amp.	810	Each

50-Year M&R Cost Summary			
Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$7,113,852	\$2.37	1.20%
Unscheduled Maintenance	\$5,137,668	\$1.71	0.86%
Renewal & Replacement	\$12,283,259	\$4.09	2.06%
Total	\$24,534,779	\$8.18	4.12%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Maintain Elevator, Geared, 3,500 lbs, 6-15 Floor, 350 fpm	25.14	7.8%
Maintain Fan Coil, Two-Pipe, 400 Cfm	20.52	6.3%
Replace Fan Coil, Two-Pipe, 400 Cfm	19.22	5.9%
Refinish Sheetrock, Stippled, Interior Wall Finish	17.64	5.5%
Refinish Sheetrock, Unstippled Ceiling	13.20	4.1%
Replace Wood, Hollow Core, Painted, Interior Door Locks	13.19	4.1%
Maintain Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	10.94	3.4%
Replace Carpet, Nylon 20 oz., Low Traffic	10.87	3.4%
Renovate Elevator, Geared, 3,500 lbs, 6-15 Floor, 350 fpm	8.98	2.8%
Replace Cooking Range, Domestic	8.28	2.6%
Replace Refrigerator, Domestic	8.11	2.5%
Replace Water Heater, Electric, 52 Gal.	7.41	2.3%
Maintain Cooking Range, Domestic	6.04	1.9%
Replace Chiller, Reciprocal Water-Cooled Hermetic, 100 Ton	5.74	1.8%
Replace Wood, Hollow Core, Painted, Interior Door	5.64	1.7%
Replace Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	4.92	1.5%
Replace Condenser, Air-Cooled, 60 Ton	4.82	1.5%
Clean & Reseal Clay Brick, Exterior, 3rd+ Floor	4.07	1.3%
Maintain Chiller, Reciprocal Water-Cooled Hermetic, 100 Ton	3.67	1.1%
Maintain Wood, Hollow Core, Painted, Interior Door Locks	3.54	1.1%
Replace Batteries & Check Operation, Smoke Detector	3.49	1.1%
Replace Bathtub & Shower Enclosure, Fiberglass	3.43	1.1%
Maintain Circuit Breaker, 600 V, 70-100 Amp., 3 Ph.	3.38	1.0%
Repair Chiller, Reciprocal Water-Cooled Hermetic, 100 Ton	3.38	1.0%
Maintain Refrigerator, Domestic	3.35	1.0%
Repair Fan Coil, Two-Pipe, 400 Cfm	3.17	1.0%
Maintain Chemical Feed System	3.10	1.0%
Clean & Reseal Clay Brick, Exterior, 2nd Floor	3.06	0.9%
Inspect & Test Gas Boiler, 1,000 Mbh	2.96	0.9%
Refinish Wood, Hollow Core, Painted, Interior Door	2.91	0.9%

*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

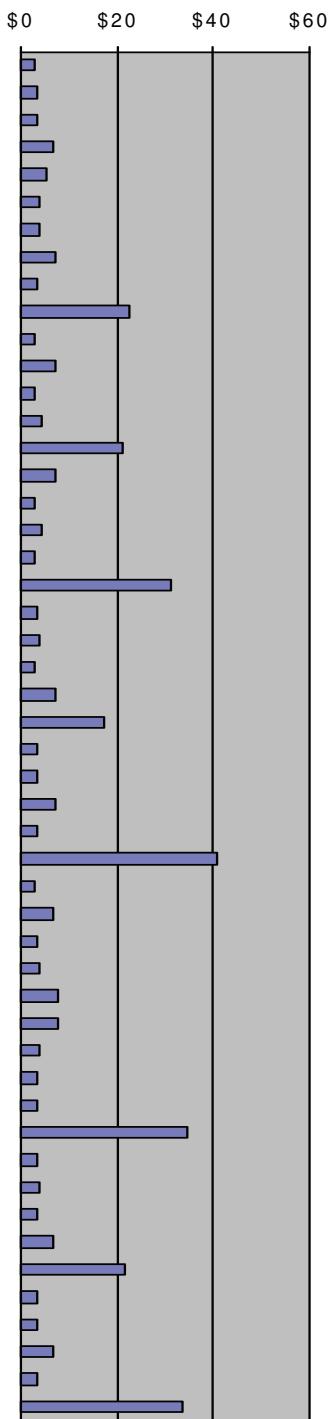
Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1	.02				.64	.05	1.55	.08	.31	.35		3.01
2	.02				.64	.59	1.56	.08	.31	.35		3.57
3	.02				.64	.20	1.55	.08	.34	.35		3.19
4	.02	.27	.03	2.57	.64	1.04	1.56	.08	.32	.35		6.90
5	.01	.03	1.19		.07	.64	.69	1.56	.11	.54	.35	5.19
6	.02				.64	.75	1.56	.08	.34	.35		3.75
7	.02				.64	.53	1.66	.08	.31	.35		3.60
8	.02	.27	.03	2.59	.64	1.14	1.56	.08	.33	.35		7.03
9	.02				.01	.64	.20	1.55	.08	.34	.35	3.21
10	4.48	.03	4.89		.11	.64	2.31	4.39	.50	2.01	3.28	22.65
11	.02				.64	.05	1.55	.08	.31	.35		3.01
12	.01	.02	.27	.03	2.57	.64	1.26	1.56	.17	.34	.35	7.23
13	.02				.64	.05	1.55	.08	.31	.35		3.01
14	.02				.64	1.08	1.67	.08	.32	.35		4.16
15	.14	.95	1.19	.08	3.66	.64	3.33	9.10	.22	1.32	.35	20.98
16	.02	.27	.03	2.59	.64	1.14	1.56	.08	.33	.35		7.02
17	.02				.64	.05	1.55	.09	.31	.35		3.03
18	.02				.74	.64	.75	1.56	.08	.38	.35	4.53
19	.02				.64	.05	1.55	.08	.31	.35		3.01
20	4.48	.03	5.16	.03	3.76	.64	3.74	6.83	.49	2.96	3.28	31.40
21	.02				.64	.29	1.66	.08	.34	.35		3.38
22	.02				.64	1.00	1.56	.09	.31	.35		3.98
23	.02				.64	.05	1.55	.08	.31	.35		3.01
24	.01	.02	.27	.03	2.57	.64	1.36	1.56	.17	.35	.35	7.35
25	2.18	.03	1.19		.19	4.49	4.18	2.85	.10	1.52	.35	17.08
26	.02				.64	.59	1.56	.08	.31	.35		3.57
27	.02				.01	.64	.20	1.55	.08	.34	.35	3.21
28	.02	.27	.03	2.59	.64	1.13	1.67	.08	.32	.35		7.11
29	.02				.64	.45	1.55	.09	.31	.35		3.43
30	4.62	1.58	6.41	.08	3.70	.64	4.75	12.58	.61	2.38	3.28	40.63
31	.02				.64	.05	1.55	.08	.31	.35		3.01
32	.02	.03	.03	2.57	.64	1.14	1.56	.08	.31	.35		6.75
33	.02				.64	.20	1.55	.08	.35	.35		3.20
34	.02	.24			.64	.59	1.56	.09	.32	.35		3.83
35	.01	.03	1.19		.07	.64	3.26	1.56	.10	.54	.35	7.75
36	.01	.02	.03	.03	3.33	.64	1.02	1.56	.17	.38	.35	7.55
37	.02				.64	.69	1.66	.08	.31	.35		3.76
38	.02	.24			.64	.35	1.56	.08	.32	.35		3.57
39	.02				.64	.44	1.55	.08	.34	.35		3.43
40	4.48	.03	6.02	.03	3.76	.64	3.78	8.12	.49	3.75	3.28	34.38
41	.02				.64	.29	1.55	.09	.33	.35		3.28
42	.02	.24			.64	.59	1.56	.08	.34	.35		3.83
43	.02				.64	.29	1.55	.08	.31	.35		3.26
44	.02	.03	.03	2.57	.64	1.21	1.67	.08	.32	.35		6.92
45	.14	.95	1.19	.08	3.68	.64	4.06	9.10	.22	1.32	.35	21.72
46	.02	.24			.64	.35	1.56	.09	.31	.35		3.58
47	.02				.64	.29	1.55	.08	.31	.35		3.25
48	.01	.02	.03	.03	2.59	.64	1.11	1.56	.17	.34	.35	6.87
49	.02				.64	.37	1.55	.08	.33	.35		3.34
50	6.69	.03	5.13	.34	2.19	4.49	5.24	3.17	.64	2.23	3.28	33.43
Total	27.26	4.55	36.28	.98	48.50	39.83	58.34	122.15	7.14	31.64	32.26	408.91

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT



Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Apartments, 24 Story

Washington, D.C.

Apartments, 24 Story

Gross Square Feet:	220,000
Height in Ft:	240
Exterior:	Stucco
Floor coverings:	Finished Concrete, Vinyl Sheet, Carpet
HVAC:	Chilled Water, Gas Boiler, Multizone Air
Capacity:	N/A
Occupancy:	990
Replacement Cost:	\$43,615,330

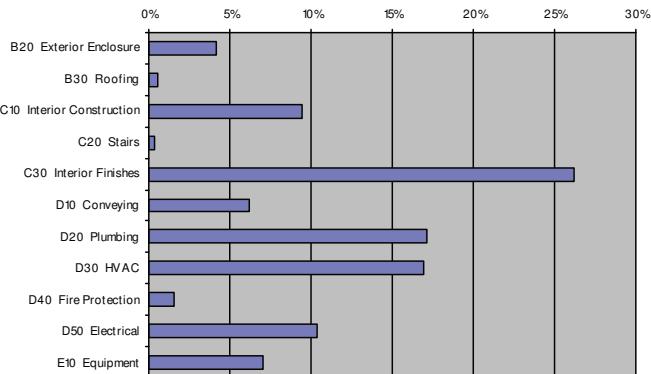
Components (Continued on Page 152)

Uniform / Component	Quantity	Units
B20 Exterior Enclosure		
Stucco, Painted, Exterior, 1st Floor	2860	Sq Ft
Stucco, Painted, Exterior, 2nd Floor	2860	Sq Ft
Stucco, Painted, Exterior, 3rd+ Floor	62920	Sq Ft
Aluminum Fixed Window, 24 sf, 1st Floor	40	Each
Aluminum Fixed Window, 24 sf, 2nd Floor	40	Each
Aluminum Operable Window, 24 sf, 3rd+ Floor	880	Each
Aluminum Frame, Fully Glazed, Exterior Door	302	Each
Steel, Painted, Exterior Door	18	Each
B30 Roofing		
Single-Ply Thermoset Roof	9167	Sq Ft
C10 Interior Construction		
Steel, Painted, Interior Door	96	Each
Wood, Hollow Core, Painted, Interior Door	872	Each
Wood, Hollow Core, Painted, Sliding Interior Door	436	Each
Wood, Solid Core, Painted, Interior Door	164	Each
C20 Stairs		
Metal, Painted, Interior Railing	1920	Ln Ft
Metal, Painted, Interior Stairs	7200	Sq Ft
C30 Interior Finishes		
Ceramic Tile, 4"x4", Interior Wall Finish	18750	Sq Ft
Concrete Block, Painted, Interior Wall Finish	27500	Sq Ft
Sheetrock, Stippled, Interior Wall Finish	563230	Sq Ft
Carpet, Nylon 20 oz., Low Traffic	59000	Sq Ft
Carpet, Wool 45 oz., Premium	116250	Sq Ft
Concrete, Painted Flooring	11000	Sq Ft
Vinyl Sheet Flooring	33750	Sq Ft
Sheetrock, Stippled Ceiling	100000	Sq Ft
Textured Spray Ceiling	120000	Sq Ft
D10 Conveying		
Elevator, Geared, 3,500 lbs, 16-25 Floor, 800 fpm	2	Each
D20 Plumbing		
Bathtub, Enamelled Steel	150	Each
Flush Tank Water Closet, One Piece	306	Each
Lavatory, Vitreous China	306	Each
Shower, Fiberglass	154	Each
Sink, Stainless Steel	152	Each
Booster Pump, 10 HP	2	Each
Circulator Pump, 3 HP, Cold Water	2	Each
Circulator Pump, 3 HP, Hot Water	2	Each
Pipe & Fittings, 3/4" Copper, Cold Water	38.9	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	23.6	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	35.3	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	39.5	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	24.5	K Ln Ft
Water Heater, Electric, 52 Gal.	152	Each
Backflow Preventer, 4"	4	Each
Pipe & Fittings, 6" Cast Iron	9.8	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.2	K Ln Ft
Sewage Ejector Pump, 1 HP	1	Each
Pipe & Fittings, 4" PVC	1.3	K Ln Ft
Roof Drain, 4-6"	5	Each
Sump Pump, 3 HP	1	Each
D30 HVAC		
Pipe & Fittings, 4" Steel, Gas	1.8	K Ln Ft
Chemical Feed System	1	Each
Circulation Pump, 25 HP, Hot Water	1	Each
Expansion Tank, 250 Gal.	1	Each
Gas Boiler, 2,000 Mbh	1	Each
Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 200 Ton	1	Each
Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 300 Ton	1	Each
Circulation Pump, 75 HP, Chiller & Condenser Water	3	Each
Cooling Tower, 500 Ton	1	Each
Air Handler, Multizone, 15,000 Cfm	13	Each
Duct Insulation, Fiberglass Blanket	40481	Sq Ft
Ductwork	60420	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	306	Each
Thermostat	151	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	1100	Each
Fire Sprinkler System	1	Each
Fire Suppression System Water Pump, 10 HP	2	Each
Fire Standpipe System	1	Each
Fire Extinguisher	50	Each
D50 Electrical		

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$10,211,671	\$0.93	0.47%
Unscheduled Maintenance	\$7,699,491	\$0.70	0.35%
Renewal & Replacement	\$33,342,394	\$3.03	1.53%
Total	\$51,253,556	\$4.66	2.35%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Refinish Sheetrock, Stippled, Interior Wall Finish	24.99	12.6%
Replace Carpet, Wool 45 oz., Premium	10.82	5.5%
Maintain Elevator, Geared, 3,500 lbs, 16-25 Floor, 800 fpm	9.05	4.6%
Replace Air Handler, Multizone, 15,000 Cfm	6.04	3.1%
Refinish Sheetrock, Stippled Ceiling	6.00	3.0%
Refinish Textured Spray Ceiling	5.55	2.8%
Replace Carpet, Nylon 20 oz., Low Traffic	4.86	2.5%
Replace Wood, Hollow Core, Painted, Interior Door Locks	4.69	2.4%
Maintain Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	4.56	2.3%
Replace Cooking Range, Domestic	4.18	2.1%
Replace Refrigerator, Domestic	4.10	2.1%
Replace Water Heater, Electric, 52 Gal.	3.70	1.9%
Replace Batteries & Check Operation, Smoke Detector	3.42	1.7%
Renovate Elevator, Geared, 3,500 lbs, 16-25 Floor, 800 fpm	3.22	1.6%
Refinish Stucco, Painted, Exterior, 3rd+ Floor	3.19	1.6%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	3.10	1.6%
Maintain Cooking Range, Domestic	3.05	1.5%
Maintain Air Handler, Multizone, 15,000 Cfm	2.97	1.5%
Replace Textured Spray Ceiling	2.70	1.4%
Replace Wood, Hollow Core, Painted, Sliding Interior Door Locks	2.34	1.2%
Replace Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 300 Ton	2.30	1.2%
Replace Shower, Fiberglass	2.21	1.1%
Replace Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	2.05	1.0%
Replace Wood, Hollow Core, Painted, Sliding Interior Door	2.03	1.0%
Replace Wood, Hollow Core, Painted, Interior Door	2.00	1.0%
Replace Incandescent Lighting Fixture, Basic, 100 w	1.87	0.9%
Replace Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 200 Ton	1.83	0.9%
Replace Aluminum Frame, Fully Glazed, Exterior Door Locks	1.71	0.9%
Maintain Circuit Breaker, 600 V, 70-100 Amp., 3 Ph.	1.71	0.9%
Maintain Refrigerator, Domestic	1.69	0.9%

*Task cost (\$2009) per GSFT over 50 years.

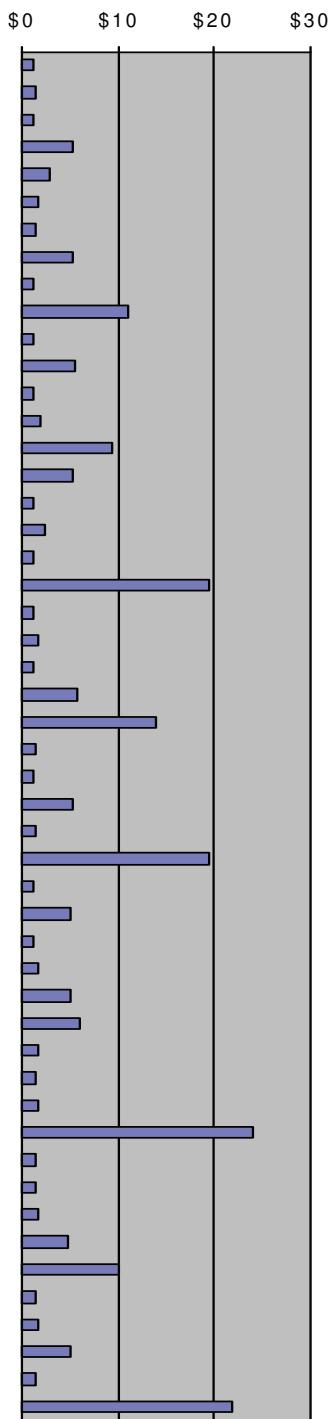
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1	.01				.23	.03	.43	.03	.23	.18		1.13
2	.01				.23	.42	.43	.03	.23	.18		1.53
3	.01				.23	.10	.43	.03	.25	.18		1.23
4	.01	.20	.03	3.19	.23	.65	.43	.03	.23	.18		5.18
5	.13	.01	.68		.14	.23	.56	.43	.05	.44	.18	2.85
6	.01				.23	.50	.43	.03	.25	.18		1.63
7	.01				.23	.28	.45	.03	.23	.18		1.41
8	.01	.20	.03	3.19	.23	.69	.43	.03	.23	.18		5.23
9	.01				.02	.23	.10	.43	.03	.25	.18	1.25
10	1.26	.02	2.79		.20	.23	1.74	1.43	.33	1.35	1.66	11.00
11	.01				.23	.03	.43	.03	.23	.18		1.13
12	.24	.01	.20	.03	3.19	.23	.76	.43	.10	.25	.18	5.61
13	.01				.23	.03	.43	.03	.23	.18		1.13
14	.01				.23	.67	.45	.03	.23	.18		1.81
15	.25	.01	.68	.09	1.74	.23	1.91	3.06	.09	1.02	.18	9.26
16	.01	.20	.03	3.19	.23	.69	.43	.03	.23	.18		5.23
17	.01				.23	.03	.43	.04	.23	.18		1.14
18	.01			.84	.23	.50	.43	.03	.30	.18		2.51
19	.01				.23	.03	.43	.03	.23	.18		1.13
20	1.27	.39	2.98	.03	3.62	.23	3.17	3.52	.32	2.33	1.66	19.52
21	.01				.23	.16	.45	.03	.25	.18		1.31
22	.01				.23	.62	.43	.04	.23	.18		1.74
23	.01				.23	.03	.43	.03	.23	.18		1.13
24	.24	.01	.20	.03	3.19	.23	.81	.43	.10	.25	.18	5.66
25	.25	.01	.68		5.89	1.61	3.51	.68	.04	.95	.18	13.80
26	.01				.23	.42	.43	.03	.23	.18		1.53
27	.01			.02	.23	.10	.43	.03	.25	.18		1.25
28	.01	.20	.03	3.19	.23	.70	.45	.03	.23	.18		5.26
29	.01				.23	.23	.43	.04	.23	.18		1.34
30	1.38	.02	3.33	.09	1.79	.23	2.94	4.66	.37	2.97	1.66	19.43
31	.01				.23	.03	.43	.03	.23	.18		1.13
32	.01	.11	.03	3.19	.23	.69	.43	.03	.23	.18		5.14
33	.01				.23	.10	.43	.03	.25	.18		1.23
34	.01	.09			.23	.42	.43	.04	.23	.18		1.63
35	.13	.01	.68		.14	.23	2.79	.43	.04	.44	.18	5.07
36	.24	.01	.11	.03	4.03	.23	.30	.43	.10	.30	.18	5.95
37	.01				.23	.46	.45	.03	.23	.18		1.59
38	.01	.09			.23	.18	.43	.03	.23	.18		1.38
39	.01				.23	.57	.43	.03	.25	.18		1.70
40	1.27	.39	4.76	.03	6.25	.23	2.52	3.77	.32	2.84	1.66	24.04
41	.01				.23	.26	.43	.04	.23	.18		1.38
42	.01	.09			.23	.32	.43	.03	.25	.18		1.53
43	.01				.23	.49	.43	.03	.23	.18		1.60
44	.01	.11	.03	3.19	.23	.38	.45	.03	.23	.18		4.85
45	.25	.01	.68	.09	1.75	.23	2.68	3.06	.09	1.02	.18	10.05
46	.01	.09			.23	.18	.43	.04	.23	.18		1.39
47	.01				.23	.49	.43	.03	.23	.18		1.60
48	.24	.01	.11	.03	3.19	.23	.34	.43	.10	.25	.18	5.11
49	.01				.23	.32	.43	.03	.23	.18		1.43
50	2.49	.02	2.87	.23	5.95	1.61	4.06	1.22	.43	1.26	1.66	21.78
Total	9.63	1.23	22.09	.89	61.09	14.42	39.95	39.52	3.69	24.18	16.29	232.97

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Auto Salesroom

Gross Square Feet:	21,000
Height in Ft:	14
Exterior:	Metal Panel
Floor coverings:	Finished Concrete, Vinyl Tile
HVAC:	Electric Cool, Gas Heat, Single Zone Air
Capacity:	N/A
Occupancy:	630
Replacement Cost:	\$3,276,000

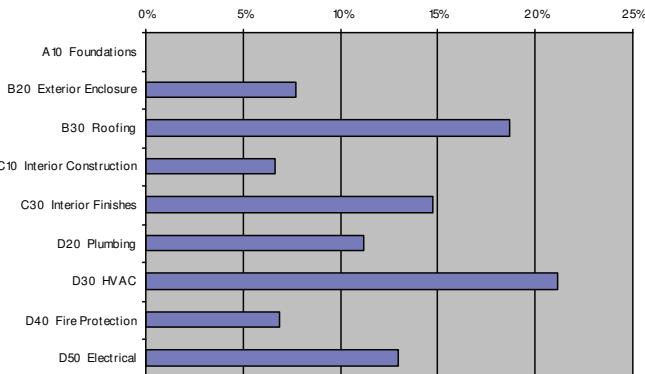
Components

Uniform / Component	Quantity	Units
A10 Foundations		
Concrete Slab	200	Sq Ft
B20 Exterior Enclosure		
Stucco, Painted, Exterior, 1st Floor	4165	Sq Ft
Aluminum Operable Window, 12 sf, 1st Floor	18	Each
Glass Curtain Wall	2744	Sq Ft
Aluminum Frame, Fully Glazed, Exterior Door	3	Each
Steel Single 12"x12", Painted, Roll-up Door	6	Each
Steel, Painted, Exterior Door	3	Each
B30 Roofing		
Built-up Roof	21000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	1	Each
Steel, Painted, Interior Door	75	Each
C30 Interior Finishes		
Sheetrock, Stippled, Interior Wall Finish	21000	Sq Ft
Concrete, Painted Flooring	10500	Sq Ft
Vinyl Tile Flooring	10500	Sq Ft
Acoustical Tile Ceiling	10500	Sq Ft
Metal, Painted Ceiling	10500	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	2	Each
Lavatory, Vitreous China	5	Each
Sink, Stainless Steel	4	Each
Tankless Water Closet	2	Each
Urinal, Vitreous China	2	Each
Circulator Pump, 1/12 HP, Cold Water	1	Each
Circulator Pump, 1/12 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.63	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.35	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.934	K Ln Ft
Pipe & Fittings, 4" Steel	1.215	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	1.038	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.668	K Ln Ft
Water Heater, Gas/Oil, 175 Gph	2	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.333	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.29	K Ln Ft
Pipe & Fittings, 4" PVC	0.17	K Ln Ft
Roof Drain, 2"	7	Each
D30 HVAC		
House Furnace, Gas/Oil, 100 Mbh	2	Each
Duct Insulation, Fiberglass Blanket	3042	Sq Ft
Ductwork	4540	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	2	Each
Exhaust Fan, Roof Mounted, 1,000 Cfm	2	Each
Air Conditioner, Rooftop, Single Zone, 50 Ton	1	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	150	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	8	Each
D50 Electrical		
Main Switchgear, <1,200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	2	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	2	Each
Exit Lighting Fixture, w/ Battery	6	Each
Fluorescent Lighting Fixture, 160 w	210	Each
Grounded Fault Circuit Interruptor, 15 Amp.	2	Each
Receptacle, 120 V, 15 Amp.	100	Each
TV Cable Outlet	1	Each
Wiring Device, Switch	30	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	8	Each
Heat Detector	8	Each
Manual Pull Station	2	Each
Smoke Detector	30	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$506,603	\$0.48	0.31%
Unscheduled Maintenance	\$434,920	\$0.41	0.27%
Renewal & Replacement	\$2,132,508	\$2.03	1.30%
Total	\$3,074,031	\$2.93	1.88%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, Single Zone, 50 Ton	13.04	10.4%
Place New Membrane Over Existing, Built-up Roof	10.97	8.7%
Refinish Sheetrock, Stippled, Interior Wall Finish	9.76	7.8%
Replace Membrane, Built-up Roof	9.50	7.6%
Refinish Metal, Painted Ceiling	6.60	5.3%
Replace Glass Curtain Wall	6.31	5.0%
Repair Air Conditioner, Rooftop, Single Zone, 50 Ton	6.20	4.9%
Replace Steel, Painted, Interior Door Locks	5.28	4.2%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	3.84	3.1%
Replace Fluorescent Lighting Fixture, 160 w	3.51	2.8%
Maintain Built-up Roof	3.04	2.4%
Replace Vinyl Tile Flooring	2.46	2.0%
Maintain Air Conditioner, Rooftop, Single Zone, 50 Ton	2.34	1.9%
Maintain Fire Sprinkler System	2.25	1.8%
Replace Water Heater, Gas/Oil, 175 Gph	2.17	1.7%
Test Gages & Valves, Fire Sprinkler System	2.08	1.7%
Maintain House Furnace, Gas/Oil, 100 Mbh	1.78	1.4%
Replace Batteries & Check Operation, Smoke Detector	1.71	1.4%
Refinish Concrete, Painted Flooring	1.66	1.3%
Clean Water Heater, Gas/Oil, 175 Gph	1.50	1.2%
Maintain Steel, Painted, Interior Door Locks	1.26	1.0%
Test Fire Sprinkler Head	1.21	1.0%
Minor Repair, Glass Curtain Wall (2% of Walls)	1.14	0.9%
Refinish Stucco, Painted, Exterior, 1st Floor	1.13	0.9%
Refinish Steel, Painted, Interior Door	.93	0.7%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	.86	0.7%
Maintain Roof Drain, 2"	.83	0.7%
Replace House Furnace, Gas/Oil, 100 Mbh	.82	0.7%
Repair Main Switchgear, <1,200 Amp.	.77	0.6%
Check Operation, Heat Detector	.76	0.6%

*Task cost (\$2009) per GSFT over 50 years.

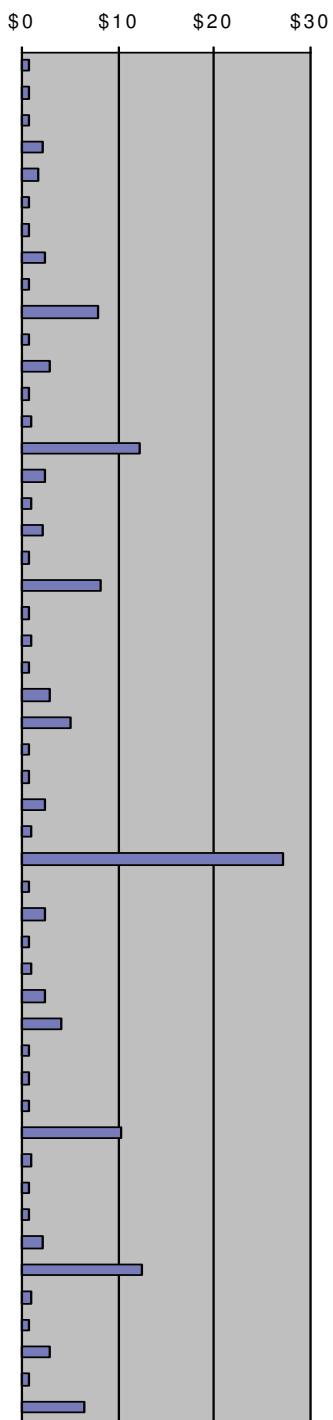
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	Interior Finishes	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13						.17	.19	.14	.14		.77
2		.13						.23	.19	.14	.14		.83
3		.13						.17	.19	.14	.14		.77
4		.13	.08	1.36				.23	.19	.14	.14		2.28
5		.15	.19	.34				.28	.20	.16	.26		1.59
6		.13						.23	.19	.14	.14		.83
7		.13						.19	.19	.14	.14		.80
8		.13	.08	1.36				.25	.19	.14	.15		2.30
9		.13						.17	.19	.14	.14		.83
10		.68	.19	1.40				.55	2.41	.56	1.73		7.86
11		.13						.17	.19	.14	.14		.77
12		.02	.13	.08	1.36			.74	.19	.25	.14		2.92
13		.13						.17	.19	.14	.14		.77
14		.13						.25	.19	.14	.14		.86
15		.20	5.67	.34	.09			.22	4.80	.29	.55		12.16
16		.13	.08	1.36				.25	.19	.14	.15		2.30
17		.13						.23	.19	.15	.14		.85
18		.13			1.26			.23	.19	.14	.14		2.09
19		.13						.17	.19	.14	.14		.77
20		.68	.19	1.51	1.76			.58	.34	.54	2.47		8.08
21		.13						.19	.19	.14	.14		.80
22		.13						.29	.19	.15	.14		.91
23		.13						.17	.19	.14	.14		.77
24		.02	.13	.08	1.36			.75	.19	.25	.15		2.94
25		.21	.19	.34	.27			.91	2.39	.14	.61		5.07
26		.13						.23	.19	.14	.14		.83
27		.13			.05			.17	.19	.14	.14		.83
28		.13	.08	1.36				.25	.19	.14	.14		2.30
29		.13						.23	.19	.15	.14		.85
30	6.91	9.50	1.40	.42				.51	5.39	.69	2.38		27.21
31		.13						.17	.19	.14	.14		.77
32		.13	.08	1.36				.25	.19	.14	.14		2.29
33		.13						.17	.19	.14	.15		.78
34		.13						.29	.19	.15	.14		.91
35		.84	.19	.34				.50	.20	.14	.26		2.48
36		.02	.13	.08	2.62			.71	.19	.25	.14		4.14
37		.13						.20	.19	.14	.14		.80
38		.13						.20	.19	.14	.14		.81
39		.13						.20	.19	.14	.14		.80
40		.47	.19	1.51	1.76			.66	2.53	.54	2.64		10.31
41		.13						.26	.19	.15	.15		.89
42		.13						.23	.19	.14	.14		.83
43		.13						.20	.19	.14	.14		.80
44		.13	.08	1.36				.20	.19	.14	.14		2.25
45		.41	5.67	.34	.14			.34	4.80	.29	.55		12.55
46		.13						.27	.19	.15	.14		.89
47		.13						.20	.19	.14	.14		.80
48		.02	.13	.08	1.36			.73	.19	.25	.14		2.90
49		.13						.22	.19	.14	.15		.83
50		.64	.19	1.40	.60			1.09	.23	.70	1.73		6.58
Total	11.30	27.33	9.70	21.62	16.32	30.99	10.11	19.01				146.38	

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Bank, Branch

Washington, D.C.

Bank, Branch

Gross Square Feet:	4,100
Height in Ft:	14
Exterior:	Stucco
Floor coverings:	Carpet Tile, Vinyl Tile
HVAC:	Electric Cooling, Gas Heating
Capacity:	N/A
Occupancy:	120
Replacement Cost:	\$1,041,400

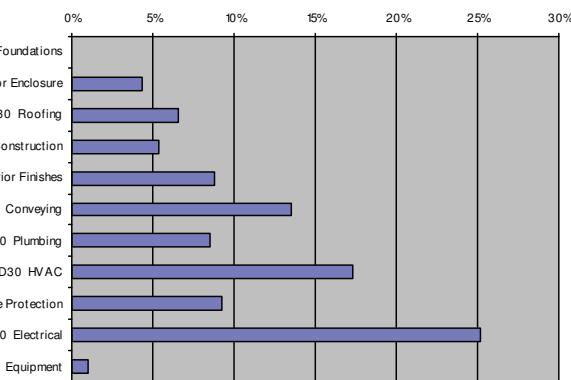
Components

Uniform / Component	Quantity	Units
A10 Foundations		
Concrete Slab	200	Sq Ft
B20 Exterior Enclosure		
Stucco, Painted, Exterior, 1st Floor	2867	Sq Ft
Aluminum Fixed Window, 24 sf, 1st Floor	25	Each
Aluminum & Glass Revolving Door	1	Each
Steel, Painted, Exterior Door	3	Each
B30 Roofing		
Built-up Roof	4100	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	5	Each
Aluminum, w/ Safety Glass, Plain or Anodized, Interior Door	21	Each
C30 Interior Finishes		
Vinyl, Interior Wall Finish	4100	Sq Ft
Carpet, Nylon 20 oz., High Traffic	2050	Sq Ft
Quarry Tile Flooring	2050	Sq Ft
Acoustical Tile Ceiling	4100	Sq Ft
D10 Conveying		
Pneumatic Tube Station	4	Each
D20 Plumbing		
Drinking Fountain, Refrigerated	2	Each
Lavatory, Iron, Enamel	6	Each
Sink, Stainless Steel	2	Each
Tankless Water Closet	5	Each
Urinal, Vitreous China	2	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.62	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.25	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.662	K Ln Ft
Pipe & Fittings, 4" Steel	0.568	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.926	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.428	K Ln Ft
Water Heater, Electric, 52 Gal.	1	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.364	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.128	K Ln Ft
Pipe & Fittings, 4" PVC	0.056	K Ln Ft
Roof Drain, 4-6"	2	Each
D30 HVAC		
Duct Insulation, Fiberglass Blanket	1166	Sq Ft
Ductwork	1740	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	2	Each
Air Conditioner, Rooftop, Single Zone, 20 Ton	1	Each
Thermostat	2	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	32	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	2	Each
D50 Electrical		
Main Switchgear, <1,200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	3	Each
Emergency Horn & Strobe	2	Each
Exit Lighting Fixture, w/ Battery	4	Each
Fluorescent Lighting Fixture, 160 w	41	Each
Receptacle, 120 V, 15 Amp.	30	Each
TV Cable Outlet	1	Each
Wiring Device, Switch	15	Each
Annunciation Panel	1	Each
Camera, Exterior, Closed Circuit, Fixed B/W	2	Each
Camera, Interior, Closed Circuit, Fixed B/W	4	Each
Camera, Security System	1	Each
Fire Alarm Horn & Strobe	2	Each
Heat Detector	2	Each
Manual Pull Station	2	Each
Monitor, Medium, Closed Circuit	2	Each
Smoke Detector	8	Each
E10 Equipment		
Microwave Oven	1	Each
Refrigerator, Domestic	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$445,059	\$2.17	0.85%
Unscheduled Maintenance	\$262,304	\$1.28	0.50%
Renewal & Replacement	\$991,976	\$4.84	1.91%
Total	\$1,699,339	\$8.29	3.26%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Maintain Pneumatic Tube Station	35.06	10.0%
Replace Air Conditioner, Rooftop, Single Zone, 20 Ton	27.70	7.9%
Repair Air Conditioner, Rooftop, Single Zone, 20 Ton	20.66	5.9%
Replace Carpet, Nylon 20 oz., High Traffic	18.11	5.2%
Replace Monitor, Medium, Closed Circuit	14.42	4.1%
Replace Camera, Interior, Closed Circuit, Fixed B/W	12.34	3.5%
Maintain Fire Sprinkler System	11.54	3.3%
Replace Camera, Exterior, Closed Circuit, Fixed B/W	11.51	3.3%
Replace Pneumatic Tube Station	11.47	3.3%
Replace Quarry Tile Flooring	11.11	3.2%
Place New Membrane Over Existing, Built-up Roof	10.97	3.1%
Test Gages & Valves, Fire Sprinkler System	10.63	3.0%
Maintain Air Conditioner, Rooftop, Single Zone, 20 Ton	9.84	2.8%
Replace Aluminum, w/ Safety Glass, Plain or Anodized, Interior Door	9.82	2.8%
Replace Membrane, Built-up Roof	9.50	2.7%
Replace Aluminum & Glass Revolving Door	7.86	2.2%
Replace Aluminum, w/ Safety Glass, Plain or Anodized, Interior Door Lock	6.06	1.7%
Maintain Camera, Interior, Closed Circuit, Fixed B/W	4.99	1.4%
Replace Vinyl, Interior Wall Finish	4.98	1.4%
Maintain Power Panel Board, 208 Y/120 V, 200 Amp.	4.59	1.3%
Replace Power Panel Board, 208 Y/120 V, 200 Amp.	4.42	1.3%
Refinish Stucco, Painted, Exterior, 1st Floor	4.00	1.1%
Repair Main Switchgear, <1,200 Amp.	3.97	1.1%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	3.84	1.1%
Replace Camera, Security System	3.84	1.1%
Replace Fluorescent Lighting Fixture, 160 w	3.51	1.0%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	3.12	0.9%
Maintain Built-up Roof	3.04	0.9%
Replace Main Switchgear, <1,200 Amp.	2.76	0.8%
Replace Fire Alarm Control Panel	2.53	0.7%

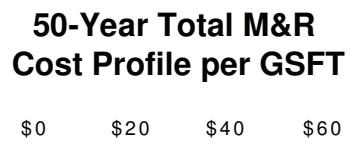
*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1	.07	.13			.93	.22	.44	.66	.87	.05		3.35
2	.07	.13			.06	.93	.49	.44	.66	.87	.05	3.69
3	.07	.13				.93	.24	.44	.66	.87	.05	3.38
4	.07	.13	.03		.06	.93	.49	.44	.66	.87	.05	3.72
5	.13	.19	.49		.04	.93	.30	.44	.71	5.17	.05	8.45
6	.07	.13			.06	.93	.52	.44	.66	.87	.05	3.72
7	.07	.13				.93	.41	.44	.66	.87	.05	3.55
8	.07	.13	.03		3.02	.93	.53	.44	.66	.87	.05	6.71
9	.07	.13				.93	.24	.44	.66	.87	.05	3.44
10	1.17	.19	2.00		.10	.93	1.60	7.47	1.15	6.89	.40	21.91
11	.07	.13				.93	.22	.44	.66	.87	.05	3.35
12	.07	.13	.03		.06	.93	.68	.44	.79	.87	.05	4.05
13	.07	.13				.93	.22	.44	.66	.87	.05	3.35
14	.07	.13			.06	.93	.69	.44	.66	.87	.05	3.89
15	.26	5.67	.49		1.89	.93	.73	9.32	1.44	5.81	.05	26.59
16	.07	.13	.03		3.02	.93	.53	.44	.66	.87	.05	6.71
17	.07	.13				.93	.22	.44	.68	.87	.05	3.37
18	.07	.13			.11	.93	.52	.44	.66	.87	.05	3.78
19	.07	.13				.93	.22	.44	.66	.87	.05	3.35
20	1.32	.19	2.96		.10	.93	1.73	.90	1.13	8.50	.40	18.14
21	.07	.13				.93	.37	.44	.66	.87	.05	3.51
22	.07	.13			.06	.93	.56	.44	.68	.87	.05	3.78
23	.07	.13				.93	.22	.44	.66	.87	.05	3.35
24	.07	.13	.03		3.02	.93	.72	.44	.79	.87	.05	7.04
25	.33	.19	.49		.04	5.74	3.01	7.33	.69	5.50	.05	23.37
26	.07	.13			.06	.93	.49	.44	.66	.87	.05	3.69
27	.07	.13			.05	.93	.24	.44	.66	.87	.05	3.44
28	.07	.13	.03		.06	.93	.62	.44	.66	.87	.05	3.85
29	.07	.13				.93	.29	.44	.68	.87	.05	3.45
30	9.09	9.50	2.00		1.95	.93	1.98	10.58	1.88	11.35	.40	49.66
31	.07	.13				.93	.22	.44	.66	.87	.05	3.35
32	.07	.13	.03		3.02	.93	.53	.44	.66	.87	.05	6.71
33	.07	.13				.93	.24	.44	.66	.87	.05	3.38
34	.07	.13			.06	.93	.49	.44	.68	.87	.05	3.71
35	.13	.19	.49		.04	.93	1.69	.44	.69	5.17	.05	9.82
36	.07	.13	.03		.11	.93	.68	.44	.79	.87	.05	4.10
37	.07	.13				.93	.29	.44	.66	.87	.05	3.43
38	.07	.13			.06	.93	.49	.44	.66	.87	.05	3.69
39	.07	.13				.93	.24	.44	.66	.87	.05	3.38
40	1.32	.19	2.96		3.06	.93	2.45	7.78	1.13	8.83	.40	29.04
41	.07	.13				.93	.22	.44	.68	.87	.05	3.37
42	.07	.13			.06	.93	.59	.44	.66	.87	.05	3.79
43	.07	.13				.93	.22	.44	.66	.87	.05	3.35
44	.07	.13	.03		.06	.93	.56	.44	.66	.87	.05	3.79
45	.26	5.67	.49		1.94	.93	1.05	9.32	1.44	5.81	.05	26.96
46	.07	.13			.06	.93	.49	.44	.68	.87	.05	3.71
47	.07	.13				.93	.27	.44	.66	.87	.05	3.41
48	.07	.13	.03		3.02	.93	.72	.44	.79	.87	.05	7.04
49	.07	.13				.93	.28	.44	.66	.87	.05	3.42
50	1.37	.19	9.82		11.21	5.74	4.13	.59	1.30	6.56	.40	41.31
Total	18.02	27.32	22.45		36.57	56.00	35.16	71.77	38.51	104.42	4.24	414.45



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Bowling Center

Washington, D.C.

Bowling Center

Gross Square Feet:	20,000
Height in Ft:	16
Exterior:	Concrete Block
Floor coverings:	Finished Concrete, Rubber Tile, Carpet
HVAC:	Single Zone Rooftop Units
Capacity:	N/A
Occupancy:	600
Replacement Cost:	\$4,840,000

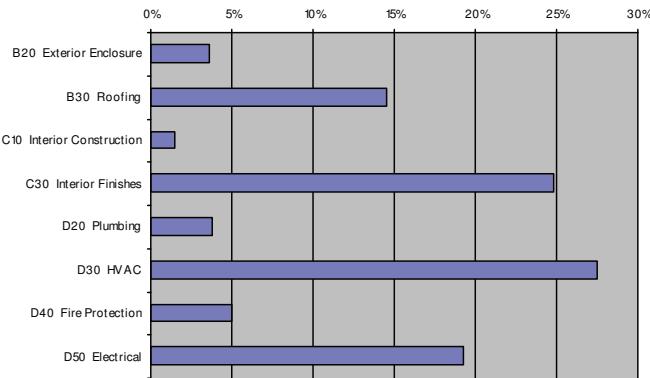
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Concrete Block, Painted, Exterior, 1st Floor	8560	Sq Ft
Aluminum Fixed Window, 24 sf, 1st Floor	21	Each
Aluminum Frame, Fully Glazed, Exterior Door	5	Each
Steel Single 12x12', Painted, Roll-up Door	1	Each
Steel, Painted, Exterior Door	3	Each
B30 Roofing	20000	Sq Ft
Built-up Roof		
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	7	Each
Wood, Solid Core, Painted, Interior Door	12	Each
C30 Interior Finishes		
Acoustical Tile, Painted, Interior Wall Finish	2000	Sq Ft
Concrete Block, Painted, Interior Wall Finish	8156	Sq Ft
Sheetrock, Unstippled, Interior Wall Finish	11200	Sq Ft
Carpet, Nylon 20 oz., High Traffic	2500	Sq Ft
Concrete, Painted Flooring	2500	Sq Ft
Maple Sports Floor	3930	Sq Ft
Rubber Tile Flooring	1070	Sq Ft
Acoustical Tile, Dropped Ceiling	17500	Sq Ft
Metal, Painted Ceiling	2500	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	1	Each
Lavatory, Vitreous China	4	Each
Service Sink, Iron, Enamel	1	Each
Sink, Stainless Steel	2	Each
Tankless Water Closet	7	Each
Urinal, Vitreous China	2	Each
Circulator Pump, 1/4 HP, Cold Water	1	Each
Circulator Pump, 1/6 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.6	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.3	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.7	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.6	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.3	K Ln Ft
Pipe & Fittings, 4" Cast Iron	1	K Ln Ft
Pipe & Fittings, 6" Cast Iron	0.5	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.3	K Ln Ft
Pipe & Fittings, 4" PVC	0.2	K Ln Ft
Roof Drain, 4-6"	6	Each
D30 HVAC		
Pipe & Fittings, 4" Steel, Gas	0.3	K Ln Ft
Duct Insulation, Fiberglass Blanket	5548	Sq Ft
Ductwork	8280	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	4	Each
Air Conditioner, Rooftop, Single Zone, 50 Ton	2	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	100	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	5	Each
D50 Electrical		
Distribution Switch, Fused, <600 V	12	Each
Main Switchgear, <1,200 Amp.	1	Each
Motor Starter, 5-20 HP, <600 V	24	Each
Exit Lighting Fixture, w/ Battery	10	Each
Fluorescent Lighting Fixture, 160 w	250	Each
Receptacle, 120 V, 15 Amp.	80	Each
Wiring Device, Switch	20	Each
Fire Alarm Horn & Strobe	5	Each
Heat Detector	10	Each
Manual Pull Station	5	Each
Smoke Detector	30	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$774,990	\$0.77	0.32%
Unscheduled Maintenance	\$533,311	\$0.53	0.22%
Renewal & Replacement	\$2,463,532	\$2.46	1.02%
Total	\$3,771,833	\$3.77	1.56%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, Single Zone, 50 Ton	27.38	16.9%
Screen & Recoat Maple Sports Floor	13.30	8.2%
Repair Air Conditioner, Rooftop, Single Zone, 50 Ton	13.03	8.0%
Place New Membrane Over Existing, Built-up Roof	10.97	6.8%
Replace Membrane, Built-up Roof	9.50	5.9%
Refinish Sheetrock, Unstippled, Interior Wall Finish	5.47	3.4%
Inspect & Clean Motor Starter, 5-20 HP, <600 V	4.93	3.0%
Maintain Air Conditioner, Rooftop, Single Zone, 50 Ton	4.92	3.0%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	4.81	3.0%
Replace Carpet, Nylon 20 oz., High Traffic	4.53	2.8%
Replace Fluorescent Lighting Fixture, 160 w	4.39	2.7%
Refinish Concrete Block, Painted, Interior Wall Finish	4.11	2.5%
Replace Coil, Motor Starter, 5-20 HP, <600 V	4.01	2.5%
Maintain Built-up Roof	3.04	1.9%
Sand & Refinish Maple Sports Floor	2.73	1.7%
Repaint (50% surface) Concrete Block, Painted, Exterior, 1st Floor	2.47	1.5%
Maintain Fire Sprinkler System	2.37	1.5%
Repaint (50% surface) Concrete Block, Painted, Interior Wall Finish	2.35	1.5%
Refinish Concrete Block, Painted, Exterior, 1st Floor	2.32	1.4%
Test Gages & Valves, Fire Sprinkler System	2.18	1.3%
Replace Motor Starter, 5-20 HP, <600 V	1.89	1.2%
Replace Batteries & Check Operation, Smoke Detector	1.79	1.1%
Replace Maple Sports Floor	1.69	1.0%
Refinish Metal, Painted Ceiling	1.65	1.0%
Replace Distribution Switch, Fused, <600 V	1.61	1.0%
Refinish Acoustical Tile, Painted, Interior Wall Finish	1.08	0.7%
Check Operation, Heat Detector	.99	0.6%
Test Fire Sprinkler Head	.85	0.5%
Replace Existing Ductwork (20% of Ductwork)	.81	0.5%
Repair Main Switchgear, <1,200 Amp.	.81	0.5%

*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13			.43		.05	.20	.14	.31			1.26
2		.13			.44		.10	.20	.14	.31			1.32
3		.13			.43		.05	.20	.14	.64			1.59
4		.13	.02		1.47		.10	.20	.14	.31			2.37
5	.04	.19	.06		.43		.09	.21	.16	.44			1.62
6		.13			.44		.10	.20	.14	.64			1.66
7		.13			.43		.07	.20	.14	.31			1.28
8		.13	.02		2.21		.11	.20	.14	.31			3.12
9		.13			.49		.05	.20	.14	.64			1.65
10		.66	.19	.23	1.21		.26	4.56	.44	2.28			9.84
11		.13			.43		.05	.20	.14	.31			1.26
12		.04	.13	.02	1.47		.17	.21	.21	.64			2.89
13		.13			.43		.05	.20	.14	.31			1.26
14		.13			.44		.12	.20	.14	.31			1.34
15		.06	5.67	.06	.45		.09	9.30	.30	1.04			16.98
16		.13	.02		2.21		.11	.20	.14	.31			3.12
17		.13			.43		.05	.20	.15	.31			1.27
18		.13			.89		.10	.20	.14	1.11			2.57
19		.13			.43		.05	.20	.14	.31			1.26
20		.69	.19	.52	2.27		.43	.34	.43	3.14			8.01
21		.13			.43		.07	.20	.14	.64			1.62
22		.13			.44		.10	.20	.15	.31			1.33
23		.13			.43		.05	.20	.14	.31			1.26
24		.04	.13	.02	2.21		.18	.21	.21	.64			3.64
25		1.40	.19	.06	1.80		.66	4.56	.15	.62			9.44
26		.13			.44		.10	.20	.14	.31			1.32
27		.13			.49		.05	.20	.14	.64			1.65
28		.13	.02		1.47		.12	.20	.14	.31			2.39
29		.13			.43		.05	.20	.15	.31			1.27
30		.69	9.50	.23	1.23		.30	10.39	.58	4.20			27.13
31		.13			.43		.05	.20	.14	.31			1.26
32		.13	.02		2.21		.11	.20	.14	.31			3.12
33		.13			.43		.05	.20	.14	.64			1.59
34		.13			.44		.10	.20	.15	.31			1.33
35		.16	.19	.06	.43		.55	.21	.15	.44			2.19
36		.04	.13	.02	1.92		.14	.21	.21	1.11			3.77
37		.13			.43		.08	.20	.14	.31			1.29
38		.13			.44		.07	.20	.14	.31			1.29
39		.13			.43		.08	.20	.14	.64			1.62
40		.65	.19	1.01	3.59		.47	4.69	.43	3.31			14.34
41		.13			.43		.08	.20	.15	.31			1.30
42		.13			.44		.09	.20	.14	.64			1.65
43		.13			.43		.08	.20	.14	.31			1.29
44		.13	.02		1.47		.07	.20	.14	.31			2.34
45		.10	5.67	.06	.51		.22	9.30	.30	1.04			17.20
46		.13			.44		.07	.20	.15	.31			1.30
47		.13			.43		.08	.20	.14	.31			1.29
48		.04	.13	.02	2.21		.14	.21	.21	.64			3.61
49		.13			.43		.10	.20	.14	.31			1.31
50		2.20	.19	.23	2.58		.74	.22	.54	2.11			8.80
Total	6.82	27.33	2.73	46.87	7.23	51.92	9.43	36.28				188.59	



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Cafeteria

Washington, D.C.

Cafeteria

Gross Square Feet:	21,500
Height in Ft:	20
Exterior:	Clay Brick
Floor coverings:	Vinyl Tile, Quarry Tile
HVAC:	Chilled Air, Heat Exch., Multizone Air
Capacity:	N/A
Occupancy:	1,290
Replacement Cost:	\$6,923,000

Components (Continued on Page 152)

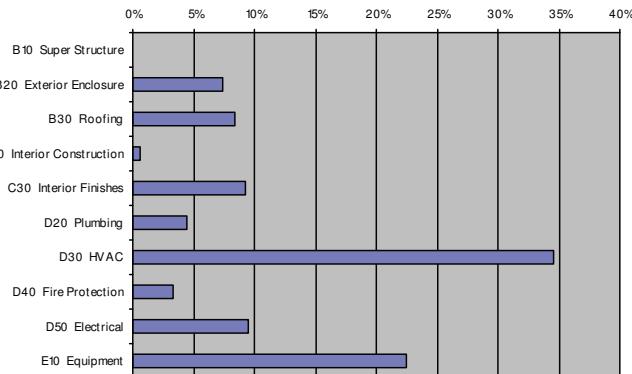
Uniform / Component	Quantity	Units
B10 Super Structure		
Steel Roof Access Ladder	30	Ln Ft
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	11700	Sq Ft
Aluminum Operable Window, 12 sf, 1st Floor	23	Each
Aluminum Operable Window, 24 sf, 1st Floor	15	Each
Aluminum Frame, Fully Glazed, Exterior Door	1	Each
Steel, Painted, Exterior Door	2	Each
Steel w/ Safety Glass, Painted, Exterior Door	5	Each
B30 Roofing		
Built-up Roof	21500	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	6	Each
Steel, Painted, Interior Double Door	8	Each
Wood, Hollow Core, Painted, Interior Door	2	Each
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	15100	Sq Ft
Gypsum Board, Interior Wall Finish	8900	Sq Ft
Carpet, Nylon 20 oz., Low Traffic	2300	Sq Ft
Concrete, Painted Flooring	4800	Sq Ft
Quarry Tile Flooring	3800	Sq Ft
Vinyl Tile Flooring	10600	Sq Ft
Acoustical Tile, Dropped Ceiling	14300	Sq Ft
Concrete, Painted Ceiling	1900	Sq Ft
Sheetrock, Unstippled Ceiling	5300	Sq Ft
D20 Plumbing		
Lavatory, Vitreous China	6	Each
Sink, Stainless Steel	9	Each
Tankless Water Closet	6	Each
Urinal, Vitreous China	3	Each
Circulator Pump, 1/6 HP, Cold Water	1	Each
Circulator Pump, 1/6 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.6	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.54	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.2	K Ln Ft
Pipe & Fittings, 4" Steel	0.4	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.8	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.54	K Ln Ft
Water Heater, Electric, 52 Gal.	0.54	K Ln Ft
Backflow Preventer, 4"	2	Each
Pipe & Fittings, 6" Cast Iron	0.24	K Ln Ft
Pipe & Fittings, 4" PVC	0.8	K Ln Ft
Roof Drain, 4-6"	6	Each
D30 HVAC		
Heat Exchanger, Steam-to-Water, 40 Gpm	3	Each
Chiller, Reciprocal Air-Cooled Hermetic, 40 Ton	1	Each
Evaporative Cooler, Indirect & Direct, Packaged w/ Heat, 4 Ton	2	Each
Air Curtain, 1,000 Cfm	2	Each
Air Handler, Multizone, 2,500 Cfm	3	Each
Duct Insulation, Fiberglass Blanket	4409	Sq Ft
Ductwork	6580	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	2	Each
Exhaust Fan, Roof Mounted, 1,000 Cfm	6	Each
Air Conditioner, Window, 1 Ton	5	Each
Baseboard Radiator 10 ft.	14	Each
Heat Pump, 2 Ton	11	Each
Heat Pump, 25 Ton	2	Each
Suspended Heater, Hot Water, 1,200 Cfm, 55 Mbh	5	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	150	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	8	Each
Kitchen Fire Suppression System (CO2)	1	Each
D50 Electrical		
Power Panel Board, 208 Y/120 V, 200 Amp.	8	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	20	Each
Exit Lighting Fixture w/ Battery	8	Each
Fluorescent Lighting Fixture, 80 w	100	Each
Incandescent Lighting Fixture, Basic, 100 w	75	Each
Metal Halide Lighting Fixture, High Bay, 400 w	10	Each
Receptacle, 120 V, 20 Amp.	190	Each
Wiring Device, Switch	75	Each
Fire Alarm Horn & Strobe	8	Each
Heat Detector	8	Each

Note: For alternative locations use the Local Indexes shown in Chapter 3.

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$1,966,967	\$1.83	0.57%
Unscheduled Maintenance	\$1,707,181	\$1.59	0.49%
Renewal & Replacement	\$3,311,937	\$3.08	0.96%
Total	\$6,986,085	\$6.50	2.02%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Place New Membrane Over Existing, Built-up Roof	10.97	4.5%
Replace Heat Pump, 25 Ton	9.84	4.0%
Maintain Heat Pump, 2 Ton	9.74	4.0%
Replace Membrane, Built-up Roof	9.50	3.9%
Replace Walk-In Freezer/Cooler, Commercial	9.32	3.8%
Replace Dishwasher, Commercial	8.84	3.6%
Maintain Icemaker, Commercial	7.52	3.1%
Replace Icemaker, Commercial	7.49	3.1%
Clean & Reseal Clay Brick, Exterior, 1st Floor	7.47	3.0%
Refinish Concrete Block, Painted, Interior Wall Finish	7.08	2.9%
Maintain Cooking Range, Commercial	6.31	2.6%
Maintain Chiller, Reciprocal Air Cooled Hermetic, 40 Ton	6.29	2.6%
Replace Heat Pump, 2 Ton	5.60	2.3%
Maintain Heat Pump, 25 Ton	5.49	2.2%
Maintain Suspended Heater, Hot Water, 1,200 Cfm, 55 Mbh	5.04	2.1%
Replace Chiller, Reciprocal Air Cooled Hermetic, 40 Ton	4.89	2.0%
Maintain Dishwasher, Commercial	4.84	2.0%
Maintain Air Handler, Multizone, 2,500 Cfm	4.56	1.9%
Repaint (50% surface) Clay Brick, Exterior, 1st Floor	4.06	1.7%
Repaint (50% surface) Concrete Block, Painted, Interior Wall Finish	4.04	1.6%
Refinish Gypsum Board, Interior Wall Finish	4.04	1.6%
Replace Quarry Tile Flooring	3.93	1.6%
Maintain Walk-In Freezer/Cooler, Commercial	3.76	1.5%
Replace Safety Switch, Fused, 400 Amp., 3 Ph.	3.75	1.5%
Replace Air Handler, Multizone, 2,500 Cfm	3.63	1.5%
Repair Heat Pump, 2 Ton	3.61	1.5%
Maintain Safety Switch, Fused, 400 Amp., 3 Ph.	3.48	1.4%
Replace Evaporative Cooler, Indirect & Direct, Pkg'd w/ Heat, 4 Ton	3.47	1.4%
Refinish Sheetrock, Unstippled Ceiling	3.26	1.3%
Maintain Built-up Roof	3.04	1.2%

*Task cost (\$2009) per GSFT over 50 years.

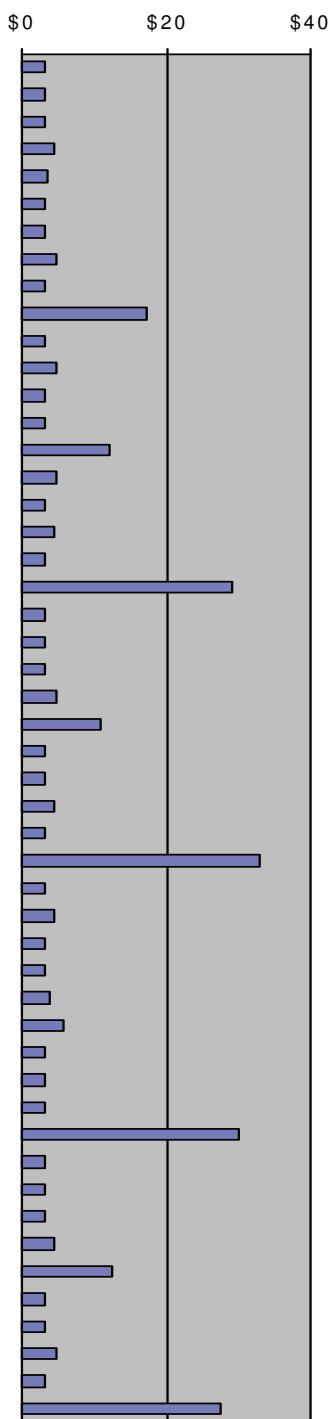
**Percent of total M&R costs.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13					.14	.14	.30	1.00		3.12
2		.13					.22	.14	.30	1.00		3.20
3		.13					.15	.14	.30	1.00		3.13
4		.13	.02	1.30			.22	.14	.30	1.00		4.52
5		.03	.19	.04	.01		.18	.14	.49	1.00		3.54
6		.13					.23	.14	.30	1.00		3.21
7		.13					.20	.14	.30	1.00		3.26
8		.13	.02	1.30			.25	.14	.40	1.00		4.66
9		.13					.15	.14	.30	1.00		3.20
10		3.72	.19	.18	.16		.67	4.87	.63	1.43	5.57	17.42
11							.14	.14	.30	1.00		3.12
12		.01	.13	.02	1.30		.24	.14	.25	.30	1.00	4.66
13							.14	.14	.30	1.00		3.12
14							.28	.14	.30	1.00		3.34
15		.14	5.67	.04	.77		.34	3.21	.29	.76	1.00	12.23
16			.13	.02	1.30		.25	.14	.40	1.00		4.66
17							.14	.14	.16	.30	1.00	3.14
18							.23	.14	.14	.30	1.00	4.46
19							.14	.14	.14	.30	1.00	3.12
20		3.72	.19	.42	1.48		.82	13.51	.61	2.68	5.57	29.00
21							.18	.14	.30	1.00		3.24
22							.25	.14	.16	.30	1.00	3.24
23							.14	.14	.30	1.00		3.12
24		.01	.13	.02	1.30		.27	.14	.25	.40	1.00	4.79
25		2.46	.19	.04	2.30		.54	1.79	.15	2.48	1.00	10.96
26							.22	.14	.14	.30	1.00	3.20
27							.15	.14	.14	.30	1.00	3.20
28							.25	.14	.14	.30	1.00	4.63
29							.17	.14	.16	.30	1.00	3.17
30		3.82	9.50	.19	.91		1.08	7.66	.76	3.56	5.57	33.06
31							.14	.14	.14	.30	1.00	3.12
32							.25	.14	.14	.30	1.00	4.55
33							.15	.14	.14	.40	1.00	3.24
34							.22	.14	.16	.30	1.00	3.22
35			.03	.19	.04	.01	.62	1.44	.15	.49	1.00	3.99
36			.01	.13	.02	2.55	.21	.14	.25	.30	1.00	5.88
37							.20	.14	.14	.30	1.00	3.26
38							.19	.14	.14	.30	1.00	3.17
39							.18	.14	.14	.30	1.00	3.17
40		3.72	.19	.42	1.48		1.09	13.87	.61	2.93	5.57	29.89
41							.17	.14	.16	.40	1.00	3.27
42							.23	.14	.14	.30	1.00	3.21
43							.17	.14	.14	.30	1.00	3.15
44							.21	.14	.14	.30	1.00	4.60
45		.14	5.67	.04	.83		.46	3.19	.29	.76	1.00	12.39
46			.13	.00			.19	.14	.16	.30	1.00	3.19
47			.13				.17	.14	.14	.30	1.00	3.15
48		.01	.13	.02	1.30		.24	.14	.25	.30	1.00	4.66
49			.13				.20	.14	.14	.40	1.00	3.29
50		6.18	.19	.18	6.38		.93	4.50	.77	2.92	5.57	27.62
Total	23.99	27.33	1.85	29.94			14.57	112.35	10.68	31.04	73.01	324.77

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT



Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Car Wash

Washington, D.C.

Car Wash

Gross Square Feet:	800
Height in Ft:	12
Exterior:	Clay Brick
Floor coverings:	Finished Concrete
HVAC:	Unit Heaters
Capacity:	N/A
Occupancy:	10
Replacement Cost:	\$240,800

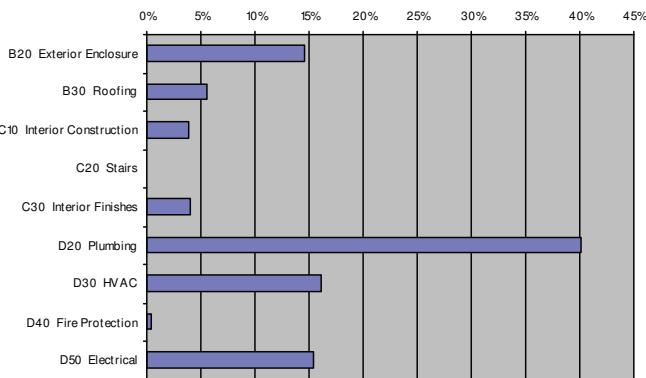
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	958	Sq Ft
Aluminum Operable Window, 12 sf, 1st Floor	8	Each
Steel Single 12"x12", Painted, Roll-up Door	2	Each
Steel, Painted, Exterior Door	2	Each
B30 Roofing		
Built-up Roof	800	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	4	Each
Steel, Painted, Interior Door	3	Each
C20 Stairs		
Concrete, Interior Stairs	12	Sq Ft
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	960	Sq Ft
Concrete Flooring	800	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	1	Each
Lavatory, Iron, Enamel	4	Each
Tankless Water Closet	4	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.4	K Ln Ft
Pipe & Fittings, 3/4" Copper, High Temp.	0.2	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.12	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.442	K Ln Ft
Pipe & Fittings, 4" Steel	0.326	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.564	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.227	K Ln Ft
Water Heater, Gas/Oil, 65 Gph	1	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.198	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.57	K Ln Ft
Pipe & Fittings, 4" PVC	0.012	K Ln Ft
Roof Drain, 4-6"	2	Each
D30 HVAC		
House Furnace, Gas/Oil, 100 Mbh	1	Each
Exhaust Fan, Ceiling, 200-500 Cfm	2	Each
Thermostat	1	Each
D40 Fire Protection		
Fire Extinguisher	1	Each
D50 Electrical		
Main Switchgear, <1,200 Amp.	1	Each
Exit Lighting Fixture, w/ Battery	2	Each
Fluorescent Lighting Fixture, 160 w	12	Each
Grounded Fault Circuit Interruptor, 15 Amp.	6	Each
Receptacle, 120 V, 15 Amp.	13	Each
Wiring Device, Switch	5	Each
Smoke Detector	4	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$94,755	\$2.37	0.79%
Unscheduled Maintenance	\$114,472	\$2.86	0.95%
Renewal & Replacement	\$186,386	\$4.66	1.55%
Total	\$395,613	\$9.89	3.29%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Maintain House Furnace, Gas/Oil, 100 Mbh	23.32	6.6%
Repair Main Switchgear, <1,200 Amp.	20.34	5.8%
Clean Water Heater, Gas/Oil, 65 Gph	19.72	5.6%
Clean & Reseal Clay Brick, Exterior, 1st Floor	16.44	4.7%
Replace Water Heater, Gas/Oil, 65 Gph	14.19	4.0%
Replace Main Switchgear, <1,200 Amp.	14.12	4.0%
Maintain Backflow Preventer, 2"	12.94	3.7%
Refinish Concrete Block, Painted, Interior Wall Finish	12.09	3.4%
Place New Membrane Over Existing, Built-up Roof	10.97	3.1%
Replace House Furnace, Gas/Oil, 100 Mbh	10.83	3.1%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	10.68	3.0%
Replace Membrane, Built-up Roof	9.50	2.7%
Replace Backflow Preventer, 2"	9.28	2.6%
Repaint (50% surface) Clay Brick, Exterior, 1st Floor	8.94	2.5%
Maintain Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	8.22	2.3%
Replace Toilet Partitions, Painted Metal, Overhead Braced	7.81	2.2%
Repaint (50% surface) Concrete Block, Painted, Interior Wall Finish	6.91	2.0%
Repair Steel Single 12"x12", Painted, Roll-up Door	6.24	1.8%
Maintain Roof Drain, 4-6"	6.19	1.8%
Maintain Main Switchgear, <1,200 Amp.	6.12	1.7%
Replace Batteries & Check Operation, Smoke Detector	5.99	1.7%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	5.77	1.6%
Replace Steel Single 12"x12", Painted, Roll-up Door	5.70	1.6%
Replace Drinking Fountain, Refrigerated	5.63	1.6%
Replace Steel, Painted, Interior Door Locks	5.54	1.6%
Replace Fluorescent Lighting Fixture, 160 w	5.27	1.5%
Replace Faucet Washer & Clean Trap, Lavatory, Iron, Enamel	5.13	1.5%
Repair House Furnace, Gas/Oil, 100 Mbh	4.70	1.3%
Replace Pipe & Fittings, 3/4" Copper, Cold Water (20% of Pipe)	4.35	1.2%
Replace Steel, Painted, Exterior Door Locks	3.89	1.1%

*Task cost (\$2009) per GSFT over 50 years.

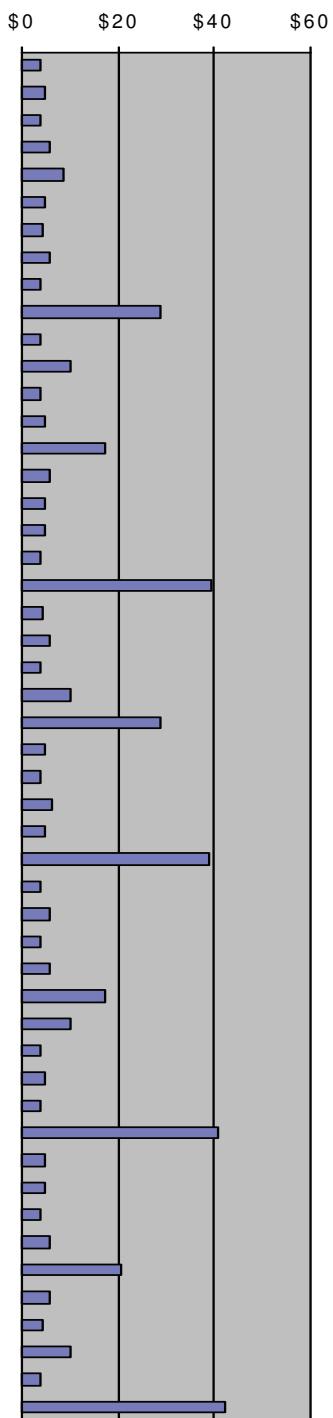
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13					2.25	1.24	.46			4.07
2		.13					2.96	1.24	.46			4.78
3		.13					2.25	1.24	.46			4.07
4		.13	.19	1.01			2.96	1.24	.46			5.98
5	.22	.19	.36				3.32	1.24	.05	3.16		8.54
6		.13					2.96	1.24	.46			4.78
7		.13					2.45	1.24	.46			4.27
8		.13	.19	1.01			2.96	1.24	.46			5.98
9		.13					2.25	1.24	.46			4.07
10	10.76	.19	1.47				7.45	3.18	.05	5.64		28.74
11		.13					2.25	1.24	.46			4.07
12		.13	.19	1.01			6.63	1.24	.35	.46		10.00
13		.13					2.25	1.24	.46			4.07
14		.13					3.16	1.24	.46			4.99
15	.92	5.68	.36	.16			2.50	3.96	3.89			17.47
16		.13	.19	1.01			2.96	1.24	.46			5.98
17		.13					3.06	1.24	.05	.46		4.94
18		.13					2.96	1.24	.46			4.78
19		.13					2.25	1.24	.46			4.07
20	10.76	.19	5.45	.04	1.01		7.09	3.20	11.59			39.34
21		.13					2.45	1.24	.46			4.27
22		.13					3.78	1.24	.05	.46		5.65
23		.13					2.25	1.24	.46			4.07
24		.13	.19	1.01			6.63	1.24	.35	.46		10.00
25	5.56	.19	.36	3.79			12.57	2.80	3.72			28.99
26		.13					2.96	1.24	.46			4.78
27		.13					2.25	1.24	.46			4.07
28		.13	.19	1.01			3.16	1.24	.46			6.18
29		.13					3.06	1.24	.05	.46		4.94
30	11.46	9.50	1.47	.16			6.12	4.34	5.81			38.86
31		.13					2.25	1.24	.46			4.07
32		.13	.19	1.01			2.96	1.24	.46			5.98
33		.13					2.25	1.24	.46			4.07
34		.13					3.78	1.24	.05	.46		5.65
35	6.22	.19	.36				6.27	1.24	3.16			17.44
36		.13	.19	1.01			6.63	1.24	.35	.46		10.00
37		.13					2.25	1.24	.46			4.07
38		.13					2.96	1.24	.46			4.78
39		.13					2.25	1.24	.46			4.07
40	8.89	.19	5.45	.04	1.01		8.51	4.77	12.15			41.02
41		.13					3.06	1.24	.05	.46		4.94
42		.13					2.96	1.24	.46			4.78
43		.13					2.25	1.24	.46			4.07
44		.13	.19	1.01			2.96	1.24	.46			5.98
45	2.79	5.68	.36	.16			3.70	3.96	3.89			20.53
46		.13					3.78	1.24	.05	.46		5.65
47		.13					2.45	1.24	.46			4.27
48		.13	.19	1.01			6.63	1.24	.35	.46		10.00
49		.13					2.25	1.24	.46			4.07
50	14.23	.19	1.47		3.79		15.97	1.62	5.08			42.34
Total	71.80	27.35	18.99	.09	20.15		198.21	79.76	1.82	76.35		494.52

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Central Plant, Boiler

Gross Square Feet:	1,100
Height in Ft:	14
Exterior:	Concrete Block
Floor coverings:	Finished Concrete
HVAC:	Gas Boiler, Unit Heaters
Capacity:	20,000 Mbh
Occupancy:	5
Replacement Cost:	\$691,900

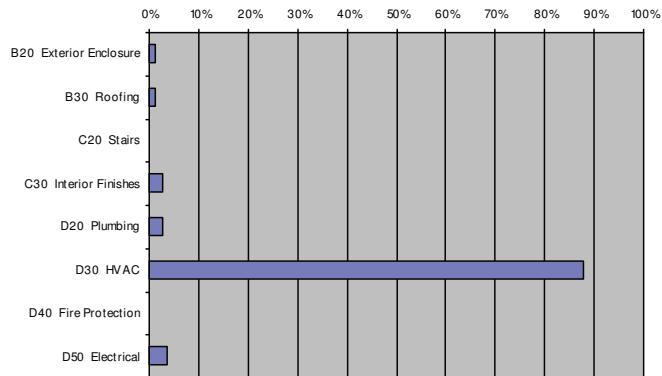
Components

Unifromat / Component	Quantity	Units
B20 Exterior Enclosure		
Concrete Block, Painted, Exterior, 1st Floor	1860	Sq Ft
Aluminum Operable Window, 24 sf, 1st Floor	2	Each
Steel Frame, Painted, Operable Window, 12 sf, 1st Floor	1	Each
Steel, Painted, Exterior Door	2	Each
B30 Roofing		
Built-up Roof	1100	Sq Ft
C20 Stairs		
Concrete, Interior Stairs	32	Sq Ft
Metal, Painted, Interior Railing	25	Ln Ft
Metal, Painted, Interior Stairs	20	Sq Ft
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	2490	Sq Ft
Concrete, Painted Flooring	1100	Sq Ft
Metal, Painted Ceiling	1100	Sq Ft
D20 Plumbing		
Emergency Eye Wash	2	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.05	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.1	K Ln Ft
Water Softener, 10 Gal.	1	Each
Backflow Preventer, 2"	1	Each
Sump Pump, 1/2 HP	1	Each
D30 HVAC		
Chemical Feed System	2	Each
Gas Boiler, 10,000 Mbh	2	Each
Pipe & Fittings, 3/4" Copper	0.05	K Ln Ft
Pipe & Fittings, 2" Copper	0.1	K Ln Ft
Pipe Insulation, Fiberglass, Heating Water/Steam	0.15	K Ln Ft
Exhaust Fan, Ceiling, 200-500 Cfm	3	Each
Suspended Heater, Hot Water, 4,000 Cfm, 180 Mbh	1	Each
D40 Fire Protection		
Fire Extinguisher	2	Each
D50 Electrical		
Distribution Panel Board	2	Each
Secondary Transformer, Dry, 50 kVA	1	Each
Emergency Lighting Pack, 2 Light w/ Battery	1	Each
Exit Lighting Fixture, w/ Battery	1	Each
Fluorescent Lighting Fixture, 80 w	5	Each
Incandescent Lighting Fixture, Basic, 100 w	1	Each
Receptacle, 120 V, 15 Amp.	6	Each
Wiring Device, Switch	2	Each
Fire Alarm Horn & Strobe	1	Each
Manual Pull Station	1	Each
Smoke Detector	2	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$810,996	\$14.75	2.34%
Unscheduled Maintenance	\$563,839	\$10.25	1.63%
Renewal & Replacement	\$843,215	\$15.33	2.44%
Total	\$2,218,050	\$40.33	6.41%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Gas Boiler, 10,000 Mbh	428.48	28.5%
Maintain Chemical Feed System	338.06	22.5%
Inspect & Test Gas Boiler, 10,000 Mbh	322.73	21.5%
Repair Gas Boiler, 10,000 Mbh	114.88	7.6%
Replace Chemical Feed System	47.09	3.1%
Refinish Concrete Block, Painted, Interior Wall Finish	22.80	1.5%
Replace Distribution Panel Board	20.13	1.3%
Maintain Suspended Heater, Hot Water, 4,000 Cfm, 180 Mbh	19.70	1.3%
Replace Suspended Heater, Hot Water, 4,000 Cfm, 180 Mbh	13.39	0.9%
Refinish Metal, Painted Ceiling	13.20	0.9%
Repaint (50% surface) Concrete Block, Painted, Interior Wall Finish	13.04	0.9%
Maintain Distribution Panel Board	11.40	0.8%
Place New Membrane Over Existing, Built-up Roof	10.97	0.7%
Repaint (50% surface) Concrete Block, Painted, Exterior, 1st Floor	9.74	0.6%
Replace Membrane, Built-up Roof	9.50	0.6%
Maintain Backflow Preventer, 2"	9.41	0.6%
Refinish Concrete Block, Painted, Exterior, 1st Floor	9.15	0.6%
Maintain Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	8.95	0.6%
Replace Backflow Preventer, 2"	6.75	0.4%
Clean Fire Box, Gas Boiler, 10,000 Mbh	6.15	0.4%
Maintain Secondary Transformer, Dry, 50 kVA	5.70	0.4%
Replace Secondary Transformer, Dry, 50 kVA	5.15	0.3%
Replace Water Softener, 10 Gal.	4.56	0.3%
Replace Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	4.03	0.3%
Refinish Concrete, Painted Flooring	3.32	0.2%
Replace Emergency Eye Wash Station	3.14	0.2%
Maintain Built-up Roof	3.03	0.2%
Replace Steel, Painted, Exterior Door Locks	2.83	0.2%
Maintain Water Softener, 10 Gal.	2.48	0.2%
Replace Batteries & Check Operation, Smoke Detector	2.18	0.1%

*Task cost (\$2009) per GSFT over 50 years.

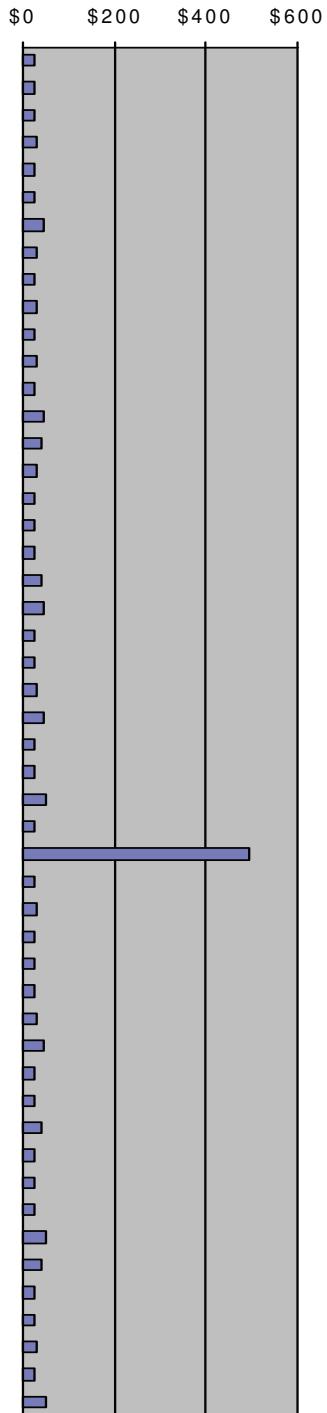
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13				.80	23.94		.74			25.61
2		.13				.80	24.39		.85			26.18
3		.13				1.01	23.94		.74			25.82
4		.13	.03	3.00		.80	24.39		.85			29.21
5		.16	.19			1.04	23.97	.07	.82			26.26
6		.13				1.01	24.39		.85			26.39
7		.13				.80	43.09		.74			44.76
8		.13	.03	3.00		.80	24.39		.85			29.21
9		.13				1.01	23.94		.74			25.82
10		2.61	.19			1.90	24.90	.07	1.97			32.31
11		.13				.80	23.94		.74			25.61
12		.13	.03	3.00		1.01	24.39	.51	.85			29.93
13		.13				.80	23.94		.74			25.61
14		.13				.80	43.54		.85			45.33
15		.52	5.67	.07	.18	2.63	32.20		1.15			42.43
16		.13	.03	3.00		.80	24.39		.85			29.21
17		.13				.80	23.94	.07	.74			25.68
18		.13				1.01	24.39		.85			26.39
19		.13				.80	23.94		.74			25.61
20		2.64	.19	.12	3.66	2.08	26.27		3.33			38.28
21		.13				1.01	43.09		.74			44.96
22		.13				.80	24.39	.07	.85			26.25
23		.13				.80	23.94		.74			25.61
24		.13	.03	3.00		1.01	24.39	.51	.85			29.93
25		5.57	.19		7.68	2.86	25.59		1.06			42.94
26		.13				.80	24.39		.85			26.18
27		.13				.80	23.94		.74			25.61
28		.13	.03	3.00		1.01	43.54		.85			48.57
29		.13				.80	23.94	.07	.74			25.68
30		2.98	9.50	.07	.84	3.21	448.95		26.40			491.96
31		.13				1.01	23.94		.74			25.82
32		.13	.03	3.00		.80	24.39		.85			29.21
33		.13				.80	23.94		.74			25.61
34		.13				1.01	24.39	.07	.85			26.46
35		.16	.19			1.11	24.03		.82			26.31
36		.13	.03	3.00		.80	24.39	.51	.85			29.73
37		.13				1.01	43.09		.74			44.96
38		.13				.80	24.39		.85			26.18
39		.13				.80	23.94		.74			25.61
40		2.64	.19	.12	3.66	2.21	26.57		3.57			38.96
41		.13				.80	23.94	.07	.74			25.68
42		.13				.80	24.39		.85			26.18
43		.13				1.01	23.94		.74			25.82
44		.13	.03	3.00		.80	43.54		.85			48.36
45		.52	5.67	.07	.18	2.50	32.31		1.15			42.41
46		.13				1.01	24.39	.07	.85			26.46
47		.13				.80	23.94		.74			25.61
48		.13	.03	3.00		.80	24.39	.51	.85			29.73
49		.13				1.01	23.94		.74			25.82
50		8.02	.19	.59	8.35	3.65	25.63		1.74			48.16
Total	25.82	27.32	1.38	55.21		58.20	1771.93	2.64	73.91			2016.41

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Central Plant, Chilled Water

Washington, D.C.

Central Plant, Chilled Water

Gross Square Feet:	9,175
Height in Ft:	24
Exterior:	Concrete
Floor coverings:	Finished Concrete, Vinyl Sheet
HVAC:	Chilled Water, Unit Heaters, Single Zone Air
Capacity:	3,000 Tons
Occupancy:	25
Replacement Cost:	\$6,927,125

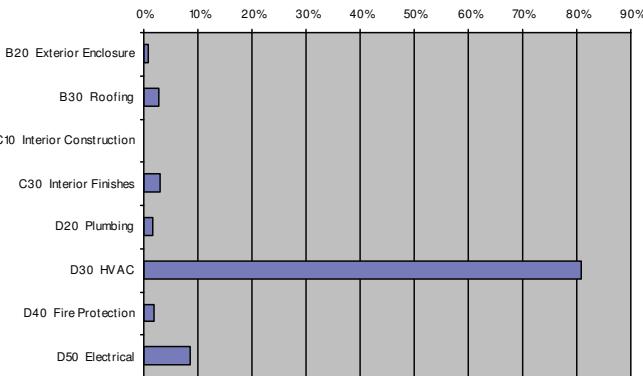
Components

Uniform / Component	Quantity	Units
B20 Exterior Enclosure		
Concrete, Painted, Exterior, 1st Floor	9195	Sq Ft
Aluminum Fixed Window, 24 sf, 1st Floor	16	Each
Steel 20'x20', Painted, Roll-up Door	1	Each
Steel w/ Safety Glass, Painted, Exterior Door	6	Each
B30 Roofing		
Built-up Roof	9175	Sq Ft
C10 Interior Construction		
Steel, Painted, Interior Door	3	Each
Steel, Painted, w/ Safety Glass, Interior Door	1	Each
Wood Hollow Core, Painted, Interior Door	2	Each
C30 Interior Finishes		
Ceramic Tile, 4"x4", Interior Wall Finish	280	Sq Ft
Concrete, Painted, Interior Wall Finish	4000	Sq Ft
Fiberglass Paneling	7620	Sq Ft
Access Flooring w/ Laminate, Raised	200	Sq Ft
Concrete, Painted Flooring	8925	Sq Ft
Vinyl Sheet Flooring	50	Sq Ft
Acoustical Tile, Dropped Ceiling	200	Sq Ft
Metal, Painted Ceiling	8925	Sq Ft
Sheetrock, Unstippled Ceiling	50	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	1	Each
Emergency Shower Station	2	Each
Flush Tank Water Closet, One Piece	1	Each
Lavatory, Vitreous China	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.1	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.1	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.05	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.1	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.1	K Ln Ft
Water Heater, Electric, 30 Gal.	1	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 4" Cast Iron	0.05	K Ln Ft
Air Compressor, 3/4 HP	1	Each
Air Compressor, 2 HP	1	Each
Compressed Air Dryer	1	Each
D30 HVAC		
Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 1,000 Ton	3	Each
Circulation Pump, 75 HP, Chiller & Condenser Water	3	Each
Circulation Pump, 150 HP, Chiller & Condenser Water	2	Each
Air Handler, Single Zone, 6,500 Cfm	1	Each
Duct Insulation, Fiberglass Blanket	8710	Sq Ft
Ductwork	13000	Lbs
Unit Heater, 12 Mbh	2	Each
Direct Digital Controls, System Points	16	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	92	Each
Fire Sprinkler System	1	Each
D50 Electrical		
Circuit Breaker, 600 V, 30-60 Amp., 3Ph.	3	Each
Circuit Breaker, Main, 240 V, 15-60 Amp., 3 Ph.	2	Each
Distribution Panel Board	3	Each
Motor Control Center	10	Each
Primary Transformer, Dry, 750 kVA	2	Each
Primary Transformer, Oil Filled, 500 kVA	2	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	5	Each
Secondary Transformer, Dry, 15 kVA	2	Each
Secondary Transformer, Dry, 50 kVA	2	Each
Emergency Lighting Pack, 2 Light w/ Battery	4	Each
Fluorescent Lighting Fixture, 80 w	45	Each
Incandescent Lighting Fixture, Basic, 100 w	3	Each
Incandescent Lighting Fixture, Basic, 200 w	10	Each
Metal Halide Lighting Fixture, Low Bay, 250 w	14	Each
Receptacle, 120 V, 20 Amp.	36	Each
Wiring Device, Switch	18	Each
Fire Alarm Horn & Strobe	4	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$1,119,626	\$2.44	0.32%
Unscheduled Maintenance	\$820,276	\$1.79	0.24%
Renewal & Replacement	\$7,527,339	\$16.41	2.17%
Total	\$9,467,241	\$20.64	2.73%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 1,000 Ton	400.94	42.5%
Repair Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 1,000 Ton	219.06	23.2%
Maintain Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 1,000 Ton	63.08	6.7%
Replace Circulation Pump, 150 HP, Chiller & Condenser Water	36.53	3.9%
Replace Circulation Pump, 75 HP, Chiller & Condenser Water	26.58	2.8%
Replace Primary Transformer, Dry, 750 kVA	14.93	1.6%
Refinish Metal, Painted Ceiling	12.84	1.4%
Place New Membrane Over Existing, Built-up Roof	10.97	1.2%
Maintain Motor Control Center	10.45	1.1%
Replace Membrane, Built-up Roof	9.50	1.0%
Replace Fiberglass Paneling	8.74	0.9%
Replace Primary Transformer, Oil Filled, 500 kVA	7.02	0.7%
Maintain Direct Digital Controls, System Points	6.17	0.7%
Replace Direct Digital Controls, System Points	5.66	0.6%
Refinish Concrete, Painted, Exterior, 1st Floor	5.43	0.6%
Replace Air Handler, Single Zone, 6,500 Cfm	5.16	0.5%
Maintain Fire Sprinkler System	5.16	0.5%
Test Gages & Valves, Fire Sprinkler System	4.75	0.5%
Refinish Concrete, Painted, Interior Wall Finish	4.39	0.5%
Maintain Air Handler, Single Zone, 6,500 Cfm	4.08	0.4%
Replace Distribution Panel Board	3.62	0.4%
Refinish Concrete, Painted Flooring	3.23	0.3%
Maintain Built-up Roof	3.04	0.3%
Replace Existing Ductwork (20% of Ductwork)	2.79	0.3%
Maintain Primary Transformer, Dry, 750 kVA	2.73	0.3%
Repair Primary Transformer, Oil Filled, 500 kVA	2.62	0.3%
Replace Safety Switch, Fused, 400 Amp., 3 Ph.	2.19	0.2%
Maintain Unit Heater, 12 Mbh	2.07	0.2%
Maintain Distribution Panel Board	2.05	0.2%
Maintain Safety Switch, Fused, 400 Amp., 3 Ph.	2.04	0.2%

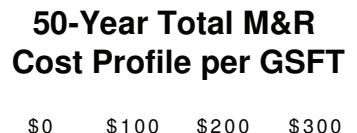
*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13						.17	2.77	.30	.85		4.22
2		.13						.19	2.77	.30	.90		4.30
3		.13						.21	2.77	.30	.85		4.25
4		.13	.01	1.44				.36	2.77	.30	.90		5.92
5		.06	.19	.06				.21	3.08	.32	1.13		5.05
6		.13						.23	2.77	.30	.90		4.33
7		.13						.19	2.77	.30	.85		4.24
8		.13	.01	1.44				.36	2.77	.30	.96		5.98
9		.13						.21	2.77	.30	.85		4.26
10		1.47	.19	.26				.59	77.34	.88	3.19		84.75
11		.13						.17	2.77	.30	.85		4.22
12		.13	.01	1.44				.40	2.77	.30	.90		5.96
13		.13						.17	2.77	.30	.85		4.22
14		.13						.22	2.77	.30	.90		4.32
15		.17	5.67	.06				.77	25.70	.66	1.26		34.48
16		.13	.01	1.44				.36	2.77	.30	.96		5.98
17		.13						.17	2.77	.30	.85		4.22
18		.13						.23	2.77	.30	.90		4.36
19		.13						.17	2.77	.30	.85		4.22
20		1.51	.19	.27	2.27			.62	202.21	.88	4.46		212.42
21		.13						.21	2.77	.30	.85		4.26
22		.13						.21	2.77	.30	.90		4.32
23		.13						.17	2.77	.30	.85		4.22
24		.13	.01	1.44				.40	2.77	.30	.96		6.02
25		.47	.19	.06	.75			1.77	3.39	.32	2.23		9.19
26		.13						.19	2.77	.30	.90		4.30
27		.13						.18	2.77	.30	.85		4.23
28		.13	.01	1.44				.22	2.77	.30	.90		5.78
29		.13						.36	2.77	.30	.85		4.41
30		1.58	9.50	.29	1.01			.96	103.38	1.22	29.79		147.73
31		.13						.19	2.77	.30	.85		4.24
32		.13	.01	1.44				.19	2.77	.30	.90		5.75
33		.13						.35	2.77	.30	.91		4.46
34		.13	.00					.22	2.77	.30	.90		4.33
35		.88	.19	.06	8.74			.35	3.08	.32	1.13		14.76
36		.13	.01	1.47				.20	2.77	.30	.90		5.78
37		.13						.40	2.77	.30	.85		4.44
38		.13	.00					.18	2.77	.30	.90		4.29
39		.13						.19	2.77	.30	.85		4.24
40		1.40	.19	.27	2.64			.57	202.52	.88	4.55		213.02
41		.13						.35	2.77	.30	.91		4.46
42		.13	.00					.20	2.77	.30	.90		4.31
43		.13						.21	2.77	.30	.85		4.25
44		.13	.01	1.44				.20	2.77	.30	.90		5.76
45		.28	5.67	.06	.35			.95	25.70	.66	1.26		34.93
46		.13	.00					.21	2.77	.30	.90		4.31
47		.13						.18	2.77	.30	.85		4.23
48		.13	.01	1.44				.20	2.77	.30	.90		5.75
49		.13						.38	2.77	.30	.91		4.49
50		1.78	.19	.26	1.40			1.83	77.04	1.10	4.30		87.90
Total		9.61	27.33	1.79	32.67			18.24	834.11	19.42	88.69		1031.85



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Central Plant, Steam

Gross Square Feet:	43,500
Height in Ft:	90
Exterior:	Clay Brick, Steel, Concrete Block
Floor coverings:	Concrete, Metal Grating, Vinyl Tile
HVAC:	Window AC, Gas Boiler
Capacity:	405,000 lb/hr
Occupancy:	130
Replacement Cost:	\$43,935,000

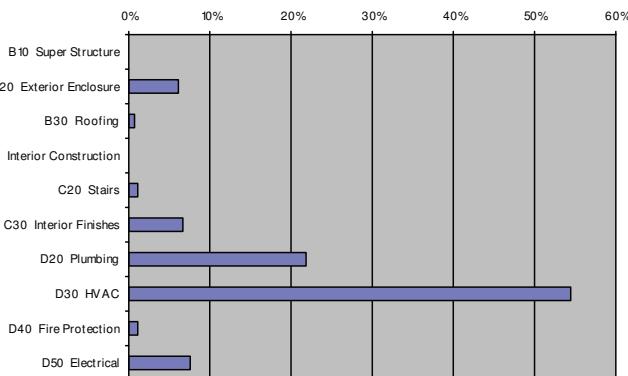
Components (Continued on Page 152)

Uniform / Component	Quantity	Units
B10 Super Structure		
Steel Roof Access Ladder	220	Ln Ft
B20 Exterior Enclosure		
Aluminum Louver, 1st Floor	11	Each
Aluminum Louver, 2nd Floor	3	Each
Aluminum Louver, 3rd Floor	3	Each
Clay Brick, Exterior, 1st Floor	4090	Sq Ft
Clay Brick, Exterior, 2nd Floor	4090	Sq Ft
Clay Brick, Exterior, 3rd+ Floor	16360	Sq Ft
Concrete Block, Painted, Exterior, 1st Floor	2700	Sq Ft
Steel, Painted, Exterior, 1st Floor	3730	Sq Ft
Steel, Painted, Exterior, 2nd Floor	3730	Sq Ft
Steel, Painted, Exterior, 3rd+ Floor	3730	Sq Ft
Aluminum Fixed Window, 24 sf, 2nd Floor	12	Each
Aluminum Fixed Window, 24 sf, 3rd+ Floor	3	Each
Aluminum Operable Window, 12 sf, 1st Floor	8	Each
Aluminum Operable Window, 12 sf, 2nd Floor	3	Each
Aluminum Operable Window, 12 sf, 3rd+ Floor	1	Each
Steel Frame, Painted, Operable Window, 12 sf, 1st Floor	2	Each
Steel Frame, Painted, Operable Window, 12 sf, 2nd Floor	1	Each
Steel Frame, Painted, Operable Window, 12 sf, 3rd+ Floor	24	Each
Steel Frame, Painted, Operable Window, 24 sf, 1st Floor	11	Each
Steel Single 12x12', Painted, Roll-up Door	5	Each
Steel Single 12x12', Painted, Roll-up Door, Automatic	1	Each
Steel, Painted, Exterior Door	12	Each
Steel w/ Safety Glass, Painted, Exterior Door	16	Each
B30 Roofing		
Aluminum Gutter, Downspouts, Fittings	0.315	K Ln Ft
Built-up Roof	7250	Sq Ft
Metal Awning	590	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	6	Each
Steel, Painted, Interior Door	13	Each
Steel, Painted, w/ Safety Glass, Interior Door	10	Each
C20 Stairs		
Metal, Painted, Exterior Railing	330	Ln Ft
Metal, Painted, Interior Railing	6430	Ln Ft
Metal, Painted, Exterior Stairs	830	Sq Ft
Metal, Painted, Interior Stairs	1975	Sq Ft
C30 Interior Finishes		
Ceramic Tile, 4"x4", Interior Wall Finish	2000	Sq Ft
Clay Brick, Interior Wall Finish	17140	Sq Ft
Concrete Block, Painted, Interior Wall Finish	18830	Sq Ft
Concrete, Painted, Interior Wall Finish	5130	Sq Ft
Steel, Painted, Interior Wall Finish	5790	Sq Ft
Concrete Flooring	22230	Sq Ft
Concrete, Painted Flooring	14870	Sq Ft
Metal Floor Grating	4660	Sq Ft
Vinyl Tile Flooring	1740	Sq Ft
Acoustical Tile, Dropped, Fiberglass Ceiling	1710	Sq Ft
Concrete, Painted Ceiling	32380	Sq Ft
Metal, Painted Ceiling	7670	Sq Ft
Sheetrock, Unstippled Ceiling	1740	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	1	Each
Emergency Eye Wash	12	Each
Lavatory, Vitreous China	3	Each
Shower, Ceramic Tile	3	Each
Sink, Plastic	1	Each
Tankless Water Closet	4	Each
Urinal, Vitreous China	4	Each
Circulator Pump, 1/2 HP, Cold Water	12	Each
Circulator Pump, 3 HP, Cold Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.53	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.41	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.2	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.73	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.41	K Ln Ft
Water Heater, Electric, 120 Gal.	2	Each
Water Storage Tank, 250 Gal.	3	Each
Water Storage Tank, 500 Gal.	16	Each
Water Storage Tank, 1,000 Gal.	3	Each
Water Storage Tank, 10,000 Gal.	2	Each
Pipe & Fittings, 4" Cast Iron	0.23	K Ln Ft
Air Compressor, 25 HP	2	Each
Air Compressor, 250 HP, 1,000 Cfm	2	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$4,399,350	\$2.02	0.20%
Unscheduled Maintenance	\$3,971,961	\$1.83	0.18%
Renewal & Replacement	\$23,746,909	\$10.92	1.08%
Total	\$32,118,220	\$14.77	1.46%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Gas Boiler, Steam, 100,000 Lb/hr, 2,898 HP, 150 PSI	79.71	12.3%
Replace Gas Boiler, Steam, 50,000 Lb/hr, 1,449 HP, 150 PSI	65.56	10.1%
Replace Air Compressor, 700 HP, 3,000 Cfm	54.28	8.4%
Replace Air Compressor, 250 HP, 1,000 Cfm	37.11	5.7%
Replace Air Compressor, 500 HP, 2,000 Cfm	36.42	5.6%
Repair Gas Boiler, Steam, 100,000 Lb/hr, 2,898 HP, 150 PSI	36.24	5.6%
Repair Gas Boiler, Steam, 50,000 Lb/hr, 1,449 HP, 150 PSI	27.78	4.3%
Replace Gas Boiler, Steam, 55,000 Lb/hr, 1,594 HP, 150 PSI	22.97	3.5%
Replace Steam Turbine 1,000 kw	19.49	3.0%
Replace Generator, Diesel, 500 kw	15.51	2.4%
Inspect & Test Gas Boiler, Steam, 50,000 Lb/hr, 1,449 HP, 150 PSI	12.24	1.9%
Replace Oil Storage Tank, 250,000 Gal.	11.79	1.8%
Replace Circulation Pump, 75 HP, Hot Water	11.21	1.7%
Clean & Reseal Clay Brick, Exterior, 3rd+ Floor	10.35	1.6%
Repair Gas Boiler, Steam, 55,000 Lb/hr, 1,594 HP, 150 PSI	10.15	1.6%
Refinish Concrete, Painted Ceiling	10.06	1.6%
Clean & Seal Clay Brick, Interior Wall Finish	10.01	1.5%
Repair Steam Turbine 1,000 kw	9.52	1.5%
Inspect & Test Steam Turbine 1,000 kw	8.16	1.3%
Inspect & Test Gas Boiler, Steam, 100,000 Lb/hr, 2,898 HP, 150 PSI	8.16	1.3%
Maintain Oil Storage Tank, 250,000 Gal.	5.68	0.9%
Refinish Concrete Block, Painted, Interior Wall Finish	4.36	0.7%
Inspect & Test Gas Boiler, Steam, 55,000 Lb/hr, 1,594 HP, 150 PSI	4.08	0.6%
Repoint (50% of surface) Clay Brick, Interior Wall Finish	3.91	0.6%
Replace Circulation Pump, 150 HP, Hot Water	3.85	0.6%
Replace Metal, Painted, Interior Railing	3.70	0.6%
Replace Condensing Heat Exchanger, Gas/Oil, 20 Mbh	3.64	0.6%
Replace Oil Storage Tank, 75,000 Gal.	3.54	0.5%
Electrical Testing, Generator, Diesel, 500 kw	3.39	0.5%
Repoint (50% surface) Clay Brick, Exterior, 3rd+ Floor	3.36	0.5%

*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Central Plant, Steam

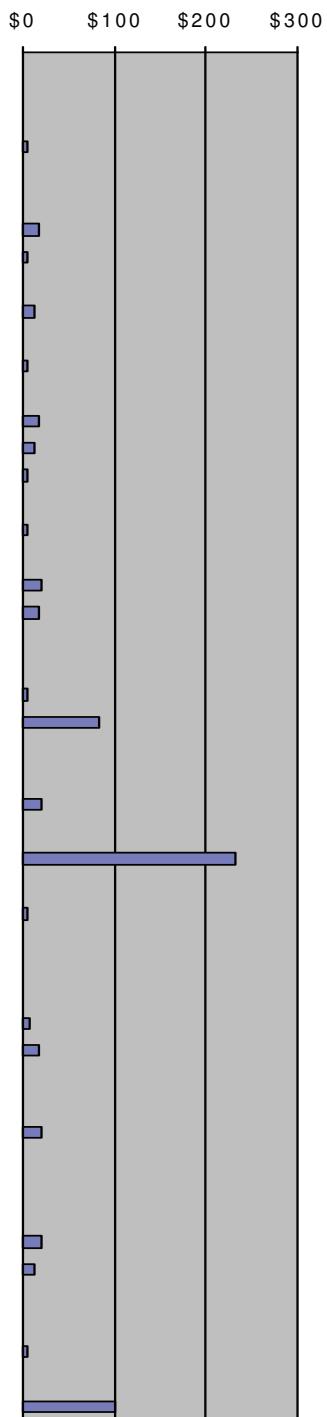
Washington, D.C.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1	.01	.03						.38	1.73	.13	.50		2.78
2	.01	.03						.40	1.82	.13	.54		2.93
3	.01	.03						.42	1.73	.13	.51		2.82
4	.01	.03	.01	.16	2.98			.55	1.82	.13	.54		6.24
5	.07	.04	.05					.47	1.83	.13	.53		3.12
6	.01	.03						.44	1.82	.13	.54		2.97
7	.01	.03						.41	16.15	.13	.50		17.23
8	.01	.03	.01	.16	2.98			.56	1.82	.13	.55		6.25
9	.01	.03						.42	1.73	.13	.51		2.83
10	7.53	.06	.21	.02	.31			.56	2.05	.52	1.85		13.09
11	.01	.03						.38	1.73	.13	.50		2.78
12	.01	.03	.01	.16	2.98			.59	1.82	.13	.54		6.29
13	.01	.03						.38	1.73	.13	.50		2.78
14	.01	.03						.43	16.24	.13	.54		17.38
15	.18	.95	.05	.38	.14			.98	7.86	.20	.64		11.38
16	.01	.03	.01	.16	2.98			.55	1.82	.13	.55		6.25
17	.01	.03						.38	1.73	.13	.50		2.79
18	.01	.03			.10			.44	1.82	.13	1.26		3.79
19	.01	.03						.38	1.73	.13	.50		2.79
20	7.56	.12	.33	.18	3.29			3.27	2.54	.52	2.76		20.57
21	.01	.03						.44	16.15	.13	.50		17.26
22	.01	.03						.41	1.82	.13	.54		2.94
23	.01	.03						.39	1.73	.13	.52		2.80
24	.01	.03	.01	.16	2.98			.59	1.82	.13	.55		6.29
25	3.33	.04	.05		4.10			65.62	1.85	.13	8.43		83.56
26	.01	.03						.40	1.82	.13	.54		2.93
27	.01	.03			.00			.39	1.73	.13	.50		2.80
28	.01	.03	.01	.16	2.98			.45	16.24	.13	.55		20.57
29	.01	.03						.55	1.73	.13	.51		2.95
30	7.65	1.74	.21	.68	3.69			1.07	213.99	.59	2.35		231.96
31	.01	.03						.41	1.73	.13	.50		2.81
32	.01	.03	.01	.16	2.98			.40	1.82	.13	.54		6.09
33	.01	.03						.54	1.73	.13	.53		2.96
34	.01	.03						.43	1.82	.13	.54		2.96
35	.40	.04	.05					.66	1.83	.13	.52		3.64
36	.01	.03	.01	.16	3.09			.40	1.82	.13	1.26		6.91
37	.01	.03						.59	16.15	.13	.50		17.41
38	.01	.03						.40	1.82	.13	.54		2.93
39	.01	.03						.39	1.73	.13	.50		2.80
40	7.45	.10	.33	.18	3.29			3.11	2.56	.52	2.88		20.41
41	.01	.03						.54	1.73	.13	.53		2.96
42	.01	.03						.42	1.82	.13	.54		2.95
43	.01	.03						.42	1.73	.13	.51		2.82
44	.01	.03	.01	.16	2.98			.41	16.24	.13	.54		20.52
45	.29	.95	.05	.38	.15			1.14	7.86	.20	.62		11.64
46	.01	.03						.42	1.82	.13	.56		2.97
47	.01	.03						.39	1.73	.13	.50		2.79
48	.01	.03	.01	.16	2.98			.40	1.82	.13	.54		6.09
49	.01	.03						.59	1.73	.13	.52		3.00
50	10.69	.09	.21	4.47	4.41			66.68	2.27	.67	12.49		101.96
Total	45.52	5.30	1.67	7.87	49.43			161.46	402.24	8.69	55.56		737.75

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT



Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Club, Social

Washington, D.C.

Club, Social

Gross Square Feet:	22,000
Height in Ft:	12
Exterior:	Stucco
Floor coverings:	Carpet, Hardwood, Ceramic Tile
HVAC:	Electric Cool, Gas Heat, Multizone Unit
Capacity:	N/A
Occupancy:	1,320
Replacement Cost:	\$5,077,313

Components

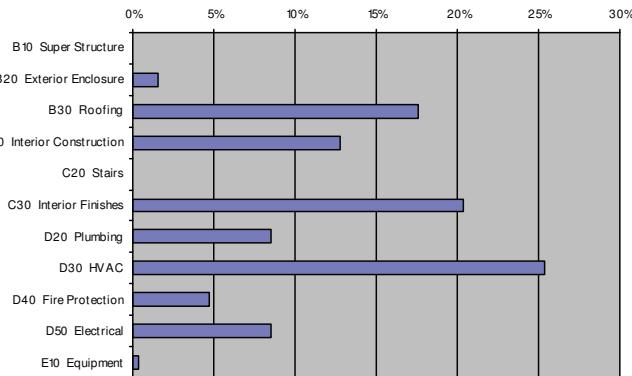
Uniform / Component	Quantity	Units
B10 Super Structure		
Concrete Decking	200	Sq Ft
Wood Decking	200	Sq Ft
B20 Exterior Enclosure		
Stucco, Painted, Exterior, 1st Floor	6226	Sq Ft
Steel Frame, Painted, Operable Window, 12 sf, 1st Floor	64	Each
Aluminum Frame, Fully Glazed, Exterior Door	2	Each
Steel, Painted, Exterior Door	4	Each
B30 Roofing		
Single-Ply Modified Bituminous/Thermoplastic Roof	22000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	8	Each
Wood, Solid Core, Painted, Interior Door	157	Each
C20 Stairs		
Wood, Painted, Interior Stairs	40	Sq Ft
C30 Interior Finishes		
Ceramic Tile, 4"x4", Interior Wall Finish	3770	Sq Ft
Concrete Block, Painted, Interior Wall Finish	4992	Sq Ft
Sheetrock, Stippled, Interior Wall Finish	24508	Sq Ft
Wallpaper, Interior Wall Finish	9400	Sq Ft
Carpet, Wool 45 oz., Premium	13200	Sq Ft
Ceramic Tile Flooring	3300	Sq Ft
Wood Parquetry Flooring	5500	Sq Ft
Acoustical Tile Ceiling	22000	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	3	Each
Lavatory, Vitreous China	11	Each
Shower, Ceramic Tile	3	Each
Sink, Stainless Steel	6	Each
Tankless Water Closet	8	Each
Urinal, Vitreous China	3	Each
Circulator Pump, 1/12 HP, Cold Water	1	Each
Circulator Pump, 1/12 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	1.16	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.63	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	1.442	K Ln Ft
Pipe & Fittings, 2" Copper, Hot Water	1.287	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	1.804	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.977	K Ln Ft
Water Heater, Gas/Oil, 175 Gph	1	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.588	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.297	K Ln Ft
Pipe & Fittings, 4" PVC	0.318	K Ln Ft
Roof Drain, 2"	9	Each
D30 HVAC		
Duct Insulation, Fiberglass Blanket	4288	Sq Ft
Ductwork	6400	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	3	Each
Air Conditioner, Rooftop, Single Zone, 20 Ton	4	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	160	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	4	Each
D50 Electrical		
Main Switchgear, <1,200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	4	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	4	Each
Exit Lighting Fixture w/ Battery	10	Each
Fluorescent Lighting Fixture, 160 w	110	Each
Grounded Fault Circuit Interruptor, 15 Amp.	3	Each
Incandescent Lighting Fixture, Basic, 100 w	20	Each
Light Dimming Panel	2	Each
Receptacle, 120 V, 15 Amp.	55	Each
TV Cable Outlet	1	Each
Wiring Device, Switch	22	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	12	Each
Heat Detector	4	Each
Manual Pull Station	4	Each
Smoke Detector	20	Each
E10 Equipment		
Microwave Oven	1	Each
Refrigerator, Domestic	1	Each

Note: For alternative locations use the Local Indexes shown in Chapter 3.

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$669,332	\$0.61	0.26%
Unscheduled Maintenance	\$558,401	\$0.51	0.22%
Renewal & Replacement	\$3,194,238	\$2.90	1.26%
Total	\$4,421,971	\$4.02	1.74%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, Single Zone, 20 Ton	20.65	11.8%
Replace Membrane, Single-Ply Modified Bituminous/Thermoplastic Roof	15.96	9.1%
Repair Air Conditioner, Rooftop, Single Zone, 20 Ton	15.40	8.8%
Replace Carpet, Wool 45 oz., Premium	12.29	7.0%
Refinish Sheetrock, Stippled, Interior Wall Finish	10.87	6.2%
Repair Single-Ply Modified Bituminous/Thermoplastic Roof	8.72	5.0%
Replace Wood, Solid Core, Painted, Interior Door	8.61	4.9%
Replace Wood, Solid Core, Painted, Interior Door Locks	8.44	4.8%
Maintain Air Conditioner, Rooftop, Single Zone, 20 Ton	7.33	4.2%
Maintain Single-Ply Modified Bituminous/Thermoplastic Roof	5.45	3.1%
Replace Wood Parquetry Floor	3.82	2.2%
Sand & Refinish Wood Parquetry Flooring	3.47	2.0%
Replace Ceramic Tile Flooring	2.95	1.7%
Refinish Concrete Block, Painted, Interior Wall Finish	2.29	1.3%
Maintain Wood, Solid Core, Painted, Interior Door Locks	2.27	1.3%
Maintain Fire Sprinkler System	2.15	1.2%
Test Gages & Valves, Fire Sprinkler System	1.98	1.1%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	1.92	1.1%
Replace Fluorescent Lighting Fixture, 160 w	1.76	1.0%
Refinish Wood, Solid Core, Painted, Interior Door	1.71	1.0%
Refinish Stucco, Painted, Exterior, 1st Floor	1.62	0.9%
Repoint (50% surface) Concrete Block, Painted, Interior Wall Finish	1.31	0.7%
Replace Wallpaper, Interior Wall Finish	1.27	0.7%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	1.27	0.7%
Test Fire Sprinkler Head	1.23	0.7%
Maintain Power Panel Board, 208 Y/120 V, 200 Amp.	1.14	0.6%
Replace Power Panel Board, 208 Y/120 V, 200 Amp.	1.10	0.6%
Replace Batteries & Check Operation, Smoke Detector	1.09	0.6%
Non-Destructive Moisture Inspection	1.04	0.6%
Replace Water Heater, Gas/Oil, 175 Gph	1.03	0.6%

*Task cost (\$2009) per GSFT over 50 years.

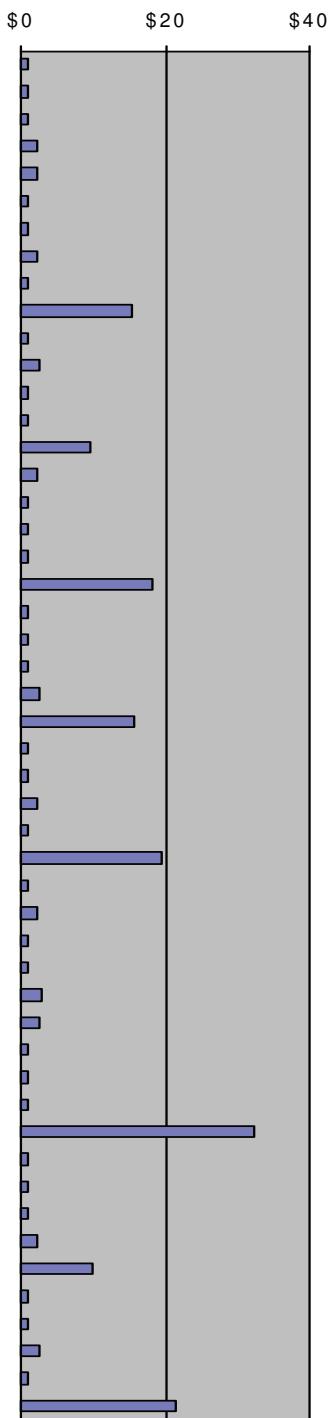
**Percent of total M&R costs.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	Plumbing	HVAC Systems	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.20						.13	.29	.13	.15	.01	.91
2		.20						.25	.29	.13	.15	.01	1.03
3		.20						.13	.29	.13	.15	.01	.91
4		.20	.16 .00	1.10				.25	.29	.13	.15	.01	2.29
5		.02 .33 .68		.20				.25	.30	.15	.31	.01	2.24
6		.20						.25	.29	.13	.15	.01	1.03
7		.20						.17	.29	.13	.15	.01	.95
8		.20	.16 .00	1.11				.27	.29	.13	.17	.01	2.35
9		.20			.05			.13	.29	.13	.15	.01	.97
10		.49 3.24 2.79	.00	1.12				.71	5.43	.55	1.09	.07	15.49
11		.20						.13	.29	.13	.15	.01	.91
12		.02 .20 .16	.00	1.10				.53	.29	.18	.15	.01	2.64
13		.20						.13	.29	.13	.15	.01	.91
14		.20						.29	.29	.13	.15	.01	1.07
15		.06 .33 .68		.26				.22	7.04	.28	.62	.01	9.49
16		.20 .16 .00		1.11				.27	.29	.13	.17	.01	2.35
17		.20						.16	.29	.14	.15	.01	.95
18		.20			.05			.25	.29	.13	.15	.01	1.09
19		.20						.13	.29	.13	.15	.01	.91
20		.56 7.98 3.23	.00	2.92				.78	.38	.55	1.73	.07	18.21
21		.20						.17	.29	.13	.15	.01	.95
22		.20						.28	.29	.14	.15	.01	1.07
23		.20						.13	.29	.13	.15	.01	.91
24		.02 .20 .16	.00	1.10				.55	.29	.18	.17	.01	2.68
25		.11 .33 .68		6.94				1.29	5.43	.14	.76	.01	15.69
26		.20						.25	.29	.13	.15	.01	1.03
27		.20			.05			.13	.29	.13	.15	.01	.97
28		.20 .16 .00		1.11				.29	.29	.13	.15	.01	2.35
29		.20						.16	.29	.14	.15	.01	.95
30		.52 3.24 2.79	.00	1.18				.84	7.80	.69	2.32	.07	19.45
31		.20						.13	.29	.13	.15	.01	.91
32		.20 .16 .00		1.10				.27	.29	.13	.15	.01	2.31
33		.20						.13	.29	.13	.17	.01	.93
34		.20						.28	.29	.14	.15	.01	1.07
35		.02 .33 .68		.20				.84	.30	.14	.31	.01	2.82
36		.02 .20 .16	.00	1.17				.48	.29	.18	.15	.01	2.65
37		.20						.19	.29	.13	.15	.01	.97
38		.20						.20	.29	.13	.15	.01	.98
39		.20						.19	.29	.13	.15	.01	.97
40		.56 7.98 9.05	.00	5.79				.83	5.52	.55	1.85	.07	32.20
41		.20						.22	.29	.14	.17	.01	1.03
42		.20						.24	.29	.13	.15	.01	1.01
43		.20						.19	.29	.13	.15	.01	.97
44		.20 .16 .00		1.10				.20	.29	.13	.15	.01	2.24
45		.06 .33 .68		.32				.46	7.04	.28	.62	.01	9.79
46		.20						.23	.29	.14	.15	.01	1.01
47		.20						.19	.29	.13	.15	.01	.97
48		.02 .20 .16	.00	1.11				.49	.29	.18	.15	.01	2.62
49		.20						.23	.29	.13	.17	.01	1.03
50		.64 3.24 2.79	.06	10.80				1.57	.30	.70	1.31	.07	21.49
Total	3.09	35.35	25.68	.08	40.99			17.18	50.95	9.56	17.07	.79	200.74

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT



Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Clubhouse, Golf

Washington, D.C.

Clubhouse, Golf

Gross Square Feet:	6,000
Height in Ft:	12
Exterior:	Stucco
Floor coverings:	Carpet, Hardwood, Ceramic Tile
HVAC:	Electric Cool, Gas Heat, Multizone Unit
Capacity:	N/A
Occupancy:	360
Replacement Cost:	\$1,628,664

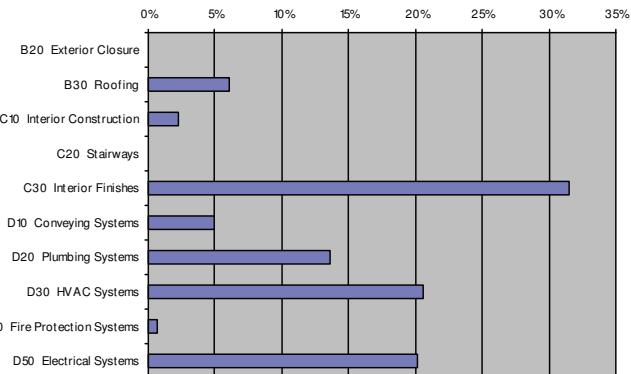
Components

Uniformat / Component	Quantity	Units
B10 Super Structure		
Concrete Decking	200	Sq Ft
Wood Decking	200	Sq Ft
B20 Exterior Enclosure		
Stucco, Painted, Exterior, 1st Floor	3160	Sq Ft
Steel Frame, Painted, Operable Window, 12 sf, 1st Floor	36	Each
Aluminum Frame, Fully Glazed, Exterior Door	2	Each
Steel, Painted, Exterior Door	4	Each
B30 Roofing		
Aluminum Gutter, Downspouts, Fittings	0.18	K Ln Ft
Asphalt Shingle Roof	7380	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	10	Each
Aluminum, w/ Safety Glass, Plain or Anodized, Interior Door	20	Each
C30 Interior Finishes		
Ceramic Tile, 4"x4", Interior Wall Finish	2057	Sq Ft
Concrete Block, Painted, Interior Wall Finish	2652	Sq Ft
Sheetrock, Stippled, Interior Wall Finish	4114	Sq Ft
Wallpaper, Interior Wall Finish	4114	Sq Ft
Carpet, Wool 45 oz., Premium	3000	Sq Ft
Ceramic Tile Flooring	1200	Sq Ft
Wood Parquet Flooring	1800	Sq Ft
Sheetrock, Stippled Ceiling	6000	Sq Ft
D20 Plumbing		
Flush Tank Water Closet, One Piece	10	Each
Lavatory, Vitreous China	10	Each
Shower, Ceramic Tile	6	Each
Sink, Stainless Steel	5	Each
Urinal, Vitreous China	2	Each
Circulator Pump, 1/12 HP, Cold Water	1	Each
Circulator Pump, 1/12 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	1.415	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.805	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	1.527	K Ln Ft
Pipe & Fittings, 4" Steel	0.887	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	1.749	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.984	K Ln Ft
Water Heater, Gas/Oil, 175 Gph	2	Each
Backflow Preventer, 4"	1	Each
Pipe & Fittings, 6" Cast Iron	0.611	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.155	K Ln Ft
Pipe & Fittings, 4" PVC	0.213	K Ln Ft
D30 HVAC		
Duct Insulation, Fiberglass Blanket	1528	Sq Ft
Ductwork	2280	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	4	Each
Exhaust Fan, Roof Mounted, 1,000 Cfm	1	Each
Air Conditioner, Rooftop, Single Zone, 5 Ton	1	Each
Air Conditioner, Rooftop, Single Zone, 20 Ton	1	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	45	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	3	Each
Kitchen Fire Suppression System (CO2)	1	Each
D50 Electrical		
Main Switchgear, <1,200 Amp.	1	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	4	Each
Exit Lighting Fixture, w/ Battery	6	Each
Fluorescent Lighting Fixture, 160 w	30	Each
Grounded Fault Circuit Interruptor, 15 Amp.	6	Each
Incandescent Lighting Fixture, Basic, 200 w	20	Each
Light Dimming Panel	2	Each
Receptacle, 120 V, 15 Amp.	36	Each
TV Cable Outlet	1	Each
Wiring Device, Switch	24	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	4	Each
Heat Detector	4	Each
Manual Pull Station	4	Each
Smoke Detector	25	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$461,463	\$1.54	0.57%
Unscheduled Maintenance	\$394,460	\$1.31	0.48%
Renewal & Replacement	\$1,132,973	\$3.78	1.39%
Total	\$1,988,896	\$6.63	2.44%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, Single Zone, 20 Ton	18.93	7.1%
Repair Air Conditioner, Rooftop, Single Zone, 20 Ton	14.12	5.3%
Refinish Sheetrock, Stippled Ceiling	13.20	5.0%
Replace Carpet, Wool 45 oz., Premium	10.24	3.9%
Maintain Asphalt Shingle Roof	10.18	3.8%
Maintain Fire Sprinkler System	7.88	3.0%
Replace Water Heater, Gas/Oil, 175 Gph	7.59	2.9%
Test Gages & Valves, Fire Sprinkler System	7.27	2.7%
Maintain Air Conditioner, Rooftop, Single Zone, 20 Ton	6.72	2.5%
Refinish Sheetrock, Stippled, Interior Wall Finish	6.69	2.5%
Maintain Air Conditioner, Rooftop, Single Zone, 5 Ton	6.54	2.5%
Replace Asphalt Shingle Roof	6.43	2.4%
Replace Aluminum, w/ Safety Glass, Plain or Anodized, Interior Door	6.39	2.4%
Replace Air Conditioner, Rooftop, Single Zone, 5 Ton	5.53	2.1%
Clean Water Heater, Gas/Oil, 175 Gph	5.26	2.0%
Place New Shingles Over Existing, Asphalt Shingle Roof	5.25	2.0%
Replace Batteries & Check Operation, Smoke Detector	4.98	1.9%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	4.92	1.9%
Replace Wood Parquetry Floor	4.58	1.7%
Refinish Concrete Block, Painted, Interior Wall Finish	4.45	1.7%
Sand & Refinish Wood Parquetry Flooring	4.17	1.6%
Replace Aluminum, w/ Safety Glass, Plain or Anodized, Interior Door Lock	3.94	1.5%
Replace Ceramic Tile Flooring	3.93	1.5%
Replace Backflow Preventer, 4"	3.33	1.3%
Refinish Stucco, Painted, Exterior, 1st Floor	3.01	1.1%
Maintain Backflow Preventer, 4"	2.75	1.0%
Repair Main Switchgear, <1,200 Amp.	2.71	1.0%
Replace Safety Switch, Fused, 400 Amp., 3 Ph.	2.68	1.0%
Replace Toilet Partitions, Painted Metal, Overhead Braced	2.60	1.0%
Repaint (50% surface) Concrete Block, Painted, Interior Wall Finish	2.55	1.0%

*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	Plumbing	HVAC Systems	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.46					.51	.62	.48	.43			2.50
2		.46					.90	.62	.48	.43			2.90
3		.46					.51	.62	.48	.43			2.50
4		.46	.04	2.03			.90	.62	.48	.43			4.96
5		.09	.59	.32	.20		1.33	.66	.53	.95			4.67
6		.46					.90	.62	.48	.43			2.90
7		.46					.62	.62	.48	.43			2.61
8		.46	.04	2.05			.96	.62	.48	.50			5.12
9		.46					.51	.62	.48	.43			2.50
10		1.12	.59	1.30	1.33		3.00	5.92	1.21	2.09			16.57
11		.46					.51	.62	.48	.43			2.50
12		.06	.46	.04	2.03		2.67	.62	.63	.43			6.92
13		.46					.51	.62	.48	.43			2.50
14		.46					1.02	.62	.48	.43			3.01
15		.20	.59	.32	.28		1.25	8.79	1.02	2.21			14.66
16		.46	.04	2.05			.96	.62	.48	.50			5.12
17		.46					.73	.62	.51	.43			2.74
18		.46					.90	.62	.48	.43			2.90
19		.46					.51	.62	.48	.43			2.50
20		1.27	6.00	2.61	4.43		3.23	1.22	1.19	3.31			23.25
21		.46					.62	.62	.48	.43			2.61
22		.46					1.12	.62	.51	.43			3.14
23		.46					.51	.62	.48	.43			2.50
24		.06	.46	.04	2.03		2.72	.62	.63	.50			7.05
25		.24	.59	.32	6.73		5.48	5.88	.51	2.69			22.44
26		.46					.90	.62	.48	.43			2.90
27		.46					.51	.62	.48	.43			2.50
28		.46	.04	2.05			1.02	.62	.48	.43			5.10
29		.46					.73	.62	.51	.43			2.74
30		1.24	.59	1.30	1.41		3.80	9.82	1.70	2.86			22.73
31		.46					.51	.62	.48	.43			2.50
32		.46	.04	2.03			.96	.62	.48	.43			5.02
33		.46					.51	.62	.48	.50			2.57
34		.46					1.12	.62	.51	.43			3.14
35		.09	.59	.32	.20		3.54	.66	.51	.95			6.86
36		.06	.46	.04	2.05		2.48	.62	.63	.43			6.76
37		.46					.70	.62	.48	.43			2.69
38		.46					.72	.62	.48	.43			2.71
39		.46					.70	.62	.48	.43			2.69
40		1.27	6.62	2.61	7.87		2.93	6.43	1.19	3.81			32.72
41		.46					.91	.62	.51	.50			3.00
42		.46					.83	.62	.48	.43			2.82
43		.46					.70	.62	.48	.43			2.69
44		.46	.04	2.03			.72	.62	.48	.43			4.77
45		.20	.59	.32	.28		1.97	8.79	1.02	2.21			15.38
46		.46					.93	.62	.51	.43			2.95
47		.46					.70	.62	.48	.43			2.69
48		.06	.46	.04	2.05		2.53	.62	.63	.43			6.81
49		.46					.81	.62	.48	.50			2.88
50		1.54	.59	6.39	11.79		6.64	.70	1.35	2.85			31.86
Total		7.49	35.84	16.16	54.93		70.70	73.64	30.30	41.46			330.53



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

College Auditorium

Washington, D.C.

College Auditorium

Gross Square Feet:	24,000
Height in Ft:	24
Exterior:	Concrete
Floor coverings:	Carpet, Hardwood
HVAC:	Electric Cooling, Gas Heating
Capacity:	N/A
Occupancy:	1,440
Replacement Cost:	\$4,224,000

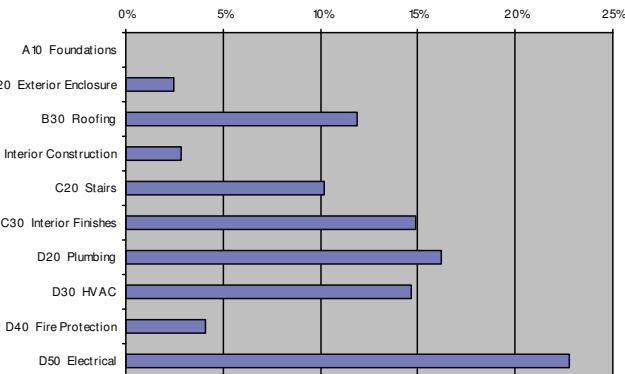
Components

Uniform / Component	Quantity	Units
A10 Foundations		
Concrete Slab	1000	Sq Ft
B20 Exterior Enclosure		
Concrete, Painted, Exterior, 1st Floor	14900	Sq Ft
Aluminum Fixed Window, 12 sf, 1st Floor	31	Each
Aluminum Frame, Fully Glazed, Exterior Door	6	Each
Steel, Painted, Exterior Door	6	Each
B30 Roofing		
Built-up Roof	24000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	17	Each
Steel, Painted, Interior Door	48	Each
C20 Stairs		
Concrete, Exterior Stairs	600	Sq Ft
Concrete, Interior Stairs	360	Sq Ft
Masonry, Painted, Interior Stairs	12288	Sq Ft
C30 Interior Finishes		
Carpet, Nylon 20 oz., High Traffic	7200	Sq Ft
Wood Parquetry Flooring	16800	Sq Ft
Acoustical Tile Ceiling	24000	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	6	Each
Lavatory, Iron, Enamel	23	Each
Lavatory, Vitreous China	23	Each
Sink, Stainless Steel	2	Each
Tankless Water Closet	17	Each
Urinal, Vitreous China	6	Each
Circulator Pump, 1/6 HP, Cold Water	1	Each
Circulator Pump, 1/6 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	1.89	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.88	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	2.25	K Ln Ft
Pipe & Fittings, 4" Steel	1.439	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	2.61	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	1.29	K Ln Ft
Water Heater, Gas/Oil, 850 Gph	2	Each
Backflow Preventer, 4"	2	Each
Pipe & Fittings, 6" Cast Iron	1.065	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.31	K Ln Ft
Pipe & Fittings, 4" PVC	0.694	K Ln Ft
Roof Drain, 4-6"	14	Each
D30 HVAC		
Duct Insulation, Fiberglass Blanket	3940	Sq Ft
Ductwork	5880	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	4	Each
Air Conditioner, Rooftop, Single Zone, 20 Ton	1	Each
Air Conditioner, Rooftop, Single Zone, 50 Ton	1	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	185	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	8	Each
D50 Electrical		
Main Switchgear, <1,200 Amp.	1	Each
Motor Starter, 5-20 HP, <600 V	4	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	2	Each
Primary Transformer, Dry, 750 kVA	1	Each
Exit Lighting Fixture, w/ Battery	12	Each
Incandescent Lighting Fixture, Basic, 100 w	50	Each
Light Dimming Panel	2	Each
Metal Halide Lighting Fixture, High Bay, 400 w	240	Each
Receptacle, 120 V, 15 Amp.	192	Each
Wiring Device, Switch	48	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	12	Each
Heat Detector	12	Each
Manual Pull Station	8	Each
Smoke Detector	20	Each
Sound System, 7 Channel	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$888,678	\$0.74	0.42%
Unscheduled Maintenance	\$716,995	\$0.60	0.34%
Renewal & Replacement	\$3,928,136	\$3.27	1.86%
Total	\$5,533,809	\$4.61	2.62%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Masonry, Painted, Interior Stairs	16.48	8.2%
Replace Air Conditioner, Rooftop, Single Zone, 50 Ton	11.41	5.7%
Replace Metal Halide Lighting Fixture, High Bay, 400 w	11.09	5.5%
Place New Membrane Over Existing, Built-up Roof	10.97	5.5%
Replace Carpet, Nylon 20 oz., High Traffic	10.87	5.4%
Replace Wood Parquetry Floor	10.69	5.3%
Replace Lamp, Metal Halide Lighting Fixture, High Bay, 400 w	10.20	5.1%
Sand & Refinish Wood Parquetry Flooring	9.73	4.8%
Replace Membrane, Built-up Roof	9.50	4.7%
Replace Ballast, Metal Halide Lighting Fixture, High Bay, 400 w	9.00	4.5%
Replace Water Heater, Gas/Oil, 850 Gph	6.67	3.3%
Repair Air Conditioner, Rooftop, Single Zone, 50 Ton	5.43	2.7%
Refinish Masonry, Painted, Interior Stairs	5.18	2.6%
Replace Air Conditioner, Rooftop, Single Zone, 20 Ton	4.73	2.4%
Repair Air Conditioner, Rooftop, Single Zone, 20 Ton	3.53	1.8%
Refinish Concrete, Painted, Exterior, 1st Floor	3.36	1.7%
Maintain Built-up Roof	3.04	1.5%
Replace Steel, Painted, Interior Door Locks	2.96	1.5%
Replace Primary Transformer, Dry, 750 kVA	2.85	1.4%
Maintain Air Conditioner, Rooftop, Single Zone, 50 Ton	2.05	1.0%
Repair Wood Parquetry Flooring (2% of Floors)	2.04	1.0%
Maintain Fire Sprinkler System	1.97	1.0%
Test Gages & Valves, Fire Sprinkler System	1.82	0.9%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	1.81	0.9%
Clean & Service Water Heater, Gas/Oil, 850 Gph	1.80	0.9%
Maintain Air Conditioner, Rooftop, Single Zone, 20 Ton	1.68	0.8%
Replace Backflow Preventer, 4"	1.67	0.8%
Maintain Roof Drain, 4-6"	1.45	0.7%
Maintain Backflow Preventer, 4"	1.38	0.7%
Test Fire Sprinkler Head	1.31	0.7%

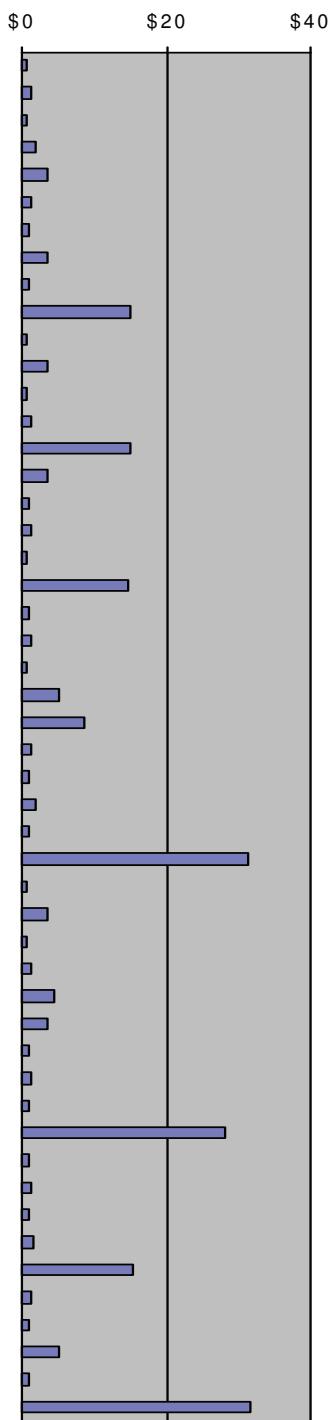
*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13						.17	.16	.12	.17		.75
2		.13			.04			.65	.16	.12	.17		1.27
3		.13						.17	.16	.12	.21		.79
4		.13	.06	.43	.04			.65	.16	.12	.17		1.76
5		.04	.19	.19	.23			.28	.17	.14	2.15		3.40
6		.13			.04			.65	.16	.12	.21		1.31
7		.13						.28	.16	.12	.17		.86
8		.13	.06	.43	1.81			.66	.16	.12	.17		3.54
9		.13			.05			.17	.16	.12	.21		.84
10		.88	.19	.78	2.69			1.57	3.15	.57	5.35		15.20
11		.13						.17	.16	.12	.17		.75
12		.04	.13	.06	.43	.04		2.17	.16	.22	.21		3.45
13		.13						.17	.16	.12	.17		.75
14		.13			.04			.77	.16	.12	.17		1.38
15		.09	5.67	.19	.07	.23		.23	5.53	.26	2.66		14.93
16		.13	.06	.43	1.81			.66	.16	.12	.17		3.54
17		.13						.22	.16	.14	.17		.81
18		.13			.09			.65	.16	.12	.28		1.43
19		.13						.17	.16	.12	.17		.75
20		.91	.19	1.38	.47	2.69		1.71	.27	.56	6.68		14.88
21		.13						.28	.16	.12	.21		.90
22		.13			.04			.70	.16	.14	.17		1.33
23		.13						.17	.16	.12	.17		.75
24		.04	.13	.06	.43	1.81		2.17	.16	.22	.21		5.23
25		.30	.19	.19	.29	.23		1.75	3.15	.13	2.34		8.57
26		.13			.04			.65	.16	.12	.17		1.27
27		.13			.05			.17	.16	.12	.21		.84
28		.13	.06	.43	.04			.77	.16	.12	.17		1.87
29		.13						.22	.16	.14	.17		.81
30		.92	9.50	.78	.07	2.69		1.65	6.17	.69	8.97		31.44
31		.13						.17	.16	.12	.17		.75
32		.13	.06	.43	1.81			.66	.16	.12	.17		3.54
33		.13						.17	.16	.12	.21		.79
34		.13			.04			.70	.16	.14	.17		1.33
35		.04	.19	.19	.23			1.42	.17	.13	2.15		4.53
36		.04	.13	.06	.43	.09		2.06	.16	.22	.28		3.46
37		.13						.28	.16	.12	.17		.86
38		.13			.04			.55	.16	.12	.17		1.16
39		.13						.28	.16	.12	.21		.90
40		.91	.19	1.38	.47	12.50		1.90	3.26	.56	6.87		28.05
41		.13						.33	.16	.14	.17		.92
42		.13			.04			.62	.16	.12	.21		1.27
43		.13						.28	.16	.12	.17		.86
44		.13	.06	.43	.04			.55	.16	.12	.17		1.65
45		.09	5.67	.19	.07	.28		.63	5.53	.26	2.66		15.38
46		.13			.04			.59	.16	.14	.17		1.22
47		.13						.32	.16	.12	.17		.90
48		.04	.13	.06	.43	1.81		2.06	.16	.22	.21		5.12
49		.13						.35	.16	.12	.17		.93
50		1.34	.19	.78	17.77	2.69		2.71	.17	.73	5.16		31.54
Total		5.69	27.33	6.65	23.51	34.28		37.34	33.85	9.41	52.49		230.56

50-Year Total M&R Cost Profile per GSFT

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

College Dormitory, 50 Room

Gross Square Feet:	25,000
Height in Ft:	36
Exterior:	Clay Brick
Floor coverings:	Finished Concrete, Ceramic Tile, Carpet
HVAC:	Chilled Water, Gas Boiler, Fan Coil Units
Capacity:	N/A
Occupancy:	450
Replacement Cost:	\$6,429,866

Components (Continued on Page 152)

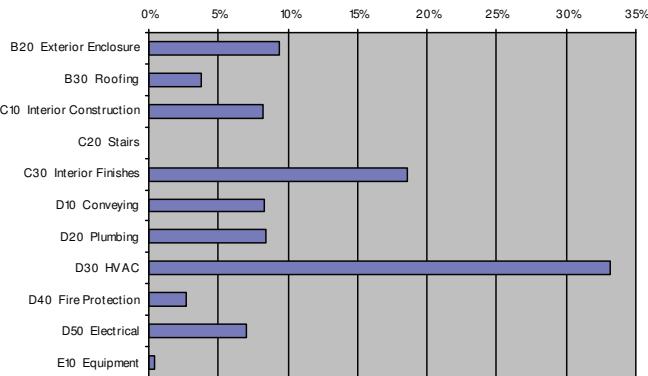
Uniform / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	3832	Sq Ft
Clay Brick, Exterior, 2nd Floor	3832	Sq Ft
Clay Brick, Exterior, 3rd+ Floor	3832	Sq Ft
Aluminum Operable Window, 12 sf, 1st Floor	40	Each
Aluminum Operable Window, 12 sf, 2nd Floor	40	Each
Aluminum Operable Window, 12 sf, 3rd+ Floor	40	Each
Aluminum Frame, Fully Glazed, Exterior Door	2	Each
Steel, Painted, Exterior Door	8	Each
B30 Roofing		
Single-Ply Modified Bituminous/Thermoplastic Roof	8340	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	14	Each
Wood, Hollow Core, Painted, Interior Door	111	Each
Wood, Solid Core, Painted, Interior Door	84	Each
C20 Stairs		
Concrete, Interior Stairs	450	Sq Ft
Metal, Painted, Interior Railing	120	Ln Ft
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	2780	Sq Ft
Sheetrock, Unstippled, Interior Wall Finish	60490	Sq Ft
Carpet, Nylon 20 oz., Low Traffic	21750	Sq Ft
Ceramic Tile Flooring	2000	Sq Ft
Concrete, Painted Flooring	1250	Sq Ft
Sheetrock, Unstippled Ceiling	25000	Sq Ft
D10 Conveying		
Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	1	Each
D20 Plumbing		
Drinking Fountain, Vitreous China	3	Each
Lavatory, Vitreous China	12	Each
Service Sink, Iron, Enamel	3	Each
Shower, Fiberglass	16	Each
Tankless Water Closet	14	Each
Circulator Pump, 1/2 HP, Cold Water	2	Each
Circulator Pump, 1/2 HP, Hot Water	2	Each
Pipe & Fittings, 3/4" Copper, Cold Water	1.6	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	1	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	2	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	1.9	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	1.4	K Ln Ft
Water Heater, Gas/Oil, 175 Gph	2	Each
Backflow Preventer, 4"	2	Each
Pipe & Fittings, 6" Cast Iron	0.6	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.2	K Ln Ft
Pipe & Fittings, 4" PVC	0.2	K Ln Ft
Roof Drain, 4-6"	5	Each
D30 HVAC		
Pipe & Fittings, 4" Steel, Gas	0.9	K Ln Ft
Chemical Feed System	1	Each
Circulation Pump, 5 HP, Hot Water	1	Each
Expansion Tank, 60 Gal.	2	Each
Gas Boiler, 1,000 Mbh	1	Each
Chiller, Reciprocal Air-Cooled Hermetic, 60 Ton	1	Each
Circulation Pump, 5 HP, Chiller & Condenser Water	2	Each
Condenser, Air-Cooled, 60 Ton	1	Each
Duct Insulation, Fiberglass Blanket	3806	Sq Ft
Ductwork	5680	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	4	Each
Exhaust Fan, Roof Mounted, 1,000 Cfm	1	Each
Fan Coil, Two-Pipe, 400 Cfm	65	Each
Thermostat	51	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	125	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	10	Each
D50 Electrical		
Distribution Switch, Fused, <600 V	3	Each
Main Switchgear, <1,200 Amp.	1	Each
Motor Starter, 5-20 HP, <600 V	3	Each
Motor Starter, 21-50 HP, <600 V	2	Each
Exit Lighting Fixture, w/ Battery	10	Each
Fluorescent Lighting Fixture, 160 w	235	Each
Receptacle, 120 V, 15 Amp.	250	Each
Wiring Device, Switch	100	Each
Fire Alarm Horn & Strobe	10	Each

College Dormitory, 50 Room

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$2,051,712	\$1.64	0.64%
Unscheduled Maintenance	\$1,554,253	\$1.24	0.48%
Renewal & Replacement	\$4,141,166	\$3.31	1.29%
Total	\$7,747,131	\$6.20	2.41%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Refinish Sheetrock, Unstippled, Interior Wall Finish	23.61	9.5%
Maintain Fan Coil, Two-Pipe, 400 Cfm	16.01	6.5%
Replace Carpet, Nylon 20 oz., Low Traffic	15.76	6.4%
Replace Fan Coil, Two-Pipe, 400 Cfm	14.99	6.1%
Maintain Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	13.54	5.5%
Refinish Sheetrock, Unstippled Ceiling	13.20	5.3%
Renovate Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	9.10	3.7%
Maintain Chemical Feed System	7.44	3.0%
Replace Chiller, Reciprocal Air Cooled Hermetic, 60 Ton	5.96	2.4%
Maintain Chiller, Reciprocal Air Cooled Hermetic, 60 Ton	5.41	2.2%
Replace Membrane, Single-Ply Modified Bituminous/Thermoplastic Roof	5.33	2.1%
Replace Wood, Hollow Core, Painted, Interior Door Locks	5.25	2.1%
Clean & Reseal Clay Brick, Exterior, 3rd+ Floor	4.22	1.7%
Replace Wood, Solid Core, Painted, Interior Door	4.05	1.6%
Replace Wood, Solid Core, Painted, Interior Door Locks	3.98	1.6%
Maintain Thermostat	3.88	1.6%
Replace Thermostat	3.86	1.6%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	3.61	1.5%
Inspect & Test Gas Boiler, 1,000 Mbh	3.55	1.4%
Replace Fluorescent Lighting Fixture, 160 w	3.30	1.3%
Clean & Reseal Clay Brick, Exterior, 2nd Floor	3.17	1.3%
Repair Chiller, Reciprocal Air Cooled Hermetic, 60 Ton	3.05	1.2%
Repair Single-Ply Modified Bituminous/Thermoplastic Roof	2.91	1.2%
Replace Condenser, Air-Cooled, 60 Ton	2.89	1.2%
Replace Batteries & Check Operation, Smoke Detector	2.87	1.2%
Repair Fan Coil, Two-Pipe, 400 Cfm	2.48	1.0%
Replace Wood, Hollow Core, Painted, Interior Door	2.25	0.9%
Clean & Reseal Clay Brick, Exterior, 1st Floor	2.10	0.8%
Replace Shower, Fiberglass	2.02	0.8%
Maintain Fire Sprinkler System	1.89	0.8%

*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

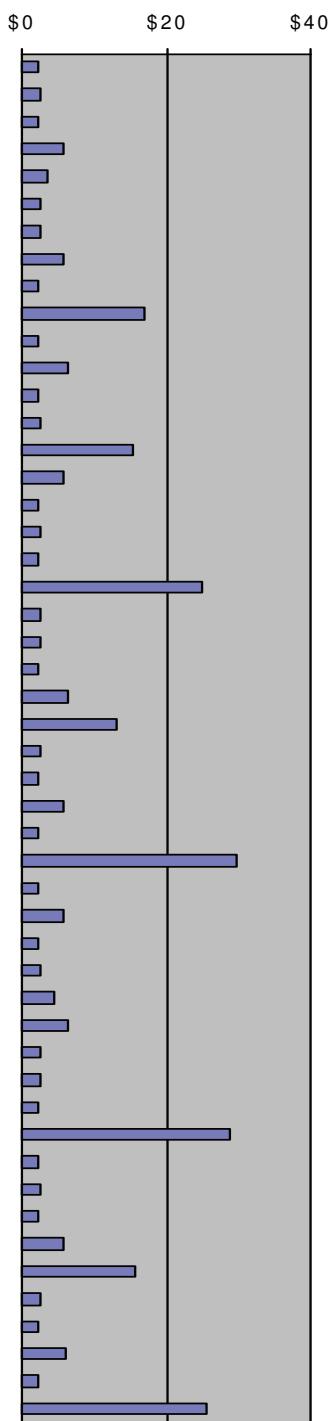
Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1	.07				.34	.20	1.35	.11	.17	.01		2.26
2	.07				.34	.34	1.36	.11	.17	.01		2.41
3	.07				.34	.20	1.35	.11	.23	.01		2.32
4	.07	.18 .00	3.16		.34	.34	1.36	.11	.17	.01		5.76
5	.04	.11 .74		.11	.34	.46	1.36	.14	.28	.01		3.59
6	.07				.34	.34	1.36	.11	.23	.01		2.47
7	.07				.34	.22	1.48	.11	.17	.01		2.41
8	.07	.18 .00	3.16		.34	.35	1.36	.11	.17	.01		5.77
9	.07				.34	.20	1.35	.11	.23	.01		2.32
10	4.78	1.08 3.05		.14	.34	1.13	3.98	.42	1.86	.11		16.89
11	.07				.34	.20	1.35	.11	.17	.01		2.26
12	.01	.07 .18 .00	3.16		.34	.75	1.37	.23	.23	.01		6.37
13	.07				.34	.20	1.35	.11	.17	.01		2.26
14	.07				.34	.36	1.49	.11	.17	.01		2.56
15	.22	.11 .74 .01	5.29		.34	.42	7.26	.24	.79	.01		15.45
16	.07	.18 .00	3.16		.34	.35	1.36	.11	.17	.01		5.77
17	.07				.34	.25	1.35	.13	.17	.01		2.33
18	.07				.34	.34	1.36	.11	.38	.01		2.62
19	.07				.34	.20	1.35	.11	.17	.01		2.26
20	4.78	2.66 3.66 .05	3.46		.34	2.21	4.90	.40	2.53	.11		25.11
21	.07				.34	.22	1.48	.11	.23	.01		2.47
22	.07				.34	.39	1.36	.13	.17	.01		2.48
23	.07				.34	.20	1.35	.11	.17	.01		2.26
24	.01	.07 .18 .00	3.16		.34	.76	1.37	.23	.23	.01		6.38
25	2.29	.11 .74 .58	4.55		1.71	2.33	.12	.64	.01			13.08
26	.07				.34	.34	1.36	.11	.17	.01		2.41
27	.07				.34	.20	1.35	.11	.23	.01		2.32
28	.07	.18 .00	3.16		.34	.36	1.49	.11	.17	.01		5.91
29	.07				.34	.25	1.35	.13	.17	.01		2.33
30	4.96	1.08 3.66 .01	5.33		.34	1.07	10.26	.52	2.31	.11		29.65
31	.07				.34	.20	1.35	.11	.17	.01		2.26
32	.07	.09 .00	3.16		.34	.35	1.36	.11	.17	.01		5.67
33	.07				.34	.20	1.35	.11	.23	.01		2.32
34	.07	.10			.34	.39	1.36	.13	.17	.01		2.58
35	.04	.11 .74 .11			.34	1.28	1.36	.12	.28	.01		4.40
36	.01	.07 .09 .00	3.16		.34	.68	1.37	.23	.38	.01		6.35
37	.07				.34	.27	1.48	.11	.17	.01		2.46
38	.07	.10			.34	.27	1.36	.11	.17	.01		2.44
39	.07				.34	.27	1.35	.11	.23	.01		2.39
40	4.78	2.66 6.30 .05	3.46		.34	1.98	5.87	.40	2.89	.11		28.85
41	.07				.34	.32	1.35	.13	.17	.01		2.40
42	.07	.10			.34	.29	1.36	.11	.23	.01		2.51
43	.07				.34	.28	1.35	.11	.17	.01		2.34
44	.07	.09 .00	3.16		.34	.27	1.49	.11	.17	.01		5.72
45	.22	.11 .74 .01	5.29		.34	.70	7.26	.24	.79	.01		15.73
46	.07	.10			.34	.32	1.36	.13	.17	.01		2.51
47	.07				.34	.27	1.35	.11	.17	.01		2.33
48	.01	.07 .09 .00	3.16		.34	.68	1.37	.23	.23	.01		6.20
49	.07				.34	.29	1.35	.11	.17	.01		2.35
50	7.10	1.08 3.15 .12	2.18		4.55	2.16	3.17	.51	1.50	.11		25.63
Total	29.26	11.79	25.34	.29	57.55	25.61	25.97	102.72	8.22	21.90	1.23	309.89

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT



Note: For alternative locations use the Local Indexes shown in Chapter 3.

College Lecture Classrooms

Gross Square Feet:	90,000
Height in Ft:	24
Exterior:	Concrete Block
Floor coverings:	Carpet, Vinyl Tile, Ceramic Tile
HVAC:	Electric Cool, Gas Heat, Multizone Heat
Capacity:	N/A
Occupancy:	4,050
Replacement Cost:	\$17,982,662

Components

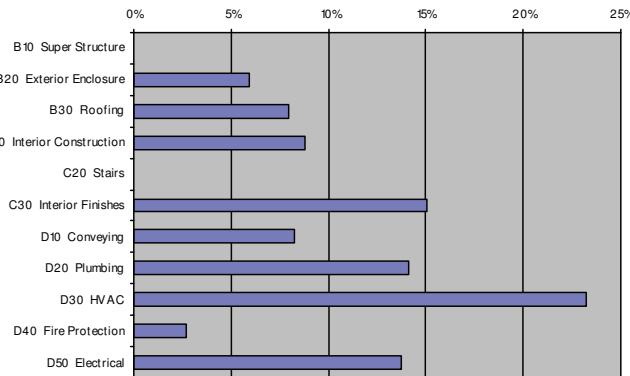
Uniformat / Component	Quantity	Units
B10 Super Structure		
Concrete Decking	1000	Sq Ft
B20 Exterior Enclosure		
Concrete Block, Exterior, 1st Floor	9160	Sq Ft
Concrete Block, Exterior, 2nd Floor	9160	Sq Ft
Aluminum Operable Window, 12 sf, 1st Floor	80	Each
Aluminum Operable Window, 12 sf, 2nd Floor	80	Each
Aluminum Frame, Fully Glazed, Exterior Door	6	Each
B30 Roofing		
Built-up Roof	45000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	80	Each
Steel, Painted, Interior Door	450	Each
C20 Stairs		
Concrete, Exterior Stairs	125	Sq Ft
Concrete, Interior Stairs	400	Sq Ft
Metal, Painted, Interior Railing	200	Ln Ft
C30 Interior Finishes		
Ceramic Tile, 4"x4", Interior Wall Finish	5400	Sq Ft
Sheetrock, Stippled, Interior Wall Finish	102600	Sq Ft
Carpet, Nylon 20 oz., High Traffic	22500	Sq Ft
Ceramic Tile Flooring	4500	Sq Ft
Vinyl Tile Flooring	63000	Sq Ft
Acoustical Tile Ceiling	90000	Sq Ft
D10 Conveying		
Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	2	Each
D20 Plumbing		
Drinking Fountain, Refrigerated	16	Each
Lavatory, Vitreous China	69	Each
Sink, Stainless Steel	118	Each
Tankless Water Closet	80	Each
Urinal, Vitreous China	54	Each
Circulator Pump, 2 HP, Cold Water	1	Each
Circulator Pump, 2 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	11.74	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	6.2	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	10.319	K Ln Ft
Pipe & Fittings, 4" Steel	1.797	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	12.638	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	6.674	K Ln Ft
Water Heater, Gas/Oil, 175 Gph	2	Each
Backflow Preventer, 4"	4	Each
Pipe & Fittings, 6" Cast Iron	5.362	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.424	K Ln Ft
Pipe & Fittings, 4" PVC	0.65	K Ln Ft
Roof Drain, 2"	24	Each
D30 HVAC		
Duct Insulation, Fiberglass Blanket	19510	Sq Ft
Ductwork	29120	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	16	Each
Air Conditioner, Rooftop, Single Zone, 50 Ton	7	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	642	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	20	Each
D50 Electrical		
Main Switchgear, <1,200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	12	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	8	Each
Secondary Transformer, Dry, 50 kVA	3	Each
Exit Lighting Fixture, w/ Battery	15	Each
Fluorescent Lighting Fixture, 160 w	1296	Each
Receptacle, 120 V, 15 Amp.	900	Each
TV Cable Outlet	47	Each
Wiring Device, Switch	90	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	40	Each
Heat Detector	30	Each
Manual Pull Station	40	Each
Smoke Detector	100	Each
Time Control Clock	30	Each

College Lecture Classrooms

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$2,762,386	\$0.61	0.31%
Unscheduled Maintenance	\$2,313,340	\$0.51	0.26%
Renewal & Replacement	\$10,383,296	\$2.31	1.15%
Total	\$15,459,022	\$3.44	1.72%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, Single Zone, 50 Ton	21.30	14.6%
Refinish Sheetrock, Stippled, Interior Wall Finish	11.13	7.6%
Repair Air Conditioner, Rooftop, Single Zone, 50 Ton	10.13	6.9%
Replace Carpet, Nylon 20 oz., High Traffic	9.06	6.2%
Maintain Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	7.52	5.2%
Replace Steel, Painted, Interior Door Locks	7.39	5.1%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	5.54	3.8%
Place New Membrane Over Existing, Built-up Roof	5.48	3.8%
Replace Fluorescent Lighting Fixture, 160 w	5.06	3.5%
Renovate Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	5.06	3.5%
Replace Membrane, Built-up Roof	4.75	3.3%
Maintain Air Conditioner, Rooftop, Single Zone, 50 Ton	3.83	2.6%
Replace Vinyl Tile Flooring	3.44	2.4%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	2.22	1.5%
Clean & Seal Concrete Block, Exterior, 2nd Floor	2.11	1.4%
Maintain Steel, Painted, Interior Door Locks	1.76	1.2%
Maintain Built-up Roof	1.52	1.0%
Clean & Seal Concrete Block, Exterior, 1st Floor	1.39	1.0%
Replace Toilet Partitions, Painted Metal, Overhead Braced	1.39	1.0%
Replace Faucet Washer & Clean Trap, Sink, Stainless Steel	1.34	0.9%
Replace Batteries & Check Operation, Smoke Detector	1.33	0.9%
Refinish Steel, Painted, Interior Door	1.30	0.9%
Replace Sink, Stainless Steel	1.25	0.9%
Test Fire Sprinkler Head	1.21	0.8%
Replace Pipe & Fittings, 3/4" Copper, Cold Water (20% of Pipe)	1.13	0.8%
Maintain Time Control Clock	1.06	0.7%
Replace Ceramic Tile Flooring	.98	0.7%
Replace Backflow Preventer, 4"	.89	0.6%
Maintain Power Panel Board, 208 Y/120 V, 200 Amp.	.84	0.6%
Replace Power Panel Board, 208 Y/120 V, 200 Amp.	.81	0.6%

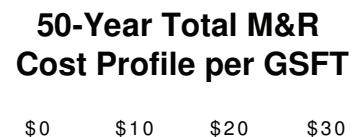
*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	Plumbing	HVAC Systems	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.06				.19	.10	.15	.04	.17			.73
2		.06			.03	.19	.36	.15	.04	.17			1.01
3		.06				.19	.10	.15	.04	.17			.73
4		.06	.13	.00	.96	.19	.36	.15	.04	.17			2.07
5		.01	.10	.48		.19	.18	.16	.05	.21			1.36
6		.06			.03	.19	.36	.15	.04	.17			1.01
7		.06				.19	.21	.15	.04	.17			.84
8		.06	.13	.00	2.44	.19	.45	.15	.04	.18			3.65
9		.06				.09	.19	.10	.15	.04	.17		.82
10		1.71	.10	1.96		.05	.19	1.12	3.54	.45	2.32		11.43
11		.06				.19	.10	.15	.04	.17			.73
12		.01	.06	.13	.00	.96	.19	.52	.15	.10	.17		2.31
13		.06					.19	.10	.15	.04	.17		.73
14		.06					.03	.19	.47	.15	.04	.17	1.13
15		.05	2.84	.48	.01	.02	.19	.16	7.15	.08	.48		11.45
16		.06	.13	.00	2.44	.19	.45	.15	.04	.18			3.65
17		.06					.19	.12	.15	.05	.17		.75
18		.06				1.80	.19	.36	.15	.04	.17		2.79
19		.06					.19	.10	.15	.04	.17		.73
20		1.71	.10	2.76	.01	1.05	.19	1.36	.27	.44	3.26		11.15
21		.06					.19	.21	.15	.04	.17		.84
22		.06				.03	.19	.37	.15	.05	.17		1.04
23		.06					.19	.10	.15	.04	.17		.73
24		.01	.06	.13	.00	2.44	.19	.61	.15	.10	.18		3.89
25		.70	.10	.48		2.53	2.27	3.54	.04	.58			10.23
26		.06				.03	.19	.36	.15	.04	.17		1.01
27		.06				.09	.19	.10	.15	.04	.17		.82
28		.06	.13	.00	.96	.19	.47	.15	.04	.17			2.18
29		.06					.19	.12	.15	.05	.17		.75
30		1.76	4.75	1.96	.01	.07	.19	1.02	8.00	.48	3.31		21.54
31		.06					.19	.10	.15	.04	.17		.73
32		.06	.13	.00	2.44	.19	.45	.15	.04	.17			3.64
33		.06					.19	.10	.15	.04	.18		.74
34		.06				.03	.19	.37	.15	.05	.17		1.04
35		.01	.10	.48			.19	1.71	.16	.04	.21		2.88
36		.01	.06	.13	.00	2.73	.19	.44	.15	.10	.17		4.00
37		.06					.19	.19	.15	.04	.17		.81
38		.06				.03	.19	.27	.15	.04	.17		.93
39		.06					.19	.19	.15	.04	.17		.81
40		1.71	.10	2.76	.01	2.53	.19	1.93	3.65	.44	3.47		16.78
41		.06					.19	.20	.15	.05	.18		.85
42		.06				.03	.19	.38	.15	.04	.17		1.04
43		.06					.19	.19	.15	.04	.17		.81
44		.06	.13	.00	.96	.19	.27	.15	.04	.17			1.98
45		.05	2.84	.48	.01	.11	.19	.60	7.15	.08	.48		11.98
46		.06				.03	.19	.29	.15	.05	.17		.95
47		.06					.19	.19	.15	.04	.17		.81
48		.01	.06	.13	.00	2.44	.19	.53	.15	.10	.17		3.79
49		.06					.19	.30	.15	.04	.18		.94
50		2.46	.10	1.96	.11	1.03	2.53	2.88	.16	.60	2.28		14.08
Total	10.22	13.66	15.04	.17	25.84	14.23	24.31	39.95	4.67	23.61		171.71	



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

College Student Union

Gross Square Feet:	25,000
Height in Ft:	24
Exterior:	Clay Brick
Floor coverings:	Carpet, Vinyl Tile
HVAC:	Electric Cool, Gas Heat, Multizone Heat
Capacity:	N/A
Occupancy:	1,120
Replacement Cost:	\$5,300,000

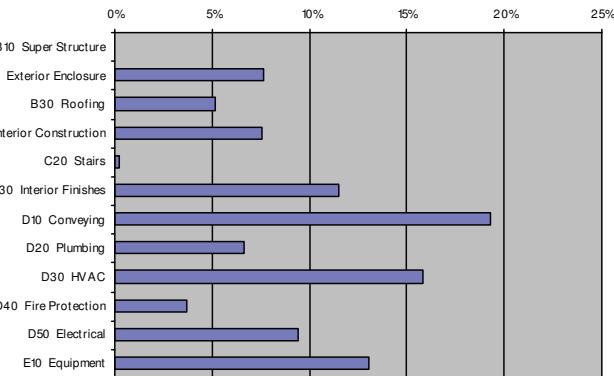
Components (Continued on Page 152)

Uniform / Component	Quantity	Units
B10 Super Structure		
Concrete Decking	400	Sq Ft
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	4785	Sq Ft
Clay Brick, Exterior, 2nd Floor	4785	Sq Ft
Aluminum Operable Window, 12 sf, 1st Floor	45	Each
Aluminum Operable Window, 12 sf, 2nd Floor	45	Each
Aluminum Frame, Fully Glazed, Exterior Door	4	Each
B30 Roofing		
Built-up Roof	12500	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	13	Each
Steel, Painted, Interior Door	179	Each
C20 Stairs		
Concrete, Exterior Stairs	100	Sq Ft
Concrete, Interior Stairs	480	Sq Ft
Metal, Painted, Interior Railing	240	Ln Ft
C30 Interior Finishes		
Sheetrock, Stippled, Interior Wall Finish	21432	Sq Ft
Carpet, Nylon 20 oz., High Traffic	12500	Sq Ft
Vinyl Tile Flooring	12500	Sq Ft
Acoustical Tile Ceiling	25000	Sq Ft
D10 Conveying		
Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	2	Each
D20 Plumbing		
Drinking Fountain, Refrigerated	3	Each
Lavatory, Vitreous China	12	Each
Sink, Stainless Steel	6	Each
Tankless Water Closet	13	Each
Urinal, Vitreous China	3	Each
Circulator Pump, 1/6 HP, Cold Water	1	Each
Circulator Pump, 1/4 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	1.34	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.66	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	1.419	K Ln Ft
Pipe & Fittings, 4" Steel	0.994	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	1.838	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.934	K Ln Ft
Water Heater, Gas/Oil, 175 Gph	2	Each
Backflow Preventer, 4"	1	Each
Pipe & Fittings, 6" Cast Iron	0.702	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.224	K Ln Ft
Pipe & Fittings, 4" PVC	0.181	K Ln Ft
Roof Drain, 2"	5	Each
D30 HVAC		
Duct Insulation, Fiberglass Blanket	5682	Sq Ft
Ductwork	8480	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	4	Each
Exhaust Fan, Roof Mounted, 1,000 Cfm	1	Each
Air Conditioner, Rooftop, Single Zone, 50 Ton	2	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	180	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	10	Each
Kitchen Fire Suppression System (CO2)	1	Each
D50 Electrical		
Main Switchgear, >1,200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	4	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	3	Each
Emergency Horn & Strobe	15	Each
Exit Lighting Fixture, w/ Battery	10	Each
Fluorescent Lighting Fixture, 160 w	375	Each
Receptacle, 120 V, 15 Amp.	200	Each
TV Cable Outlet	9	Each
Wiring Device, Switch	50	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	15	Each
Heat Detector	10	Each
Manual Pull Station	10	Each
Smoke Detector	25	Each
E10 Equipment		
Coffee Brewer, 5 Burners	1	Each
Cooking Range, Commercial	1	Each
Dishwasher, Commercial	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$1,703,933	\$1.36	0.64%
Unscheduled Maintenance	\$1,171,191	\$0.94	0.44%
Renewal & Replacement	\$3,773,578	\$3.02	1.42%
Total	\$6,648,702	\$5.32	2.51%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Maintain Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	27.09	12.4%
Replace Air Conditioner, Rooftop, Single Zone, 50 Ton	21.90	10.0%
Renovate Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	18.20	8.3%
Replace Carpet, Nylon 20 oz., High Traffic	18.11	8.3%
Replace Steel, Painted, Interior Door Locks	10.59	4.8%
Repair Air Conditioner, Rooftop, Single Zone, 50 Ton	10.42	4.8%
Refinish Sheetrock, Stippled, Interior Wall Finish	8.37	3.8%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	5.77	2.6%
Place New Membrane Over Existing, Built-up Roof	5.48	2.5%
Replace Fluorescent Lighting Fixture, 160 w	5.27	2.4%
Replace Membrane, Built-up Roof	4.75	2.2%
Replace Walk-In Freezer/Cooler, Commercial	4.01	1.8%
Clean & Reseal Clay Brick, Exterior, 2nd Floor	3.96	1.8%
Maintain Air Conditioner, Rooftop, Single Zone, 50 Ton	3.94	1.8%
Replace Dishwasher, Commercial	3.80	1.7%
Maintain Icemaker, Commercial	3.24	1.5%
Replace Icemaker, Commercial	3.22	1.5%
Maintain Cooking Range, Commercial	2.71	1.2%
Clean & Reseal Clay Brick, Exterior, 1st Floor	2.63	1.2%
Maintain Steel, Painted, Interior Door Locks	2.53	1.2%
Replace Vinyl Tile Flooring	2.46	1.1%
Maintain Dishwasher, Commercial	2.08	0.9%
Maintain Fire Sprinkler System	1.89	0.9%
Refinish Steel, Painted, Interior Door	1.87	0.9%
Replace Water Heater, Gas/Oil, 175 Gph	1.82	0.8%
Test Gages & Valves, Fire Sprinkler System	1.74	0.8%
Maintain Walk-In Freezer/Cooler, Commercial	1.62	0.7%
Repaint (50% surface) Clay Brick, Exterior, 2nd Floor	1.57	0.7%
Maintain Built-up Roof	1.52	0.7%
Repaint (50% surface) Clay Brick, Exterior, 1st Floor	1.43	0.7%

*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

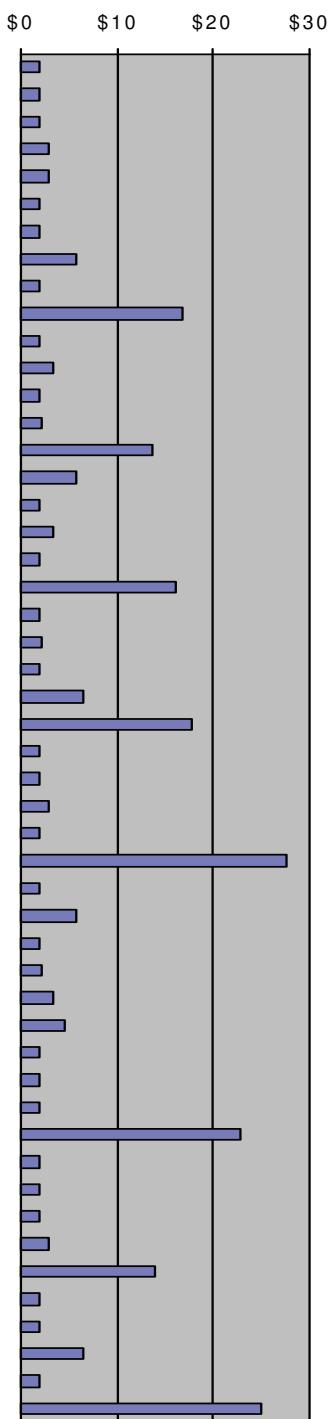
Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT	
1	.06				.69	.15	.17	.13	.17	.49		1.85	
2	.06			.06	.69	.24	.17	.13	.17	.49		2.01	
3	.06				.69	.15	.17	.13	.17	.49		1.85	
4	.06	.17	.01	.76	.69	.24	.17	.13	.17	.49		2.88	
5	.01	.10	.68		.69	.25	.18	.15	.27	.49		2.82	
6	.06			.06	.69	.24	.17	.13	.17	.49		2.01	
7	.06				.69	.18	.17	.13	.17	.49		1.88	
8	.06	.17	.01	3.72	.69	.26	.17	.13	.18	.49		5.87	
9	.06				.08	.69	.15	.17	.13	.49		1.93	
10	3.24	.10	2.80		.06	.69	.72	3.67	.61	2.43	2.39	16.70	
11	.06					.69	.15	.17	.13	.17	.49		1.85
12	.03	.06	.17	.01	.76	.69	.67	.17	.24	.17	.49		3.45
13	.06					.69	.15	.17	.13	.17	.49		1.85
14	.06				.06	.69	.28	.17	.13	.17	.49		2.04
15	.11	2.84	.68	.03		.69	.20	7.45	.25	.55	.77		13.57
16	.06	.17	.01	3.72	.69	.26	.17	.13	.18	.49		5.87	
17	.06					.69	.20	.17	.14	.17	.49		1.92
18	.06				1.34	.69	.24	.17	.13	.17	.49		3.29
19	.06					.69	.15	.17	.13	.17	.49		1.85
20	3.24	.10	3.36	.06	.81	.69	.82	.32	.60	3.75	2.39	16.14	
21	.06					.69	.18	.17	.13	.17	.49		1.88
22	.06				.06	.69	.30	.17	.14	.17	.49		2.07
23	.06					.69	.15	.17	.13	.17	.49		1.85
24	.03	.06	.17	.01	3.72	.69	.69	.17	.24	.18	.49		6.44
25	1.80	.10	.68			9.10	1.17	3.66	.13	.69	.49		17.82
26	.06				.06	.69	.24	.17	.13	.17	.49		2.01
27	.06				.08	.69	.15	.17	.13	.17	.49		1.93
28	.06	.17	.01	.76	.69	.28	.17	.13	.17	.49		2.91	
29	.06					.69	.20	.17	.14	.17	.49		1.92
30	3.34	4.75	2.80	.03	.06	.69	.66	8.35	.72	3.42	2.67		27.49
31	.06					.69	.15	.17	.13	.17	.49		1.85
32	.06	.17	.01	3.72	.69	.26	.17	.13	.17	.49		5.85	
33	.06					.69	.15	.17	.13	.18	.49		1.86
34	.06				.06	.69	.30	.17	.14	.17	.49		2.07
35	.01	.10	.68			.69	.88	.18	.13	.27	.49		3.43
36	.03	.06	.17	.01	2.04	.69	.62	.17	.24	.17	.49		4.68
37	.06					.69	.20	.17	.13	.17	.49		1.90
38	.06				.06	.69	.19	.17	.13	.17	.49		1.95
39	.06					.69	.20	.17	.13	.17	.49		1.90
40	3.24	.10	3.36	.06	3.77	.69	.81	3.79	.60	3.94	2.39		22.75
41	.06					.69	.26	.17	.14	.18	.49		1.99
42	.06				.06	.69	.23	.17	.13	.17	.49		1.99
43	.06					.69	.20	.17	.13	.17	.49		1.90
44	.06	.17	.01	.76	.69	.19	.17	.13	.17	.49		2.82	
45	.11	2.84	.68	.03	.08	.69	.42	7.45	.25	.55	.77		13.88
46	.06				.06	.69	.24	.17	.14	.17	.49		2.02
47	.06					.69	.20	.17	.13	.17	.49		1.90
48	.03	.06	.17	.01	3.72	.69	.64	.17	.24	.17	.49		6.37
49	.06					.69	.24	.17	.13	.18	.49		1.95
50	5.16	.10	2.80	.39	.06	9.10	1.46	.19	.75	2.46	2.39		24.86
Total	20.39	13.66	20.20	.66	30.54	51.22	17.58	42.12	9.77	25.08	34.63	265.86	

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT



Note: For alternative locations use the Local Indexes shown in Chapter 3.

Community Center

Gross Square Feet:	10,000
Height in Ft:	12
Exterior:	Clay Brick
Floor coverings:	Carpet, Vinyl Tile
HVAC:	Electric Cool, Gas Heat, Multizone Heat
Capacity:	N/A
Occupancy:	600
Replacement Cost:	\$2,558,919

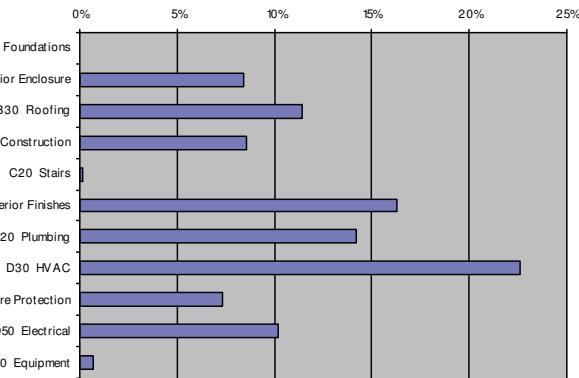
Components

Uniform / Component	Quantity	Units
A10 Foundations		
Concrete Slab	400	Sq Ft
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	4356	Sq Ft
Steel Frame, Painted, Operable Window, 12 sf, 1st Floor	30	Each
Aluminum Frame, Fully Glazed, Exterior Door	4	Each
B30 Roofing		
Built-up Roof	10000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	6	Each
Steel, Painted, Interior Door	72	Each
C20 Stairs		
Concrete, Exterior Stairs	100	Sq Ft
C30 Interior Finishes		
Sheetrock, Stippled, Interior Wall Finish	17160	Sq Ft
Carpet, Nylon 20 oz., High Traffic	5000	Sq Ft
Vinyl Tile Flooring	5000	Sq Ft
Acoustical Tile Ceiling	10000	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	3	Each
Lavatory, Vitreous China	7	Each
Sink, Stainless Steel	4	Each
Tankless Water Closet	6	Each
Urinal, Vitreous China	2	Each
Circulator Pump, 1/12 HP, Cold Water	1	Each
Circulator Pump, 1/12 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.79	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.35	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.935	K Ln Ft
Pipe & Fittings, 4" Steel	0.9	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	1.24	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.6	K Ln Ft
Water Heater, Gas/Oil, 175 Gph	2	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.43	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.2	K Ln Ft
Pipe & Fittings, 4" PVC	0.096	K Ln Ft
Roof Drain, 4-6"	4	Each
D30 HVAC		
Duct Insulation, Fiberglass Blanket	2868	Sq Ft
Ductwork	4280	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	4	Each
Air Conditioner, Rooftop, Single Zone, 50 Ton	1	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	71	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	4	Each
D50 Electrical		
Main Switchgear, <1,200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	2	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	1	Each
Emergency Horn & Strobe	5	Each
Exit Lighting Fixture, w/ Battery	4	Each
Fluorescent Lighting Fixture, 160 w	60	Each
Incandescent Lighting Fixture, Basic, 100 w	60	Each
Receptacle, 120 V, 15 Amp.	60	Each
TV Cable Outlet	1	Each
Wiring Device, Switch	30	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	4	Each
Heat Detector	4	Each
Manual Pull Station	4	Each
Smoke Detector	12	Each
E10 Equipment		
Microwave Oven	1	Each
Refrigerator, Domestic	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$444,448	\$0.89	0.35%
Unscheduled Maintenance	\$418,390	\$0.84	0.33%
Renewal & Replacement	\$1,531,335	\$3.06	1.20%
Total	\$2,394,173	\$4.79	1.87%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, Single Zone, 50 Ton	27.38	13.9%
Replace Carpet, Nylon 20 oz., High Traffic	18.11	9.2%
Refinish Sheetrock, Stippled, Interior Wall Finish	16.75	8.5%
Repair Air Conditioner, Rooftop, Single Zone, 50 Ton	13.03	6.6%
Place New Membrane Over Existing, Built-up Roof	10.97	5.6%
Replace Steel, Painted, Interior Door Locks	10.65	5.4%
Replace Membrane, Built-up Roof	9.50	4.8%
Clean & Reseal Clay Brick, Exterior, 1st Floor	5.98	3.0%
Maintain Air Conditioner, Rooftop, Single Zone, 50 Ton	4.92	2.5%
Maintain Fire Sprinkler System	4.73	2.4%
Replace Water Heater, Gas/Oil, 175 Gph	4.55	2.3%
Test Gages & Valves, Fire Sprinkler System	4.36	2.2%
Repaint (50% surface) Clay Brick, Exterior, 1st Floor	3.25	1.6%
Clean Water Heater, Gas/Oil, 175 Gph	3.16	1.6%
Maintain Built-up Roof	3.04	1.5%
Maintain Steel, Painted, Interior Door Locks	2.54	1.3%
Replace Vinyl Tile Flooring	2.46	1.2%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	2.31	1.2%
Replace Fluorescent Lighting Fixture, 160 w	2.11	1.1%
Refinish Steel, Painted, Interior Door	1.88	0.9%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	1.81	0.9%
Repair Main Switchgear, <1,200 Amp.	1.63	0.8%
Replace Incandescent Lighting Fixture, Basic, 100 w	1.49	0.8%
Replace Batteries & Check Operation, Smoke Detector	1.43	0.7%
Replace Drinking Fountain, Refrigerated	1.35	0.7%
Maintain Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	1.31	0.7%
Maintain Power Panel Board, 208 Y/120 V, 200 Amp.	1.25	0.6%
Replace Power Panel Board, 208 Y/120 V, 200 Amp.	1.21	0.6%
Test Fire Sprinkler Head	1.20	0.6%
Repair Carpet, Nylon 20 oz., High Traffic (2% of Carpet)	1.15	0.6%

*Task cost (\$2009) per GSFT over 50 years.

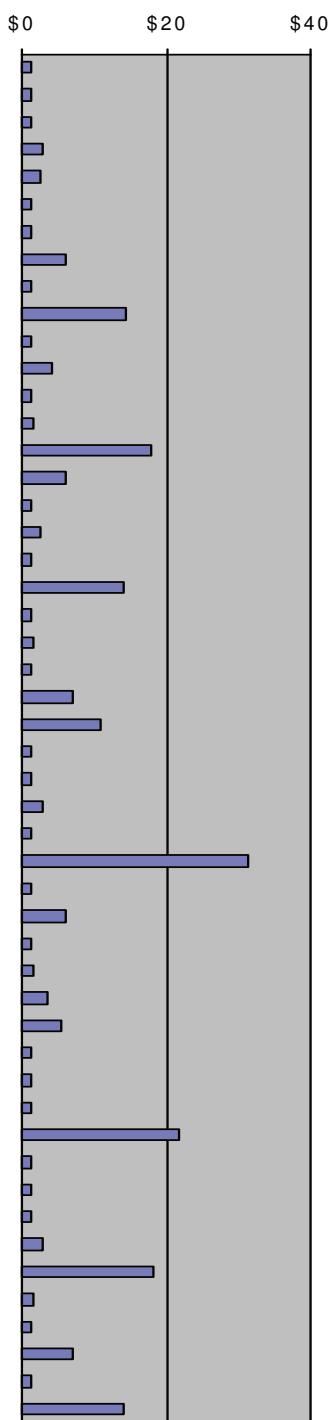
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	Interior Finishes	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13					.32	.23	.28	.20	.02		1.18
2		.13			.06		.48	.23	.28	.20	.02		1.40
3		.13					.32	.23	.28	.20	.02		1.18
4		.13	.17		1.46		.48	.23	.28	.20	.02		2.96
5		.04	.19	.69			.55	.26	.31	.58	.02		2.62
6		.13			.06		.48	.23	.28	.20	.02		1.40
7		.13					.38	.23	.28	.20	.02		1.23
8		.13	.17		4.41		.51	.23	.28	.21	.02		5.96
9		.13			.08		.32	.23	.28	.20	.02		1.25
10		3.06	.19	2.82		.06	1.27	4.60	.70	1.63	.16		14.50
11		.13					.32	.23	.28	.20	.02		1.18
12		.07	.13	.17	1.46		1.53	.23	.39	.20	.02		4.19
13		.13					.32	.23	.28	.20	.02		1.18
14		.13			.06		.54	.23	.28	.20	.02		1.45
15		.04	5.67	.69	.03		.42	9.48	.60	.96	.02		17.90
16		.13	.17		4.41		.51	.23	.28	.21	.02		5.96
17		.13					.45	.23	.29	.20	.02		1.32
18		.13			1.34		.48	.23	.28	.20	.02		2.68
19		.13					.32	.23	.28	.20	.02		1.18
20		3.14	.19	3.44		1.57	1.33	.51	.69	3.05	.16		14.08
21		.13					.38	.23	.28	.20	.02		1.23
22		.13			.06		.61	.23	.29	.20	.02		1.54
23		.13					.32	.23	.28	.20	.02		1.18
24		.07	.13	.17		4.41	1.56	.23	.39	.21	.02		7.19
25		1.98	.19	.69			1.95	4.60	.29	1.01	.02		10.72
26		.13			.06		.48	.23	.28	.20	.02		1.40
27		.13			.08		.32	.23	.28	.20	.02		1.25
28		.13	.17		1.46		.54	.23	.28	.20	.02		3.02
29		.13					.45	.23	.29	.20	.02		1.32
30		3.06	9.50	2.82	.03	.06	1.12	10.61	1.00	2.90	.16		31.25
31		.13					.32	.23	.28	.20	.02		1.18
32		.13	.17		4.41		.51	.23	.28	.20	.02		5.95
33		.13					.32	.23	.28	.21	.02		1.19
34		.13			.06		.61	.23	.29	.20	.02		1.54
35		.04	.19	.69			1.35	.26	.29	.58	.02		3.40
36		.07	.13	.17		2.74	1.45	.23	.39	.20	.02		5.39
37		.13					.40	.23	.28	.20	.02		1.25
38		.13			.06		.40	.23	.28	.20	.02		1.32
39		.13					.40	.23	.28	.20	.02		1.25
40		3.14	.19	3.44		4.52	1.41	4.85	.69	3.30	.16		21.71
41		.13					.53	.23	.29	.21	.02		1.41
42		.13			.06		.46	.23	.28	.20	.02		1.37
43		.13					.40	.23	.28	.20	.02		1.25
44		.13	.17		1.46		.40	.23	.28	.20	.02		2.88
45		.04	5.67	.69	.03	.08	.75	9.48	.60	.96	.02		18.32
46		.13			.06		.53	.23	.29	.20	.02		1.46
47		.13					.40	.23	.28	.20	.02		1.25
48		.07	.13	.17		4.41	1.48	.23	.39	.20	.02		7.10
49		.13					.46	.23	.28	.21	.02		1.32
50		5.33	.19	2.82	.34	.06	2.40	.26	.84	1.56	.16		13.96
Total	20.12	27.33	20.45	.42	39.03		34.05	54.19	17.59	24.47	1.74		239.40

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Court House

Gross Square Feet:	30,000
Height in Ft:	14
Exterior:	Concrete Block
Floor coverings:	Carpet, Hardwood, Terrazzo Tile
HVAC:	Electric Cool, Gas Heat, Multizone Unit
Capacity:	N/A
Occupancy:	670
Replacement Cost:	\$8,080,357

Components

Uniform / Component	Quantity	Units
A10 Foundations		
Concrete Slab	1000	Sq Ft
B20 Exterior Enclosure		
Concrete Block, Exterior, 1st Floor	8952	Sq Ft
Steel Frame, Painted, Operable Window, 12 sf, 1st Floor	50	Each
Wood, Solid Core, Painted, Exterior Door	7	Each
B30 Roofing		
Built-up Roof	30000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	14	Each
Wood, Solid Core, Painted, Interior Door	300	Each
C20 Stairs		
Concrete, Exterior Stairs	200	Sq Ft
C30 Interior Finishes		
Sheetrock, Stippled, Interior Wall Finish	29400	Sq Ft
Vinyl, Interior Wall Finish	8400	Sq Ft
Wallpaper, Interior Wall Finish	4200	Sq Ft
Carpet, Nylon 20 oz., High Traffic	6000	Sq Ft
Terrazzo Flooring	6000	Sq Ft
Wood Parquetry Flooring	18000	Sq Ft
Plaster Ceiling	30000	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	10	Each
Lavatory, Vitreous China	22	Each
Sink, Stainless Steel	8	Each
Tankless Water Closet	14	Each
Urinal, Vitreous China	6	Each
Circulator Pump, 1/6 HP, Cold Water	1	Each
Circulator Pump, 1/6 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	2.02	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.94	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	2.511	K Ln Ft
Pipe & Fittings, 4" Steel	1.486	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	2.762	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	1.336	K Ln Ft
Water Heater, Gas/Oil, 175 Gph	2	Each
Backflow Preventer, 4"	1	Each
Pipe & Fittings, 6" Cast Iron	0.943	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.346	K Ln Ft
Pipe & Fittings, 4" PVC	0.434	K Ln Ft
Roof Drain, 2"	8	Each
D30 HVAC		
Duct Insulation, Fiberglass Blanket	5548	Sq Ft
Ductwork	8280	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	4	Each
Air Conditioner, Rooftop, Single Zone, 50 Ton	2	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	215	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	10	Each
D50 Electrical		
Main Switchgear, >1,200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	3	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	2	Each
Exit Lighting Fixture, w/ Battery	7	Each
Fluorescent Lighting Fixture, 160 w	300	Each
Grounded Fault Circuit Interruptor, 15 Amp.	4	Each
Receptacle, 120 V, 15 Amp.	150	Each
TV Cable Outlet	1	Each
Wiring Device, Switch	60	Each
Annunciation Panel	1	Each
Camera, Exterior, Closed Circuit, Fixed B/W	2	Each
Camera, Interior, Closed Circuit, Fixed B/W	6	Each
Fire Alarm Horn & Strobe	10	Each
Heat Detector	10	Each
Manual Pull Station	10	Each
Monitor, Medium, Closed Circuit	2	Each
Smoke Detector	30	Each
E10 Equipment		
Microwave Oven	1	Each
Refrigerator, Domestic	1	Each

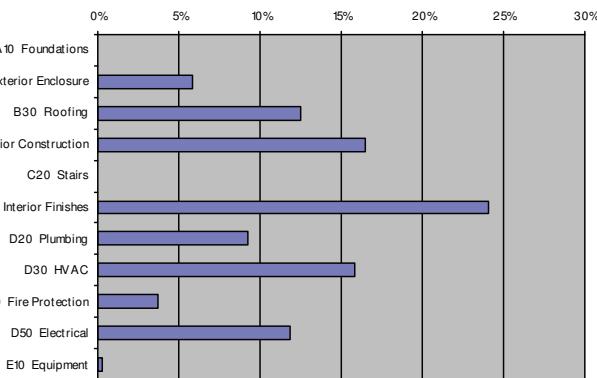
Court House

Washington, D.C.

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$842,682	\$0.56	0.21%
Unscheduled Maintenance	\$865,440	\$0.58	0.21%
Renewal & Replacement	\$4,830,105	\$3.22	1.20%
Total	\$6,538,227	\$4.36	1.62%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, Single Zone, 50 Ton	18.25	9.7%
Refinish Plaster Ceiling	13.20	7.0%
Replace Wood, Solid Core, Painted, Interior Door	12.06	6.4%
Replace Wood, Solid Core, Painted, Interior Door Locks	11.83	6.3%
Place New Membrane Over Existing, Built-up Roof	10.97	5.8%
Refinish Sheetrock, Stippled, Interior Wall Finish	9.56	5.1%
Replace Membrane, Built-up Roof	9.50	5.0%
Replace Wood Parquetry Floor	9.16	4.8%
Repair Air Conditioner, Rooftop, Single Zone, 50 Ton	8.69	4.6%
Sand & Refinish Wood Parquetry Flooring	8.34	4.4%
Replace Carpet, Nylon 20 oz., High Traffic	7.25	3.8%
Clean & Seal Concrete Block, Exterior, 1st Floor	4.08	2.2%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	3.84	2.0%
Replace Fluorescent Lighting Fixture, 160 w	3.51	1.9%
Maintain Air Conditioner, Rooftop, Single Zone, 50 Ton	3.28	1.7%
Maintain Wood, Solid Core, Painted, Interior Door Locks	3.18	1.7%
Maintain Built-up Roof	3.04	1.6%
Replace Camera, Interior, Closed Circuit, Fixed B/W	2.53	1.3%
Refinish Wood, Solid Core, Painted, Interior Door	2.39	1.3%
Replace Monitor, Medium, Closed Circuit	1.97	1.0%
Repair Wood Parquetry Flooring (2% of Floors)	1.75	0.9%
Repaint (50% surface) Concrete Block, Exterior, 1st Floor	1.72	0.9%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	1.62	0.9%
Maintain Fire Sprinkler System	1.58	0.8%
Replace Camera, Exterior, Closed Circuit, Fixed B/W	1.57	0.8%
Replace Water Heater, Gas/Oil, 175 Gph	1.52	0.8%
Replace Drinking Fountain, Refrigerated	1.50	0.8%
Test Gages & Valves, Fire Sprinkler System	1.45	0.8%
Replace Vinyl, Interior Wall Finish	1.39	0.7%
Test Fire Sprinkler Head	1.22	0.6%

*Task cost (\$2009) per GSFT over 50 years.

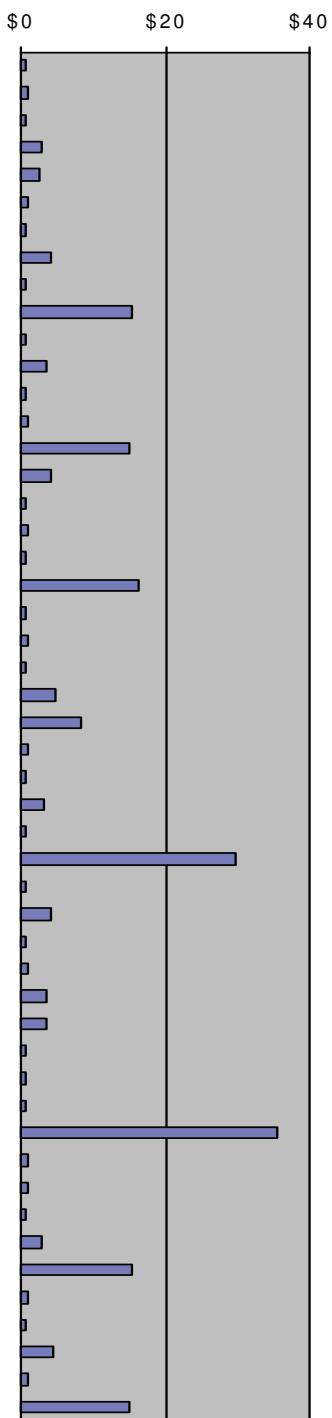
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	Plumbing	HVAC Systems	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13					.14	.13	.10	.18	.01		.69
2		.13			.02		.29	.13	.10	.18	.01		.86
3		.13					.14	.13	.10	.18	.01		.69
4		.13	.23		1.92		.29	.13	.10	.18	.01		2.99
5		.02	.19	.95	.20		.23	.14	.12	.80	.01		2.68
6		.13			.02		.29	.13	.10	.18	.01		.86
7		.01	.13				.19	.13	.10	.18	.01		.75
8		.13	.23		3.11		.31	.13	.10	.19	.01		4.20
9		.13					.14	.13	.10	.18	.01		.69
10		2.11	.19	3.91	2.31		.96	3.04	.52	2.29	.05		15.39
11		.13					.14	.13	.10	.18	.01		.69
12		.13	.23		1.92		.67	.13	.19	.18	.01		3.46
13		.13					.14	.13	.10	.18	.01		.69
14		.01	.13		.02		.35	.13	.10	.18	.01		.92
15		.02	5.67	.95	.02	.73	.19	6.20	.21	1.06	.01		15.06
16		.13	.23		3.11		.31	.13	.10	.19	.01		4.20
17		.13					.18	.13	.11	.18	.01		.74
18		.13			.02		.29	.13	.10	.18	.01		.86
19		.13					.14	.13	.10	.18	.01		.69
20		2.15	.19	4.49	4.48		1.07	.23	.51	3.03	.05		16.21
21		.01	.13				.19	.13	.10	.18	.01		.75
22		.13			.02		.33	.13	.11	.18	.01		.92
23		.13					.14	.13	.10	.18	.01		.69
24		.13	.23		3.10		.68	.13	.19	.19	.01		4.67
25		.97	.19	.95	.46		1.52	3.04	.10	1.11	.01		8.36
26		.13			.02		.29	.13	.10	.18	.01		.86
27		.13					.14	.13	.10	.18	.01		.69
28		.01	.13	.23	1.93		.35	.13	.10	.18	.01		3.05
29		.13					.18	.13	.11	.18	.01		.74
30		2.11	9.50	3.91	.02	2.84	.95	6.93	.61	2.93	.05		29.84
31		.13					.14	.13	.10	.18	.01		.69
32		.13	.23		3.10		.31	.13	.10	.18	.01		4.19
33		.13					.14	.13	.10	.19	.01		.69
34		.13			.02		.33	.13	.11	.18	.01		.92
35		.03	.19	.95	.20		1.04	.14	.10	.80	.01		3.48
36		.13	.23		1.93		.58	.13	.19	.18	.01		3.38
37		.13					.22	.13	.10	.18	.01		.77
38		.13			.02		.21	.13	.10	.18	.01		.78
39		.13					.22	.13	.10	.18	.01		.77
40		2.30	.19	12.64	12.55		1.00	3.12	.51	3.22	.05		35.59
41		.13					.26	.13	.11	.19	.01		.83
42		.13			.02		.26	.13	.10	.18	.01		.84
43		.13					.22	.13	.10	.18	.01		.77
44		.13	.23		1.92		.21	.13	.10	.18	.01		2.90
45		.02	5.67	.95	.02	.73	.51	6.20	.21	1.06	.01		15.39
46		.13			.02		.25	.13	.11	.18	.01		.84
47		.01	.13				.22	.13	.10	.18	.01		.77
48		.13	.23		3.11		.60	.13	.19	.18	.01		4.58
49		.13					.28	.13	.10	.19	.01		.83
50		3.05	.19	3.91	.23	2.57	1.99	.14	.66	2.23	.05		15.03
Total	12.80	27.33	35.90	.28	52.48		20.20	34.59	8.01	25.75	.58		217.92

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Data Center, Tier III

Washington, D.C.

Data Center, Tier III

Gross Square Feet:	25,000
Height in Ft:	24
Exterior:	Clay Brick, Concrete
Floor coverings:	Access, Laminate, Concrete
HVAC:	Packaged Air Conditioning
Capacity:	N/A
Occupancy:	70
Replacement Cost:	\$48,000,000

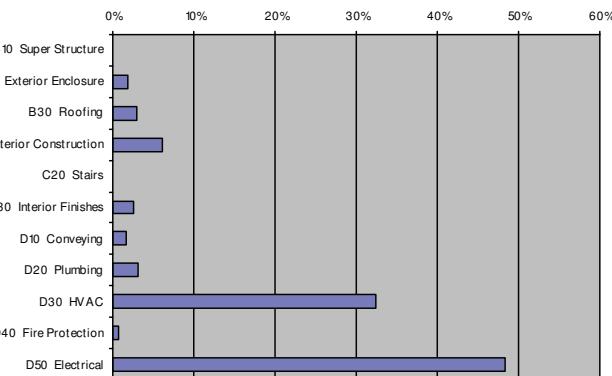
Components (Continued on Page 153)

Uniformat / Component	Quantity	Units
B10 Super Structure		
Steel Roof Access Ladder	40	Ln Ft
B20 Exterior Enclosure		
Aluminum Louver, 1st Floor	12	Each
Clay Brick, Exterior, 1st Floor	12015	Sq Ft
Concrete, Painted, Exterior, 1st Floor	3160	Sq Ft
Steel 20'x20', Painted, Roll-up Door	2	Each
Steel, Painted, Exterior Door	5	Each
B30 Roofing		
Single-Ply Modified Bituminous/Thermoplastic Roof	25000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	999	Each
Steel, Painted, Interior Door	4	Each
Wood, Solid Core, Painted, Interior Door	4	Each
C20 Stairs		
Metal, Painted, Interior Railing	40	Ln Ft
Metal, Painted, Interior Stairs	160	Sq Ft
C30 Interior Finishes		
Ceramic Tile, 4"x4", Interior Wall Finish	800	Sq Ft
Concrete, Painted, Interior Wall Finish	14670	Sq Ft
Sheetrock, Unstripped, Interior Wall Finish	1415	Sq Ft
Access Flooring w/ Laminate, Raised	13650	Sq Ft
Carpet, Nylon 20 oz., Low Traffic	1250	Sq Ft
Ceramic Tile Flooring	400	Sq Ft
Concrete Flooring	5500	Sq Ft
Concrete, Painted Flooring	1000	Sq Ft
Metal Floor Grating	3200	Sq Ft
Acoustical Tile, Dropped Ceiling	13650	Sq Ft
Metal Ceiling	9700	Sq Ft
Sheetrock, Unstripped Ceiling	1650	Sq Ft
D10 Conveying		
Crane, Jib, Electric, 2 Ton	2	Each
Platform Lifter, 5 Ton	2	Each
D20 Plumbing		
Drinking Fountain, Refrigerated	2	Each
Flush Tank Water Closet, One Piece	5	Each
Lavatory, Vitreous China	6	Each
Urinal, Vitreous China	2	Each
Circulator Pump, 1/2 HP, Cold Water	1	Each
Circulator Pump, 1 HP, Cold Water	1	Each
Circulator Pump, 1/2 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.15	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.15	K Ln Ft
Pipe & Fittings, 1" Copper	0.15	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.1	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.25	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.15	K Ln Ft
Water Heater, Electric, 70 Gal.	1	Each
Floor Drain	4	Each
Pipe & Fittings, 4" Cast Iron	0.33	K Ln Ft
Pipe & Fittings, 6" Cast Iron	0.47	K Ln Ft
Air Compressor, 150 HP	2	Each
D30 HVAC		
Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 500 Ton	2	Each
Circulation Pump, 50 HP, Chiller & Condenser Water	2	Each
Pipe & Fittings, 2" Copper	0.25	K Ln Ft
Pipe & Fittings, 2" Steel	0.7	K Ln Ft
Pipe & Fittings, 3" Steel	0.8	K Ln Ft
Pipe & Fittings, 6" Steel	0.6	K Ln Ft
Pipe & Fittings, 8" Steel	0.2	K Ln Ft
Duct Insulation, Fiberglass Blanket	103448	Sq Ft
Ductwork	154400	Lbs
Exhaust Fan, Roof Mounted, 2,000 Cfm	30	Each
Air Conditioner, Computer Room, Chilled Water, 30 Ton	26	Each
Direct Digital Controls, System Points	80	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	200	Each
Fire Sprinkler System	1	Each
Pipe & Fittings, 1" Steel	0.5	K Ln Ft
Pipe & Fittings, 2" Steel	0.1	K Ln Ft
D50 Electrical		
Cable, Copper, 1 Gauge	4800	Ln Ft
Main Switchgear, 480 V, 4,000 Amp.	4	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 225 Amp	176	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$4,714,408	\$3.77	0.20%
Unscheduled Maintenance	\$3,562,187	\$2.85	0.15%
Renewal & Replacement	\$21,045,031	\$16.84	0.88%
Total	\$29,321,626	\$23.46	1.22%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Main Switchgear, 480 V, 4,000 Amp.	117.44	11.4%
Replace Uninterruptible Power Supply Motor Generator, 750 kVA	101.82	9.9%
Replace Air Conditioner, Computer Room, Chilled Water, 30 Ton	71.75	7.0%
Replace Toilet Partitions, Painted Metal, Overhead Braced	62.44	6.1%
Replace Generator, Diesel, 1,000 kw	60.77	5.9%
Repair Air Conditioner, Computer Room, Chilled Water, 30 Ton	58.98	5.7%
Replace Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 500 Ton	56.92	5.5%
Maintain Power Panel Board, 208 Y/120 V, 225 Amp.	44.11	4.3%
Replace Power Panel Board, 208 Y/120 V, 225 Amp.	43.50	4.2%
Maintain Air Conditioner, Computer Room, Chilled Water, 30 Ton	42.32	4.1%
Replace Air Compressor, 150 HP	29.29	2.8%
Repair Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 500 Ton	27.64	2.7%
Replace Primary Transformer, Dry, 3,500 kVA	17.91	1.7%
Replace Secondary Transformer, Dry, 300 kVA	16.36	1.6%
Replace Membrane, Single-Ply Modified Bituminous/Thermoplastic Roof	15.96	1.5%
Maintain Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 500 Ton	15.43	1.5%
Replace Access Flooring w/ Laminate, Raised	13.74	1.3%
Replace Existing Ductwork (20% of Ductwork)	12.14	1.2%
Maintain Direct Digital Controls, System Points	11.31	1.1%
Replace Power Panel Board, 480 V, 1,000 Amp.	10.68	1.0%
Replace Power Panel Board, 480 V, 4,000 Amp.	10.64	1.0%
Replace Direct Digital Controls, System Points	10.38	1.0%
Replace Transfer Switch, Auto, 600 V, 1,600 Amp.	9.71	0.9%
Repair Main Switchgear, 480 V, 4,000 Amp.	8.84	0.9%
Electrical Testing, Generator, Diesel, 1,000 kw	8.84	0.9%
Maintain Exhaust Fan, Roof Mounted, 2,000 Cfm	8.73	0.8%
Repair Single-Ply Modified Bituminous/Thermoplastic Roof	8.72	0.8%
Refinish Toilet Partitions, Painted Metal, Overhead Braced	8.68	0.8%
Maintain Platform Lifter, 5 Ton	7.19	0.7%
Clean & Reseal Clay Brick, Exterior, 1st Floor	6.60	0.6%

*Task cost (\$2009) per GSFT over 50 years.

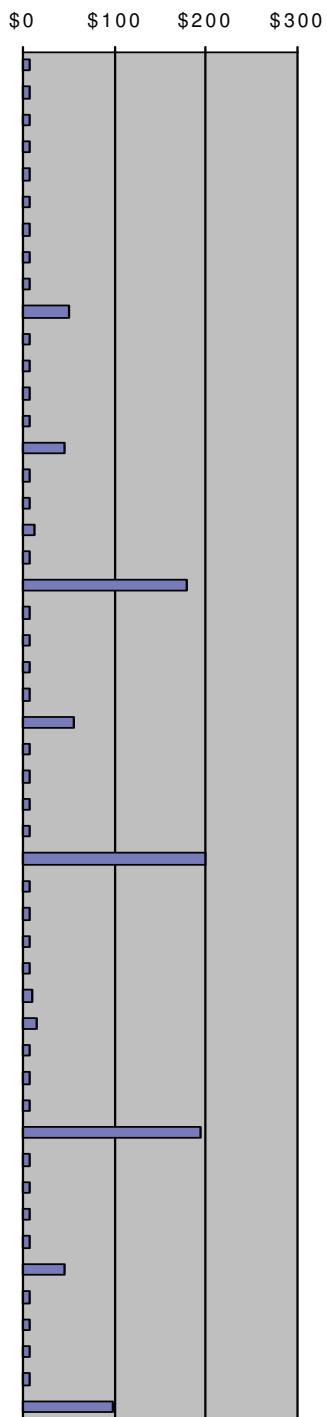
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT	
1	.20				.35	.07	2.72	.12	3.00			6.45	
2	.20				.35	.10	2.72	.12	3.02			6.51	
3	.20				.35	.07	2.72	.12	3.00			6.45	
4	.20	.88	.01	.61	.35	.19	2.72	.12	3.02			8.09	
5	.02	.33	.03		.01	.35	.12	2.74	.12	4.26			7.98
6	.20				.35	.11	2.72	.12	3.02			6.52	
7	.20				.35	.10	2.72	.12	3.00			6.48	
8	.20	.88	.01	.81	.35	.19	2.72	.12	3.02			8.29	
9	.20				.03	.35	.07	2.72	.12	3.00			6.49
10	3.47	3.24	.13		.12	.35	.26	33.61	.57	7.66			49.40
11	.20				.35	.07	2.72	.12	3.00			6.45	
12	.20	.88	.01	.61	.35	.21	2.75	.12	3.02			8.16	
13	.20				.35	.07	2.72	.12	3.00			6.45	
14	.20				.35	.13	2.72	.12	3.02			6.54	
15	.05	.33	.03	.02	.63	.35	.25	4.11	.25	38.51			44.52
16	.20	.88	.01	.81	.35	.19	2.72	.12	3.02			8.29	
17	.20				.35	.07	2.72	.12	3.00			6.45	
18	.20				.03	.35	.11	2.72	.12	9.11			12.64
19	.20				.35	.07	2.72	.12	3.00			6.45	
20	3.47	7.98	31.35	.01	.74	.35	.71	68.20	.57	65.67			179.04
21	.20				.35	.09	2.72	.12	3.00			6.48	
22	.20				.35	.11	2.72	.12	3.02			6.52	
23	.20				.35	.07	2.72	.12	3.05			6.50	
24	.20	.88	.01	.81	.35	.21	2.75	.12	3.02			8.36	
25	2.21	.33	.03		.31	1.40	14.87	2.85	.13	34.54			56.68
26	.20				.35	.10	2.72	.12	3.02			6.51	
27	.20				.03	.35	.07	2.72	.12	3.00			6.49
28	.20	.88	.01	.61	.35	.12	2.72	.12	3.07			8.08	
29	.20				.35	.16	2.72	.12	3.00			6.55	
30	3.50	3.24	.13	.02	4.61	.35	.38	51.21	.70	136.04			200.17
31	.20				.35	.07	2.72	.12	3.00			6.45	
32	.20	.88	.01	.81	.35	.10	2.72	.12	3.02			8.21	
33	.20				.35	.16	2.72	.12	3.05			6.59	
34	.20				.35	.10	2.72	.12	3.02			6.51	
35	.62	.33	.03		.01	.35	.45	2.74	.12	5.59			10.24
36	.20	.88	.01	.64	.35	.10	2.75	.12	9.11			14.16	
37	.20				.35	.19	2.72	.12	3.00			6.57	
38	.20				.35	.08	2.72	.12	3.02			6.48	
39	.20				.35	.10	2.72	.12	3.00			6.48	
40	3.39	7.98	31.48	.01	14.68	.35	.57	68.19	.57	65.97			193.19
41	.20				.35	.18	2.72	.12	3.05			6.61	
42	.20				.35	.10	2.72	.12	3.02			6.51	
43	.20				.35	.09	2.72	.12	3.00			6.48	
44	.20	.88	.01	.61	.35	.09	2.72	.12	3.02			7.99	
45	.13	.33	.03	.02	.38	.35	.39	4.12	.25	38.45			44.46
46	.20				.35	.08	2.72	.12	3.07			6.54	
47	.20				.35	.09	2.72	.12	3.00			6.48	
48	.20	.88	.01	.81	.35	.10	2.75	.12	3.02			8.25	
49	.20				.35	.20	2.72	.12	3.00			6.58	
50	5.58	3.24	.13	.04	.74	1.40	14.96	33.72	.75	37.34			97.90
Total	22.44	35.35	72.12	.17	29.47	19.67	37.53	380.34	8.82	566.78			1172.68

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Day Care Center

Washington, D.C.

Day Care Center

Gross Square Feet:	12,000
Height in Ft:	12
Exterior:	Clay Brick
Floor coverings:	Vinyl Tile, Carpet
HVAC:	Heat Pumps, Gas Boiler
Capacity:	N/A
Occupancy:	310
Replacement Cost:	\$2,882,846

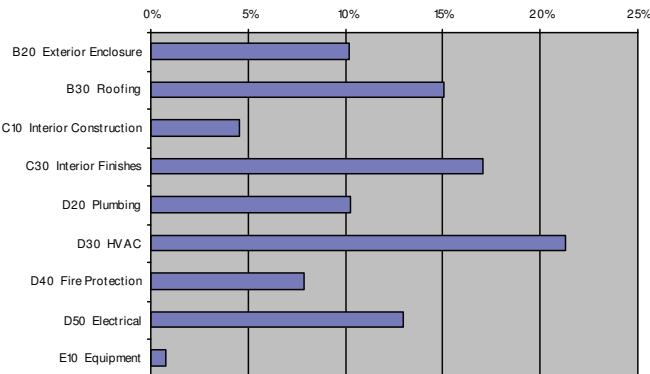
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	4450	Sq Ft
Aluminum Fixed Window, 12 sf, 1st Floor	48	Each
Aluminum Frame, Fully Glazed, Exterior Door	2	Each
Steel, Painted, Exterior Door	9	Each
B30 Roofing		
Built-up Roof	12000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	5	Each
Wood, Solid Core, Painted, Interior Door	26	Each
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	600	Sq Ft
Sheetrock, Stippled, Interior Wall Finish	11910	Sq Ft
Vinyl, Interior Wall Finish	3000	Sq Ft
Carpet, Nylon 20 oz., Low Traffic	8400	Sq Ft
Vinyl Tile Flooring	3600	Sq Ft
Acoustical Tile, Dropped Ceiling	8400	Sq Ft
Sheetrock, Stippled Ceiling	3600	Sq Ft
D20 Plumbing		
Drinking Fountain, Vitreous China	4	Each
Lavatory, Vitreous China	4	Each
Service Sink, Iron, Enamel	2	Each
Sink, Stainless Steel	2	Each
Tankless Water Closet	5	Each
Urinal, Vitreous China	3	Each
Circulator Pump, 1/12 HP, Cold Water	1	Each
Circulator Pump, 1/12 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.7	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.3	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.9	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.7	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.3	K Ln Ft
Water Heater, Gas/Oil, 65 Gph	1	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.5	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.3	K Ln Ft
Pipe & Fittings, 4" PVC	0.1	K Ln Ft
Roof Drain, 4-6"	3	Each
D30 HVAC		
Pipe & Fittings, 4" Steel, Gas	0.3	K Ln Ft
Duct Insulation, Fiberglass Blanket	2238	Sq Ft
Ductwork	3340	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	2	Each
Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	2	Each
Thermostat	4	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	60	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	4	Each
D50 Electrical		
Distribution Switch, Fused, <600 V	3	Each
Main Switchgear, <1,200 Amp.	1	Each
Exit Lighting Fixture, w/ Battery	11	Each
Fluorescent Lighting Fixture, 160 w	128	Each
Receptacle, 120 V, 15 Amp.	48	Each
Wiring Device, Switch	40	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	8	Each
Heat Detector	8	Each
Manual Pull Station	10	Each
Smoke Detector	24	Each
E10 Equipment		
Microwave Oven	1	Each
Refrigerator, Domestic	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$440,907	\$0.73	0.31%
Unscheduled Maintenance	\$387,625	\$0.65	0.27%
Renewal & Replacement	\$1,354,623	\$2.26	0.94%
Total	\$2,183,155	\$3.64	1.51%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Repair Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	15.05	10.1%
Replace Carpet, Nylon 20 oz., Low Traffic	12.68	8.5%
Place New Membrane Over Existing, Built-up Roof	10.97	7.3%
Refinish Sheetrock, Stippled, Interior Wall Finish	9.69	6.5%
Replace Membrane, Built-up Roof	9.50	6.3%
Maintain Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	7.27	4.9%
Replace Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	7.09	4.7%
Clean & Reseal Clay Brick, Exterior, 1st Floor	5.09	3.4%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	4.10	2.7%
Refinish Sheetrock, Stippled Ceiling	3.96	2.6%
Maintain Fire Sprinkler System	3.94	2.6%
Replace Fluorescent Lighting Fixture, 160 w	3.75	2.5%
Test Gages & Valves, Fire Sprinkler System	3.63	2.4%
Maintain Built-up Roof	3.04	2.0%
Repaint (50% surface) Clay Brick, Exterior, 1st Floor	2.77	1.9%
Replace Wood, Solid Core, Painted, Interior Door	2.61	1.7%
Replace Wood, Solid Core, Painted, Interior Door Locks	2.56	1.7%
Replace Batteries & Check Operation, Smoke Detector	2.39	1.6%
Replace Vinyl Tile Flooring	1.47	1.0%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	1.45	1.0%
Repair Main Switchgear, <1,200 Amp.	1.36	0.9%
Check Operation, Heat Detector	1.32	0.9%
Clean Water Heater, Gas/Oil, 65 Gph	1.31	0.9%
Replace Vinyl, Interior Wall Finish	1.25	0.8%
Replace Steel, Painted, Exterior Door Locks	1.17	0.8%
Replace Water Heater, Gas/Oil, 65 Gph	.95	0.6%
Replace Main Switchgear, <1,200 Amp.	.94	0.6%
Replace Smoke Detector	.91	0.6%
Replace Fire Alarm Control Panel	.87	0.6%
Maintain Backflow Preventer, 2"	.86	0.6%

*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	Interior Finishes	Plumbing	HVAC Systems	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13					.18	.31	.23	.17	.02		1.03
2		.13					.26	.31	.23	.17	.02		1.12
3		.13					.18	.31	.23	.19	.02		1.05
4		.13	.06	1.18			.26	.31	.23	.17	.02		2.35
5		.08	.19	.21			.31	.31	.25	.40	.02		1.86
6		.13					.26	.31	.23	.19	.02		1.14
7		.13					.23	.31	.23	.17	.02		1.08
8		.13	.06	1.18			.29	.31	.23	.17	.02		2.37
9		.13					.18	.31	.23	.19	.02		1.11
10		2.81	.19	.85			.09	.62	5.43	.53	2.14	.14	12.81
11		.13					.18	.31	.23	.17	.02		1.03
12		.03	.13	.06	1.18		.49	.32	.32	.19	.02		2.73
13		.13					.18	.31	.23	.17	.02		1.03
14		.13					.31	.31	.23	.17	.02		1.16
15		.21	5.67	.21	4.64		.29	.31	.50	.95	.02		12.79
16		.13	.06	1.18			.29	.31	.23	.17	.02		2.37
17		.13					.23	.31	.24	.17	.02		1.10
18		.13					.26	.31	.23	.19	.02		1.91
19		.13					.18	.31	.23	.17	.02		1.03
20		2.91	.19	1.22	1.34		.73	3.79	.52	3.00	.14		13.84
21		.13					.23	.31	.23	.19	.02		1.10
22		.13					.32	.31	.24	.17	.02		1.18
23		.13					.18	.31	.23	.17	.02		1.03
24		.03	.13	.06	1.18		.51	.32	.32	.19	.02		2.75
25		1.73	.19	.21	.29		1.40	.32	.24	.75	.02		5.14
26		.13					.26	.31	.23	.17	.02		1.12
27		.13					.18	.31	.23	.19	.02		1.11
28		.13	.06	1.18			.31	.31	.23	.17	.02		2.40
29		.13					.23	.31	.24	.17	.02		1.10
30		2.94	9.50	.85	4.64		.60	6.16	.78	2.96	.14		28.56
31		.13					.18	.31	.23	.17	.02		1.03
32		.13	.06	1.18			.29	.31	.23	.17	.02		2.37
33		.13					.18	.31	.23	.19	.02		1.05
34		.13					.32	.31	.24	.17	.02		1.18
35		.08	.19	.21	.09		1.51	.31	.24	.40	.02		3.05
36		.03	.13	.06	1.96		.42	.32	.32	.19	.02		3.44
37		.13					.25	.31	.23	.17	.02		1.10
38		.13					.20	.31	.23	.17	.02		1.05
39		.13					.25	.31	.23	.19	.02		1.12
40		2.91	.19	2.99	1.34		.67	3.79	.52	3.35	.14		15.89
41		.13					.30	.31	.24	.17	.02		1.17
42		.13					.25	.31	.23	.19	.02		1.12
43		.13					.26	.31	.23	.17	.02		1.11
44		.13	.06	1.18			.20	.31	.23	.17	.02		2.29
45		.21	5.67	.21	4.70		.51	.31	.50	.95	.02		13.07
46		.13					.25	.31	.24	.17	.02		1.12
47		.13					.25	.31	.23	.17	.02		1.10
48		.03	.13	.06	1.18		.43	.32	.32	.19	.02		2.67
49		.13					.29	.31	.23	.17	.02		1.14
50		4.60	.19	.85	.29		1.55	5.43	.63	1.79	.14		15.46
Total	18.59	27.33	8.34	30.97			18.68	38.70	14.31	23.57	1.45		181.93



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Electrical Power, Backup

Gross Square Feet:	240
Height in Ft:	10
Exterior:	Steel
Floor coverings:	Metal Grating
HVAC:	Unit Heaters
Capacity:	1,000 kw
Occupancy:	
Replacement Cost:	\$768,720

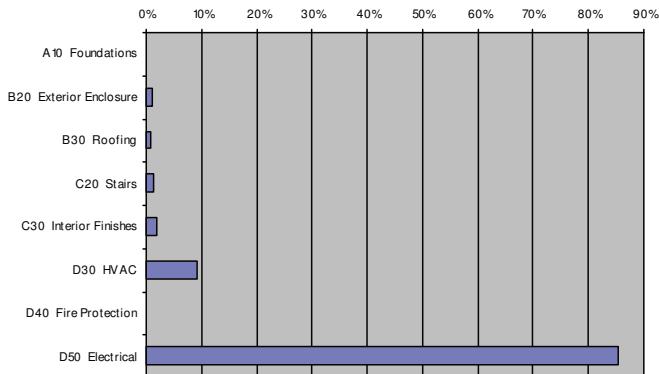
Components

Uniform / Component	Quantity	Units
A10 Foundations		
Concrete Slab	690	Sq Ft
B20 Exterior Enclosure		
Aluminum Louver, 1st Floor	4	Each
Steel, Painted, Exterior, 1st Floor	620	Sq Ft
Steel, Painted, Exterior Door	2	Each
B30 Roofing		
Metal Roof	240	Sq Ft
C20 Stairs		
Metal, Painted, Exterior Railing	30	Ln Ft
Metal, Exterior Stairs	45	Sq Ft
C30 Interior Finishes		
Steel, Painted, Interior Wall Finish	620	Sq Ft
Metal Floor Grating	285	Sq Ft
Metal, Painted Ceiling	240	Sq Ft
D30 HVAC		
Oil Storage Tank, Steel, 1,500 Gal.	1	Each
Unit Heater, 36 Mbh	2	Each
Thermostat	2	Each
D40 Fire Protection		
Fire Extinguisher	1	Each
D50 Electrical		
Power Panel Board, 208 Y/120 V, 100 Amp.	2	Each
Secondary Transformer, Dry, 15 kVA	1	Each
Secondary Transformer, Dry, 500 kVA	1	Each
Transfer Switch, Auto, 600 V, 800 Amp.	1	Each
Emergency Lighting Pack, 2 Light w/ Battery	2	Each
Fluorescent Lighting Fixture, 80 w	4	Each
Receptacle, 120 V, 20 Amp.	2	Each
Wiring Device, Switch	2	Each
Smoke Detector	1	Each
Generator Battery, Wet	1	Each
Generator Switchgear	1	Each
Generator, Diesel, 1,000 kw	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$192,261	\$16.02	0.50%
Unscheduled Maintenance	\$165,155	\$13.76	0.43%
Renewal & Replacement	\$689,780	\$57.48	1.79%
Total	\$1,047,196	\$87.27	2.72%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Generator, Diesel, 1,000 kw	109.93	57.4%
Electrical Testing, Generator, Diesel, 1,000 kw	306.80	8.3%
Maintain Generator Switchgear	153.40	4.2%
Replace Transfer Switch, Auto, 600 V, 800 Amp.	147.90	4.0%
Replace Secondary Transformer, Dry, 500 kVA	125.39	3.4%
Maintain Oil Storage Tank Steel, 1,500 Gal.	88.40	2.4%
Replace Generator Switchgear	81.30	2.2%
Maintain Unit Heater, 36 Mbh	79.12	2.2%
Maintain Power Panel Board, 208 Y/120 V, 100 Amp.	52.27	1.4%
Replace Metal Floor Grating	36.68	1.0%
Replace Power Panel Board, 208 Y/120 V, 100 Amp.	34.82	0.9%
Replace Metal, Exterior Stairs	32.53	0.9%
Replace Unit Heater, 36 Mbh	28.15	0.8%
Refinish Steel, Painted, Interior Wall Finish	27.40	0.7%
Replace Oil Storage Tank Steel, 1,500 Gal.	27.38	0.7%
Repair Metal, Exterior Stairs	26.46	0.7%
Maintain Secondary Transformer, Dry, 15 kVA	26.13	0.7%
Maintain Secondary Transformer, Dry, 500 kVA	26.13	0.7%
Replace Secondary Transformer, Dry, 15 kVA	17.75	0.5%
Replace Emergency Lighting Pack, 2 Light w/ Battery	17.46	0.5%
Maintain Thermostat	15.94	0.4%
Replace Thermostat	15.77	0.4%
Replace Lamp, Replace Emergency Lighting Pack, 2 Light w/ Battery	15.24	0.4%
Repair Unit Heater, 36 Mbh	13.33	0.4%
Refinish Metal, Painted Ceiling	13.20	0.4%
Replace Steel, Painted, Exterior Door Locks	12.98	0.4%
Refinish Steel, Painted, Exterior, 1st Floor	12.88	0.4%
Clean Terminals, Check Water & Test Generator Battery, Wet	12.00	0.3%
Replace Metal Roof	10.52	0.3%
Replace Generator Battery, Wet	10.29	0.3%

*Task cost (\$2009) per GSFT over 50 years.

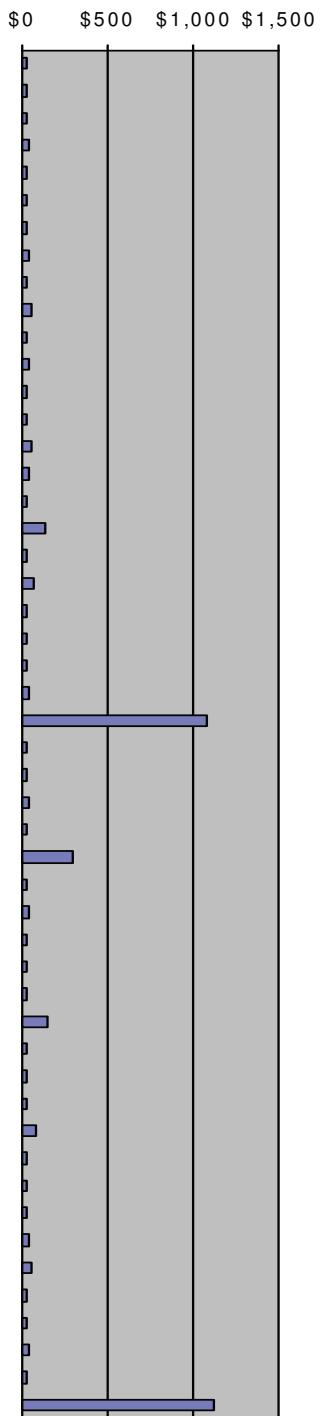
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	Plumbing	HVAC Systems	Fire Protection	Equipment	Site Improvements	Total per GSFT
1		.35						6.68	23.29			30.32
2		.35						6.68	24.33			31.36
3		.35						6.68	23.29			30.32
4		.35			3.38			6.68	24.33			34.75
5		.74						6.68	.17	24.30		32.45
6		.35						6.68	24.33			31.36
7		.35						6.68	23.29			30.32
8		.35			3.38			6.68	24.33			34.75
9		.35						6.68	23.29			30.32
10		6.78			.56			13.65	.17	33.08		55.11
11								6.68	23.29			30.32
12		.35						6.68	1.18	24.33		35.92
13		.35						6.68	23.29			30.32
14		.35						6.68	24.33			31.36
15		2.18						13.22	24.99			49.95
16		.35						6.68	24.33			34.75
17		.35						6.68	.17	23.29		30.49
18		.35						6.68	132.53			139.55
19		.35						6.68	23.29			30.32
20		6.78						9.21	40.29			61.30
21		.35						6.68	23.29			30.32
22		.35						6.68	.17	24.33		31.53
23		.35						6.68	24.30			31.33
24		.35			3.38			6.68	1.18	24.33		35.92
25		2.37						11.12	1066.72			1082.74
26		.35						6.68	24.33			31.36
27		.35						6.68	23.29			30.32
28		.35						6.68	25.34			35.75
29		.35						6.68	.17	23.29		30.49
30		8.21						39.92	202.59			301.64
31		.35						6.68	23.29			30.32
32		.35						6.68	24.33			34.75
33		.35						6.68	24.30			31.33
34		.35						6.68	.17	24.33		31.53
35		.74						6.68	23.29			31.27
36		.35			3.38			6.68	1.18	132.53		144.11
37		.35						6.68	23.29			30.32
38		.35						6.68	24.33			31.36
39		.35						6.68	23.29			30.32
40		6.78						13.65	40.90			76.10
41		.35						6.68	.17	24.30		31.50
42		.35						6.68	24.33			31.36
43		.35						6.68	23.29			30.32
44		.35						6.68	24.33			34.75
45		2.18						13.22	23.98			48.95
46		.35						6.68	.17	25.34		32.54
47		.35						6.68	23.29			30.32
48		.35						6.68	1.18	24.33		35.92
49		.35						6.68	23.29			30.32
50		8.40						9.21	1074.29			1127.84
Total	45.15	29.75	64.79	84.17				403.71	6.07	3728.27		4361.92

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Electrical Power, Substation

Gross Square Feet:	220
Height in Ft:	10
Exterior:	N/A
Floor coverings:	Concrete
HVAC:	N/A
Capacity:	1,550 kVA
Occupancy:	
Replacement Cost:	\$314,600

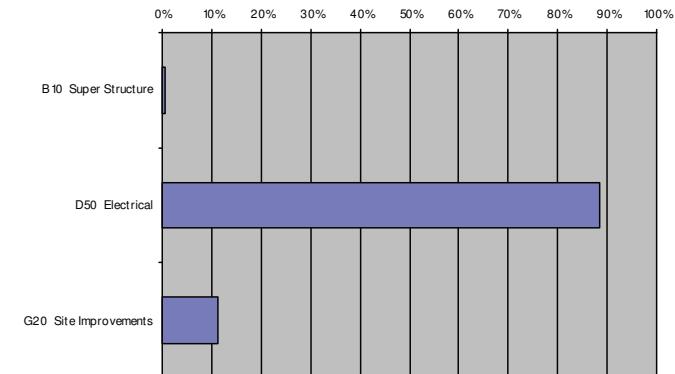
Components

Uniform / Component	Quantity	Units
B10 Super Structure		
Concrete Decking	220	Sq Ft
D50 Electrical		
Circuit Breaker, Main, 600 V, 800 Amp., 3 Ph.	2	Each
Primary Transformer, Dry, 300 kVA	1	Each
Primary Transformer, Dry, 750 kVA	1	Each
Primary Transformer, Oil Filled, 500 kVA	1	Each
G20 Site Improvements		
Chain Link Fence, 8'	100	Ln Ft

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$49,539	\$4.50	0.31%
Unscheduled Maintenance	\$24,206	\$2.20	0.15%
Renewal & Replacement	\$187,112	\$17.01	1.19%
Total	\$260,857	\$23.71	1.66%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Primary Transformer, Dry, 750 kVA	311.26	28.9%
Replace Primary Transformer, Dry, 300 kVA	185.17	17.2%
Replace Primary Transformer, Oil Filled, 500 kVA	146.29	13.6%
Maintain Chain Link Fence, 8'	102.68	9.5%
Replace Circuit Breaker, Main, 600 V, 800 Amp., 3 Ph.	87.09	8.1%
Maintain Primary Transformer, Dry, 750 kVA	57.02	5.3%
Repair Primary Transformer, Oil Filled, 500 kVA	54.65	5.1%
Replace Chain Link Fence, 8'	30.45	2.8%
Maintain Primary Transformer, Dry, 300 kVA	28.51	2.7%
Repair Circuit Breaker, Main, 600 V, 800 Amp., 3 Ph.	24.85	2.3%
Maintain Circuit Breaker, Main, 600 V, 800 Amp., 3 Ph.	22.72	2.1%
Maintain Primary Transformer, Oil Filled, 500 kVA	14.25	1.3%
Refinish Concrete Decking	4.18	0.4%
Repair Primary Transformer, Dry, 750 kVA	3.16	0.3%
Repair Primary Transformer, Dry, 300 kVA	2.07	0.2%
Repair Concrete Decking (2% of Decking)	1.27	0.1%
Finish Repaired Concrete Decking	.05	0.0%

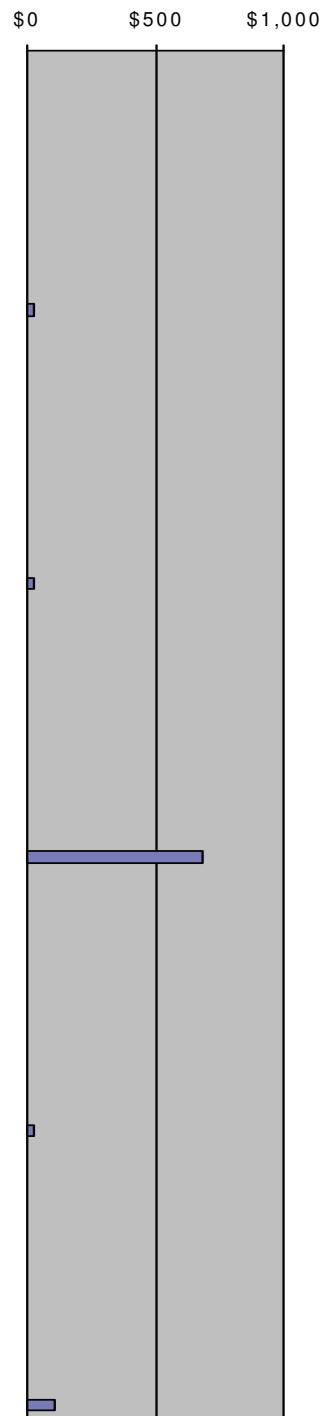
*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	Plumbing	HVAC Systems	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1										4.75	2.10	4.75	
2										4.75	2.10	4.75	
3										4.75	2.10	4.75	
4										4.75	2.10	4.75	
5										4.75	2.10	4.75	
6										4.75	2.10	4.75	
7										4.75	2.10	4.75	
8										4.75	2.10	4.75	
9										4.75	2.10	4.75	
10										24.62	2.10	24.62	
11										4.75	2.10	4.75	
12										4.75	2.10	4.75	
13										4.75	2.10	4.75	
14										4.75	2.10	4.75	
15										7.36	2.10	7.36	
16										4.75	2.10	4.75	
17										4.75	2.10	4.75	
18										4.75	2.10	4.75	
19										4.75	2.10	4.75	
20										24.62	2.10	24.62	
21										4.75	2.10	4.75	
22										4.75	2.10	4.75	
23										4.75	2.10	4.75	
24										4.75	2.10	4.75	
25										4.75	2.10	4.75	
26										4.75	2.10	4.75	
27										4.75	2.10	4.75	
28										4.75	2.10	4.75	
29										4.75	2.10	4.75	
30										649.82	30.45	649.82	
31										4.75	2.10	4.75	
32										4.75	2.10	4.75	
33										4.75	2.10	4.75	
34										4.75	2.10	4.75	
35										4.75	2.10	4.75	
36										4.75	2.10	4.75	
37										4.75	2.10	4.75	
38										4.75	2.10	4.75	
39										4.75	2.10	4.75	
40										24.62	2.10	24.62	
41										4.75	2.10	4.75	
42										4.75	2.10	4.75	
43										4.75	2.10	4.75	
44										4.75	2.10	4.75	
45										7.36	2.10	7.36	
46										4.75	2.10	4.75	
47										4.75	2.10	4.75	
48										4.75	2.10	4.75	
49										4.75	2.10	4.75	
50										104.61	2.10	104.61	
Total										1047.09	133.12	1180.21	

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Elementary School

Washington, D.C.

Elementary School

Gross Square Feet:	47,000
Height in Ft:	12
Exterior:	Concrete
Floor coverings:	Finished Concrete, Tile, Carpet
HVAC:	Chilled Air, Gas Boiler, Multizone Air
Capacity:	N/A
Occupancy:	2,110
Replacement Cost:	\$9,701,531

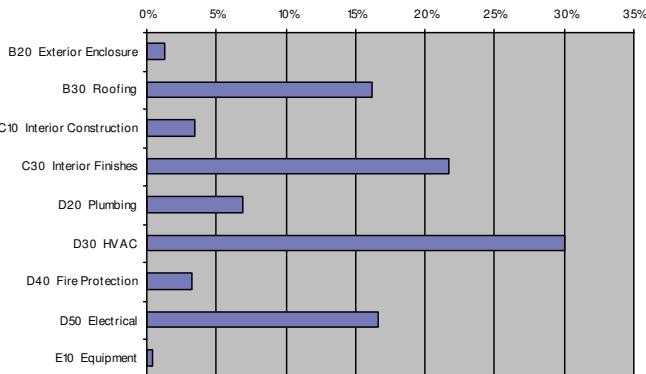
Components (Continued on Page 153)

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Concrete, Painted, Exterior, 1st Floor	8834	Sq Ft
Aluminum Fixed Window, 12 sf, 1st Floor	110	Each
Aluminum Frame, Fully Glazed, Exterior Door	4	Each
Steel w/ Safety Glass, Painted, Exterior Door	8	Each
B30 Roofing	47000	Sq Ft
Built-up Roof		
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	22	Each
Wood, Solid Core, Painted, Interior Door	16	Each
Wood, Solid Core w/ Safety Glass, Painted, Interior Door	52	Each
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	2350	Sq Ft
Plaster, Interior Wall Finish	50650	Sq Ft
Carpet, Nylon 20 oz., Low Traffic	4700	Sq Ft
Concrete, Painted Flooring	2350	Sq Ft
Quarry Tile Flooring	11750	Sq Ft
Vinyl Tile Flooring	28200	Sq Ft
Plaster Ceiling	47000	Sq Ft
D20 Plumbing		
Drinking Fountain, Vitreous China	18	Each
Lavatory, Vitreous China	18	Each
Service Sink, Iron, Enamel	4	Each
Tankless Water Closet	22	Each
Urinal, Vitreous China	12	Each
Circulator Pump, 1/6 HP, Cold Water	1	Each
Circulator Pump, 1/6 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	2.5	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.7	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	3	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	3	K Ln Ft
Water Heater, Gas/Oil, 130 Gph	1	K Ln Ft
Backflow Preventer, 4"	1	Each
Pipe & Fittings, 6" Cast Iron	1.5	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.5	K Ln Ft
Pipe & Fittings, 4" PVC	0.4	K Ln Ft
Roof Drain, 4-6"	14	Each
D30 HVAC		
Pipe & Fittings, 4" Steel, Gas	1.8	K Ln Ft
Chemical Feed System	1	Each
Circulation Pump, 5 HP, Hot Water	1	Each
Expansion Tank, 60 Gal.	2	Each
Gas Boiler, 2,500 Mbh	1	Each
Chiller, Reciprocal Water-Cooled Hermetic, 165 Ton	1	Each
Circulation Pump, 5 HP, Chiller & Condenser Water	3	Each
Cooling Tower, 200 Ton	1	Each
Air Handler, Multizone, 15,000 Cfm	1	Each
Air Handler, Multizone, 50,000 Cfm	1	Each
Duct Insulation, Fiberglass Blanket	9085	Sq Ft
Ductwork	13560	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	8	Each
Thermostat	12	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	235	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	16	Each
D50 Electrical		
Distribution Switch, Fused, <600 V	5	Each
Main Switchgear, <1,200 Amp.	1	Each
Motor Starter, 5-20 HP, <600 V	4	Each
Motor Starter, 21-50 HP, <600 V	5	Each
Motor Starter, 51-75 HP, <600 V	1	Each
Secondary Transformer, Dry, 150 kVA	3	Each
Exit Lighting Fixture, w/ Battery	12	Each
Fluorescent Lighting Fixture, 160 w	881	Each
Receptacle, 120 V, 15 Amp.	270	Each
Wiring Device, Switch	70	Each
Annunciation Panel	1	Each
Fire Alarm Bell, 6"	6	Each
Fire Alarm Horn & Strobe	16	Each
Heat Detector	16	Each
Manual Pull Station	32	Each
Smoke Detector	94	Each
E10 Equipment		

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$1,389,231	\$0.59	0.29%
Unscheduled Maintenance	\$1,070,522	\$0.46	0.22%
Renewal & Replacement	\$5,470,564	\$2.33	1.13%
Total	\$7,930,317	\$3.37	1.63%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Refinish Plaster Ceiling	13.20	9.0%
Place New Membrane Over Existing, Built-up Roof	10.97	7.5%
Refinish Plaster, Interior Wall Finish	10.52	7.2%
Replace Membrane, Built-up Roof	9.50	6.5%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	7.21	4.9%
Replace Air Handler, Multizone, 50,000 Cfm	6.83	4.7%
Replace Fluorescent Lighting Fixture, 160 w	6.59	4.5%
Replace Quarry Tile Flooring	5.56	3.8%
Replace Chiller, Reciprocal Water-Cooled Hermetic, 165 Ton	4.96	3.4%
Maintain Chemical Feed System	3.96	2.7%
Inspect & Test Gas Boiler, 2,500 Mbh	3.78	2.6%
Repair Chiller, Reciprocal Water-Cooled Hermetic, 165 Ton	3.16	2.2%
Maintain Built-up Roof	3.04	2.1%
Replace Vinyl Tile Flooring	2.95	2.0%
Replace Batteries & Check Operation, Smoke Detector	2.39	1.6%
Maintain Chiller, Reciprocal Water-Cooled Hermetic, 165 Ton	2.34	1.6%
Replace Air Handler, Multizone, 15,000 Cfm	2.17	1.5%
Replace Cooling Tower, 200 Ton	2.10	1.4%
Replace Carpet, Nylon 20 oz., Low Traffic	1.81	1.2%
Maintain Cooling Tower, 200 Ton	1.69	1.2%
Replace Wood, Solid Core w/ Safety Glass, Painted, Interior Door	1.33	0.9%
Replace Wood, Solid Core w/ Safety Glass, Painted, Interior Door Locks	1.31	0.9%
Maintain Air Handler, Multizone, 50,000 Cfm	1.24	0.9%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	1.23	0.8%
Maintain Air Handler, Multizone, 15,000 Cfm	1.07	0.7%
Refinish Concrete, Painted, Exterior, 1st Floor	1.02	0.7%
Maintain Fire Sprinkler System	1.01	0.7%
Test Gages & Valves, Fire Sprinkler System	.93	0.6%
Replace Smoke Detector	.91	0.6%
Test Fire Sprinkler Head	.85	0.6%

*Task cost (\$2009) per GSFT over 50 years.

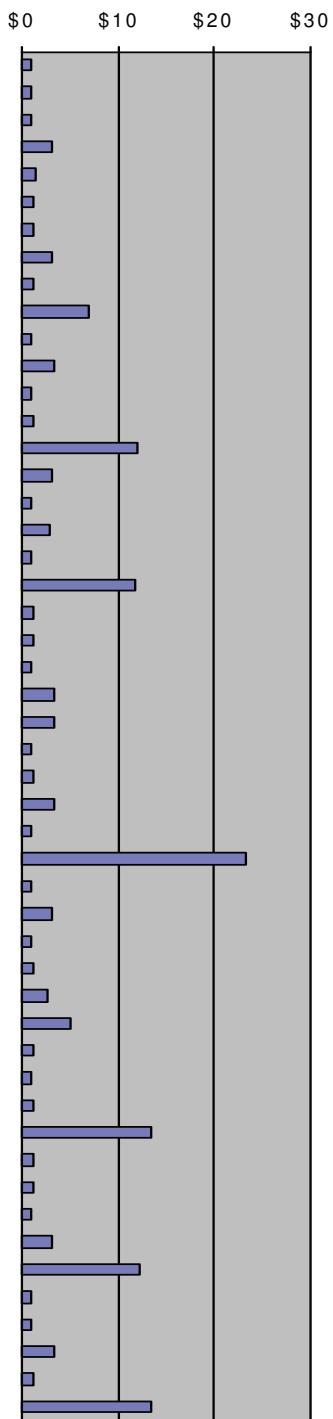
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13					.09	.54	.06	.17	.01	.99
2		.13					.15	.54	.06	.17	.01	1.06
3		.13					.09	.54	.06	.24	.01	1.06
4		.13	.04	2.02			.15	.54	.06	.17	.01	3.12
5		.02	.19	.14	.01		.14	.55	.08	.23	.01	1.37
6		.13					.15	.54	.06	.24	.01	1.13
7		.13					.14	.64	.06	.17	.01	1.14
8		.13	.04	2.02			.15	.54	.06	.17	.01	3.13
9		.13			.03		.09	.54	.06	.24	.01	1.09
10		.31	.19	.57	.05		.40	2.06	.36	2.90	.07	6.90
11		.13					.09	.54	.06	.17	.01	.99
12		.01	.13	.04	2.02		.27	.56	.16	.24	.01	3.45
13		.13					.09	.54	.06	.17	.01	.99
14		.13					.20	.64	.06	.17	.01	1.21
15		.05	5.67	.14	.73		.17	4.46	.13	.67	.01	12.03
16		.13	.04	2.02			.15	.54	.06	.17	.01	3.13
17		.13					.10	.54	.08	.17	.01	1.02
18		.13		1.47			.15	.54	.06	.48	.01	2.84
19		.13					.09	.54	.06	.17	.01	.99
20		.37	.19	.96	2.34		.49	3.13	.35	3.93	.07	11.83
21		.13					.14	.64	.06	.24	.01	1.21
22		.13					.16	.54	.08	.17	.01	1.09
23		.13					.09	.54	.06	.17	.01	.99
24		.01	.13	.04	2.02		.28	.56	.16	.24	.01	3.45
25		.10	.19	.14	.43		1.10	.93	.07	.47	.01	3.42
26		.13					.15	.54	.06	.17	.01	1.06
27		.13		.03			.09	.54	.06	.24	.01	1.09
28		.13	.04	2.02			.20	.64	.06	.17	.01	3.27
29		.13					.10	.54	.08	.17	.01	1.02
30		.34	9.50	.57	.76		.43	7.06	.41	4.03	.07	23.16
31		.13					.09	.54	.06	.17	.01	.99
32		.13	.04	2.02			.15	.54	.06	.17	.01	3.13
33		.13					.09	.54	.06	.24	.01	1.06
34		.13					.16	.54	.08	.17	.01	1.09
35		.02	.19	.14	.01		1.43	.55	.07	.23	.01	2.65
36		.01	.13	.04	3.49		.21	.56	.16	.48	.01	5.10
37		.13					.15	.64	.06	.17	.01	1.15
38		.13					.09	.54	.06	.17	.01	1.00
39		.13					.15	.54	.06	.24	.01	1.13
40		.37	.19	2.14	2.34		.35	3.51	.35	4.17	.07	13.48
41		.13					.16	.54	.08	.17	.01	1.09
42		.13					.14	.54	.06	.24	.01	1.12
43		.13					.15	.54	.06	.17	.01	1.06
44		.13	.04	2.02			.09	.64	.06	.17	.01	3.16
45		.05	5.67	.14	.76		.36	4.46	.13	.67	.01	12.26
46		.13					.10	.54	.08	.17	.01	1.03
47		.13					.15	.54	.06	.17	.01	1.06
48		.01	.13	.04	2.02		.21	.56	.16	.24	.01	3.38
49		.13					.20	.54	.06	.17	.01	1.11
50		.46	.19	.57	6.01		1.20	1.77	.46	2.66	.07	13.39
Total	2.14	27.33	5.91		36.62		11.64	50.76	5.46	28.13	.74	168.73

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Fire Station

Washington, D.C.

Fire Station

Gross Square Feet:	6,000
Height in Ft:	24
Exterior:	Clay Brick
Floor coverings:	Finished Concrete
HVAC:	Multizone Unit
Capacity:	N/A
Occupancy:	50
Replacement Cost:	\$1,504,190

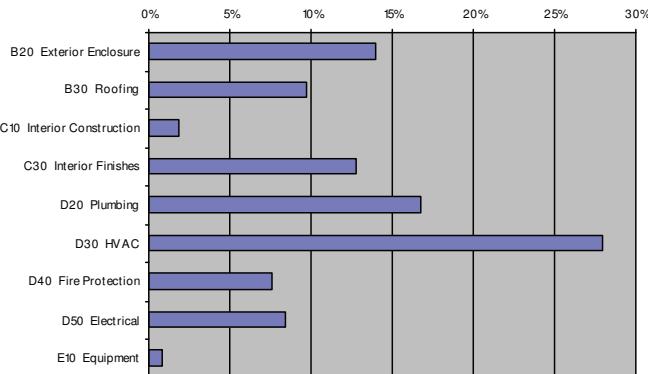
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	6384	Sq Ft
Aluminum Operable Window, 12 sf, 1st Floor	14	Each
Aluminum Frame, Fully Glazed, Exterior Door	1	Each
Steel 20x20', Painted, Roll-up Door	2	Each
Steel, Painted, Exterior Door	3	Each
B30 Roofing		
Single-Ply Modified Bituminous/Thermoplastic Roof	6000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	5	Each
Steel, Painted, Interior Door	12	Each
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	13242	Sq Ft
Concrete Flooring	3000	Sq Ft
Vinyl Tile Flooring	3000	Sq Ft
Acoustical Tile Ceiling	3000	Sq Ft
Metal, Painted Ceiling	3000	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	2	Each
Lavatory, Vitreous China	7	Each
Shower, Ceramic Tile	4	Each
Sink, Stainless Steel	4	Each
Tankless Water Closet	5	Each
Urinal, Vitreous China	2	Each
Circulator Pump, 1/12 HP, Cold Water	1	Each
Circulator Pump, 1/12 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.96	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.59	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	1.235	K Ln Ft
Pipe & Fittings, 4" Steel	0.82	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	1.37	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.845	K Ln Ft
Water Heater, Gas/Oil, 175 Gph	2	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.427	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.155	K Ln Ft
Pipe & Fittings, 4" PVC	0.173	K Ln Ft
Roof Drain, 2"	3	Each
D30 HVAC		
Duct Insulation, Fiberglass Blanket	2372	Sq Ft
Ductwork	3540	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	2	Each
Exhaust Fan, Roof Mounted, 5,000 Cfm	2	Each
Air Conditioner, Rooftop, Single Zone, 20 Ton	2	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	45	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	4	Each
D50 Electrical		
Main Switchgear, <1,200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	1	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	1	Each
Exit Lighting Fixture, w/ Battery	5	Each
Fluorescent Lighting Fixture, 160 w	30	Each
Grounded Fault Circuit Interruptor, 15 Amp.	4	Each
Receptacle, 120 V, 15 Amp.	16	Each
TV Cable Outlet	1	Each
Wiring Device, Switch	15	Each
Annunciation Panel	1	Each
Fire Alarm Bell, 6"	4	Each
Fire Alarm Horn & Strobe	4	Each
Heat Detector	4	Each
Manual Pull Station	4	Each
Smoke Detector	20	Each
E10 Equipment		
Microwave Oven	1	Each
Refrigerator, Domestic	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$483,339	\$1.61	0.64%
Unscheduled Maintenance	\$439,146	\$1.46	0.58%
Renewal & Replacement	\$1,252,252	\$4.17	1.67%
Total	\$2,174,737	\$7.25	2.89%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, Single Zone, 20 Ton	37.85	13.1%
Repair Air Conditioner, Rooftop, Single Zone, 20 Ton	28.24	9.8%
Refinish Concrete Block, Painted, Interior Wall Finish	22.23	7.7%
Replace Membrane, Single-Ply Modified Bituminous/Thermoplastic Roof	15.96	5.5%
Clean & Reseal Clay Brick, Exterior, 1st Floor	14.61	5.1%
Maintain Air Conditioner, Rooftop, Single Zone, 20 Ton	13.44	4.6%
Repaint (50% surface) Concrete Block, Painted, Interior Wall Finish	12.71	4.4%
Repair Single-Ply Modified Bituminous/Thermoplastic Roof	8.72	3.0%
Repaint (50% surface) Clay Brick, Exterior, 1st Floor	7.95	2.7%
Maintain Fire Sprinkler System	7.88	2.7%
Replace Water Heater, Gas/Oil, 175 Gph	7.59	2.6%
Test Gages & Valves, Fire Sprinkler System	7.27	2.5%
Refinish Metal, Painted Ceiling	6.60	2.3%
Maintain Single-Ply Modified Bituminous/Thermoplastic Roof	5.45	1.9%
Clean Water Heater, Gas/Oil, 175 Gph	5.26	1.8%
Replace Batteries & Check Operation, Smoke Detector	3.99	1.4%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	3.98	1.4%
Replace Steel, Painted, Interior Door Locks	2.96	1.0%
Repair Main Switchgear, <1,200 Amp.	2.71	0.9%
Replace Vinyl Tile Flooring	2.46	0.8%
Replace Steel 20x20', Painted, Roll-up Door	2.45	0.8%
Maintain Exhaust Fan, Roof Mounted, 5,000 Cfm	2.42	0.8%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	1.92	0.7%
Replace Main Switchgear, <1,200 Amp.	1.88	0.7%
Replace Fluorescent Lighting Fixture, 160 w	1.76	0.6%
Replace Fire Alarm Control Panel	1.73	0.6%
Maintain Backflow Preventer, 2"	1.73	0.6%
Replace HVAC Control Panel	1.57	0.5%
Repair Clay Brick, Exterior, 1st Floor (2% of Walls)	1.53	0.5%
Replace Smoke Detector	1.52	0.5%

*Task cost (\$2009) per GSFT over 50 years.

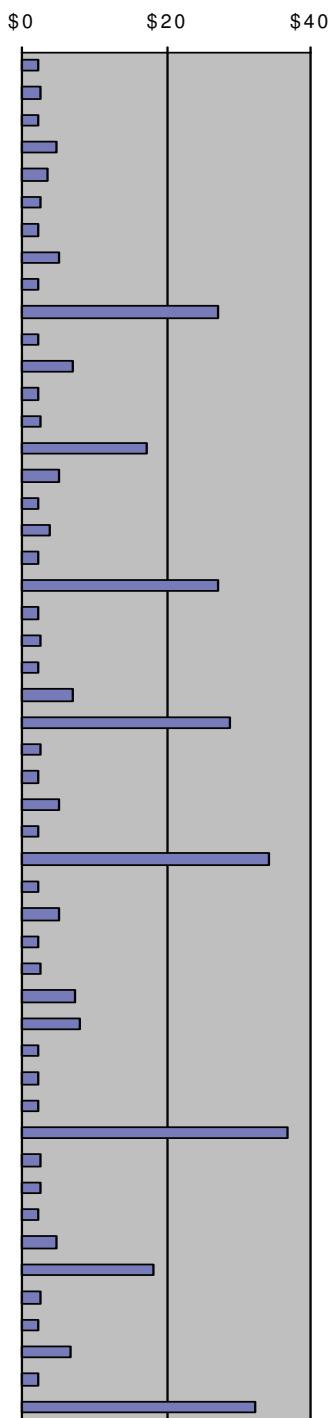
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.20				.51	.63	.45	.31	.03		2.15
2		.20				.84	.63	.45	.31	.03		2.47
3		.20				.51	.63	.45	.31	.03		2.15
4		.20	.06	2.40		.84	.63	.45	.31	.03		4.93
5		.06	.33	.19		1.04	.67	.50	.71	.03		3.54
6		.20				.84	.63	.45	.31	.03		2.47
7		.20				.61	.63	.45	.31	.03		2.24
8		.20	.06	2.40		.88	.63	.45	.33	.03		5.00
9		.20				.51	.63	.45	.31	.03		2.20
10		7.57	3.24	.78		2.35	10.20	.92	1.76	.27		27.09
11		.20				.51	.63	.45	.31	.03		2.15
12		.03	.20	.06	2.40	2.57	.63	.64	.31	.03		6.88
13		.20				.51	.63	.45	.31	.03		2.15
14		.20				.93	.63	.45	.31	.03		2.56
15		.21	.33	.19	.08	.82	13.26	.99	1.43	.03		17.34
16		.20	.06	2.40		.88	.63	.45	.33	.03		5.00
17		.20				.73	.63	.48	.31	.03		2.39
18		.20			1.26	.84	.63	.45	.31	.03		3.72
19		.20				.51	.63	.45	.31	.03		2.15
20		7.57	7.98	1.48	2.40	2.49	1.46	.90	2.72	.27		27.27
21		.20				.61	.63	.45	.31	.03		2.24
22		.20				1.05	.63	.48	.31	.03		2.71
23		.20				.51	.63	.45	.31	.03		2.15
24		.03	.20	.06	2.40	2.62	.63	.64	.33	.03		6.95
25		4.80	.33	.19	7.23	4.18	10.08	.48	1.40	.03		28.73
26		.20				.84	.63	.45	.31	.03		2.47
27		.20			.05	.51	.63	.45	.31	.03		2.20
28		.20	.06	2.40		.93	.63	.45	.31	.03		5.03
29		.20				.73	.63	.48	.31	.03		2.39
30		7.72	3.24	.78	.08	2.73	14.93	1.41	3.04	.27		34.20
31		.20				.51	.63	.45	.31	.03		2.15
32		.20	.06	2.40		.88	.63	.45	.31	.03		4.98
33		.20				.51	.63	.45	.33	.03		2.16
34		.20				1.05	.63	.48	.31	.03		2.71
35		2.59	.33	.19		2.33	.67	.48	.71	.03		7.32
36		.03	.20	.06	3.66	2.44	.63	.64	.31	.03		8.01
37		.20				.65	.63	.45	.31	.03		2.28
38		.20				.70	.63	.45	.31	.03		2.34
39		.20				.65	.63	.45	.31	.03		2.28
40		7.24	7.98	1.48	2.40	2.44	10.87	.90	3.10	.27		36.67
41		.20				.86	.63	.48	.33	.03		2.54
42		.20				.80	.63	.45	.31	.03		2.43
43		.20				.65	.63	.45	.31	.03		2.28
44		.20	.06	2.40		.70	.63	.45	.31	.03		4.80
45		.54	.33	.19	.13	1.47	13.26	.99	1.43	.03		18.37
46		.20				.92	.63	.48	.31	.03		2.58
47		.20				.65	.63	.45	.31	.03		2.28
48		.03	.20	.06	2.40	2.48	.63	.64	.31	.03		6.80
49		.20				.74	.63	.45	.33	.03		2.39
50		12.12	3.24	.78	7.23	5.00	.79	1.06	1.69	.27		32.18
Total	50.52	35.35	6.87	46.21	60.85	101.44	27.64	30.68	2.90	362.46		

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Garage, Parking

Gross Square Feet:	110,800
Height in Ft:	40
Exterior:	Concrete
Floor coverings:	Unfinished Concrete
HVAC:	N/A
Capacity:	N/A
Occupancy:	
Replacement Cost:	\$11,454,275

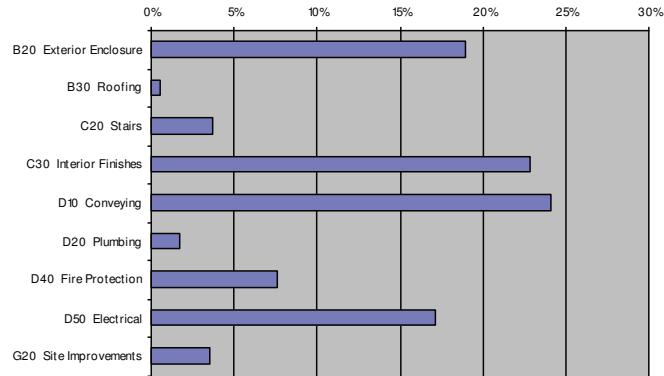
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	1950	Sq Ft
Clay Brick, Exterior, 2nd Floor	1950	Sq Ft
Clay Brick, Exterior, 3rd+ Floor	3900	Sq Ft
Concrete, Painted, Exterior, 1st Floor	13710	Sq Ft
Concrete, Painted, Exterior, 2nd Floor	13710	Sq Ft
Concrete, Painted, Exterior, 3rd+ Floor	22710	Sq Ft
Aluminum Fixed Window, 24 sf, 1st Floor	4	Each
Aluminum Fixed Window, 24 sf, 2nd Floor	4	Each
Aluminum Fixed Window, 24 sf, 3rd+ Floor	8	Each
Steel, Painted, Exterior Door	6	Each
B30 Roofing		
Metal Roof	900	Sq Ft
C20 Stairs		
Concrete, Interior Stairs	640	Sq Ft
Metal, Painted, Interior Railing	4776	Ln Ft
C30 Interior Finishes		
Concrete, Painted Ceiling	83106	Sq Ft
D10 Conveying		
Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	2	Each
D20 Plumbing		
Service Sink, Iron, Enamel	1	Each
Pipe & Fittings, 2" Copper, Cold Water	0.563	K Ln Ft
Water Heater, Electric, 52 Gal.	1	Each
Pipe & Fittings, 4" Cast Iron	0.276	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.333	K Ln Ft
Pipe & Fittings, 4" PVC	0.64	K Ln Ft
Roof Drain, 4-6"	8	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	400	Each
Fire Sprinkler System	1	Each
Fire Suppression System Water Pump, 10 HP	1	Each
Fire Standpipe System	1	Each
Fire Extinguisher	8	Each
D50 Electrical		
Main Switchgear, <1,200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	4	Each
Secondary Transformer, Dry, 50 kVA	1	Each
Exit Lighting Fixture, w/ Battery	48	Each
Metal Halide Lighting Fixture, Low Bay, 250 w	222	Each
Metal Halide Lighting Fixture, High Bay, 400 w	12	Each
Receptacle, 120 V, 20 Amp.	16	Each
Wiring Device, Switch	8	Each
Fire Alarm Horn & Strobe	16	Each
Manual Pull Station	8	Each
G20 Site Improvements		
Parking Control Equipment, Barrier Gate & Controller	2	Each
Parking Control Equipment, Card Reader	2	Each
Parking Stall Lines	916	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$1,451,881	\$0.26	0.25%
Unscheduled Maintenance	\$661,085	\$0.12	0.12%
Renewal & Replacement	\$3,192,649	\$0.58	0.56%
Total	\$5,305,615	\$0.96	0.93%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Refinish Concrete, Painted Ceiling	10.14	24.2%
Maintain Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	6.11	14.6%
Renovate Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	4.11	9.8%
Refinish Concrete, Painted, Exterior, 3rd+ Floor	2.23	5.3%
Replace Metal Halide Lighting Fixture, Low Bay, 250 w	2.11	5.0%
Replace Lamp, Metal Halide Lighting Fixture, Low Bay, 250 w	1.68	4.0%
Replace Ballast, Metal Halide Lighting Fixture, Low Bay, 250 w	1.43	3.4%
Replace Metal, Painted, Interior Railing	1.08	2.6%
Refinish Concrete, Painted, Exterior, 2nd Floor	1.01	2.4%
Clean & Reseal Clay Brick, Exterior, 3rd+ Floor	.97	2.3%
Repair Concrete, Painted Ceiling (2% of Ceiling)	.74	1.8%
Refinish Concrete, Painted, Exterior, 1st Floor	.67	1.6%
Test Fire Sprinkler Head	.61	1.5%
Inspect & Test Barrier Gate & Controller	.52	1.2%
Replace Barrier Gate & Controller	.48	1.1%
Maintain Fire Sprinkler System	.43	1.0%
Refinish Metal, Painted, Interior Railing	.42	1.0%
Paint Parking Stall Lines	.42	1.0%
Test Gages & Valves, Fire Sprinkler System	.39	0.9%
Clean & Reseal Clay Brick, Exterior, 2nd Floor	.36	0.9%
Repaint (50% surface) Clay Brick, Exterior, 3rd+ Floor	.31	0.7%
Replace Fire Sprinkler Head	.29	0.7%
Replace Parking Control Equipment, Card Reader	.27	0.6%
Maintain Fire Suppression System Water Pump, 10 HP	.26	0.6%
Clean & Reseal Clay Brick, Exterior, 1st Floor	.24	0.6%
Replace Exit Lighting Fixture, w/ Battery	.24	0.6%
Inspect Fire Sprinkler Head	.23	0.5%
Maintain Power Panel Board, 208 Y/120 V, 200 Amp.	.23	0.5%
Replace Power Panel Board, 208 Y/120 V, 200 Amp.	.22	0.5%
Repair Concrete, Painted, Exterior, 3rd+ Floor (2% of Walls)	.19	0.5%

*Task cost (\$2009) per GSFT over 50 years.

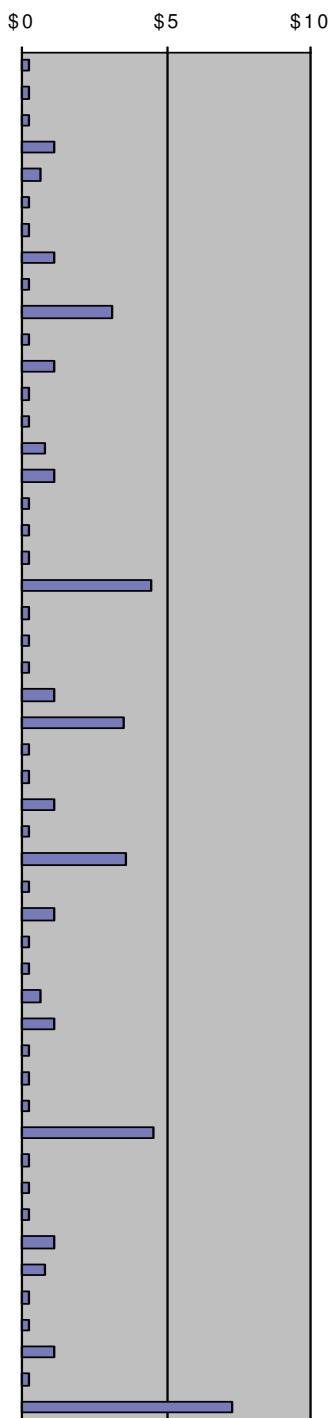
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1	.00				.16	.01		.04	.01		.01	.22
2	.00				.16	.01		.04	.01		.01	.22
3	.00				.16	.01		.04	.01		.01	.22
4	.00	.04	.85	.16	.01			.04	.01		.01	1.11
5	.00	.00			.16	.01		.05	.40		.01	.62
6	.00				.16	.01		.04	.01		.01	.23
7	.00				.16	.01		.04	.01		.01	.23
8	.00	.04	.85	.16	.01			.04	.01		.01	1.11
9	.00				.16	.01		.04	.01		.01	.22
10	1.57	.00			.16	.02		.26	.92		.23	2.92
11	.00				.16	.01		.04	.01		.01	.22
12	.00	.04	.85	.16	.02			.06	.01		.01	1.13
13	.00				.16	.01		.04	.01		.01	.22
14	.00				.16	.01		.04	.01		.01	.23
15	.01	.00	.07		.16	.03		.12	.40		.01	.79
16	.00	.04	.85	.16	.01			.04	.01		.01	1.11
17	.00				.16	.01		.05	.01		.01	.23
18	.00				.16	.01		.04	.01		.01	.23
19	.00				.16	.01		.04	.01		.01	.22
20	1.58	.01	.05	.85	.16	.02		.25	1.34		.23	4.25
21	.00				.16	.01		.04	.01		.01	.22
22	.00				.16	.01		.05	.01		.01	.23
23	.00				.16	.01		.04	.01		.01	.22
24	.00	.04	.85	.16	.02			.06	.01		.01	1.13
25	.57	.00	.39	2.05	.06			.05	.40		.01	3.53
26	.00				.16	.01		.04	.01		.01	.22
27	.00				.16	.01		.04	.01		.01	.22
28	.00	.04	.85	.16	.01			.04	.01		.01	1.11
29	.00				.16	.01		.05	.01		.01	.23
30	1.58	.00	.07		.16	.07		.32	1.17		.23	3.37
31	.00				.16	.01		.04	.01		.01	.22
32	.00	.04	.85	.16	.01			.04	.01		.01	1.11
33	.00				.16	.01		.04	.01		.01	.22
34	.00				.16	.01		.05	.01		.01	.23
35	.00	.00			.16	.02		.05	.40		.01	.63
36	.00	.04	.85	.16	.02			.06	.01		.01	1.13
37	.00				.16	.01		.04	.01		.01	.23
38	.00				.16	.01		.04	.01		.01	.22
39	.00				.16	.01		.04	.01		.01	.23
40	1.58	.09	.05	.85	.16	.03		.25	1.35		.23	4.35
41	.00				.16	.01		.05	.01		.01	.23
42	.00				.16	.01		.04	.01		.01	.22
43	.00				.16	.01		.04	.01		.01	.23
44	.00	.04	.85	.16	.01			.04	.01		.01	1.11
45	.01	.00	.07		.16	.03		.12	.40		.01	.79
46	.00				.16	.01		.05	.01		.01	.23
47	.00				.16	.01		.04	.01		.01	.22
48	.00	.04	.85	.16	.02			.06	.01		.01	1.13
49	.00				.16	.01		.04	.01		.01	.22
50	2.14	.00	1.11	.39	2.05	.06		.33	.91		.23	7.01
Total	9.05	.24	1.77	10.92	11.56	.81		3.64	8.20		1.70	47.88

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Garage, Service Station

Washington, D.C.

Garage, Service Station

Gross Square Feet:	1,400
Height in Ft:	10
Exterior:	Clay Brick
Floor coverings:	Finished Concrete, Vinyl Tile
HVAC:	Spilt System, Gas Heat
Capacity:	N/A
Occupancy:	10
Replacement Cost:	\$372,233

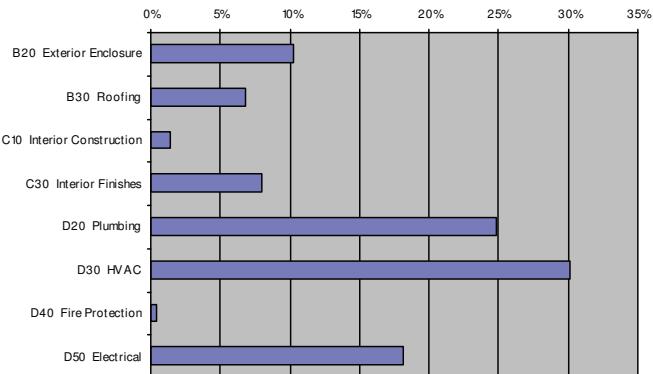
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	1122	Sq Ft
Aluminum Fixed Window, 12 sf, 1st Floor	2	Each
Aluminum Frame, Fully Glazed, Exterior Door	1	Each
Steel Single 12'x12', Painted, Roll-up Door	2	Each
Steel, Painted, Exterior Door	2	Each
B30 Roofing		
Aluminum Gutter, Downspouts, Fittings	0.1	K Ln Ft
Asphalt Shingle Roof	1400	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	2	Each
Steel, Painted, Interior Door	2	Each
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	2038	Sq Ft
Concrete, Painted Flooring	910	Sq Ft
Vinyl Tile Flooring	490	Sq Ft
Acoustical Tile Ceiling	490	Sq Ft
Metal, Painted Ceiling	910	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	2	Each
Lavatory, Vitreous China	3	Each
Service Sink, Iron, Enamel	4	Each
Tankless Water Closet	3	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.44	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.23	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.517	K Ln Ft
Pipe & Fittings, 4" Steel	0.346	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.614	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.327	K Ln Ft
Water Heater, Gas/Oil, 75 Gph	1	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.148	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.077	K Ln Ft
D30 HVAC		
House Furnace, Gas/Oil, 100 Mbh	2	Each
Condenser, Air Cooled, 7 1/2 Ton	1	Each
Exhaust Fan, Ceiling, 200-500 Cfm	2	Each
Exhaust Fan, Roof Mounted, 5,000 Cfm	3	Each
Thermostat	1	Each
D40 Fire Protection		
Fire Extinguisher	2	Each
D50 Electrical		
Main Switchgear, <1,200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	1	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	2	Each
Exit Lighting Fixture, w/ Battery	3	Each
Fluorescent Lighting Fixture, 160 w	14	Each
Grounded Fault Circuit Interruptor, 15 Amp.	2	Each
Receptacle, 120 V, 15 Amp.	11	Each
Wiring Device, Switch	6	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	2	Each
Heat Detector	2	Each
Manual Pull Station	2	Each
Smoke Detector	2	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$178,436	\$2.55	0.96%
Unscheduled Maintenance	\$182,942	\$2.61	0.98%
Renewal & Replacement	\$297,487	\$4.25	1.60%
Total	\$658,865	\$9.41	3.54%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Maintain House Furnace, Gas/Oil, 100 Mbh	26.66	7.8%
Maintain Exhaust Fan, Roof Mounted, 5,000 Cfm	15.60	4.6%
Refinish Concrete Block, Painted, Interior Wall Finish	14.67	4.3%
Replace House Furnace, Gas/Oil, 100 Mbh	12.37	3.6%
Repair Main Switchgear, <1,200 Amp.	11.62	3.4%
Clean Water Heater, Gas/Oil, 75 Gph	11.27	3.3%
Replace Condenser, Air-Cooled, 7 1/2 Ton	11.05	3.3%
Clean & Reseal Clay Brick, Exterior, 1st Floor	11.00	3.2%
Replace Water Heater, Gas/Oil, 75 Gph	8.89	2.6%
Refinish Metal, Painted Ceiling	8.58	2.5%
Replace Exhaust Fan, Roof Mounted, 5,000 Cfm	8.44	2.5%
Repaint (50% surface) Concrete Block, Painted, Interior Wall Finish	8.38	2.5%
Maintain Asphalt Shingle Roof	8.30	2.4%
Replace Main Switchgear, <1,200 Amp.	8.07	2.4%
Maintain Condenser, Air-Cooled, 7 1/2 Ton	7.72	2.3%
Maintain Backflow Preventer, 2"	7.39	2.2%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	7.14	2.1%
Replace Drinking Fountain, Refrigerated	6.43	1.9%
Repaint (50% surface) Clay Brick, Exterior, 1st Floor	5.98	1.8%
Replace Safety Switch, Fused, 400 Amp., 3 Ph.	5.75	1.7%
Repair House Furnace, Gas/Oil, 100 Mbh	5.37	1.6%
Maintain Safety Switch, Fused, 400 Amp., 3 Ph.	5.35	1.6%
Replace Backflow Preventer, 2"	5.30	1.6%
Replace Asphalt Shingle Roof	5.23	1.5%
Maintain Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	4.70	1.4%
Maintain Power Panel Board, 208 Y/120 V, 200 Amp.	4.48	1.3%
Replace Power Panel Board, 208 Y/120 V, 200 Amp.	4.32	1.3%
Place New Shingles Over Existing, Asphalt Shingle Roof	4.27	1.3%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	3.84	1.1%
Repair Steel Single 12'x12', Painted, Roll-up Door	3.57	1.0%

*Task cost (\$2009) per GSFT over 50 years.

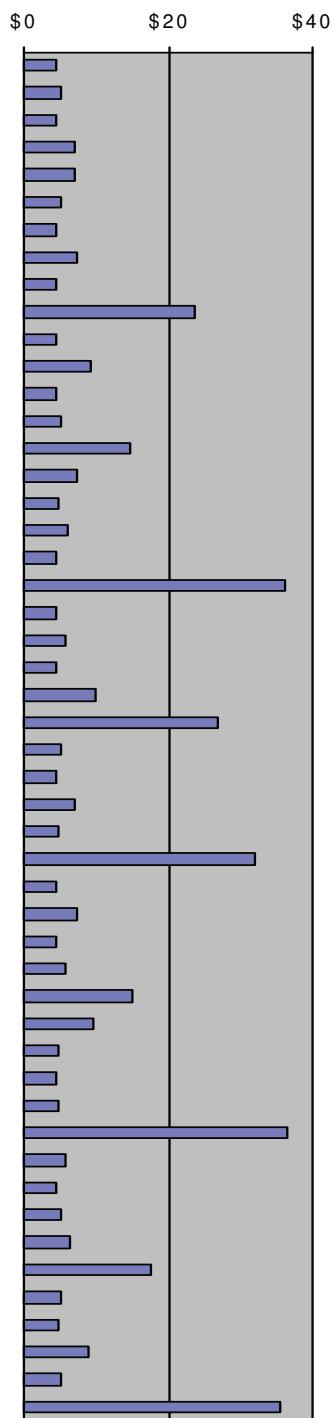
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.43					1.09	2.04	.79			4.35
2		.43					1.83	2.04	.79			5.09
3		.43					1.09	2.04	.79			4.35
4		.43	.06	1.94			1.83	2.04	.79			7.08
5	.19	.53	.14				1.73	2.04	.06	2.38		7.07
6		.43					1.83	2.04	.79			5.09
7		.43					1.18	2.04	.79			4.44
8		.43	.06	1.94			2.03	2.04	.95			7.44
9		.43					1.09	2.04	.79			4.39
10	7.20	.53	.56	.43			5.23	5.54	.06	4.20		23.75
11		.43					1.09	2.04	.79			4.35
12	.12	.43	.06	1.94			3.64	2.04	.40	.79		9.43
13		.43					1.09	2.04	.79			4.35
14		.43					1.91	2.04	.79			5.17
15	.44	.53	.14	.11			1.26	8.55		3.60		14.63
16		.43	.06	1.94			2.03	2.04		.95		7.44
17		.43					1.56	2.04	.06	.79		4.88
18		.43		.88			1.83	2.04		.79		5.97
19		.43					1.09	2.04		.79		4.35
20	7.23	5.17	1.71	2.37			5.04	6.85		7.70		36.07
21		.43					1.18	2.04		.79		4.44
22		.43					2.29	2.04	.06	.79		5.61
23		.43					1.09	2.04		.79		4.35
24	.12	.43	.06	1.94			3.84	2.04	.40	.95		9.78
25	3.76	.53	.14	4.94			7.36	4.57		5.49		26.79
26		.43					1.83	2.04		.79		5.09
27		.43		.04			1.09	2.04		.79		4.39
28		.43	.06	1.94			1.91	2.04		.79		7.17
29		.43					1.56	2.04	.06	.79		4.88
30	7.45	.53	.56	.55			4.40	9.53		9.03		32.03
31		.43					1.09	2.04		.79		4.35
32		.43	.06	1.94			2.03	2.04		.79		7.28
33		.43					1.09	2.04		.95		4.51
34		.43					2.29	2.04	.06	.79		5.61
35	3.62	.53	.14				6.36	2.04		2.38		15.07
36	.12	.43	.06	2.82			3.08	2.04	.40	.79		9.74
37		.43					1.66	2.04		.79		4.92
38		.43					1.26	2.04		.79		4.52
39		.43					1.66	2.04		.79		4.92
40	6.17	5.68	1.71	2.37			3.17	9.37		8.14		36.61
41		.43					2.13	2.04	.06	.95		5.60
42		.43					1.35	2.04		.79		4.60
43		.43					1.86	2.04		.79		5.12
44		.43	.06	1.94			1.26	2.04		.79		6.52
45	1.50	.53	.14	.15			3.14	8.55		3.60		17.60
46		.43					1.73	2.04	.06	.79		5.04
47		.43					1.66	2.04		.79		4.92
48	.12	.43	.06	1.94			3.08	2.04	.40	.79		8.86
49		.43					1.75	2.04		.95		5.16
50	10.28	.53	.56	5.38			9.27	3.02		6.43		35.46
Total	48.33	32.16	6.39	37.50			116.90	141.73	2.08	85.54		470.62

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Greenhouse, Research

Gross Square Feet:	2,100
Height in Ft:	15
Exterior:	Greenhouse Structure
Floor coverings:	Unfinished Concrete
HVAC:	Gas Boiler, Baseboard Rad.
Capacity:	N/A
Occupancy:	10
Replacement Cost:	\$447,300

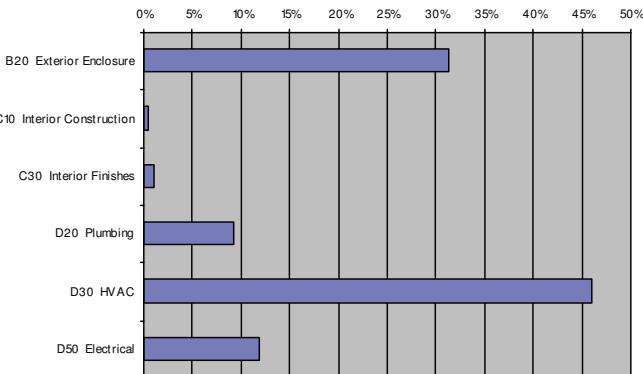
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Concrete Block, Exterior, 1st Floor	450	Sq Ft
Greenhouse Structure, Glazing & Accessories	3640	Sq Ft
Aluminum Frame, Fully Glazed, Exterior Door	2	Each
C10 Interior Construction		
Aluminum, Fully Glazed, Interior Door	1	Each
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	430	Sq Ft
Concrete Flooring	2100	Sq Ft
Concrete Ceiling	60	Sq Ft
D20 Plumbing		
Sink, Stainless Steel	2	Each
Circulator Pump, 1/2 HP, Cold Water	2	Each
Pipe Insulation, Fiberglass, Heating Water/Steam	0.125	K Ln Ft
Floor Drain	5	Each
Pipe & Fittings, 4" PVC	0.05	K Ln Ft
D30 HVAC		
Gas Boiler, 750 Mbh	1	Each
Pipe & Fittings, 2" Steel	0.15	K Ln Ft
Pipe & Fittings, 3" Steel	0.05	K Ln Ft
Exhaust Fan, Propeller, 1,000 Cfm	6	Each
Baseboard Radiator 10 ft.	12	Each
Direct Digital Controls, System Points	10	Each
D50 Electrical		
Power Panel Board, 208 Y/120 V, 200 Amp.	1	Each
Emergency Horn & Strobe	3	Each
High Pressure Sodium Lighting Fixture, 250 w	16	Each
Receptacle, 120 V, 15 Amp.	6	Each
Receptacle, 208 V, 3 phase	16	Each
Wiring Device, Switch	6	Each
Smoke Detector	2	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$187,922	\$1.79	0.84%
Unscheduled Maintenance	\$151,073	\$1.44	0.68%
Renewal & Replacement	\$419,913	\$4.00	1.88%
Total	\$758,908	\$7.23	3.39%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Greenhouse Structure, Glazing & Accessories	101.31	35.0%
Inspect & Test Gas Boiler, 750 Mbh	31.76	11.0%
Maintain Exhaust Fan, Propeller, 1,000 Cfm	20.80	7.2%
Maintain Direct Digital Controls, System Points	16.82	5.8%
Replace Direct Digital Controls, System Points	15.45	5.3%
Replace HP Sodium Lighting Fixture, 250 w	13.51	4.7%
Replace Ballast & Lamp, HP Sodium Lighting Fixture, 250 w	12.00	4.1%
Repair Gas Boiler, 750 Mbh	8.88	3.1%
Replace Gas Boiler, 750 Mbh	8.13	2.8%
Replace Baseboard Radiator, 10 ft.	7.95	2.7%
Replace Exhaust Fan, Propeller, 1,000 Cfm	6.03	2.1%
Maintain Floor Drain	5.83	2.0%
Replace Circulator Pump, 1/2 HP, Cold Water	5.31	1.8%
Maintain Power Panel Board, 208 Y/120 V, 200 Amp.	2.99	1.0%
Clean & Seal Concrete Block, Exterior, 1st Floor	2.93	1.0%
Replace Power Panel Board, 208 Y/120 V, 200 Amp.	2.88	1.0%
Refinish Concrete Block, Painted, Interior Wall Finish	2.06	0.7%
Inspect & Lubricate Circulator Pump, 1/2 HP, Cold Water	2.06	0.7%
Repair Exhaust Fan, Propeller, 1,000 Cfm	1.99	0.7%
Replace Receptacle, 208 V, 3 phase	1.98	0.7%
Clean Fire Box, Gas Boiler, 750 Mbh	1.61	0.6%
Maintain Emergency Horn & Strobe	1.33	0.5%
Repaint (50% surface) Concrete Block, Exterior, 1st Floor	1.23	0.4%
Replace Aluminum Frame, Fully Glazed, Exterior Door Locks	1.19	0.4%
Repaint (50% surface) Concrete Block, Painted, Interior Wall Finish	1.18	0.4%
Replace Aluminum Frame, Fully Glazed, Exterior Door	1.15	0.4%
Replace Batteries & Check Operation, Smoke Detector	1.14	0.4%
Replace Faucet Washer & Clean Trap, Sink, Stainless Steel	.97	0.3%
Replace Sink, Stainless Steel	.91	0.3%
Replace Emergency Horn & Strobe	.76	0.3%

*Task cost (\$2009) per GSFT over 50 years.

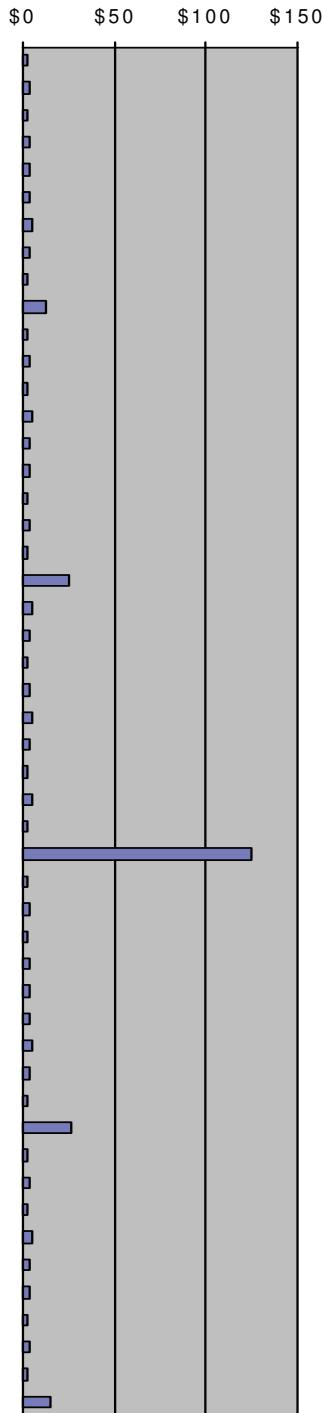
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	Plumbing	HVAC Systems	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT	
1							.43	2.40		.21				3.04
2							.54	2.52		.21				3.27
3							.43	2.40		.21				3.04
4							.17	.54	2.52	.21				3.44
5	.08	.05					.67	2.40		.21				3.41
6							.54	2.52		.21				3.27
7							.43	3.88		.21				4.52
8							.17	.60	2.52	.21				3.51
9							.43	2.40		.21				3.04
10	1.78	.19					.90	5.74		4.45				13.07
11							.43	2.40		.21				3.04
12	.16						.54	2.55		.21				3.63
13							.43	2.40		.21				3.04
14							.54	4.00		.21				4.75
15	.08	.05					.67	2.40		.40				3.76
16							.60	2.52		.21				3.51
17							.43	2.40		.21				3.04
18							.54	2.52		.21				3.27
19							.43	2.40		.21				3.04
20	1.78	.19					3.22	11.35		8.43				25.13
21							.43	3.88		.21				4.52
22							.54	2.52		.21				3.27
23							.43	2.40		.21				3.04
24	.16						.60	2.55		.21				3.69
25	.77	.05					.72	2.42		.39				5.00
26							.54	2.52		.21				3.27
27							.43	2.40		.21				3.04
28							.17	.54	4.00	.21				4.92
29							.43	2.40		.21				3.04
30	103.09	.19					1.08	12.60		7.16				124.27
31							.43	2.40		.21				3.04
32							.17	.60	2.52	.21				3.51
33							.43	2.40		.21				3.04
34							.54	2.52		.21				3.27
35	.08	.05					.67	2.40		.21				3.41
36	.16						.54	2.55		.21				3.63
37							.43	3.88		.21				4.52
38							.54	2.52		.21				3.27
39							.43	2.40		.21				3.04
40	1.78	.19					4.20	11.35		8.61				26.29
41							.43	2.40		.21				3.04
42							.54	2.52		.21				3.27
43							.43	2.40		.21				3.04
44							.17	.54	4.00	.21				4.92
45	.08	.05					.67	2.40		.40				3.76
46							.54	2.52		.21				3.27
47							.43	2.40		.21				3.04
48	.16						.60	2.55		.21				3.69
49							.43	2.40		.21				3.04
50	3.22	.57					.96	5.76		4.27				15.44
Total	113.40	1.54	3.87				33.40	166.33		42.84				361.38

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Guard House

Washington, D.C.

Guard House

Gross Square Feet:	100
Height in Ft:	10
Exterior:	Aluminum Siding
Floor coverings:	Vinyl Tile Flooring
HVAC:	Window AC
Capacity:	N/A
Occupancy:	2
Replacement Cost:	\$40,900

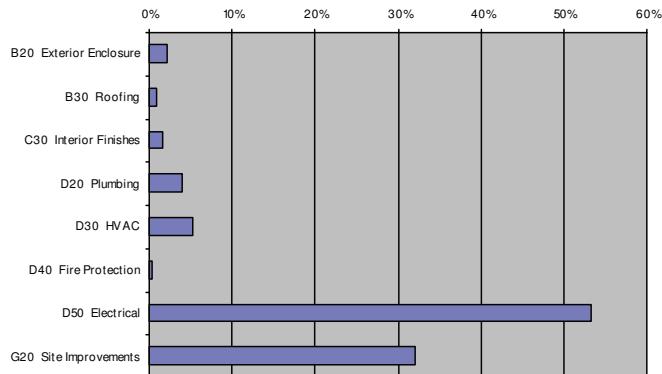
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Aluminum Siding, Painted, Exterior, 1st Floor	286	Sq Ft
Aluminum Fixed Window, 24 sf, 1st Floor	2	Each
Aluminum Operable Window, 12 sf, 1st Floor	2	Each
Steel w/ Safety Glass, Painted, Exterior Door	2	Each
B30 Roofing		
Metal Roof	100	Sq Ft
C30 Interior Finishes		
Sheetrock, Unstippled, Interior Wall Finish	400	Sq Ft
Vinyl Tile Flooring	100	Sq Ft
Metal, Painted Ceiling	100	Sq Ft
D20 Plumbing		
Roof Drain, 2"	2	Each
D30 HVAC		
Air Conditioner, Window, 1 Ton	1	Each
D40 Fire Protection		
Fire Extinguisher	1	Each
D50 Electrical		
Power Panel Board, 208 Y/120 V, 200 Amp.	1	Each
Flood Light, Exterior, 100 w	8	Each
Fluorescent Lighting Fixture, 80 w	2	Each
Receptacle, 120 V, 15 Amp.	8	Each
Wiring Device, Switch	2	Each
Alarm Siren	1	Each
Camera, Exterior, Closed Circuit, Fixed B/W	2	Each
Monitor, Small, Closed Circuit	2	Each
Public Address Speaker	1	Each
Security Control Panel	1	Each
Smoke Detector	1	Each
G20 Site Improvements		
Parking Control Equipment, Barrier Gate & Controller	2	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$99,760	\$19.95	4.88%
Unscheduled Maintenance	\$39,956	\$7.99	1.95%
Renewal & Replacement	\$203,667	\$40.73	9.96%
Total	\$343,383	\$68.68	16.79%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Inspect & Test Barrier Gate & Controller	575.55	19.0%
Replace Barrier Gate & Controller	527.75	17.4%
Replace Camera, Exterior, Closed Circuit, Fixed B/W	472.00	15.6%
Replace Monitor, Small, Closed Circuit	336.70	11.1%
Replace Security Control Panel	159.48	5.3%
Replace Flood Light, Exterior, 100 w	131.70	4.3%
Maintain Camera, Exterior, Closed Circuit, Fixed B/W	102.40	3.4%
Maintain Air Conditioner, Window, 1 Ton	91.20	3.0%
Replace Lamp, Flood Light, Exterior, 100 w	87.72	2.9%
Maintain Power Panel Board, 208 Y/120 V, 200 Amp.	62.72	2.1%
Replace Power Panel Board, 208 Y/120 V, 200 Amp.	60.45	2.0%
Maintain Roof Drain, 2"	49.49	1.6%
Inspect & Maintain Security Control Panel	47.94	1.6%
Refinish Sheetrock, Unstippled, Interior Wall Finish	39.00	1.3%
Repair Security Control Panel	35.70	1.2%
Replace Steel w/ Safety Glass, Painted, Exterior Door Locks	31.15	1.0%
Replace Air Conditioner, Window, 1 Ton	24.50	0.8%
Maintain Public Address Speaker	19.74	0.7%
Maintain Alarm Siren	18.90	0.6%
Refinish Aluminum Siding, Painted, Exterior, 1st Floor	13.70	0.5%
Refinish Metal, Painted Ceiling	13.20	0.4%
Replace Batteries & Check Operation, Smoke Detector	11.75	0.4%
Replace Fire Extinguisher	11.28	0.4%
Replace Metal Roof	10.52	0.3%
Repair Steel w/ Safety Glass, Painted, Exterior Door	10.32	0.3%
Replace Public Address Speaker	8.67	0.3%
Maintain Metal Roof	8.33	0.3%
Replace Roof Drain, 2"	7.19	0.2%
Maintain Steel w/ Safety Glass, Painted, Exterior Door Locks	7.10	0.2%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 80 w	6.42	0.2%

*Task cost (\$2009) per GSFT over 50 years.

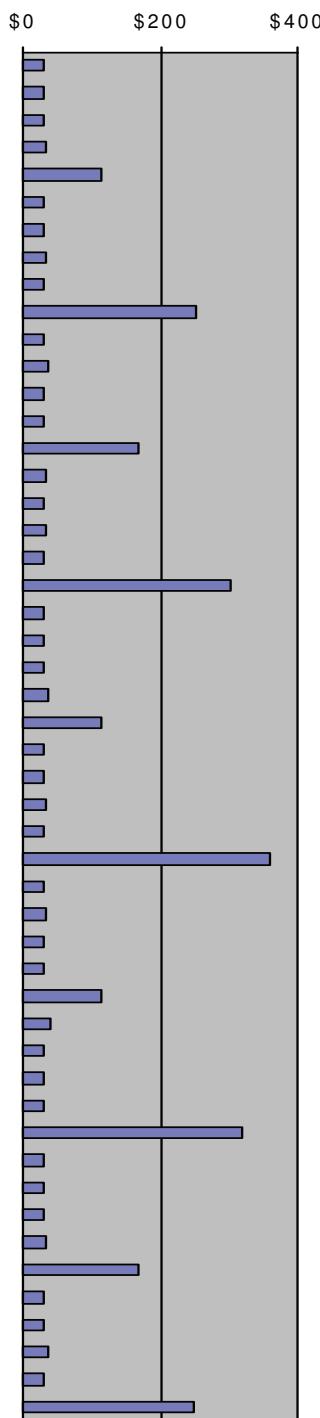
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.35				2.68	3.20	11.26	12.79		17.49	
2		.35				2.68	3.20	11.26	12.79		17.49	
3		.35				2.68	3.20	11.26	12.79		17.49	
4		.35			4.35	2.68	3.20	11.26	12.79		21.84	
5	1.78	.56				2.68	3.20	.41	92.37	12.79	101.00	
6		.35				2.68	3.20	11.26	12.79		17.49	
7		.35				2.68	3.20	11.26	12.79		17.49	
8		.35			4.35	2.68	3.20	11.26	12.79		21.84	
9		.35			.05	2.68	3.20	11.26	12.79		17.54	
10	11.18	.56				2.68	4.05	.41	127.02	105.55	145.90	
11		.35				2.68	3.20	11.26	12.79		17.49	
12		.35			4.35	2.68	3.20	2.82	11.26	12.79	24.66	
13		.35				2.68	3.20	11.26	12.79		17.49	
14		.35				2.68	3.20	11.26	12.79		17.49	
15	5.76	.56				2.68	3.20	142.25	12.79		154.45	
16		.35			4.35	2.68	3.20	11.26	12.79		21.84	
17		.35				2.68	3.20	.41	11.26	12.79	17.90	
18		.35			2.46	2.68	3.20	11.26	12.79		19.95	
19		.35				2.68	3.20	11.26	12.79		17.49	
20	11.66	.77			4.61	2.68	12.25	165.42	105.55		197.39	
21		.35				2.68	3.20	11.26	12.79		17.49	
22		.35				2.68	3.20	.41	11.26	12.79	17.90	
23		.35				2.68	3.20	11.26	12.79		17.49	
24		.35			4.35	2.68	3.20	2.82	11.26	12.79	24.66	
25	1.78	.56			.54	2.68	3.20	93.83	12.79		102.59	
26		.35				2.68	3.20	11.26	12.79		17.49	
27		.35				2.68	3.20	11.26	12.79		17.54	
28		.35			4.35	2.68	3.20	11.26	12.79		21.84	
29		.35				2.68	3.20	.41	11.26	12.79	17.90	
30	15.16	.56				2.68	4.05	232.12	105.55		254.57	
31		.35				2.68	3.20	11.26	12.79		17.49	
32		.35			4.35	2.68	3.20	11.26	12.79		21.84	
33		.35				2.68	3.20	11.26	12.79		17.49	
34		.35				2.68	3.20	.41	11.26	12.79	17.90	
35	1.78	.56				2.68	3.20	92.37	12.79		100.59	
36		.35			6.81	2.68	3.20	2.82	11.26	12.79	27.12	
37		.35				2.68	3.20	11.26	12.79		17.49	
38		.35				2.68	3.20	11.26	12.79		17.49	
39		.35				2.68	3.20	11.26	12.79		17.49	
40	11.66	10.52			4.61	7.19	12.25	166.88	105.55		213.11	
41		.35				2.68	3.20	.41	11.26	12.79	17.90	
42		.35				2.68	3.20	11.26	12.79		17.49	
43		.35				2.68	3.20	11.26	12.79		17.49	
44		.35			4.35	2.68	3.20	11.26	12.79		21.84	
45	5.76	.56			.05	2.68	3.20	142.25	12.79		154.50	
46		.35				2.68	3.20	.41	11.26	12.79	17.90	
47		.35				2.68	3.20	11.26	12.79		17.49	
48		.35			4.35	2.68	3.20	2.82	11.26	12.79	24.66	
49		.35				2.68	3.20	11.26	12.79		17.49	
50	11.18	.56			.54	2.68	4.05	125.56	105.55		144.57	
Total	77.70	29.77			58.87	138.51	180.65	14.56	1830.47	1103.30	3433.83	

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Health Club w/Gymnasium

Washington, D.C.

Health Club w/Gymnasium

Gross Square Feet:	40,000
Height in Ft:	24
Exterior:	Clay Brick
Floor coverings:	Finished Conc, Maple, Rubber Tile, Carpet
HVAC:	Single Zone Rooftop Units
Capacity:	N/A
Occupancy:	720
Replacement Cost:	\$8,506,074

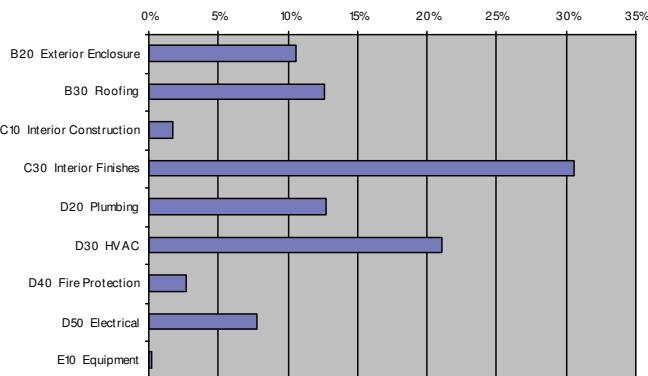
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	8448	Sq Ft
Clay Brick, Exterior, 2nd Floor	8448	Sq Ft
Aluminum Fixed Window, 12 sf, 1st Floor	80	Each
Aluminum Fixed Window, 12 sf, 2nd Floor	84	Each
Aluminum Frame, Fully Glazed, Exterior Door	2	Each
Steel, Painted, Exterior Door	14	Each
B30 Roofing	40000	Sq Ft
Built-up Roof		
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	11	Each
Aluminum, w/ Safety Glass, Plain or Anodized, Interior Door	12	Each
Steel, Painted, Interior Door	30	Each
C30 Interior Finishes		
Ceramic Tile, 4"x4", Interior Wall Finish	2000	Sq Ft
Concrete Block, Painted, Interior Wall Finish	960	Sq Ft
Sheetrock, Unstippled, Interior Wall Finish	27840	Sq Ft
Carpet, Nylon 20 oz., Low Traffic	10000	Sq Ft
Ceramic Tile Flooring	6000	Sq Ft
Concrete, Painted Flooring	2000	Sq Ft
Maple Sports Floor	10000	Sq Ft
Rubber Tile Flooring	12000	Sq Ft
Metal, Painted Ceiling	25000	Sq Ft
Sheetrock, Unstippled Ceiling	15000	Sq Ft
D20 Plumbing		
Drinking Fountain, Vitreous China	6	Each
Lavatory, Vitreous China	13	Each
Service Sink, Iron, Enamel	2	Each
Shower, Ceramic Tile	27	Each
Tankless Water Closet	11	Each
Circulator Pump, 1/6 HP, Cold Water	2	Each
Circulator Pump, 1/2 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	2.2	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	1.3	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	2.9	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	2.2	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	1.3	K Ln Ft
Water Heater, Gas/Oil, 850 Gph	3	Each
Water Storage Tank, 2,500 Gal.	1	Each
Backflow Preventer, 4"	2	Each
Pipe & Fittings, 6" Cast Iron	1.1	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.4	K Ln Ft
Pipe & Fittings, 4" PVC	0.555	K Ln Ft
Roof Drain, 4-6"	12	Each
D30 HVAC		
Pipe & Fittings, 4" Steel, Gas	0.4	K Ln Ft
Duct Insulation, Fiberglass Blanket	9487	Sq Ft
Ductwork	14160	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	8	Each
Air Conditioner, Rooftop, Single Zone, 20 Ton	1	Each
Air Conditioner, Rooftop, Single Zone, 50 Ton	3	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	200	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	10	Each
D50 Electrical		
Distribution Switch, Fused, <600 V	11	Each
Main Switchgear, <1,200 Amp.	1	Each
Secondary Transformer, Dry, 150 kVA	3	Each
Exit Lighting Fixture, w/ Battery	16	Each
Fluorescent Lighting Fixture, 160 w	150	Each
Metal Halide Lighting Fixture, High Bay, 400 w	20	Each
Receptacle, 120 V, 15 Amp.	160	Each
Wiring Device, Switch	40	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	16	Each
Heat Detector	16	Each
Manual Pull Station	16	Each
Smoke Detector	80	Each
E10 Equipment		
Microwave Oven	1	Each
Refrigerator, Domestic	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$1,891,377	\$0.95	0.44%
Unscheduled Maintenance	\$1,647,164	\$0.82	0.39%
Renewal & Replacement	\$5,139,912	\$2.57	1.21%
Total	\$8,678,453	\$4.34	2.04%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, Single Zone, 50 Ton	20.54	11.7%
Screen & Recoat Maple Sports Floor	16.93	9.6%
Place New Membrane Over Existing, Built-up Roof	10.97	6.2%
Repair Air Conditioner, Rooftop, Single Zone, 50 Ton	9.77	5.6%
Replace Membrane, Built-up Roof	9.50	5.4%
Refinish Metal, Painted Ceiling	8.25	4.7%
Refinish Sheetrock, Unstippled, Interior Wall Finish	6.79	3.9%
Replace Water Heater, Gas/Oil, 850 Gph	6.00	3.4%
Refinish Sheetrock, Unstippled Ceiling	4.95	2.8%
Replace Carpet, Nylon 20 oz., Low Traffic	4.53	2.6%
Replace Rubber Tile Flooring	4.48	2.5%
Clean & Reseal Clay Brick, Exterior, 2nd Floor	4.37	2.5%
Maintain Air Conditioner, Rooftop, Single Zone, 50 Ton	3.69	2.1%
Sand & Refinish Maple Sports Floor	3.47	2.0%
Maintain Built-up Roof	3.04	1.7%
Replace Ceramic Tile Flooring	2.95	1.7%
Clean & Reseal Clay Brick, Exterior, 1st Floor	2.90	1.6%
Replace Air Conditioner, Rooftop, Single Zone, 20 Ton	2.84	1.6%
Replace Batteries & Check Operation, Smoke Detector	2.39	1.4%
Replace Maple Sports Floor	2.15	1.2%
Repair Air Conditioner, Rooftop, Single Zone, 20 Ton	2.12	1.2%
Repaint (50% surface) Clay Brick, Exterior, 2nd Floor	1.73	1.0%
Clean & Service Water Heater, Gas/Oil, 850 Gph	1.62	0.9%
Repaint (50% surface) Clay Brick, Exterior, 1st Floor	1.58	0.9%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	1.44	0.8%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	1.40	0.8%
Replace Fluorescent Lighting Fixture, 160 w	1.32	0.7%
Maintain Fire Sprinkler System	1.18	0.7%
Replace Steel, Painted, Interior Door Locks	1.11	0.6%
Test Gages & Valves, Fire Sprinkler System	1.09	0.6%

*Task cost (\$2009) per GSFT over 50 years.

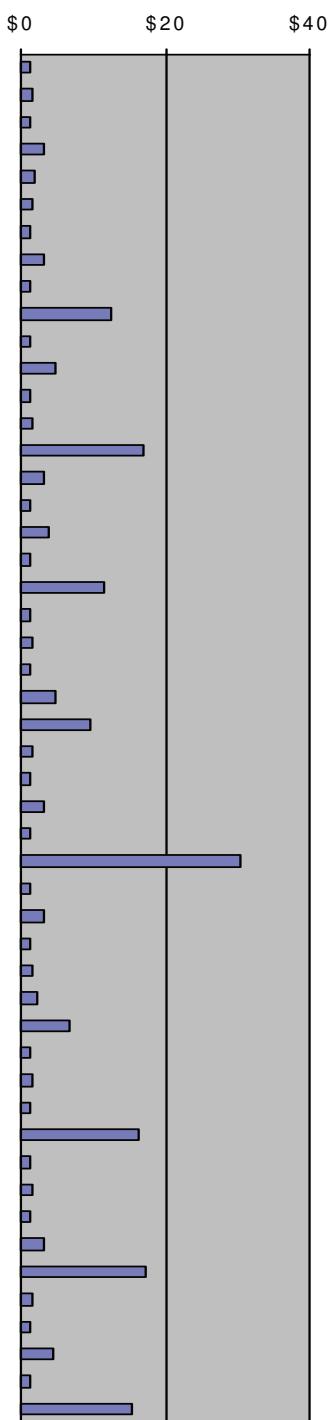
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	Plumbing	HVAC Systems	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13			.54		.11	.19	.07	.14	.01		1.20
2		.13			.54		.44	.19	.07	.14	.01		1.53
3		.13			.54		.11	.19	.07	.17	.01		1.22
4		.13	.02		2.23		.44	.19	.07	.14	.01		3.24
5	.04	.19	.10		.57		.34	.20	.09	.31	.01		1.84
6		.13			.54		.44	.19	.07	.17	.01		1.55
7		.13			.54		.13	.19	.07	.14	.01		1.21
8		.13	.02		2.23		.45	.19	.07	.14	.01		3.24
9		.13			.59		.11	.19	.07	.17	.01		1.27
10	3.67	.19	.41		1.49		1.07	4.16	.37	1.20	.04		12.60
11		.13			.54		.11	.19	.07	.14	.01		1.20
12	.01	.13	.02		2.23		1.77	.20	.14	.17	.01		4.67
13		.13			.54		.11	.19	.07	.14	.01		1.20
14		.13			.54		.46	.19	.07	.14	.01		1.54
15	.10	5.67	.10		2.12		.31	7.89	.16	.68	.01		17.03
16		.13	.02		2.23		.45	.19	.07	.14	.01		3.24
17		.13			.54		.16	.19	.08	.14	.01		1.26
18		.13			2.78		.44	.19	.07	.17	.01		3.79
19		.13			.54		.11	.19	.07	.14	.01		1.20
20	3.77	.19	.64		3.22		1.41	.32	.36	1.56	.04		11.52
21		.13			.54		.13	.19	.07	.17	.01		1.24
22		.13			.54		.49	.19	.08	.14	.01		1.58
23		.13			.54		.11	.19	.07	.14	.01		1.20
24	.01	.13	.02		2.23		1.77	.20	.14	.17	.01		4.67
25	2.01	.19	.10		1.03		1.43	4.16	.08	.51	.01		9.53
26		.13			.54		.44	.19	.07	.14	.01		1.53
27		.13			.59		.11	.19	.07	.17	.01		1.27
28		.13	.02		2.23		.46	.19	.07	.14	.01		3.25
29		.13			.54		.16	.19	.08	.14	.01		1.26
30	3.73	9.50	.41		3.04		1.67	8.82	.44	2.82	.04		30.47
31		.13			.54		.11	.19	.07	.14	.01		1.20
32		.13	.02		2.23		.45	.19	.07	.14	.01		3.24
33		.13			.54		.11	.19	.07	.17	.01		1.22
34		.13			.54		.49	.19	.08	.14	.01		1.58
35	.04	.19	.10		.57		.90	.20	.08	.31	.01		2.40
36	.01	.13	.02		4.47		1.72	.20	.14	.17	.01		6.86
37		.13			.54		.16	.19	.07	.14	.01		1.25
38		.13			.54		.40	.19	.07	.14	.01		1.48
39		.13			.54		.16	.19	.07	.17	.01		1.27
40	3.77	.19	.64		3.96		1.28	4.29	.36	1.77	.04		16.30
41		.13			.54		.20	.19	.08	.14	.01		1.30
42		.13			.54		.41	.19	.07	.17	.01		1.52
43		.13			.54		.16	.19	.07	.14	.01		1.25
44		.13	.02		2.23		.40	.19	.07	.14	.01		3.19
45	.10	5.67	.10		2.17		.52	7.89	.16	.68	.01		17.28
46		.13			.54		.44	.19	.08	.14	.01		1.54
47		.13			.54		.16	.19	.07	.14	.01		1.25
48	.01	.13	.02		2.23		1.72	.20	.14	.17	.01		4.62
49		.13			.54		.17	.19	.07	.14	.01		1.26
50		5.69	.19	.87	4.90		2.01	.20	.47	.99	.04		15.36
Total	22.95	27.33	3.70		66.28		27.76	45.78	5.86	16.87	.43		216.96

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Hospital, General

Washington, D.C.

Hospital, General

Gross Square Feet:	125,000
Height in Ft:	36
Exterior:	Cast Concrete
Floor coverings:	Finished Concrete, Tile, Carpet
HVAC:	Chilled Water, Gas Boiler, Fan Coil Units
Capacity:	N/A
Occupancy:	940
Replacement Cost:	\$47,948,865

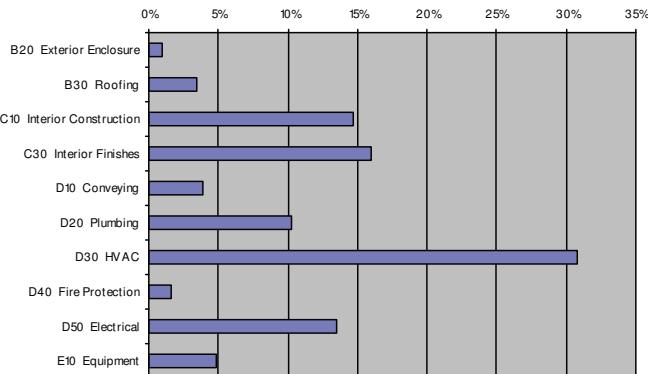
Components (Continued on Page 153)

Uniform / Component	Quantity	Units
B20 Exterior Enclosure		
Concrete, Painted, Exterior, 1st Floor	8840	Sq Ft
Concrete, Painted, Exterior, 2nd Floor	8840	Sq Ft
Concrete, Painted, Exterior, 3rd+ Floor	8840	Sq Ft
Aluminum Fixed Window, 12 sf, 1st Floor	60	Each
Aluminum Fixed Window, 12 sf, 2nd Floor	90	Each
Aluminum Fixed Window, 12 sf, 3rd+ Floor	90	Each
Aluminum Frame, Fully Glazed, Exterior Door	6	Each
Aluminum Frame, Fully Glazed, Sliding Exterior Door	2	Each
Steel, Painted, Exterior Door	8	Each
B30 Roofing		
Built-up Roof	41700	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	18	Each
Aluminum, w/ Safety Glass, Plain or Anodized, Interior Door	8	Each
Steel, Painted, Interior Door	50	Each
Wood, Lead-Lined Medical Interior Door	4	Each
Wood, Solid Core, Painted, Interior Door	1317	Each
C30 Interior Finishes		
Plaster, Interior Wall Finish	188180	Sq Ft
Vinyl, Interior Wall Finish	111120	Sq Ft
Carpet, Nylon 20 oz., Low Traffic	25000	Sq Ft
Ceramic Tile Flooring	31250	Sq Ft
Concrete, Painted Flooring	6250	Sq Ft
Vinyl Tile Flooring	62500	Sq Ft
Acoustical Tile Ceiling	31250	Sq Ft
Plaster Ceiling	93750	Sq Ft
D10 Conveying		
Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	2	Each
D20 Plumbing		
Bathtub, Enameled Steel	5	Each
Drinking Fountain, Refrigerated	6	Each
Flush Tank Water Closet, One Piece	75	Each
Lavatory, Vitreous China	150	Each
Service Sink, Iron, Enamel	6	Each
Shower, Fiberglass	75	Each
Sink, Enameled Steel	70	Each
Sink, Stainless Steel	24	Each
Tankless Water Closet	112	Each
Urinal, Vitreous China	8	Each
Circulator Pump, 2 HP, Cold Water	2	Each
Circulator Pump, 2 HP, Hot Water	2	Each
Pipe & Fittings, 3/4" Copper, Cold Water	16.5	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	10.3	K Ln Ft
Pipe & Fittings, 3/4" Copper, Oxygen	2	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	15.2	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	17	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	11.1	K Ln Ft
Water Heater, Gas/Oil, 275 Gph	1	Each
Water Heater, Gas/Oil, 575 Gph	2	Each
Water Storage Tank, 1,000 Gal.	1	Each
Backflow Preventer, 4"	2	Each
Pipe & Fittings, 6" Cast Iron	6.3	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.5	K Ln Ft
Pipe & Fittings, 4" PVC	0.9	K Ln Ft
Roof Drain, 4-6"	12	Each
D30 HVAC		
Pipe & Fittings, 4" Steel, Gas	6.6	K Ln Ft
Chemical Feed System	1	Each
Circulation Pump, 25 HP, Hot Water	2	Each
Expansion Tank, 100 Gal.	2	Each
Gas Boiler, 2,000 Mbtu	2	Each
Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 200 Ton	2	Each
Circulation Pump, 75 HP, Chiller & Condenser Water	2	Each
Cooling Tower, 200 Ton	2	Each
Exhaust Fan, Ceiling, 200-500 Cfm	6	Each
Fan Coil, Two-Pipe, 400 Cfm	390	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	625	Each
Fire Sprinkler System	1	Each
Fire Suppression System Water Pump, 10 HP	1	Each
Fire Standpipe System	1	Each
Fire Extinguisher	30	Each
Kitchen Fire Suppression System (CO2)	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$7,219,388	\$1.16	0.30%
Unscheduled Maintenance	\$5,611,898	\$0.90	0.23%
Renewal & Replacement	\$20,171,630	\$3.23	0.84%
Total	\$33,002,916	\$5.28	1.38%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Maintain Fan Coil, Two-Pipe, 400 Cfm	19.21	8.8%
Replace Fan Coil, Two-Pipe, 400 Cfm	17.99	8.2%
Refinish Plaster, Interior Wall Finish	14.69	6.7%
Replace Wood, Solid Core, Painted, Interior Door	12.71	5.8%
Replace Wood, Solid Core, Painted, Interior Door Locks	12.47	5.7%
Refinish Plaster Ceiling	9.90	4.5%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	7.21	3.3%
Replace Fluorescent Lighting Fixture, 160 w	6.59	3.0%
Replace Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 200 Ton	6.42	2.9%
Maintain Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	5.42	2.5%
Replace Ceramic Tile Flooring	4.91	2.2%
Replace Batteries & Check Operation, Smoke Detector	4.78	2.2%
Replace Vinyl, Interior Wall Finish	4.43	2.0%
Place New Membrane Over Existing, Built-up Roof	3.66	1.7%
Renovate Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	3.64	1.7%
Replace Carpet, Nylon 20 oz., Low Traffic	3.62	1.7%
Maintain Wood, Solid Core, Painted, Interior Door Locks	3.35	1.5%
Replace Membrane, Built-up Roof	3.17	1.4%
Maintain Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 200 Ton	3.09	1.4%
Repair Fan Coil, Two-Pipe, 400 Cfm	2.97	1.4%
Inspect & Test Gas Boiler, 2,000 Mbh	2.84	1.3%
Refinish Wood, Solid Core, Painted, Interior Door	2.52	1.1%
Replace Vinyl Tile Flooring	2.46	1.1%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	2.35	1.1%
Repair Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 200 Ton	2.28	1.0%
Replace Shower, Fiberglass	1.89	0.9%
Replace Smoke Detector	1.83	0.8%
Replace Walk-In Freezer/Cooler, Commercial	1.60	0.7%
Check Operation, Heat Detector	1.59	0.7%
Replace Cooling Tower, 200 Ton	1.58	0.7%

*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

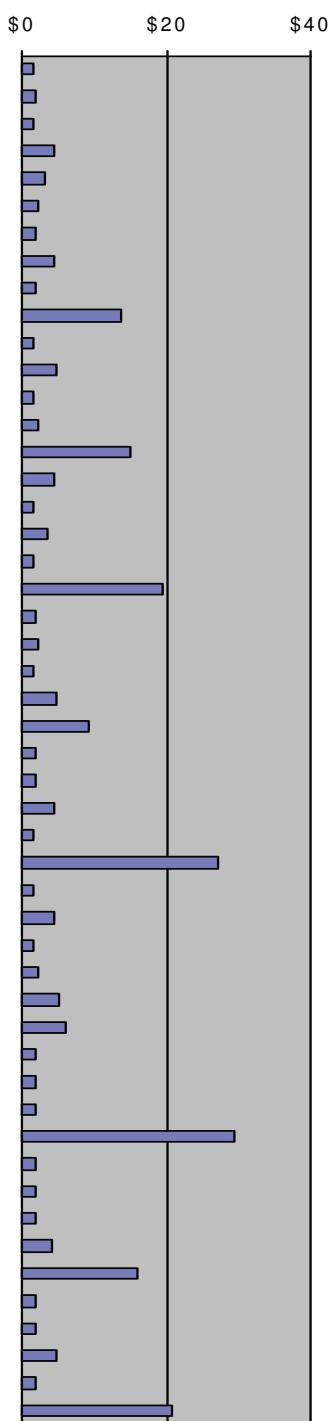
Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1	.04				.14	.04	.98	.04	.27	.19		1.71
2	.04				.14	.39	.98	.04	.27	.19		2.06
3	.04				.14	.04	.98	.04	.31	.19		1.75
4	.04	.24			2.05	.14	.41	.98	.04	.27	.19	4.36
5	.01	.06	1.05		.06	.14	.33	.99	.06	.33	.19	3.22
6	.04					.14	.39	.98	.04	.31	.19	2.10
7	.04					.14	.10	1.05	.04	.27	.19	1.84
8	.04	.24			2.05	.14	.45	.98	.04	.27	.19	4.40
9	.04	.01			.04	.14	.04	.98	.04	.31	.19	1.79
10	.40	.06	4.31		.09	.14	1.30	2.87	.35	3.33	.80	13.67
11	.04					.14	.04	.98	.04	.27	.19	1.71
12	.01	.04	.24		2.05	.14	.76	1.01	.11	.31	.19	4.85
13	.04					.14	.04	.98	.04	.27	.19	1.71
14	.04					.14	.45	1.06	.04	.27	.19	2.19
15	.02	1.89	1.05		2.79	.14	.36	7.40	.11	1.13	.30	15.20
16	.04	.24			2.05	.14	.45	.98	.04	.27	.19	4.40
17	.04					.14	.06	.98	.05	.27	.19	1.73
18	.04	.01			1.24	.14	.39	.98	.04	.45	.19	3.49
19	.04					.14	.04	.98	.04	.27	.19	1.71
20	.44	.06	4.66		2.52	.14	2.33	4.13	.34	4.22	.80	19.65
21	.04					.14	.10	1.05	.04	.31	.19	1.88
22	.04					.14	.41	.98	.05	.27	.19	2.09
23	.04					.14	.04	.98	.04	.27	.19	1.71
24	.01	.04	.24		2.05	.14	.79	1.01	.11	.31	.19	4.89
25	.11	.06	1.05		.25	1.82	2.62	2.12	.05	.90	.19	9.17
26	.04					.14	.39	.98	.04	.27	.19	2.06
27	.04	.01			.04	.14	.04	.98	.04	.31	.19	1.79
28	.04	.24			2.05	.14	.46	1.06	.04	.27	.19	4.49
29	.04					.14	.06	.98	.05	.27	.19	1.73
30	.41	3.17	4.31		2.82	.14	1.24	8.60	.40	5.08	.92	27.10
31	.04					.14	.04	.98	.04	.27	.19	1.71
32	.04	.24			2.05	.14	.45	.98	.04	.27	.19	4.40
33	.04					.14	.04	.98	.04	.31	.19	1.75
34	.04					.14	.41	.98	.05	.27	.19	2.09
35	.01	.06	1.05		.06	.14	2.28	.99	.05	.33	.19	5.16
36	.01	.04	.25		3.29	.14	.53	1.01	.11	.45	.19	6.02
37	.04					.14	.25	1.05	.04	.27	.19	1.99
38	.04					.14	.18	.98	.04	.27	.19	1.85
39	.04					.14	.27	.98	.04	.31	.19	1.97
40	.44	.06	13.25		2.52	.14	1.75	5.24	.34	4.79	.80	29.34
41	.04					.14	.27	.98	.05	.27	.19	1.94
42	.04					.14	.24	.98	.04	.31	.19	1.95
43	.04					.14	.29	.98	.04	.27	.19	1.96
44	.04	.24			2.05	.14	.18	1.06	.04	.27	.19	4.21
45	.02	1.89	1.06		2.83	.14	1.03	7.40	.11	1.13	.30	15.91
46	.04					.14	.20	.98	.05	.27	.19	1.88
47	.04					.14	.27	.98	.04	.27	.19	1.93
48	.01	.04	.24		2.05	.14	.55	1.01	.11	.31	.19	4.64
49	.04					.14	.31	.98	.04	.27	.19	1.97
50	.56	.06	4.41		5.19	1.82	3.04	1.82	.45	2.77	.80	20.93
Total	2.49	9.12	38.65		42.19	10.24	27.21	81.36	4.31	35.67	12.79	264.02

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT



Note: For alternative locations use the Local Indexes shown in Chapter 3.

Hospital, Research

Gross Square Feet:	540,200
Height in Ft:	60
Exterior:	Clay Brick
Floor coverings:	Vinyl Tile, Terrazzo, Carpet
HVAC:	Chilled Water, Gas Boiler, Fan Coil Units
Capacity:	N/A
Occupancy:	4,050
Replacement Cost:	\$173,225,704

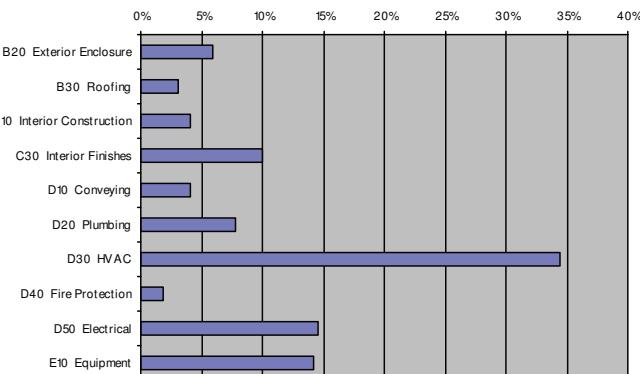
Components (Continued on Page 153)

Uniform / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	94650	Sq Ft
Clay Brick, Exterior, 2nd Floor	31550	Sq Ft
Clay Brick, Exterior, 3rd+ Floor	31550	Sq Ft
Aluminum Fixed Window, 12 sf, 1st Floor	416	Each
Aluminum Fixed Window, 12 sf, 2nd Floor	416	Each
Aluminum Fixed Window, 12 sf, 3rd Floor	1248	Each
Aluminum Frame, Fully Glazed, Exterior Door	45	Each
Steel Single 12x12", Painted, Roll-up Door	12	Each
Steel, Painted, Exterior Door	10	Each
B30 Roofing		
Single-Ply Modified Bituminous/Thermoplastic Roof	129325	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	81	Each
Aluminum, Fully Glazed, Interior Door	265	Each
Steel, Painted, Interior Door	580	Each
Wood, Solid Core, Painted, Interior Door	955	Each
C30 Interior Finishes		
Concrete, Painted, Interior Wall Finish	25400	Sq Ft
Fabric, Interior Wall Finish	6300	Sq Ft
Sheetrock, Unstippled, Interior Wall Finish	884300	Sq Ft
Vinyl, Interior Wall Finish	7600	Sq Ft
Carpet, Nylon 20 oz., Low Traffic	79800	Sq Ft
Ceramic Tile Flooring	14300	Sq Ft
Rubber Tile Flooring	2500	Sq Ft
Terrazzo Flooring	119107	Sq Ft
Vinyl Sheet Flooring	16050	Sq Ft
Vinyl Tile Flooring	225400	Sq Ft
Wood Parquet Flooring	5400	Sq Ft
Acoustical Tile Ceiling	273000	Sq Ft
Concrete, Painted Ceiling	14800	Sq Ft
Sheetrock, Unstippled Ceiling	132650	Sq Ft
D10 Conveying		
Elevator, Geared, 3,000 lbs, 3-5 Floor, 300 fpm	4	Each
Elevator, Hydraulic, 6,000 lbs, 3-5 Floor, 150 fpm	2	Each
Platform Lifter, 5 Ton	1	Each
Wheel Chair Lift	1	Each
Dock Ramp Leveler	5	Each
D20 Plumbing		
Drinking Fountain, Refrigerated	12	Each
Flush Tank Water Closet, One Piece	81	Each
Lavatory, Vitreous China	106	Each
Service Sink, Iron, Enamel	35	Each
Shower, Fiberglass	163	Each
Sink, Enamaled Steel	375	Each
Sink, Stainless Steel	511	Each
Urinal, Vitreous China	21	Each
Booster Pump, 10 HP	1	Each
Circulator Pump, 2 HP, Cold Water	2	Each
Circulator Pump, 2 HP, Hot Water	2	Each
Pipe & Fittings, 3/4" Copper, Cold Water	56	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	39	K Ln Ft
Pipe & Fittings, 3/4" Copper, Oxygen	69	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	50	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	56	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	39	K Ln Ft
Backflow Preventer, 2"	16	Each
Backflow Preventer, 4"	4	Each
Backflow Preventer, 8"	3	Each
Pipe & Fittings, 6" Cast Iron	4	K Ln Ft
Pipe & Fittings, 10" Cast Iron	1	K Ln Ft
Pipe & Fittings, 4" PVC	17	K Ln Ft
Roof Drain, 4-6"	80	Each
Gas Compressor, 7 1/2 HP	1	Each
Reverse Osmosis/Deionized Water System	2	Each
D30 HVAC		
Fuel Oil Pump, 1 1/2 HP	5	Each
Leak Detection, Panel & Float Assembly	2	Each
Oil Storage Tank, 25,000 Gal.	2	Each
Pipe & Fittings, 2" Copper, Fuel Oil	5	K Ln Ft
Pipe & Fittings, 4" Steel, Gas	16.4	K Ln Ft
Boiler Blowoff System	1	Each
Chemical Feed System	4	Each
Circulation Pump, 5 HP, Hot Water	17	Each
Circulation Pump, 7 1/2 HP, Hot Water	4	Each
Circulation Pump, 25 HP, Hot Water	7	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$40,526,970	\$1.50	0.47%
Unscheduled Maintenance	\$33,542,400	\$1.24	0.39%
Renewal & Replacement	\$72,508,016	\$2.68	0.84%
Total	\$146,577,386	\$5.43	1.69%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Maintain Variable Air Volume Control Box	16.39	7.8%
Refinish Sheetrock, Unstippled, Interior Wall Finish	15.98	7.6%
Replace Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 1,000 Ton	9.08	4.3%
Maintain Medical Gas Outlet	8.45	4.0%
Replace Laboratory Exhaust Hood, 4'	5.39	2.6%
Repair Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 1,000 Ton	4.96	2.4%
Replace Air Handler, Single Zone, 100,000 Cfm	4.80	2.3%
Maintain Laboratory Exhaust Hood, 4'	4.49	2.1%
Maintain Power Panel Board, 208 Y/120 V, 200 Amp.	4.08	2.0%
Replace Power Panel Board, 208 Y/120 V, 200 Amp.	3.94	1.9%
Replace Membrane, Single-Ply Modified Bituminous/Thermoplastic Roof	3.82	1.8%
Maintain Humidifier, Steam, Duct w/ Controls	3.27	1.6%
Refinish Sheetrock, Unstippled Ceiling	3.24	1.5%
Maintain Elevator, Hydraulic, 6,000 lbs, 3-5 Floor, 150 fpm	3.18	1.5%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	3.04	1.5%
Maintain Elevator, Geared, 3,000 lbs, 3-5 Floor, 300 fpm	2.92	1.4%
Replace Generator, Diesel, 1,000 kw	2.81	1.3%
Replace Fluorescent Lighting Fixture, 160 w	2.78	1.3%
Replace Carpet, Nylon 20 oz., Low Traffic	2.68	1.3%
Replace Gas Boiler, Steam, 24,000 Lb/hr	2.50	1.2%
Clean & Reseal Clay Brick, Exterior, 1st Floor	2.41	1.1%
Replace Humidifier, Steam, Duct w/ Controls	2.33	1.1%
Replace Cooling Tower, 1,000 Ton	2.22	1.1%
Replace Batteries & Check Operation, Smoke Detector	2.21	1.1%
Replace Medical Gas Outlet	2.16	1.0%
Replace Wood, Solid Core, Painted, Interior Door	2.13	1.0%
Replace Wood, Solid Core, Painted, Interior Door Locks	2.09	1.0%
Repair Single-Ply Modified Bituminous/Thermoplastic Roof	2.09	1.0%
Replace Vinyl Tile Flooring	2.05	1.0%
Replace Air Handler, Single Zone, 50,000 Cfm	2.02	1.0%

*Task cost (\$2009) per GSFT over 50 years.

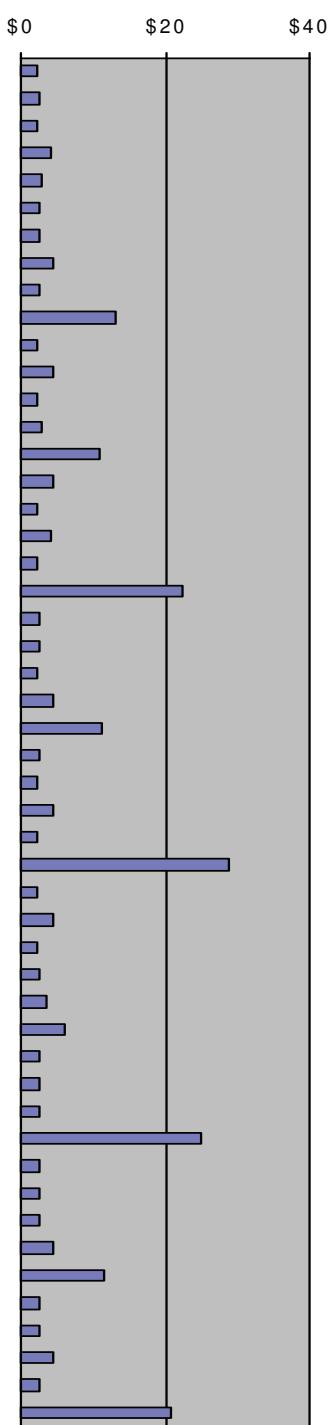
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	Plumbing	HVAC Systems	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT	
1		.05					.17	.06	1.05	.03	.36	.60	2.32	
2		.05					.17	.31	1.05	.03	.36	.60	2.57	
3		.05					.17	.06	1.09	.03	.36	.60	2.36	
4		.05	.06		1.67		.17	.32	1.05	.03	.36	.60	4.31	
5		.01	.08	.32	.02		.17	.19	1.08	.05	.39	.60	2.90	
6		.05					.17	.31	1.10	.03	.36	.60	2.62	
7		.05					.17	.07	1.22	.03	.36	.60	2.50	
8		.05	.06		1.67		.17	.41	1.05	.03	.36	.60	4.41	
9		.05					.05	.17	.06	1.09	.03	.36	.60	2.41
10		2.58	.77	1.30	.06		.17	1.03	3.31	.58	2.20	1.07	13.07	
11		.05					.17	.06	1.05	.03	.36	.60	2.32	
12		.01	.05	.06	1.67		.17	.32	1.07	.14	.36	.60	4.46	
13		.05					.17	.06	1.09	.03	.36	.60	2.36	
14		.05					.17	.33	1.22	.03	.36	.60	2.75	
15		.01	.08	.32	1.01		.17	.25	5.91	.08	.76	2.24	10.83	
16		.05	.06		1.67		.17	.41	1.09	.03	.36	.60	4.45	
17		.05					.17	.06	1.05	.05	.36	.60	2.34	
18		.05					.17	.31	1.06	.03	.75	.60	4.23	
19		.05					.17	.06	1.09	.03	.36	.60	2.36	
20		2.67	1.91	1.48	1.83		.17	1.54	7.80	.56	3.39	1.07	22.43	
21		.05					.17	.07	1.22	.03	.36	.60	2.50	
22		.05					.17	.31	1.05	.05	.36	.60	2.59	
23		.05					.17	.06	1.09	.03	.36	.60	2.37	
24		.01	.05	.06	1.67		.17	.42	1.07	.14	.36	.60	4.55	
25		1.39	.08	.32	.09		1.36	2.52	1.75	.03	2.21	1.33	11.07	
26		.05					.17	.31	1.09	.03	.36	.60	2.61	
27		.05					.05	.17	.06	1.05	.03	.36	.60	2.37
28		.05	.06		1.67		.17	.33	1.22	.03	.36	.60	4.50	
29		.05					.17	.06	1.09	.05	.36	.60	2.38	
30		2.58	.77	1.30	1.06		.17	1.15	11.36	.60	7.16	2.72	28.89	
31		.05					.17	.06	1.05	.03	.36	.60	2.32	
32		.05	.06		1.67		.17	.41	1.05	.03	.36	.60	4.41	
33		.05					.17	.06	1.09	.03	.36	.60	2.37	
34		.05					.17	.31	1.05	.05	.36	.60	2.59	
35		.06	.08	.32	.02		.17	.92	1.08	.03	.39	.60	3.67	
36		.01	.05	.06	2.92		.17	.21	1.11	.14	.75	.60	6.03	
37		.05					.17	.17	1.22	.03	.36	.60	2.59	
38		.05					.17	.21	1.05	.03	.36	.60	2.47	
39		.05					.17	.17	1.09	.03	.36	.60	2.47	
40		2.66	1.91	2.92	1.95		.17	1.76	8.20	.56	3.69	1.07	24.88	
41		.05					.17	.17	1.05	.05	.36	.60	2.45	
42		.05					.17	.22	1.06	.03	.36	.60	2.48	
43		.05					.17	.20	1.09	.03	.36	.60	2.50	
44		.05	.06		1.67		.17	.21	1.22	.03	.36	.60	4.37	
45		.03	.08	.32	1.06		.17	.74	5.92	.08	.76	2.24	11.40	
46		.05					.17	.21	1.09	.05	.36	.60	2.53	
47		.05					.17	.17	1.05	.03	.36	.60	2.43	
48		.01	.05	.06	1.67		.17	.28	1.07	.14	.36	.60	4.41	
49		.05					.17	.18	1.09	.03	.36	.60	2.48	
50		4.01	.77	1.70	.64		1.36	2.98	3.21	.76	3.41	1.80	20.65	
Total	16.06	8.46	10.95		27.06	10.97	21.21	93.39	5.18	39.45	38.61		271.34	

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Jail, County

Gross Square Feet:	318,455
Height in Ft:	173
Exterior:	Concrete
Floor coverings:	Finished Concrete, Vinyl Tile, Carpet
HVAC:	Chilled Water, Gas Boiler, Multizone Air
Capacity:	N/A
Occupancy:	5,730
Replacement Cost:	\$63,427,887

Components (Continued on Page 153)

Uniform / Component	Quantity	Units
B20 Exterior Enclosure		
Concrete, Painted, Exterior, 1st Floor	17900	Sq Ft
Concrete, Painted, Exterior, 2nd Floor	17900	Sq Ft
Concrete, Painted, Exterior, 3rd+ Floor	89200	Sq Ft
Aluminum Fixed Window, 24 sf, 3rd+ Floor	910	Each
Aluminum Frame, Fully Glazed, Exterior Door	4	Each
Steel Single 12'x12', Painted, Roll-up Door	2	Each
Steel, Painted, Exterior Door	36	Each
B30 Roofing		
Built-up Roof	35700	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	69	Each
Steel, Painted, Interior Door	631	Each
Wood, Solid Core, Painted, Interior Door	83	Each
C20 Stairs		
Concrete, Interior Stairs	4800	Sq Ft
Metal, Painted, Interior Railing	1280	Ln Ft
C30 Interior Finishes		
Ceramic Tile, 4"x4", Interior Wall Finish	151280	Sq Ft
Concrete, Painted, Interior Wall Finish	312340	Sq Ft
Sheetrock, Unstipped, Interior Wall Finish	105160	Sq Ft
Carpet, Nylon 20 oz., High Traffic	38280	Sq Ft
Concrete, Painted Flooring	179110	Sq Ft
Vinyl Tile Flooring	82210	Sq Ft
Acoustical Tile Ceiling	114300	Sq Ft
Concrete, Painted Ceiling	104600	Sq Ft
Sheetrock, Unstipped Ceiling	29315	Sq Ft
D10 Conveying		
Elevator, Geared, 3,500 lbs, 6-15 Floor, 350 fpm	7	Each
D20 Plumbing		
Drinking Fountain, Refrigerated	4	Each
Lavatory, Vitreous China	128	Each
Service Sink, Iron, Enamel	33	Each
Shower, Fiberglass	84	Each
Tankless Water Closet	69	Each
Toilet & Wash Basin, Stainless Steel, Detention Fixture	806	Each
Urinal, Vitreous China	13	Each
Booster Pump, 10 HP	3	Each
Circulator Pump, 3 HP, Cold Water	2	Each
Circulator Pump, 3 HP, Hot Water	2	Each
Pipe & Fittings, 3/4" Copper, Cold Water	34	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	8	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	12	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	34	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	8	K Ln Ft
Water Heater, Electric, 1,500 Gal., 1,970 Gph	2	Each
Water Softener, 10 Gal.	1	Each
Water Storage Tank, 500 Gal.	3	Each
Backflow Preventer, 4"	20	Each
Backflow Preventer, 6"	10	Each
Backflow Preventer, 10"	6	Each
Pipe & Fittings, 6" Cast Iron	27	K Ln Ft
Pipe & Fittings, 10" Cast Iron	1	K Ln Ft
Sewage Ejector Pump, 1 HP	2	Each
Pipe & Fittings, 4" PVC	2	K Ln Ft
Roof Drain, 4-6"	17	Each
Sump Pump, 3 HP	2	Each
Compressed Air Dryer	2	Each
Gas Compressor, 7 1/2 HP	2	Each
D30 HVAC		
Fuel Oil Pump, 1 1/2 HP	1	Each
Pipe & Fittings, 4" Steel, Gas	1	K Ln Ft
Chemical Feed System	5	Each
Circulation Pump, 25 HP, Hot Water	2	Each
Expansion Tank, 60 Gal.	3	Each
Gas Boiler, 2,500 Mbh	2	Each
Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 300 Ton	2	Each
Circulation Pump, 7 1/2 HP, Chiller & Condenser Water	4	Each
Circulation Pump, 25 HP, Chiller & Condenser Water	4	Each
Cooling Tower, 300 Ton	2	Each
Air Handler, Multizone, 2,500 Cfm	19	Each
Air Handler, Multizone, 10,000 Cfm	6	Each
Air Handler, Multizone, 15,000 Cfm	2	Each
Duct Insulation, Fiberglass Blanket	48575	Sq Ft
Ductwork	72500	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	12	Each

Note: For alternative locations use the Local Indexes shown in Chapter 3.

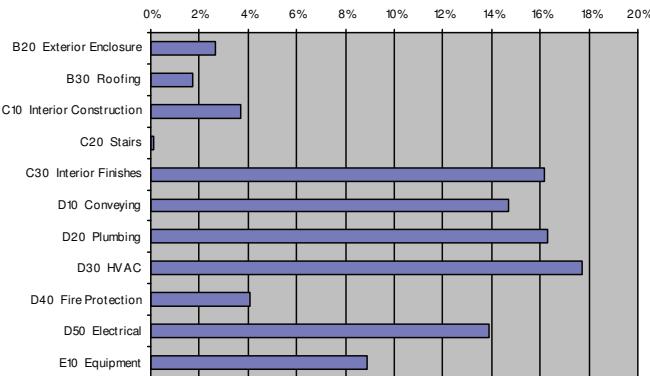
Jail, County

Washington, D.C.

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$21,313,250	\$1.34	0.67%
Unscheduled Maintenance	\$13,504,420	\$0.85	0.43%
Renewal & Replacement	\$43,288,061	\$2.72	1.36%
Total		\$78,105,731	2.46%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Maintain Elevator, Geared, 3,500 lbs, 6-15 Floor, 350 fpm	22.71	11.2%
Refinish Concrete, Painted, Interior Wall Finish	13.54	6.7%
Replace Toilet & Wash Basin, Stainless Steel, Detention Fixture	10.12	5.0%
Renovate Elevator, Geared, 3,500 lbs, 6-15 Floor, 350 fpm	8.11	4.0%
Maintain & Repair Detention Doors & Hardware	7.37	3.6%
Refinish Concrete, Painted Ceiling	6.08	3.0%
Replace Carpet, Nylon 20 oz., High Traffic	5.97	2.9%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	4.78	2.4%
Replace Batteries & Check Operation, Smoke Detector	4.68	2.3%
Refinish Sheetrock, Unstipped, Interior Wall Finish	4.42	2.2%
Replace Fluorescent Lighting Fixture, 160 w	4.37	2.2%
Replace Generator, Diesel, 1,000 kw	4.36	2.1%
Replace Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 300 Ton	4.35	2.1%
Refinish Concrete, Painted, Exterior, 3rd+ Floor	4.17	2.1%
Replace Steel, Painted, Interior Door Locks	4.01	2.0%
Maintain Chemical Feed System	4.00	2.0%
Maintain Air Handler, Multizone, 2,500 Cfm	2.67	1.3%
Refinish Concrete, Painted Flooring	2.56	1.3%
Test Fire Sprinkler Head	2.56	1.3%
Replace Water Heater, Electric, 1,500 Gal., 1,970 Gph	2.31	1.1%
Replace Backflow Preventer, 10"	2.24	1.1%
Replace Air Handler, Multizone, 2,500 Cfm	2.13	1.0%
Replace Air Handler, Multizone, 10,000 Cfm	1.95	1.0%
Repair Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 300 Ton	1.84	0.9%
Replace Smoke Detector	1.79	0.9%
Replace Vinyl Tile Flooring	1.74	0.9%
Replace Backflow Preventer, 4"	1.72	0.8%
Place New Membrane Over Existing, Built-up Roof	1.68	0.8%
Refinish Sheetrock, Unstipped Ceiling	1.67	0.8%
Maintain Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 300 Ton	1.66	0.8%

*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

2. M&R Cost Profiles

Jail, County

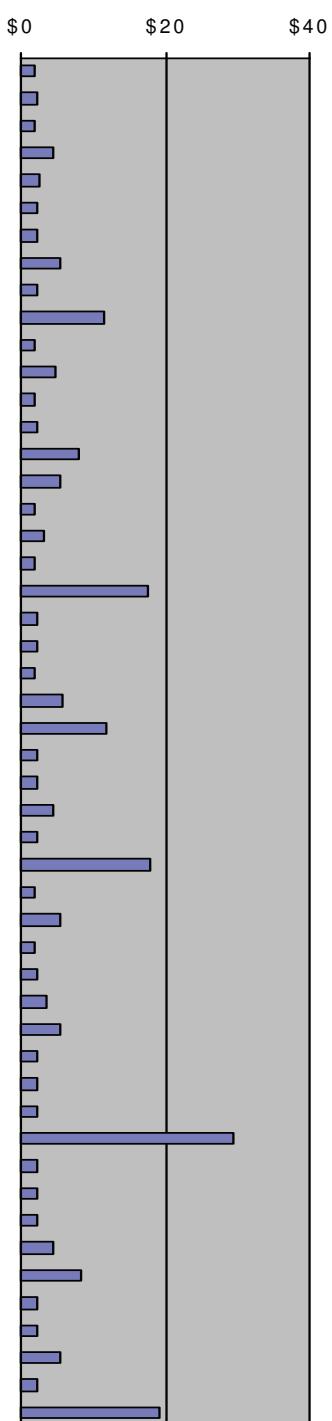
Washington, D.C.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	Plumbing	HVAC Systems	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.02				.58	.22	.51	.07	.27	.39		2.06
2		.02			.02	.58	.34	.51	.07	.27	.39		2.20
3		.02				.58	.22	.51	.07	.27	.39		2.06
4		.02	.07	.00	2.16	.58	.35	.51	.07	.27	.39		4.43
5		.02	.03	.29		.58	.35	.52	.11	.38	.39		2.67
6		.02			.02	.58	.34	.51	.07	.27	.39		2.20
7		.02				.58	.25	.55	.07	.27	.39		2.13
8		.02	.07	.00	3.14	.58	.36	.51	.07	.27	.39		5.41
9		.02				.04	.58	.22	.51	.07	.27		2.10
10		1.12	.03	1.20		.70	.58	1.78	1.60	.96	2.71	.82	11.51
11		.02					.58	.22	.51	.07	.27		2.06
12		.00	.02	.07	.00	2.16	.58	.44	.52	.19	.27	.39	4.65
13		.02					.58	.22	.51	.07	.27		2.06
14		.02					.58	.37	.55	.07	.27		2.27
15		.04	.87	.29	.01	.14	.58	1.16	2.79	.43	1.13	.45	7.89
16		.02	.07	.00	3.14	.58	.36	.51	.07	.27	.39		5.41
17		.02					.58	.22	.51	.09	.27		2.08
18		.02				.92	.58	.34	.51	.07	.27	.39	3.10
19		.02					.58	.22	.51	.07	.27		2.06
20		1.22	.03	1.50	.06	2.87	.58	2.60	3.71	.94	3.19	.82	17.52
21		.02					.58	.25	.55	.07	.27		2.13
22		.02				.02	.58	.34	.51	.09	.27	.39	2.22
23		.02					.58	.22	.51	.07	.27		2.06
24		.00	.02	.07	.00	3.14	.58	.45	.52	.19	.27	.39	5.63
25		.28	.03	.29		.94	4.06	1.85	.85	.09	3.18	.39	11.96
26		.02				.02	.58	.34	.51	.07	.27		2.20
27		.02				.04	.58	.22	.51	.07	.27	.39	2.10
28		.02	.07	.00	2.16	.58	.37	.55	.07	.27	.39		4.49
29		.02					.58	.23	.51	.09	.27		2.09
30		1.15	1.46	1.20	.01	.84	.58	2.54	4.64	1.28	3.27	.88	17.86
31		.02					.58	.22	.51	.07	.27		2.06
32		.02	.07	.00	3.14	.58	.35	.51	.07	.27	.39		5.41
33		.02					.58	.23	.51	.07	.27		2.07
34		.02				.02	.58	.34	.51	.09	.27	.39	2.22
35		.04	.03	.29			.58	1.04	.52	.09	.38	.39	3.36
36		.00	.02	.07	.00	3.06	.58	.36	.52	.19	.27	.39	5.46
37		.02					.58	.31	.55	.07	.27		2.19
38		.02				.02	.58	.26	.51	.07	.27	.39	2.12
39		.02					.58	.30	.51	.07	.27		2.14
40		1.21	.03	1.79	.06	3.85	.58	12.27	4.04	.94	3.84	.82	29.43
41		.02					.58	.31	.51	.09	.27		2.16
42		.02				.02	.58	.29	.51	.07	.27		2.16
43		.02					.58	.31	.51	.07	.27		2.15
44		.02	.07	.00	2.16	.58	.27	.55	.07	.27	.39		4.39
45		.05	.87	.29	.01	.18	.58	1.50	2.79	.43	1.13	.45	8.28
46		.02				.02	.58	.26	.51	.09	.27		2.14
47		.02					.58	.30	.51	.07	.27		2.14
48		.00	.02	.07	.00	3.14	.58	.36	.52	.19	.27	.39	5.54
49		.02					.58	.34	.51	.07	.27		2.17
50		1.40	.03	1.20	.14	1.64	4.06	2.99	1.30	1.27	4.21	.82	19.05
Total		6.53	4.20	9.09	.34	39.72	35.98	40.01	43.49	10.01	34.08	21.82	245.26

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT



Note: For alternative locations use the Local Indexes shown in Chapter 3.

Laboratory, Agricultural

Gross Square Feet:	27,000
Height in Ft:	56
Exterior:	Clay Brick, Concrete
Floor coverings:	Vinyl Sheet, Carpet, Finished Concrete
HVAC:	Chilled Water, Unit Heaters, Fan Coil Units
Capacity:	N/A
Occupancy:	240
Replacement Cost:	\$9,949,841

Components (Continued on Page 154)

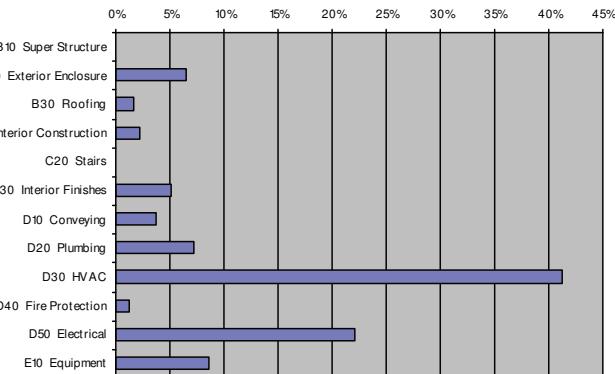
Uniform / Component	Quantity	Units
B10 Super Structure		
Concrete Decking	1370	Sq Ft
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	2210	Sq Ft
Clay Brick, Exterior, 2nd Floor	3850	Sq Ft
Clay Brick, Exterior, 3rd+ Floor	7700	Sq Ft
Concrete, Painted, Exterior, 1st Floor	1640	Sq Ft
Glass Curtain Wall	3000	Sq Ft
Aluminum Single 12"x12", Painted, Roll-up Door	3	Each
Steel, Painted, Exterior Door	3	Each
Wood, Solid Core, Painted, Exterior Door	2	Each
B30 Roofing		
Single-Ply Modified Bituminous/Thermoplastic Roof	6550	Sq Ft
Roof Hatch, Aluminum	2	Each
Single Unit Glass Skylight	200	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	7	Each
Aluminum, Interior Door	6	Each
Steel, Painted, Interior Door	16	Each
Steel, Painted, Interior Double Door	5	Each
Steel, Painted, w/ Safety Glass, Interior Door	10	Each
Wood, Solid Core, Painted, Interior Door	22	Each
Wood, Solid Core w/ Safety Glass, Painted, Interior Door	51	Each
C20 Stairs		
Concrete, Interior Stairs	85	Sq Ft
Metal, Painted, Interior Railing	350	Ln Ft
Metal, Painted, Interior Stairs	910	Sq Ft
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	1475	Sq Ft
Concrete, Painted, Interior Wall Finish	2400	Sq Ft
Gypsum Board, Interior Wall Finish	30700	Sq Ft
Access Flooring, Computer Room Raised	1500	Sq Ft
Carpet, Nylon 20 oz., High Traffic	5200	Sq Ft
Ceramic Tile Flooring	1350	Sq Ft
Concrete, Painted Flooring	5100	Sq Ft
Metal Floor Grating	300	Sq Ft
Rubber Tile Flooring	700	Sq Ft
Vinyl Sheet Flooring	13250	Sq Ft
Acoustical Tile Ceiling	13950	Sq Ft
Concrete Ceiling	4800	Sq Ft
Gypsum Board, Finished Ceiling	5700	Sq Ft
Metal Ceiling	2550	Sq Ft
D10 Conveying		
Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 rpm	1	Each
D20 Plumbing		
Drinking Fountain, Refrigerated	3	Each
Emergency Eye Wash	13	Each
Emergency Shower Station	9	Each
Lavatory, Vitreous China	8	Each
Service Sink, Iron, Enamel	2	Each
Shower, Ceramic Tile	2	Each
Sink, Stainless Steel	7	Each
Tankless Water Closet	7	Each
Urinal, Vitreous China	2	Each
Circulator Pump, 1/2 HP, Cold Water	2	Each
Circulator Pump, 1/2 HP, Cold Water	1	Each
Circulator Pump, 1 HP, Cold Water	1	Each
Circulator Pump, 1 HP, Hot Water	2	Each
Flow Control Valve, Motorized, 2"	4	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.75	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.75	K Ln Ft
Pipe & Fittings, 3/4" Copper, Oxygen	0.85	K Ln Ft
Pipe & Fittings, 1" Copper	0.23	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.35	K Ln Ft
Pipe & Fittings, 2" Copper, Hot Water	0.1	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	1	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.75	K Ln Ft
Valve, Non-Drain, 2"	4	Each
Water Flow Meter, 1"	1	Each
Water Heater, Gas/Oil, 275 Gph	1	Each
Water Softener, 10 Gal.	2	Each
Backflow Preventer, 1"	2	Each
Backflow Preventer, 2"	1	Each
Floor Drain	16	Each
Pipe & Fittings, 3" Cast Iron	0.45	K Ln Ft
Pipe & Fittings, 4" Cast Iron	0.3	K Ln Ft

Note: For alternative locations use the Local Indexes shown in Chapter 3.

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$4,921,276	\$3.65	0.99%
Unscheduled Maintenance	\$3,939,461	\$2.92	0.79%
Renewal & Replacement	\$8,508,985	\$6.30	1.71%
Total	\$17,369,722	\$12.87	3.49%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Main Switchgear, 480 V, 2,000 Amp.	17.47	3.5%
Replace Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 200 Ton	14.87	3.0%
Inspect & Test Gas Boiler, 4,200 Mbh	13.15	2.6%
Maintain Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	12.54	2.5%
Refinish Gypsum Board, Interior Wall Finish	11.10	2.2%
Replace Laboratory Exhaust Hood, 6'	10.54	2.1%
Maintain Direct Digital Controls, System Points	9.43	1.9%
Replace Direct Digital Controls, System Points	8.65	1.7%
Lubricate, Repack Gland, Valve, Non Drain, 2"	8.48	1.7%
Replace Air Handler, Multizone, 40,000 Cfm	8.44	1.7%
Renovate Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	8.43	1.7%
Replace Generator, Diesel, 125 kw	8.33	1.7%
Replace Variable Frequency Drive, <600V	8.22	1.7%
Clean & Reseal Clay Brick, Exterior, 3rd+ Floor	7.85	1.6%
Maintain Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 200 Ton	7.14	1.4%
Replace Carpet, Nylon 20 oz., High Traffic	6.98	1.4%
Maintain Chemical Feed System	6.89	1.4%
Maintain Variable Air Volume Control Box	6.72	1.4%
Replace Camera, Security System	6.42	1.3%
Replace Gas Boiler, 4,200 Mbh	6.38	1.3%
Maintain Exhaust Fan, Roof Mounted, 1,000 Cfm	5.93	1.2%
Maintain Laboratory Exhaust Hood, 6'	5.57	1.1%
Replace Motor Control Center w/ Main Breaker, 480 V, 600 Amp.	5.57	1.1%
Replace Glass Curtain Wall	5.36	1.1%
Replace Vinyl Sheet Flooring	5.36	1.1%
Repair Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 200 Ton	5.29	1.1%
Replace Air Handler, Multizone, 20,000 Cfm	4.96	1.0%
Lubricate, Repack Gland, Valve, Non Drain, 4"	4.74	1.0%
Replace Cooling Tower, 250 Ton	4.47	0.9%
Maintain Vacuum Pump, 10 HP	4.46	0.9%

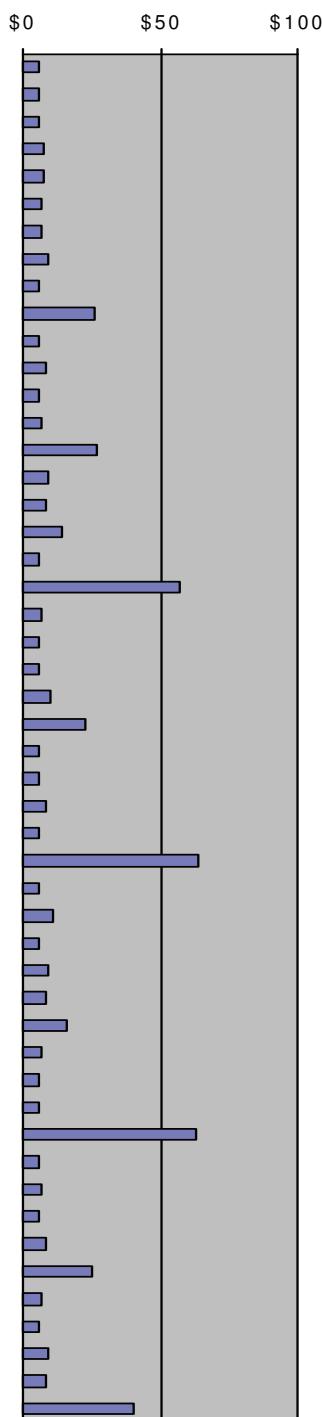
*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT	
1	.07				.32	.52	3.22	.11	1.08	.68		6.00	
2	.07			.02	.32	.62	3.24	.11	1.08	.79		6.25	
3	.07				.32	.62	3.22	.11	1.14	.68		6.15	
4	.07	.09	.04	1.30	.32	.69	3.24	.11	1.08	.79		7.73	
5	.12	.10	.39		.32	.66	3.38	.13	2.14	.70		7.94	
6	.21			.02	.32	.71	3.35	.11	1.14	.79		6.66	
7	.00	.07			.32	.55	3.98	.11	1.08	.68		6.78	
8	.07	.09	.04	2.49	.32	.72	3.24	.11	1.08	.88		9.03	
9	.07				.32	.62	3.22	.11	1.14	.68		6.24	
10	6.16	.80	1.59		.16	.32	1.14	7.91	.50	5.96	1.49	26.04	
11	.07				.32	.52	3.22	.11	1.08	.68		6.00	
12	.21	.09	.04	1.30	.32	1.09	3.41	.21	1.14	.79		8.60	
13	.07				.32	.52	3.22	.11	1.08	.68		6.00	
14	.00	.07			.02	.32	.64	4.00	.11	1.08	.79		7.02
15	.14	.10	.39	.09	.07	.32	2.11	14.47	.23	3.62	5.34	26.90	
16	.07	.09	.04	2.49	.32	.72	3.24	.11	1.08	.68		8.83	
17	.07				.32	.81	5.51	.12	1.08	.79		8.70	
18	.21			2.92	.32	.71	3.35	.11	5.90	.68		14.20	
19	.07				.32	.52	3.22	.11	1.08	.79		6.11	
20	6.16	1.96	1.88	.05	1.51	.32	1.90	20.30	.49	20.12	2.14	56.83	
21	.00	.07				.32	.64	3.98	.11	1.14	.79	7.04	
22	.07			.02	.32	.64	3.24	.12	1.08	.68		6.17	
23	.07				.32	.52	3.22	.11	1.14	.88		6.27	
24	.21	.09	.04	2.49	.32	1.11	3.41	.21	1.14	.68		9.70	
25	2.74	.10	.39		.33	4.21	2.81	4.36	.11	6.65	.97	22.67	
26	.07			.02	.32	.62	3.24	.11	1.08	.68		6.13	
27	.07			.09	.32	.52	3.22	.11	1.14	.79		6.26	
28	.00	.07	.09	.04	1.30	.32	.73	4.00	.11	1.14	.68	8.47	
29	.07				.32	.62	3.22	.12	1.08	.79		6.23	
30	11.44	.95	1.59	.09	.57	.32	2.43	26.31	.60	13.76	5.86	63.92	
31	.07				.32	.62	3.22	.11	1.08	.68		6.09	
32	.07	.09	.04	2.49	.32	.80	5.18	.11	1.08	.79		10.97	
33	.07				.32	.60	3.22	.11	1.20	.68		6.20	
34	.07			.02	.32	1.00	5.53	.12	1.08	.79		8.93	
35	.48	.10	.39		.32	1.12	3.38	.11	2.08	.70		8.68	
36	.21	.09	.04	4.20	.32	.88	3.41	.21	5.90	.79		16.05	
37	.07				.32	.73	3.98	.11	1.08	.68		6.96	
38	.07			.02	.32	.58	3.24	.11	1.08	.88		6.30	
39	.07				.32	.57	3.22	.11	1.14	.68		6.10	
40	6.13	2.24	4.09	.05	3.74	.32	2.20	21.09	.49	20.54	2.41	63.29	
41	.07				.32	.67	3.22	.12	1.14	.68		6.22	
42	.07			.02	.32	.60	3.35	.11	1.14	.79		6.40	
43	.07				.32	.66	3.22	.11	1.08	.68		6.14	
44	.07	.09	.04	1.30	.32	.58	4.00	.11	1.08	.79		8.37	
45	.23	.10	.39	.09	.14	.32	2.13	12.53	.23	3.56	5.34	25.06	
46	.21			.02	.32	.69	3.24	.12	1.14	.68		6.43	
47	.00	.07			.32	.57	3.22	.11	1.08	.79		6.15	
48	.07	.09	.04	2.49	.32	.90	3.41	.21	1.14	.68		9.34	
49	.07				.32	.92	5.16	.11	1.08	.79		8.44	
50	8.69	.87	1.90	.34	1.47	4.21	3.03	7.91	.63	9.79	1.21	40.06	
Total	42.30	10.88	13.93	1.09	33.13	23.71	46.88	264.93	8.40	141.95	55.83	643.04	

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Laboratory, Electronics

Gross Square Feet:	30,200
Height in Ft:	22
Exterior:	Concrete, Steel
Floor coverings:	Vinyl Tile, Finished Concrete
HVAC:	Pkgd DX AC, Chilled Water, Single Zone Air
Capacity:	N/A
Occupancy:	270
Replacement Cost:	\$10,039,947

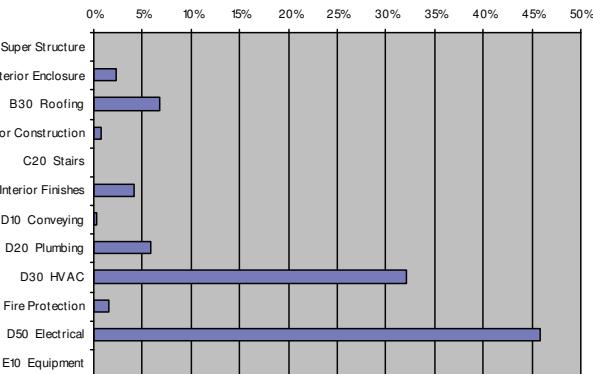
Components (Continued on Page 154)

Uniform / Component	Quantity	Units
B10 Super Structure		
Steel Roof Access Ladder	90	Ln Ft
B20 Exterior Enclosure		
Aluminum Louver, 1st Floor	205	Each
Concrete, Exterior, 1st Floor	6700	Sq Ft
Steel, Painted, Exterior, 1st Floor	5800	Sq Ft
Aluminum Fixed Window, 12 sf, 1st Floor	19	Each
Aluminum Fixed Window, 24 sf, 1st Floor	38	Each
Aluminum Frame, Fully Glazed, Exterior Door	1	Each
Steel Double 12'x24', Painted, Roll-up Door	4	Each
Steel, Painted, Exterior Door	4	Each
Steel, Painted, Exterior Double Door	5	Each
B30 Roofing		
Single-Ply Modified Bituminous/Thermoplastic Roof	30200	Sq Ft
Roof Hatch, Aluminum	1	Each
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	9	Each
Steel, Painted, Interior Door	35	Each
Steel, Painted, Interior Double Door	5	Each
Wood, Solid Core, Painted, Interior Door	3	Each
C20 Stairs		
Metal, Painted, Exterior Railing	50	Ln Ft
Metal, Exterior Stairs	75	Sq Ft
C30 Interior Finishes		
Gypsum Board, Interior Wall Finish	35900	Sq Ft
Access Flooring w/ Laminate, Raised	1215	Sq Ft
Carpet, Nylon 20 oz., High Traffic	2200	Sq Ft
Concrete, Painted Flooring	7320	Sq Ft
Quarry Tile Flooring	1840	Sq Ft
Vinyl Sheet Flooring	2460	Sq Ft
Vinyl Tile Flooring	15165	Sq Ft
Acoustical Tile, Dropped Ceiling	28415	Sq Ft
Gypsum Board, Finished Ceiling	1785	Sq Ft
D10 Conveying		
Hoist Electric, Overhead, Chain, 3 Ton	2	Each
D20 Plumbing		
Drinking Fountain, Refrigerated	2	Each
Emergency Eye Wash	14	Each
Emergency Shower Station	3	Each
Lavatory, Vitreous China	8	Each
Service Sink, Iron, Enamel	1	Each
Sink, Stainless Steel	15	Each
Urinal, Vitreous China	2	Each
Circulator Pump, 1/6 HP, Cold Water	2	Each
Circulator Pump, 1/6 HP, Hot Water	2	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.16	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.16	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.1	K Ln Ft
Water Storage Tank, 150 Gal.	0.26	K Ln Ft
Water Storage Tank, 1,000 Gal.	2	Each
Backflow Preventer, 2"	2	Each
Backflow Preventer, 4"	3	Each
Floor Drain	1	Each
Pipe & Fittings, 3" Cast Iron	36	Each
Pipe & Fittings, 4" Cast Iron	0.4	K Ln Ft
Pipe & Fittings, 4" PVC	0.25	K Ln Ft
Roof Drain, 4"	0.384	K Ln Ft
Sump Pump, 1/2 HP	14	Each
Air Compressor, 2 HP	2	Each
Air Compressor, 2 HP	1	Each
D30 HVAC		
Fluid Storage Tank, 5,000 Gal.	1	Each
Valve, Non-Drain, 4"	2	Each
Check Valve, 3-4"	1	Each
Circulation Pump, 5 HP, Chiller & Condenser Water	1	Each
Circulation Pump, 75 HP, Chiller & Condenser Water	2	Each
Condenser, Air Cooled, 7 1/2 Ton	1	Each
Pipe & Fittings, 2" Steel	1.34	K Ln Ft
Air Handler, Single Zone, 1,300 Cfm	7	Each
Air Handler, Single Zone, 10,000 Cfm	2	Each
Air Handler, Single Zone, 20,000 Cfm	1	Each
Air Handler, Single Zone, 100,000 Cfm	1	Each
Duct Insulation, Fiberglass Blanket	53620	Sq Ft
Ductwork	35925	Lbs
Exhaust Fan, Centrifugal, 25,000 Cfm	2	Each
Exhaust Fan, Propeller, 4,700 Cfm	10	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$4,528,497	\$3.00	0.90%
Unscheduled Maintenance	\$3,591,017	\$2.38	0.72%
Renewal & Replacement	\$7,905,366	\$5.24	1.57%
Total	\$16,024,880	\$10.61	3.19%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Maintain Circuit Breaker, 240 V, 15-60 Amp., 3 Ph.	44.40	10.8%
Repair Circuit Breaker, 240 V, 15-60 Amp., 3 Ph.	30.94	7.5%
Maintain Direct Digital Controls, System Points	25.75	6.3%
Replace Direct Digital Controls, System Points	23.63	5.7%
Replace Air Handler, Single Zone, 100,000 Cfm	17.16	4.2%
Replace Membrane, Single-Ply Modified Bituminous/Thermoplastic Roof	15.96	3.9%
Replace Circuit Breaker, Main, 240 V, 15-60 Amp., 3 Ph.	13.51	3.3%
Refinish Gypsum Board, Interior Wall Finish	11.60	2.8%
Replace Generator, Diesel, 500 kw	11.17	2.7%
Repair Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	8.97	2.2%
Repair Single-Ply Modified Bituminous/Thermoplastic Roof	8.72	2.1%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 80 w	6.60	1.6%
Replace Fluorescent Lighting Fixture, 80 w	6.18	1.5%
Maintain Air Handler, Single Zone, 1,300 Cfm	5.97	1.5%
Maintain Single-Ply Modified Bituminous/Thermoplastic Roof	5.45	1.3%
Replace Circulation Pump, 75 HP, Chiller & Condenser Water	5.38	1.3%
Replace Card Reader	4.76	1.2%
Maintain Public Address Speaker	4.60	1.1%
Maintain Power Panel Board, 208 Y/120 V, 100 Amp.	4.56	1.1%
Replace Receptacle, 120 V, 20 Amp.	4.48	1.1%
Replace Air Handler, Single Zone, 10,000 Cfm	4.40	1.1%
Maintain Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	4.33	1.1%
Replace Air Handler, Single Zone, 1,300 Cfm	4.29	1.0%
Replace Bus Duct & Fittings, AL, 800-4,000 Amp.	4.24	1.0%
Replace Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	4.22	1.0%
Replace Air Handler, Single Zone, 20,000 Cfm	3.82	0.9%
Replace Circuit Breaker, Main, MV, 600 V, 1,600 Amp.	3.51	0.9%
Maintain Air Handler, Single Zone, 10,000 Cfm	3.33	0.8%
Maintain Card Reader	3.22	0.8%
Replace Power Panel Board, 208 Y/120 V, 100 Amp.	3.04	0.7%

*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

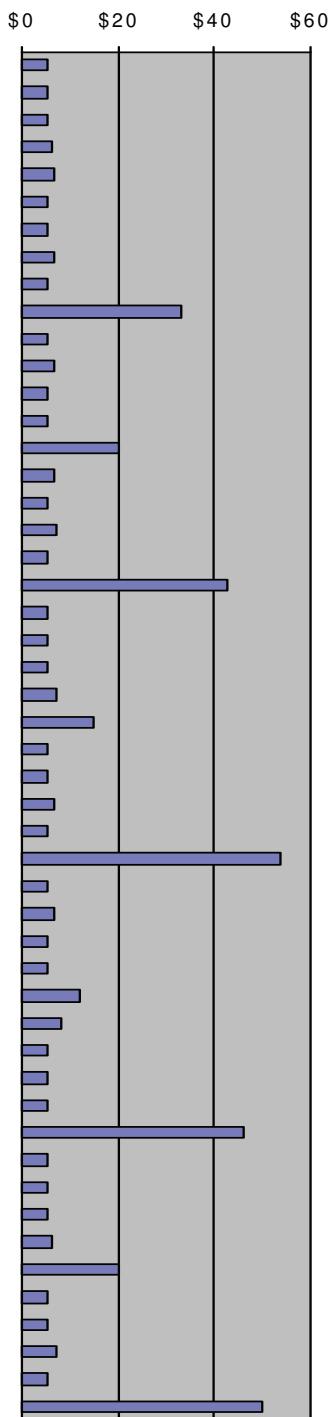
Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT		
1	.21				.01	.43	1.81	.10	2.71	.01		5.27		
2	.21				.01	.01	.52	1.81	.10	2.71	.01	5.38		
3	.21					.01	.49	1.81	.10	2.71	.01	5.34		
4	.21	.04			1.04	.01	.55	1.81	.10	2.71	.01	6.48		
5	.03	.34			.14		.01	.48	1.85	.12	3.53	.01	6.50	
6	.21				.01	.01	.59	1.81	.10	2.71	.01	5.44		
7	.21					.01	.45	1.81	.10	2.71	.01	5.29		
8	.21	.04			1.47	.01	.59	1.81	.10	2.71	.01	6.95		
9	.21				.09	.01	.49	1.81	.10	2.71	.01	5.42		
10	2.18	3.25	.56	.00	.00	.17	.01	.93	10.08	.55	15.31	.05	33.09	
11	.21						.01	.43	1.81	.10	2.71	.01	5.27	
12	.01	.21	.04		1.04	.01	.62	1.82	.19	2.71	.01	6.66		
13	.21						.01	.43	1.81	.10	2.71	.01	5.27	
14	.21					.01	.01	.54	1.81	.10	2.71	.01	5.40	
15	.11	.34	.14	.12	.09	.01	.54	13.43	.21	5.05	.01	20.04		
16	.21	.04			1.47	.01	.59	1.81	.10	2.71	.01	6.95		
17	.21						.01	.43	1.81	.11	2.71	.01	5.29	
18	.21				1.74	.01	.59	1.81	.10	2.71	.01	7.17		
19	.21						.01	.43	1.81	.10	2.71	.01	5.27	
20	2.23	7.99	.82	.00	1.28	.01	1.53	9.64	.53	18.51	.05	42.60		
21	.21						.01	.51	1.81	.10	2.71	.01	5.36	
22	.21				.01	.01	.52	1.81	.11	2.71	.01	5.39		
23	.21						.01	.43	1.81	.10	2.71	.01	5.27	
24	.01	.21	.04		1.47	.01	.66	1.82	.19	2.71	.01	7.13		
25	.24	.34	.14		.01	.31	1.26	2.93	.11	9.41	.01	14.73		
26	.21						.01	.01	.52	1.81	.10	2.71	.01	5.38
27	.21				.09	.01	.43	1.81	.10	2.71	.01	5.36		
28	.21	.04		1.04	.01	.01	.61	1.81	.10	2.71	.01	6.54		
29	.21						.01	.45	1.81	.11	2.71	.01	5.31	
30	2.26	3.25	.56	.18	.26	.01	1.01	24.90	.63	20.53	.05	53.65		
31	.21						.01	.49	1.81	.10	2.71	.01	5.34	
32	.21	.04		1.47	.01	.56	1.81	.10	2.71	.01		6.92		
33	.21						.01	.45	1.81	.10	2.71	.01	5.30	
34	.21				.01	.01	.59	1.81	.11	2.71	.01	5.46		
35	.66	.34	.14				.01	.70	1.85	.11	8.06	.01	11.86	
36	.01	.21	.04	2.77	.01	.50	1.82	.19	2.71	.01		8.27		
37	.21						.01	.55	1.81	.10	2.71	.01	5.40	
38	.21				.01	.01	.49	1.81	.10	2.71	.01	5.35		
39	.21						.01	.46	1.81	.10	2.71	.01	5.31	
40	2.10	7.99	.90	.00	2.72	.01	2.13	10.71	.53	18.90	.05	46.06		
41	.21						.01	.49	1.81	.11	2.71	.01	5.35	
42	.21				.01	.01	.51	1.81	.10	2.71	.01		5.37	
43	.21						.01	.53	1.81	.10	2.71	.01	5.37	
44	.21	.04		1.04	.01	.01	.49	1.81	.10	2.71	.01		6.42	
45	.23	.34	.14	.12	.16	.01	.60	13.43	.21	5.05	.01	20.28		
46	.21				.01	.01	.55	1.81	.11	2.71	.01		5.42	
47	.21						.01	.46	1.81	.10	2.71	.01	5.31	
48	.01	.21	.04		1.47	.01	.53	1.82	.19	2.71	.01		7.00	
49	.21						.01	.57	1.81	.10	2.71	.01	5.42	
50	2.29	3.27	.56	.43	1.53	.31	1.62	9.01	.70	30.11	.05	49.89		
Total	12.36	35.80	4.49	.86	22.50	1.33	31.31	170.08	8.15	242.82	.58	530.27		

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT



Note: For alternative locations use the Local Indexes shown in Chapter 3.

Laboratory, General

Gross Square Feet:	56,000
Height in Ft:	25
Exterior:	Clay Brick
Floor coverings:	Carpet, Ceramic Tile, Finished Concrete
HVAC:	Chilled Water, Heat Exch., Single Zone
Capacity:	N/A
Occupancy:	500
Replacement Cost:	\$18,450,880

Components (Continued on Page 155)

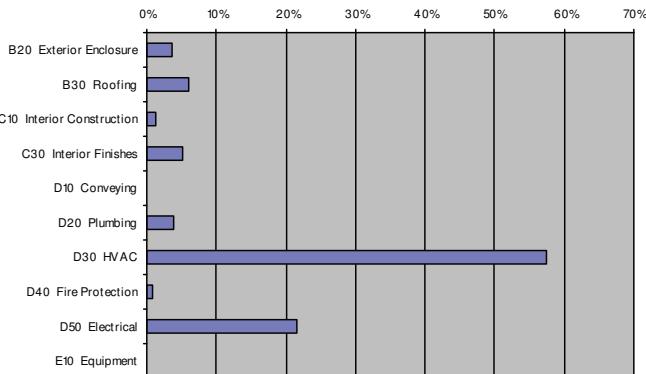
Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Aluminum Louver, 1st Floor	5	Each
Clay Brick, Exterior, 1st Floor	11000	Sq Ft
Concrete Block, Exterior, 1st Floor	12800	Sq Ft
Steel Single 12"x12", Painted, Roll-up Door	1	Each
Steel, Painted, Exterior Door	7	Each
B30 Roofing		
Single-Ply Thermoset Roof	56000	Sq Ft
C10 Interior Construction		
Movable Partitions, Office, Fabric, 6'	100	Ln Ft
Toilet Partitions, Painted Metal, Overhead Braced	16	Each
Steel, Painted, Interior Door	114	Each
C30 Interior Finishes		
Ceramic Tile, 4"x4", Interior Wall Finish	2500	Sq Ft
Gypsum Board, Interior Wall Finish	42700	Sq Ft
Carpet, Nylon 20 oz., High Traffic	13800	Sq Ft
Ceramic Tile Flooring	17000	Sq Ft
Concrete, Painted Flooring	25200	Sq Ft
Acoustical Tile, Dropped Ceiling	54400	Sq Ft
Gypsum Board, Finished Ceiling	1600	Sq Ft
D10 Conveying		
Hoist Electric, Overhead, Chain, 3 Ton	1	Each
D20 Plumbing		
Drinking Fountain, Refrigerated	2	Each
Lavatory, Vitreous China	27	Each
Service Sink, Iron, Enamel	2	Each
Sink, Stainless Steel	2	Each
Tankless Water Closet	16	Each
Urinal, Vitreous China	9	Each
Circulator Pump, 1 HP, Cold Water	2	Each
Circulator Pump, 3 HP, Cold Water	3	Each
Circulator Pump, 1/2 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	1.7	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.88	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.8	K Ln Ft
Pipe & Fittings, 4" Copper, Cold Water	0.4	K Ln Ft
Pipe & Fittings, 4" Steel	1.5	K Ln Ft
Pipe & Fittings, 12" Steel	1.3	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	4	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	1.2	K Ln Ft
Water Heater, Gas/Oil, 275 Gph	1	Each
Backflow Preventer, 4"	2	Each
Floor Drain	4	Each
Pipe & Fittings, 4" Cast Iron	1.6	K Ln Ft
Pipe & Fittings, 6" Cast Iron	1.3	K Ln Ft
Pipe & Fittings, 4" PVC	0.777	K Ln Ft
Roof Drain, 4-6"	16	Each
Sump Pump, 1/2 HP	2	Each
Air Compressor, 25 HP	2	Each
Compressed Air Dryer	2	Each
Gas Compressor, 7 1/2 HP	2	Each
D30 HVAC		
Chemical Feed System	1	Each
Condensate Receiver Station, 10-15 Gal.	1	Each
Expansion Tank, 100 Gal.	2	Each
Expansion Tank, 400 Gal.	1	Each
Heat Exchanger, Steam-to-Water, 40 Gpm	1	Each
Steam Trap, F&T, 2"	6	Each
Valve, Non-Drain, 2"	430	Each
Valve, Non-Drain, 4"	50	Each
Chiller, Reciprocal Water-Cooled Hermetic, 100 Ton	1	Each
Circulation Pump, 5 HP, Chiller & Condenser Water	4	Each
Circulation Pump, 25 HP, Chiller & Condenser Water	2	Each
Cooling Tower, 100 Ton	2	Each
Evaporative Cooler, Indirect, 2,000 Scfm	12	Each
Evaporative Cooler, Indirect, 5,000 Scfm	1	Each
Pipe & Fittings, 2" Copper	0.5	K Ln Ft
Pipe & Fittings, 2" Steel	1.6	K Ln Ft
Pipe & Fittings, 3" Steel	1.8	K Ln Ft
Pipe & Fittings, 6" Steel	1.3	K Ln Ft
Pipe & Fittings, 8" Steel	0.3	K Ln Ft
Air Handler, Single Zone, 6,500 Cfm	2	Each
Air Handler, Single Zone, 10,000 Cfm	25	Each
Duct Insulation, Fiberglass Blanket	18200	Sq Ft
Ductwork	26000	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	6	Each

Note: For alternative locations use the Local Indexes shown in Chapter 3.

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$8,447,563	\$3.02	0.92%
Unscheduled Maintenance	\$6,243,754	\$2.23	0.68%
Renewal & Replacement	\$12,811,543	\$4.58	1.39%
Total	\$27,502,860	\$9.82	2.98%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Lubricate, Repack Gland, Valve, Non Drain, 2"	58.58	15.4%
Replace MV Switchgear, >1,200 Amp.	44.71	11.8%
Replace Air Handler, Single Zone, 10,000 Cfm	29.66	7.8%
Maintain Air Handler, Single Zone, 10,000 Cfm	22.44	5.9%
Replace Membrane, Single-Ply Thermoset Roof	18.57	4.9%
Replace Valve, Non-Drain, 2"	16.16	4.3%
Replace Carpet, Nylon 20 oz., High Traffic	8.93	2.4%
Refinish Gypsum Board, Interior Wall Finish	7.44	2.0%
Lubricate, Repack Gland, Valve, Non Drain, 4"	6.35	1.7%
Maintain Power Panel Board, 208 Y/120 V, 200 Amp.	6.15	1.6%
Replace Ceramic Tile Flooring	5.96	1.6%
Replace Power Panel Board, 208 Y/120 V, 200 Amp.	5.94	1.6%
Maintain Evaporative Cooler, Indirect, 2,000 Scfm	5.88	1.5%
Replace Evaporative Cooler, Indirect, 2,000 Scfm	5.42	1.4%
Maintain Single-Ply Thermoset Roof	5.13	1.4%
Maintain Direct Digital Controls, System Points	5.11	1.3%
Replace Circuit Breaker, Main, MV, 600 V, 1,600 Amp.	4.73	1.2%
Replace Direct Digital Controls, System Points	4.69	1.2%
Replace Transfer Switch, HV, Auto, 600 V	4.02	1.1%
Replace Valve, Non-Drain, 4"	3.59	0.9%
Maintain Chemical Feed System	3.32	0.9%
Clean & Seal Concrete Block, Exterior, 1st Floor	3.13	0.8%
Replace Chiller, Reciprocal Water-Cooled Hermetic, 100 Ton	3.07	0.8%
Replace Steel, Painted, Interior Door Locks	3.01	0.8%
Clean & Reseal Clay Brick, Exterior, 1st Floor	2.70	0.7%
Repair Air Handler, Single Zone, 10,000 Cfm	2.67	0.7%
Maintain Cooling Tower, 100 Ton	2.44	0.6%
Replace Batteries & Check Operation, Smoke Detector	2.13	0.6%
Replace Cooling Tower, 100 Ton	2.05	0.5%
Maintain Chiller, Reciprocal Water-Cooled Hermetic, 100 Ton	1.97	0.5%

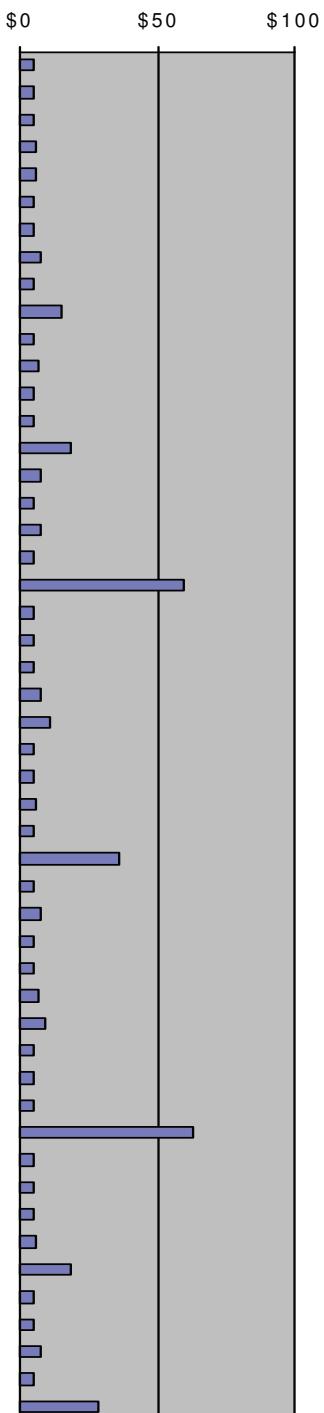
*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT	
1	.19				.00	.15	4.10	.05	.58	.00		5.08	
2	.19				.03	.00	.22	4.10	.05	.61	.00	5.21	
3	.19					.00	.15	4.15	.05	.58	.00	5.14	
4	.19	.05			.68	.00	.28	4.10	.05	.61	.00	5.97	
5	.01	.32	.19			.00	.23	4.15	.07	.75	.00	5.74	
6	.19				.03	.00	.22	4.15	.05	.61	.00	5.26	
7	.19					.00	.19	4.11	.05	.58	.00	5.13	
8	.19	.05			2.14	.00	.29	4.10	.05	.61	.00	7.44	
9	.19					.06	.00	.15	4.15	.05	.58	.00	5.19
10	2.85	.51	.80		.34	.00	.59	7.20	.25	2.32	.03	14.88	
11	.19					.00	.15	4.10	.05	.58	.00	5.08	
12	.19	.05			.68	.00	.49	4.14	.15	.61	.00	6.33	
13	.19					.00	.15	4.14	.05	.58	.00	5.13	
14	.19					.03	.00	.26	4.11	.05	.61	.00	5.26
15	.03	.32	.19		.20	.00	.35	15.94	.11	1.09	.00	18.24	
16	.19	.05			2.14	.00	.29	4.14	.05	.61	.00	7.48	
17	.19					.00	.16	4.10	.07	.58	.00	5.11	
18	.19					.08	.00	.22	4.11	.05	3.18	.00	7.84
19	.19					.00	.15	4.14	.05	.58	.00	5.13	
20	2.85	9.29	1.06		1.04	.00	1.36	18.69	.24	25.29	.03	59.85	
21	.19					.00	.19	4.12	.05	.58	.00	5.14	
22	.19					.03	.00	.23	4.10	.07	.61	.00	5.23
23	.19					.00	.15	4.14	.05	.61	.00	5.15	
24	.19	.05			2.14	.00	.49	4.14	.15	.61	.00	7.79	
25	1.61	.32	.23		.00	.08	1.88	5.70	.06	.94	.00	10.83	
26	.19					.03	.00	.22	4.14	.05	.61	.00	5.25
27	.19					.06	.00	.15	4.11	.05	.58	.00	5.15
28	.19	.05			.68	.00	.26	4.11	.05	.64	.00	5.99	
29	.19					.00	.23	4.14	.07	.58	.00	5.22	
30	2.87	.51	.80		.54	.00	.73	18.91	.29	11.63	.03	36.30	
31	.19					.00	.15	4.10	.05	.58	.00	5.08	
32	.19	.05			2.14	.00	.22	4.10	.05	.61	.00	7.38	
33	.19					.00	.21	4.15	.05	.61	.00	5.22	
34	.19					.03	.00	.23	4.10	.07	.61	.00	5.23
35	.05	.32	.19			.00	.80	4.16	.06	.73	.00	6.32	
36	.19	.05			.74	.00	.36	4.18	.15	3.17	.00	8.86	
37	.19					.00	.27	4.11	.05	.58	.00	5.22	
38	.19					.03	.00	.16	4.10	.05	.61	.00	5.15
39	.19					.00	.21	4.15	.05	.58	.00	5.19	
40	2.83	9.29	1.06		2.50	.00	1.28	20.07	.24	25.51	.03	62.80	
41	.19					.00	.28	4.10	.07	.61	.00	5.26	
42	.19					.03	.00	.20	4.11	.05	.61	.00	5.20
43	.19					.00	.21	4.14	.05	.58	.00	5.19	
44	.19	.05			.68	.00	.16	4.11	.05	.61	.00	5.86	
45	.05	.32	.19		.25	.00	.59	15.95	.11	1.06	.00	18.54	
46	.19				.03	.00	.17	4.14	.07	.64	.00	5.25	
47	.19					.00	.21	4.10	.05	.58	.00	5.14	
48	.19	.05			2.14	.00	.37	4.14	.15	.61	.00	7.66	
49	.19					.00	.31	4.14	.05	.58	.00	5.29	
50	4.43	.51	.83		6.31	.08	1.99	6.27	.31	7.99	.03	28.75	
Total	17.58	29.47	6.06		25.80	.36	18.90	281.88	4.31	106.44	.31	491.12	

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Laboratory, Life Science

Gross Square Feet:	27,400
Height in Ft:	15
Exterior:	Clay Brick
Floor coverings:	Vinyl Tile, Concrete, Ceramic Tile
HVAC:	Single Zone Air, Heat Exch.
Capacity:	N/A
Occupancy:	245
Replacement Cost:	\$10,732,918

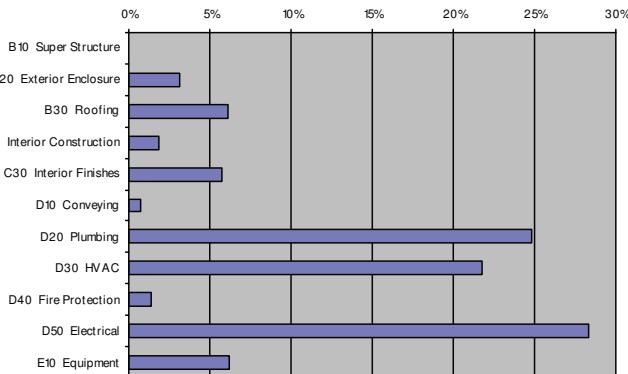
Components (Continued on Page 155)

Uniform / Component	Quantity	Units
B10 Super Structure		
Steel Roof Access Ladder	15	Ln Ft
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	7800	Sq Ft
Aluminum Fixed Window, 12 sf, 1st Floor	31	Each
Glass Curtain Wall	2130	Sq Ft
Aluminum Double 12"x24", Painted, Roll-up Door	2	Each
Aluminum Frame, Fully Glazed, Exterior Door	2	Each
Steel, Exterior Door	8	Each
B30 Roofing		
Single-Ply Modified Bituminous/Thermoplastic Roof	27400	Sq Ft
Roof Hatch, Aluminum	1	Each
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	6	Each
Wood, Solid Core, Painted, Interior Door	38	Each
Wood, Solid Core w/ Safety Glass, Painted, Interior Door	45	Each
C30 Interior Finishes		
Ceramic Tile, 4"x4", Interior Wall Finish	1600	Sq Ft
Concrete Block, Painted, Interior Wall Finish	5500	Sq Ft
Gypsum Board, Interior Wall Finish	22500	Sq Ft
Carpet, Nylon 20 oz., High Traffic	9085	Sq Ft
Ceramic Tile Flooring	1600	Sq Ft
Concrete Flooring	2890	Sq Ft
Metal Floor Grating	3325	Sq Ft
Vinyl Tile Flooring	10500	Sq Ft
Acoustical Tile, Dropped Ceiling	24100	Sq Ft
Gypsum Board, Finished Ceiling	3300	Sq Ft
D10 Conveying		
Platform Lifter, 5 Ton	1	Each
D20 Plumbing		
Drinking Fountain, Refrigerated	2	Each
Emergency Eye Wash	5	Each
Emergency Shower Station	5	Each
Flush Tank Water Closet, One Piece	6	Each
Lavatory, Vitreous China	8	Each
Service Sink, Iron, Enamel	4	Each
Urinal, Vitreous China	4	Each
Circulator Pump, 1/6 HP, Cold Water	1	Each
Circulator Pump, 1 HP, Cold Water	1	Each
Circulator Pump, 1/6 HP, Hot Water	2	Each
Circulator Pump, 1 HP, Hot Water	2	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.18	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.18	K Ln Ft
Pipe & Fittings, 1" Copper	0.18	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.11	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.65	K Ln Ft
Pipe Insulation, Fiberglass, Heating Water/Steam	0.38	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.18	K Ln Ft
Valve, Non-Drain, 2"	110	Each
Valve, Non-Drain, 4"	45	Each
Water Heater, Gas/Oil, 275 Gph	1	Each
Backflow Preventer, 2"	1	Each
Floor Drain	16	Each
Pipe & Fittings, 4" Cast Iron	0.36	K Ln Ft
Pipe & Fittings, 6" Cast Iron	0.5	K Ln Ft
Pipe & Fittings, 4" PVC	0.238	K Ln Ft
Roof Drain, 4-6"	8	Each
Air Compressor, 2 HP	1	Each
Compressed Air Dryer	1	Each
D30 HVAC		
Leak Detection, Panel & Float Assembly	1	Each
Ball Valve, 2"	9	Each
Heat Exchanger, Steam-to-Water, 40 Gpm	1	Each
Heat Exchanger, Steam-to-Water, 130 Gpm	1	Each
Steam Trap, F&T, 2"	10	Each
Chiller, Reciprocal Air-Cooled Hermetic, 100 Ton	2	Each
Circulation Pump, 7 1/2 HP, Chiller & Condenser Water	2	Each
Flow Control Valve, Motorized, 1"	6	Each
Pipe & Fittings, 1" Steel	0.5	K Ln Ft
Pipe & Fittings, 2" Steel	0.17	K Ln Ft
Pipe & Fittings, 3" Steel	0.09	K Ln Ft
Air Handler, Single Zone, 20,000 Cfm	2	Each
Duct Insulation, Fiberglass Blanket	8630	Sq Ft
Ductwork	5760	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	4	Each
Exhaust Fan, Centrifugal, 5,000 Cfm	4	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$4,072,671	\$2.97	0.76%
Unscheduled Maintenance	\$4,155,872	\$3.03	0.77%
Renewal & Replacement	\$7,826,875	\$5.71	1.46%
Total	\$16,055,418	\$11.72	2.99%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace MV Switchgear, >1,200 Amp.	45.69	10.5%
Lubricate, Repack Gland, Valve, Non Drain, 2"	30.90	7.1%
Replace Membrane, Single-Ply Modified Bituminous/Thermoplastic Roof	15.96	3.7%
Replace Chiller, Reciprocal Air Cooled Hermetic, 100 Ton	15.87	3.7%
Replace Generator, Diesel, 500 kw	12.32	2.8%
Maintain Chiller, Reciprocal Air Cooled Hermetic, 100 Ton	12.12	2.8%
Replace Carpet, Nylon 20 oz., High Traffic	12.01	2.8%
Lubricate, Repack Gland, Valve, Non Drain, 4"	11.69	2.7%
Replace Walk-In Freezer/Cooler, Commercial	10.98	2.5%
Maintain Direct Digital Controls, System Points	9.68	2.2%
Replace Variable Frequency Drive, <600V	9.26	2.1%
Replace Direct Digital Controls, System Points	8.88	2.0%
Repair Single-Ply Modified Bituminous/Thermoplastic Roof	8.72	2.0%
Replace Valve, Non-Drain, 2"	8.49	2.0%
Replace Air Handler, Single Zone, 20,000 Cfm	8.42	1.9%
Refinish Gypsum Board, Interior Wall Finish	8.01	1.8%
Maintain Power Panel Board, 208 Y/120 V, 200 Amp.	7.77	1.8%
Replace Power Panel Board, 208 Y/120 V, 200 Amp.	7.50	1.7%
Repair Chiller, Reciprocal Air Cooled Hermetic, 100 Ton	7.11	1.6%
Replace Valve, Non-Drain, 4"	6.62	1.5%
Maintain Single-Ply Modified Bituminous/Thermoplastic Roof	5.44	1.3%
Maintain Walk-In Freezer/Cooler, Commercial	4.43	1.0%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	4.07	0.9%
Replace Laboratory Exhaust Hood, 4'	3.95	0.9%
Clean & Reseal Clay Brick, Exterior, 1st Floor	3.91	0.9%
Replace Glass Curtain Wall	3.75	0.9%
Replace Metal Floor Grating	3.75	0.9%
Replace Uninterruptible Power Supply Motor Generator, 8.0 kVA	3.74	0.9%
Replace Fluorescent Lighting Fixture, 160 w	3.72	0.9%
Maintain Air Handler, Single Zone, 20,000 Cfm	3.67	0.8%

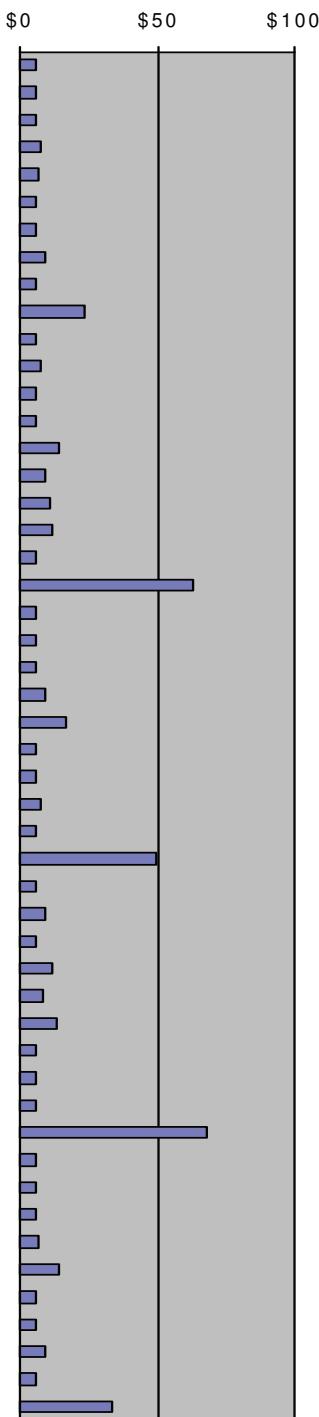
*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT	
1	.21				.09	2.50	1.46	.11	1.08	.42		5.86	
2	.21			.04	.09	2.55	1.46	.11	1.17	.42		6.05	
3	.21				.09	2.54	1.61	.11	1.08	.42		6.05	
4	.21	.07		1.01	.09	2.58	1.46	.11	1.22	.42		7.16	
5	.11	.34	.29		.09	2.62	1.68	.13	1.44	.42		7.12	
6	.21			.04	.09	2.60	1.61	.11	1.17	.42		6.24	
7	.21				.09	2.53	1.51	.11	1.08	.42		5.94	
8	.21	.07		2.97	.09	2.59	1.46	.11	1.22	.42		9.13	
9	.21				.07	.09	2.54	1.61	.11	1.08	.42		6.12
10	2.15	3.25	1.18		.13	.09	2.89	6.39	.50	4.80	2.47	23.85	
11	.21				.09	2.50	1.46	.11	1.08	.42		5.86	
12	.01	.21	.07		1.01	.09	2.92	1.46	.21	1.17	.42		7.58
13	.21					.09	2.50	1.61	.11	1.08	.42		6.01
14	.21				.04	.09	2.59	1.51	.11	1.22	.42		6.17
15	.16	.34	.29		.04	.09	2.79	5.16	.23	3.24	2.08	14.40	
16	.21	.07		2.97	.09	2.59	1.61	.11	1.17	.42		9.24	
17	.21					.09	7.80	1.51	.12	1.08	.42		11.23
18	.21			1.03	.09	2.60	1.46	.11	5.78	.42		11.68	
19	.21				.09	2.50	1.61	.11	1.08	.42		6.01	
20	2.18	7.99	1.42		1.15	.09	3.45	12.93	.48	30.53	2.47	62.69	
21	.21					.09	2.57	1.51	.11	1.08	.42		5.98
22	.21			.04	.09	2.58	1.46	.12	1.17	.42		6.09	
23	.21				.09	2.50	1.61	.11	1.13	.42		6.06	
24	.01	.21	.07		2.97	.09	2.93	1.46	.21	1.22	.42		9.60
25	1.38	.34	.29		.65	.11	3.35	2.70	.11	7.82	.42	17.17	
26	.21			.04	.09	2.55	1.61	.11	1.17	.42		6.20	
27	.21			.07	.09	2.50	1.46	.11	1.08	.42		5.93	
28	.21	.07		1.01	.09	2.63	1.51	.11	1.27	.42		7.30	
29	.21				.09	2.55	1.61	.12	1.08	.42		6.08	
30	5.88	3.25	1.18		3.84	.09	3.02	10.87	.59	16.97	4.14	49.84	
31	.21					.09	2.54	1.46	.11	1.08	.42		5.90
32	.21	.07		2.97	.09	2.57	1.57	.11	1.17	.42		9.17	
33	.21				.09	2.53	1.61	.11	1.13	.42		6.09	
34	.21			.04	.09	7.90	1.51	.12	1.22	.42		11.51	
35	.57	.34	.29			.09	3.16	1.68	.11	1.40	.42		8.05
36	.01	.21	.07	2.00	.09	2.81	1.62	.21	5.73	.42		13.16	
37	.21				.09	2.62	1.51	.11	1.08	.42		6.03	
38	.21			.04	.09	2.51	1.46	.11	1.22	.42		6.04	
39	.21				.09	2.55	1.61	.11	1.08	.42		6.06	
40	2.11	7.99	3.89		3.11	.09	3.54	13.32	.48	30.90	2.47	67.91	
41	.21					.09	2.60	1.46	.12	1.13	.42		6.02
42	.21			.04	.09	2.54	1.46	.11	1.17	.42		6.03	
43	.21				.09	2.60	1.61	.11	1.08	.42		6.11	
44	.21	.07		1.01	.09	2.51	1.51	.11	1.22	.42		7.13	
45	.23	.34	.29		.11	.09	2.89	5.05	.23	3.19	2.08	14.48	
46	.21			.04	.09	2.57	1.61	.12	1.22	.42		6.28	
47	.21				.09	2.55	1.46	.11	1.08	.42		5.91	
48	.01	.21	.07	2.97	.09	2.81	1.46	.21	1.22	.42		9.47	
49	.21				.09	2.65	1.72	.11	1.08	.42		6.27	
50	3.41	3.28	1.18		1.93	.11	3.43	6.63	.62	10.57	2.47	33.63	
Total	18.22	35.85	11.01		33.38	4.34	145.17	127.69	8.28	165.82	36.14	585.90	

50-Year Total M&R Cost Profile per GSFT

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Laundry, Self-Service

Gross Square Feet:	3,000
Height in Ft:	12
Exterior:	Concrete Block
Floor coverings:	Vinyl Tile
HVAC:	Single Zone Rooftop Unit
Capacity:	N/A
Occupancy:	90
Replacement Cost:	\$645,000

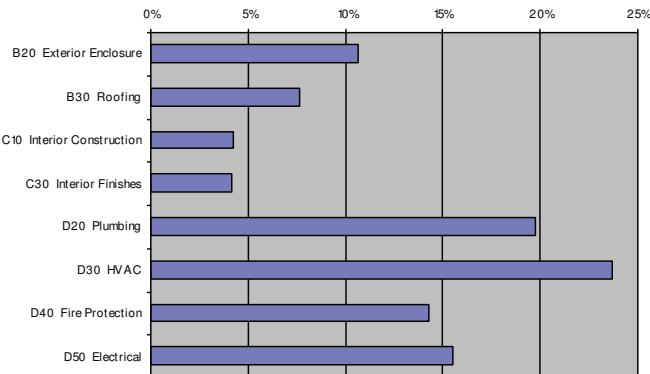
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	2628	Sq Ft
Aluminum Operable Window, 24 sf, 1st Floor	9	Each
Aluminum Frame, Fully Glazed, Exterior Door	1	Each
B30 Roofing		
Built-up Roof	3000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	2	Each
Wood, Solid Core w/ Safety Glass, Painted, Interior Door	12	Each
C30 Interior Finishes		
Sheetrock, Stippled, Interior Wall Finish	2880	Sq Ft
Vinyl Tile Flooring	3000	Sq Ft
Acoustical Tile Ceiling	3000	Sq Ft
D20 Plumbing		
Lavatory, Vitreous China	3	Each
Tankless Water Closet	3	Each
Circulator Pump, 1/6 HP, Cold Water	1	Each
Circulator Pump, 1/6 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.1	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.03	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.172	K Ln Ft
Pipe & Fittings, 4" Steel	0.486	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.344	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.164	K Ln Ft
Water Heater, Gas/Oil, 175 Gph	1	Each
Water Storage Tank, 2,500 Gal.	1	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.109	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.11	K Ln Ft
Pipe & Fittings, 4" PVC	0.024	K Ln Ft
Roof Drain, 2"	2	Each
D30 HVAC		
Duct Insulation, Fiberglass Blanket	630	Sq Ft
Ductwork	940	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	2	Each
Air Conditioner, Rooftop, Single Zone, 5 Ton	2	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	24	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	1	Each
D50 Electrical		
Main Switchgear, >1,200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	1	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	2	Each
Exit Lighting Fixture, w/ Battery	2	Each
Fluorescent Lighting Fixture, 160 w	30	Each
Grounded Fault Circuit Interruptor, 15 Amp.	2	Each
Receptacle, 120 V, 15 Amp.	8	Each
Receptacle, 120 V, 20 Amp.	15	Each
Receptacle, 208 V, 3 phase	15	Each
Wiring Device, Switch	10	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	2	Each
Heat Detector	4	Each
Manual Pull Station	1	Each
Smoke Detector	8	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$339,145	\$2.26	1.05%
Unscheduled Maintenance	\$285,181	\$1.90	0.88%
Renewal & Replacement	\$447,412	\$2.98	1.39%
Total	\$1,071,738	\$7.14	3.32%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Maintain Air Conditioner, Rooftop, Single Zone, 5 Ton	26.16	10.0%
Replace Air Conditioner, Rooftop, Single Zone, 5 Ton	22.11	8.4%
Maintain Fire Sprinkler System	15.77	6.0%
Test Gages & Valves, Fire Sprinkler System	14.53	5.5%
Clean & Reseal Clay Brick, Exterior, 1st Floor	12.03	4.6%
Place New Membrane Over Existing, Built-up Roof	10.97	4.2%
Replace Membrane, Built-up Roof	9.50	3.6%
Refinish Sheetrock, Stippled, Interior Wall Finish	9.37	3.6%
Replace Water Heater, Gas/Oil, 175 Gph	7.59	2.9%
Repoint (50% surface) Clay Brick, Exterior, 1st Floor	6.54	2.5%
Repair Air Conditioner, Rooftop, Single Zone, 5 Ton	6.13	2.3%
Replace Water Storage Tank, 2,500 Gal.	5.64	2.1%
Repair Main Switchgear, >1,200 Amp.	5.42	2.1%
Replace Main Switchgear, >1,200 Amp.	5.29	2.0%
Clean Water Heater, Gas/Oil, 175 Gph	5.26	2.0%
Replace Vinyl Tile Flooring	4.91	1.9%
Replace Wood, Solid Core w/ Safety Glass, Painted, Interior Door	4.82	1.8%
Replace Wood, Solid Core w/ Safety Glass, Painted, Interior Door Locks	4.73	1.8%
Maintain Water Storage Tank, 2,500 Gal.	3.89	1.5%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	3.85	1.5%
Replace Fluorescent Lighting Fixture, 160 w	3.51	1.3%
Replace Fire Alarm Control Panel	3.46	1.3%
Maintain Backflow Preventer, 2"	3.45	1.3%
Replace Batteries & Check Operation, Smoke Detector	3.18	1.2%
Replace HVAC Control Panel	3.15	1.2%
Maintain Built-up Roof	3.04	1.2%
Inspect & Test Fire Alarm Control Panel	2.84	1.1%
Replace Safety Switch, Fused, 400 Amp., 3 Ph.	2.68	1.0%
Check Operation, Heat Detector	2.65	1.0%
Maintain Safety Switch, Fused, 400 Amp., 3 Ph.	2.50	1.0%

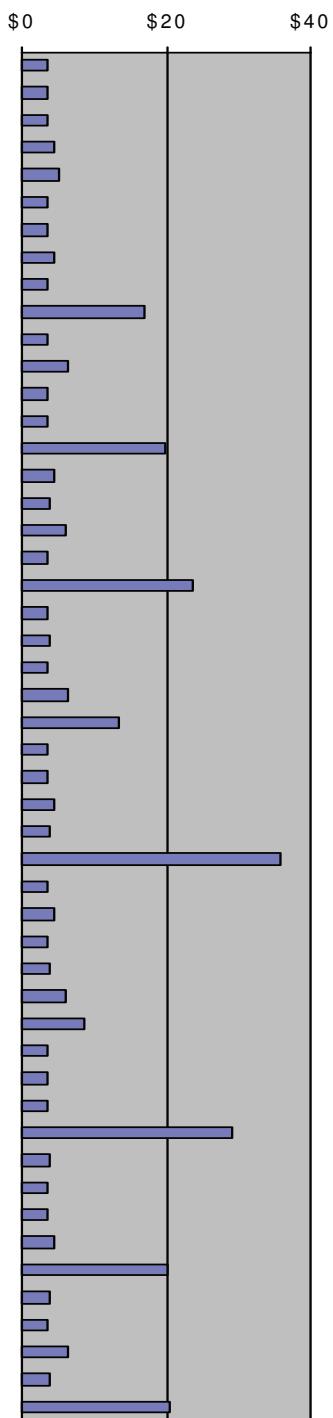
*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	Interior Finishes	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13					.89	1.08	.89	.51			3.50
2		.13					1.01	1.08	.89	.51			3.62
3		.13					.89	1.08	.89	.51			3.50
4		.13	.10	.78			1.01	1.08	.89	.51			4.50
5	.03	.19	.38				1.31	1.16	.96	1.23			5.26
6		.13					1.01	1.08	.89	.51			3.62
7		.13					.93	1.08	.89	.51			3.54
8		.13	.10	.78			1.01	1.08	.89	.58			4.57
9		.13					.89	1.08	.89	.51			3.60
10	5.87	.19	1.56				1.91	3.20	1.40	2.95			17.09
11		.13					.89	1.08	.89	.51			3.50
12	.06	.13	.10	.78			2.74	1.08	.99	.51			6.38
13		.13					.89	1.08	.89	.51			3.50
14		.13					1.05	1.08	.89	.51			3.66
15		.11	5.67	.38			1.09	8.49	1.97	2.09			19.81
16		.13	.10	.78			1.01	1.08	.89	.58			4.57
17		.13					1.11	1.08	.91	.51			3.73
18		.13		2.51			1.01	1.08	.89	.51			6.13
19		.13					.89	1.08	.89	.51			3.50
20	5.87	.19	2.17	.84			5.26	1.59	1.39	6.40			23.71
21		.13					.93	1.08	.89	.51			3.54
22		.13					1.22	1.08	.91	.51			3.85
23		.13					.89	1.08	.89	.51			3.50
24	.06	.13	.10	.78			2.74	1.08	.99	.58			6.45
25	3.93	.19	.38				1.98	3.20	.94	2.87			13.50
26		.13					1.01	1.08	.89	.51			3.62
27		.13		.10			.89	1.08	.89	.51			3.60
28		.13	.10	.78			1.05	1.08	.89	.51			4.54
29		.13					1.11	1.08	.91	.51			3.73
30	5.95	9.50	1.56				1.71	9.31	2.42	5.31			35.75
31		.13					.89	1.08	.89	.51			3.50
32		.13	.10	.78			1.01	1.08	.89	.51			4.50
33		.13					.89	1.08	.89	.58			3.58
34		.13					1.22	1.08	.91	.51			3.85
35	.03	.19	.38				2.16	1.16	.94	1.23			6.10
36	.06	.13	.10	3.29			2.62	1.08	.99	.51			8.78
37		.13					1.01	1.08	.89	.51			3.62
38		.13					.89	1.08	.89	.51			3.50
39		.13					1.01	1.08	.89	.51			3.62
40	5.87	.19	5.43	.84			5.07	3.63	1.39	6.79			29.22
41		.13					1.22	1.08	.91	.58			3.92
42		.13					.93	1.08	.89	.51			3.54
43		.13					1.01	1.08	.89	.51			3.62
44		.13	.10	.78			.89	1.08	.89	.51			4.38
45		.11	5.67	.38	.10		1.43	8.49	1.97	2.09			20.25
46		.13					1.11	1.08	.91	.51			3.73
47		.13					1.01	1.08	.89	.51			3.62
48	.06	.13	.10	.78			2.62	1.08	.99	.51			6.27
49		.13					1.05	1.08	.89	.58			3.73
50	10.04	.19	1.56				2.27	1.16	1.56	3.80			20.59
Total	38.03	27.32	15.22		14.82		70.63	84.56	51.13	55.54			357.25

50-Year Total M&R Cost Profile per GSFT

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Maintenance Shop

Gross Square Feet:	12,100
Height in Ft:	13
Exterior:	Concrete Block
Floor coverings:	Finished Concrete, Vinyl Tile
HVAC:	Pkgd DX, Window AC, Single Zone Air
Capacity:	N/A
Occupancy:	50
Replacement Cost:	\$2,528,312

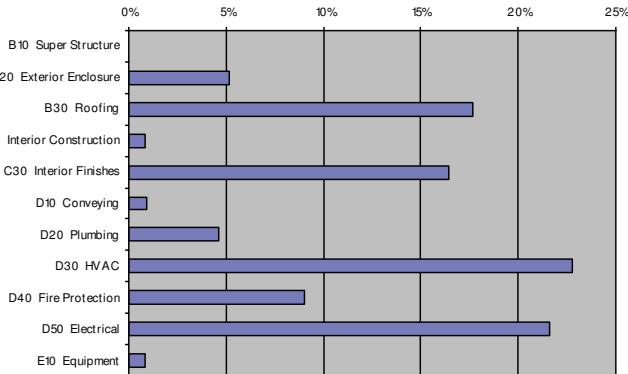
Components (Continued on Page 155)

Uniform / Component	Quantity	Units
B10 Super Structure		
Metal Decking	75	Sq Ft
B20 Exterior Enclosure		
Concrete Block, Exterior, 1st Floor	1550	Sq Ft
Steel, Painted, Exterior, 1st Floor	3990	Sq Ft
Aluminum Fixed Window, 24 sf, 1st Floor	18	Each
Steel Single 12x12, Painted, Roll-up Door	2	Each
Steel w/ Safety Glass, Painted, Exterior Door	4	Each
B30 Roofing		
Aluminum Gutter, Downspouts, Fittings	0.25	K Ln Ft
Metal Roof	12100	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	1	Each
Steel, Painted, Interior Door	4	Each
Steel, Painted, w/ Safety Glass, Interior Door	2	Each
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	3680	Sq Ft
Gypsum Board, Interior Wall Finish	4030	Sq Ft
Steel, Painted, Interior Wall Finish	3350	Sq Ft
Concrete, Painted Flooring	10050	Sq Ft
Vinyl Tile Flooring	2050	Sq Ft
Acoustical Tile, Dropped Ceiling	1000	Sq Ft
Concrete, Painted Ceiling	10500	Sq Ft
Gypsum Board, Finished Ceiling	600	Sq Ft
D10 Conveying		
Hoist Electric, Overhead, Chain, 3 Ton	1	Each
D20 Plumbing		
Drinking Fountain, Refrigerated	1	Each
Lavatory, Vitreous China	2	Each
Service Sink, Iron, Enamel	1	Each
Sink, Stainless Steel	1	Each
Tankless Water Closet	2	Each
Urinal, Vitreous China	2	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.25	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.25	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.2	K Ln Ft
Pipe & Fittings, 4" Steel	0.85	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.25	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.75	K Ln Ft
Water Heater, Electric, 52 Gal.	2	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.2	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.22	K Ln Ft
Pipe & Fittings, 4" PVC	0.091	K Ln Ft
D30 HVAC		
Pipe & Fittings, 2" Steel	0.5	K Ln Ft
Air Handler, Single Zone, 10,000 Cfm	1	Each
Duct Insulation, Fiberglass Blanket	2600	Sq Ft
Ductwork	3800	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	2	Each
Exhaust Fan, Propeller, 375 Cfm	1	Each
Exhaust Fan, Propeller, 10,000 Cfm	1	Each
Exhaust Fan, Roof Mounted, 800 Cfm	1	Each
Air Conditioner, Indoor DX Packaged, Air Cooled, 5 Ton	1	Each
Air Conditioner, Window, 1 Ton	5	Each
Baseboard Radiator 10 ft.	3	Each
Finned Radiator	1	Each
Unit Heater, 12 Mbh	3	Each
Unit Heater, 250 Mbh	1	Each
Thermostat	2	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	110	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	4	Each
D50 Electrical		
Circuit Breaker, 600 V, 30-60 Amp., 3Ph.	12	Each
Circuit Breaker, 600 V, 70-100 Amp., 3 Ph.	2	Each
Circuit Breaker, 600 V, 125-400 Amp.	5	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	3	Each
Secondary Transformer, Dry, 15 kVA	1	Each
Secondary Transformer, Dry, 50 kVA	2	Each
Transfer Switch, Auto, 600 V, 400 Amp.	1	Each
Emergency Lighting Pack, 2 Light w/ Battery	2	Each
Exit Lighting Fixture, w/ Battery	2	Each
Fluorescent Lighting Fixture, 80 w	105	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$603,352	\$1.00	0.48%
Unscheduled Maintenance	\$450,204	\$0.74	0.36%
Renewal & Replacement	\$1,069,715	\$1.77	0.85%
Total	\$2,123,271	\$3.51	1.68%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Refinish Concrete, Painted Ceiling	11.73	8.5%
Replace Metal Roof	10.52	7.6%
Maintain Metal Roof	8.28	6.0%
Replace Air Handler, Single Zone, 10,000 Cfm	5.49	4.0%
Maintain Air Handler, Single Zone, 10,000 Cfm	4.15	3.0%
Maintain Fire Sprinkler System	3.91	2.8%
Maintain Air Conditioner, Window, 1 Ton	3.78	2.7%
Test Gages & Valves, Fire Sprinkler System	3.60	2.6%
Refinish Gypsum Board, Interior Wall Finish	3.25	2.4%
Refinish Concrete Block, Painted, Interior Wall Finish	3.06	2.2%
Refinish Steel, Painted, Interior Wall Finish	2.94	2.1%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 80 w	2.79	2.0%
Refinish Concrete, Painted Flooring	2.76	2.0%
Replace Fluorescent Lighting Fixture, 80 w	2.61	1.9%
Maintain Circuit Breaker, 600 V, 30-60 Amp., 3 Ph.	2.49	1.8%
Maintain Unit Heater, 12 Mbh	2.35	1.7%
Replace Batteries & Check Operation, Smoke Detector	1.98	1.4%
Replace Transfer Switch, Auto, 600 V, 400 Amp.	1.91	1.4%
Repair Metal Roof	1.86	1.3%
Clean & Seal Concrete Block, Exterior, 1st Floor	1.75	1.3%
Repoint (50% surface) Concrete Block, Painted, Interior Wall Finish	1.75	1.3%
Repair Circuit Breaker, 600 V, 30-60 Amp., 3 Ph.	1.73	1.3%
Refinish Steel, Painted, Exterior, 1st Floor	1.64	1.2%
Maintain Power Panel Board, 208 Y/120 V, 200 Amp.	1.56	1.1%
Test Fire Sprinkler Head	1.54	1.1%
Replace Power Panel Board, 208 Y/120 V, 200 Amp.	1.50	1.1%
Maintain Air Conditioner, Indoor DX Packaged, Air Cooled, 5 Ton	1.42	1.0%
Replace Air Conditioner, Indoor DX Packaged, Air Cooled, 5 Ton	1.35	1.0%
Replace Circuit Breaker, 600 V, 125-400 Amp., 3 Ph.	1.25	0.9%
Maintain Exhaust Fan, Propeller, 10,000 Cfm	1.11	0.8%

*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

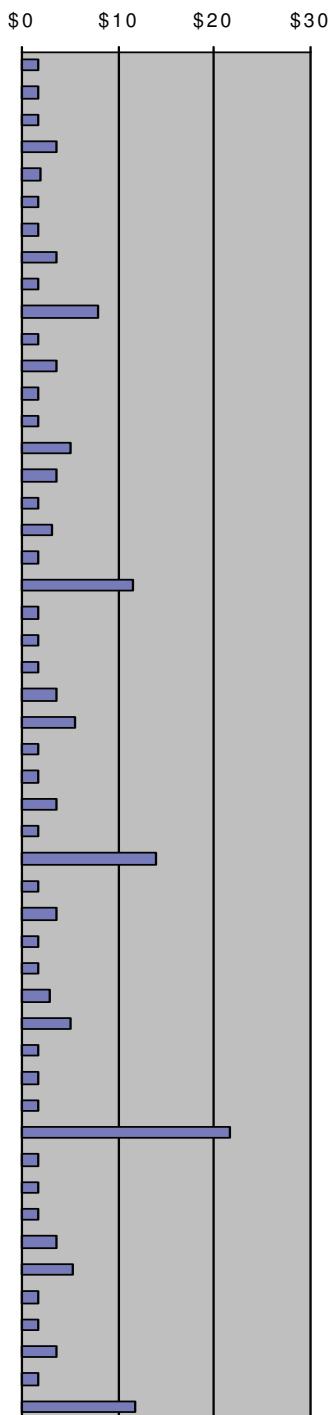
Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	Plumbing	HVAC Systems	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT		
													1.61		
1	.37						.02	.05	.54	.23	.38	.02		1.61	
2	.37						.02	.10	.54	.23	.40	.02		1.68	
3	.37						.02	.07	.54	.23	.38	.02		1.63	
4	.37	.01	1.80				.02	.10	.54	.23	.40	.02		3.49	
5	.03	.58	.05				.02	.07	.54	.26	.43	.02		1.99	
6	.37						.02	.12	.54	.23	.40	.02		1.70	
7	.37						.02	.13	.54	.23	.38	.02		1.69	
8	.37	.01	1.80				.02	.11	.54	.23	.40	.02		3.51	
9	.37						.01	.02	.54	.23	.38	.02		1.64	
10	1.43	.58	.19				.55	.02	.33	1.38	.77	2.44	.13	7.82	
11	.37							.02	.05	.54	.23	.38	.02	1.61	
12	.37	.01	1.80				.02	.18	.55	.33	.40	.02		3.68	
13	.37							.02	.05	.54	.23	.38	.02	1.61	
14	.37							.02	.17	.54	.23	.40	.02	1.76	
15	.09	.58	.05				.15	.02	.37	2.54	.50	.75	.02	5.04	
16	.37	.01	1.80				.02	.11	.54	.23	.40	.02		3.51	
17	.37							.02	.05	.54	.25	.38	.02	1.62	
18	.37							.42	.02	.12	.54	.23	1.34	.02	3.06
19	.37								.02	.05	.54	.23	.38	.02	1.61
20	1.46	.90	.27				2.38	.02	.34	2.25	.75	3.03	.13	11.54	
21	.37							.02	.10	.54	.23	.38	.02	1.66	
22	.37							.02	.15	.54	.25	.40	.02	1.74	
23	.37							.02	.05	.54	.23	.40	.02	1.63	
24	.37	.01	1.80				.02	.19	.55	.33	.40	.02		3.69	
25	.64	.58	.05				1.57	.38	.48	.88	.25	.66	.02	5.50	
26	.37							.02	.10	.54	.23	.40	.02	1.68	
27	.37							.01	.02	.54	.23	.38	.02	1.64	
28	.37	.01	1.80				.02	.13	.54	.23	.42	.02		3.54	
29	.37							.02	.10	.54	.25	.38	.02	1.67	
30	1.48	.58	.19				.70	.02	.65	3.87	1.01	5.05	.13	13.69	
31	.37							.02	.05	.54	.23	.38	.02	1.61	
32	.37	.01	1.80				.02	.11	.54	.23	.40	.02		3.51	
33	.37							.02	.07	.54	.23	.40	.02	1.65	
34	.37							.02	.10	.54	.25	.40	.02	1.69	
35	.43	.58	.05					.02	.49	.54	.25	.41	.02	2.78	
36	.37	.01	2.22				.02	.15	.55	.33	1.34	.02		5.02	
37	.37							.02	.13	.54	.23	.38	.02	1.69	
38	.37							.02	.07	.54	.23	.40	.02	1.65	
39	.37							.02	.10	.54	.23	.38	.02	1.66	
40	1.34	10.65	.27				2.38	.02	.30	2.59	.75	3.28	.13	21.70	
41	.37							.02	.08	.54	.25	.40	.02	1.67	
42	.37							.02	.12	.54	.23	.40	.02	1.70	
43	.37							.02	.08	.54	.23	.38	.02	1.64	
44	.37	.01	1.80				.02	.12	.54	.23	.40	.02		3.51	
45	.21	.58	.05				.16	.02	.47	2.54	.50	.73	.02	5.26	
46	.37							.02	.07	.54	.25	.42	.02	1.68	
47	.37							.02	.08	.54	.23	.38	.02	1.64	
48	.37	.01	1.80				.02	.16	.55	.33	.40	.02		3.66	
49	.37							.02	.11	.54	.23	.38	.02	1.67	
50	1.92	.58	.19				2.12	.38	.65	1.05	.95	3.70	.13	11.68	
Total	9.02	31.05	1.48				28.90	1.66	8.14	39.91	15.78	37.95	1.44	175.34	

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT



Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Manufacturing Plant, Light

Washington, D.C.

Manufacturing Plant, Light

Gross Square Feet:	45,000
Height in Ft:	20
Exterior:	Clay Brick
Floor coverings:	Finished Concrete, Vinyl Tile, Carpet
HVAC:	Single Zone Rooftop Units
Capacity:	N/A
Occupancy:	200
Replacement Cost:	\$10,668,264

Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	14541	Sq Ft
Aluminum Fixed Window, 12 sf, 1st Floor	72	Each
Aluminum Fixed Window, 12 sf, 2nd Floor	72	Each
Steel Single 12"x12", Painted, Roll-up Door	4	Each
Steel, Painted, Exterior Door	6	Each
B30 Roofing		
Built-up Roof	45000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	17	Each
Steel, Painted, Interior Door	6	Each
Wood, Solid Core, Painted, Interior Door	12	Each
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	12600	Sq Ft
Sheetrock, Unstipped, Interior Wall Finish	3263	Sq Ft
Carpet, Nylon 20 oz., Low Traffic	4000	Sq Ft
Concrete, Painted Flooring	39250	Sq Ft
Vinyl Tile Flooring	1750	Sq Ft
Acoustical Tile, Dropped Ceiling	5750	Sq Ft
Metal, Painted Ceiling	39250	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	6	Each
Lavatory, Vitreous China	31	Each
Service Sink, Iron, Enamel	3	Each
Tankless Water Closet	17	Each
Urinal, Vitreous China	7	Each
Circulator Pump, 1/2 HP, Cold Water	1	Each
Circulator Pump, 1/2 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	2.1	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	1.1	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	2.6	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	2.1	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	1.1	K Ln Ft
Water Heater, Gas/Oil, 175 Gph	1	Each
Backflow Preventer, 4"	1	Each
Pipe & Fittings, 6" Cast Iron	1.2	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.5	K Ln Ft
Pipe & Fittings, 4" PVC	0.6	K Ln Ft
Roof Drain, 4-6"	14	Each
D30 HVAC		
Pipe & Fittings, 4" Steel, Gas	0.5	K Ln Ft
Duct Insulation, Fiberglass Blanket	9393	Sq Ft
Ductwork	14020	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	6	Each
Air Conditioner, Rooftop, Single Zone, 20 Ton	1	Each
Air Conditioner, Rooftop, Single Zone, 50 Ton	3	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	263	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	10	Each
D50 Electrical		
Distribution Switch, Fused, <600 V	8	Each
Main Switchgear, <1,200 Amp.	1	Each
Emergency Lighting Pack, 2 Light w/ Battery	6	Each
Exit Lighting Fixture, w/ Battery	6	Each
Fluorescent Lighting Fixture, 160 w	600	Each
Receptacle, 120 V, 15 Amp.	240	Each
Wiring Device, Switch	60	Each
Fire Alarm Horn & Strobe	20	Each
Heat Detector	20	Each
Manual Pull Station	20	Each
Smoke Detector	100	Each
E10 Equipment		
Microwave Oven	1	Each
Refrigerator, Domestic	1	Each

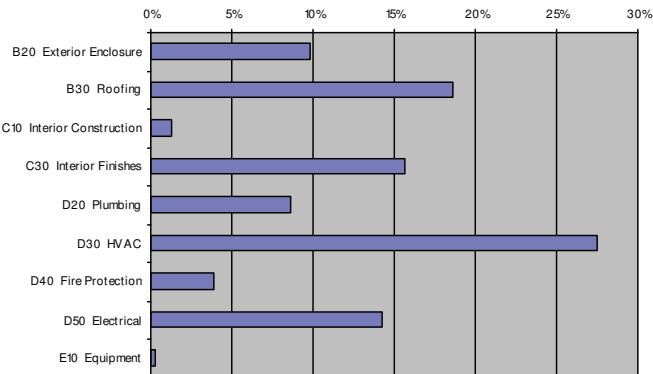
Manufacturing Plant, Light

Washington, D.C.

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$1,027,989	\$0.46	0.19%
Unscheduled Maintenance	\$953,529	\$0.42	0.18%
Renewal & Replacement	\$4,638,841	\$2.06	0.87%
Total	\$6,620,359	\$2.94	1.24%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, Single Zone, 50 Ton	18.25	14.5%
Refinish Metal, Painted Ceiling	11.52	9.1%
Place New Membrane Over Existing, Built-up Roof	10.97	8.7%
Replace Membrane, Built-up Roof	9.50	7.5%
Repair Air Conditioner, Rooftop, Single Zone, 50 Ton	8.69	6.9%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	5.13	4.1%
Replace Fluorescent Lighting Fixture, 160 w	4.69	3.7%
Clean & Reseal Clay Brick, Exterior, 1st Floor	4.44	3.5%
Maintain Air Conditioner, Rooftop, Single Zone, 50 Ton	3.28	2.6%
Maintain Built-up Roof	3.04	2.4%
Refinish Concrete, Painted Flooring	2.89	2.3%
Refinish Concrete Block, Painted, Interior Wall Finish	2.82	2.2%
Replace Batteries & Check Operation, Smoke Detector	2.66	2.1%
Replace Air Conditioner, Rooftop, Single Zone, 20 Ton	2.52	2.0%
Repaint (50% surface) Clay Brick, Exterior, 1st Floor	2.41	1.9%
Repair Air Conditioner, Rooftop, Single Zone, 20 Ton	1.88	1.5%
Repaint (50% surface) Concrete Block, Painted, Interior Wall Finish	1.61	1.3%
Replace Carpet, Nylon 20 oz., Low Traffic	1.61	1.3%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	1.12	0.9%
Maintain Fire Sprinkler System	1.05	0.8%
Replace Smoke Detector	1.02	0.8%
Test Fire Sprinkler Head	.99	0.8%
Test Gages & Valves, Fire Sprinkler System	.97	0.8%
Repair Metal, Painted Ceiling (2% of Ceiling)	.91	0.7%
Maintain Air Conditioner, Rooftop, Single Zone, 20 Ton	.90	0.7%
Check Operation, Heat Detector	.88	0.7%
Maintain Roof Drain, 4-6"	.77	0.6%
Refinish Sheetrock, Unstipped, Interior Wall Finish	.71	0.6%
Replace Faucet Washer & Clean Trap, Lavatory, Vitreous China	.71	0.6%
Replace Existing Ductwork (20% of Ductwork)	.61	0.5%

*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	Plumbing	HVAC Systems	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13					.09	.17	.07	.13	.00		.59
2		.13					.19	.17	.07	.15	.00		.71
3		.13					.09	.17	.07	.15	.00		.60
4		.13	.02	1.25			.19	.17	.07	.15	.00		1.98
5	.01	.19	.04	.01			.13	.17	.08	.19	.00		.83
6		.13					.19	.17	.07	.17	.00		.72
7		.13					.14	.17	.07	.13	.00		.64
8		.13	.02	1.25			.19	.17	.07	.15	.00		1.98
9		.13		.01			.09	.17	.07	.15	.00		.61
10	2.24	.19	.16	.59			.57	3.69	.41	2.17	.04		10.05
11		.13					.09	.17	.07	.13	.00		.59
12		.13	.02	1.25			.33	.17	.13	.17	.00		2.20
13		.13					.09	.17	.07	.13	.00		.59
14		.13					.24	.17	.07	.15	.00		.76
15	.03	5.67	.04	.69			.12	7.01	.14	.57	.00		14.28
16		.13	.02	1.25			.19	.17	.07	.15	.00		1.98
17		.13					.10	.17	.08	.13	.00		.61
18		.13		.10			.19	.17	.07	.17	.00		.83
19		.13					.09	.17	.07	.13	.00		.59
20	2.31	.19	.46	1.85			.70	.26	.40	3.03	.04		9.24
21		.13					.14	.17	.07	.15	.00		.65
22		.13					.20	.17	.08	.15	.00		.73
23		.13					.09	.17	.07	.13	.00		.59
24		.13	.02	1.25			.34	.17	.13	.17	.00		2.21
25	1.45	.19	.04	1.37			1.03	3.70	.07	.42	.00		8.28
26		.13					.19	.17	.07	.15	.00		.71
27		.13		.01			.09	.17	.07	.15	.00		.61
28		.13	.02	1.25			.24	.17	.07	.15	.00		2.03
29		.13					.10	.17	.08	.13	.00		.61
30	2.26	9.50	.16	1.27			.59	7.83	.47	2.76	.04		24.87
31		.13					.09	.17	.07	.13	.00		.59
32		.13	.02	1.25			.19	.17	.07	.15	.00		1.98
33		.13					.09	.17	.07	.15	.00		.60
34		.13					.20	.17	.08	.15	.00		.73
35	.23	.19	.04	.01			.90	.17	.07	.19	.00		1.80
36		.13	.02	1.36			.24	.17	.13	.17	.00		2.22
37		.13					.17	.17	.07	.13	.00		.68
38		.13					.10	.17	.07	.15	.00		.62
39		.13					.17	.17	.07	.15	.00		.69
40	2.25	.19	.68	1.85			.52	3.78	.40	3.26	.04		12.96
41		.13					.19	.17	.08	.13	.00		.70
42		.13					.15	.17	.07	.17	.00		.69
43		.13					.18	.17	.07	.13	.00		.68
44		.13	.02	1.25			.10	.17	.07	.15	.00		1.89
45	.10	5.67	.04	.70			.40	7.01	.14	.57	.00		14.64
46		.13					.12	.17	.08	.15	.00		.65
47		.13					.17	.17	.07	.13	.00		.68
48		.13	.02	1.25			.24	.17	.13	.17	.00		2.12
49		.13					.22	.17	.07	.13	.00		.72
50	3.61	.19	.16	1.95			1.22	.17	.53	1.94	.04		9.80
Total	14.50	27.33	1.97	23.04			12.74	40.40	5.75	21.01	.39		147.12



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Manufacturing Plant, Machinery

Gross Square Feet:	384,000
Height in Ft:	40
Exterior:	Concrete Block
Floor coverings:	Finished Concrete
HVAC:	Pkgd DX, Window AC, Multizone Air
Capacity:	N/A
Occupancy:	1,705
Replacement Cost:	\$82,856,363

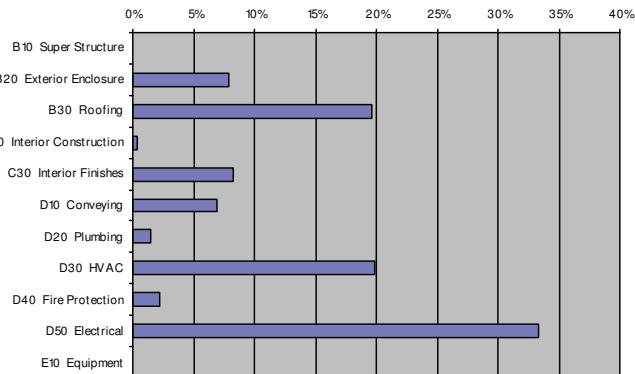
Components (Continued on Page 155)

Uniform / Component	Quantity	Units
B10 Super Structure		
Steel Roof Access Ladder	200	Ln Ft
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	86750	Sq Ft
Concrete Block, Exterior, 1st Floor	12390	Sq Ft
Aluminum Fixed Window, 12 sf, 1st Floor	96	Each
Aluminum Fixed Window, 24 sf, 1st Floor	12	Each
Aluminum Operable Window, 12 sf, 1st Floor	12	Each
Steel Single 12"x12", Painted, Roll-up Door	8	Each
Steel Double 12"x24", Painted, Roll-up Door	6	Each
Steel, Painted, Exterior Door	18	Each
Steel w/ Safety Glass, Painted, Exterior Door	6	Each
B30 Roofing		
Built-up Roof	307200	Sq Ft
Single-Ply Thermoset Roof	76800	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	24	Each
Steel, Painted, Interior Door	40	Each
Steel, Painted, Interior Double Door	10	Each
C30 Interior Finishes		
Ceramic Tile, 4"x4", Interior Wall Finish	3100	Sq Ft
Concrete Block, Painted, Interior Wall Finish	109055	Sq Ft
Gypsum Board, Interior Wall Finish	7090	Sq Ft
Carpet, Nylon 20 oz., Low Traffic	15000	Sq Ft
Concrete, Painted Flooring	360010	Sq Ft
Vinyl Sheet Flooring	2990	Sq Ft
Vinyl Tile Flooring	6000	Sq Ft
Acoustical Tile, Dropped Ceiling	324650	Sq Ft
Concrete, Painted Ceiling	15360	Sq Ft
Sheetrock, Unstippled Ceiling	43990	Sq Ft
D10 Conveying		
Crane, Jib, Electric, 2 Ton	8	Each
Crane, Jib, Electric, 5 Ton	4	Each
Hoist Electric, Overhead, Chain, 3 Ton	4	Each
Platform Lifter, 5 Ton	18	Each
D20 Plumbing		
Drinking Fountain, Refrigerated	4	Each
Lavatory, Vitreous China	16	Each
Sink, Stainless Steel	8	Each
Tankless Water Closet	24	Each
Urinal, Vitreous China	8	Each
Circulator Pump, 2 HP, Cold Water	1	Each
Circulator Pump, 2 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.6	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.6	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.1	K Ln Ft
Pipe & Fittings, 2" Steel	6	K Ln Ft
Pipe & Fittings, 3" Steel	4	K Ln Ft
Pipe & Fittings, 4" Steel	4	K Ln Ft
Pipe & Fittings, 6" Steel	2	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.6	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.6	K Ln Ft
Water Heater, Gas/Oil, 175 Gph	3	Each
Backflow Preventer, 4"	2	Each
Floor Drain	8	Each
Pipe & Fittings, 4" Cast Iron	0.1	K Ln Ft
Pipe & Fittings, 10" Cast Iron	1.239	K Ln Ft
Pipe & Fittings, 4" PVC	1.6	K Ln Ft
Roof Drain, 2"	20	Each
D30 HVAC		
Fuel Oil Pump, 3 HP	1	Each
Oil Storage Tank, 25,000 Gal.	1	Each
Air Handler, Multizone, 20,000 Cfm	4	Each
Air Handler, Multizone, 50,000 Cfm	4	Each
Duct Insulation, Fiberglass Blanket	62550	Sq Ft
Ductwork	93360	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	8	Each
Exhaust Fan, Propeller, 1,000 Cfm	12	Each
Exhaust Fan, Roof Mounted, 2,000 Cfm	18	Each
Air Conditioner, Indoor DX Packaged, Air Cooled, 5 Ton	5	Each
Air Conditioner, Window, 1 Ton	15	Each
Fan Coil Unit, 30 Ton	10	Each
Direct Digital Controls, System Points	698	Each
HVAC Control Panel	2	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$13,316,643	\$0.69	0.32%
Unscheduled Maintenance	\$8,490,042	\$0.44	0.20%
Renewal & Replacement	\$32,485,806	\$1.69	0.78%
Total	\$54,292,491	\$2.83	1.31%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Bus Duct & Fittings, CU, 800-4,000 Amp.	10.88	9.1%
Place New Membrane Over Existing, Built-up Roof	8.77	7.4%
Replace Membrane, Built-up Roof	7.60	6.4%
Maintain Direct Digital Controls, System Points	6.42	5.4%
Replace Direct Digital Controls, System Points	5.90	4.9%
Replace Main Switchgear, 480 V, 800 Amp.	5.35	4.5%
Replace Metal Halide Lighting Fixture, High Bay, 400 w	4.62	3.9%
Replace Lamp, Metal Halide Lighting Fixture, High Bay, 400 w	4.25	3.6%
Maintain Platform Lifter, 5 Ton	4.21	3.5%
Replace Ballast, Metal Halide Lighting Fixture, High Bay, 400 w	3.75	3.1%
Replace Membrane, Single-Ply Thermoset Roof	3.71	3.1%
Replace Air Handler, Multizone, 50,000 Cfm	3.34	2.8%
Refinish Concrete, Painted Flooring	3.11	2.6%
Clean & Reseal Clay Brick, Exterior, 1st Floor	3.10	2.6%
Refinish Concrete Block, Painted, Interior Wall Finish	2.86	2.4%
Maintain Built-up Roof	2.43	2.0%
Maintain Power Panel Board, 208 Y/120 V, 100 Amp.	1.96	1.6%
Replace Generator, Diesel, 500 kw	1.76	1.5%
Repoint (50% surface) Clay Brick, Exterior, 1st Floor	1.69	1.4%
Repoint (50% surface) Concrete Block, Painted, Interior Wall Finish	1.64	1.4%
Maintain Crane, Jib, Electric, Chain, 2 Ton	1.62	1.4%
Refinish Sheetrock, Unstippled Ceiling	1.51	1.3%
Replace Air Handler, Multizone, 20,000 Cfm	1.40	1.2%
Replace Fan Coil Unit, 30 Ton	1.33	1.1%
Replace Power Panel Board, 208 Y/120 V, 100 Amp.	1.31	1.1%
Test Fire Sprinkler Head	1.10	0.9%
Maintain Single-Ply Thermoset Roof	1.03	0.9%
Maintain Crane, Jib, Electric, Chain, 5 Ton	.84	0.7%
Replace Carpet, Nylon 20 oz., Low Traffic	.71	0.6%
Replace Primary Transformer, Oil Filled, 500 kVA	.67	0.6%

*Task cost (\$2009) per GSFT over 50 years.

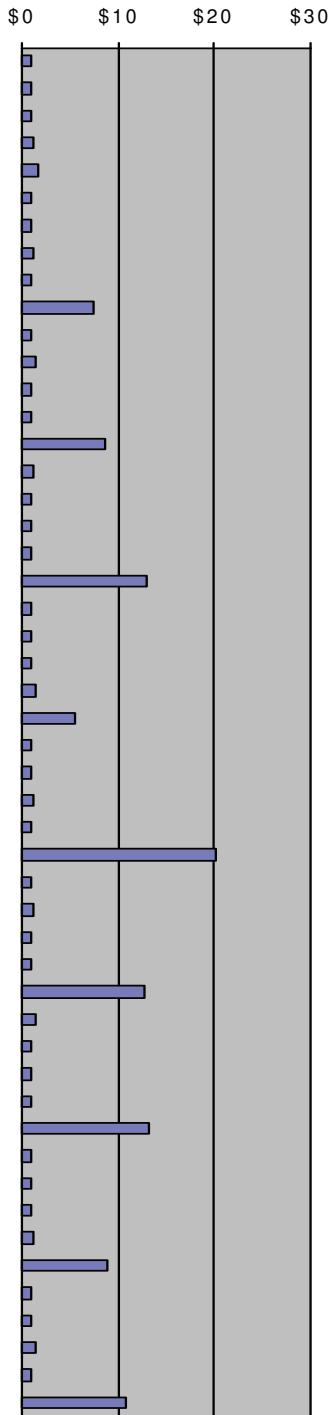
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1	.14				.18	.02	.31	.02	.18	.00		.85
2	.14				.18	.03	.31	.02	.19	.00		.86
3	.14				.18	.02	.31	.02	.19	.00		.86
4	.14	.00			.42	.18	.03	.31	.02	.19	.00	1.29
5	.01	.22	.01		.00	.18	.03	.31	.02	.99	.00	1.77
6	.14				.18	.03	.31	.02	.20	.00		.87
7	.14				.18	.03	.31	.02	.18	.00		.85
8	.14	.00			.42	.18	.03	.31	.02	.19	.00	1.29
9	.14				.05	.18	.02	.31	.02	.19	.00	.91
10	1.75	.26	.05		.63	.18	.07	1.50	.39	2.60	.01	7.44
11	.14				.18	.02	.31	.02	.18	.00		.85
12	.14	.00			.42	.18	.09	.31	.06	.20	.00	1.40
13	.14				.18	.02	.31	.02	.18	.00		.85
14	.14				.18	.04	.31	.02	.19	.00		.87
15	.02	4.60	.01		.40	.18	.02	2.29	.03	1.15	.00	8.71
16	.14	.00			.42	.18	.03	.31	.02	.19	.00	1.29
17	.14				.18	.03	.31	.02	.18	.00		.86
18	.14				.13	.18	.03	.31	.02	.23	.00	1.03
19	.14				.18	.02	.31	.02	.18	.00		.85
20	1.75	2.01	.10		1.05	.18	.11	1.51	.38	5.74	.01	12.85
21	.14				.18	.03	.31	.02	.19	.00		.86
22	.14				.18	.04	.31	.02	.19	.00		.88
23	.14				.18	.02	.31	.02	.18	.00		.85
24	.14	.00			.42	.18	.09	.31	.06	.20	.00	1.40
25	1.11	.22	.01		.94	.66	.05	.45	.02	1.97	.00	5.42
26	.14				.18	.03	.31	.02	.19	.00		.86
27	.14				.05	.18	.02	.31	.02	.19	.00	.91
28	.14	.00			.42	.18	.04	.31	.02	.19	.00	1.30
29	.14				.18	.03	.31	.02	.18	.00		.86
30	1.76	7.70	.05		1.03	.18	.10	4.13	.39	4.69	.01	20.03
31	.14				.18	.02	.31	.02	.18	.00		.85
32	.14	.00			.42	.18	.03	.31	.02	.19	.00	1.29
33	.14				.18	.02	.31	.02	.19	.00		.86
34	.14				.18	.04	.31	.02	.19	.00		.88
35	.13	.22	.01		.00	.18	.10	.31	.02	11.87	.00	12.84
36	.14	.00			.55	.18	.08	.31	.06	.23	.00	1.56
37	.14				.18	.03	.31	.02	.18	.00		.85
38	.14				.18	.03	.31	.02	.19	.00		.86
39	.14				.18	.03	.31	.02	.19	.00		.86
40	1.72	2.01	.10		1.05	.18	.12	1.65	.38	5.86	.01	13.09
41	.14				.18	.03	.31	.02	.18	.00		.86
42	.14				.18	.03	.31	.02	.20	.00		.87
43	.14				.18	.03	.31	.02	.18	.00		.85
44	.14	.00			.42	.18	.03	.31	.02	.19	.00	1.29
45	.05	4.60	.01		.45	.18	.04	2.29	.03	1.15	.00	8.80
46	.14				.18	.03	.31	.02	.19	.00		.87
47	.14				.18	.03	.31	.02	.18	.00		.85
48	.14	.00			.42	.18	.08	.31	.06	.20	.00	1.40
49	.14				.18	.03	.31	.02	.18	.00		.86
50	2.82	.26	.05		1.56	.66	.08	1.36	.52	3.52	.01	10.84
Total	11.12	27.76	.47		11.72	9.81	2.08	28.02	3.12	47.14	.09	141.32

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Manufacturing Plant, Process

Gross Square Feet:	50,700
Height in Ft:	45
Exterior:	Clay Brick
Floor coverings:	Concrete, Vinyl Tile, Carpet, Ceramic Tile
HVAC:	Single Zone Air, Window AC
Capacity:	N/A
Occupancy:	225
Replacement Cost:	\$11,838,131

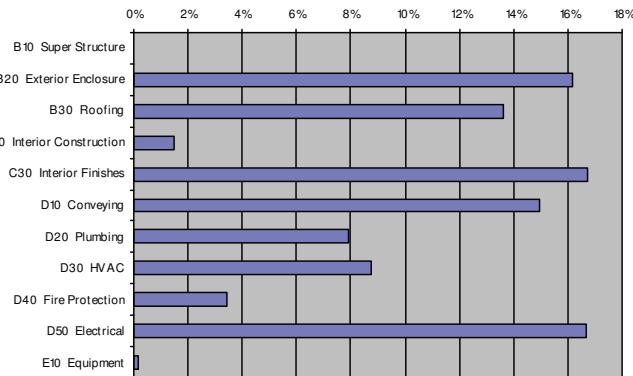
Components (Continued on Page 156)

Uniform / Component	Quantity	Units
B10 Super Structure		
Steel Roof Access Ladder	15	Ln Ft
B20 Exterior Enclosure		
Aluminum Louver, 1st Floor	58	Each
Aluminum Louver, 2nd Floor	58	Each
Clay Brick, Exterior, 1st Floor	10765	Sq Ft
Clay Brick, Exterior, 2nd Floor	10765	Sq Ft
Concrete Block, Exterior, 1st Floor	9000	Sq Ft
Steel, Painted, Exterior, 1st Floor	5000	Sq Ft
Steel, Painted, Exterior, 2nd Floor	5000	Sq Ft
Aluminum Fixed Window, 12 sf, 2nd Floor	12	Each
Aluminum Fixed Window, 24 sf, 1st Floor	15	Each
Steel Frame, Painted, Operable Window, 12 sf, 1st Floor	15	Each
Steel Single 12'x12', Painted, Roll-up Door	4	Each
Steel 20'x20', Painted, Roll-up Door	4	Each
Steel, Painted, Exterior Door	6	Each
B30 Roofing		
Built-up Roof	50700	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	10	Each
Steel, Painted, Interior Door	46	Each
Steel, Painted, Interior Double Door	4	Each
C30 Interior Finishes		
Clay Brick, Interior Wall Finish	7905	Sq Ft
Concrete Block, Painted, Interior Wall Finish	15150	Sq Ft
Concrete, Painted, Interior Wall Finish	5515	Sq Ft
Gypsum Board, Interior Wall Finish	5200	Sq Ft
Carpet, Nylon 20 oz., High Traffic	1600	Sq Ft
Ceramic Tile Flooring	700	Sq Ft
Concrete, Painted Flooring	41000	Sq Ft
Vinyl Tile Flooring	7400	Sq Ft
Acoustical Tile Ceiling	5140	Sq Ft
Concrete, Painted Ceiling	44860	Sq Ft
Gypsum Board, Finished Ceiling	700	Sq Ft
D10 Conveying		
Crane, Jib, Electric, 2 Ton	4	Each
Hoist Electric, Overhead, Chain, 3 Ton	3	Each
Platform Lifter, 5 Ton	8	Each
D20 Plumbing		
Drinking Fountain, Refrigerated	2	Each
Lavatory, Vitreous China	12	Each
Service Sink, Iron, Enamel	8	Each
Tankless Water Closet	10	Each
Urinal, Vitreous China	6	Each
Circulator Pump, 1/6 HP, Cold Water	1	Each
Circulator Pump, 1/6 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	1.28	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	1.82	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.78	K Ln Ft
Pipe & Fittings, 4" Copper, Cold Water	0.27	K Ln Ft
Pipe & Fittings, 4" Steel	2.6	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	3.25	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	5.25	K Ln Ft
Water Heater, Gas/Oil, 175 Gph	2	Each
Backflow Preventer, 4"	1	Each
Pipe & Fittings, 4" Cast Iron	1.82	K Ln Ft
Pipe & Fittings, 6" Cast Iron	0.07	K Ln Ft
Pipe & Fittings, 4" PVC	1.319	K Ln Ft
Roof Drain, 4-6"	15	Each
Storm Water & Drain Lift Station, 5 HP	1.319	Each
D30 HVAC		
Pipe & Fittings, 2" Copper	0.52	K Ln Ft
Pipe & Fittings, 2" Steel	1.82	K Ln Ft
Pipe & Fittings, 3" Steel	2.1	K Ln Ft
Pipe & Fittings, 6" Steel	1.26	K Ln Ft
Pipe & Fittings, 8" Steel	0.27	K Ln Ft
Air Handler, Single Zone, 1,300 Cfm	1	Each
Air Handler, Single Zone, 10,000 Cfm	2	Each
Air Handler, Single Zone, 20,000 Cfm	1	Each
Duct Insulation, Fiberglass Blanket	18130	Sq Ft
Ductwork	25900	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	4	Each
Exhaust Fan, Centrifugal, 2,000 Cfm	1	Each
Exhaust Fan, Centrifugal, 5,000 Cfm	1	Each
Fan, Axial Flow, 15,000 Cfm	1	Each
Air Conditioner, Window, 1 Ton	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$3,019,390	\$1.19	0.51%
Unscheduled Maintenance	\$2,154,832	\$0.85	0.36%
Renewal & Replacement	\$4,984,099	\$1.97	0.84%
Total		\$10,158,321	\$4.01
			1.72%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Maintain Platform Lifter, 5 Ton	14.18	9.0%
Refinish Concrete, Painted Ceiling	11.96	7.6%
Place New Membrane Over Existing, Built-up Roof	10.97	6.9%
Replace Membrane, Built-up Roof	9.50	6.0%
Replace Generator, Diesel, 500 kw	6.66	4.2%
Maintain Crane, Jib, Electric, 2 Ton	6.13	3.9%
Clean & Reseal Clay Brick, Exterior, 2nd Floor	4.39	2.8%
Clean & Seal Clay Brick, Interior Wall Finish	3.96	2.5%
Maintain Built-up Roof	3.04	1.9%
Refinish Concrete Block, Painted, Interior Wall Finish	3.01	1.9%
Clean & Reseal Clay Brick, Exterior, 1st Floor	2.92	1.8%
Refinish Concrete, Painted Flooring	2.68	1.7%
Replace Air Handler, Single Zone, 10,000 Cfm	2.62	1.7%
Clean & Seal Concrete Block, Exterior, 1st Floor	2.43	1.5%
Replace Batteries & Check Operation, Smoke Detector	2.36	1.5%
Replace Air Handler, Single Zone, 20,000 Cfm	2.28	1.4%
Replace Crane, Jib, Electric, 2 Ton	2.27	1.4%
Maintain Air Handler, Single Zone, 10,000 Cfm	1.98	1.3%
Replace Receptacle, 120 V, 20 Amp.	1.75	1.1%
Repoint (50% surface) Clay Brick, Exterior, 2nd Floor	1.74	1.1%
Repoint (50% surface) Concrete Block, Painted, Interior Wall Finish	1.72	1.1%
Repoint (50% surface) Clay Brick, Exterior, 1st Floor	1.59	1.0%
Repoint (50% surface) Clay Brick, Interior Wall Finish	1.55	1.0%
Electrical Testing, Generator, Diesel, 500 kw	1.45	0.9%
Replace Steel, Painted, Interior Door Locks	1.34	0.9%
Test Fire Sprinkler Head	1.32	0.8%
Maintain Storm Water & Drain Lift Station, 5 HP	1.24	0.8%
Replace Carpet, Nylon 20 oz., High Traffic	1.14	0.7%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 80 w	1.12	0.7%
Refinish Concrete, Painted, Interior Wall Finish	1.10	0.7%

*Task cost (\$2009) per GSFT over 50 years.

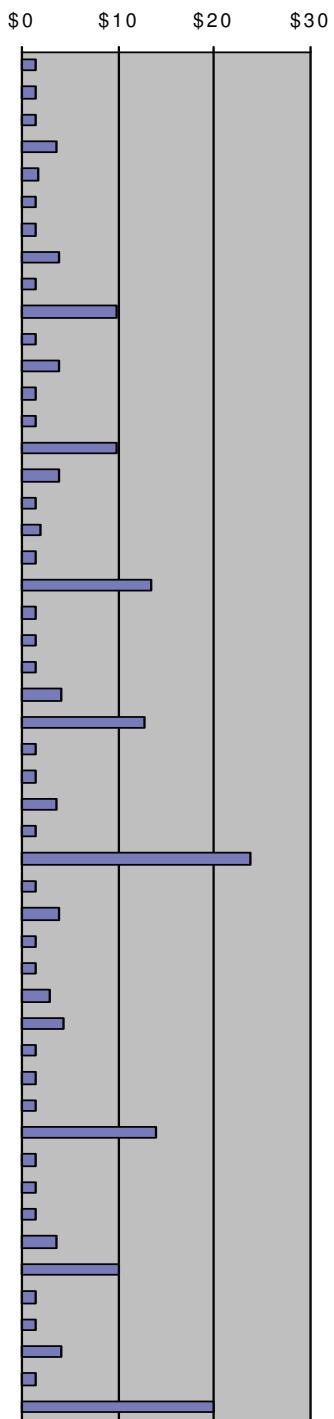
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13			.55	.17	.18	.07	.30	.00		1.40
2		.13		.00	.55	.22	.18	.07	.33	.00		1.48
3		.13			.55	.17	.18	.07	.32	.00		1.41
4		.13	.03	1.97	.55	.32	.18	.07	.33	.00		3.57
5		.01	.19	.09		.55	.25	.18	.09	.33	.00	1.70
6		.13		.00	.55	.22	.18	.07	.34	.00		1.49
7		.13			.55	.20	.18	.07	.30	.00		1.42
8		.13	.03	2.15	.55	.33	.18	.07	.33	.00		3.77
9		.13			.01	.55	.17	.18	.07	.32	.00	1.43
10		5.25	.19	.39	.54	.55	.49	.40	.53	1.40	.03	9.75
11		.13			.55	.17	.18	.07	.30	.00		1.40
12		.13	.03	1.97	.55	.55	.22	.18	.34	.00		3.96
13		.13			.55	.17	.18	.07	.30	.00		1.40
14		.13		.00	.55	.25	.18	.07	.33	.00		1.50
15		.03	5.67	.09	.15	.55	.22	.190	.20	.94	.00	9.75
16		.13	.03	2.15	.55	.33	.18	.07	.33	.00		3.77
17		.13			.55	.20	.18	.09	.30	.00		1.44
18		.13		.37	.55	.22	.18	.07	.38	.00		1.89
19		.13			.55	.17	.18	.07	.30	.00		1.40
20		5.27	.19	.56	2.51	.55	.65	.64	.51	2.51	.03	13.42
21		.13			.55	.20	.18	.07	.32	.00		1.44
22		.13		.00	.55	.25	.18	.09	.33	.00		1.52
23		.13			.55	.17	.18	.07	.30	.00		1.40
24		.13	.03	2.15	.55	.56	.22	.18	.34	.00		4.16
25		2.69	.19	.09	2.30	1.89	.89	.56	.08	3.91	.00	12.61
26		.13		.00	.55	.22	.18	.07	.33	.00		1.48
27		.13		.01	.55	.17	.18	.07	.32	.00		1.43
28		.13	.03	1.97	.55	.35	.18	.07	.33	.00		3.59
29		.13			.55	.20	.18	.09	.30	.00		1.44
30		5.27	9.50	.39	.69	.55	.62	3.27	.63	2.90	.03	23.85
31		.13			.55	.17	.18	.07	.30	.00		1.40
32		.13	.03	2.15	.55	.33	.18	.07	.33	.00		3.77
33		.13			.55	.17	.18	.07	.32	.00		1.41
34		.13		.00	.55	.25	.18	.09	.33	.00		1.52
35		.80	.19	.09		.55	.73	.19	.08	.33	.00	2.96
36		.13	.03	2.33	.55	.50	.22	.18	.38	.00		4.32
37		.13			.55	.22	.18	.07	.30	.00		1.44
38		.13		.00	.55	.18	.18	.07	.33	.00		1.43
39		.13			.55	.22	.18	.07	.32	.00		1.46
40		5.13	.19	.56	2.70	.55	.58	.82	.51	2.81	.03	13.88
41		.13			.55	.24	.18	.09	.30	.00		1.49
42		.13		.00	.55	.20	.18	.07	.34	.00		1.47
43		.13			.55	.23	.18	.07	.30	.00		1.45
44		.13	.03	1.97	.55	.28	.18	.07	.33	.00		3.52
45		.17	5.67	.09	.16	.55	.38	1.91	.20	.94	.00	10.07
46		.13		.00	.55	.20	.18	.09	.33	.00		1.47
47		.13			.55	.22	.18	.07	.30	.00		1.44
48		.13	.03	2.15	.55	.50	.22	.18	.34	.00		4.10
49		.13			.55	.24	.18	.07	.30	.00		1.47
50		7.79	.19	.39	3.11	1.89	1.00	.40	.68	4.50	.03	19.99
Total	32.42	27.33	3.03		33.54	29.97	15.92	17.50	6.84	33.43	.34	200.33

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Medical Clinic

Washington, D.C.

Medical Clinic

Gross Square Feet:	13,000
Height in Ft:	12
Exterior:	Cast Concrete
Floor coverings:	Finished Concrete, Linoleum, Carpet
HVAC:	Packaged DX Air Conditioning
Capacity:	N/A
Occupancy:	50
Replacement Cost:	\$3,995,623

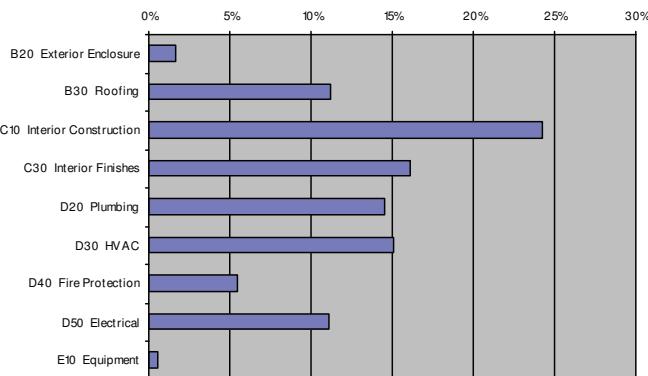
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Concrete, Painted, Exterior, 1st Floor	4927	Sq Ft
Aluminum Fixed Window, 12 sf, 1st Floor	35	Each
Aluminum Frame, Fully Glazed, Exterior Door	2	Each
Steel, Painted, Exterior Door	2	Each
Steel w/ Safety Glass, Painted, Exterior Door	2	Each
B30 Roofing		
Built-up Roof	13000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	7	Each
Wood Solid Core, Painted, Interior Door	215	Each
C30 Interior Finishes		
Ceramic Tile, 4"x4", Interior Wall Finish	4800	Sq Ft
Fabric, Interior Wall Finish	10840	Sq Ft
Sheetrock, Unstippled, Interior Wall Finish	31420	Sq Ft
Carpet, Nylon 20 oz., High Traffic	3250	Sq Ft
Concrete, Painted Flooring	650	Sq Ft
Linoleum Flooring	9100	Sq Ft
Acoustical Tile, Dropped Ceiling	13000	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	1	Each
Lavatory, Vitreous China	7	Each
Service Sink, Iron, Enamel	2	Each
Sink, Stainless Steel	37	Each
Tankless Water Closet	7	Each
Urinal, Vitreous China	3	Each
Circulator Pump, 1/12 HP, Cold Water	1	Each
Circulator Pump, 1/12 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	2	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	1.6	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	1.9	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	2	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	1.6	K Ln Ft
Water Heater, Gas/Oil, 65 Gph	1	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.5	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.3	K Ln Ft
Pipe & Fittings, 4" PVC	0.1	K Ln Ft
Roof Drain, 4-6"	4	Each
D30 HVAC		
Pipe & Fittings, 4" Steel, Gas	0.3	K Ln Ft
Duct Insulation, Fiberglass Blanket	2332	Sq Ft
Ductwork	3480	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	4	Each
Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	2	Each
Thermostat	4	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	65	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	4	Each
D50 Electrical		
Distribution Switch, Fused, <600 V	3	Each
Main Switchgear, <1,200 Amp.	1	Each
Exit Lighting Fixture, w/ Battery	6	Each
Fluorescent Lighting Fixture, 160 w	204	Each
Receptacle, 120 V, 15 Amp.	260	Each
Wiring Device, Switch	130	Each
Fire Alarm Horn & Strobe	4	Each
Heat Detector	4	Each
Manual Pull Station	4	Each
Smoke Detector	30	Each
E10 Equipment		
Microwave Oven	1	Each
Refrigerator, Domestic	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$489,127	\$0.75	0.24%
Unscheduled Maintenance	\$475,163	\$0.73	0.24%
Renewal & Replacement	\$2,196,737	\$3.38	1.10%
Total	\$3,161,027	\$4.86	1.58%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Refinish Sheetrock, Unstippled, Interior Wall Finish	23.59	11.4%
Replace Wood, Solid Core, Painted, Interior Door	19.94	9.7%
Replace Wood, Solid Core, Painted, Interior Door Locks	19.57	9.5%
Repair Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	13.89	6.7%
Place New Membrane Over Existing, Built-up Roof	10.97	5.3%
Replace Membrane, Built-up Roof	9.50	4.6%
Replace Carpet, Nylon 20 oz., High Traffic	9.06	4.4%
Maintain Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	6.71	3.2%
Replace Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	6.54	3.2%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	6.03	2.9%
Replace Fluorescent Lighting Fixture, 160 w	5.51	2.7%
Maintain Wood, Solid Core, Painted, Interior Door Locks	5.25	2.5%
Refinish Wood, Solid Core, Painted, Interior Door	3.95	1.9%
Maintain Fire Sprinkler System	3.64	1.8%
Test Gages & Valves, Fire Sprinkler System	3.35	1.6%
Replace Linoleum Flooring	3.29	1.6%
Maintain Built-up Roof	3.04	1.5%
Replace Faucet Washer & Clean Trap, Sink, Stainless Steel	2.92	1.4%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	2.83	1.4%
Replace Batteries & Check Operation, Smoke Detector	2.76	1.3%
Replace Sink, Stainless Steel	2.71	1.3%
Refinish Concrete, Painted, Exterior, 1st Floor	2.05	1.0%
Replace Valve Set, Sink, Stainless Steel	1.39	0.7%
Repair Wiring Device, Switch	1.36	0.7%
Replace Pipe & Fittings, 3/4" Copper, Cold Water (20% of Pipe)	1.34	0.6%
Repair Main Switchgear, <1,200 Amp.	1.25	0.6%
Clean Water Heater, Gas/Oil, 65 Gph	1.21	0.6%
Replace Receptacle, 120 V, 15 Amp.	1.19	0.6%
Replace Fabric, Interior Wall Finish	1.15	0.6%
Replace Pipe & Fittings, 3/4" Copper, Hot Water (20% of Pipe)	1.07	0.5%

*Task cost (\$2009) per GSFT over 50 years.

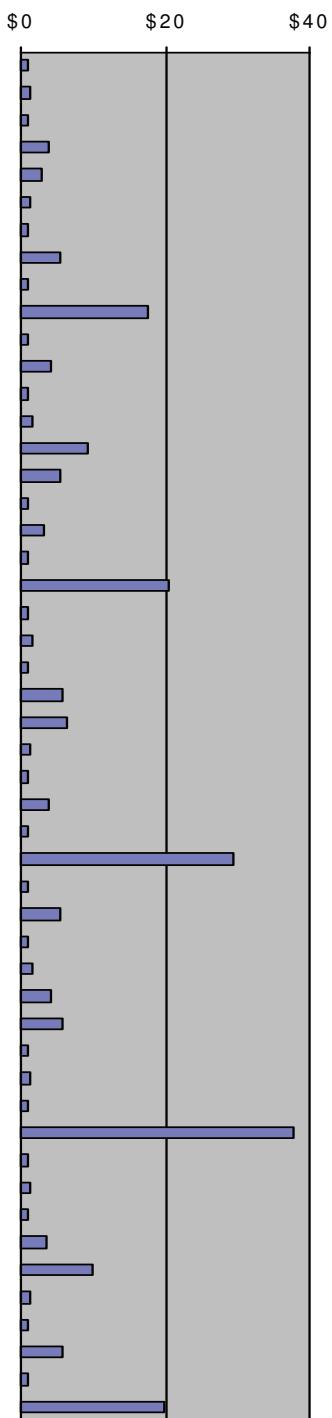
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	Interior Finishes	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13					.18	.30	.21	.14	.02		.97
2		.13				.03	.59	.30	.21	.14	.02		1.42
3		.13					.18	.30	.21	.16	.02		.99
4		.13	.37		2.00		.59	.30	.21	.14	.02		3.75
5		.04	.19	1.58			.33	.30	.24	.32	.02		3.02
6		.13				.03	.59	.30	.21	.16	.02		1.43
7		.13					.23	.30	.21	.14	.02		1.03
8		.13	.37		3.48		.80	.30	.21	.14	.02		5.44
9		.13				.09	.18	.30	.21	.16	.02		1.08
10		.60	.19	6.47		.19	1.50	5.03	.52	2.98	.13		17.59
11		.13					.18	.30	.21	.14	.02		.97
12		.03	.13	.37	2.00		.79	.31	.30	.16	.02		4.10
13		.13					.18	.30	.21	.14	.02		.97
14		.13				.03	.64	.30	.21	.14	.02		1.47
15		.09	5.67	1.58		.01	.28	.30	.46	.94	.02		9.36
16		.13	.37		3.48		.80	.30	.21	.14	.02		5.44
17		.13					.23	.30	.22	.14	.02		1.04
18		.13				1.73	.59	.30	.21	.16	.02		3.13
19		.13					.18	.30	.21	.14	.02		.97
20		.67	.19	7.25		2.31	1.68	3.61	.50	4.11	.13		20.44
21		.13					.23	.30	.21	.16	.02		1.05
22		.13				.03	.64	.30	.22	.14	.02		1.48
23		.13					.18	.30	.21	.14	.02		.97
24		.03	.13	.37		3.48	1.00	.31	.30	.16	.02		5.79
25		.20	.19	1.58			3.06	.31	.22	.94	.02		6.52
26		.13				.03	.59	.30	.21	.14	.02		1.42
27		.13				.09	.18	.30	.21	.16	.02		1.08
28		.13	.37		2.00		.64	.30	.21	.14	.02		3.80
29		.13					.23	.30	.22	.14	.02		1.04
30		.65	9.50	6.47		1.32	1.33	5.73	.74	3.55	.13		29.42
31		.13					.18	.30	.21	.14	.02		.97
32		.13	.37		3.48		.80	.30	.21	.14	.02		5.44
33		.13					.18	.30	.21	.16	.02		.99
34		.13				.03	.64	.30	.22	.14	.02		1.48
35		.04	.19	1.58			1.36	.30	.22	.32	.02		4.04
36		.03	.13	.37		3.70	.71	.31	.30	.16	.02		5.72
37		.13					.26	.30	.21	.14	.02		1.05
38		.13				.03	.51	.30	.21	.14	.02		1.34
39		.13					.26	.30	.21	.16	.02		1.07
40		.67	.19	20.72		3.79	3.33	3.61	.50	4.73	.13		37.67
41		.13					.31	.30	.22	.14	.02		1.12
42		.13				.03	.56	.30	.21	.16	.02		1.41
43		.13					.27	.30	.21	.14	.02		1.06
44		.13	.37		2.00		.51	.30	.21	.14	.02		3.67
45		.09	5.67	1.58		.10	.77	.30	.46	.94	.02		9.93
46		.13				.03	.56	.30	.22	.14	.02		1.40
47		.13					.26	.30	.21	.14	.02		1.05
48		.03	.13	.37		3.48	.91	.31	.30	.16	.02		5.70
49		.13					.31	.30	.21	.14	.02		1.11
50		.88	.19	6.47		.19	3.87	5.03	.61	2.36	.13		19.73
Total		4.05	27.33	58.97		39.14	35.28	36.73	13.35	26.97	1.34		243.16

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Mortuary

Washington, D.C.

Mortuary

Gross Square Feet:	10,000
Height in Ft:	10
Exterior:	Aluminum Siding
Floor coverings:	Carpet, Ceramic Tile
HVAC:	Electric Cool, Gas Heat, Multizone Unit
Capacity:	N/A
Occupancy:	600
Replacement Cost:	\$2,340,000

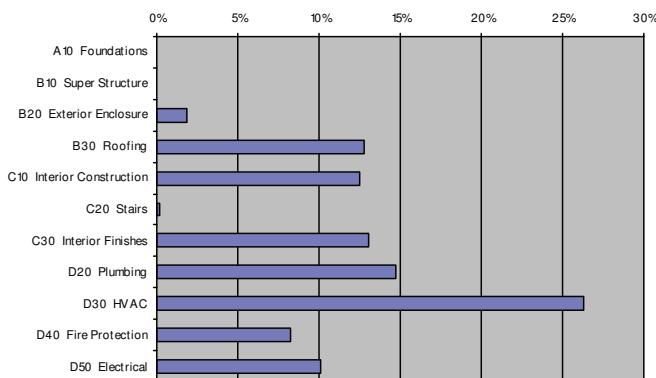
Components

Uniform / Component	Quantity	Units
A10 Foundations		
Concrete Slab	200	Sq Ft
B10 Super Structure		
Concrete Decking	200	Sq Ft
B20 Exterior Enclosure		
Aluminum Siding, Painted, Exterior, 1st Floor	3825	Sq Ft
Steel Frame, Painted, Operable Window, 12 sf, 1st Floor	38	Each
Wood, Solid Core, Painted, Exterior Door	4	Each
B30 Roofing		
Built-up Roof	10000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	4	Each
Wood, Painted, Fully Glazed, Interior Door	67	Each
C20 Stairs		
Concrete, Exterior Stairs	100	Sq Ft
C30 Interior Finishes		
Fabric, Interior Wall Finish	3335	Sq Ft
Sheetrock, Stippled, Interior Wall Finish	3335	Sq Ft
Wallpaper, Interior Wall Finish	6670	Sq Ft
Carpet, Wool 45 oz., Premium	7000	Sq Ft
Ceramic Tile Flooring	3000	Sq Ft
Acoustical Tile Ceiling	10000	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	2	Each
Flush Tank Water Closet, One Piece	4	Each
Lavatory, Vitreous China	4	Each
Sink, Stainless Steel	6	Each
Urinal, Vitreous China	2	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.73	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.39	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.86	K Ln Ft
Pipe & Fittings, 4" Steel	0.88	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	1.17	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.63	K Ln Ft
Water Heater, Gas/Oil, 175 Gph	2	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.36	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.2	K Ln Ft
Pipe & Fittings, 4" PVC	0.116	K Ln Ft
Roof Drain, 4-6"	4	Each
D30 HVAC		
Duct Insulation, Fiberglass Blanket	3042	Sq Ft
Ductwork	4540	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	2	Each
Exhaust Fan, Roof Mounted, 1,000 Cfm	2	Each
Air Conditioner, Rooftop, Single Zone, 50 Ton	1	Each
Thermostat	4	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	71	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	4	Each
D50 Electrical		
Main Switchgear, <1,200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	2	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	1	Each
Exit Lighting Fixture, w/ Battery	6	Each
Fluorescent Lighting Fixture, 160 w	50	Each
Grounded Fault Circuit Interruptor, 15 Amp.	2	Each
Receptacle, 120 V, 15 Amp.	25	Each
TV Cable Outlet	1	Each
Wiring Device, Switch	10	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	4	Each
Heat Detector	4	Each
Manual Pull Station	4	Each
Smoke Detector	20	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$379,306	\$0.76	0.32%
Unscheduled Maintenance	\$320,572	\$0.64	0.27%
Renewal & Replacement	\$1,431,965	\$2.86	1.22%
Total	\$2,131,843	\$4.26	1.82%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, Single Zone, 50 Ton	27.38	15.1%
Replace Carpet, Wool 45 oz., Premium	14.34	7.9%
Repair Air Conditioner, Rooftop, Single Zone, 50 Ton	13.03	7.2%
Place New Membrane Over Existing, Built-up Roof	10.97	6.1%
Replace Wood, Painted, Fully Glazed, Interior Door	10.39	5.7%
Replace Membrane, Built-up Roof	9.50	5.2%
Replace Wood, Painted, Fully Glazed, Interior Door Locks	7.93	4.4%
Replace Ceramic Tile Flooring	5.89	3.3%
Maintain Air Conditioner, Rooftop, Single Zone, 50 Ton	4.92	2.7%
Maintain Fire Sprinkler System	4.73	2.6%
Replace Water Heater, Gas/Oil, 175 Gph	4.55	2.5%
Test Gages & Valves, Fire Sprinkler System	4.36	2.4%
Refinish Sheetrock, Stippled, Interior Wall Finish	3.25	1.8%
Clean Water Heater, Gas/Oil, 175 Gph	3.16	1.7%
Maintain Built-up Roof	3.04	1.7%
Replace Batteries & Check Operation, Smoke Detector	2.39	1.3%
Maintain Wood, Painted, Fully Glazed, Interior Door Locks	2.13	1.2%
Replace Wallpaper, Interior Wall Finish	1.99	1.1%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	1.92	1.1%
Refinish Aluminum Siding, Painted, Exterior, 1st Floor	1.83	1.0%
Replace Fluorescent Lighting Fixture, 160 w	1.76	1.0%
Refinish Wood, Painted, Fully Glazed, Interior Door	1.75	1.0%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	1.66	0.9%
Repair Main Switchgear, <1,200 Amp.	1.63	0.9%
Maintain Exhaust Fan, Roof Mounted, 1,000 Cfm	1.45	0.8%
Maintain Power Panel Board, 208 Y/120 V, 200 Amp.	1.25	0.7%
Replace Power Panel Board, 208 Y/120 V, 200 Amp.	1.21	0.7%
Test Fire Sprinkler Head	1.20	0.7%
Repair Wool 45 oz., Premium (2% of Carpet)	1.15	0.6%
Replace Main Switchgear, <1,200 Amp.	1.13	0.6%

*Task cost (\$2009) per GSFT over 50 years.

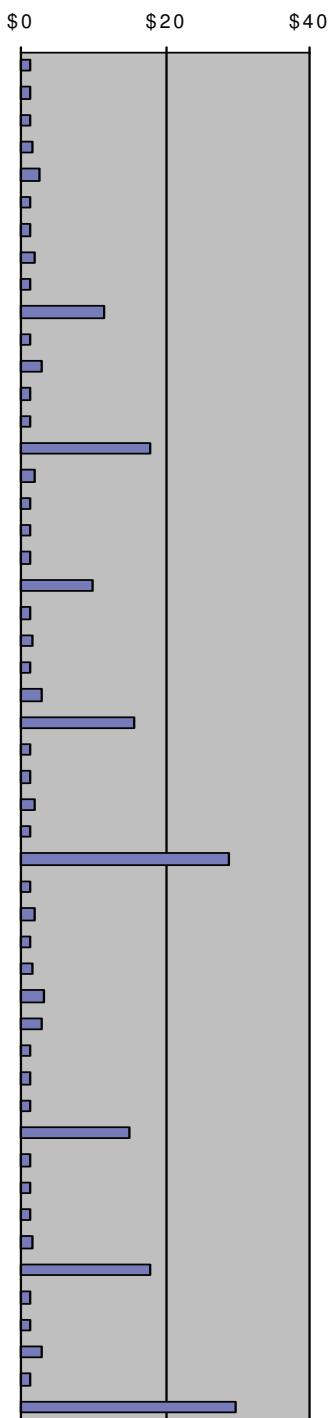
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	Plumbing	HVAC Systems	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13					.30	.27	.28	.21			1.19
2		.13					.44	.27	.28	.21			1.33
3		.13					.30	.27	.28	.21			1.19
4		.13	.15		.27		.44	.27	.28	.21			1.75
5		.04	.19	.64	.14		.52	.27	.31	.46			2.57
6		.13					.44	.27	.28	.21			1.33
7		.01	.13				.34	.27	.28	.21			1.24
8		.13	.15		.29		.48	.27	.28	.22			1.83
9		.13			.05		.30	.27	.28	.21			1.24
10		.66	.19	2.62	.15		1.11	4.78	.70	1.33			11.57
11		.13					.30	.27	.28	.21			1.19
12		.13	.15		.27		1.48	.27	.39	.21			2.91
13		.13					.30	.27	.28	.21			1.19
14		.01	.13				.48	.27	.28	.21			1.38
15		.04	5.67	.64	.03	.26	.43	9.23	.60	.87			17.76
16		.13	.15		.29		.48	.27	.28	.22			1.83
17		.13					.43	.27	.29	.21			1.34
18		.13			.05		.44	.27	.28	.21			1.38
19		.13					.30	.27	.28	.21			1.19
20		.75	.19	3.08		1.44	1.06	.68	.69	1.99			9.89
21		.01	.13				.34	.27	.28	.21			1.24
22		.13					.57	.27	.29	.21			1.47
23		.13					.30	.27	.28	.21			1.19
24		.13	.15		.27		1.52	.27	.39	.22			2.96
25		.04	.19	.64		7.17	1.84	4.62	.29	.85			15.62
26		.13					.44	.27	.28	.21			1.33
27		.13			.05		.30	.27	.28	.21			1.24
28		.01	.13	.15		.29	.48	.27	.28	.21			1.83
29		.13					.43	.27	.29	.21			1.34
30		.66	9.50	2.62	.03	.72	1.02	10.59	1.00	2.68			28.81
31		.13					.30	.27	.28	.21			1.19
32		.13	.15		.27		.48	.27	.28	.21			1.79
33		.13					.30	.27	.28	.22			1.20
34		.13					.57	.27	.29	.21			1.47
35		.04	.19	.64		.14	1.11	.27	.29	.46			3.14
36		.13	.15		.35		1.43	.27	.39	.21			2.94
37		.13					.34	.27	.28	.21			1.23
38		.13					.39	.27	.28	.21			1.28
39		.13					.34	.27	.28	.21			1.23
40		1.02	.19	3.08		1.44	1.36	5.03	.69	2.20			15.00
41		.13					.47	.27	.29	.22			1.39
42		.13					.43	.27	.28	.21			1.32
43		.13					.34	.27	.28	.21			1.23
44		.13	.15		.27		.39	.27	.28	.21			1.71
45		.04	5.67	.64	.03	.32	.64	9.23	.60	.87			18.03
46		.13					.52	.27	.29	.21			1.43
47		.01	.13				.34	.27	.28	.21			1.24
48		.13	.15		.29		1.47	.27	.39	.21			2.93
49		.13					.39	.27	.28	.22			1.29
50		.66	.19	10.53	.34	13.07	2.28	.44	.84	1.32			29.69
Total		3.99	27.33	26.67	.42	27.90	31.46	56.09	17.59	21.61			213.06

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Motel, 18 Units

Washington, D.C.

Motel, 18 Units

Gross Square Feet:	8,000
Height in Ft:	9
Exterior:	Clay Brick
Floor coverings:	Carpet, Ceramic Tile
HVAC:	Electric Cooling & Heating
Capacity:	N/A
Occupancy:	40
Replacement Cost:	\$1,720,000

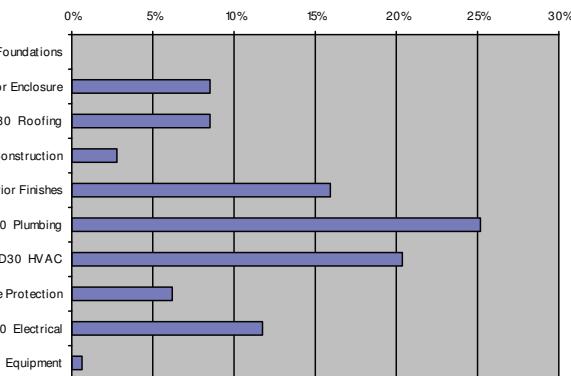
Components

Uniform / Component	Quantity	Units
A10 Foundations		
Concrete Slab	4800	Sq Ft
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	3456	Sq Ft
Aluminum Operable Window, 24 sf, 1st Floor	24	Each
Steel, Painted, Exterior Door	2	Each
Wood, Solid Core, Fully Glazed, Exterior Door	2	Each
Wood, Solid Core, Painted, Exterior Door	18	Each
B30 Roofing		
Aluminum Gutter, Downspouts, Fittings	0.2	K Ln Ft
Asphalt Shingle Roof	8000	Sq Ft
C10 Interior Construction		
Wood, Hollow Core, Painted, Interior Door	27	Each
C30 Interior Finishes		
Concrete, Painted, Interior Wall Finish	3024	Sq Ft
Sheetrock, Stippled, Interior Wall Finish	14385	Sq Ft
Carpet, Nylon 20 oz., Low Traffic	7000	Sq Ft
Ceramic Tile Flooring	1000	Sq Ft
Sheetrock, Unstippled Ceiling	8000	Sq Ft
D20 Plumbing		
Bathtub & Shower Enclosure, Fiberglass	18	Each
Flush Tank Water Closet, One Piece	20	Each
Lavatory, Vitreous China	20	Each
Circulator Pump, 1/6 HP, Cold Water	1	Each
Circulator Pump, 1/6 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	1.96	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	1.23	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	2.238	K Ln Ft
Pipe & Fittings, 4" Steel	0.752	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	2.336	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	1.427	K Ln Ft
Water Heater, Gas/Oil, 175 Gph	2	Each
Water Storage Tank, 2,500 Gal.	1	Each
Backflow Preventer, 4"	1	Each
Pipe & Fittings, 6" Cast Iron	0.797	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.179	K Ln Ft
Pipe & Fittings, 4" PVC	0.042	K Ln Ft
D30 HVAC		
Exhaust Fan, Ceiling, 200-500 Cfm	20	Each
Air Conditioner, Window, 2 Ton	22	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	60	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	4	Each
D50 Electrical		
Main Switchgear, <1,200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	3	Each
Exit Lighting Fixture, w/ Battery	4	Each
Grounded Fault Circuit Interruptor, 15 Amp.	20	Each
Incandescent Lighting Fixture, Basic, 100 w	40	Each
Receptacle, 120 V, 15 Amp.	80	Each
TV Cable Outlet	18	Each
Wiring Device, Switch	40	Each
Fire Alarm Horn & Strobe	20	Each
Heat Detector	20	Each
Manual Pull Station	4	Each
Smoke Detector	34	Each
E10 Equipment		
Microwave Oven	1	Each
Refrigerator, Domestic	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$793,871	\$1.98	0.92%
Unscheduled Maintenance	\$708,849	\$1.77	0.82%
Renewal & Replacement	\$1,247,807	\$3.12	1.45%
Total	\$2,750,527	\$6.88	3.20%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Maintain Air Conditioner, Window, 2 Ton	25.13	9.8%
Refinish Sheetrock, Stippled, Interior Wall Finish	17.55	6.9%
Replace Carpet, Nylon 20 oz., Low Traffic	15.85	6.2%
Refinish Sheetrock, Unstippled Ceiling	13.20	5.2%
Replace Air Conditioner, Window, 2 Ton	10.99	4.3%
Maintain Asphalt Shingle Roof	8.28	3.2%
Maintain Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	8.20	3.2%
Clean & Reseal Clay Brick, Exterior, 1st Floor	5.93	2.3%
Maintain Fire Sprinkler System	5.91	2.3%
Replace Bathtub & Shower Enclosure, Fiberglass	5.71	2.2%
Replace Water Heater, Gas/Oil, 175 Gph	5.69	2.2%
Test Gages & Valves, Fire Sprinkler System	5.45	2.1%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	5.41	2.1%
Replace Asphalt Shingle Roof	5.23	2.0%
Replace Batteries & Check Operation, Smoke Detector	5.08	2.0%
Check Operation, Heat Detector	4.96	1.9%
Place New Shingles Over Existing, Asphalt Shingle Roof	4.27	1.7%
Replace Wood, Hollow Core, Painted, Interior Door Locks	3.99	1.6%
Clean Water Heater, Gas/Oil, 175 Gph	3.94	1.5%
Refinish Concrete, Painted, Interior Wall Finish	3.81	1.5%
Replace Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	3.69	1.4%
Repair Diverter Valve, Bathtub & Shower Enclosure, Fiberglass	3.68	1.4%
Repoint (50% surface) Clay Brick, Exterior, 1st Floor	3.23	1.3%
Replace Wood, Solid Core, Painted, Exterior Door Locks	2.81	1.1%
Replace Wood, Solid Core, Painted, Exterior Door	2.71	1.1%
Replace Faucet Washer & Clean Trap, Lavatory, Vitreous China	2.56	1.0%
Replace Backflow Preventer, 4"	2.50	1.0%
Replace Ceramic Tile Flooring	2.46	1.0%
Maintain Power Panel Board, 208 Y/120 V, 200 Amp.	2.35	0.9%
Replace Power Panel Board, 208 Y/120 V, 200 Amp.	2.27	0.9%

*Task cost (\$2009) per GSFT over 50 years.

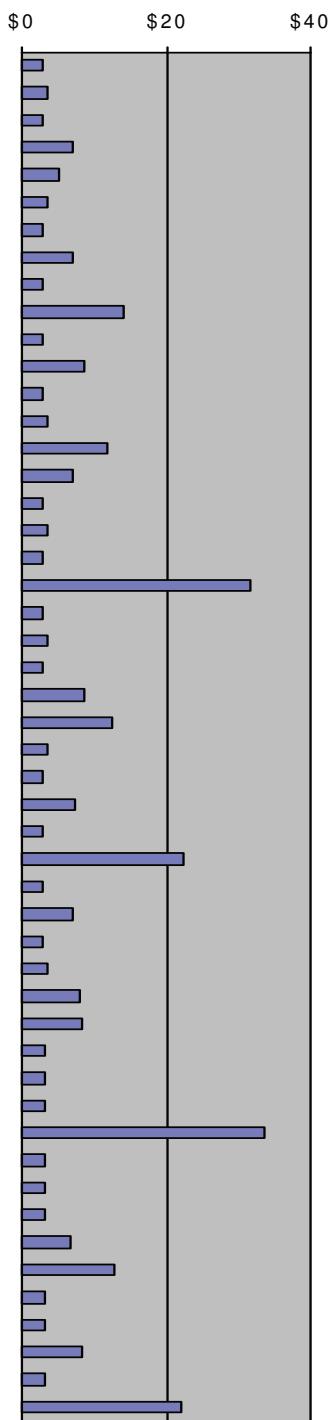
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	Interior Finishes	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.38					.46	1.14	.34	.50	.03		2.84
2		.38					1.00	1.14	.34	.50	.03		3.38
3		.38					.46	1.14	.34	.50	.03		2.84
4		.38	.07	2.88			1.75	1.14	.34	.50	.03		7.08
5	.24	.48	.32	.11			1.57	1.14	.38	.91	.03		5.17
6		.38					1.00	1.14	.34	.50	.03		3.38
7	.05	.38					.56	1.14	.34	.50	.03		2.99
8		.38	.07	2.88			1.75	1.14	.34	.50	.03		7.08
9		.38					.46	1.14	.34	.50	.03		2.84
10	4.37	.48	1.32	.11			3.59	1.39	.80	1.72	.20		13.98
11		.38					.46	1.14	.34	.50	.03		2.84
12		.38	.07	2.88			3.08	1.14	.48	.50	.03		8.56
13		.38					.46	1.14	.34	.50	.03		2.84
14	.05	.38					1.10	1.14	.34	.50	.03		3.53
15	.37	.48	.32	5.33			1.62	1.14	.75	1.80	.03		11.83
16		.38	.07	2.88			1.75	1.14	.34	.50	.03		7.08
17		.38					.62	1.14	.36	.50	.03		3.03
18		.38					1.00	1.14	.34	.50	.03		3.38
19		.38					.46	1.14	.34	.50	.03		2.84
20	4.37	4.88	1.39	3.10			6.67	7.34	.78	3.08	.20		31.81
21	.05	.38					.56	1.14	.34	.50	.03		2.99
22		.38					1.16	1.14	.36	.50	.03		3.57
23		.38					.46	1.14	.34	.50	.03		2.84
24		.38	.07	2.88			3.08	1.14	.48	.50	.03		8.56
25	2.17	.48	.32	.42			6.14	1.14	.36	1.55	.03		12.61
26		.38					1.00	1.14	.34	.50	.03		3.38
27		.38					.46	1.14	.34	.50	.03		2.84
28	.05	.38	.07	2.88			1.85	1.14	.34	.50	.03		7.23
29		.38					.62	1.14	.36	.50	.03		3.03
30	4.49	.48	1.78	5.33			3.39	1.39	1.17	4.10	.20		22.34
31		.38					.46	1.14	.34	.50	.03		2.84
32		.38		2.88			1.75	1.14	.34	.50	.03		7.01
33		.38					.46	1.14	.34	.50	.03		2.84
34		.38	.07				1.16	1.14	.36	.50	.03		3.64
35	.29	.48	.32	.11			4.47	1.14	.36	.91	.03		8.11
36		.38		2.88			2.80	1.14	.48	.50	.03		8.20
37		.38					.75	1.14	.34	.50	.03		3.13
38		.38	.07				.72	1.14	.34	.50	.03		3.17
39		.38					.75	1.14	.34	.50	.03		3.13
40	6.08	5.39	1.32	3.10			5.50	7.34	.78	3.72	.20		33.44
41		.38					.91	1.14	.36	.50	.03		3.31
42		.38	.07				.82	1.14	.34	.50	.03		3.27
43		.38					.75	1.14	.34	.50	.03		3.13
44		.38		2.88			1.47	1.14	.34	.50	.03		6.73
45	.37	.48	.32	5.33			2.50	1.14	.75	1.80	.03		12.72
46		.38	.07				.88	1.14	.36	.50	.03		3.35
47	.05	.38					.75	1.14	.34	.50	.03		3.17
48		.38		2.88			2.80	1.14	.48	.50	.03		8.20
49		.38					.85	1.14	.34	.50	.03		3.23
50		6.29	.48	1.39	2.88		7.50	1.39	.94	1.08	.20		22.16
Total	29.28	29.18	9.55	54.61			86.61	70.11	21.46	40.56	2.17		343.52

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Motel, 40 Units

Washington, D.C.

Motel, 40 Units

Gross Square Feet:	18,000
Height in Ft:	20
Exterior:	Stucco
Floor coverings:	Finished Concrete, Quarry Tile, Carpet
HVAC:	Heat Pumps
Capacity:	N/A
Occupancy:	80
Replacement Cost:	\$3,606,280

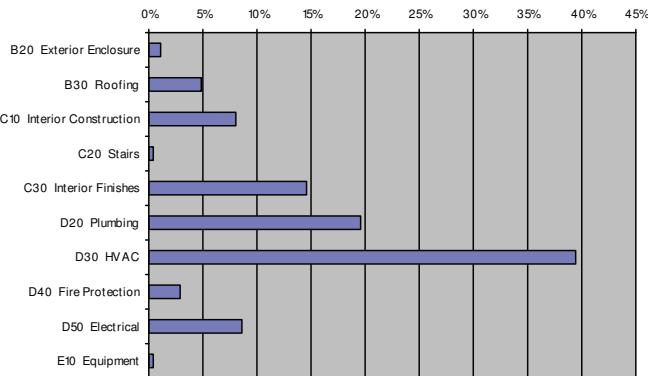
Components (Continued on Page 156)

Uniform / Component	Quantity	Units
B20 Exterior Enclosure		
Stucco, Painted, Exterior, 1st Floor	3230	Sq Ft
Stucco, Painted, Exterior, 2nd Floor	3230	Sq Ft
Aluminum Fixed Window, 24 sf, 1st Floor	8	Each
Aluminum Operable Window, 24 sf, 1st Floor	20	Each
Aluminum Operable Window, 24 sf, 2nd Floor	20	Each
Aluminum Frame, Fully Glazed, Exterior Door	2	Each
Aluminum Frame, Fully Glazed, Sliding Exterior Door	2	Each
Steel, Painted, Exterior Door	2	Each
B30 Roofing		
Single-Ply Modified Bituminous/Thermoplastic Roof	9000	Sq Ft
C10 Interior Construction		
Wood, Painted, Fully Glazed, Sliding Interior Door	42	Each
Wood, Solid Core, Painted, Interior Door	90	Each
C20 Stairs		
Masonry, Interior Stairs	600	Sq Ft
Metal, Painted, Interior Railing	160	Ln Ft
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	2000	Sq Ft
Sheetrock, Unstippled, Interior Wall Finish	5000	Sq Ft
Vinyl, Interior Wall Finish	39450	Sq Ft
Carpet, Nylon 20 oz., High Traffic	3150	Sq Ft
Carpet, Nylon 20 oz., Low Traffic	9700	Sq Ft
Ceramic Tile Flooring	2000	Sq Ft
Concrete, Painted Flooring	900	Sq Ft
Quarry Tile Flooring	2250	Sq Ft
Sheetrock, Unstippled Ceiling	8000	Sq Ft
Textured Spray Ceiling	10000	Sq Ft
D20 Plumbing		
Bathtub & Shower Enclosure, Fiberglass	40	Each
Drinking Fountain, Refrigerated	1	Each
Flush Tank Water Closet, One Piece	42	Each
Lavatory, Vitreous China	42	Each
Service Sink, Iron, Enamel	2	Each
Circulator Pump, 1/2 HP, Cold Water	1	Each
Circulator Pump, 1/2 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	3.9	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	2.5	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	4.5	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	3.9	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	2.5	K Ln Ft
Water Heater, Gas/Oil, 275 Gph	2	Each
Water Storage Tank, 2,500 Gal.	1	Each
Backflow Preventer, 4"	2	Each
Pipe & Fittings, 6" Cast Iron	1.4	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.2	K Ln Ft
Pipe & Fittings, 4" PVC	0.2	K Ln Ft
Roof Drain, 4-6"	3	Each
D30 HVAC		
Pipe & Fittings, 4" Steel, Gas	0.2	K Ln Ft
Duct Insulation, Fiberglass Blanket	4650	Sq Ft
Ductwork	6940	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	42	Each
Heat Pump, 1 Ton	40	Each
Heat Pump, 5 Ton	2	Each
Thermostat	41	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	90	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	8	Each
D50 Electrical		
Distribution Switch, Fused, <600 V	3	Each
Main Switchgear, <1,200 Amp.	1	Each
Exit Lighting Fixture, w/ Battery	6	Each
Fluorescent Lighting Fixture, 160 w	75	Each
Incandescent Lighting Fixture, Basic, 100 w	80	Each
Receptacle, 120 V, 15 Amp.	250	Each
Wiring Device, Switch	175	Each
Fire Alarm Horn & Strobe	42	Each
Heat Detector	42	Each
Manual Pull Station	8	Each
Smoke Detector	60	Each
E10 Equipment		
Cooking Range, Domestic	1	Each
Microwave Oven	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$1,711,141	\$1.90	0.95%
Unscheduled Maintenance	\$1,425,202	\$1.58	0.79%
Renewal & Replacement	\$3,447,776	\$3.83	1.91%
Total	\$6,584,119	\$7.32	3.65%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Maintain Heat Pump, 1 Ton	42.29	14.8%
Replace Heat Pump, 1 Ton	22.33	7.8%
Repair Heat Pump, 1 Ton	15.04	5.2%
Replace Vinyl, Interior Wall Finish	10.91	3.8%
Replace Carpet, Nylon 20 oz., Low Traffic	9.76	3.4%
Replace Membrane, Single-Ply Modified Bituminous/Thermoplastic Roof	7.98	2.8%
Maintain Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	7.66	2.7%
Replace Carpet, Nylon 20 oz., High Traffic	6.34	2.2%
Replace Wood, Solid Core, Painted, Interior Door	6.03	2.1%
Replace Wood, Painted, Fully Glazed, Sliding Interior Door	6.02	2.1%
Replace Wood, Solid Core, Painted, Interior Door Locks	5.92	2.1%
Refinish Sheetrock, Unstippled Ceiling	5.87	2.0%
Refinish Textured Spray Ceiling	5.65	2.0%
Replace Bathtub & Shower Enclosure, Fiberglass	5.64	2.0%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	4.83	1.7%
Check Operation, Heat Detector	4.63	1.6%
Repair Single-Ply Modified Bituminous/Thermoplastic Roof	4.36	1.5%
Maintain Thermostat	4.33	1.5%
Replace Thermostat	4.31	1.5%
Replace Batteries & Check Operation, Smoke Detector	3.98	1.4%
Replace Water Heater, Gas/Oil, 275 Gph	3.80	1.3%
Repair Diverter Valve, Bathtub & Shower Enclosure, Fiberglass	3.64	1.3%
Replace Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	3.45	1.2%
Replace Quarry Tile Flooring	2.78	1.0%
Replace Wood, Painted, Fully Glazed, Sliding Interior Door Locks	2.76	1.0%
Replace Textured Spray Ceiling	2.75	1.0%
Maintain Single-Ply Modified Bituminous/Thermoplastic Roof	2.72	0.9%
Refinish Sheetrock, Unstippled, Interior Wall Finish	2.71	0.9%
Maintain Fire Sprinkler System	2.63	0.9%
Test Gages & Valves, Fire Sprinkler System	2.42	0.8%

*Task cost (\$2009) per GSFT over 50 years.

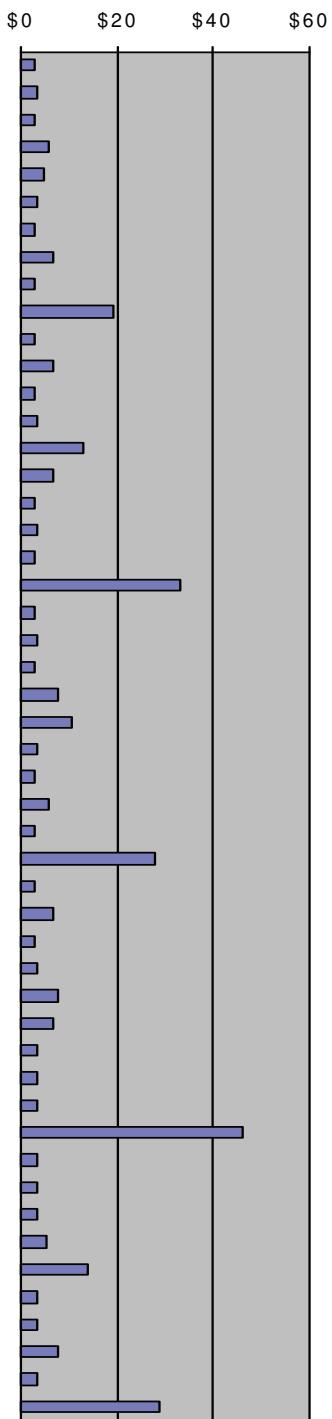
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.10				.28	1.99	.16	.34	.02		2.89
2		.10			.02	.82	1.99	.16	.34	.02		3.45
3		.10				.28	1.99	.16	.35	.02		2.90
4		.10	.21	.01	1.34	1.56	1.99	.16	.34	.02		5.72
5		.03	.17	.70	.15	1.21	1.99	.18	.59	.02		5.03
6		.10			.02	.82	1.99	.16	.35	.02		3.46
7		.10				.38	1.99	.16	.34	.02		2.98
8		.10	.21	.01	2.38	1.57	1.99	.16	.34	.02		6.77
9		.10				.28	1.99	.16	.35	.02		2.90
10		.65	1.62	2.87	.20	3.19	8.03	.46	1.93	.16		19.10
11		.10				.28	1.99	.16	.34	.02		2.89
12		.04	.10	.21	.01	1.34	2.48	1.99	.28	.35	.02	6.83
13		.10				.28	1.99	.16	.34	.02		2.89
14		.10			.02	.91	1.99	.16	.34	.02		3.54
15		.11	.17	.70	.01	7.00	1.34	1.99	.33	1.51	.02	13.17
16		.10	.21	.01	2.38	1.57	1.99	.16	.34	.02		6.77
17		.10				.35	1.99	.17	.34	.02		2.98
18		.10			.02	.82	1.99	.16	.35	.02		3.46
19		.10				.28	1.99	.16	.34	.02		2.89
20		.66	3.99	3.08	.01	1.61	5.69	14.82	.44	2.84	.16	33.29
21		.10				.38	1.99	.16	.35	.02		2.99
22		.10			.02	.89	1.99	.17	.34	.02		3.54
23		.10				.28	1.99	.16	.34	.02		2.89
24		.04	.10	.21	.01	2.38	2.49	1.99	.28	.35	.02	7.87
25		.14	.17	.70	.02	.55	5.31	1.99	.16	1.37	.02	10.44
26		.10			.02	.82	1.99	.16	.34	.02		3.45
27		.10				.28	1.99	.16	.35	.02		2.90
28		.10	.21	.01	1.34	1.65	1.99	.16	.34	.02		5.82
29		.10				.35	1.99	.17	.34	.02		2.98
30		.72	1.62	2.87	.01	7.06	3.14	9.04	.61	2.47	.16	27.71
31		.10				.28	1.99	.16	.34	.02		2.89
32		.10	.21	.01	2.38	1.57	1.99	.16	.34	.02		6.77
33		.10				.28	1.99	.16	.35	.02		2.90
34		.10			.02	.89	1.99	.17	.34	.02		3.54
35		.03	.17	.70	.15	4.09	1.99	.16	.59	.02		7.89
36		.04	.10	.21	.01	1.34	2.20	1.99	.28	.35	.02	6.55
37		.10				.56	1.99	.16	.34	.02		3.17
38		.10			.02	.54	1.99	.16	.34	.02		3.17
39		.10				.56	1.99	.16	.35	.02		3.18
40		.66	3.99	12.26	.01	5.32	4.65	14.82	.44	3.63	.16	45.93
41		.10				.63	1.99	.17	.34	.02		3.26
42		.10			.02	.63	1.99	.16	.35	.02		3.27
43		.10				.57	1.99	.16	.34	.02		3.17
44		.10	.21	.01	1.34	1.28	1.99	.16	.34	.02		5.45
45		.11	.17	.70	.01	7.00	2.17	1.99	.33	1.51	.02	14.00
46		.10			.02	.61	1.99	.17	.34	.02		3.26
47		.10				.56	1.99	.16	.34	.02		3.17
48		.04	.10	.21	.01	2.38	2.20	1.99	.28	.35	.02	7.59
49		.10				.65	1.99	.16	.34	.02		3.26
50		1.03	1.62	2.87	1.30	5.57	6.66	8.03	.55	1.14	.16	28.92
Total		4.30	17.67	29.51	1.45	53.42	71.54	144.32	10.51	31.34	1.71	365.78

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Movie Theater

Washington, D.C.

Movie Theater

Gross Square Feet:	10,000
Height in Ft:	20
Exterior:	Clay Brick
Floor coverings:	Finished Concrete, Carpet
HVAC:	Single Zone Rooftop Units
Capacity:	N/A
Occupancy:	600
Replacement Cost:	\$2,090,424

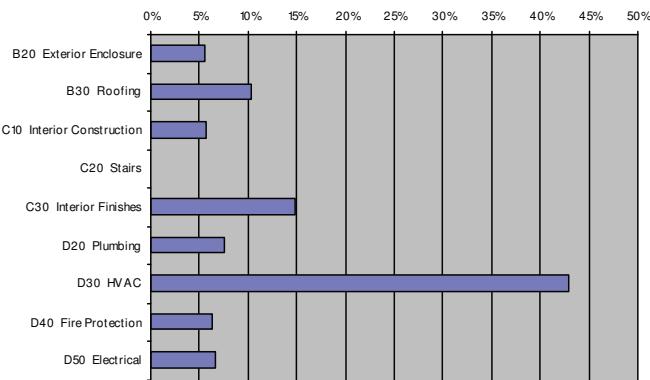
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Painted, Exterior, 1st Floor	7620	Sq Ft
Aluminum Fixed Window, 24 sf, 1st Floor	16	Each
Aluminum Frame, Fully Glazed, Exterior Door	4	Each
Steel, Painted, Exterior Door	7	Each
B30 Roofing		
Built-up Roof	10000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	8	Each
Steel, Painted, Interior Door	50	Each
C20 Stairs		
Concrete, Interior Stairs	150	Sq Ft
Metal, Painted, Interior Railing	75	Ln Ft
C30 Interior Finishes		
Acoustical Tile, Painted, Interior Wall Finish	7160	Sq Ft
Concrete Block, Painted, Interior Wall Finish	1000	Sq Ft
Sheetrock, Unstippled, Interior Wall Finish	19470	Sq Ft
Carpet, Nylon 20 oz., High Traffic	1500	Sq Ft
Concrete, Painted Flooring	8500	Sq Ft
Acoustical Tile Ceiling	9500	Sq Ft
Sheetrock, Unstippled Ceiling	500	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	1	Each
Lavatory, Vitreous China	6	Each
Service Sink, Iron, Enamel	1	Each
Sink, Stainless Steel	1	Each
Tankless Water Closet	8	Each
Urinal, Vitreous China	3	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.7	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.3	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.7	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.7	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.3	K Ln Ft
Water Heater, Gas/Oil, 65 Gph	1	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.6	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.2	K Ln Ft
Pipe & Fittings, 4" PVC	0.2	K Ln Ft
Roof Drain, 4-6"	3	Each
D30 HVAC		
Pipe & Fittings, 4" Steel, Gas	0.2	K Ln Ft
Duct Insulation, Fiberglass Blanket	4476	Sq Ft
Ductwork	6680	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	4	Each
Air Conditioner, Rooftop, Single Zone, 20 Ton	4	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	50	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	4	Each
D50 Electrical		
Distribution Switch, Fused, <600 V	3	Each
Main Switchgear, <1,200 Amp.	1	Each
Exit Lighting Fixture, w/ Battery	11	Each
Fluorescent Lighting Fixture, 160 w	10	Each
Incandescent Lighting Fixture, Basic, 100 w	42	Each
Receptacle, 120 V, 15 Amp.	40	Each
Wiring Device, Switch	20	Each
Fire Alarm Horn & Strobe	5	Each
Heat Detector	5	Each
Manual Pull Station	5	Each
Smoke Detector	20	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$439,695	\$0.88	0.42%
Unscheduled Maintenance	\$335,466	\$0.67	0.32%
Renewal & Replacement	\$1,855,678	\$3.71	1.78%
Total	\$2,630,839	\$5.26	2.52%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, Single Zone, 20 Ton	45.42	19.8%
Repair Air Conditioner, Rooftop, Single Zone, 20 Ton	33.88	14.8%
Refinish Sheetrock, Unstippled, Interior Wall Finish	19.00	8.3%
Maintain Air Conditioner, Rooftop, Single Zone, 20 Ton	16.13	7.0%
Place New Membrane Over Existing, Built-up Roof	10.97	4.8%
Replace Membrane, Built-up Roof	9.50	4.1%
Refinish Acoustical Tile, Painted, Interior Wall Finish	7.73	3.4%
Replace Steel, Painted, Interior Door Locks	7.39	3.2%
Repaint (50% surface) Clay Brick, Painted, Exterior, 1st Floor	5.69	2.5%
Replace Carpet, Nylon 20 oz., High Traffic	5.43	2.4%
Maintain Fire Sprinkler System	4.73	2.1%
Test Gages & Valves, Fire Sprinkler System	4.36	1.9%
Refinish Clay Brick, Painted, Exterior, 1st Floor	4.14	1.8%
Maintain Built-up Roof	3.04	1.3%
Refinish Concrete, Painted Flooring	2.82	1.2%
Replace Batteries & Check Operation, Smoke Detector	2.39	1.0%
Maintain Steel, Painted, Interior Door Locks	1.77	0.8%
Repair Main Switchgear, <1,200 Amp.	1.63	0.7%
Clean Water Heater, Gas/Oil, 65 Gph	1.58	0.7%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	1.35	0.6%
Replace Existing Ductwork (20% of Ductwork)	1.31	0.6%
Maintain Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	1.31	0.6%
Refinish Steel, Painted, Interior Door	1.30	0.6%
Replace Toilet Partitions, Painted Metal, Overhead Braced	1.25	0.5%
Replace Water Heater, Gas/Oil, 65 Gph	1.14	0.5%
Replace Main Switchgear, <1,200 Amp.	1.13	0.5%
Repair Clay Brick, Painted, Exterior, 1st Floor (2% of Walls)	1.10	0.5%
Replace Steel, Painted, Exterior Door Locks	1.09	0.5%
Replace Incandescent Lighting Fixture, Basic, 100 w	1.05	0.5%
Replace Fire Alarm Control Panel	1.04	0.5%

*Task cost (\$2009) per GSFT over 50 years.

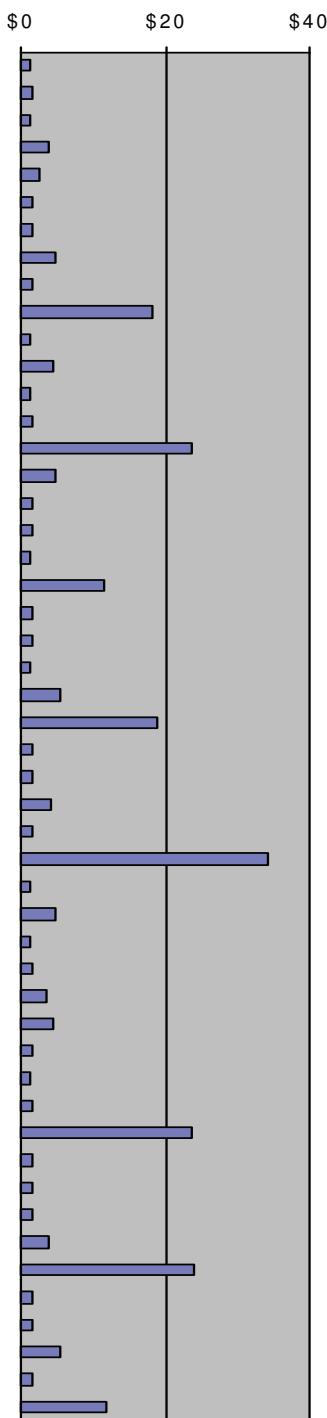
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	Plumbing	HVAC Systems	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13					.19	.64	.27	.14			1.38
2		.13			.02		.30	.64	.27	.14			1.50
3		.13					.19	.64	.27	.17			1.40
4		.13	.13	.01	2.38		.30	.64	.27	.14			4.00
5		.10	.19	.48			.28	.66	.30	.52			2.54
6		.13			.02		.30	.64	.27	.17			1.52
7		.13					.26	.64	.27	.14			1.44
8		.13	.13	.01	3.27		.31	.64	.27	.14			4.90
9		.13			.05		.19	.64	.27	.17			1.45
10		1.28	.19	1.96		.58	.75	11.96	.58	.94			18.25
11		.13					.19	.64	.27	.14			1.38
12		.07	.13	.13	.01	2.38	.56	.65	.39	.17			4.47
13		.13					.19	.64	.27	.14			1.38
14		.13			.02		.36	.64	.27	.14			1.56
15		.22	5.67	.48	.01	.15	.22	15.50	.59	.92			23.76
16		.13	.13	.13	.01	3.27	.31	.64	.27	.14			4.90
17		.13					.26	.64	.29	.14			1.46
18		.13			.07		.30	.64	.27	.17			1.57
19		.13					.19	.64	.27	.14			1.38
20		1.32	.19	2.69	.05	3.07	.74	.92	.57	1.93			11.48
21		.13					.26	.64	.27	.17			1.47
22		.13			.02		.36	.64	.29	.14			1.58
23		.13					.19	.64	.27	.14			1.38
24		.07	.13	.13	.01	3.27	.57	.65	.39	.17			5.37
25		3.51	.19	.48		.42	1.40	11.96	.29	.78			19.03
26		.13			.02		.30	.64	.27	.14			1.50
27		.13			.05		.19	.64	.27	.17			1.45
28		.13	.13	.13	.01	2.38	.36	.64	.27	.14			4.06
29		.13					.26	.64	.29	.14			1.46
30		1.41	9.50	1.96	.01	.73	.76	17.25	.87	1.83			34.31
31		.13					.19	.64	.27	.14			1.38
32		.13	.13	.13	.01	3.27	.31	.64	.27	.14			4.90
33		.13					.19	.64	.27	.17			1.40
34		.13			.02		.36	.64	.29	.14			1.58
35		.10	.19	.48			1.39	.66	.29	.52			3.63
36		.07	.13	.13	.01	2.44	.48	.65	.39	.17			4.44
37		.13					.27	.64	.27	.14			1.46
38		.13			.02		.22	.64	.27	.14			1.42
39		.13					.27	.64	.27	.17			1.48
40		1.32	.19	2.69	.05	3.96	.59	12.21	.57	2.19			23.77
41		.13					.34	.64	.29	.14			1.54
42		.13			.02		.28	.64	.27	.17			1.51
43		.13					.28	.64	.27	.14			1.46
44		.13	.13	.13	.01	2.38	.22	.64	.27	.14			3.92
45		.22	5.67	.48	.01	.20	.53	15.50	.59	.92			24.12
46		.13			.02		.28	.64	.29	.14			1.50
47		.13					.27	.64	.27	.14			1.46
48		.07	.13	.13	.01	3.27	.49	.65	.39	.17			5.29
49		.13					.34	.64	.27	.14			1.52
50		5.02	.19	1.96	.19	1.00	1.61	.67	.68	.68			12.00
Total	14.77	27.33	14.89	.39	38.79		19.94	112.85	16.78	17.34		263.08	

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Municipal Building

Washington, D.C.

Municipal Building

Gross Square Feet:	11,000
Height in Ft:	12
Exterior:	Clay Brick
Floor coverings:	Carpet, Vinyl Tile, Terrazzo Tile
HVAC:	Electric Cooling, Gas Heating
Capacity:	N/A
Occupancy:	660
Replacement Cost:	\$2,860,000

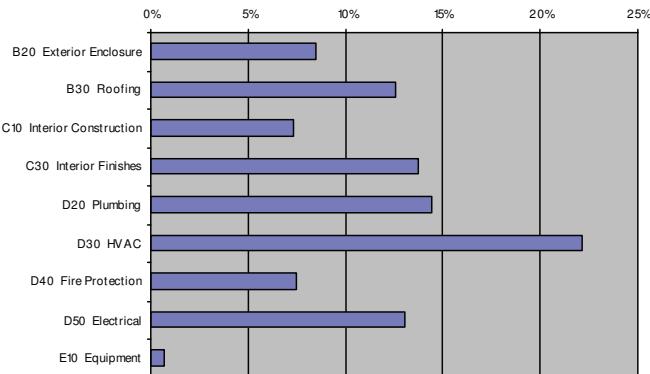
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	4470	Sq Ft
Aluminum Fixed Window, 12 sf, 1st Floor	40	Each
Aluminum Frame, Fully Glazed, Exterior Door	3	Each
Steel w/ Safety Glass, Painted, Exterior Door	1	Each
B30 Roofing		
Built-up Roof	11000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	11	Each
Wood, Hollow Core, Painted, Interior Door	55	Each
C30 Interior Finishes		
Ceramic Tile, 4"x4", Interior Wall Finish	1320	Sq Ft
Sheetrock, Stippled, Interior Wall Finish	11880	Sq Ft
Carpet, Nylon 20 oz., Low Traffic	7700	Sq Ft
Terrazzo Flooring	1650	Sq Ft
Vinyl Tile Flooring	1650	Sq Ft
Acoustical Tile Ceiling	7400	Sq Ft
Metal, Painted Ceiling	3600	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	6	Each
Lavatory, Vitreous China	13	Each
Sink, Enamelled Steel	8	Each
Sink, Stainless Steel	2	Each
Tankless Water Closet	11	Each
Urinal, Vitreous China	5	Each
Pipe & Fittings, 3/4" Copper, Cold Water	1.47	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.67	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	1.592	K Ln Ft
Pipe & Fittings, 4" Steel	0.887	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	1.914	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.904	K Ln Ft
Water Heater, Gas/Oil, 75 Gph	1	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.709	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.21	K Ln Ft
Pipe & Fittings, 4" PVC	0.096	K Ln Ft
Roof Drain, 2"	4	Each
D30 HVAC		
Duct Insulation, Fiberglass Blanket	2774	Sq Ft
Ductwork	4140	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	2	Each
Air Conditioner, Rooftop, Single Zone, 50 Ton	1	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	79	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	4	Each
D50 Electrical		
Main Switchgear, <1,200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	3	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	1	Each
Emergency Horn & Strobe	6	Each
Exit Lighting Fixture, w/ Battery	6	Each
Fluorescent Lighting Fixture, 160 w	110	Each
Grounded Fault Circuit Interruptor, 15 Amp.	2	Each
Receptacle, 120 V, 15 Amp.	178	Each
Wiring Device, Switch	55	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	6	Each
Heat Detector	4	Each
Manual Pull Station	4	Each
Smoke Detector	20	Each
E10 Equipment		
Microwave Oven	1	Each
Refrigerator, Domestic	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$440,177	\$0.80	0.31%
Unscheduled Maintenance	\$402,202	\$0.73	0.28%
Renewal & Replacement	\$1,546,581	\$2.81	1.08%
Total	\$2,388,960	\$4.34	1.67%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, Single Zone, 50 Ton	24.89	13.8%
Replace Carpet, Nylon 20 oz., Low Traffic	12.68	7.0%
Repair Air Conditioner, Rooftop, Single Zone, 50 Ton	11.85	6.6%
Place New Membrane Over Existing, Built-up Roof	10.97	6.1%
Refinish Sheetrock, Stippled, Interior Wall Finish	10.54	5.8%
Replace Membrane, Built-up Roof	9.50	5.3%
Replace Wood, Hollow Core, Painted, Interior Door Locks	5.92	3.3%
Clean & Reseal Clay Brick, Exterior, 1st Floor	5.58	3.1%
Maintain Air Conditioner, Rooftop, Single Zone, 50 Ton	4.47	2.5%
Refinish Metal, Painted Ceiling	4.32	2.4%
Maintain Fire Sprinkler System	4.30	2.4%
Test Gages & Valves, Fire Sprinkler System	3.96	2.2%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	3.84	2.1%
Replace Fluorescent Lighting Fixture, 160 w	3.51	1.9%
Maintain Built-up Roof	3.04	1.7%
Repoint (50% surface) Clay Brick, Exterior, 1st Floor	3.03	1.7%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	2.80	1.5%
Replace Wood, Hollow Core, Painted, Interior Door	2.53	1.4%
Replace Drinking Fountain, Refrigerated	2.46	1.4%
Replace Batteries & Check Operation, Smoke Detector	2.17	1.2%
Maintain Power Panel Board, 208 Y/120 V, 200 Amp.	1.71	0.9%
Replace Power Panel Board, 208 Y/120 V, 200 Amp.	1.65	0.9%
Maintain Wood, Hollow Core, Painted, Interior Door Locks	1.59	0.9%
Replace Toilet Partitions, Painted Metal, Overhead Braced	1.56	0.9%
Repair Main Switchgear, <1,200 Amp.	1.48	0.8%
Clean Water Heater, Gas/Oil, 75 Gph	1.43	0.8%
Refinish Wood, Hollow Core, Painted, Interior Door	1.30	0.7%
Test Fire Sprinkler Head	1.22	0.7%
Replace Faucet Washer & Clean Trap, Lavatory, Vitreous China	1.21	0.7%
Replace Pipe & Fittings, 3/4" Copper, Cold Water (20% of Pipe)	1.16	0.6%

*Task cost (\$2009) per GSFT over 50 years.

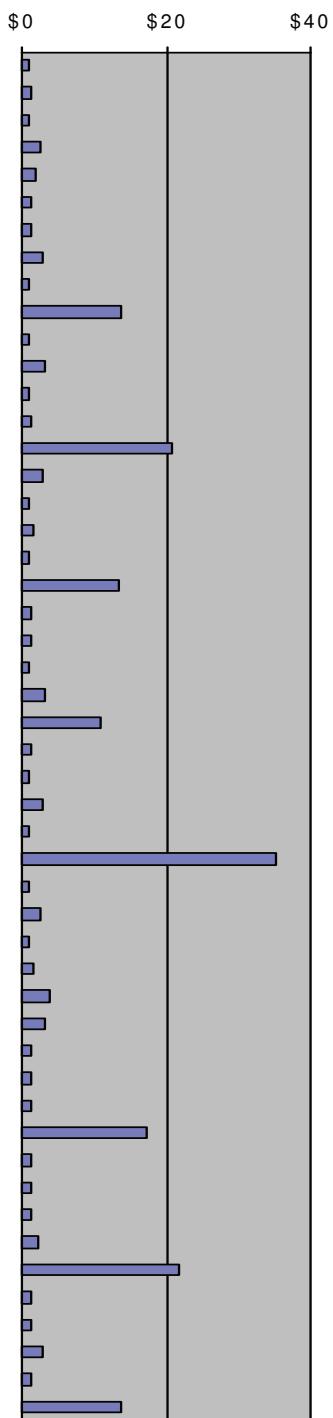
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	Interior Finishes	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13					.19	.19	.25	.24	.02		1.02
2		.13					.49	.19	.25	.24	.02		1.32
3		.13					.19	.19	.25	.24	.02		1.02
4		.13	.13	1.24			.49	.19	.25	.24	.02		2.69
5	.03	.19	.48	.08			.31	.21	.28	.46	.02		2.07
6		.13					.49	.19	.25	.24	.02		1.32
7		.13					.30	.19	.25	.24	.02		1.12
8		.13	.13	1.24			.53	.19	.25	.25	.02		2.74
9		.13					.19	.19	.25	.24	.02		1.06
10	2.81	.19	1.96		.12		1.55	4.16	.68	2.14	.15		13.76
11		.13					.19	.19	.25	.24	.02		1.02
12	.05	.13	.13	1.24			.79	.19	.35	.24	.02		3.14
13		.13					.19	.19	.25	.24	.02		1.02
14		.13					.60	.19	.25	.24	.02		1.43
15	.05	5.67	.48	4.28			.25	8.60	.55	.95	.02		20.85
16		.13	.13	1.24			.53	.19	.25	.25	.02		2.74
17		.13					.25	.19	.27	.24	.02		1.09
18		.13		.41			.49	.19	.25	.24	.02		1.72
19		.13					.19	.19	.25	.24	.02		1.02
20	2.89	.19	2.85	1.42			1.60	.33	.67	3.39	.15		13.49
21		.13					.30	.19	.25	.24	.02		1.12
22		.13					.55	.19	.27	.24	.02		1.39
23		.13					.19	.19	.25	.24	.02		1.02
24	.05	.13	.13	1.24			.83	.19	.35	.25	.02		3.19
25	1.84	.19	.48	.26			2.67	4.16	.27	1.00	.02		10.89
26		.13					.49	.19	.25	.24	.02		1.32
27		.13		.04			.19	.19	.25	.24	.02		1.06
28		.13	.13	1.24			.60	.19	.25	.24	.02		2.79
29		.13					.25	.19	.27	.24	.02		1.09
30	2.82	9.50	2.64	4.31			1.41	9.59	.95	3.82	.15		35.18
31		.13					.19	.19	.25	.24	.02		1.02
32		.13	.02	1.24			.53	.19	.25	.24	.02		2.62
33		.13					.19	.19	.25	.25	.02		1.03
34		.13	.11				.55	.19	.27	.24	.02		1.50
35	.03	.19	.48	.08			2.22	.21	.27	.46	.02		3.96
36	.05	.13	.02	1.64			.58	.19	.35	.24	.02		3.22
37		.13					.40	.19	.25	.24	.02		1.23
38		.13	.11				.27	.19	.25	.24	.02		1.21
39		.13					.40	.19	.25	.24	.02		1.23
40	2.89	.19	2.74	1.42			1.08	4.28	.67	3.76	.15		17.18
41		.13					.46	.19	.27	.25	.02		1.32
42		.13	.11				.38	.19	.25	.24	.02		1.32
43		.13					.43	.19	.25	.24	.02		1.26
44		.13	.02	1.24			.27	.19	.25	.24	.02		2.36
45	.05	5.67	.48	4.32			.98	8.60	.55	.95	.02		21.62
46		.13	.11				.33	.19	.27	.24	.02		1.28
47		.13					.40	.19	.25	.24	.02		1.23
48	.05	.13	.02	1.24			.59	.19	.35	.24	.02		2.83
49		.13					.51	.19	.25	.25	.02		1.35
50	4.84	.19	2.06	.29			3.29	.21	.82	1.94	.15		13.80
Total	18.45	27.33	15.92	29.88	31.33	48.07	16.27	28.35	1.58			217.18	

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Office Building, 2 Story

Washington, D.C.

Office Building, 2 Story

Gross Square Feet:	83,000
Height in Ft:	24
Exterior:	Clay Brick
Floor coverings:	Terrazzo, Vinyl Tile, Carpet
HVAC:	Chilled Water, Gas Boiler, Multizone Air
Capacity:	N/A
Occupancy:	740
Replacement Cost:	\$16,255,022

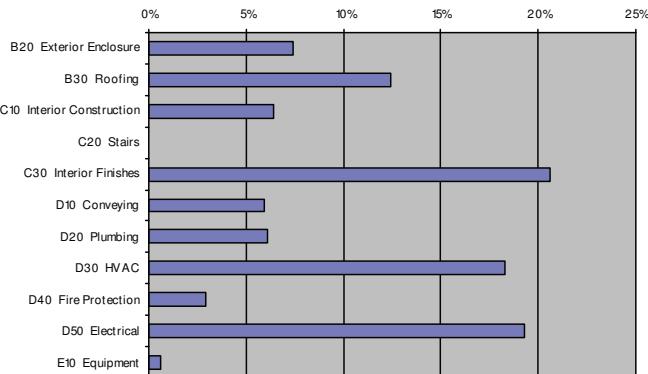
Components (Continued on Page 156)

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	8340	Sq Ft
Clay Brick, Exterior, 2nd Floor	8340	Sq Ft
Aluminum Operable Window, 12 sf, 1st Floor	35	Each
Aluminum Operable Window, 12 sf, 2nd Floor	35	Each
Aluminum Operable Window, 24 sf, 1st Floor	35	Each
Aluminum Operable Window, 24 sf, 2nd Floor	35	Each
Steel, Painted, Exterior Door	11	Each
Steel w/ Safety Glass, Painted, Exterior Door	6	Each
B30 Roofing		
Single-Ply Modified Bituminous/Thermoplastic Roof	41500	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	36	Each
Steel, Painted, Interior Door	8	Each
Wood, Solid Core, Painted, Interior Door	184	Each
C20 Stairs		
Concrete, Interior Stairs	600	Sq Ft
Metal, Painted, Interior Railing	160	Ln Ft
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	7470	Sq Ft
Fabric, Interior Wall Finish	13280	Sq Ft
Sheetrock, Unstippled, Interior Wall Finish	72710	Sq Ft
Carpet, Nylon 20 oz., Low Traffic	62250	Sq Ft
Concrete, Painted Flooring	7470	Sq Ft
Terrazzo Flooring	11205	Sq Ft
Vinyl Tile Flooring	2075	Sq Ft
Acoustical Tile, Dropped Ceiling	75530	Sq Ft
Sheetrock, Unstippled Ceiling	7470	Sq Ft
D10 Conveying		
Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	1	Each
D20 Plumbing		
Drinking Fountain, Refrigerated	8	Each
Lavatory, Vitreous China	40	Each
Service Sink, Iron, Enamel	2	Each
Tankless Water Closet	36	Each
Urinal, Vitreous China	12	Each
Circulator Pump, 1 HP, Cold Water	1	Each
Circulator Pump, 1 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	3.1	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	1.3	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	3.2	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	5.7	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	1.3	K Ln Ft
Water Heater, Gas/Oil, 175 Gph	1	Each
Backflow Preventer, 4"	2	Each
Pipe & Fittings, 6" Cast Iron	2	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.5	K Ln Ft
Pipe & Fittings, 4" PVC	0.6	K Ln Ft
Roof Drain, 4-6"	12	Each
D30 HVAC		
Pipe & Fittings, 4" Steel, Gas	1.8	K Ln Ft
Chemical Feed System	1	Each
Circulation Pump, 10 HP, Hot Water	2	Each
Expansion Tank, 100 Gal.	2	Each
Gas Boiler, 2,500 Mbh	1	Each
Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 250 Ton	1	Each
Circulation Pump, 100 HP, Chiller & Condenser Water	2	Each
Cooling Tower, 250 Ton	1	Each
Air Handler, Multizone, 25,000 Cfm	4	Each
Duct Insulation, Fiberglass Blanket	13963	Sq Ft
Ductwork	20840	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	12	Each
HVAC Control Panel	2	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	415	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	40	Each
D50 Electrical		
Distribution Switch, Fused, <600 V	16	Each
Main Switchgear, <1,200 Amp.	1	Each
Motor Starter, 5-20 HP, <600 V	6	Each
Motor Starter, 21-50 HP, <600 V	10	Each
Motor Starter, 51-75 HP, <600 V	1	Each
Secondary Transformer, Dry, 150 kVA	6	Each
Exit Lighting Fixture, w/ Battery	20	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$2,389,377	\$0.58	0.29%
Unscheduled Maintenance	\$1,733,791	\$0.42	0.21%
Renewal & Replacement	\$6,891,304	\$1.66	0.85%
Total	\$11,014,472	\$2.65	1.36%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Carpet, Nylon 20 oz., Low Traffic	13.80	12.3%
Refinish Sheetrock, Unstippled, Interior Wall Finish	8.84	7.9%
Replace Membrane, Single-Ply Modified Bituminous/Thermoplastic Roof	7.46	6.7%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	5.14	4.6%
Replace Fluorescent Lighting Fixture, 160 w	4.71	4.2%
Repair Single-Ply Modified Bituminous/Thermoplastic Roof	4.35	3.9%
Maintain Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	4.22	3.8%
Renovate Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	2.76	2.5%
Replace Wood, Solid Core, Painted, Interior Door	2.65	2.4%
Replace Wood, Solid Core, Painted, Interior Door Locks	2.58	2.3%
Maintain Air Handler, Multizone, 25,000 Cfm	2.53	2.3%
Replace Air Handler, Multizone, 25,000 Cfm	2.52	2.3%
Maintain Single-Ply Modified Bituminous/Thermoplastic Roof	2.45	2.2%
Replace Batteries & Check Operation, Smoke Detector	2.19	2.0%
Maintain Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 250 Ton	2.10	1.9%
Maintain Chemical Feed System	1.93	1.7%
Clean & Reseal Clay Brick, Exterior, 2nd Floor	1.80	1.6%
Inspect & Test Gas Boiler, 2,500 Mbh	1.80	1.6%
Refinish Sheetrock, Unstippled Ceiling	1.23	1.1%
Clean & Reseal Clay Brick, Exterior, 1st Floor	1.20	1.1%
Replace Receptacle, 120 V, 15 Amp.	.99	0.9%
Refinish Concrete Block, Painted, Interior Wall Finish	.94	0.8%
Replace Gas Boiler, 2,500 Mbh	.93	0.8%
Repair Wiring Device, Switch	.91	0.8%
Replace Existing Ductwork (20% of Ductwork)	.90	0.8%
Replace Smoke Detector	.88	0.8%
Maintain Cooling Tower, 250 Ton	.88	0.8%
Repaint (50% surface) Clay Brick, Exterior, 2nd Floor	.86	0.8%
Repair Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 250 Ton	.83	0.7%
Check Operation, Heat Detector	.82	0.7%

*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

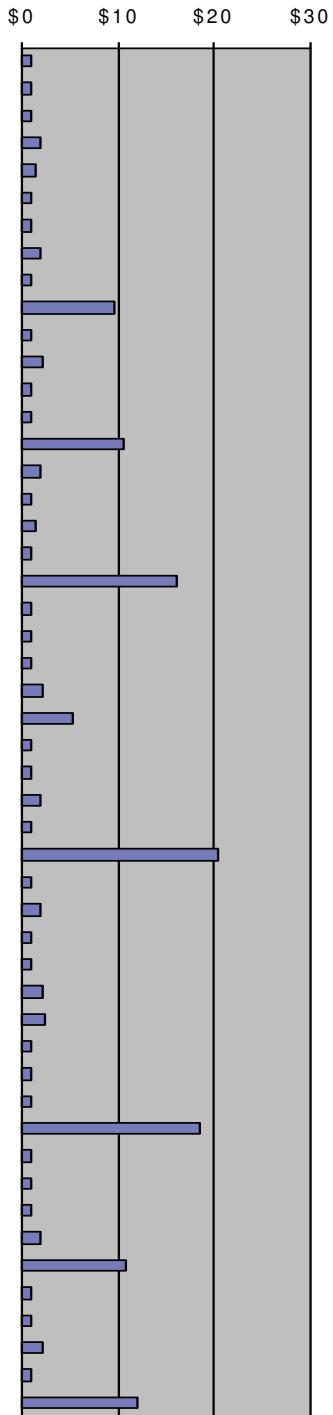
Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.10				.10	.06	.38	.04	.18	.01	.87
2		.10				.10	.13	.38	.04	.18	.01	.94
3		.10				.10	.06	.38	.04	.25	.01	.94
4		.10	.06 .00	.89	.10	.13	.38	.04	.18	.01		1.89
5		.02	.17 .22	.09	.10	.09	.40	.06	.26	.01		1.42
6		.10				.10	.13	.38	.04	.25	.01	1.01
7		.10				.10	.10	.43	.04	.18	.01	.96
8		.10	.06 .00	.89	.10	.13	.38	.04	.18	.01		1.89
9		.10				.05	.10	.06	.38	.04	.25	.01
10		1.75	1.62 .90	.16	.10	.42	1.53	.34	2.63	.08		9.55
11		.10				.10	.06	.38	.04	.18	.01	.87
12		.10	.06 .00	.89	.10	.21	.39	.18	.25	.01		2.19
13		.10				.10	.06	.38	.04	.18	.01	.87
14		.10				.10	.16	.44	.04	.18	.01	1.04
15		.10	.17 .22 .00	4.59	.10	.08	4.38	.08	.87	.01		10.60
16		.10	.06 .00	.89	.10	.13	.38	.04	.18	.01		1.89
17		.10				.10	.06	.38	.06	.18	.01	.90
18		.10				.11	.10	.13	.38	.04	.47	.01
19		.10				.10	.06	.38	.04	.18	.01	.87
20		1.75	3.99 1.29 .02	1.10	.10	.54	3.14	.32	3.69	.08		16.04
21		.10				.10	.10	.43	.04	.25	.01	1.03
22		.10				.10	.13	.38	.06	.18	.01	.97
23		.10				.10	.06	.38	.04	.18	.01	.87
24		.10	.06 .00	.89	.10	.21	.39	.18	.25	.01		2.19
25		.96	.17 .22 .00	.39	1.37	.74	.70	.04	.79	.01		5.38
26		.10				.10	.13	.38	.04	.18	.01	.94
27		.10				.05	.10	.06	.38	.04	.25	.01
28		.10	.06 .00	.89	.10	.16	.44	.04	.18	.01		1.98
29		.10				.10	.06	.38	.06	.18	.01	.90
30		1.83	1.62 .90 .00	4.87	.10	.43	6.27	.36	3.94	.08		20.41
31		.10				.10	.06	.38	.04	.18	.01	.87
32		.10	.06 .00	.89	.10	.13	.38	.04	.18	.01		1.89
33		.10				.10	.06	.38	.04	.25	.01	.94
34		.10				.10	.13	.38	.06	.18	.01	.97
35		.02	.17 .22 .00	.09	.10	.74	.40	.04	.26	.01		2.05
36		.10	.06 .00	1.00	.10	.15	.39	.18	.47	.01		2.46
37		.10				.10	.11	.43	.04	.18	.01	.98
38		.10				.10	.07	.38	.04	.18	.01	.88
39		.10				.10	.11	.38	.04	.25	.01	1.00
40		1.75	3.99 3.10 .02	1.10	.10	.39	3.44	.32	4.23	.08		18.53
41		.10				.10	.12	.38	.06	.18	.01	.95
42		.10				.10	.11	.38	.04	.25	.01	.99
43		.10				.10	.12	.38	.04	.18	.01	.93
44		.10	.06 .00	.89	.10	.07	.44	.04	.18	.01		1.89
45		.10	.17 .22 .00	4.64	.10	.28	4.38	.08	.87	.01		10.86
46		.10				.10	.08	.38	.06	.18	.01	.91
47		.10				.10	.11	.38	.04	.18	.01	.93
48		.10	.06 .00	.89	.10	.15	.39	.18	.25	.01		2.13
49		.10				.10	.15	.38	.04	.18	.01	.97
50		2.69	1.62 .90 .05	.45	1.37	.90	1.31	.43	2.10	.08		11.92
Total	10.98	17.67	8.81	.12	26.68	7.71	8.90	41.57	4.35	28.16	.84	155.80

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT



Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Office Building, 15 Story

Washington, D.C.

Office Building, 15 Story

Gross Square Feet:	250,000
Height in Ft:	180
Exterior:	Concrete
Floor coverings:	Vinyl Tile, Carpet
HVAC:	Chilled Water, Gas Boiler, Multizone Air
Capacity:	N/A
Occupancy:	2,250
Replacement Cost:	\$48,871,302

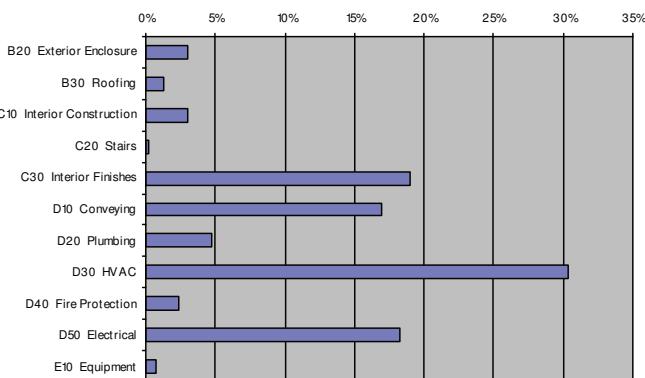
Components (Continued on Page 156)

Uniform / Component	Quantity	Units
B20 Exterior Enclosure		
Concrete, Painted, Exterior, 1st Floor	4940	Sq Ft
Concrete, Painted, Exterior, 2nd Floor	4940	Sq Ft
Concrete, Painted, Exterior, 3rd+ Floor	64100	Sq Ft
Aluminum Fixed Window, 24 sf, 1st Floor	52	Each
Aluminum Fixed Window, 24 sf, 2nd Floor	52	Each
Aluminum Fixed Window, 24 sf, 3rd+ Floor	678	Each
Aluminum & Glass Revolving Door	4	Each
Aluminum Frame, Fully Glazed, Exterior Door	4	Each
B30 Roofing		
Built-up Roof		
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	70	Each
Steel, Painted, Interior Door	30	Each
Wood, Hollow Core, Painted, Interior Door	195	Each
Wood, Solid Core, Painted, Interior Door	90	Each
C20 Stairs		
Concrete, Interior Stairs	4500	Sq Ft
Metal, Painted, Interior Railing	1200	Ln Ft
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	22500	Sq Ft
Sheetrock, Unstippled, Interior Wall Finish	160675	Sq Ft
Carpet, Nylon 20 oz., Low Traffic	187500	Sq Ft
Concrete, Painted Flooring	22500	Sq Ft
Vinyl Tile Flooring	40000	Sq Ft
Acoustical Tile, Dropped Ceiling	187500	Sq Ft
Sheetrock, Unstippled Ceiling	62500	Sq Ft
D10 Conveying		
Elevator, Geared, 3,500 lbs, 6-15 Floor, 350 fpm	5	Each
D20 Plumbing		
Drinking Fountain, Refrigerated	30	Each
Lavatory, Vitreous China	84	Each
Service Sink, Iron, Enamel	15	Each
Tankless Water Closet	70	Each
Urinal, Vitreous China	28	Each
Booster Pump, 10 HP	2	Each
Circulator Pump, 2 HP, Cold Water	2	Each
Circulator Pump, 2 HP, Hot Water	2	Each
Pipe & Fittings, 3/4" Copper, Cold Water	7.3	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	3.1	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	7.5	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	11.8	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	3.1	K Ln Ft
Water Heater, Gas/Oil, 275 Gph	2	Each
Water Storage Tank, 250 Gal.	1	Each
Backflow Preventer, 4"	4	Each
Pipe & Fittings, 6" Cast Iron	4	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.3	K Ln Ft
Sewage Ejector Pump, 1 HP	1	Each
Pipe & Fittings, 4" PVC	1.8	K Ln Ft
Roof Drain, 4-6"	5	Each
D30 HVAC		
Pipe & Fittings, 4" Steel, Gas	1.8	K Ln Ft
Chemical Feed System	1	Each
Circulation Pump, 75 HP, Hot Water	4	Each
Expansion Tank, 250 Gal.	2	Each
Gas Boiler, 2,000 Mbh	3	Each
Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 250 Ton	3	Each
Cooling Tower, 250 Ton	1	Each
Cooling Tower, 500 Ton	1	Each
Air Handler, Multizone, 10,000 Cfm	30	Each
Duct Insulation, Fiberglass Blanket	41326	Sq Ft
Ductwork	61680	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	24	Each
HVAC Control Panel	6	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	1250	Each
Fire Sprinkler System	1	Each
Fire Suppression System Water Pump, 10 HP	1	Each
Fire Standpipe System	1	Each
Fire Extinguisher	80	Each
D50 Electrical		
Distribution Switch, Fused, <600 V	32	Each
Main Switchgear, >1,200 Amp.	1	Each
Motor Starter, 5-20 HP, <600 V	32	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$8,972,326	\$0.72	0.37%
Unscheduled Maintenance	\$4,536,479	\$0.36	0.19%
Renewal & Replacement	\$21,798,346	\$1.74	0.89%
Total	\$35,307,151	\$2.82	1.44%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Maintain Elevator, Geared, 3,500 lbs, 6-15 Floor, 350 fpm	15.08	12.3%
Replace Carpet, Nylon 20 oz., Low Traffic	13.58	11.0%
Replace Air Handler, Multizone, 10,000 Cfm	9.06	7.4%
Refinish Sheetrock, Unstippled, Interior Wall Finish	6.27	5.1%
Maintain Air Handler, Multizone, 10,000 Cfm	6.03	4.9%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	6.01	4.9%
Replace Fluorescent Lighting Fixture, 160 w	5.49	4.5%
Replace Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 250 Ton	5.44	4.4%
Renovate Elevator, Geared, 3,500 lbs, 6-15 Floor, 350 fpm	5.39	4.4%
Refinish Sheetrock, Unstippled Ceiling	3.30	2.7%
Refinish Concrete, Painted, Exterior, 3rd+ Floor	2.79	2.3%
Repair Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 250 Ton	2.48	2.0%
Replace Batteries & Check Operation, Smoke Detector	2.39	1.9%
Maintain Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 250 Ton	2.32	1.9%
Inspect & Test Gas Boiler, 2,000 Mbh	2.13	1.7%
Replace Circulation Pump, 75 HP, Hot Water	1.30	1.1%
Repair Air Handler, Multizone, 10,000 Cfm	.93	0.8%
Replace Wood, Hollow Core, Painted, Interior Door Locks	.92	0.7%
Replace Smoke Detector	.91	0.7%
Refinish Concrete Block, Painted, Interior Wall Finish	.91	0.7%
Test Fire Sprinkler Head	.85	0.7%
Replace Cooling Tower, 500 Ton	.83	0.7%
Replace Vinyl Tile Flooring	.79	0.6%
Maintain Chemical Feed System	.74	0.6%
Replace Receptacle, 120 V, 15 Amp.	.74	0.6%
Place New Membrane Over Existing, Built-up Roof	.73	0.6%
Replace Secondary Transformer, Dry, 150 kVA	.69	0.6%
Repair Wiring Device, Switch	.68	0.6%
Check Operation, Heat Detector	.63	0.5%
Repair Carpet, Nylon 20 oz., Low Traffic (2% of Carpet)	.63	0.5%

*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

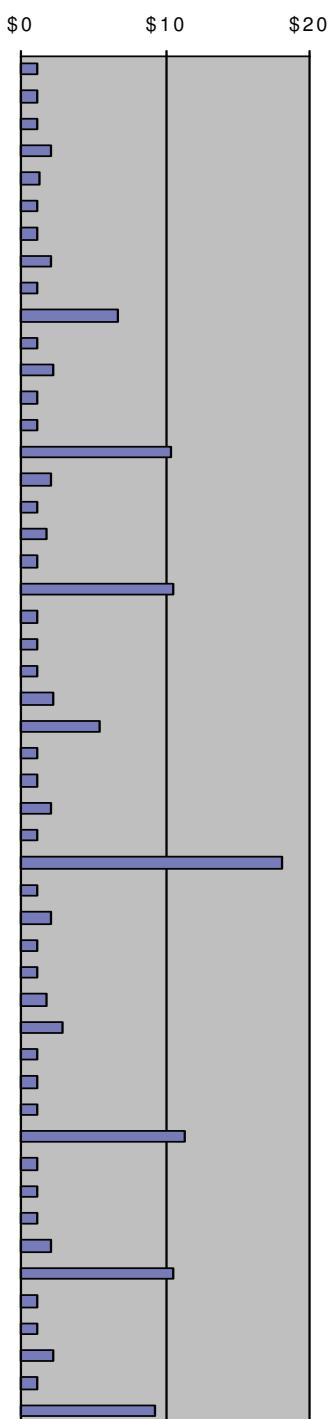
Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1	.00	.01			.39	.03	.42	.02	.16	.01		1.04
2	.00	.01			.39	.09	.42	.02	.16	.01		1.11
3	.00	.01			.39	.03	.42	.02	.23	.01		1.11
4	.00	.01	.03	.00	.87	.39	.09	.42	.02	.16	.01	2.02
5	.01	.01	.12		.09	.39	.06	.43	.04	.18	.01	1.34
6	.00	.01			.39	.09	.42	.02	.23	.01		1.18
7	.00	.01			.39	.06	.47	.02	.16	.01		1.13
8	.00	.01	.03	.00	.87	.39	.09	.42	.02	.16	.01	2.02
9	.00	.01			.05	.39	.03	.42	.02	.23	.01	1.16
10	.62	.01	.49		.15	.39	.35	1.66	.32	2.59	.10	6.67
11	.00	.01			.39	.03	.42	.02	.16	.01		1.04
12	.01	.01	.03	.00	.87	.39	.16	.43	.12	.23	.01	2.26
13	.00	.01			.39	.03	.42	.02	.16	.01		1.04
14	.00	.01			.39	.12	.48	.02	.16	.01		1.19
15	.01	.38	.12	.01	4.54	.39	.05	4.18	.06	.67	.01	10.41
16	.00	.01	.03	.00	.87	.39	.09	.42	.02	.16	.01	2.02
17	.00	.01			.39	.04	.42	.04	.16	.01		1.06
18	.00	.01			.44	.39	.09	.42	.02	.41	.01	1.79
19	.00	.01			.39	.03	.42	.02	.16	.01		1.04
20	.70	.01	.74	.05	1.06	.39	.57	3.14	.31	3.43	.10	10.50
21	.00	.01			.39	.06	.47	.02	.23	.01		1.20
22	.00	.01			.39	.10	.42	.04	.16	.01		1.12
23	.00	.01			.39	.03	.42	.02	.16	.01		1.04
24	.01	.01	.03	.00	.87	.39	.17	.43	.12	.23	.01	2.26
25	.16	.01	.12		.40	2.69	.56	.83	.03	.55	.01	5.37
26	.00	.01			.39	.09	.42	.02	.16	.01		1.11
27	.00	.01			.05	.39	.03	.42	.02	.23	.01	1.16
28	.00	.01	.03	.00	.87	.39	.12	.48	.02	.16	.01	2.10
29	.00	.01			.39	.04	.42	.04	.16	.01		1.06
30	1.13	.63	.60	.01	4.60	.39	.36	5.98	.34	3.96	.10	18.10
31	.00	.01			.39	.03	.42	.02	.16	.01		1.04
32	.00	.01	.02	.00	.87	.39	.09	.42	.02	.16	.01	2.00
33	.00	.01			.39	.03	.42	.02	.23	.01		1.11
34	.00	.01	.02		.39	.10	.42	.04	.16	.01		1.14
35	.01	.01	.12		.09	.39	.55	.43	.03	.18	.01	1.81
36	.01	.01	.02	.00	1.31	.39	.12	.43	.12	.41	.01	2.81
37	.00	.01			.39	.08	.47	.02	.16	.01		1.14
38	.00	.01	.02		.39	.05	.42	.02	.16	.01		1.08
39	.00	.01			.39	.08	.42	.02	.23	.01		1.16
40	.70	.01	1.02	.05	1.06	.39	.42	3.53	.31	3.81	.10	11.39
41	.00	.01			.39	.08	.42	.04	.16	.01		1.11
42	.00	.01	.02		.39	.07	.42	.02	.23	.01		1.18
43	.00	.01			.39	.08	.42	.02	.16	.01		1.09
44	.00	.01	.02	.00	.87	.39	.05	.48	.02	.16	.01	2.01
45	.01	.38	.12	.01	4.59	.39	.21	4.18	.06	.67	.01	10.62
46	.00	.01	.02		.39	.05	.42	.04	.16	.01		1.10
47	.00	.01			.39	.08	.42	.02	.16	.01		1.09
48	.01	.01	.02	.00	.87	.39	.12	.43	.12	.23	.01	2.20
49	.00	.01			.39	.10	.42	.02	.16	.01		1.12
50	.78	.01	.51	.12	.46	2.69	.72	1.32	.42	2.21	.10	9.35
Total	4.29	1.82	4.29	.29	26.78	23.90	6.78	42.85	3.35	25.83	1.04	141.23

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT



Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Office Park

Washington, D.C.

Office Park

Gross Square Feet:	65,000
Height in Ft:	12
Exterior:	Concrete
Floor coverings:	Vinyl Tile, Carpet, Quarry Tile
HVAC:	Single Zone Rooftop Units
Capacity:	N/A
Occupancy:	580
Replacement Cost:	\$12,782,311

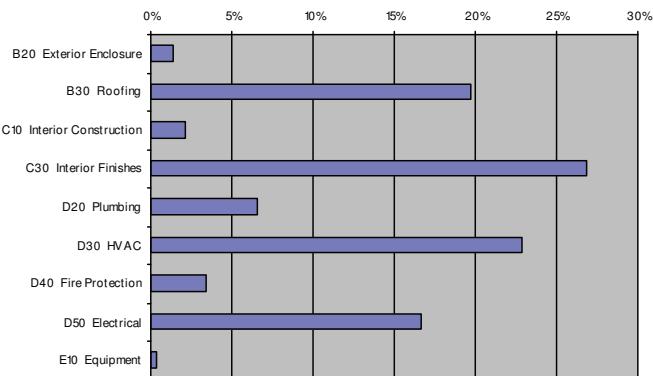
Components

Uniform / Component	Quantity	Units
B20 Exterior Enclosure		
Concrete, Painted, Exterior, 1st Floor	10744	Sq Ft
Aluminum Operable Window, 12 sf, 1st Floor	100	Each
Aluminum Frame, Fully Glazed, Exterior Door	4	Each
Steel w/ Safety Glass, Painted, Exterior Door	10	Each
B30 Roofing		
Built-up Roof	65000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	20	Each
Steel, Painted, Interior Door	15	Each
Wood, Hollow Core, Painted, Interior Door	40	Each
C30 Interior Finishes		
Sheetrock, Unstipped, Interior Wall Finish	9120	Sq Ft
Vinyl, Interior Wall Finish	9750	Sq Ft
Carpet, Nylon 20 oz., High Traffic	52000	Sq Ft
Concrete, Painted Flooring	3250	Sq Ft
Quarry Tile Flooring	8125	Sq Ft
Vinyl Tile Flooring	1625	Sq Ft
Acoustical Tile, Dropped Ceiling	61750	Sq Ft
Sheetrock, Unstipped Ceiling	3250	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	8	Each
Lavatory, Vitreous China	24	Each
Service Sink, Iron, Enamel	4	Each
Tankless Water Closet	20	Each
Urinal, Vitreous China	8	Each
Circulator Pump, 1/2 HP, Cold Water	1	Each
Circulator Pump, 1/2 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	2.1	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.9	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	2.5	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	2.1	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.9	K Ln Ft
Water Heater, Gas/Oil, 130 Gph	1	Each
Backflow Preventer, 4"	1	Each
Pipe & Fittings, 6" Cast Iron	1.3	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.6	K Ln Ft
Pipe & Fittings, 4" PVC	0.5	K Ln Ft
Roof Drain, 4-6"	19	Each
D30 HVAC		
Pipe & Fittings, 4" Steel, Gas	0.6	K Ln Ft
Duct Insulation, Fiberglass Blanket	11095	Sq Ft
Ductwork	16560	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	8	Each
Air Conditioner, Rooftop, Single Zone, 50 Ton	4	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	325	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	30	Each
D50 Electrical		
Distribution Switch, Fused, <600 V	8	Each
Main Switchgear, <1,200 Amp.	1	Each
Exit Lighting Fixture, w/ Battery	14	Each
Fluorescent Lighting Fixture, 160 w	1056	Each
Receptacle, 120 V, 15 Amp.	240	Each
Wiring Device, Switch	580	Each
Fire Alarm Horn & Strobe	30	Each
Heat Detector	30	Each
Manual Pull Station	30	Each
Smoke Detector	130	Each
E10 Equipment		
Microwave Oven	2	Each
Refrigerator, Domestic	2	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$999,603	\$0.31	0.16%
Unscheduled Maintenance	\$834,638	\$0.26	0.13%
Renewal & Replacement	\$7,176,035	\$2.21	1.12%
Total	\$9,010,276	\$2.77	1.41%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Carpet, Nylon 20 oz., High Traffic	28.98	23.0%
Replace Air Conditioner, Rooftop, Single Zone, 50 Ton	16.85	13.4%
Place New Membrane Over Existing, Built-up Roof	10.97	8.7%
Replace Membrane, Built-up Roof	9.50	7.6%
Repair Air Conditioner, Rooftop, Single Zone, 50 Ton	8.02	6.4%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	6.25	5.0%
Replace Fluorescent Lighting Fixture, 160 w	5.71	4.5%
Maintain Built-up Roof	3.04	2.4%
Maintain Air Conditioner, Rooftop, Single Zone, 50 Ton	3.03	2.4%
Replace Quarry Tile Flooring	2.78	2.2%
Replace Batteries & Check Operation, Smoke Detector	2.39	1.9%
Repair Carpet, Nylon 20 oz., High Traffic (2% of Carpet)	1.84	1.5%
Refinish Sheetrock, Unstipped, Interior Wall Finish	1.37	1.1%
Repair Wiring Device, Switch	1.21	1.0%
Check Operation, Heat Detector	.92	0.7%
Replace Smoke Detector	.91	0.7%
Refinish Concrete, Painted, Exterior, 1st Floor	.90	0.7%
Test Fire Sprinkler Head	.85	0.7%
Replace Wiring Device, Switch	.77	0.6%
Replace Vinyl, Interior Wall Finish	.75	0.6%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	.74	0.6%
Replace Wood, Hollow Core, Painted, Interior Door Locks	.73	0.6%
Maintain Fire Sprinkler System	.73	0.6%
Maintain Roof Drain, 4-6"	.72	0.6%
Test Gages & Valves, Fire Sprinkler System	.67	0.5%
Refinish Sheetrock, Unstipped Ceiling	.66	0.5%
Non-Destructive Moisture Inspection, Built-up Roof	.57	0.5%
Replace Drinking Fountain, Refrigerated	.55	0.4%
Replace Fire Extinguisher	.52	0.4%
Replace Existing Ductwork (20% of Ductwork)	.50	0.4%

*Task cost (\$2009) per GSFT over 50 years.

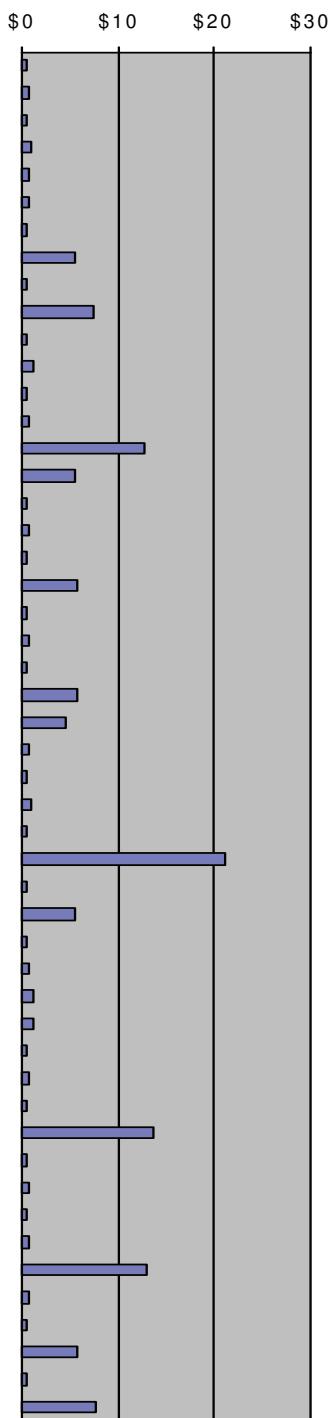
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	Plumbing	HVAC Systems	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13					.07	.12	.05	.13	.01		.50
2		.13			.10		.14	.12	.05	.13	.01		.66
3		.13					.07	.12	.05	.14	.01		.51
4		.13	.03		.27		.14	.12	.05	.13	.01		.86
5	.02	.19	.08		.01		.10	.13	.07	.17	.01		.77
6		.13			.10		.14	.12	.05	.14	.01		.67
7		.13					.10	.12	.05	.13	.01		.53
8		.13	.03		5.00		.14	.12	.05	.13	.01		5.59
9		.13			.06		.07	.12	.05	.14	.01		.57
10		.27	.19	.33	.14		.41	2.80	.35	2.83	.05		7.37
11		.13					.07	.12	.05	.13	.01		.50
12		.01	.13	.03	.27		.23	.13	.18	.14	.01		1.10
13		.13					.07	.12	.05	.13	.01		.50
14		.13			.10		.17	.12	.05	.13	.01		.69
15		.09	5.67	.08	.31		.09	5.68	.10	.74	.01		12.77
16		.13	.03		5.00		.14	.12	.05	.13	.01		5.59
17		.13					.08	.12	.07	.13	.01		.53
18		.13			.21		.14	.12	.05	.14	.01		.79
19		.13					.07	.12	.05	.13	.01		.50
20		.27	.19	.59	.31		.50	.20	.33	3.32	.05		5.77
21		.13					.10	.12	.05	.14	.01		.54
22		.13			.10		.15	.12	.07	.13	.01		.69
23		.13					.07	.12	.05	.13	.01		.50
24		.01	.13	.03	5.00		.23	.13	.18	.14	.01		5.84
25		.09	.19	.08	.01		.69	2.80	.05	.74	.01		4.66
26		.13			.10		.14	.12	.05	.13	.01		.66
27		.13			.06		.07	.12	.05	.14	.01		.57
28		.13	.03		.27		.17	.12	.05	.13	.01		.89
29		.13					.08	.12	.07	.13	.01		.53
30	.34	9.50	.41	.44			.42	6.35	.38	3.14	.05		21.03
31		.13					.07	.12	.05	.13	.01		.50
32		.13	.01	5.00			.14	.12	.05	.13	.01		5.58
33		.13					.07	.12	.05	.14	.01		.51
34		.13	.01	.10			.15	.12	.07	.13	.01		.71
35		.02	.19	.08	.01		.64	.13	.05	.17	.01		1.29
36		.01	.13	.01	.38		.18	.13	.18	.14	.01		1.16
37		.13					.12	.12	.05	.13	.01		.55
38		.13	.01	.10			.09	.12	.05	.13	.01		.63
39		.13					.12	.12	.05	.14	.01		.56
40		.27	.19	.58	5.05		.42	2.88	.33	3.89	.05		13.65
41		.13					.13	.12	.07	.13	.01		.58
42		.13	.01	.10			.12	.12	.05	.14	.01		.67
43		.13					.13	.12	.05	.13	.01		.56
44		.13	.01	.27			.09	.12	.05	.13	.01		.79
45		.09	5.67	.08	.37		.26	5.68	.10	.74	.01		13.00
46		.13	.01	.10			.10	.12	.07	.13	.01		.66
47		.13					.12	.12	.05	.13	.01		.55
48		.01	.13	.01	5.00		.18	.13	.18	.14	.01		5.77
49		.13					.15	.12	.05	.13	.01		.58
50		.39	.19	.34	2.92		.85	.13	.44	2.27	.05		7.58
Total	1.87	27.33	2.91	37.20			9.16	31.65	4.80	23.17	.53		138.62

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Passenger Terminal

Washington, D.C.

Passenger Terminal

Gross Square Feet:	12,000
Height in Ft:	14
Exterior:	Clay Brick
Floor coverings:	Finished Concrete, Vinyl Tile, Quarry Tile
HVAC:	Electric Cooling, Gas Heating
Capacity:	N/A
Occupancy:	720
Replacement Cost:	\$2,592,000

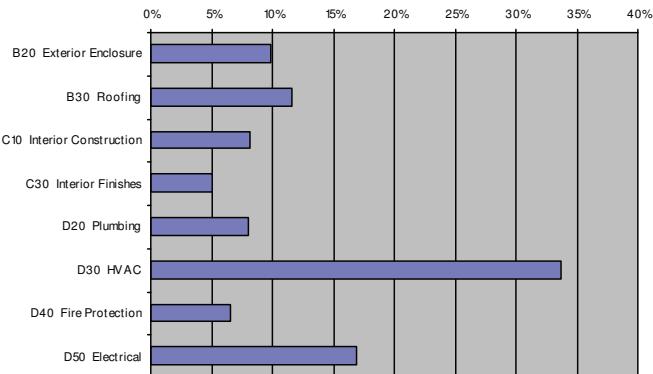
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	5882	Sq Ft
Aluminum Frame, Fully Glazed, Sliding Exterior Door	2	Each
Steel, Painted, Exterior Door	2	Each
Steel w/ Safety Glass, Painted, Exterior Door	6	Each
B30 Roofing		
Built-up Roof	12000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	8	Each
Steel, Painted, Interior Door	80	Each
C30 Interior Finishes		
Ceramic Tile, 4"x4", Interior Wall Finish	22400	Sq Ft
Concrete, Painted Flooring	6000	Sq Ft
Quarry Tile Flooring	3000	Sq Ft
Vinyl Tile Flooring	3000	Sq Ft
Acoustical Tile Ceiling	12000	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	2	Each
Lavatory, Iron, Enamel	9	Each
Sink, Stainless Steel	2	Each
Tankless Water Closet	8	Each
Urinal, Vitreous China	2	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.8	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.34	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.914	K Ln Ft
Pipe & Fittings, 4" Steel	0.976	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	1.288	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.609	K Ln Ft
Water Heater, Electric, 120 Gal.	2	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.5	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.219	K Ln Ft
Pipe & Fittings, 4" PVC	0.173	K Ln Ft
Roof Drain, 4-6"	2	Each
D30 HVAC		
Duct Insulation, Fiberglass Blanket	4127	Sq Ft
Ductwork	6160	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	6	Each
Air Conditioner, Rooftop, Single Zone, 20 Ton	1	Each
Air Conditioner, Rooftop, Single Zone, 50 Ton	1	Each
Electric Cabinet Heater	6	Each
HVAC Control Panel	1	Each
Thermostat	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	90	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	5	Each
D50 Electrical		
Main Switchgear, <1,200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	2	Each
Primary Transformer, Dry, 750 kVA	1	Each
Exit Lighting Fixture, w/ Battery	10	Each
Fluorescent Lighting Fixture, 160 w	120	Each
Grounded Fault Circuit Interrupter, 15 Amp.	6	Each
Receptacle, 120 V, 15 Amp.	60	Each
Wiring Device, Switch	20	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	5	Each
Heat Detector	5	Each
Manual Pull Station	5	Each
Smoke Detector	60	Each
Time Control Clock	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$583,830	\$0.97	0.45%
Unscheduled Maintenance	\$486,754	\$0.81	0.38%
Renewal & Replacement	\$1,743,371	\$2.91	1.35%
Total	\$2,813,955	\$4.69	2.17%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, Single Zone, 50 Ton	22.82	11.8%
Place New Membrane Over Existing, Built-up Roof	10.97	5.7%
Repair Air Conditioner, Rooftop, Single Zone, 50 Ton	10.86	5.6%
Replace Steel, Painted, Interior Door Locks	9.86	5.1%
Replace Membrane, Built-up Roof	9.50	4.9%
Replace Air Conditioner, Rooftop, Single Zone, 20 Ton	9.46	4.9%
Repair Air Conditioner, Rooftop, Single Zone, 20 Ton	7.06	3.6%
Clean & Reseal Clay Brick, Exterior, 1st Floor	6.73	3.5%
Replace Batteries & Check Operation, Smoke Detector	5.98	3.1%
Replace Primary Transformer, Dry, 750 kVA	5.71	2.9%
Replace Quarry Tile Flooring	5.56	2.9%
Replace Water Heater, Electric, 120 Gal.	4.69	2.4%
Maintain Air Conditioner, Rooftop, Single Zone, 50 Ton	4.10	2.1%
Replace Electric Cabinet Heater	3.96	2.0%
Maintain Fire Sprinkler System	3.94	2.0%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	3.84	2.0%
Repaint (50% surface) Clay Brick, Exterior, 1st Floor	3.66	1.9%
Test Gages & Valves, Fire Sprinkler System	3.63	1.9%
Inspect & Maintain Electric Cabinet Heater	3.54	1.8%
Replace Fluorescent Lighting Fixture, 160 w	3.51	1.8%
Maintain Air Conditioner, Rooftop, Single Zone, 20 Ton	3.36	1.7%
Maintain Built-up Roof	3.04	1.6%
Repair Ceramic Tile, 4"x4", Interior Wall Finish (2% of Walls)	2.45	1.3%
Maintain Steel, Painted, Interior Door Locks	2.35	1.2%
Replace Smoke Detector	2.29	1.2%
Refinish Steel, Painted, Interior Door	1.74	0.9%
Refinish Concrete, Painted Flooring	1.66	0.9%
Maintain Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	1.64	0.8%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	1.47	0.8%
Repair Main Switchgear, <1,200 Amp.	1.36	0.7%

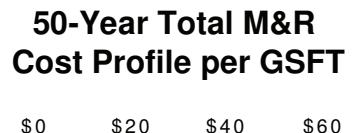
*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	Plumbing	HVAC Systems	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13					.07	.46	.23	.37			1.26
2		.13					.20	.46	.23	.37			1.39
3		.13					.09	.46	.23	.37			1.28
4		.13	.16				.20	.46	.23	.37			1.55
5		.07	.19	.64			.11	.48	.26	.59			2.35
6		.13					.22	.46	.23	.37			1.41
7		.13					.18	.46	.23	.37			1.36
8		.13	.16				.21	.46	.23	.37			1.56
9		.13			.07		.09	.46	.23	.37			1.35
10		3.56	.19	2.61		.82	.65	6.48	.68	2.31			17.30
11		.13					.07	.46	.23	.37			1.26
12		.04	.13	.16			.30	.46	.35	.37			1.81
13		.13					.07	.46	.23	.37			1.26
14		.13					.30	.46	.23	.37			1.49
15		.19	5.67	.64		.20	1.68	12.40	.50	1.38			22.66
16		.13	.16				.21	.46	.23	.37			1.56
17		.13					.07	.46	.25	.37			1.28
18		.13		.67			.22	.46	.23	.37			2.07
19		.13					.07	.46	.23	.37			1.26
20		3.56	.19	3.27		.82	.70	.83	.66	3.08			13.12
21		.13					.15	.46	.23	.37			1.33
22		.13					.25	.46	.25	.37			1.45
23		.13					.07	.46	.23	.37			1.26
24		.04	.13	.16			.31	.46	.35	.37			1.82
25		2.26	.19	.64			1.38	6.46	.24	1.01			12.17
26		.13					.20	.46	.23	.37			1.39
27		.13		.07			.09	.46	.23	.37			1.35
28		.13	.16				.25	.46	.23	.37			1.60
29		.13					.12	.46	.25	.37			1.33
30		3.67	9.50	2.61		1.02	2.24	13.77	.92	9.27			43.00
31		.13					.07	.46	.23	.37			1.26
32		.13	.16				.21	.46	.23	.37			1.56
33		.13					.09	.46	.23	.37			1.28
34		.13					.20	.46	.25	.37			1.40
35		.07	.19	.64			.76	.48	.24	.59			2.98
36		.04	.13	.16		.67	.30	.46	.35	.37			2.48
37		.13					.12	.46	.23	.37			1.31
38		.13					.20	.46	.23	.37			1.39
39		.13					.09	.46	.23	.37			1.28
40		3.56	.19	3.27		.82	1.00	6.80	.66	3.50			19.81
41		.13					.07	.46	.25	.37			1.28
42		.13					.24	.46	.23	.37			1.43
43		.13					.07	.46	.23	.37			1.26
44		.13	.16				.25	.46	.23	.37			1.59
45		.19	5.67	.64		.27	1.82	12.40	.50	1.38			22.87
46		.13					.20	.46	.25	.37			1.40
47		.13					.10	.46	.23	.37			1.29
48		.04	.13	.16			.31	.46	.35	.37			1.82
49		.13					.10	.46	.23	.37			1.29
50		6.01	.19	2.61		6.38	1.82	.51	.83	1.89			20.24
Total	23.29	27.33	19.14	11.80		18.82	79.11	15.39	39.61			234.50	



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Post Office

Washington, D.C.

Post Office

Gross Square Feet:	13,000
Height in Ft:	14
Exterior:	Clay Brick
Floor coverings:	Finished Concrete, Vinyl Tile
HVAC:	Electric Cool, Gas Heating, Single Zone Air
Capacity:	N/A
Occupancy:	780
Replacement Cost:	\$1,885,000

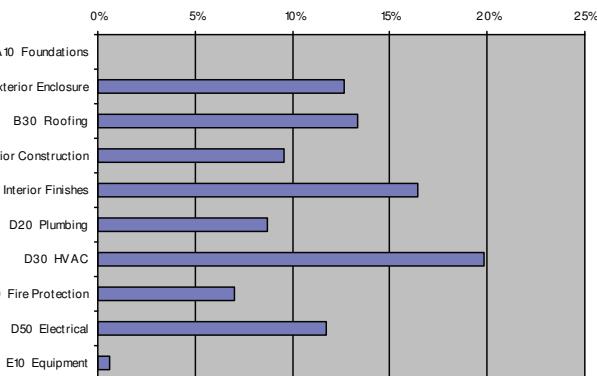
Components

Uniform / Component	Quantity	Units
A10 Foundations		
Concrete Slab	1000	Sq Ft
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	5561	Sq Ft
Aluminum Fixed Window, 12 sf, 1st Floor	50	Each
Aluminum & Glass Revolving Door	2	Each
Steel w/ Safety Glass, Painted, Exterior Door	4	Each
B30 Roofing		
Built-up Roof	13000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	5	Each
Wood, Hollow Core, Painted, Interior Door	87	Each
C30 Interior Finishes		
Sheetrock, Stippled, Interior Wall Finish	24276	Sq Ft
Concrete, Painted Flooring	6500	Sq Ft
Vinyl Tile Flooring	6500	Sq Ft
Acoustical Tile Ceiling	3250	Sq Ft
Metal, Painted Ceiling	9750	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	2	Each
Lavatory, Vitreous China	9	Each
Tankless Water Closet	5	Each
Urinal, Vitreous China	2	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.64	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.27	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.852	K Ln Ft
Pipe & Fittings, 4" Steel	0.968	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	1.124	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.526	K Ln Ft
Water Heater, Gas/Oil, 75 Gph	1	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.392	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.228	K Ln Ft
Pipe & Fittings, 4" PVC	0.105	K Ln Ft
Roof Drain, 4-6"	6	Each
D30 HVAC		
Duct Insulation, Fiberglass Blanket	2774	Sq Ft
Ductwork	4140	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	2	Each
Air Conditioner, Rooftop, Single Zone, 50 Ton	1	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	93	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	6	Each
D50 Electrical		
Main Switchgear, <1,200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	3	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	1	Each
Exit Lighting Fixture, w/ Battery	6	Each
Fluorescent Lighting Fixture, 160 w	130	Each
Grounded Fault Circuit Interruptor, 15 Amp.	2	Each
Receptacle, 120 V, 15 Amp.	104	Each
Wiring Device, Switch	33	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	6	Each
Heat Detector	6	Each
Manual Pull Station	6	Each
Smoke Detector	20	Each
E10 Equipment		
Microwave Oven	1	Each
Refrigerator, Domestic	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$469,202	\$0.72	0.50%
Unscheduled Maintenance	\$440,799	\$0.68	0.47%
Renewal & Replacement	\$1,755,411	\$2.70	1.86%
Total	\$2,665,412	\$4.10	2.83%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, Single Zone, 50 Ton	21.06	12.3%
Refinish Sheetrock, Stippled, Interior Wall Finish	18.23	10.7%
Place New Membrane Over Existing, Built-up Roof	10.97	6.4%
Repair Air Conditioner, Rooftop, Single Zone, 50 Ton	10.02	5.9%
Refinish Metal, Painted Ceiling	9.90	5.8%
Replace Membrane, Built-up Roof	9.50	5.6%
Replace Wood, Hollow Core, Painted, Interior Door Locks	7.92	4.6%
Clean & Reseal Clay Brick, Exterior, 1st Floor	5.87	3.4%
Replace Aluminum & Glass Revolving Door	4.96	2.9%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	3.84	2.2%
Maintain Air Conditioner, Rooftop, Single Zone, 50 Ton	3.79	2.2%
Maintain Fire Sprinkler System	3.64	2.1%
Replace Fluorescent Lighting Fixture, 160 w	3.51	2.1%
Replace Wood, Hollow Core, Painted, Interior Door	3.38	2.0%
Test Gages & Valves, Fire Sprinkler System	3.35	2.0%
Repoint (50% surface) Clay Brick, Exterior, 1st Floor	3.19	1.9%
Maintain Built-up Roof	3.04	1.8%
Replace Vinyl Tile Flooring	2.46	1.4%
Maintain Wood, Hollow Core, Painted, Interior Door Locks	2.13	1.2%
Replace Batteries & Check Operation, Smoke Detector	1.84	1.1%
Refinish Wood, Hollow Core, Painted, Interior Door	1.74	1.0%
Refinish Concrete, Painted Flooring	1.66	1.0%
Maintain Power Panel Board, 208 Y/120 V, 200 Amp.	1.45	0.8%
Replace Power Panel Board, 208 Y/120 V, 200 Amp.	1.40	0.8%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	1.27	0.7%
Repair Main Switchgear, <1,200 Amp.	1.25	0.7%
Test Fire Sprinkler Head	1.21	0.7%
Clean Water Heater, Gas/Oil, 75 Gph	1.21	0.7%
Maintain Roof Drain, 4-6"	1.14	0.7%
Replace Water Heater, Gas/Oil, 75 Gph	.96	0.6%

*Task cost (\$2009) per GSFT over 50 years.

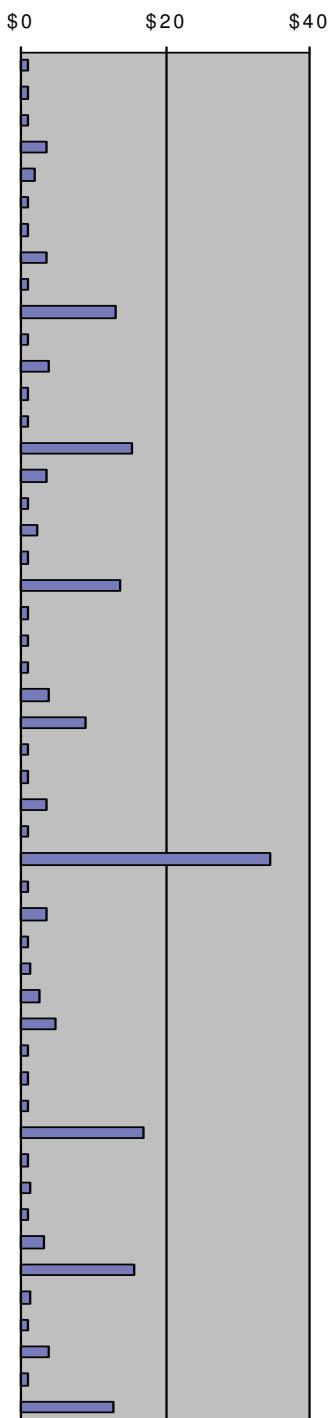
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	Interior Finishes	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1	.04	.13						.18	.16	.22	.20	.02	.94
2	.04	.13						.28	.16	.22	.20	.02	1.03
3	.04	.13						.18	.16	.22	.20	.02	.94
4	.04	.13	.15	2.34				.28	.16	.22	.20	.02	3.53
5	.07	.19	.64					.26	.18	.25	.38	.02	1.98
6	.04	.13						.28	.16	.22	.20	.02	1.03
7	.04	.13						.23	.16	.22	.20	.02	.99
8	.04	.13	.15	2.34				.28	.16	.22	.20	.02	3.54
9	.04	.13						.18	.16	.22	.20	.02	.98
10	2.97	.19	2.62	.33				.70	3.52	.65	1.95	.13	13.06
11	.04	.13						.18	.16	.22	.20	.02	.94
12	.04	.13	.15	2.34				.52	.16	.35	.20	.02	3.91
13	.04	.13						.18	.16	.22	.20	.02	.94
14	.04	.13						.32	.16	.22	.20	.02	1.08
15	.12	5.67	.64	.09				.21	7.28	.46	.78	.02	15.27
16	.04	.13	.15	2.34				.28	.16	.22	.20	.02	3.54
17	.04	.13						.23	.16	.23	.20	.02	1.01
18	.04	.13		1.24				.28	.16	.22	.20	.02	2.28
19	.04	.13						.18	.16	.22	.20	.02	.94
20	3.06	.19	3.06	2.80				.70	.28	.63	2.86	.13	13.70
21	.04	.13						.23	.16	.22	.20	.02	.99
22	.04	.13						.33	.16	.23	.20	.02	1.10
23	.04	.13						.18	.16	.22	.20	.02	.94
24	.04	.13	.15	2.34				.52	.16	.35	.20	.02	3.91
25	1.97	.19	.64	.41				1.24	3.52	.23	.78	.02	9.00
26	.04	.13						.28	.16	.22	.20	.02	1.03
27	.04	.13		.04				.18	.16	.22	.20	.02	.98
28	.04	.13	.15	2.34				.32	.16	.22	.20	.02	3.58
29	.04	.13						.23	.16	.23	.20	.02	1.01
30	7.94	9.50	3.53	.42				.65	8.12	.86	3.40	.13	34.55
31	.04	.13						.18	.16	.22	.20	.02	.94
32	.04	.13	.01	2.34				.28	.16	.22	.20	.02	3.39
33	.04	.13						.18	.16	.22	.20	.02	.95
34	.04	.13	.15					.33	.16	.23	.20	.02	1.25
35	.07	.19	.64					.94	.18	.23	.38	.02	2.64
36	.04	.13	.01	3.59				.44	.16	.35	.20	.02	4.92
37	.04	.13						.26	.16	.22	.20	.02	1.02
38	.04	.13	.15					.20	.16	.22	.20	.02	1.10
39	.04	.13						.26	.16	.22	.20	.02	1.02
40	3.06	.19	2.92	2.80				.57	3.62	.63	3.11	.13	17.02
41	.04	.13						.31	.16	.23	.20	.02	1.09
42	.04	.13	.15					.25	.16	.22	.20	.02	1.15
43	.04	.13						.26	.16	.22	.20	.02	1.02
44	.04	.13	.01	2.34				.20	.16	.22	.20	.02	3.31
45	.12	5.67	.64	.13				.49	7.28	.46	.78	.02	15.59
46	.04	.13	.15					.25	.16	.23	.20	.02	1.17
47	.04	.13						.26	.16	.22	.20	.02	1.02
48	.04	.13	.01	2.34				.44	.16	.35	.20	.02	3.68
49	.04	.13						.31	.16	.22	.20	.02	1.07
50	4.88	.19	2.76	.74				1.45	.18	.78	1.84	.13	12.95
Total	25.93	27.33	19.62	33.70				17.89	40.67	14.41	24.11	1.34	204.99

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Public Library, 3 Story

Washington, D.C.

Public Library, 3 Story

Gross Square Feet:	60,000
Height in Ft:	36
Exterior:	Concrete
Floor coverings:	Finished Concrete, Quarry Tile, Carpet
HVAC:	Chilled Water, Gas Boiler, Multizone Air
Capacity:	N/A
Occupancy:	1,080
Replacement Cost:	\$13,509,303

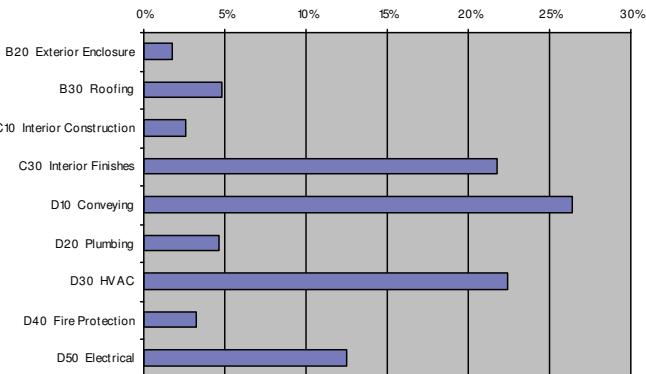
Components (Continued on Page 156)

Uniform / Component	Quantity	Units
B20 Exterior Enclosure		
Concrete, Painted, Exterior, 1st Floor	5750	Sq Ft
Concrete, Painted, Exterior, 2nd Floor	5750	Sq Ft
Concrete, Painted, Exterior, 3rd+ Floor	5750	Sq Ft
Aluminum Fixed Window, 24 sf, 1st Floor	50	Each
Aluminum Fixed Window, 24 sf, 2nd Floor	40	Each
Aluminum Fixed Window, 24 sf, 3rd+ Floor	40	Each
Aluminum Frame, Fully Glazed, Exterior Door	4	Each
Steel Single 12x12', Painted, Roll-up Door	1	Each
Steel, Painted, Exterior Door	6	Each
B30 Roofing		
Built-up Roof	20000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	21	Each
Wood, Solid Core, Painted, Interior Door	48	Each
Wood, Solid Core w/ Safety Glass, Painted, Interior Door	24	Each
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	1200	Sq Ft
Sheetrock, Unstippled, Interior Wall Finish	36590	Sq Ft
Carpet, Nylon 20 oz., High Traffic	45000	Sq Ft
Concrete, Painted Flooring	3000	Sq Ft
Quarry Tile Flooring	12000	Sq Ft
Acoustical Tile, Dropped Ceiling	57000	Sq Ft
Metal, Painted Ceiling	3000	Sq Ft
D10 Conveying		
Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	2	Each
Escalator, 16 ft rise, 100 fpm	4	Each
D20 Plumbing		
Drinking Fountain, Refrigerated	12	Each
Lavatory, Vitreous China	24	Each
Service Sink, Iron, Enamel	3	Each
Tankless Water Closet	21	Each
Urinal, Vitreous China	3	Each
Circulator Pump, 1/2 HP, Cold Water	1	Each
Circulator Pump, 1/2 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	2.1	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.9	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	2.6	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	2.4	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	1.4	K Ln Ft
Water Heater, Gas/Oil, 130 Gph	1	Each
Backflow Preventer, 4"	1	Each
Pipe & Fittings, 6" Cast Iron	1	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.3	K Ln Ft
Pipe & Fittings, 4" PVC	0.5	K Ln Ft
Roof Drain, 4-6"	6	Each
D30 HVAC		
Pipe & Fittings, 4" Steel, Gas	1.3	K Ln Ft
Chemical Feed System	1	Each
Circulation Pump, 5 HP, Hot Water	2	Each
Expansion Tank, 100 Gal.	2	Each
Gas Boiler, 2,000 Mbh	1	Each
Chiller, Reciprocal Water-Cooled Hermetic, 100 Ton	2	Each
Circulation Pump, 5 HP, Chiller & Condenser Water	2	Each
Air Handler, Multizone, 25,000 Cfm	3	Each
Duct Insulation, Fiberglass Blanket	10238	Sq Ft
Ductwork	15280	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	4	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	462	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	30	Each
D50 Electrical		
Distribution Switch, Fused, <600 V	8	Each
Main Switchgear, <1,200 Amp.	1	Each
Motor Starter, 5-20 HP, <600 V	5	Each
Motor Starter, 21-50 HP, <600 V	1	Each
Motor Starter, 51-75 HP, <600 V	2	Each
Secondary Transformer, Dry, 150 KVA	4	Each
Exit Lighting Fixture, w/ Battery	16	Each
Fluorescent Lighting Fixture, 160 w	750	Each
Receptacle, 120 V, 15 Amp.	600	Each
Wiring Device, Switch	150	Each
Annunciation Panel	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$3,554,521	\$1.18	0.53%
Unscheduled Maintenance	\$1,515,897	\$0.51	0.22%
Renewal & Replacement	\$6,294,236	\$2.10	0.93%
Total	\$11,364,654	\$3.79	1.68%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Carpet, Nylon 20 oz., High Traffic	27.17	16.6%
Maintain Escalator, 16 ft rise, 100 fpm	23.51	14.3%
Maintain Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	11.29	6.9%
Replace Air Handler, Multizone, 25,000 Cfm	7.90	4.8%
Renovate Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	7.58	4.6%
Refinish Sheetrock, Unstippled, Interior Wall Finish	5.95	3.6%
Replace Chiller, Reciprocal Water-Cooled Hermetic, 100 Ton	5.74	3.5%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	4.81	2.9%
Replace Quarry Tile Flooring	4.45	2.7%
Replace Fluorescent Lighting Fixture, 160 w	4.39	2.7%
Maintain Chiller, Reciprocal Water-Cooled Hermetic, 100 Ton	3.67	2.2%
Place New Membrane Over Existing, Built-up Roof	3.66	2.2%
Repair Chiller, Reciprocal Water-Cooled Hermetic, 100 Ton	3.38	2.1%
Replace Membrane, Built-up Roof	3.17	1.9%
Maintain Chemical Feed System	3.10	1.9%
Inspect & Test Gas Boiler, 2,000 Mbh	2.96	1.8%
Maintain Air Handler, Multizone, 25,000 Cfm	2.75	1.7%
Replace Batteries & Check Operation, Smoke Detector	2.39	1.5%
Repair Carpet, Nylon 20 oz., High Traffic (2% of Carpet)	1.72	1.0%
Test Fire Sprinkler Head	1.31	0.8%
Refinish Concrete, Painted, Exterior, 3rd+ Floor	1.04	0.6%
Maintain Built-up Roof	1.01	0.6%
Check Operation, Heat Detector	.99	0.6%
Replace Wood, Solid Core, Painted, Interior Door	.96	0.6%
Replace Wood, Solid Core, Painted, Interior Door Locks	.95	0.6%
Replace Smoke Detector	.91	0.6%
Replace Drinking Fountain, Refrigerated	.90	0.5%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	.84	0.5%
Maintain Fire Sprinkler System	.79	0.5%
Refinish Concrete, Painted, Exterior, 2nd Floor	.78	0.5%

*Task cost (\$2009) per GSFT over 50 years.

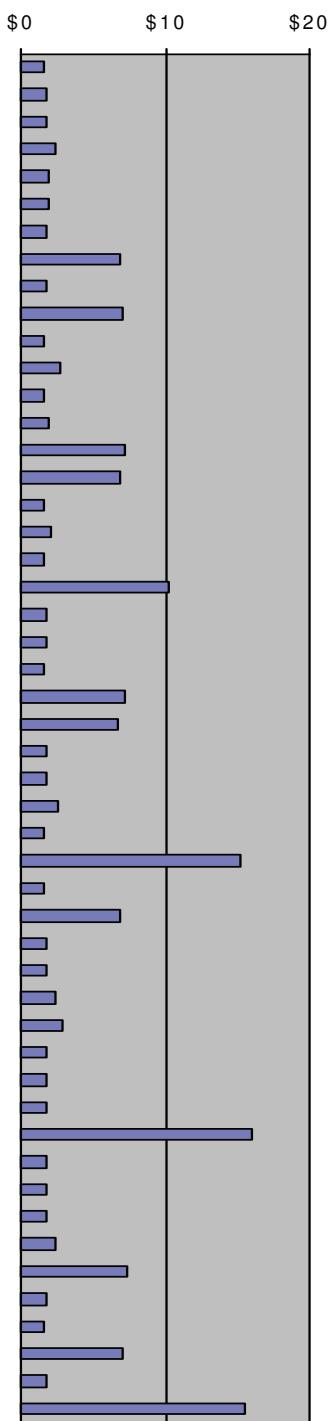
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.04			.86	.05	.45	.06	.17			1.63
2		.04			.09	.86	.12	.45	.06	.17		1.80
3		.04				.86	.05	.45	.06	.23		1.69
4		.04	.03		.66	.86	.12	.45	.06	.17		2.40
5		.01	.06	.11		.86	.08	.46	.08	.22		1.90
6		.04			.09	.86	.12	.45	.06	.23		1.85
7		.04				.86	.07	.52	.06	.17		1.73
8		.04	.03		5.10	.86	.13	.45	.06	.17		6.84
9		.04			.05	.86	.05	.45	.06	.23		1.74
10		.55	.06	.47		.12	.86	.47	1.79	.51	2.14	6.98
11		.04				.86	.05	.45	.06	.17		1.63
12		.01	.04	.03	.66	.86	.21	.46	.20	.23		2.71
13		.04				.86	.05	.45	.06	.17		1.63
14		.04			.09	.86	.15	.53	.06	.17		1.89
15		.03	1.89	.11	.10	.86	.07	3.33	.11	.68		7.19
16		.04	.03		5.10	.86	.13	.45	.06	.17		6.84
17		.04				.86	.06	.45	.08	.17		1.66
18		.04			.14	.86	.12	.45	.06	.39		2.08
19		.04				.86	.05	.45	.06	.17		1.63
20		.60	.06	.77	.73	.86	.57	3.24	.49	2.95		10.27
21		.04				.86	.07	.52	.06	.23		1.78
22		.04			.09	.86	.13	.45	.08	.17		1.83
23		.04				.86	.05	.45	.06	.17		1.63
24		.01	.04	.03	5.10	.86	.22	.46	.20	.23		7.15
25		.15	.06	.11	.09	4.37	.75	.66	.06	.50		6.76
26		.04			.09	.86	.12	.45	.06	.17		1.80
27		.04			.05	.86	.05	.45	.06	.23		1.74
28		.04	.03		.66	.86	.15	.53	.06	.17		2.50
29		.04				.86	.06	.45	.08	.17		1.66
30		.57	3.17	.47	.22	.86	.48	5.58	.54	3.33		15.23
31		.04				.86	.05	.45	.06	.17		1.63
32		.04	.03		5.10	.86	.13	.45	.06	.17		6.84
33		.04				.86	.05	.45	.06	.23		1.69
34		.04			.09	.86	.13	.45	.08	.17		1.83
35		.05	.06	.11		.86	.58	.46	.06	.22		2.41
36		.01	.04	.03	.71	.86	.16	.46	.20	.39		2.88
37		.04				.86	.10	.52	.06	.17		1.75
38		.04			.09	.86	.07	.45	.06	.17		1.74
39		.04				.86	.10	.45	.06	.23		1.74
40		.59	.06	1.75	5.17	.86	.42	3.44	.49	3.23		16.00
41		.04				.86	.11	.45	.08	.17		1.71
42		.04			.09	.86	.10	.45	.06	.23		1.83
43		.04				.86	.10	.45	.06	.17		1.68
44		.04	.03		.66	.86	.07	.53	.06	.17		2.42
45		.04	1.89	.11	.15	.86	.26	3.33	.11	.68		7.44
46		.04			.09	.86	.08	.45	.08	.17		1.78
47		.04				.86	.10	.45	.06	.17		1.68
48		.01	.04	.03		5.10	.86	.16	.46	.20	.23	7.09
49		.04				.86	.12	.45	.06	.17		1.70
50		.73	.06	.47	4.66	4.37	.98	1.70	.66	1.86		15.48
Total		3.38	9.11	4.83		41.14	50.00	8.69	42.51	6.08	23.66	189.41

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Public Restroom

Gross Square Feet:	500
Height in Ft:	12
Exterior:	Clay Brick
Floor coverings:	Concrete
HVAC:	N/A
Capacity:	N/A
Occupancy:	8
Replacement Cost:	\$135,054

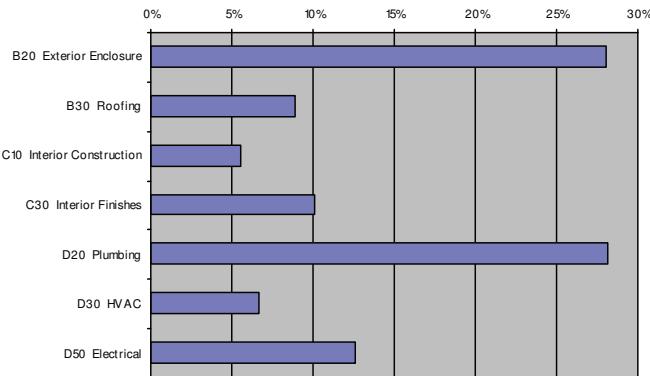
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	1075	Sq Ft
Steel, Painted, Exterior Door	3	Each
B30 Roofing		
Aluminum Gutter, Downspouts, Fittings	0.05	K Ln Ft
Asphalt Shingle Roof	500	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	6	Each
C30 Interior Finishes		
Concrete, Painted, Interior Wall Finish	1075	Sq Ft
Concrete Flooring	500	Sq Ft
Concrete, Painted Ceiling	500	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	1	Each
Lavatory, Vitreous China	4	Each
Tankless Water Closet	6	Each
Urinal, Vitreous China	2	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.05	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.05	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.025	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.05	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.05	K Ln Ft
Water Heater, Electric, 52 Gal.	1	Each
Floor Drain	2	Each
Pipe & Fittings, 4" Cast Iron	0.025	K Ln Ft
D30 HVAC		
Exhaust Fan, Ceiling, 200-500 Cfm	2	Each
D50 Electrical		
Power Panel Board, 208 Y/120 V, 200 Amp.	1	Each
Fluorescent Lighting Fixture, 80 w	8	Each
Receptacle, 120 V, 15 Amp.	4	Each
Wiring Device, Switch	2	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$44,662	\$1.79	0.66%
Unscheduled Maintenance	\$54,199	\$2.17	0.80%
Renewal & Replacement	\$93,501	\$3.74	1.38%
Total	\$192,362	\$7.69	2.85%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Clean & Reseal Clay Brick, Exterior, 1st Floor	29.52	10.7%
Refinish Concrete, Painted, Interior Wall Finish	21.65	7.8%
Replace Toilet Partitions, Painted Metal, Overhead Braced	18.75	6.8%
Repaint (50% surface) Clay Brick, Exterior, 1st Floor	16.06	5.8%
Refinish Concrete, Painted Ceiling	13.51	4.9%
Maintain Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	13.15	4.8%
Maintain Power Panel Board, 208 Y/120 V, 200 Amp.	12.54	4.5%
Replace Power Panel Board, 208 Y/120 V, 200 Amp.	12.09	4.4%
Replace Water Heater, Electric, 52 Gal.	10.71	3.9%
Maintain Floor Drain	9.80	3.5%
Replace Steel, Painted, Exterior Door Locks	9.35	3.4%
Replace Drinking Fountain, Refrigerated	9.00	3.3%
Maintain Asphalt Shingle Roof	8.23	3.0%
Replace Faucet Washer & Clean Trap, Lavatory, Vitreous China	8.21	3.0%
Replace Tankless Water Closet	7.09	2.6%
Replace Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	5.90	2.1%
Replace Asphalt Shingle Roof	5.23	1.9%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 80 w	5.14	1.9%
Replace Fluorescent Lighting Fixture, 80 w	4.82	1.7%
Place New Shingles Over Existing, Asphalt Shingle Roof	4.27	1.5%
Replace Valve Set, Lavatory, Vitreous China	3.90	1.4%
Replace Urinal, Vitreous China	3.69	1.3%
Drain & Flush Water Heater, Electric, 52 Gal.	3.49	1.3%
Replace Lavatory, Vitreous China	3.46	1.3%
Replace Flush Valve, Urinal, Vitreous China	3.26	1.2%
Repair Steel, Painted, Exterior Door	3.10	1.1%
Repair Clay Brick, Exterior, 1st Floor (2% of Walls)	3.10	1.1%
Refinish Toilet Partitions, Painted Metal, Overhead Braced	2.60	0.9%
Maintain Aluminum Gutter, Downspouts, Fittings	2.50	0.9%
Repair Concrete, Painted, Interior Wall Finish (2% of Walls)	2.13	0.8%

*Task cost (\$2009) per GSFT over 50 years.

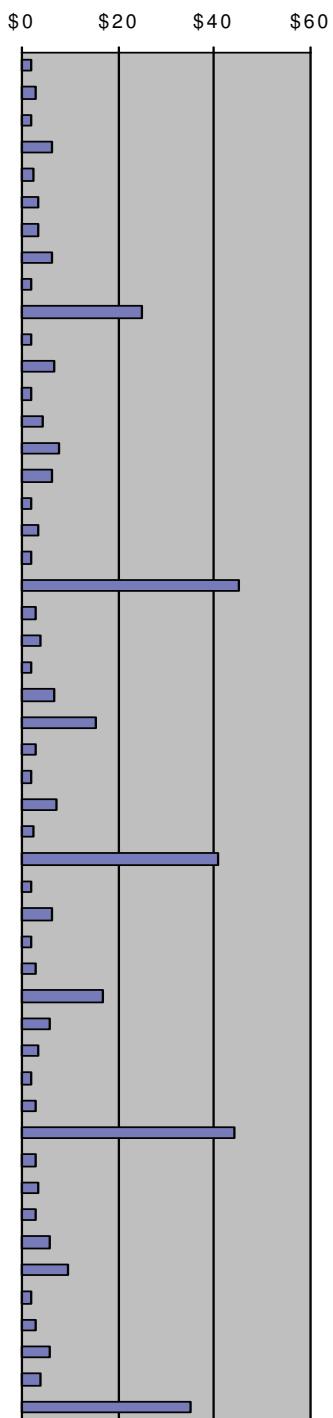
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	Interior Finishes	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.46					.53	.41		.49			1.89
2		.46					1.68	.41		.49			3.03
3		.46					.76	.41		.49			2.12
4		.46	.26	2.93			1.68	.41		.49			6.22
5		.53	.56				.59	.41		.49			2.58
6		.46					1.90	.41		.49			3.26
7		.46					1.98	.41		.49			3.34
8		.46	.26	2.93			1.68	.41		.49			6.22
9		.46					.76	.41		.49			2.12
10		16.61	.56				4.66	.41		2.65			24.89
11		.46					.53	.41		.49			1.89
12		.46	.26	2.93			1.93	.41		.49			6.48
13		.46					.53	.41		.49			1.89
14		.46					3.12	.41		.49			4.48
15		1.57	.56	.16			4.16	.41		.60			7.46
16		.46	.26	2.93			1.68	.41		.49			6.22
17		.46					.53	.41		.49			1.89
18		.46					1.90	.41		.49			3.26
19		.46					.53	.41		.49			1.89
20		16.61	5.35	9.38	2.93		4.73	2.95		3.40			45.35
21		.46					1.62	.41		.49			2.98
22		.46					2.26	.41		.49			3.62
23		.46					.53	.41		.49			1.89
24		.46	.26	2.93			1.93	.41		.49			6.48
25		10.11	.56		1.62		2.06	.41		.67			15.43
26		.46					1.68	.41		.49			3.03
27		.46					.76	.41		.49			2.12
28		.46	.26	2.93			2.54	.41		.49			7.09
29		.46					1.12	.41		.49			2.47
30		17.64	.56	.16			8.13	.41		13.92			40.83
31		.46					.53	.41		.49			1.89
32		.46	.26	2.93			1.68	.41		.49			6.22
33		.46					.76	.41		.49			2.12
34		.46					1.68	.41		.49			3.03
35		.53	.56				14.93	.41		.49			16.92
36		.46	.26	2.93			1.02	.41		.49			5.57
37		.46					2.02	.41		.49			3.38
38		.46					.77	.41		.49			2.13
39		.46					1.67	.41		.49			3.03
40		16.61	5.86	9.38	2.93		2.88	2.95		3.58			44.19
41		.46					1.44	.41		.49			2.80
42		.46					1.86	.41		.49			3.22
43		.46					1.44	.41		.49			2.80
44		.46	.26	2.93			1.35	.41		.49			5.90
45		1.57	.56	.16			6.50	.41		.60			9.81
46		.46					.77	.41		.49			2.13
47		.46					1.44	.41		.49			2.80
48		.46	.26	2.93			1.02	.41		.49			5.57
49		.46					2.31	.41		.49			3.66
50		26.19	.56		1.62		3.86	.41		2.47			35.10
Total	107.97	34.03	21.35		38.88		108.41	25.78		48.30			384.72

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Pump House

Gross Square Feet:	195
Height in Ft:	10
Exterior:	Clay Brick
Floor coverings:	Finished Concrete
HVAC:	Unit Heaters
Capacity:	30 HP
Occupancy:	
Replacement Cost:	\$122,655

Components

Unifomat / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	560	Sq Ft
Aluminum Operable Window, 12 sf, 1st Floor	2	Each
Wood, Solid Core, Painted, Exterior Door	1	Each
B30 Roofing		
Asphalt Shingle Roof	195	Sq Ft
C30 Interior Finishes		
Concrete, Painted, Interior Wall Finish	560	Sq Ft
Concrete, Painted Flooring	195	Sq Ft
Concrete, Painted Ceiling	195	Sq Ft
D20 Plumbing		
Water Softener, 10 Gal.	1	Each
Well Pump, 30 HP	1	Each
D30 HVAC		
Suspended Electric Heater, Standard, 240 V	1	Each
Direct Digital Controls, System Points	1	Each
D40 Fire Protection		
Fire Extinguisher	1	Each
D50 Electrical		
Motor Starter, 51-75 HP, <600 V	1	Each
Power Panel Board, 208 Y/120 V, 100 Amp.	2	Each
Secondary Transformer, Dry, 50 kVA	1	Each
Incandescent Lighting Fixture, Basic, 200 w	1	Each
Metal Halide Lighting Fixture, Wall Mount, 150 w	1	Each
Receptacle, 120 V, 15 Amp.	2	Each
Wiring Device, Switch	1	Each

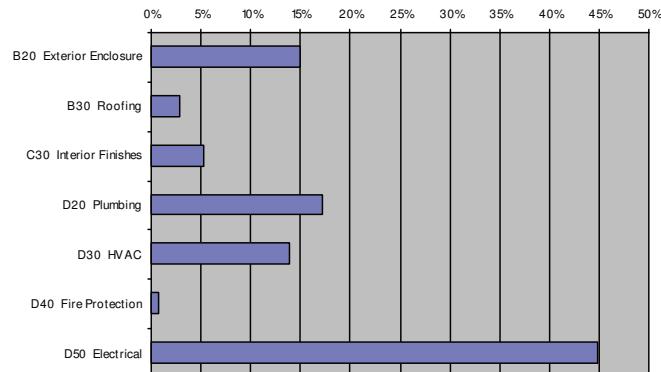
Pump House

Washington, D.C.

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$52,705	\$5.41	0.86%
Unscheduled Maintenance	\$50,852	\$5.22	0.83%
Renewal & Replacement	\$80,818	\$8.29	1.32%
Total	\$184,375	\$18.91	3.01%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Maintain Power Panel Board, 208 Y/120 V, 100 Amp.	64.33	9.4%
Replace Well Pump, 30 HP, Pump & Motor Assembly	57.25	8.4%
Replace Coil, Motor Starter, 51-75 HP, <600 V	53.85	7.9%
Maintain Suspended Electric Heater, Standard, 240 V	45.79	6.7%
Replace Motor Starter, 51-75 HP, <600 V	44.41	6.5%
Replace Power Panel Board, 208 Y/120 V, 100 Amp.	42.85	6.3%
Clean & Reseal Clay Brick, Exterior, 1st Floor	39.44	5.8%
Maintain Secondary Transformer, Dry, 50 kVA	32.16	4.7%
Replace Secondary Transformer, Dry, 50 kVA	29.04	4.2%
Refinish Concrete, Painted, Interior Wall Finish	28.92	4.2%
Replace Water Softener, 10 Gal.	25.72	3.8%
Repaint (50% surface) Clay Brick, Exterior, 1st Floor	21.45	3.1%
Inspect & Clean Motor Starter, 51-75 HP, <600 V	21.17	3.1%
Maintain Direct Digital Controls, System Points	18.23	2.7%
Replace Direct Digital Controls, System Points	16.64	2.4%
Maintain Water Softener, 10 Gal.	13.98	2.0%
Inspect, Clean, Adjust & Lubricate Well Pump, 30 HP	13.78	2.0%
Refinish Concrete, Painted Ceiling	13.54	2.0%
Replace Suspended Electric Heater, Standard, 240 V	11.98	1.8%
Maintain Asphalt Shingle Roof	8.29	1.2%
Replace Wood, Solid Core, Painted, Exterior Door Locks	6.40	0.9%
Repair Secondary Transformer, Dry, 50 kVA	6.26	0.9%
Replace Wood, Solid Core, Painted, Exterior Door	6.18	0.9%
Replace Fire Extinguisher	5.78	0.8%
Repair Power Panel Board, 208 Y/120 V, 100 Amp.	5.48	0.8%
Overhaul Well Pump, 30 HP	5.25	0.8%
Replace Asphalt Shingle Roof	5.23	0.8%
Replace Metal Halide Lighting Fixture, Wall Mount, 150 w	4.99	0.7%
Replace Lamp, Metal Halide Lighting Fixture, Wall Mount, 150 w	4.35	0.6%
Place New Shingles Over Existing, Asphalt Shingle Roof	4.27	0.6%

*Task cost (\$2009) per GSFT over 50 years.

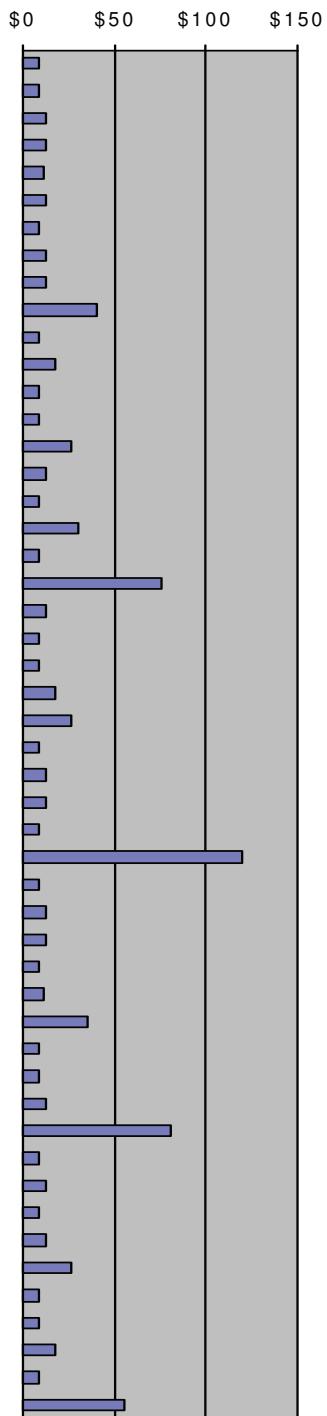
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.35						1.45	2.22	4.57			8.59
2		.35						1.45	2.22	4.57			8.59
3		.35						1.45	2.22	8.42			12.44
4		.35			3.54			1.45	2.22	4.57			12.13
5		.46	.45					2.85	2.22	.21	5.52		11.71
6		.35						1.45	2.22	8.42			12.44
7		.11	.35					1.45	2.22	4.57			8.71
8		.35			3.54			1.45	2.22	4.57			12.13
9		.35						1.45	2.22	8.42			12.44
10	21.74	.45			.66			2.85	4.97	.21	9.74		40.63
11		.35						1.45	2.22	4.57			8.59
12		.35			3.54			1.45	2.22	1.45	8.42		17.43
13		.35						1.45	2.22	4.57			8.59
14		.11	.35					1.45	2.22	4.57			8.71
15		.73	.45		.18			10.64	4.57		9.52		26.09
16		.35			3.54			1.45	2.22	4.57			12.13
17		.35						1.45	2.22	.21	4.57		8.81
18		.35						1.45	2.22		25.94		29.96
19		.35						1.45	2.22	4.57			8.59
20	21.74	4.72			4.20			29.42	4.97		10.94		75.99
21		.11	.35					1.45	2.22		8.42		12.55
22		.35						1.45	2.22	.21	4.57		8.81
23		.35						1.45	2.22	4.57			8.59
24		.35			3.54			1.45	2.22	1.45	8.42		17.43
25	13.25	.45			1.98			2.85	2.22		5.75		26.51
26		.35						1.45	2.22	4.57			8.59
27		.35						1.45	2.22	8.42			12.44
28		.11	.35		3.54			1.45	2.22	4.57			12.25
29		.35						1.45	2.22	.21	4.57		8.81
30	22.02	.45			.84			10.64	7.32		78.72		119.98
31		.35						1.45	2.22	4.57			8.59
32		.35			3.54			1.45	2.22	4.57			12.13
33		.35						1.45	2.22	8.42			12.44
34		.35						1.45	2.22	.21	4.57		8.81
35		.57	.45					2.85	2.22		5.52		11.62
36		.35			3.54			1.45	2.22	1.45	25.94		34.95
37		.35						1.45	2.22	4.57			8.59
38		.35						1.45	2.22	4.57			8.59
39		.35						1.45	2.22	8.42			12.44
40	25.10	5.23			4.20			29.42	4.97		11.17		80.09
41		.35						1.45	2.22	.21	4.57		8.81
42		.35						1.45	2.22		8.42		12.44
43		.35						1.45	2.22	4.57			8.59
44		.35			3.54			1.45	2.22	4.57			12.13
45		.73	.45		.18			10.64	4.57		9.52		26.09
46		.35						1.45	2.22	.21	4.57		8.81
47		.11	.35					1.45	2.22	4.57			8.71
48		.35			3.54			1.45	2.22	1.45	8.42		17.43
49		.35						1.45	2.22	4.57			8.59
50	34.53	.45			2.65			2.85	4.97		9.51		54.96
Total	141.43	27.51			50.28			163.05	131.84	7.47	423.94		945.51

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Religious Assembly

Gross Square Feet:	17,000
Height in Ft:	24
Exterior:	Clay Brick
Floor coverings:	Carpet
HVAC:	Split System, Oil Heat, Wall Fin Radiation
Capacity:	N/A
Occupancy:	1,020
Replacement Cost:	\$4,243,987

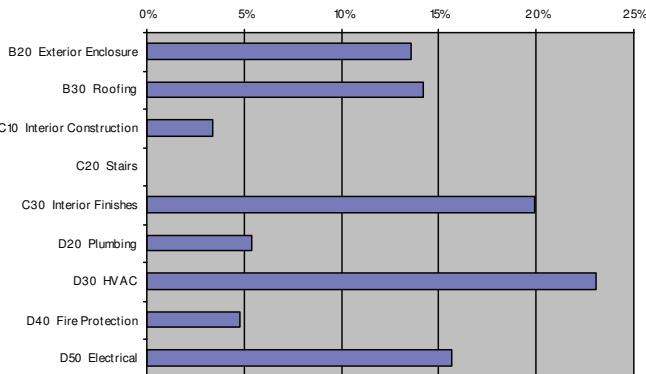
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	12312	Sq Ft
Steel Frame, Painted, Operable Window, 12 sf, 1st Floor	50	Each
Steel Frame, Painted, Operable Window, 12 sf, 2nd Floor	23	Each
Aluminum Frame, Fully Glazed, Exterior Door	2	Each
Wood, Solid Core, Painted, Exterior Door	10	Each
B30 Roofing		
Aluminum Gutter, Downspouts, Fittings	0.54	K Ln Ft
Asphalt Shingle Roof	20400	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	4	Each
Steel, Painted, Interior Door	42	Each
Wood, Painted, Fully Glazed, Interior Door	6	Each
C20 Stairs		
Concrete, Interior Stairs	100	Sq Ft
C30 Interior Finishes		
Clay Brick, Interior Wall Finish	860	Sq Ft
Concrete, Painted, Interior Wall Finish	10368	Sq Ft
Carpet, Nylon 20 oz., High Traffic	8500	Sq Ft
Vinyl Tile Flooring	8500	Sq Ft
Wood, Finished Ceiling	20400	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	2	Each
Flush Tank Water Closet, One Piece	4	Each
Lavatory, Vitreous China	3	Each
Sink, Enamelled Steel	4	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.48	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.23	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.766	K Ln Ft
Pipe & Fittings, 4" Steel	1.343	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.902	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.616	K Ln Ft
Water Heater, Electric, 65 Gal.	1	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.333	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.286	K Ln Ft
Storm Water & Drain Lift Station, 2 HP	0.59	Each
D30 HVAC		
Pipe & Fittings, 2" Copper, Fuel Oil	0.42	K Ln Ft
Circulation Pump, 5 HP, Hot Water	1	Each
Gas Boiler, 2,000 Mbh	1	Each
Condenser, Air-Cooled, 20 Ton	1	Each
Condenser, Air-Cooled, 40 Ton	1	Each
Air Handler, Multizone, 20,000 Cfm	1	Each
Air Handler, Single Zone, 6,500 Cfm	1	Each
Duct Insulation, Fiberglass Blanket	3645	Sq Ft
Ductwork	5440	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	2	Each
Direct Digital Controls, System Points	4	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	125	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	8	Each
D50 Electrical		
Main Switchgear, <1,200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	4	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	7	Each
Emergency Horn & Strobe	15	Each
Exit Lighting Fixture, w/ Battery	15	Each
Fluorescent Lighting Fixture, 160 w	85	Each
Light Dimming Panel	1	Each
Metal Halide Lighting Fixture, High Bay, 400 w	60	Each
Receptacle, 120 V, 15 Amp.	43	Each
Wiring Device, Switch	17	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	8	Each
Heat Detector	8	Each
Manual Pull Station	8	Each
Smoke Detector	25	Each
Sound System, 7 Channel	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$1,095,102	\$1.29	0.52%
Unscheduled Maintenance	\$963,140	\$1.13	0.45%
Renewal & Replacement	\$2,152,340	\$2.53	1.01%
Total	\$4,210,582	\$4.95	1.98%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Carpet, Nylon 20 oz., High Traffic	18.11	9.5%
Refinish Wood, Finished Ceiling	17.08	8.9%
Inspect & Test Gas Boiler, 2,000 Mbh	10.44	5.5%
Clean & Reseal Clay Brick, Exterior, 1st Floor	9.94	5.2%
Maintain Asphalt Shingle Roof	9.94	5.2%
Replace Air Handler, Multizone, 20,000 Cfm	7.88	4.1%
Replace Asphalt Shingle Roof	6.28	3.3%
Refinish Concrete, Painted, Interior Wall Finish	6.14	3.2%
Repoint (50% surface) Clay Brick, Exterior, 1st Floor	5.41	2.8%
Place New Shingles Over Existing, Asphalt Shingle Roof	5.12	2.7%
Replace Metal Halide Lighting Fixture, High Bay, 400 w	3.92	2.0%
Replace Steel, Painted, Interior Door Locks	3.65	1.9%
Replace Lamp, Metal Halide Lighting Fixture, High Bay, 400 w	3.60	1.9%
Replace Ballast, Metal Halide Lighting Fixture, High Bay, 400 w	3.18	1.7%
Replace Condenser, Air-Cooled, 40 Ton	2.97	1.6%
Maintain Air Handler, Multizone, 20,000 Cfm	2.96	1.5%
Replace Air Handler, Single Zone, 6,500 Cfm	2.79	1.5%
Maintain Fire Sprinkler System	2.78	1.5%
Test Gages & Valves, Fire Sprinkler System	2.56	1.3%
Replace Vinyl Tile Flooring	2.46	1.3%
Maintain Air Handler, Single Zone, 6,500 Cfm	2.20	1.2%
Replace Gas Boiler, 2,000 Mbh	1.99	1.0%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	1.92	1.0%
Replace Batteries & Check Operation, Smoke Detector	1.76	0.9%
Replace Fluorescent Lighting Fixture, 160 w	1.76	0.9%
Replace Condenser, Air-Cooled, 20 Ton	1.73	0.9%
Maintain Storm Water & Drain Lift Station, 2 HP	1.66	0.9%
Replace Safety Switch, Fused, 400 Amp., 3 Ph.	1.66	0.9%
Repair Gas Boiler, 2,000 Mbh	1.61	0.8%
Maintain Safety Switch, Fused, 400 Amp., 3 Ph.	1.54	0.8%

*Task cost (\$2009) per GSFT over 50 years.

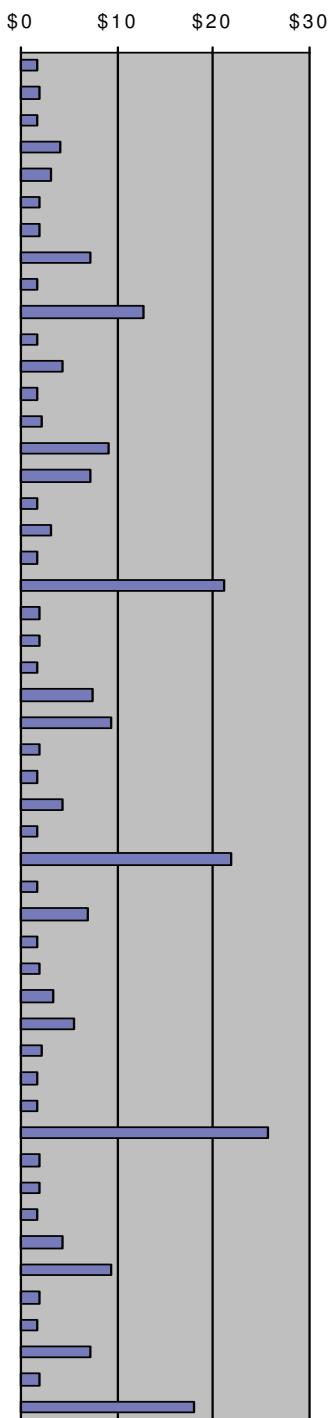
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	Interior Finishes	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.45						.13	.67	.17	.28		1.71
2		.45			.06			.19	.69	.17	.28		1.85
3		.45						.14	.67	.17	.28		1.72
4		.45	.07		2.17			.25	.69	.17	.28		4.08
5		.06	.58	.27				.18	.69	.20	1.10		3.09
6		.45				.06		.20	.69	.17	.28		1.85
7		.01	.45					.16	.94	.17	.28		2.02
8		.45	.07		5.12			.26	.69	.17	.33		7.09
9		.45				.02		.14	.67	.17	.28		1.74
10		5.21	.58	1.10		.28		.47	1.42	.61	3.02		12.68
11		.45						.13	.67	.17	.28		1.71
12		.02	.45	.07	2.17			.37	.69	.30	.28		4.35
13		.45						.13	.67	.17	.28		1.71
14		.01	.45			.06		.22	.96	.17	.28		2.15
15		.06	.58	.27				.33	5.94	.36	1.63		9.18
16		.45	.07		5.12			.26	.69	.17	.33		7.09
17		.45						.13	.67	.19	.28		1.73
18		.45			1.29			.20	.69	.17	.28		3.08
19		.45						.13	.67	.17	.28		1.71
20		5.31	5.87	1.35	.02	2.38		.57	.93	.59	4.08		21.10
21		.01	.45					.15	.94	.17	.28		2.01
22		.45			.06			.21	.69	.19	.28		1.88
23		.45						.13	.67	.17	.28		1.71
24		.02	.45	.07	5.12			.38	.69	.30	.33		7.37
25		3.29	.58	.27		.58		.87	1.51	.18	2.05		9.34
26		.45			.06			.19	.69	.17	.28		1.85
27		.45			.02			.14	.67	.17	.28		1.74
28		.01	.45	.07	2.17			.26	.96	.17	.28		4.36
29		.45						.15	.67	.19	.28		1.75
30		5.21	.58	1.10		.28		.58	8.53	.77	4.70		21.74
31		.45						.13	.67	.17	.28		1.71
32		.45	.07	5.12				.26	.69	.17	.28		7.04
33		.45						.14	.67	.17	.33		1.76
34		.45			.06			.19	.69	.19	.28		1.87
35		.08	.58	.27				.55	.71	.18	1.10		3.46
36		.02	.45	.07	3.39			.33	.69	.30	.28		5.54
37		.45						.20	.94	.17	.28		2.04
38		.45			.06			.15	.69	.17	.28		1.80
39		.45						.19	.67	.17	.28		1.76
40		5.70	6.48	1.35	.02	5.34		.40	1.48	.59	4.26		25.61
41		.45						.18	.67	.19	.33		1.82
42		.45			.06			.16	.69	.17	.28		1.81
43		.45						.19	.67	.17	.28		1.77
44		.45	.07	2.17				.22	.96	.17	.28		4.32
45		.06	.58	.27		.02		.47	5.97	.36	1.63		9.37
46		.45				.06		.15	.69	.19	.28		1.82
47		.01	.45					.18	.67	.17	.28		1.77
48		.02	.45	.07	5.12			.33	.69	.30	.28		7.27
49		.45						.19	.67	.17	.33		1.81
50		8.53	.58	1.52		.86		1.05	1.08	.75	3.60		17.97
Total		33.65	35.13	8.44	.03	49.31		13.30	57.17	11.92	38.73		247.68

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Religious Education

Gross Square Feet:	10,000
Height in Ft:	12
Exterior:	Clay Brick
Floor coverings:	Carpet, Vinyl Tile
HVAC:	Oil Heat Wall Fin Radiation, Split System
Capacity:	N/A
Occupancy:	450
Replacement Cost:	\$2,673,587

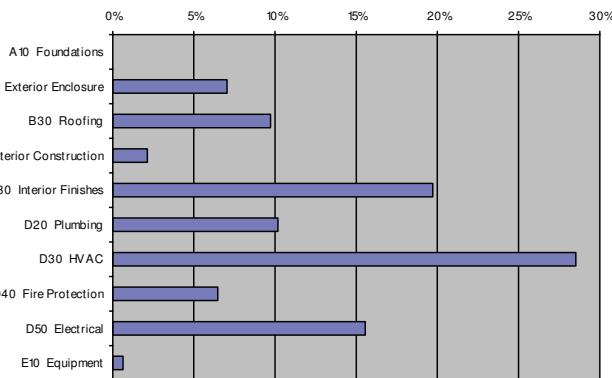
Components

Uniform / Component	Quantity	Units
A10 Foundations		
Concrete Slab	24	Sq Ft
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	4404	Sq Ft
Aluminum Operable Window, 12 sf, 1st Floor	26	Each
Steel w/ Safety Glass, Painted, Exterior Door	4	Each
B30 Roofing		
Built-up Roof	10000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	12	Each
Steel, Painted, Interior Door	14	Each
C30 Interior Finishes		
Concrete, Painted, Interior Wall Finish	30000	Sq Ft
Carpet, Nylon 20 oz., High Traffic	5000	Sq Ft
Vinyl Tile Flooring	5000	Sq Ft
Acoustical Tile Ceiling	10000	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	3	Each
Lavatory, Vitreous China	12	Each
Sink, Stainless Steel	4	Each
Tankless Water Closet	12	Each
Urinal, Vitreous China	3	Each
Pipe & Fittings, 3/4" Copper, Cold Water	1.15	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.5	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	1.172	K Ln Ft
Pipe & Fittings, 4" Steel	0.848	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	1.574	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.724	K Ln Ft
Water Heater, Gas/Oil, 75 Gph	1	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.634	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.2	K Ln Ft
Pipe & Fittings, 4" PVC	0.069	K Ln Ft
Roof Drain, 4-6"	5	Each
D30 HVAC		
Circulation Pump, 5 HP, Hot Water	1	Each
Expansion Tank, 250 Gal.	1	Each
Gas Boiler, 2,000 Mbh	1	Each
Condenser, Air-Cooled, 20 Ton	2	Each
Air Handler, Single Zone, 6,500 Cfm	2	Each
Duct Insulation, Fiberglass Blanket	1930	Sq Ft
Ductwork	2880	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	4	Each
Thermostat	4	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	71	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	8	Each
D50 Electrical		
Main Switchgear, <1,200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	2	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	5	Each
Emergency Horn & Strobe	35	Each
Exit Lighting Fixture, w/ Battery	6	Each
Fluorescent Lighting Fixture, 160 w	125	Each
Grounded Fault Circuit Interrupter, 15 Amp.	4	Each
Receptacle, 120 V, 15 Amp.	50	Each
Wiring Device, Switch	30	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	8	Each
Heat Detector	8	Each
Manual Pull Station	8	Each
Smoke Detector	25	Each
E10 Equipment		
Microwave Oven	1	Each
Refrigerator, Domestic	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$706,165	\$1.41	0.53%
Unscheduled Maintenance	\$593,223	\$1.19	0.44%
Renewal & Replacement	\$1,510,297	\$3.02	1.13%
Total	\$2,809,685	\$5.62	2.10%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Refinish Concrete, Painted, Interior Wall Finish	30.22	13.6%
Replace Carpet, Nylon 20 oz., High Traffic	18.11	8.2%
Inspect & Test Gas Boiler, 2,000 Mbh	17.75	8.0%
Place New Membrane Over Existing, Built-up Roof	10.97	4.9%
Replace Membrane, Built-up Roof	9.50	4.3%
Replace Air Handler, Single Zone, 6,500 Cfm	9.48	4.3%
Maintain Air Handler, Single Zone, 6,500 Cfm	7.49	3.4%
Clean & Reseal Clay Brick, Exterior, 1st Floor	6.05	2.7%
Replace Condenser, Air-Cooled, 20 Ton	5.89	2.7%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	4.81	2.2%
Maintain Fire Sprinkler System	4.73	2.1%
Replace Fluorescent Lighting Fixture, 160 w	4.39	2.0%
Test Gages & Valves, Fire Sprinkler System	4.36	2.0%
Replace Gas Boiler, 2,000 Mbh	3.39	1.5%
Repaint (50% surface) Clay Brick, Exterior, 1st Floor	3.29	1.5%
Maintain Emergency Horn & Strobe	3.22	1.5%
Maintain Built-up Roof	3.04	1.4%
Replace Batteries & Check Operation, Smoke Detector	2.99	1.3%
Repair Concrete, Painted, Interior Wall Finish (2% of Walls)	2.97	1.3%
Repair Gas Boiler, 2,000 Mbh	2.74	1.2%
Replace Vinyl Tile Flooring	2.46	1.1%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	2.27	1.0%
Maintain Condenser, Air-Cooled, 20 Ton	2.17	1.0%
Replace Steel, Painted, Interior Door Locks	2.07	0.9%
Replace Safety Switch, Fused, 400 Amp., 3 Ph.	2.01	0.9%
Replace Toilet Partitions, Painted Metal, Overhead Braced	1.88	0.8%
Maintain Safety Switch, Fused, 400 Amp., 3 Ph.	1.87	0.8%
Replace Emergency Horn & Strobe	1.86	0.8%
Repair Main Switchgear, <1,200 Amp.	1.63	0.7%
Check Operation, Heat Detector	1.59	0.7%

*Task cost (\$2009) per GSFT over 50 years.

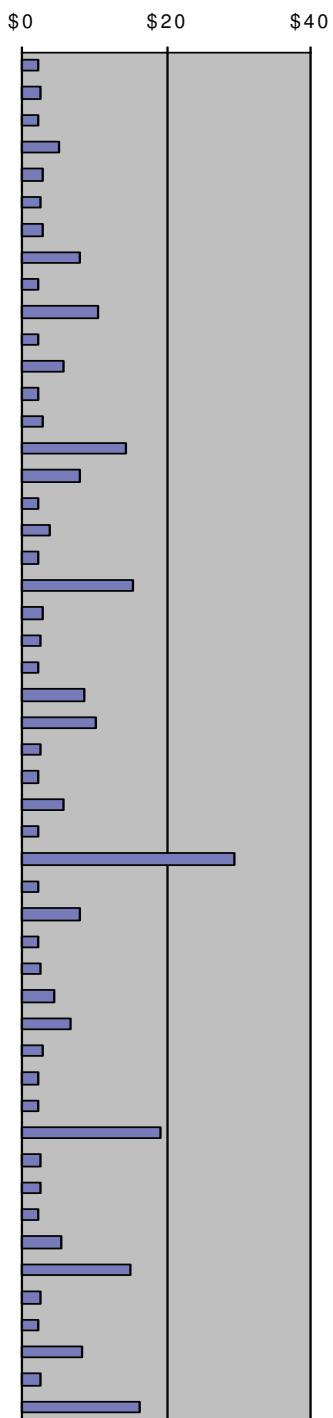
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	Interior Finishes	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13					.22	1.08	.28	.45	.02		2.18
2		.13					.44	1.11	.28	.45	.02		2.48
3		.13					.22	1.08	.28	.45	.02		2.18
4		.13	.06		2.58		.44	1.11	.28	.45	.02		5.06
5		.04	.19	.13			.34	1.09	.32	.70	.02		2.84
6		.13					.44	1.11	.28	.45	.02		2.48
7		.13					.31	1.54	.28	.45	.02		2.73
8		.13	.06		5.54		.46	1.11	.28	.51	.02		8.10
9		.13					.22	1.08	.28	.45	.02		2.26
10		3.05	.19	.55			1.23	1.90	.72	2.69	.16		10.56
11		.13					.22	1.08	.28	.45	.02		2.18
12		.13	.06		2.58		.76	1.11	.50	.45	.02		5.61
13		.13					.22	1.08	.28	.45	.02		2.18
14		.13					.53	1.56	.28	.45	.02		3.03
15		.17	5.67	.13			.28	6.22	.60	1.30	.02		14.39
16		.13	.06		5.54		.46	1.11	.28	.51	.02		8.10
17		.13					.29	1.08	.31	.45	.02		2.28
18		.13			1.34		.44	1.11	.28	.45	.02		3.77
19		.13					.22	1.08	.28	.45	.02		2.18
20		3.05	.19	1.52	2.58		1.26	1.49	.69	4.50	.16		15.44
21		.13					.31	1.54	.28	.45	.02		2.73
22		.13			.06		.50	1.11	.31	.45	.02		2.58
23		.13					.22	1.08	.28	.45	.02		2.18
24		.13	.06		5.54		.79	1.11	.50	.51	.02		8.65
25		2.00	.19	.13	1.54		2.29	1.75	.29	2.00	.02		10.21
26		.13					.44	1.11	.28	.45	.02		2.48
27		.13			.08		.22	1.08	.28	.45	.02		2.26
28		.13	.06		2.58		.53	1.56	.28	.45	.02		5.60
29		.13					.29	1.08	.31	.45	.02		2.28
30		3.19	9.50	.55	.06		1.09	9.84	1.00	4.06	.16		29.45
31		.13					.22	1.08	.28	.45	.02		2.18
32		.13	.06		5.54		.46	1.11	.28	.45	.02		8.05
33		.13					.22	1.08	.28	.51	.02		2.24
34		.13			.06		.50	1.11	.31	.45	.02		2.58
35		.04	.19	.13			1.90	1.09	.29	.70	.02		4.36
36		.13	.06		3.86		.63	1.11	.50	.45	.02		6.76
37		.13					.36	1.54	.28	.45	.02		2.77
38		.13			.06		.30	1.11	.28	.45	.02		2.35
39		.13					.36	1.08	.28	.45	.02		2.32
40		3.05	.19	1.52	5.54		1.18	2.15	.69	4.87	.16		19.35
41		.13					.42	1.08	.31	.51	.02		2.47
42		.13			.06		.39	1.11	.28	.45	.02		2.44
43		.13					.36	1.08	.28	.45	.02		2.32
44		.13	.06		2.58		.30	1.56	.28	.45	.02		5.38
45		.17	5.67	.13	.08		.80	6.22	.60	1.30	.02		15.00
46		.13			.06		.37	1.11	.31	.45	.02		2.45
47		.13					.36	1.08	.28	.45	.02		2.32
48		.13	.06		5.54		.65	1.11	.50	.45	.02		8.46
49		.13					.45	1.08	.28	.51	.02		2.46
50		5.01	.19	.55	1.60		2.74	1.91	.84	3.26	.16		16.27
Total	19.78	27.33	5.91		55.36		28.62	80.25	18.17	43.83	1.74		280.97

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Restaurant

Gross Square Feet:	10,000
Height in Ft:	12
Exterior:	Clay Brick
Floor coverings:	Finished Concrete, Quarry Tile, Carpet
HVAC:	Single Zone Rooftop Units
Capacity:	N/A
Occupancy:	600
Replacement Cost:	\$3,064,095

Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	4100	Sq Ft
Steel Frame, Painted, Operable Window, 12 sf, 1st Floor	60	Each
Steel, Painted, Exterior Door	2	Each
Wood, Solid Core, Painted, Exterior Door	1	Each
B30 Roofing		
Built-up Roof	10000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	14	Each
Wood, Solid Core, Painted, Interior Door	40	Each
C30 Interior Finishes		
Plaster, Interior Wall Finish	13660	Sq Ft
Carpet, Nylon 20 oz., High Traffic	8000	Sq Ft
Concrete, Painted Flooring	500	Sq Ft
Quarry Tile Flooring	1500	Sq Ft
Plaster Ceiling	10000	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	1	Each
Lavatory, Vitreous China	12	Each
Service Sink, Iron, Enamel	1	Each
Sink, Stainless Steel	5	Each
Tankless Water Closet	14	Each
Urinal, Vitreous China	3	Each
Circulator Pump, 1/12 HP, Cold Water	1	Each
Circulator Pump, 1/12 HP, Hot Water	2	Each
Pipe & Fittings, 3/4" Copper, Cold Water	1.2	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.6	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	1.1	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	1.1	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.6	K Ln Ft
Water Heater, Gas/Oil, 75 Gph	1	Each
Water Storage Tank, 250 Gal.	1	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.7	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.2	K Ln Ft
Pipe & Fittings, 4" PVC	0.096	K Ln Ft
Roof Drain, 4-6"	4	Each
D30 HVAC		
Pipe & Fittings, 4" Steel, Gas	0.2	K Ln Ft
Duct Insulation, Fiberglass Blanket	7424	Sq Ft
Ductwork	11080	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	4	Each
Exhaust Fan, Roof Mounted, 10,000 Cfm	3	Each
Air Conditioner, Rooftop, Single Zone, 20 Ton	3	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	50	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	6	Each
Kitchen Fire Suppression System (CO2)	1	Each
D50 Electrical		
Distribution Switch, Fused, <600 V	5	Each
Main Switchgear, <1,200 Amp.	1	Each
Motor Starter, 5-20 HP, <600 V	3	Each
Exit Lighting Fixture, w/ Battery	3	Each
Fluorescent Lighting Fixture, 160 w	106	Each
Receptacle, 120 V, 15 Amp.	75	Each
Wiring Device, Switch	25	Each
Fire Alarm Horn & Strobe	6	Each
Heat Detector	6	Each
Manual Pull Station	6	Each
Smoke Detector	25	Each
E10 Equipment		
Coffee Brewer, 5 Burners	1	Each
Cooking Range, Commercial	1	Each
Dishwasher, Commercial	1	Each
Icemaker, Commercial	1	Each
Kitchen Exhaust Hood, Commercial	1	Each
Microwave Oven	1	Each
Trash Compactor, 600 lbs	1	Each
Walk-In Freezer/Cooler, Commercial	1	Each

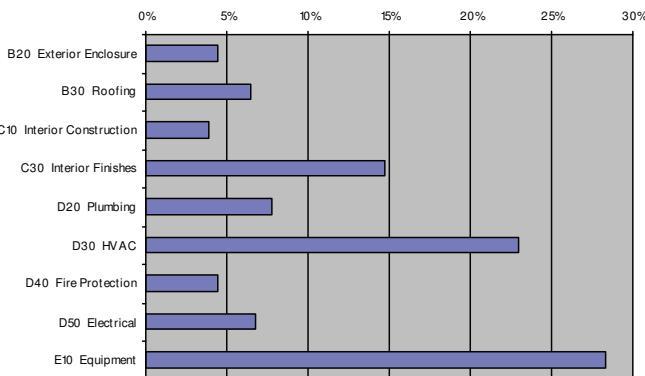
Restaurant

Washington, D.C.

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$949,846	\$1.90	0.62%
Unscheduled Maintenance	\$868,987	\$1.74	0.57%
Renewal & Replacement	\$2,401,911	\$4.80	1.57%
Total	\$4,220,744	\$8.44	2.75%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, Single Zone, 20 Ton	34.07	10.2%
Replace Carpet, Nylon 20 oz., High Traffic	28.98	8.6%
Repair Air Conditioner, Rooftop, Single Zone, 20 Ton	25.41	7.6%
Refinish Plaster, Interior Wall Finish	13.33	4.0%
Maintain Trash Compactor, 600 lbs	13.23	3.9%
Refinish Plaster Ceiling	13.20	3.9%
Maintain Air Conditioner, Rooftop, Single Zone, 20 Ton	12.10	3.6%
Place New Membrane Over Existing, Built-up Roof	10.97	3.3%
Replace Walk-In Freezer/Cooler, Commercial	10.02	3.0%
Replace Dishwasher, Commercial	9.50	2.8%
Replace Membrane, Built-up Roof	9.50	2.8%
Maintain Icemaker, Commercial	8.09	2.4%
Replace Icemaker, Commercial	8.05	2.4%
Replace Trash Compactor, 600 lbs	6.85	2.0%
Maintain Cooking Range, Commercial	6.79	2.0%
Clean & Reseal Clay Brick, Exterior, 1st Floor	5.63	1.7%
Maintain Dishwasher, Commercial	5.20	1.6%
Replace Wood, Solid Core, Painted, Interior Door	4.82	1.4%
Replace Wood, Solid Core, Painted, Interior Door Locks	4.73	1.4%
Maintain Fire Sprinkler System	4.73	1.4%
Test Gages & Valves, Fire Sprinkler System	4.36	1.3%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	4.08	1.2%
Maintain Walk-In Freezer/Cooler, Commercial	4.05	1.2%
Maintain Exhaust Fan, Roof Mounted, 10,000 Cfm	4.03	1.2%
Replace Fluorescent Lighting Fixture, 160 w	3.72	1.1%
Replace Quarry Tile Flooring	3.33	1.0%
Repaint (50% surface) Clay Brick, Exterior, 1st Floor	3.06	0.9%
Maintain Built-up Roof	3.04	0.9%
Replace Batteries & Check Operation, Smoke Detector	2.99	0.9%
Maintain Coffee Brewer, 5 Burners	2.80	0.8%

*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

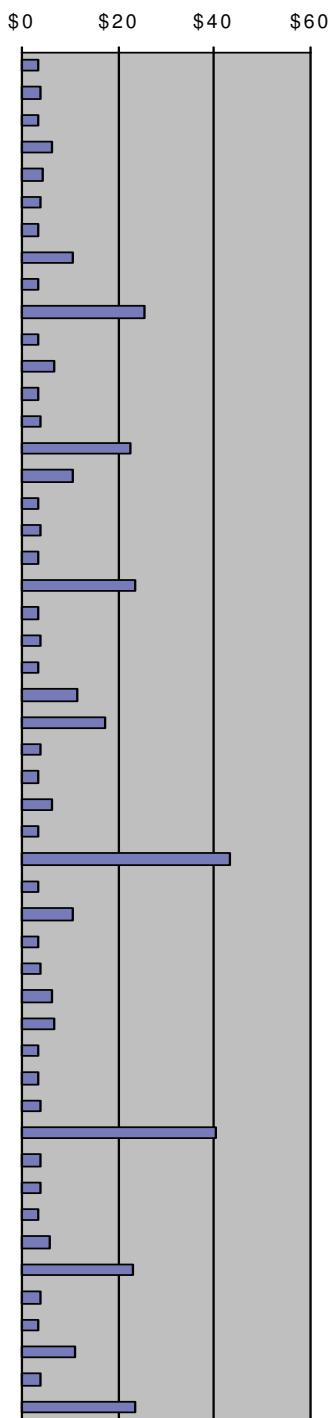
Restaurant

Washington, D.C.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13						.29	.64	.29	.22	1.80	3.37
2		.13			.10			.51	.64	.29	.22	1.80	3.68
3		.13						.29	.64	.29	.33	1.80	3.48
4		.13	.12		2.31			.51	.64	.29	.22	1.80	6.01
5		.03	.19	.38				.47	.66	.33	.45	1.80	4.31
6		.13			.10			.51	.64	.29	.33	1.80	3.79
7		.00	.13					.38	.64	.29	.22	1.80	3.46
8		.13	.12		7.04			.55	.64	.29	.22	1.80	10.79
9		.13						.29	.64	.29	.33	1.80	3.48
10		2.93	.19	1.56		.13		1.23	9.24	.77	2.18	7.35	25.58
11		.13						.29	.64	.29	.22	1.80	3.37
12		.13	.12		2.31			.80	.65	.46	.33	1.80	6.60
13		.13						.29	.64	.29	.22	1.80	3.37
14		.00	.13		.10			.60	.64	.29	.22	1.80	3.77
15		.06	5.67	.38		.08		.41	11.86	.61	1.01	2.51	22.59
16		.13	.12		7.04			.55	.64	.29	.22	1.80	10.79
17		.13						.36	.64	.32	.22	1.80	3.46
18		.13			.10			.51	.64	.29	.45	1.80	3.91
19		.13						.29	.64	.29	.22	1.80	3.37
20		3.08	.19	2.75		2.69		1.63	1.97	.74	3.09	7.35	23.48
21		.00	.13					.38	.64	.29	.33	1.80	3.57
22		.13			.10			.57	.64	.32	.22	1.80	3.77
23		.13						.29	.64	.29	.22	1.80	3.37
24		.13	.12		7.04			.85	.65	.46	.33	1.80	11.37
25		1.85	.19	.38		.26		2.36	9.14	.31	.77	1.80	17.05
26		.13			.10			.51	.64	.29	.22	1.80	3.68
27		.13						.29	.64	.29	.33	1.80	3.48
28		.00	.13	.12		2.31		.60	.64	.29	.22	1.80	6.10
29		.13						.36	.64	.32	.22	1.80	3.46
30		2.97	9.50	1.56		.21		1.11	14.87	1.05	3.67	8.05	43.00
31		.13						.29	.64	.29	.22	1.80	3.37
32		.13	.12		7.04			.55	.64	.29	.22	1.80	10.79
33		.13						.29	.64	.29	.33	1.80	3.48
34		.13			.10			.57	.64	.32	.22	1.80	3.77
35		.03	.19	.38				2.24	.66	.31	.45	1.80	6.06
36		.13	.12		2.31			.66	.65	.46	.45	1.80	6.57
37		.13						.44	.64	.29	.22	1.80	3.52
38		.13			.10			.36	.64	.29	.22	1.80	3.54
39		.13						.44	.64	.29	.33	1.80	3.63
40		3.14	.19	6.00		7.42		1.56	10.44	.74	3.41	7.35	40.26
41		.13						.50	.64	.32	.22	1.80	3.61
42		.13			.10			.45	.64	.29	.33	1.80	3.74
43		.13						.45	.64	.29	.22	1.80	3.52
44		.13	.12		2.31			.36	.64	.29	.22	1.80	5.86
45		.06	5.67	.38		.08		.96	11.86	.61	1.01	2.51	23.14
46		.13			.10			.43	.64	.32	.22	1.80	3.63
47		.00	.13					.44	.64	.29	.22	1.80	3.52
48		.13	.12		7.04			.69	.65	.46	.33	1.80	11.22
49		.13						.53	.64	.29	.22	1.80	3.61
50		4.76	.19	1.56		3.72		2.66	.77	.85	1.86	7.35	23.72
Total	18.91	27.33	16.52		62.28			32.95	97.01	18.81	28.51	119.76	422.07

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Restaurant, Fast Food

Washington, D.C.

Restaurant, Fast Food

Gross Square Feet:	4,000
Height in Ft:	10
Exterior:	Stucco
Floor coverings:	Finished Concrete, Quarry Tile
HVAC:	Single Zone Rooftop Units
Capacity:	N/A
Occupancy:	240
Replacement Cost:	\$1,244,062

Components

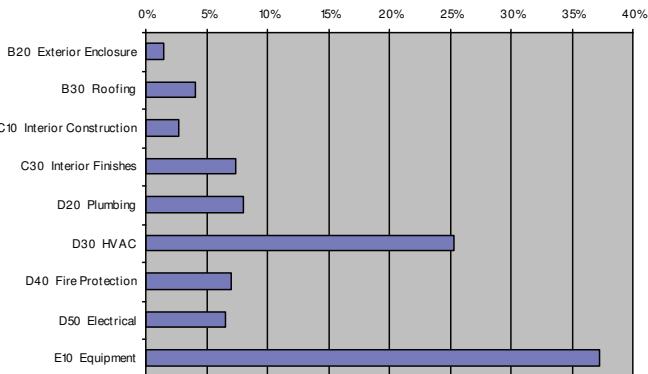
Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Stucco, Painted, Exterior, 1st Floor	2150	Sq Ft
Aluminum Fixed Window, 24 sf, 1st Floor	16	Each
Aluminum Frame, Fully Glazed, Exterior Door	4	Each
Steel, Painted, Exterior Door	2	Each
B30 Roofing		
Aluminum Gutter, Downspouts, Fittings	0.15	K Ln Ft
Clay Tile Roof	4870	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	8	Each
Wood, Solid Core, Painted, Interior Door	15	Each
C30 Interior Finishes		
Ceramic Tile, 4"x4", Interior Wall Finish	278	Sq Ft
Sheetrock, Unstripped, Interior Wall Finish	1060	Sq Ft
Vinyl, Interior Wall Finish	5260	Sq Ft
Concrete, Painted Flooring	500	Sq Ft
Quarry Tile Flooring	3500	Sq Ft
Acoustical Tile Ceiling	1200	Sq Ft
Wood, Finished Ceiling	3670	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	1	Each
Lavatory, Vitreous China	4	Each
Service Sink, Iron, Enamel	1	Each
Sink, Stainless Steel	2	Each
Tankless Water Closet	5	Each
Urinal, Vitreous China	2	Each
Circulator Pump, 1/12 HP, Cold Water	1	Each
Circulator Pump, 1/12 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.8	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.4	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.8	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.8	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.4	K Ln Ft
Water Heater, Gas/Oil, 65 Gph	1	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.5	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.2	K Ln Ft
D30 HVAC		
Pipe & Fittings, 4" Steel, Gas	0.2	K Ln Ft
Duct Insulation, Fiberglass Blanket	3578	Sq Ft
Ductwork	5340	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	2	Each
Exhaust Fan, Roof Mounted, 10,000 Cfm	1	Each
Air Conditioner, Rooftop, Single Zone, 20 Ton	2	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	20	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	2	Each
Kitchen Fire Suppression System (CO2)	1	Each
D50 Electrical		
Distribution Switch, Fused, <600 V	4	Each
Main Switchgear, <1,200 Amp.	1	Each
Motor Starter, 5-20 HP, <600 V	2	Each
Exit Lighting Fixture, w/ Battery	6	Each
Fluorescent Lighting Fixture, 160 w	50	Each
Receptacle, 120 V, 15 Amp.	40	Each
Wiring Device, Switch	10	Each
Fire Alarm Horn & Strobe	2	Each
Heat Detector	2	Each
Manual Pull Station	2	Each
Smoke Detector	8	Each
E10 Equipment		
Cooking Range, Commercial	1	Each
Dishwasher, Commercial	1	Each
Fryer, Deep Fat	1	Each
Icemaker, Commercial	1	Each
Kitchen Exhaust Hood, Commercial	2	Each
Microwave Oven	2	Each
Walk-In Freezer/Cooler, Commercial	1	Each

Restaurant, Fast Food

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$618,850	\$3.09	0.99%
Unscheduled Maintenance	\$526,524	\$2.63	0.85%
Renewal & Replacement	\$1,268,966	\$6.34	2.04%
Total	\$2,414,340	\$12.07	3.88%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, Single Zone, 20 Ton	56.78	12.0%
Repair Air Conditioner, Rooftop, Single Zone, 20 Ton	42.35	9.0%
Replace Walk-In Freezer/Cooler, Commercial	25.06	5.3%
Replace Dishwasher, Commercial	23.76	5.0%
Maintain Icemaker, Commercial	20.23	4.3%
Maintain Air Conditioner, Rooftop, Single Zone, 20 Ton	20.16	4.3%
Replace Icemaker, Commercial	20.13	4.3%
Replace Quarry Tile Flooring	19.45	4.1%
Maintain Cooking Range, Commercial	16.97	3.6%
Refinish Wood, Finished Ceiling	13.06	2.8%
Maintain Dishwasher, Commercial	13.01	2.8%
Maintain Fire Sprinkler System	11.83	2.5%
Replace Kitchen Exhaust Hood, Commercial	10.94	2.3%
Test Gages & Valves, Fire Sprinkler System	10.90	2.3%
Maintain Clay Tile Roof	10.29	2.2%
Maintain Walk-In Freezer/Cooler, Commercial	10.11	2.1%
Replace Fryer, Deep Fat	6.58	1.4%
Replace Vinyl, Interior Wall Finish	6.55	1.4%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	4.81	1.0%
Replace Wood, Solid Core, Painted, Interior Door	4.52	1.0%
Maintain Fryer, Deep Fat	4.51	1.0%
Replace Wood, Solid Core, Painted, Interior Door Locks	4.44	0.9%
Replace Fluorescent Lighting Fixture, 160 w	4.39	0.9%
Repair Main Switchgear, <1,200 Amp.	4.07	0.9%
Clean Water Heater, Gas/Oil, 65 Gph	3.94	0.8%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	3.87	0.8%
Maintain Exhaust Fan, Roof Mounted, 10,000 Cfm	3.36	0.7%
Replace Toilet Partitions, Painted Metal, Overhead Braced	3.13	0.7%
Refinish Stucco, Painted, Exterior, 1st Floor	3.07	0.7%
Replace Cooking Range, Commercial	2.85	0.6%

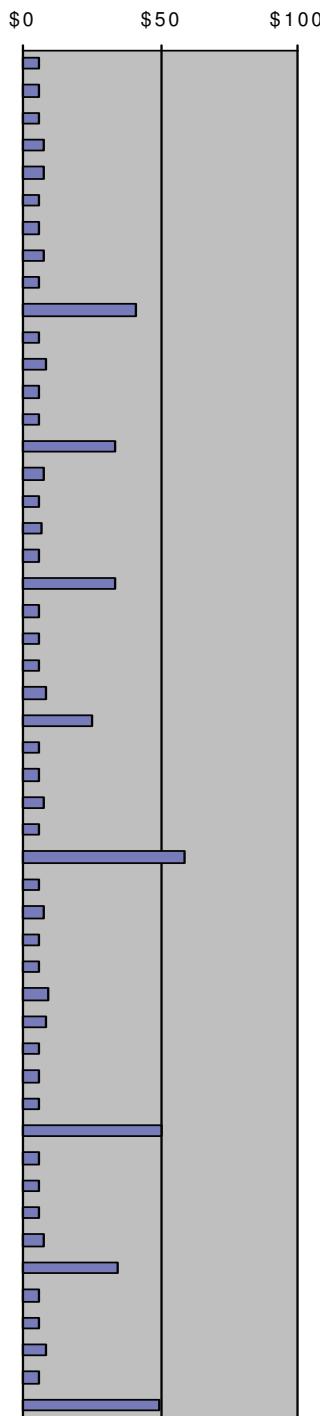
*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.47						.44	.94	.72	.26	2.99	5.81
2		.47						.67	.94	.72	.26	2.99	6.04
3		.47						.44	.94	.72	.46	2.99	6.01
4		.47	.13	1.30				.67	.94	.72	.26	2.99	7.47
5		.13	.47	.36	.05			.80	1.00	.77	.86	2.99	7.43
6		.47						.67	.94	.72	.46	2.99	6.24
7		.47						.55	.94	.72	.26	2.99	5.92
8		.47	.13	1.30				.72	.94	.72	.26	2.99	7.52
9		.47			.02			.44	.94	.72	.46	2.99	6.03
10		1.23	.47	1.47	.32			1.90	15.21	1.44	2.85	16.00	40.87
11		.47						.44	.94	.72	.26	2.99	5.81
12		.17	.47	.13	1.30			1.31	.96	.86	.46	2.99	8.64
13		.47						.44	.94	.72	.26	2.99	5.81
14		.47						.78	.94	.72	.26	2.99	6.15
15		.22	.47	.36	2.60			.64	19.88	1.52	1.44	6.53	33.66
16		.47	.13	1.30				.72	.94	.72	.26	2.99	7.52
17		.47						.60	.94	.74	.26	2.99	5.99
18		.47			.02			.67	.94	.72	.65	2.99	6.45
19		.47						.44	.94	.72	.26	2.99	5.81
20		1.32	.98	3.11	1.64			2.21	2.20	1.42	4.72	16.00	33.59
21		.47						.55	.94	.72	.46	2.99	6.12
22		.47						.83	.94	.74	.26	2.99	6.22
23		.47						.44	.94	.72	.26	2.99	5.81
24		.17	.47	.13	1.30			1.36	.96	.86	.46	2.99	8.69
25		.29	.47	.36	.05			4.07	15.13	.75	1.14	2.99	25.25
26		.47						.67	.94	.72	.26	2.99	6.04
27		.47			.02			.44	.94	.72	.46	2.99	6.03
28		.47	.13	1.30				.78	.94	.72	.26	2.99	7.57
29		.47						.60	.94	.74	.26	2.99	5.99
30		1.31	.47	1.47	2.87			1.52	23.48	2.19	5.65	19.54	58.49
31		.47						.44	.94	.72	.26	2.99	5.81
32		.47	.13	1.30				.72	.94	.72	.26	2.99	7.52
33		.47						.44	.94	.72	.46	2.99	6.01
34		.47						.83	.94	.74	.26	2.99	6.22
35		.13	.47	.36	.05			2.70	1.00	.75	.86	2.99	9.32
36		.17	.47	.13	1.32			1.16	.96	.86	.65	2.99	8.71
37		.47						.58	.94	.72	.26	2.99	5.95
38		.47						.53	.94	.72	.26	2.99	5.90
39		.47						.58	.94	.72	.46	2.99	6.15
40		1.32	.98	6.17	1.64			1.87	16.32	1.42	5.00	16.00	50.71
41		.47						.75	.94	.74	.26	2.99	6.14
42		.47						.63	.94	.72	.46	2.99	6.20
43		.47						.60	.94	.72	.26	2.99	5.97
44		.47	.13	1.30				.53	.94	.72	.26	2.99	7.32
45		.22	.47	.36	2.62			1.34	19.88	1.52	1.44	6.53	34.38
46		.47						.69	.94	.74	.26	2.99	6.08
47		.47						.58	.94	.72	.26	2.99	5.95
48		.17	.47	.13	1.30			1.20	.96	.86	.46	2.99	8.53
49		.47						.69	.94	.72	.26	2.99	6.06
50		2.18	.47	1.47	19.76			4.63	1.10	1.53	2.57	16.00	49.71
Total		9.05	24.33	16.71	44.69			48.27	152.93	42.67	39.74	225.19	603.59

50-Year Total M&R Cost Profile per GSFT

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Skating Rink

Gross Square Feet:	30,000
Height in Ft:	24
Exterior:	Concrete Block
Floor coverings:	Finished Concrete, Vinyl Sheet
HVAC:	Pkgd DX AC, Gas Boiler, Unit Heaters
Capacity:	N/A
Occupancy:	540
Replacement Cost:	\$5,090,082

Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Concrete Block, Exterior, 1st Floor	16872	Sq Ft
Aluminum Fixed Window, 12 sf, 1st Floor	9	Each
Aluminum Frame, Fully Glazed, Exterior Door	2	Each
Steel w/ Safety Glass, Painted, Exterior Door	6	Each
B30 Roofing	30000	Sq Ft
Built-up Roof		
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	10	Each
Wood Hollow Core, Painted, Interior Door	12	Each
C30 Interior Finishes		
Concrete, Painted, Interior Wall Finish	16872	Sq Ft
Concrete Flooring	3000	Sq Ft
Vinyl Tile Flooring	12000	Sq Ft
Acoustical Tile Ceiling	10000	Sq Ft
Metal, Painted Ceiling	20000	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	3	Each
Lavatory, Vitreous China	8	Each
Shower, Ceramic Tile	17	Each
Sink, Stainless Steel	2	Each
Tankless Water Closet	10	Each
Urinal, Vitreous China	7	Each
Circulator Pump, 1/2 HP, Cold Water	1	Each
Circulator Pump, 1/2 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	1.57	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.82	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	1.92	K Ln Ft
Pipe & Fittings, 4" Steel	1.482	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	2.31	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	1.214	K Ln Ft
Water Heater, Gas/Oil, 75 Gph	3	Each
Backflow Preventer, 4"	1	Each
Pipe & Fittings, 6" Cast Iron	0.871	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.346	K Ln Ft
Pipe & Fittings, 4" PVC	0.416	K Ln Ft
Roof Drain, 4-6"	9	Each
D30 HVAC		
Circulation Pump, 5 HP, Hot Water	2	Each
Gas Boiler, 1,000 Mbh	2	Each
Duct Insulation, Fiberglass Blanket	8053	Sq Ft
Ductwork	12020	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	6	Each
Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	1	Each
Air Conditioner, Indoor DX Packaged, Air Cooled, 50 Ton	1	Each
Terminal Reheat Unit, 10,000 Cfm	3	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	150	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	6	Each
D50 Electrical		
Main Switchgear, <1,200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	6	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	2	Each
Secondary Transformer, Dry, 50 kVA	1	Each
Exit Lighting Fixture, w/ Battery	14	Each
Fluorescent Lighting Fixture, 160 w	60	Each
Grounded Fault Circuit Interruptor, 15 Amp.	5	Each
Metal Halide Lighting Fixture, High Bay, 400 w	300	Each
Receptacle, 120 V, 15 Amp.	38	Each
Wiring Device, Switch	10	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	6	Each
Heat Detector	6	Each
Manual Pull Station	6	Each
Smoke Detector	36	Each
Time Control Clock	1	Each

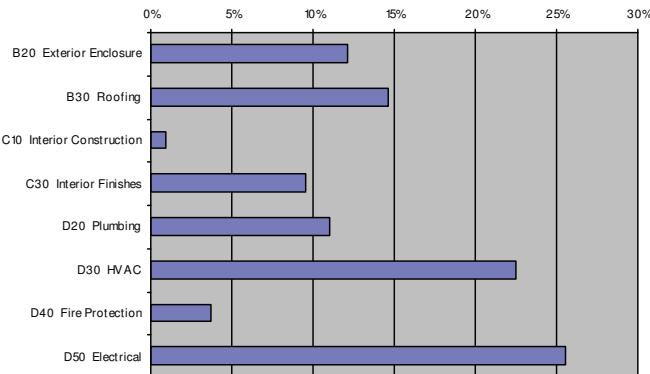
Skating Rink

Washington, D.C.

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$1,441,133	\$0.96	0.57%
Unscheduled Maintenance	\$1,228,579	\$0.82	0.48%
Renewal & Replacement	\$2,948,035	\$1.97	1.16%
Total	\$5,617,747	\$3.75	2.21%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Metal Halide Lighting Fixture, High Bay, 400 w	11.09	7.6%
Place New Membrane Over Existing, Built-up Roof	10.97	7.5%
Replace Lamp, Metal Halide Lighting Fixture, High Bay, 400 w	10.20	7.0%
Replace Membrane, Built-up Roof	9.50	6.5%
Replace Ballast, Metal Halide Lighting Fixture, High Bay, 400 w	9.00	6.2%
Refinish Metal, Painted Ceiling	8.80	6.0%
Clean & Seal Concrete Block, Exterior, 1st Floor	7.69	5.3%
Inspect & Test Gas Boiler, 1,000 Mbh	5.92	4.0%
Refinish Concrete, Painted, Interior Wall Finish	5.67	3.9%
Repair Air Conditioner, Indoor DX Packaged, Air Cooled, 50 Ton	5.27	3.6%
Repaint (50% surface) Concrete Block, Exterior, 1st Floor	3.24	2.2%
Maintain Built-up Roof	3.04	2.1%
Repair Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	3.01	2.1%
Replace Air Conditioner, Indoor DX Packaged, Air Cooled, 50 Ton	2.99	2.0%
Maintain Terminal Reheat Unit, 10,000 Cfm	2.92	2.0%
Replace Vinyl Tile Flooring	1.97	1.3%
Maintain Air Conditioner, Indoor DX Packaged, Air Cooled, 50 Ton	1.86	1.3%
Maintain Fire Sprinkler System	1.58	1.1%
Clean Water Heater, Gas/Oil, 75 Gph	1.58	1.1%
Replace Gas Boiler, 1,000 Mbh	1.48	1.0%
Maintain Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	1.45	1.0%
Test Gages & Valves, Fire Sprinkler System	1.45	1.0%
Replace Batteries & Check Operation, Smoke Detector	1.43	1.0%
Replace Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	1.42	1.0%
Repair Gas Boiler, 1,000 Mbh	1.31	0.9%
Maintain Power Panel Board, 208 Y/120 V, 200 Amp.	1.25	0.9%
Replace Water Heater, Gas/Oil, 75 Gph	1.24	0.9%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	1.24	0.8%
Replace Power Panel Board, 208 Y/120 V, 200 Amp.	1.21	0.8%
Test Fire Sprinkler Head	.85	0.6%

*Task cost (\$2009) per GSFT over 50 years.

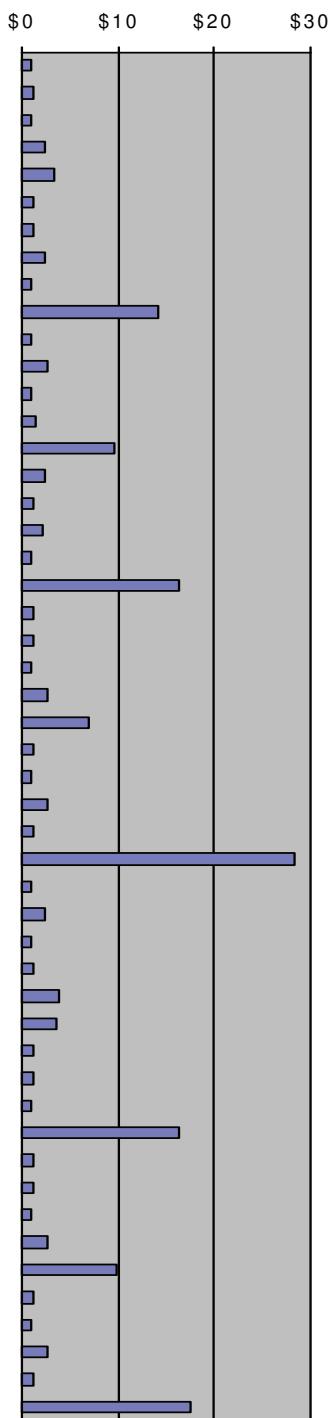
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	Interior Finishes	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13						.17	.48	.10	.15		1.02
2		.13						.29	.49	.10	.15		1.15
3		.13						.17	.48	.10	.15		1.02
4		.13	.02	1.21				.29	.49	.10	.15		2.37
5		.02	.19	.04				.40	.49	.11	2.05		3.31
6		.13						.29	.49	.10	.15		1.15
7		.13						.21	.69	.10	.15		1.28
8		.13	.02	1.21				.29	.49	.10	.16		2.39
9		.13						.17	.48	.10	.15		1.06
10		3.78	.19	.16				.91	3.31	.39	5.46		14.19
11		.13						.17	.48	.10	.15		1.02
12		.01	.13	.02	1.21			.56	.49	.15	.15		2.72
13		.13						.17	.48	.10	.15		1.02
14		.13						.33	.71	.10	.15		1.41
15		.06	5.67	.04	.02			.33	.92	.20	2.26		9.51
16		.13	.02	1.21				.29	.49	.10	.16		2.39
17		.13						.24	.48	.10	.15		1.10
18		.13		1.00				.29	.49	.10	.15		2.15
19		.13						.17	.48	.10	.15		1.02
20		3.78	.19	.43	1.21			1.06	2.71	.38	6.48		16.24
21		.13						.21	.69	.10	.15		1.28
22		.13						.35	.49	.10	.15		1.23
23		.13						.17	.48	.10	.15		1.02
24		.01	.13	.02	1.21			.57	.49	.15	.16		2.73
25		1.81	.19	.04	.65			1.38	.53	.10	2.29		6.99
26		.13						.29	.49	.10	.15		1.15
27		.13		.04				.17	.48	.10	.15		1.06
28		.13	.02	1.21				.33	.71	.10	.15		2.63
29		.13						.24	.48	.10	.15		1.10
30		3.81	9.50	.21	.02			1.39	6.00	.48	6.86		28.27
31		.13						.17	.48	.10	.15		1.02
32		.13	.01	1.21				.29	.49	.10	.15		2.37
33		.13						.17	.48	.10	.16		1.03
34		.13	.01					.35	.49	.10	.15		1.24
35		.02	.19	.04				.92	.49	.10	2.05		3.82
36		.01	.13	.01	2.21			.53	.49	.15	.15		3.68
37		.13						.20	.69	.10	.15		1.27
38		.13	.01					.26	.49	.10	.15		1.13
39		.13						.20	.48	.10	.15		1.05
40		3.78	.19	.42	1.21			1.02	2.75	.38	6.59		16.34
41		.13						.27	.48	.10	.16		1.13
42		.13	.01					.30	.49	.10	.15		1.17
43		.13						.20	.48	.10	.15		1.05
44		.13	.01	1.21				.26	.71	.10	.15		2.55
45		.06	5.67	.04	.05			.51	.92	.20	2.26		9.73
46		.13	.01					.32	.49	.10	.15		1.21
47		.13						.20	.48	.10	.15		1.05
48		.01	.13	.01	1.21			.54	.49	.15	.15		2.68
49		.13						.24	.48	.10	.16		1.10
50		5.61	.19	.17	.65			1.76	3.27	.49	5.47		17.61
Total	22.79	27.33	1.73	17.93	20.63	42.11	6.98	47.77				187.26	

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Store, Convenience

Washington, D.C.

Store, Convenience

Gross Square Feet:	4,000
Height in Ft:	12
Exterior:	Concrete Block
Floor coverings:	Vinyl Tile
HVAC:	Single Zone Rooftop Units
Capacity:	N/A
Occupancy:	120
Replacement Cost:	\$812,000

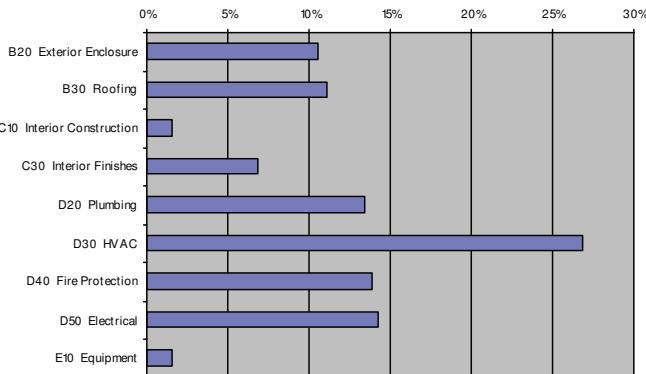
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Concrete Block, Exterior, 1st Floor	2733	Sq Ft
Aluminum Operable Window, 24 sf, 1st Floor	10	Each
Aluminum Frame, Fully Glazed, Exterior Door	1	Each
Wood, Solid Core, Painted, Exterior Door	2	Each
B30 Roofing		
Aluminum Gutter, Downspouts, Fittings	0.15	K Ln Ft
Asphalt Shingle Roof	4216	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	4	Each
Wood, Solid Core w/ Safety Glass, Painted, Interior Door	3	Each
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	2429	Sq Ft
Sheetrock, Stippled, Interior Wall Finish	1600	Sq Ft
Vinyl Tile Flooring	4000	Sq Ft
Acoustical Tile Ceiling	4000	Sq Ft
D20 Plumbing		
Lavatory, Vitreous China	4	Each
Sink, Stainless Steel	1	Each
Tankless Water Closet	4	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.355	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.155	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.368	K Ln Ft
Pipe & Fittings, 4" Steel	0.554	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.631	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.305	K Ln Ft
Water Heater, Gas/Oil, 75 Gph	1	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.207	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.126	K Ln Ft
Pipe & Fittings, 4" PVC	0.024	K Ln Ft
Roof Drain, 2"	2	Each
D30 HVAC		
Duct Insulation, Fiberglass Blanket	1166	Sq Ft
Ductwork	1740	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	2	Each
Air Conditioner, Rooftop, Single Zone, 20 Ton	1	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	30	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	2	Each
D50 Electrical		
Main Switchgear, <1,200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	2	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	1	Each
Exit Lighting Fixture, w/ Battery	3	Each
Fluorescent Lighting Fixture, 160 w	40	Each
Receptacle, 120 V, 15 Amp.	10	Each
Wiring Device, Switch	4	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	2	Each
Heat Detector	2	Each
Manual Pull Station	2	Each
Smoke Detector	8	Each
E10 Equipment		
Microwave Oven	1	Each
Refrigerator, Domestic	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$320,342	\$1.60	0.79%
Unscheduled Maintenance	\$265,576	\$1.33	0.65%
Renewal & Replacement	\$543,721	\$2.72	1.34%
Total	\$1,129,639	\$5.65	2.78%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, Single Zone, 20 Ton	28.39	13.1%
Repair Air Conditioner, Rooftop, Single Zone, 20 Ton	21.18	9.8%
Maintain Fire Sprinkler System	11.83	5.5%
Test Gages & Valves, Fire Sprinkler System	10.90	5.0%
Maintain Air Conditioner, Rooftop, Single Zone, 20 Ton	10.08	4.7%
Clean & Seal Concrete Block, Exterior, 1st Floor	9.34	4.3%
Maintain Asphalt Shingle Roof	8.72	4.0%
Refinish Concrete Block, Painted, Interior Wall Finish	6.12	2.8%
Replace Asphalt Shingle Roof	5.51	2.6%
Replace Vinyl Tile Flooring	4.91	2.3%
Place New Shingles Over Existing, Asphalt Shingle Roof	4.50	2.1%
Repair Main Switchgear, <1,200 Amp.	4.07	1.9%
Clean Water Heater, Gas/Oil, 75 Gph	3.94	1.8%
Repoint (50% surface) Concrete Block, Exterior, 1st Floor	3.94	1.8%
Refinish Sheetrock, Stippled, Interior Wall Finish	3.90	1.8%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	3.84	1.8%
Replace Fluorescent Lighting Fixture, 160 w	3.51	1.6%
Repoint (50% surface) Concrete Block, Painted, Interior Wall Finish	3.50	1.6%
Maintain Power Panel Board, 208 Y/120 V, 200 Amp.	3.14	1.5%
Replace Water Heater, Gas/Oil, 75 Gph	3.11	1.4%
Replace Power Panel Board, 208 Y/120 V, 200 Amp.	3.02	1.4%
Replace Main Switchgear, <1,200 Amp.	2.82	1.3%
Replace Fire Alarm Control Panel	2.60	1.2%
Maintain Backflow Preventer, 2"	2.59	1.2%
Replace Batteries & Check Operation, Smoke Detector	2.39	1.1%
Replace HVAC Control Panel	2.36	1.1%
Inspect & Test Fire Alarm Control Panel	2.13	1.0%
Replace Backflow Preventer, 2"	1.86	0.9%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	1.78	0.8%
Maintain Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	1.64	0.8%

*Task cost (\$2009) per GSFT over 50 years.

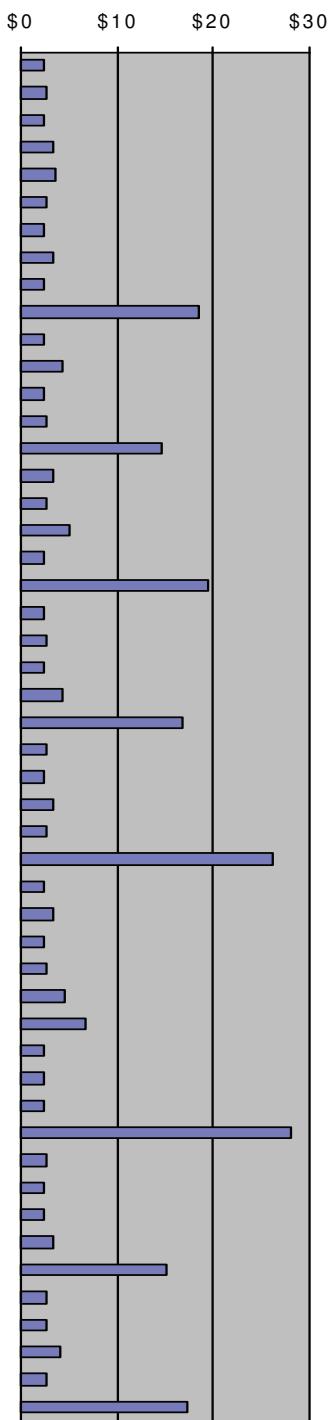
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.41					.45	.46	.67	.36	.05	2.41
2		.41					.59	.46	.67	.36	.05	2.55
3		.41					.45	.46	.67	.36	.05	2.41
4		.41	.04	.84			.59	.46	.67	.36	.05	3.42
5		.07	.52	.07			.67	.52	.73	.92	.05	3.55
6		.41					.59	.46	.67	.36	.05	2.55
7		.01	.41				.49	.46	.67	.36	.05	2.46
8		.41	.04	.84			.61	.46	.67	.39	.05	3.47
9		.41					.45	.46	.67	.36	.05	2.51
10		4.84	.52	.29			1.30	7.58	1.15	2.49	.41	18.58
11		.41					.45	.46	.67	.36	.05	2.41
12		.04	.41	.04	.84		1.28	.46	.81	.36	.05	4.29
13		.41					.45	.46	.67	.36	.05	2.41
14		.01	.41				.63	.46	.67	.36	.05	2.60
15		.13	.52	.07			.51	10.30	1.48	1.50	.05	14.56
16		.41	.04	.84			.61	.46	.67	.39	.05	3.47
17		.41					.61	.46	.69	.36	.05	2.59
18		.41		2.51			.59	.46	.67	.36	.05	5.06
19		.41					.45	.46	.67	.36	.05	2.41
20		4.84	5.22	1.09	.86		1.21	.84	1.13	3.92	.41	19.51
21		.01	.41				.49	.46	.67	.36	.05	2.46
22		.41					.75	.46	.69	.36	.05	2.73
23		.41					.45	.46	.67	.36	.05	2.41
24		.04	.41	.04	.84		1.29	.46	.81	.39	.05	4.33
25		2.24	.52	.07	1.92		2.12	7.58	.71	1.60	.05	16.81
26		.41					.59	.46	.67	.36	.05	2.55
27		.41			.10		.45	.46	.67	.36	.05	2.51
28		.01	.41	.04	.84		.63	.46	.67	.36	.05	3.47
29		.41					.61	.46	.69	.36	.05	2.59
30		4.91	.52	.29			1.09	11.44	1.90	5.68	.41	26.24
31		.41					.45	.46	.67	.36	.05	2.41
32		.41	.04	.84			.61	.46	.67	.36	.05	3.44
33		.41					.45	.46	.67	.39	.05	2.43
34		.41					.75	.46	.69	.36	.05	2.73
35		.08	.52	.07			1.63	.52	.71	.92	.05	4.50
36		.04	.41	.04	3.35		1.16	.46	.81	.36	.05	6.69
37		.41					.56	.46	.67	.36	.05	2.52
38		.41					.48	.46	.67	.36	.05	2.43
39		.41					.56	.46	.67	.36	.05	2.52
40		5.17	5.75	1.70	.86		1.08	7.90	1.13	4.13	.41	28.12
41		.41					.73	.46	.69	.39	.05	2.73
42		.41					.52	.46	.67	.36	.05	2.47
43		.41					.56	.46	.67	.36	.05	2.52
44		.41	.04	.84			.48	.46	.67	.36	.05	3.31
45		.13	.52	.07	.10		.93	10.30	1.48	1.50	.05	15.09
46		.41					.64	.46	.69	.36	.05	2.62
47		.01	.41				.56	.46	.67	.36	.05	2.53
48		.04	.41	.04	.84		1.18	.46	.81	.36	.05	4.19
49		.41					.60	.46	.67	.39	.05	2.59
50		7.21	.52	.29	1.92		2.40	.52	1.29	2.74	.41	17.30
Total	29.84	31.48	4.41	19.24		37.80	75.86	39.29	40.16	4.34		282.41

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Store, Department

Gross Square Feet:	94,000
Height in Ft:	16
Exterior:	Clay Brick
Floor coverings:	Finished Concrete, Terrazzo, Carpet
HVAC:	Single Zone Rooftop Units
Capacity:	N/A
Occupancy:	2,820
Replacement Cost:	\$15,118,934

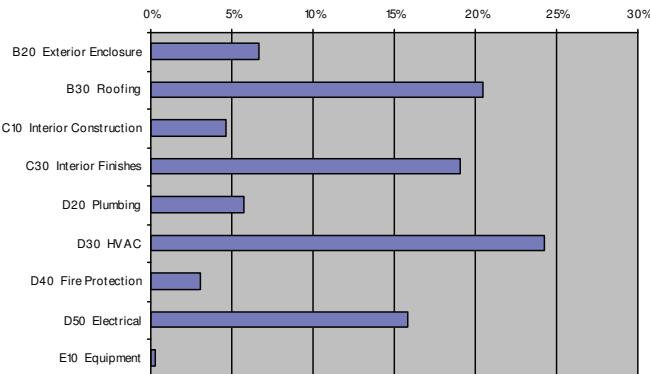
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	17642	Sq Ft
Aluminum Fixed Window, 24 sf, 1st Floor	84	Each
Aluminum Frame, Fully Glazed, Exterior Door	10	Each
Steel Single 12"x12", Painted, Roll-up Door	4	Each
Steel, Painted, Exterior Door	8	Each
Steel w/ Safety Glass, Painted, Exterior Door	4	Each
B30 Roofing		
Built-up Roof	94000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	24	Each
Steel, Painted, Interior Door	6	Each
Wood, Solid Core, Painted, Interior Door	150	Each
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	2200	Sq Ft
Sheetrock, Unstippled, Interior Wall Finish	56800	Sq Ft
Carpet, Nylon 20 oz., High Traffic	37600	Sq Ft
Concrete, Painted Flooring	4700	Sq Ft
Terrazzo Flooring	51700	Sq Ft
Acoustical Tile, Dropped Ceiling	75200	Sq Ft
Sheetrock, Unstippled Ceiling	18800	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	3	Each
Lavatory, Vitreous China	24	Each
Service Sink, Iron, Enamel	3	Each
Tankless Water Closet	24	Each
Urinal, Vitreous China	6	Each
Circulator Pump, 1/2 HP, Cold Water	1	Each
Circulator Pump, 1/2 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	1.9	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.9	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	2.2	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	1.9	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.9	K Ln Ft
Water Heater, Gas/Oil, 65 Gph	3	Each
Backflow Preventer, 4"	1	Each
Pipe & Fittings, 6" Cast Iron	1.4	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.7	K Ln Ft
Pipe & Fittings, 4" PVC	0.9	K Ln Ft
Roof Drain, 4-6"	27	Each
D30 HVAC		
Pipe & Fittings, 4" Steel, Gas	0.7	K Ln Ft
Duct Insulation, Fiberglass Blanket	16361	Sq Ft
Ductwork	24420	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	6	Each
Air Conditioner, Rooftop, Single Zone, 50 Ton	6	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	470	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	40	Each
D50 Electrical		
Distribution Switch, Fused, <600 V	16	Each
Main Switchgear, >1,200 Amp.	1	Each
Exit Lighting Fixture, w/ Battery	22	Each
Fluorescent Lighting Fixture, 160 w	1470	Each
Receptacle, 120 V, 15 Amp.	415	Each
Wiring Device, Switch	104	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	40	Each
Heat Detector	40	Each
Manual Pull Station	40	Each
Smoke Detector	190	Each
E10 Equipment		
Microwave Oven	2	Each
Refrigerator, Domestic	2	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$1,645,202	\$0.35	0.22%
Unscheduled Maintenance	\$1,551,733	\$0.33	0.21%
Renewal & Replacement	\$9,336,087	\$1.99	1.24%
Total	\$12,533,022	\$2.67	1.66%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, Single Zone, 50 Ton	17.48	15.0%
Replace Carpet, Nylon 20 oz., High Traffic	14.49	12.4%
Place New Membrane Over Existing, Built-up Roof	10.97	9.4%
Replace Membrane, Built-up Roof	9.50	8.1%
Repair Air Conditioner, Rooftop, Single Zone, 50 Ton	8.32	7.1%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	6.01	5.1%
Refinish Sheetrock, Unstippled, Interior Wall Finish	5.90	5.0%
Replace Fluorescent Lighting Fixture, 160 w	5.50	4.7%
Maintain Air Conditioner, Rooftop, Single Zone, 50 Ton	3.14	2.7%
Maintain Built-up Roof	3.04	2.6%
Refinish Sheetrock, Unstippled Ceiling	2.64	2.3%
Clean & Reseal Clay Brick, Exterior, 1st Floor	2.58	2.2%
Replace Batteries & Check Operation, Smoke Detector	2.42	2.1%
Replace Wood, Solid Core, Painted, Interior Door	1.92	1.6%
Replace Wood, Solid Core, Painted, Interior Door Locks	1.89	1.6%
Repaint (50% surface) Clay Brick, Exterior, 1st Floor	1.40	1.2%
Replace Smoke Detector	.92	0.8%
Repair Carpet, Nylon 20 oz., High Traffic (2% of Carpet)	.92	0.8%
Test Fire Sprinkler Head	.85	0.7%
Check Operation, Heat Detector	.84	0.7%
Maintain Roof Drain, 4-6"	.71	0.6%
Non-Destructive Moisture Inspection, Built-up Roof	.57	0.5%
Repair Terrazzo Flooring (2% of Floors)	.57	0.5%
Replace Existing Ductwork (20% of Ductwork)	.51	0.4%
Maintain Wood, Solid Core, Painted, Interior Door Locks	.51	0.4%
Maintain Fire Sprinkler System	.50	0.4%
Clean Water Heater, Gas/Oil, 65 Gph	.50	0.4%
Replace Fire Extinguisher	.48	0.4%
Test Gages & Valves, Fire Sprinkler System	.46	0.4%
Replace Distribution Switch, Fused, <600 V	.46	0.4%

*Task cost (\$2009) per GSFT over 50 years.

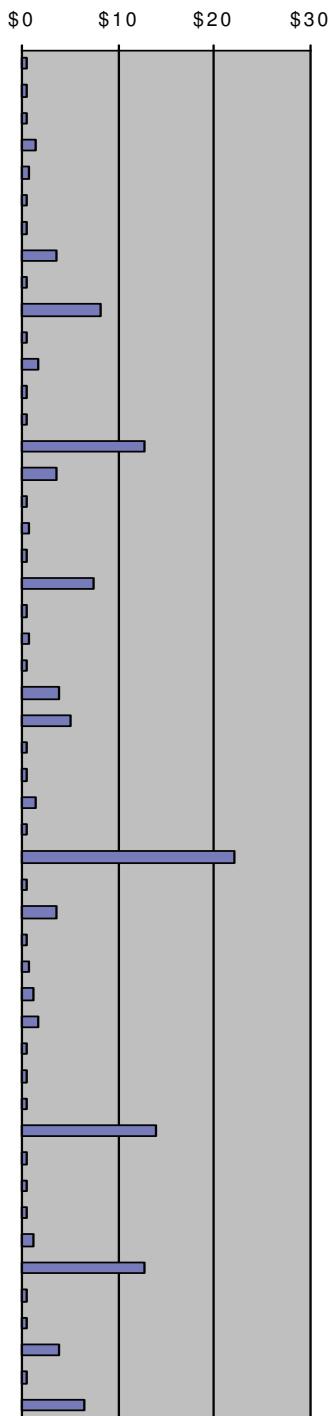
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13				.08	.12	.04	.12	.00		.49
2		.13		.05		.12	.12	.04	.12	.00		.58
3		.13				.08	.12	.04	.14	.00		.51
4		.13	.04	.78		.12	.12	.04	.12	.00		1.35
5	.02	.19	.16			.11	.12	.06	.16	.00		.83
6		.13		.05		.12	.12	.04	.14	.00		.59
7		.13				.10	.12	.04	.12	.00		.51
8		.13	.04	3.15		.12	.12	.04	.12	.00		3.72
9		.13		.05		.08	.12	.04	.14	.00		.55
10	1.36	.19	.65	.08		.28	2.89	.34	2.40	.03		8.21
11		.13				.08	.12	.04	.12	.00		.49
12	.02	.13	.04	.78		.20	.12	.16	.14	.00		1.59
13		.13				.08	.12	.04	.12	.00		.49
14		.13		.05		.14	.12	.04	.12	.00		.60
15	.04	5.67	.16	.20		.09	5.87	.07	.52	.00		12.63
16		.13	.04	3.15		.12	.12	.04	.12	.00		3.72
17		.13				.10	.12	.05	.12	.00		.53
18		.13		.09		.12	.12	.04	.14	.00		.64
19		.13				.08	.12	.04	.12	.00		.49
20	1.38	.19	.88	.85		.32	.16	.32	3.24	.03		7.38
21		.13				.10	.12	.04	.14	.00		.53
22		.13		.05		.14	.12	.05	.12	.00		.62
23		.13				.08	.12	.04	.12	.00		.49
24	.02	.13	.04	3.15		.20	.12	.16	.14	.00		3.96
25	.86	.19	.16	.10		.47	2.90	.04	.37	.00		5.09
26		.13		.05		.12	.12	.04	.12	.00		.58
27		.13		.05		.08	.12	.04	.14	.00		.55
28		.13	.04	.78		.14	.12	.04	.12	.00		1.37
29		.13				.10	.12	.05	.12	.00		.53
30	1.38	9.50	.65	.28		.30	6.55	.35	2.96	.03		22.01
31		.13				.08	.12	.04	.12	.00		.49
32		.13	.04	3.15		.12	.12	.04	.12	.00		3.72
33		.13				.08	.12	.04	.14	.00		.51
34		.13		.05		.14	.12	.05	.12	.00		.62
35	.12	.19	.16			.46	.12	.04	.16	.00		1.26
36	.02	.13	.04	.82		.17	.12	.16	.14	.00		1.60
37		.13				.11	.12	.04	.12	.00		.53
38		.13		.05		.08	.12	.04	.12	.00		.54
39		.13				.11	.12	.04	.14	.00		.54
40	1.35	.19	2.18	3.22		.30	2.93	.32	3.45	.03		13.98
41		.13				.13	.12	.05	.12	.00		.56
42		.13		.05		.10	.12	.04	.14	.00		.58
43		.13				.12	.12	.04	.12	.00		.53
44		.13	.04	.78		.08	.12	.04	.12	.00		1.32
45	.07	5.67	.16	.24		.21	5.87	.07	.52	.00		12.82
46		.13		.05		.11	.12	.05	.12	.00		.58
47		.13				.11	.12	.04	.12	.00		.53
48	.02	.13	.04	3.15		.17	.12	.16	.14	.00		3.92
49		.13				.13	.12	.04	.12	.00		.54
50	2.25	.19	.65	.18		.53	.12	.43	2.18	.03		6.57
Total	8.90	27.33	6.22	25.45		7.61	32.29	4.07	21.09	.37		133.33

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Store, Retail

Washington, D.C.

Store, Retail

Gross Square Feet:	8,000
Height in Ft:	14
Exterior:	Decorative Concrete Block
Floor coverings:	Vinyl Tile
HVAC:	Single Zone Rooftop Units
Capacity:	N/A
Occupancy:	240
Replacement Cost:	\$1,624,000

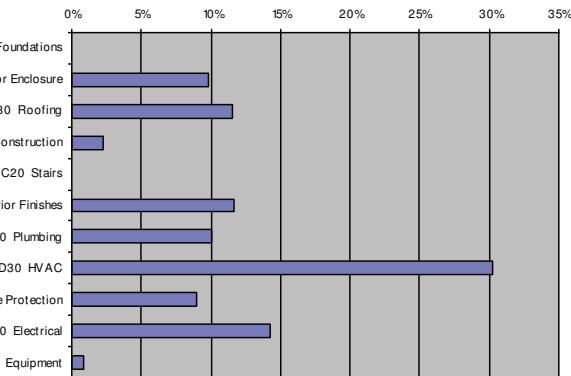
Components

Uniform / Component	Quantity	Units
A10 Foundations		
Concrete Slab	800	Sq Ft
B20 Exterior Enclosure		
Concrete Block, Exterior, 1st Floor	4559	Sq Ft
Aluminum Operable Window, 24 sf, 1st Floor	17	Each
Aluminum Frame, Fully Glazed, Exterior Door	1	Each
Steel w/ Safety Glass, Painted, Exterior Door	1	Each
B30 Roofing		
Built-up Roof	8000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	5	Each
Steel, Painted, Interior Door	13	Each
C20 Stairs		
Concrete, Exterior Stairs	40	Sq Ft
C30 Interior Finishes		
Sheetrock, Stippled, Interior Wall Finish	4536	Sq Ft
Carpet, Nylon 20 oz., High Traffic	4000	Sq Ft
Vinyl Tile Flooring	4000	Sq Ft
Acoustical Tile Ceiling	8000	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	2	Each
Lavatory, Vitreous China	5	Each
Sink, Stainless Steel	2	Each
Tankless Water Closet	5	Each
Urinal, Vitreous China	2	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.59	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.22	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.663	K Ln Ft
Pipe & Fittings, 4" Steel	0.772	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.976	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.427	K Ln Ft
Water Heater, Gas/Oil, 75 Gph	1	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.367	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.179	K Ln Ft
Pipe & Fittings, 4" PVC	0.065	K Ln Ft
Roof Drain, 2"	2	Each
D30 HVAC		
Duct Insulation, Fiberglass Blanket	2238	Sq Ft
Ductwork	3340	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	2	Each
Air Conditioner, Rooftop, Single Zone, 20 Ton	2	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	57	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	4	Each
D50 Electrical		
Main Switchgear, >1,200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	2	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	2	Each
Exit Lighting Fixture, w/ Battery	4	Each
Fluorescent Lighting Fixture, 160 w	100	Each
Grounded Fault Circuit Interrupter, 15 Amp.	2	Each
Receptacle, 120 V, 15 Amp.	64	Each
Wiring Device, Switch	16	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	4	Each
Heat Detector	4	Each
Manual Pull Station	4	Each
Smoke Detector	20	Each
E10 Equipment		
Microwave Oven	1	Each
Refrigerator, Domestic	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$408,599	\$1.02	0.50%
Unscheduled Maintenance	\$343,603	\$0.86	0.42%
Renewal & Replacement	\$1,142,472	\$2.86	1.41%
Total	\$1,894,674	\$4.74	2.33%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, Single Zone, 20 Ton	28.39	14.6%
Repair Air Conditioner, Rooftop, Single Zone, 20 Ton	21.18	10.9%
Replace Carpet, Nylon 20 oz., High Traffic	18.11	9.3%
Place New Membrane Over Existing, Built-up Roof	10.97	5.7%
Maintain Air Conditioner, Rooftop, Single Zone, 20 Ton	10.08	5.2%
Replace Membrane, Built-up Roof	9.50	4.9%
Clean & Seal Concrete Block, Exterior, 1st Floor	7.79	4.0%
Maintain Fire Sprinkler System	5.91	3.0%
Refinish Sheetrock, Stippled, Interior Wall Finish	5.53	2.9%
Test Gages & Valves, Fire Sprinkler System	5.45	2.8%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	4.81	2.5%
Replace Fluorescent Lighting Fixture, 160 w	4.39	2.3%
Repaint (50% surface) Concrete Block, Exterior, 1st Floor	3.28	1.7%
Maintain Built-up Roof	3.04	1.6%
Replace Batteries & Check Operation, Smoke Detector	2.99	1.5%
Replace Vinyl Tile Flooring	2.46	1.3%
Replace Steel, Painted, Interior Door Locks	2.40	1.2%
Repair Main Switchgear, >1,200 Amp.	2.03	1.0%
Replace Main Switchgear, >1,200 Amp.	1.98	1.0%
Clean Water Heater, Gas/Oil, 75 Gph	1.97	1.0%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	1.60	0.8%
Maintain Power Panel Board, 208 Y/120 V, 200 Amp.	1.57	0.8%
Replace Water Heater, Gas/Oil, 75 Gph	1.56	0.8%
Replace Power Panel Board, 208 Y/120 V, 200 Amp.	1.51	0.8%
Replace Fire Alarm Control Panel	1.30	0.7%
Maintain Backflow Preventer, 2"	1.29	0.7%
Test Fire Sprinkler Head	1.21	0.6%
Replace HVAC Control Panel	1.18	0.6%
Repair Carpet, Nylon 20 oz., High Traffic (2% of Carpet)	1.15	0.6%
Replace Smoke Detector	1.14	0.6%

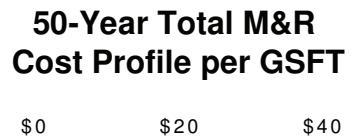
*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	Plumbing	HVAC Systems	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13					.22	.41	.34	.29	.03		1.42
2		.13			.06		.35	.41	.34	.29	.03		1.61
3		.13					.22	.41	.34	.29	.03		1.42
4		.13	.05		.52		.35	.41	.34	.29	.03		2.12
5	.02	.19	.15				.35	.44	.38	.57	.03		2.14
6		.13			.06		.35	.41	.34	.29	.03		1.61
7		.13					.28	.41	.34	.29	.03		1.48
8		.13	.05		3.48		.37	.41	.34	.31	.03		5.12
9		.13			.08		.22	.41	.34	.29	.03		1.49
10	3.82	.19	.64		.06		.99	7.50	.78	2.50	.20		16.67
11		.13					.22	.41	.34	.29	.03		1.42
12	.02	.13	.05		.52		.73	.41	.48	.29	.03		2.65
13		.13					.22	.41	.34	.29	.03		1.42
14		.13			.06		.41	.41	.34	.29	.03		1.66
15	.10	5.67	.15	.01			.27	9.88	.74	1.11	.03		17.98
16		.13	.05		3.48		.37	.41	.34	.31	.03		5.12
17		.13					.31	.41	.36	.29	.03		1.52
18		.13			1.34		.35	.41	.34	.29	.03		2.89
19		.13					.22	.41	.34	.29	.03		1.42
20	3.82	.19	1.16		.56		.97	.60	.76	3.96	.20		12.21
21		.13					.28	.41	.34	.29	.03		1.48
22		.13			.06		.43	.41	.36	.29	.03		1.71
23		.13					.22	.41	.34	.29	.03		1.42
24	.02	.13	.05		3.48		.75	.41	.48	.31	.03		5.66
25	1.83	.19	.15				1.64	7.50	.36	1.33	.03		13.03
26		.13			.06		.35	.41	.34	.29	.03		1.61
27		.13			.08		.22	.41	.34	.29	.03		1.49
28		.13	.05		.52		.41	.41	.34	.29	.03		2.17
29		.13					.31	.41	.36	.29	.03		1.52
30	3.90	9.50	.64	.01	.06		.89	10.98	1.14	4.17	.20		31.48
31		.13					.22	.41	.34	.29	.03		1.42
32		.13	.05		3.48		.37	.41	.34	.29	.03		5.09
33		.13					.22	.41	.34	.31	.03		1.44
34		.13			.06		.43	.41	.36	.29	.03		1.71
35	.02	.19	.15				1.22	.44	.36	.57	.03		2.99
36	.02	.13	.05		1.80		.66	.41	.48	.29	.03		3.87
37		.13					.30	.41	.34	.29	.03		1.49
38		.13			.06		.28	.41	.34	.29	.03		1.53
39		.13					.30	.41	.34	.29	.03		1.49
40	3.82	.19	1.16		3.52		.90	7.66	.76	4.25	.20		22.45
41		.13					.38	.41	.36	.31	.03		1.62
42		.13			.06		.34	.41	.34	.29	.03		1.59
43		.13					.30	.41	.34	.29	.03		1.49
44		.13	.05		.52		.28	.41	.34	.29	.03		2.04
45	.10	5.67	.15	.01	.08		.57	9.88	.74	1.11	.03		18.36
46		.13			.06		.36	.41	.36	.29	.03		1.64
47		.13					.30	.41	.34	.29	.03		1.49
48	.02	.13	.05		3.48		.68	.41	.48	.29	.03		5.56
49		.13					.35	.41	.34	.31	.03		1.57
50		5.73	.19	.64	.17	.06	2.04	.44	.91	2.67	.20		13.05
Total	23.24	27.33	5.49	.21	27.67		23.82	71.75	21.31	33.80	2.17		236.79



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Supermarket

Washington, D.C.

Supermarket

Gross Square Feet:	96,000
Height in Ft:	20
Exterior:	Clay Brick
Floor coverings:	Finished Concrete, Vinyl Tile, Ceramic Tile
HVAC:	Single Zone Rooftop Units
Capacity:	N/A
Occupancy:	2,880
Replacement Cost:	\$16,122,380

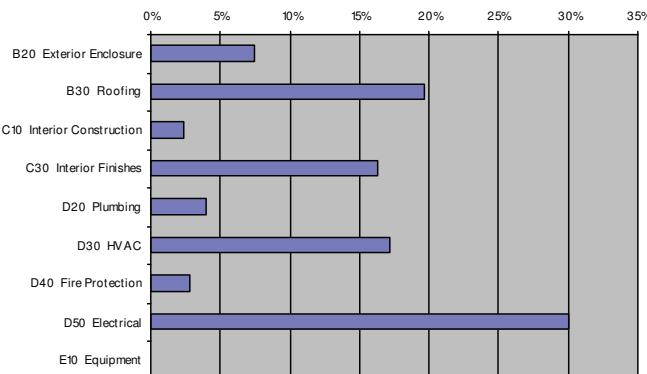
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	21074	Sq Ft
Aluminum Fixed Window, 24 sf, 1st Floor	75	Each
Aluminum Fixed Window, 24 sf, 2nd Floor	79	Each
Aluminum Frame, Fully Glazed, Exterior Door	8	Each
Steel Single 12'x12', Painted, Roll-up Door	4	Each
Steel, Painted, Exterior Door	12	Each
Steel w/ Safety Glass, Painted, Exterior Door	4	Each
B30 Roofing	96000	Sq Ft
Built-up Roof		
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	11	Each
Aluminum, w/ Safety Glass, Plain or Anodized, Interior Door	40	Each
Wood, Solid Core, Painted, Interior Door	40	Each
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	40274	Sq Ft
Sheetrock, Unstippled, Interior Wall Finish	76800	Sq Ft
Concrete, Painted Flooring	19200	Sq Ft
Vinyl Tile Flooring	76800	Sq Ft
Acoustical Tile, Dropped Ceiling	76800	Sq Ft
Metal, Painted Ceiling	19200	Sq Ft
D20 Plumbing		
Drinking Fountain, Vitreous China	4	Each
Lavatory, Vitreous China	11	Each
Service Sink, Iron, Enamel	3	Each
Sink, Stainless Steel	6	Each
Tankless Water Closet	11	Each
Urinal, Vitreous China	3	Each
Circulator Pump, 1/12 HP, Cold Water	1	Each
Circulator Pump, 1/12 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	1.3	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.7	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	1.8	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	1.3	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.7	K Ln Ft
Water Heater, Gas/Oil, 75 Gph	1	Each
Backflow Preventer, 4"	1	Each
Pipe & Fittings, 6" Cast Iron	0.9	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.7	K Ln Ft
Pipe & Fittings, 4" PVC	1.2	K Ln Ft
Roof Drain, 4-6"	28	Each
D30 HVAC		
Pipe & Fittings, 4" Steel, Gas	0.7	K Ln Ft
Duct Insulation, Fiberglass Blanket	11886	Sq Ft
Ductwork	17740	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	2	Each
Air Conditioner, Rooftop, Single Zone, 20 Ton	1	Each
Air Conditioner, Rooftop, Single Zone, 50 Ton	4	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	520	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	20	Each
D50 Electrical		
Distribution Switch, Fused, <600 V	16	Each
Main Switchgear, <1,200 Amp.	1	Each
Exit Lighting Fixture, w/ Battery	24	Each
Fluorescent Lighting Fixture, 160 w	280	Each
Incandescent Lighting Fixture, Basic, 100 w	20	Each
Metal Halide Lighting Fixture, Low Bay, 250 w	975	Each
Receptacle, 120 V, 15 Amp.	520	Each
Wiring Device, Switch	130	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	20	Each
Heat Detector	20	Each
Manual Pull Station	20	Each
Smoke Detector	200	Each
E10 Equipment		
Microwave Oven	1	Each
Refrigerator, Domestic	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$2,355,756	\$0.49	0.29%
Unscheduled Maintenance	\$1,853,818	\$0.39	0.23%
Renewal & Replacement	\$9,108,899	\$1.90	1.13%
Total	\$13,318,473	\$2.77	1.65%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, Single Zone, 50 Ton	11.41	9.6%
Place New Membrane Over Existing, Built-up Roof	10.97	9.2%
Replace Metal Halide Lighting Fixture, Low Bay, 250 w	10.70	9.0%
Replace Membrane, Built-up Roof	9.50	8.0%
Replace Lamp, Metal Halide Lighting Fixture, Low Bay, 250 w	8.53	7.1%
Refinish Sheetrock, Unstippled, Interior Wall Finish	7.81	6.5%
Replace Ballast, Metal Halide Lighting Fixture, Low Bay, 250 w	7.25	6.1%
Repair Air Conditioner, Rooftop, Single Zone, 50 Ton	5.43	4.5%
Refinish Concrete Block, Painted, Interior Wall Finish	4.23	3.5%
Replace Vinyl Tile Flooring	3.93	3.3%
Maintain Built-up Roof	3.04	2.5%
Clean & Reseal Clay Brick, Exterior, 1st Floor	3.01	2.5%
Refinish Metal, Painted Ceiling	2.64	2.2%
Replace Batteries & Check Operation, Smoke Detector	2.49	2.1%
Repaint (50% surface) Concrete Block, Painted, Interior Wall Finish	2.42	2.0%
Maintain Air Conditioner, Rooftop, Single Zone, 50 Ton	2.05	1.7%
Repaint (50% surface) Clay Brick, Exterior, 1st Floor	1.64	1.4%
Replace Air Conditioner, Rooftop, Single Zone, 20 Ton	1.18	1.0%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	1.12	0.9%
Replace Fluorescent Lighting Fixture, 160 w	1.02	0.9%
Replace Smoke Detector	.95	0.8%
Test Fire Sprinkler Head	.92	0.8%
Repair Air Conditioner, Rooftop, Single Zone, 20 Ton	.88	0.7%
Replace Aluminum, w/ Safety Glass, Plain or Anodized, Interior Door	.80	0.7%
Maintain Roof Drain, 4-6"	.72	0.6%
Refinish Concrete, Painted Flooring	.66	0.6%
Non-Destructive Moisture Inspection, Built-up Roof	.57	0.5%
Replace Wood, Solid Core, Painted, Interior Door	.50	0.4%
Replace Aluminum, w/ Safety Glass, Plain or Anodized, Interior Door Lock	.49	0.4%
Replace Wood, Solid Core, Painted, Interior Door Locks	.49	0.4%

*Task cost (\$2009) per GSFT over 50 years.

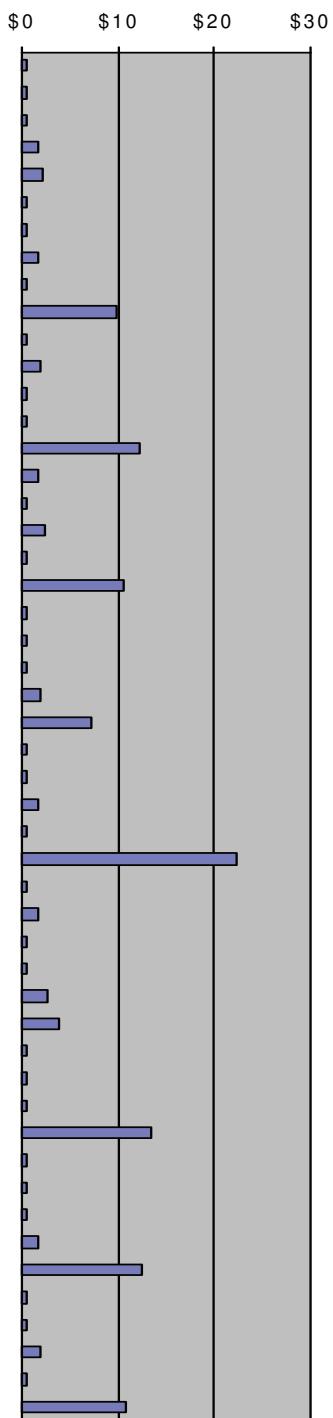
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13						.06	.09	.04	.11	.00	.43
2		.13						.09	.09	.04	.11	.00	.45
3		.13						.06	.09	.04	.12	.00	.44
4		.13	.01	1.22				.09	.09	.04	.11	.00	1.69
5	.02	.19	.08					.08	.09	.05	1.76	.00	2.27
6		.13						.09	.09	.04	.12	.00	.47
7		.13						.07	.09	.04	.11	.00	.44
8		.13	.01	1.22				.09	.09	.04	.11	.00	1.69
9		.13			.08			.06	.09	.04	.12	.00	.53
10	1.57	.19	.33		.13			.19	2.20	.35	4.77	.02	9.74
11		.13						.06	.09	.04	.11	.00	.43
12	.01	.13	.01	1.22				.13	.09	.10	.12	.00	1.82
13		.13						.06	.09	.04	.11	.00	.43
14		.13						.09	.09	.04	.11	.00	.46
15	.05	5.67	.08		.04			.08	4.23	.07	2.09	.00	12.31
16		.13	.01	1.22				.09	.09	.04	.11	.00	1.69
17		.13						.07	.09	.05	.11	.00	.44
18		.13		2.01				.09	.09	.04	.12	.00	2.48
19		.13						.06	.09	.04	.11	.00	.43
20	1.61	.19	.42	1.41				.21	.11	.34	6.34	.02	10.64
21		.13						.07	.09	.04	.12	.00	.45
22		.13						.09	.09	.05	.11	.00	.47
23		.13						.06	.09	.04	.11	.00	.43
24	.01	.13	.01	1.22				.13	.09	.10	.12	.00	1.82
25	1.00	.19	.08	1.43				.36	2.20	.04	1.96	.00	7.26
26		.13						.09	.09	.04	.11	.00	.45
27		.13		.08				.06	.09	.04	.12	.00	.53
28		.13	.01	1.22				.09	.09	.04	.11	.00	1.70
29		.13						.07	.09	.05	.11	.00	.44
30	1.60	9.50	.33	.17				.26	4.72	.37	5.31	.02	22.27
31		.13						.06	.09	.04	.11	.00	.43
32		.13	.01	1.22				.09	.09	.04	.11	.00	1.69
33		.13						.06	.09	.04	.12	.00	.44
34		.13						.09	.09	.05	.11	.00	.47
35	.12	.19	.08					.32	.09	.04	1.76	.00	2.60
36	.01	.13	.01	3.23				.11	.09	.10	.12	.00	3.81
37		.13						.08	.09	.04	.11	.00	.45
38		.13						.07	.09	.04	.11	.00	.44
39		.13						.08	.09	.04	.12	.00	.46
40	1.58	.19	.76	1.41				.27	2.21	.34	6.54	.02	13.32
41		.13						.09	.09	.05	.11	.00	.46
42		.13						.08	.09	.04	.12	.00	.46
43		.13						.08	.09	.04	.11	.00	.45
44		.13	.01	1.22				.07	.09	.04	.11	.00	1.67
45	.08	5.67	.08	.12				.14	4.23	.07	2.09	.00	12.49
46		.13						.08	.09	.05	.11	.00	.45
47		.13						.08	.09	.04	.11	.00	.45
48	.01	.13	.01	1.22				.11	.09	.10	.12	.00	1.80
49		.13						.09	.09	.04	.11	.00	.45
50	2.59	.19	.96	1.56				.41	.10	.46	4.56	.02	10.85
Total	10.28	27.33	3.31	22.69				5.54	23.83	3.88	41.69	.18	138.73

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Telecom Central Office

Gross Square Feet:	5,000
Height in Ft:	12
Exterior:	Clay Brick
Floor coverings:	Carpet, Vinyl Tile
HVAC:	Single Zone Rooftop Units
Capacity:	N/A
Occupancy:	50
Replacement Cost:	\$1,415,000

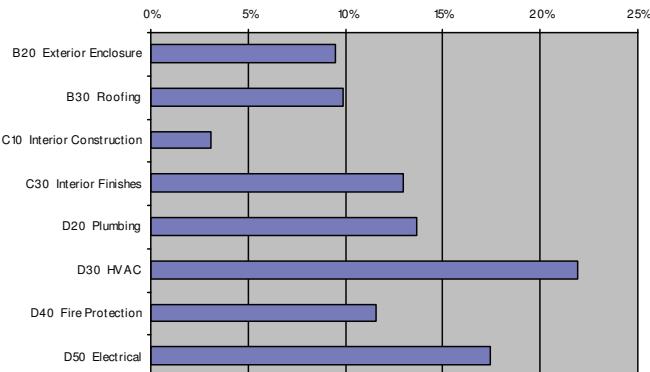
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	2944	Sq Ft
Aluminum Fixed Window, 12 sf, 1st Floor	34	Each
Aluminum Frame, Fully Glazed, Exterior Door	1	Each
Steel w/ Safety Glass, Painted, Exterior Door	1	Each
B30 Roofing		
Built-up Roof	5000	Sq Ft
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	3	Each
Steel, Painted, Interior Door	14	Each
C30 Interior Finishes		
Concrete, Painted, Interior Wall Finish	2745	Sq Ft
Sheetrock, Stippled, Interior Wall Finish	6000	Sq Ft
Carpet, Nylon 20 oz., Low Traffic	4500	Sq Ft
Vinyl Tile Flooring	500	Sq Ft
Acoustical Tile Ceiling	5000	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	2	Each
Lavatory, Vitreous China	3	Each
Sink, Stainless Steel	2	Each
Tankless Water Closet	3	Each
Urinal, Vitreous China	2	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.47	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.16	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.523	K Ln Ft
Pipe & Fittings, 4" Steel	0.614	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.776	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.225	K Ln Ft
Water Heater, Gas/Oil, 75 Gph	1	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.285	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.141	K Ln Ft
Pipe & Fittings, 4" PVC	0.096	K Ln Ft
Roof Drain, 2"	4	Each
D30 HVAC		
Duct Insulation, Fiberglass Blanket	1166	Sq Ft
Ductwork	1170	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	2	Each
Air Conditioner, Rooftop, Single Zone, 20 Ton	1	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	38	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	2	Each
D50 Electrical		
Main Switchgear, <1,200 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	2	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	1	Each
Secondary Transformer, Dry, 150 kVA	1	Each
Exit Lighting Fixture, w/ Battery	2	Each
Fluorescent Lighting Fixture, 160 w	50	Each
Grounded Fault Circuit Interruptor, 15 Amp.	2	Each
Receptacle, 120 V, 15 Amp.	25	Each
Wiring Device, Switch	15	Each
Annunciation Panel	1	Each
Fire Alarm Horn & Strobe	2	Each
Heat Detector	2	Each
Manual Pull Station	2	Each
Smoke Detector	10	Each
Uninterruptible Power Supply, 8.0 kVA	1	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$318,764	\$1.28	0.45%
Unscheduled Maintenance	\$268,225	\$1.07	0.38%
Renewal & Replacement	\$794,271	\$3.18	1.12%
Total	\$1,381,260	\$5.53	1.95%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, Single Zone, 20 Ton	22.71	10.2%
Repair Air Conditioner, Rooftop, Single Zone, 20 Ton	16.94	7.6%
Replace Carpet, Nylon 20 oz., Low Traffic	16.30	7.3%
Refinish Sheetrock, Stippled, Interior Wall Finish	11.71	5.3%
Place New Membrane Over Existing, Built-up Roof	10.97	4.9%
Replace Membrane, Built-up Roof	9.50	4.3%
Maintain Fire Sprinkler System	9.46	4.2%
Test Gages & Valves, Fire Sprinkler System	8.72	3.9%
Clean & Reseal Clay Brick, Exterior, 1st Floor	8.09	3.6%
Maintain Air Conditioner, Rooftop, Single Zone, 20 Ton	8.07	3.6%
Replace Uninterruptible Power Supply Motor Generator, 8.0 kVA	6.84	3.1%
Refinish Concrete, Painted, Interior Wall Finish	5.53	2.5%
Repaint (50% surface) Clay Brick, Exterior, 1st Floor	4.40	2.0%
Replace Steel, Painted, Interior Door Locks	4.14	1.9%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	3.84	1.7%
Replace Fluorescent Lighting Fixture, 160 w	3.51	1.6%
Repair Main Switchgear, <1,200 Amp.	3.25	1.5%
Clean Water Heater, Gas/Oil, 75 Gph	3.16	1.4%
Maintain Built-up Roof	3.04	1.4%
Maintain Power Panel Board, 208 Y/120 V, 200 Amp.	2.51	1.1%
Replace Water Heater, Gas/Oil, 75 Gph	2.49	1.1%
Replace Power Panel Board, 208 Y/120 V, 200 Amp.	2.42	1.1%
Replace Batteries & Check Operation, Smoke Detector	2.39	1.1%
Replace Main Switchgear, <1,200 Amp.	2.26	1.0%
Replace Secondary Transformer, Dry, 150 kVA	2.17	1.0%
Replace Fire Alarm Control Panel	2.08	0.9%
Maintain Backflow Preventer, 2"	2.07	0.9%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	2.02	0.9%
Maintain Roof Drain, 2"	1.98	0.9%
Replace HVAC Control Panel	1.89	0.8%

*Task cost (\$2009) per GSFT over 50 years.

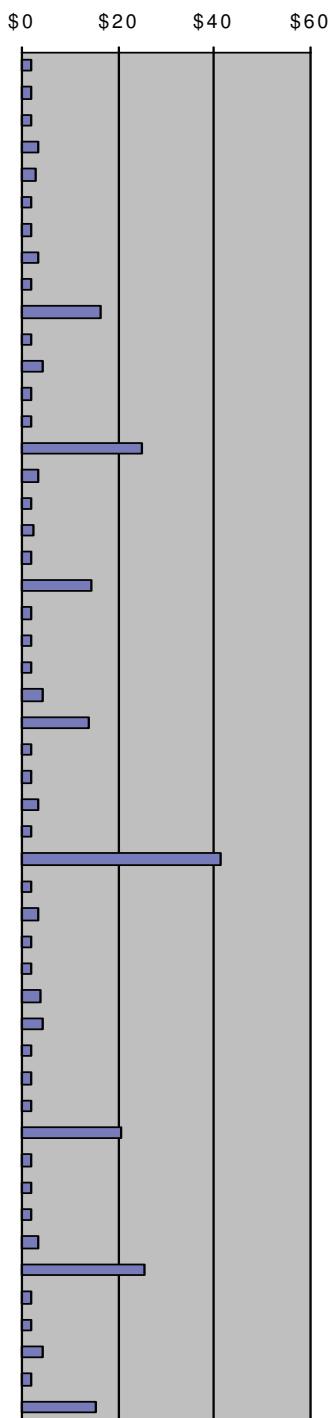
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	Interior Finishes	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13						.41	.37	.54	.38		1.83
2		.13						.57	.37	.54	.38		1.99
3		.13						.41	.37	.54	.38		1.83
4		.13	.07	1.44				.57	.37	.54	.38		3.50
5	.04	.19	.27		.11			.60	.42	.59	.81		3.02
6		.13						.57	.37	.54	.38		1.99
7		.13						.49	.37	.54	.38		1.91
8		.13	.07	1.44				.60	.37	.54	.40		3.55
9		.13			.06			.41	.37	.54	.38		1.89
10	4.02	.19	1.10		.11	1.48	6.06	1.01	2.57				16.54
11		.13						.41	.37	.54	.38		1.83
12	.03	.13	.07	1.44				1.14	.37	.65	.38		4.22
13		.13						.41	.37	.54	.38		1.83
14		.13						.65	.37	.54	.38		2.07
15	.07	5.67	.27	5.43				.46	8.24	1.19	3.64		24.97
16		.13	.07	1.44				.60	.37	.54	.40		3.55
17		.13						.54	.37	.56	.38		1.98
18		.13		.30				.57	.37	.54	.38		2.29
19		.13						.41	.37	.54	.38		1.83
20	4.18	.19	1.62	1.62				1.43	.67	1.00	3.70		14.42
21		.13						.49	.37	.54	.38		1.91
22		.13						.70	.37	.56	.38		2.14
23		.13						.41	.37	.54	.38		1.83
24	.03	.13	.07	1.44				1.17	.37	.65	.40		4.27
25	2.66	.19	.27	.39				2.17	6.06	.57	1.54		13.86
26		.13						.57	.37	.54	.38		1.99
27		.13		.06				.41	.37	.54	.38		1.89
28		.13	.07	1.44				.65	.37	.54	.38		3.58
29		.13						.54	.37	.56	.38		1.98
30	4.05	9.50	1.10	5.43				1.40	8.93	1.61	9.36		41.38
31		.13						.41	.37	.54	.38		1.83
32		.13	.07	1.44				.60	.37	.54	.38		3.53
33		.13						.41	.37	.54	.40		1.85
34		.13						.70	.37	.56	.38		2.14
35	.04	.19	.27	.11				1.55	.42	.57	.81		3.95
36	.03	.13	.07	1.74				1.07	.37	.65	.38		4.45
37		.13						.48	.37	.54	.38		1.90
38		.13						.51	.37	.54	.38		1.92
39		.13						.48	.37	.54	.38		1.90
40	4.18	.19	1.62	1.62				1.57	6.32	1.00	4.05		20.55
41		.13						.61	.37	.56	.40		2.07
42		.13						.58	.37	.54	.38		2.00
43		.13						.48	.37	.54	.38		1.90
44		.13	.07	1.44				.51	.37	.54	.38		3.43
45	.07	5.67	.27	5.49				.80	8.24	1.19	3.64		25.37
46		.13						.64	.37	.56	.38		2.07
47		.13						.48	.37	.54	.38		1.90
48	.03	.13	.07	1.44				1.10	.37	.65	.38		4.18
49		.13						.56	.37	.54	.40		2.00
50		6.80	.19	1.10	.39			2.81	.42	1.16	2.58		15.45
Total	26.25	27.33	8.61	35.80	37.66	60.47	32.04	48.11				276.25	

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Visitor Center

Washington, D.C.

Visitor Center

Gross Square Feet:	20,700
Height in Ft:	21
Exterior:	Stucco
Floor coverings:	Carpet, Ceramic Tile, Vinyl Tile
HVAC:	Heat Pumps, Single Zone
Capacity:	N/A
Occupancy:	1,240
Replacement Cost:	\$4,812,210

Components (Continued on Page 156)

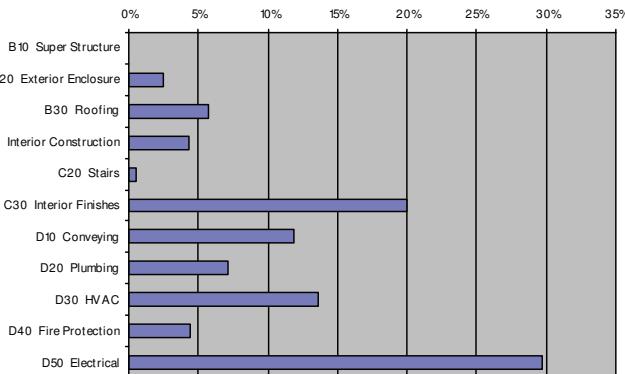
Uniform / Component	Quantity	Units
B10 Super Structure		
Steel Roof Access Ladder	26	Ln Ft
B20 Exterior Enclosure		
Stucco, Painted, Exterior, 1st Floor	7667	Sq Ft
Stucco, Painted, Exterior, 2nd Floor	7667	Sq Ft
Aluminum Fixed Window, 24 sf, 1st Floor	34	Each
Aluminum Fixed Window, 24 sf, 2nd Floor	34	Each
Steel, Painted, Exterior Double Door	3	Each
B30 Roofing		
Built-up Roof	10400	Sq Ft
Roof Skylight, 20 sf	7	Each
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	12	Each
Steel, Painted, Interior Door	4	Each
Steel, Painted, Interior Double Door	1	Each
Steel, Painted, w/ Safety Glass, Interior Door	2	Each
Wood, Solid Core, Painted, Interior Door	40	Each
Wood, Solid Core w/ Safety Glass, Painted, Interior Door	14	Each
C20 Stairs		
Metal, Painted, Exterior Railing	48	Ln Ft
Metal, Painted, Interior Railing	52	Ln Ft
Metal, Exterior Stairs	81	Sq Ft
Metal, Painted, Interior Stairs	104	Sq Ft
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	600	Sq Ft
Fabric, Interior Wall Finish	1800	Sq Ft
Sheetrock, Unstipped, Interior Wall Finish	31000	Sq Ft
Carpet, Nylon 20 oz., High Traffic	15900	Sq Ft
Ceramic Tile Flooring	1200	Sq Ft
Vinyl Tile Flooring	3600	Sq Ft
Acoustical Tile Ceiling	13700	Sq Ft
Concrete, Painted Ceiling	2900	Sq Ft
Gypsum Board, Finished Ceiling	4100	Sq Ft
D10 Conveying		
Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	1	Each
D20 Plumbing		
Drinking Fountain, Refrigerated	2	Each
Flush Tank Water Closet, One Piece	12	Each
Lavatory, Vitreous China	12	Each
Service Sink, Iron, Enamel	1	Each
Sink, Stainless Steel	6	Each
Urinal, Vitreous China	5	Each
Circulator Pump, 1/6 HP, Cold Water	1	Each
Circulator Pump, 1/6 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	1.355	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.605	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	1.195	K Ln Ft
Pipe & Fittings, 4" Steel	1	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	1.805	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.851	K Ln Ft
Water Flow Meter, 4"	1	Each
Water Heater, Electric, 52 Gal.	4	Each
Backflow Preventer, 4"	1	Each
Floor Drain	4	Each
Pipe & Fittings, 4" Cast Iron	0.754	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.204	K Ln Ft
Pipe & Fittings, 4" PVC	0.168	K Ln Ft
Roof Drain, 4-6"	4	Each
D30 HVAC		
Check Valve, 6"	1	Each
Pipe & Fittings, 2" Copper	0.2	K Ln Ft
Pipe & Fittings, 2" Steel	0.2	K Ln Ft
Duct Insulation, Fiberglass Blanket	4600	Sq Ft
Ductwork	3082	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	4	Each
Exhaust Fan, Propeller, 800 Cfm	2	Each
Air Conditioner, Rooftop, Single Zone, 25 Ton	2	Each
HVAC Control Panel	2	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	223	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	8	Each
D50 Electrical		
Motor Starter, 5-20 HP, <600 V	30	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	13	Each

Note: For alternative locations use the Local Indexes shown in Chapter 3.

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$1,156,436	\$1.12	0.48%
Unscheduled Maintenance	\$747,389	\$0.72	0.31%
Renewal & Replacement	\$3,470,701	\$3.35	1.44%
Total	\$5,374,526	\$5.19	2.23%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Carpet, Nylon 20 oz., High Traffic	27.83	12.4%
Maintain Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	16.36	7.3%
Refinish Sheetrock, Unstipped, Interior Wall Finish	14.62	6.5%
Replace Air Conditioner, Rooftop, Single Zone, 25 Ton	13.42	6.0%
Renovate Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	10.99	4.9%
Repair Air Conditioner, Rooftop, Single Zone, 25 Ton	9.64	4.3%
Inspect & Clean Motor Starter, 5-20 HP, <600 V	5.96	2.7%
Place New Membrane Over Existing, Built-up Roof	5.51	2.5%
Replace Coil, Motor Starter, 5-20 HP, <600 V	4.84	2.2%
Replace Membrane, Built-up Roof	4.77	2.1%
Maintain Power Panel Board, 208 Y/120 V, 200 Amp.	3.93	1.8%
Maintain Air Conditioner, Rooftop, Single Zone, 25 Ton	3.90	1.7%
Replace Power Panel Board, 208 Y/120 V, 200 Amp.	3.80	1.7%
Refinish Stucco, Painted, Exterior, 2nd Floor	3.14	1.4%
Replace Variable Frequency Drive, <600V	3.06	1.4%
Replace Primary Transformer, Dry, 500 kVA	2.64	1.2%
Refinish Gypsum Board, Finished Ceiling	2.62	1.2%
Replace Wood, Solid Core, Painted, Interior Door	2.33	1.0%
Replace Batteries & Check Operation, Smoke Detector	2.31	1.0%
Replace Wood, Solid Core, Painted, Interior Door Locks	2.29	1.0%
Maintain Fire Sprinkler System	2.29	1.0%
Replace Motor Starter, 5-20 HP, <600 V	2.28	1.0%
Refinish Stucco, Painted, Exterior, 1st Floor	2.12	0.9%
Test Gages & Valves, Fire Sprinkler System	2.11	0.9%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	2.06	0.9%
Replace Switchboard, 800 Amp.	1.94	0.9%
Maintain Public Address Speaker	1.92	0.9%
Refinish Concrete, Painted Ceiling	1.89	0.8%
Replace Fluorescent Lighting Fixture, 160 w	1.88	0.8%
Replace Receptacle, 120 V, 20 Amp.	1.87	0.8%

*Task cost (\$2009) per GSFT over 50 years.

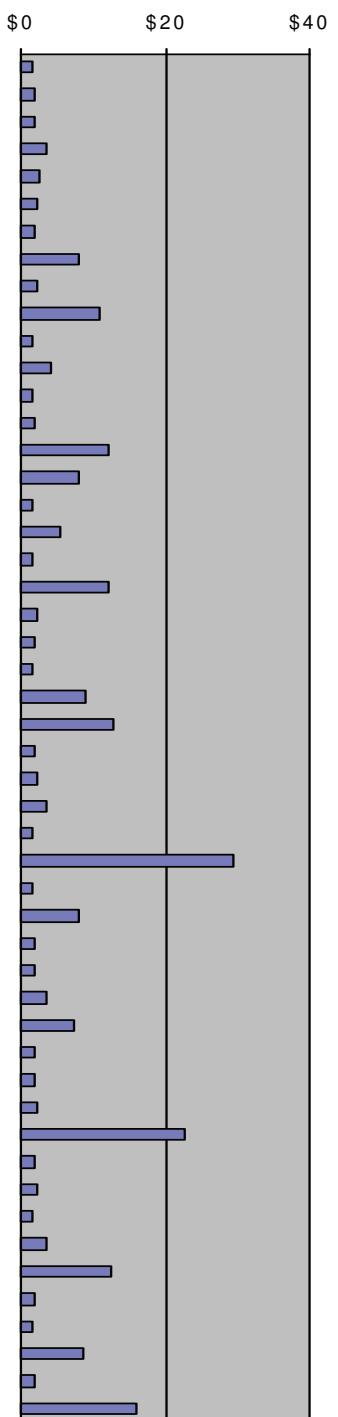
**Percent of total M&R costs.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1	.06				.42	.12	.21	.15	.73			1.68
2	.06			.09	.42	.23	.21	.15	.73			1.89
3	.06				.42	.14	.21	.15	1.08			2.05
4	.06	.08	.01	1.71	.42	.23	.21	.15	.73			3.59
5	.01	.10	.28		.42	.24	.23	.17	1.13			2.57
6	.20			.09	.42	.25	.21	.15	1.08			2.39
7	.06				.42	.23	.21	.15	.73			1.79
8	.06	.08	.01	6.26	.42	.26	.21	.15	.73			8.16
9	.06				.42	.14	.21	.15	1.08			2.09
10	1.11	.10	1.15	.00	.10	.42	.76	3.47	.77	2.85		10.73
11	.06				.42	.12	.21	.15	.73			1.68
12	.20	.08	.01	1.71	.42	.31	.21	.25	1.08			4.25
13	.06				.42	.12	.21	.15	.73			1.68
14	.06				.42	.34	.21	.15	.73			2.00
15	.06	2.85	.28	.20	.02	.42	.64	4.82	.30	2.56		12.16
16	.06	.08	.01	6.26	.42	.26	.21	.15	.73			8.16
17	.06				.42	.12	.21	.16	.73			1.70
18	.20				.56	.42	.25	.21	.15	3.70		5.47
19	.06				.42	.12	.21	.15	.73			1.68
20	1.19	.10	1.67	.01	1.81	.42	.96	.54	.76	4.86		12.31
21	.06					.42	.19	.21	.15	1.08		2.10
22	.06				.09	.42	.29	.21	.16	.73		1.96
23	.06					.42	.12	.21	.15	.76		1.71
24	.20	.08	.01	6.26	.42	.33	.21	.25	1.08			8.82
25	.24	.10	.28		.19	5.50	1.57	3.54	.15	1.38		12.95
26	.06				.09	.42	.23	.21	.15	.73		1.89
27	.06				.04	.42	.14	.21	.15	1.08		2.09
28	.06	.08	.01	1.71	.42	.29	.21	.15	.76			3.67
29	.06					.42	.17	.21	.16	.73		1.75
30	1.16	4.90	1.15	.29	.24	.42	1.15	5.36	.90	13.82		29.39
31	.06					.42	.12	.21	.15	.73		1.68
32	.06	.08	.01	6.26	.42	.26	.21	.15	.73			8.16
33	.06					.42	.14	.21	.15	1.11		2.08
34	.06				.09	.42	.23	.21	.16	.73		1.90
35	.01	.10	.28			.42	1.22	.23	.15	1.10		3.51
36	.20	.08	.01	2.17	.42	.24	.21	.25	3.70			7.27
37	.06					.42	.24	.21	.15	.73		1.81
38	.06				.09	.42	.16	.21	.15	.73		1.82
39	.06					.42	.21	.21	.15	1.08		2.12
40	1.19	.36	3.80	.01	6.35	.42	.97	3.74	.76	5.15		22.75
41	.06					.42	.19	.21	.16	.76		1.80
42	.06				.09	.42	.24	.21	.15	1.08		2.24
43	.06					.42	.19	.21	.15	.73		1.76
44	.06	.08	.01	1.71	.42	.22	.21	.15	.73			3.58
45	.06	2.85	.28	.20	.07	.42	.85	4.83	.30	2.53		12.40
46	.20				.09	.42	.16	.21	.16	.76		1.99
47	.06					.42	.19	.21	.15	.73		1.75
48	.06	.08	.01	6.26	.42	.26	.21	.25	1.08			8.62
49	.06					.42	.24	.21	.15	.73		1.81
50	1.34	.10	1.15	.75	1.42	5.50	1.93	.35	.99	2.54		16.07
Total	6.40	14.90	11.10	1.52	51.97	30.93	18.54	35.35	11.62	77.15		259.49

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

50-Year Total M&R Cost Profile per GSFT



Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Warehouse, Dry

Washington, D.C.

Warehouse, Dry

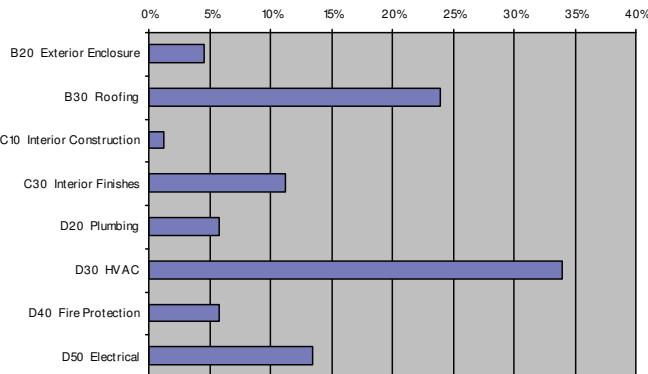
Gross Square Feet:	80,000
Height in Ft:	24
Exterior:	Concrete Block
Floor coverings:	Vinyl Tile, Carpet, Finished Concrete
HVAC:	Pkgd DX AC, Gas Boiler, Unit Heaters
Capacity:	N/A
Occupancy:	140
Replacement Cost:	\$8,306,188

Components

Uniform / Component	Quantity	Units
B20 Exterior Enclosure		
Concrete Block, Painted, Exterior, 1st Floor	13580	Sq Ft
Concrete Block, Painted, Exterior, 2nd Floor	12580	Sq Ft
Aluminum Fixed Window, 12 sf, 1st Floor	8	Each
Steel Single 12"x12", Painted, Roll-up Door	10	Each
Steel, Painted, Exterior Door	4	Each
B30 Roofing	80000	Sq Ft
Built-up Roof		
C10 Interior Construction		
Toilet Partitions, Painted Metal, Overhead Braced	8	Each
Steel, Painted, Interior Door	10	Each
Wood, Solid Core, Painted, Interior Door	20	Each
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	31360	Sq Ft
Sheetrock, Unstippled, Interior Wall Finish	6400	Sq Ft
Carpet, Nylon 20 oz., Low Traffic	6400	Sq Ft
Concrete, Painted Flooring	70600	Sq Ft
Vinyl Tile Flooring	3000	Sq Ft
Acoustical Tile, Dropped Ceiling	6400	Sq Ft
Sheetrock, Unstippled Ceiling	3000	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	6	Each
Lavatory, Vitreous China	10	Each
Service Sink, Iron, Enamel	3	Each
Tankless Water Closet	8	Each
Urinal, Vitreous China	4	Each
Circulator Pump, 1/6 HP, Cold Water	1	Each
Circulator Pump, 1/6 HP, Hot Water	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	2.1	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	1.1	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	2.7	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	2.7	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	2.1	K Ln Ft
Water Heater, Gas/Oil, 175 Gph	1	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	1.3	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.6	K Ln Ft
Pipe & Fittings, 4" PVC	1.2	K Ln Ft
Roof Drain, 4-6"	23	Each
D30 HVAC		
Pipe & Fittings, 4" Steel, Gas	2.4	K Ln Ft
Circulation Pump, 5 HP, Hot Water	2	Each
Expansion Tank, 100 Gal.	1	Each
Gas Boiler, 2,000 Mbh	3	Each
Duct Insulation, Fiberglass Blanket	1260	Sq Ft
Ductwork	1880	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	4	Each
Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	1	Each
Suspended Heater, Hot Water, 4,000 Cfm, 180 Mbh	30	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	840	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	40	Each
D50 Electrical		
Distribution Switch, Fused, <600 V	5	Each
Main Switchgear, <1,200 Amp.	1	Each
Motor Starter, 5-20 HP, <600 V	4	Each
Exit Lighting Fixture, w/ Battery	14	Each
Fluorescent Lighting Fixture, 160 w	600	Each
Receptacle, 120 V, 15 Amp.	250	Each
Wiring Device, Switch	63	Each
Fire Alarm Horn & Strobe	40	Each
Heat Detector	40	Each
Manual Pull Station	40	Each
Smoke Detector	160	Each

50-Year M&R Cost Summary			
Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$2,239,328	\$0.56	0.54%
Unscheduled Maintenance	\$1,763,283	\$0.44	0.42%
Renewal & Replacement	\$5,113,481	\$1.28	1.23%
Total	\$9,116,092	\$2.28	2.20%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Place New Membrane Over Existing, Built-up Roof	10.97	11.9%
Replace Membrane, Built-up Roof	9.50	10.3%
Maintain Suspended Heater, Hot Water, 4,000 Cfm, 180 Mbh	8.12	8.8%
Inspect & Test Gas Boiler, 2,000 Mbh	6.66	7.2%
Replace Suspended Heater, Hot Water, 4,000 Cfm, 180 Mbh	5.52	6.0%
Refinish Concrete Block, Painted, Interior Wall Finish	3.95	4.3%
Maintain Built-up Roof	3.04	3.3%
Refinish Concrete, Painted Flooring	2.93	3.2%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	2.88	3.1%
Replace Fluorescent Lighting Fixture, 160 w	2.64	2.9%
Replace Batteries & Check Operation, Smoke Detector	2.39	2.6%
Repaint (50% surface) Concrete Block, Painted, Interior Wall Finish	2.26	2.5%
Test Fire Sprinkler Head	1.78	1.9%
Replace Carpet, Nylon 20 oz., Low Traffic	1.45	1.6%
Refinish Concrete Block, Painted, Exterior, 2nd Floor	1.29	1.4%
Replace Gas Boiler, 2,000 Mbh	1.27	1.4%
Repair Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	1.13	1.2%
Repaint (50% surface) Concrete Block, Painted, Exterior, 2nd Floor	1.03	1.1%
Repair Gas Boiler, 2,000 Mbh	1.03	1.1%
Check Operation, Heat Detector	.99	1.1%
Repaint (50% surface) Concrete Block, Painted, Exterior, 1st Floor	.98	1.1%
Refinish Concrete Block, Painted, Exterior, 1st Floor	.92	1.0%
Replace Smoke Detector	.91	1.0%
Replace Fire Sprinkler Head	.84	0.9%
Refinish Sheetrock, Unstippled, Interior Wall Finish	.78	0.8%
Maintain Roof Drain, 4-6"	.71	0.8%
Inspect Fire Sprinkler Head	.66	0.7%
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	.65	0.7%
Maintain Fire Sprinkler System	.59	0.6%
Non-Destructive Moisture Inspection, Built-up Roof	.57	0.6%

*Task cost (\$2009) per GSFT over 50 years.

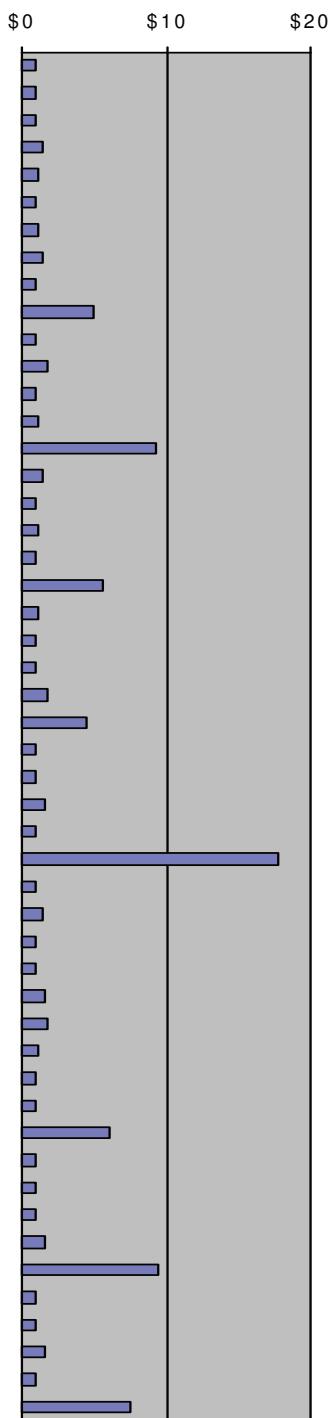
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	Interior Finishes	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13						.06	.58	.05	.14		.96
2		.13						.09	.59	.05	.14		.99
3		.13						.06	.58	.05	.15		.97
4		.13	.01	.44				.09	.59	.05	.14		1.44
5	.00	.19	.04	.01				.09	.59	.07	.17		1.16
6		.13						.09	.59	.05	.15		1.01
7		.13						.07	.75	.05	.14		1.14
8		.13	.01	.44				.09	.59	.05	.14		1.44
9		.13						.06	.58	.05	.15		.98
10		.56	.19	.15	.60			.25	1.14	.66	1.35		4.89
11		.13						.06	.58	.05	.14		.96
12		.13	.01	.44				.17	.60	.19	.15		1.69
13		.13						.06	.58	.05	.14		.96
14		.13						.10	.76	.05	.14		1.18
15		.01	5.67	.04	.64			.08	2.24	.09	.52		9.30
16		.13	.01	.44				.09	.59	.05	.14		1.44
17		.13						.07	.58	.07	.14		.98
18		.13			.10			.09	.59	.05	.17		1.13
19		.13						.06	.58	.05	.14		.96
20		.56	.19	.23	1.04			.30	.87	.64	1.75		5.58
21		.13						.07	.75	.05	.15		1.16
22		.13						.10	.59	.07	.14		1.02
23		.13						.06	.58	.05	.14		.96
24		.13	.01	.44				.17	.60	.19	.15		1.69
25		1.12	.19	.04	1.25			.62	.76	.05	.38		4.41
26		.13						.09	.59	.05	.14		.99
27		.13			.01			.06	.58	.05	.15		.98
28		.13	.01	.44				.10	.76	.05	.14		1.62
29		.13						.07	.58	.07	.14		.98
30		.56	9.50	.15	1.22			.32	3.71	.68	1.65		17.79
31		.13						.06	.58	.05	.14		.96
32		.13	.01	.44				.09	.59	.05	.14		1.44
33		.13						.06	.58	.05	.15		.97
34		.13						.10	.59	.07	.14		1.02
35		.30	.19	.04	.01			.31	.59	.05	.17		1.66
36		.13	.01	.53				.15	.60	.19	.17		1.79
37		.13						.08	.75	.05	.14		1.15
38		.13						.07	.59	.05	.14		.97
39		.13						.08	.58	.05	.15		.99
40		.46	.19	.44	1.04			.29	1.04	.64	1.96		6.07
41		.13						.09	.58	.07	.14		1.00
42		.13						.08	.59	.05	.15		1.00
43		.13						.08	.58	.05	.14		.98
44		.13	.01	.44				.07	.76	.05	.14		1.59
45		.11	5.67	.04	.64			.18	2.24	.09	.52		9.50
46		.13						.08	.59	.07	.14		1.00
47		.13						.08	.58	.05	.14		.97
48		.13	.01	.44				.15	.60	.19	.15		1.67
49		.13						.09	.58	.05	.14		.99
50		1.58	.19	.15	1.84			.70	1.02	.87	1.14		7.48
Total		5.26	27.33	1.39	12.84			6.56	38.68	6.57	15.32		113.95

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Warehouse, HAZMAT

Washington, D.C.

Warehouse, HAZMAT

Gross Square Feet:	3,680
Height in Ft:	24
Exterior:	Steel
Floor coverings:	Finished Concrete, Metal Grating
HVAC:	Evaporative Cooler, Unit Heaters
Capacity:	N/A
Occupancy:	6
Replacement Cost:	\$785,003

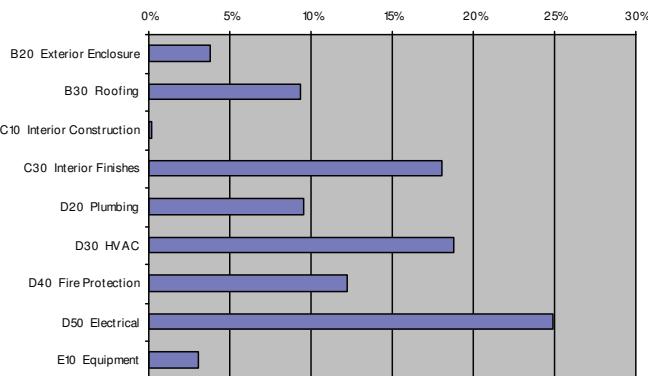
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Steel, Painted, Exterior, 1st Floor	5825	Sq Ft
Steel Single 12'x12', Painted, Roll-up Door	1	Each
Steel, Painted, Exterior Door	2	Each
B30 Roofing		
Single-Ply Thermoset Roof	3680	Sq Ft
Roof Skylight, 20 sf	3	Each
C10 Interior Construction		
Steel, Painted, Interior Door	1	Each
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	7505	Sq Ft
Gypsum Board, Interior Wall Finish	300	Sq Ft
Concrete, Painted Flooring	3680	Sq Ft
Metal Floor Grating	1070	Sq Ft
Gypsum Board, Finished Ceiling	75	Sq Ft
Metal, Painted Ceiling	3605	Sq Ft
D20 Plumbing		
Emergency Shower Station	1	Each
Lavatory, Vitreous China	2	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.3	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.15	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.1	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.4	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.15	K Ln Ft
Water Heater, Electric, 52 Gal.	1	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 4" Cast Iron	0.35	K Ln Ft
Pipe & Fittings, 6" Cast Iron	0.05	K Ln Ft
Pipe & Fittings, 4" PVC	0.096	K Ln Ft
Roof Drain, 4-6"	2	Each
Air Compressor, 2 HP	1	Each
D30 HVAC		
Evaporative Cooler, Direct, Packaged w/ Heat, 4 Ton	1	Each
Pipe & Fittings, 2" Copper	0.15	K Ln Ft
Duct Insulation, Fiberglass Blanket	1829	Sq Ft
Ductwork	2730	Lbs
Exhaust Fan, Propeller, 800 Cfm	3	Each
Exhaust Fan, Roof Mounted, 1,000 Cfm	3	Each
Unit Heater, 250 Mbh	2	Each
Thermostat	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	25	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	2	Each
D50 Electrical		
Circuit Breaker, 600 V, 70-100 Amp., 3 Ph.	1	Each
Circuit Breaker, 600 V, 125-400 Amp.	1	Each
Power Panel Board, 208 Y/120 V, 100 Amp.	2	Each
Secondary Transformer, Dry, 50 kVA	1	Each
Emergency Lighting Pack, 2 Light w/ Battery	4	Each
Exit Lighting Fixture, w/ Battery	2	Each
Fluorescent Lighting Fixture, 80 w	66	Each
Receptacle, 120 V, 15 Amp.	32	Each
Wiring Device, Switch	10	Each
Card Reader	1	Each
Fire Alarm Horn & Strobe	2	Each
Heat Detector	2	Each
Manual Pull Station	2	Each
Smoke Detector	8	Each
Generator, Diesel, 60 kw	1	Each
E10 Equipment		
Laboratory Exhaust Hood, 4'	2	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$305,643	\$1.66	0.78%
Unscheduled Maintenance	\$209,415	\$1.14	0.53%
Renewal & Replacement	\$750,307	\$4.08	1.91%
Total	\$1,265,365	\$6.88	3.22%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Replace Generator, Diesel, 60 kw	32.72	11.4%
Refinish Concrete Block, Painted, Interior Wall Finish	20.55	7.2%
Replace Membrane, Single-Ply Thermoset Roof	18.57	6.5%
Refinish Metal, Painted Ceiling	12.94	4.5%
Maintain Fire Sprinkler System	12.85	4.5%
Test Gages & Valves, Fire Sprinkler System	11.85	4.1%
Repoint (50% surface) Concrete Block, Painted, Interior Wall Finish	11.75	4.1%
Replace Evaporative Cooler, Direct, Packaged w/ Heat, 4 Ton	11.11	3.9%
Replace Metal Floor Grating	8.98	3.1%
Refinish Steel, Painted, Exterior, 1st Floor	7.89	2.8%
Maintain Exhaust Fan, Roof Mounted, 1,000 Cfm	5.93	2.1%
Maintain Exhaust Fan, Propeller, 800 Cfm	5.93	2.1%
Maintain Evaporative Cooler, Direct, Packaged w/ Heat, 4 Ton	5.87	2.0%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 80 w	5.76	2.0%
Replace Fluorescent Lighting Fixture, 80 w	5.40	1.9%
Replace Unit Heater, 250 Mbh	5.18	1.8%
Maintain Unit Heater, 250 Mbh	5.16	1.8%
Maintain Single-Ply Thermoset Roof	5.13	1.8%
Replace Laboratory Exhaust Hood, 4'	3.92	1.4%
Replace Air Compressor, 2 HP	3.55	1.2%
Maintain Power Panel Board, 208 Y/120 V, 100 Amp.	3.41	1.2%
Refinish Concrete, Painted Flooring	3.32	1.2%
Maintain Laboratory Exhaust Hood, 4'	3.27	1.1%
Replace Fire Alarm Control Panel	2.82	1.0%
Maintain Backflow Preventer, 2"	2.81	1.0%
Replace Batteries & Check Operation, Smoke Detector	2.59	0.9%
Repair Air Compressor, 2 HP	2.55	0.9%
Inspect & Test Fire Alarm Control Panel	2.31	0.8%
Replace Emergency Lighting Pack, 2 Light w/ Battery	2.28	0.8%
Replace Power Panel Board, 208 Y/120 V, 100 Amp.	2.27	0.8%

*Task cost (\$2009) per GSFT over 50 years.

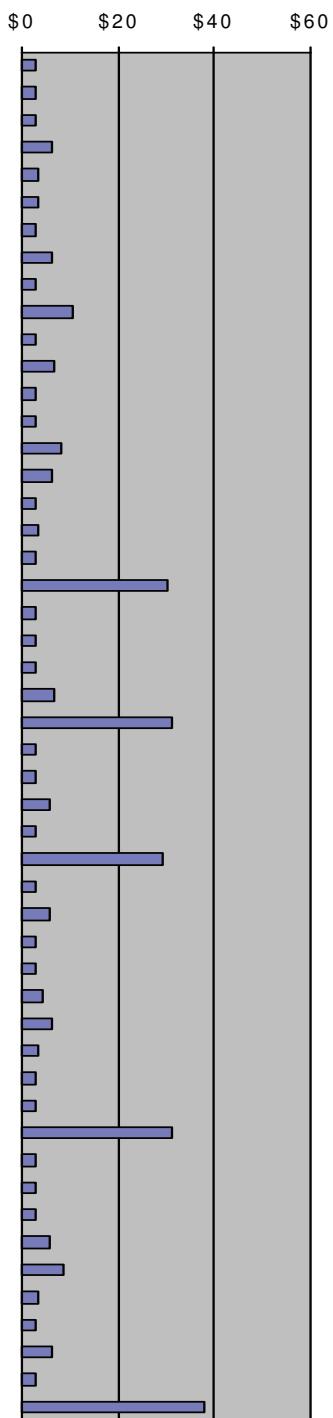
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.19					.34	.83	.73	.51	.14	2.74
2		.19					.40	.83	.73	.64	.14	2.94
3		.19					.40	.83	.73	.51	.14	2.80
4		.19	.01	2.88			.62	.83	.73	.64	.14	6.03
5	.05	.32	.03				.38	.83	.79	.68	.14	3.22
6		.51					.47	.83	.73	.64	.14	3.31
7		.19					.44	.83	.73	.51	.14	2.84
8		.19	.01	2.88			.62	.83	.73	.64	.14	6.03
9		.19					.40	.83	.73	.51	.14	2.80
10	2.01	.51	.11	.84			.83	1.65	1.17	3.48	.14	10.73
11		.19					.34	.83	.73	.51	.14	2.74
12		.51	.01	2.88			.75	.83	.88	.64	.14	6.63
13		.19					.34	.83	.73	.51	.14	2.74
14		.19					.51	.83	.73	.64	.14	3.04
15		.14	.32	.03	.18		.90	2.37	1.60	1.10	1.31	7.94
16		.19	.01	2.88			.62	.83	.73	.64	.14	6.03
17		.19					.34	.83	.75	.51	.14	2.76
18		.51					.47	.83	.73	.64	.14	3.31
19		.19					.34	.83	.73	.51	.14	2.74
20	2.01	9.29	.11	3.73			1.08	7.51	1.15	5.38	.14	30.39
21		.19					.43	.83	.73	.51	.14	2.82
22		.19					.48	.83	.75	.64	.14	3.04
23		.19					.34	.83	.73	.51	.14	2.74
24		.51	.01	2.88			.75	.83	.88	.64	.14	6.63
25	1.05	.32	.03	6.97			3.19	1.58	.77	17.29	.14	31.33
26		.19					.40	.83	.73	.64	.14	2.94
27		.19					.37	.83	.73	.51	.14	2.77
28		.19	.01	2.88			.46	.83	.73	.64	.14	5.87
29		.19					.64	.83	.75	.51	.14	3.05
30	2.10	.82	.11	9.82			1.43	4.78	1.98	7.04	1.31	29.40
31		.19					.37	.83	.73	.51	.14	2.77
32		.19	.01	2.88			.40	.83	.73	.64	.14	5.82
33		.19					.59	.83	.73	.51	.14	2.98
34		.19					.44	.83	.75	.64	.14	2.99
35	.70	.32	.03				.69	.85	.77	.68	.14	4.17
36		.51	.01	2.88			.44	.83	.88	.64	.14	6.32
37		.19					.73	.83	.73	.51	.14	3.12
38		.19					.34	.83	.73	.64	.14	2.87
39		.19					.44	.83	.73	.51	.14	2.83
40	1.81	9.92	.11	3.73			.83	7.81	1.15	5.68	.14	31.17
41		.19					.62	.83	.75	.51	.14	3.03
42		.19					.40	.83	.73	.64	.14	2.93
43		.19					.44	.83	.73	.51	.14	2.83
44		.19	.01	2.88			.42	.83	.73	.64	.14	5.84
45	.34	.32	.03	.18			1.32	2.41	1.60	1.10	1.31	8.60
46		.51					.37	.83	.75	.64	.14	3.24
47		.19					.40	.83	.73	.51	.14	2.80
48		.19	.01	2.88			.44	.83	.88	.64	.14	6.01
49		.19					.67	.83	.73	.51	.14	3.06
50	2.81	.51	.11	7.81			3.44	1.70	1.30	20.32	.14	38.13
Total	13.02	32.30	.73	62.04			32.87	64.57	42.17	85.73	10.42	343.85

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Warehouse, Self-storage

Washington, D.C.

Warehouse, Self-storage

Gross Square Feet:	24,000
Height in Ft:	12
Exterior:	Stucco
Floor coverings:	Unfinished Concrete, Linoleum
HVAC:	Window AC, Gas Boiler, Single Zone Air
Capacity:	N/A
Occupancy:	70
Replacement Cost:	\$2,760,552

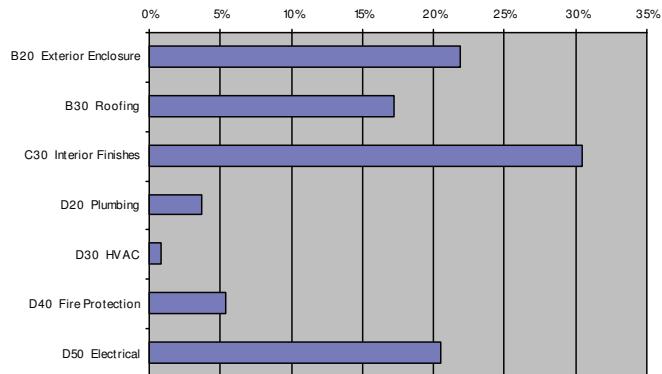
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Stucco, Painted, Exterior, 1st Floor	2980	Sq Ft
Aluminum Operable Window, 12 sf, 1st Floor	4	Each
Steel Single 12"x12", Painted, Roll-up Door	150	Each
Steel, Painted, Exterior Door	2	Each
B30 Roofing	24000	Sq Ft
Built-up Roof		
C30 Interior Finishes		
Concrete Block, Painted, Interior Wall Finish	65574	Sq Ft
Concrete Flooring	23424	Sq Ft
Linoleum Flooring	576	Sq Ft
Acoustical Tile, Dropped Ceiling	576	Sq Ft
Metal Ceiling	23424	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	1	Each
Flush Tank Water Closet, One Piece	1	Each
Lavatory, Vitreous China	1	Each
Service Sink, Iron, Enamel	2	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.21	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.1	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.512	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.21	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.1	K Ln Ft
Water Heater, Electric, 30 Gal.	1	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 6" Cast Iron	0.209	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.31	K Ln Ft
Pipe & Fittings, 4" PVC	0.192	K Ln Ft
Root Drain, 4-6"	8	Each
D30 HVAC		
Duct Insulation, Fiberglass Blanket	67	Sq Ft
Ductwork	100	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	1	Each
Air Conditioner, Window, 2 Ton	1	Each
Thermostat	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	151	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	4	Each
D50 Electrical		
Distribution Switch, Fused, <600 V	4	Each
Main Switchgear, <1,200 Amp.	1	Each
Motor Starter, 5-20 HP, <600 V	12	Each
Exit Lighting Fixture, w/ Battery	2	Each
Fluorescent Lighting Fixture, 160 w	152	Each
Receptacle, 120 V, 15 Amp.	156	Each
Wiring Device, Switch	152	Each
Fire Alarm Horn & Strobe	4	Each
Heat Detector	4	Each
Manual Pull Station	4	Each
Smoke Detector	151	Each

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$505,172	\$0.42	0.37%
Unscheduled Maintenance	\$371,082	\$0.31	0.27%
Renewal & Replacement	\$2,933,135	\$2.44	2.13%
Total	\$3,809,389	\$3.17	2.76%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Refinish Concrete Block, Painted, Interior Wall Finish	27.53	19.2%
Repoint (50% surface) Concrete Block, Painted, Interior Wall Finish	15.74	11.0%
Repair Steel Single 12"x12", Painted, Roll-up Door	15.60	10.9%
Replace Steel Single 12"x12", Painted, Roll-up Door	14.25	9.9%
Place New Membrane Over Existing, Built-up Roof	10.97	7.7%
Replace Membrane, Built-up Roof	9.50	6.6%
Replace Batteries & Check Operation, Smoke Detector	7.52	5.2%
Maintain Built-up Roof	3.04	2.1%
Repair Metal Ceiling (2% of Ceiling)	3.04	2.1%
Refinish Steel Single 12"x12", Painted, Roll-up Door	3.02	2.1%
Replace Smoke Detector	2.88	2.0%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	2.43	1.7%
Replace Fluorescent Lighting Fixture, 160 w	2.23	1.6%
Inspect & Clean Motor Starter, 5-20 HP, <600 V	2.06	1.4%
Maintain Fire Sprinkler System	1.97	1.4%
Test Gages & Valves, Fire Sprinkler System	1.82	1.3%
Replace Coil, Motor Starter, 5-20 HP, <600 V	1.67	1.2%
Repair Concrete Block, Painted, Interior Wall Finish (2% of Walls)	1.41	1.0%
Test Fire Sprinkler Head	1.07	0.7%
Repair Smoke Detector	1.05	0.7%
Repair Wiring Device, Switch	.86	0.6%
Maintain Roof Drain, 4-6"	.82	0.6%
Replace Motor Starter, 5-20 HP, <600 V	.79	0.6%
Finish Replaced Steel Single 12"x12", Painted, Roll-up Door	.76	0.5%
Refinish Stucco, Painted, Exterior, 1st Floor	.71	0.5%
Repair Main Switchgear, <1,200 Amp.	.68	0.5%
Non-Destructive Moisture Inspection, Built-up Roof	.57	0.4%
Replace Wiring Device, Switch	.55	0.4%
Replace Fire Sprinkler Head	.50	0.3%
Repair Concrete Flooring (2% of Floors)	.48	0.3%

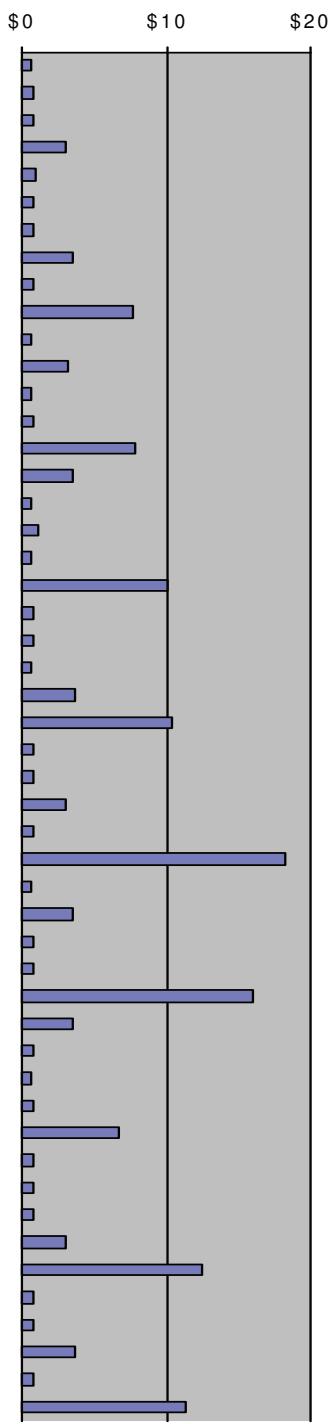
*Task cost (\$2009) per GSFT over 50 years.

**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Conveying Systems	Interior Finishes	HVAC Systems	Plumbing	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.13						.07	.02	.12	.37		.71
2		.13						.09	.02	.12	.37		.73
3		.13						.08	.02	.12	.50		.85
4		.13			2.29			.09	.02	.12	.37		3.02
5	.01	.19						.08	.02	.13	.46		.89
6		.13						.09	.02	.12	.50		.87
7		.13						.08	.02	.12	.37		.72
8		.13			2.80			.10	.02	.12	.37		3.54
9		.13						.08	.02	.12	.50		.85
10	4.83	.19						.20	.04	.49	1.95		7.69
11		.13						.07	.02	.12	.37		.71
12		.13			2.29			.12	.02	.17	.50		3.23
13		.13						.07	.02	.12	.37		.71
14		.13						.10	.02	.12	.37		.74
15	.03	5.67			.16			.13	.02	.25	1.50		7.77
16		.13			2.80			.10	.02	.12	.37		3.54
17		.13						.07	.02	.13	.37		.72
18		.13			.06			.09	.02	.12	.70		1.12
19		.13						.07	.02	.12	.37		.71
20	4.83	.19			2.29			.21	.13	.48	1.97		10.11
21		.13						.08	.02	.12	.50		.85
22		.13						.10	.02	.13	.37		.75
23		.13						.07	.02	.12	.37		.71
24		.13			2.80			.12	.02	.17	.50		3.74
25	.04	.19			8.62			.35	.02	.13	1.12		10.47
26		.13						.09	.02	.12	.37		.73
27		.13			.00			.08	.02	.12	.50		.85
28		.13			2.29			.09	.02	.12	.37		3.03
29		.13						.08	.02	.13	.37		.73
30	4.85	9.50			.16			.30	.05	.61	2.74		18.20
31		.13						.07	.02	.12	.37		.71
32		.13			2.80			.10	.02	.12	.37		3.54
33		.13						.08	.02	.12	.50		.85
34		.13						.09	.02	.13	.37		.74
35	15.01	.19						.21	.02	.13	.46		16.02
36		.13			2.35			.10	.02	.17	.70		3.47
37		.13						.09	.02	.12	.37		.73
38		.13						.08	.02	.12	.37		.72
39		.13						.09	.02	.12	.50		.86
40	.18	.19			2.80			.26	.13	.48	2.63		6.67
41		.13						.08	.02	.13	.37		.73
42		.13						.08	.02	.12	.50		.86
43		.13						.09	.02	.12	.37		.73
44		.13			2.29			.08	.02	.12	.37		3.02
45	4.68	5.67			.16			.19	.02	.25	1.50		12.48
46		.13						.08	.02	.13	.37		.72
47		.13						.08	.02	.12	.37		.73
48		.13			2.80			.10	.02	.17	.50		3.72
49		.13						.09	.02	.12	.37		.73
50	.21	.19			8.62			.43	.04	.62	1.29		11.40
Total	34.67	27.33			48.40			5.80	1.32	8.62	32.59		158.72

50-Year Total M&R Cost Profile per GSFT

A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Warehouse, Temperature Controlled

Washington, D.C.

Warehouse, Temperature Controlled

Gross Square Feet:	8,200
Height in Ft:	15
Exterior:	Steel
Floor coverings:	Finished Concrete, Vinyl Tile, Terrazzo
HVAC:	Electric Cool, Unit Heaters, Fan Coil Units
Capacity:	N/A
Occupancy:	14
Replacement Cost:	\$1,161,509

Components

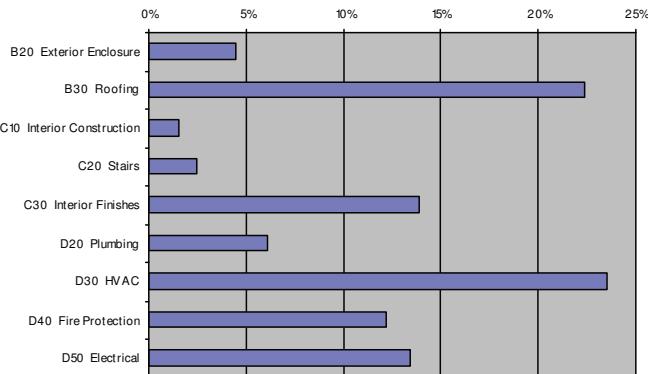
Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Steel, Painted, Exterior, 1st Floor	5430	Sq Ft
Steel Single 12'x12', Painted, Roll-up Door	1	Each
Steel Double 12'x24', Painted, Roll-up Door	2	Each
Steel w/ Safety Glass, Painted, Exterior Door	2	Each
B30 Roofing		
Aluminum Gutter, Downspouts, Fittings	0.21	K Ln Ft
Metal Roof	7800	Sq Ft
Single Unit Glass Skylight	400	Sq Ft
C10 Interior Construction		
Steel, Painted, Interior Door	2	Each
Wood, Hollow Core, Painted, Interior Door	2	Each
Wood, Solid Core w/ Safety Glass, Painted, Interior Door	3	Each
C20 Stairs		
Metal, Painted, Exterior Railing	70	Ln Ft
Metal, Exterior Stairs	100	Sq Ft
C30 Interior Finishes		
Gypsum Board, Interior Wall Finish	4000	Sq Ft
Plastic, Fiberglass Reinforced, Interior Wall Panels	4660	Sq Ft
Concrete, Painted Flooring	7280	Sq Ft
Terrazzo Flooring	220	Sq Ft
Vinyl Tile Flooring	700	Sq Ft
Acoustical Tile Ceiling	730	Sq Ft
Gypsum Board, Finished Ceiling	220	Sq Ft
Metal, Painted Ceiling	7250	Sq Ft
D20 Plumbing		
Drinking Fountain, Refrigerated	1	Each
Lavatory, Vitreous China	2	Each
Sink, Enamelled Steel	1	Each
Sink, Stainless Steel	1	Each
Tankless Water Closet	1	Each
Urinal, Vitreous China	1	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.4	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.2	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.2	K Ln Ft
Pipe & Fittings, 4" Copper, Cold Water	0.04	K Ln Ft
Pipe Insulation, Fiberglass, Cold Water	0.6	K Ln Ft
Pipe Insulation, Fiberglass, Hot Water	0.2	K Ln Ft
Water Heater, Electric, 52 Gal.	1	Each
Backflow Preventer, 2"	1	Each
Pipe & Fittings, 4" Cast Iron	0.29	K Ln Ft
Pipe & Fittings, 6" Cast Iron	0.05	K Ln Ft
D30 HVAC		
Pipe & Fittings, 2" Copper	0.08	K Ln Ft
Pipe & Fittings, 2" Steel	0.29	K Ln Ft
Pipe & Fittings, 3" Steel	0.33	K Ln Ft
Duct Insulation, Fiberglass Blanket	2850	Sq Ft
Ductwork	4070	Lbs
Exhaust Fan, Ceiling, 200-500 Cfm	1	Each
Exhaust Fan, Roof Mounted, 1,000 Cfm	4	Each
Air Conditioner, Rooftop, Single Zone, 5 Ton	1	Each
Air Conditioner, Window, 1 Ton	2	Each
Fan Coil, Two-Pipe, 400 Cfm	1	Each
Unit Heater, 36 Mbh	4	Each
Thermostat	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Sprinkler Head	65	Each
Fire Sprinkler System	1	Each
Fire Extinguisher	2	Each
D50 Electrical		
Circuit Breaker, 600 V, 30-60 Amp., 3 Ph.	9	Each
Circuit Breaker, 600 V, 70-100 Amp., 3 Ph.	1	Each
Circuit Breaker, 600 V, 125-400 Amp.	1	Each
Secondary Transformer, Dry, 50 kVA	1	Each
Emergency Lighting Pack, 2 Light w/ Battery	1	Each
Exit Lighting Fixture, w/ Battery	2	Each
Fluorescent Lighting Fixture, 80 w	62	Each
Receptacle, 120 V, 20 Amp.	22	Each
Wiring Device, Switch	20	Each
Fire Alarm Horn & Strobe	2	Each
Heat Detector	2	Each
Manual Pull Station	2	Each
Smoke Detector	8	Each

Warehouse, Temperature Controlled

50-Year M&R Cost Summary

Task Type	50 Year Total Cost	Annual Cost per GSFT	Annual Cost as % of Replacement
PM & Minor Repair	\$390,886	\$0.95	0.67%
Unscheduled Maintenance	\$277,592	\$0.68	0.48%
Renewal & Replacement	\$735,746	\$1.79	1.27%
Total	\$1,404,224	\$3.42	2.42%

Distribution of M&R Costs



Thirty Most Costly M&R Tasks

M&R Task	Task Cost*	Pct.**
Refinish Metal, Painted Ceiling	11.68	8.5%
Replace Metal Roof	10.01	7.3%
Maintain Metal Roof	7.88	5.7%
Repair Unit Glass Skylight Glazing	6.57	4.8%
Maintain Fire Sprinkler System	5.77	4.2%
Test Gages & Valves, Fire Sprinkler System	5.32	3.9%
Maintain Air Conditioner, Rooftop, Single Zone, 5 Ton	4.79	3.5%
Refinish Gypsum Board, Interior Wall Finish	4.76	3.5%
Maintain Unit Heater, 36 Mbh	4.63	3.4%
Replace Air Conditioner, Rooftop, Single Zone, 5 Ton	4.04	2.9%
Maintain Exhaust Fan, Roof Mounted, 1,000 Cfm	3.55	2.6%
Refinish Steel, Painted, Exterior, 1st Floor	3.30	2.4%
Refinish Concrete, Painted Flooring	2.95	2.1%
Maintain Circuit Breaker, 600 V, 30-60 Amp., 3 Ph.	2.75	2.0%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 80 w	2.43	1.8%
Replace Fluorescent Lighting Fixture, 80 w	2.28	1.7%
Maintain Air Conditioner, Window, 1 Ton	2.23	1.6%
Replace Metal, Exterior Stairs	2.12	1.5%
Repair Circuit Breaker, 600 V, 30-60 Amp., 3 Ph.	1.92	1.4%
Replace Unit Glass Skylight and Structure	1.89	1.4%
Replace Plastic, Fiberglass Reinforced, Interior Wall Panels	1.86	1.4%
Repair Metal Roof	1.77	1.3%
Repair Metal, Exterior Stairs	1.72	1.3%
Replace Unit Heater, 36 Mbh	1.65	1.2%
Test Fire Sprinkler Head	1.35	1.0%
Replace Fire Alarm Control Panel	1.27	0.9%
Maintain Backflow Preventer, 2"	1.26	0.9%
Replace Batteries & Check Operation, Smoke Detector	1.16	0.8%
Repair Air Conditioner, Rooftop, Single Zone, 5 Ton	1.12	0.8%
Replace Steel Double 12'x24', Painted, Roll-up Door	1.09	0.8%

*Task cost (\$2009) per GSFT over 50 years.

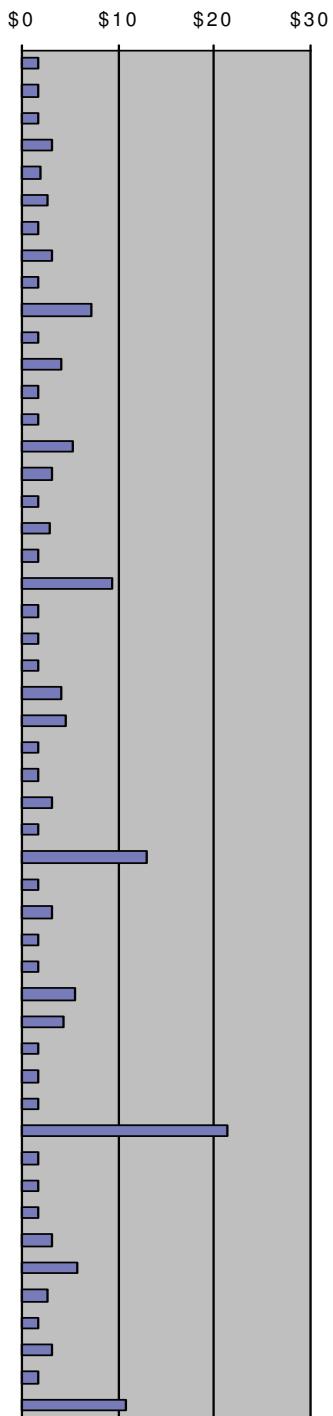
**Percent of total M&R costs.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

Cost per GSFT by System

Asset Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finishes	Conveying Systems	Plumbing	HVAC Systems	Fire Protection	Electrical	Equipment	Site Improvements	Total per GSFT
1		.36					.07	.59	.34	.22			1.58
2		.36					.14	.59	.34	.24			1.66
3		.36					.09	.59	.34	.22			1.59
4		.36	.02	1.40			.14	.59	.34	.24			3.08
5		.02	.56	.08			.10	.59	.36	.24			1.95
6		1.30					.16	.59	.34	.24			2.62
7		.36					.14	.59	.34	.22			1.64
8		.36	.02	1.40			.16	.59	.34	.24			3.10
9		.36			.01		.09	.59	.34	.22			1.60
10	1.08	.56	.33	.01	.63		.48	1.44	.81	1.88			7.21
11		.36					.07	.59	.34	.22			1.58
12		1.30	.02	1.40			.18	.61	.40	.24			4.15
13		.36					.07	.59	.34	.22			1.58
14		.36					.21	.59	.34	.24			1.73
15		.06	.56	.08	.59	.17	.32	2.35	.73	.46			5.31
16		.36	.02		1.40		.16	.59	.34	.24			3.10
17		.36					.07	.59	.35	.22			1.59
18		1.30			.21		.16	.59	.34	.24			2.83
19		.36					.07	.59	.34	.22			1.58
20	1.08	.89	.35	.01	2.06		.51	1.32	.80	2.45			9.48
21		.36					.12	.59	.34	.22			1.62
22		.36					.18	.59	.35	.24			1.71
23		.36					.07	.59	.34	.22			1.58
24		1.30	.02	1.40			.20	.61	.40	.24			4.16
25		.44	.56	.08	.48		.85	1.37	.35	.43			4.56
26		.36					.14	.59	.34	.24			1.66
27		.36			.01		.09	.59	.34	.22			1.60
28		.36	.02	1.40			.17	.59	.34	.24			3.11
29		.36					.11	.59	.35	.22			1.63
30	1.12	1.50	.37	.91	.79		.65	3.84	1.17	2.54			12.89
31		.36					.07	.59	.34	.22			1.58
32		.36	.01	1.40			.16	.59	.34	.24			3.09
33		.36					.09	.59	.34	.22			1.59
34		.36	.01				.14	.59	.35	.24			1.68
35		1.47	.56	.08	1.86		.48	.59	.35	.24			5.64
36		1.30	.01	1.61			.14	.61	.40	.24			4.32
37		.36					.15	.59	.34	.22			1.66
38		.36	.01				.10	.59	.34	.24			1.63
39		.36					.13	.59	.34	.22			1.64
40		.76	12.05	.65	.01	2.02	.43	1.99	.80	2.65			21.35
41		.36					.12	.59	.35	.22			1.63
42		.36	.01				.14	.59	.34	.24			1.67
43		.36					.12	.59	.34	.22			1.63
44		.36	.01	1.40			.14	.59	.34	.24			3.07
45		.38	.56	.08	.59	.21	.48	2.36	.73	.46			5.85
46		1.30	.01				.10	.59	.35	.24			2.58
47		.36					.12	.59	.34	.22			1.62
48		.36	.01	1.40			.15	.61	.40	.24			3.17
49		.36					.14	.59	.34	.22			1.65
50		1.18	.56	.34	2.13	1.07	1.09	.87	.97	2.51			10.71
Total		7.61	38.38	2.63	4.23	23.73	10.50	40.35	20.81	23.01			171.25

50-Year Total M&R Cost Profile per GSFT



A value of ".00" means a cost of more than \$.000 but less than \$.005 per GSFT.

Note: For alternative locations use the Local Indexes shown in Chapter 3.

2. M&R Cost Profiles

Washington, D.C.

Apartments, 1-3 Story (Continued from Page 10)

Uniformat / Component	Quantity	Units
D50 Electrical		
Manual Pull Station	10	Each
Heat Detector	2	Each
Security System Panel	1	Each
Smoke Detector	60	Each
Fire Alarm Horn & Strobe	10	Each
E10 Equipment		
Cooking Range, Domestic	42	Each
Refrigerator, Domestic	42	Each

Apartments, 4-7 Story (Continued from Page 12)

Uniformat / Component	Quantity	Units
D50 Electrical		
Smoke Detector	175	Each
Manual Pull Station	15	Each
Wiring Device, Switch	810	Each
Heat Detector	7	Each
Annunciation Panel	1	Each
TV Cable Outlet	81	Each
Security System Panel	1	Each
Fire Alarm Horn & Strobe	20	Each
E10 Equipment		
Cooking Range, Domestic	81	Each
Refrigerator, Domestic	81	Each

Apartments, 24 Story (Continued from Page 14)

Uniformat / Component	Quantity	Units
D50 Electrical		
Heat Detector	24	Each
Incandescent Lighting Fixture, Basic, 100 w	1650	Each
Main Switchgear, >1,200 Amp.	1	Each
Manual Pull Station	48	Each
Fluorescent Lighting Fixture, 160 w	50	Each
Wiring Device, Switch	1600	Each
Annunciation Panel	1	Each
Smoke Detector	630	Each
Power Panel Board, 208 Y/120 V, 400 Amp.	2	Each
Secondary Transformer, Dry, 150 kVA	15	Each
Security System Panel	1	Each
Fire Alarm Horn & Strobe	50	Each
Circuit Breaker, 600 V, 70-100 Amp., 3 Ph.	150	Each
Motor Starter, 21-50 HP, <600 V	8	Each
Distribution Switch, Fused, <600 V	32	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	4	Each
TV Cable Outlet	150	Each
Exit Lighting Fixture, w/ Battery	50	Each
Receptacle, 120 V, 15 Amp.	4360	Each
Primary Transformer, Dry, 750 kVA	1	Each
E10 Equipment		
Refrigerator, Domestic	150	Each
Cooking Range, Domestic	150	Each

Cafeteria (Continued from Page 22)

Uniformat / Component	Quantity	Units
D50 Electrical		
Smoke Detector	20	Each
Manual Pull Station	8	Each
E10 Equipment		
Walk-In Freezer/Cooler, Commercial	2	Each
Icemaker, Commercial	2	Each
Dishwasher, Commercial	2	Each
Refrigerator, Domestic	4	Each
Cooking Range, Commercial	2	Each

Central Plant, Steam (Continued from Page 30)

Uniformat / Component	Quantity	Units
D20 Plumbing		
Air Compressor, 500 HP, 2,000 Cfm	1	Each
Air Compressor, 700 HP, 3,000 Cfm	1	Each
D30 HVAC		
Exhaust Fan, Propeller, 1,000 Cfm	1	Each
Fuel Oil Pump, 5 HP	2	Each
Oil Storage Tank, 75,000 Gal.	1	Each
Ductwork	9920	Lbs
Circulation Pump, 75 HP, Hot Water	6	Each
Oil Storage Tank, Fiberglass, 500 Gal.	1	Each
Circulation Pump, 5 HP, Hot Water	2	Each
Oil Storage Tank, 250,000 Gal.	1	Each
Exhaust Fan, Roof Mounted, 2,000 Cfm	5	Each
Air Conditioner, Window, 1 Ton	7	Each
Air Conditioner, Window, 2 Ton	1	Each
Circulation Pump, 10 HP, Hot Water	5	Each
Heater Electric, Convector, 12,000 Watt	6	Each
Duct Insulation, Fiberglass Blanket	6645	Sq Ft
Expansion Tank, 400 Gal.	1	Each
Gas Boiler, Steam, 100,000 Lb/hr, 2,898 HP, 150 PSI	2	Each
Gas Boiler, Steam, 55,000 Lb/hr, 1,594 HP, 150 PSI	1	Each
Gas Boiler, Steam, 50,000 Lb/hr, 1,449 HP, 150 PSI	3	Each
Heat Exchanger, Water-to-Water, 40 Gpm	1	Each
Circulation Pump, 150 HP, Hot Water	1	Each
Condensing Heat Exchanger, Gas/Oil, 20 Mbh	1	Each
Exhaust Fan, Roof Mounted, 5,000 Cfm	7	Each
Oil Storage Tank, 275 Gal.	1	Each
Steam Turbine 1,000 kw	2	Each
D40 Fire Protection		
Fire Sprinkler System	2	Each
Fire Sprinkler Head	299	Each
Fire Alarm Control Panel	1	Each
D50 Electrical		
Circuit Breaker, Main, 240 V, 15-60 Amp., 3 Ph.	21	Each
Secondary Transformer, Dry, 50 kVA	3	Each
Power Panel Board, 208 Y/120 V, 100 Amp.	1	Each
Secondary Transformer, Dry, 10 kVA	1	Each
Safety Switch, Fused, 400 Amp., 3 Ph.	4	Each
Disconnect Switch, 60 Amp.	8	Each
Circuit Breaker, Main, 600 V, 800 Amp., 3 Ph.	13	Each
Receptacle, 120 V, 20 Amp.	198	Each
Generator, Diesel, 500 kw	2	Each
Disconnect Switch, 30 Amp.	27	Each
Fluorescent Lighting Fixture, 80 w	180	Each
Transfer Switch, Auto, 600 V, 400 Amp.	2	Each
Disconnect Switch, 200 Amp.	2	Each
Switchgear, Indoor, <600 V	1	Each
Disconnect Switch, 100 Amp.	3	Each
Wiring Device, Switch	82	Each
Motor Control Center	14	Each
Manual Pull Station	16	Each
Emergency Lighting Pack, 2 Light w/ Battery	13	Each
Smoke Detector	8	Each
Generator Switchgear	1	Each
High Pressure Sodium Lighting Fixture, 250 w	8	Each
Incandescent Lighting Fixture, Basic, 100 w	20	Each

College Dormitory, 50 Room (Continued from Page 38)

Uniformat / Component	Quantity	Units
D50 Electrical		
Manual Pull Station	10	Each
Heat Detector	10	Each
Smoke Detector	60	Each
E10 Equipment		
Microwave Oven	1	Each
Cooking Range, Domestic	1	Each
Refrigerator, Domestic	1	Each

College Student Union (Continued from Page 42)

Uniformat / Component	Quantity	Units
E10 Equipment		
Walk-In Freezer/Cooler, Commercial	1	Each
Microwave Oven	1	Each
Icemaker, Commercial	1	Each

2. M&R Cost Profiles

Washington, D.C.

Kitchen Exhaust Hood, Commercial

1 Each

D50 Electrical			
Emergency Lighting Pack, 2 Light w/ Battery	5	Each	
Wiring Device, Switch	80	Each	
Receptacle, 120 V, 15 Amp.	210	Each	
Incandescent Lighting Fixture, Basic, 100 w	3	Each	
Manual Pull Station	8	Each	
Variable Frequency Drive, <600 V	2	Each	
Fluorescent Lighting Fixture, 80 w	140	Each	
Transfer Switch, Auto, 600 V, 1,600 Amp.	4	Each	
Power Panel Board, 480 V, 1,000 Amp.	20	Each	
Heat Detector	8	Each	
Public Address Speaker	4	Each	
Power Panel Board, 480 V, 4,000 Amp.	8	Each	
Primary Transformer, Dry, 3,500 kVA	4	Each	
Secondary Transformer, Dry, 300 kVA	20	Each	
Fluorescent Lighting Fixture, 160 w	20	Each	
Exit Lighting Fixture, w/ Battery	5	Each	
Metal Halide Lighting Fixture, Wall Mount, 150 w	4	Each	
Generator, Diesel, 1,000 kw	3	Each	
Fire Alarm Horn & Strobe	18	Each	
Card Reader	3	Each	
Uninterruptible Power Supply, 750 KVA	10	Each	
D40 Fire Protection			
Kitchen Fire Suppression System (CO2)			1 Each
Fire Standpipe System			1 Each
Fire Suppression System Water Pump, 10 HP			5 Each
Fire Alarm Control Panel			1 Each
Fire Extinguisher			200 Each
Fire Sprinkler System			1 Each
Fire Sprinkler Head			5035 Each
D50 Electrical			
Incandescent Lighting Fixture, Basic, 100 w			250 Each
Power Panel Board, 208 Y/120 V, 200 Amp.			352 Each
Wiring Device, Switch			1300 Each
Motor Control Center			8 Each
Main Switchgear, >1,200 Amp.			1 Each
Receptacle, 120 V, 15 Amp.			12900 Each
Transfer Switch, Auto, 600 V, 400 Amp.			8 Each
Transfer Switch, Auto, 600 V, 800 Amp.			7 Each
Exit Lighting Fixture, w/ Battery			80 Each
Main Switchgear, <1,200 Amp.			1 Each
High Pressure Sodium Lighting Fixture, 250 w			385 Each
Fluorescent Lighting Fixture, 160 w			4266 Each
Secondary Transformer, Dry, 150 kVA			63 Each
Manual Pull Station			200 Each
Smoke Detector			1000 Each
Generator, Diesel, 30 kw			2 Each
Time Control Clock			149 Each
Generator, Diesel, 1,000 kw			3 Each
Heat Detector			200 Each
Fire Alarm Horn & Strobe			200 Each
Annunciation Panel			1 Each
E10 Equipment			
Mortuary Unit Cooler			1 Each
Laboratory Exhaust Hood, 4'			404 Each
Kitchen Exhaust Hood, Commercial			2 Each
Coffee Brewer, 5 Burners			1 Each
Refrigerator, Domestic			5 Each
Dust Collection System			1 Each
Medical Gas Outlet			2245 Each
Dishwasher, Commercial			1 Each
Cooking Range, Commercial			2 Each
Icemaker, Commercial			1 Each
Anesthesia Vacuum Pump, <16 HP			2 Each
Microwave Oven			5 Each
Medical Gas Compressor/Dryer			5 Each
Walk-In Freezer/Cooler, Commercial			6 Each

Data Center, Tier III

(Continued from Page 48)

Uniformat / Component

Quantity

Units

D50 Electrical		
Emergency Lighting Pack, 2 Light w/ Battery	5	Each
Wiring Device, Switch	80	Each
Receptacle, 120 V, 15 Amp.	210	Each
Incandescent Lighting Fixture, Basic, 100 w	3	Each
Manual Pull Station	8	Each
Variable Frequency Drive, <600 V	2	Each
Fluorescent Lighting Fixture, 80 w	140	Each
Transfer Switch, Auto, 600 V, 1,600 Amp.	4	Each
Power Panel Board, 480 V, 1,000 Amp.	20	Each
Heat Detector	8	Each
Public Address Speaker	4	Each
Power Panel Board, 480 V, 4,000 Amp.	8	Each
Primary Transformer, Dry, 3,500 kVA	4	Each
Secondary Transformer, Dry, 300 kVA	20	Each
Fluorescent Lighting Fixture, 160 w	20	Each
Exit Lighting Fixture, w/ Battery	5	Each
Metal Halide Lighting Fixture, Wall Mount, 150 w	4	Each
Generator, Diesel, 1,000 kw	3	Each
Fire Alarm Horn & Strobe	18	Each
Card Reader	3	Each
Uninterruptible Power Supply, 750 KVA	10	Each

Elementary School

(Continued from Page 56)

Uniformat / Component

Quantity

Units

E10 Equipment		
Microwave Oven	2	Each
Refrigerator, Domestic	2	Each

Hospital, General

(Continued from Page 70)

Uniformat / Component

Quantity

Units

D50 Electrical		
Smoke Detector	500	Each
Annunciation Panel	1	Each
Wiring Device, Switch	700	Each
Receptacle, 120 V, 15 Amp.	1000	Each
Primary Transformer, Dry, 750 kVA	1	Each
Incandescent Lighting Fixture, Basic, 100 w	75	Each
Fluorescent Lighting Fixture, 160 w	2344	Each
Manual Pull Station	100	Each
Heat Detector	100	Each
Fire Alarm Horn & Strobe	100	Each
Public Address Speaker	1	Each
Main Switchgear, >1,200 Amp.	1	Each
Distribution Switch, Fused, <600 V	16	Each
Motor Starter, 21-50 HP, <600 V	9	Each
Motor Starter, 51-75 HP, <600 V	2	Each
Exit Lighting Fixture, w/ Battery	50	Each
Secondary Transformer, Dry, 150 kVA	8	Each
E10 Equipment		

Dishwasher, Commercial	1	Each
Icemaker, Commercial	1	Each
Refrigerator, Domestic	3	Each
Cooking Range, Commercial	2	Each
Walk-In Freezer/Cooler, Commercial	2	Each
Coffee Brewer, 5 Burners	1	Each
Microwave Oven	3	Each
Kitchen Exhaust Hood, Commercial	2	Each
Trash Compactor, 600 lbs	1	Each

Hospital, Research

(Continued from Page 72)

Uniformat / Component

Quantity

Units

D30 HVAC		
Circulation Pump, 150 HP, Hot Water	2	Each
Air Handler, Single Zone, 150,000 Cfm	1	Each

D30 HVAC		
HVAC Control Panel		
Supply Fan, Roof Mounted, 5,000 Cfm	24	Each
Fan, Axial Flow, 5,000 Cfm	23	Each
Exhaust Fan, Roof Mounted, 5,000 Cfm	9	Each
Exhaust Fan, Roof Mounted, 10,000 Cfm	3	Each
Supply Fan, Roof Mounted, 10,000 Cfm	3	Each
D40 Fire Protection		
Fire Alarm Control Panel		
Fire Standpipe System	23	Each

Jail, County

(Continued from Page 74)

Uniformat / Component

Quantity

Units

D30 HVAC		
HVAC Control Panel		
Supply Fan, Roof Mounted, 5,000 Cfm	24	Each
Fan, Axial Flow, 5,000 Cfm	23	Each
Exhaust Fan, Roof Mounted, 5,000 Cfm	9	Each
Exhaust Fan, Roof Mounted, 10,000 Cfm	3	Each
Supply Fan, Roof Mounted, 10,000 Cfm	3	Each
D40 Fire Protection		
Fire Alarm Control Panel		
Fire Standpipe System	1	Each

2. M&R Cost Profiles

Washington, D.C.

Fire Suppression System Water Pump, 10 HP	2	Each	Circulation Pump, 5 HP, Chiller & Condenser Water	1	Each
Fire Sprinkler Head	3500	Each	Unit Heater, 250 Mbh	1	Each
Fire Sprinkler System	1	Each	Direct Digital Controls, System Points	72	Each
Fire Extinguisher	100	Each	Flow Control Valve, Motorized, 4"	6	Each
Kitchen Fire Suppression System (CO2)	1	Each	Fan Coil Unit, 1 Ton	2	Each
D50 Electrical			Heat Exchanger, Water-to-Water, 380 Gpm	1	Each
Wiring Device, Switch	2000	Each	Circulation Pump, 15 HP, Chiller & Condenser Water	2	Each
Generator, Diesel, 1,000 kw	2	Each	Air Separator, 8"	3	Each
Receptacle, 120 V, 15 Amp.	1109	Each	Unit Heater, 85 Mbh	1	Each
Annunciation Panel	1	Each	Exhaust Fan, Roof Mounted, 1,000 Cfm	22	Each
Smoke Detector	911	Each	Check Valve, 3-4"	6	Each
Fire Alarm Horn & Strobe	125	Each	Flow Control Valve, Motorized, 6"	3	Each
Heat Detector	125	Each	Cooling Tower, 250 Ton	1	Each
Fluorescent Lighting Fixture, 160 w	2891	Each	Pipe & Fittings, 4" Steel	0.62	K Ln Ft
Primary Transformer, Dry, 750 kVA	1	Each	Flow Control Valve, Motorized, 2"	6	Each
Metal Halide Lighting Fixture, Low Bay, 250 w	75	Each	D40 Fire Protection		
Secondary Transformer, Dry, 150 kVA	4	Each	Fire Sprinkler Head	180	Each
Manual Pull Station	32	Each	Fire Alarm Control Panel	1	Each
Main Switchgear, <1,200 Amp.	5	Each	Fire Sprinkler System	1	Each
Exit Lighting Fixture, w/ Battery	80	Each	Fire Extinguisher	10	Each
Emergency Horn & Strobe	125	Each	D50 Electrical		
E10 Equipment			Disconnect Switch, 100 Amp.	1	Each
Microwave Oven	3	Each	Disconnect Switch, 60 Amp.	4	Each
Walk-In Freezer/Cooler, Commercial	2	Each	Generator, Diesel, 125 kw	1	Each
Icemaker, Commercial	2	Each	Circuit Breaker, 600 V, 30-60 Amp., 3Ph.	2	Each
Refrigerator, Domestic	5	Each	Camera, Security System	11	Each
Detention Doors & Hardware	831	Each	Secondary Transformer, Dry, 30 kVA	1	Each
Dishwasher, Commercial	2	Each	Disconnect Switch, 30 Amp.	9	Each
Cooking Range, Commercial	2	Each	Secondary Transformer, Dry, 15 kVA	1	Each
Kitchen Exhaust Hood, Commercial	2	Each	Fluorescent Lighting Fixture, 80 w	175	Each

Laboratory, Agricultural

(Continued from Page 76)

Uniformat / Component	Quantity	Units	Uniformat / Component	Quantity	Units
D20 Plumbing			D20 Plumbing		
Pipe & Fittings, 4" PVC	0.15	K Ln Ft	Pipe & Fittings, 4" PVC	0.204	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.1	K Ln Ft	Compressed Air Dryer	1	Each
Pipe & Fittings, 4" PVC	0.204	K Ln Ft	Reverse Osmosis/Deionized Water System	2	Each
Roof Drain, 4-6"	14	Each	Roof Drain, 4-6"	14	Each
Pipe & Fittings, 2" PVC	0.25	K Ln Ft	Pipe & Fittings, 6" Cast Iron	0.25	K Ln Ft
Pipe & Fittings, 6" Cast Iron	0.25	K Ln Ft	Sump Pump, 1 HP	2	Each
Sump Pump, 1 HP	2	Each	Air Compressor, 10 HP	2	Each
Air Compressor, 10 HP	2	Each	D30 HVAC		
Variable Air Volume Control Box	40	Each	Expansion Tank, 10 Gal.	2	Each
Expansion Tank, 400 Gal.	1	Each	Metal Flue, Stainless Steel, 18"	0.1	K Ln Ft
Metal Flue, Stainless Steel, 18"	0.1	K Ln Ft	Ductwork	22150	Lbs
Ductwork	22150	Lbs	Exhaust Fan, Roof Mounted, 800 Cfm	9	Each
Air Handler, Exhaust, 20,000 Cfm	1	Each	Air Handler, Exhaust, 20,000 Cfm	1	Each
Chemical Feed System	1	Each	Valve, Non-Drain, 8"	10	Each
Valve, Non-Drain, 8"	10	Each	Steel Damper, Motorized	35	Each
Steel Damper, Motorized	35	Each	Gate Valve, 10"	2	Each
Gate Valve, 10"	2	Each	Air Handler, Multizone, 40,000 Cfm	1	Each
Air Handler, Multizone, 40,000 Cfm	1	Each	Valve, Non-Drain, 2"	30	Each
Valve, Non-Drain, 2"	30	Each	Gate Valve, 6"	6	Each
Gate Valve, 6"	6	Each	Valve, Non-Drain, 4"	18	Each
Gas Boiler, 4,200 Mbh	2	Each	Gas Boiler, 4,200 Mbh	2	Each
Circulation Pump, 5 HP, Hot Water	2	Each	Circulation Pump, 5 HP, Hot Water	2	Each
Gate Valve, 4"	4	Each	Gate Valve, 4"	4	Each
Duct Insulation, Fiberglass Blanket	17035	Sq Ft	Valve, Non-Drain, 10"	4	Each
Valve, Non-Drain, 10"	4	Each	Exhaust Fan, Roof Mounted, 2,000 Cfm	2	Each
Exhaust Fan, Roof Mounted, 2,000 Cfm	2	Each	Heat Exchanger, Water-to-Water, 40 Gpm	2	Each
Heat Exchanger, Water-to-Water, 40 Gpm	2	Each	Gate Valve, 2-3"	5	Each
Gate Valve, 2-3"	5	Each	Expansion Tank, 175 Gal.	1	Each
Pressure Reducer Valve, 2"	5	Each	Pressure Reducer Valve, 2"	5	Each
Pipe & Fittings, 1" Copper	0.1	K Ln Ft	Air Handler, Multizone, 20,000 Cfm	1	Each
Air Handler, Multizone, 20,000 Cfm	1	Each	Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 200 Ton	1	Each
Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 200 Ton	1	Each	Pipe Insulation, Fiberglass, Chilled Water	1.35	K Ln Ft
Pipe Insulation, Fiberglass, Chilled Water	1.35	K Ln Ft	Pipe & Fittings, 10" Steel	0.15	K Ln Ft
Pipe & Fittings, 10" Steel	0.15	K Ln Ft	HVAC Control Panel	1	Each
HVAC Control Panel	1	Each	Air Separator, 4"	1	Each
Air Separator, 4"	1	Each	Pipe Insulation, Fiberglass, Heating Water/Steam	1.6	K Ln Ft
Pipe Insulation, Fiberglass, Heating Water/Steam	1.6	K Ln Ft	Unit Heater, 36 Mbh	1	Each
Unit Heater, 36 Mbh	1	Each	Pipe & Fittings, 3" Steel	1.15	K Ln Ft
Pipe & Fittings, 3" Steel	1.15	K Ln Ft	Pipe & Fittings, 6" Steel	0.45	K Ln Ft
Pipe & Fittings, 6" Steel	0.45	K Ln Ft	Pipe & Fittings, 8" Steel	0.3	K Ln Ft
Pipe & Fittings, 8" Steel	0.3	K Ln Ft	Pipe & Fittings, 2" Steel	0.75	K Ln Ft
Pipe & Fittings, 2" Steel	0.75	K Ln Ft	Flow Control Valve, Motorized, 1"	12	Each
Flow Control Valve, Motorized, 1"	12	Each	Check Valve, 6"	2	Each
Check Valve, 6"	2	Each	Flow Control Valve, Motorized, 10"	2	Each
Flow Control Valve, Motorized, 10"	2	Each	Secondary Coil, 36" x 36"	1	Each
Secondary Coil, 36" x 36"	1	Each	Circulation Pump, 10 HP, Hot Water	4	Each
Circulation Pump, 10 HP, Hot Water	4	Each	D30 HVAC		
D40 Fire Protection			Exhaust Fan, Roof Mounted, 800 Cfm	10	Each
Fire Extinguisher	10	Each	Exhaust Fan, Roof Mounted, 2,000 Cfm	2	Each
Fire Sprinkler Head	230	Each	Supply Fan, Roof Mounted, 10,000 Cfm	1	Each
Fire Sprinkler System	1	Each	Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	3	Each
Fire Alarm Control Panel	1	Each	HVAC Control Panel	1	Each
D50 Electrical			Direct Digital Controls, System Points	220	Each
Light Dimming Panel	15	Each	D40 Fire Protection		
Secondary Transformer, Dry, 50 kVA	2	Each	Fire Extinguisher	10	Each
Heat Detector	10	Each	Fire Sprinkler Head	230	Each

Laboratory, Electronics

(Continued from Page 78)

Uniformat / Component	Quantity	Units
D30 HVAC		
Exhaust Fan, Roof Mounted, 800 Cfm	10	Each
Exhaust Fan, Roof Mounted, 2,000 Cfm	2	Each
Supply Fan, Roof Mounted, 10,000 Cfm	1	Each
Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	3	Each
HVAC Control Panel	1	Each
Direct Digital Controls, System Points	220	Each
D40 Fire Protection		
Fire Extinguisher	10	Each
Fire Sprinkler Head	230	Each
Fire Sprinkler System	1	Each
Fire Alarm Control Panel	1	Each
D50 Electrical		
Light Dimming Panel	15	Each
Secondary Transformer, Dry, 50 kVA	2	Each
Heat Detector	10	Each

2. M&R Cost Profiles

Washington, D.C.

Cable, Copper, 1 Gauge	1200	Ln Ft
Fluorescent Lighting Fixture, 80 w	620	Each
Smoke Detector	60	Each
Receptacle, 120 V, 20 Amp.	770	Each
Card Reader	19	Each
Metal Halide Lighting Fixture, Wall Mount, 150 w	65	Each
Public Address Speaker	70	Each
Exit Lighting Fixture, w/ Battery	10	Each
Manual Pull Station	10	Each
Metal Halide Lighting Fixture, Low Bay, 250 w	15	Each
Wiring Device, Switch	160	Each
Circuit Breaker, Main, 240 V, 15-60 Amp., 3 Ph.	535	Each
Secondary Transformer, Dry, 500 kVA	1	Each
Power Panel Board, 208 Y/120 V, 100 Amp.	22	Each
Circuit Breaker, 600 V, 30-60 Amp., 3Ph.	30	Each
Fire Alarm Horn & Strobe	10	Each
Bur Duct & Fittings, AL, 800-4,000 Amp.	190	Ln Ft
Circuit Breaker, Main, 600 V, 800 Amp., 3 Ph.	1	Each
Circuit Breaker, 600 V, 125-400 Amp.	18	Each
Generator, Diesel, 500 kw	1	Each
Circuit Breaker, 600 V, 70-100 Amp., 3 Ph.	1	Each
Circuit Breaker, Main, MV, 600 V, 1,600 Amp.	2	Each
E10 Equipment		
Refrigerator, Domestic	1	Each
Microwave Oven	1	Each

Laboratory, General

(Continued from Page 80)

Unformat / Component	Quantity	Units
D30 HVAC		
Baseboard Radiator 10 ft.	4	Each
Air Conditioner, Computer Room, Chilled Water, 10 Ton	1	Each
Fan Coil Unit, 5 Ton	5	Each
Unit Heater, 36 Mbh	1	Each
Secondary Coil, 36" x 36"	2	Each
Finned Radiator	38	Each
Exhaust Fan, Roof Mounted, 800 Cfm	3	Each
Direct Digital Controls, System Points	81	Each
Unit Heater, 85 Mbh	4	Each
Fan Coil, Two-Pipe, 400 Cfm	5	Each
Air Conditioner, Rooftop, Single Zone, 5 Ton	2	Each
Exhaust Fan, Roof Mounted, 1,000 Cfm	5	Each
HVAC Control Panel	1	Each
Steel Damper, Motorized	2	Each
Exhaust Fan, Propeller, 4,700 Cfm	5	Each
Exhaust Fan, Centrifugal, 2,000 Cfm	3	Each
Exhaust Fan, Propeller, 1,000 Cfm	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Extinguisher	20	Each
Fire Sprinkler Head	180	Each
Fire Sprinkler System	1	Each
D50 Electrical		
Circuit Breaker, Main, 600 V, 1,200 Amp., 1 Ph.	2	Each
Receptacle, 120 V, 15 Amp.	420	Each
Wiring Device, Switch	105	Each
Secondary Transformer, Dry, 150 kVA	7	Each
Secondary Transformer, Dry, 50 kVA	9	Each
Switchgear, Indoor, 600 V	1	Each
Motor Control Center	2	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	55	Each
Primary Transformer, Oil Filled, 750 kVA	1	Each
Smoke Detector	100	Each
Circuit Breaker, 600 V, 125-400 Amp.	20	Each
Annunciation Panel	1	Each
Transfer Switch, HV, Auto, 600 V	2	Each
Secondary Transformer, Dry, 15 kVA	7	Each
Main Switchgear, MV, >1,200 Amp.	2	Each
Circuit Breaker, 600 V, 30-60 Amp., 3Ph.	6	Each
Secondary Transformer, Dry, 500 kVA	1	Each
Variable Frequency Drive, <600 V	2	Each
Heat Detector	10	Each
Circuit Breaker, Main, MV, 600 V, 1,600 Amp.	5	Each
Circuit Breaker, 600 V, 70-100 Amp., 3 Ph.	4	Each
Public Address Speaker	6	Each
Metal Halide Lighting Fixture, Wall Mount, 150 w	8	Each
Fire Alarm Horn & Strobe	35	Each
Exit Lighting Fixture, w/ Battery	7	Each
Manual Pull Station	20	Each
Card Reader	6	Each
Emergency Lighting Pack, 2 Light w/ Battery	13	Each
Fluorescent Lighting Fixture, 160 w	42	Each
Incandescent Lighting Fixture, Basic, 100 w	5	Each
Fluorescent Lighting Fixture, 80 w	288	Each
E10 Equipment		
Microwave Oven	1	Each
Refrigerator, Domestic	1	Each

Laboratory, Life Science

(Continued from Page 82)

Unformat / Component	Quantity	Units
D30 HVAC		
Exhaust Fan, Roof Mounted, 5,000 Cfm	1	Each
Variable Air Volume Control Box	15	Each
Steel Damper, Motorized	90	Each
Exhaust Fan, Centrifugal, 16,000 Cfm	4	Each
Unit Heater, 36 Mbh	10	Each
Direct Digital Controls, System Points	75	Each
Secondary Coil, 24" x 24"	4	Each
Secondary Coil, 12" x 24"	26	Each
Exhaust Fan, Roof Mounted, 800 Cfm	2	Each
HVAC Control Panel	1	Each
D40 Fire Protection		
Fire Alarm Control Panel	1	Each
Fire Extinguisher	10	Each
Fire Sprinkler Head	180	Each
Fire Sprinkler System	1	Each
D50 Electrical		
Receptacle, 208 V, 3 phase	7	Each
Disconnect Switch, 30 Amp.	24	Each
Receptacle, 120 V, 20 Amp.	515	Each
Heat Detector	16	Each
Uninterruptible Power Supply, 8.0 kVA	3	Each
Disconnect Switch, 60 Amp.	1	Each
Generator, Diesel, 500 kw	1	Each
Main Switchgear, MV, >1,200 Amp.	1	Each
Grounded Fault Circuit Interrupter, 15 Amp.	11	Each
Secondary Transformer, Dry, 75 kVA	1	Each
Security Control Panel	1	Each
Secondary Transformer, Dry, 112-1/2 kVA	1	Each
Power Panel Board, 208 Y/120 V, 200 Amp.	34	Each
Power Panel Board, 480 V, 400 Amp.	7	Each
Emergency Lighting Pack, 2 Light w/ Battery	20	Each
Fluorescent Lighting Fixture, 160 w	290	Each
Wiring Device, Switch	115	Each
Smoke Detector	40	Each
Manual Pull Station	16	Each
Incandescent Lighting Fixture, Basic, 100 w	8	Each
Exit Lighting Fixture, w/ Battery	10	Each
Card Reader	11	Each
Secondary Transformer, Dry, 150 kVA	1	Each
Fire Alarm Horn & Strobe	20	Each
Intercom Speaker	11	Each
Security System Panel	5	Each
Secondary Transformer, Dry, 225 kVA	1	Each
Magnetic Lock	11	Each
Variable Frequency Drive, <600 V	8	Each
Power Supply, Closed Circuit	6	Each
Fluorescent Lighting Fixture, 80 w	100	Each
E10 Equipment		
Vacuum Pump, 10 HP	1	Each
Microwave Oven	1	Each
Laboratory Exhaust Hood, 6'	3	Each
Laboratory Exhaust Hood, 4'	15	Each
Walk-In Freezer/Cooler, Commercial	3	Each
Refrigerator, Domestic	1	Each

Maintenance Shop

(Continued from Page 86)

Unformat / Component	Quantity	Units
D50 Electrical		
Metal Halide Lighting Fixture, Wall Mount, 150 w	1	Each
Wiring Device, Switch	32	Each
Incandescent Lighting Fixture, Basic, 100 w	4	Each
Smoke Detector	20	Each
Manual Pull Station	4	Each
Fire Alarm Horn & Strobe	4	Each
Receptacle, 120 V, 15 Amp.	80	Each
Heat Detector	4	Each
E10 Equipment		
Refrigerator, Domestic	1	Each
Microwave Oven	1	Each

Manufacturing Plant, Machinery

(Continued from Page 90)

Unformat / Component	Quantity	Units
D40 Fire Protection		

2. M&R Cost Profiles

Washington, D.C.

Fire Extinguisher	60	Each
Fire Sprinkler System	1	Each
Fire Sprinkler Head	2500	Each
D50 Electrical		
Fire Alarm Horn & Strobe	60	Each
Secondary Transformer, Dry, 30 kVA	6	Each
Secondary Transformer, Dry, 15 kVA	10	Each
Manual Pull Station	60	Each
Receptacle, 120 V, 15 Amp.	2770	Each
Circuit Breaker, 600 V, 30-60 Amp., 3Ph.	48	Each
Smoke Detector	200	Each
Receptacle, 208 V, 3 phase	12	Each
Generator, Diesel, 500 kw	2	Each
Metal Halide Lighting Fixture, High Bay, 400 w	1600	Each
Emergency Lighting Pack, 2 Light w/ Battery	24	Each
Motor Starter, 5-20 HP, <600 V	6	Each
Exit Lighting Fixture, w/ Battery	24	Each
Public Address Speaker	45	Each
Bus Duct & Fittings, CU, 800-4,000 Amp.	5000	Ln Ft
Heat Detector	60	Each
Power Panel Board, 208 Y/120 V, 100 Amp.	120	Each
Main Switchgear, 480 V, 800 Amp.	12	Each
Motor Starter, 21-50 HP, >600 V	8	Each
Wiring Device, Switch	625	Each
Fluorescent Lighting Fixture, 80 w	132	Each
Circuit Breaker, Main, 600 V, 1,200 Amp., 1 Ph.	5	Each
Primary Transformer, Oil Filled, 500 kVA	8	Each
Secondary Transformer, Dry, 50 kVA	6	Each
Circuit Breaker, 600 V, 70-100 Amp., 3 Ph.	12	Each
E10 Equipment		
Refrigerator, Domestic	2	Each
Microwave Oven	2	Each

Manufacturing Plant, Process

(Continued from Page 92)

Uniformat / Component	Quantity	Units
D30 HVAC		
Air Conditioner, Window, 2 Ton	2	Each
Secondary Coil, 30" x 72"	2	Each
HVAC Control Panel	1	Each
Unit Heater, 12 Mbh	1	Each
Unit Heater, 36 Mbh	1	Each
D40 Fire Protection		
Fire Sprinkler System	1	Each
Fire Alarm Control Panel	2	Each
Fire Sprinkler Head	395	Each
Fire Extinguisher	20	Each
D50 Electrical		
Fluorescent Lighting Fixture, 80 w	176	Each
Exit Lighting Fixture, w/ Battery	10	Each
Motor Starter, 5-20 HP, <600 V	2	Each
Generator, Diesel, 500 kw	1	Each
Fire Alarm Horn & Strobe	20	Each
Public Address Speaker	15	Each
Power Panel Board, 208 Y/120 V, 400 Amp.	7	Each
Secondary Transformer, Dry, 50 kVA	1	Each
Light Dimming Panel	6	Each
Secondary Transformer, Dry, 15 kVA	2	Each
Emergency Lighting Pack, 2 Light w/ Battery	10	Each
Manual Pull Station	20	Each
Incandescent Lighting Fixture, Basic, 100 w	11	Each
Heat Detector	20	Each
Receptacle, 120 V, 20 Amp.	505	Each
Motor Starter, 21-50 HP, <600 V	1	Each
Fluorescent Lighting Fixture, 160 w	67	Each
Circuit Breaker, 600 V, 30-60 Amp., 3Ph.	14	Each
Smoke Detector	100	Each
Wiring Device, Switch	170	Each
Circuit Breaker, 600 V, 70-100 Amp., 3 Ph.	3	Each
Receptacle, 208 V, 3 phase	10	Each
E10 Equipment		
Refrigerator, Domestic	1	Each
Microwave Oven	1	Each

Motel, 40 Units

(Continued from Page 100)

Uniformat / Component	Quantity	Units
E10 Equipment		
Refrigerator, Domestic	1	Each

Office Building, 2 Story

(Continued from Page 106)

Uniformat / Component	Quantity	Units
D50 Electrical		
Manual Pull Station	40	Each
Fire Alarm Horn & Strobe	40	Each
Fluorescent Lighting Fixture, 160 w	1167	Each
Incandescent Lighting Fixture, Basic, 100 w	130	Each
Smoke Detector	170	Each
Receptacle, 120 V, 15 Amp.	1660	Each
Wiring Device, Switch	664	Each
Heat Detector	40	Each
E10 Equipment		
Microwave Oven	4	Each
Refrigerator, Domestic	4	Each

Office Building, 15 Story

(Continued from Page 108)

Uniformat / Component	Quantity	Units
D50 Electrical		
Annunciation Panel	1	Each
Exit Lighting Fixture, w/ Battery	38	Each
Manual Pull Station	80	Each
Fluorescent Lighting Fixture, 160 w	3906	Each
Receptacle, 120 V, 15 Amp.	3125	Each
Wiring Device, Switch	1250	Each
Smoke Detector	500	Each
Primary Transformer, Dry, 750 kVA	1	Each
Heat Detector	80	Each
Motor Starter, 51-75 HP, <600 V	9	Each
Motor Starter, 21-50 HP, <600 V	2	Each
Fire Alarm Horn & Strobe	80	Each
Secondary Transformer, Dry, 150 kVA	16	Each
E10 Equipment		
Microwave Oven	15	Each
Refrigerator, Domestic	15	Each

Public Library, 3 Story

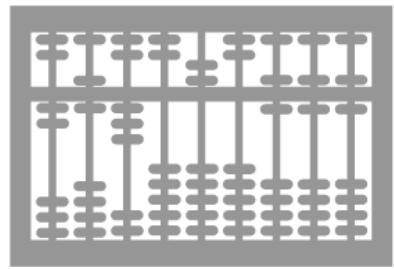
(Continued from Page 116)

Uniformat / Component	Quantity	Units
D50 Electrical		
Manual Pull Station	30	Each
Smoke Detector	120	Each
Fire Alarm Horn & Strobe	30	Each
Heat Detector	30	Each

Visitor Center

(Continued from Page 142)

Uniformat / Component	Quantity	Units
D50 Electrical		
Manual Pull Station	8	Each
Fluorescent Lighting Fixture, 80 w	102	Each
Receptacle, 120 V, 20 Amp.	221	Each
Light Dimming Panel	1	Each
Metal Halide Lighting Fixture, Wall Mount, 150 w	7	Each
Public Address Speaker	20	Each
Exit Lighting Fixture, w/ Battery	11	Each
Secondary Transformer, Dry, 50 kVA	3	Each
Security Control Panel	2	Each
Secondary Transformer, Dry, 150 kVA	2	Each
Fluorescent Lighting Fixture, 160 w	111	Each
Fire Alarm Horn & Strobe	8	Each
Incandescent Lighting Fixture, Basic, 100 w	145	Each
Smoke Detector	40	Each
Transfer Switch, Auto, 600 V, 400 Amp.	1	Each
Variable Frequency Drive, <600 V	2	Each
Wiring Device, Switch	60	Each
Heat Detector	8	Each
Switchboard, 800 Amp.	2	Each
Primary Transformer, Dry, 500 kVA	1	Each
Card Reader	2	Each



Chapter 3

Local M&R Costs

Local Maintenance
Cost Indexes

In-House Shop Rates

Contract Labor Rates

3. Local M&R Costs

The statistics in this chapter focus on local maintenance costs for 234 major U.S. and Canadian areas. Three types of measures are presented:

Section 3.1: Local maintenance cost indexes measure M&R costs across areas.

Section 3.2: In-house shop rates for trades and supervisory positions common to facility staff.

Section 3.3: Contract labor rates for trades common in M&R construction.

The local maintenance cost index is based on the M&R costs of the 2 Story Office Building (shown in Chapter 2) standardized to the Washington, D.C. area. The range of the index is considerable, as Table 3-1 indicates. Costs in New York, NY are an estimated 26% higher than those in Washington, D.C. for the same asset. In the other direction, M&R costs in San Juan, PR are an estimated 32% lower than the Washington, D.C. value. This index can be used for simple comparisons among areas, and also used to adjust the cost profiles in Chapter 2 for areas other than Washington, D.C.

Table 3-1
Comparison of M&R Costs by Area

Area	Local Maintenance Cost Index*	Area	Local Maintenance Cost Index*	Area	Local Maintenance Cost Index*	Area	Local Maintenance Cost Index*
New York, NY	126.1	Scranton, PA	96.9	Lincoln, NE	88.9	Amarillo, TX	82.6
Yonkers, NY	126.1	Santa Barbara, CA	96.8	Denver, CO	88.9	Tampa, FL	82.3
San Francisco, CA	124.8	Eugene, OR	96.7	Great Falls, MT	88.7	Tuscaloosa, AL	82.0
Trenton, NJ	124.6	Indianapolis, IN	96.7	Manchester, NH	88.6	Oklahoma City, OK	82.0
New Brunswick, NJ	124.6	Evansville, IN	96.6	Omaha, NE	88.6	Little Rock, AR	81.9
Philadelphia, PA	117.3	Bakersfield, CA	96.5	Syracuse, NY	88.5	Bowling Green, KY	81.9
Atlantic City, NJ	117.1	Worcester, MA	96.2	Watertown, NY	88.5	Macon, GA	81.9
Camden, NJ	117.0	Cincinnati, OH	96.2	Billings, MT	88.3	Tulsa, OK	81.9
Jersey City, NJ	116.5	Terre Haute, IN	96.2	Beaumont, TX	88.3	Montgomery, AL	81.7
Morristown, NJ	116.5	Springfield, MA	96.0	Fort Lauderdale, FL	88.0	Fort Worth, TX	81.6
Newark, NJ	116.5	Charleston, WV	95.9	Atlanta, GA	87.8	Beaufort, SC	81.3
Chicago, IL	116.5	Olympia, WA	95.8	Huntsville, AL	87.8	Charleston, SC	81.3
San Jose, CA	111.3	Akron, OH	95.7	Shreveport, LA	87.7	Dallas, TX	81.2
Springfield, IL	111.2	Dayton, OH	95.6	Lawton, OK	87.3	Cheyenne, WY	81.2
Oakland, CA	110.9	Jefferson City, MO	95.5	Baton Rouge, LA	87.3	Columbia, SC	81.0
Ann Arbor, MI	110.4	Saginaw, MI	95.5	Albuquerque, NM	87.2	Knoxville, TN	81.0
Flint, MI	109.8	Salem, OR	95.3	Lewiston, ME	87.1	Orlando, FL	80.9
Kokomo, IN	108.7	Oxnard, CA	95.3	Phoenix, AZ	86.8	Charlotte, NC	80.3
Hilo, HI	108.1	Annapolis, MD	95.2	Boise, ID	86.7	Springfield, MO	80.3
Honolulu, HI	108.1	Rochester, MN	95.2	Houston, TX	86.4	Raleigh-Durham, NC	80.2
Minneapolis, MN	107.1	Baltimore, MD	95.1	Waco, TX	86.4	Roanoke, VA	80.1
St. Paul, MN	107.1	Parkersburg, WV	95.0	Frankfort, KY	85.9	Fort Smith, AR	79.5
Peoria, IL	107.1	Moline, IL	95.0	Lexington, KY	85.9	Fayetteville, AR	79.5
Detroit, MI	107.1	Anacortes, WA	95.0	Chattanooga, TN	85.8	Fargo, ND	79.4
St. Louis, MO	106.9	Eau Claire, WI	95.0	Newport News, VA	85.7	Tallahassee, FL	78.8
Rockford, IL	106.7	Buffalo, NY	94.7	Hampton, VA	85.7	Daytona Beach, FL	78.7
Boston, MA	105.6	Stockton, CA	94.6	Colorado Springs, CO	85.6	Nashville, TN	78.6
Springfield, OH	105.3	Brockton, MA	94.4	Norfolk, VA	85.6	Las Cruces, NM	78.4
Gary, IN	104.5	San Diego, CA	94.0	Virginia Beach, VA	85.6	Sioux Falls, SD	78.3
Juneau, AK	103.7	Reno, NV	93.9	Jacksonville, FL	85.5	Greensboro, NC	78.3
Waterbury, CT	103.5	Harrisburg, PA	93.8	Biloxi, MS	85.4	Pierre, SD	77.9
Kansas City, MO	103.4	Lowell, MA	93.6	Miami, FL	85.3	Rapid City, SD	77.9
Las Vegas, NV	103.4	Fall River, MA	93.5	Richmond, VA	85.1	Bismarck, ND	77.7
Danbury, CT	103.2	Des Moines, IA	93.3	Utica, NY	85.0	Winston-Salem, NC	77.5
Milwaukee, WI	102.6	Boulder, CO	93.2	Memphis, TN	85.0	Columbus, GA	77.3
Cleveland, OH	102.6	Green Bay, WI	93.0	Corpus Christi, TX	84.7	Alamogordo, NM	76.4
Stamford, CT	102.5	Davenport, IA	93.0	Spokane, WA	84.5	El Paso, TX	75.9
New Haven, CT	102.5	Pueblo, CO	93.0	Burlington, VT	84.5	Lubbock, TX	75.2
Norwalk, CT	102.5	Topeka, KS	92.8	Montpelier, VT	84.5	Hagatna, GU	74.8
Anchorage, AK	102.1	Albany, NY	92.8	Sioux City, IA	84.4	San Juan, PR	68.4
Fairbanks, AK	102.1	Providence, RI	92.7	Rutland, VT	84.3		
Seattle, WA	101.9	Columbus, OH	92.6	Tucson, AZ	84.3	Canadian Cities+	
Portland, OR	101.8	Fresno, CA	92.6	Owensboro, KY	84.3		
Norwich, CT	101.5	Rochester, NY	92.4	Altus, OK	84.1	Toronto, ON	87.8
Washington, D.C.	100.0	Muncie, IN	92.2	Pocatello, ID	84.0	Calgary, AB	86.7
Lansing, MI	99.6	Helena, MT	91.9	Austin, TX	84.0	Ottawa, ON	86.7
Wilmington, DE	99.4	Battle Creek, MI	91.8	St. George, UT	83.9	Hamilton, ON	86.6
Pittsburgh, PA	99.3	Kalamazoo, MI	91.8	Jackson, MS	83.9	London, ON	86.6
Marquette, MI	99.2	South Bend, IN	91.7	Birmingham, AL	83.9	Vancouver, BC	86.2
Hartford, CT	98.9	Grand Rapids, MI	91.6	Key West, FL	83.9	Edmonton, AB	85.2
Madison, WI	98.8	Concord, NH	91.5	Mobile, AL	83.8	Victoria, BC	85.1
Los Angeles, CA	98.5	Toledo, OH	91.4	Portland, ME	83.7	Montreal, QC	83.0
Anaheim, CA	98.4	Cumberland, MD	91.0	Sante Fe, NM	83.6	Regina, SK	80.7
Richland, WA	98.3	Dover, DE	91.0	Ogden, UT	83.5	Quebec City, QC	80.4
Youngstown, OH	98.2	Riverside, CA	90.9	Salt Lake City, UT	83.5	Halifax, NS	78.2
Carson City, NV	98.2	Medford, OR	90.9	Wichita, KS	83.4	St. John's, NL	76.4
Tacoma, WA	98.0	Cedar Rapids, IA	90.9	Augusta, ME	83.3	Winnipeg, MB	75.6
Duluth, MN	97.4	New Orleans, LA	90.4	Wichita Falls, TX	83.2		
Sacramento, CA	97.3	Erie, PA	90.4	San Antonio, TX	82.9		
Reading, PA	97.2	Louisville, KY	89.9	Savannah, GA	82.7		

*Total average cost, Washington D.C.=100

+Adjusted using 3/13/09 exchange rate from Reuters.com

3.1 Local Maintenance Cost Indexes, Selected Areas

Area	Cost per GSFT *	Local Index	234 Area Ranking	Area	Cost per GSFT *	Local Index	234 Area Ranking
Akron, OH				Ann Arbor, MI			
PM & Minor Repair	\$.60	94.8	69	PM & Minor Repair	\$.74	115.5	15
Unscheduled Maintenance	\$.45	92.8	62	Unscheduled Maintenance	\$.56	116.3	15
Renewal & Replacement	\$1.93	96.6	79	Renewal & Replacement	\$2.14	107.3	19
Total Average Cost	\$2.98	95.7	73	Total Average Cost	\$3.44	110.4	16
Alamogordo, NM				Annapolis, MD			
PM & Minor Repair	\$.45	70.6	219	PM & Minor Repair	\$.56	87.7	113
Unscheduled Maintenance	\$.30	62.6	214	Unscheduled Maintenance	\$.41	84.7	110
Renewal & Replacement	\$1.63	81.5	228	Renewal & Replacement	\$2.00	100.1	49
Total Average Cost	\$2.38	76.4	229	Total Average Cost	\$2.97	95.2	79
Albany, NY				Atlanta, GA			
PM & Minor Repair	\$.57	89.4	103	PM & Minor Repair	\$.52	81.2	147
Unscheduled Maintenance	\$.41	84.4	113	Unscheduled Maintenance	\$.37	76.9	142
Renewal & Replacement	\$1.91	95.8	89	Renewal & Replacement	\$1.85	92.6	127
Total Average Cost	\$2.89	92.8	100	Total Average Cost	\$2.74	87.8	131
Albuquerque, NM				Atlantic City, NJ			
PM & Minor Repair	\$.56	87.2	118	PM & Minor Repair	\$.75	118.2	13
Unscheduled Maintenance	\$.40	82.4	120	Unscheduled Maintenance	\$.59	121.9	13
Renewal & Replacement	\$1.77	88.4	173	Renewal & Replacement	\$2.31	115.7	4
Total Average Cost	\$2.72	87.2	137	Total Average Cost	\$3.65	117.1	7
Altus, OK				Augusta, ME			
PM & Minor Repair	\$.50	78.4	170	PM & Minor Repair	\$.51	79.6	156
Unscheduled Maintenance	\$.35	73.1	166	Unscheduled Maintenance	\$.35	73.8	159
Renewal & Replacement	\$1.77	88.5	171	Renewal & Replacement	\$1.73	86.8	198
Total Average Cost	\$2.62	84.1	172	Total Average Cost	\$2.60	83.3	185
Amarillo, TX				Austin, TX			
PM & Minor Repair	\$.51	79.3	160	PM & Minor Repair	\$.48	75.3	193
Unscheduled Maintenance	\$.36	74.0	156	Unscheduled Maintenance	\$.32	66.5	207
Renewal & Replacement	\$1.71	85.7	209	Renewal & Replacement	\$1.82	91.0	151
Total Average Cost	\$2.57	82.6	190	Total Average Cost	\$2.62	84.0	174
Anacortes, WA				Bakersfield, CA			
PM & Minor Repair	\$.64	100.7	42	PM & Minor Repair	\$.62	96.6	59
Unscheduled Maintenance	\$.48	100.0	41	Unscheduled Maintenance	\$.45	94.4	54
Renewal & Replacement	\$1.84	91.9	134	Renewal & Replacement	\$1.94	96.9	77
Total Average Cost	\$2.96	95.0	84	Total Average Cost	\$3.01	96.5	66
Anaheim, CA				Baltimore, MD			
PM & Minor Repair	\$.64	99.8	44	PM & Minor Repair	\$.56	87.7	114
Unscheduled Maintenance	\$.47	98.7	46	Unscheduled Maintenance	\$.41	84.7	111
Renewal & Replacement	\$1.96	98.0	69	Renewal & Replacement	\$2.00	100.0	51
Total Average Cost	\$3.07	98.4	53	Total Average Cost	\$2.96	95.1	81
Anchorage, AK				Baton Rouge, LA			
PM & Minor Repair	\$.73	113.9	17	PM & Minor Repair	\$.50	77.8	174
Unscheduled Maintenance	\$.55	114.0	20	Unscheduled Maintenance	\$.35	72.3	171
Renewal & Replacement	\$1.91	95.5	98	Renewal & Replacement	\$1.88	93.9	111
Total Average Cost	\$3.18	102.1	41	Total Average Cost	\$2.72	87.3	136

*Annual average costs, over a 50 year service life, of maintaining the 2 Story Office Building shown in Chapter 2.

Note: Local Indexes are standardized (equal 100) for the Washington D.C. area.

3.1 Local Maintenance Cost Indexes, Selected Areas

Area	Cost per GSFT *	Local Index	234 Area Ranking	Area	Cost per GSFT *	Local Index	234 Area Ranking
Battle Creek, MI				Boulder, CO			
PM & Minor Repair	\$.58	91.0	90	PM & Minor Repair	\$.62	98.0	52
Unscheduled Maintenance	\$.42	87.1	94	Unscheduled Maintenance	\$.45	93.3	57
Renewal & Replacement	\$1.86	93.1	116	Renewal & Replacement	\$1.83	91.6	141
Total Average Cost	\$2.86	91.8	108	Total Average Cost	\$2.90	93.2	95
Beaufort, SC				Bowling Green, KY			
PM & Minor Repair	\$.46	71.7	213	PM & Minor Repair	\$.49	76.9	184
Unscheduled Maintenance	\$.31	64.9	212	Unscheduled Maintenance	\$.33	69.0	190
Renewal & Replacement	\$1.76	88.3	175	Renewal & Replacement	\$1.73	86.6	202
Total Average Cost	\$2.53	81.3	200	Total Average Cost	\$2.55	81.9	195
Beaumont, TX				Brockton, MA			
PM & Minor Repair	\$.52	82.0	141	PM & Minor Repair	\$.57	88.7	108
Unscheduled Maintenance	\$.37	76.5	144	Unscheduled Maintenance	\$.41	84.4	114
Renewal & Replacement	\$1.86	93.1	119	Renewal & Replacement	\$1.97	98.5	61
Total Average Cost	\$2.75	88.3	129	Total Average Cost	\$2.94	94.4	88
Billings, MT				Buffalo, NY			
PM & Minor Repair	\$.54	84.4	134	PM & Minor Repair	\$.59	92.0	84
Unscheduled Maintenance	\$.38	79.6	134	Unscheduled Maintenance	\$.42	88.2	85
Renewal & Replacement	\$1.83	91.6	142	Renewal & Replacement	\$1.94	97.2	74
Total Average Cost	\$2.75	88.3	128	Total Average Cost	\$2.95	94.7	86
Biloxi, MS				Burlington, VT			
PM & Minor Repair	\$.48	75.9	190	PM & Minor Repair	\$.51	80.7	152
Unscheduled Maintenance	\$.34	69.7	185	Unscheduled Maintenance	\$.36	74.1	154
Renewal & Replacement	\$1.84	92.2	130	Renewal & Replacement	\$1.76	88.2	180
Total Average Cost	\$2.66	85.4	157	Total Average Cost	\$2.63	84.5	166
Birmingham, AL				Camden, NJ			
PM & Minor Repair	\$.50	78.2	172	PM & Minor Repair	\$.79	124.5	7
Unscheduled Maintenance	\$.34	71.1	179	Unscheduled Maintenance	\$.63	130.2	7
Renewal & Replacement	\$1.77	88.8	168	Renewal & Replacement	\$2.23	111.5	13
Total Average Cost	\$2.61	83.9	177	Total Average Cost	\$3.65	117.0	8
Bismarck, ND				Carson City, NV			
PM & Minor Repair	\$.49	77.6	179	PM & Minor Repair	\$.60	94.3	71
Unscheduled Maintenance	\$.35	72.2	172	Unscheduled Maintenance	\$.44	91.1	74
Renewal & Replacement	\$1.58	79.1	231	Renewal & Replacement	\$2.02	101.1	45
Total Average Cost	\$2.42	77.7	225	Total Average Cost	\$3.06	98.2	56
Boise, ID				Cedar Rapids, IA			
PM & Minor Repair	\$.55	85.7	125	PM & Minor Repair	\$.57	88.9	106
Unscheduled Maintenance	\$.39	81.5	123	Unscheduled Maintenance	\$.41	85.2	106
Renewal & Replacement	\$1.76	88.2	179	Renewal & Replacement	\$1.85	92.8	124
Total Average Cost	\$2.70	86.7	142	Total Average Cost	\$2.83	90.9	117
Boston, MA				Charleston, SC			
PM & Minor Repair	\$.67	104.6	32	PM & Minor Repair	\$.46	71.7	212
Unscheduled Maintenance	\$.50	103.4	34	Unscheduled Maintenance	\$.31	64.9	211
Renewal & Replacement	\$2.13	106.4	22	Renewal & Replacement	\$1.76	88.3	176
Total Average Cost	\$3.29	105.6	27	Total Average Cost	\$2.53	81.3	201

*Annual average costs, over a 50 year service life, of maintaining the 2 Story Office Building shown in Chapter 2.
Note: Local Indexes are standardized (equal 100) for the Washington D.C. area.

3.1 Local Maintenance Cost Indexes, Selected Areas

Area	Cost per GSFT *	Local Index	234 Area Ranking	Area	Cost per GSFT *	Local Index	234 Area Ranking
Charleston, WV				Columbus, GA			
PM & Minor Repair	\$.58	90.3	96	PM & Minor Repair	\$.42	66.1	230
Unscheduled Maintenance	\$.42	87.3	92	Unscheduled Maintenance	\$.27	56.3	230
Renewal & Replacement	\$1.99	99.8	53	Renewal & Replacement	\$1.72	85.9	207
Total Average Cost	\$2.99	95.9	71	Total Average Cost	\$2.41	77.3	227
Charlotte, NC				Columbus, OH			
PM & Minor Repair	\$.47	73.1	206	PM & Minor Repair	\$.54	84.6	133
Unscheduled Maintenance	\$.31	63.7	213	Unscheduled Maintenance	\$.39	81.8	121
Renewal & Replacement	\$1.73	86.6	201	Renewal & Replacement	\$1.95	97.8	70
Total Average Cost	\$2.50	80.3	209	Total Average Cost	\$2.89	92.6	102
Chattanooga, TN				Concord, NH			
PM & Minor Repair	\$.53	83.6	137	PM & Minor Repair	\$.55	86.3	122
Unscheduled Maintenance	\$.38	79.0	138	Unscheduled Maintenance	\$.38	79.3	135
Renewal & Replacement	\$1.76	88.1	182	Renewal & Replacement	\$1.92	96.2	82
Total Average Cost	\$2.67	85.8	150	Total Average Cost	\$2.85	91.5	111
Cheyenne, WY				Corpus Christi, TX			
PM & Minor Repair	\$.52	80.8	150	PM & Minor Repair	\$.48	74.6	199
Unscheduled Maintenance	\$.36	75.5	146	Unscheduled Maintenance	\$.33	67.9	195
Renewal & Replacement	\$1.65	82.6	221	Renewal & Replacement	\$1.84	91.9	135
Total Average Cost	\$2.53	81.2	203	Total Average Cost	\$2.64	84.7	164
Chicago, IL				Cumberland, MD			
PM & Minor Repair	\$.75	117.2	14	PM & Minor Repair	\$.54	85.0	130
Unscheduled Maintenance	\$.57	118.0	14	Unscheduled Maintenance	\$.39	81.5	122
Renewal & Replacement	\$2.32	115.9	3	Renewal & Replacement	\$1.90	95.2	101
Total Average Cost	\$3.63	116.5	12	Total Average Cost	\$2.84	91.0	113
Cincinnati, OH				Dallas, TX			
PM & Minor Repair	\$.55	86.5	121	PM & Minor Repair	\$.48	75.2	194
Unscheduled Maintenance	\$.40	82.7	118	Unscheduled Maintenance	\$.33	69.3	187
Renewal & Replacement	\$2.05	102.5	38	Renewal & Replacement	\$1.72	86.0	205
Total Average Cost	\$3.00	96.2	68	Total Average Cost	\$2.53	81.2	202
Cleveland, OH				Danbury, CT			
PM & Minor Repair	\$.67	105.8	30	PM & Minor Repair	\$.65	102.1	38
Unscheduled Maintenance	\$.51	106.7	30	Unscheduled Maintenance	\$.48	100.0	43
Renewal & Replacement	\$2.01	100.6	48	Renewal & Replacement	\$2.08	104.3	35
Total Average Cost	\$3.20	102.6	36	Total Average Cost	\$3.22	103.2	34
Colorado Springs, CO				Davenport, IA			
PM & Minor Repair	\$.52	81.0	148	PM & Minor Repair	\$.59	93.0	77
Unscheduled Maintenance	\$.36	74.1	153	Unscheduled Maintenance	\$.44	90.9	76
Renewal & Replacement	\$1.79	89.8	158	Renewal & Replacement	\$1.87	93.5	113
Total Average Cost	\$2.67	85.6	153	Total Average Cost	\$2.90	93.0	97
Columbia, SC				Dayton, OH			
PM & Minor Repair	\$.45	70.7	217	PM & Minor Repair	\$.58	90.3	97
Unscheduled Maintenance	\$.30	61.7	219	Unscheduled Maintenance	\$.42	86.4	101
Renewal & Replacement	\$1.78	88.9	166	Renewal & Replacement	\$1.99	99.5	54
Total Average Cost	\$2.52	81.0	204	Total Average Cost	\$2.98	95.6	74

*Annual average costs, over a 50 year service life, of maintaining the 2 Story Office Building shown in Chapter 2.
Note: Local Indexes are standardized (equal 100) for the Washington D.C. area.

3.1 Local Maintenance Cost Indexes, Selected Areas

Area	Cost per GSFT *	Local Index	234 Area Ranking	Area	Cost per GSFT *	Local Index	234 Area Ranking
Daytona Beach, FL				Eugene, OR			
PM & Minor Repair	\$.42	66.6	229	PM & Minor Repair	\$.62	96.7	57
Unscheduled Maintenance	\$.28	58.1	228	Unscheduled Maintenance	\$.46	95.3	52
Renewal & Replacement	\$ 1.75	87.5	191	Renewal & Replacement	\$ 1.94	97.1	75
Total Average Cost	\$ 2.45	78.7	217	Total Average Cost	\$ 3.01	96.7	63
Denver, CO				Evansville, IN			
PM & Minor Repair	\$.56	88.2	110	PM & Minor Repair	\$.59	92.5	80
Unscheduled Maintenance	\$.40	84.0	116	Unscheduled Maintenance	\$.43	90.2	77
Renewal & Replacement	\$ 1.80	90.3	153	Renewal & Replacement	\$ 1.99	99.5	55
Total Average Cost	\$ 2.77	88.9	122	Total Average Cost	\$ 3.01	96.6	65
Des Moines, IA				Fairbanks, AK			
PM & Minor Repair	\$.58	91.8	85	PM & Minor Repair	\$.73	113.9	16
Unscheduled Maintenance	\$.43	89.6	80	Unscheduled Maintenance	\$.55	114.0	19
Renewal & Replacement	\$ 1.89	94.7	104	Renewal & Replacement	\$ 1.91	95.5	99
Total Average Cost	\$ 2.91	93.3	94	Total Average Cost	\$ 3.18	102.1	40
Detroit, MI				Fall River, MA			
PM & Minor Repair	\$.70	110.1	22	PM & Minor Repair	\$.58	90.9	93
Unscheduled Maintenance	\$.54	111.3	22	Unscheduled Maintenance	\$.42	87.5	89
Renewal & Replacement	\$ 2.10	105.1	32	Renewal & Replacement	\$ 1.91	95.8	91
Total Average Cost	\$ 3.34	107.1	24	Total Average Cost	\$ 2.91	93.5	93
Dover, DE				Fargo, ND			
PM & Minor Repair	\$.52	81.3	145	PM & Minor Repair	\$.50	79.2	162
Unscheduled Maintenance	\$.36	74.6	149	Unscheduled Maintenance	\$.35	73.7	161
Renewal & Replacement	\$ 1.96	98.0	67	Renewal & Replacement	\$ 1.61	80.8	230
Total Average Cost	\$ 2.83	91.0	114	Total Average Cost	\$ 2.47	79.4	215
Duluth, MN				Fayetteville, AR			
PM & Minor Repair	\$.61	95.5	65	PM & Minor Repair	\$.47	73.1	207
Unscheduled Maintenance	\$.45	93.2	58	Unscheduled Maintenance	\$.32	65.6	209
Renewal & Replacement	\$ 1.98	99.0	57	Renewal & Replacement	\$ 1.70	84.9	215
Total Average Cost	\$ 3.03	97.4	58	Total Average Cost	\$ 2.48	79.5	214
Eau Claire, WI				Flint, MI			
PM & Minor Repair	\$.60	94.7	70	PM & Minor Repair	\$.72	112.2	21
Unscheduled Maintenance	\$.45	92.6	64	Unscheduled Maintenance	\$.55	114.3	17
Renewal & Replacement	\$ 1.91	95.6	95	Renewal & Replacement	\$ 2.16	107.9	17
Total Average Cost	\$ 2.96	95.0	85	Total Average Cost	\$ 3.42	109.8	17
El Paso, TX				Fort Lauderdale, FL			
PM & Minor Repair	\$.45	70.2	220	PM & Minor Repair	\$.50	78.8	165
Unscheduled Maintenance	\$.30	62.4	217	Unscheduled Maintenance	\$.35	72.5	168
Renewal & Replacement	\$ 1.62	80.9	229	Renewal & Replacement	\$ 1.89	94.6	105
Total Average Cost	\$ 2.36	75.9	230	Total Average Cost	\$ 2.74	88.0	130
Erie, PA				Fort Smith, AR			
PM & Minor Repair	\$.56	87.6	116	PM & Minor Repair	\$.48	74.5	200
Unscheduled Maintenance	\$.41	84.7	109	Unscheduled Maintenance	\$.33	69.0	189
Renewal & Replacement	\$ 1.85	92.6	126	Renewal & Replacement	\$ 1.67	83.7	218
Total Average Cost	\$ 2.82	90.4	119	Total Average Cost	\$ 2.48	79.5	213

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Note: Local Indexes are standardized (equal 100) for the Washington D.C. area.

3.1 Local Maintenance Cost Indexes, Selected Areas

Area	Cost per GSFT *	Local Index	234 Area Ranking	Area	Cost per GSFT *	Local Index	234 Area Ranking
Fort Worth, TX				Hampton, VA			
PM & Minor Repair	\$.49	77.2	181	PM & Minor Repair	\$.49	77.6	177
Unscheduled Maintenance	\$.34	69.7	186	Unscheduled Maintenance	\$.34	71.2	178
Renewal & Replacement	\$ 1.72	85.9	206	Renewal & Replacement	\$ 1.83	91.7	137
Total Average Cost	\$ 2.54	81.6	199	Total Average Cost	\$ 2.67	85.7	152
Frankfort, KY				Harrisburg, PA			
PM & Minor Repair	\$.49	76.7	187	PM & Minor Repair	\$.56	87.7	111
Unscheduled Maintenance	\$.33	68.8	193	Unscheduled Maintenance	\$.40	82.9	117
Renewal & Replacement	\$ 1.86	93.0	121	Renewal & Replacement	\$ 1.97	98.4	63
Total Average Cost	\$ 2.68	85.9	149	Total Average Cost	\$ 2.92	93.8	91
Fresno, CA				Hartford, CT			
PM & Minor Repair	\$.58	90.8	94	PM & Minor Repair	\$.62	97.5	55
Unscheduled Maintenance	\$.42	87.3	91	Unscheduled Maintenance	\$.44	92.2	68
Renewal & Replacement	\$ 1.89	94.4	107	Renewal & Replacement	\$ 2.02	100.9	47
Total Average Cost	\$ 2.88	92.6	103	Total Average Cost	\$ 3.08	98.9	50
Gary, IN				Helena, MT			
PM & Minor Repair	\$.69	107.8	28	PM & Minor Repair	\$.59	92.2	82
Unscheduled Maintenance	\$.53	109.4	26	Unscheduled Maintenance	\$.43	89.4	81
Renewal & Replacement	\$ 2.04	102.3	40	Renewal & Replacement	\$ 1.85	92.4	128
Total Average Cost	\$ 3.26	104.5	29	Total Average Cost	\$ 2.86	91.9	106
Grand Rapids, MI				Hilo, HI			
PM & Minor Repair	\$.57	89.8	101	PM & Minor Repair	\$.67	104.4	34
Unscheduled Maintenance	\$.41	85.7	105	Unscheduled Maintenance	\$.50	103.7	33
Renewal & Replacement	\$ 1.87	93.6	112	Renewal & Replacement	\$ 2.20	110.3	15
Total Average Cost	\$ 2.86	91.6	110	Total Average Cost	\$ 3.37	108.1	20
Great Falls, MT				Honolulu, HI			
PM & Minor Repair	\$.56	87.6	117	PM & Minor Repair	\$.67	104.4	33
Unscheduled Maintenance	\$.41	84.6	112	Unscheduled Maintenance	\$.50	103.7	32
Renewal & Replacement	\$ 1.80	90.0	155	Renewal & Replacement	\$ 2.20	110.3	14
Total Average Cost	\$ 2.76	88.7	123	Total Average Cost	\$ 3.37	108.1	19
Green Bay, WI				Houston, TX			
PM & Minor Repair	\$.55	86.2	123	PM & Minor Repair	\$.49	77.6	175
Unscheduled Maintenance	\$.39	81.3	124	Unscheduled Maintenance	\$.34	71.7	175
Renewal & Replacement	\$ 1.96	98.0	68	Renewal & Replacement	\$ 1.85	92.7	125
Total Average Cost	\$ 2.90	93.0	96	Total Average Cost	\$ 2.69	86.4	145
Greensboro, NC				Huntsville, AL			
PM & Minor Repair	\$.45	69.9	222	PM & Minor Repair	\$.55	86.8	120
Unscheduled Maintenance	\$.29	60.7	222	Unscheduled Maintenance	\$.39	80.2	129
Renewal & Replacement	\$ 1.70	85.1	214	Renewal & Replacement	\$ 1.80	89.9	157
Total Average Cost	\$ 2.44	78.3	221	Total Average Cost	\$ 2.73	87.8	133
Hagatna, GU				Indianapolis, IN			
PM & Minor Repair	\$.38	59.6	233	PM & Minor Repair	\$.60	94.0	74
Unscheduled Maintenance	\$.24	50.1	233	Unscheduled Maintenance	\$.45	92.8	63
Renewal & Replacement	\$ 1.71	85.6	213	Renewal & Replacement	\$ 1.97	98.5	62
Total Average Cost	\$ 2.33	74.8	233	Total Average Cost	\$ 3.01	96.7	64

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Note: Local Indexes are standardized (equal 100) for the Washington D.C. area.

3.1 Local Maintenance Cost Indexes, Selected Areas

Area	Cost per GSFT *	Local Index	234 Area Ranking	Area	Cost per GSFT *	Local Index	234 Area Ranking
Jackson, MS				Kokomo, IN			
PM & Minor Repair	\$.51	80.2	154	PM & Minor Repair	\$.72	113.4	20
Unscheduled Maintenance	\$.36	75.3	147	Unscheduled Maintenance	\$.55	115.0	16
Renewal & Replacement	\$1.74	87.2	195	Renewal & Replacement	\$2.11	105.7	30
Total Average Cost	\$2.62	83.9	176	Total Average Cost	\$3.39	108.7	18
Jacksonville, FL				Lansing, MI			
PM & Minor Repair	\$.49	76.7	185	PM & Minor Repair	\$.66	103.7	36
Unscheduled Maintenance	\$.34	70.2	184	Unscheduled Maintenance	\$.49	102.2	38
Renewal & Replacement	\$1.84	92.0	132	Renewal & Replacement	\$1.95	97.7	71
Total Average Cost	\$2.66	85.5	156	Total Average Cost	\$3.10	99.6	46
Jefferson City, MO				Las Cruces, NM			
PM & Minor Repair	\$.59	92.3	81	PM & Minor Repair	\$.45	70.7	216
Unscheduled Maintenance	\$.44	90.9	75	Unscheduled Maintenance	\$.30	62.5	216
Renewal & Replacement	\$1.95	97.6	73	Renewal & Replacement	\$1.69	84.7	216
Total Average Cost	\$2.98	95.5	75	Total Average Cost	\$2.44	78.4	219
Jersey City, NJ				Las Vegas, NV			
PM & Minor Repair	\$.77	121.0	11	PM & Minor Repair	\$.67	104.9	31
Unscheduled Maintenance	\$.61	127.9	8	Unscheduled Maintenance	\$.51	105.7	31
Renewal & Replacement	\$2.25	112.4	9	Renewal & Replacement	\$2.05	102.4	39
Total Average Cost	\$3.63	116.5	10	Total Average Cost	\$3.22	103.4	33
Juneau, AK				Lawton, OK			
PM & Minor Repair	\$.72	113.7	18	PM & Minor Repair	\$.52	81.6	144
Unscheduled Maintenance	\$.55	113.9	21	Unscheduled Maintenance	\$.37	77.5	141
Renewal & Replacement	\$1.96	98.1	66	Renewal & Replacement	\$1.83	91.5	144
Total Average Cost	\$3.23	103.7	30	Total Average Cost	\$2.72	87.3	135
Kalamazoo, MI				Lewiston, ME			
PM & Minor Repair	\$.58	91.0	91	PM & Minor Repair	\$.56	87.6	115
Unscheduled Maintenance	\$.42	87.1	95	Unscheduled Maintenance	\$.41	85.2	107
Renewal & Replacement	\$1.86	93.1	115	Renewal & Replacement	\$1.74	87.3	193
Total Average Cost	\$2.86	91.8	107	Total Average Cost	\$2.71	87.1	138
Kansas City, MO				Lexington, KY			
PM & Minor Repair	\$.63	98.2	51	PM & Minor Repair	\$.49	76.7	186
Unscheduled Maintenance	\$.47	98.6	47	Unscheduled Maintenance	\$.33	68.8	192
Renewal & Replacement	\$2.12	106.2	26	Renewal & Replacement	\$1.86	93.0	120
Total Average Cost	\$3.22	103.4	32	Total Average Cost	\$2.68	85.9	148
Key West, FL				Lincoln, NE			
PM & Minor Repair	\$.47	73.2	205	PM & Minor Repair	\$.50	78.8	168
Unscheduled Maintenance	\$.32	67.0	203	Unscheduled Maintenance	\$.35	72.3	170
Renewal & Replacement	\$1.83	91.4	146	Renewal & Replacement	\$1.92	96.2	80
Total Average Cost	\$2.61	83.9	178	Total Average Cost	\$2.77	88.9	121
Knoxville, TN				Little Rock, AR			
PM & Minor Repair	\$.48	75.6	191	PM & Minor Repair	\$.47	73.9	203
Unscheduled Maintenance	\$.33	68.4	194	Unscheduled Maintenance	\$.32	66.2	208
Renewal & Replacement	\$1.71	85.7	210	Renewal & Replacement	\$1.76	88.3	174
Total Average Cost	\$2.52	81.0	205	Total Average Cost	\$2.55	81.9	194

*Annual average costs, over a 50 year service life, of maintaining the 2 Story Office Building shown in Chapter 2.
Note: Local Indexes are standardized (equal 100) for the Washington D.C. area.

3.1 Local Maintenance Cost Indexes, Selected Areas

Area	Cost per GSFT *	Local Index	234 Area Ranking	Area	Cost per GSFT *	Local Index	234 Area Ranking
Los Angeles, CA				Memphis, TN			
PM & Minor Repair	\$.64	99.8	45	PM & Minor Repair	\$.51	79.5	157
Unscheduled Maintenance	\$.47	98.7	45	Unscheduled Maintenance	\$.35	73.6	164
Renewal & Replacement	\$1.96	98.1	65	Renewal & Replacement	\$1.79	89.5	161
Total Average Cost	\$3.07	98.5	52	Total Average Cost	\$2.65	85.0	163
Louisville, KY				Miami, FL			
PM & Minor Repair	\$.52	81.8	143	PM & Minor Repair	\$.49	77.6	176
Unscheduled Maintenance	\$.36	74.6	150	Unscheduled Maintenance	\$.34	71.0	182
Renewal & Replacement	\$1.92	96.2	81	Renewal & Replacement	\$1.82	91.2	148
Total Average Cost	\$2.80	89.9	120	Total Average Cost	\$2.66	85.3	158
Lowell, MA				Milwaukee, WI			
PM & Minor Repair	\$.59	92.0	83	PM & Minor Repair	\$.63	98.6	47
Unscheduled Maintenance	\$.41	85.0	108	Unscheduled Maintenance	\$.46	95.8	51
Renewal & Replacement	\$1.92	96.1	85	Renewal & Replacement	\$2.11	105.6	31
Total Average Cost	\$2.92	93.6	92	Total Average Cost	\$3.20	102.6	35
Lubbock, TX				Minneapolis, MN			
PM & Minor Repair	\$.42	65.3	231	PM & Minor Repair	\$.69	107.9	27
Unscheduled Maintenance	\$.27	56.3	231	Unscheduled Maintenance	\$.53	109.4	24
Renewal & Replacement	\$1.66	82.9	220	Renewal & Replacement	\$2.12	106.3	23
Total Average Cost	\$2.34	75.2	232	Total Average Cost	\$3.34	107.1	22
Macon, GA				Mobile, AL			
PM & Minor Repair	\$.48	74.8	198	PM & Minor Repair	\$.45	70.8	215
Unscheduled Maintenance	\$.32	67.0	202	Unscheduled Maintenance	\$.30	62.6	215
Renewal & Replacement	\$1.75	87.7	186	Renewal & Replacement	\$1.86	93.1	117
Total Average Cost	\$2.55	81.9	196	Total Average Cost	\$2.61	83.8	179
Madison, WI				Moline, IL			
PM & Minor Repair	\$.61	95.6	63	PM & Minor Repair	\$.60	94.1	73
Unscheduled Maintenance	\$.44	92.3	67	Unscheduled Maintenance	\$.44	91.3	70
Renewal & Replacement	\$2.03	101.4	44	Renewal & Replacement	\$1.92	96.2	83
Total Average Cost	\$3.08	98.8	51	Total Average Cost	\$2.96	95.0	83
Manchester, NH				Montgomery, AL			
PM & Minor Repair	\$.55	86.2	124	PM & Minor Repair	\$.44	69.1	225
Unscheduled Maintenance	\$.38	79.7	133	Unscheduled Maintenance	\$.29	59.8	227
Renewal & Replacement	\$1.83	91.5	143	Renewal & Replacement	\$1.82	91.0	150
Total Average Cost	\$2.76	88.6	124	Total Average Cost	\$2.55	81.7	198
Marquette, MI				Montpelier, VT			
PM & Minor Repair	\$.61	95.3	67	PM & Minor Repair	\$.51	80.7	151
Unscheduled Maintenance	\$.45	93.0	59	Unscheduled Maintenance	\$.36	74.1	155
Renewal & Replacement	\$2.04	101.9	41	Renewal & Replacement	\$1.76	88.2	181
Total Average Cost	\$3.09	99.2	49	Total Average Cost	\$2.63	84.5	167
Medford, OR				Morristown, NJ			
PM & Minor Repair	\$.58	91.1	89	PM & Minor Repair	\$.77	121.0	9
Unscheduled Maintenance	\$.42	88.3	83	Unscheduled Maintenance	\$.61	127.9	9
Renewal & Replacement	\$1.83	91.5	145	Renewal & Replacement	\$2.25	112.4	10
Total Average Cost	\$2.83	90.9	116	Total Average Cost	\$3.63	116.5	9

*Annual average costs, over a 50 year service life, of maintaining the 2 Story Office Building shown in Chapter 2.
Note: Local Indexes are standardized (equal 100) for the Washington D.C. area.

3.1 Local Maintenance Cost Indexes, Selected Areas

Area	Cost per GSFT *	Local Index	234 Area Ranking	Area	Cost per GSFT *	Local Index	234 Area Ranking
Muncie, IN				Norwalk, CT			
PM & Minor Repair	\$.52	82.4	139	PM & Minor Repair	\$.63	98.3	48
Unscheduled Maintenance	\$.37	78.0	139	Unscheduled Maintenance	\$.45	92.5	65
Renewal & Replacement	\$1.97	98.7	59	Renewal & Replacement	\$2.12	106.2	27
Total Average Cost	\$2.87	92.2	105	Total Average Cost	\$3.19	102.5	39
Nashville, TN				Norwich, CT			
PM & Minor Repair	\$.45	70.1	221	PM & Minor Repair	\$.62	97.9	54
Unscheduled Maintenance	\$.29	60.7	223	Unscheduled Maintenance	\$.46	95.1	53
Renewal & Replacement	\$1.71	85.7	211	Renewal & Replacement	\$2.08	104.3	36
Total Average Cost	\$2.45	78.6	218	Total Average Cost	\$3.16	101.5	44
New Brunswick, NJ				Oakland, CA			
PM & Minor Repair	\$.88	138.5	2	PM & Minor Repair	\$.77	120.6	12
Unscheduled Maintenance	\$.70	145.2	2	Unscheduled Maintenance	\$.59	123.7	11
Renewal & Replacement	\$2.30	115.2	6	Renewal & Replacement	\$2.09	104.7	34
Total Average Cost	\$3.88	124.6	5	Total Average Cost	\$3.46	110.9	15
New Haven, CT				Ogden, UT			
PM & Minor Repair	\$.62	96.6	58	PM & Minor Repair	\$.50	78.8	167
Unscheduled Maintenance	\$.44	91.6	69	Unscheduled Maintenance	\$.35	71.9	173
Renewal & Replacement	\$2.14	107.0	20	Renewal & Replacement	\$1.75	87.7	187
Total Average Cost	\$3.19	102.5	38	Total Average Cost	\$2.60	83.5	183
New Orleans, LA				Oklahoma City, OK			
PM & Minor Repair	\$.54	84.7	132	PM & Minor Repair	\$.47	74.0	202
Unscheduled Maintenance	\$.39	80.1	130	Unscheduled Maintenance	\$.33	67.8	198
Renewal & Replacement	\$1.89	94.8	103	Renewal & Replacement	\$1.76	87.9	183
Total Average Cost	\$2.82	90.4	118	Total Average Cost	\$2.55	82.0	193
New York, NY				Olympia, WA			
PM & Minor Repair	\$.82	128.4	4	PM & Minor Repair	\$.65	101.8	39
Unscheduled Maintenance	\$.65	136.0	4	Unscheduled Maintenance	\$.49	102.7	36
Renewal & Replacement	\$2.46	123.0	1	Renewal & Replacement	\$1.84	92.2	129
Total Average Cost	\$3.93	126.1	1	Total Average Cost	\$2.99	95.8	72
Newark, NJ				Omaha, NE			
PM & Minor Repair	\$.77	121.0	10	PM & Minor Repair	\$.56	87.7	112
Unscheduled Maintenance	\$.61	127.9	10	Unscheduled Maintenance	\$.40	84.0	115
Renewal & Replacement	\$2.25	112.4	8	Renewal & Replacement	\$1.80	89.9	156
Total Average Cost	\$3.63	116.5	11	Total Average Cost	\$2.76	88.6	125
Newport News, VA				Orlando, FL			
PM & Minor Repair	\$.49	77.6	178	PM & Minor Repair	\$.44	68.6	227
Unscheduled Maintenance	\$.34	71.2	177	Unscheduled Maintenance	\$.29	60.4	225
Renewal & Replacement	\$1.83	91.7	136	Renewal & Replacement	\$1.79	89.8	159
Total Average Cost	\$2.67	85.7	151	Total Average Cost	\$2.52	80.9	206
Norfolk, VA				Owensboro, KY			
PM & Minor Repair	\$.49	77.2	183	PM & Minor Repair	\$.52	82.1	140
Unscheduled Maintenance	\$.34	71.0	181	Unscheduled Maintenance	\$.37	76.8	143
Renewal & Replacement	\$1.83	91.7	139	Renewal & Replacement	\$1.73	86.7	199
Total Average Cost	\$2.67	85.6	154	Total Average Cost	\$2.63	84.3	171

*Annual average costs, over a 50 year service life, of maintaining the 2 Story Office Building shown in Chapter 2.
Note: Local Indexes are standardized (equal 100) for the Washington D.C. area.

3.1 Local Maintenance Cost Indexes, Selected Areas

Area	Cost per GSFT *	Local Index	234 Area Ranking	Area	Cost per GSFT *	Local Index	234 Area Ranking
Oxnard, CA				Portland, OR			
PM & Minor Repair	\$.61	96.1	62	PM & Minor Repair	\$.69	109.0	24
Unscheduled Maintenance	\$.45	92.9	61	Unscheduled Maintenance	\$.53	109.3	27
Renewal & Replacement	\$ 1.91	95.7	94	Renewal & Replacement	\$ 1.95	97.6	72
Total Average Cost	\$ 2.97	95.3	78	Total Average Cost	\$ 3.17	101.8	43
Parkersburg, WV				Providence, RI			
PM & Minor Repair	\$.57	88.8	107	PM & Minor Repair	\$.58	91.4	87
Unscheduled Maintenance	\$.42	87.1	93	Unscheduled Maintenance	\$.43	88.5	82
Renewal & Replacement	\$ 1.98	98.9	58	Renewal & Replacement	\$ 1.88	94.1	110
Total Average Cost	\$ 2.96	95.0	82	Total Average Cost	\$ 2.89	92.7	101
Peoria, IL				Pueblo, CO			
PM & Minor Repair	\$.66	103.3	37	PM & Minor Repair	\$.56	88.5	109
Unscheduled Maintenance	\$.49	102.3	37	Unscheduled Maintenance	\$.41	85.8	102
Renewal & Replacement	\$ 2.19	109.5	16	Renewal & Replacement	\$ 1.92	96.1	84
Total Average Cost	\$ 3.34	107.1	23	Total Average Cost	\$ 2.90	93.0	98
Philadelphia, PA				Raleigh-Durham, NC			
PM & Minor Repair	\$.80	125.0	6	PM & Minor Repair	\$.46	71.6	214
Unscheduled Maintenance	\$.63	130.4	6	Unscheduled Maintenance	\$.29	61.3	221
Renewal & Replacement	\$ 2.23	111.7	12	Renewal & Replacement	\$ 1.75	87.5	190
Total Average Cost	\$ 3.66	117.3	6	Total Average Cost	\$ 2.50	80.2	211
Phoenix, AZ				Rapid City, SD			
PM & Minor Repair	\$.51	79.5	158	PM & Minor Repair	\$.46	72.9	210
Unscheduled Maintenance	\$.36	74.3	151	Unscheduled Maintenance	\$.32	66.5	205
Renewal & Replacement	\$ 1.84	92.2	131	Renewal & Replacement	\$ 1.64	82.3	224
Total Average Cost	\$ 2.70	86.8	139	Total Average Cost	\$ 2.43	77.9	224
Pierre, SD				Reading, PA			
PM & Minor Repair	\$.46	72.9	209	PM & Minor Repair	\$.58	91.2	88
Unscheduled Maintenance	\$.32	66.5	206	Unscheduled Maintenance	\$.42	87.5	90
Renewal & Replacement	\$ 1.64	82.3	223	Renewal & Replacement	\$ 2.03	101.5	43
Total Average Cost	\$ 2.43	77.9	223	Total Average Cost	\$ 3.03	97.2	60
Pittsburgh, PA				Reno, NV			
PM & Minor Repair	\$.59	92.7	79	PM & Minor Repair	\$.60	94.2	72
Unscheduled Maintenance	\$.43	89.9	78	Unscheduled Maintenance	\$.44	91.2	72
Renewal & Replacement	\$ 2.07	103.6	37	Renewal & Replacement	\$ 1.89	94.5	106
Total Average Cost	\$ 3.09	99.3	48	Total Average Cost	\$ 2.93	93.9	90
Pocatello, ID				Richland, WA			
PM & Minor Repair	\$.52	81.9	142	PM & Minor Repair	\$.67	104.4	35
Unscheduled Maintenance	\$.37	77.6	140	Unscheduled Maintenance	\$.50	103.2	35
Renewal & Replacement	\$ 1.72	86.2	204	Renewal & Replacement	\$ 1.90	95.2	102
Total Average Cost	\$ 2.62	84.0	173	Total Average Cost	\$ 3.06	98.3	54
Portland, ME				Richmond, VA			
PM & Minor Repair	\$.51	80.4	153	PM & Minor Repair	\$.50	78.7	169
Unscheduled Maintenance	\$.35	73.6	163	Unscheduled Maintenance	\$.36	75.1	148
Renewal & Replacement	\$ 1.74	87.2	194	Renewal & Replacement	\$ 1.79	89.5	160
Total Average Cost	\$ 2.61	83.7	180	Total Average Cost	\$ 2.65	85.1	161

*Annual average costs, over a 50 year service life, of maintaining the 2 Story Office Building shown in Chapter 2.
Note: Local Indexes are standardized (equal 100) for the Washington D.C. area.

3.1 Local Maintenance Cost Indexes, Selected Areas

Area	Cost per GSFT *	Local Index	234 Area Ranking	Area	Cost per GSFT *	Local Index	234 Area Ranking
Riverside, CA				Salt Lake City, UT			
PM & Minor Repair	\$.54	84.9	131	PM & Minor Repair	\$.50	78.8	166
Unscheduled Maintenance	\$.38	79.8	132	Unscheduled Maintenance	\$.35	71.9	174
Renewal & Replacement	\$1.91	95.5	97	Renewal & Replacement	\$1.75	87.7	188
Total Average Cost	\$2.83	90.9	115	Total Average Cost	\$2.60	83.5	182
Roanoke, VA				San Antonio, TX			
PM & Minor Repair	\$.41	63.9	232	PM & Minor Repair	\$.46	72.6	211
Unscheduled Maintenance	\$.25	52.4	232	Unscheduled Maintenance	\$.31	65.5	210
Renewal & Replacement	\$1.84	92.0	133	Renewal & Replacement	\$1.81	90.4	152
Total Average Cost	\$2.50	80.1	212	Total Average Cost	\$2.58	82.9	188
Rochester, MN				San Diego, CA			
PM & Minor Repair	\$.61	95.5	64	PM & Minor Repair	\$.59	92.7	78
Unscheduled Maintenance	\$.44	91.2	73	Unscheduled Maintenance	\$.42	87.7	88
Renewal & Replacement	\$1.92	96.0	87	Renewal & Replacement	\$1.92	96.0	88
Total Average Cost	\$2.97	95.2	80	Total Average Cost	\$2.93	94.0	89
Rochester, NY				San Francisco, CA			
PM & Minor Repair	\$.58	90.9	92	PM & Minor Repair	\$.91	142.9	1
Unscheduled Maintenance	\$.42	86.9	97	Unscheduled Maintenance	\$.72	149.7	1
Renewal & Replacement	\$1.88	94.2	109	Renewal & Replacement	\$2.26	113.0	7
Total Average Cost	\$2.88	92.4	104	Total Average Cost	\$3.89	124.8	3
Rockford, IL				San Jose, CA			
PM & Minor Repair	\$.69	107.7	29	PM & Minor Repair	\$.78	122.6	8
Unscheduled Maintenance	\$.52	107.8	29	Unscheduled Maintenance	\$.59	123.6	12
Renewal & Replacement	\$2.12	106.1	28	Renewal & Replacement	\$2.09	104.8	33
Total Average Cost	\$3.32	106.7	26	Total Average Cost	\$3.47	111.3	13
Rutland, VT				San Juan, PR			
PM & Minor Repair	\$.52	80.8	149	PM & Minor Repair	\$.35	54.3	234
Unscheduled Maintenance	\$.36	74.2	152	Unscheduled Maintenance	\$.22	44.8	234
Renewal & Replacement	\$1.76	87.9	184	Renewal & Replacement	\$1.57	78.6	233
Total Average Cost	\$2.63	84.3	169	Total Average Cost	\$2.13	68.4	234
Sacramento, CA				Santa Barbara, CA			
PM & Minor Repair	\$.61	95.4	66	PM & Minor Repair	\$.62	98.0	53
Unscheduled Maintenance	\$.42	88.2	84	Unscheduled Maintenance	\$.46	95.9	50
Renewal & Replacement	\$2.00	100.0	50	Renewal & Replacement	\$1.93	96.7	78
Total Average Cost	\$3.03	97.3	59	Total Average Cost	\$3.02	96.8	62
Saginaw, MI				Sante Fe, NM			
PM & Minor Repair	\$.62	96.5	61	PM & Minor Repair	\$.45	70.7	218
Unscheduled Maintenance	\$.45	93.6	56	Unscheduled Maintenance	\$.30	61.4	220
Renewal & Replacement	\$1.91	95.6	96	Renewal & Replacement	\$1.86	93.1	118
Total Average Cost	\$2.97	95.5	76	Total Average Cost	\$2.61	83.6	181
Salem, OR				Savannah, GA			
PM & Minor Repair	\$.60	94.9	68	PM & Minor Repair	\$.48	74.8	197
Unscheduled Maintenance	\$.45	94.0	55	Unscheduled Maintenance	\$.33	67.8	196
Renewal & Replacement	\$1.91	95.8	90	Renewal & Replacement	\$1.77	88.8	167
Total Average Cost	\$2.97	95.3	77	Total Average Cost	\$2.58	82.7	189

*Annual average costs, over a 50 year service life, of maintaining the 2 Story Office Building shown in Chapter 2.
Note: Local Indexes are standardized (equal 100) for the Washington D.C. area.

3.1 Local Maintenance Cost Indexes, Selected Areas

Area	Cost per GSFT *	Local Index	234 Area Ranking	Area	Cost per GSFT *	Local Index	234 Area Ranking
Scranton, PA				Springfield, MO			
PM & Minor Repair	\$.57	90.2	100	PM & Minor Repair	\$.44	69.0	226
Unscheduled Maintenance	\$.42	88.1	86	Unscheduled Maintenance	\$.29	60.1	226
Renewal & Replacement	\$2.02	101.1	46	Renewal & Replacement	\$1.77	88.7	169
Total Average Cost	\$3.02	96.9	61	Total Average Cost	\$2.50	80.3	210
Seattle, WA				Springfield, OH			
PM & Minor Repair	\$.72	113.5	19	PM & Minor Repair	\$.65	101.5	41
Unscheduled Maintenance	\$.55	114.0	18	Unscheduled Maintenance	\$.48	100.2	40
Renewal & Replacement	\$1.90	95.3	100	Renewal & Replacement	\$2.15	107.7	18
Total Average Cost	\$3.18	101.9	42	Total Average Cost	\$3.28	105.3	28
Shreveport, LA				St. George, UT			
PM & Minor Repair	\$.50	78.4	171	PM & Minor Repair	\$.47	73.0	208
Unscheduled Maintenance	\$.35	72.3	169	Unscheduled Maintenance	\$.32	66.5	204
Renewal & Replacement	\$1.88	94.3	108	Renewal & Replacement	\$1.83	91.6	140
Total Average Cost	\$2.73	87.7	134	Total Average Cost	\$2.62	83.9	175
Sioux City, IA				St. Louis, MO			
PM & Minor Repair	\$.53	83.5	138	PM & Minor Repair	\$.69	107.9	25
Unscheduled Maintenance	\$.38	80.0	131	Unscheduled Maintenance	\$.53	110.0	23
Renewal & Replacement	\$1.71	85.7	208	Renewal & Replacement	\$2.11	105.9	29
Total Average Cost	\$2.63	84.4	168	Total Average Cost	\$3.33	106.9	25
Sioux Falls, SD				St. Paul, MN			
PM & Minor Repair	\$.47	74.4	201	PM & Minor Repair	\$.69	107.9	26
Unscheduled Maintenance	\$.33	67.8	197	Unscheduled Maintenance	\$.53	109.4	25
Renewal & Replacement	\$1.64	82.0	226	Renewal & Replacement	\$2.12	106.3	24
Total Average Cost	\$2.44	78.3	220	Total Average Cost	\$3.34	107.1	21
South Bend, IN				Stamford, CT			
PM & Minor Repair	\$.57	89.7	102	PM & Minor Repair	\$.63	98.3	49
Unscheduled Maintenance	\$.42	87.1	96	Unscheduled Maintenance	\$.45	92.5	66
Renewal & Replacement	\$1.87	93.5	114	Renewal & Replacement	\$2.12	106.3	25
Total Average Cost	\$2.86	91.7	109	Total Average Cost	\$3.20	102.5	37
Spokane, WA				Stockton, CA			
PM & Minor Repair	\$.50	78.9	164	PM & Minor Repair	\$.60	93.8	75
Unscheduled Maintenance	\$.36	73.8	158	Unscheduled Maintenance	\$.44	91.2	71
Renewal & Replacement	\$1.78	88.9	165	Renewal & Replacement	\$1.91	95.7	93
Total Average Cost	\$2.63	84.5	165	Total Average Cost	\$2.95	94.6	87
Springfield, IL				Syracuse, NY			
PM & Minor Repair	\$.70	109.4	23	PM & Minor Repair	\$.57	89.0	105
Unscheduled Maintenance	\$.52	109.1	28	Unscheduled Maintenance	\$.41	85.8	103
Renewal & Replacement	\$2.24	112.4	11	Renewal & Replacement	\$1.78	89.0	164
Total Average Cost	\$3.47	111.2	14	Total Average Cost	\$2.76	88.5	126
Springfield, MA				Tacoma, WA			
PM & Minor Repair	\$.58	91.5	86	PM & Minor Repair	\$.65	101.7	40
Unscheduled Maintenance	\$.42	87.9	87	Unscheduled Maintenance	\$.48	100.7	39
Renewal & Replacement	\$1.99	99.4	56	Renewal & Replacement	\$1.92	96.1	86
Total Average Cost	\$2.99	96.0	70	Total Average Cost	\$3.05	98.0	57

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Note: Local Indexes are standardized (equal 100) for the Washington D.C. area.

3.1 Local Maintenance Cost Indexes, Selected Areas

Area	Cost per GSFT *	Local Index	234 Area Ranking	Area	Cost per GSFT *	Local Index	234 Area Ranking
Tallahassee, FL				Utica, NY			
PM & Minor Repair	\$.43	67.4	228	PM & Minor Repair	\$.51	79.7	155
Unscheduled Maintenance	\$.28	57.4	229	Unscheduled Maintenance	\$.35	73.6	162
Renewal & Replacement	\$1.75	87.6	189	Renewal & Replacement	\$1.79	89.5	162
Total Average Cost	\$2.45	78.8	216	Total Average Cost	\$2.65	85.0	162
Tampa, FL				Virginia Beach, VA			
PM & Minor Repair	\$.44	69.3	224	PM & Minor Repair	\$.49	77.2	182
Unscheduled Maintenance	\$.30	61.9	218	Unscheduled Maintenance	\$.34	71.0	180
Renewal & Replacement	\$1.83	91.4	147	Renewal & Replacement	\$1.83	91.7	138
Total Average Cost	\$2.56	82.3	191	Total Average Cost	\$2.67	85.6	155
Terre Haute, IN				Waco, TX			
PM & Minor Repair	\$.62	96.5	60	PM & Minor Repair	\$.49	77.3	180
Unscheduled Maintenance	\$.47	97.6	48	Unscheduled Maintenance	\$.34	71.4	176
Renewal & Replacement	\$1.91	95.7	92	Renewal & Replacement	\$1.86	92.9	123
Total Average Cost	\$3.00	96.2	69	Total Average Cost	\$2.69	86.4	146
Toledo, OH				Washington, D.C.			
PM & Minor Repair	\$.58	90.3	98	PM & Minor Repair	\$.64	100.0	43
Unscheduled Maintenance	\$.42	86.4	100	Unscheduled Maintenance	\$.48	100.0	42
Renewal & Replacement	\$1.86	93.0	122	Renewal & Replacement	\$2.00	100.0	52
Total Average Cost	\$2.85	91.4	112	Total Average Cost	\$3.12	100.0	45
Topeka, KS				Waterbury, CT			
PM & Minor Repair	\$.55	87.0	119	PM & Minor Repair	\$.63	98.6	46
Unscheduled Maintenance	\$.40	82.7	119	Unscheduled Maintenance	\$.46	96.0	49
Renewal & Replacement	\$1.94	97.0	76	Renewal & Replacement	\$2.13	106.8	21
Total Average Cost	\$2.89	92.8	99	Total Average Cost	\$3.22	103.5	31
Trenton, NJ				Watertown, NY			
PM & Minor Repair	\$.88	138.5	3	PM & Minor Repair	\$.57	89.0	104
Unscheduled Maintenance	\$.70	145.2	3	Unscheduled Maintenance	\$.41	85.8	104
Renewal & Replacement	\$2.30	115.3	5	Renewal & Replacement	\$1.78	89.0	163
Total Average Cost	\$3.88	124.6	4	Total Average Cost	\$2.76	88.5	127
Tucson, AZ				Wichita Falls, TX			
PM & Minor Repair	\$.48	75.5	192	PM & Minor Repair	\$.50	78.2	173
Unscheduled Maintenance	\$.33	67.6	200	Unscheduled Maintenance	\$.35	73.0	167
Renewal & Replacement	\$1.82	91.1	149	Renewal & Replacement	\$1.74	87.3	192
Total Average Cost	\$2.63	84.3	170	Total Average Cost	\$2.59	83.2	186
Tulsa, OK				Wichita, KS			
PM & Minor Repair	\$.49	76.2	189	PM & Minor Repair	\$.50	79.2	163
Unscheduled Maintenance	\$.33	69.3	188	Unscheduled Maintenance	\$.35	73.3	165
Renewal & Replacement	\$1.73	86.7	200	Renewal & Replacement	\$1.74	87.2	196
Total Average Cost	\$2.55	81.9	197	Total Average Cost	\$2.60	83.4	184
Tuscaloosa, AL				Wilmington, DE			
PM & Minor Repair	\$.48	75.0	195	PM & Minor Repair	\$.62	96.9	56
Unscheduled Maintenance	\$.32	67.3	201	Unscheduled Maintenance	\$.45	92.9	60
Renewal & Replacement	\$1.75	87.8	185	Renewal & Replacement	\$2.03	101.8	42
Total Average Cost	\$2.55	82.0	192	Total Average Cost	\$3.10	99.4	47

*Annual average costs, over a 50 year service life, of maintaining the 2 Story Office Building shown in Chapter 2.
Note: Local Indexes are standardized (equal 100) for the Washington D.C. area.

3.1 Local Maintenance Cost Indexes, Selected Areas

Area	Cost per GSFT *	Local Index	234 Area Ranking	Area	Cost per GSFT *	Local Index	234 Area Ranking
Winston-Salem, NC				London, ON			
PM & Minor Repair	\$.45	69.8	223	PM & Minor Repair	\$.54	85.4	126
Unscheduled Maintenance	\$.29	60.7	224	Unscheduled Maintenance	\$.39	81.2	126
Renewal & Replacement	\$1.68	84.0	217	Renewal & Replacement	\$1.76	88.3	177
Total Average Cost	\$2.41	77.5	226	Total Average Cost	\$2.70	86.6	144
Worcester, MA				Montreal, QC			
PM & Minor Repair	\$.60	93.6	76	PM & Minor Repair	\$.50	79.2	161
Unscheduled Maintenance	\$.43	89.8	79	Unscheduled Maintenance	\$.35	73.8	160
Renewal & Replacement	\$1.97	98.6	60	Renewal & Replacement	\$1.73	86.5	203
Total Average Cost	\$3.00	96.2	67	Total Average Cost	\$2.59	83.0	187
Yonkers, NY				Ottawa, ON			
PM & Minor Repair	\$.82	128.4	5	PM & Minor Repair	\$.54	85.3	128
Unscheduled Maintenance	\$.65	136.0	5	Unscheduled Maintenance	\$.39	81.1	128
Renewal & Replacement	\$2.46	123.0	2	Renewal & Replacement	\$1.77	88.5	172
Total Average Cost	\$3.93	126.1	2	Total Average Cost	\$2.70	86.7	141
Youngstown, OH				Quebec City, QC			
PM & Minor Repair	\$.63	98.2	50	PM & Minor Repair	\$.51	79.4	159
Unscheduled Maintenance	\$.47	98.7	44	Unscheduled Maintenance	\$.36	73.9	157
Renewal & Replacement	\$1.96	98.1	64	Renewal & Replacement	\$1.64	82.3	222
Total Average Cost	\$3.06	98.2	55	Total Average Cost	\$2.51	80.4	208
Canadian Cities				Regina, SK			
Calgary, AB				PM & Minor Repair	\$.52	81.2	146
PM & Minor Repair	\$.57	90.2	99	Unscheduled Maintenance	\$.37	76.1	145
Unscheduled Maintenance	\$.42	86.8	99	Renewal & Replacement	\$1.63	81.7	227
Renewal & Replacement	\$1.71	85.6	212	Total Average Cost	\$2.52	80.7	207
Total Average Cost	\$2.70	86.7	140				
Edmonton, AB				St. John's, NL			
PM & Minor Repair	\$.58	90.3	95	PM & Minor Repair	\$.48	74.8	196
Unscheduled Maintenance	\$.42	86.9	98	Unscheduled Maintenance	\$.33	69.0	191
Renewal & Replacement	\$1.66	83.1	219	Renewal & Replacement	\$1.57	78.7	232
Total Average Cost	\$2.65	85.2	159	Total Average Cost	\$2.38	76.4	228
Halifax, NS				Toronto, ON			
PM & Minor Repair	\$.47	73.6	204	PM & Minor Repair	\$.54	85.3	129
Unscheduled Maintenance	\$.33	67.7	199	Unscheduled Maintenance	\$.39	81.1	127
Renewal & Replacement	\$1.64	82.2	225	Renewal & Replacement	\$1.80	90.2	154
Total Average Cost	\$2.44	78.2	222	Total Average Cost	\$2.74	87.8	132
Hamilton, ON				Vancouver, BC			
PM & Minor Repair	\$.54	85.4	127	PM & Minor Repair	\$.53	83.7	136
Unscheduled Maintenance	\$.39	81.2	125	Unscheduled Maintenance	\$.38	79.2	136
Renewal & Replacement	\$1.76	88.3	178	Renewal & Replacement	\$1.77	88.6	170
Total Average Cost	\$2.70	86.6	143	Total Average Cost	\$2.69	86.2	147
Victoria, BC				Victoria, BC			
PM & Minor Repair	\$.53	83.7	135	PM & Minor Repair	\$.53	83.7	135
Unscheduled Maintenance	\$.38	79.2	137	Unscheduled Maintenance	\$.38	79.2	137
Renewal & Replacement	\$1.74	86.9	197	Renewal & Replacement	\$1.74	86.9	197
Total Average Cost	\$2.65	85.1	160	Total Average Cost	\$2.65	85.1	160

*Annual average costs, over a 50 year service life, of maintaining the 2 Story Office Building shown in Chapter 2.

Note: Local Indexes are standardized (equal 100) for the Washington D.C. area. Values for Canadian areas are reported in U.S. dollars.

3.1 Local Maintenance Cost Indexes, Selected Areas

Area	Cost per GSFT *	Local Index	234 Area Ranking	Area	Cost per GSFT *	Local Index	234 Area Ranking
Winnipeg, MB							
PM & Minor Repair	\$.49	76.4	188				
Unscheduled Maintenance	\$.34	70.8	183				
Renewal & Replacement	\$1.53	76.5	234				
Total Average Cost	\$2.36	75.6	231				

*Annual average costs, over a 50 year service life, of maintaining the 2 Story Office Building shown in Chapter 2.

Note: Local Indexes are standardized (equal 100) for the Washington D.C. area. Values for Canadian areas are reported in U.S. dollars.

3.2 In-House Shop Rates, Selected Areas

Area	Staff HVAC Tech	Staff Electrician	Staff Plumber	Staff Carpenter	Staff Painter	Staff Road Worker	General Maintenance Worker	Trade Shop Supervisor
Akron, OH								
Direct Wage	\$39.39	\$39.33	\$39.50	\$38.41	\$35.23	\$38.41	\$32.90	\$47.08
Markup	\$78.78	\$78.66	\$79.00	\$76.82	\$70.46	\$76.82	\$65.80	\$94.16
Total Shop Rate	\$118.17	\$117.99	\$118.50	\$115.23	\$105.69	\$115.23	\$98.70	\$141.24
Alamogordo, NM								
Direct Wage	\$26.10	\$26.06	\$26.17	\$25.45	\$23.34	\$25.45	\$21.79	\$31.19
Markup	\$52.20	\$52.12	\$52.34	\$50.90	\$46.68	\$50.90	\$43.58	\$62.38
Total Shop Rate	\$78.30	\$78.18	\$78.51	\$76.35	\$70.02	\$76.35	\$65.37	\$93.57
Albany, NY								
Direct Wage	\$35.39	\$35.33	\$35.48	\$34.50	\$31.65	\$34.50	\$29.55	\$42.29
Markup	\$70.78	\$70.66	\$70.96	\$69.00	\$63.30	\$69.00	\$59.10	\$84.58
Total Shop Rate	\$106.17	\$105.99	\$106.44	\$103.50	\$94.95	\$103.50	\$88.65	\$126.87
Albuquerque, NM								
Direct Wage	\$34.58	\$34.53	\$34.67	\$33.72	\$30.92	\$33.72	\$28.88	\$41.33
Markup	\$69.16	\$69.06	\$69.34	\$67.44	\$61.84	\$67.44	\$57.76	\$82.66
Total Shop Rate	\$103.74	\$103.59	\$104.01	\$101.16	\$92.76	\$101.16	\$86.64	\$123.99
Altus, OK								
Direct Wage	\$30.84	\$30.79	\$30.92	\$30.07	\$27.57	\$30.07	\$25.75	\$36.85
Markup	\$61.68	\$61.58	\$61.84	\$60.14	\$55.14	\$60.14	\$51.50	\$73.70
Total Shop Rate	\$92.52	\$92.37	\$92.76	\$90.21	\$82.71	\$90.21	\$77.25	\$110.55
Amarillo, TX								
Direct Wage	\$31.23	\$31.18	\$31.31	\$30.45	\$27.92	\$30.45	\$26.08	\$37.32
Markup	\$62.46	\$62.36	\$62.62	\$60.90	\$55.84	\$60.90	\$52.16	\$74.64
Total Shop Rate	\$93.69	\$93.54	\$93.93	\$91.35	\$83.76	\$91.35	\$78.24	\$111.96
Anacortes, WA								
Direct Wage	\$42.55	\$42.49	\$42.66	\$41.49	\$38.05	\$41.49	\$35.54	\$50.85
Markup	\$85.10	\$84.98	\$85.32	\$82.98	\$76.10	\$82.98	\$71.08	\$101.70
Total Shop Rate	\$127.65	\$127.47	\$127.98	\$124.47	\$114.15	\$124.47	\$106.62	\$152.55
Anaheim, CA								
Direct Wage	\$41.81	\$41.75	\$41.92	\$40.77	\$37.39	\$40.77	\$34.92	\$49.97
Markup	\$83.62	\$83.50	\$83.84	\$81.54	\$74.78	\$81.54	\$69.84	\$99.94
Total Shop Rate	\$125.43	\$125.25	\$125.76	\$122.31	\$112.17	\$122.31	\$104.76	\$149.91
Anchorage, AK								
Direct Wage	\$48.06	\$47.99	\$48.19	\$46.87	\$42.98	\$46.87	\$40.14	\$57.44
Markup	\$96.12	\$95.98	\$96.38	\$93.74	\$85.96	\$93.74	\$80.28	\$114.88
Total Shop Rate	\$144.18	\$143.97	\$144.57	\$140.61	\$128.94	\$140.61	\$120.42	\$172.32
Ann Arbor, MI								
Direct Wage	\$49.23	\$49.15	\$49.36	\$48.00	\$44.02	\$48.00	\$41.11	\$58.83
Markup	\$98.46	\$98.30	\$98.72	\$96.00	\$88.04	\$96.00	\$82.22	\$117.66
Total Shop Rate	\$147.69	\$147.45	\$148.08	\$144.00	\$132.06	\$144.00	\$123.33	\$176.49
Annapolis, MD								
Direct Wage	\$35.96	\$35.90	\$36.05	\$35.06	\$32.15	\$35.06	\$30.03	\$42.97
Markup	\$71.92	\$71.80	\$72.10	\$70.12	\$64.30	\$70.12	\$60.06	\$85.94
Total Shop Rate	\$107.88	\$107.70	\$108.15	\$105.18	\$96.45	\$105.18	\$90.09	\$128.91

Note: Total shop rates are expressed as costs per hour. Shop markup includes all benefits, non-productive time, support, and supervision.

3.2 In-House Shop Rates, Selected Areas

Area	Staff HVAC Tech	Staff Electrician	Staff Plumber	Staff Carpenter	Staff Painter	Staff Road Worker	General Maintenance Worker	Trade Shop Supervisor
Atlanta, GA								
Direct Wage	\$32.50	\$32.45	\$32.59	\$31.69	\$29.07	\$31.69	\$27.15	\$38.85
Markup	\$65.00	\$64.90	\$65.18	\$63.38	\$58.14	\$63.38	\$54.30	\$77.70
Total Shop Rate	\$97.50	\$97.35	\$97.77	\$95.07	\$87.21	\$95.07	\$81.45	\$116.55
Atlantic City, NJ								
Direct Wage	\$52.11	\$52.03	\$52.25	\$50.81	\$46.60	\$50.81	\$43.52	\$62.28
Markup	\$104.22	\$104.06	\$104.50	\$101.62	\$93.20	\$101.62	\$87.04	\$124.56
Total Shop Rate	\$156.33	\$156.09	\$156.75	\$152.43	\$139.80	\$152.43	\$130.56	\$186.84
Augusta, ME								
Direct Wage	\$31.08	\$31.03	\$31.16	\$30.30	\$27.79	\$30.30	\$25.96	\$37.14
Markup	\$62.16	\$62.06	\$62.32	\$60.60	\$55.58	\$60.60	\$51.92	\$74.28
Total Shop Rate	\$93.24	\$93.09	\$93.48	\$90.90	\$83.37	\$90.90	\$77.88	\$111.42
Austin, TX								
Direct Wage	\$27.50	\$27.46	\$27.57	\$26.81	\$24.59	\$26.81	\$22.96	\$32.86
Markup	\$55.00	\$54.92	\$55.14	\$53.62	\$49.18	\$53.62	\$45.92	\$65.72
Total Shop Rate	\$82.50	\$82.38	\$82.71	\$80.43	\$73.77	\$80.43	\$68.88	\$98.58
Bakersfield, CA								
Direct Wage	\$39.91	\$39.85	\$40.02	\$38.92	\$35.69	\$38.92	\$33.33	\$47.70
Markup	\$79.82	\$79.70	\$80.04	\$77.84	\$71.38	\$77.84	\$66.66	\$95.40
Total Shop Rate	\$119.73	\$119.55	\$120.06	\$116.76	\$107.07	\$116.76	\$99.99	\$143.10
Baltimore, MD								
Direct Wage	\$35.96	\$35.90	\$36.05	\$35.06	\$32.15	\$35.06	\$30.03	\$42.97
Markup	\$71.92	\$71.80	\$72.10	\$70.12	\$64.30	\$70.12	\$60.06	\$85.94
Total Shop Rate	\$107.88	\$107.70	\$108.15	\$105.18	\$96.45	\$105.18	\$90.09	\$128.91
Baton Rouge, LA								
Direct Wage	\$30.51	\$30.46	\$30.59	\$29.75	\$27.28	\$29.75	\$25.48	\$36.46
Markup	\$61.02	\$60.92	\$61.18	\$59.50	\$54.56	\$59.50	\$50.96	\$72.92
Total Shop Rate	\$91.53	\$91.38	\$91.77	\$89.25	\$81.84	\$89.25	\$76.44	\$109.38
Battle Creek, MI								
Direct Wage	\$36.67	\$36.62	\$36.77	\$35.76	\$32.80	\$35.76	\$30.63	\$43.83
Markup	\$73.34	\$73.24	\$73.54	\$71.52	\$65.60	\$71.52	\$61.26	\$87.66
Total Shop Rate	\$110.01	\$109.86	\$110.31	\$107.28	\$98.40	\$107.28	\$91.89	\$131.49
Beaufort, SC								
Direct Wage	\$27.29	\$27.24	\$27.36	\$26.60	\$24.40	\$26.60	\$22.79	\$32.61
Markup	\$54.58	\$54.48	\$54.72	\$53.20	\$48.80	\$53.20	\$45.58	\$65.22
Total Shop Rate	\$81.87	\$81.72	\$82.08	\$79.80	\$73.20	\$79.80	\$68.37	\$97.83
Beaumont, TX								
Direct Wage	\$32.11	\$32.06	\$32.20	\$31.31	\$28.72	\$31.31	\$26.82	\$38.38
Markup	\$64.22	\$64.12	\$64.40	\$62.62	\$57.44	\$62.62	\$53.64	\$76.76
Total Shop Rate	\$96.33	\$96.18	\$96.60	\$93.93	\$86.16	\$93.93	\$80.46	\$115.14
Billings, MT								
Direct Wage	\$33.54	\$33.49	\$33.63	\$32.70	\$29.99	\$32.70	\$28.01	\$40.08
Markup	\$67.08	\$66.98	\$67.26	\$65.40	\$59.98	\$65.40	\$56.02	\$80.16
Total Shop Rate	\$100.62	\$100.47	\$100.89	\$98.10	\$89.97	\$98.10	\$84.03	\$120.24

Note: Total shop rates are expressed as costs per hour. Shop markup includes all benefits, non-productive time, support, and supervision.

3.2 In-House Shop Rates, Selected Areas

Area	Staff HVAC Tech	Staff Electrician	Staff Plumber	Staff Carpenter	Staff Painter	Staff Road Worker	General Maintenance Worker	Trade Shop Supervisor
Biloxi, MS								
Direct Wage	\$29.38	\$29.33	\$29.46	\$28.64	\$26.27	\$28.64	\$24.54	\$35.11
Markup	\$58.76	\$58.66	\$58.92	\$57.28	\$52.54	\$57.28	\$49.08	\$70.22
Total Shop Rate	\$88.14	\$87.99	\$88.38	\$85.92	\$78.81	\$85.92	\$73.62	\$105.33
Birmingham, AL								
Direct Wage	\$29.66	\$29.62	\$29.74	\$28.92	\$26.53	\$28.92	\$24.77	\$35.45
Markup	\$59.32	\$59.24	\$59.48	\$57.84	\$53.06	\$57.84	\$49.54	\$70.90
Total Shop Rate	\$88.98	\$88.86	\$89.22	\$86.76	\$79.59	\$86.76	\$74.31	\$106.35
Bismarck, ND								
Direct Wage	\$30.49	\$30.45	\$30.57	\$29.73	\$27.27	\$29.73	\$25.47	\$36.44
Markup	\$60.98	\$60.90	\$61.14	\$59.46	\$54.54	\$59.46	\$50.94	\$72.88
Total Shop Rate	\$91.47	\$91.35	\$91.71	\$89.19	\$81.81	\$89.19	\$76.41	\$109.32
Boise, ID								
Direct Wage	\$34.45	\$34.40	\$34.54	\$33.59	\$30.81	\$33.59	\$28.77	\$41.17
Markup	\$68.90	\$68.80	\$69.08	\$67.18	\$61.62	\$67.18	\$57.54	\$82.34
Total Shop Rate	\$103.35	\$103.20	\$103.62	\$100.77	\$92.43	\$100.77	\$86.31	\$123.51
Boston, MA								
Direct Wage	\$43.71	\$43.64	\$43.82	\$42.62	\$39.09	\$42.62	\$36.50	\$52.24
Markup	\$87.42	\$87.28	\$87.64	\$85.24	\$78.18	\$85.24	\$73.00	\$104.48
Total Shop Rate	\$131.13	\$130.92	\$131.46	\$127.86	\$117.27	\$127.86	\$109.50	\$156.72
Boulder, CO								
Direct Wage	\$39.00	\$38.94	\$39.11	\$38.03	\$34.88	\$38.03	\$32.57	\$46.61
Markup	\$78.00	\$77.88	\$78.22	\$76.06	\$69.76	\$76.06	\$65.14	\$93.22
Total Shop Rate	\$117.00	\$116.82	\$117.33	\$114.09	\$104.64	\$114.09	\$97.71	\$139.83
Bowling Green, KY								
Direct Wage	\$28.64	\$28.59	\$28.71	\$27.92	\$25.61	\$27.92	\$23.92	\$34.22
Markup	\$57.28	\$57.18	\$57.42	\$55.84	\$51.22	\$55.84	\$47.84	\$68.44
Total Shop Rate	\$85.92	\$85.77	\$86.13	\$83.76	\$76.83	\$83.76	\$71.76	\$102.66
Brockton, MA								
Direct Wage	\$35.59	\$35.54	\$35.68	\$34.70	\$31.83	\$34.70	\$29.72	\$42.53
Markup	\$71.18	\$71.08	\$71.36	\$69.40	\$63.66	\$69.40	\$59.44	\$85.06
Total Shop Rate	\$106.77	\$106.62	\$107.04	\$104.10	\$95.49	\$104.10	\$89.16	\$127.59
Buffalo, NY								
Direct Wage	\$37.13	\$37.07	\$37.23	\$36.20	\$33.20	\$36.20	\$31.01	\$44.37
Markup	\$74.26	\$74.14	\$74.46	\$72.40	\$66.40	\$72.40	\$62.02	\$88.74
Total Shop Rate	\$111.39	\$111.21	\$111.69	\$108.60	\$99.60	\$108.60	\$93.03	\$133.11
Burlington, VT								
Direct Wage	\$30.99	\$30.94	\$31.07	\$30.22	\$27.71	\$30.22	\$25.88	\$37.04
Markup	\$61.98	\$61.88	\$62.14	\$60.44	\$55.42	\$60.44	\$51.76	\$74.08
Total Shop Rate	\$92.97	\$92.82	\$93.21	\$90.66	\$83.13	\$90.66	\$77.64	\$111.12
Camden, NJ								
Direct Wage	\$55.89	\$55.80	\$56.04	\$54.49	\$49.98	\$54.49	\$46.68	\$66.79
Markup	\$111.78	\$111.60	\$112.08	\$108.98	\$99.96	\$108.98	\$93.36	\$133.58
Total Shop Rate	\$167.67	\$167.40	\$168.12	\$163.47	\$149.94	\$163.47	\$140.04	\$200.37

Note: Total shop rates are expressed as costs per hour. Shop markup includes all benefits, non-productive time, support, and supervision.

3.2 In-House Shop Rates, Selected Areas

Area	Staff HVAC Tech	Staff Electrician	Staff Plumber	Staff Carpenter	Staff Painter	Staff Road Worker	General Maintenance Worker	Trade Shop Supervisor
Carson City, NV								
Direct Wage	\$38.46	\$38.40	\$38.56	\$37.50	\$34.39	\$37.50	\$32.12	\$45.96
Markup	\$76.92	\$76.80	\$77.12	\$75.00	\$68.78	\$75.00	\$64.24	\$91.92
Total Shop Rate	\$115.38	\$115.20	\$115.68	\$112.50	\$103.17	\$112.50	\$96.36	\$137.88
Cedar Rapids, IA								
Direct Wage	\$36.05	\$36.00	\$36.15	\$35.15	\$32.24	\$35.15	\$30.11	\$43.09
Markup	\$72.10	\$72.00	\$72.30	\$70.30	\$64.48	\$70.30	\$60.22	\$86.18
Total Shop Rate	\$108.15	\$108.00	\$108.45	\$105.45	\$96.72	\$105.45	\$90.33	\$129.27
Charleston, SC								
Direct Wage	\$27.29	\$27.24	\$27.36	\$26.60	\$24.40	\$26.60	\$22.79	\$32.61
Markup	\$54.58	\$54.48	\$54.72	\$53.20	\$48.80	\$53.20	\$45.58	\$65.22
Total Shop Rate	\$81.87	\$81.72	\$82.08	\$79.80	\$73.20	\$79.80	\$68.37	\$97.83
Charleston, WV								
Direct Wage	\$36.98	\$36.93	\$37.08	\$36.06	\$33.07	\$36.06	\$30.89	\$44.20
Markup	\$73.96	\$73.86	\$74.16	\$72.12	\$66.14	\$72.12	\$61.78	\$88.40
Total Shop Rate	\$110.94	\$110.79	\$111.24	\$108.18	\$99.21	\$108.18	\$92.67	\$132.60
Charlotte, NC								
Direct Wage	\$26.21	\$26.17	\$26.28	\$25.56	\$23.44	\$25.56	\$21.89	\$31.32
Markup	\$52.42	\$52.34	\$52.56	\$51.12	\$46.88	\$51.12	\$43.78	\$62.64
Total Shop Rate	\$78.63	\$78.51	\$78.84	\$76.68	\$70.32	\$76.68	\$65.67	\$93.96
Chattanooga, TN								
Direct Wage	\$33.29	\$33.24	\$33.37	\$32.46	\$29.77	\$32.46	\$27.80	\$39.78
Markup	\$66.58	\$66.48	\$66.74	\$64.92	\$59.54	\$64.92	\$55.60	\$79.56
Total Shop Rate	\$99.87	\$99.72	\$100.11	\$97.38	\$89.31	\$97.38	\$83.40	\$119.34
Cheyenne, WY								
Direct Wage	\$31.87	\$31.82	\$31.95	\$31.07	\$28.50	\$31.07	\$26.62	\$38.09
Markup	\$63.74	\$63.64	\$63.90	\$62.14	\$57.00	\$62.14	\$53.24	\$76.18
Total Shop Rate	\$95.61	\$95.46	\$95.85	\$93.21	\$85.50	\$93.21	\$79.86	\$114.27
Chicago, IL								
Direct Wage	\$49.87	\$49.80	\$50.00	\$48.63	\$44.60	\$48.63	\$41.65	\$59.60
Markup	\$99.74	\$99.60	\$100.00	\$97.26	\$89.20	\$97.26	\$83.30	\$119.20
Total Shop Rate	\$149.61	\$149.40	\$150.00	\$145.89	\$133.80	\$145.89	\$124.95	\$178.80
Cincinnati, OH								
Direct Wage	\$35.04	\$34.99	\$35.14	\$34.17	\$31.34	\$34.17	\$29.27	\$41.88
Markup	\$70.08	\$69.98	\$70.28	\$68.34	\$62.68	\$68.34	\$58.54	\$83.76
Total Shop Rate	\$105.12	\$104.97	\$105.42	\$102.51	\$94.02	\$102.51	\$87.81	\$125.64
Cleveland, OH								
Direct Wage	\$45.52	\$45.45	\$45.64	\$44.39	\$40.71	\$44.39	\$38.02	\$54.41
Markup	\$91.04	\$90.90	\$91.28	\$88.78	\$81.42	\$88.78	\$76.04	\$108.82
Total Shop Rate	\$136.56	\$136.35	\$136.92	\$133.17	\$122.13	\$133.17	\$114.06	\$163.23
Colorado Springs, CO								
Direct Wage	\$30.92	\$30.88	\$31.01	\$30.15	\$27.65	\$30.15	\$25.83	\$36.96
Markup	\$61.84	\$61.76	\$62.02	\$60.30	\$55.30	\$60.30	\$51.66	\$73.92
Total Shop Rate	\$92.76	\$92.64	\$93.03	\$90.45	\$82.95	\$90.45	\$77.49	\$110.88

Note: Total shop rates are expressed as costs per hour. Shop markup includes all benefits, non-productive time, support, and supervision.

3.2 In-House Shop Rates, Selected Areas

Area	Staff HVAC Tech	Staff Electrician	Staff Plumber	Staff Carpenter	Staff Painter	Staff Road Worker	General Maintenance Worker	Trade Shop Supervisor
Columbia, SC								
Direct Wage	\$25.55	\$25.51	\$25.62	\$24.91	\$22.85	\$24.91	\$21.34	\$30.54
Markup	\$51.10	\$51.02	\$51.24	\$49.82	\$45.70	\$49.82	\$42.68	\$61.08
Total Shop Rate	\$76.65	\$76.53	\$76.86	\$74.73	\$68.55	\$74.73	\$64.02	\$91.62
Columbus, GA								
Direct Wage	\$23.25	\$23.21	\$23.31	\$22.67	\$20.79	\$22.67	\$19.41	\$27.78
Markup	\$46.50	\$46.42	\$46.62	\$45.34	\$41.58	\$45.34	\$38.82	\$55.56
Total Shop Rate	\$69.75	\$69.63	\$69.93	\$68.01	\$62.37	\$68.01	\$58.23	\$83.34
Columbus, OH								
Direct Wage	\$34.88	\$34.83	\$34.97	\$34.01	\$31.19	\$34.01	\$29.13	\$41.69
Markup	\$69.76	\$69.66	\$69.94	\$68.02	\$62.38	\$68.02	\$58.26	\$83.38
Total Shop Rate	\$104.64	\$104.49	\$104.91	\$102.03	\$93.57	\$102.03	\$87.39	\$125.07
Concord, NH								
Direct Wage	\$32.91	\$32.86	\$33.00	\$32.09	\$29.43	\$32.09	\$27.49	\$39.33
Markup	\$65.82	\$65.72	\$66.00	\$64.18	\$58.86	\$64.18	\$54.98	\$78.66
Total Shop Rate	\$98.73	\$98.58	\$99.00	\$96.27	\$88.29	\$96.27	\$82.47	\$117.99
Corpus Christi, TX								
Direct Wage	\$28.48	\$28.44	\$28.56	\$27.77	\$25.47	\$27.77	\$23.79	\$34.04
Markup	\$56.96	\$56.88	\$57.12	\$55.54	\$50.94	\$55.54	\$47.58	\$68.08
Total Shop Rate	\$85.44	\$85.32	\$85.68	\$83.31	\$76.41	\$83.31	\$71.37	\$102.12
Cumberland, MD								
Direct Wage	\$34.68	\$34.63	\$34.77	\$33.82	\$31.02	\$33.82	\$28.97	\$41.45
Markup	\$69.36	\$69.26	\$69.54	\$67.64	\$62.04	\$67.64	\$57.94	\$82.90
Total Shop Rate	\$104.04	\$103.89	\$104.31	\$101.46	\$93.06	\$101.46	\$86.91	\$124.35
Dallas, TX								
Direct Wage	\$29.19	\$29.15	\$29.27	\$28.46	\$26.10	\$28.46	\$24.38	\$34.89
Markup	\$58.38	\$58.30	\$58.54	\$56.92	\$52.20	\$56.92	\$48.76	\$69.78
Total Shop Rate	\$87.57	\$87.45	\$87.81	\$85.38	\$78.30	\$85.38	\$73.14	\$104.67
Danbury, CT								
Direct Wage	\$42.20	\$42.14	\$42.31	\$41.15	\$37.74	\$41.15	\$35.25	\$50.44
Markup	\$84.40	\$84.28	\$84.62	\$82.30	\$75.48	\$82.30	\$70.50	\$100.88
Total Shop Rate	\$126.60	\$126.42	\$126.93	\$123.45	\$113.22	\$123.45	\$105.75	\$151.32
Davenport, IA								
Direct Wage	\$38.61	\$38.55	\$38.71	\$37.65	\$34.53	\$37.65	\$32.25	\$46.14
Markup	\$77.22	\$77.10	\$77.42	\$75.30	\$69.06	\$75.30	\$64.50	\$92.28
Total Shop Rate	\$115.83	\$115.65	\$116.13	\$112.95	\$103.59	\$112.95	\$96.75	\$138.42
Dayton, OH								
Direct Wage	\$36.48	\$36.42	\$36.57	\$35.57	\$32.62	\$35.57	\$30.46	\$43.60
Markup	\$72.96	\$72.84	\$73.14	\$71.14	\$65.24	\$71.14	\$60.92	\$87.20
Total Shop Rate	\$109.44	\$109.26	\$109.71	\$106.71	\$97.86	\$106.71	\$91.38	\$130.80
Daytona Beach, FL								
Direct Wage	\$24.22	\$24.19	\$24.29	\$23.62	\$21.66	\$23.62	\$20.23	\$28.95
Markup	\$48.44	\$48.38	\$48.58	\$47.24	\$43.32	\$47.24	\$40.46	\$57.90
Total Shop Rate	\$72.66	\$72.57	\$72.87	\$70.86	\$64.98	\$70.86	\$60.69	\$86.85

Note: Total shop rates are expressed as costs per hour. Shop markup includes all benefits, non-productive time, support, and supervision.

3.2 In-House Shop Rates, Selected Areas

Area	Staff HVAC Tech	Staff Electrician	Staff Plumber	Staff Carpenter	Staff Painter	Staff Road Worker	General Maintenance Worker	Trade Shop Supervisor
Denver, CO								
Direct Wage	\$35.43	\$35.37	\$35.52	\$34.54	\$31.68	\$34.54	\$29.59	\$42.34
Markup	\$70.86	\$70.74	\$71.04	\$69.08	\$63.36	\$69.08	\$59.18	\$84.68
Total Shop Rate	\$106.29	\$106.11	\$106.56	\$103.62	\$95.04	\$103.62	\$88.77	\$127.02
Des Moines, IA								
Direct Wage	\$38.09	\$38.03	\$38.19	\$37.14	\$34.06	\$37.14	\$31.81	\$45.52
Markup	\$76.18	\$76.06	\$76.38	\$74.28	\$68.12	\$74.28	\$63.62	\$91.04
Total Shop Rate	\$114.27	\$114.09	\$114.57	\$111.42	\$102.18	\$111.42	\$95.43	\$136.56
Detroit, MI								
Direct Wage	\$47.35	\$47.28	\$47.47	\$46.17	\$42.34	\$46.17	\$39.54	\$56.59
Markup	\$94.70	\$94.56	\$94.94	\$92.34	\$84.68	\$92.34	\$79.08	\$113.18
Total Shop Rate	\$142.05	\$141.84	\$142.41	\$138.51	\$127.02	\$138.51	\$118.62	\$169.77
Dover, DE								
Direct Wage	\$31.19	\$31.15	\$31.28	\$30.42	\$27.90	\$30.42	\$26.05	\$37.28
Markup	\$62.38	\$62.30	\$62.56	\$60.84	\$55.80	\$60.84	\$52.10	\$74.56
Total Shop Rate	\$93.57	\$93.45	\$93.84	\$91.26	\$83.70	\$91.26	\$78.15	\$111.84
Duluth, MN								
Direct Wage	\$39.42	\$39.36	\$39.52	\$38.43	\$35.25	\$38.43	\$32.92	\$47.11
Markup	\$78.84	\$78.72	\$79.04	\$76.86	\$70.50	\$76.86	\$65.84	\$94.22
Total Shop Rate	\$118.26	\$118.08	\$118.56	\$115.29	\$105.75	\$115.29	\$98.76	\$141.33
Eau Claire, WI								
Direct Wage	\$39.27	\$39.21	\$39.37	\$38.29	\$35.12	\$38.29	\$32.80	\$46.93
Markup	\$78.54	\$78.42	\$78.74	\$76.58	\$70.24	\$76.58	\$65.60	\$93.86
Total Shop Rate	\$117.81	\$117.63	\$118.11	\$114.87	\$105.36	\$114.87	\$98.40	\$140.79
El Paso, TX								
Direct Wage	\$26.10	\$26.06	\$26.17	\$25.45	\$23.34	\$25.45	\$21.79	\$31.19
Markup	\$52.20	\$52.12	\$52.34	\$50.90	\$46.68	\$50.90	\$43.58	\$62.38
Total Shop Rate	\$78.30	\$78.18	\$78.51	\$76.35	\$70.02	\$76.35	\$65.37	\$93.57
Erie, PA								
Direct Wage	\$36.02	\$35.97	\$36.12	\$35.12	\$32.21	\$35.12	\$30.08	\$43.05
Markup	\$72.04	\$71.94	\$72.24	\$70.24	\$64.42	\$70.24	\$60.16	\$86.10
Total Shop Rate	\$108.06	\$107.91	\$108.36	\$105.36	\$96.63	\$105.36	\$90.24	\$129.15
Eugene, OR								
Direct Wage	\$40.52	\$40.45	\$40.62	\$39.51	\$36.23	\$39.51	\$33.84	\$48.42
Markup	\$81.04	\$80.90	\$81.24	\$79.02	\$72.46	\$79.02	\$67.68	\$96.84
Total Shop Rate	\$121.56	\$121.35	\$121.86	\$118.53	\$108.69	\$118.53	\$101.52	\$145.26
Evansville, IN								
Direct Wage	\$38.20	\$38.15	\$38.31	\$37.25	\$34.16	\$37.25	\$31.91	\$45.66
Markup	\$76.40	\$76.30	\$76.62	\$74.50	\$68.32	\$74.50	\$63.82	\$91.32
Total Shop Rate	\$114.60	\$114.45	\$114.93	\$111.75	\$102.48	\$111.75	\$95.73	\$136.98
Fairbanks, AK								
Direct Wage	\$48.06	\$47.99	\$48.19	\$46.87	\$42.98	\$46.87	\$40.14	\$57.44
Markup	\$96.12	\$95.98	\$96.38	\$93.74	\$85.96	\$93.74	\$80.28	\$114.88
Total Shop Rate	\$144.18	\$143.97	\$144.57	\$140.61	\$128.94	\$140.61	\$120.42	\$172.32

Note: Total shop rates are expressed as costs per hour. Shop markup includes all benefits, non-productive time, support, and supervision.

3.2 In-House Shop Rates, Selected Areas

Area	Staff HVAC Tech	Staff Electrician	Staff Plumber	Staff Carpenter	Staff Painter	Staff Road Worker	General Maintenance Worker	Trade Shop Supervisor
Fall River, MA								
Direct Wage	\$36.99	\$36.93	\$37.09	\$36.07	\$33.08	\$36.07	\$30.89	\$44.21
Markup	\$73.98	\$73.86	\$74.18	\$72.14	\$66.16	\$72.14	\$61.78	\$88.42
Total Shop Rate	\$110.97	\$110.79	\$111.27	\$108.21	\$99.24	\$108.21	\$92.67	\$132.63
Fargo, ND								
Direct Wage	\$31.02	\$30.98	\$31.10	\$30.25	\$27.74	\$30.25	\$25.91	\$37.08
Markup	\$62.04	\$61.96	\$62.20	\$60.50	\$55.48	\$60.50	\$51.82	\$74.16
Total Shop Rate	\$93.06	\$92.94	\$93.30	\$90.75	\$83.22	\$90.75	\$77.73	\$111.24
Fayetteville, AR								
Direct Wage	\$27.43	\$27.39	\$27.50	\$26.75	\$24.53	\$26.75	\$22.91	\$32.78
Markup	\$54.86	\$54.78	\$55.00	\$53.50	\$49.06	\$53.50	\$45.82	\$65.56
Total Shop Rate	\$82.29	\$82.17	\$82.50	\$80.25	\$73.59	\$80.25	\$68.73	\$98.34
Flint, MI								
Direct Wage	\$48.74	\$48.67	\$48.87	\$47.52	\$43.59	\$47.52	\$40.71	\$58.25
Markup	\$97.48	\$97.34	\$97.74	\$95.04	\$87.18	\$95.04	\$81.42	\$116.50
Total Shop Rate	\$146.22	\$146.01	\$146.61	\$142.56	\$130.77	\$142.56	\$122.13	\$174.75
Fort Lauderdale, FL								
Direct Wage	\$30.37	\$30.32	\$30.45	\$29.61	\$27.16	\$29.61	\$25.36	\$36.30
Markup	\$60.74	\$60.64	\$60.90	\$59.22	\$54.32	\$59.22	\$50.72	\$72.60
Total Shop Rate	\$91.11	\$90.96	\$91.35	\$88.83	\$81.48	\$88.83	\$76.08	\$108.90
Fort Smith, AR								
Direct Wage	\$29.21	\$29.16	\$29.28	\$28.48	\$26.12	\$28.48	\$24.39	\$34.91
Markup	\$58.42	\$58.32	\$58.56	\$56.96	\$52.24	\$56.96	\$48.78	\$69.82
Total Shop Rate	\$87.63	\$87.48	\$87.84	\$85.44	\$78.36	\$85.44	\$73.17	\$104.73
Fort Worth, TX								
Direct Wage	\$29.00	\$28.96	\$29.08	\$28.28	\$25.94	\$28.28	\$24.22	\$34.66
Markup	\$58.00	\$57.92	\$58.16	\$56.56	\$51.88	\$56.56	\$48.44	\$69.32
Total Shop Rate	\$87.00	\$86.88	\$87.24	\$84.84	\$77.82	\$84.84	\$72.66	\$103.98
Frankfort, KY								
Direct Wage	\$28.64	\$28.59	\$28.71	\$27.92	\$25.61	\$27.92	\$23.92	\$34.22
Markup	\$57.28	\$57.18	\$57.42	\$55.84	\$51.22	\$55.84	\$47.84	\$68.44
Total Shop Rate	\$85.92	\$85.77	\$86.13	\$83.76	\$76.83	\$83.76	\$71.76	\$102.66
Fresno, CA								
Direct Wage	\$36.78	\$36.72	\$36.88	\$35.86	\$32.89	\$35.86	\$30.72	\$43.96
Markup	\$73.56	\$73.44	\$73.76	\$71.72	\$65.78	\$71.72	\$61.44	\$87.92
Total Shop Rate	\$110.34	\$110.16	\$110.64	\$107.58	\$98.67	\$107.58	\$92.16	\$131.88
Gary, IN								
Direct Wage	\$46.68	\$46.61	\$46.80	\$45.52	\$41.74	\$45.52	\$38.99	\$55.79
Markup	\$93.36	\$93.22	\$93.60	\$91.04	\$83.48	\$91.04	\$77.98	\$111.58
Total Shop Rate	\$140.04	\$139.83	\$140.40	\$136.56	\$125.22	\$136.56	\$116.97	\$167.37
Grand Rapids, MI								
Direct Wage	\$36.10	\$36.04	\$36.19	\$35.19	\$32.28	\$35.19	\$30.15	\$43.14
Markup	\$72.20	\$72.08	\$72.38	\$70.38	\$64.56	\$70.38	\$60.30	\$86.28
Total Shop Rate	\$108.30	\$108.12	\$108.57	\$105.57	\$96.84	\$105.57	\$90.45	\$129.42

Note: Total shop rates are expressed as costs per hour. Shop markup includes all benefits, non-productive time, support, and supervision.

3.2 In-House Shop Rates, Selected Areas

Area	Staff HVAC Tech	Staff Electrician	Staff Plumber	Staff Carpenter	Staff Painter	Staff Road Worker	General Maintenance Worker	Trade Shop Supervisor
Great Falls, MT								
Direct Wage	\$35.96	\$35.90	\$36.05	\$35.06	\$32.15	\$35.06	\$30.03	\$42.97
Markup	\$71.92	\$71.80	\$72.10	\$70.12	\$64.30	\$70.12	\$60.06	\$85.94
Total Shop Rate	\$107.88	\$107.70	\$108.15	\$105.18	\$96.45	\$105.18	\$90.09	\$128.91
Green Bay, WI								
Direct Wage	\$34.16	\$34.11	\$34.25	\$33.31	\$30.55	\$33.31	\$28.53	\$40.82
Markup	\$68.32	\$68.22	\$68.50	\$66.62	\$61.10	\$66.62	\$57.06	\$81.64
Total Shop Rate	\$102.48	\$102.33	\$102.75	\$99.93	\$91.65	\$99.93	\$85.59	\$122.46
Greensboro, NC								
Direct Wage	\$25.09	\$25.06	\$25.16	\$24.47	\$22.44	\$24.47	\$20.96	\$29.99
Markup	\$50.18	\$50.12	\$50.32	\$48.94	\$44.88	\$48.94	\$41.92	\$59.98
Total Shop Rate	\$75.27	\$75.18	\$75.48	\$73.41	\$67.32	\$73.41	\$62.88	\$89.97
Hagatna, GU								
Direct Wage	\$20.88	\$20.85	\$20.93	\$20.36	\$18.67	\$20.36	\$17.44	\$24.95
Markup	\$41.76	\$41.70	\$41.86	\$40.72	\$37.34	\$40.72	\$34.88	\$49.90
Total Shop Rate	\$62.64	\$62.55	\$62.79	\$61.08	\$56.01	\$61.08	\$52.32	\$74.85
Hampton, VA								
Direct Wage	\$29.83	\$29.78	\$29.90	\$29.08	\$26.67	\$29.08	\$24.91	\$35.65
Markup	\$59.66	\$59.56	\$59.80	\$58.16	\$53.34	\$58.16	\$49.82	\$71.30
Total Shop Rate	\$89.49	\$89.34	\$89.70	\$87.24	\$80.01	\$87.24	\$74.73	\$106.95
Harrisburg, PA								
Direct Wage	\$34.86	\$34.80	\$34.95	\$33.99	\$31.17	\$33.99	\$29.11	\$41.66
Markup	\$69.72	\$69.60	\$69.90	\$67.98	\$62.34	\$67.98	\$58.22	\$83.32
Total Shop Rate	\$104.58	\$104.40	\$104.85	\$101.97	\$93.51	\$101.97	\$87.33	\$124.98
Hartford, CT								
Direct Wage	\$38.42	\$38.37	\$38.53	\$37.47	\$34.36	\$37.47	\$32.09	\$45.92
Markup	\$76.84	\$76.74	\$77.06	\$74.94	\$68.72	\$74.94	\$64.18	\$91.84
Total Shop Rate	\$115.26	\$115.11	\$115.59	\$112.41	\$103.08	\$112.41	\$96.27	\$137.76
Helena, MT								
Direct Wage	\$37.88	\$37.82	\$37.98	\$36.93	\$33.87	\$36.93	\$31.63	\$45.27
Markup	\$75.76	\$75.64	\$75.96	\$73.86	\$67.74	\$73.86	\$63.26	\$90.54
Total Shop Rate	\$113.64	\$113.46	\$113.94	\$110.79	\$101.61	\$110.79	\$94.89	\$135.81
Hilo, HI								
Direct Wage	\$43.82	\$43.76	\$43.94	\$42.73	\$39.19	\$42.73	\$36.60	\$52.37
Markup	\$87.64	\$87.52	\$87.88	\$85.46	\$78.38	\$85.46	\$73.20	\$104.74
Total Shop Rate	\$131.46	\$131.28	\$131.82	\$128.19	\$117.57	\$128.19	\$109.80	\$157.11
Honolulu, HI								
Direct Wage	\$43.82	\$43.76	\$43.94	\$42.73	\$39.19	\$42.73	\$36.60	\$52.37
Markup	\$87.64	\$87.52	\$87.88	\$85.46	\$78.38	\$85.46	\$73.20	\$104.74
Total Shop Rate	\$131.46	\$131.28	\$131.82	\$128.19	\$117.57	\$128.19	\$109.80	\$157.11
Houston, TX								
Direct Wage	\$30.15	\$30.11	\$30.23	\$29.40	\$26.96	\$29.40	\$25.18	\$36.03
Markup	\$60.30	\$60.22	\$60.46	\$58.80	\$53.92	\$58.80	\$50.36	\$72.06
Total Shop Rate	\$90.45	\$90.33	\$90.69	\$88.20	\$80.88	\$88.20	\$75.54	\$108.09

Note: Total shop rates are expressed as costs per hour. Shop markup includes all benefits, non-productive time, support, and supervision.

3.2 In-House Shop Rates, Selected Areas

Area	Staff HVAC Tech	Staff Electrician	Staff Plumber	Staff Carpenter	Staff Painter	Staff Road Worker	General Maintenance Worker	Trade Shop Supervisor
Huntsville, AL								
Direct Wage	\$33.33	\$33.28	\$33.42	\$32.50	\$29.80	\$32.50	\$27.83	\$39.83
Markup	\$66.66	\$66.56	\$66.84	\$65.00	\$59.60	\$65.00	\$55.66	\$79.66
Total Shop Rate	\$99.99	\$99.84	\$100.26	\$97.50	\$89.40	\$97.50	\$83.49	\$119.49
Indianapolis, IN								
Direct Wage	\$39.57	\$39.51	\$39.68	\$38.58	\$35.39	\$38.58	\$33.05	\$47.29
Markup	\$79.14	\$79.02	\$79.36	\$77.16	\$70.78	\$77.16	\$66.10	\$94.58
Total Shop Rate	\$118.71	\$118.53	\$119.04	\$115.74	\$106.17	\$115.74	\$99.15	\$141.87
Jackson, MS								
Direct Wage	\$31.84	\$31.79	\$31.92	\$31.04	\$28.47	\$31.04	\$26.59	\$38.05
Markup	\$63.68	\$63.58	\$63.84	\$62.08	\$56.94	\$62.08	\$53.18	\$76.10
Total Shop Rate	\$95.52	\$95.37	\$95.76	\$93.12	\$85.41	\$93.12	\$79.77	\$114.15
Jacksonville, FL								
Direct Wage	\$29.46	\$29.41	\$29.54	\$28.72	\$26.34	\$28.72	\$24.60	\$35.21
Markup	\$58.92	\$58.82	\$59.08	\$57.44	\$52.68	\$57.44	\$49.20	\$70.42
Total Shop Rate	\$88.38	\$88.23	\$88.62	\$86.16	\$79.02	\$86.16	\$73.80	\$105.63
Jefferson City, MO								
Direct Wage	\$38.70	\$38.64	\$38.80	\$37.74	\$34.61	\$37.74	\$32.32	\$46.25
Markup	\$77.40	\$77.28	\$77.60	\$75.48	\$69.22	\$75.48	\$64.64	\$92.50
Total Shop Rate	\$116.10	\$115.92	\$116.40	\$113.22	\$103.83	\$113.22	\$96.96	\$138.75
Jersey City, NJ								
Direct Wage	\$55.24	\$55.15	\$55.38	\$53.86	\$49.40	\$53.86	\$46.13	\$66.02
Markup	\$110.48	\$110.30	\$110.76	\$107.72	\$98.80	\$107.72	\$92.26	\$132.04
Total Shop Rate	\$165.72	\$165.45	\$166.14	\$161.58	\$148.20	\$161.58	\$138.39	\$198.06
Juneau, AK								
Direct Wage	\$48.06	\$47.99	\$48.19	\$46.87	\$42.98	\$46.87	\$40.14	\$57.44
Markup	\$96.12	\$95.98	\$96.38	\$93.74	\$85.96	\$93.74	\$80.28	\$114.88
Total Shop Rate	\$144.18	\$143.97	\$144.57	\$140.61	\$128.94	\$140.61	\$120.42	\$172.32
Kalamazoo, MI								
Direct Wage	\$36.67	\$36.62	\$36.77	\$35.76	\$32.80	\$35.76	\$30.63	\$43.83
Markup	\$73.34	\$73.24	\$73.54	\$71.52	\$65.60	\$71.52	\$61.26	\$87.66
Total Shop Rate	\$110.01	\$109.86	\$110.31	\$107.28	\$98.40	\$107.28	\$91.89	\$131.49
Kansas City, MO								
Direct Wage	\$42.20	\$42.14	\$42.31	\$41.15	\$37.74	\$41.15	\$35.25	\$50.44
Markup	\$84.40	\$84.28	\$84.62	\$82.30	\$75.48	\$82.30	\$70.50	\$100.88
Total Shop Rate	\$126.60	\$126.42	\$126.93	\$123.45	\$113.22	\$123.45	\$105.75	\$151.32
Key West, FL								
Direct Wage	\$28.25	\$28.20	\$28.32	\$27.54	\$25.26	\$27.54	\$23.59	\$33.76
Markup	\$56.50	\$56.40	\$56.64	\$55.08	\$50.52	\$55.08	\$47.18	\$67.52
Total Shop Rate	\$84.75	\$84.60	\$84.96	\$82.62	\$75.78	\$82.62	\$70.77	\$101.28
Knoxville, TN								
Direct Wage	\$28.61	\$28.57	\$28.69	\$27.90	\$25.59	\$27.90	\$23.90	\$34.20
Markup	\$57.22	\$57.14	\$57.38	\$55.80	\$51.18	\$55.80	\$47.80	\$68.40
Total Shop Rate	\$85.83	\$85.71	\$86.07	\$83.70	\$76.77	\$83.70	\$71.70	\$102.60

Note: Total shop rates are expressed as costs per hour. Shop markup includes all benefits, non-productive time, support, and supervision.

3.2 In-House Shop Rates, Selected Areas

Area	Staff HVAC Tech	Staff Electrician	Staff Plumber	Staff Carpenter	Staff Painter	Staff Road Worker	General Maintenance Worker	Trade Shop Supervisor
Kokomo, IN								
Direct Wage	\$48.94	\$48.87	\$49.07	\$47.72	\$43.77	\$47.72	\$40.88	\$58.49
Markup	\$97.88	\$97.74	\$98.14	\$95.44	\$87.54	\$95.44	\$81.76	\$116.98
Total Shop Rate	\$146.82	\$146.61	\$147.21	\$143.16	\$131.31	\$143.16	\$122.64	\$175.47
Lansing, MI								
Direct Wage	\$43.19	\$43.12	\$43.30	\$42.11	\$38.62	\$42.11	\$36.07	\$51.61
Markup	\$86.38	\$86.24	\$86.60	\$84.22	\$77.24	\$84.22	\$72.14	\$103.22
Total Shop Rate	\$129.57	\$129.36	\$129.90	\$126.33	\$115.86	\$126.33	\$108.21	\$154.83
Las Cruces, NM								
Direct Wage	\$26.02	\$25.98	\$26.09	\$25.37	\$23.27	\$25.37	\$21.73	\$31.10
Markup	\$52.04	\$51.96	\$52.18	\$50.74	\$46.54	\$50.74	\$43.46	\$62.20
Total Shop Rate	\$78.06	\$77.94	\$78.27	\$76.11	\$69.81	\$76.11	\$65.19	\$93.30
Las Vegas, NV								
Direct Wage	\$44.95	\$44.89	\$45.07	\$43.83	\$40.20	\$43.83	\$37.54	\$53.73
Markup	\$89.90	\$89.78	\$90.14	\$87.66	\$80.40	\$87.66	\$75.08	\$107.46
Total Shop Rate	\$134.85	\$134.67	\$135.21	\$131.49	\$120.60	\$131.49	\$112.62	\$161.19
Lawton, OK								
Direct Wage	\$32.85	\$32.80	\$32.94	\$32.03	\$29.38	\$32.03	\$27.44	\$39.27
Markup	\$65.70	\$65.60	\$65.88	\$64.06	\$58.76	\$64.06	\$54.88	\$78.54
Total Shop Rate	\$98.55	\$98.40	\$98.82	\$96.09	\$88.14	\$96.09	\$82.32	\$117.81
Lewiston, ME								
Direct Wage	\$36.28	\$36.22	\$36.37	\$35.37	\$32.44	\$35.37	\$30.30	\$43.35
Markup	\$72.56	\$72.44	\$72.74	\$70.74	\$64.88	\$70.74	\$60.60	\$86.70
Total Shop Rate	\$108.84	\$108.66	\$109.11	\$106.11	\$97.32	\$106.11	\$90.90	\$130.05
Lexington, KY								
Direct Wage	\$28.64	\$28.59	\$28.71	\$27.92	\$25.61	\$27.92	\$23.92	\$34.22
Markup	\$57.28	\$57.18	\$57.42	\$55.84	\$51.22	\$55.84	\$47.84	\$68.44
Total Shop Rate	\$85.92	\$85.77	\$86.13	\$83.76	\$76.83	\$83.76	\$71.76	\$102.66
Lincoln, NE								
Direct Wage	\$30.33	\$30.28	\$30.41	\$29.57	\$27.12	\$29.57	\$25.33	\$36.25
Markup	\$60.66	\$60.56	\$60.82	\$59.14	\$54.24	\$59.14	\$50.66	\$72.50
Total Shop Rate	\$90.99	\$90.84	\$91.23	\$88.71	\$81.36	\$88.71	\$75.99	\$108.75
Little Rock, AR								
Direct Wage	\$27.61	\$27.57	\$27.68	\$26.92	\$24.69	\$26.92	\$23.06	\$33.00
Markup	\$55.22	\$55.14	\$55.36	\$53.84	\$49.38	\$53.84	\$46.12	\$66.00
Total Shop Rate	\$82.83	\$82.71	\$83.04	\$80.76	\$74.07	\$80.76	\$69.18	\$99.00
Los Angeles, CA								
Direct Wage	\$41.81	\$41.75	\$41.92	\$40.77	\$37.39	\$40.77	\$34.92	\$49.97
Markup	\$83.62	\$83.50	\$83.84	\$81.54	\$74.78	\$81.54	\$69.84	\$99.94
Total Shop Rate	\$125.43	\$125.25	\$125.76	\$122.31	\$112.17	\$122.31	\$104.76	\$149.91
Louisville, KY								
Direct Wage	\$31.04	\$30.99	\$31.12	\$30.26	\$27.76	\$30.26	\$25.92	\$37.10
Markup	\$62.08	\$61.98	\$62.24	\$60.52	\$55.52	\$60.52	\$51.84	\$74.20
Total Shop Rate	\$93.12	\$92.97	\$93.36	\$90.78	\$83.28	\$90.78	\$77.76	\$111.30

Note: Total shop rates are expressed as costs per hour. Shop markup includes all benefits, non-productive time, support, and supervision.

3.2 In-House Shop Rates, Selected Areas

Area	Staff HVAC Tech	Staff Electrician	Staff Plumber	Staff Carpenter	Staff Painter	Staff Road Worker	General Maintenance Worker	Trade Shop Supervisor
Lowell, MA								
Direct Wage	\$35.20	\$35.15	\$35.29	\$34.32	\$31.48	\$34.32	\$29.40	\$42.07
Markup	\$70.40	\$70.30	\$70.58	\$68.64	\$62.96	\$68.64	\$58.80	\$84.14
Total Shop Rate	\$105.60	\$105.45	\$105.87	\$102.96	\$94.44	\$102.96	\$88.20	\$126.21
Lubbock, TX								
Direct Wage	\$23.43	\$23.39	\$23.49	\$22.84	\$20.95	\$22.84	\$19.56	\$28.00
Markup	\$46.86	\$46.78	\$46.98	\$45.68	\$41.90	\$45.68	\$39.12	\$56.00
Total Shop Rate	\$70.29	\$70.17	\$70.47	\$68.52	\$62.85	\$68.52	\$58.68	\$84.00
Macon, GA								
Direct Wage	\$27.89	\$27.85	\$27.96	\$27.19	\$24.94	\$27.19	\$23.29	\$33.33
Markup	\$55.78	\$55.70	\$55.92	\$54.38	\$49.88	\$54.38	\$46.58	\$66.66
Total Shop Rate	\$83.67	\$83.55	\$83.88	\$81.57	\$74.82	\$81.57	\$69.87	\$99.99
Madison, WI								
Direct Wage	\$38.84	\$38.78	\$38.94	\$37.87	\$34.73	\$37.87	\$32.44	\$46.42
Markup	\$77.68	\$77.56	\$77.88	\$75.74	\$69.46	\$75.74	\$64.88	\$92.84
Total Shop Rate	\$116.52	\$116.34	\$116.82	\$113.61	\$104.19	\$113.61	\$97.32	\$139.26
Manchester, NH								
Direct Wage	\$33.19	\$33.14	\$33.28	\$32.36	\$29.68	\$32.36	\$27.72	\$39.66
Markup	\$66.38	\$66.28	\$66.56	\$64.72	\$59.36	\$64.72	\$55.44	\$79.32
Total Shop Rate	\$99.57	\$99.42	\$99.84	\$97.08	\$89.04	\$97.08	\$83.16	\$118.98
Marquette, MI								
Direct Wage	\$39.42	\$39.36	\$39.52	\$38.43	\$35.25	\$38.43	\$32.92	\$47.11
Markup	\$78.84	\$78.72	\$79.04	\$76.86	\$70.50	\$76.86	\$65.84	\$94.22
Total Shop Rate	\$118.26	\$118.08	\$118.56	\$115.29	\$105.75	\$115.29	\$98.76	\$141.33
Medford, OR								
Direct Wage	\$37.40	\$37.34	\$37.50	\$36.46	\$33.44	\$36.46	\$31.23	\$44.70
Markup	\$74.80	\$74.68	\$75.00	\$72.92	\$66.88	\$72.92	\$62.46	\$89.40
Total Shop Rate	\$112.20	\$112.02	\$112.50	\$109.38	\$100.32	\$109.38	\$93.69	\$134.10
Memphis, TN								
Direct Wage	\$30.86	\$30.81	\$30.94	\$30.09	\$27.60	\$30.09	\$25.77	\$36.88
Markup	\$61.72	\$61.62	\$61.88	\$60.18	\$55.20	\$60.18	\$51.54	\$73.76
Total Shop Rate	\$92.58	\$92.43	\$92.82	\$90.27	\$82.80	\$90.27	\$77.31	\$110.64
Miami, FL								
Direct Wage	\$29.72	\$29.67	\$29.80	\$28.98	\$26.58	\$28.98	\$24.82	\$35.52
Markup	\$59.44	\$59.34	\$59.60	\$57.96	\$53.16	\$57.96	\$49.64	\$71.04
Total Shop Rate	\$89.16	\$89.01	\$89.40	\$86.94	\$79.74	\$86.94	\$74.46	\$106.56
Milwaukee, WI								
Direct Wage	\$40.32	\$40.26	\$40.43	\$39.32	\$36.06	\$39.32	\$33.67	\$48.19
Markup	\$80.64	\$80.52	\$80.86	\$78.64	\$72.12	\$78.64	\$67.34	\$96.38
Total Shop Rate	\$120.96	\$120.78	\$121.29	\$117.96	\$108.18	\$117.96	\$101.01	\$144.57
Minneapolis, MN								
Direct Wage	\$46.68	\$46.61	\$46.80	\$45.52	\$41.74	\$45.52	\$38.99	\$55.79
Markup	\$93.36	\$93.22	\$93.60	\$91.04	\$83.48	\$91.04	\$77.98	\$111.58
Total Shop Rate	\$140.04	\$139.83	\$140.40	\$136.56	\$125.22	\$136.56	\$116.97	\$167.37

Note: Total shop rates are expressed as costs per hour. Shop markup includes all benefits, non-productive time, support, and supervision.

3.2 In-House Shop Rates, Selected Areas

Area	Staff HVAC Tech	Staff Electrician	Staff Plumber	Staff Carpenter	Staff Painter	Staff Road Worker	General Maintenance Worker	Trade Shop Supervisor
Mobile, AL								
Direct Wage	\$26.10	\$26.06	\$26.17	\$25.45	\$23.34	\$25.45	\$21.79	\$31.19
Markup	\$52.20	\$52.12	\$52.34	\$50.90	\$46.68	\$50.90	\$43.58	\$62.38
Total Shop Rate	\$78.30	\$78.18	\$78.51	\$76.35	\$70.02	\$76.35	\$65.37	\$93.57
Moline, IL								
Direct Wage	\$38.61	\$38.55	\$38.71	\$37.65	\$34.53	\$37.65	\$32.25	\$46.14
Markup	\$77.22	\$77.10	\$77.42	\$75.30	\$69.06	\$75.30	\$64.50	\$92.28
Total Shop Rate	\$115.83	\$115.65	\$116.13	\$112.95	\$103.59	\$112.95	\$96.75	\$138.42
Montgomery, AL								
Direct Wage	\$24.75	\$24.72	\$24.82	\$24.14	\$22.14	\$24.14	\$20.67	\$29.58
Markup	\$49.50	\$49.44	\$49.64	\$48.28	\$44.28	\$48.28	\$41.34	\$59.16
Total Shop Rate	\$74.25	\$74.16	\$74.46	\$72.42	\$66.42	\$72.42	\$62.01	\$88.74
Montpelier, VT								
Direct Wage	\$30.99	\$30.94	\$31.07	\$30.22	\$27.71	\$30.22	\$25.88	\$37.04
Markup	\$61.98	\$61.88	\$62.14	\$60.44	\$55.42	\$60.44	\$51.76	\$74.08
Total Shop Rate	\$92.97	\$92.82	\$93.21	\$90.66	\$83.13	\$90.66	\$77.64	\$111.12
Morristown, NJ								
Direct Wage	\$55.24	\$55.15	\$55.38	\$53.86	\$49.40	\$53.86	\$46.13	\$66.02
Markup	\$110.48	\$110.30	\$110.76	\$107.72	\$98.80	\$107.72	\$92.26	\$132.04
Total Shop Rate	\$165.72	\$165.45	\$166.14	\$161.58	\$148.20	\$161.58	\$138.39	\$198.06
Muncie, IN								
Direct Wage	\$33.01	\$32.96	\$33.10	\$32.19	\$29.52	\$32.19	\$27.57	\$39.45
Markup	\$66.02	\$65.92	\$66.20	\$64.38	\$59.04	\$64.38	\$55.14	\$78.90
Total Shop Rate	\$99.03	\$98.88	\$99.30	\$96.57	\$88.56	\$96.57	\$82.71	\$118.35
Nashville, TN								
Direct Wage	\$25.05	\$25.02	\$25.12	\$24.43	\$22.40	\$24.43	\$20.92	\$29.94
Markup	\$50.10	\$50.04	\$50.24	\$48.86	\$44.80	\$48.86	\$41.84	\$59.88
Total Shop Rate	\$75.15	\$75.06	\$75.36	\$73.29	\$67.20	\$73.29	\$62.76	\$89.82
New Brunswick, NJ								
Direct Wage	\$62.00	\$61.90	\$62.16	\$60.45	\$55.44	\$60.45	\$51.78	\$74.09
Markup	\$124.00	\$123.80	\$124.32	\$120.90	\$110.88	\$120.90	\$103.56	\$148.18
Total Shop Rate	\$186.00	\$185.70	\$186.48	\$181.35	\$166.32	\$181.35	\$155.34	\$222.27
New Haven, CT								
Direct Wage	\$38.23	\$38.17	\$38.33	\$37.27	\$34.19	\$37.27	\$31.93	\$45.69
Markup	\$76.46	\$76.34	\$76.66	\$74.54	\$68.38	\$74.54	\$63.86	\$91.38
Total Shop Rate	\$114.69	\$114.51	\$114.99	\$111.81	\$102.57	\$111.81	\$95.79	\$137.07
New Orleans, LA								
Direct Wage	\$33.79	\$33.74	\$33.88	\$32.95	\$30.22	\$32.95	\$28.22	\$40.38
Markup	\$67.58	\$67.48	\$67.76	\$65.90	\$60.44	\$65.90	\$56.44	\$80.76
Total Shop Rate	\$101.37	\$101.22	\$101.64	\$98.85	\$90.66	\$98.85	\$84.66	\$121.14
New York, NY								
Direct Wage	\$58.55	\$58.46	\$58.71	\$57.09	\$52.36	\$57.09	\$48.90	\$69.98
Markup	\$117.10	\$116.92	\$117.42	\$114.18	\$104.72	\$114.18	\$97.80	\$139.96
Total Shop Rate	\$175.65	\$175.38	\$176.13	\$171.27	\$157.08	\$171.27	\$146.70	\$209.94

Note: Total shop rates are expressed as costs per hour. Shop markup includes all benefits, non-productive time, support, and supervision.

3.2 In-House Shop Rates, Selected Areas

Area	Staff HVAC Tech	Staff Electrician	Staff Plumber	Staff Carpenter	Staff Painter	Staff Road Worker	General Maintenance Worker	Trade Shop Supervisor
Newark, NJ								
Direct Wage	\$55.24	\$55.15	\$55.38	\$53.86	\$49.40	\$53.86	\$46.13	\$66.02
Markup	\$110.48	\$110.30	\$110.76	\$107.72	\$98.80	\$107.72	\$92.26	\$132.04
Total Shop Rate	\$165.72	\$165.45	\$166.14	\$161.58	\$148.20	\$161.58	\$138.39	\$198.06
Newport News, VA								
Direct Wage	\$29.83	\$29.78	\$29.90	\$29.08	\$26.67	\$29.08	\$24.91	\$35.65
Markup	\$59.66	\$59.56	\$59.80	\$58.16	\$53.34	\$58.16	\$49.82	\$71.30
Total Shop Rate	\$89.49	\$89.34	\$89.70	\$87.24	\$80.01	\$87.24	\$74.73	\$106.95
Norfolk, VA								
Direct Wage	\$29.83	\$29.78	\$29.90	\$29.08	\$26.67	\$29.08	\$24.91	\$35.65
Markup	\$59.66	\$59.56	\$59.80	\$58.16	\$53.34	\$58.16	\$49.82	\$71.30
Total Shop Rate	\$89.49	\$89.34	\$89.70	\$87.24	\$80.01	\$87.24	\$74.73	\$106.95
Norwalk, CT								
Direct Wage	\$38.45	\$38.39	\$38.55	\$37.49	\$34.38	\$37.49	\$32.11	\$45.95
Markup	\$76.90	\$76.78	\$77.10	\$74.98	\$68.76	\$74.98	\$64.22	\$91.90
Total Shop Rate	\$115.35	\$115.17	\$115.65	\$112.47	\$103.14	\$112.47	\$96.33	\$137.85
Norwich, CT								
Direct Wage	\$40.09	\$40.03	\$40.20	\$39.09	\$35.85	\$39.09	\$33.48	\$47.92
Markup	\$80.18	\$80.06	\$80.40	\$78.18	\$71.70	\$78.18	\$66.96	\$95.84
Total Shop Rate	\$120.27	\$120.09	\$120.60	\$117.27	\$107.55	\$117.27	\$100.44	\$143.76
Oakland, CA								
Direct Wage	\$52.57	\$52.49	\$52.71	\$51.26	\$47.01	\$51.26	\$43.90	\$62.82
Markup	\$105.14	\$104.98	\$105.42	\$102.52	\$94.02	\$102.52	\$87.80	\$125.64
Total Shop Rate	\$157.71	\$157.47	\$158.13	\$153.78	\$141.03	\$153.78	\$131.70	\$188.46
Ogden, UT								
Direct Wage	\$30.09	\$30.04	\$30.17	\$29.34	\$26.90	\$29.34	\$25.13	\$35.96
Markup	\$60.18	\$60.08	\$60.34	\$58.68	\$53.80	\$58.68	\$50.26	\$71.92
Total Shop Rate	\$90.27	\$90.12	\$90.51	\$88.02	\$80.70	\$88.02	\$75.39	\$107.88
Oklahoma City, OK								
Direct Wage	\$28.51	\$28.46	\$28.58	\$27.80	\$25.49	\$27.80	\$23.81	\$34.07
Markup	\$57.02	\$56.92	\$57.16	\$55.60	\$50.98	\$55.60	\$47.62	\$68.14
Total Shop Rate	\$85.53	\$85.38	\$85.74	\$83.40	\$76.47	\$83.40	\$71.43	\$102.21
Olympia, WA								
Direct Wage	\$43.94	\$43.88	\$44.06	\$42.85	\$39.30	\$42.85	\$36.70	\$52.52
Markup	\$87.88	\$87.76	\$88.12	\$85.70	\$78.60	\$85.70	\$73.40	\$105.04
Total Shop Rate	\$131.82	\$131.64	\$132.18	\$128.55	\$117.90	\$128.55	\$110.10	\$157.56
Omaha, NE								
Direct Wage	\$35.53	\$35.47	\$35.62	\$34.64	\$31.77	\$34.64	\$29.67	\$42.46
Markup	\$71.06	\$70.94	\$71.24	\$69.28	\$63.54	\$69.28	\$59.34	\$84.92
Total Shop Rate	\$106.59	\$106.41	\$106.86	\$103.92	\$95.31	\$103.92	\$89.01	\$127.38
Orlando, FL								
Direct Wage	\$25.20	\$25.16	\$25.27	\$24.57	\$22.54	\$24.57	\$21.05	\$30.12
Markup	\$50.40	\$50.32	\$50.54	\$49.14	\$45.08	\$49.14	\$42.10	\$60.24
Total Shop Rate	\$75.60	\$75.48	\$75.81	\$73.71	\$67.62	\$73.71	\$63.15	\$90.36

Note: Total shop rates are expressed as costs per hour. Shop markup includes all benefits, non-productive time, support, and supervision.

3.2 In-House Shop Rates, Selected Areas

Area	Staff HVAC Tech	Staff Electrician	Staff Plumber	Staff Carpenter	Staff Painter	Staff Road Worker	General Maintenance Worker	Trade Shop Supervisor
Owensboro, KY								
Direct Wage	\$32.32	\$32.27	\$32.40	\$31.51	\$28.90	\$31.51	\$26.99	\$38.62
Markup	\$64.64	\$64.54	\$64.80	\$63.02	\$57.80	\$63.02	\$53.98	\$77.24
Total Shop Rate	\$96.96	\$96.81	\$97.20	\$94.53	\$86.70	\$94.53	\$80.97	\$115.86
Oxnard, CA								
Direct Wage	\$39.07	\$39.01	\$39.17	\$38.09	\$34.94	\$38.09	\$32.63	\$46.69
Markup	\$78.14	\$78.02	\$78.34	\$76.18	\$69.88	\$76.18	\$65.26	\$93.38
Total Shop Rate	\$117.21	\$117.03	\$117.51	\$114.27	\$104.82	\$114.27	\$97.89	\$140.07
Parkersburg, WV								
Direct Wage	\$37.29	\$37.24	\$37.39	\$36.36	\$33.35	\$36.36	\$31.14	\$44.57
Markup	\$74.58	\$74.48	\$74.78	\$72.72	\$66.70	\$72.72	\$62.28	\$89.14
Total Shop Rate	\$111.87	\$111.72	\$112.17	\$109.08	\$100.05	\$109.08	\$93.42	\$133.71
Peoria, IL								
Direct Wage	\$43.28	\$43.21	\$43.39	\$42.20	\$38.70	\$42.20	\$36.14	\$51.72
Markup	\$86.56	\$86.42	\$86.78	\$84.40	\$77.40	\$84.40	\$72.28	\$103.44
Total Shop Rate	\$129.84	\$129.63	\$130.17	\$126.60	\$116.10	\$126.60	\$108.42	\$155.16
Philadelphia, PA								
Direct Wage	\$55.89	\$55.80	\$56.04	\$54.49	\$49.98	\$54.49	\$46.68	\$66.79
Markup	\$111.78	\$111.60	\$112.08	\$108.98	\$99.96	\$108.98	\$93.36	\$133.58
Total Shop Rate	\$167.67	\$167.40	\$168.12	\$163.47	\$149.94	\$163.47	\$140.04	\$200.37
Phoenix, AZ								
Direct Wage	\$31.36	\$31.32	\$31.45	\$30.58	\$28.05	\$30.58	\$26.19	\$37.48
Markup	\$62.72	\$62.64	\$62.90	\$61.16	\$56.10	\$61.16	\$52.38	\$74.96
Total Shop Rate	\$94.08	\$93.96	\$94.35	\$91.74	\$84.15	\$91.74	\$78.57	\$112.44
Pierre, SD								
Direct Wage	\$28.05	\$28.01	\$28.12	\$27.35	\$25.08	\$27.35	\$23.43	\$33.52
Markup	\$56.10	\$56.02	\$56.24	\$54.70	\$50.16	\$54.70	\$46.86	\$67.04
Total Shop Rate	\$84.15	\$84.03	\$84.36	\$82.05	\$75.24	\$82.05	\$70.29	\$100.56
Pittsburgh, PA								
Direct Wage	\$38.07	\$38.01	\$38.17	\$37.12	\$34.04	\$37.12	\$31.79	\$45.49
Markup	\$76.14	\$76.02	\$76.34	\$74.24	\$68.08	\$74.24	\$63.58	\$90.98
Total Shop Rate	\$114.21	\$114.03	\$114.51	\$111.36	\$102.12	\$111.36	\$95.37	\$136.47
Pocatello, ID								
Direct Wage	\$32.87	\$32.82	\$32.96	\$32.05	\$29.40	\$32.05	\$27.45	\$39.28
Markup	\$65.74	\$65.64	\$65.92	\$64.10	\$58.80	\$64.10	\$54.90	\$78.56
Total Shop Rate	\$98.61	\$98.46	\$98.88	\$96.15	\$88.20	\$96.15	\$82.35	\$117.84
Portland, ME								
Direct Wage	\$30.76	\$30.72	\$30.84	\$29.99	\$27.51	\$29.99	\$25.69	\$36.76
Markup	\$61.52	\$61.44	\$61.68	\$59.98	\$55.02	\$59.98	\$51.38	\$73.52
Total Shop Rate	\$92.28	\$92.16	\$92.52	\$89.97	\$82.53	\$89.97	\$77.07	\$110.28
Portland, OR								
Direct Wage	\$46.30	\$46.23	\$46.42	\$45.14	\$41.40	\$45.14	\$38.67	\$55.33
Markup	\$92.60	\$92.46	\$92.84	\$90.28	\$82.80	\$90.28	\$77.34	\$110.66
Total Shop Rate	\$138.90	\$138.69	\$139.26	\$135.42	\$124.20	\$135.42	\$116.01	\$165.99

Note: Total shop rates are expressed as costs per hour. Shop markup includes all benefits, non-productive time, support, and supervision.

3.2 In-House Shop Rates, Selected Areas

Area	Staff HVAC Tech	Staff Electrician	Staff Plumber	Staff Carpenter	Staff Painter	Staff Road Worker	General Maintenance Worker	Trade Shop Supervisor
Providence, RI								
Direct Wage	\$37.46	\$37.41	\$37.56	\$36.53	\$33.50	\$36.53	\$31.29	\$44.77
Markup	\$74.92	\$74.82	\$75.12	\$73.06	\$67.00	\$73.06	\$62.58	\$89.54
Total Shop Rate	\$112.38	\$112.23	\$112.68	\$109.59	\$100.50	\$109.59	\$93.87	\$134.31
Pueblo, CO								
Direct Wage	\$36.53	\$36.48	\$36.63	\$35.62	\$32.67	\$35.62	\$30.51	\$43.66
Markup	\$73.06	\$72.96	\$73.26	\$71.24	\$65.34	\$71.24	\$61.02	\$87.32
Total Shop Rate	\$109.59	\$109.44	\$109.89	\$106.86	\$98.01	\$106.86	\$91.53	\$130.98
Raleigh-Durham, NC								
Direct Wage	\$25.09	\$25.06	\$25.16	\$24.47	\$22.44	\$24.47	\$20.96	\$29.99
Markup	\$50.18	\$50.12	\$50.32	\$48.94	\$44.88	\$48.94	\$41.92	\$59.98
Total Shop Rate	\$75.27	\$75.18	\$75.48	\$73.41	\$67.32	\$73.41	\$62.88	\$89.97
Rapid City, SD								
Direct Wage	\$28.05	\$28.01	\$28.12	\$27.35	\$25.08	\$27.35	\$23.43	\$33.52
Markup	\$56.10	\$56.02	\$56.24	\$54.70	\$50.16	\$54.70	\$46.86	\$67.04
Total Shop Rate	\$84.15	\$84.03	\$84.36	\$82.05	\$75.24	\$82.05	\$70.29	\$100.56
Reading, PA								
Direct Wage	\$36.88	\$36.82	\$36.97	\$35.96	\$32.98	\$35.96	\$30.80	\$44.07
Markup	\$73.76	\$73.64	\$73.94	\$71.92	\$65.96	\$71.92	\$61.60	\$88.14
Total Shop Rate	\$110.64	\$110.46	\$110.91	\$107.88	\$98.94	\$107.88	\$92.40	\$132.21
Reno, NV								
Direct Wage	\$38.46	\$38.40	\$38.56	\$37.50	\$34.39	\$37.50	\$32.12	\$45.96
Markup	\$76.92	\$76.80	\$77.12	\$75.00	\$68.78	\$75.00	\$64.24	\$91.92
Total Shop Rate	\$115.38	\$115.20	\$115.68	\$112.50	\$103.17	\$112.50	\$96.36	\$137.88
Richland, WA								
Direct Wage	\$43.58	\$43.51	\$43.69	\$42.49	\$38.97	\$42.49	\$36.39	\$52.08
Markup	\$87.16	\$87.02	\$87.38	\$84.98	\$77.94	\$84.98	\$72.78	\$104.16
Total Shop Rate	\$130.74	\$130.53	\$131.07	\$127.47	\$116.91	\$127.47	\$109.17	\$156.24
Richmond, VA								
Direct Wage	\$32.01	\$31.96	\$32.09	\$31.21	\$28.62	\$31.21	\$26.73	\$38.25
Markup	\$64.02	\$63.92	\$64.18	\$62.42	\$57.24	\$62.42	\$53.46	\$76.50
Total Shop Rate	\$96.03	\$95.88	\$96.27	\$93.63	\$85.86	\$93.63	\$80.19	\$114.75
Riverside, CA								
Direct Wage	\$33.51	\$33.45	\$33.59	\$32.67	\$29.96	\$32.67	\$27.98	\$40.04
Markup	\$67.02	\$66.90	\$67.18	\$65.34	\$59.92	\$65.34	\$55.96	\$80.08
Total Shop Rate	\$100.53	\$100.35	\$100.77	\$98.01	\$89.88	\$98.01	\$83.94	\$120.12
Roanoke, VA								
Direct Wage	\$21.38	\$21.35	\$21.44	\$20.85	\$19.12	\$20.85	\$17.86	\$25.55
Markup	\$42.76	\$42.70	\$42.88	\$41.70	\$38.24	\$41.70	\$35.72	\$51.10
Total Shop Rate	\$64.14	\$64.05	\$64.32	\$62.55	\$57.36	\$62.55	\$53.58	\$76.65
Rochester, MN								
Direct Wage	\$38.14	\$38.08	\$38.24	\$37.19	\$34.11	\$37.19	\$31.85	\$45.58
Markup	\$76.28	\$76.16	\$76.48	\$74.38	\$68.22	\$74.38	\$63.70	\$91.16
Total Shop Rate	\$114.42	\$114.24	\$114.72	\$111.57	\$102.33	\$111.57	\$95.55	\$136.74

Note: Total shop rates are expressed as costs per hour. Shop markup includes all benefits, non-productive time, support, and supervision.

3.2 In-House Shop Rates, Selected Areas

Area	Staff HVAC Tech	Staff Electrician	Staff Plumber	Staff Carpenter	Staff Painter	Staff Road Worker	General Maintenance Worker	Trade Shop Supervisor
Rochester, NY								
Direct Wage	\$36.59	\$36.54	\$36.69	\$35.68	\$32.72	\$35.68	\$30.56	\$43.73
Markup	\$73.18	\$73.08	\$73.38	\$71.36	\$65.44	\$71.36	\$61.12	\$87.46
Total Shop Rate	\$109.77	\$109.62	\$110.07	\$107.04	\$98.16	\$107.04	\$91.68	\$131.19
Rockford, IL								
Direct Wage	\$45.68	\$45.61	\$45.80	\$44.54	\$40.85	\$44.54	\$38.15	\$54.59
Markup	\$91.36	\$91.22	\$91.60	\$89.08	\$81.70	\$89.08	\$76.30	\$109.18
Total Shop Rate	\$137.04	\$136.83	\$137.40	\$133.62	\$122.55	\$133.62	\$114.45	\$163.77
Rutland, VT								
Direct Wage	\$30.99	\$30.94	\$31.07	\$30.22	\$27.71	\$30.22	\$25.88	\$37.04
Markup	\$61.98	\$61.88	\$62.14	\$60.44	\$55.42	\$60.44	\$51.76	\$74.08
Total Shop Rate	\$92.97	\$92.82	\$93.21	\$90.66	\$83.13	\$90.66	\$77.64	\$111.12
Sacramento, CA								
Direct Wage	\$36.33	\$36.28	\$36.43	\$35.42	\$32.49	\$35.42	\$30.34	\$43.42
Markup	\$72.66	\$72.56	\$72.86	\$70.84	\$64.98	\$70.84	\$60.68	\$86.84
Total Shop Rate	\$108.99	\$108.84	\$109.29	\$106.26	\$97.47	\$106.26	\$91.02	\$130.26
Saginaw, MI								
Direct Wage	\$39.45	\$39.39	\$39.55	\$38.47	\$35.28	\$38.47	\$32.95	\$47.15
Markup	\$78.90	\$78.78	\$79.10	\$76.94	\$70.56	\$76.94	\$65.90	\$94.30
Total Shop Rate	\$118.35	\$118.17	\$118.65	\$115.41	\$105.84	\$115.41	\$98.85	\$141.45
Salem, OR								
Direct Wage	\$40.17	\$40.11	\$40.27	\$39.16	\$35.92	\$39.16	\$33.55	\$48.00
Markup	\$80.34	\$80.22	\$80.54	\$78.32	\$71.84	\$78.32	\$67.10	\$96.00
Total Shop Rate	\$120.51	\$120.33	\$120.81	\$117.48	\$107.76	\$117.48	\$100.65	\$144.00
Salt Lake City, UT								
Direct Wage	\$30.09	\$30.04	\$30.17	\$29.34	\$26.90	\$29.34	\$25.13	\$35.96
Markup	\$60.18	\$60.08	\$60.34	\$58.68	\$53.80	\$58.68	\$50.26	\$71.92
Total Shop Rate	\$90.27	\$90.12	\$90.51	\$88.02	\$80.70	\$88.02	\$75.39	\$107.88
San Antonio, TX								
Direct Wage	\$27.47	\$27.43	\$27.55	\$26.79	\$24.57	\$26.79	\$22.94	\$32.83
Markup	\$54.94	\$54.86	\$55.10	\$53.58	\$49.14	\$53.58	\$45.88	\$65.66
Total Shop Rate	\$82.41	\$82.29	\$82.65	\$80.37	\$73.71	\$80.37	\$68.82	\$98.49
San Diego, CA								
Direct Wage	\$36.59	\$36.54	\$36.69	\$35.68	\$32.72	\$35.68	\$30.56	\$43.73
Markup	\$73.18	\$73.08	\$73.38	\$71.36	\$65.44	\$71.36	\$61.12	\$87.46
Total Shop Rate	\$109.77	\$109.62	\$110.07	\$107.04	\$98.16	\$107.04	\$91.68	\$131.19
San Francisco, CA								
Direct Wage	\$63.64	\$63.54	\$63.81	\$62.05	\$56.91	\$62.05	\$53.15	\$76.06
Markup	\$127.28	\$127.08	\$127.62	\$124.10	\$113.82	\$124.10	\$106.30	\$152.12
Total Shop Rate	\$190.92	\$190.62	\$191.43	\$186.15	\$170.73	\$186.15	\$159.45	\$228.18
San Jose, CA								
Direct Wage	\$52.02	\$51.94	\$52.16	\$50.72	\$46.52	\$50.72	\$43.45	\$62.17
Markup	\$104.04	\$103.88	\$104.32	\$101.44	\$93.04	\$101.44	\$86.90	\$124.34
Total Shop Rate	\$156.06	\$155.82	\$156.48	\$152.16	\$139.56	\$152.16	\$130.35	\$186.51

Note: Total shop rates are expressed as costs per hour. Shop markup includes all benefits, non-productive time, support, and supervision.

3.2 In-House Shop Rates, Selected Areas

Area	Staff HVAC Tech	Staff Electrician	Staff Plumber	Staff Carpenter	Staff Painter	Staff Road Worker	General Maintenance Worker	Trade Shop Supervisor
San Juan, PR								
Direct Wage	\$18.84	\$18.81	\$18.89	\$18.37	\$16.85	\$18.37	\$15.74	\$22.52
Markup	\$37.68	\$37.62	\$37.78	\$36.74	\$33.70	\$36.74	\$31.48	\$45.04
Total Shop Rate	\$56.52	\$56.43	\$56.67	\$55.11	\$50.55	\$55.11	\$47.22	\$67.56
Santa Barbara, CA								
Direct Wage	\$40.48	\$40.42	\$40.59	\$39.47	\$36.20	\$39.47	\$33.81	\$48.38
Markup	\$80.96	\$80.84	\$81.18	\$78.94	\$72.40	\$78.94	\$67.62	\$96.76
Total Shop Rate	\$121.44	\$121.26	\$121.77	\$118.41	\$108.60	\$118.41	\$101.43	\$145.14
Sante Fe, NM								
Direct Wage	\$25.40	\$25.36	\$25.46	\$24.76	\$22.71	\$24.76	\$21.21	\$30.35
Markup	\$50.80	\$50.72	\$50.92	\$49.52	\$45.42	\$49.52	\$42.42	\$60.70
Total Shop Rate	\$76.20	\$76.08	\$76.38	\$74.28	\$68.13	\$74.28	\$63.63	\$91.05
Savannah, GA								
Direct Wage	\$28.39	\$28.35	\$28.47	\$27.68	\$25.39	\$27.68	\$23.71	\$33.93
Markup	\$56.78	\$56.70	\$56.94	\$55.36	\$50.78	\$55.36	\$47.42	\$67.86
Total Shop Rate	\$85.17	\$85.05	\$85.41	\$83.04	\$76.17	\$83.04	\$71.13	\$101.79
Scranton, PA								
Direct Wage	\$37.52	\$37.46	\$37.62	\$36.58	\$33.55	\$36.58	\$31.34	\$44.84
Markup	\$75.04	\$74.92	\$75.24	\$73.16	\$67.10	\$73.16	\$62.68	\$89.68
Total Shop Rate	\$112.56	\$112.38	\$112.86	\$109.74	\$100.65	\$109.74	\$94.02	\$134.52
Seattle, WA								
Direct Wage	\$48.34	\$48.27	\$48.47	\$47.14	\$43.23	\$47.14	\$40.37	\$57.78
Markup	\$96.68	\$96.54	\$96.94	\$94.28	\$86.46	\$94.28	\$80.74	\$115.56
Total Shop Rate	\$145.02	\$144.81	\$145.41	\$141.42	\$129.69	\$141.42	\$121.11	\$173.34
Shreveport, LA								
Direct Wage	\$30.40	\$30.35	\$30.48	\$29.64	\$27.18	\$29.64	\$25.39	\$36.33
Markup	\$60.80	\$60.70	\$60.96	\$59.28	\$54.36	\$59.28	\$50.78	\$72.66
Total Shop Rate	\$91.20	\$91.05	\$91.44	\$88.92	\$81.54	\$88.92	\$76.17	\$108.99
Sioux City, IA								
Direct Wage	\$33.99	\$33.94	\$34.08	\$33.15	\$30.40	\$33.15	\$28.39	\$40.63
Markup	\$67.98	\$67.88	\$68.16	\$66.30	\$60.80	\$66.30	\$56.78	\$81.26
Total Shop Rate	\$101.97	\$101.82	\$102.24	\$99.45	\$91.20	\$99.45	\$85.17	\$121.89
Sioux Falls, SD								
Direct Wage	\$28.53	\$28.49	\$28.61	\$27.82	\$25.51	\$27.82	\$23.83	\$34.10
Markup	\$57.06	\$56.98	\$57.22	\$55.64	\$51.02	\$55.64	\$47.66	\$68.20
Total Shop Rate	\$85.59	\$85.47	\$85.83	\$83.46	\$76.53	\$83.46	\$71.49	\$102.30
South Bend, IN								
Direct Wage	\$36.98	\$36.93	\$37.08	\$36.06	\$33.07	\$36.06	\$30.89	\$44.20
Markup	\$73.96	\$73.86	\$74.16	\$72.12	\$66.14	\$72.12	\$61.78	\$88.40
Total Shop Rate	\$110.94	\$110.79	\$111.24	\$108.18	\$99.21	\$108.18	\$92.67	\$132.60
Spokane, WA								
Direct Wage	\$31.22	\$31.17	\$31.30	\$30.44	\$27.92	\$30.44	\$26.07	\$37.31
Markup	\$62.44	\$62.34	\$62.60	\$60.88	\$55.84	\$60.88	\$52.14	\$74.62
Total Shop Rate	\$93.66	\$93.51	\$93.90	\$91.32	\$83.76	\$91.32	\$78.21	\$111.93

Note: Total shop rates are expressed as costs per hour. Shop markup includes all benefits, non-productive time, support, and supervision.

3.2 In-House Shop Rates, Selected Areas

Area	Staff HVAC Tech	Staff Electrician	Staff Plumber	Staff Carpenter	Staff Painter	Staff Road Worker	General Maintenance Worker	Trade Shop Supervisor
Springfield, IL								
Direct Wage	\$46.14	\$46.07	\$46.27	\$44.99	\$41.26	\$44.99	\$38.54	\$55.15
Markup	\$92.28	\$92.14	\$92.54	\$89.98	\$82.52	\$89.98	\$77.08	\$110.30
Total Shop Rate	\$138.42	\$138.21	\$138.81	\$134.97	\$123.78	\$134.97	\$115.62	\$165.45
Springfield, MA								
Direct Wage	\$37.08	\$37.02	\$37.18	\$36.16	\$33.16	\$36.16	\$30.97	\$44.32
Markup	\$74.16	\$74.04	\$74.36	\$72.32	\$66.32	\$72.32	\$61.94	\$88.64
Total Shop Rate	\$111.24	\$111.06	\$111.54	\$108.48	\$99.48	\$108.48	\$92.91	\$132.96
Springfield, MO								
Direct Wage	\$24.93	\$24.89	\$25.00	\$24.31	\$22.30	\$24.31	\$20.82	\$29.80
Markup	\$49.86	\$49.78	\$50.00	\$48.62	\$44.60	\$48.62	\$41.64	\$59.60
Total Shop Rate	\$74.79	\$74.67	\$75.00	\$72.93	\$66.90	\$72.93	\$62.46	\$89.40
Springfield, OH								
Direct Wage	\$42.44	\$42.37	\$42.55	\$41.38	\$37.95	\$41.38	\$35.44	\$50.72
Markup	\$84.88	\$84.74	\$85.10	\$82.76	\$75.90	\$82.76	\$70.88	\$101.44
Total Shop Rate	\$127.32	\$127.11	\$127.65	\$124.14	\$113.85	\$124.14	\$106.32	\$152.16
St. George, UT								
Direct Wage	\$28.07	\$28.02	\$28.14	\$27.37	\$25.10	\$27.37	\$23.44	\$33.54
Markup	\$56.14	\$56.04	\$56.28	\$54.74	\$50.20	\$54.74	\$46.88	\$67.08
Total Shop Rate	\$84.21	\$84.06	\$84.42	\$82.11	\$75.30	\$82.11	\$70.32	\$100.62
St. Louis, MO								
Direct Wage	\$46.97	\$46.89	\$47.09	\$45.79	\$42.00	\$45.79	\$39.22	\$56.13
Markup	\$93.94	\$93.78	\$94.18	\$91.58	\$84.00	\$91.58	\$78.44	\$112.26
Total Shop Rate	\$140.91	\$140.67	\$141.27	\$137.37	\$126.00	\$137.37	\$117.66	\$168.39
St. Paul, MN								
Direct Wage	\$46.68	\$46.61	\$46.80	\$45.52	\$41.74	\$45.52	\$38.99	\$55.79
Markup	\$93.36	\$93.22	\$93.60	\$91.04	\$83.48	\$91.04	\$77.98	\$111.58
Total Shop Rate	\$140.04	\$139.83	\$140.40	\$136.56	\$125.22	\$136.56	\$116.97	\$167.37
Stamford, CT								
Direct Wage	\$38.45	\$38.39	\$38.55	\$37.49	\$34.38	\$37.49	\$32.11	\$45.95
Markup	\$76.90	\$76.78	\$77.10	\$74.98	\$68.76	\$74.98	\$64.22	\$91.90
Total Shop Rate	\$115.35	\$115.17	\$115.65	\$112.47	\$103.14	\$112.47	\$96.33	\$137.85
Stockton, CA								
Direct Wage	\$38.54	\$38.48	\$38.64	\$37.58	\$34.46	\$37.58	\$32.19	\$46.06
Markup	\$77.08	\$76.96	\$77.28	\$75.16	\$68.92	\$75.16	\$64.38	\$92.12
Total Shop Rate	\$115.62	\$115.44	\$115.92	\$112.74	\$103.38	\$112.74	\$96.57	\$138.18
Syracuse, NY								
Direct Wage	\$36.37	\$36.32	\$36.47	\$35.46	\$32.53	\$35.46	\$30.38	\$43.47
Markup	\$72.74	\$72.64	\$72.94	\$70.92	\$65.06	\$70.92	\$60.76	\$86.94
Total Shop Rate	\$109.11	\$108.96	\$109.41	\$106.38	\$97.59	\$106.38	\$91.14	\$130.41
Tacoma, WA								
Direct Wage	\$42.72	\$42.66	\$42.84	\$41.66	\$38.21	\$41.66	\$35.68	\$51.06
Markup	\$85.44	\$85.32	\$85.68	\$83.32	\$76.42	\$83.32	\$71.36	\$102.12
Total Shop Rate	\$128.16	\$127.98	\$128.52	\$124.98	\$114.63	\$124.98	\$107.04	\$153.18

Note: Total shop rates are expressed as costs per hour. Shop markup includes all benefits, non-productive time, support, and supervision.

3.2 In-House Shop Rates, Selected Areas

Area	Staff HVAC Tech	Staff Electrician	Staff Plumber	Staff Carpenter	Staff Painter	Staff Road Worker	General Maintenance Worker	Trade Shop Supervisor
Tallahassee, FL								
Direct Wage	\$23.70	\$23.67	\$23.77	\$23.11	\$21.20	\$23.11	\$19.80	\$28.33
Markup	\$47.40	\$47.34	\$47.54	\$46.22	\$42.40	\$46.22	\$39.60	\$56.66
Total Shop Rate	\$71.10	\$71.01	\$71.31	\$69.33	\$63.60	\$69.33	\$59.40	\$84.99
Tampa, FL								
Direct Wage	\$25.94	\$25.90	\$26.01	\$25.29	\$23.20	\$25.29	\$21.67	\$31.00
Markup	\$51.88	\$51.80	\$52.02	\$50.58	\$46.40	\$50.58	\$43.34	\$62.00
Total Shop Rate	\$77.82	\$77.70	\$78.03	\$75.87	\$69.60	\$75.87	\$65.01	\$93.00
Terre Haute, IN								
Direct Wage	\$41.99	\$41.93	\$42.10	\$40.94	\$37.55	\$40.94	\$35.07	\$50.18
Markup	\$83.98	\$83.86	\$84.20	\$81.88	\$75.10	\$81.88	\$70.14	\$100.36
Total Shop Rate	\$125.97	\$125.79	\$126.30	\$122.82	\$112.65	\$122.82	\$105.21	\$150.54
Toledo, OH								
Direct Wage	\$36.48	\$36.42	\$36.57	\$35.57	\$32.62	\$35.57	\$30.46	\$43.60
Markup	\$72.96	\$72.84	\$73.14	\$71.14	\$65.24	\$71.14	\$60.92	\$87.20
Total Shop Rate	\$109.44	\$109.26	\$109.71	\$106.71	\$97.86	\$106.71	\$91.38	\$130.80
Topeka, KS								
Direct Wage	\$34.92	\$34.87	\$35.02	\$34.05	\$31.23	\$34.05	\$29.17	\$41.74
Markup	\$69.84	\$69.74	\$70.04	\$68.10	\$62.46	\$68.10	\$58.34	\$83.48
Total Shop Rate	\$104.76	\$104.61	\$105.06	\$102.15	\$93.69	\$102.15	\$87.51	\$125.22
Trenton, NJ								
Direct Wage	\$62.00	\$61.90	\$62.16	\$60.45	\$55.44	\$60.45	\$51.78	\$74.09
Markup	\$124.00	\$123.80	\$124.32	\$120.90	\$110.88	\$120.90	\$103.56	\$148.18
Total Shop Rate	\$186.00	\$185.70	\$186.48	\$181.35	\$166.32	\$181.35	\$155.34	\$222.27
Tucson, AZ								
Direct Wage	\$28.16	\$28.12	\$28.24	\$27.46	\$25.19	\$27.46	\$23.52	\$33.66
Markup	\$56.32	\$56.24	\$56.48	\$54.92	\$50.38	\$54.92	\$47.04	\$67.32
Total Shop Rate	\$84.48	\$84.36	\$84.72	\$82.38	\$75.57	\$82.38	\$70.56	\$100.98
Tulsa, OK								
Direct Wage	\$28.98	\$28.93	\$29.06	\$28.26	\$25.91	\$28.26	\$24.20	\$34.63
Markup	\$57.96	\$57.86	\$58.12	\$56.52	\$51.82	\$56.52	\$48.40	\$69.26
Total Shop Rate	\$86.94	\$86.79	\$87.18	\$84.78	\$77.73	\$84.78	\$72.60	\$103.89
Tuscaloosa, AL								
Direct Wage	\$28.02	\$27.98	\$28.09	\$27.32	\$25.06	\$27.32	\$23.40	\$33.48
Markup	\$56.04	\$55.96	\$56.18	\$54.64	\$50.12	\$54.64	\$46.80	\$66.96
Total Shop Rate	\$84.06	\$83.94	\$84.27	\$81.96	\$75.18	\$81.96	\$70.20	\$100.44
Utica, NY								
Direct Wage	\$30.93	\$30.89	\$31.01	\$30.16	\$27.66	\$30.16	\$25.83	\$36.97
Markup	\$61.86	\$61.78	\$62.02	\$60.32	\$55.32	\$60.32	\$51.66	\$73.94
Total Shop Rate	\$92.79	\$92.67	\$93.03	\$90.48	\$82.98	\$90.48	\$77.49	\$110.91
Virginia Beach, VA								
Direct Wage	\$29.83	\$29.78	\$29.90	\$29.08	\$26.67	\$29.08	\$24.91	\$35.65
Markup	\$59.66	\$59.56	\$59.80	\$58.16	\$53.34	\$58.16	\$49.82	\$71.30
Total Shop Rate	\$89.49	\$89.34	\$89.70	\$87.24	\$80.01	\$87.24	\$74.73	\$106.95

Note: Total shop rates are expressed as costs per hour. Shop markup includes all benefits, non-productive time, support, and supervision.

3.2 In-House Shop Rates, Selected Areas

Area	Staff HVAC Tech	Staff Electrician	Staff Plumber	Staff Carpenter	Staff Painter	Staff Road Worker	General Maintenance Worker	Trade Shop Supervisor
Waco, TX								
Direct Wage	\$30.06	\$30.02	\$30.14	\$29.31	\$26.88	\$29.31	\$25.11	\$35.93
Markup	\$60.12	\$60.04	\$60.28	\$58.62	\$53.76	\$58.62	\$50.22	\$71.86
Total Shop Rate	\$90.18	\$90.06	\$90.42	\$87.93	\$80.64	\$87.93	\$75.33	\$107.79
Washington, D.C.								
Direct Wage	\$42.68	\$42.62	\$42.80	\$41.62	\$38.17	\$41.62	\$35.65	\$51.01
Markup	\$85.36	\$85.24	\$85.60	\$83.24	\$76.34	\$83.24	\$71.30	\$102.02
Total Shop Rate	\$128.04	\$127.86	\$128.40	\$124.86	\$114.51	\$124.86	\$106.95	\$153.03
Waterbury, CT								
Direct Wage	\$40.55	\$40.49	\$40.66	\$39.54	\$36.26	\$39.54	\$33.87	\$48.46
Markup	\$81.10	\$80.98	\$81.32	\$79.08	\$72.52	\$79.08	\$67.74	\$96.92
Total Shop Rate	\$121.65	\$121.47	\$121.98	\$118.62	\$108.78	\$118.62	\$101.61	\$145.38
Watertown, NY								
Direct Wage	\$36.37	\$36.32	\$36.47	\$35.46	\$32.53	\$35.46	\$30.38	\$43.47
Markup	\$72.74	\$72.64	\$72.94	\$70.92	\$65.06	\$70.92	\$60.76	\$86.94
Total Shop Rate	\$109.11	\$108.96	\$109.41	\$106.38	\$97.59	\$106.38	\$91.14	\$130.41
Wichita Falls, TX								
Direct Wage	\$30.84	\$30.79	\$30.92	\$30.07	\$27.57	\$30.07	\$25.75	\$36.85
Markup	\$61.68	\$61.58	\$61.84	\$60.14	\$55.14	\$60.14	\$51.50	\$73.70
Total Shop Rate	\$92.52	\$92.37	\$92.76	\$90.21	\$82.71	\$90.21	\$77.25	\$110.55
Wichita, KS								
Direct Wage	\$30.81	\$30.76	\$30.89	\$30.04	\$27.55	\$30.04	\$25.73	\$36.82
Markup	\$61.62	\$61.52	\$61.78	\$60.08	\$55.10	\$60.08	\$51.46	\$73.64
Total Shop Rate	\$92.43	\$92.28	\$92.67	\$90.12	\$82.65	\$90.12	\$77.19	\$110.46
Wilmington, DE								
Direct Wage	\$38.98	\$38.92	\$39.08	\$38.01	\$34.86	\$38.01	\$32.55	\$46.58
Markup	\$77.96	\$77.84	\$78.16	\$76.02	\$69.72	\$76.02	\$65.10	\$93.16
Total Shop Rate	\$116.94	\$116.76	\$117.24	\$114.03	\$104.58	\$114.03	\$97.65	\$139.74
Winston-Salem, NC								
Direct Wage	\$25.09	\$25.06	\$25.16	\$24.47	\$22.44	\$24.47	\$20.96	\$29.99
Markup	\$50.18	\$50.12	\$50.32	\$48.94	\$44.88	\$48.94	\$41.92	\$59.98
Total Shop Rate	\$75.27	\$75.18	\$75.48	\$73.41	\$67.32	\$73.41	\$62.88	\$89.97
Worcester, MA								
Direct Wage	\$37.81	\$37.76	\$37.91	\$36.87	\$33.82	\$36.87	\$31.58	\$45.19
Markup	\$75.62	\$75.52	\$75.82	\$73.74	\$67.64	\$73.74	\$63.16	\$90.38
Total Shop Rate	\$113.43	\$113.28	\$113.73	\$110.61	\$101.46	\$110.61	\$94.74	\$135.57
Yonkers, NY								
Direct Wage	\$58.55	\$58.46	\$58.71	\$57.09	\$52.36	\$57.09	\$48.90	\$69.98
Markup	\$117.10	\$116.92	\$117.42	\$114.18	\$104.72	\$114.18	\$97.80	\$139.96
Total Shop Rate	\$175.65	\$175.38	\$176.13	\$171.27	\$157.08	\$171.27	\$146.70	\$209.94
Youngstown, OH								
Direct Wage	\$42.27	\$42.20	\$42.38	\$41.21	\$37.80	\$41.21	\$35.30	\$50.51
Markup	\$84.54	\$84.40	\$84.76	\$82.42	\$75.60	\$82.42	\$70.60	\$101.02
Total Shop Rate	\$126.81	\$126.60	\$127.14	\$123.63	\$113.40	\$123.63	\$105.90	\$151.53

Note: Total shop rates are expressed as costs per hour. Shop markup includes all benefits, non-productive time, support, and supervision.

3.2 In-House Shop Rates, Selected Areas

Area	Staff HVAC Tech	Staff Electrician	Staff Plumber	Staff Carpenter	Staff Painter	Staff Road Worker	General Maintenance Worker	Trade Shop Supervisor
Calgary, AB								
Direct Wage	\$45.53	\$45.46	\$45.66	\$44.39	\$40.71	\$44.39	\$38.03	\$54.42
Markup	\$91.06	\$90.92	\$91.32	\$88.78	\$81.42	\$88.78	\$76.06	\$108.84
Total Shop Rate	\$136.59	\$136.38	\$136.98	\$133.17	\$122.13	\$133.17	\$114.09	\$163.26
Edmonton, AB								
Direct Wage	\$45.53	\$45.46	\$45.66	\$44.39	\$40.71	\$44.39	\$38.03	\$54.42
Markup	\$91.06	\$90.92	\$91.32	\$88.78	\$81.42	\$88.78	\$76.06	\$108.84
Total Shop Rate	\$136.59	\$136.38	\$136.98	\$133.17	\$122.13	\$133.17	\$114.09	\$163.26
Halifax, NS								
Direct Wage	\$35.63	\$35.57	\$35.72	\$34.74	\$31.87	\$34.74	\$29.76	\$42.58
Markup	\$71.26	\$71.14	\$71.44	\$69.48	\$63.74	\$69.48	\$59.52	\$85.16
Total Shop Rate	\$106.89	\$106.71	\$107.16	\$104.22	\$95.61	\$104.22	\$89.28	\$127.74
Hamilton, ON								
Direct Wage	\$42.61	\$42.54	\$42.73	\$41.55	\$38.10	\$41.55	\$35.58	\$50.93
Markup	\$85.22	\$85.08	\$85.46	\$83.10	\$76.20	\$83.10	\$71.16	\$101.86
Total Shop Rate	\$127.83	\$127.62	\$128.19	\$124.65	\$114.30	\$124.65	\$106.74	\$152.79
London, ON								
Direct Wage	\$42.61	\$42.54	\$42.73	\$41.55	\$38.10	\$41.55	\$35.58	\$50.93
Markup	\$85.22	\$85.08	\$85.46	\$83.10	\$76.20	\$83.10	\$71.16	\$101.86
Total Shop Rate	\$127.83	\$127.62	\$128.19	\$124.65	\$114.30	\$124.65	\$106.74	\$152.79
Montreal, QC								
Direct Wage	\$38.68	\$38.61	\$38.78	\$37.71	\$34.59	\$37.71	\$32.30	\$46.22
Markup	\$77.36	\$77.22	\$77.56	\$75.42	\$69.18	\$75.42	\$64.60	\$92.44
Total Shop Rate	\$116.04	\$115.83	\$116.34	\$113.13	\$103.77	\$113.13	\$96.90	\$138.66
Ottawa, ON								
Direct Wage	\$42.61	\$42.54	\$42.73	\$41.55	\$38.10	\$41.55	\$35.58	\$50.93
Markup	\$85.22	\$85.08	\$85.46	\$83.10	\$76.20	\$83.10	\$71.16	\$101.86
Total Shop Rate	\$127.83	\$127.62	\$128.19	\$124.65	\$114.30	\$124.65	\$106.74	\$152.79
Quebec City, QC								
Direct Wage	\$38.68	\$38.61	\$38.78	\$37.71	\$34.59	\$37.71	\$32.30	\$46.22
Markup	\$77.36	\$77.22	\$77.56	\$75.42	\$69.18	\$75.42	\$64.60	\$92.44
Total Shop Rate	\$116.04	\$115.83	\$116.34	\$113.13	\$103.77	\$113.13	\$96.90	\$138.66
Regina, SK								
Direct Wage	\$39.81	\$39.74	\$39.92	\$38.81	\$35.59	\$38.81	\$33.25	\$47.57
Markup	\$79.62	\$79.48	\$79.84	\$77.62	\$71.18	\$77.62	\$66.50	\$95.14
Total Shop Rate	\$119.43	\$119.22	\$119.76	\$116.43	\$106.77	\$116.43	\$99.75	\$142.71
St. John's, NL								
Direct Wage	\$36.18	\$36.12	\$36.27	\$35.27	\$32.35	\$35.27	\$30.21	\$43.24
Markup	\$72.36	\$72.24	\$72.54	\$70.54	\$64.70	\$70.54	\$60.42	\$86.48
Total Shop Rate	\$108.54	\$108.36	\$108.81	\$105.81	\$97.05	\$105.81	\$90.63	\$129.72

Note: Total shop rates are expressed as costs per hour. Shop markup includes all benefits, non-productive time, support, and supervision.
Values for Canadian areas are reported in Canadian dollars.

3.2 In-House Shop Rates, Selected Areas

Area	Staff HVAC Tech	Staff Electrician	Staff Plumber	Staff Carpenter	Staff Painter	Staff Road Worker	General Maintenance Worker	Trade Shop Supervisor
Toronto, ON								
Direct Wage	\$42.61	\$42.54	\$42.73	\$41.55	\$38.10	\$41.55	\$35.58	\$50.93
Markup	\$85.22	\$85.08	\$85.46	\$83.10	\$76.20	\$83.10	\$71.16	\$101.86
Total Shop Rate	\$127.83	\$127.62	\$128.19	\$124.65	\$114.30	\$124.65	\$106.74	\$152.79
Vancouver, BC								
Direct Wage	\$41.63	\$41.57	\$41.74	\$40.60	\$37.23	\$40.60	\$34.77	\$49.76
Markup	\$83.26	\$83.14	\$83.48	\$81.20	\$74.46	\$81.20	\$69.54	\$99.52
Total Shop Rate	\$124.89	\$124.71	\$125.22	\$121.80	\$111.69	\$121.80	\$104.31	\$149.28
Victoria, BC								
Direct Wage	\$41.63	\$41.57	\$41.74	\$40.60	\$37.23	\$40.60	\$34.77	\$49.76
Markup	\$83.26	\$83.14	\$83.48	\$81.20	\$74.46	\$81.20	\$69.54	\$99.52
Total Shop Rate	\$124.89	\$124.71	\$125.22	\$121.80	\$111.69	\$121.80	\$104.31	\$149.28
Winnipeg, MB								
Direct Wage	\$37.06	\$37.01	\$37.16	\$36.14	\$33.15	\$36.14	\$30.96	\$44.29
Markup	\$74.12	\$74.02	\$74.32	\$72.28	\$66.30	\$72.28	\$61.92	\$88.58
Total Shop Rate	\$111.18	\$111.03	\$111.48	\$108.42	\$99.45	\$108.42	\$92.88	\$132.87

Note: Total shop rates are expressed as costs per hour. Shop markup includes all benefits, non-productive time, support, and supervision.
Values for Canadian areas are reported in Canadian dollars.

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Akron, OH												
Basic Wage & Fringe	\$44.21	\$35.55	\$48.38	\$40.72	\$34.93	\$65.54	\$44.58	\$43.18	\$29.17	\$35.26	\$42.19	\$28.80
Comp. Insurance	\$4.92	\$3.52	\$2.74	\$2.47	\$4.80	\$2.33	\$5.25	\$2.62	\$8.88	\$3.01	\$2.07	\$1.41
Other Req'd Benefits	\$8.09	\$6.51	\$8.85	\$7.45	\$6.39	\$11.99	\$8.16	\$7.90	\$5.34	\$6.45	\$7.72	\$5.27
Total Contract Rate	\$57.22	\$45.58	\$59.97	\$50.64	\$46.12	\$79.86	\$57.99	\$53.70	\$43.39	\$44.72	\$51.98	\$35.48
Alamogordo, NM												
Basic Wage & Fringe	\$23.25	\$21.97	\$32.05	\$26.86	\$17.93	\$55.27	\$29.05	\$28.49	\$17.32	\$25.74	\$24.28	\$16.49
Comp. Insurance	\$4.18	\$1.58	\$2.69	\$2.34	\$2.13	\$5.90	\$4.61	\$2.48	\$6.76	\$5.82	\$2.56	\$1.74
Other Req'd Benefits	\$4.25	\$4.02	\$5.87	\$4.92	\$3.28	\$10.11	\$5.32	\$5.21	\$3.17	\$4.71	\$4.44	\$3.02
Total Contract Rate	\$31.68	\$27.57	\$40.61	\$34.12	\$23.34	\$71.28	\$38.98	\$36.18	\$27.25	\$36.27	\$31.28	\$21.25
Albany, NY												
Basic Wage & Fringe	\$37.54	\$39.47	\$43.46	\$46.02	\$33.47	\$65.58	\$46.82	\$48.81	\$31.27	\$29.65	\$28.35	\$29.26
Comp. Insurance	\$6.93	\$7.29	\$3.25	\$4.16	\$4.34	\$6.81	\$9.71	\$4.41	\$10.47	\$6.58	\$7.60	\$7.85
Other Req'd Benefits	\$6.87	\$7.22	\$7.95	\$8.42	\$6.13	\$12.00	\$8.57	\$8.93	\$5.72	\$5.43	\$5.19	\$5.35
Total Contract Rate	\$51.34	\$53.98	\$54.66	\$58.60	\$43.94	\$84.39	\$65.10	\$62.15	\$47.46	\$41.66	\$41.14	\$42.46
Albuquerque, NM												
Basic Wage & Fringe	\$31.58	\$34.28	\$42.47	\$39.37	\$22.22	\$63.19	\$31.98	\$41.76	\$22.79	\$20.40	\$30.22	\$25.41
Comp. Insurance	\$5.68	\$2.47	\$3.56	\$3.43	\$2.64	\$6.74	\$5.08	\$3.64	\$8.89	\$4.61	\$3.19	\$2.68
Other Req'd Benefits	\$5.78	\$6.27	\$7.77	\$7.20	\$4.07	\$11.56	\$5.85	\$7.64	\$4.17	\$3.73	\$5.53	\$4.65
Total Contract Rate	\$43.04	\$43.02	\$53.80	\$50.00	\$28.93	\$81.49	\$42.91	\$53.04	\$35.85	\$28.74	\$38.94	\$32.74
Altus, OK												
Basic Wage & Fringe	\$25.95	\$28.87	\$37.87	\$31.61	\$23.18	\$53.21	\$34.85	\$33.53	\$25.95	\$24.78	\$27.36	\$20.17
Comp. Insurance	\$4.71	\$3.19	\$3.87	\$3.54	\$3.37	\$3.72	\$5.93	\$3.76	\$7.89	\$3.84	\$3.91	\$2.88
Other Req'd Benefits	\$4.75	\$5.28	\$6.93	\$5.78	\$4.24	\$9.74	\$6.38	\$6.14	\$4.75	\$4.53	\$5.01	\$3.69
Total Contract Rate	\$35.41	\$37.34	\$48.67	\$40.93	\$30.79	\$66.67	\$47.16	\$43.43	\$38.59	\$33.15	\$36.28	\$26.74
Amarillo, TX												
Basic Wage & Fringe	\$24.55	\$30.37	\$38.35	\$32.48	\$21.84	\$55.98	\$27.65	\$34.45	\$27.31	\$26.07	\$28.78	\$23.21
Comp. Insurance	\$2.76	\$3.42	\$2.36	\$2.19	\$1.96	\$3.34	\$3.02	\$2.33	\$5.35	\$2.45	\$3.81	\$3.08
Other Req'd Benefits	\$4.49	\$5.56	\$7.02	\$5.94	\$4.00	\$10.24	\$5.06	\$6.30	\$5.00	\$4.77	\$5.27	\$4.25
Total Contract Rate	\$31.80	\$39.35	\$47.73	\$40.61	\$27.80	\$69.56	\$35.73	\$43.08	\$37.66	\$33.29	\$37.86	\$30.54
Anacortes, WA												
Basic Wage & Fringe	\$37.27	\$35.74	\$52.26	\$48.42	\$30.39	\$68.82	\$43.15	\$51.35	\$32.61	\$36.25	\$35.63	\$26.67
Comp. Insurance	\$1.04	\$0.87	\$0.62	\$0.87	\$0.91	\$0.99	\$1.48	\$0.92	\$1.68	\$0.87	\$0.65	\$0.49
Other Req'd Benefits	\$6.82	\$6.54	\$9.56	\$8.86	\$5.56	\$12.59	\$7.90	\$9.40	\$5.97	\$6.63	\$6.52	\$4.88
Total Contract Rate	\$45.13	\$43.15	\$62.44	\$58.15	\$36.86	\$82.40	\$52.53	\$61.67	\$40.26	\$43.75	\$42.80	\$32.04
Anaheim, CA												
Basic Wage & Fringe	\$43.29	\$30.51	\$51.35	\$42.84	\$31.88	\$69.03	\$50.46	\$45.44	\$42.67	\$49.44	\$35.90	\$32.21
Comp. Insurance	\$5.86	\$4.13	\$1.94	\$2.24	\$2.03	\$1.60	\$4.34	\$2.37	\$7.95	\$2.30	\$2.74	\$2.46
Other Req'd Benefits	\$7.92	\$5.58	\$9.40	\$7.84	\$5.83	\$12.63	\$9.23	\$8.32	\$7.81	\$9.05	\$6.57	\$5.89
Total Contract Rate	\$57.07	\$40.22	\$62.69	\$52.92	\$39.74	\$83.26	\$64.03	\$56.13	\$58.43	\$60.79	\$45.21	\$40.56
Anchorage, AK												
Basic Wage & Fringe	\$51.44	\$44.10	\$59.03	\$55.28	\$30.07	\$81.32	\$58.13	\$58.63	\$39.65	\$37.88	\$53.90	\$33.65
Comp. Insurance	\$8.18	\$9.47	\$5.19	\$5.70	\$3.10	\$3.97	\$17.86	\$6.04	\$14.65	\$2.08	\$7.94	\$4.96
Other Req'd Benefits	\$9.41	\$8.07	\$10.80	\$10.12	\$5.50	\$14.88	\$10.64	\$10.73	\$7.26	\$6.93	\$9.86	\$6.16
Total Contract Rate	\$69.03	\$61.64	\$75.02	\$71.10	\$38.67	\$100.17	\$86.63	\$75.40	\$61.56	\$46.89	\$71.70	\$44.77

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Ann Arbor, MI												
Basic Wage & Fringe	\$48.39	\$44.00	\$60.46	\$55.18	\$46.40	\$81.12	\$47.16	\$58.52	\$39.17	\$31.56	\$41.70	\$43.26
Comp. Insurance	\$11.07	\$10.07	\$3.19	\$3.98	\$6.30	\$5.35	\$6.81	\$4.22	\$12.79	\$3.62	\$5.67	\$5.88
Other Req'd Benefits	\$8.86	\$8.05	\$11.06	\$10.10	\$8.49	\$14.84	\$8.63	\$10.71	\$7.17	\$5.78	\$7.63	\$7.92
Total Contract Rate	\$68.32	\$62.12	\$74.71	\$69.26	\$61.19	\$101.31	\$62.60	\$73.45	\$59.13	\$40.96	\$55.00	\$57.06
Annapolis, MD												
Basic Wage & Fringe	\$37.00	\$37.33	\$44.16	\$41.60	\$30.56	\$55.07	\$40.17	\$44.12	\$29.59	\$28.37	\$34.77	\$27.76
Comp. Insurance	\$3.94	\$2.86	\$3.18	\$3.22	\$2.82	\$4.06	\$4.17	\$3.41	\$7.59	\$3.78	\$4.09	\$3.26
Other Req'd Benefits	\$6.77	\$6.83	\$8.08	\$7.61	\$5.59	\$10.08	\$7.35	\$8.07	\$5.41	\$5.19	\$6.36	\$5.08
Total Contract Rate	\$47.71	\$47.02	\$55.42	\$52.43	\$38.97	\$69.21	\$51.69	\$55.60	\$42.59	\$37.34	\$45.22	\$36.10
Atlanta, GA												
Basic Wage & Fringe	\$31.00	\$29.71	\$39.92	\$35.17	\$27.27	\$49.35	\$32.73	\$37.30	\$25.74	\$24.69	\$28.62	\$23.27
Comp. Insurance	\$7.96	\$4.14	\$4.32	\$4.01	\$6.21	\$5.57	\$6.89	\$4.25	\$14.08	\$5.17	\$6.04	\$4.91
Other Req'd Benefits	\$5.67	\$5.44	\$7.31	\$6.44	\$4.99	\$9.03	\$5.99	\$6.83	\$4.71	\$4.52	\$5.24	\$4.26
Total Contract Rate	\$44.63	\$39.29	\$51.55	\$45.62	\$38.47	\$63.95	\$45.61	\$48.38	\$44.53	\$34.38	\$39.90	\$32.44
Atlantic City, NJ												
Basic Wage & Fringe	\$58.14	\$55.30	\$64.00	\$59.02	\$35.47	\$68.71	\$60.77	\$62.60	\$46.25	\$37.67	\$33.74	\$28.26
Comp. Insurance	\$8.60	\$8.18	\$2.81	\$3.42	\$4.04	\$3.74	\$8.17	\$3.62	\$17.56	\$3.42	\$2.13	\$1.79
Other Req'd Benefits	\$10.64	\$10.12	\$11.71	\$10.80	\$6.49	\$12.57	\$11.12	\$11.46	\$8.46	\$6.89	\$6.17	\$5.17
Total Contract Rate	\$77.38	\$73.60	\$78.52	\$73.24	\$46.00	\$85.02	\$80.06	\$77.68	\$72.27	\$47.98	\$42.04	\$35.22
Augusta, ME												
Basic Wage & Fringe	\$28.45	\$31.18	\$38.17	\$32.45	\$23.89	\$57.49	\$37.65	\$34.42	\$28.04	\$23.38	\$29.56	\$21.18
Comp. Insurance	\$9.27	\$4.28	\$3.24	\$3.79	\$4.03	\$5.52	\$6.69	\$4.02	\$6.75	\$2.91	\$3.84	\$2.75
Other Req'd Benefits	\$5.21	\$5.71	\$6.99	\$5.94	\$4.37	\$10.52	\$6.89	\$6.30	\$5.13	\$4.28	\$5.41	\$3.88
Total Contract Rate	\$42.93	\$41.17	\$48.40	\$42.18	\$32.29	\$73.53	\$51.23	\$44.74	\$39.92	\$30.57	\$38.81	\$27.81
Austin, TX												
Basic Wage & Fringe	\$30.40	\$36.96	\$33.77	\$35.02	\$19.48	\$68.14	\$34.30	\$37.15	\$23.17	\$24.88	\$21.98	\$21.59
Comp. Insurance	\$3.42	\$4.16	\$2.08	\$2.36	\$1.75	\$4.07	\$3.74	\$2.51	\$4.54	\$2.34	\$2.91	\$2.86
Other Req'd Benefits	\$5.56	\$6.76	\$6.18	\$6.41	\$3.56	\$12.47	\$6.28	\$6.80	\$4.24	\$4.55	\$4.02	\$3.95
Total Contract Rate	\$39.38	\$47.88	\$42.03	\$43.79	\$24.79	\$84.68	\$44.32	\$46.46	\$31.95	\$31.77	\$28.91	\$28.40
Bakersfield, CA												
Basic Wage & Fringe	\$42.72	\$29.56	\$49.02	\$43.74	\$35.26	\$68.50	\$40.17	\$46.39	\$35.18	\$30.84	\$38.99	\$24.15
Comp. Insurance	\$5.78	\$4.00	\$1.85	\$2.28	\$2.25	\$1.59	\$3.45	\$2.42	\$6.56	\$1.43	\$2.97	\$1.84
Other Req'd Benefits	\$7.82	\$5.41	\$8.97	\$8.00	\$6.45	\$12.54	\$7.35	\$8.49	\$6.44	\$5.64	\$7.14	\$4.42
Total Contract Rate	\$56.32	\$38.97	\$59.84	\$54.02	\$43.96	\$82.63	\$50.97	\$57.30	\$48.18	\$37.91	\$49.10	\$30.41
Baltimore, MD												
Basic Wage & Fringe	\$37.00	\$37.33	\$44.16	\$41.60	\$30.56	\$55.07	\$40.17	\$44.12	\$29.59	\$28.37	\$34.77	\$27.76
Comp. Insurance	\$3.94	\$2.86	\$3.18	\$3.22	\$2.82	\$4.06	\$4.17	\$3.41	\$7.59	\$3.78	\$4.09	\$3.26
Other Req'd Benefits	\$6.77	\$6.83	\$8.08	\$7.61	\$5.59	\$10.08	\$7.35	\$8.07	\$5.41	\$5.19	\$6.36	\$5.08
Total Contract Rate	\$47.71	\$47.02	\$55.42	\$52.43	\$38.97	\$69.21	\$51.69	\$55.60	\$42.59	\$37.34	\$45.22	\$36.10
Baton Rouge, LA												
Basic Wage & Fringe	\$30.75	\$33.50	\$37.47	\$37.63	\$22.48	\$51.96	\$35.67	\$39.90	\$26.64	\$28.75	\$27.48	\$22.71
Comp. Insurance	\$8.50	\$4.33	\$2.56	\$2.64	\$3.18	\$3.75	\$5.38	\$2.80	\$8.75	\$3.36	\$3.18	\$2.63
Other Req'd Benefits	\$5.63	\$6.13	\$6.86	\$6.89	\$4.11	\$8.57	\$6.53	\$7.30	\$4.88	\$5.26	\$5.03	\$4.16
Total Contract Rate	\$44.88	\$43.96	\$46.89	\$47.16	\$29.77	\$64.28	\$47.58	\$50.00	\$40.27	\$37.37	\$35.69	\$29.50

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Battle Creek, MI												
Basic Wage & Fringe	\$39.29	\$34.46	\$45.04	\$52.81	\$27.75	\$61.86	\$31.64	\$56.01	\$34.67	\$32.39	\$39.76	\$26.36
Comp. Insurance	\$8.99	\$7.88	\$2.37	\$3.81	\$3.77	\$4.08	\$4.57	\$4.04	\$11.32	\$3.72	\$5.41	\$3.58
Other Req'd Benefits	\$7.19	\$6.31	\$8.24	\$9.66	\$5.08	\$11.32	\$5.79	\$10.25	\$6.34	\$5.93	\$7.28	\$4.82
Total Contract Rate	\$55.47	\$48.65	\$55.65	\$66.28	\$36.60	\$77.26	\$42.00	\$70.30	\$52.33	\$42.04	\$52.45	\$34.76
Beaufort, SC												
Basic Wage & Fringe	\$28.33	\$32.93	\$33.51	\$27.50	\$24.39	\$51.23	\$31.98	\$29.16	\$23.14	\$28.27	\$25.34	\$30.37
Comp. Insurance	\$6.37	\$2.95	\$3.84	\$3.40	\$3.78	\$3.40	\$4.45	\$3.60	\$11.59	\$3.51	\$3.51	\$4.21
Other Req'd Benefits	\$5.18	\$6.03	\$6.13	\$5.03	\$4.46	\$8.45	\$5.85	\$5.34	\$4.23	\$5.17	\$4.64	\$5.56
Total Contract Rate	\$39.88	\$41.91	\$43.48	\$35.93	\$32.63	\$63.08	\$42.28	\$38.10	\$38.96	\$36.95	\$33.49	\$40.14
Beaumont, TX												
Basic Wage & Fringe	\$28.73	\$33.61	\$39.44	\$33.72	\$22.57	\$61.97	\$36.70	\$35.77	\$30.22	\$31.38	\$36.49	\$24.54
Comp. Insurance	\$3.23	\$3.78	\$2.43	\$2.28	\$2.03	\$3.70	\$4.00	\$2.41	\$5.92	\$2.95	\$4.83	\$3.25
Other Req'd Benefits	\$5.26	\$6.15	\$7.22	\$6.17	\$4.13	\$11.34	\$6.72	\$6.55	\$5.53	\$5.74	\$6.68	\$4.49
Total Contract Rate	\$37.22	\$43.54	\$49.09	\$42.17	\$28.73	\$77.01	\$47.42	\$44.73	\$41.67	\$40.07	\$48.00	\$32.28
Billings, MT												
Basic Wage & Fringe	\$27.65	\$30.64	\$41.19	\$37.89	\$27.24	\$56.50	\$43.13	\$40.18	\$24.36	\$35.39	\$37.26	\$23.09
Comp. Insurance	\$14.82	\$4.46	\$5.22	\$7.85	\$4.85	\$6.75	\$11.19	\$8.32	\$20.09	\$17.13	\$11.43	\$7.08
Other Req'd Benefits	\$5.06	\$5.61	\$7.54	\$6.93	\$4.98	\$10.34	\$7.89	\$7.35	\$4.02	\$6.48	\$6.82	\$4.23
Total Contract Rate	\$47.53	\$40.71	\$53.95	\$52.67	\$37.07	\$73.59	\$62.21	\$55.85	\$48.47	\$59.00	\$55.51	\$34.40
Biloxi, MS												
Basic Wage & Fringe	\$33.20	\$30.98	\$36.08	\$28.07	\$22.40	\$55.85	\$37.04	\$29.77	\$25.61	\$20.37	\$20.96	\$23.91
Comp. Insurance	\$5.74	\$2.61	\$2.34	\$2.23	\$2.86	\$3.50	\$5.17	\$2.36	\$8.82	\$1.49	\$2.54	\$2.89
Other Req'd Benefits	\$6.08	\$5.67	\$6.60	\$5.14	\$4.10	\$10.22	\$6.78	\$5.45	\$4.69	\$3.73	\$3.84	\$4.38
Total Contract Rate	\$45.02	\$39.26	\$45.02	\$35.44	\$29.36	\$69.57	\$48.99	\$37.58	\$39.12	\$25.59	\$27.34	\$31.18
Birmingham, AL												
Basic Wage & Fringe	\$29.56	\$28.45	\$36.43	\$30.31	\$21.96	\$62.84	\$37.20	\$32.15	\$26.04	\$21.77	\$29.38	\$23.75
Comp. Insurance	\$9.98	\$2.68	\$3.73	\$3.09	\$4.71	\$5.72	\$8.88	\$3.27	\$11.35	\$3.92	\$3.00	\$2.43
Other Req'd Benefits	\$5.41	\$5.21	\$6.67	\$5.55	\$4.02	\$11.50	\$6.81	\$5.88	\$4.77	\$3.98	\$5.38	\$4.35
Total Contract Rate	\$44.95	\$36.34	\$46.83	\$38.95	\$30.69	\$80.06	\$52.89	\$41.30	\$42.16	\$29.67	\$37.76	\$30.53
Bismarck, ND												
Basic Wage & Fringe	\$25.28	\$26.56	\$37.45	\$27.32	\$25.28	\$57.13	\$37.42	\$28.98	\$23.38	\$30.30	\$29.38	\$33.24
Comp. Insurance	\$2.79	\$1.33	\$1.41	\$1.48	\$1.80	\$1.97	\$2.56	\$1.57	\$4.77	\$1.48	\$2.48	\$2.81
Other Req'd Benefits	\$4.63	\$4.86	\$6.85	\$5.00	\$4.63	\$10.45	\$6.85	\$5.30	\$4.28	\$5.54	\$5.38	\$6.08
Total Contract Rate	\$32.70	\$32.75	\$45.71	\$33.80	\$31.71	\$69.55	\$46.83	\$35.85	\$32.43	\$37.32	\$37.24	\$42.13
Boise, ID												
Basic Wage & Fringe	\$27.68	\$34.63	\$42.31	\$36.63	\$21.51	\$63.83	\$39.23	\$38.85	\$30.10	\$28.16	\$28.49	\$21.98
Comp. Insurance	\$2.85	\$2.80	\$1.47	\$1.84	\$1.69	\$2.09	\$2.88	\$1.95	\$7.85	\$1.68	\$1.72	\$1.32
Other Req'd Benefits	\$5.07	\$6.34	\$7.74	\$6.70	\$3.94	\$11.68	\$7.18	\$7.11	\$5.51	\$5.15	\$5.21	\$4.02
Total Contract Rate	\$35.60	\$43.77	\$51.52	\$45.17	\$27.14	\$77.60	\$49.29	\$47.91	\$43.46	\$34.99	\$35.42	\$27.32
Boston, MA												
Basic Wage & Fringe	\$50.93	\$56.49	\$53.68	\$60.50	\$32.76	\$72.76	\$67.60	\$64.16	\$61.00	\$35.55	\$58.20	\$28.90
Comp. Insurance	\$6.07	\$2.44	\$1.70	\$2.35	\$1.64	\$2.52	\$7.86	\$2.49	\$8.59	\$2.47	\$4.04	\$2.01
Other Req'd Benefits	\$9.32	\$10.34	\$9.82	\$11.07	\$6.00	\$13.32	\$12.37	\$11.74	\$11.16	\$6.51	\$10.65	\$5.29
Total Contract Rate	\$66.32	\$69.27	\$65.20	\$73.92	\$40.40	\$88.60	\$87.83	\$78.39	\$80.75	\$44.53	\$72.89	\$36.20

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Boulder, CO												
Basic Wage & Fringe	\$36.58	\$48.02	\$47.90	\$37.24	\$25.78	\$88.53	\$37.71	\$39.49	\$30.16	\$32.67	\$45.52	\$23.30
Comp. Insurance	\$4.19	\$3.99	\$2.39	\$2.47	\$2.10	\$4.76	\$4.89	\$2.62	\$7.70	\$2.84	\$4.89	\$2.50
Other Req'd Benefits	\$6.69	\$8.79	\$8.77	\$6.81	\$4.72	\$16.20	\$6.90	\$7.23	\$5.52	\$5.98	\$8.33	\$4.26
Total Contract Rate	\$47.46	\$60.80	\$59.06	\$46.52	\$32.60	\$109.49	\$49.50	\$49.34	\$43.38	\$41.49	\$58.74	\$30.06
Bowling Green, KY												
Basic Wage & Fringe	\$28.97	\$20.46	\$35.17	\$35.28	\$23.47	\$60.54	\$34.44	\$37.42	\$28.75	\$23.07	\$42.21	\$25.95
Comp. Insurance	\$10.22	\$1.94	\$2.47	\$2.77	\$4.16	\$9.91	\$3.76	\$2.94	\$9.53	\$3.04	\$3.96	\$2.44
Other Req'd Benefits	\$5.30	\$3.74	\$6.44	\$6.46	\$4.30	\$11.08	\$6.30	\$6.85	\$5.26	\$4.22	\$7.72	\$4.75
Total Contract Rate	\$44.49	\$26.14	\$44.08	\$44.51	\$31.93	\$81.53	\$44.50	\$47.21	\$43.54	\$30.33	\$53.89	\$33.14
Brockton, MA												
Basic Wage & Fringe	\$47.32	\$39.06	\$43.71	\$30.62	\$45.26	\$72.00	\$47.16	\$32.47	\$35.11	\$35.33	\$37.03	\$28.01
Comp. Insurance	\$5.64	\$1.69	\$1.39	\$1.19	\$2.27	\$2.50	\$5.48	\$1.26	\$4.94	\$2.46	\$2.57	\$1.95
Other Req'd Benefits	\$8.66	\$7.15	\$8.00	\$5.60	\$8.28	\$13.18	\$8.63	\$5.94	\$6.43	\$6.47	\$6.78	\$5.13
Total Contract Rate	\$61.62	\$47.90	\$53.10	\$37.41	\$55.81	\$87.68	\$61.27	\$39.67	\$46.48	\$44.26	\$46.38	\$35.09
Buffalo, NY												
Basic Wage & Fringe	\$34.96	\$35.27	\$45.60	\$42.83	\$40.47	\$65.44	\$46.33	\$45.42	\$27.62	\$32.03	\$35.69	\$31.28
Comp. Insurance	\$6.46	\$6.51	\$3.41	\$3.87	\$5.24	\$6.80	\$9.61	\$4.10	\$9.25	\$7.11	\$9.57	\$8.39
Other Req'd Benefits	\$6.40	\$6.45	\$8.34	\$7.84	\$7.41	\$11.98	\$8.48	\$8.31	\$5.05	\$5.86	\$6.53	\$5.72
Total Contract Rate	\$47.82	\$48.23	\$57.35	\$54.54	\$53.12	\$84.22	\$64.42	\$57.83	\$41.92	\$45.00	\$51.79	\$45.39
Burlington, VT												
Basic Wage & Fringe	\$35.00	\$34.53	\$38.06	\$34.53	\$27.36	\$67.97	\$44.52	\$36.62	\$29.46	\$28.19	\$34.95	\$25.77
Comp. Insurance	\$3.17	\$1.82	\$1.87	\$1.94	\$2.47	\$2.71	\$3.71	\$2.06	\$6.22	\$2.75	\$2.02	\$1.49
Other Req'd Benefits	\$6.40	\$6.32	\$6.96	\$6.32	\$5.01	\$12.44	\$8.15	\$6.70	\$5.39	\$5.16	\$6.40	\$4.72
Total Contract Rate	\$44.57	\$42.67	\$46.89	\$42.79	\$34.84	\$83.12	\$56.38	\$45.38	\$41.07	\$36.10	\$43.37	\$31.98
Camden, NJ												
Basic Wage & Fringe	\$49.11	\$40.79	\$68.64	\$54.04	\$35.29	\$71.68	\$57.37	\$57.31	\$37.57	\$35.65	\$38.66	\$28.78
Comp. Insurance	\$7.26	\$6.03	\$3.01	\$3.13	\$4.02	\$3.91	\$7.71	\$3.32	\$14.27	\$3.24	\$2.44	\$1.82
Other Req'd Benefits	\$8.99	\$7.46	\$12.56	\$9.89	\$6.46	\$13.12	\$10.50	\$10.49	\$6.88	\$6.52	\$7.07	\$5.27
Total Contract Rate	\$65.36	\$54.28	\$84.21	\$67.06	\$45.77	\$88.71	\$75.58	\$71.12	\$58.72	\$45.41	\$48.17	\$35.87
Carson City, NV												
Basic Wage & Fringe	\$42.15	\$35.64	\$47.23	\$53.69	\$29.94	\$64.30	\$42.10	\$56.94	\$30.66	\$29.95	\$36.82	\$24.86
Comp. Insurance	\$4.88	\$2.31	\$3.39	\$3.21	\$2.39	\$3.67	\$3.16	\$3.41	\$4.32	\$3.44	\$3.28	\$2.22
Other Req'd Benefits	\$7.71	\$6.52	\$8.64	\$9.83	\$5.48	\$11.77	\$7.70	\$10.42	\$5.61	\$5.48	\$6.74	\$4.55
Total Contract Rate	\$54.74	\$44.47	\$59.26	\$66.73	\$37.81	\$79.74	\$52.96	\$70.77	\$40.59	\$38.87	\$46.84	\$31.63
Cedar Rapids, IA												
Basic Wage & Fringe	\$31.91	\$35.24	\$44.28	\$35.78	\$31.16	\$64.98	\$35.02	\$37.94	\$32.04	\$30.75	\$39.15	\$26.76
Comp. Insurance	\$4.62	\$2.48	\$2.47	\$2.89	\$2.82	\$3.43	\$3.96	\$3.07	\$8.73	\$2.61	\$4.18	\$2.52
Other Req'd Benefits	\$5.84	\$6.45	\$8.10	\$6.55	\$5.70	\$11.89	\$6.41	\$6.94	\$5.86	\$5.63	\$6.46	\$4.90
Total Contract Rate	\$42.37	\$44.17	\$54.85	\$45.22	\$39.68	\$80.30	\$45.39	\$47.95	\$46.63	\$38.99	\$49.79	\$34.18
Charleston, SC												
Basic Wage & Fringe	\$28.33	\$32.93	\$33.51	\$27.50	\$24.39	\$51.23	\$31.98	\$29.16	\$23.14	\$28.27	\$25.34	\$30.37
Comp. Insurance	\$6.37	\$2.95	\$3.84	\$3.40	\$3.78	\$3.40	\$4.45	\$3.60	\$11.59	\$3.51	\$3.51	\$4.21
Other Req'd Benefits	\$5.18	\$6.03	\$6.13	\$5.03	\$4.46	\$8.45	\$5.85	\$5.34	\$4.23	\$5.17	\$4.64	\$5.56
Total Contract Rate	\$39.88	\$41.91	\$43.48	\$35.93	\$32.63	\$63.08	\$42.28	\$38.10	\$38.96	\$36.95	\$33.49	\$40.14

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Charleston, WV												
Basic Wage & Fringe	\$31.85	\$32.70	\$45.42	\$43.45	\$33.05	\$60.30	\$39.69	\$46.08	\$24.52	\$28.07	\$35.67	\$34.25
Comp. Insurance	\$4.42	\$2.06	\$2.90	\$2.89	\$3.54	\$3.94	\$4.30	\$3.06	\$6.01	\$2.59	\$2.94	\$2.82
Other Req'd Benefits	\$5.83	\$5.98	\$8.31	\$7.95	\$6.05	\$11.03	\$7.26	\$8.43	\$4.49	\$5.14	\$6.53	\$6.27
Total Contract Rate	\$42.10	\$40.74	\$56.63	\$54.29	\$42.64	\$75.27	\$51.25	\$57.57	\$35.02	\$35.80	\$45.14	\$43.34
Charlotte, NC												
Basic Wage & Fringe	\$28.03	\$27.22	\$32.19	\$29.01	\$24.11	\$66.68	\$35.38	\$30.77	\$23.58	\$22.25	\$27.54	\$23.20
Comp. Insurance	\$4.54	\$2.49	\$3.45	\$2.74	\$2.76	\$6.89	\$4.01	\$2.91	\$6.23	\$3.06	\$4.37	\$3.68
Other Req'd Benefits	\$5.13	\$4.98	\$5.89	\$5.31	\$4.41	\$12.20	\$6.47	\$5.63	\$4.32	\$4.07	\$5.04	\$4.25
Total Contract Rate	\$37.70	\$34.69	\$41.53	\$37.06	\$31.28	\$85.77	\$45.86	\$39.31	\$34.13	\$29.38	\$36.95	\$31.13
Chattanooga, TN												
Basic Wage & Fringe	\$27.38	\$35.30	\$40.88	\$34.50	\$21.58	\$59.62	\$34.56	\$36.59	\$22.13	\$22.24	\$25.99	\$21.67
Comp. Insurance	\$3.57	\$2.72	\$2.37	\$2.34	\$2.56	\$4.04	\$4.27	\$2.48	\$5.35	\$2.01	\$1.89	\$1.58
Other Req'd Benefits	\$5.01	\$6.46	\$7.48	\$6.31	\$3.95	\$10.91	\$6.32	\$6.70	\$4.05	\$4.07	\$4.76	\$3.97
Total Contract Rate	\$35.96	\$44.48	\$50.73	\$43.15	\$28.09	\$74.57	\$45.15	\$45.77	\$31.53	\$28.32	\$32.64	\$27.22
Cheyenne, WY												
Basic Wage & Fringe	\$31.24	\$34.00	\$39.14	\$26.66	\$21.48	\$62.68	\$32.40	\$28.27	\$26.58	\$29.18	\$32.23	\$22.78
Comp. Insurance	\$1.49	\$1.62	\$1.87	\$1.27	\$1.02	\$2.99	\$1.55	\$1.35	\$1.27	\$1.39	\$1.54	\$1.09
Other Req'd Benefits	\$5.72	\$6.22	\$7.16	\$4.88	\$3.93	\$11.47	\$5.93	\$5.17	\$4.86	\$5.34	\$5.90	\$4.17
Total Contract Rate	\$38.45	\$41.84	\$48.17	\$32.81	\$26.43	\$77.14	\$39.88	\$34.79	\$32.71	\$35.91	\$39.67	\$28.04
Chicago, IL												
Basic Wage & Fringe	\$57.30	\$56.66	\$61.25	\$61.58	\$49.08	\$74.40	\$59.09	\$65.31	\$38.61	\$43.62	\$57.45	\$27.21
Comp. Insurance	\$17.13	\$10.19	\$8.11	\$9.38	\$7.43	\$10.53	\$16.08	\$9.95	\$16.58	\$9.32	\$8.79	\$4.16
Other Req'd Benefits	\$10.49	\$10.37	\$11.21	\$11.27	\$8.98	\$13.62	\$10.81	\$11.95	\$7.07	\$7.98	\$10.51	\$4.98
Total Contract Rate	\$84.92	\$77.22	\$80.57	\$82.23	\$65.49	\$98.55	\$85.98	\$87.21	\$62.26	\$60.92	\$76.75	\$36.35
Cincinnati, OH												
Basic Wage & Fringe	\$34.43	\$34.99	\$43.04	\$40.25	\$31.41	\$59.97	\$44.58	\$42.69	\$40.82	\$29.85	\$33.52	\$25.01
Comp. Insurance	\$3.83	\$3.46	\$2.44	\$2.44	\$4.32	\$2.13	\$5.25	\$2.59	\$12.43	\$2.55	\$1.65	\$1.23
Other Req'd Benefits	\$6.30	\$6.40	\$7.88	\$7.37	\$5.75	\$10.97	\$8.16	\$7.81	\$7.47	\$5.46	\$6.13	\$4.58
Total Contract Rate	\$44.56	\$44.85	\$53.36	\$50.06	\$41.48	\$73.07	\$57.99	\$53.09	\$60.72	\$37.86	\$41.30	\$30.82
Cleveland, OH												
Basic Wage & Fringe	\$39.74	\$42.63	\$55.91	\$52.87	\$31.74	\$65.04	\$45.38	\$56.07	\$39.33	\$34.63	\$39.62	\$25.56
Comp. Insurance	\$4.42	\$4.22	\$3.17	\$3.21	\$4.36	\$2.31	\$5.34	\$3.40	\$11.98	\$2.96	\$1.95	\$1.25
Other Req'd Benefits	\$7.27	\$7.80	\$10.23	\$9.68	\$5.81	\$11.90	\$8.30	\$10.26	\$7.20	\$6.34	\$7.25	\$4.68
Total Contract Rate	\$51.43	\$54.65	\$69.31	\$65.76	\$41.91	\$79.25	\$59.02	\$69.73	\$58.51	\$43.93	\$48.82	\$31.49
Colorado Springs, CO												
Basic Wage & Fringe	\$36.18	\$36.96	\$37.98	\$37.57	\$26.21	\$68.14	\$40.34	\$39.84	\$26.78	\$29.88	\$30.31	\$21.92
Comp. Insurance	\$4.15	\$3.07	\$1.90	\$2.49	\$2.14	\$3.67	\$5.24	\$2.65	\$6.84	\$2.59	\$3.26	\$2.36
Other Req'd Benefits	\$6.62	\$6.76	\$6.95	\$6.88	\$4.80	\$12.47	\$7.38	\$7.29	\$4.90	\$5.47	\$5.55	\$4.01
Total Contract Rate	\$46.95	\$46.79	\$46.83	\$46.94	\$33.15	\$84.28	\$52.96	\$49.78	\$38.52	\$37.94	\$39.12	\$28.29
Columbia, SC												
Basic Wage & Fringe	\$27.76	\$33.06	\$31.38	\$28.39	\$26.70	\$60.95	\$26.77	\$30.11	\$23.74	\$28.39	\$22.16	\$24.18
Comp. Insurance	\$6.24	\$2.97	\$3.59	\$3.51	\$4.14	\$4.18	\$3.73	\$3.72	\$11.89	\$3.53	\$3.07	\$3.35
Other Req'd Benefits	\$5.08	\$6.05	\$5.74	\$5.20	\$4.89	\$11.15	\$4.90	\$5.51	\$4.34	\$5.20	\$4.06	\$4.42
Total Contract Rate	\$39.08	\$42.08	\$40.71	\$37.10	\$35.73	\$76.28	\$35.40	\$39.34	\$39.97	\$37.12	\$29.29	\$31.95

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Columbus, GA												
Basic Wage & Fringe	\$23.76	\$29.86	\$28.55	\$28.41	\$20.59	\$55.05	\$27.91	\$30.13	\$22.12	\$17.86	\$21.34	\$21.36
Comp. Insurance	\$6.10	\$4.16	\$3.09	\$3.24	\$4.69	\$6.21	\$5.88	\$3.43	\$12.10	\$3.74	\$4.51	\$4.51
Other Req'd Benefits	\$4.35	\$5.46	\$5.22	\$5.20	\$3.77	\$10.07	\$5.11	\$5.51	\$4.05	\$3.27	\$3.91	\$3.91
Total Contract Rate	\$34.21	\$39.48	\$36.86	\$36.85	\$29.05	\$71.33	\$38.90	\$39.07	\$38.27	\$24.87	\$29.76	\$29.78
Columbus, OH												
Basic Wage & Fringe	\$35.76	\$37.70	\$42.84	\$38.88	\$25.87	\$50.70	\$40.22	\$41.24	\$27.05	\$30.37	\$26.85	\$23.09
Comp. Insurance	\$3.98	\$3.73	\$2.43	\$2.36	\$3.55	\$1.80	\$4.73	\$2.50	\$8.24	\$2.59	\$1.32	\$1.13
Other Req'd Benefits	\$6.54	\$6.90	\$7.84	\$7.12	\$4.73	\$9.28	\$7.36	\$7.55	\$4.95	\$5.56	\$4.91	\$4.23
Total Contract Rate	\$46.28	\$48.33	\$53.11	\$48.36	\$34.15	\$61.78	\$52.31	\$51.29	\$40.24	\$38.52	\$33.08	\$28.45
Concord, NH												
Basic Wage & Fringe	\$34.19	\$40.93	\$40.42	\$38.06	\$32.27	\$77.35	\$49.40	\$40.36	\$36.79	\$26.36	\$38.79	\$25.83
Comp. Insurance	\$6.79	\$2.68	\$2.96	\$3.84	\$7.07	\$4.85	\$10.46	\$4.07	\$16.71	\$2.77	\$4.17	\$2.78
Other Req'd Benefits	\$6.26	\$7.49	\$7.40	\$6.96	\$5.91	\$14.16	\$9.04	\$7.39	\$6.73	\$4.82	\$7.10	\$4.73
Total Contract Rate	\$47.24	\$51.10	\$50.78	\$48.86	\$45.25	\$96.36	\$68.90	\$51.82	\$60.23	\$33.95	\$50.06	\$33.34
Corpus Christi, TX												
Basic Wage & Fringe	\$22.58	\$29.53	\$34.98	\$33.33	\$27.92	\$54.45	\$29.78	\$35.35	\$22.99	\$16.63	\$24.31	\$19.43
Comp. Insurance	\$2.54	\$3.32	\$2.15	\$2.25	\$2.51	\$3.25	\$3.25	\$2.39	\$4.50	\$1.56	\$3.22	\$2.57
Other Req'd Benefits	\$4.13	\$5.40	\$6.40	\$6.10	\$5.11	\$9.96	\$5.45	\$6.47	\$4.21	\$3.04	\$4.45	\$3.56
Total Contract Rate	\$29.25	\$38.25	\$43.53	\$41.68	\$35.54	\$67.66	\$38.48	\$44.21	\$31.70	\$21.23	\$31.98	\$25.56
Cumberland, MD												
Basic Wage & Fringe	\$30.07	\$31.62	\$42.59	\$27.38	\$26.22	\$58.28	\$38.17	\$29.04	\$28.42	\$23.25	\$29.97	\$33.28
Comp. Insurance	\$3.20	\$2.42	\$3.07	\$2.12	\$2.42	\$4.30	\$3.97	\$2.24	\$7.29	\$3.10	\$3.52	\$3.91
Other Req'd Benefits	\$5.50	\$5.79	\$7.79	\$5.01	\$4.80	\$10.67	\$6.99	\$5.31	\$5.20	\$4.25	\$5.48	\$6.09
Total Contract Rate	\$38.77	\$39.83	\$53.45	\$34.51	\$33.44	\$73.25	\$49.13	\$36.59	\$40.91	\$30.60	\$38.97	\$43.28
Dallas, TX												
Basic Wage & Fringe	\$27.98	\$22.96	\$35.85	\$39.23	\$22.46	\$48.23	\$33.69	\$41.60	\$22.87	\$29.61	\$24.36	\$22.52
Comp. Insurance	\$3.15	\$2.58	\$2.20	\$2.65	\$2.02	\$2.88	\$3.68	\$2.81	\$4.48	\$2.79	\$3.23	\$2.98
Other Req'd Benefits	\$5.12	\$4.20	\$6.56	\$7.18	\$4.11	\$8.83	\$6.17	\$7.61	\$4.19	\$5.42	\$4.46	\$4.12
Total Contract Rate	\$36.25	\$29.74	\$44.61	\$49.06	\$28.59	\$59.94	\$43.54	\$52.02	\$31.54	\$37.82	\$32.05	\$29.62
Danbury, CT												
Basic Wage & Fringe	\$43.75	\$40.64	\$51.83	\$44.30	\$27.43	\$74.92	\$43.33	\$46.98	\$36.54	\$37.21	\$38.53	\$24.97
Comp. Insurance	\$10.93	\$3.69	\$4.41	\$4.47	\$4.50	\$7.01	\$10.09	\$4.74	\$12.77	\$5.38	\$4.22	\$2.74
Other Req'd Benefits	\$8.01	\$7.44	\$9.48	\$8.11	\$5.02	\$13.71	\$7.93	\$8.60	\$6.69	\$6.81	\$7.05	\$4.57
Total Contract Rate	\$62.69	\$51.77	\$65.72	\$56.88	\$36.95	\$95.64	\$61.35	\$60.32	\$56.00	\$49.40	\$49.80	\$32.28
Davenport, IA												
Basic Wage & Fringe	\$40.57	\$28.54	\$47.42	\$41.11	\$33.40	\$61.09	\$30.80	\$43.60	\$31.40	\$38.33	\$42.65	\$28.29
Comp. Insurance	\$5.87	\$2.01	\$2.65	\$3.33	\$3.02	\$3.23	\$3.48	\$3.53	\$8.56	\$3.25	\$4.01	\$2.66
Other Req'd Benefits	\$7.42	\$5.22	\$8.68	\$7.52	\$6.11	\$11.18	\$5.64	\$7.98	\$5.75	\$7.01	\$7.80	\$5.18
Total Contract Rate	\$53.86	\$35.77	\$58.75	\$51.96	\$42.53	\$75.50	\$39.92	\$55.11	\$45.71	\$48.59	\$54.46	\$36.13
Dayton, OH												
Basic Wage & Fringe	\$36.01	\$36.64	\$44.80	\$41.11	\$25.50	\$67.57	\$43.96	\$43.60	\$33.44	\$32.69	\$31.25	\$25.55
Comp. Insurance	\$4.01	\$3.63	\$2.54	\$2.50	\$3.50	\$2.40	\$5.17	\$2.65	\$10.18	\$2.79	\$1.53	\$1.25
Other Req'd Benefits	\$6.59	\$6.71	\$8.20	\$7.52	\$4.67	\$12.37	\$8.04	\$7.98	\$6.12	\$5.98	\$5.72	\$4.68
Total Contract Rate	\$46.61	\$46.98	\$55.54	\$51.13	\$33.67	\$82.34	\$57.17	\$54.23	\$49.74	\$41.46	\$38.50	\$31.48

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Daytona Beach, FL												
Basic Wage & Fringe	\$30.43	\$28.51	\$29.75	\$26.80	\$19.35	\$52.56	\$34.42	\$28.43	\$25.68	\$27.43	\$25.13	\$21.95
Comp. Insurance	\$3.89	\$1.47	\$1.52	\$1.38	\$1.59	\$2.07	\$2.94	\$1.46	\$5.14	\$2.30	\$2.45	\$2.14
Other Req'd Benefits	\$5.57	\$5.22	\$5.44	\$4.90	\$3.54	\$9.62	\$6.30	\$5.20	\$4.70	\$5.02	\$4.60	\$4.02
Total Contract Rate	\$39.89	\$35.20	\$36.71	\$33.08	\$24.48	\$64.25	\$43.66	\$35.09	\$35.52	\$34.75	\$32.18	\$28.11
Denver, CO												
Basic Wage & Fringe	\$35.29	\$25.86	\$43.51	\$39.11	\$29.73	\$65.84	\$36.45	\$41.48	\$27.44	\$33.03	\$37.63	\$26.82
Comp. Insurance	\$4.04	\$2.15	\$2.17	\$2.60	\$2.43	\$3.54	\$4.73	\$2.75	\$7.01	\$2.87	\$4.05	\$2.88
Other Req'd Benefits	\$6.46	\$4.73	\$7.96	\$7.16	\$5.44	\$12.05	\$6.67	\$7.59	\$5.02	\$6.04	\$6.89	\$4.91
Total Contract Rate	\$45.79	\$32.74	\$53.64	\$48.87	\$37.60	\$81.43	\$47.85	\$51.82	\$39.47	\$41.94	\$48.57	\$34.61
Des Moines, IA												
Basic Wage & Fringe	\$34.37	\$35.50	\$46.78	\$40.76	\$31.93	\$59.72	\$46.02	\$43.23	\$31.47	\$32.81	\$40.19	\$23.85
Comp. Insurance	\$4.97	\$2.50	\$2.61	\$3.30	\$2.89	\$3.15	\$5.20	\$3.50	\$8.58	\$2.78	\$3.78	\$2.24
Other Req'd Benefits	\$6.29	\$6.50	\$8.56	\$7.46	\$5.84	\$10.93	\$8.42	\$7.91	\$5.76	\$6.00	\$7.35	\$4.36
Total Contract Rate	\$45.63	\$44.50	\$57.95	\$51.52	\$40.66	\$73.80	\$59.64	\$54.64	\$45.81	\$41.59	\$51.32	\$30.45
Detroit, MI												
Basic Wage & Fringe	\$48.81	\$43.15	\$58.15	\$55.69	\$42.52	\$67.40	\$48.13	\$59.06	\$38.54	\$37.05	\$43.80	\$33.86
Comp. Insurance	\$11.17	\$9.87	\$3.06	\$4.02	\$5.77	\$4.45	\$6.95	\$4.26	\$12.58	\$4.25	\$5.96	\$4.60
Other Req'd Benefits	\$8.93	\$7.90	\$10.64	\$10.19	\$7.78	\$12.33	\$8.81	\$10.81	\$7.05	\$6.78	\$8.02	\$6.20
Total Contract Rate	\$68.91	\$60.92	\$71.85	\$69.90	\$56.07	\$84.18	\$63.89	\$74.13	\$58.17	\$48.08	\$57.78	\$44.66
Dover, DE												
Basic Wage & Fringe	\$40.72	\$34.01	\$38.31	\$45.10	\$24.96	\$62.70	\$43.43	\$47.83	\$30.58	\$29.20	\$32.24	\$27.37
Comp. Insurance	\$4.13	\$6.93	\$1.99	\$3.14	\$3.35	\$3.78	\$4.90	\$3.33	\$7.22	\$4.45	\$3.85	\$3.27
Other Req'd Benefits	\$7.45	\$6.22	\$7.01	\$8.25	\$4.57	\$11.47	\$7.95	\$8.75	\$5.60	\$5.34	\$5.90	\$5.01
Total Contract Rate	\$52.30	\$47.16	\$47.31	\$56.49	\$32.88	\$77.95	\$56.28	\$59.91	\$43.40	\$38.99	\$41.99	\$35.65
Duluth, MN												
Basic Wage & Fringe	\$35.91	\$34.13	\$48.41	\$48.29	\$41.16	\$62.93	\$49.60	\$51.21	\$46.04	\$35.02	\$48.71	\$28.99
Comp. Insurance	\$11.56	\$5.27	\$3.23	\$5.45	\$6.00	\$2.82	\$9.60	\$5.78	\$25.27	\$5.53	\$10.68	\$6.36
Other Req'd Benefits	\$6.57	\$6.25	\$8.86	\$8.84	\$7.53	\$11.52	\$9.08	\$9.37	\$8.43	\$6.41	\$8.91	\$5.31
Total Contract Rate	\$54.04	\$45.65	\$60.50	\$62.58	\$54.69	\$77.27	\$68.28	\$66.36	\$79.74	\$46.96	\$68.30	\$40.66
Eau Claire, WI												
Basic Wage & Fringe	\$38.91	\$31.92	\$48.23	\$46.31	\$31.46	\$58.84	\$38.53	\$49.11	\$27.49	\$29.02	\$30.25	\$22.65
Comp. Insurance	\$11.23	\$8.37	\$5.21	\$5.29	\$8.13	\$5.93	\$10.71	\$5.61	\$10.27	\$3.49	\$11.79	\$8.83
Other Req'd Benefits	\$7.12	\$5.84	\$8.83	\$8.47	\$5.76	\$10.77	\$7.05	\$8.99	\$4.54	\$5.31	\$5.54	\$4.14
Total Contract Rate	\$57.26	\$46.13	\$62.27	\$60.07	\$45.35	\$75.54	\$56.29	\$63.71	\$42.30	\$37.82	\$47.58	\$35.62
El Paso, TX												
Basic Wage & Fringe	\$23.25	\$21.97	\$32.05	\$26.86	\$17.93	\$55.27	\$29.05	\$28.49	\$17.32	\$25.74	\$24.28	\$16.49
Comp. Insurance	\$2.62	\$2.47	\$1.97	\$1.81	\$1.61	\$3.30	\$3.17	\$1.92	\$3.39	\$2.42	\$3.22	\$2.18
Other Req'd Benefits	\$4.25	\$4.02	\$5.87	\$4.92	\$3.28	\$10.11	\$5.32	\$5.21	\$3.17	\$4.71	\$4.44	\$3.02
Total Contract Rate	\$30.12	\$28.46	\$39.89	\$33.59	\$22.82	\$68.68	\$37.54	\$35.62	\$23.88	\$32.87	\$31.94	\$21.69
Erie, PA												
Basic Wage & Fringe	\$28.45	\$30.19	\$44.24	\$37.11	\$28.63	\$55.66	\$40.58	\$39.35	\$32.76	\$25.82	\$28.62	\$24.40
Comp. Insurance	\$3.78	\$4.00	\$3.07	\$3.16	\$4.38	\$4.93	\$5.78	\$3.35	\$10.48	\$3.58	\$4.18	\$3.56
Other Req'd Benefits	\$5.21	\$5.52	\$8.10	\$6.79	\$5.24	\$10.19	\$7.43	\$7.20	\$6.00	\$4.73	\$5.24	\$4.47
Total Contract Rate	\$37.44	\$39.71	\$55.41	\$47.06	\$38.25	\$70.78	\$53.79	\$49.90	\$49.24	\$34.13	\$38.04	\$32.43

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Eugene, OR												
Basic Wage & Fringe	\$39.09	\$25.02	\$49.76	\$51.45	\$23.65	\$60.65	\$43.59	\$54.57	\$26.63	\$28.24	\$32.69	\$26.39
Comp. Insurance	\$5.68	\$2.58	\$2.46	\$2.78	\$2.36	\$2.92	\$5.27	\$2.95	\$5.86	\$3.44	\$6.53	\$5.27
Other Req'd Benefits	\$7.15	\$4.58	\$9.11	\$9.42	\$4.33	\$11.10	\$7.98	\$9.99	\$4.87	\$5.17	\$5.98	\$4.83
Total Contract Rate	\$51.92	\$32.18	\$61.33	\$63.65	\$30.34	\$74.67	\$56.84	\$67.51	\$37.36	\$36.85	\$45.20	\$36.49
Evansville, IN												
Basic Wage & Fringe	\$34.49	\$34.18	\$46.92	\$42.71	\$44.28	\$63.01	\$45.84	\$45.30	\$43.18	\$23.50	\$27.54	\$24.43
Comp. Insurance	\$2.39	\$1.00	\$1.34	\$1.18	\$2.15	\$1.65	\$2.09	\$1.25	\$4.34	\$1.35	\$0.87	\$0.77
Other Req'd Benefits	\$6.31	\$6.25	\$8.59	\$7.82	\$8.10	\$11.53	\$8.39	\$8.29	\$7.90	\$4.30	\$5.04	\$4.47
Total Contract Rate	\$43.19	\$41.43	\$56.85	\$51.71	\$54.53	\$76.19	\$56.32	\$54.84	\$55.42	\$29.15	\$33.45	\$29.67
Fairbanks, AK												
Basic Wage & Fringe	\$51.44	\$44.10	\$59.03	\$55.28	\$30.07	\$81.32	\$58.13	\$58.63	\$39.65	\$37.88	\$52.14	\$33.65
Comp. Insurance	\$8.18	\$9.47	\$5.19	\$5.70	\$3.10	\$3.97	\$17.86	\$6.04	\$14.65	\$2.08	\$7.68	\$4.96
Other Req'd Benefits	\$9.41	\$8.07	\$10.80	\$10.12	\$5.50	\$14.88	\$10.64	\$10.73	\$7.26	\$6.93	\$9.54	\$6.16
Total Contract Rate	\$69.03	\$61.64	\$75.02	\$71.10	\$38.67	\$100.17	\$86.63	\$75.40	\$61.56	\$46.89	\$69.36	\$44.77
Fall River, MA												
Basic Wage & Fringe	\$42.06	\$34.97	\$45.43	\$45.77	\$27.68	\$64.47	\$65.19	\$48.55	\$46.52	\$30.81	\$33.15	\$24.59
Comp. Insurance	\$5.01	\$1.51	\$1.44	\$1.78	\$1.39	\$2.24	\$7.58	\$1.88	\$6.55	\$2.14	\$2.30	\$1.71
Other Req'd Benefits	\$7.70	\$6.40	\$8.31	\$8.38	\$5.07	\$11.80	\$11.93	\$8.88	\$8.51	\$5.64	\$6.07	\$4.50
Total Contract Rate	\$54.77	\$42.88	\$55.18	\$55.93	\$34.14	\$78.51	\$84.70	\$59.31	\$61.58	\$38.59	\$41.52	\$30.80
Fargo, ND												
Basic Wage & Fringe	\$27.83	\$29.67	\$38.10	\$37.32	\$23.81	\$56.88	\$44.87	\$39.58	\$24.54	\$32.58	\$25.29	\$26.11
Comp. Insurance	\$3.07	\$1.61	\$1.44	\$2.03	\$1.70	\$1.96	\$3.07	\$2.15	\$5.01	\$1.60	\$2.13	\$2.20
Other Req'd Benefits	\$5.09	\$4.90	\$6.97	\$6.83	\$4.36	\$10.41	\$8.21	\$7.24	\$4.49	\$5.96	\$4.63	\$4.78
Total Contract Rate	\$35.99	\$36.18	\$46.51	\$46.18	\$29.87	\$69.25	\$56.15	\$48.97	\$34.04	\$40.14	\$32.05	\$33.09
Fayetteville, AR												
Basic Wage & Fringe	\$29.55	\$31.61	\$33.69	\$30.18	\$21.40	\$58.26	\$36.13	\$32.01	\$25.86	\$23.79	\$21.77	\$21.21
Comp. Insurance	\$3.93	\$1.99	\$1.53	\$1.50	\$2.21	\$2.92	\$2.53	\$1.59	\$5.18	\$1.25	\$2.18	\$2.13
Other Req'd Benefits	\$5.41	\$5.78	\$6.17	\$5.52	\$3.92	\$10.66	\$6.61	\$5.86	\$4.73	\$4.35	\$3.98	\$3.88
Total Contract Rate	\$38.89	\$39.38	\$41.39	\$37.20	\$27.53	\$71.84	\$45.27	\$39.46	\$35.77	\$29.39	\$27.93	\$27.22
Flint, MI												
Basic Wage & Fringe	\$41.63	\$38.06	\$59.86	\$48.68	\$52.26	\$70.17	\$46.64	\$51.63	\$41.48	\$32.67	\$36.54	\$45.05
Comp. Insurance	\$9.52	\$8.71	\$3.15	\$3.51	\$7.09	\$4.63	\$6.74	\$3.72	\$13.54	\$3.75	\$4.97	\$6.13
Other Req'd Benefits	\$7.62	\$6.96	\$10.95	\$8.91	\$9.56	\$12.84	\$8.54	\$9.45	\$7.59	\$5.98	\$6.69	\$8.24
Total Contract Rate	\$58.77	\$53.73	\$73.96	\$61.10	\$68.91	\$87.64	\$61.92	\$64.80	\$62.61	\$42.40	\$48.20	\$59.42
Fort Lauderdale, FL												
Basic Wage & Fringe	\$29.55	\$40.66	\$37.30	\$36.24	\$25.30	\$60.42	\$37.04	\$38.43	\$30.06	\$24.87	\$39.70	\$22.25
Comp. Insurance	\$3.77	\$2.10	\$1.91	\$1.86	\$2.08	\$2.38	\$3.16	\$1.98	\$6.02	\$2.08	\$4.48	\$2.17
Other Req'd Benefits	\$5.41	\$7.44	\$6.83	\$6.63	\$4.63	\$11.06	\$6.78	\$7.03	\$5.50	\$4.55	\$6.55	\$4.07
Total Contract Rate	\$38.73	\$50.20	\$46.04	\$44.73	\$32.01	\$73.86	\$46.98	\$47.44	\$41.58	\$31.50	\$50.73	\$28.49
Fort Smith, AR												
Basic Wage & Fringe	\$23.86	\$27.43	\$35.87	\$27.60	\$20.09	\$50.54	\$33.24	\$29.27	\$19.68	\$20.99	\$22.96	\$24.86
Comp. Insurance	\$3.17	\$1.72	\$1.63	\$1.37	\$2.31	\$2.53	\$2.33	\$1.45	\$3.94	\$1.10	\$2.30	\$2.49
Other Req'd Benefits	\$4.37	\$5.02	\$6.56	\$5.05	\$3.31	\$9.25	\$6.08	\$5.36	\$3.60	\$3.84	\$4.20	\$4.55
Total Contract Rate	\$31.40	\$34.17	\$44.06	\$34.02	\$25.71	\$62.32	\$41.65	\$36.08	\$27.22	\$25.93	\$29.46	\$31.90

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Fort Worth, TX												
Basic Wage & Fringe	\$27.56	\$19.26	\$35.62	\$34.95	\$24.41	\$64.19	\$33.96	\$37.07	\$23.34	\$26.42	\$23.02	\$21.88
Comp. Insurance	\$3.10	\$2.17	\$2.19	\$2.36	\$2.19	\$3.83	\$3.71	\$2.50	\$4.57	\$2.49	\$3.05	\$2.90
Other Req'd Benefits	\$5.04	\$3.52	\$6.52	\$6.40	\$4.47	\$11.75	\$6.21	\$6.78	\$4.27	\$4.83	\$4.21	\$4.00
Total Contract Rate	\$35.70	\$24.95	\$44.33	\$43.71	\$31.07	\$79.77	\$43.88	\$46.35	\$32.18	\$33.74	\$30.28	\$28.78
Frankfort, KY												
Basic Wage & Fringe	\$28.97	\$20.46	\$35.17	\$35.28	\$23.47	\$60.54	\$34.44	\$37.42	\$28.75	\$23.07	\$42.21	\$25.95
Comp. Insurance	\$10.22	\$1.94	\$2.47	\$2.77	\$4.16	\$9.91	\$3.76	\$2.94	\$9.53	\$3.04	\$3.96	\$2.44
Other Req'd Benefits	\$5.30	\$3.74	\$6.44	\$6.46	\$4.30	\$11.08	\$6.30	\$6.85	\$5.26	\$4.22	\$7.72	\$4.75
Total Contract Rate	\$44.49	\$26.14	\$44.08	\$44.51	\$31.93	\$81.53	\$44.50	\$47.21	\$43.54	\$30.33	\$53.89	\$33.14
Fresno, CA												
Basic Wage & Fringe	\$37.02	\$34.39	\$45.17	\$43.79	\$26.28	\$65.54	\$55.68	\$46.45	\$34.55	\$38.66	\$58.54	\$25.25
Comp. Insurance	\$5.01	\$4.65	\$1.71	\$2.29	\$1.68	\$1.52	\$4.79	\$2.42	\$6.44	\$1.80	\$4.47	\$1.93
Other Req'd Benefits	\$6.77	\$6.29	\$8.27	\$8.01	\$4.81	\$11.99	\$10.19	\$8.50	\$6.32	\$7.07	\$10.71	\$4.62
Total Contract Rate	\$48.80	\$45.33	\$55.15	\$54.09	\$32.77	\$79.05	\$70.66	\$57.37	\$47.31	\$47.53	\$73.72	\$31.80
Gary, IN												
Basic Wage & Fringe	\$45.48	\$35.20	\$57.33	\$57.00	\$41.36	\$64.90	\$47.50	\$60.45	\$46.60	\$24.54	\$52.11	\$37.71
Comp. Insurance	\$3.15	\$1.03	\$1.63	\$1.57	\$2.01	\$1.70	\$2.17	\$1.67	\$4.69	\$1.41	\$1.65	\$1.20
Other Req'd Benefits	\$8.32	\$6.44	\$10.49	\$10.43	\$7.57	\$11.88	\$8.69	\$11.06	\$8.53	\$4.49	\$9.54	\$6.90
Total Contract Rate	\$56.95	\$42.67	\$69.45	\$69.00	\$50.94	\$78.48	\$58.36	\$73.18	\$59.82	\$30.44	\$63.30	\$45.81
Grand Rapids, MI												
Basic Wage & Fringe	\$34.42	\$34.27	\$44.33	\$42.45	\$34.49	\$65.26	\$37.80	\$45.02	\$27.41	\$35.41	\$37.71	\$28.69
Comp. Insurance	\$7.88	\$7.84	\$2.34	\$3.06	\$4.68	\$4.31	\$5.46	\$3.25	\$8.95	\$4.06	\$5.13	\$3.90
Other Req'd Benefits	\$6.30	\$6.27	\$8.11	\$7.77	\$6.31	\$11.94	\$6.92	\$8.24	\$5.02	\$6.48	\$6.90	\$5.25
Total Contract Rate	\$48.60	\$48.38	\$54.78	\$53.28	\$45.48	\$81.51	\$50.18	\$56.51	\$41.38	\$45.95	\$49.74	\$37.84
Great Falls, MT												
Basic Wage & Fringe	\$27.62	\$28.39	\$44.16	\$36.17	\$27.09	\$52.33	\$34.27	\$38.36	\$19.43	\$24.37	\$26.91	\$22.17
Comp. Insurance	\$14.80	\$4.14	\$5.60	\$7.49	\$4.82	\$6.25	\$8.89	\$7.94	\$18.71	\$11.80	\$8.26	\$6.80
Other Req'd Benefits	\$5.05	\$5.20	\$8.08	\$6.62	\$4.96	\$9.58	\$6.27	\$7.02	\$3.56	\$4.46	\$4.92	\$4.06
Total Contract Rate	\$47.47	\$37.73	\$57.84	\$50.28	\$36.87	\$68.16	\$49.43	\$53.32	\$41.70	\$40.63	\$40.09	\$33.03
Green Bay, WI												
Basic Wage & Fringe	\$39.50	\$46.34	\$41.95	\$45.02	\$32.28	\$59.44	\$43.95	\$47.75	\$23.88	\$32.69	\$31.50	\$40.58
Comp. Insurance	\$11.40	\$12.15	\$4.53	\$5.15	\$8.34	\$5.99	\$12.21	\$5.46	\$15.48	\$3.93	\$12.28	\$15.81
Other Req'd Benefits	\$7.23	\$8.48	\$7.68	\$8.24	\$5.91	\$10.88	\$8.04	\$8.74	\$4.37	\$5.98	\$5.76	\$7.43
Total Contract Rate	\$58.13	\$66.97	\$54.16	\$58.41	\$46.53	\$76.31	\$64.20	\$61.95	\$43.73	\$42.60	\$49.54	\$63.82
Greensboro, NC												
Basic Wage & Fringe	\$27.05	\$32.10	\$30.82	\$29.33	\$21.24	\$59.19	\$28.08	\$31.11	\$21.94	\$27.62	\$27.67	\$25.14
Comp. Insurance	\$4.38	\$2.94	\$3.31	\$2.77	\$2.43	\$6.11	\$3.18	\$2.94	\$5.79	\$3.80	\$4.39	\$3.99
Other Req'd Benefits	\$4.95	\$5.87	\$5.64	\$5.37	\$3.89	\$10.83	\$5.14	\$5.69	\$4.02	\$5.05	\$5.06	\$4.60
Total Contract Rate	\$36.38	\$40.91	\$39.77	\$37.47	\$27.56	\$76.13	\$36.40	\$39.74	\$31.75	\$36.47	\$37.12	\$33.73
Hagatna, GU												
Basic Wage & Fringe	\$21.68	\$25.52	\$25.64	\$22.37	\$21.50	\$47.04	\$30.80	\$23.72	\$22.93	\$21.91	\$21.67	\$22.60
Comp. Insurance	\$1.59	\$0.78	\$1.01	\$0.83	\$1.18	\$2.28	\$2.27	\$0.88	\$5.02	\$1.61	\$1.43	\$1.49
Other Req'd Benefits	\$3.97	\$4.67	\$4.69	\$4.09	\$3.93	\$8.61	\$5.64	\$4.34	\$4.20	\$4.01	\$3.97	\$4.14
Total Contract Rate	\$27.24	\$30.97	\$31.34	\$27.29	\$26.61	\$57.93	\$38.71	\$28.94	\$32.15	\$27.53	\$27.07	\$28.23

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Hampton, VA												
Basic Wage & Fringe	\$30.25	\$40.10	\$36.63	\$32.45	\$27.75	\$57.21	\$36.84	\$34.42	\$30.19	\$30.03	\$26.56	\$23.39
Comp. Insurance	\$5.25	\$5.91	\$2.56	\$3.39	\$3.22	\$5.60	\$5.83	\$3.59	\$11.00	\$3.43	\$5.04	\$4.44
Other Req'd Benefits	\$5.54	\$7.34	\$6.70	\$5.94	\$5.08	\$10.47	\$6.74	\$6.30	\$5.52	\$5.50	\$4.86	\$4.28
Total Contract Rate	\$41.04	\$53.35	\$45.89	\$41.78	\$36.05	\$73.28	\$49.41	\$44.31	\$46.71	\$38.96	\$36.46	\$32.11
Harrisburg, PA												
Basic Wage & Fringe	\$35.53	\$28.88	\$42.81	\$39.20	\$28.87	\$66.11	\$33.58	\$41.57	\$30.03	\$29.14	\$27.65	\$26.61
Comp. Insurance	\$4.71	\$3.83	\$2.97	\$3.34	\$4.41	\$5.85	\$4.79	\$3.54	\$9.61	\$4.04	\$4.03	\$3.88
Other Req'd Benefits	\$6.50	\$5.29	\$7.83	\$7.17	\$5.28	\$12.10	\$6.15	\$7.61	\$5.50	\$5.33	\$5.06	\$4.87
Total Contract Rate	\$46.74	\$38.00	\$53.61	\$49.71	\$38.56	\$84.06	\$44.52	\$52.72	\$45.14	\$38.51	\$36.74	\$35.36
Hartford, CT												
Basic Wage & Fringe	\$42.78	\$45.41	\$47.19	\$46.24	\$32.27	\$83.72	\$42.47	\$49.04	\$42.46	\$39.92	\$51.48	\$28.81
Comp. Insurance	\$10.69	\$4.13	\$4.01	\$4.66	\$5.29	\$7.83	\$9.89	\$4.94	\$14.84	\$5.77	\$5.64	\$3.16
Other Req'd Benefits	\$7.83	\$8.31	\$8.64	\$8.46	\$5.91	\$15.32	\$7.77	\$8.97	\$7.77	\$7.31	\$9.42	\$5.27
Total Contract Rate	\$61.30	\$57.85	\$59.84	\$59.36	\$43.47	\$106.87	\$60.13	\$62.95	\$65.07	\$53.00	\$66.54	\$37.24
Helena, MT												
Basic Wage & Fringe	\$28.73	\$30.45	\$46.52	\$44.72	\$26.52	\$56.12	\$36.76	\$47.43	\$21.98	\$26.13	\$25.84	\$28.06
Comp. Insurance	\$15.40	\$4.44	\$5.89	\$9.26	\$4.72	\$6.70	\$9.54	\$9.82	\$21.16	\$12.65	\$7.93	\$8.61
Other Req'd Benefits	\$5.26	\$5.57	\$8.51	\$8.18	\$4.85	\$10.27	\$6.73	\$8.68	\$4.02	\$4.78	\$4.73	\$5.13
Total Contract Rate	\$49.39	\$40.46	\$60.92	\$62.16	\$36.09	\$73.09	\$53.03	\$65.93	\$47.16	\$43.56	\$38.50	\$41.80
Hilo, HI												
Basic Wage & Fringe	\$56.81	\$40.60	\$53.82	\$47.10	\$45.58	\$73.35	\$47.62	\$49.96	\$50.31	\$32.70	\$57.21	\$31.22
Comp. Insurance	\$7.39	\$3.21	\$2.33	\$1.73	\$3.28	\$2.49	\$4.53	\$1.84	\$6.66	\$2.93	\$3.98	\$2.17
Other Req'd Benefits	\$10.40	\$7.43	\$9.85	\$8.62	\$8.34	\$13.42	\$8.71	\$9.14	\$9.21	\$5.98	\$10.47	\$5.71
Total Contract Rate	\$74.60	\$51.24	\$66.00	\$57.45	\$57.20	\$89.26	\$60.86	\$60.94	\$66.18	\$41.61	\$71.66	\$39.10
Honolulu, HI												
Basic Wage & Fringe	\$56.81	\$40.60	\$53.82	\$47.10	\$45.58	\$73.35	\$47.62	\$49.96	\$50.31	\$32.70	\$57.21	\$31.22
Comp. Insurance	\$7.39	\$3.21	\$2.33	\$1.73	\$3.28	\$2.49	\$4.53	\$1.84	\$6.66	\$2.93	\$3.98	\$2.17
Other Req'd Benefits	\$10.40	\$7.43	\$9.85	\$8.62	\$8.34	\$13.42	\$8.71	\$9.14	\$9.21	\$5.98	\$10.47	\$5.71
Total Contract Rate	\$74.60	\$51.24	\$66.00	\$57.45	\$57.20	\$89.26	\$60.86	\$60.94	\$66.18	\$41.61	\$71.66	\$39.10
Houston, TX												
Basic Wage & Fringe	\$28.52	\$37.12	\$37.03	\$37.52	\$23.44	\$53.60	\$30.74	\$39.80	\$25.55	\$31.88	\$23.50	\$22.25
Comp. Insurance	\$3.21	\$4.18	\$2.28	\$2.53	\$2.10	\$3.20	\$3.35	\$2.69	\$5.01	\$3.00	\$3.11	\$2.95
Other Req'd Benefits	\$5.22	\$6.79	\$6.78	\$6.87	\$4.29	\$9.81	\$5.63	\$7.28	\$4.68	\$5.83	\$4.30	\$4.07
Total Contract Rate	\$36.95	\$48.09	\$46.09	\$46.92	\$29.83	\$66.61	\$39.72	\$49.77	\$35.24	\$40.71	\$30.91	\$29.27
Huntsville, AL												
Basic Wage & Fringe	\$24.19	\$41.54	\$40.93	\$31.99	\$19.64	\$76.59	\$34.88	\$33.93	\$21.41	\$22.87	\$21.31	\$22.66
Comp. Insurance	\$8.16	\$3.92	\$4.19	\$3.26	\$4.21	\$6.98	\$8.33	\$3.45	\$9.33	\$4.12	\$2.18	\$2.32
Other Req'd Benefits	\$4.43	\$7.60	\$7.49	\$5.85	\$3.59	\$14.02	\$6.38	\$6.21	\$3.92	\$4.19	\$3.90	\$4.15
Total Contract Rate	\$36.78	\$53.06	\$52.61	\$41.10	\$27.44	\$97.59	\$49.59	\$43.59	\$34.66	\$31.18	\$27.39	\$29.13
Indianapolis, IN												
Basic Wage & Fringe	\$37.08	\$31.79	\$48.60	\$42.28	\$28.90	\$60.02	\$45.85	\$44.84	\$32.54	\$25.34	\$38.44	\$24.92
Comp. Insurance	\$2.57	\$0.93	\$1.39	\$1.17	\$1.40	\$1.57	\$2.09	\$1.24	\$3.27	\$1.46	\$1.22	\$0.79
Other Req'd Benefits	\$6.79	\$5.82	\$8.89	\$7.74	\$5.29	\$10.98	\$8.39	\$8.21	\$5.95	\$4.64	\$7.03	\$4.56
Total Contract Rate	\$46.44	\$38.54	\$58.88	\$51.19	\$35.59	\$72.57	\$56.33	\$54.29	\$41.76	\$31.44	\$46.69	\$30.27

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Jackson, MS												
Basic Wage & Fringe	\$26.93	\$30.96	\$39.10	\$26.72	\$22.08	\$57.09	\$32.50	\$28.33	\$24.12	\$19.17	\$26.02	\$21.46
Comp. Insurance	\$4.65	\$2.61	\$2.53	\$2.12	\$2.82	\$3.57	\$4.54	\$2.25	\$8.31	\$1.41	\$3.15	\$2.60
Other Req'd Benefits	\$4.93	\$5.67	\$7.16	\$4.89	\$4.04	\$10.45	\$5.95	\$5.18	\$4.41	\$3.51	\$4.76	\$3.93
Total Contract Rate	\$36.51	\$39.24	\$48.79	\$33.73	\$28.94	\$71.11	\$42.99	\$35.76	\$36.84	\$24.09	\$33.93	\$27.99
Jacksonville, FL												
Basic Wage & Fringe	\$31.86	\$33.26	\$36.18	\$29.29	\$22.87	\$61.30	\$36.96	\$31.06	\$27.31	\$21.17	\$26.72	\$23.23
Comp. Insurance	\$4.07	\$1.72	\$1.85	\$1.51	\$1.88	\$2.42	\$3.16	\$1.60	\$5.46	\$1.77	\$2.60	\$2.26
Other Req'd Benefits	\$5.83	\$6.09	\$6.62	\$5.36	\$4.19	\$11.22	\$6.76	\$5.68	\$5.00	\$3.87	\$4.89	\$4.25
Total Contract Rate	\$41.76	\$41.07	\$44.65	\$36.16	\$28.94	\$74.94	\$46.88	\$38.34	\$37.77	\$26.81	\$34.21	\$29.74
Jefferson City, MO												
Basic Wage & Fringe	\$32.51	\$29.71	\$47.53	\$39.75	\$38.11	\$54.78	\$42.42	\$42.16	\$39.05	\$24.13	\$49.62	\$23.88
Comp. Insurance	\$3.83	\$3.27	\$3.00	\$3.61	\$3.42	\$4.00	\$5.67	\$3.82	\$11.71	\$2.69	\$4.58	\$2.21
Other Req'd Benefits	\$5.95	\$5.44	\$8.70	\$7.27	\$6.97	\$10.02	\$7.76	\$7.72	\$6.44	\$4.42	\$9.08	\$4.37
Total Contract Rate	\$42.29	\$38.42	\$59.23	\$50.63	\$48.50	\$68.80	\$55.85	\$53.70	\$57.20	\$31.24	\$63.28	\$30.46
Jersey City, NJ												
Basic Wage & Fringe	\$51.36	\$57.42	\$67.84	\$45.47	\$36.98	\$61.13	\$56.50	\$48.22	\$29.38	\$36.96	\$57.35	\$30.54
Comp. Insurance	\$7.60	\$8.49	\$2.98	\$2.63	\$4.22	\$3.33	\$7.59	\$2.79	\$11.16	\$3.36	\$3.62	\$1.93
Other Req'd Benefits	\$9.40	\$10.51	\$12.41	\$8.32	\$6.77	\$11.19	\$10.34	\$8.82	\$5.38	\$6.76	\$10.50	\$5.59
Total Contract Rate	\$68.36	\$76.42	\$83.23	\$56.42	\$47.97	\$75.65	\$74.43	\$59.83	\$45.92	\$47.08	\$71.47	\$38.06
Juneau, AK												
Basic Wage & Fringe	\$51.44	\$44.10	\$59.03	\$55.28	\$30.07	\$81.32	\$58.13	\$58.63	\$39.65	\$37.88	\$52.14	\$33.65
Comp. Insurance	\$8.18	\$9.47	\$5.19	\$5.70	\$3.10	\$3.97	\$17.86	\$6.04	\$14.65	\$2.08	\$7.68	\$4.96
Other Req'd Benefits	\$9.41	\$8.07	\$10.80	\$10.12	\$5.50	\$14.88	\$10.64	\$10.73	\$7.26	\$6.93	\$9.54	\$6.16
Total Contract Rate	\$69.03	\$61.64	\$75.02	\$71.10	\$38.67	\$100.17	\$86.63	\$75.40	\$61.56	\$46.89	\$69.36	\$44.77
Kalamazoo, MI												
Basic Wage & Fringe	\$39.29	\$34.46	\$45.04	\$52.81	\$27.75	\$61.86	\$31.64	\$56.01	\$34.67	\$32.39	\$39.76	\$26.36
Comp. Insurance	\$8.99	\$7.88	\$2.37	\$3.81	\$3.77	\$4.08	\$4.57	\$4.04	\$11.32	\$3.72	\$5.41	\$3.58
Other Req'd Benefits	\$7.19	\$6.31	\$8.24	\$9.66	\$5.08	\$11.32	\$5.79	\$10.25	\$6.34	\$5.93	\$7.28	\$4.82
Total Contract Rate	\$55.47	\$48.65	\$55.65	\$66.28	\$36.60	\$77.26	\$42.00	\$70.30	\$52.33	\$42.04	\$52.45	\$34.76
Kansas City, MO												
Basic Wage & Fringe	\$48.90	\$47.65	\$51.83	\$51.02	\$27.80	\$50.56	\$47.00	\$54.11	\$43.95	\$26.16	\$35.70	\$25.10
Comp. Insurance	\$5.76	\$5.24	\$3.28	\$4.63	\$2.49	\$3.69	\$6.28	\$4.91	\$12.05	\$2.91	\$3.30	\$2.32
Other Req'd Benefits	\$8.95	\$8.72	\$9.48	\$9.34	\$5.09	\$9.25	\$8.60	\$9.90	\$8.04	\$4.79	\$6.53	\$4.59
Total Contract Rate	\$63.61	\$61.61	\$64.59	\$64.99	\$35.38	\$63.50	\$61.88	\$68.92	\$64.04	\$33.86	\$45.53	\$32.01
Key West, FL												
Basic Wage & Fringe	\$29.62	\$28.12	\$34.69	\$27.15	\$27.74	\$51.85	\$29.57	\$28.79	\$26.75	\$23.41	\$32.51	\$21.57
Comp. Insurance	\$3.78	\$1.45	\$1.78	\$1.40	\$2.28	\$2.04	\$2.53	\$1.48	\$5.35	\$1.96	\$3.17	\$2.10
Other Req'd Benefits	\$5.42	\$5.15	\$6.35	\$4.97	\$5.08	\$9.49	\$5.41	\$5.27	\$4.90	\$4.28	\$5.95	\$3.95
Total Contract Rate	\$38.82	\$34.72	\$42.82	\$33.52	\$35.10	\$63.38	\$37.51	\$35.54	\$37.00	\$29.65	\$41.63	\$27.62
Knoxville, TN												
Basic Wage & Fringe	\$28.36	\$30.94	\$35.14	\$28.10	\$21.27	\$61.44	\$35.19	\$29.81	\$28.58	\$22.67	\$31.93	\$23.09
Comp. Insurance	\$3.70	\$2.38	\$2.03	\$1.91	\$2.52	\$4.17	\$4.35	\$2.02	\$6.91	\$2.04	\$2.32	\$1.68
Other Req'd Benefits	\$5.19	\$5.66	\$6.43	\$5.14	\$3.89	\$11.24	\$6.44	\$5.46	\$5.23	\$4.15	\$5.84	\$4.23
Total Contract Rate	\$37.25	\$38.98	\$43.60	\$35.15	\$27.68	\$76.85	\$45.98	\$37.29	\$40.72	\$28.86	\$40.09	\$29.00

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Kokomo, IN												
Basic Wage & Fringe	\$38.26	\$43.36	\$60.11	\$49.66	\$35.95	\$79.94	\$52.35	\$52.67	\$29.35	\$37.23	\$41.10	\$43.71
Comp. Insurance	\$2.65	\$1.27	\$1.71	\$1.37	\$1.75	\$2.09	\$2.39	\$1.45	\$2.95	\$2.14	\$1.30	\$1.39
Other Req'd Benefits	\$7.00	\$7.93	\$11.00	\$9.09	\$6.58	\$14.63	\$9.58	\$9.64	\$5.37	\$6.81	\$7.52	\$8.00
Total Contract Rate	\$47.91	\$52.56	\$72.82	\$60.12	\$44.28	\$96.66	\$64.32	\$63.76	\$37.67	\$46.18	\$49.92	\$53.10
Lansing, MI												
Basic Wage & Fringe	\$40.76	\$39.83	\$53.04	\$49.91	\$34.94	\$73.44	\$46.44	\$52.93	\$26.99	\$34.79	\$40.78	\$24.80
Comp. Insurance	\$9.33	\$9.11	\$2.80	\$3.60	\$4.74	\$4.85	\$6.71	\$3.82	\$8.81	\$3.99	\$5.55	\$3.37
Other Req'd Benefits	\$7.46	\$7.29	\$9.71	\$9.13	\$6.39	\$13.44	\$8.50	\$9.69	\$4.94	\$6.37	\$7.46	\$4.54
Total Contract Rate	\$57.55	\$56.23	\$65.55	\$62.64	\$46.07	\$91.73	\$61.65	\$66.44	\$40.74	\$45.15	\$53.79	\$32.71
Las Cruces, NM												
Basic Wage & Fringe	\$24.42	\$32.40	\$31.96	\$29.88	\$17.37	\$55.05	\$39.12	\$31.69	\$21.10	\$27.82	\$30.71	\$16.47
Comp. Insurance	\$4.40	\$2.33	\$2.68	\$2.60	\$2.07	\$5.87	\$6.21	\$2.76	\$8.24	\$6.29	\$3.24	\$1.74
Other Req'd Benefits	\$4.47	\$5.93	\$5.85	\$5.47	\$3.18	\$10.07	\$7.16	\$5.80	\$3.86	\$5.09	\$5.62	\$3.01
Total Contract Rate	\$33.29	\$40.66	\$40.49	\$37.95	\$22.62	\$70.99	\$52.49	\$40.25	\$33.20	\$39.20	\$39.57	\$21.22
Las Vegas, NV												
Basic Wage & Fringe	\$49.10	\$40.90	\$55.21	\$51.06	\$41.86	\$61.94	\$37.05	\$54.16	\$31.68	\$37.02	\$53.10	\$26.51
Comp. Insurance	\$5.69	\$2.65	\$3.96	\$3.05	\$3.34	\$3.53	\$2.78	\$3.24	\$4.46	\$4.26	\$4.74	\$2.36
Other Req'd Benefits	\$8.99	\$7.48	\$10.10	\$9.34	\$7.66	\$11.34	\$6.78	\$9.91	\$5.80	\$6.77	\$9.72	\$4.85
Total Contract Rate	\$63.78	\$51.03	\$69.27	\$63.45	\$52.86	\$76.81	\$46.61	\$67.31	\$41.94	\$48.05	\$67.56	\$33.72
Lawton, OK												
Basic Wage & Fringe	\$27.00	\$27.85	\$40.35	\$32.90	\$30.35	\$51.35	\$33.63	\$34.89	\$25.03	\$23.91	\$26.39	\$23.39
Comp. Insurance	\$4.90	\$3.08	\$4.12	\$3.69	\$4.41	\$3.59	\$5.72	\$3.91	\$7.61	\$3.71	\$3.77	\$3.34
Other Req'd Benefits	\$4.94	\$5.10	\$7.38	\$6.02	\$5.55	\$9.40	\$6.15	\$6.38	\$4.58	\$4.38	\$4.83	\$4.28
Total Contract Rate	\$36.84	\$36.03	\$51.85	\$42.61	\$40.31	\$64.34	\$45.50	\$45.18	\$37.22	\$32.00	\$34.99	\$31.01
Lewiston, ME												
Basic Wage & Fringe	\$28.34	\$29.68	\$44.55	\$29.27	\$24.62	\$54.71	\$36.05	\$31.05	\$28.91	\$24.58	\$28.13	\$22.52
Comp. Insurance	\$9.23	\$4.08	\$3.79	\$3.42	\$4.15	\$5.26	\$6.41	\$3.63	\$6.96	\$3.06	\$3.65	\$2.93
Other Req'd Benefits	\$5.19	\$5.43	\$8.15	\$5.36	\$4.51	\$10.01	\$6.60	\$5.68	\$5.29	\$4.50	\$5.15	\$4.12
Total Contract Rate	\$42.76	\$39.19	\$56.49	\$38.05	\$33.28	\$69.98	\$49.06	\$40.36	\$41.16	\$32.14	\$36.93	\$29.57
Lexington, KY												
Basic Wage & Fringe	\$28.97	\$20.46	\$35.17	\$35.28	\$23.47	\$60.54	\$34.44	\$37.42	\$28.75	\$23.07	\$42.21	\$25.95
Comp. Insurance	\$10.22	\$1.94	\$2.47	\$2.77	\$4.16	\$9.91	\$3.76	\$2.94	\$9.53	\$3.04	\$3.96	\$2.44
Other Req'd Benefits	\$5.30	\$3.74	\$6.44	\$6.46	\$4.30	\$11.08	\$6.30	\$6.85	\$5.26	\$4.22	\$7.72	\$4.75
Total Contract Rate	\$44.49	\$26.14	\$44.08	\$44.51	\$31.93	\$81.53	\$44.50	\$47.21	\$43.54	\$30.33	\$53.89	\$33.14
Lincoln, NE												
Basic Wage & Fringe	\$31.26	\$32.91	\$37.25	\$37.08	\$27.28	\$60.67	\$43.30	\$39.32	\$24.00	\$25.14	\$25.74	\$24.49
Comp. Insurance	\$4.87	\$2.76	\$2.72	\$3.45	\$3.51	\$2.91	\$7.08	\$3.66	\$6.62	\$3.01	\$2.46	\$2.34
Other Req'd Benefits	\$5.72	\$6.02	\$6.82	\$6.79	\$4.99	\$11.10	\$7.92	\$7.20	\$4.39	\$4.60	\$4.71	\$4.48
Total Contract Rate	\$41.85	\$41.69	\$46.79	\$47.32	\$35.78	\$74.68	\$58.30	\$50.18	\$35.01	\$32.75	\$32.91	\$31.31
Little Rock, AR												
Basic Wage & Fringe	\$27.98	\$32.58	\$33.91	\$32.55	\$25.30	\$60.08	\$31.97	\$34.52	\$29.00	\$23.85	\$23.30	\$22.40
Comp. Insurance	\$3.72	\$2.05	\$1.54	\$1.61	\$2.61	\$3.01	\$2.24	\$1.71	\$5.81	\$1.25	\$2.33	\$2.24
Other Req'd Benefits	\$5.12	\$5.96	\$6.21	\$5.96	\$4.63	\$10.99	\$5.85	\$6.32	\$5.31	\$4.36	\$4.26	\$4.10
Total Contract Rate	\$36.82	\$40.59	\$41.66	\$40.12	\$32.54	\$74.08	\$40.06	\$42.55	\$40.12	\$29.46	\$29.89	\$28.74

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Los Angeles, CA												
Basic Wage & Fringe	\$43.29	\$30.51	\$51.35	\$42.84	\$31.88	\$69.03	\$52.62	\$45.44	\$42.67	\$49.44	\$35.90	\$32.21
Comp. Insurance	\$5.86	\$4.13	\$1.94	\$2.24	\$2.03	\$1.60	\$4.53	\$2.37	\$7.95	\$2.30	\$2.74	\$2.46
Other Req'd Benefits	\$7.92	\$5.58	\$9.40	\$7.84	\$5.83	\$12.63	\$9.63	\$8.32	\$7.81	\$9.05	\$6.57	\$5.89
Total Contract Rate	\$57.07	\$40.22	\$62.69	\$52.92	\$39.74	\$83.26	\$66.78	\$56.13	\$58.43	\$60.79	\$45.21	\$40.56
Louisville, KY												
Basic Wage & Fringe	\$32.43	\$24.58	\$38.12	\$44.76	\$27.06	\$62.43	\$33.41	\$47.47	\$26.48	\$22.98	\$27.46	\$23.32
Comp. Insurance	\$11.44	\$2.33	\$2.67	\$3.52	\$4.80	\$10.22	\$3.65	\$3.73	\$8.78	\$3.02	\$2.58	\$2.19
Other Req'd Benefits	\$5.93	\$4.50	\$6.98	\$8.19	\$4.95	\$11.42	\$6.11	\$8.69	\$4.85	\$4.21	\$5.03	\$4.27
Total Contract Rate	\$49.80	\$31.41	\$47.77	\$56.47	\$36.81	\$84.07	\$43.17	\$59.89	\$40.11	\$30.21	\$35.07	\$29.78
Lowell, MA												
Basic Wage & Fringe	\$42.54	\$48.61	\$43.23	\$42.52	\$33.19	\$89.63	\$58.69	\$45.10	\$39.06	\$52.39	\$46.09	\$27.39
Comp. Insurance	\$5.07	\$2.10	\$1.37	\$1.65	\$1.66	\$3.11	\$6.82	\$1.75	\$5.50	\$3.65	\$3.20	\$1.90
Other Req'd Benefits	\$7.78	\$8.90	\$7.91	\$7.78	\$6.07	\$16.40	\$10.74	\$8.25	\$7.15	\$9.59	\$8.43	\$5.01
Total Contract Rate	\$55.39	\$59.61	\$52.51	\$51.95	\$40.92	\$109.14	\$76.25	\$55.10	\$51.71	\$65.63	\$57.72	\$34.30
Lubbock, TX												
Basic Wage & Fringe	\$23.41	\$28.64	\$28.77	\$26.83	\$20.80	\$52.79	\$32.73	\$28.46	\$25.74	\$24.58	\$27.15	\$21.80
Comp. Insurance	\$2.63	\$3.22	\$1.77	\$1.81	\$1.87	\$3.15	\$3.57	\$1.92	\$5.04	\$2.31	\$3.60	\$2.89
Other Req'd Benefits	\$4.28	\$5.24	\$5.26	\$4.91	\$3.81	\$9.66	\$5.99	\$5.21	\$4.71	\$4.50	\$4.97	\$3.99
Total Contract Rate	\$30.32	\$37.10	\$35.80	\$33.55	\$26.48	\$65.60	\$42.29	\$35.59	\$35.49	\$31.39	\$35.72	\$28.68
Macon, GA												
Basic Wage & Fringe	\$28.52	\$31.00	\$34.25	\$34.78	\$19.79	\$57.16	\$29.85	\$36.88	\$22.61	\$22.27	\$26.76	\$26.33
Comp. Insurance	\$7.32	\$4.32	\$3.71	\$3.96	\$4.51	\$6.45	\$6.29	\$4.20	\$12.37	\$4.67	\$5.65	\$5.56
Other Req'd Benefits	\$5.22	\$5.67	\$6.27	\$6.36	\$3.62	\$10.46	\$5.46	\$6.75	\$4.14	\$4.08	\$4.90	\$4.82
Total Contract Rate	\$41.06	\$40.99	\$44.23	\$45.10	\$27.92	\$74.07	\$41.60	\$47.83	\$39.12	\$31.02	\$37.31	\$36.71
Madison, WI												
Basic Wage & Fringe	\$39.60	\$41.41	\$47.70	\$54.26	\$33.13	\$63.30	\$45.42	\$57.54	\$33.65	\$36.15	\$35.56	\$24.88
Comp. Insurance	\$11.42	\$10.86	\$5.16	\$6.20	\$8.56	\$6.38	\$12.62	\$6.58	\$21.82	\$4.35	\$13.86	\$9.70
Other Req'd Benefits	\$7.25	\$7.58	\$8.73	\$9.93	\$6.06	\$11.58	\$8.31	\$10.53	\$6.16	\$6.62	\$6.51	\$4.55
Total Contract Rate	\$58.27	\$59.85	\$61.59	\$70.39	\$47.75	\$81.26	\$66.35	\$74.65	\$61.63	\$47.12	\$55.93	\$39.13
Manchester, NH												
Basic Wage & Fringe	\$38.63	\$38.84	\$40.76	\$42.12	\$27.99	\$71.60	\$29.40	\$44.67	\$28.06	\$33.35	\$34.87	\$26.15
Comp. Insurance	\$7.67	\$2.54	\$2.99	\$4.25	\$6.13	\$4.49	\$6.22	\$4.51	\$12.74	\$3.50	\$3.75	\$2.81
Other Req'd Benefits	\$7.07	\$7.11	\$7.46	\$7.71	\$5.12	\$13.10	\$5.38	\$8.17	\$5.13	\$6.10	\$6.38	\$4.79
Total Contract Rate	\$53.37	\$48.49	\$51.21	\$54.08	\$39.24	\$89.19	\$41.00	\$57.35	\$45.93	\$42.95	\$45.00	\$33.75
Marquette, MI												
Basic Wage & Fringe	\$35.91	\$34.13	\$48.41	\$48.29	\$41.16	\$62.93	\$49.60	\$51.21	\$46.04	\$35.02	\$47.31	\$28.99
Comp. Insurance	\$8.22	\$7.81	\$2.55	\$3.48	\$5.59	\$4.15	\$7.17	\$3.69	\$15.03	\$4.02	\$6.43	\$3.94
Other Req'd Benefits	\$6.57	\$6.25	\$8.86	\$8.84	\$7.53	\$11.52	\$9.08	\$9.37	\$8.43	\$6.41	\$8.66	\$5.31
Total Contract Rate	\$50.70	\$48.19	\$59.82	\$60.61	\$54.28	\$78.60	\$65.85	\$64.27	\$69.50	\$45.45	\$62.40	\$38.24
Medford, OR												
Basic Wage & Fringe	\$34.24	\$33.12	\$45.93	\$54.28	\$24.39	\$57.27	\$41.90	\$57.07	\$26.94	\$26.67	\$39.77	\$24.31
Comp. Insurance	\$4.98	\$3.41	\$2.27	\$2.94	\$2.44	\$2.76	\$5.06	\$3.09	\$5.92	\$3.25	\$7.95	\$4.86
Other Req'd Benefits	\$6.27	\$6.06	\$8.41	\$9.93	\$4.46	\$10.48	\$7.67	\$10.44	\$4.93	\$4.88	\$7.28	\$4.45
Total Contract Rate	\$45.49	\$42.59	\$56.61	\$67.15	\$31.29	\$70.51	\$54.63	\$70.60	\$37.79	\$34.80	\$55.00	\$33.62

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Memphis, TN												
Basic Wage & Fringe	\$27.71	\$29.20	\$37.90	\$33.03	\$27.75	\$60.08	\$36.62	\$35.03	\$24.27	\$20.96	\$19.84	\$21.91
Comp. Insurance	\$3.61	\$2.25	\$2.19	\$2.24	\$3.29	\$4.07	\$4.52	\$2.38	\$5.87	\$1.89	\$1.44	\$1.59
Other Req'd Benefits	\$5.07	\$5.34	\$6.94	\$6.04	\$5.08	\$10.99	\$6.70	\$6.41	\$4.44	\$3.84	\$3.63	\$4.01
Total Contract Rate	\$36.39	\$36.79	\$47.03	\$41.31	\$36.12	\$75.14	\$47.84	\$43.82	\$34.58	\$26.69	\$24.91	\$27.51
Miami, FL												
Basic Wage & Fringe	\$28.69	\$22.58	\$36.50	\$34.53	\$26.26	\$60.32	\$32.55	\$36.62	\$26.94	\$27.79	\$34.87	\$25.00
Comp. Insurance	\$3.66	\$1.17	\$1.87	\$1.77	\$2.16	\$2.38	\$2.78	\$1.88	\$5.39	\$2.33	\$3.40	\$2.44
Other Req'd Benefits	\$5.25	\$4.13	\$6.68	\$6.32	\$4.81	\$11.04	\$5.96	\$6.70	\$4.93	\$5.09	\$6.38	\$4.58
Total Contract Rate	\$37.60	\$27.88	\$45.05	\$42.62	\$33.23	\$73.74	\$41.29	\$45.20	\$37.26	\$35.21	\$44.65	\$32.02
Milwaukee, WI												
Basic Wage & Fringe	\$42.12	\$41.68	\$49.52	\$53.59	\$34.96	\$66.32	\$51.28	\$56.84	\$45.86	\$36.75	\$30.46	\$27.85
Comp. Insurance	\$12.15	\$10.93	\$5.35	\$6.13	\$9.03	\$6.69	\$14.25	\$6.50	\$29.74	\$4.42	\$11.87	\$10.85
Other Req'd Benefits	\$7.71	\$7.63	\$9.06	\$9.81	\$6.40	\$12.14	\$9.38	\$10.40	\$8.39	\$6.73	\$5.57	\$5.10
Total Contract Rate	\$61.98	\$60.24	\$63.93	\$69.53	\$50.39	\$85.15	\$74.91	\$73.74	\$83.99	\$47.90	\$47.90	\$43.80
Minneapolis, MN												
Basic Wage & Fringe	\$46.66	\$44.06	\$57.33	\$56.35	\$36.07	\$61.81	\$55.24	\$59.76	\$47.99	\$35.79	\$50.81	\$29.72
Comp. Insurance	\$15.02	\$6.81	\$3.83	\$6.36	\$5.26	\$2.77	\$10.69	\$6.74	\$26.34	\$5.65	\$11.14	\$6.52
Other Req'd Benefits	\$8.54	\$8.06	\$10.49	\$10.31	\$6.60	\$11.31	\$10.11	\$10.94	\$8.78	\$6.55	\$9.30	\$5.44
Total Contract Rate	\$70.22	\$58.93	\$71.65	\$73.02	\$47.93	\$75.89	\$76.04	\$77.44	\$83.11	\$47.99	\$71.25	\$41.68
Mobile, AL												
Basic Wage & Fringe	\$25.28	\$30.31	\$32.05	\$29.49	\$25.44	\$55.88	\$30.71	\$31.28	\$23.29	\$19.13	\$29.73	\$23.15
Comp. Insurance	\$8.53	\$2.86	\$3.28	\$3.00	\$5.45	\$5.09	\$7.33	\$3.18	\$10.15	\$3.45	\$3.04	\$2.37
Other Req'd Benefits	\$4.63	\$5.55	\$5.87	\$5.40	\$4.66	\$10.23	\$5.62	\$5.72	\$4.26	\$3.50	\$5.44	\$4.24
Total Contract Rate	\$38.44	\$38.72	\$41.20	\$37.89	\$35.55	\$71.20	\$43.66	\$40.18	\$37.70	\$26.08	\$38.21	\$29.76
Moline, IL												
Basic Wage & Fringe	\$40.57	\$28.54	\$47.42	\$41.11	\$33.40	\$61.09	\$30.80	\$43.60	\$31.40	\$38.33	\$46.59	\$28.29
Comp. Insurance	\$12.13	\$5.13	\$6.28	\$6.26	\$5.06	\$8.64	\$8.38	\$6.64	\$13.48	\$8.19	\$7.13	\$4.33
Other Req'd Benefits	\$7.42	\$5.22	\$8.68	\$7.52	\$6.11	\$11.18	\$5.64	\$7.98	\$5.75	\$7.01	\$8.53	\$5.18
Total Contract Rate	\$60.12	\$38.89	\$62.38	\$54.89	\$44.57	\$80.91	\$44.82	\$58.22	\$50.63	\$53.53	\$62.25	\$37.80
Montgomery, AL												
Basic Wage & Fringe	\$25.23	\$31.85	\$30.40	\$30.19	\$21.03	\$58.70	\$30.78	\$29.33	\$22.25	\$20.85	\$22.03	\$25.63
Comp. Insurance	\$8.52	\$3.00	\$3.11	\$3.07	\$4.51	\$5.35	\$7.35	\$2.99	\$9.70	\$3.76	\$2.25	\$2.62
Other Req'd Benefits	\$4.62	\$5.83	\$5.56	\$5.52	\$3.85	\$10.74	\$5.63	\$5.37	\$4.07	\$3.82	\$4.03	\$4.69
Total Contract Rate	\$38.37	\$40.68	\$39.07	\$38.78	\$29.39	\$74.79	\$43.76	\$37.69	\$36.02	\$28.43	\$28.31	\$32.94
Montpelier, VT												
Basic Wage & Fringe	\$35.00	\$34.53	\$38.06	\$34.53	\$27.36	\$67.97	\$44.52	\$36.62	\$29.46	\$28.19	\$34.95	\$25.77
Comp. Insurance	\$3.17	\$1.82	\$1.87	\$1.94	\$2.47	\$2.71	\$3.71	\$2.06	\$6.22	\$2.75	\$2.02	\$1.49
Other Req'd Benefits	\$6.40	\$6.32	\$6.96	\$6.32	\$5.01	\$12.44	\$8.15	\$6.70	\$5.39	\$5.16	\$6.40	\$4.72
Total Contract Rate	\$44.57	\$42.67	\$46.89	\$42.79	\$34.84	\$83.12	\$56.38	\$45.38	\$41.07	\$36.10	\$43.37	\$31.98
Morristown, NJ												
Basic Wage & Fringe	\$51.36	\$57.42	\$67.84	\$45.47	\$36.98	\$61.13	\$56.50	\$48.22	\$29.38	\$36.96	\$57.88	\$30.54
Comp. Insurance	\$7.60	\$8.49	\$2.98	\$2.63	\$4.22	\$3.33	\$7.59	\$2.79	\$11.16	\$3.36	\$3.66	\$1.93
Other Req'd Benefits	\$9.40	\$10.51	\$12.41	\$8.32	\$6.77	\$11.19	\$10.34	\$8.82	\$5.38	\$6.76	\$10.59	\$5.59
Total Contract Rate	\$68.36	\$76.42	\$83.23	\$56.42	\$47.97	\$75.65	\$74.43	\$59.83	\$45.92	\$47.08	\$72.13	\$38.06

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Muncie, IN												
Basic Wage & Fringe	\$35.50	\$30.37	\$40.54	\$41.41	\$34.68	\$55.98	\$39.98	\$43.92	\$33.58	\$22.51	\$28.78	\$29.36
Comp. Insurance	\$2.46	\$0.89	\$1.16	\$1.14	\$1.69	\$1.47	\$1.82	\$1.21	\$3.38	\$1.29	\$0.91	\$0.93
Other Req'd Benefits	\$6.50	\$5.56	\$7.42	\$7.58	\$6.35	\$10.24	\$7.32	\$8.04	\$6.15	\$4.12	\$5.27	\$5.37
Total Contract Rate	\$44.46	\$36.82	\$49.12	\$50.13	\$42.72	\$67.69	\$49.12	\$53.17	\$43.11	\$27.92	\$34.96	\$35.66
Nashville, TN												
Basic Wage & Fringe	\$28.27	\$34.19	\$30.77	\$30.23	\$21.95	\$63.04	\$37.94	\$32.06	\$25.79	\$25.20	\$26.61	\$25.59
Comp. Insurance	\$3.68	\$2.63	\$1.78	\$2.05	\$2.60	\$4.27	\$4.69	\$2.18	\$6.24	\$2.27	\$1.93	\$1.86
Other Req'd Benefits	\$5.17	\$6.26	\$5.63	\$5.53	\$4.02	\$11.54	\$6.94	\$5.87	\$4.72	\$4.61	\$4.87	\$4.68
Total Contract Rate	\$37.12	\$43.08	\$38.18	\$37.81	\$28.57	\$78.85	\$49.57	\$40.11	\$36.75	\$32.08	\$33.41	\$32.13
New Brunswick, NJ												
Basic Wage & Fringe	\$57.51	\$52.83	\$76.14	\$63.72	\$30.62	\$89.77	\$58.79	\$67.58	\$42.88	\$34.66	\$46.15	\$22.74
Comp. Insurance	\$8.51	\$7.81	\$3.34	\$3.69	\$3.49	\$4.89	\$7.90	\$3.91	\$16.28	\$3.15	\$2.92	\$1.44
Other Req'd Benefits	\$10.52	\$9.67	\$13.93	\$11.66	\$5.60	\$16.43	\$10.76	\$12.37	\$7.85	\$6.34	\$8.45	\$4.16
Total Contract Rate	\$76.54	\$70.31	\$93.41	\$79.07	\$39.71	\$111.09	\$77.45	\$83.86	\$67.01	\$44.15	\$57.52	\$28.34
New Haven, CT												
Basic Wage & Fringe	\$42.67	\$42.63	\$46.95	\$50.35	\$30.46	\$78.59	\$52.87	\$53.40	\$40.22	\$37.47	\$40.41	\$25.62
Comp. Insurance	\$10.66	\$3.88	\$3.99	\$5.08	\$4.99	\$7.35	\$12.31	\$5.38	\$14.06	\$5.42	\$4.43	\$2.81
Other Req'd Benefits	\$7.81	\$7.80	\$8.59	\$9.21	\$5.57	\$14.38	\$9.68	\$9.77	\$7.36	\$6.86	\$7.40	\$4.69
Total Contract Rate	\$61.14	\$54.31	\$59.53	\$64.64	\$41.02	\$100.32	\$74.86	\$68.55	\$61.64	\$49.75	\$52.24	\$33.12
New Orleans, LA												
Basic Wage & Fringe	\$33.12	\$26.13	\$41.50	\$32.84	\$25.95	\$61.86	\$35.79	\$34.83	\$27.62	\$25.64	\$27.67	\$23.91
Comp. Insurance	\$9.16	\$3.38	\$2.84	\$2.30	\$3.67	\$4.21	\$5.39	\$2.44	\$9.07	\$3.00	\$3.21	\$2.77
Other Req'd Benefits	\$6.06	\$4.78	\$7.59	\$6.01	\$4.75	\$11.32	\$6.55	\$6.37	\$5.05	\$4.69	\$5.06	\$4.38
Total Contract Rate	\$48.34	\$34.29	\$51.93	\$41.15	\$34.37	\$77.39	\$47.73	\$43.64	\$41.74	\$33.33	\$35.94	\$31.06
New York, NY												
Basic Wage & Fringe	\$57.03	\$54.40	\$71.91	\$59.11	\$45.43	\$62.00	\$59.29	\$62.69	\$54.67	\$41.59	\$72.16	\$30.71
Comp. Insurance	\$10.53	\$10.05	\$5.37	\$5.34	\$5.89	\$6.44	\$12.30	\$5.66	\$18.30	\$9.23	\$19.35	\$8.24
Other Req'd Benefits	\$10.44	\$9.96	\$13.16	\$10.82	\$8.31	\$11.35	\$10.85	\$11.47	\$10.00	\$7.61	\$13.21	\$5.62
Total Contract Rate	\$78.00	\$74.41	\$90.44	\$75.27	\$59.63	\$79.79	\$82.44	\$79.82	\$82.97	\$58.43	\$104.72	\$44.57
Newark, NJ												
Basic Wage & Fringe	\$51.36	\$57.42	\$67.84	\$45.47	\$36.98	\$61.13	\$56.50	\$48.22	\$29.38	\$36.96	\$57.88	\$30.54
Comp. Insurance	\$7.60	\$8.49	\$2.98	\$2.63	\$4.22	\$3.33	\$7.59	\$2.79	\$11.16	\$3.36	\$3.66	\$1.93
Other Req'd Benefits	\$9.40	\$10.51	\$12.41	\$8.32	\$6.77	\$11.19	\$10.34	\$8.82	\$5.38	\$6.76	\$10.59	\$5.59
Total Contract Rate	\$68.36	\$76.42	\$83.23	\$56.42	\$47.97	\$75.65	\$74.43	\$59.83	\$45.92	\$47.08	\$72.13	\$38.06
Newport News, VA												
Basic Wage & Fringe	\$30.25	\$40.10	\$36.63	\$32.45	\$27.75	\$57.21	\$36.84	\$34.42	\$30.19	\$30.03	\$26.56	\$31.23
Comp. Insurance	\$5.25	\$5.91	\$2.56	\$3.39	\$3.22	\$5.60	\$5.83	\$3.59	\$11.00	\$3.43	\$5.04	\$5.93
Other Req'd Benefits	\$5.54	\$7.34	\$6.70	\$5.94	\$5.08	\$10.47	\$6.74	\$6.30	\$5.52	\$5.50	\$4.86	\$5.72
Total Contract Rate	\$41.04	\$53.35	\$45.89	\$41.78	\$36.05	\$73.28	\$49.41	\$44.31	\$46.71	\$38.96	\$36.46	\$42.88
Norfolk, VA												
Basic Wage & Fringe	\$30.25	\$40.10	\$36.63	\$32.45	\$27.75	\$55.14	\$36.84	\$34.42	\$30.19	\$30.03	\$26.56	\$23.39
Comp. Insurance	\$5.25	\$5.91	\$2.56	\$3.39	\$3.22	\$5.40	\$5.83	\$3.59	\$11.00	\$3.43	\$5.04	\$4.44
Other Req'd Benefits	\$5.54	\$7.34	\$6.70	\$5.94	\$5.08	\$10.09	\$6.74	\$6.30	\$5.52	\$5.50	\$4.86	\$4.28
Total Contract Rate	\$41.04	\$53.35	\$45.89	\$41.78	\$36.05	\$70.63	\$49.41	\$44.31	\$46.71	\$38.96	\$36.46	\$32.11

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Norwalk, CT												
Basic Wage & Fringe	\$43.80	\$47.45	\$47.22	\$47.18	\$28.49	\$87.49	\$44.98	\$50.03	\$40.69	\$38.39	\$50.74	\$28.44
Comp. Insurance	\$10.95	\$4.31	\$4.01	\$4.76	\$4.67	\$8.18	\$10.47	\$5.04	\$14.22	\$5.55	\$5.56	\$3.12
Other Req'd Benefits	\$8.02	\$8.68	\$8.64	\$8.63	\$5.21	\$16.01	\$8.23	\$9.16	\$7.45	\$7.03	\$9.29	\$5.20
Total Contract Rate	\$62.77	\$60.44	\$59.87	\$60.57	\$38.37	\$111.68	\$63.68	\$64.23	\$62.36	\$50.97	\$65.59	\$36.76
Norwich, CT												
Basic Wage & Fringe	\$41.80	\$38.58	\$49.24	\$43.71	\$29.92	\$71.13	\$46.59	\$46.36	\$34.69	\$37.00	\$47.27	\$27.10
Comp. Insurance	\$10.45	\$3.51	\$4.19	\$4.41	\$4.90	\$6.65	\$10.85	\$4.67	\$12.12	\$5.35	\$5.18	\$2.97
Other Req'd Benefits	\$7.65	\$7.06	\$9.01	\$8.00	\$5.48	\$13.02	\$8.53	\$8.48	\$6.35	\$6.77	\$8.65	\$4.96
Total Contract Rate	\$59.90	\$49.15	\$62.44	\$56.12	\$40.30	\$90.80	\$65.97	\$59.51	\$53.16	\$49.12	\$61.10	\$35.03
Oakland, CA												
Basic Wage & Fringe	\$53.29	\$39.44	\$64.56	\$58.20	\$39.10	\$79.64	\$54.90	\$61.73	\$39.45	\$44.60	\$53.38	\$33.02
Comp. Insurance	\$7.21	\$5.34	\$2.44	\$3.04	\$2.49	\$1.85	\$4.72	\$3.22	\$7.35	\$2.07	\$4.07	\$2.52
Other Req'd Benefits	\$9.75	\$7.22	\$11.81	\$10.65	\$7.16	\$14.57	\$10.05	\$11.30	\$7.22	\$8.16	\$9.77	\$6.04
Total Contract Rate	\$70.25	\$52.00	\$78.81	\$71.89	\$48.75	\$96.06	\$69.67	\$76.25	\$54.02	\$54.83	\$67.22	\$41.58
Ogden, UT												
Basic Wage & Fringe	\$32.93	\$32.54	\$36.95	\$36.99	\$23.00	\$64.43	\$33.40	\$39.23	\$32.12	\$30.01	\$31.20	\$24.51
Comp. Insurance	\$3.97	\$2.69	\$1.77	\$2.06	\$1.77	\$2.57	\$3.81	\$2.18	\$7.77	\$0.47	\$2.49	\$1.95
Other Req'd Benefits	\$6.03	\$5.95	\$6.76	\$6.77	\$4.21	\$11.79	\$5.51	\$7.18	\$5.88	\$5.49	\$5.71	\$4.49
Total Contract Rate	\$42.93	\$41.18	\$45.48	\$45.82	\$28.98	\$78.79	\$42.72	\$48.59	\$45.77	\$35.97	\$39.40	\$30.95
Oklahoma City, OK												
Basic Wage & Fringe	\$27.16	\$22.10	\$35.01	\$34.61	\$28.29	\$49.43	\$40.66	\$36.70	\$22.91	\$22.84	\$28.72	\$21.31
Comp. Insurance	\$4.93	\$2.44	\$3.57	\$3.88	\$4.11	\$3.46	\$6.92	\$4.11	\$6.97	\$3.54	\$4.10	\$3.04
Other Req'd Benefits	\$4.97	\$4.04	\$6.41	\$6.33	\$5.18	\$9.05	\$7.44	\$6.72	\$4.19	\$4.18	\$5.26	\$3.90
Total Contract Rate	\$37.06	\$28.58	\$44.99	\$44.82	\$37.58	\$61.94	\$55.02	\$47.53	\$34.07	\$30.56	\$38.08	\$28.25
Olympia, WA												
Basic Wage & Fringe	\$42.90	\$41.21	\$53.97	\$42.29	\$30.76	\$64.12	\$49.77	\$44.85	\$29.03	\$39.94	\$39.08	\$26.12
Comp. Insurance	\$1.20	\$1.00	\$0.64	\$0.76	\$0.92	\$0.92	\$1.70	\$0.81	\$1.49	\$0.96	\$0.72	\$0.48
Other Req'd Benefits	\$7.85	\$7.54	\$9.88	\$7.74	\$5.63	\$10.58	\$9.11	\$8.21	\$5.31	\$7.31	\$7.15	\$4.78
Total Contract Rate	\$51.95	\$49.75	\$64.49	\$50.79	\$37.31	\$75.62	\$60.58	\$53.87	\$35.83	\$48.21	\$46.95	\$31.38
Omaha, NE												
Basic Wage & Fringe	\$29.79	\$26.16	\$43.63	\$44.89	\$25.09	\$59.21	\$40.43	\$47.61	\$27.09	\$30.28	\$36.05	\$24.40
Comp. Insurance	\$4.64	\$2.19	\$3.19	\$4.18	\$3.23	\$2.84	\$6.61	\$4.43	\$7.47	\$3.62	\$3.45	\$2.34
Other Req'd Benefits	\$5.45	\$4.79	\$7.98	\$8.21	\$4.59	\$10.84	\$7.40	\$8.71	\$4.96	\$5.54	\$6.60	\$4.47
Total Contract Rate	\$39.88	\$33.14	\$54.80	\$57.28	\$32.91	\$72.89	\$54.44	\$60.75	\$39.52	\$39.44	\$46.10	\$31.21
Orlando, FL												
Basic Wage & Fringe	\$29.09	\$23.11	\$30.95	\$28.36	\$25.81	\$54.51	\$38.06	\$30.08	\$26.07	\$23.86	\$24.74	\$24.00
Comp. Insurance	\$3.71	\$1.19	\$1.58	\$1.46	\$2.12	\$2.15	\$3.25	\$1.55	\$5.22	\$2.00	\$2.41	\$2.34
Other Req'd Benefits	\$5.32	\$4.23	\$5.66	\$5.19	\$4.72	\$9.98	\$6.96	\$5.50	\$4.77	\$4.37	\$4.53	\$4.39
Total Contract Rate	\$38.12	\$28.53	\$38.19	\$35.01	\$32.65	\$66.64	\$48.27	\$37.13	\$36.06	\$30.23	\$31.68	\$30.73
Owensboro, KY												
Basic Wage & Fringe	\$25.74	\$30.12	\$39.69	\$35.49	\$20.30	\$55.52	\$33.23	\$37.64	\$25.29	\$22.33	\$28.55	\$26.96
Comp. Insurance	\$9.08	\$2.86	\$2.78	\$2.79	\$3.60	\$9.09	\$3.63	\$2.96	\$8.38	\$2.94	\$2.68	\$2.53
Other Req'd Benefits	\$4.71	\$5.51	\$7.26	\$6.49	\$3.71	\$10.16	\$6.08	\$6.89	\$4.63	\$4.09	\$5.22	\$4.93
Total Contract Rate	\$39.53	\$38.49	\$49.73	\$44.77	\$27.61	\$74.77	\$42.94	\$47.49	\$38.30	\$29.36	\$36.45	\$34.42

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Oxnard, CA												
Basic Wage & Fringe	\$40.24	\$42.12	\$47.98	\$36.38	\$26.26	\$77.63	\$47.28	\$38.59	\$38.07	\$37.61	\$54.93	\$22.13
Comp. Insurance	\$5.44	\$5.70	\$1.81	\$1.90	\$1.68	\$1.80	\$4.07	\$2.01	\$7.10	\$1.75	\$4.19	\$1.69
Other Req'd Benefits	\$7.36	\$7.71	\$8.78	\$6.66	\$4.81	\$14.21	\$8.65	\$7.06	\$6.97	\$6.88	\$10.05	\$4.05
Total Contract Rate	\$53.04	\$55.53	\$58.57	\$44.94	\$32.75	\$93.64	\$60.00	\$47.66	\$52.14	\$46.24	\$69.17	\$27.87
Parkersburg, WV												
Basic Wage & Fringe	\$40.28	\$29.65	\$45.80	\$28.02	\$31.80	\$54.67	\$36.74	\$29.71	\$34.96	\$29.05	\$28.10	\$21.42
Comp. Insurance	\$5.59	\$1.86	\$2.92	\$1.86	\$3.41	\$3.57	\$3.98	\$1.98	\$8.57	\$2.68	\$2.31	\$1.76
Other Req'd Benefits	\$7.37	\$5.43	\$8.38	\$5.13	\$5.82	\$10.00	\$6.72	\$5.44	\$6.40	\$5.32	\$5.14	\$3.92
Total Contract Rate	\$53.24	\$36.94	\$57.10	\$35.01	\$41.03	\$68.24	\$47.44	\$37.13	\$49.93	\$37.05	\$35.55	\$27.10
Peoria, IL												
Basic Wage & Fringe	\$45.08	\$34.16	\$53.15	\$56.64	\$47.36	\$61.39	\$54.01	\$60.07	\$43.62	\$38.54	\$39.09	\$27.15
Comp. Insurance	\$13.47	\$6.15	\$7.04	\$8.63	\$7.17	\$8.69	\$14.70	\$9.15	\$18.73	\$8.24	\$5.98	\$4.15
Other Req'd Benefits	\$8.25	\$6.25	\$9.73	\$10.37	\$8.67	\$11.23	\$9.88	\$10.99	\$7.98	\$7.05	\$7.15	\$4.97
Total Contract Rate	\$66.80	\$46.56	\$69.92	\$75.64	\$63.20	\$81.31	\$78.59	\$80.21	\$70.33	\$53.83	\$52.22	\$36.27
Philadelphia, PA												
Basic Wage & Fringe	\$49.11	\$40.79	\$68.64	\$54.04	\$35.29	\$71.68	\$54.19	\$57.31	\$37.57	\$35.65	\$38.66	\$28.78
Comp. Insurance	\$6.52	\$5.41	\$4.76	\$4.60	\$5.40	\$6.34	\$7.72	\$4.88	\$12.02	\$4.95	\$5.64	\$4.20
Other Req'd Benefits	\$8.99	\$7.46	\$12.56	\$9.89	\$6.46	\$13.12	\$9.92	\$10.49	\$6.88	\$6.52	\$7.07	\$5.27
Total Contract Rate	\$64.62	\$53.66	\$85.96	\$68.53	\$47.15	\$91.14	\$71.83	\$72.68	\$56.47	\$47.12	\$51.37	\$38.25
Phoenix, AZ												
Basic Wage & Fringe	\$32.22	\$25.49	\$38.52	\$34.79	\$24.80	\$53.88	\$35.62	\$36.90	\$24.94	\$28.90	\$35.36	\$24.34
Comp. Insurance	\$7.38	\$1.29	\$2.48	\$2.61	\$2.11	\$4.32	\$3.41	\$2.77	\$4.89	\$3.34	\$3.72	\$2.56
Other Req'd Benefits	\$5.90	\$4.66	\$7.05	\$6.37	\$4.54	\$9.86	\$6.52	\$6.75	\$4.56	\$5.29	\$6.47	\$4.45
Total Contract Rate	\$45.50	\$31.44	\$48.05	\$43.77	\$31.45	\$68.06	\$45.55	\$46.42	\$34.39	\$37.53	\$45.55	\$31.35
Pierre, SD												
Basic Wage & Fringe	\$24.99	\$27.65	\$34.45	\$28.38	\$20.77	\$50.99	\$40.92	\$30.10	\$24.87	\$23.26	\$27.39	\$20.99
Comp. Insurance	\$6.35	\$2.27	\$1.88	\$3.13	\$2.10	\$3.22	\$4.51	\$3.32	\$5.99	\$2.57	\$5.26	\$4.03
Other Req'd Benefits	\$4.57	\$5.06	\$6.30	\$5.19	\$3.80	\$9.33	\$7.49	\$5.51	\$4.55	\$4.26	\$5.01	\$3.84
Total Contract Rate	\$35.91	\$34.98	\$42.63	\$36.70	\$26.67	\$63.54	\$52.92	\$38.93	\$35.41	\$30.09	\$37.66	\$28.86
Pittsburgh, PA												
Basic Wage & Fringe	\$38.60	\$28.93	\$46.75	\$46.42	\$33.94	\$60.78	\$42.60	\$49.24	\$36.64	\$30.81	\$29.96	\$26.99
Comp. Insurance	\$5.12	\$3.84	\$3.24	\$3.95	\$5.19	\$5.38	\$6.07	\$4.19	\$11.72	\$4.28	\$4.37	\$3.94
Other Req'd Benefits	\$7.06	\$5.29	\$8.56	\$8.49	\$6.21	\$11.12	\$7.80	\$9.01	\$6.71	\$5.64	\$5.48	\$4.94
Total Contract Rate	\$50.78	\$38.06	\$58.55	\$58.86	\$45.34	\$77.28	\$56.47	\$62.44	\$55.07	\$40.73	\$39.81	\$35.87
Pocatello, ID												
Basic Wage & Fringe	\$29.35	\$31.53	\$40.37	\$30.50	\$26.15	\$58.12	\$38.06	\$32.35	\$28.34	\$27.06	\$29.88	\$22.55
Comp. Insurance	\$3.02	\$2.55	\$1.40	\$1.53	\$2.06	\$1.91	\$2.80	\$1.62	\$7.39	\$1.62	\$1.80	\$1.36
Other Req'd Benefits	\$5.37	\$5.77	\$7.39	\$5.58	\$4.79	\$10.64	\$6.96	\$5.92	\$5.19	\$4.95	\$5.47	\$4.13
Total Contract Rate	\$37.74	\$39.85	\$49.16	\$37.61	\$33.00	\$70.67	\$47.82	\$39.89	\$40.92	\$33.63	\$37.15	\$28.04
Portland, ME												
Basic Wage & Fringe	\$31.73	\$35.80	\$37.78	\$32.60	\$23.20	\$64.12	\$38.54	\$34.57	\$27.76	\$27.29	\$34.66	\$26.97
Comp. Insurance	\$10.34	\$4.92	\$3.21	\$3.81	\$3.91	\$6.16	\$6.85	\$4.04	\$6.68	\$3.40	\$4.50	\$3.50
Other Req'd Benefits	\$5.81	\$6.55	\$6.91	\$5.97	\$4.25	\$11.73	\$7.05	\$6.33	\$5.08	\$4.99	\$6.34	\$4.94
Total Contract Rate	\$47.88	\$47.27	\$47.90	\$42.38	\$31.36	\$82.01	\$52.44	\$44.94	\$39.52	\$35.68	\$45.50	\$35.41

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Portland, OR												
Basic Wage & Fringe	\$39.14	\$35.85	\$56.86	\$54.41	\$27.09	\$73.52	\$51.97	\$57.71	\$37.87	\$34.82	\$43.66	\$28.72
Comp. Insurance	\$5.69	\$3.70	\$2.81	\$2.94	\$2.71	\$3.54	\$6.28	\$3.12	\$8.33	\$4.24	\$8.72	\$5.74
Other Req'd Benefits	\$7.16	\$6.56	\$10.41	\$9.96	\$4.96	\$13.45	\$9.51	\$10.56	\$6.93	\$6.37	\$7.99	\$5.26
Total Contract Rate	\$51.99	\$46.11	\$70.08	\$67.31	\$34.76	\$90.51	\$67.76	\$71.39	\$53.13	\$45.43	\$60.37	\$39.72
Providence, RI												
Basic Wage & Fringe	\$41.68	\$28.45	\$46.01	\$47.42	\$28.97	\$60.28	\$54.95	\$50.29	\$33.79	\$32.34	\$50.50	\$27.31
Comp. Insurance	\$5.84	\$1.86	\$3.03	\$2.67	\$3.38	\$3.27	\$8.16	\$2.83	\$6.40	\$3.43	\$4.95	\$2.68
Other Req'd Benefits	\$7.63	\$5.21	\$8.42	\$8.68	\$5.30	\$11.03	\$10.06	\$9.20	\$6.18	\$5.92	\$9.24	\$5.00
Total Contract Rate	\$55.15	\$35.52	\$57.46	\$58.77	\$37.65	\$74.58	\$73.17	\$62.32	\$46.37	\$41.69	\$64.69	\$34.99
Pueblo, CO												
Basic Wage & Fringe	\$39.01	\$31.43	\$44.87	\$35.18	\$26.16	\$57.92	\$33.83	\$37.31	\$28.25	\$26.97	\$23.36	\$25.31
Comp. Insurance	\$4.47	\$2.61	\$2.24	\$2.34	\$2.13	\$3.12	\$4.39	\$2.48	\$7.21	\$2.34	\$2.51	\$2.72
Other Req'd Benefits	\$7.14	\$5.75	\$8.21	\$6.44	\$4.79	\$10.60	\$6.19	\$6.83	\$5.17	\$4.94	\$4.27	\$4.63
Total Contract Rate	\$50.62	\$39.79	\$55.32	\$43.96	\$33.08	\$71.64	\$44.41	\$46.62	\$40.63	\$34.25	\$30.14	\$32.66
Raleigh-Durham, NC												
Basic Wage & Fringe	\$27.23	\$36.51	\$30.82	\$32.74	\$22.02	\$67.32	\$28.76	\$34.72	\$27.35	\$22.48	\$24.18	\$22.13
Comp. Insurance	\$4.41	\$3.34	\$3.31	\$3.10	\$2.52	\$6.95	\$3.26	\$3.28	\$7.22	\$3.09	\$3.83	\$3.51
Other Req'd Benefits	\$4.98	\$6.68	\$5.64	\$5.99	\$4.03	\$12.32	\$5.26	\$6.35	\$5.01	\$4.11	\$4.42	\$4.05
Total Contract Rate	\$36.62	\$46.53	\$39.77	\$41.83	\$28.57	\$86.59	\$37.28	\$44.35	\$39.58	\$29.68	\$32.43	\$29.69
Rapid City, SD												
Basic Wage & Fringe	\$24.99	\$27.65	\$34.45	\$28.38	\$20.77	\$50.99	\$40.92	\$30.10	\$24.87	\$23.26	\$27.39	\$20.99
Comp. Insurance	\$6.35	\$2.27	\$1.88	\$3.13	\$2.10	\$3.22	\$4.51	\$3.32	\$5.99	\$2.57	\$5.26	\$4.03
Other Req'd Benefits	\$4.57	\$5.06	\$6.30	\$5.19	\$3.80	\$9.33	\$7.49	\$5.51	\$4.55	\$4.26	\$5.01	\$3.84
Total Contract Rate	\$35.91	\$34.98	\$42.63	\$36.70	\$26.67	\$63.54	\$52.92	\$38.93	\$35.41	\$30.09	\$37.66	\$28.86
Reading, PA												
Basic Wage & Fringe	\$36.04	\$32.79	\$45.29	\$53.36	\$26.48	\$60.45	\$37.73	\$56.59	\$37.76	\$30.60	\$46.31	\$26.47
Comp. Insurance	\$4.78	\$4.35	\$3.14	\$4.54	\$4.05	\$5.35	\$5.38	\$4.82	\$12.08	\$4.25	\$6.76	\$3.86
Other Req'd Benefits	\$6.60	\$6.00	\$8.29	\$9.76	\$4.85	\$11.06	\$6.90	\$10.36	\$6.91	\$5.60	\$8.47	\$4.84
Total Contract Rate	\$47.42	\$43.14	\$56.72	\$67.66	\$35.38	\$76.86	\$50.01	\$71.77	\$56.75	\$40.45	\$61.54	\$35.17
Reno, NV												
Basic Wage & Fringe	\$42.15	\$35.64	\$47.23	\$53.69	\$29.94	\$64.30	\$42.10	\$56.94	\$30.66	\$29.95	\$36.82	\$24.86
Comp. Insurance	\$4.88	\$2.31	\$3.39	\$3.21	\$2.39	\$3.67	\$3.16	\$3.41	\$4.32	\$3.44	\$3.28	\$2.22
Other Req'd Benefits	\$7.71	\$6.52	\$8.64	\$9.83	\$5.48	\$11.77	\$7.70	\$10.42	\$5.61	\$5.48	\$6.74	\$4.55
Total Contract Rate	\$54.74	\$44.47	\$59.26	\$66.73	\$37.81	\$79.74	\$52.96	\$70.77	\$40.59	\$38.87	\$46.84	\$31.63
Richland, WA												
Basic Wage & Fringe	\$43.71	\$29.73	\$53.52	\$50.85	\$35.53	\$78.02	\$51.09	\$53.93	\$27.86	\$36.34	\$35.39	\$24.55
Comp. Insurance	\$1.22	\$0.72	\$0.63	\$0.92	\$1.07	\$1.12	\$1.75	\$0.97	\$1.43	\$0.88	\$0.65	\$0.45
Other Req'd Benefits	\$8.00	\$5.44	\$9.79	\$9.31	\$6.50	\$14.28	\$9.35	\$9.87	\$5.10	\$6.65	\$6.48	\$4.49
Total Contract Rate	\$52.93	\$35.89	\$63.94	\$61.08	\$43.10	\$93.42	\$62.19	\$64.77	\$34.39	\$43.87	\$42.52	\$29.49
Richmond, VA												
Basic Wage & Fringe	\$33.82	\$27.73	\$39.31	\$33.39	\$25.85	\$42.06	\$36.97	\$35.41	\$30.40	\$30.54	\$35.51	\$25.72
Comp. Insurance	\$5.87	\$4.08	\$2.74	\$3.49	\$3.00	\$4.12	\$5.85	\$3.70	\$11.07	\$3.48	\$6.74	\$4.88
Other Req'd Benefits	\$6.19	\$5.07	\$7.19	\$6.11	\$4.73	\$7.70	\$6.77	\$6.48	\$5.56	\$5.59	\$6.50	\$4.71
Total Contract Rate	\$45.88	\$36.88	\$49.24	\$42.99	\$33.58	\$53.88	\$49.59	\$45.59	\$47.03	\$39.61	\$48.75	\$35.31

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Riverside, CA												
Basic Wage & Fringe	\$42.37	\$48.23	\$41.15	\$34.72	\$28.62	\$66.96	\$42.50	\$36.82	\$35.39	\$38.85	\$44.18	\$28.20
Comp. Insurance	\$5.73	\$6.53	\$1.56	\$1.81	\$1.83	\$1.55	\$3.66	\$1.92	\$6.60	\$1.81	\$3.37	\$2.15
Other Req'd Benefits	\$7.75	\$8.83	\$7.53	\$6.35	\$5.24	\$12.25	\$7.78	\$6.74	\$6.48	\$7.11	\$8.08	\$5.16
Total Contract Rate	\$55.85	\$63.59	\$50.24	\$42.88	\$35.69	\$80.76	\$53.94	\$45.48	\$48.47	\$47.77	\$55.63	\$35.51
Roanoke, VA												
Basic Wage & Fringe	\$27.22	\$29.88	\$26.26	\$28.16	\$24.15	\$62.52	\$36.36	\$29.87	\$25.95	\$29.61	\$29.05	\$21.13
Comp. Insurance	\$4.73	\$4.40	\$1.83	\$2.94	\$2.81	\$6.12	\$5.75	\$3.12	\$9.45	\$3.38	\$5.52	\$4.01
Other Req'd Benefits	\$4.98	\$5.47	\$4.81	\$5.15	\$4.42	\$11.44	\$6.65	\$5.47	\$4.75	\$5.42	\$5.32	\$3.87
Total Contract Rate	\$36.93	\$39.75	\$32.90	\$36.25	\$31.38	\$80.08	\$48.76	\$38.46	\$40.15	\$38.41	\$39.89	\$29.01
Rochester, MN												
Basic Wage & Fringe	\$41.44	\$40.19	\$46.84	\$52.41	\$29.78	\$74.09	\$41.35	\$55.58	\$29.62	\$35.03	\$38.10	\$24.83
Comp. Insurance	\$13.34	\$6.21	\$3.13	\$5.91	\$4.34	\$3.32	\$8.00	\$6.27	\$16.26	\$5.53	\$8.36	\$5.45
Other Req'd Benefits	\$7.58	\$7.35	\$8.57	\$9.59	\$5.45	\$13.56	\$7.57	\$10.17	\$5.42	\$6.41	\$6.97	\$4.54
Total Contract Rate	\$62.36	\$53.75	\$58.54	\$67.91	\$39.57	\$90.97	\$56.92	\$72.02	\$51.30	\$46.97	\$53.43	\$34.82
Rochester, NY												
Basic Wage & Fringe	\$34.25	\$36.02	\$44.94	\$41.99	\$31.12	\$64.73	\$52.38	\$44.53	\$30.21	\$33.41	\$43.30	\$26.01
Comp. Insurance	\$6.33	\$6.65	\$3.36	\$3.79	\$4.03	\$6.73	\$10.86	\$4.02	\$10.11	\$7.42	\$11.61	\$6.98
Other Req'd Benefits	\$6.27	\$6.59	\$8.22	\$7.68	\$5.69	\$11.85	\$9.59	\$8.15	\$5.53	\$6.11	\$7.92	\$4.76
Total Contract Rate	\$46.85	\$49.26	\$56.52	\$53.46	\$40.84	\$83.31	\$72.83	\$56.70	\$45.85	\$46.94	\$62.83	\$37.75
Rockford, IL												
Basic Wage & Fringe	\$42.91	\$34.91	\$56.10	\$56.11	\$31.50	\$64.36	\$52.04	\$59.50	\$57.75	\$40.12	\$40.59	\$23.32
Comp. Insurance	\$12.83	\$6.28	\$7.43	\$8.55	\$4.77	\$9.11	\$14.16	\$9.06	\$24.80	\$8.57	\$6.21	\$3.57
Other Req'd Benefits	\$7.85	\$6.39	\$10.27	\$10.27	\$5.76	\$11.78	\$9.52	\$10.89	\$10.57	\$7.34	\$7.43	\$4.27
Total Contract Rate	\$63.59	\$47.58	\$73.80	\$74.93	\$42.03	\$85.25	\$75.72	\$79.45	\$93.12	\$56.03	\$54.23	\$31.16
Rutland, VT												
Basic Wage & Fringe	\$35.00	\$34.53	\$38.06	\$34.53	\$27.36	\$67.97	\$44.52	\$36.62	\$29.46	\$28.19	\$34.95	\$25.77
Comp. Insurance	\$3.17	\$1.82	\$1.87	\$1.94	\$2.47	\$2.71	\$3.71	\$2.06	\$6.22	\$2.75	\$2.02	\$1.49
Other Req'd Benefits	\$6.40	\$6.32	\$6.96	\$6.32	\$5.01	\$12.44	\$8.15	\$6.70	\$5.39	\$5.16	\$6.40	\$4.72
Total Contract Rate	\$44.57	\$42.67	\$46.89	\$42.79	\$34.84	\$83.12	\$56.38	\$45.38	\$41.07	\$36.10	\$43.37	\$31.98
Sacramento, CA												
Basic Wage & Fringe	\$45.87	\$38.28	\$44.62	\$47.23	\$36.89	\$95.95	\$56.39	\$50.09	\$35.48	\$39.94	\$53.51	\$27.89
Comp. Insurance	\$6.21	\$5.18	\$1.69	\$2.47	\$2.35	\$2.23	\$4.85	\$2.61	\$6.61	\$1.86	\$4.08	\$2.13
Other Req'd Benefits	\$8.39	\$7.01	\$8.17	\$8.64	\$6.75	\$17.56	\$10.32	\$9.17	\$6.49	\$7.31	\$9.79	\$5.10
Total Contract Rate	\$60.47	\$50.47	\$54.48	\$58.34	\$45.99	\$115.74	\$71.56	\$61.87	\$48.58	\$49.11	\$67.38	\$35.12
Saginaw, MI												
Basic Wage & Fringe	\$48.96	\$36.46	\$48.45	\$50.70	\$31.06	\$67.21	\$43.89	\$52.44	\$31.44	\$31.30	\$34.56	\$47.08
Comp. Insurance	\$11.20	\$8.34	\$2.55	\$3.66	\$4.21	\$4.44	\$6.34	\$3.78	\$10.26	\$3.59	\$4.70	\$6.40
Other Req'd Benefits	\$8.96	\$6.67	\$8.87	\$9.28	\$5.68	\$12.30	\$8.03	\$9.60	\$5.75	\$5.73	\$6.32	\$8.62
Total Contract Rate	\$69.12	\$51.47	\$59.87	\$63.64	\$40.95	\$83.95	\$58.26	\$65.82	\$47.45	\$40.62	\$45.58	\$62.10
Salem, OR												
Basic Wage & Fringe	\$30.19	\$33.17	\$49.33	\$34.76	\$20.94	\$61.15	\$48.56	\$36.87	\$27.58	\$31.98	\$34.78	\$22.47
Comp. Insurance	\$4.39	\$3.42	\$2.44	\$1.88	\$2.09	\$2.95	\$5.87	\$1.99	\$6.06	\$3.90	\$6.95	\$4.49
Other Req'd Benefits	\$5.52	\$6.07	\$9.03	\$6.36	\$3.83	\$11.19	\$8.89	\$6.75	\$5.05	\$5.85	\$6.36	\$4.11
Total Contract Rate	\$40.10	\$42.66	\$60.80	\$43.00	\$26.86	\$75.29	\$63.32	\$45.61	\$38.69	\$41.73	\$48.09	\$31.07

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Salt Lake City, UT												
Basic Wage & Fringe	\$32.93	\$32.54	\$36.95	\$36.99	\$23.00	\$64.43	\$33.40	\$39.23	\$32.12	\$30.01	\$31.20	\$24.51
Comp. Insurance	\$3.97	\$2.69	\$1.77	\$2.06	\$1.77	\$2.57	\$3.81	\$2.18	\$7.77	\$0.47	\$2.49	\$1.95
Other Req'd Benefits	\$6.03	\$5.95	\$6.76	\$6.77	\$4.21	\$11.79	\$5.51	\$7.18	\$5.88	\$5.49	\$5.71	\$4.49
Total Contract Rate	\$42.93	\$41.18	\$45.48	\$45.82	\$28.98	\$78.79	\$42.72	\$48.59	\$45.77	\$35.97	\$39.40	\$30.95
San Antonio, TX												
Basic Wage & Fringe	\$25.67	\$30.18	\$33.74	\$31.34	\$21.99	\$54.73	\$31.63	\$33.24	\$22.85	\$34.58	\$22.83	\$21.02
Comp. Insurance	\$2.89	\$6.70	\$2.08	\$2.12	\$1.97	\$3.27	\$3.45	\$2.24	\$4.48	\$3.25	\$3.02	\$2.79
Other Req'd Benefits	\$4.70	\$4.98	\$6.17	\$5.74	\$4.02	\$10.02	\$5.79	\$6.08	\$4.18	\$6.33	\$4.18	\$3.85
Total Contract Rate	\$33.26	\$41.86	\$41.99	\$39.20	\$27.98	\$68.02	\$40.87	\$41.56	\$31.51	\$44.16	\$30.03	\$27.66
San Diego, CA												
Basic Wage & Fringe	\$42.36	\$30.70	\$44.94	\$43.33	\$31.58	\$79.09	\$55.82	\$45.96	\$34.30	\$37.23	\$44.47	\$31.66
Comp. Insurance	\$5.73	\$4.15	\$1.70	\$2.26	\$2.01	\$1.83	\$4.80	\$2.40	\$6.39	\$1.73	\$3.39	\$2.42
Other Req'd Benefits	\$7.75	\$5.62	\$8.22	\$7.93	\$5.78	\$14.47	\$10.22	\$8.41	\$6.28	\$6.81	\$8.14	\$5.79
Total Contract Rate	\$55.84	\$40.47	\$54.86	\$53.52	\$39.37	\$95.39	\$70.84	\$56.77	\$46.97	\$45.77	\$56.00	\$39.87
San Francisco, CA												
Basic Wage & Fringe	\$54.22	\$53.26	\$78.16	\$60.22	\$43.52	\$102.03	\$64.03	\$63.87	\$47.47	\$47.08	\$55.90	\$42.15
Comp. Insurance	\$7.34	\$7.21	\$2.95	\$3.14	\$2.78	\$2.37	\$5.51	\$3.33	\$8.85	\$2.19	\$4.27	\$3.22
Other Req'd Benefits	\$9.92	\$9.75	\$14.30	\$11.02	\$7.96	\$18.67	\$11.72	\$11.69	\$8.69	\$8.62	\$10.23	\$7.71
Total Contract Rate	\$71.48	\$70.22	\$95.41	\$74.38	\$54.26	\$123.07	\$81.26	\$78.89	\$65.01	\$57.89	\$70.40	\$53.08
San Jose, CA												
Basic Wage & Fringe	\$48.70	\$38.31	\$63.89	\$65.32	\$34.90	\$94.42	\$55.40	\$69.28	\$47.33	\$47.66	\$41.41	\$29.96
Comp. Insurance	\$6.59	\$5.18	\$2.42	\$3.41	\$2.23	\$2.19	\$4.76	\$3.62	\$8.82	\$2.22	\$3.16	\$2.29
Other Req'd Benefits	\$8.91	\$7.01	\$11.69	\$11.95	\$6.39	\$17.28	\$10.14	\$12.68	\$8.66	\$8.72	\$7.58	\$5.48
Total Contract Rate	\$64.20	\$50.50	\$78.00	\$80.68	\$43.52	\$113.89	\$70.30	\$85.58	\$64.81	\$58.60	\$52.15	\$37.73
San Juan, PR												
Basic Wage & Fringe	\$14.49	\$20.46	\$23.14	\$15.94	\$12.53	\$37.74	\$15.30	\$16.90	\$15.37	\$11.59	\$15.45	\$15.52
Comp. Insurance	\$2.29	\$1.94	\$1.41	\$1.24	\$1.35	\$2.35	\$1.97	\$1.31	\$4.09	\$1.22	\$1.85	\$1.85
Other Req'd Benefits	\$2.65	\$3.74	\$4.23	\$2.92	\$2.29	\$6.91	\$2.80	\$3.09	\$2.81	\$2.12	\$2.83	\$2.84
Total Contract Rate	\$19.43	\$26.14	\$28.78	\$20.10	\$16.17	\$47.00	\$20.07	\$21.30	\$22.27	\$14.93	\$20.13	\$20.21
Santa Barbara, CA												
Basic Wage & Fringe	\$47.95	\$39.12	\$49.72	\$41.21	\$30.72	\$72.12	\$38.03	\$43.70	\$35.56	\$42.46	\$37.09	\$25.10
Comp. Insurance	\$6.49	\$5.29	\$1.88	\$2.15	\$1.96	\$1.67	\$3.27	\$2.28	\$6.63	\$1.97	\$2.83	\$1.92
Other Req'd Benefits	\$8.77	\$7.16	\$9.10	\$7.54	\$5.62	\$13.20	\$6.96	\$8.00	\$6.51	\$7.77	\$6.79	\$4.59
Total Contract Rate	\$63.21	\$51.57	\$60.70	\$50.90	\$38.30	\$86.99	\$48.26	\$53.98	\$48.70	\$52.20	\$46.71	\$31.61
Sante Fe, NM												
Basic Wage & Fringe	\$31.86	\$33.46	\$31.19	\$29.98	\$27.44	\$61.66	\$24.30	\$31.80	\$20.87	\$28.72	\$31.71	\$25.37
Comp. Insurance	\$5.73	\$2.41	\$2.62	\$2.61	\$3.27	\$6.58	\$3.86	\$2.77	\$8.15	\$6.49	\$3.35	\$2.68
Other Req'd Benefits	\$5.83	\$6.12	\$5.71	\$5.49	\$5.02	\$11.28	\$4.45	\$5.82	\$3.82	\$5.26	\$5.80	\$4.64
Total Contract Rate	\$43.42	\$41.99	\$39.52	\$38.08	\$35.73	\$79.52	\$32.61	\$40.39	\$32.84	\$40.47	\$40.86	\$32.69
Savannah, GA												
Basic Wage & Fringe	\$28.21	\$33.67	\$34.87	\$28.78	\$21.75	\$55.21	\$31.67	\$30.53	\$24.16	\$28.91	\$23.21	\$25.07
Comp. Insurance	\$7.24	\$4.69	\$3.77	\$3.28	\$4.95	\$6.23	\$6.67	\$3.48	\$13.22	\$6.06	\$4.90	\$5.29
Other Req'd Benefits	\$5.16	\$6.16	\$6.38	\$5.27	\$3.98	\$10.10	\$5.80	\$5.59	\$4.42	\$5.29	\$4.25	\$4.59
Total Contract Rate	\$40.61	\$44.52	\$45.02	\$37.33	\$30.68	\$71.54	\$44.14	\$39.60	\$41.80	\$40.26	\$32.36	\$34.95

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Scranton, PA												
Basic Wage & Fringe	\$32.72	\$30.28	\$46.08	\$36.97	\$34.41	\$55.81	\$37.73	\$39.21	\$29.17	\$27.23	\$28.71	\$24.03
Comp. Insurance	\$4.34	\$4.02	\$3.19	\$3.15	\$5.26	\$4.94	\$5.38	\$3.34	\$9.33	\$3.78	\$4.19	\$3.51
Other Req'd Benefits	\$5.99	\$5.54	\$8.43	\$6.77	\$6.30	\$10.21	\$6.90	\$7.18	\$5.34	\$4.98	\$5.25	\$4.40
Total Contract Rate	\$43.05	\$39.84	\$57.70	\$46.89	\$45.97	\$70.96	\$50.01	\$49.73	\$43.84	\$35.99	\$38.15	\$31.94
Seattle, WA												
Basic Wage & Fringe	\$46.21	\$39.09	\$59.37	\$51.27	\$27.17	\$86.47	\$50.98	\$54.37	\$45.30	\$40.45	\$42.18	\$32.54
Comp. Insurance	\$1.29	\$0.95	\$0.70	\$0.92	\$0.82	\$1.25	\$1.74	\$0.98	\$2.33	\$0.97	\$0.77	\$0.60
Other Req'd Benefits	\$8.46	\$7.15	\$10.86	\$9.38	\$4.97	\$15.82	\$9.33	\$9.95	\$8.29	\$7.40	\$7.72	\$5.95
Total Contract Rate	\$55.96	\$47.19	\$70.93	\$61.57	\$32.96	\$103.54	\$62.05	\$65.30	\$55.92	\$48.82	\$50.67	\$39.09
Shreveport, LA												
Basic Wage & Fringe	\$27.92	\$35.26	\$37.33	\$37.57	\$23.89	\$56.42	\$37.10	\$39.84	\$23.19	\$26.28	\$30.52	\$21.88
Comp. Insurance	\$7.72	\$4.56	\$2.55	\$2.63	\$3.38	\$3.84	\$5.59	\$2.79	\$7.61	\$3.07	\$3.54	\$2.54
Other Req'd Benefits	\$5.11	\$6.45	\$6.83	\$6.88	\$4.37	\$10.32	\$6.79	\$7.29	\$4.24	\$4.81	\$5.59	\$4.00
Total Contract Rate	\$40.75	\$46.27	\$46.71	\$47.08	\$31.64	\$70.58	\$49.48	\$49.92	\$35.04	\$34.16	\$39.65	\$28.42
Sioux City, IA												
Basic Wage & Fringe	\$28.66	\$28.15	\$41.75	\$39.24	\$18.52	\$51.89	\$35.30	\$41.62	\$27.23	\$29.85	\$22.74	\$20.73
Comp. Insurance	\$4.15	\$1.98	\$2.33	\$3.17	\$1.67	\$2.74	\$3.99	\$3.37	\$7.42	\$2.53	\$2.14	\$1.95
Other Req'd Benefits	\$5.24	\$5.15	\$7.64	\$7.18	\$3.39	\$9.50	\$6.46	\$7.62	\$4.98	\$5.46	\$4.16	\$3.79
Total Contract Rate	\$38.05	\$35.28	\$51.72	\$49.59	\$23.58	\$64.13	\$45.75	\$52.61	\$39.63	\$37.84	\$29.04	\$26.47
Sioux Falls, SD												
Basic Wage & Fringe	\$26.06	\$29.21	\$35.04	\$30.95	\$21.60	\$53.88	\$28.29	\$32.82	\$22.25	\$25.46	\$29.79	\$21.77
Comp. Insurance	\$6.62	\$2.40	\$1.92	\$3.41	\$2.18	\$3.40	\$3.11	\$3.62	\$5.36	\$2.81	\$5.72	\$4.18
Other Req'd Benefits	\$4.77	\$5.35	\$6.41	\$5.66	\$3.95	\$9.86	\$5.18	\$6.01	\$4.07	\$4.66	\$5.45	\$3.98
Total Contract Rate	\$37.45	\$36.96	\$43.37	\$40.02	\$27.73	\$67.14	\$36.58	\$42.45	\$31.68	\$32.93	\$40.96	\$29.93
South Bend, IN												
Basic Wage & Fringe	\$37.98	\$31.85	\$45.42	\$44.99	\$32.90	\$58.70	\$46.71	\$47.72	\$34.16	\$26.42	\$30.18	\$22.14
Comp. Insurance	\$2.63	\$0.93	\$1.29	\$1.24	\$1.60	\$1.54	\$2.13	\$1.32	\$3.44	\$1.52	\$0.96	\$0.70
Other Req'd Benefits	\$6.95	\$5.83	\$8.31	\$8.23	\$6.02	\$10.74	\$8.55	\$8.73	\$6.25	\$4.83	\$5.52	\$4.05
Total Contract Rate	\$47.56	\$38.61	\$55.02	\$54.46	\$40.52	\$70.98	\$57.39	\$57.77	\$43.85	\$32.77	\$36.66	\$26.89
Spokane, WA												
Basic Wage & Fringe	\$36.94	\$34.55	\$38.34	\$42.25	\$28.72	\$53.45	\$44.55	\$44.81	\$38.93	\$34.15	\$35.02	\$29.61
Comp. Insurance	\$1.03	\$0.84	\$0.45	\$0.76	\$0.86	\$0.77	\$1.52	\$0.81	\$2.00	\$0.82	\$0.64	\$0.54
Other Req'd Benefits	\$6.76	\$6.32	\$7.02	\$7.73	\$5.26	\$8.82	\$8.15	\$8.20	\$7.12	\$6.25	\$6.41	\$5.42
Total Contract Rate	\$44.73	\$41.71	\$45.81	\$50.74	\$34.84	\$63.04	\$54.22	\$53.82	\$48.05	\$41.22	\$42.07	\$35.57
Springfield, IL												
Basic Wage & Fringe	\$39.88	\$38.42	\$56.67	\$53.22	\$41.52	\$70.82	\$52.78	\$56.44	\$31.35	\$42.43	\$37.12	\$27.31
Comp. Insurance	\$11.92	\$6.91	\$7.50	\$8.11	\$6.29	\$10.02	\$14.36	\$8.60	\$13.46	\$9.07	\$5.68	\$4.18
Other Req'd Benefits	\$7.30	\$7.03	\$10.37	\$9.74	\$7.60	\$12.96	\$9.66	\$10.33	\$5.74	\$7.76	\$6.79	\$5.00
Total Contract Rate	\$59.10	\$52.36	\$74.54	\$71.07	\$55.41	\$93.80	\$76.80	\$75.37	\$50.55	\$59.26	\$49.59	\$36.49
Springfield, MA												
Basic Wage & Fringe	\$36.43	\$50.87	\$45.54	\$44.60	\$32.00	\$68.42	\$88.60	\$47.31	\$34.54	\$35.80	\$37.75	\$27.91
Comp. Insurance	\$4.34	\$2.20	\$1.44	\$1.73	\$1.60	\$2.37	\$10.30	\$1.84	\$4.86	\$2.49	\$2.62	\$1.94
Other Req'd Benefits	\$6.67	\$9.31	\$8.33	\$8.16	\$5.86	\$12.52	\$16.21	\$8.66	\$6.32	\$6.55	\$6.91	\$5.11
Total Contract Rate	\$47.44	\$62.38	\$55.31	\$54.49	\$39.46	\$83.31	\$115.11	\$57.81	\$45.72	\$44.84	\$47.28	\$34.96

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Springfield, MO												
Basic Wage & Fringe	\$28.63	\$36.88	\$30.62	\$40.60	\$22.96	\$52.31	\$44.33	\$43.06	\$30.54	\$22.13	\$26.90	\$22.74
Comp. Insurance	\$3.37	\$4.05	\$1.94	\$3.68	\$2.06	\$3.82	\$5.93	\$3.91	\$8.37	\$2.46	\$2.49	\$2.10
Other Req'd Benefits	\$5.24	\$6.75	\$5.60	\$7.43	\$4.20	\$9.57	\$8.11	\$7.88	\$5.59	\$4.05	\$4.92	\$4.16
Total Contract Rate	\$37.24	\$47.68	\$38.16	\$51.71	\$29.22	\$65.70	\$58.37	\$54.85	\$44.50	\$28.64	\$34.31	\$29.00
Springfield, OH												
Basic Wage & Fringe	\$42.57	\$42.46	\$52.12	\$52.16	\$37.60	\$70.14	\$46.82	\$55.32	\$31.49	\$33.15	\$43.26	\$28.43
Comp. Insurance	\$4.74	\$4.20	\$2.96	\$3.17	\$5.17	\$2.49	\$5.51	\$3.36	\$9.59	\$2.83	\$2.12	\$1.40
Other Req'd Benefits	\$7.79	\$7.77	\$9.54	\$9.55	\$6.88	\$12.84	\$8.57	\$10.12	\$5.76	\$6.07	\$7.92	\$5.20
Total Contract Rate	\$55.10	\$54.43	\$64.62	\$64.88	\$49.65	\$85.47	\$60.90	\$68.80	\$46.84	\$42.05	\$53.30	\$35.03
St. George, UT												
Basic Wage & Fringe	\$27.83	\$27.88	\$34.47	\$34.10	\$22.35	\$51.40	\$33.66	\$36.16	\$27.59	\$23.94	\$29.32	\$25.90
Comp. Insurance	\$3.36	\$2.31	\$1.65	\$1.90	\$1.72	\$2.05	\$3.33	\$2.01	\$6.67	\$0.38	\$2.34	\$2.06
Other Req'd Benefits	\$5.09	\$5.10	\$6.31	\$6.24	\$4.09	\$9.41	\$6.16	\$6.62	\$5.05	\$4.38	\$5.37	\$4.74
Total Contract Rate	\$36.28	\$35.29	\$42.43	\$42.24	\$28.16	\$62.86	\$43.15	\$44.79	\$39.31	\$28.70	\$37.03	\$32.70
St. Louis, MO												
Basic Wage & Fringe	\$48.24	\$43.21	\$57.68	\$53.00	\$41.84	\$58.53	\$49.63	\$56.21	\$44.00	\$33.27	\$44.39	\$24.92
Comp. Insurance	\$5.68	\$4.75	\$3.65	\$4.81	\$3.75	\$4.27	\$6.64	\$5.10	\$12.06	\$3.70	\$4.10	\$2.30
Other Req'd Benefits	\$8.83	\$7.91	\$10.56	\$9.70	\$7.66	\$10.71	\$9.08	\$10.29	\$8.05	\$6.09	\$8.12	\$4.56
Total Contract Rate	\$62.75	\$55.87	\$71.89	\$67.51	\$53.25	\$73.51	\$65.35	\$71.60	\$64.11	\$43.06	\$56.61	\$31.78
St. Paul, MN												
Basic Wage & Fringe	\$46.66	\$44.06	\$57.33	\$56.35	\$36.07	\$61.81	\$55.24	\$59.76	\$47.99	\$35.79	\$50.81	\$29.72
Comp. Insurance	\$15.02	\$6.81	\$3.83	\$6.36	\$5.26	\$2.77	\$10.69	\$6.74	\$26.34	\$5.65	\$11.14	\$6.52
Other Req'd Benefits	\$8.54	\$8.06	\$10.49	\$10.31	\$6.60	\$11.31	\$10.11	\$10.94	\$8.78	\$6.55	\$9.30	\$5.44
Total Contract Rate	\$70.22	\$58.93	\$71.65	\$73.02	\$47.93	\$75.89	\$76.04	\$77.44	\$83.11	\$47.99	\$71.25	\$41.68
Stamford, CT												
Basic Wage & Fringe	\$43.80	\$47.45	\$47.22	\$47.18	\$28.49	\$87.49	\$44.98	\$50.03	\$40.69	\$38.39	\$51.48	\$28.44
Comp. Insurance	\$10.95	\$4.31	\$4.01	\$4.76	\$4.67	\$8.18	\$10.47	\$5.04	\$14.22	\$5.55	\$5.64	\$3.12
Other Req'd Benefits	\$8.02	\$8.68	\$8.64	\$8.63	\$5.21	\$16.01	\$8.23	\$9.16	\$7.45	\$7.03	\$9.42	\$5.20
Total Contract Rate	\$62.77	\$60.44	\$59.87	\$60.57	\$38.37	\$111.68	\$63.68	\$64.23	\$62.36	\$50.97	\$66.54	\$36.76
Stockton, CA												
Basic Wage & Fringe	\$43.36	\$23.85	\$47.33	\$40.95	\$33.68	\$66.61	\$54.34	\$43.43	\$34.69	\$35.44	\$50.72	\$27.80
Comp. Insurance	\$5.87	\$3.23	\$1.79	\$2.14	\$2.15	\$1.55	\$4.67	\$2.27	\$6.47	\$1.65	\$3.87	\$2.12
Other Req'd Benefits	\$7.93	\$4.36	\$8.66	\$7.49	\$6.16	\$12.19	\$9.94	\$7.95	\$6.35	\$6.49	\$9.28	\$5.09
Total Contract Rate	\$57.16	\$31.44	\$57.78	\$50.58	\$41.99	\$80.35	\$68.95	\$53.65	\$47.51	\$43.58	\$63.87	\$35.01
Syracuse, NY												
Basic Wage & Fringe	\$32.07	\$24.87	\$44.67	\$34.29	\$29.31	\$59.35	\$42.95	\$36.36	\$24.87	\$28.36	\$34.13	\$26.20
Comp. Insurance	\$5.92	\$4.59	\$3.34	\$3.10	\$3.80	\$6.17	\$8.91	\$3.28	\$8.33	\$6.30	\$9.15	\$7.03
Other Req'd Benefits	\$5.87	\$4.55	\$8.17	\$6.28	\$5.36	\$10.86	\$7.86	\$6.65	\$4.55	\$5.19	\$6.25	\$4.79
Total Contract Rate	\$43.86	\$34.01	\$56.18	\$43.67	\$38.47	\$76.38	\$59.72	\$46.29	\$37.75	\$39.85	\$49.53	\$38.02
Tacoma, WA												
Basic Wage & Fringe	\$40.75	\$38.45	\$52.47	\$53.73	\$33.49	\$70.88	\$52.93	\$54.95	\$42.28	\$38.33	\$47.27	\$33.19
Comp. Insurance	\$1.14	\$0.93	\$0.62	\$0.97	\$1.00	\$1.02	\$1.81	\$0.99	\$2.17	\$0.92	\$0.87	\$0.61
Other Req'd Benefits	\$7.46	\$7.04	\$9.60	\$9.83	\$6.13	\$12.97	\$9.69	\$10.06	\$7.74	\$7.01	\$8.65	\$6.07
Total Contract Rate	\$49.35	\$46.42	\$62.69	\$64.53	\$40.62	\$84.87	\$64.43	\$66.00	\$52.19	\$46.26	\$56.79	\$39.87

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Tallahassee, FL												
Basic Wage & Fringe	\$27.43	\$18.67	\$29.11	\$29.07	\$21.60	\$62.76	\$36.44	\$30.83	\$24.85	\$26.31	\$27.85	\$21.86
Comp. Insurance	\$3.50	\$0.97	\$1.49	\$1.49	\$1.78	\$2.47	\$3.11	\$1.58	\$4.97	\$2.20	\$2.71	\$2.13
Other Req'd Benefits	\$5.02	\$3.42	\$5.33	\$5.32	\$3.95	\$11.49	\$6.67	\$5.64	\$4.55	\$4.81	\$5.10	\$4.00
Total Contract Rate	\$35.95	\$23.06	\$35.93	\$35.88	\$27.33	\$76.72	\$46.22	\$38.05	\$34.37	\$33.32	\$35.66	\$27.99
Tampa, FL												
Basic Wage & Fringe	\$29.25	\$32.28	\$31.86	\$28.58	\$27.14	\$51.23	\$29.40	\$30.31	\$26.73	\$23.55	\$24.31	\$21.97
Comp. Insurance	\$3.74	\$1.67	\$1.63	\$1.47	\$2.23	\$2.02	\$2.51	\$1.56	\$5.35	\$1.97	\$2.37	\$2.14
Other Req'd Benefits	\$5.35	\$5.91	\$5.83	\$5.23	\$4.97	\$9.38	\$5.38	\$5.55	\$4.89	\$4.31	\$4.45	\$4.02
Total Contract Rate	\$38.34	\$39.86	\$39.32	\$35.28	\$34.34	\$62.63	\$37.29	\$37.42	\$36.97	\$29.83	\$31.13	\$28.13
Terre Haute, IN												
Basic Wage & Fringe	\$40.55	\$27.22	\$51.57	\$33.91	\$24.55	\$54.59	\$35.75	\$35.97	\$36.55	\$22.64	\$28.07	\$23.33
Comp. Insurance	\$2.81	\$0.80	\$1.47	\$0.94	\$1.19	\$1.43	\$1.63	\$0.99	\$3.68	\$1.30	\$0.89	\$0.74
Other Req'd Benefits	\$7.42	\$4.98	\$9.44	\$6.21	\$4.49	\$9.99	\$6.54	\$6.58	\$6.69	\$4.14	\$5.14	\$4.27
Total Contract Rate	\$50.78	\$33.00	\$62.48	\$41.06	\$30.23	\$66.01	\$43.92	\$43.54	\$46.92	\$28.08	\$34.10	\$28.34
Toledo, OH												
Basic Wage & Fringe	\$36.01	\$36.64	\$44.80	\$41.11	\$25.50	\$67.57	\$43.96	\$43.60	\$33.44	\$32.69	\$31.25	\$25.55
Comp. Insurance	\$4.01	\$3.63	\$2.54	\$2.50	\$3.50	\$2.40	\$5.17	\$2.65	\$10.18	\$2.79	\$1.53	\$1.25
Other Req'd Benefits	\$6.59	\$6.71	\$8.20	\$7.52	\$4.67	\$12.37	\$8.04	\$7.98	\$6.12	\$5.98	\$5.72	\$4.68
Total Contract Rate	\$46.61	\$46.98	\$55.54	\$51.13	\$33.67	\$82.34	\$57.17	\$54.23	\$49.74	\$41.46	\$38.50	\$31.48
Topeka, KS												
Basic Wage & Fringe	\$29.47	\$30.78	\$42.89	\$45.12	\$29.96	\$62.59	\$43.41	\$47.86	\$24.04	\$24.69	\$27.52	\$25.98
Comp. Insurance	\$2.67	\$2.02	\$1.45	\$2.04	\$2.27	\$2.24	\$3.08	\$2.17	\$2.99	\$1.51	\$1.64	\$1.55
Other Req'd Benefits	\$5.39	\$5.63	\$7.85	\$8.26	\$4.94	\$11.45	\$7.94	\$8.76	\$4.40	\$4.52	\$5.04	\$4.75
Total Contract Rate	\$37.53	\$38.43	\$52.19	\$55.42	\$37.17	\$76.28	\$54.43	\$58.79	\$31.43	\$30.72	\$34.20	\$32.28
Trenton, NJ												
Basic Wage & Fringe	\$57.51	\$53.00	\$76.14	\$63.72	\$30.62	\$89.77	\$58.79	\$67.58	\$42.88	\$34.66	\$46.15	\$22.74
Comp. Insurance	\$8.51	\$7.84	\$3.34	\$3.69	\$3.49	\$4.89	\$7.90	\$3.91	\$16.28	\$3.15	\$2.92	\$1.44
Other Req'd Benefits	\$10.52	\$9.70	\$13.93	\$11.66	\$5.60	\$16.43	\$10.76	\$12.37	\$7.85	\$6.34	\$8.45	\$4.16
Total Contract Rate	\$76.54	\$70.54	\$93.41	\$79.07	\$39.71	\$111.09	\$77.45	\$83.86	\$67.01	\$44.15	\$57.52	\$28.34
Tucson, AZ												
Basic Wage & Fringe	\$32.60	\$18.67	\$34.59	\$32.73	\$23.37	\$62.77	\$46.42	\$34.71	\$28.93	\$28.07	\$25.81	\$24.70
Comp. Insurance	\$7.46	\$0.95	\$2.23	\$2.45	\$1.98	\$5.03	\$4.44	\$2.60	\$5.67	\$3.24	\$2.72	\$2.60
Other Req'd Benefits	\$5.97	\$3.42	\$6.33	\$5.99	\$4.28	\$11.49	\$8.49	\$6.35	\$5.29	\$5.14	\$4.72	\$4.52
Total Contract Rate	\$46.03	\$23.04	\$43.15	\$41.17	\$29.63	\$79.29	\$59.35	\$43.66	\$39.89	\$36.45	\$33.25	\$31.82
Tulsa, OK												
Basic Wage & Fringe	\$24.60	\$31.58	\$35.59	\$32.81	\$22.99	\$58.20	\$36.93	\$34.80	\$21.20	\$23.14	\$26.17	\$21.85
Comp. Insurance	\$4.47	\$3.49	\$3.63	\$3.68	\$3.34	\$4.07	\$6.28	\$3.90	\$6.45	\$3.59	\$3.74	\$3.12
Other Req'd Benefits	\$4.50	\$5.78	\$6.51	\$6.00	\$4.21	\$10.65	\$6.76	\$6.37	\$3.88	\$4.23	\$4.79	\$4.00
Total Contract Rate	\$33.57	\$40.85	\$45.73	\$42.49	\$30.54	\$72.92	\$49.97	\$45.07	\$31.53	\$30.96	\$34.70	\$28.97
Tuscaloosa, AL												
Basic Wage & Fringe	\$26.25	\$31.61	\$34.41	\$31.02	\$21.64	\$59.87	\$32.80	\$32.90	\$21.83	\$22.15	\$26.84	\$23.76
Comp. Insurance	\$8.86	\$2.98	\$3.52	\$3.16	\$4.64	\$5.45	\$7.83	\$3.35	\$9.52	\$3.99	\$2.74	\$2.43
Other Req'd Benefits	\$4.80	\$5.78	\$6.30	\$5.68	\$3.96	\$10.96	\$6.00	\$6.02	\$3.99	\$4.05	\$4.91	\$4.35
Total Contract Rate	\$39.91	\$40.37	\$44.23	\$39.86	\$30.24	\$76.28	\$46.63	\$42.27	\$35.34	\$30.19	\$34.49	\$30.54

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Utica, NY												
Basic Wage & Fringe	\$30.24	\$33.26	\$37.99	\$31.30	\$30.25	\$59.64	\$37.57	\$33.19	\$28.04	\$27.17	\$31.52	\$27.80
Comp. Insurance	\$5.59	\$6.14	\$2.84	\$2.83	\$3.92	\$6.20	\$7.79	\$3.00	\$9.39	\$6.03	\$8.45	\$7.46
Other Req'd Benefits	\$5.53	\$6.09	\$6.95	\$5.73	\$5.54	\$10.91	\$6.88	\$6.07	\$5.13	\$4.97	\$5.77	\$5.09
Total Contract Rate	\$41.36	\$45.49	\$47.78	\$39.86	\$39.71	\$76.75	\$52.24	\$42.26	\$42.56	\$38.17	\$45.74	\$40.35
Virginia Beach, VA												
Basic Wage & Fringe	\$30.25	\$40.10	\$36.63	\$32.45	\$27.75	\$55.14	\$36.84	\$34.42	\$30.19	\$30.03	\$26.56	\$23.39
Comp. Insurance	\$5.25	\$5.91	\$2.56	\$3.39	\$3.22	\$5.40	\$5.83	\$3.59	\$11.00	\$3.43	\$5.04	\$4.44
Other Req'd Benefits	\$5.54	\$7.34	\$6.70	\$5.94	\$5.08	\$10.09	\$6.74	\$6.30	\$5.52	\$5.50	\$4.86	\$4.28
Total Contract Rate	\$41.04	\$53.35	\$45.89	\$41.78	\$36.05	\$70.63	\$49.41	\$44.31	\$46.71	\$38.96	\$36.46	\$32.11
Waco, TX												
Basic Wage & Fringe	\$34.06	\$30.19	\$36.92	\$32.42	\$27.46	\$55.66	\$35.47	\$34.39	\$20.49	\$25.92	\$22.44	\$21.39
Comp. Insurance	\$3.83	\$3.40	\$2.27	\$2.19	\$2.47	\$3.32	\$3.87	\$2.32	\$4.01	\$2.44	\$2.97	\$2.83
Other Req'd Benefits	\$6.23	\$5.52	\$6.76	\$5.93	\$5.03	\$10.19	\$6.49	\$6.29	\$3.75	\$4.74	\$4.11	\$3.91
Total Contract Rate	\$44.12	\$39.11	\$45.95	\$40.54	\$34.96	\$69.17	\$45.83	\$43.00	\$28.25	\$33.10	\$29.52	\$28.13
Washington, D.C.												
Basic Wage & Fringe	\$37.97	\$33.52	\$52.42	\$44.21	\$27.88	\$59.30	\$40.00	\$46.89	\$34.01	\$37.65	\$34.74	\$32.14
Comp. Insurance	\$3.03	\$1.71	\$3.26	\$3.60	\$1.69	\$5.73	\$3.31	\$3.82	\$4.99	\$3.35	\$2.74	\$2.54
Other Req'd Benefits	\$6.95	\$6.13	\$9.59	\$8.09	\$5.10	\$10.85	\$7.32	\$8.58	\$6.22	\$6.89	\$6.36	\$5.88
Total Contract Rate	\$47.95	\$41.36	\$65.27	\$55.90	\$34.67	\$75.88	\$50.63	\$59.29	\$45.22	\$47.89	\$43.84	\$40.56
Waterbury, CT												
Basic Wage & Fringe	\$41.59	\$38.78	\$49.80	\$42.36	\$29.57	\$71.49	\$51.58	\$44.93	\$47.64	\$37.47	\$50.29	\$27.71
Comp. Insurance	\$10.39	\$3.53	\$4.23	\$4.27	\$4.85	\$6.68	\$12.01	\$4.53	\$16.65	\$5.42	\$5.51	\$3.04
Other Req'd Benefits	\$7.61	\$7.10	\$9.11	\$7.75	\$5.41	\$13.08	\$9.44	\$8.22	\$8.72	\$6.86	\$9.20	\$5.07
Total Contract Rate	\$59.59	\$49.41	\$63.14	\$54.38	\$39.83	\$91.25	\$73.03	\$57.68	\$73.01	\$49.75	\$65.00	\$35.82
Watertown, NY												
Basic Wage & Fringe	\$32.07	\$24.87	\$44.67	\$34.29	\$29.31	\$59.35	\$42.95	\$36.36	\$24.87	\$28.36	\$34.13	\$26.20
Comp. Insurance	\$5.92	\$4.59	\$3.34	\$3.10	\$3.80	\$6.17	\$8.91	\$3.28	\$8.33	\$6.30	\$9.15	\$7.03
Other Req'd Benefits	\$5.87	\$4.55	\$8.17	\$6.28	\$5.36	\$10.86	\$7.86	\$6.65	\$4.55	\$5.19	\$6.25	\$4.79
Total Contract Rate	\$43.86	\$34.01	\$56.18	\$43.67	\$38.47	\$76.38	\$59.72	\$46.29	\$37.75	\$39.85	\$49.53	\$38.02
Wichita Falls, TX												
Basic Wage & Fringe	\$25.95	\$28.87	\$37.87	\$31.61	\$23.18	\$53.21	\$34.85	\$33.53	\$25.95	\$24.78	\$27.36	\$20.17
Comp. Insurance	\$2.92	\$3.25	\$2.33	\$2.13	\$2.08	\$3.18	\$3.80	\$2.26	\$5.08	\$2.33	\$3.63	\$2.67
Other Req'd Benefits	\$4.75	\$5.28	\$6.93	\$5.78	\$4.24	\$9.74	\$6.38	\$6.14	\$4.75	\$4.53	\$5.01	\$3.69
Total Contract Rate	\$33.62	\$37.40	\$47.13	\$39.52	\$29.50	\$66.13	\$45.03	\$41.93	\$35.78	\$31.64	\$36.00	\$26.53
Wichita, KS												
Basic Wage & Fringe	\$28.45	\$26.64	\$37.84	\$36.99	\$27.75	\$58.93	\$36.87	\$39.23	\$23.83	\$24.63	\$26.96	\$23.90
Comp. Insurance	\$2.58	\$1.75	\$1.28	\$1.68	\$1.98	\$2.11	\$2.61	\$1.78	\$2.97	\$1.51	\$1.61	\$1.42
Other Req'd Benefits	\$5.21	\$4.88	\$6.92	\$6.77	\$5.08	\$10.78	\$6.75	\$7.18	\$4.36	\$4.51	\$4.93	\$4.37
Total Contract Rate	\$36.24	\$33.27	\$46.04	\$45.44	\$34.81	\$71.82	\$46.23	\$48.19	\$31.16	\$30.65	\$33.50	\$29.69
Wilmington, DE												
Basic Wage & Fringe	\$42.28	\$36.45	\$47.87	\$44.78	\$27.07	\$78.84	\$43.87	\$47.49	\$35.21	\$26.03	\$38.30	\$25.81
Comp. Insurance	\$4.29	\$7.43	\$2.49	\$3.12	\$3.63	\$4.75	\$4.95	\$3.31	\$8.32	\$3.97	\$4.58	\$3.08
Other Req'd Benefits	\$7.74	\$6.67	\$8.76	\$8.19	\$4.95	\$14.43	\$8.03	\$8.69	\$6.44	\$4.76	\$7.01	\$4.72
Total Contract Rate	\$54.31	\$50.55	\$59.12	\$56.09	\$35.65	\$98.02	\$56.85	\$59.49	\$49.97	\$34.76	\$49.89	\$33.61

3.3 Contract Labor Rates, Selected Areas

Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
Winston-Salem, NC												
Basic Wage & Fringe	\$27.05	\$32.10	\$30.82	\$29.33	\$21.24	\$59.19	\$28.08	\$31.11	\$21.94	\$27.62	\$27.67	\$25.14
Comp. Insurance	\$4.38	\$2.94	\$3.31	\$2.77	\$2.43	\$6.11	\$3.18	\$2.94	\$5.79	\$3.80	\$4.39	\$3.99
Other Req'd Benefits	\$4.95	\$5.87	\$5.64	\$5.37	\$3.89	\$10.83	\$5.14	\$5.69	\$4.02	\$5.05	\$5.06	\$4.60
Total Contract Rate	\$36.38	\$40.91	\$39.77	\$37.47	\$27.56	\$76.13	\$36.40	\$39.74	\$31.75	\$36.47	\$37.12	\$33.73
Worcester, MA												
Basic Wage & Fringe	\$38.45	\$40.42	\$46.44	\$42.15	\$31.37	\$74.51	\$59.75	\$44.70	\$54.14	\$35.24	\$48.02	\$26.07
Comp. Insurance	\$4.58	\$1.75	\$1.47	\$1.64	\$1.57	\$2.59	\$6.94	\$1.73	\$7.62	\$2.45	\$3.34	\$1.81
Other Req'd Benefits	\$7.04	\$7.40	\$8.50	\$7.71	\$5.74	\$13.64	\$10.93	\$8.18	\$9.91	\$6.45	\$8.79	\$4.77
Total Contract Rate	\$50.07	\$49.57	\$56.41	\$51.50	\$38.68	\$90.74	\$77.62	\$54.61	\$71.67	\$44.14	\$60.15	\$32.65
Yonkers, NY												
Basic Wage & Fringe	\$57.03	\$54.40	\$71.91	\$59.11	\$45.43	\$62.00	\$59.29	\$62.69	\$54.67	\$41.59	\$63.42	\$30.71
Comp. Insurance	\$10.53	\$10.05	\$5.37	\$5.34	\$5.89	\$6.44	\$12.30	\$5.66	\$18.30	\$9.23	\$17.01	\$8.24
Other Req'd Benefits	\$10.44	\$9.96	\$13.16	\$10.82	\$8.31	\$11.35	\$10.85	\$11.47	\$10.00	\$7.61	\$11.61	\$5.62
Total Contract Rate	\$78.00	\$74.41	\$90.44	\$75.27	\$59.63	\$79.79	\$82.44	\$79.82	\$82.97	\$58.43	\$92.04	\$44.57
Youngstown, OH												
Basic Wage & Fringe	\$30.10	\$31.55	\$51.91	\$40.75	\$39.31	\$58.16	\$42.01	\$43.21	\$31.64	\$29.41	\$23.64	\$27.12
Comp. Insurance	\$3.35	\$3.12	\$2.94	\$2.47	\$5.40	\$2.06	\$4.94	\$2.62	\$9.63	\$2.51	\$1.16	\$1.33
Other Req'd Benefits	\$5.51	\$5.77	\$9.50	\$7.46	\$7.19	\$10.64	\$7.69	\$7.91	\$5.79	\$5.38	\$4.33	\$4.96
Total Contract Rate	\$38.96	\$40.44	\$64.35	\$50.68	\$51.90	\$70.86	\$54.64	\$53.74	\$47.06	\$37.30	\$29.13	\$33.41
Canadian Cities												
Calgary, AB												
Basic Wage & Fringe	\$44.32	\$44.32	\$55.92	\$50.75	\$36.75	\$81.69	\$53.50	\$53.82	\$39.83	\$38.05	\$41.99	\$33.61
Comp. Insurance	\$2.66	\$1.28	\$1.09	\$2.37	\$1.22	\$1.59	\$2.15	\$2.52	\$2.56	\$0.89	\$2.34	\$1.86
Other Req'd Benefits	\$8.11	\$8.11	\$10.24	\$9.29	\$6.72	\$14.95	\$9.79	\$9.85	\$7.29	\$6.97	\$7.69	\$6.15
Total Contract Rate	\$55.09	\$53.71	\$67.25	\$62.41	\$44.69	\$98.23	\$65.44	\$66.19	\$49.68	\$45.91	\$52.02	\$41.62
Edmonton, AB												
Basic Wage & Fringe	\$44.32	\$44.32	\$55.92	\$50.75	\$36.75	\$81.69	\$53.50	\$53.82	\$39.83	\$38.05	\$41.99	\$33.61
Comp. Insurance	\$2.66	\$1.28	\$1.09	\$2.37	\$1.22	\$1.59	\$2.15	\$2.52	\$2.56	\$0.89	\$2.34	\$1.86
Other Req'd Benefits	\$8.11	\$8.11	\$10.24	\$9.29	\$6.72	\$14.95	\$9.79	\$9.85	\$7.29	\$6.97	\$7.69	\$6.15
Total Contract Rate	\$55.09	\$53.71	\$67.25	\$62.41	\$44.69	\$98.23	\$65.44	\$66.19	\$49.68	\$45.91	\$52.02	\$41.62
Halifax, NS												
Basic Wage & Fringe	\$34.65	\$34.65	\$43.76	\$39.69	\$28.74	\$63.90	\$41.86	\$42.09	\$31.16	\$29.76	\$32.85	\$26.28
Comp. Insurance	\$1.57	\$1.50	\$1.17	\$2.00	\$1.24	\$1.02	\$3.86	\$2.12	\$2.87	\$0.75	\$2.48	\$1.99
Other Req'd Benefits	\$6.34	\$6.34	\$8.01	\$7.27	\$5.26	\$11.69	\$7.67	\$7.70	\$5.70	\$5.44	\$6.01	\$4.81
Total Contract Rate	\$42.56	\$42.49	\$52.94	\$48.96	\$35.24	\$76.61	\$53.39	\$51.91	\$39.73	\$35.95	\$41.34	\$33.08
Hamilton, ON												
Basic Wage & Fringe	\$41.47	\$41.47	\$52.33	\$47.50	\$34.39	\$76.43	\$50.06	\$50.38	\$37.27	\$35.61	\$39.30	\$31.44
Comp. Insurance	\$1.80	\$2.80	\$1.70	\$3.78	\$2.32	\$1.98	\$5.58	\$4.01	\$4.83	\$1.66	\$3.12	\$2.48
Other Req'd Benefits	\$7.59	\$7.59	\$9.58	\$8.70	\$6.30	\$13.99	\$9.16	\$9.22	\$6.82	\$6.51	\$7.19	\$5.75
Total Contract Rate	\$50.86	\$51.86	\$63.61	\$59.98	\$43.01	\$92.40	\$64.80	\$63.61	\$48.92	\$43.78	\$49.61	\$39.67

Note: Values for Canadian areas are reported in Canadian dollars.

3.3 Contract Labor Rates, Selected Areas

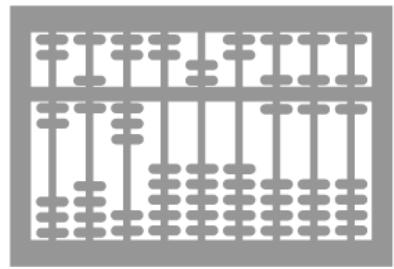
Area	Carpenter	Carpet Layer	Electrician	Plumber	Painter	Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver
London, ON												
Basic Wage & Fringe	\$41.47	\$41.47	\$52.33	\$47.50	\$34.39	\$76.43	\$50.06	\$50.38	\$37.27	\$35.61	\$39.30	\$31.44
Comp. Insurance	\$1.80	\$2.80	\$1.70	\$3.78	\$2.32	\$1.98	\$5.58	\$4.01	\$4.83	\$1.66	\$3.12	\$2.48
Other Req'd Benefits	\$7.59	\$7.59	\$9.58	\$8.70	\$6.30	\$13.99	\$9.16	\$9.22	\$6.82	\$6.51	\$7.19	\$5.75
Total Contract Rate	\$50.86	\$51.86	\$63.61	\$59.98	\$43.01	\$92.40	\$64.80	\$63.61	\$48.92	\$43.78	\$49.61	\$39.67
Montreal, QC												
Basic Wage & Fringe	\$37.64	\$37.64	\$47.50	\$43.10	\$31.20	\$69.39	\$45.43	\$45.71	\$33.83	\$32.31	\$35.67	\$28.55
Comp. Insurance	\$4.99	\$4.99	\$2.81	\$5.33	\$4.14	\$4.30	\$9.07	\$5.65	\$4.49	\$2.44	\$8.08	\$6.46
Other Req'd Benefits	\$6.88	\$6.88	\$8.70	\$7.89	\$5.71	\$12.70	\$8.31	\$8.36	\$6.19	\$5.91	\$6.52	\$5.23
Total Contract Rate	\$49.51	\$49.51	\$59.01	\$56.32	\$41.05	\$86.39	\$62.81	\$59.72	\$44.51	\$40.66	\$50.27	\$40.24
Ottawa, ON												
Basic Wage & Fringe	\$41.47	\$41.47	\$52.33	\$47.50	\$34.39	\$76.43	\$50.06	\$50.38	\$37.27	\$35.61	\$39.30	\$31.44
Comp. Insurance	\$1.80	\$2.80	\$1.70	\$3.78	\$2.32	\$1.98	\$5.58	\$4.01	\$4.83	\$1.66	\$3.12	\$2.48
Other Req'd Benefits	\$7.59	\$7.59	\$9.58	\$8.70	\$6.30	\$13.99	\$9.16	\$9.22	\$6.82	\$6.51	\$7.19	\$5.75
Total Contract Rate	\$50.86	\$51.86	\$63.61	\$59.98	\$43.01	\$92.40	\$64.80	\$63.61	\$48.92	\$43.78	\$49.61	\$39.67
Quebec City, QC												
Basic Wage & Fringe	\$37.64	\$37.64	\$47.50	\$43.10	\$31.20	\$69.39	\$45.43	\$45.71	\$33.83	\$32.31	\$35.67	\$28.55
Comp. Insurance	\$4.99	\$4.99	\$2.81	\$5.33	\$4.14	\$4.30	\$9.07	\$5.65	\$4.49	\$2.44	\$8.08	\$6.46
Other Req'd Benefits	\$6.88	\$6.88	\$8.70	\$7.89	\$5.71	\$12.70	\$8.31	\$8.36	\$6.19	\$5.91	\$6.52	\$5.23
Total Contract Rate	\$49.51	\$49.51	\$59.01	\$56.32	\$41.05	\$86.39	\$62.81	\$59.72	\$44.51	\$40.66	\$50.27	\$40.24
Regina, SK												
Basic Wage & Fringe	\$38.73	\$38.73	\$48.89	\$44.35	\$32.12	\$71.39	\$46.75	\$47.05	\$34.82	\$33.25	\$36.70	\$29.36
Comp. Insurance	\$2.11	\$2.11	\$2.66	\$4.82	\$1.75	\$3.89	\$2.55	\$5.12	\$1.89	\$1.81	\$5.99	\$4.80
Other Req'd Benefits	\$7.08	\$7.08	\$8.95	\$8.11	\$5.88	\$13.07	\$8.56	\$8.61	\$6.37	\$6.09	\$6.72	\$5.37
Total Contract Rate	\$47.92	\$47.92	\$60.50	\$57.28	\$39.75	\$88.35	\$57.86	\$60.78	\$43.08	\$41.15	\$49.41	\$39.53
St. John's, NL												
Basic Wage & Fringe	\$35.20	\$35.20	\$44.43	\$40.32	\$29.20	\$64.88	\$42.50	\$42.76	\$31.64	\$30.23	\$33.36	\$26.69
Comp. Insurance	\$3.88	\$1.54	\$1.29	\$2.48	\$1.28	\$1.69	\$4.67	\$2.63	\$3.48	\$1.16	\$5.19	\$4.15
Other Req'd Benefits	\$6.44	\$6.44	\$8.13	\$7.38	\$5.34	\$11.88	\$7.78	\$7.83	\$5.79	\$5.53	\$6.10	\$4.88
Total Contract Rate	\$45.52	\$43.18	\$53.85	\$50.18	\$35.82	\$78.45	\$54.95	\$53.22	\$40.91	\$36.92	\$44.65	\$35.72
Toronto, ON												
Basic Wage & Fringe	\$41.47	\$41.47	\$52.33	\$47.50	\$34.39	\$76.43	\$50.06	\$50.38	\$37.27	\$35.61	\$39.30	\$31.44
Comp. Insurance	\$1.80	\$2.80	\$1.70	\$3.78	\$2.32	\$1.98	\$5.58	\$4.01	\$4.83	\$1.66	\$3.12	\$2.48
Other Req'd Benefits	\$7.59	\$7.59	\$9.58	\$8.70	\$6.30	\$13.99	\$9.16	\$9.22	\$6.82	\$6.51	\$7.19	\$5.75
Total Contract Rate	\$50.86	\$51.86	\$63.61	\$59.98	\$43.01	\$92.40	\$64.80	\$63.61	\$48.92	\$43.78	\$49.61	\$39.67
Vancouver, BC												
Basic Wage & Fringe	\$40.51	\$40.51	\$51.14	\$46.40	\$33.59	\$74.69	\$48.91	\$49.21	\$36.43	\$34.79	\$38.40	\$30.72
Comp. Insurance	\$1.62	\$1.55	\$0.67	\$1.88	\$1.28	\$3.62	\$2.14	\$1.99	\$4.21	\$1.69	\$4.44	\$3.55
Other Req'd Benefits	\$7.42	\$7.42	\$9.36	\$8.50	\$6.15	\$13.67	\$8.95	\$9.01	\$6.67	\$6.36	\$7.03	\$5.63
Total Contract Rate	\$49.55	\$49.48	\$61.17	\$56.78	\$41.02	\$91.98	\$60.00	\$60.21	\$47.31	\$42.84	\$49.87	\$39.90
Victoria, BC												
Basic Wage & Fringe	\$40.51	\$40.51	\$51.14	\$46.40	\$33.59	\$74.69	\$48.91	\$49.21	\$36.43	\$34.79	\$38.40	\$30.72
Comp. Insurance	\$1.62	\$1.55	\$0.67	\$1.88	\$1.28	\$3.62	\$2.14	\$1.99	\$4.21	\$1.69	\$4.44	\$3.55
Other Req'd Benefits	\$7.42	\$7.42	\$9.36	\$8.50	\$6.15	\$13.67	\$8.95	\$9.01	\$6.67	\$6.36	\$7.03	\$5.63
Total Contract Rate	\$49.55	\$49.48	\$61.17	\$56.78	\$41.02	\$91.98	\$60.00	\$60.21	\$47.31	\$42.84	\$49.87	\$39.90

Note: Values for Canadian areas are reported in Canadian dollars.

3.3 Contract Labor Rates, Selected Areas

Area	Carpet				Elevator Mechanic	Brick Layer	HVAC Tech	Roofer	Road Worker	Crane Operator	Fork Lift Driver	
	Carpenter	Layer	Electrician	Plumber								
Winnipeg, MB												
Basic Wage & Fringe	\$36.05	\$36.05	\$45.52	\$41.31	\$29.89	\$66.49	\$43.55	\$43.81	\$32.43	\$30.97	\$34.18	\$27.35
Comp. Insurance	\$1.50	\$1.50	\$0.87	\$2.51	\$0.98	\$1.96	\$1.81	\$2.66	\$2.39	\$0.91	\$3.30	\$2.65
Other Req'd Benefits	\$6.60	\$6.60	\$8.34	\$7.55	\$5.47	\$12.16	\$7.96	\$8.01	\$5.94	\$5.67	\$6.25	\$5.01
Total Contract Rate	\$44.15	\$44.15	\$54.73	\$51.37	\$36.34	\$80.61	\$53.32	\$54.48	\$40.76	\$37.55	\$43.73	\$35.01

Note: Values for Canadian areas are reported in Canadian dollars.



Chapter 4

M&R Construction Indexes

National M&R Cost
Indexes

Selected M&R-
Related Commodity
Indexes

4. M&R Construction Indexes

This chapter presents a collection of national-level economic indicators relevant for the maintenance and repair (M&R) construction industry. Four of these measures are unique to this publication—indexes for residential, non-residential (commercial and institutional assets), and military facilities M&R construction, as well as an index for new construction projects. Other indexes are included for products and services common in asset M&R activities. Source data and index methodology are presented in Chapter 6.

Table 4-1
Maintenance and New Construction Costs

Change in average from previous year

Whitestone M&R Indexes					
	Non-Residential Buildings	Residential Buildings	Military Facilities	New Construction	CPI*
2000	4.5%	5.3%	5.5%	4.5%	3.3%
2001	1.3%	0.5%	1.2%	1.5%	2.9%
2002	0.9%	-0.2%	0.9%	0.4%	1.6%
2003	3.2%	4.2%	3.6%	3.6%	2.2%
2004	4.3%	5.8%	5.0%	4.4%	2.7%
2005	5.4%	7.5%	6.4%	5.2%	3.4%
2006	5.0%	6.1%	6.0%	5.0%	3.2%
2007	4.5%	4.6%	5.2%	4.3%	2.9%
2008	8.0%	10.0%	9.4%	8.3%	3.9%
2009e	-3.6%	-8.2%	-5.9%	-3.9%	-0.9%
Avg.**	3.3%	3.4%	3.7%	3.3%	2.5%

*Consumer Price Index for all items, urban consumers

**Geometric average rate of change

e = estimate based on average change, 2nd quarter 2008 to 2nd quarter 2009.

M&R and New Construction Costs

Whitestone indexes anticipate the largest decrease in M&R and new construction costs seen in the last ten years, as shown in Table 4-1. These decreases are fueled by declining demand for key components; petroleum costs will decrease 48 percent, primary and intermediate metals will decrease by over 9 percent, and lumber costs will decrease by 8 percent.

M&R Labor and Commodity Costs

A view of specific factors affecting costs is provided in Table 4-2. The first eleven items are general product groupings that are inputs to Whitestone indexes, while the other items are commodities common to M&R construction. We follow the price changes of these particular commodities because manufacturers and distributors often use them in making price adjustments.

Projected wage increases for A&E and general construction workers are expected to fall short of the 5.9 and 4.7 percent growth respectively, seen in 2008. Among organized workers, we expect an average wage increase of 4.4 percent, with the greatest increase—5.1 percent—in the Southwest. Wage changes by region are discussed in Chapter 6.

Using M&R Cost Indexes

Change in costs over time can be expressed in various ways. Two common methods are shown in Box 4-1. Focusing on the *Whitestone Military Facilities M&R Index*, for example, we find costs for military facilities rose around 43 percent between 1999 and 2009. The average annual (or compound) rate of increase was 3.7 percent during the same period. By comparison, the average annual rate of increase for new construction was 3.3 percent from 1999 to 2009.

The choice of indexes is important, particularly when used for adjusting cost trends. Consider the example of the M&R budget of the U.S. Department of Defense (DoD), one of the world's largest property owners. In 1999, DoD spent roughly \$4.9 billion for facility maintenance. Starting from this point, we can calculate how much funding would

Table 4-2
M&R-related Service and Commodity Costs

Change in average from previous year

Index	2004	2005	2006	2007	2008	2009e
Architect & Engineering Services*	3.3%	3.1%	3.7%	5.8%	5.9%	5.5%
Petroleum Refining & Related Products*	22.8%	33.7%	17.5%	10.8%	27.3%	-48.4%
Lumber and Wood Products*	3.9%	2.2%	-1.4%	-0.9%	-2.0%	-7.8%
Fabricated Metal Products*	6.4%	5.7%	4.1%	4.4%	7.9%	4.2%
Stone, Clay, Glass, & Concrete*	3.4%	6.5%	7.5%	2.1%	2.6%	4.0%
Rubber & Miscellaneous Plastics*	2.6%	7.2%	6.0%	0.8%	7.3%	3.0%
Chemicals & Allied Products*	5.0%	8.4%	5.1%	3.4%	12.7%	2.8%
Electrical Equipment & Supplies*	0.1%	3.0%	1.4%	1.5%	3.2%	6.7%
Stone & Clay Mining*	3.3%	6.7%	9.1%	8.8%	14.3%	12.7%
Primary Metal Industries*	20.6%	9.4%	14.8%	6.3%	12.0%	-17.8%
Construction Labor*	1.5%	1.2%	2.8%	4.6%	4.7%	4.1%
Intermediate Materials*	6.7%	8.0%	6.4%	4.2%	10.7%	-9.0%
Prepared Paints	2.9%	6.9%	7.2%	3.8%	7.1%	9.2%
Vitreous China Fixtures	-2.0%	1.7%	1.9%	0.1%	-5.0%	2.5%
Elevators, Escalators & Lifts	1.5%	2.6%	1.9%	2.6%	4.5%	4.0%
Air Conditioning & Refrigeration Equip.	1.6%	4.9%	2.6%	4.8%	3.6%	4.1%
Floor Coverings	2.3%	7.1%	5.5%	1.4%	2.8%	3.1%
Asphalt & Tar Roofing Products	1.1%	11.2%	10.4%	0.7%	31.0%	49.0%

*Component of Whitestone M&R Indexes

e = estimate based on average change, 2nd quarter 2008 to 2nd quarter 2009.

Box 4-1 **Calculating Rates of Change: DoD Maintenance Expenditures**

Simple percentage change:

$$\text{change (\%)} = ((\text{index}_{t+n} / \text{index}_t) - 1)$$

Where t and t+n are different points in time

Example: Calculate the inflation in M&R costs for military facilities during the period 1999-2009:

$$43.2\% = .432 = ((128.3_{2009} / 89.6_{1999}) - 1)$$

Average rate of change:

$$\text{average annual rate of change (\%)} = ((\text{index}_{t+n} / \text{index}_t)^{(1/n)} - 1)$$

Example: Calculate the annual inflation rate in M&R costs for military facilities during the period 1999-2009:

$$3.7\% = .037 = ((128.3_{2009} / 89.6_{1999})^{(1/10)} - 1)$$

be required in 2009 for the same level of M&R goods and services. Based on the *Whitestone Military Facilities M&R Index*, the 2009 cost in current dollars would be approximately \$7.0 billion. Using an alternative inflation measure such as that for new construction—a common practice—suggests a requirement of \$6.7 billion, an understatement of \$300 million in the DoD budget for a single year.

The appropriate M&R indexes can also be used to correct timeworn funding benchmarks. Funding rules established in the past may no longer reflect current cost trends. For example, a military organization may have found ten years ago that an M&R budget of 3 percent of replacement value—a common rule of thumb—was adequate for maintaining their

physical plant. Today that rule of thumb is incorrect because of the different inflation rates of maintenance construction and new construction, the two components in the “percent of replacement value” ratio.⁸ Using the appropriate inflation rates, it is shown—3 percent multiplied by (1.432_{Military} / 1.382_{New Construction}) that the M&R goods and services purchased with 3 percent of replacement value in 1999 would now require 3.1 percent.

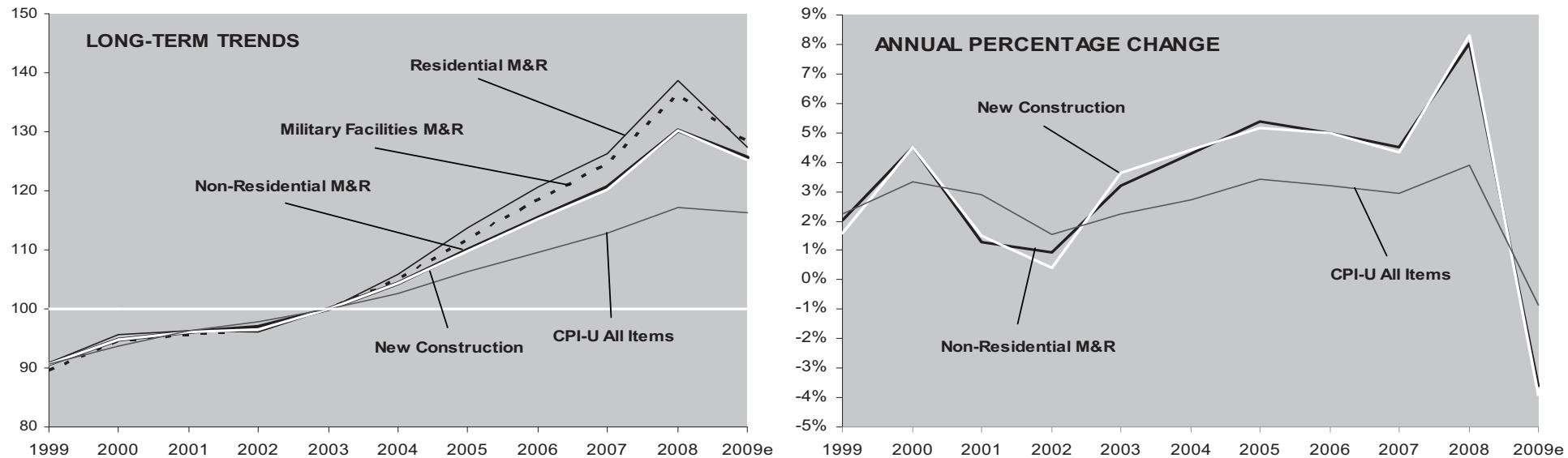
A simpler approach is to use a funding rule expressed in terms of square feet rather than replacement cost. For example, a benchmark of \$3 per GSFT in 1999 could be adjusted just by using the M&R cost index (a multiplier of 1.385 in the case of non-residential facilities) to determine that the equivalent amount would be \$4.16 in 2009. *No matter how they are expressed, funding benchmarks are not static over time and must be adjusted to reflect prevailing cost trends.*

The choice of indexes is also important for adjusting location-specific costs. The local maintenance cost index shown in Chapter 3 specifically reflects place-to-place variations in M&R costs. Use of an alternative index, such as one designed for new construction, will not measure the true change in the “market basket” of goods and services specific to M&R construction. Is the difference meaningful? The 50-year average M&R cost for a 2 Story Office Building in Washington, D.C. is \$2.89, as shown in Chapter 2. The same asset would cost \$3.57 in Trenton, NJ, according to the Whitestone local cost index (the index value for Trenton is 123.5). A well-known survey publication suggests using a consumer expenditure index to adjust office building costs for different areas; using this approach, M&R cost estimates varied by over 50 percent from the Whitestone local cost index for some areas.

Monthly updates of Whitestone indexes are available at www.whitestoneresearch.com/indexes/index.htm.

⁸ In fact, a recent U.S. Government Accountability Report (April 2008) noted that Defense made just this error in adjusting many of its facility sustainment (M&R) costs for inflation.

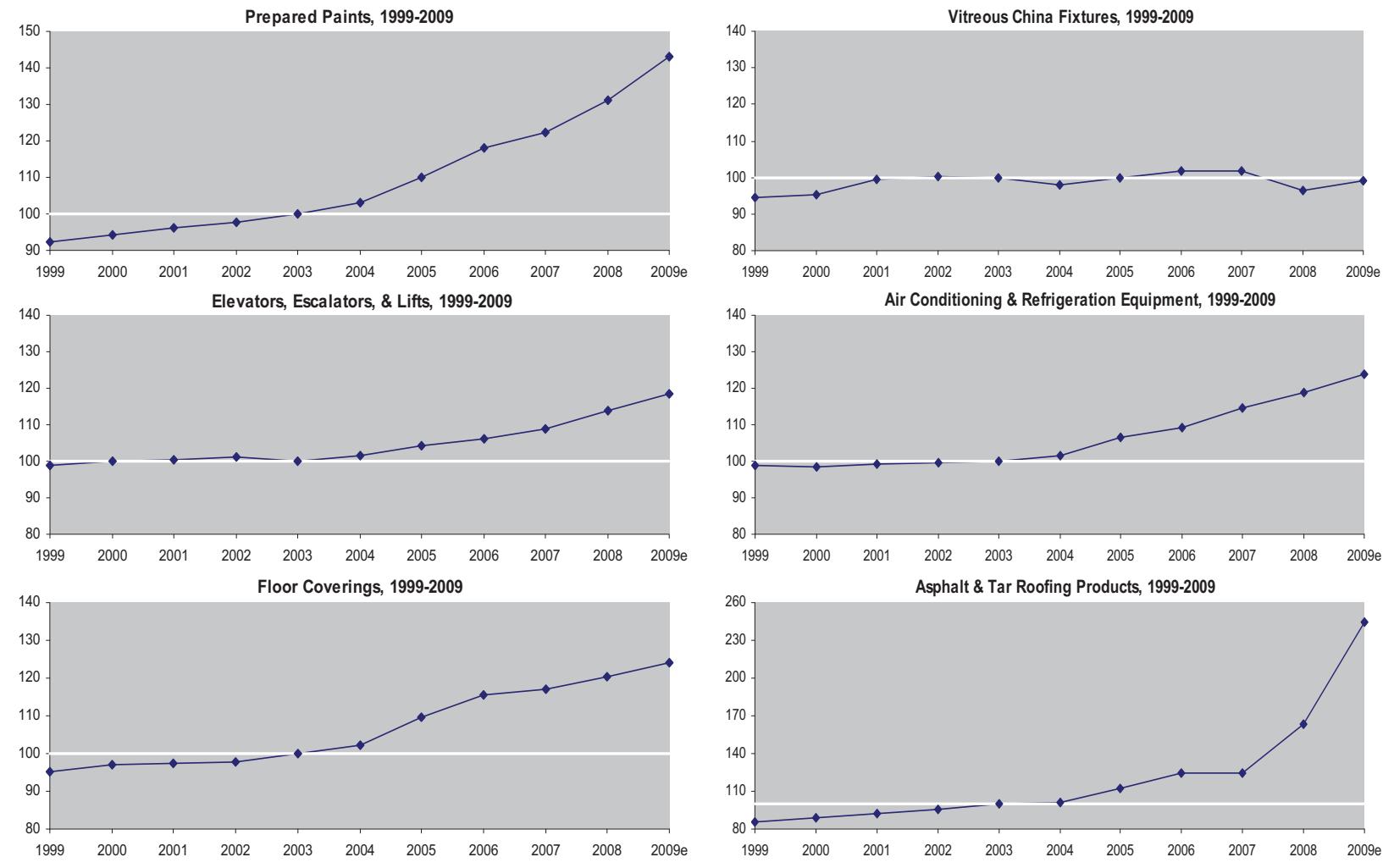
4.1 National M&R Cost Indexes



Indexes	Annual average										Rate of change		
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009e	10-year average	2008-09 est.
Whitestone M&R Indexes													
Non-Residential Buildings M&R	90.7	94.8	96.0	96.9	100.0	104.3	109.9	115.4	120.6	130.3	125.6	3.3%	-3.6%
Residential Buildings M&R	90.9	95.7	96.2	96.0	100.0	105.8	113.7	120.6	126.2	138.8	127.4	3.4%	-8.2%
Military Facilities M&R	89.6	94.5	95.6	96.5	100.0	105.0	111.7	118.4	124.6	136.3	128.3	3.7%	-5.9%
Index Components													
Architect & Engineering Services	87.1	91.1	93.6	96.0	100.0	103.3	106.5	110.4	116.8	123.7	130.5	4.1%	5.5%
Petroleum Refining & Related Products	62.9	92.4	86.2	81.0	100.0	122.8	164.2	193.0	213.8	272.1	140.4	8.4%	-48.4%
Lumber & Wood Products	108.3	105.2	99.3	97.9	100.0	103.9	106.2	104.7	103.8	101.7	93.8	-1.4%	-7.8%
Fabricated Metal Products	97.2	98.1	98.6	99.1	100.0	106.4	112.5	117.1	122.2	131.8	137.4	3.5%	4.2%
Stone, Clay, Glass & Concrete	96.1	97.5	98.5	99.3	100.0	103.4	110.1	118.4	120.9	124.0	128.9	3.0%	4.0%
Rubber & Miscellaneous Plastics	95.2	97.1	98.1	97.7	100.0	102.6	110.0	116.6	117.5	126.1	129.9	3.2%	3.0%
Chemicals & Allied Products	91.0	95.2	96.2	95.5	100.0	105.0	113.8	119.6	123.7	139.4	143.3	4.6%	2.8%
Electrical Equipment & Supplies	104.0	103.1	101.5	101.1	100.0	100.1	103.1	104.5	106.1	109.5	116.8	1.2%	6.7%
Stone & Clay Mining	91.5	93.6	96.3	98.0	100.0	103.3	110.2	120.2	130.8	149.5	168.5	6.3%	12.7%
Primary Metal Industries	97.8	101.2	98.0	98.1	100.0	120.6	131.9	151.4	161.0	180.4	148.2	4.2%	-17.8%
Construction Labor	88.6	92.2	95.0	97.7	100.0	101.5	102.7	105.6	110.5	115.7	120.5	3.1%	4.1%
Intermediate Materials	92.1	96.6	97.0	95.6	100.0	106.7	115.2	122.6	127.8	141.5	128.8	3.4%	-9.0%
Other Indexes													
New Construction	90.6	94.7	96.1	96.5	100.0	104.4	109.8	115.3	120.3	130.3	125.2	3.3%	-3.9%
CPI-Urban Consumers, All Items	90.6	93.6	96.3	97.8	100.0	102.7	106.2	109.6	112.8	117.2	116.2	2.5%	-0.9%

e = estimate based on average change, 2nd quarter 2008 to 2nd quarter 2009. Sources: U.S. Dept. of Commerce, Dept. of Labor, and Whitestone Research.

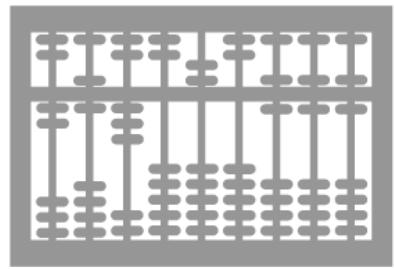
4.2 Selected M&R-Related Commodity Indexes



2003=100

Indexes	Annual average											Rate of change	
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009e	10-year average	2008-09 est.
Prepared Paints	92.2	94.2	96.3	97.7	100.0	102.9	110.0	117.9	122.4	131.1	143.1	4.5%	9.2%
Vitreous China Fixtures	94.6	95.3	99.6	100.4	100.0	98.0	99.7	101.6	101.7	96.6	99.0	0.5%	2.5%
Elevators, Escalators & Lifts	99.0	100.0	100.5	101.0	100.0	101.5	104.1	106.1	108.9	113.8	118.4	1.8%	4.0%
Air Conditioning & Refrigeration Equip.	98.7	98.6	99.1	99.7	100.0	101.6	106.6	109.4	114.7	118.8	123.7	2.3%	4.1%
Floor Coverings	95.2	97.0	97.5	97.7	100.0	102.3	109.6	115.6	117.2	120.5	124.2	2.7%	3.1%
Asphalt & Tar Roofing Products	85.2	89.4	92.3	95.2	100.0	101.1	112.4	124.1	125.0	163.7	243.9	11.1%	49.0%

e = estimate based on average change, 2nd quarter 2008 to 2nd quarter 2009. Sources: U.S. Dept. of Commerce, Dept. of Labor, and Whitestone Research.



Chapter 5

Component Data

Components and
M&R Tasks

M&R Task
Frequencies of HVAC
Components by
Climate Zone

5. Component Data

This chapter provides M&R data for over 1,200 components and more than 3,200 associated maintenance tasks. The tasks are the basis for the Asset M&R Cost Profiles shown in Chapter 2. All of the components used in generating the profiles are included. Detailed information including labor hours, material and equipment costs, and task frequencies are listed in the first section of this chapter; the second section lists different task frequencies for HVAC components across climate zones. Components and tasks are listed according to Uniformat II, a twenty-two division classification system commonly used by architects, engineers, and cost analysts (shown in the Appendix 1).

Box 5-1 Calculating Maintenance Task Costs

Cost of an individual maintenance task:

$$\text{Task cost} = \text{quantity} \times [(\text{labor} \times \text{um multiplier} \times \text{trade rate} \times \text{markup}) + (\text{material} \times \text{markup}) + (\text{equip} \times \text{equip rate} \times \text{markup})] \times \text{total utilization factor}$$

where: quantity = expressed in specified units; e.g. GSFT, 1,000 linear feet, etc.

labor = hours per unit

um (unscheduled maintenance) multiplier = 1.0 for renewal and replacement tasks or > 1.0 for all other tasks

trade rate = contract rate or in-house shop rate

markup = contract markup, including overhead and fee

material = material cost per unit

equip = special equipment required, in hours per unit

equip rate = hourly rate for equipment and operator

total utilization factor = $1 + \sum (\beta - 1)$, where β = the multiplier values for hours of operation, security, and safety & permitting

Example: Place new membrane over 41,500 GSFT existing built-up roof (Washington, D.C.)

$$\$227,546 = 41,500 \times [(.05236 \times 1.0 \times \$45.22 \times 1.3) + (\$1.85 \times 1.3) + (\text{no special equip})] \times 1$$

Major repair costs for a selected component over a given lifetime:

$$\text{Component cost} = \sum (\text{task cost} * (\text{lifetime} / \text{frequency}))$$

where: \sum = sum for all tasks associated with the component

task cost = explained above

lifetime = arbitrary period beginning with new construction (50 yrs. was used in Ch. 2)

frequency = frequency of task (for HVAC units this varies by region)

note: results of (lifetime/frequency) are rounded to the nearest integer; frequencies are reset upon component replacement.

*Example: M&R costs of a 41,500 GSFT built-up roof, over 50 years (Washington, D.C.)**

Maintain built up roof	\$2,2663	$\times 49 =$	\$130,490
Non-destructive moisture inspection	2,684	$\times 9 =$	24,152
Place new membrane over existing roof	227,546	$\times 2 =$	455,092
Remove and replace old membrane	394,158	$\times 1 =$	<u>394,158</u>

*Unscheduled maintenance not included

The primary reason for presenting detailed component and task data is to allow the reader to both understand the source of the estimates presented, and to make it simple to alter the cost profiles in Chapter 2. With this information one can substitute alternative labor, material, and frequency for specific tasks—or add and substitute alternative components.

Alternative assumptions regarding component and task data can have significant effects on M&R costs. For example, there is general disagreement regarding the task schedule associated with clay brick exterior walls. Including a clean and reseal task, performed every 10 years, and a 50 percent surface repoint task, performed every 25 years, increases the 50-year annual average cost by \$0.16 per square foot.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
A10 Foundations										
A1030 Slab on Grade										
Concrete Slab										
Repair Concrete Slab (2% of Slab)	Sq Ft	Brick Layer	Contract	.0015	.05	0	None	15	Major	No
Replace Concrete Slab	Sq Ft	Brick Layer	Contract	.0725	2.59	0	None	75	Major	Yes
B10 Super Structure										
B1010 Floor Construction										
Concrete Decking										
Refinish Concrete Decking	Sq Ft	Painter	Contract	.0163	.08	0	None	10	Major	No
Repair Concrete Decking (2% of Decking)	Sq Ft	Carpenter	Contract	.0048	.10	0	None	15	Major	No
Finish Repaired Concrete Decking	Sq Ft	Painter	Contract	.0003	.00	0	None	15	Major	No
Replace Concrete Decking	Sq Ft	Carpenter	Contract	.2415	4.75	0	None	75	Major	Yes
Finish Replaced Concrete Decking	Sq Ft	Painter	Contract	.0163	.08	0	None	75	Major	No
Metal Decking										
Refinish Metal Decking	Sq Ft	Painter	Contract	.0165	.06	0	None	10	Major	No
Repair Metal Decking (2% of Decking)	Sq Ft	Carpenter	Contract	.0047	.07	0	None	20	Major	No
Replace Metal Decking	Sq Ft	Carpenter	Contract	.2329	3.28	0	None	30	Major	Yes
Wood Decking										
Refinish Wood Decking	Sq Ft	Painter	Contract	.0122	.12	0	None	5	Major	No
Repair Wood Decking (2% of Decking)	Sq Ft	Carpenter	Contract	.0006	.10	0	None	10	Major	No
Replace Wood Decking	Sq Ft	Carpenter	Contract	.0280	5.21	0	None	20	Major	Yes
Wood Ramp										
Replace Wood Ramp	Sq Ft	Carpenter	Contract	.0280	5.21	0	None	20	Major	Yes
B1020 Roof Construction										
Steel Roof Access Ladder										
Repair Steel Roof Access Ladder	Ln Ft	Carpenter	Contract	.0030	16.75	0	None	15	Major	No
Replace Steel Roof Access Ladder	Ln Ft	Carpenter	Contract	.1500	50.26	0	None	40	Major	Yes
B20 Exterior Enclosure										
B2010 Exterior Walls										
Aluminum Louver, 1st Floor										
Refinish Aluminum Louver, 1st Floor	Each	Painter	Contract	.8500	2.26	0	None	10	Major	No
Replace Aluminum Louver, 1st Floor	Each	Carpenter	Contract	3.7400	194.75	0	None	60	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
B2010 Exterior Walls										
Aluminum Louver, 2nd Floor										
Refinish Aluminum Louver, 2nd Floor	Each	Painter	Contract	1.5100	2.26	0	None	10	Major	No
Replace Aluminum Louver, 2nd Floor	Each	Carpenter	Contract	4.6800	194.75	0	None	60	Major	Yes
Aluminum Louver, 3rd Floor										
Refinish Aluminum Louver, 3rd Floor	Each	Painter	Contract	2.1800	2.26	0	None	10	Major	No
Replace Aluminum Louver, 3rd Floor	Each	Carpenter	Contract	5.6300	194.75	0	None	60	Major	Yes
Aluminum Siding, Exterior, 1st Floor										
Replace Aluminum Siding, Exterior, 1st Floor	Sq Ft	Carpenter	Contract	.0563	1.08	0	None	60	Major	Yes
Aluminum Siding, Exterior, 2nd Floor										
Replace Aluminum Siding, Exterior, 2nd Floor	Sq Ft	Carpenter	Contract	.0719	1.08	0	None	60	Major	Yes
Aluminum Siding, Exterior, 3rd+ Floor										
Replace Aluminum Siding, Exterior, 3rd+ Floor	Sq Ft	Carpenter	Contract	.0874	1.08	0	None	60	Major	Yes
Aluminum Siding, Painted, Exterior, 1st Floor										
Refinish Aluminum Siding, Painted, Exterior, 1st Floor	Sq Ft	Painter	Contract	.0177	.13	0	None	10	Major	No
Replace Aluminum Siding, Painted, Exterior, 1st Floor	Sq Ft	Carpenter	Contract	.0563	1.08	0	None	60	Major	Yes
Finish Replaced Aluminum Siding, Painted, Exterior, 1st Floor	Sq Ft	Painter	Contract	.0177	.13	0	None	60	Major	No
Aluminum Siding, Painted, Exterior, 2nd Floor										
Refinish Aluminum Siding, Painted, Exterior, 2nd Floor	Sq Ft	Painter	Contract	.0294	.13	0	None	10	Major	No
Replace Aluminum Siding, Painted, Exterior, 2nd Floor	Sq Ft	Carpenter	Contract	.0719	1.08	0	None	60	Major	Yes
Finish Replaced Aluminum Siding, Painted, Exterior, 2nd Floor	Sq Ft	Painter	Contract	.0294	.13	0	None	60	Major	No
Aluminum Siding, Painted, Exterior, 3rd+ Floor										
Refinish Aluminum Siding, Painted, Exterior, 3rd+ Floor	Sq Ft	Painter	Contract	.0410	.13	0	None	10	Major	No
Replace Aluminum Siding, Painted, Exterior, 3rd+ Floor	Sq Ft	Carpenter	Contract	.0874	1.08	0	None	60	Major	Yes
Finish Replaced Aluminum Siding, Painted, Exterior, 3rd+ Floor	Sq Ft	Painter	Contract	.0410	.13	0	None	60	Major	No
Clay Brick, Exterior, 1st Floor										
Clean & Reseal Clay Brick, Exterior, 1st Floor	Sq Ft	Staff Painter	Staff	.0218	.25	0	None	10	PM	No
Repair Clay Brick, Exterior, 1st Floor (2% of Walls)	Sq Ft	Brick Layer	Contract	.0097	.06	0	None	25	Major	No
Repoint (50% surface) Clay Brick, Exterior, 1st Floor	Sq Ft	Brick Layer	Contract	.0559	.04	0	None	25	Major	No
Replace Clay Brick, Exterior, 1st Floor	Sq Ft	Brick Layer	Contract	.4867	3.08	0	None	75	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
B2010 Exterior Walls										
Clay Brick, Exterior, 2nd Floor										
Clean & Reseal Clay Brick, Exterior, 2nd Floor	Sq Ft	Staff Painter	Staff	.0340	.25	0	None	10	PM	No
Repair Clay Brick, Exterior, 2nd Floor (2% of Walls)	Sq Ft	Brick Layer	Contract	.0109	.06	0	None	25	Major	No
Repoint (50% surface) Clay Brick, Exterior, 2nd Floor	Sq Ft	Brick Layer	Contract	.0615	.04	0	None	25	Major	No
Replace Clay Brick, Exterior, 2nd Floor	Sq Ft	Brick Layer	Contract	.5453	3.08	0	None	75	Major	Yes
Clay Brick, Exterior, 3rd+ Floor										
Clean & Reseal Clay Brick, Exterior, 3rd+ Floor	Sq Ft	Staff Painter	Staff	.0459	.25	0	None	10	PM	No
Repair Clay Brick, Exterior, 3rd+ Floor (2% of Walls)	Sq Ft	Brick Layer	Contract	.0121	.06	0	None	25	Major	No
Repoint (50% surface) Clay Brick, Exterior, 3rd+ Floor	Sq Ft	Brick Layer	Contract	.0670	.04	0	None	25	Major	No
Replace Clay Brick, Exterior, 3rd+ Floor	Sq Ft	Brick Layer	Contract	.6039	3.08	0	None	75	Major	Yes
Clay Brick, Painted, Exterior, 1st Floor										
Refinish Clay Brick, Painted, Exterior, 1st Floor	Sq Ft	Painter	Contract	.0218	.08	0	None	10	Major	No
Repair Clay Brick, Painted, Exterior, 1st Floor (2% of Walls)	Sq Ft	Brick Layer	Contract	.0097	.06	0	None	25	Major	No
Repoint (50% surface) Clay Brick, Painted, Exterior, 1st Floor	Sq Ft	Brick Layer	Contract	.0559	.04	0	None	25	Major	No
Finish Repaired Clay Brick, Painted, Exterior, 1st Floor	Sq Ft	Painter	Contract	.0004	.00	0	None	25	Major	No
Replace Clay Brick, Painted, Exterior, 1st Floor	Sq Ft	Brick Layer	Contract	.4867	3.08	0	None	75	Major	Yes
Finish Replaced Clay Brick, Painted, Exterior, 1st Floor	Sq Ft	Painter	Contract	.0218	.08	0	None	75	Major	No
Clay Brick, Painted, Exterior, 2nd Floor										
Refinish Clay Brick, Painted, Exterior, 2nd Floor	Sq Ft	Painter	Contract	.0340	.08	0	None	10	Major	No
Repair Clay Brick, Painted, Exterior, 2nd Floor (2% of Walls)	Sq Ft	Brick Layer	Contract	.0109	.06	0	None	25	Major	No
Repoint (50% surface) Clay Brick, Painted, Exterior, 2nd Floor	Sq Ft	Brick Layer	Contract	.0615	.04	0	None	25	Major	No
Finish Repaired Clay Brick, Painted, Exterior, 2nd Floor	Sq Ft	Painter	Contract	.0007	.00	0	None	25	Major	No
Replace Clay Brick, Painted, Exterior, 2nd Floor	Sq Ft	Brick Layer	Contract	.5453	3.08	0	None	75	Major	Yes
Finish Replaced Clay Brick, Painted, Exterior, 2nd Floor	Sq Ft	Painter	Contract	.0340	.08	0	None	75	Major	No
Clay Brick, Painted, Exterior, 3rd+ Floor										
Refinish Clay Brick, Painted, Exterior, 3rd+ Floor	Sq Ft	Painter	Contract	.0459	.08	0	None	10	Major	No
Repair Clay Brick, Painted, Exterior, 3rd+ Floor (2% of Walls)	Sq Ft	Brick Layer	Contract	.0121	.06	0	None	25	Major	No
Repoint (50% surface) Clay Brick, Painted, Exterior, 3rd+ Floor	Sq Ft	Brick Layer	Contract	.0670	.04	0	None	25	Major	No
Finish Repaired Clay Brick, Painted, Exterior, 3rd+ Floor	Sq Ft	Painter	Contract	.0009	.00	0	None	25	Major	No
Replace Clay Brick, Painted, Exterior, 3rd+ Floor	Sq Ft	Brick Layer	Contract	.6039	3.08	0	None	75	Major	Yes
Finish Replaced Clay Brick, Painted, Exterior, 3rd+ Floor	Sq Ft	Painter	Contract	.0459	.08	0	None	75	Major	No

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
B2010 Exterior Walls										
Concrete Block, Exterior, 1st Floor										
Clean & Seal Concrete Block, Exterior, 1st Floor	Sq Ft	Staff Painter	Staff	.0217	.25	0	None	10	PM	No
Repair Concrete Block, Exterior, 1st Floor (2% of Walls)	Sq Ft	Brick Layer	Contract	.0034	.05	0	None	25	Major	No
Repoint (50% surface) Concrete Block, Exterior, 1st Floor	Sq Ft	Brick Layer	Contract	.0431	.03	0	None	25	Major	No
Replace Concrete Block, Exterior, 1st Floor	Sq Ft	Brick Layer	Contract	.1550	2.62	0	None	100	Major	Yes
Concrete Block, Exterior, 2nd Floor										
Clean & Seal Concrete Block, Exterior, 2nd Floor	Sq Ft	Staff Painter	Staff	.0340	.25	0	None	10	PM	No
Repair Concrete Block, Exterior, 2nd Floor (2% of Walls)	Sq Ft	Brick Layer	Contract	.0037	.05	0	None	25	Major	No
Repoint (50% surface) Concrete Block, Exterior, 2nd Floor	Sq Ft	Brick Layer	Contract	.0494	.03	0	None	25	Major	No
Replace Concrete Block, Exterior, 2nd Floor	Sq Ft	Brick Layer	Contract	.1805	2.62	0	None	100	Major	Yes
Concrete Block, Exterior, 3rd+ Floor										
Clean & Seal Concrete Block, Exterior, 3rd+ Floor	Sq Ft	Staff Painter	Staff	.0459	.25	0	None	10	PM	No
Repair Concrete Block, Exterior, 3rd+ Floor (2% of Walls)	Sq Ft	Brick Layer	Contract	.0039	.05	0	None	25	Major	No
Repoint (50% surface) Concrete Block, Exterior, 3rd+ Floor	Sq Ft	Brick Layer	Contract	.0556	.03	0	None	25	Major	No
Replace Concrete Block, Exterior, 3rd+ Floor	Sq Ft	Brick Layer	Contract	.2059	2.62	0	None	100	Major	Yes
Concrete Block, Painted, Exterior, 1st Floor										
Refinish Concrete Block, Painted, Exterior, 1st Floor	Sq Ft	Painter	Contract	.0217	.08	0	None	10	Major	No
Repair Concrete Block, Painted, Exterior, 1st Floor (2% of Walls)	Sq Ft	Brick Layer	Contract	.0034	.05	0	None	25	Major	No
Repoint (50% surface) Concrete Block, Painted, Exterior, 1st Floor	Sq Ft	Brick Layer	Contract	.0431	.03	0	None	25	Major	No
Finish Repaired Concrete Block, Painted, Exterior, 1st Floor	Sq Ft	Painter	Contract	.0004	.00	0	None	25	Major	No
Replace Concrete Block, Painted, Exterior, 1st Floor	Sq Ft	Brick Layer	Contract	.1550	2.62	0	None	100	Major	Yes
Finish Replaced Concrete Block, Painted, Exterior, 1st Floor	Sq Ft	Painter	Contract	.0217	.08	0	None	100	Major	No
Concrete Block, Painted, Exterior, 2nd Floor										
Refinish Concrete Block, Painted, Exterior, 2nd Floor	Sq Ft	Painter	Contract	.0340	.08	0	None	10	Major	No
Repair Concrete Block, Painted, Exterior, 2nd Floor (2% of Walls)	Sq Ft	Brick Layer	Contract	.0037	.05	0	None	25	Major	No
Repoint (50% surface) Concrete Block, Painted, Exterior, 2nd Floor	Sq Ft	Brick Layer	Contract	.0494	.03	0	None	25	Major	No
Finish Repaired Concrete Block, Painted, Exterior, 2nd Floor	Sq Ft	Painter	Contract	.0007	.00	0	None	25	Major	No
Replace Concrete Block, Painted, Exterior, 2nd Floor	Sq Ft	Brick Layer	Contract	.1805	2.62	0	None	100	Major	Yes
Finish Replaced Concrete Block, Painted, Exterior, 2nd Floor	Sq Ft	Painter	Contract	.0340	.08	0	None	100	Major	No

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
B2010 Exterior Walls										
Concrete Block, Painted, Exterior, 3rd+ Floor										
Refinish Concrete Block, Painted, Exterior, 3rd+ Floor	Sq Ft	Painter	Contract	.0459	.08	0	None	10	Major	No
Repair Concrete Block, Painted, Exterior, 3rd+ Floor (2% of Walls)	Sq Ft	Brick Layer	Contract	.0039	.05	0	None	25	Major	No
Repoint (50% surface) Concrete Block, Painted, Exterior, 3rd+ Floor	Sq Ft	Brick Layer	Contract	.0556	.03	0	None	25	Major	No
Finish Repaired Concrete Block, Painted, Exterior, 3rd Floor	Sq Ft	Painter	Contract	.0009	.00	0	None	25	Major	No
Replace Concrete Block, Painted, Exterior, 3rd+ Floor	Sq Ft	Brick Layer	Contract	.2059	2.62	0	None	100	Major	Yes
Finish Replaced Concrete Block, Painted, Exterior, 3rd+ Floor	Sq Ft	Painter	Contract	.0459	.08	0	None	100	Major	No
Concrete, Exterior, 1st Floor										
Clean & Seal Concrete, Exterior, 1st Floor	Sq Ft	Staff Painter	Staff	.0217	.25	0	None	10	PM	No
Repair Concrete, Exterior, 1st Floor (2% of Walls)	Sq Ft	Brick Layer	Contract	.0041	.10	0	None	25	Major	No
Replace Concrete, Exterior, 1st Floor	Sq Ft	Brick Layer	Contract	.2056	4.75	0	None	100	Major	Yes
Concrete, Exterior, 2nd Floor										
Clean & Seal Concrete, Exterior, 2nd Floor	Sq Ft	Staff Painter	Staff	.0340	.25	0	None	10	PM	No
Repair Concrete, Exterior, 2nd Floor (2% of Walls)	Sq Ft	Brick Layer	Contract	.0047	.10	0	None	25	Major	No
Replace Concrete, Exterior, 2nd Floor	Sq Ft	Brick Layer	Contract	.2362	4.75	0	None	100	Major	Yes
Concrete, Exterior, 3rd+ Floor										
Clean & Seal Concrete, Exterior, 3rd+ Floor	Sq Ft	Staff Painter	Staff	.0459	.25	0	None	10	PM	No
Repair Concrete, Exterior, 3rd+ Floor (2% of Walls)	Sq Ft	Brick Layer	Contract	.0053	.10	0	None	25	Major	No
Replace Concrete, Exterior, 3rd+ Floor	Sq Ft	Brick Layer	Contract	.2665	4.75	0	None	100	Major	Yes
Concrete, Painted, Exterior, 1st Floor										
Refinish Concrete, Painted, Exterior, 1st Floor	Sq Ft	Painter	Contract	.0217	.08	0	None	10	Major	No
Repair Concrete, Painted, Exterior 1st Floor (2% of Walls)	Sq Ft	Brick Layer	Contract	.0041	.10	0	None	25	Major	No
Finish Repaired Concrete, Painted, Exterior, 1st Floor	Sq Ft	Painter	Contract	.0004	.00	0	None	25	Major	No
Replace Concrete, Painted, Exterior, 1st Floor	Sq Ft	Brick Layer	Contract	.2056	4.75	0	None	100	Major	Yes
Finish Replaced Concrete, Painted, Exterior, 1st Floor	Sq Ft	Painter	Contract	.0217	.08	0	None	100	Major	No
Concrete, Painted, Exterior, 2nd Floor										
Refinish Concrete, Painted, Exterior, 2nd Floor	Sq Ft	Painter	Contract	.0340	.08	0	None	10	Major	No
Repair Concrete, Painted, Exterior, 2nd Floor (2% of Walls)	Sq Ft	Brick Layer	Contract	.0047	.10	0	None	25	Major	No
Finish Repaired Concrete, Painted, Exterior, 2nd Floor	Sq Ft	Painter	Contract	.0007	.00	0	None	25	Major	No
Replace Concrete, Painted, Exterior, 2nd Floor	Sq Ft	Brick Layer	Contract	.2362	4.75	0	None	100	Major	Yes
Finish Replaced Concrete, Painted, Exterior, 2nd Floor	Sq Ft	Painter	Contract	.0340	.08	0	None	100	Major	No

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
B2010 Exterior Walls										
Concrete, Painted, Exterior, 3rd+ Floor										
Refinish Concrete, Painted, Exterior, 3rd+ Floor	Sq Ft	Painter	Contract	.0459	.08	0	None	10	Major	No
Repair Concrete, Painted, Exterior, 3rd+ Floor (2% of Walls)	Sq Ft	Brick Layer	Contract	.0053	.10	0	None	25	Major	No
Finish Repaired Concrete, Painted, Exterior, 3rd+ Floor	Sq Ft	Painter	Contract	.0009	.00	0	None	25	Major	No
Replace Concrete, Painted, Exterior, 3rd+ Floor	Sq Ft	Brick Layer	Contract	.2665	4.75	0	None	100	Major	Yes
Finish Replaced Concrete, Painted, Exterior, 3rd+ Floor	Sq Ft	Painter	Contract	.0459	.08	0	None	100	Major	No
Greenhouse Structure, Glazing & Accessories										
Replace Greenhouse Structure, Glazing & Accessories	Sq Ft	Carpenter	Contract	.5518	18.50	0	None	30	Major	Yes
Greenhouse Structure, Truss Frame, Plastic Walls										
Replace Plastic Walls, Greenhouse Structure, Truss Frame, Plastic Walls	Sq Ft	Carpenter	Contract	.0040	.50	0	None	5	Major	No
Replace Greenhouse Structure, Truss Frame, Plastic Walls	Sq Ft	Carpenter	Contract	.1518	15.50	0	None	15	Major	Yes
Steel, Exterior, 1st Floor										
Repair Steel, Exterior, 1st Floor (2% of Walls)	Sq Ft	Carpenter	Contract	.0069	.14	0	None	25	Major	No
Replace Steel, Exterior, 1st Floor	Sq Ft	Carpenter	Contract	.3464	6.87	0	None	75	Major	Yes
Steel, Exterior, 2nd Floor										
Repair Steel, Exterior, 2nd Floor (2% of Walls)	Sq Ft	Carpenter	Contract	.0078	.14	0	None	25	Major	No
Replace Steel, Exterior, 2nd Floor	Sq Ft	Carpenter	Contract	.3890	6.87	0	None	75	Major	Yes
Steel, Exterior, 3rd+ Floor										
Repair Steel, Exterior, 3rd+ Floor (2% of Walls)	Sq Ft	Carpenter	Contract	.0087	.14	0	None	25	Major	No
Replace Steel, Exterior, 3rd+ Floor	Sq Ft	Carpenter	Contract	.4352	6.87	0	None	75	Major	Yes
Steel, Painted, Exterior, 1st Floor										
Refinish Steel, Painted, Exterior, 1st Floor	Sq Ft	Painter	Contract	.0185	.13	0	None	10	Major	No
Repair Steel, Painted, Exterior, 1st Floor (2% of Walls)	Sq Ft	Carpenter	Contract	.0069	.14	0	None	25	Major	No
Finish Repaired Steel, Painted, Exterior, 1st Floor	Sq Ft	Painter	Contract	.0004	.00	0	None	25	Major	No
Replace Steel, Painted, Exterior, 1st Floor	Sq Ft	Carpenter	Contract	.3464	6.87	0	None	75	Major	Yes
Finish Replaced Steel, Painted, Exterior, 1st Floor	Sq Ft	Painter	Contract	.0298	.43	0	None	75	Major	No
Steel, Painted, Exterior, 2nd Floor										
Refinish Steel, Painted, Exterior, 2nd Floor	Sq Ft	Painter	Contract	.0304	.13	0	None	10	Major	No
Repair Steel, Painted, Exterior, 2nd Floor (2% of Walls)	Sq Ft	Carpenter	Contract	.0078	.14	0	None	25	Major	No
Finish Repaired Steel, Painted, Exterior, 2nd Floor	Sq Ft	Painter	Contract	.0006	.00	0	None	25	Major	No
Replace Steel, Painted, Exterior, 2nd Floor	Sq Ft	Carpenter	Contract	.3890	6.87	0	None	75	Major	Yes
Finish Replaced Steel, Painted, Exterior, 2nd Floor	Sq Ft	Painter	Contract	.0428	.43	0	None	75	Major	No

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
B2010 Exterior Walls										
Steel, Painted, Exterior, 3rd+ Floor										
Refinish Steel, Painted, Exterior, 3rd+ Floor	Sq Ft	Painter	Contract	.0421	.13	0	None	10	Major	No
Repair Steel, Painted, Exterior, 3rd+ Floor (2% of Walls)	Sq Ft	Carpenter	Contract	.0087	.14	0	None	25	Major	No
Finish Repaired Steel, Painted, Exterior, 3rd Floor	Sq Ft	Painter	Contract	.0008	.00	0	None	25	Major	No
Replace Steel, Painted, Exterior, 3rd+ Floor	Sq Ft	Carpenter	Contract	.4352	6.87	0	None	75	Major	Yes
Finish Replaced Steel, Painted, Exterior, 3rd+ Floor	Sq Ft	Painter	Contract	.0557	.43	0	None	75	Major	No
Stucco, Painted, Exterior, 1st Floor										
Refinish Stucco, Painted, Exterior, 1st Floor	Sq Ft	Painter	Contract	.0217	.13	0	None	10	Major	No
Repair Stucco, Painted, Exterior, 1st Floor (2% of Walls)	Sq Ft	Brick Layer	Contract	.0037	.01	0	None	25	Major	No
Finish Repaired Stucco, Painted, Exterior, 1st Floor	Sq Ft	Painter	Contract	.0004	.00	0	None	25	Major	No
Replace Stucco, Painted, Exterior, 1st Floor	Sq Ft	Brick Layer	Contract	.1861	.74	0	None	75	Major	Yes
Finish Replaced Stucco, Painted, Exterior, 1st Floor	Sq Ft	Painter	Contract	.0217	.13	0	None	75	Major	No
Stucco, Painted, Exterior, 2nd Floor										
Refinish Stucco, Painted, Exterior, 2nd Floor	Sq Ft	Painter	Contract	.0340	.13	0	None	10	Major	No
Repair Stucco, Painted, Exterior, 2nd Floor (2% of Walls)	Sq Ft	Brick Layer	Contract	.0043	.01	0	None	25	Major	No
Finish Repaired Stucco, Painted, Exterior, 2nd Floor	Sq Ft	Painter	Contract	.0007	.00	0	None	25	Major	No
Replace Stucco, Painted, Exterior, 2nd Floor	Sq Ft	Brick Layer	Contract	.2148	.74	0	None	75	Major	Yes
Finish Replaced Stucco, Painted, Exterior, 2nd Floor	Sq Ft	Painter	Contract	.0340	.13	0	None	75	Major	No
Stucco, Painted, Exterior, 3rd+ Floor										
Refinish Stucco, Painted, Exterior, 3rd+ Floor	Sq Ft	Painter	Contract	.0459	.13	0	None	10	Major	No
Repair Stucco, Painted, Exterior, 3rd+ Floor (2% of Walls)	Sq Ft	Brick Layer	Contract	.0052	.01	0	None	25	Major	No
Finish Repaired Stucco, Painted, Exterior, 3rd+ Floor	Sq Ft	Painter	Contract	.0009	.00	0	None	25	Major	No
Replace Stucco, Painted, Exterior, 3rd+ Floor	Sq Ft	Brick Layer	Contract	.2615	.74	0	None	75	Major	Yes
Finish Replaced Stucco, Painted, Exterior, 3rd+ Floor	Sq Ft	Painter	Contract	.0459	.13	0	None	75	Major	No
Wood Clapboard, Exterior, 1st Floor										
Refinish Wood Clapboard, Exterior, 1st Floor	Sq Ft	Painter	Contract	.0188	.13	0	None	7	Major	No
Repair Wood Clapboard, Exterior, 1st Floor (2% of Walls)	Sq Ft	Carpenter	Contract	.0046	.07	0	None	25	Major	No
Finish Repaired Wood Clapboard, Exterior, 1st Floor	Sq Ft	Painter	Contract	.0004	.00	0	None	25	Major	No
Replace Wood Clapboard, Exterior, 1st Floor	Sq Ft	Carpenter	Contract	.2310	3.60	0	None	75	Major	Yes
Finish Replaced, Wood Clapboard, Exterior, 1st Floor	Sq Ft	Painter	Contract	.0188	.13	0	None	75	Major	No

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
B2010 Exterior Walls										
Wood Clapboard, Exterior, 2nd Floor										
Refinish Wood Clapboard, Exterior, 2nd Floor	Sq Ft	Painter	Contract	.0307	.13	0	None	7	Major	No
Repair Wood Clapboard, Exterior, 2nd Floor (2% of Walls)	Sq Ft	Carpenter	Contract	.0048	.07	0	None	25	Major	No
Finish Repaired Wood Clapboard, Exterior, 2nd Floor	Sq Ft	Painter	Contract	.0006	.00	0	None	25	Major	No
Replace Wood Clapboard, Exterior, 2nd Floor	Sq Ft	Carpenter	Contract	.2422	3.60	0	None	75	Major	Yes
Finish Replaced, Wood Clapboard, Exterior, 2nd Floor	Sq Ft	Painter	Contract	.0307	.13	0	None	75	Major	No
Wood Clapboard, Exterior, 3rd+ Floor										
Refinish Wood Clapboard, Exterior, 3rd+ Floor	Sq Ft	Painter	Contract	.0423	.13	0	None	7	Major	No
Repair Wood Clapboard, Exterior, 3rd+ Floor (2% of Walls)	Sq Ft	Carpenter	Contract	.0051	.07	0	None	25	Major	No
Finish Repaired Wood Clapboard, Exterior, 3rd+ Floor	Sq Ft	Painter	Contract	.0008	.00	0	None	25	Major	No
Replace Wood Clapboard, Exterior, 3rd+ Floor	Sq Ft	Carpenter	Contract	.2532	3.60	0	None	75	Major	Yes
Finish Replaced, Wood Clapboard, Exterior, 3rd+ Floor	Sq Ft	Painter	Contract	.0423	.13	0	None	75	Major	No
Wood Louver, 1st Floor										
Refinish Wood Louver, 1st Floor	Each	Painter	Contract	.3300	2.26	0	None	7	Major	No
Replace Wood Louver, 1st Floor	Each	Carpenter	Contract	3.7400	63.01	0	None	60	Major	Yes
Wood Louver, 2nd Floor										
Refinish Wood Louver, 2nd Floor	Each	Painter	Contract	.3500	2.26	0	None	7	Major	No
Replace Wood Louver, 2nd Floor	Each	Carpenter	Contract	4.6800	63.01	0	None	60	Major	Yes
Wood Louver, 3rd+ Floor										
Refinish Wood Louver, 3rd+ Floor	Each	Painter	Contract	.4000	2.26	0	None	7	Major	No
Replace Wood Louver, 3rd+ Floor	Each	Carpenter	Contract	5.6300	63.01	0	None	60	Major	Yes
Wood Shingles, 1st Floor										
Repair Wood Shingles, 1st Floor (2% of Walls)	Sq Ft	Carpenter	Contract	.0007	.04	0	None	20	Major	No
Replace Wood Shingles, 1st Floor	Sq Ft	Carpenter	Contract	.0335	1.80	0	None	60	Major	Yes
Wood Shingles, 2nd Floor										
Repair Wood Shingles, 2nd Floor (2% of Walls)	Sq Ft	Carpenter	Contract	.0009	.04	0	None	20	Major	No
Replace Wood Shingles, 2nd Floor	Sq Ft	Carpenter	Contract	.0469	1.80	0	None	60	Major	Yes
Wood Shingles, 3rd+ Floor										
Repair Wood Shingles, 3rd+ Floor (2% of Walls)	Sq Ft	Carpenter	Contract	.0012	.04	0	None	20	Major	No
Replace Wood Shingles, 3rd+ Floor	Sq Ft	Carpenter	Contract	.0601	1.80	0	None	60	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
B2010 Exterior Walls										
Wood Shingles, Finished, 1st Floor										
Refinish Wood Shingles, Finished, 1st Floor	Sq Ft	Painter	Contract	.0239	.18	0	None	7	Major	No
Repair Wood Shingles, Finished, 1st Floor (2% of Walls)	Sq Ft	Carpenter	Contract	.0007	.04	0	None	20	Major	No
Finish Repaired Wood Shingles, Finished, 1st Floor	Sq Ft	Painter	Contract	.0024	.00	0	None	20	Major	No
Replace Wood Shingles, Finished, 1st Floor	Sq Ft	Carpenter	Contract	.0335	1.80	0	None	60	Major	Yes
Finished Replaced Wood Shingles, Finished, 1st Floor	Sq Ft	Painter	Contract	.0239	.18	0	None	60	Major	No
Wood Shingles, Finished, 2nd Floor										
Refinish Wood Shingles, Finished, 2nd Floor	Sq Ft	Painter	Contract	.0364	.18	0	None	7	Major	No
Repair Wood Shingles, Finished, 2nd Floor (2% of Walls)	Sq Ft	Carpenter	Contract	.0009	.04	0	None	20	Major	No
Finish Repaired Wood Shingles, Finished, 2nd Floor	Sq Ft	Painter	Contract	.0138	.00	0	None	20	Major	No
Replace Wood Shingles, Finished, 2nd Floor	Sq Ft	Carpenter	Contract	.0469	1.80	0	None	60	Major	Yes
Finished Replaced Wood Shingles, Finished, 2nd Floor	Sq Ft	Painter	Contract	.0364	.18	0	None	60	Major	No
Wood Shingles, Finished, 3rd+ Floor										
Refinish Wood Shingles, Finished, 3rd+ Floor	Sq Ft	Painter	Contract	.0484	.18	0	None	7	Major	No
Repair Wood Shingles, Finished, 3rd+ Floor (2% of Walls)	Sq Ft	Carpenter	Contract	.0012	.04	0	None	20	Major	No
Finish Repaired Wood Shingles, Finished, 3rd+ Floor	Sq Ft	Painter	Contract	.0200	.00	0	None	20	Major	No
Replace Wood Shingles, Finished, 3rd+ Floor	Sq Ft	Carpenter	Contract	.0601	1.80	0	None	60	Major	Yes
Finished Replaced Wood Shingles, Finished, 3rd+ Floor	Sq Ft	Painter	Contract	.0484	.18	0	None	60	Major	No
B2020 Exterior Windows										
Aluminum Fixed Window w/ Thermal Break, Double Glazed, Gas Filled, 12 sf, 1st Fl										
Repair Al. Fixed Window w/ Thermal Break, Dbl Glazed, Gas Filled, 12 sf, 1st Fl	Each	Carpenter	Contract	.3300	2.14	0	None	20	Major	No
Replace Al. Fixed Window w/ Thermal Break, Dbl Glazed, Gas Filled, 12 sf, 1st Fl	Each	Carpenter	Contract	2.5400	170.00	0	None	75	Major	Yes
Aluminum Fixed Window w/ Thermal Break, Double Glazed, Gas Filled, 12 sf, 2nd Fl										
Repair Al. Fixed Window w/ Thermal Break, Dbl Glazed, Gas Filled, 12 sf, 2nd Fl	Each	Carpenter	Contract	.3300	2.14	0	None	20	Major	No
Replace Al. Fixed Window w/ Thermal Break, Dbl Glazed, Gas Filled, 12 sf, 2nd Fl	Each	Carpenter	Contract	2.5400	170.00	0	None	75	Major	Yes
Aluminum Fixed Window w/ Thermal Break, Double Glazed, Gas Filled, 12 sf, 3rd Fl										
Repair Al. Fixed Window w/ Thermal Break, Dbl Glazed, Gas Filled, 12 sf, 3rd Fl	Each	Carpenter	Contract	.3300	2.14	0	None	20	Major	No
Replace Al. Fixed Window w/ Thermal Break, Db. Glazed, Gas Filled, 12 sf, 3rd Fl	Each	Carpenter	Contract	2.5400	170.00	0	None	75	Major	Yes
Aluminum Fixed Window w/ Thermal Break, Double Glazed, Gas Filled, 24 sf, 1st Fl										
Repair Al. Fixed Window w/ Thermal Break, Dbl Glazed, Gas Filled, 24 sf, 1st Fl	Each	Carpenter	Contract	.3300	2.14	0	None	20	Major	No
Replace Al. Fixed Window w/ Thermal Break, Dbl Glazed, Gas Filled, 24 sf, 1st Fl	Each	Carpenter	Contract	2.5400	340.00	0	None	75	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
B2020 Exterior Windows										
Aluminum Fixed Window w/ Thermal Break, Triple Glazed, 12 sf, 1st Fl										
Repair Al. Fixed Window w/ Thermal Break, Triple Glazed, 12 sf, 1st Floor	Each	Carpenter	Contract	.3300	2.14	0	None	20	Major	No
Replace Al. Fixed Window w/ Thermal Break, Triple Glazed, 12 sf, 1st Floor	Each	Carpenter	Contract	2.5400	340.00	0	None	75	Major	Yes
Aluminum Fixed Window w/ Thermal Break, Triple Glazed, 12 sf, 2nd Fl										
Repair Al. Fixed Window w/ Thermal Break, Triple Glazed, 12 sf, 2nd Floor	Each	Carpenter	Contract	.3300	2.14	0	None	20	Major	No
Replace Al. Fixed Window w/ Thermal Break, Triple Glazed, 12 sf, 2nd Floor	Each	Carpenter	Contract	2.5400	340.00	0	None	75	Major	Yes
Aluminum Fixed Window w/ Thermal Break, Triple Glazed, 12 sf, 3rd+ Fl										
Repair Al. Fixed Window w/ Thermal Break, Triple Glazed, 12 sf, 3rd+ Floor	Each	Carpenter	Contract	.3300	2.14	0	None	20	Major	No
Replace Al. Fixed Window w/ Thermal Break, Triple Glazed, 12 sf, 3rd+ Floor	Each	Carpenter	Contract	2.5400	340.00	0	None	75	Major	Yes
Aluminum Fixed Window w/ Thermal Break, Triple Glazed, 24 sf, 1st Fl										
Repair Al. Fixed Window w/ Thermal Break, Triple Glazed, 24 sf, 1st Floor	Each	Carpenter	Contract	.3300	2.14	0	None	20	Major	No
Replace Al. Fixed Window w/ Thermal Break, Triple Glazed, 24 sf, 1st Floor	Each	Carpenter	Contract	2.5400	680.00	0	None	75	Major	Yes
Aluminum Fixed Window, 12 sf, 1st Floor										
Repair Aluminum Fixed Window, 12 sf, 1st Floor	Each	Carpenter	Contract	.3300	2.60	0	None	20	Major	No
Replace Aluminum Fixed Window, 12 sf, 1st Floor	Each	Carpenter	Contract	2.5400	164.00	0	None	75	Major	Yes
Aluminum Fixed Window, 12 sf, 2nd Floor										
Repair Aluminum Fixed Window, 12 sf, 2nd Floor	Each	Carpenter	Contract	.3300	2.60	0	None	20	Major	No
Replace Aluminum Fixed Window, 12 sf, 2nd Floor	Each	Carpenter	Contract	3.2400	164.00	0	None	75	Major	Yes
Aluminum Fixed Window, 12 sf, 3rd+ Floor										
Repair Aluminum Fixed Window, 12 sf, 3rd+ Floor	Each	Carpenter	Contract	.3300	2.60	0	None	20	Major	No
Replace Aluminum Fixed Window, 12 sf, 3rd+ Floor	Each	Carpenter	Contract	3.9400	164.00	0	None	75	Major	Yes
Aluminum Fixed Window, 24 sf, 1st Floor										
Repair Aluminum Fixed Window, 24 sf, 1st Floor	Each	Carpenter	Contract	.3300	2.60	0	None	20	Major	No
Replace Aluminum Fixed Window, 24 sf, 1st Floor	Each	Carpenter	Contract	2.5400	328.00	0	None	75	Major	Yes
Aluminum Fixed Window, 24 sf, 2nd Floor										
Repair Aluminum Fixed Window, 24 sf, 2nd Floor	Each	Carpenter	Contract	.3300	2.60	0	None	20	Major	No
Replace Aluminum Fixed Window, 24 sf, 2nd Floor	Each	Carpenter	Contract	3.2400	328.00	0	None	75	Major	Yes
Aluminum Fixed Window, 24 sf, 3rd+ Floor										
Repair Aluminum Fixed Window, 24 sf, 3rd+ Floor	Each	Carpenter	Contract	.3300	2.60	0	None	20	Major	No
Replace Aluminum Fixed Window, 24 sf, 3rd+ Floor	Each	Carpenter	Contract	3.9400	328.00	0	None	75	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
B2020 Exterior Windows										
Aluminum Operable Window, 12 sf, 1st Floor										
Repair Aluminum Operable Window, 12 sf, 1st Floor	Each	Carpenter	Contract	.3300	4.99	0	None	15	Major	No
Replace Aluminum Operable Window, 12 sf, 1st Floor	Each	Carpenter	Contract	2.5400	454.83	0	None	75	Major	Yes
Aluminum Operable Window, 12 sf, 2nd Floor										
Repair Aluminum Operable Window, 12 sf, 2nd Floor	Each	Carpenter	Contract	.3300	4.99	0	None	15	Major	No
Replace Aluminum Operable Window, 12 sf, 2nd Floor	Each	Carpenter	Contract	3.2400	454.83	0	None	75	Major	Yes
Aluminum Operable Window, 12 sf, 3rd+ Floor										
Repair Aluminum Operable Window, 12 sf, 3rd+ Floor	Each	Carpenter	Contract	.3300	4.99	0	None	15	Major	No
Replace Aluminum Operable Window, 12 sf, 3rd+ Floor	Each	Carpenter	Contract	3.9400	454.83	0	None	75	Major	Yes
Aluminum Operable Window, 24 sf, 1st Floor										
Repair Aluminum Operable Window, 24 sf, 1st Floor	Each	Carpenter	Contract	.3300	4.99	0	None	15	Major	No
Replace Aluminum Operable Window, 24 sf, 1st Floor	Each	Carpenter	Contract	2.5400	909.66	0	None	75	Major	Yes
Aluminum Operable Window, 24 sf, 2nd Floor										
Repair Aluminum Operable Window, 24 sf, 2nd Floor	Each	Carpenter	Contract	.3300	4.99	0	None	15	Major	No
Replace Aluminum Operable Window, 24 sf, 2nd Floor	Each	Carpenter	Contract	3.2400	909.66	0	None	75	Major	Yes
Aluminum Operable Window, 24 sf, 3rd+ Floor										
Repair Aluminum Operable Window, 24 sf, 3rd+ Floor	Each	Carpenter	Contract	.3300	4.99	0	None	15	Major	No
Replace Aluminum Operable Window, 24 sf, 3rd+ Floor	Each	Carpenter	Contract	3.9400	909.66	0	None	75	Major	Yes
Glass Block Window, 1st Floor										
Repair Glass Block Window, 1st Floor (2% of Glass)	Sq Ft	Carpenter	Contract	.0035	.39	0	None	10	Major	No
Replace Glass Block Window, 1st Floor	Sq Ft	Carpenter	Contract	.1772	19.69	0	None	75	Major	Yes
Glass Block Window, 2nd Floor										
Repair Glass Block Window, 2nd Floor (2% of Glass)	Sq Ft	Carpenter	Contract	.0040	.39	0	None	10	Major	No
Replace Glass Block Window, 2nd Floor	Sq Ft	Carpenter	Contract	.1998	19.69	0	None	75	Major	Yes
Glass Block Window, 3rd+ Floor										
Repair Glass Block Window, 3rd+ Floor (2% of Glass)	Sq Ft	Carpenter	Contract	.0042	.39	0	None	10	Major	No
Replace Glass Block Window, 3rd+ Floor	Sq Ft	Carpenter	Contract	.2108	19.69	0	None	75	Major	Yes
Steel Frame, Painted, Operable Window, 12 sf, 1st Floor										
Refinish Steel Frame, Painted, Operable Window, 12 sf, 1st Floor	Each	Painter	Contract	.3400	1.80	0	None	10	Major	No
Repair Steel Frame, Painted, Operable Window, 12 sf, 1st Floor	Each	Carpenter	Contract	.3300	2.60	0	None	20	Major	No
Replace Steel Frame, Painted, Operable Window, 12 sf, 1st Floor	Each	Carpenter	Contract	2.5400	1,096.99	0	None	75	Major	Yes
Finish Replaced Steel Frame, Painted, Operable Window, 12 sf, 1st Floor	Each	Painter	Contract	.3400	1.80	0	None	75	Major	No

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
B2020 Exterior Windows										
Steel Frame, Painted, Operable Window, 12 sf, 2nd Floor										
Refinish Steel Frame, Painted, Operable Window, 12 sf, 2nd Floor	Each	Painter	Contract	.4600	1.80	0	None	10	Major	No
Repair Steel Frame, Painted, Operable Window, 12 sf, 2nd Floor	Each	Carpenter	Contract	.3300	2.60	0	None	20	Major	No
Replace Steel Frame, Painted, Operable Window, 12 sf, 2nd Floor	Each	Carpenter	Contract	3.2400	1,096.99	0	None	75	Major	Yes
Finish Replaced Steel Frame, Painted, Operable Window, 12 sf, 2nd Floor	Each	Painter	Contract	.4600	1.80	0	None	75	Major	No
Steel Frame, Painted, Operable Window, 12 sf, 3rd+ Floor										
Refinish Steel Frame, Painted, Operable Window, 12 sf, 3rd+ Floor	Each	Painter	Contract	.4800	1.80	0	None	10	Major	No
Repair Steel Frame, Painted, Operable Window, 12 sf, 3rd+ Floor	Each	Carpenter	Contract	.3300	2.60	0	None	20	Major	No
Replace Steel Frame, Painted, Operable Window, 12 sf, 3rd+ Floor	Each	Carpenter	Contract	3.9400	1,096.99	0	None	75	Major	Yes
Finish Replaced Steel Frame, Painted, Operable Window, 12 sf, 3rd+ Floor	Each	Painter	Contract	.4800	1.80	0	None	75	Major	No
Steel Frame, Painted, Operable Window, 24 sf, 1st Floor										
Refinish Steel Frame, Painted, Operable Window, 24 sf, 1st Floor	Each	Painter	Contract	.6800	3.60	0	None	10	Major	No
Repair Steel Frame, Painted, Operable Window, 24 sf, 1st Floor	Each	Carpenter	Contract	.3300	2.60	0	None	20	Major	No
Replace Steel Frame, Painted, Operable Window, 24 sf, 1st Floor	Each	Carpenter	Contract	2.5400	2,193.98	0	None	75	Major	Yes
Finish Replaced Steel Frame, Painted, Operable Window, 24 sf, 1st Floor	Each	Painter	Contract	.6800	3.60	0	None	75	Major	No
Steel Frame, Painted, Operable Window, 24 sf, 2nd Floor										
Refinish Steel Frame, Painted, Operable Window, 24 sf, 2nd Floor	Each	Painter	Contract	.9200	3.60	0	None	10	Major	No
Repair Steel Frame, Painted, Operable Window, 24 sf, 2nd Floor	Each	Carpenter	Contract	.3300	2.60	0	None	20	Major	No
Replace Steel Frame, Painted, Operable Window, 24 sf, 2nd Floor	Each	Carpenter	Contract	2.5400	2,193.98	0	None	75	Major	Yes
Finish Replaced Steel Frame, Painted, Operable Window, 24 sf, 2nd Floor	Each	Painter	Contract	.9200	3.60	0	None	75	Major	No
Steel Frame, Painted, Operable Window, 24 sf, 3rd+ Floor										
Refinish Steel Frame, Painted, Operable Window, 24 sf, 3rd+ Floor	Each	Painter	Contract	.9600	3.60	0	None	10	Major	No
Repair Steel Frame, Painted, Operable Window, 24 sf, 3rd+ Floor	Each	Carpenter	Contract	.3300	2.60	0	None	20	Major	No
Replace Steel Frame, Painted, Operable Window, 24 sf, 3rd+ Floor	Each	Carpenter	Contract	2.5400	2,193.98	0	None	75	Major	Yes
Finish Replaced Steel Frame, Painted, Operable Window, 24 sf, 3rd+ Floor	Each	Painter	Contract	.9600	3.60	0	None	75	Major	No
Wood Frame Fixed Window, 12 sf, 1st Floor										
Refinish Wood Frame Fixed Window, 12 sf, 1st Floor	Each	Painter	Contract	.3400	1.80	0	None	7	Major	No
Repair Wood Frame Fixed Window, 12 sf, 1st Floor	Each	Carpenter	Contract	.3300	2.60	0	None	20	Major	No
Replace Wood Frame Fixed Window, 12 sf, 1st Floor	Each	Carpenter	Contract	2.5400	311.24	0	None	40	Major	Yes
Wood Frame Fixed Window, 12 sf, 2nd Floor										
Refinish Wood Frame Fixed Window, 12 sf, 2nd Floor	Each	Painter	Contract	.4600	1.80	0	None	7	Major	No
Repair Wood Frame Fixed Window, 12 sf, 2nd Floor	Each	Carpenter	Contract	.3300	2.60	0	None	20	Major	No
Replace Wood Frame Fixed Window, 12 sf, 2nd Floor	Each	Carpenter	Contract	3.2400	311.24	0	None	40	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
B2020 Exterior Windows										
Wood Frame Fixed Window, 12 sf, 3rd+ Floor										
Refinish Wood Frame Fixed Window, 12 sf, 3rd+ Floor	Each	Painter	Contract	.4800	1.80	0	None	7	Major	No
Repair Wood Frame Fixed Window, 12 sf, 3rd+ Floor	Each	Carpenter	Contract	.3300	2.60	0	None	20	Major	No
Replace Wood Frame Fixed Window, 12 sf, 3rd+ Floor	Each	Carpenter	Contract	3.9400	311.24	0	None	40	Major	Yes
Wood Frame Operable Window, 12 sf, 1st Floor										
Refinish Wood Frame Operable Window, 12 sf, 1st Floor	Each	Painter	Contract	.3400	1.80	0	None	7	Major	No
Repair Wood Frame Operable Window, 12 sf, 1st Floor	Each	Carpenter	Contract	.3300	2.60	0	None	15	Major	No
Replace Wood Frame Operable Window, 12 sf, 1st Floor	Each	Carpenter	Contract	2.5400	213.12	0	None	40	Major	Yes
Wood Frame Operable Window, 12 sf, 2nd Floor										
Refinish Wood Frame Operable Window, 12 sf, 2nd Floor	Each	Painter	Contract	.4600	1.80	0	None	7	Major	No
Repair Wood Frame Operable Window, 12 sf, 2nd Floor	Each	Carpenter	Contract	.3300	2.60	0	None	15	Major	No
Replace Wood Frame Operable Window, 12 sf, 2nd Floor	Each	Carpenter	Contract	3.2400	213.12	0	None	40	Major	Yes
Wood Frame Operable Window, 12 sf, 3rd+ Floor										
Refinish Wood Frame Operable Window, 12 sf, 3rd+ Floor	Each	Painter	Contract	.4800	1.80	0	None	7	Major	No
Repair Wood Frame Operable Window, 12 sf, 3rd+ Floor	Each	Carpenter	Contract	.3300	2.60	0	None	15	Major	No
Replace Wood Frame Operable Window, 12 sf, 3rd+ Floor	Each	Carpenter	Contract	3.9400	213.12	0	None	40	Major	Yes
Glass Curtain Wall										
Minor Repair, Glass Curtain Wall (2% of Walls)	Sq Ft	Carpenter	Contract	.0015	.67	0	None	5	Major	No
Replace Glass Curtain Wall	Sq Ft	Carpenter	Contract	.0762	33.48	0	None	30	Major	Yes
B2030 Exterior Doors										
Aluminum & Glass Revolving Door										
Maintain Aluminum & Glass Revolving Door	Each	Gen Maint Worker	Staff	1.0000	.00	0	None	1	PM	No
Replace Aluminum & Glass Revolving Door	Each	Carpenter	Contract	50.0000	22,380.32	0	None	30	Major	Yes
Aluminum Single 12'x12', Painted, Roll-up Door										
Repair Aluminum Single 12'x12', Painted, Roll-up Door	Each	Carpenter	Contract	.7900	442.04	0	None	10	Major	No
Refinish Aluminum Single 12'x12', Painted, Roll-up Door	Each	Painter	Contract	1.6400	36.16	0	None	10	Major	No
Replace Aluminum Single 12'x12', Painted, Roll-up Door	Each	Carpenter	Contract	4.3400	2,146.97	0	None	35	Major	Yes
Finish Replaced Aluminum Single 12'x12', Painted, Roll-up Door	Each	Painter	Contract	1.6400	36.16	0	None	35	Major	No
Aluminum Double 12'x24', Painted, Roll-up Door										
Repair Aluminum Double 12'x24', Painted, Roll-up Door	Each	Carpenter	Contract	.7900	492.24	0	None	10	Major	No
Refinish Aluminum Double 12'x24', Painted, Roll-up Door	Each	Painter	Contract	3.3800	72.33	0	None	10	Major	No
Replace Aluminum Double 12'x24', Painted, Roll-up Door	Each	Carpenter	Contract	7.5200	4,293.95	0	None	35	Major	Yes
Finish Replaced Aluminum Double 12'x24', Painted, Roll-up Door	Each	Painter	Contract	3.3800	72.33	0	None	35	Major	No

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
B2030 Exterior Doors										
Aluminum Frame, Fully Glazed, Exterior Door										
Maintain Aluminum Frame, Fully Glazed, Exterior Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Aluminum Frame, Fully Glazed, Exterior Door Locks	Each	Maint Worker	Contract	.7200	199.72	0	None	10	Major	No
Repair Aluminum Frame, Fully Glazed, Exterior Door	Each	Carpenter	Contract	.8400	92.19	0	None	12	Major	No
Replace Aluminum Frame, Fully Glazed, Exterior Door	Each	Carpenter	Contract	2.1000	824.95	0	None	50	Major	Yes
Aluminum Frame, Fully Glazed, Sliding Exterior Door										
Maintain Aluminum Frame, Fully Glazed, Sliding Exterior Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Aluminum Frame, Fully Glazed, Sliding Exterior Door Locks	Each	Maint Worker	Contract	.7200	199.72	0	None	10	Major	No
Repair Aluminum Frame, Fully Glazed, Sliding Exterior Door	Each	Carpenter	Contract	1.1100	123.00	0	None	12	Major	No
Replace Aluminum Frame, Fully Glazed, Sliding Exterior Door	Each	Carpenter	Contract	5.0600	1,316.48	0	None	50	Major	Yes
Metal Wire Mesh Door										
Maintain Metal Wire Mesh Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Metal Wire Mesh Door Locks	Each	Maint Worker	Contract	.7200	199.72	0	None	10	Major	No
Repair Metal Wire Mesh Door	Each	Carpenter	Contract	.3300	52.70	0	None	15	Major	No
Replace Metal Wire Mesh Door	Each	Carpenter	Contract	4.3900	779.50	0	None	30	Major	Yes
Sliding, Motor-Operated, Exterior Door										
Maintain Sliding, Motor-Operated, Exterior Door	Each	Gen Maint Worker	Staff	1.6600	.00	0	None	1	PM	No
Maintain Sliding, Motor-Operated, Exterior Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Sliding, Motor-Operated, Exterior Door Locks	Each	Maint Worker	Contract	.7200	199.72	0	None	10	Major	No
Replace Sliding, Motor-Operated, Exterior Door	Each	Carpenter	Contract	9.0000	7,300.26	0	None	30	Major	Yes
Steel Single 12'x12', Painted, Roll-up Door										
Repair Steel Single 12'x12', Painted, Roll-up Door	Each	Carpenter	Contract	.7900	442.04	0	None	10	Major	No
Refinish Steel Single 12'x12', Painted, Roll-up Door	Each	Painter	Contract	1.6400	36.16	0	None	10	Major	No
Replace Steel Single 12'x12', Painted, Roll-up Door	Each	Carpenter	Contract	4.3400	1,545.21	0	None	35	Major	Yes
Finish Replaced Steel Single 12'x12', Painted, Roll-up Door	Each	Painter	Contract	1.6400	36.16	0	None	35	Major	No
Steel Single 12'x12', Painted, Roll-up Door, Automatic										
Maintain Steel Single 12'x12', Painted, Roll-up Door, Automatic	Each	Gen Maint Worker	Staff	1.5100	.00	0	None	1	PM	No
Repair Steel Single 12'x12', Painted, Roll-up Door, Automatic	Each	Staff Carpenter	Staff	.7900	442.04	0	None	10	Major	No
Refinish Steel Single 12'x12', Painted, Roll-up Door, Automatic	Each	Staff Painter	Staff	1.6400	36.16	0	None	10	Major	No
Replace Steel Single 12'x12', Painted, Roll-up Door, Automatic	Each	Staff Carpenter	Staff	6.3400	2,044.21	0	None	35	Major	Yes
Finish Replaced Steel Single 12'x12', Painted, Roll-up Door, Automatic	Each	Staff Painter	Staff	1.6400	36.16	0	None	35	Major	No

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
B2030 Exterior Doors										
Steel Double 12'x24', Painted, Roll-up Door										
Repair Steel Double 12'x24', Painted, Roll-up Door	Each	Carpenter	Contract	.7900	492.24	0	None	10	Major	No
Refinish Steel Double 12'x24', Painted, Roll-up Door	Each	Painter	Contract	3.3800	72.33	0	None	10	Major	No
Replace Steel Double 12'x24', Painted, Roll-up Door	Each	Carpenter	Contract	7.5200	3,090.41	0	None	35	Major	Yes
Finish Replaced Steel Double 12'x24', Painted, Roll-up Door	Each	Painter	Contract	3.3800	72.33	0	None	35	Major	No
Steel 20'x20', Painted, Roll-up Door										
Repair Steel 20'x20', Painted, Roll-up Door	Each	Carpenter	Contract	.7900	542.44	0	None	10	Major	No
Refinish Steel 20'x20', Painted, Roll-up Door	Each	Painter	Contract	2.1800	100.46	0	None	10	Major	No
Replace Steel 20'x20', Painted, Roll-up Door	Each	Carpenter	Contract	4.3400	5,448.52	0	None	35	Major	Yes
Finish Replaced Steel 20'x20', Painted, Roll-up Door	Each	Painter	Contract	2.1800	100.46	0	None	35	Major	No
Steel, Exterior Door										
Maintain Steel, Exterior Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Steel, Exterior Door Locks	Each	Maint Worker	Contract	.7200	199.72	0	None	10	Major	No
Repair Steel, Exterior Door	Each	Carpenter	Contract	.8400	92.19	0	None	15	Major	No
Replace Steel, Exterior Door	Each	Carpenter	Contract	2.1000	688.95	0	None	75	Major	Yes
Steel, Painted, Exterior Door										
Maintain Steel, Painted, Exterior Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Steel, Painted, Exterior Door Locks	Each	Maint Worker	Contract	.7200	199.72	0	None	10	Major	No
Refinish Steel, Painted, Exterior Door	Each	Painter	Contract	.3300	5.27	0	None	10	Major	No
Repair Steel, Painted, Exterior Door	Each	Carpenter	Contract	.8400	92.19	0	None	15	Major	No
Replace Steel, Painted, Exterior Door	Each	Carpenter	Contract	2.1000	688.95	0	None	75	Major	Yes
Finish Replaced Steel, Painted, Exterior Door	Each	Painter	Contract	.3300	5.27	0	None	75	Major	No
Steel, Painted, Exterior Double Door										
Maintain Steel, Painted, Exterior Double Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Steel, Painted, Exterior Double Door Locks	Each	Maint Worker	Contract	.7200	199.72	0	None	10	Major	No
Refinish Steel, Painted, Exterior Double Door	Each	Painter	Contract	.6400	5.27	0	None	10	Major	No
Repair Steel, Painted, Exterior Double Door	Each	Carpenter	Contract	1.6800	184.38	0	None	15	Major	No
Replace Steel, Painted, Exterior Double Door	Each	Carpenter	Contract	4.2000	1,220.45	0	None	75	Major	Yes
Finish Replaced Steel, Painted, Exterior Double Door	Each	Painter	Contract	.6400	5.27	0	None	75	Major	No

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
B2030 Exterior Doors										
Steel w/ Safety Glass, Painted, Exterior Door										
Maintain Steel w/ Safety Glass, Painted, Exterior Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Steel w/ Safety Glass, Painted, Exterior Door Locks	Each	Maint Worker	Contract	.7200	199.72	0	None	10	Major	No
Refinish Steel w/ Safety Glass, Painted, Exterior Door	Each	Painter	Contract	.3300	5.27	0	None	10	Major	No
Repair Steel w/ Safety Glass, Painted, Exterior Door	Each	Carpenter	Contract	.8400	92.19	0	None	15	Major	No
Replace Steel w/ Safety Glass, Painted, Exterior Door	Each	Carpenter	Contract	2.1000	773.99	0	None	75	Major	Yes
Finish Replaced Steel w/ Safety Glass, Painted, Exterior Door	Each	Painter	Contract	.3300	5.27	0	None	75	Major	No
Swinging Doors, Motor-Operated, Metal										
Maintain Swinging Doors, Motor-Operated, Metal	Each	Gen Maint Worker	Staff	8.0000	.00	0	None	1	PM	No
Replace Swinging Doors, Motor-Operated, Metal	Each	Carpenter	Contract	8.0000	6,588.80	0	None	30	Major	Yes
Wood, Solid Core, Fully Glazed, Exterior Door										
Maintain Wood, Solid Core, Fully Glazed, Exterior Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Wood, Solid Core, Fully Glazed, Exterior Door Locks	Each	Maint Worker	Contract	.7200	199.72	0	None	10	Major	No
Repair Wood, Solid Core, Fully Glazed, Exterior Door	Each	Carpenter	Contract	.8400	92.19	0	None	10	Major	No
Replace Wood, Solid Core, Fully Glazed, Exterior Door	Each	Carpenter	Contract	2.1000	1,091.95	0	None	40	Major	Yes
Wood, Solid Core, Painted, Exterior Door										
Maintain Wood, Solid Core, Painted, Exterior Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Refinish Wood, Solid Core, Painted, Exterior Door	Each	Painter	Contract	.3300	5.27	0	None	7	Major	No
Replace Wood, Solid Core, Painted, Exterior Door Locks	Each	Maint Worker	Contract	.7200	199.72	0	None	10	Major	No
Repair Wood, Solid Core, Painted, Exterior Door	Each	Carpenter	Contract	.8400	92.19	0	None	10	Major	No
Replace Wood, Solid Core, Painted, Exterior Door	Each	Carpenter	Contract	2.1000	826.95	0	None	40	Major	Yes
Finish Replaced Wood, Solid Core, Painted, Exterior Door	Each	Painter	Contract	.3300	5.27	0	None	40	Major	No
Wrought Iron, Painted, Gate										
Maintain Wrought Iron, Painted, Gate Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Wrought Iron, Painted, Gate Locks	Each	Maint Worker	Contract	.7200	199.72	0	None	10	Major	No
Refinish Wrought Iron, Painted, Gate	Each	Painter	Contract	.3300	2.19	0	None	10	Major	No
Repair Wrought Iron, Painted, Gate	Each	Carpenter	Contract	.9500	36.79	0	None	15	Major	No
Replace Wrought Iron, Painted, Gate	Each	Carpenter	Contract	1.5800	449.00	0	None	45	Major	Yes
Finish Replaced Wrought Iron, Painted, Gate	Each	Painter	Contract	.3300	2.19	0	None	45	Major	No

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
B30 Roofing										
B3010 Roof Coverings										
Aluminum Gutter, Downspouts, Fittings										
Maintain Aluminum Gutter, Downspouts, Fittings	K Ln Ft	Gen Maint Worker	Staff	4.8260	2.99	0	None	1	PM	No
Replace Aluminum Gutter, Downspouts, Fittings	K Ln Ft	Carpenter	Contract	65.1400	1,716.00	0	None	20	Major	Yes
Asphalt Shingle Roof										
Maintain Asphalt Shingle Roof	Sq Ft	Gen Maint Worker	Staff	.0016	.00	0	None	1	PM	No
Minor Replacement, Asphalt Shingle Roof (2% of Roof)	Sq Ft	Roofer	Contract	.0005	.06	0	None	5	Major	No
Place New Shingles Over Existing, Asphalt Shingle Roof	Sq Ft	Roofer	Contract	.0140	2.65	0	None	20	Major	No
Replace Asphalt Shingle Roof	Sq Ft	Roofer	Contract	.0245	2.91	0	None	40	Major	Yes
Built-up Roof										
Maintain Built-up Roof	Sq Ft	Gen Maint Worker	Staff	.0006	.00	0	None	1	PM	No
Non-Destructive Moisture Inspection, Built-up Roof	Sq Ft	Roofer	Contract	.0011	.00	0	None	5	Major	No
Place New Membrane Over Existing, Built-up Roof	Sq Ft	Roofer	Contract	.0524	1.85	0	None	15	Major	No
Replace Membrane, Built-up Roof	Sq Ft	Roofer	Contract	.0942	3.05	0	None	30	Major	Yes
Built-up Roof w/ Cool Reflective Coating										
Maintain Built-up Roof w/ Cool Reflective Coating	Sq Ft	Gen Maint Worker	Staff	.0006	.00	0	None	1	PM	No
Non-Destructive Moisture Inspection, Built-up Roof w/ Cool Reflective Coating	Sq Ft	Roofer	Contract	.0011	.00	0	None	5	Major	No
Place New Membrane Over Existing, Built-up Roof w/ Cool Reflective Coating	Sq Ft	Roofer	Contract	.0766	2.60	0	None	15	Major	No
Replace Membrane, Built-up Roof w/ Cool Reflective Coating	Sq Ft	Roofer	Contract	.1184	3.80	0	None	35	Major	Yes
Clay Tile Roof										
Maintain Clay Tile Roof	Sq Ft	Gen Maint Worker	Staff	.0016	.00	0	None	1	PM	No
Minor Replacement, Clay Tile Roof (2% of Roof)	Sq Ft	Roofer	Contract	.0014	.14	0	None	20	Major	No
Replace Clay Tile Roof	Sq Ft	Roofer	Contract	.0711	6.86	0	None	70	Major	Yes
Concrete Roof										
Clean & Seal Concrete Roof	Sq Ft	Staff Painter	Staff	.0179	.09	0	None	6	PM	No
Repair Concrete Roof	Sq Ft	Roofer	Contract	.0016	.06	0	None	25	Major	No
Replace Concrete Roof	Sq Ft	Roofer	Contract	.2087	4.78	0	None	50	Major	Yes
Fabric Awning										
Replace Fabric Awning	Sq Ft	Carpenter	Contract	.0430	2.88	0	None	10	Major	Yes
Fabric Awning, 24 sf										
Replace Fabric Awning, 24 sf	Each	Carpenter	Contract	1.0400	69.23	0	None	10	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
B3010 Roof Coverings										
Fabric Awning, 32 sf										
Replace Fabric Awning, 32 sf	Each	Carpenter	Contract	1.3800	92.30	0	None	10	Major	Yes
Fiberglass Dome Roof										
Maintain Fiberglass Dome Roof	Sq Ft	Gen Maint Worker	Staff	.0016	.00	0	None	5	PM	No
Replace Fiberglass Roof	Sq Ft	Roofer	Contract	.0357	2.10	0	None	20	Major	Yes
Green Roof with Growing Medium, Hot Applied Rubberized Asphalt Roof										
Maintain Green Roof w/ Growing Medium, Hot Applied Rubberized Asphalt	Sq Ft	Gen Maint Worker	Staff	.0009	.00	0	None	1	PM	No
Non-Destructive Moisture Inspection	Sq Ft	Roofer	Contract	.0022	.00	0	None	5	Major	No
Repair Green Roof w/ Growing Medium, Hot Applied Rubberized Asphalt	Sq Ft	Roofer	Contract	.0014	2.25	0	None	10	Major	No
Replace Membrane, Roof w/ Growing Medium, Hot Applied Rubberized Asphalt	Sq Ft	Roofer	Contract	.0816	6.15	0	None	20	Major	Yes
Metal Awning										
Refinish Metal Awning	Sq Ft	Painter	Contract	.0201	.43	0	None	10	Major	No
Repair Metal Awning	Sq Ft	Carpenter	Contract	.0287	.09	0	None	20	Major	No
Replace Metal Awning	Sq Ft	Carpenter	Contract	.0850	4.60	0	None	30	Major	Yes
Metal Awning, 24 sf										
Refinish Metal Awning, 24 sf	Each	Painter	Contract	.4800	10.33	0	None	10	Major	No
Repair Metal Awning, 24 sf	Each	Carpenter	Contract	.6900	2.21	0	None	20	Major	No
Replace Metal Awning, 24 sf	Each	Carpenter	Contract	2.0400	110.33	0	None	30	Major	Yes
Metal Awning, 32 sf										
Refinish Metal Awning, 32 sf	Each	Painter	Contract	.6500	13.78	0	None	10	Major	No
Repair Metal Awning, 32 sf	Each	Carpenter	Contract	.9200	2.94	0	None	20	Major	No
Replace Metal Awning, 32 sf	Each	Carpenter	Contract	2.7200	147.10	0	None	30	Major	Yes
Metal Roof										
Maintain Metal Roof	Sq Ft	Gen Maint Worker	Staff	.0016	.00	0	None	1	PM	No
Repair Metal Roof	Sq Ft	Roofer	Contract	.0030	.03	0	None	5	Major	No
Minor Replacement, Metal Roof (2% of Roof)	Sq Ft	Roofer	Contract	.0018	.08	0	None	20	Major	No
Replace Metal Roof	Sq Ft	Roofer	Contract	.0883	4.10	0	None	40	Major	Yes
Single-Ply Modified Bituminous/Thermoplastic Roof										
Maintain Single-Ply Modified Bituminous/Thermoplastic Roof	Sq Ft	Gen Maint Worker	Staff	.0008	.03	0	None	1	PM	No
Non-Destructive Moisture Inspection	Sq Ft	Roofer	Contract	.0022	.00	0	None	5	Major	No
Repair Single-Ply Modified Bituminous/Thermoplastic Roof	Sq Ft	Roofer	Contract	.0013	2.18	0	None	10	Major	No
Replace Membrane, Single-Ply Modified Bituminous/Thermoplastic Roof	Sq Ft	Roofer	Contract	.0773	2.65	0	None	20	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
B3010 Roof Coverings										
Single-Ply Thermoset Roof										
Maintain Single-Ply Thermoset Roof	Sq Ft	Gen Maint Worker	Staff	.0008	.03	0	None	1	PM	No
Non-Destructive Moisture Inspection	Sq Ft	Roofer	Contract	.0022	.00	0	None	5	Major	No
Minor Replacement, Single-Ply Thermoset Roof (2% of Roof)	Sq Ft	Roofer	Contract	.0017	.07	0	None	10	Major	No
Replace Membrane, Single-Ply Thermoset Roof	Sq Ft	Roofer	Contract	.0851	3.30	0	None	20	Major	Yes
Slate Steep Roof										
Maintain Slate Steep Roof	Sq Ft	Gen Maint Worker	Staff	.0016	.00	0	None	1	PM	No
Minor Replacement, Slate Steep Roof (2% of Roof)	Sq Ft	Roofer	Contract	.0009	.10	0	None	20	Major	No
Replace Slate Steep Roof	Sq Ft	Roofer	Contract	.0458	5.06	0	None	70	Major	Yes
B3020 Roof Openings										
Roof Hatch, Aluminum										
Maintain Roof Hatch, Aluminum	Each	Staff Carpenter	Staff	1.0000	.00	0	None	1	PM	No
Replace Roof Hatch, Aluminum	Each	Roofer	Contract	3.2000	714.00	0	None	50	Major	Yes
Roof Skylight, 20 sf										
Repair Roof Skylight, 20 sf	Each	Carpenter	Contract	.5700	269.59	0	None	6	Major	No
Replace Roof Skylight, 20 sf	Each	Carpenter	Contract	3.5100	425.80	0	None	40	Major	Yes
Single Unit Glass Skylight										
Repair Unit Glass Skylight Glazing	Sq Ft	Carpenter	Contract	.0277	13.48	0	None	6	Major	No
Replace Unit Glass Skylight and Structure	Sq Ft	Carpenter	Contract	.1760	21.29	0	None	40	Major	Yes
C10 Interior Construction										
C1010 Partitions										
Movable Partitions, Office, Fabric, 6'										
Replace Movable Partitions, Office, Fabric, 6'	Ln Ft	Carpenter	Contract	.1694	7.77	0	None	25	Major	Yes
Toilet Partitions, Painted Metal, Overhead Braced										
Refinish Toilet Partitions, Painted Metal, Overhead Braced	Each	Painter	Contract	.3300	5.27	0	None	4	Major	No
Replace Toilet Partitions, Painted Metal, Overhead Braced	Each	Carpenter	Contract	1.7000	519.50	0	None	20	Major	Yes
C1020 Interior Doors										
Aluminum, Interior Door										
Maintain Aluminum, Interior Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Aluminum, Interior Door Locks	Each	Maint Worker	Contract	.5000	199.72	0	None	10	Major	No
Replace Aluminum, Interior Door	Each	Carpenter	Contract	2.1000	1,268.95	0	None	50	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
C1020 Interior Doors										
Aluminum, Fully Glazed, Interior Door										
Maintain Aluminum, Fully Glazed, Interior Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Aluminum, Fully Glazed, Interior Door Locks	Each	Maint Worker	Contract	.5000	199.72	0	None	10	Major	No
Replace Aluminum, Fully Glazed, Interior Door	Each	Carpenter	Contract	2.1000	824.95	0	None	50	Major	Yes
Aluminum, w/ Safety Glass, Plain or Anodized, Interior Door										
Maintain Aluminum, w/ Safety Glass, Plain or Anodized, Interior Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Aluminum, w/ Safety Glass, Plain or Anodized, Interior Door Locks	Each	Maint Worker	Contract	.5000	199.72	0	None	10	Major	No
Replace Aluminum, w/ Safety Glass, Plain or Anodized, Interior Door	Each	Carpenter	Contract	2.1000	1,374.43	0	None	50	Major	Yes
Bi-Fold, Painted, Interior Door										
Refinish Bi-Fold, Painted, Interior Door	Each	Painter	Contract	.3300	5.27	0	None	4	Major	No
Maintain Bi-Fold, Painted, Interior Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Bi-Fold, Painted, Interior Door Locks	Each	Maint Worker	Contract	.5000	199.72	0	None	10	Major	No
Replace Bi-Fold, Painted, Interior Door	Each	Carpenter	Contract	3.5600	320.63	0	None	25	Major	Yes
Finish Replaced Bi-Fold, Painted, Interior Door	Each	Painter	Contract	.3300	5.27	0	None	25	Major	No
Steel, Interior Door										
Maintain Steel, Interior Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Steel, Interior Door Locks	Each	Maint Worker	Contract	.5000	199.72	0	None	10	Major	No
Replace Steel, Interior Door	Each	Carpenter	Contract	2.1000	688.95	0	None	75	Major	Yes
Steel, Painted, Interior Door										
Refinish Steel, Painted, Interior Door	Each	Painter	Contract	.3300	5.27	0	None	4	Major	No
Maintain Steel, Painted, Interior Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Steel, Painted, Interior Door Locks	Each	Maint Worker	Contract	.5000	199.72	0	None	10	Major	No
Replace Steel, Painted, Interior Door	Each	Carpenter	Contract	2.1000	688.95	0	None	75	Major	Yes
Finish Replaced Steel, Painted, Interior Door	Each	Painter	Contract	.3300	5.27	0	None	75	Major	No
Steel, Painted, Interior Double Door										
Refinish Steel, Painted, Interior Double Door	Each	Painter	Contract	.6400	10.55	0	None	4	Major	No
Maintain Steel, Painted, Interior Double Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Steel, Painted, Interior Double Door Locks	Each	Maint Worker	Contract	.5000	199.72	0	None	10	Major	No
Replace Steel, Painted, Interior Double Door	Each	Carpenter	Contract	4.2000	1,220.45	0	None	75	Major	Yes
Finish Replaced Steel, Painted, Interior Double Doors	Each	Painter	Contract	.6400	10.55	0	None	75	Major	No

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
C1020 Interior Doors										
Steel, Painted, w/ Safety Glass, Interior Door										
Refinish Steel, Painted, w/ Safety Glass Interior Door	Each	Painter	Contract	.3300	5.27	0	None	4	Major	No
Maintain Steel, Painted, w/ Safety Glass Interior Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Steel, Painted, w/ Safety Glass Interior Door Locks	Each	Maint Worker	Contract	.5000	199.72	0	None	10	Major	No
Replace Steel, Painted, w/ Safety Glass Interior Door	Each	Carpenter	Contract	2.1000	773.99	0	None	75	Major	Yes
Finish Replaced Steel, Painted, w/ Safety Glass Interior Door	Each	Painter	Contract	.3300	5.27	0	None	75	Major	No
Wood, Painted, Fully Glazed, Interior Door										
Refinish Wood, Painted, Fully Glazed, Interior Door	Each	Painter	Contract	.3300	5.27	0	None	4	Major	No
Maintain Wood, Painted, Fully Glazed, Interior Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Wood, Painted, Fully Glazed, Interior Door Locks	Each	Maint Worker	Contract	.5000	199.72	0	None	10	Major	No
Replace Wood, Painted, Fully Glazed, Interior Door	Each	Carpenter	Contract	2.1000	1,091.95	0	None	50	Major	Yes
Finish Replaced Wood, Painted, Fully Glazed, Interior Door	Each	Painter	Contract	.3300	5.27	0	None	50	Major	No
Wood, Painted, Fully Glazed, Sliding Interior Door										
Refinish Wood, Painted, Fully Glazed, Sliding Interior Door	Each	Painter	Contract	.6400	10.55	0	None	4	Major	No
Maintain Wood, Painted, Fully Glazed, Sliding Interior Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Wood, Painted, Fully Glazed, Sliding Interior Door Locks	Each	Maint Worker	Contract	.5000	199.72	0	None	10	Major	No
Replace Wood, Painted, Fully Glazed, Sliding Interior Door	Each	Carpenter	Contract	5.0600	1,741.14	0	None	40	Major	Yes
Finish Replaced Wood, Painted, Fully Glazed, Sliding Interior Door	Each	Painter	Contract	.6400	10.55	0	None	40	Major	No
Wood, Lead-Lined Medical Interior Door										
Maintain Wood, Lead-Lined Medical Interior Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Repair Wood, Lead-Lined Medical Interior Door	Each	Carpenter	Contract	.3300	120.83	0	None	9	Major	No
Replace Wood, Lead-Lined Medical Interior Door Locks	Each	Maint Worker	Contract	.5000	199.72	0	None	10	Major	No
Replace Wood, Lead-Lined Medical Interior Door	Each	Carpenter	Contract	2.1000	948.84	0	None	80	Major	Yes
Wood, Hollow Core, Painted, Interior Door										
Refinish Wood, Hollow Core, Painted, Interior Door	Each	Painter	Contract	.3300	5.27	0	None	4	Major	No
Maintain Wood, Hollow Core, Painted, Interior Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Wood, Hollow Core, Painted, Interior Door Locks	Each	Maint Worker	Contract	.5000	199.72	0	None	10	Major	No
Replace Wood, Hollow Core, Painted, Interior Door	Each	Carpenter	Contract	1.7200	306.58	0	None	30	Major	Yes
Finish Replaced Wood, Hollow Core, Painted, Interior Door	Each	Painter	Contract	.3300	5.27	0	None	30	Major	No

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
C1020 Interior Doors										
Wood, Hollow Core, Painted, Sliding Interior Door										
Refinish Wood, Hollow Core, Painted, Sliding Interior Door	Each	Painter	Contract	.6400	10.55	0	None	4	Major	No
Maintain Wood, Hollow Core, Painted, Sliding Interior Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Wood, Hollow Core, Painted, Sliding Interior Door Locks	Each	Maint Worker	Contract	.5000	199.72	0	None	10	Major	No
Replace Wood, Hollow Core, Painted, Sliding Interior Door	Each	Carpenter	Contract	5.0600	545.60	0	None	40	Major	Yes
Finish Replaced Wood, Hollow Core, Painted, Sliding Interior Door	Each	Painter	Contract	.6400	10.55	0	None	40	Major	No
Wood, Solid Core, Painted, Interior Door										
Refinish Wood, Solid Core, Painted, Interior Door	Each	Painter	Contract	.3300	5.27	0	None	4	Major	No
Maintain Wood, Solid Core, Painted, Interior Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Wood, Solid Core, Painted, Interior Door Locks	Each	Maint Worker	Contract	.5000	199.72	0	None	10	Major	No
Replace Wood, Solid Core, Painted, Interior Door	Each	Carpenter	Contract	2.1000	826.95	0	None	40	Major	Yes
Finish Replaced Wood, Solid Core, Painted, Interior Door	Each	Painter	Contract	.3300	5.27	0	None	40	Major	No
Wood, Solid Core, Painted, Sliding Interior Door										
Refinish Wood, Solid Core, Painted, Sliding Interior Door	Each	Painter	Contract	.6400	10.55	0	None	4	Major	No
Maintain Wood, Solid Core, Painted, Sliding Interior Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Wood, Solid Core, Painted, Sliding Interior Door Locks	Each	Maint Worker	Contract	.5000	199.72	0	None	10	Major	No
Replace Wood, Solid Core, Painted, Sliding Interior Door	Each	Carpenter	Contract	5.0600	1,176.81	0	None	40	Major	Yes
Finish Replaced Wood, Solid Core, Painted, Sliding Interior Door	Each	Painter	Contract	.6400	10.55	0	None	40	Major	No
Wood, Solid Core w/ Safety Glass, Painted, Interior Door										
Refinish Wood, Solid Core w/ Safety Glass, Painted, Interior Door	Each	Painter	Contract	.3300	5.27	0	None	4	Major	No
Maintain Wood, Solid Core w/ Safety Glass, Painted, Interior Door Locks	Each	Gen Maint Worker	Staff	.3300	.00	0	None	5	PM	No
Replace Wood, Solid Core w/ Safety Glass, Painted, Interior Door Locks	Each	Maint Worker	Contract	.5000	199.72	0	None	10	Major	No
Replace Wood, Solid Core w/ Safety Glass, Painted, Interior Door	Each	Carpenter	Contract	2.1000	826.95	0	None	40	Major	Yes
Finish Replaced Wood, Solid Core w/ Safety Glass, Painted, Interior Door	Each	Painter	Contract	.3300	5.27	0	None	40	Major	No
C1030 Fittings										
Protective Chair Rails										
Refinish Protective Chair Rails	Ln Ft	Painter	Contract	.0122	.08	0	None	4	Major	No
Repair Protective Chair Rails	Ln Ft	Carpenter	Contract	.0023	.01	0	None	15	Major	No
Finish Repaired Protective Chair Rails	Ln Ft	Painter	Contract	.0004	.04	0	None	15	Major	No
Wall & Corner Guards										
Replace Wall & Corner Guards	Ln Ft	Carpenter	Contract	.0219	11.56	0	None	4	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
C20 Stairs										
C2010 Stair Construction										
Concrete, Exterior Stairs										
Repair Concrete, Exterior Stairs	Sq Ft	Carpenter	Contract	.0407	.10	0	None	15	Major	No
Replace Concrete, Exterior Stairs	Sq Ft	Carpenter	Contract	.4748	3.67	0	None	50	Major	Yes
Concrete, Interior Stairs										
Repair Concrete, Interior Stairs	Sq Ft	Brick Layer	Contract	.0407	.10	0	None	20	Major	No
Replace Concrete, Interior Stairs	Sq Ft	Brick Layer	Contract	.4748	3.67	0	None	75	Major	Yes
Masonry, Interior Stairs										
Repair Masonry, Interior Stairs	Sq Ft	Brick Layer	Contract	.0075	.03	0	None	25	Major	No
Replace Masonry, Interior Stairs	Sq Ft	Brick Layer	Contract	.3755	5.74	0	None	50	Major	Yes
Masonry, Painted, Interior Stairs										
Refinish Masonry, Painted, Interior Stairs	Sq Ft	Painter	Contract	.0164	.08	0	None	4	Major	No
Repair Masonry, Painted, Interior Stairs	Sq Ft	Brick Layer	Contract	.0075	.03	0	None	25	Major	No
Finish Repaired Masonry, Painted, Interior Stairs	Sq Ft	Painter	Contract	.0005	.00	0	None	25	Major	No
Replace Masonry, Painted, Interior Stairs	Sq Ft	Brick Layer	Contract	.3755	5.74	0	None	50	Major	Yes
Finish Replaced Masonry, Painted, Interior Stairs	Sq Ft	Painter	Contract	.0164	.08	0	None	50	Major	No
Metal, Painted, Exterior Railing										
Refinish Metal, Painted, Exterior Railing	Ln Ft	Carpenter	Contract	.0165	.06	0	None	10	Major	No
Repair Metal, Painted, Exterior Railing	Ln Ft	Carpenter	Contract	.0225	.06	0	None	15	Major	No
Finish Repaired Metal, Painted, Exterior Railing	Ln Ft	Painter	Contract	.0005	.00	0	None	15	Major	No
Replace Metal, Painted, Exterior Railing	Ln Ft	Carpenter	Contract	.1173	23.64	0	None	30	Major	Yes
Finish Replaced Metal, Painted, Exterior Railing	Ln Ft	Painter	Contract	.0165	.06	0	None	30	Major	No
Metal, Painted, Interior Railing										
Refinish Metal, Painted, Interior Railing	Ln Ft	Painter	Contract	.0165	.06	0	None	4	Major	No
Repair Metal, Painted, Interior Railing	Ln Ft	Carpenter	Contract	.0225	.06	0	None	15	Major	No
Finish Repaired Metal, Painted, Interior Railing	Ln Ft	Painter	Contract	.0005	.00	0	None	15	Major	No
Replace Metal, Painted, Interior Railing	Ln Ft	Carpenter	Contract	.1173	13.63	0	None	50	Major	Yes
Finish Replaced Metal, Painted, Interior Railing	Ln Ft	Painter	Contract	.0165	.06	0	None	50	Major	No
Metal, Exterior Stairs										
Repair Metal, Exterior Stairs	Sq Ft	Carpenter	Contract	.0086	35.78	0	None	15	Major	No
Replace Metal, Exterior Stairs	Sq Ft	Carpenter	Contract	.3417	117.08	0	None	50	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
C2010 Stair Construction										
Metal, Painted, Exterior Stairs										
Refinish Metal, Painted, Exterior Stairs	Sq Ft	Painter	Contract	.0165	.06	0	None	10	Major	No
Repair Metal, Painted, Exterior Stairs	Sq Ft	Carpenter	Contract	.0086	1.26	0	None	15	Major	No
Finish Repaired Metal, Painted, Exterior Stairs	Sq Ft	Painter	Contract	.0005	.00	0	None	15	Major	No
Replace Metal, Painted, Exterior Stairs	Sq Ft	Carpenter	Contract	.3417	8.71	0	None	50	Major	Yes
Finish Replaced Metal, Painted, Exterior Stairs	Sq Ft	Painter	Contract	.0165	.06	0	None	50	Major	No
Metal, Painted, Interior Stairs										
Refinish Metal, Painted, Interior Stairs	Sq Ft	Painter	Contract	.0165	.06	0	None	4	Major	No
Repair Metal, Painted, Interior Stairs	Sq Ft	Carpenter	Contract	.0086	1.26	0	None	15	Major	No
Finish Repaired Metal, Painted, Interior Stairs	Sq Ft	Painter	Contract	.0005	.00	0	None	15	Major	No
Replace Metal, Painted, Interior Stairs	Sq Ft	Carpenter	Contract	.3417	8.71	0	None	75	Major	Yes
Finish Replaced Metal, Painted, Interior Stairs	Sq Ft	Painter	Contract	.0165	.06	0	None	75	Major	No
Wood, Interior Railing										
Refinish Wood, Interior Railing	Ln Ft	Painter	Contract	.0122	.06	0	None	4	Major	No
Repair Wood, Interior Railing	Ln Ft	Carpenter	Contract	.0024	.08	0	None	15	Major	No
Finish Repaired Wood, Interior Railing	Ln Ft	Painter	Contract	.0004	.00	0	None	15	Major	No
Replace Wood, Interior Railing	Ln Ft	Carpenter	Contract	.1173	1.83	0	None	50	Major	Yes
Finish Replaced Wood, Interior Railing	Ln Ft	Painter	Contract	.0122	.06	0	None	50	Major	No
Wood, Painted, Exterior Stairs										
Refinish Wood, Painted, Exterior Stairs	Sq Ft	Carpenter	Contract	.0122	.13	0	None	7	Major	No
Repair Wood, Painted, Exterior Stairs	Sq Ft	Carpenter	Contract	.0078	.05	0	None	15	Major	No
Finish Repaired Wood, Painted, Exterior Stairs	Sq Ft	Carpenter	Contract	.0004	.00	0	None	15	Major	No
Replace Wood, Painted, Exterior Stairs	Sq Ft	Carpenter	Contract	.3448	4.00	0	None	30	Major	Yes
Finish Replaced Wood, Painted, Exterior Stairs	Sq Ft	Carpenter	Contract	.0122	.13	0	None	30	Major	No
Wood, Interior Stairs										
Repair Wood, Interior Stairs	Sq Ft	Carpenter	Contract	.0078	.05	0	None	10	Major	No
Replace Wood, Interior Stairs	Sq Ft	Carpenter	Contract	.3448	8.99	0	None	50	Major	Yes
Wood, Painted, Interior Stairs										
Refinish Wood, Painted, Interior Stairs	Sq Ft	Painter	Contract	.0122	.13	0	None	4	Major	No
Repair Wood, Painted, Interior Stairs	Sq Ft	Carpenter	Contract	.0078	.05	0	None	10	Major	No
Finish Repaired Wood, Painted Interior Stairs	Sq Ft	Painter	Contract	.0004	.00	0	None	10	Major	No
Replace Wood, Painted, Interior Stairs	Sq Ft	Carpenter	Contract	.3448	8.99	0	None	50	Major	Yes
Finish Replaced Wood, Painted Interior Stairs	Sq Ft	Painter	Contract	.0122	.13	0	None	50	Major	No

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
C30 Interior Finishes										
C3010 Wall Finishes										
Acoustical Tile, Interior Wall Finish										
Repair Acoustical Tile, Interior Wall Finish (2% of Walls)	Sq Ft	Carpenter	Contract	.0009	.05	0	None	25	Major	No
Replace Acoustical Tile, Interior Wall Finish	Sq Ft	Carpenter	Contract	.0437	2.49	0	None	60	Major	Yes
Acoustical Tile, Painted, Interior Wall Finish										
Refinish Acoustical Tile, Painted, Interior Wall Finish	Sq Ft	Painter	Contract	.0163	.13	0	None	4	Major	No
Repair Acoustical Tile, Painted, Interior Wall Finish (2% of Walls)	Sq Ft	Carpenter	Contract	.0009	.05	0	None	25	Major	No
Finish Repaired Acoustical Tile, Painted, Interior Wall Finish	Sq Ft	Painter	Contract	.0003	.00	0	None	25	Major	No
Replace Acoustical Tile, Painted, Interior Wall Finish	Sq Ft	Carpenter	Contract	.0437	2.49	0	None	60	Major	Yes
Finish Replaced Acoustical Tile, Painted, Interior Wall Finish	Sq Ft	Painter	Contract	.0163	.13	0	None	60	Major	No
Ceramic Tile, 4"x4", Interior Wall Finish										
Repair Ceramic Tile, 4"x4", Interior Wall Finish (2% of Walls)	Sq Ft	Brick Layer	Contract	.0031	.04	0	None	10	Major	No
Replace Ceramic Tile, 4"x4", Interior Wall Finish	Sq Ft	Brick Layer	Contract	.1566	2.16	0	None	75	Major	Yes
Clay Brick, Interior Wall Finish										
Clean & Seal Clay Brick, Interior Wall Finish	Sq Ft	Staff Painter	Staff	.0163	.25	0	None	4	PM	No
Repair Clay Brick, Interior Wall Finish (2% of Walls)	Sq Ft	Brick Layer	Contract	.0052	.06	0	None	25	Major	No
Repoint (50% of surface) Clay Brick, Interior Wall Finish	Sq Ft	Brick Layer	Contract	.0751	.01	0	None	25	Major	No
Replace Clay Brick, Interior Wall Finish	Sq Ft	Brick Layer	Contract	.2583	3.08	0	None	75	Major	Yes
Clay Brick, Painted, Interior Wall Finish										
Refinish Clay Brick, Painted, Interior Wall Finish	Sq Ft	Painter	Contract	.0163	.08	0	None	4	Major	No
Repair Clay Brick, Interior Wall Finish (2% of Walls)	Sq Ft	Brick Layer	Contract	.0052	.06	0	None	25	Major	No
Repoint (50% of surface) Clay Brick, Interior Wall Finish	Sq Ft	Brick Layer	Contract	.0751	.04	0	None	25	Major	No
Finish Repaired Clay Brick, Painted, Interior Wall Finish	Sq Ft	Painter	Contract	.0003	.00	0	None	25	Major	No
Replace Clay Brick, Interior Wall Finish	Sq Ft	Brick Layer	Contract	.2583	3.08	0	None	75	Major	Yes
Finish Replaced Clay Brick, Painted, Interior Wall Finish	Sq Ft	Painter	Contract	.0163	.08	0	None	75	Major	No
Concrete Block, Interior Wall Finish										
Clean & Seal Concrete Block, Interior Wall Finish	Sq Ft	Staff Painter	Staff	.0163	.25	0	None	4	PM	No
Repair Concrete Block, Interior Wall Finish (2% of Walls)	Sq Ft	Brick Layer	Contract	.0031	.04	0	None	25	Major	No
Repoint (50% of surface) Concrete Block, Interior Wall Finish	Sq Ft	Brick Layer	Contract	.0431	.03	0	None	25	Major	No
Replace Concrete Block, Interior Wall Finish	Sq Ft	Brick Layer	Contract	.1550	2.09	0	None	75	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
C3010 Wall Finishes										
Concrete Block, Painted, Interior Wall Finish										
Refinish Concrete Block, Painted, Interior Wall Finish	Sq Ft	Painter	Contract	.0163	.08	0	None	4	Major	No
Repair Concrete Block, Painted, Interior Wall Finish (2% of Walls)	Sq Ft	Brick Layer	Contract	.0031	.04	0	None	25	Major	No
Repoint (50% surface) Concrete Block, Painted, Interior Wall Finish	Sq Ft	Brick Layer	Contract	.0431	.03	0	None	25	Major	No
Finish Repaired Concrete Block, Painted, Interior Wall Finish	Sq Ft	Painter	Contract	.0003	.00	0	None	25	Major	No
Replace Concrete Block, Painted, Interior Wall Finish	Sq Ft	Brick Layer	Contract	.1550	2.09	0	None	75	Major	Yes
Finish Replaced Concrete Block, Painted, Interior Wall Finish	Sq Ft	Painter	Contract	.0163	.08	0	None	75	Major	No
Concrete, Interior Wall Finish										
Clean & Seal Concrete, Interior Wall Finish	Sq Ft	Staff Painter	Staff	.0163	.25	0	None	4	PM	No
Repair Concrete, Interior Wall Finish (2% of Walls)	Sq Ft	Brick Layer	Contract	.0061	.07	0	None	25	Major	No
Replace Concrete, Interior Wall Finish	Sq Ft	Brick Layer	Contract	.3036	3.67	0	None	75	Major	Yes
Concrete, Painted, Interior Wall Finish										
Refinish Concrete, Painted, Interior Wall Finish	Sq Ft	Painter	Contract	.0163	.08	0	None	4	Major	No
Repair Concrete, Painted, Interior Wall Finish (2% of Walls)	Sq Ft	Brick Layer	Contract	.0061	.07	0	None	25	Major	No
Finish Repaired Concrete, Painted, Interior Wall Finish	Sq Ft	Painter	Contract	.0003	.00	0	None	25	Major	No
Replace Concrete, Painted, Interior Wall Finish	Sq Ft	Brick Layer	Contract	.3036	3.67	0	None	75	Major	Yes
Finish Replaced Concrete, Painted, Interior Wall Finish	Sq Ft	Painter	Contract	.0163	.08	0	None	75	Major	No
Fabric, Interior Wall Finish										
Repair Fabric, Interior Wall Finish (2% of Walls)	Sq Ft	Carpenter	Contract	.0003	.01	0	None	10	Major	No
Replace Fabric, Interior Wall Finish	Sq Ft	Painter	Contract	.0128	.62	0	None	30	Major	Yes
Fiberglass Paneling										
Repair Fiberglass Paneling (2% of Walls)	Sq Ft	Carpenter	Contract	.0003	.15	0	None	10	Major	No
Replace Fiberglass Paneling	Sq Ft	Carpenter	Contract	.0157	7.34	0	None	35	Major	Yes
Gypsum Board, Interior Wall Finish										
Refinish Gypsum Board, Interior Wall Finish	Sq Ft	Painter	Contract	.0163	.06	0	None	4	Major	No
Repair Gypsum Board, Interior Wall Finish (2% of Walls)	Sq Ft	Carpenter	Contract	.0006	.01	0	None	20	Major	No
Finish Repaired Gypsum Board, Interior Wall Finish	Sq Ft	Painter	Contract	.0003	.00	0	None	20	Major	No
Replace Gypsum Board, Interior Wall Finish	Sq Ft	Carpenter	Contract	.0321	.31	0	None	75	Major	Yes
Finish Replaced Gypsum Board, Interior Wall Finish	Sq Ft	Painter	Contract	.0163	.06	0	None	75	Major	No

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
C3010 Wall Finishes										
Plaster, Interior Wall Finish										
Refinish Plaster, Interior Wall Finish	Sq Ft	Painter	Contract	.0163	.06	0	None	4	Major	No
Repair Plaster, Interior Wall Finish (2% of Walls)	Sq Ft	Carpenter	Contract	.0033	.02	0	None	20	Major	No
Finish Repaired Plaster, Interior Wall Finish	Sq Ft	Painter	Contract	.0003	.00	0	None	20	Major	No
Replace Plaster, Interior Wall Finish	Sq Ft	Carpenter	Contract	.1652	1.16	0	None	75	Major	Yes
Finish Replaced Plaster, Interior Wall Finish	Sq Ft	Painter	Contract	.0163	.06	0	None	75	Major	No
Plastic, Fiberglass Reinforced, Interior Wall Panels										
Repair Plastic, Fiberglass Reinforced, Interior Wall Panels (2% of Walls)	Sq Ft	Carpenter	Contract	.0005	.03	0	None	10	Major	No
Replace Plastic, Fiberglass Reinforced, Interior Wall Panels	Sq Ft	Carpenter	Contract	.0250	1.32	0	None	35	Major	Yes
Sheetrock, Stippled, Interior Wall Finish										
Refinish Sheetrock, Stippled, Interior Wall Finish	Sq Ft	Painter	Contract	.0163	.06	0	None	4	Major	No
Repair Sheetrock, Stippled, Interior Wall Finish (2% of Walls)	Sq Ft	Carpenter	Contract	.0006	.01	0	None	20	Major	No
Finish Repaired Sheetrock, Stippled, Interior Wall Finish	Sq Ft	Painter	Contract	.0003	.00	0	None	20	Major	No
Replace Sheetrock, Stippled, Interior Wall Finish	Sq Ft	Carpenter	Contract	.0321	.31	0	None	75	Major	Yes
Finish Replaced Sheetrock, Stippled, Interior Wall Finish	Sq Ft	Painter	Contract	.0163	.06	0	None	75	Major	No
Sheetrock, Unstippled, Interior Wall Finish										
Refinish Sheetrock, Unstippled, Interior Wall Finish	Sq Ft	Painter	Contract	.0163	.06	0	None	4	Major	No
Repair Sheetrock, Unstippled, Interior Wall Finish (2% of Walls)	Sq Ft	Carpenter	Contract	.0006	.01	0	None	20	Major	No
Finish Repaired Sheetrock, Unstippled, Interior Wall Finish	Sq Ft	Painter	Contract	.0003	.00	0	None	20	Major	No
Replace Sheetrock, Unstippled, Interior Wall Finish	Sq Ft	Carpenter	Contract	.0321	.31	0	None	75	Major	Yes
Finish Replaced Sheetrock, Unstippled, Interior Wall Finish	Sq Ft	Painter	Contract	.0163	.06	0	None	75	Major	No
Steel, Interior Wall Finish										
Repair Steel, Interior Wall Finish (2% of Walls)	Sq Ft	Carpenter	Contract	.0088	.09	0	None	25	Major	No
Replace Steel, Interior Wall Finish	Sq Ft	Carpenter	Contract	.3346	4.56	0	None	75	Major	Yes
Steel, Painted, Interior Wall Finish										
Refinish Steel, Painted, Interior Wall Finish	Sq Ft	Painter	Contract	.0160	.13	0	None	4	Major	No
Repair Steel, Painted, Interior Wall Finish (2% of Walls)	Sq Ft	Carpenter	Contract	.0067	.09	0	None	25	Major	No
Finish Repaired Steel, Painted, Interior Wall Finish	Sq Ft	Painter	Contract	.0003	.00	0	None	25	Major	No
Replace Steel, Painted, Interior Wall Finish	Sq Ft	Carpenter	Contract	.3346	4.68	0	None	75	Major	Yes
Finish Replaced Steel, Painted, Interior Wall Finish	Sq Ft	Painter	Contract	.0273	.43	0	None	75	Major	No
Vinyl, Interior Wall Finish										
Repair Vinyl, Interior Wall Finish (2% of Walls)	Sq Ft	Carpenter	Contract	.0003	.02	0	None	5	Major	No
Replace Vinyl, Interior Wall Finish	Sq Ft	Painter	Contract	.0128	.83	0	None	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
C3010 Wall Finishes										
Wallpaper, Interior Wall Finish										
Repair Wallpaper, Interior Wall Finish (2% of Walls)	Sq Ft	Carpenter	Contract	.0003	.01	0	None	8	Major	No
Replace Wallpaper, Interior Wall Finish	Sq Ft	Painter	Contract	.0128	.70	0	None	20	Major	Yes
Wood, Interior Paneling										
Repair Wood, Interior Paneling (2% of Walls)	Sq Ft	Carpenter	Contract	.0047	.04	0	None	10	Major	No
Replace Wood, Interior Paneling	Sq Ft	Carpenter	Contract	.2213	1.87	0	None	75	Major	Yes
Wood, Finished, Interior Paneling										
Refinish Wood, Finished, Interior Paneling	Sq Ft	Painter	Contract	.0163	.13	0	None	4	Major	No
Repair Wood, Finished, Interior Paneling (2% of Walls)	Sq Ft	Carpenter	Contract	.0047	.04	0	None	10	Major	No
Finish Repaired Wood, Finished, Interior Paneling	Sq Ft	Painter	Contract	.0003	.00	0	None	10	Major	No
Replace Wood, Finished, Interior Paneling	Sq Ft	Carpenter	Contract	.2213	1.87	0	None	75	Major	Yes
Finished Replaced Wood, Finished, Interior Paneling	Sq Ft	Painter	Contract	.0163	.13	0	None	75	Major	No
C3020 Floor Finishes										
Access Flooring, Computer Room Raised										
Repair Access Flooring, Computer Room Raised (2% of Floors)	Sq Ft	Carpenter	Contract	.0017	.21	0	None	15	Major	No
Replace Access Flooring, Computer Room Raised	Sq Ft	Carpenter	Contract	.0860	10.35	0	None	40	Major	Yes
Access Flooring w/ Laminate, Raised										
Repair Access Flooring w/ Laminate, Raised (2% of Floors)	Sq Ft	Carpet Layer	Contract	.0017	.32	0	None	15	Major	No
Replace Access Flooring w/ Laminate, Raised	Sq Ft	Carpet Layer	Contract	.0860	15.80	0	None	40	Major	Yes
Carpet, Nylon 20 oz., High Traffic										
Repair Carpet, Nylon 20 oz., High Traffic (2% of Carpet)	Sq Ft	Carpet Layer	Contract	.0008	.06	0	None	2	Major	No
Replace Carpet, Nylon 20 oz., High Traffic	Sq Ft	Carpet Layer	Contract	.0400	2.99	0	None	8	Major	Yes
Carpet, Nylon 20 oz., Low Traffic										
Repair Carpet, Nylon 20 oz., Low Traffic (2% of Carpet)	Sq Ft	Carpet Layer	Contract	.0008	.06	0	None	5	Major	No
Replace Carpet, Nylon 20 oz., Low Traffic	Sq Ft	Carpet Layer	Contract	.0400	2.99	0	None	15	Major	Yes
Carpet, Nylon 20 oz., Multi-Residential										
Repair Carpet, Nylon 20 oz., Multi-Residential (2% of Carpet)	Sq Ft	Carpet Layer	Contract	.0008	.06	0	None	2	Major	No
Replace Carpet, Nylon 20 oz., Multi-Residential	Sq Ft	Carpet Layer	Contract	.0400	2.99	0	None	6	Major	Yes
Carpet, Wool 45 oz., Premium										
Repair Wool 45 oz., Premium (2% of Carpet)	Sq Ft	Carpet Layer	Contract	.0008	.12	0	None	5	Major	No
Replace Carpet, Wool 45 oz., Premium	Sq Ft	Carpet Layer	Contract	.0400	6.22	0	None	25	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
C3020 Floor Finishes										
Ceramic Tile Flooring										
Repair Ceramic Tile Flooring (2% of Floors)	Sq Ft	Brick Layer	Contract	.0041	.09	0	None	15	Major	No
Replace Ceramic Tile Flooring	Sq Ft	Brick Layer	Contract	.2067	4.65	0	None	50	Major	Yes
Concrete Flooring										
Repair Concrete Flooring (2% of Floors)	Sq Ft	Brick Layer	Contract	.0015	.05	0	None	15	Major	No
Replace Concrete Flooring	Sq Ft	Brick Layer	Contract	.0725	2.59	0	None	75	Major	Yes
Concrete, Painted Flooring										
Refinish Concrete, Painted Flooring	Sq Ft	Painter	Contract	.0124	.08	0	None	10	Major	No
Repair Concrete, Painted Flooring (2% of Floors)	Sq Ft	Brick Layer	Contract	.0015	.05	0	None	15	Major	No
Finish Repaired Concrete, Painted Flooring	Sq Ft	Painter	Contract	.0002	.00	0	None	15	Major	No
Replace Concrete, Painted Flooring	Sq Ft	Brick Layer	Contract	.0725	2.59	0	None	75	Major	Yes
Finish Replaced Concrete, Painted Flooring	Sq Ft	Painter	Contract	.0124	.08	0	None	75	Major	No
Linoleum Flooring										
Repair Linoleum Flooring (2% of Floors)	Sq Ft	Carpet Layer	Contract	.0005	.02	0	None	9	Major	No
Replace Linoleum Flooring	Sq Ft	Carpet Layer	Contract	.0229	.86	0	None	18	Major	Yes
Maple Sports Floor										
Screen & Recoat Maple Sports Floor	Sq Ft	Staff Carpenter	Staff	.0095	.19	0	None	1	PM	No
Sand & Refinishing Maple Sports Floor	Sq Ft	Carpenter	Contract	.0127	2.06	0	None	10	Major	No
Replace Maple Sports Floor	Sq Ft	Carpenter	Contract	.0293	5.21	0	None	40	Major	Yes
Metal Floor Grating										
Repair Metal Floor Grating (2% of Grating)	Sq Ft	Carpenter	Contract	.0055	.21	0	None	10	Major	No
Replace Metal Floor Grating	Sq Ft	Carpenter	Contract	.2761	10.52	0	None	30	Major	Yes
Plywood Flooring										
Repair Plywood Flooring (2% of Floors)	Sq Ft	Carpenter	Contract	.0004	.03	0	None	10	Major	No
Replace Plywood Flooring	Sq Ft	Carpenter	Contract	.0185	1.39	0	None	40	Major	Yes
Quarry Tile Flooring										
Repair Quarry Tile Flooring (2% of Floors)	Sq Ft	Brick Layer	Contract	.0047	.11	0	None	15	Major	No
Replace Quarry Tile Flooring	Sq Ft	Brick Layer	Contract	.2330	5.30	0	None	50	Major	Yes
Rubber Tile Flooring										
Repair Rubber Tile Flooring (2% of Floors)	Sq Ft	Carpet Layer	Contract	.0005	.09	0	None	9	Major	No
Replace Rubber Tile Flooring	Sq Ft	Carpet Layer	Contract	.0249	4.71	0	None	18	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
C3020 Floor Finishes										
Terrazzo Flooring										
Repair Terrazzo Flooring (2% of Floors)	Sq Ft	Brick Layer	Contract	.0043	.05	0	None	15	Major	No
Replace Terrazzo Flooring	Sq Ft	Brick Layer	Contract	.2127	2.53	0	None	75	Major	Yes
Vinyl Sheet Flooring										
Repair Vinyl Sheet Flooring (2% of Floors)	Sq Ft	Carpet Layer	Contract	.0005	.07	0	None	9	Major	No
Replace Vinyl Sheet Flooring	Sq Ft	Carpet Layer	Contract	.0229	3.25	0	None	18	Major	Yes
Vinyl Tile Flooring										
Repair Vinyl Tile Flooring (2% of Floors)	Sq Ft	Carpet Layer	Contract	.0005	.02	0	None	9	Major	No
Replace Vinyl Tile Flooring	Sq Ft	Carpet Layer	Contract	.0249	.86	0	None	18	Major	Yes
Wood Parquetry Flooring										
Repair Wood Parquetry Flooring (2% of Floors)	Sq Ft	Carpenter	Contract	.0031	.10	0	None	5	Major	No
Sand & Refinish Wood Parquetry Flooring	Sq Ft	Carpenter	Contract	.0127	2.06	0	None	10	Major	No
Replace Wood Parquetry Floor	Sq Ft	Carpenter	Contract	.1537	4.38	0	None	40	Major	Yes
C3030 Ceiling Finishes										
Acoustical Tile Ceiling										
Repair Acoustic Tile Ceiling (2% of Ceiling)	Sq Ft	Carpenter	Contract	.0004	.02	0	None	9	Major	No
Replace Acoustic Tile Ceiling	Sq Ft	Carpenter	Contract	.0201	1.12	0	None	70	Major	Yes
Acoustical Tile, Dropped Ceiling										
Repair Acoustic Tile, Dropped Ceiling (2% of Ceiling)	Sq Ft	Carpenter	Contract	.0004	.02	0	None	9	Major	No
Replace Acoustical Tile, Dropped Ceiling	Sq Ft	Carpenter	Contract	.0205	1.20	0	None	70	Major	Yes
Acoustical Tile, Dropped, Fiberglass Ceiling										
Repair Acoustic Tile, Dropped, Fiberglass Ceiling (2% of Ceiling)	Sq Ft	Carpenter	Contract	.0004	.03	0	None	9	Major	No
Replace Acoustical Tile, Dropped, Fiberglass Ceiling	Sq Ft	Carpenter	Contract	.0205	1.58	0	None	70	Major	Yes
Concrete Ceiling										
Repair Concrete Ceiling (2% of Ceiling)	Sq Ft	Brick Layer	Contract	.0061	.07	0	None	25	Major	No
Replace Concrete Ceiling	Sq Ft	Brick Layer	Contract	.3036	3.67	0	None	75	Major	Yes
Concrete, Painted Ceiling										
Refinish Concrete, Painted Ceiling	Sq Ft	Painter	Contract	.0227	.08	0	None	4	Major	No
Repair Concrete, Painted Ceiling (2% of Ceiling)	Sq Ft	Brick Layer	Contract	.0061	.07	0	None	25	Major	No
Finish Repaired Concrete, Painted Ceiling	Sq Ft	Painter	Contract	.0005	.00	0	None	25	Major	No
Replace Concrete, Painted Ceiling	Sq Ft	Brick Layer	Contract	.3036	3.67	0	None	75	Major	Yes
Finish Replaced Concrete, Painted Ceiling	Sq Ft	Painter	Contract	.0227	.08	0	None	75	Major	No

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
C3030 Ceiling Finishes										
Gypsum Board, Finished Ceiling										
Refinish Gypsum Board, Finished Ceiling	Sq Ft	Painter	Contract	.0227	.06	0	None	4	Major	No
Repair Gypsum Board, Finished Ceiling (2% of Ceiling)	Sq Ft	Carpenter	Contract	.0015	.01	0	None	25	Major	No
Finish Repaired Gypsum Board, Finished Ceiling	Sq Ft	Painter	Contract	.0005	.00	0	None	25	Major	No
Replace Gypsum Board, Finished Ceiling	Sq Ft	Carpenter	Contract	.0729	.31	0	None	75	Major	Yes
Finish Replaced Gypsum Board, Finished Ceiling	Sq Ft	Painter	Contract	.0227	.06	0	None	75	Major	No
Metal Ceiling										
Repair Metal Ceiling (2% of Ceiling)	Sq Ft	Carpenter	Contract	.0066	.08	0	None	8	Major	No
Replace Metal Ceiling	Sq Ft	Carpenter	Contract	.3322	4.04	0	None	75	Major	Yes
Metal, Painted Ceiling										
Refinish Metal, Painted Ceiling	Sq Ft	Painter	Contract	.0227	.06	0	None	4	Major	No
Repair Metal, Painted Ceiling (2% of Ceiling)	Sq Ft	Carpenter	Contract	.0066	.08	0	None	25	Major	No
Finish Repaired Metal, Painted Ceiling	Sq Ft	Painter	Contract	.0005	.00	0	None	25	Major	No
Replace Metal, Painted Ceiling	Sq Ft	Carpenter	Contract	.3322	4.04	0	None	75	Major	Yes
Finish Replaced Metal, Painted Ceiling	Sq Ft	Painter	Contract	.0227	.06	0	None	75	Major	No
Plaster Ceiling										
Refinish Plaster Ceiling	Sq Ft	Painter	Contract	.0227	.06	0	None	4	Major	No
Repair Plaster Ceiling (2% of Ceiling)	Sq Ft	Carpenter	Contract	.0033	.02	0	None	25	Major	No
Finish Repaired Plaster Ceiling	Sq Ft	Painter	Contract	.0005	.00	0	None	25	Major	No
Replace Plaster Ceiling	Sq Ft	Carpenter	Contract	.1652	1.06	0	None	75	Major	Yes
Finish Replaced Plaster Ceiling	Sq Ft	Painter	Contract	.0227	.06	0	None	75	Major	No
Sheetrock, Stippled Ceiling										
Refinish Sheetrock, Stippled Ceiling	Sq Ft	Painter	Contract	.0227	.06	0	None	4	Major	No
Repair Sheetrock, Stippled Ceiling (2% of Ceiling)	Sq Ft	Carpenter	Contract	.0015	.01	0	None	25	Major	No
Finish Repaired Sheetrock Stippled, Ceiling	Sq Ft	Painter	Contract	.0005	.00	0	None	25	Major	No
Replace Sheetrock, Stippled Ceiling	Sq Ft	Carpenter	Contract	.0731	.31	0	None	75	Major	Yes
Finish Replaced Sheetrock Stippled, Ceiling	Sq Ft	Painter	Contract	.0227	.06	0	None	75	Major	No
Sheetrock, Unstippled Ceiling										
Refinish Sheetrock, Unstippled Ceiling	Sq Ft	Painter	Contract	.0227	.06	0	None	4	Major	No
Repair Sheetrock, Unstippled Ceiling (2% of Ceiling)	Sq Ft	Carpenter	Contract	.0015	.01	0	None	25	Major	No
Finish Repaired Sheetrock, Unstippled Ceiling	Sq Ft	Painter	Contract	.0005	.00	0	None	25	Major	No
Replace Sheetrock, Unstippled Ceiling	Sq Ft	Carpenter	Contract	.0729	.31	0	None	75	Major	Yes
Finish Replaced Sheetrock, Unstippled Ceiling	Sq Ft	Painter	Contract	.0227	.06	0	None	75	Major	No

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
C3030 Ceiling Finishes										
Textured Spray Ceiling										
Refinish Textured Spray Ceiling	Sq Ft	Painter	Contract	.0188	.06	0	None	4	Major	No
Repair Textured Spray Ceiling (2% of Walls)	Sq Ft	Carpenter	Contract	.0015	.01	0	None	20	Major	No
Finish Repaired Textured Spray Ceiling	Sq Ft	Painter	Contract	.0004	.00	0	None	20	Major	No
Replace Textured Spray Ceiling	Sq Ft	Carpenter	Contract	.0729	.31	0	None	40	Major	Yes
Finish Replaced Textured Spray Ceiling	Sq Ft	Painter	Contract	.0188	.06	0	None	40	Major	No
Wood Ceiling										
Repair Wood Ceiling (2% of Ceiling)	Sq Ft	Carpenter	Contract	.0015	.05	0	None	10	Major	No
Replace Wood Ceiling	Sq Ft	Carpenter	Contract	.0731	2.47	0	None	75	Major	Yes
Wood, Finished Ceiling										
Refinish Wood, Finished Ceiling	Sq Ft	Painter	Contract	.0227	.13	0	None	4	Major	No
Repair Wood, Finished Ceiling (2% of Ceiling)	Sq Ft	Carpenter	Contract	.0015	.05	0	None	10	Major	No
Finish Repaired Wood, Finished Ceiling	Sq Ft	Painter	Contract	.0005	.00	0	None	10	Major	No
Replace Wood, Finished Ceiling	Sq Ft	Carpenter	Contract	.0731	2.47	0	None	75	Major	Yes
Finish Replaced Wood, Finished Ceiling	Sq Ft	Painter	Contract	.0227	.13	0	None	75	Major	No
D10 Conveying										
D1010 Elevators and Lifts										
Bridge Crane, Overhead, 25 Ton										
Maintain Bridge Crane, Overhead, 25 Ton	Each	Elevator Mechanic	Contract	8.3000	52.03	0	None	1	PM	No
Replace Bridge Crane, Overhead, 25 Ton	Each	Elevator Mechanic	Contract	120.0000	69,939.11	0	None	25	Major	Yes
Crane, Jib, Electric, 1/2 Ton										
Maintain Crane, Jib, Electric, Chain, 1/2 Ton	Each	Elevator Mechanic	Contract	16.0000	15.23	0	None	1	PM	No
Replace Crane, Jib, Electric, 1/2 Ton	Each	Elevator Mechanic	Contract	96.0000	2,102.00	0	None	25	Major	Yes
Crane, Jib, Electric, 1 Ton										
Maintain Crane, Jib, Electric, Chain, 1 Ton	Each	Elevator Mechanic	Contract	16.0000	15.23	0	None	1	PM	No
Replace Crane, Jib, Electric, 1 Ton	Each	Elevator Mechanic	Contract	96.0000	3,234.00	0	None	25	Major	Yes
Crane, Jib, Electric, 2 Ton										
Maintain Crane, Jib, Electric, Chain, 2 Ton	Each	Elevator Mechanic	Contract	16.0000	30.45	0	None	1	PM	No
Replace Crane, Jib, Electric, 2 Ton	Each	Elevator Mechanic	Contract	96.0000	3,774.50	0	None	25	Major	Yes
Crane, Jib, Electric, 5 Ton										
Maintain Crane, Jib, Electric, Chain, 5 Ton	Each	Elevator Mechanic	Contract	16.0000	76.07	0	None	1	PM	No
Replace Crane, Jib, Electric, 5 Ton	Each	Elevator Mechanic	Contract	96.0000	4,882.00	0	None	25	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D1010 Elevators and Lifts										
Dumbwaiter, Electric, 5 Floor										
Maintain Dumbwaiter, Electric, 5 Floor	Each	Elevator Mechanic	Contract	.5000	43.15	0	None	1	PM	No
Renovate Dumbwaiter, Electric, 5 Floor	Each	Elevator Mechanic	Contract	40.0000	5,691.23	0	None	25	Major	Yes
Elevator, Geared, 3,000 lbs, 3-5 Floor, 300 fpm										
Maintain Elevator, Geared, 3,000 lbs, 3-5 Floor, 300 fpm	Each	Elevator Mechanic	Contract	58.0100	1,918.35	0	None	1	PM	No
Renovate Elevator, Geared, 3,000 lbs, 3-5 Floor, 300 fpm	Each	Elevator Mechanic	Contract	175.0000	72,417.65	0	None	25	Major	Yes
Elevator, Geared, 3,500 lbs, 6-15 Floor, 350 fpm										
Maintain Elevator, Geared, 3,500 lbs, 6-15 Floor, 350 fpm	Each	Elevator Mechanic	Contract	134.0000	1,918.35	0	None	1	PM	No
Renovate Elevator, Geared, 3,500 lbs, 6-15 Floor, 350 fpm	Each	Elevator Mechanic	Contract	411.0000	72,417.65	0	None	25	Major	Yes
Elevator, Geared, 3,500 lbs, 16-25 Floor, 350 fpm										
Maintain Elevator, Geared, 3,500 lbs, 16-25 Floor, 350 fpm	Each	Elevator Mechanic	Contract	154.0000	1,918.35	0	None	1	PM	No
Renovate Elevator, Geared, 3,500 lbs, 16-25 Floor, 350 fpm	Each	Elevator Mechanic	Contract	840.0000	72,417.65	0	None	25	Major	Yes
Elevator, Geared, 3,500 lbs, 16-25 Floor, 800 fpm										
Maintain Elevator, Geared, 3,500 lbs, 16-25 Floor, 800 fpm	Each	Elevator Mechanic	Contract	185.0100	1,918.35	0	None	1	PM	No
Renovate Elevator, Geared, 3,500 lbs, 16-25 Floor, 800 fpm	Each	Elevator Mechanic	Contract	840.0000	72,417.65	0	None	25	Major	Yes
Elevator, Geared, 5,000 lbs, 6-15 Floor, 350 fpm										
Maintain Elevator, Geared, 5,000 lbs, 6-15 Floor, 350 fpm	Each	Elevator Mechanic	Contract	154.0000	1,420.52	0	None	1	PM	No
Renovate Elevator, Geared, 5,000 lbs, 6-15 Floor, 350 fpm	Each	Elevator Mechanic	Contract	411.0000	72,417.65	0	None	25	Major	Yes
Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm										
Maintain Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	Each	Elevator Mechanic	Contract	58.0100	1,024.00	0	None	1	PM	No
Renovate Elevator, Hydraulic, 2,500 lbs, 3-5 Floor, 200 fpm	Each	Elevator Mechanic	Contract	224.0000	70,516.84	0	None	25	Major	Yes
Elevator, Hydraulic, 6,000 lbs, 3-5 Floor, 150 fpm										
Maintain Elevator, Hydraulic, 6,000 lbs, 3-5 Floor, 150 fpm	Each	Elevator Mechanic	Contract	167.9900	1,024.00	0	None	1	PM	No
Renovate Elevator, Hydraulic, 6,000 lbs, 3-5 Floor, 150 fpm	Each	Elevator Mechanic	Contract	224.0000	70,516.84	0	None	25	Major	Yes
Hoist Electric, Overhead, Chain, 3 Ton										
Maintain Hoist Electric, Chain, 3 Ton	Each	Elevator Mechanic	Contract	1.6500	13.96	0	None	1	PM	No
Replace Hoist Electric, Chain, 3 Ton	Each	Elevator Mechanic	Contract	8.0000	2,947.00	0	None	25	Major	Yes
Platform Lifter, 5 Ton										
Maintain Platform Lifter, 5 Ton	Each	Elevator Mechanic	Contract	18.0000	73.84	0	None	1	PM	No
Renovate Platform Lifter, 5 Ton	Each	Elevator Mechanic	Contract	5.0000	1,984.73	0	None	25	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D1010 Elevators and Lifts										
Wheel Chair Lift										
Maintain Wheel Chair Lift	Each	Elevator Mechanic	Contract	12.0000	50.34	0	None	1	PM	No
Renovate Wheel Chair Lift	Each	Elevator Mechanic	Contract	63.0000	6,500.00	0	None	25	Major	Yes
D1020 Escalators & Moving Walks										
Escalator, 16 ft rise, 100 fpm										
Maintain Escalator, 16 ft rise, 100 fpm	Each	Elevator Mechanic	Contract	58.0100	1,024.00	0	None	1	PM	No
D1090 Other Conveying Systems										
Dock Ramp Leveler										
Maintain Dock Ramp Leveler	Each	Gen Maint Worker	Staff	7.6000	.00	0	None	1	PM	No
Replace Dock Ramp Leveler	Each	Carpenter	Contract	6.3200	6,443.71	0	None	25	Major	Yes
Pneumatic Tube Station										
Maintain Pneumatic Tube Station	Each	Gen Maint Worker	Staff	7.0000	.00	0	None	1	PM	No
Replace Pneumatic Tube Station	Each	Carpenter	Contract	6.1600	4,227.54	0	None	25	Major	Yes
D20 Plumbing										
D2010 Plumbing Fixtures										
Bathtub, Enameled Steel										
Replace Faucet Washer & Clean Shower Head, Bathtub, Enameled Steel	Each	Staff Plumber	Staff	.3300	.34	0	None	2	PM	No
Repair Diverter Valve, Bathtub, Enameled Steel	Each	Staff Plumber	Staff	.7900	62.30	0	None	4	PM	No
Reseal Bathtub, Enameled Steel	Each	Staff Plumber	Staff	.5900	2.75	0	None	5	PM	No
Replace Valve Set, Bathtub, Enameled Steel	Each	Plumber	Contract	.6400	139.00	0	None	10	Major	No
Replace Bathtub, Enameled Steel	Each	Plumber	Contract	5.6800	396.00	0	None	35	Major	Yes
Bathtub & Shower Enclosure, Fiberglass										
Replace Faucet Washer & Clean Shower Head, Shower Enclosure, Fiberglass	Each	Staff Plumber	Staff	.3300	.34	0	None	2	PM	No
Repair Diverter Valve, Bathtub & Shower Enclosure, Fiberglass	Each	Staff Plumber	Staff	.7900	62.30	0	None	4	PM	No
Reseal Bathtub & Shower Enclosure, Fiberglass	Each	Staff Plumber	Staff	.5900	2.75	0	None	5	PM	No
Replace Valve Set, Bathtub & Shower Enclosure, Fiberglass	Each	Plumber	Contract	.6400	139.00	0	None	10	Major	No
Replace Bathtub & Shower Enclosure, Fiberglass	Each	Plumber	Contract	7.8000	540.57	0	None	20	Major	Yes
Drinking Fountain, Refrigerated										
Replace Coolant & Adjust Drinking Fountain, Refrigerated	Each	Staff Plumber	Staff	.3300	3.98	0	None	2	PM	No
Replace Drinking Fountain, Refrigerated	Each	Plumber	Contract	2.1200	574.00	0	None	10	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D2010 Plumbing Fixtures										
Drinking Fountain, Vitreous China										
Repack Valve Glands, Drinking Fountain, Vitreous China	Each	Plumber	Contract	.3300	.59	0	None	2	Major	No
Repair Valve, Drinking Fountain, Vitreous China	Each	Plumber	Contract	.3300	3.90	0	None	5	Major	No
Replace Valve, Drinking Fountain, Vitreous China	Each	Plumber	Contract	.6400	44.44	0	None	15	Major	No
Replace Drinking Fountain, Vitreous China	Each	Plumber	Contract	7.8000	570.00	0	None	35	Major	Yes
Emergency Eye Wash										
Inspect & Clean Spray Heads, Emergency Eye Wash	Each	Staff Plumber	Staff	.3300	.00	0	None	3	PM	No
Repack Valve Glands, Emergency Eye Wash	Each	Plumber	Contract	.3300	.58	0	None	10	Major	No
Replace Emergency Eye Wash Station	Each	Plumber	Contract	7.8000	229.00	0	None	25	Major	Yes
Emergency Shower Station										
Inspect & Clean Emergency Shower Station	Each	Staff Plumber	Staff	.3300	.00	0	None	3	PM	No
Repack Valve Glands, Emergency Shower Station	Each	Plumber	Contract	.3300	.61	0	None	10	Major	No
Replace Emergency Shower Station	Each	Plumber	Contract	7.8000	250.25	0	None	25	Major	Yes
Flush Tank Water Closet, One Piece										
Replace Washer in Ball Cock, Flush Tank Water Closet, One Piece	Each	Staff Plumber	Staff	.3400	3.92	0	None	5	PM	No
Replace Worn Parts, Flush Tank Water Closet, One Piece	Each	Plumber	Contract	.8900	16.45	0	None	15	Major	No
Install Gasket in Spud Connection, Flush Tank Water Closet, One Piece	Each	Plumber	Contract	.3300	1.38	0	None	20	Major	No
Replace Flush Tank Water Closet, One Piece	Each	Plumber	Contract	3.1500	440.00	0	None	35	Major	Yes
Lavatory, Enamelled Steel										
Replace Faucet Washer & Clean Trap, Lavatory, Enamelled Steel	Each	Staff Plumber	Staff	.3300	.34	0	None	2	PM	No
Replace Washer & Spud Connection, Lavatory, Enamelled Steel	Each	Plumber	Contract	.3300	12.94	0	None	7	Major	No
Replace Faucet & Valve Set, Lavatory, Enamelled Steel	Each	Plumber	Contract	.6400	57.95	0	None	10	Major	No
Replace Lavatory, Enamelled Steel	Each	Plumber	Contract	1.5500	163.77	0	None	35	Major	Yes
Lavatory, Iron, Enamel										
Replace Faucet Washer & Clean Trap, Lavatory, Iron, Enamel	Each	Staff Plumber	Staff	.3300	.34	0	None	2	PM	No
Replace Washer & Spud Connection, Lavatory, Iron, Enamel	Each	Plumber	Contract	.3300	12.94	0	None	7	Major	No
Replace Faucet & Valve Set, Lavatory, Iron, Enamel	Each	Plumber	Contract	.6400	57.95	0	None	10	Major	No
Replace Lavatory, Iron, Enamel	Each	Plumber	Contract	1.5500	375.50	0	None	40	Major	Yes
Lavatory, Vitreous China										
Replace Faucet Washer & Clean Trap, Lavatory, Vitreous China	Each	Staff Plumber	Staff	.3300	.34	0	None	2	PM	No
Replace Washer & Spud Connection, Lavatory, Vitreous China	Each	Plumber	Contract	.3300	12.35	0	None	7	Major	No
Replace Valve Set, Lavatory, Vitreous China	Each	Plumber	Contract	.6400	57.95	0	None	10	Major	No
Replace Lavatory, Vitreous China	Each	Plumber	Contract	1.5500	245.75	0	None	35	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D2010 Plumbing Fixtures										
Service Sink, Iron, Enamel										
Replace Faucet Washer & Clean Trap, Sink, Iron, Enamel	Each	Staff Plumber	Staff	.3300	.34	0	None	2	PM	No
Repair Strainer, Sink, Iron, Enamel	Each	Plumber	Contract	.9000	3.10	0	None	8	Major	No
Replace Valve Set, Service Sink, Iron, Enamel	Each	Plumber	Contract	.6400	57.95	0	None	10	Major	No
Replace Service Sink, Iron, Enamel	Each	Plumber	Contract	2.3600	552.02	0	None	35	Major	Yes
Shower, Ceramic Tile										
Replace Faucet Washer & Clean Shower Head, Ceramic Tile	Each	Staff Plumber	Staff	.3300	.34	0	None	2	PM	No
Reseal Shower, Ceramic Tile	Each	Staff Plumber	Staff	.5900	2.75	0	None	5	PM	No
Replace Valve Set, Shower, Ceramic Tile	Each	Plumber	Contract	.6400	107.10	0	None	10	Major	No
Replace Shower, Ceramic Tile	Each	Brick Layer	Contract	16.0000	255.00	0	None	30	Major	Yes
Shower, Enameled Steel										
Replace Faucet Washer & Clean Shower Head, Enameled Steel	Each	Staff Plumber	Staff	.3300	.34	0	None	2	PM	No
Reseal Shower, Enameled Steel	Each	Staff Plumber	Staff	.5900	2.75	0	None	5	PM	No
Replace Valve Set, Shower, Enameled Steel	Each	Plumber	Contract	.6400	107.10	0	None	10	Major	No
Replace Shower, Enameled Steel	Each	Plumber	Contract	15.6000	415.00	0	None	35	Major	Yes
Shower, Fiberglass										
Replace Faucet Washer & Clean Shower Head, Fiberglass	Each	Staff Plumber	Staff	.3300	.34	0	None	2	PM	No
Reseal Shower, Fiberglass	Each	Staff Plumber	Staff	.5900	2.75	0	None	5	PM	No
Replace Valve Set, Shower, Fiberglass	Each	Plumber	Contract	.6400	107.10	0	None	10	Major	No
Replace Shower, Fiberglass	Each	Plumber	Contract	13.0000	484.99	0	None	20	Major	Yes
Shower, Terrazzo										
Replace Washer & Clean Shower Head, Terrazzo	Each	Staff Plumber	Staff	.3300	.34	0	None	2	PM	No
Reseal Shower, Terrazzo	Each	Staff Plumber	Staff	.5900	2.75	0	None	5	PM	No
Replace Valve Set, Shower, Terrazzo	Each	Plumber	Contract	.6400	107.10	0	None	10	Major	No
Replace Shower, Terrazzo	Each	Brick Layer	Contract	14.1000	376.20	0	None	30	Major	Yes
Sink, Enameled Steel										
Replace Faucet Washer & Clean Trap, Sink, Enameled Steel	Each	Staff Plumber	Staff	.3300	.34	0	None	2	PM	No
Repair Strainer, Sink, Enameled Steel	Each	Plumber	Contract	.4800	3.10	0	None	8	Major	No
Replace Valve Set, Sink, Enameled Steel	Each	Plumber	Contract	.6400	57.95	0	None	10	Major	No
Replace Sink, Enameled Steel	Each	Plumber	Contract	3.0600	145.00	0	None	35	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D2010 Plumbing Fixtures										
Sink, Iron, Enamel										
Replace Faucet Washer & Clean Trap, Sink, Iron, Enamel	Each	Staff Plumber	Staff	.3300	.34	0	None	2	PM	No
Repair Strainer, Sink, Iron, Enamel	Each	Plumber	Contract	.4800	3.10	0	None	8	Major	No
Replace Valve Set, Sink, Iron, Enamel	Each	Plumber	Contract	.6400	57.95	0	None	10	Major	No
Replace Sink, Iron, Enamel	Each	Plumber	Contract	5.3400	245.75	0	None	35	Major	Yes
Sink, Plastic										
Replace Faucet Washer & Clean Trap, Sink, Plastic	Each	Staff Plumber	Staff	.3300	.34	0	None	2	PM	No
Repair Strainer, Sink, Plastic	Each	Plumber	Contract	.9000	3.10	0	None	8	Major	No
Replace Valve Set, Sink, Plastic	Each	Plumber	Contract	.6400	57.95	0	None	10	Major	No
Replace Sink, Plastic	Each	Plumber	Contract	3.0600	1,225.00	0	None	15	Major	Yes
Sink, Stainless Steel										
Replace Faucet Washer & Clean Trap, Sink, Stainless Steel	Each	Staff Plumber	Staff	.3300	.34	0	None	2	PM	No
Repair Strainer, Sink, Stainless Steel	Each	Plumber	Contract	.9000	3.10	0	None	8	Major	No
Replace Valve Set, Sink, Stainless Steel	Each	Plumber	Contract	.6400	57.95	0	None	10	Major	No
Replace Sink, Stainless Steel	Each	Plumber	Contract	3.0600	561.85	0	None	40	Major	Yes
Tankless Water Closet										
Replace Flush Valve, Tankless Water Closet	Each	Plumber	Contract	.3300	.00	0	None	10	Major	No
Replace Tankless Water Closet	Each	Plumber	Contract	1.5700	366.50	0	None	35	Major	Yes
Toilet & Wash Basin, Stainless Steel, Detention Fixture										
Replace Flush Valve, Toilet & Wash Basin, Stainless Steel	Each	Plumber	Contract	.3300	13.05	0	None	10	Major	No
Replace Toilet & Wash Basin, Stainless Steel, Detention Fixture	Each	Plumber	Contract	2.0000	2,133.38	0	None	40	Major	Yes
Urinal, Vitreous China										
Replace Flush Valve, Urinal, Vitreous China	Each	Plumber	Contract	.9000	54.35	0	None	7	Major	No
Replace Urinal, Vitreous China	Each	Plumber	Contract	6.5800	342.30	0	None	35	Major	Yes
D2020 Domestic Water Distribution										
Ball Valve, 1"										
Lubricate, Repack Gland, Ball Valve, 1"	Each	Staff HVAC Tech	Staff	1.1700	1.03	0	None	1	PM	No
Replace Ball Valve, 1"	Each	HVAC Technician	Contract	2.0600	114.52	0	None	17	Major	Yes
Ball Valve, 2"										
Lubricate, Repack Gland, Ball Valve, 2"	Each	Staff HVAC Tech	Staff	1.1700	1.03	0	None	1	PM	No
Replace Ball Valve, 2"	Each	HVAC Technician	Contract	2.0600	272.75	0	None	17	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D2020 Domestic Water Distribution										
Ball Valve, 4"										
Lubricate, Repack Gland, Ball Valve, 4"	Each	Staff HVAC Tech	Staff	1.1700	1.03	0	None	1	PM	No
Replace Ball Valve, 4"	Each	HVAC Technician	Contract	2.0600	495.49	0	None	17	Major	Yes
Ball Valve, 6"										
Lubricate, Repack Gland, Ball Valve, 6"	Each	Staff HVAC Tech	Staff	1.1700	1.03	0	None	1	PM	No
Replace Ball Valve, 6"	Each	HVAC Technician	Contract	2.0600	1,127.44	0	None	17	Major	Yes
Booster Pump, 1 1/2 HP										
Inspect & Lubricate Booster Pump, 1 1/2 HP	Each	Staff Plumber	Staff	.3300	2.44	0	None	1	PM	No
Overhaul Booster Pump, 1 1/2 HP	Each	Staff Plumber	Staff	.6800	43.30	0	None	5	PM	No
Replace Assembly, Booster Pump, 1 1/2 HP	Each	Plumber	Contract	12.8000	4,744.11	0	None	20	Major	Yes
Booster Pump, 7 1/2 HP										
Inspect & Lubricate Booster Pump, 7 1/2 HP	Each	Staff Plumber	Staff	.3300	2.44	0	None	1	PM	No
Overhaul Booster Pump, 7 1/2 HP	Each	Staff Plumber	Staff	.6800	43.30	0	None	5	PM	No
Replace Assembly, Booster Pump, 7 1/2 HP	Each	Plumber	Contract	16.0000	6,099.58	0	None	20	Major	Yes
Booster Pump, 10 HP										
Inspect & Lubricate Booster Pump, 10 HP	Each	Staff Plumber	Staff	.3300	2.44	0	None	1	PM	No
Overhaul Booster Pump, 10 HP	Each	Staff Plumber	Staff	.6800	43.30	0	None	5	PM	No
Replace Assembly, Booster Pump, 10 HP	Each	Plumber	Contract	16.0000	6,357.78	4	2T Forklift	20	Major	Yes
Booster Pump, 25 HP										
Inspect & Lubricate Booster Pump, 25 HP	Each	Staff Plumber	Staff	.3300	2.44	0	None	1	PM	No
Overhaul Booster Pump, 25 HP	Each	Staff Plumber	Staff	1.6300	59.64	0	None	5	PM	No
Replace Assembly, Booster Pump, 25 HP	Each	Plumber	Contract	24.0000	8,264.60	4	2T Forklift	20	Major	Yes
Booster Pump, 30 HP										
Inspect & Lubricate Booster Pump, 30 HP	Each	Staff Plumber	Staff	.3300	2.44	0	None	1	PM	No
Overhaul Booster Pump, 30 HP	Each	Staff Plumber	Staff	1.6300	59.64	0	None	5	PM	No
Replace Assembly, Booster Pump, 30 HP	Each	Plumber	Contract	30.0000	8,977.01	4	2T Forklift	20	Major	Yes
Butterfly Valve, 3"										
Lubricate, Repack Gland, Butterfly Valve, 3"	Each	Staff HVAC Tech	Staff	1.1500	13.08	0	None	1	PM	No
Replace Butterfly Valve, 3"	Each	HVAC Technician	Contract	2.0000	133.70	0	None	17	Major	Yes
Butterfly Valve, 4"										
Lubricate, Repack Gland, Butterfly Valve, 4"	Each	Staff HVAC Tech	Staff	1.1500	13.08	0	None	1	PM	No
Replace Butterfly Valve, 4"	Each	HVAC Technician	Contract	12.2400	170.00	0	None	17	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D2020 Domestic Water Distribution										
Butterfly Valve, 6"										
Lubricate, Repack Gland, Butterfly Valve, 6"	Each	Staff HVAC Tech	Staff	1.1500	13.08	0	None	1	PM	No
Replace Butterfly Valve, 6"	Each	HVAC Technician	Contract	15.6000	235.75	0	None	17	Major	Yes
Butterfly Valve, 8"										
Lubricate, Repack Gland, Butterfly Valve, 8"	Each	Staff HVAC Tech	Staff	1.1500	13.08	0	None	1	PM	No
Replace Butterfly Valve, 8"	Each	HVAC Technician	Contract	16.2400	320.75	0	None	17	Major	Yes
Butterfly Valve, 10"										
Lubricate, Repack Gland, Butterfly Valve, 10"	Each	Staff HVAC Tech	Staff	1.1500	13.08	0	None	1	PM	No
Replace Butterfly Valve, 10"	Each	HVAC Technician	Contract	17.5800	597.00	0	None	17	Major	Yes
Butterfly Valve, 12"										
Lubricate, Repack Gland, Butterfly Valve, 12"	Each	Staff HVAC Tech	Staff	1.1500	13.08	0	None	1	PM	No
Replace Butterfly Valve, 12"	Each	HVAC Technician	Contract	18.5000	928.00	0	None	17	Major	Yes
Butterfly Valve, 36"										
Lubricate, Repack Gland, Butterfly Valve, 36"	Each	Staff HVAC Tech	Staff	1.1500	13.08	0	None	1	PM	No
Replace Butterfly Valve, 36"	Each	HVAC Technician	Contract	60.0000	4,900.00	0	None	17	Major	Yes
Check Valve, 3-4"										
Inspect, Clean, & Verify Opening/Closing, Check Valve, 3-4"	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Replace Check Valve, 3-4"	Each	HVAC Technician	Contract	12.2400	674.29	0	None	17	Major	Yes
Check Valve, 6"										
Inspect, Clean, & Verify Opening/Closing, Check Valve, 6"	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Replace Check Valve, 6"	Each	HVAC Technician	Contract	12.2400	1,110.12	0	None	17	Major	Yes
Check Valve, 10"										
Inspect, Clean, & Verify Opening/Closing, Check Valve, 10"	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Replace Check Valve, 10"	Each	HVAC Technician	Contract	12.2400	4,186.77	0	None	17	Major	Yes
Circulator Pump, 1/12 HP, Cold Water										
Inspect & Lubricate Circulator Pump, 1/12 HP, Cold Water	Each	Staff Plumber	Staff	.3300	2.44	0	None	1	PM	No
Overhaul Circulator Pump, 1/12 HP, Cold Water	Each	Staff Plumber	Staff	.6800	4.70	0	None	5	PM	No
Replace Circulator Pump, 1/12 HP, Cold Water	Each	Plumber	Contract	4.0000	528.50	0	None	20	Major	Yes
Circulator Pump, 1/6 HP, Cold Water										
Inspect & Lubricate Circulator Pump, 1/6 HP, Cold Water	Each	Staff Plumber	Staff	.3300	2.44	0	None	1	PM	No
Overhaul Circulator Pump, 1/6 HP, Cold Water	Each	Staff Plumber	Staff	.6800	4.70	0	None	5	PM	No
Replace Circulator Pump, 1/6 HP, Cold Water	Each	Plumber	Contract	4.0000	1,124.00	0	None	20	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D2020 Domestic Water Distribution										
Circulator Pump, 1/2 HP, Cold Water										
Inspect & Lubricate Circulator Pump, 1/2 HP, Cold Water	Each	Staff Plumber	Staff	.3300	2.44	0	None	1	PM	No
Overhaul Circulator Pump, 1/2 HP, Cold Water	Each	Staff Plumber	Staff	.6800	4.70	0	None	5	PM	No
Replace Circulator Pump, 1/2 HP, Cold Water	Each	Plumber	Contract	4.0000	1,920.00	0	None	20	Major	Yes
Circulator Pump, 1 HP, Cold Water										
Inspect & Lubricate Circulator Pump, 1 HP, Cold Water	Each	Staff Plumber	Staff	.3300	2.44	0	None	1	PM	No
Overhaul Circulator Pump, 1 HP, Cold Water	Each	Staff Plumber	Staff	.6800	40.37	0	None	5	PM	No
Replace Circulator Pump, 1 HP, Cold Water	Each	Plumber	Contract	4.0000	3,114.00	0	None	20	Major	Yes
Circulator Pump, 2 HP, Cold Water										
Inspect & Lubricate Circulator Pump, 2 HP, Cold Water	Each	Staff Plumber	Staff	.3300	2.44	0	None	1	PM	No
Overhaul Circulator Pump, 2 HP, Cold Water	Each	Staff Plumber	Staff	.6800	4.70	0	None	5	PM	No
Replace Circulator Pump, 2 HP, Cold Water	Each	Plumber	Contract	4.0000	5,502.00	0	None	20	Major	Yes
Circulator Pump, 3 HP, Cold Water										
Inspect & Lubricate Circulator Pump, 3 HP, Cold Water	Each	Staff Plumber	Staff	.3300	2.44	0	None	1	PM	No
Overhaul Circulator Pump, 3 HP, Cold Water	Each	Staff Plumber	Staff	.6800	4.70	0	None	5	PM	No
Replace Circulator Pump, 3 HP, Cold Water	Each	Plumber	Contract	4.0000	7,890.00	0	None	20	Major	Yes
Circulator Pump, 1/12 HP, Hot Water										
Inspect & Lubricate Circulator Pump, 1/12 HP, Hot Water	Each	Staff Plumber	Staff	.3300	2.44	0	None	1	PM	No
Overhaul Circulator Pump, 1/12 HP, Hot Water	Each	Staff Plumber	Staff	.6800	4.70	0	None	5	PM	No
Replace Circulator Pump, 1/12 HP, Hot Water	Each	Plumber	Contract	4.0000	528.50	0	None	20	Major	Yes
Circulator Pump, 1/6 HP, Hot Water										
Inspect & Lubricate Circulator Pump, 1/6 HP, Hot Water	Each	Staff Plumber	Staff	.3300	2.44	0	None	1	PM	No
Overhaul Circulator Pump, 1/6 HP, Hot Water	Each	Staff Plumber	Staff	.6800	4.70	0	None	5	PM	No
Replace Circulator Pump, 1/6 HP, Hot Water	Each	Plumber	Contract	4.0000	1,124.00	0	None	20	Major	Yes
Circulator Pump, 1/2 HP, Hot Water										
Inspect & Lubricate Circulator Pump, 1/2 HP, Hot Water	Each	Staff Plumber	Staff	.3300	2.44	0	None	1	PM	No
Overhaul Circulator Pump, 1/2 HP, Hot Water	Each	Staff Plumber	Staff	.6800	4.70	0	None	5	PM	No
Replace Circulator Pump, 1/2 HP, Hot Water	Each	Plumber	Contract	4.0000	1,920.00	0	None	20	Major	Yes
Circulator Pump, 1 HP, Hot Water										
Inspect & Lubricate Circulator Pump, 1 HP, Hot Water	Each	Staff Plumber	Staff	.3300	2.44	0	None	1	PM	No
Overhaul Circulator Pump, 1 HP, Hot Water	Each	Staff Plumber	Staff	.6800	40.37	0	None	5	PM	No
Replace Circulator Pump, 1 HP, Hot Water	Each	Plumber	Contract	4.0000	3,114.00	0	None	20	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D2020 Domestic Water Distribution										
Circulator Pump, 2 HP, Hot Water										
Inspect & Lubricate Circulator Pump, 2 HP, Hot Water	Each	Staff Plumber	Staff	.3300	2.44	0	None	1	PM	No
Overhaul Circulator Pump, 2 HP, Hot Water	Each	Staff Plumber	Staff	.6800	4.70	0	None	5	PM	No
Replace Circulator Pump, 2 HP, Hot Water	Each	Plumber	Contract	4.0000	5,502.00	0	None	20	Major	Yes
Circulator Pump, 3 HP, Hot Water										
Inspect & Lubricate Circulator Pump, 3 HP, Hot Water	Each	Staff Plumber	Staff	.3300	2.44	0	None	1	PM	No
Overhaul Circulator Pump, 3 HP, Hot Water	Each	Staff Plumber	Staff	.6800	4.70	0	None	5	PM	No
Replace Circulator Pump, 3 HP, Hot Water	Each	Plumber	Contract	4.0000	7,890.00	0	None	20	Major	Yes
Flow Control Valve, Motorized, 1"										
Maintain Flow Control Valve & Actuator, 1"	Each	Staff HVAC Tech	Staff	1.0000	13.25	0	None	1	PM	No
Replace Valve Actuator, 1"	Each	HVAC Technician	Contract	1.2000	304.01	0	None	15	Major	No
Replace Flow Control Valve, Motorized, 1"	Each	HVAC Technician	Contract	1.2000	304.01	0	None	17	Major	Yes
Flow Control Valve, Motorized, 2"										
Maintain Flow Control Valve & Actuator, 2"	Each	Staff HVAC Tech	Staff	1.0000	13.25	0	None	1	PM	No
Replace Valve Actuator, 2"	Each	HVAC Technician	Contract	2.4000	690.64	0	None	15	Major	No
Replace Flow Control Valve, Motorized, 2"	Each	HVAC Technician	Contract	2.4000	1,002.67	0	None	17	Major	Yes
Flow Control Valve, Motorized, 4"										
Maintain Flow Control Valve & Actuator, 4"	Each	Staff HVAC Tech	Staff	1.0000	13.25	0	None	1	PM	No
Replace Valve Actuator, 4"	Each	HVAC Technician	Contract	12.2400	690.64	0	None	15	Major	No
Replace Flow Control Valve, Motorized, 4"	Each	HVAC Technician	Contract	12.2400	1,563.73	0	None	17	Major	Yes
Flow Control Valve, Motorized, 6"										
Maintain Flow Control Valve & Actuator, 6"	Each	Staff HVAC Tech	Staff	1.0000	13.25	0	None	1	PM	No
Replace Valve Actuator, 6"	Each	HVAC Technician	Contract	15.0200	2,507.21	0	None	15	Major	No
Replace Flow Control Valve, Motorized, 6"	Each	HVAC Technician	Contract	15.0200	2,453.40	0	None	17	Major	Yes
Flow Control Valve, Motorized, 8"										
Maintain Flow Control Valve & Actuator, 8"	Each	Staff HVAC Tech	Staff	1.0000	13.25	0	None	1	PM	No
Replace Valve Actuator, 8"	Each	HVAC Technician	Contract	16.2400	2,453.41	0	None	15	Major	No
Replace Flow Control Valve, Motorized, 8"	Each	HVAC Technician	Contract	16.2400	3,857.44	0	None	17	Major	Yes
Flow Control Valve, Motorized, 10"										
Maintain Flow Control Valve & Actuator, 10"	Each	Staff HVAC Tech	Staff	1.0000	13.25	0	None	1	PM	No
Replace Valve Actuator, 10"	Each	HVAC Technician	Contract	17.5800	5,014.43	0	None	15	Major	No
Replace Flow Control Valve, Motorized, 10"	Each	HVAC Technician	Contract	17.5800	7,840.84	0	None	17	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D2020 Domestic Water Distribution										
Flow Control Valve, Motorized, 12"										
Maintain Flow Control Valve & Actuator, 12"	Each	Staff HVAC Tech	Staff	1.0000	13.25	0	None	1	PM	No
Replace Valve Actuator, 12"	Each	HVAC Technician	Contract	17.5800	5,014.43	0	None	15	Major	No
Replace Flow Control Valve, Motorized, 12"	Each	HVAC Technician	Contract	17.5800	14,325.35	0	None	17	Major	Yes
Gate Valve, 2-3"										
Rearrange Gland, Gate Valve, 2-3"	Each	HVAC Technician	Contract	1.1500	13.08	0	None	10	Major	No
Replace Gate Valve, 2-3"	Each	HVAC Technician	Contract	2.0600	273.50	0	None	17	Major	Yes
Gate Valve, 4"										
Rearrange Gland, Gate Valve, 4"	Each	HVAC Technician	Contract	1.1500	13.08	0	None	10	Major	No
Replace Gate Valve, 4"	Each	HVAC Technician	Contract	12.2400	509.00	0	None	17	Major	Yes
Gate Valve, 6"										
Rearrange Gland, Gate Valve, 6"	Each	HVAC Technician	Contract	1.1500	13.08	0	None	10	Major	No
Replace Gate Valve, 6"	Each	HVAC Technician	Contract	15.0000	867.00	0	None	17	Major	Yes
Gate Valve, 8"										
Rearrange Gland, Gate Valve, 8"	Each	HVAC Technician	Contract	1.1500	13.08	0	None	10	Major	No
Replace Gate Valve, 8"	Each	HVAC Technician	Contract	15.0000	1,695.60	0	None	17	Major	Yes
Gate Valve, 10"										
Rearrange Gland, Gate Valve, 10"	Each	HVAC Technician	Contract	1.1500	13.08	0	None	10	Major	No
Replace Gate Valve, 10"	Each	HVAC Technician	Contract	17.5800	2,593.44	0	None	17	Major	Yes
Gate Valve, 12"										
Rearrange Gland, Gate Valve, 12"	Each	HVAC Technician	Contract	1.1500	13.08	0	None	10	Major	No
Replace Gate Valve, 12"	Each	HVAC Technician	Contract	17.5800	3,491.30	0	None	17	Major	Yes
Gate Valve, 24"										
Rearrange Gland, Gate Valve, 24"	Each	HVAC Technician	Contract	1.1500	13.08	0	None	10	Major	No
Replace Gate Valve, 24"	Each	HVAC Technician	Contract	60.0000	5,552.74	0	None	17	Major	Yes
Globe Valve, 6"										
Lubricate, Rearrange Gland, Globe Valve, 6"	Each	Staff HVAC Tech	Staff	1.1500	1.03	0	None	1	PM	No
Replace Globe Valve, 6"	Each	HVAC Technician	Contract	15.0000	1,107.21	0	None	17	Major	Yes
Pipe & Fittings, 3/4" Copper, Cold Water										
Resolder Joint, Pipe & Fittings, 3/4" Copper, Cold Water	K Ln Ft	Plumber	Contract	5.6800	10.05	0	None	10	Major	No
Replace 10' Section, Pipe & Fittings, 3/4" Copper, Cold Water	K Ln Ft	Plumber	Contract	2.1000	49.90	0	None	20	Major	No
Replace Pipe & Fittings, 3/4" Copper, Cold Water (20% of Pipe)	K Ln Ft	Plumber	Contract	42.0000	998.00	0	None	25	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D2020 Domestic Water Distribution										
Pipe & Fittings, 3/4" Copper, High Temp.										
Resolder Joint, Pipe & Fittings, 3/4" Copper, High Temp.	K Ln Ft	Plumber	Contract	5.6800	10.05	0	None	10	Major	No
Replace 10' Section, Pipe & Fittings, 3/4" Copper, High Temp.	K Ln Ft	Plumber	Contract	2.1000	49.90	0	None	20	Major	No
Replace Pipe & Fittings, 3/4" Copper, High Temp. (20% of Pipe)	K Ln Ft	Plumber	Contract	42.0000	998.00	0	None	25	Major	Yes
Pipe & Fittings, 3/4" Copper, Hot Water										
Resolder Joint, Pipe & Fittings, 3/4" Copper, Hot Water	K Ln Ft	Plumber	Contract	5.6800	10.05	0	None	10	Major	No
Replace 10' Section, Pipe & Fittings, 3/4" Copper, Hot Water	K Ln Ft	Plumber	Contract	2.1000	49.90	0	None	20	Major	No
Replace Pipe & Fittings, 3/4" Copper, Hot Water (20% of Pipe)	K Ln Ft	Plumber	Contract	42.0000	998.00	0	None	25	Major	Yes
Pipe & Fittings, 3/4" Copper, Nitrogen										
Resolder Joint, Pipe & Fittings, 3/4" Copper, Nitrogen	K Ln Ft	Plumber	Contract	5.6800	10.05	0	None	10	Major	No
Replace 10' Section, Pipe & Fittings, 3/4" Copper, Nitrogen	K Ln Ft	Plumber	Contract	2.1000	49.90	0	None	20	Major	No
Replace Pipe & Fittings, 3/4" Copper, Nitrogen (20% of Pipe)	K Ln Ft	Plumber	Contract	42.0000	998.00	0	None	25	Major	Yes
Pipe & Fittings, 3/4" Copper, Oxygen										
Resolder Joint, Pipe & Fittings, 3/4" Copper, Oxygen	K Ln Ft	Plumber	Contract	5.6800	10.05	0	None	10	Major	No
Replace 10' Section, Pipe & Fittings, 3/4" Copper, Oxygen	K Ln Ft	Plumber	Contract	2.1000	49.90	0	None	20	Major	No
Replace Pipe & Fittings, 3/4" Copper, Oxygen (20% of Pipe)	K Ln Ft	Plumber	Contract	42.0000	998.00	0	None	25	Major	Yes
Pipe & Fittings, 1" Copper										
Resolder Joint, Pipe & Fittings, 1" Copper	K Ln Ft	Plumber	Contract	5.6800	10.05	0	None	10	Major	No
Replace 10' Section, Pipe & Fittings, 1" Copper	K Ln Ft	Plumber	Contract	2.3100	57.30	0	None	20	Major	No
Replace Pipe & Fittings, 1" Copper (20% of Pipe)	K Ln Ft	Plumber	Contract	46.2000	1,146.00	0	None	25	Major	Yes
Pipe & Fittings, 2" Copper, Cold Water										
Resolder Joint, Pipe & Fittings, 2" Copper, Cold Water	K Ln Ft	Plumber	Contract	5.6800	10.05	0	None	10	Major	No
Replace 10' Section, Pipe & Fittings, 2" Copper, Cold Water	K Ln Ft	Plumber	Contract	3.9000	153.80	0	None	20	Major	No
Replace Pipe & Fittings, 2" Copper, Cold Water (20% of Pipe)	K Ln Ft	Plumber	Contract	78.0000	3,076.00	0	None	25	Major	Yes
Pipe & Fittings, 2" Copper, Hot Water										
Resolder Joint, Pipe & Fittings, 2" Copper, Hot Water	K Ln Ft	Plumber	Contract	5.6800	10.05	0	None	10	Major	No
Replace 10' Section, Pipe & Fittings, 2" Copper, Hot Water	K Ln Ft	Plumber	Contract	3.9000	153.80	0	None	20	Major	No
Replace Pipe & Fittings, 2" Copper, Hot Water (20% of Pipe)	K Ln Ft	Plumber	Contract	78.0000	3,076.00	0	None	25	Major	Yes
Pipe & Fittings, 4" Copper, Cold Water										
Resolder Joint, Pipe & Fittings, 4" Copper, Cold Water	K Ln Ft	Plumber	Contract	5.6800	10.05	0	None	10	Major	No
Replace 10' Section, Pipe & Fittings, 4" Copper, Cold Water	K Ln Ft	Plumber	Contract	8.2100	588.20	0	None	20	Major	No
Replace Pipe & Fittings, 4" Copper, Cold Water (20% of Pipe)	K Ln Ft	Plumber	Contract	164.2000	11,764.00	0	None	25	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D2020 Domestic Water Distribution										
Pipe & Fittings, 4" Copper, Hot Water										
Resolder Joint, Pipe & Fittings, 4" Copper, Hot Water	K Ln Ft	Plumber	Contract	5.6800	10.05	0	None	10	Major	No
Replace 10' Section, Pipe & Fittings, 4" Copper, Hot Water	K Ln Ft	Plumber	Contract	8.2100	588.20	0	None	20	Major	No
Replace Pipe & Fittings, 4" Copper, Hot Water (20% of Pipe)	K Ln Ft	Plumber	Contract	164.2000	11,764.00	0	None	25	Major	Yes
Pipe & Fittings, 8" Copper										
Resolder Joint, Pipe & Fittings, 8" Copper	K Ln Ft	Plumber	Contract	5.6800	10.05	0	None	10	Major	No
Replace 10' Section, Pipe & Fittings, 8" Copper	K Ln Ft	Plumber	Contract	16.1200	3,490.50	0	None	20	Major	No
Replace Pipe & Fittings, 8" Copper (20% of Pipe)	K Ln Ft	Plumber	Contract	322.4000	69,810.00	0	None	25	Major	Yes
Pipe & Fittings, 1" PVC										
Replace 10' Section, Pipe & Fittings, 1" DWV PVC	K Ln Ft	Plumber	Contract	3.4756	16.90	0	None	10	Major	No
Replace Pipe & Fittings, 1" DWV PVC (20% of Pipe)	K Ln Ft	Plumber	Contract	69.5118	338.00	0	None	30	Major	Yes
Pipe & Fittings, 2" PVC										
Replace 10' Section, Pipe & Fittings, 2" DWV PVC	K Ln Ft	Plumber	Contract	3.7987	23.42	0	None	10	Major	No
Replace Pipe & Fittings, 2" DWV PVC (20% of Pipe)	K Ln Ft	Plumber	Contract	75.9738	468.40	0	None	30	Major	Yes
Pipe & Fittings, 4" PVC										
Replace 10' Section, Pipe & Fittings, 4" DWV PVC	K Ln Ft	Plumber	Contract	4.4178	48.40	0	None	10	Major	No
Replace Pipe & Fittings, 4" DWV PVC (20% of Pipe)	K Ln Ft	Plumber	Contract	88.3558	968.00	0	None	30	Major	Yes
Pipe & Fittings, 6" PVC										
Replace 10' Section, Pipe & Fittings, 6" DWV PVC	K Ln Ft	Plumber	Contract	5.3726	85.10	0	None	10	Major	No
Replace Pipe & Fittings, 6" DWV PVC (20% of Pipe)	K Ln Ft	Plumber	Contract	107.4518	1,702.00	0	None	30	Major	Yes
Pipe & Fittings, 8" PVC										
Replace 10' Section, Pipe & Fittings, 8" DWV PVC	K Ln Ft	Plumber	Contract	6.4500	114.30	0	None	10	Major	No
Replace Pipe & Fittings, 8" DWV PVC (20% of Pipe)	K Ln Ft	Plumber	Contract	129.0000	2,286.00	0	None	30	Major	Yes
Pipe & Fittings, 3/4" Steel										
Replace 10' Section, Pipe & Fittings, 3/4" Steel	K Ln Ft	Plumber	Contract	1.8720	15.05	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 3/4" Steel	K Ln Ft	Plumber	Contract	1.6540	4.84	0	None	25	Major	No
Replace Pipe & Fittings, 3/4" Steel (20% of Pipe)	K Ln Ft	Plumber	Contract	37.4400	301.00	0	None	75	Major	Yes
Pipe & Fittings, 1" Steel										
Replace 10' Section, Pipe & Fittings, 1" Steel	K Ln Ft	Plumber	Contract	1.8720	22.79	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 1" Steel	K Ln Ft	Plumber	Contract	1.6540	4.84	0	None	25	Major	No
Replace Pipe & Fittings, 1" Steel (20% of Pipe)	K Ln Ft	Plumber	Contract	37.4400	455.80	0	None	75	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D2020 Domestic Water Distribution										
Pipe & Fittings, 2" Steel										
Replace 10' Section, Pipe & Fittings, 2" Steel	K Ln Ft	Plumber	Contract	2.3192	44.53	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 2" Steel	K Ln Ft	Plumber	Contract	1.6540	4.84	0	None	25	Major	No
Replace Pipe & Fittings, 2" Steel (20% of Pipe)	K Ln Ft	Plumber	Contract	46.3836	890.60	0	None	75	Major	Yes
Pipe & Fittings, 3" Steel										
Replace 10' Section, Pipe & Fittings, 3" Steel	K Ln Ft	HVAC Technician	Contract	2.4646	83.76	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 3" Steel	K Ln Ft	HVAC Technician	Contract	1.8900	5.00	0	None	25	Major	No
Replace Pipe & Fittings, 3" Steel (20% of Pipe)	K Ln Ft	HVAC Technician	Contract	49.2916	1,675.20	0	None	75	Major	Yes
Pipe & Fittings, 4" Steel										
Replace 10' Section, Pipe & Fittings, 4" Steel	K Ln Ft	Plumber	Contract	3.4756	117.90	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 4" Steel	K Ln Ft	Plumber	Contract	2.6000	9.00	0	None	25	Major	No
Replace Pipe & Fittings, 4" Steel (20% of Pipe)	K Ln Ft	Plumber	Contract	69.5118	2,358.00	0	None	75	Major	Yes
Pipe & Fittings, 6" Steel										
Replace 10' Section, Pipe & Fittings, 6" Steel	K Ln Ft	HVAC Technician	Contract	3.9000	201.70	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 6" Steel	K Ln Ft	HVAC Technician	Contract	3.4700	14.80	0	None	25	Major	No
Replace Pipe & Fittings, 6" Steel (20% of Pipe)	K Ln Ft	HVAC Technician	Contract	78.0000	4,034.00	0	None	75	Major	Yes
Pipe & Fittings, 8" Steel										
Replace 10' Section, Pipe & Fittings, 8" Steel	K Ln Ft	HVAC Technician	Contract	4.4499	301.50	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 8" Steel	K Ln Ft	HVAC Technician	Contract	3.4700	14.80	0	None	25	Major	No
Replace Pipe & Fittings, 8" Steel (20% of Pipe)	K Ln Ft	HVAC Technician	Contract	88.9980	6,852.00	0	None	75	Major	Yes
Pipe & Fittings, 10" Steel										
Replace 10' Section, Pipe & Fittings, 10" Steel	K Ln Ft	Plumber	Contract	4.8800	425.80	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 10" Steel	K Ln Ft	Plumber	Contract	3.4660	14.80	0	None	25	Major	No
Replace Pipe & Fittings, 10" Steel (20% of Pipe)	K Ln Ft	Plumber	Contract	97.6000	9,714.00	0	None	75	Major	Yes
Pipe & Fittings, 12" Steel										
Replace 10' Section, Pipe & Fittings, 12" Steel	K Ln Ft	Plumber	Contract	5.3500	556.30	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 12" Steel	K Ln Ft	Plumber	Contract	3.4660	14.80	0	None	25	Major	No
Replace Pipe & Fittings, 12" Steel (20% of Pipe)	K Ln Ft	Plumber	Contract	107.0000	11,894.00	0	None	75	Major	Yes
Pipe Insulation, Fiberglass, Cold Water										
Re-tape Pipe Insulation, Fiberglass, Cold Water	K Ln Ft	Staff Plumber	Staff	.2600	166.50	0	None	5	PM	No
Replace Pipe Insulation, Fiberglass, Cold Water (20% of Insulation)	K Ln Ft	Plumber	Contract	4.7200	346.60	0	None	25	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D2020 Domestic Water Distribution										
Pipe Insulation, Fiberglass, Heating Water/Steam										
Re-Tape Pipe Insulation, Fiberglass, Heating Water/Steam	K Ln Ft	Staff Plumber	Staff	.2600	166.50	0	None	5	PM	No
Replace Pipe Insulation, Fiberglass, Heating Water/Steam (20% of Insulation)	K Ln Ft	Plumber	Contract	4.7200	615.07	0	None	25	Major	Yes
Pipe Insulation, Fiberglass, Hot Water										
Re-tape Pipe Insulation, Fiberglass, Hot Water	K Ln Ft	Staff Plumber	Staff	.2600	166.50	0	None	5	PM	No
Replace Pipe Insulation, Fiberglass, Hot Water (20% of Insulation)	K Ln Ft	Plumber	Contract	4.7200	346.60	0	None	25	Major	Yes
Plug Valve, 6"										
Lubricate, Repack Gland, Plug Valve, 6"	Each	Staff HVAC Tech	Staff	1.1500	1.03	0	None	1	PM	No
Replace Plug Valve, 6"	Each	HVAC Technician	Contract	15.0000	816.91	0	None	17	Major	Yes
Plug Valve, 8"										
Lubricate, Repack Gland, Plug Valve, 8"	Each	Staff HVAC Tech	Staff	1.1500	1.03	0	None	1	PM	No
Replace Plug Valve, 8"	Each	HVAC Technician	Contract	15.0000	1,331.91	0	None	17	Major	Yes
Pressure Reducer Valve, 1/2"										
Maintain Pressure Reducer Valve, 1/2"	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Replace Pressure Reducer Valve, 1/2"	Each	HVAC Technician	Contract	.6600	85.85	0	None	6	Major	Yes
Pressure Reducer Valve, 1"										
Maintain Pressure Reducer Valve, 1"	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Replace Pressure Reducer Valve, 1"	Each	HVAC Technician	Contract	.8400	104.60	0	None	6	Major	Yes
Pressure Reducer Valve, 1-1/2"										
Maintain Pressure Reducer Valve, 1-1/2"	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Replace Pressure Reducer Valve, 1-1/2"	Each	HVAC Technician	Contract	1.2000	316.75	0	None	6	Major	Yes
Pressure Reducer Valve, 2"										
Maintain Pressure Reducer Valve, 2"	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Replace Pressure Reducer Valve, 2"	Each	HVAC Technician	Contract	1.4200	444.75	0	None	6	Major	Yes
Valve, Non-Drain, 2"										
Lubricate, Repack Gland, Valve, Non Drain, 2"	Each	Staff HVAC Tech	Staff	1.1500	13.08	0	None	1	PM	No
Replace Valve, Non-Drain, 2"	Each	HVAC Technician	Contract	2.4000	671.44	0	None	17	Major	Yes
Valve, Non-Drain, 4"										
Lubricate, Repack Gland, Valve, Non Drain, 4"	Each	Staff HVAC Tech	Staff	1.1500	1.03	0	None	1	PM	No
Replace Valve, Non-Drain, 4"	Each	HVAC Technician	Contract	12.2400	824.58	0	None	17	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D2020 Domestic Water Distribution										
Valve, Non-Drain, 6"										
Lubricate, Repack Gland, Valve, Non Drain, 6"	Each	Staff HVAC Tech	Staff	1.1500	1.03	0	None	1	PM	No
Replace Valve, Non-Drain, 6"	Each	HVAC Technician	Contract	15.0200	1,142.63	0	None	17	Major	Yes
Valve, Non-Drain, 8"										
Lubricate, Repack Gland, Valve, Non Drain, 8"	Each	Staff HVAC Tech	Staff	1.1500	1.03	0	None	1	PM	No
Replace Valve, Non-Drain, 8"	Each	HVAC Technician	Contract	16.2400	1,973.10	0	None	17	Major	Yes
Valve, Non-Drain, 10"										
Lubricate, Repack Gland, Valve, Non Drain, 10"	Each	Staff HVAC Tech	Staff	1.1500	1.03	0	None	1	PM	No
Replace Valve, Non-Drain, 10"	Each	HVAC Technician	Contract	17.5800	3,445.57	0	None	17	Major	Yes
Water Flow Meter, 3/4"										
Maintain Water Flow Meter, 3/4"	Each	Staff Plumber	Staff	.3300	11.80	0	None	1	PM	No
Replace Water Flow Meter, 3/4"	Each	Plumber	Contract	1.1200	531.41	0	None	25	Major	Yes
Water Flow Meter, 1"										
Maintain Water Flow Meter, 1"	Each	Staff Plumber	Staff	.3300	11.80	0	None	1	PM	No
Replace Water Flow Meter, 1"	Each	Plumber	Contract	1.3000	569.37	0	None	25	Major	Yes
Water Flow Meter, 2"										
Maintain Water Flow Meter, 2"	Each	Staff Plumber	Staff	.3300	11.80	0	None	1	PM	No
Replace Water Flow Meter, 2"	Each	Plumber	Contract	2.6000	1,256.59	0	None	25	Major	Yes
Water Flow Meter, 3"										
Maintain Water Flow Meter, 3"	Each	Staff Plumber	Staff	.3300	11.80	0	None	1	PM	No
Replace Water Flow Meter, 3"	Each	Plumber	Contract	10.4000	1,915.45	0	None	25	Major	Yes
Water Flow Meter, 4"										
Maintain Water Flow Meter, 4"	Each	Staff Plumber	Staff	.3300	11.80	0	None	1	PM	No
Replace Water Flow Meter, 4"	Each	Plumber	Contract	20.8000	3,281.73	0	None	25	Major	Yes
Water Flow Meter, 6"										
Maintain Water Flow Meter, 6"	Each	Staff Plumber	Staff	.3300	11.80	0	None	1	PM	No
Replace Water Flow Meter, 6"	Each	Plumber	Contract	31.2000	5,117.58	0	None	25	Major	Yes
Water Flow Meter, 8"										
Maintain Water Flow Meter, 8"	Each	Staff Plumber	Staff	.3300	11.80	0	None	1	PM	No
Replace Water Flow Meter, 8"	Each	Plumber	Contract	39.0200	9,329.89	0	None	25	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D2020 Domestic Water Distribution										
Water Heater, Condensing Style, High Efficiency, 52 Gal.										
Clean Water Heater, Condensing Style, High Efficiency, 52 Gal.	Each	Staff Plumber	Staff	2.6700	.00	0	None	1	PM	No
Overhaul Water Heater, Condensing Style, High Efficiency, 52 Gal.	Each	Staff Plumber	Staff	1.8400	22.67	0	None	5	PM	No
Replace Water Heater, Condensing Style, High Efficiency, 52 Gal.	Each	Plumber	Contract	9.5400	6,600.00	0	None	16	Major	Yes
Water Heater, Condensing Style, High Efficiency, 70 Gal.										
Clean Water Heater, Condensing Style, High Efficiency, 70 Gal.	Each	Staff Plumber	Staff	2.6700	.00	0	None	1	PM	No
Overhaul Water Heater, Condensing Style, High Efficiency, 70 Gal.	Each	Staff Plumber	Staff	1.8400	22.67	0	None	5	PM	No
Replace Water Heater, Condensing Style, High Efficiency, 70 Gal.	Each	Plumber	Contract	9.5400	8,885.00	0	None	16	Major	Yes
Water Heater, Condensing Style, High Efficiency, 120 Gal.										
Clean Water Heater, Condensing Style, High Efficiency, 120 Gal.	Each	Staff Plumber	Staff	2.6700	.00	0	None	1	PM	No
Overhaul Water Heater, Condensing Style, High Efficiency, 120 Gal.	Each	Staff Plumber	Staff	1.8400	22.67	0	None	5	PM	No
Replace Water Heater, Condensing Style, High Efficiency, 120 Gal.	Each	Plumber	Contract	9.5400	12,442.00	0	None	16	Major	Yes
Water Heater, Electric, 5 Gal.										
Check Operation, Water Heater, Electric, 5 Gal.	Each	Staff Plumber	Staff	.3300	.00	0	None	3	PM	No
Drain & Flush Water Heater, Electric, 5 Gal.	Each	Plumber	Contract	1.3300	.00	0	None	7	Major	No
Replace Water Heater, Electric, 5 Gal.	Each	Plumber	Contract	4.3400	299.00	0	None	15	Major	Yes
Water Heater, Electric, 15 Gal.										
Check Operation, Water Heater, Electric, 15 Gal.	Each	Staff Plumber	Staff	.3300	.00	0	None	3	PM	No
Drain & Flush Water Heater, Electric, 15 Gal.	Each	Plumber	Contract	2.6700	.00	0	None	7	Major	No
Replace Water Heater, Electric, 15 Gal.	Each	Plumber	Contract	8.6600	345.00	0	None	15	Major	Yes
Water Heater, Electric, 20 Gal.										
Check Operation, Water Heater, Electric, 20 Gal.	Each	Staff Plumber	Staff	.3300	.00	0	None	3	PM	No
Drain & Flush Water Heater, Electric, 20 Gal.	Each	Plumber	Contract	2.6700	.00	0	None	7	Major	No
Replace Water Heater, Electric, 20 Gal.	Each	Plumber	Contract	8.6600	367.00	0	None	15	Major	Yes
Water Heater, Electric, 30 Gal.										
Check Operation, Water Heater, Electric, 30 Gal.	Each	Staff Plumber	Staff	.3300	.00	0	None	3	PM	No
Drain & Flush Water Heater, Electric, 30 Gal.	Each	Plumber	Contract	2.6700	.00	0	None	7	Major	No
Replace Water Heater, Electric, 30 Gal.	Each	Plumber	Contract	8.6600	425.00	0	None	15	Major	Yes
Water Heater, Electric, 40 Gal.										
Check Operation, Water Heater, Electric, 40 Gal.	Each	Staff Plumber	Staff	.3300	.00	0	None	3	PM	No
Drain & Flush Water Heater, Electric, 40 Gal.	Each	Plumber	Contract	4.0000	.00	0	None	7	Major	No
Replace Water Heater, Electric, 40 Gal.	Each	Plumber	Contract	13.0000	604.00	0	None	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D2020 Domestic Water Distribution										
Water Heater, Electric, 52 Gal.										
Check Operation, Water Heater, Electric, 52 Gal.	Each	Staff Plumber	Staff	.3300	.00	0	None	3	PM	No
Drain & Flush Water Heater, Electric, 52 Gal.	Each	Plumber	Contract	4.0000	.00	0	None	7	Major	No
Replace Water Heater, Electric, 52 Gal.	Each	Plumber	Contract	13.0000	646.00	0	None	15	Major	Yes
Water Heater, Electric, 65 Gal.										
Check Operation, Water Heater, Electric, 65 Gal.	Each	Staff Plumber	Staff	.3300	.00	0	None	3	PM	No
Drain & Flush Water Heater, Electric, 65 Gal.	Each	Plumber	Contract	4.0000	.00	0	None	7	Major	No
Replace Water Heater, Electric, 65 Gal.	Each	Plumber	Contract	13.0000	933.81	0	None	15	Major	Yes
Water Heater, Electric, 70 Gal.										
Check Operation, Water Heater, Electric, 70 Gal.	Each	Staff Plumber	Staff	.3300	.00	0	None	3	PM	No
Drain & Flush Water Heater, Electric, 70 Gal.	Each	Plumber	Contract	4.0000	.00	0	None	7	Major	No
Replace Water Heater, Electric, 70 Gal.	Each	Plumber	Contract	13.0000	1,438.87	0	None	15	Major	Yes
Water Heater, Electric, 80 Gal.										
Check Operation, Water Heater, Electric, 80 Gal.	Each	Staff Plumber	Staff	.3300	.00	0	None	3	PM	No
Drain & Flush Water Heater, Electric, 80 Gal.	Each	Plumber	Contract	4.0000	.00	0	None	7	Major	No
Replace Water Heater, Electric, 80 Gal.	Each	Plumber	Contract	13.0000	3,308.00	0	None	15	Major	Yes
Water Heater, Electric, 100 Gal.										
Check Operation, Water Heater, Electric, 100 Gal.	Each	Staff Plumber	Staff	.3300	.00	0	None	3	PM	No
Drain & Flush Water Heater, Electric, 100 Gal.	Each	Plumber	Contract	4.0000	.00	0	None	7	Major	No
Replace Water Heater, Electric, 100 Gal.	Each	Plumber	Contract	13.0000	3,635.00	0	None	15	Major	Yes
Water Heater, Electric, 120 Gal.										
Check Operation, Water Heater, Electric, 120 Gal.	Each	Staff Plumber	Staff	.3300	.00	0	None	3	PM	No
Drain & Flush Water Heater, Electric, 120 Gal.	Each	Plumber	Contract	4.0000	.00	0	None	7	Major	No
Replace Water Heater, Electric, 120 Gal.	Each	Plumber	Contract	13.0000	6,489.54	0	None	15	Major	Yes
Water Heater, Electric, 300 Gal., 738 Gph										
Check Operation, Water Heater, Electric, 300 Gal., 738 Gph	Each	Staff Plumber	Staff	.3300	.00	0	None	3	PM	No
Drain & Flush Water Heater, Electric, 300 Gal., 738 Gph	Each	Plumber	Contract	4.0000	.00	0	None	7	Major	No
Replace Water Heater, Electric, 300 Gal., 738 Gph	Each	Plumber	Contract	24.0000	24,671.93	0	None	15	Major	Yes
Water Heater, Electric, 1,000 Gal.										
Check Operation, Water Heater, Electric, 1,000 Gal.	Each	Staff Plumber	Staff	.3300	.00	0	None	3	PM	No
Drain & Flush Water Heater, Electric, 1,000 Gal.	Each	Plumber	Contract	4.0000	.00	0	None	7	Major	No
Replace Water Heater, Electric, 1,000 Gal.	Each	Plumber	Contract	66.9000	43,497.44	4	2T Forklift	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D2020 Domestic Water Distribution										
Water Heater, Electric, 1,500 Gal., 1,970 Gph										
Check Operation, Water Heater, Electric, 1,500 Gal., 1,970 Gph	Each	Staff Plumber	Staff	.3300	.00	0	None	3	PM	No
Drain & Flush Water Heater, Electric, 1,500 Gal., 1,970 Gph	Each	Plumber	Contract	4.0000	.00	0	None	7	Major	No
Replace Water Heater, Electric, 1,500 Gal., 1,970 Gph	Each	Plumber	Contract	75.2200	64,310.74	4	2T Forklift	15	Major	Yes
Water Heater, Electric, 2,000 Gal.										
Check Operation, Water Heater, Electric, 2,000 Gal.	Each	Staff Plumber	Staff	.3300	.00	0	None	3	PM	No
Drain & Flush Water Heater, Electric, 2,000 Gal.	Each	Plumber	Contract	4.0000	.00	0	None	7	Major	No
Replace Water Heater, Electric, 2,000 Gal.	Each	Plumber	Contract	93.5400	71,326.44	4	2T Forklift	15	Major	Yes
Water Heater, Gas/Oil, 25 Gph										
Clean Water Heater, Gas/Oil, 25 Gph	Each	Staff Plumber	Staff	2.6700	.00	0	None	1	PM	No
Overhaul Water Heater, Gas/Oil, 25 Gph	Each	Staff Plumber	Staff	1.8400	22.67	0	None	5	PM	No
Replace Water Heater, Gas/Oil, 25 Gph	Each	Plumber	Contract	8.0200	814.56	0	None	10	Major	Yes
Water Heater, Gas/Oil, 30 Gph										
Clean Water Heater, Gas/Oil, 30 Gph	Each	Staff Plumber	Staff	2.6700	.00	0	None	1	PM	No
Overhaul Water Heater, Gas/Oil, 30 Gph	Each	Staff Plumber	Staff	1.8400	22.67	0	None	5	PM	No
Replace Water Heater, Gas/Oil, 30 Gph	Each	Plumber	Contract	8.0200	919.00	0	None	10	Major	Yes
Water Heater, Gas/Oil, 65 Gph										
Clean Water Heater, Gas/Oil, 65 Gph	Each	Staff Plumber	Staff	2.6700	.00	0	None	1	PM	No
Overhaul Water Heater, Gas/Oil, 65 Gph	Each	Staff Plumber	Staff	1.8400	22.67	0	None	5	PM	No
Replace Water Heater, Gas/Oil, 65 Gph	Each	Plumber	Contract	9.5400	1,650.07	0	None	12	Major	Yes
Water Heater, Gas/Oil, 70 Gph										
Clean Water Heater, Gas/Oil, 70 Gph	Each	Staff Plumber	Staff	2.6700	.00	0	None	1	PM	No
Overhaul Water Heater, Gas/Oil, 70 Gph	Each	Staff Plumber	Staff	1.8400	22.67	0	None	5	PM	No
Replace Water Heater, Gas/Oil, 70 Gph	Each	Plumber	Contract	9.5400	1,754.51	0	None	12	Major	Yes
Water Heater, Gas/Oil, 75 Gph										
Clean Water Heater, Gas/Oil, 75 Gph	Each	Staff Plumber	Staff	2.6700	.00	0	None	1	PM	No
Overhaul Water Heater, Gas/Oil, 75 Gph	Each	Staff Plumber	Staff	1.8400	22.67	0	None	5	PM	No
Replace Water Heater, Gas/Oil, 75 Gph	Each	Plumber	Contract	9.5400	1,858.95	0	None	12	Major	Yes
Water Heater, Gas/Oil, 130 Gph										
Clean Water Heater, Gas/Oil, 130 Gph	Each	Staff Plumber	Staff	2.6700	.00	0	None	1	PM	No
Overhaul Water Heater, Gas/Oil, 130 Gph	Each	Staff Plumber	Staff	1.8400	22.67	0	None	5	PM	No
Replace Water Heater, Gas/Oil, 130 Gph	Each	Plumber	Contract	9.5400	3,412.00	0	None	12	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D2020 Domestic Water Distribution										
Water Heater, Gas/Oil, 175 Gph										
Clean Water Heater, Gas/Oil, 175 Gph	Each	Staff Plumber	Staff	2.6700	.00	0	None	1	PM	No
Overhaul Water Heater, Gas/Oil, 175 Gph	Each	Staff Plumber	Staff	1.8400	22.67	0	None	5	PM	No
Replace Water Heater, Gas/Oil, 175 Gph	Each	Plumber	Contract	9.5400	3,845.00	0	None	12	Major	Yes
Water Heater, Gas/Oil, 275 Gph										
Clean Water Heater, Gas/Oil, 275 Gph	Each	Staff Plumber	Staff	2.6700	.00	0	None	1	PM	No
Overhaul Water Heater, Gas/Oil, 275 Gph	Each	Staff Plumber	Staff	1.8400	22.67	0	None	5	PM	No
Replace Water Heater, Gas/Oil, 275 Gph	Each	Plumber	Contract	9.5400	6,036.51	0	None	12	Major	Yes
Water Heater, Gas/Oil, 575 Gph										
Clean & Service Water Heater, Gas/Oil, 575 Gph	Each	Staff Plumber	Staff	8.0000	.00	0	None	2	PM	No
Overhaul Water Heater, Gas/Oil, 575 Gph	Each	Staff Plumber	Staff	1.8400	22.67	0	None	5	PM	No
Replace Water Heater, Gas/Oil, 575 Gph	Each	Plumber	Contract	22.8600	12,302.84	4	2T Forklift	12	Major	Yes
Water Heater, Gas/Oil, 850 Gph										
Clean & Service Water Heater, Gas/Oil, 850 Gph	Each	Staff Plumber	Staff	8.0000	.00	0	None	2	PM	No
Overhaul Water Heater, Gas/Oil, 850 Gph	Each	Staff Painter	Staff	1.8400	22.67	0	None	5	PM	No
Replace Water Heater, Gas/Oil, 850 Gph	Each	Plumber	Contract	26.6600	13,605.40	4	2T Forklift	12	Major	Yes
Water Heater, Gas/Oil, 1,150 Gph										
Clean & Service Water Heater, Gas/Oil, 1,150 Gph	Each	Staff Plumber	Staff	8.0000	.00	0	None	2	PM	No
Overhaul Water Heater, Gas/Oil, 1,150 Gph	Each	Staff Painter	Staff	1.8400	22.67	0	None	5	PM	No
Replace Water Heater, Gas/Oil, 1,150 Gph	Each	Plumber	Contract	26.6600	15,363.03	4	2T Forklift	12	Major	Yes
Water Heater, Instant Hot, 120 Gph										
Check Operation, Water Heater, Instant Hot, 120 Gph	Each	Staff Plumber	Staff	.3300	.00	0	None	1	PM	No
Replace Water Heater, Instant Hot, 120 Gph	Each	Plumber	Contract	.5800	280.75	0	None	15	Major	Yes
Water Softener, 10 Gal.										
Maintain Water Softener, 10 Gal.	Each	Staff Plumber	Staff	.4500	.00	0	None	1	PM	No
Replace Water Softener, 10 Gal.	Each	Plumber	Contract	7.8000	850.00	0	None	15	Major	Yes
Water Softener, 1,000 Gal.										
Maintain Water Softener, 1,000 Gal.	Each	Staff Plumber	Staff	.7000	.00	0	None	1	PM	No
Replace Water Softener, 1,000 Gal.	Each	Plumber	Contract	40.0000	8,689.76	0	None	15	Major	Yes
Water Softener, 2,000 Gal.										
Maintain Water Softener, 2,000 Gal.	Each	Staff Plumber	Staff	.9500	.00	0	None	1	PM	No
Replace Water Softener, 2,000 Gal.	Each	Plumber	Contract	60.0000	17,379.53	0	None	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D2020 Domestic Water Distribution										
Water Storage Tank, 150 Gal.										
Maintain Water Storage Tank, 150 Gal.	Each	Staff Plumber	Staff	1.4700	.00	0	None	1	PM	No
Replace Water Storage Tank, 150 Gal.	Each	Plumber	Contract	2.4900	1,361.18	0	None	20	Major	Yes
Water Storage Tank, 250 Gal.										
Maintain Water Storage Tank, 250 Gal.	Each	Staff Plumber	Staff	1.4700	.00	0	None	1	PM	No
Replace Water Storage Tank, 250 Gal.	Each	Plumber	Contract	2.4900	1,638.02	0	None	20	Major	Yes
Water Storage Tank, 500 Gal.										
Maintain Water Storage Tank, 500 Gal.	Each	Staff Plumber	Staff	1.4700	.00	0	None	1	PM	No
Replace Water Storage Tank, 500 Gal.	Each	Plumber	Contract	2.4900	2,563.87	4	2T Forklift	20	Major	Yes
Water Storage Tank, 1,000 Gal.										
Maintain Water Storage Tank, 1,000 Gal.	Each	Staff Plumber	Staff	1.8900	.00	0	None	1	PM	No
Replace Water Storage Tank, 1,000 Gal.	Each	Plumber	Contract	6.0200	3,067.95	4	2T Forklift	20	Major	Yes
Water Storage Tank, 2,500 Gal.										
Maintain Water Storage Tank, 2,500 Gal.	Each	Staff Plumber	Staff	1.8900	.00	0	None	1	PM	No
Replace Water Storage Tank, 2,500 Gal.	Each	Plumber	Contract	8.0100	5,768.71	4	2T Forklift	20	Major	Yes
Water Storage Tank, 5,000 Gal.										
Maintain Water Storage Tank, 5,000 Gal.	Each	Staff Plumber	Staff	1.8900	.00	0	None	1	PM	No
Replace Water Storage Tank, 5,000 Gal.	Each	Plumber	Contract	10.0200	5,994.84	4	2T Forklift	50	Major	Yes
Water Storage Tank, 10,000 Gal.										
Maintain Water Storage Tank, 10,000 Gal.	Each	Staff Plumber	Staff	1.8900	.00	0	None	1	PM	No
Replace Water Storage Tank, 10,000 Gal.	Each	Plumber	Contract	16.0000	16,362.39	4	4T Forklift	50	Major	Yes
Well Pump, 1 1/2 HP										
Inspect, Clean, Adjust & Lubricate Well Pump, 1 1/2 HP	Each	Staff Plumber	Staff	.3400	4.84	0	None	1	PM	No
Overhaul Well Pump, 1 1/2 HP	Each	Staff Plumber	Staff	.6800	33.44	0	None	5	PM	No
Replace Well Pump, 1 1/2 HP, Pump & Motor Assembly	Each	Plumber	Contract	10.0000	795.00	0	None	20	Major	Yes
Well Pump, 15 HP										
Inspect, Clean, Adjust & Lubricate Well Pump, 15 HP	Each	Staff Plumber	Staff	.3400	12.08	0	None	1	PM	No
Overhaul Well Pump, 15 HP	Each	Staff Plumber	Staff	.6800	40.37	0	None	5	PM	No
Replace Well Pump, 15 HP, Pump & Motor Assembly	Each	Plumber	Contract	10.0000	1,053.54	0	None	20	Major	Yes
Well Pump, 30 HP										
Inspect, Clean, Adjust & Lubricate Well Pump, 30 HP	Each	Staff Plumber	Staff	.3400	12.08	0	None	1	PM	No
Overhaul Well Pump, 30 HP	Each	Staff Plumber	Staff	.6800	40.37	0	None	5	PM	No
Replace Well Pump, 30 HP, Pump & Motor Assembly	Each	Plumber	Contract	10.0000	3,735.00	0	None	20	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D2030 Sanitary Waste										
Backflow Preventer, 3/4"										
Maintain Backflow Preventer, 3/4"	Each	Staff Plumber	Staff	.7800	.00	0	None	1	PM	No
Replace Backflow Preventer, 3/4"	Each	Plumber	Contract	1.0200	472.25	0	None	10	Major	Yes
Backflow Preventer, 1"										
Maintain Backflow Preventer, 1"	Each	Staff Plumber	Staff	.7800	.00	0	None	1	PM	No
Replace Backflow Preventer, 1"	Each	Plumber	Contract	1.4400	562.00	0	None	10	Major	Yes
Backflow Preventer, 2"										
Maintain Backflow Preventer, 2"	Each	Staff Plumber	Staff	1.7900	.00	0	None	1	PM	No
Replace Backflow Preventer, 2"	Each	Plumber	Contract	2.0200	1,029.00	0	None	10	Major	Yes
Backflow Preventer, 4"										
Maintain Backflow Preventer, 4"	Each	Staff Plumber	Staff	2.8600	.00	0	None	1	PM	No
Replace Backflow Preventer, 4"	Each	Plumber	Contract	5.0200	2,797.00	0	None	10	Major	Yes
Backflow Preventer, 6"										
Maintain Backflow Preventer, 6"	Each	Staff Plumber	Staff	3.8500	.00	0	None	1	PM	No
Replace Backflow Preventer, 6"	Each	Plumber	Contract	9.0200	4,565.00	0	None	10	Major	Yes
Backflow Preventer, 8"										
Maintain Backflow Preventer, 8"	Each	Staff Plumber	Staff	4.8500	.00	0	None	1	PM	No
Replace Backflow Preventer, 8"	Each	Plumber	Contract	13.0200	8,461.94	0	None	10	Major	Yes
Backflow Preventer, 10"										
Maintain Backflow Preventer, 10"	Each	Staff Plumber	Staff	5.8600	.00	0	None	1	PM	No
Replace Backflow Preventer, 10"	Each	Plumber	Contract	15.0200	12,496.41	0	None	10	Major	Yes
Floor Drain										
Maintain Floor Drain	Each	Staff Plumber	Staff	.3900	.00	0	None	1	PM	No
Replace Floor Drain	Each	Plumber	Contract	1.0000	142.25	0	None	40	Major	Yes
Pipe & Fittings, 3" Cast Iron										
Replace 10' Section, Pipe & Fittings, 3" Cast Iron	K Ln Ft	Plumber	Contract	2.6700	113.70	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 3" Cast Iron	K Ln Ft	Plumber	Contract	1.8900	5.00	0	None	25	Major	No
Replace Pipe & Fittings, 3" Cast Iron (20% of Pipe)	K Ln Ft	Plumber	Contract	53.4000	2,274.00	0	None	75	Major	Yes
Pipe & Fittings, 4" Cast Iron										
Replace 10' Section, Pipe & Fittings, 4" Cast Iron	K Ln Ft	Plumber	Contract	5.6700	147.70	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 4" Cast Iron	K Ln Ft	Plumber	Contract	2.6000	9.00	0	None	25	Major	No
Replace Pipe & Fittings, 4" Cast Iron (20% of Pipe)	K Ln Ft	Plumber	Contract	113.4000	2,954.00	0	None	75	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D2030 Sanitary Waste										
Pipe & Fittings, 6" Cast Iron										
Replace 10' Section, Pipe & Fittings, 6" Cast Iron	K Ln Ft	Plumber	Contract	5.6700	253.90	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 6" Cast Iron	K Ln Ft	Plumber	Contract	2.6000	16.95	0	None	25	Major	No
Replace Pipe & Fittings, 6" Cast Iron (20% of Pipe)	K Ln Ft	Plumber	Contract	113.4000	5,078.00	0	None	75	Major	Yes
Pipe & Fittings, 10" Cast Iron										
Replace 10' Section, Pipe & Fittings, 10" Cast Iron	K Ln Ft	Plumber	Contract	5.9300	658.10	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 10" Cast Iron	K Ln Ft	Plumber	Contract	2.6000	16.95	0	None	25	Major	No
Replace Pipe & Fittings, 10" Cast Iron (20% of Pipe)	K Ln Ft	Plumber	Contract	118.6000	13,162.00	0	None	75	Major	Yes
Pipe & Fittings, 12" Cast Iron										
Replace 10' Section, Pipe & Fittings, 12" Cast Iron	K Ln Ft	Plumber	Contract	6.6700	956.10	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 12" Cast Iron	K Ln Ft	Plumber	Contract	2.6000	16.95	0	None	25	Major	No
Replace Pipe & Fittings, 12" Cast Iron (20% of Pipe)	K Ln Ft	Plumber	Contract	133.4000	19,122.00	0	None	75	Major	Yes
Pipe & Fittings, 18" Cast Iron										
Replace 10' Section, Pipe & Fittings, 18" Cast Iron	K Ln Ft	Plumber	Contract	8.2650	1,397.20	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 18" Cast Iron	K Ln Ft	Plumber	Contract	2.6000	16.95	0	None	25	Major	No
Replace Pipe & Fittings, 18" Cast Iron (20% of Pipe)	K Ln Ft	Plumber	Contract	165.3000	27,944.00	0	None	75	Major	Yes
Pipe & Fittings, 1" PVC										
Replace 10' Section, Pipe & Fittings, 1" DWV PVC	K Ln Ft	Plumber	Contract	3.4756	16.90	0	None	10	Major	No
Replace Pipe & Fittings, 1" DWV PVC (20% of Pipe)	K Ln Ft	Plumber	Contract	69.5118	338.00	0	None	30	Major	Yes
Pipe & Fittings, 2" PVC										
Replace 10' Section, Pipe & Fittings, 2" DWV PVC	K Ln Ft	Plumber	Contract	3.7987	23.42	0	None	10	Major	No
Replace Pipe & Fittings, 2" DWV PVC (20% of Pipe)	K Ln Ft	Plumber	Contract	75.9738	468.40	0	None	30	Major	Yes
Pipe & Fittings, 4" PVC										
Replace 10' Section, Pipe & Fittings, 4" DWV PVC	K Ln Ft	Plumber	Contract	4.4178	48.40	0	None	10	Major	No
Replace Pipe & Fittings, 4" DWV PVC (20% of Pipe)	K Ln Ft	Plumber	Contract	88.3558	968.00	0	None	30	Major	Yes
Pipe & Fittings, 6" PVC										
Replace 10' Section, Pipe & Fittings, 6" DWV PVC	K Ln Ft	Plumber	Contract	5.3726	85.10	0	None	10	Major	No
Replace Pipe & Fittings, 6" DWV PVC (20% of Pipe)	K Ln Ft	Plumber	Contract	107.4518	1,702.00	0	None	30	Major	Yes
Pipe & Fittings, 8" PVC										
Replace 10' Section, Pipe & Fittings, 8" DWV PVC	K Ln Ft	Plumber	Contract	6.4500	114.30	0	None	10	Major	No
Replace Pipe & Fittings, 8" DWV PVC (20% of Pipe)	K Ln Ft	Plumber	Contract	129.0000	2,286.00	0	None	30	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D2030 Sanitary Waste										
Sewage Ejector Pump, 1 HP										
Inspect & Lubricate Sewage Ejector Pump, 1 HP	Each	Staff Plumber	Staff	.3500	2.44	0	None	1	PM	No
Replace Sewage Ejector Pump, 1 HP	Each	Plumber	Contract	8.0000	1,148.56	0	None	20	Major	Yes
Sewage Ejector Pump, 30 HP										
Inspect & Lubricate Sewage Ejector Pump, 30 HP	Each	Staff Plumber	Staff	.3500	27.10	0	None	1	PM	No
Replace Sewage Ejector Pump, 30 HP	Each	Plumber	Contract	20.0000	6,022.58	0	None	30	Major	Yes
Sewage Tank, 500 Gal.										
Maintain Sewage Tank, 500 Gal.	Each	Staff Plumber	Staff	1.0000	.00	0	None	1	PM	No
Replace Sewage Tank, 500 Gal.	Each	Plumber	Contract	16.6200	1,996.53	0	None	20	Major	Yes
D2040 Rain Water Drainage										
Pipe & Fittings, 1" PVC										
Replace 10' Section, Pipe & Fittings, 1" DWV PVC	K Ln Ft	Plumber	Contract	3.4756	16.90	0	None	10	Major	No
Replace Pipe & Fittings, 1" DWV PVC (20% of Pipe)	K Ln Ft	Plumber	Contract	69.5118	338.00	0	None	30	Major	Yes
Pipe & Fittings, 2" PVC										
Replace 10' Section, Pipe & Fittings, 2" DWV PVC	K Ln Ft	Plumber	Contract	3.7987	23.42	0	None	10	Major	No
Replace Pipe & Fittings, 2" DWV PVC (20% of Pipe)	K Ln Ft	Plumber	Contract	75.9738	468.40	0	None	30	Major	Yes
Pipe & Fittings, 4" PVC										
Replace 10' Section, Pipe & Fittings, 4" DWV PVC	K Ln Ft	Plumber	Contract	4.4178	48.40	0	None	10	Major	No
Replace Pipe & Fittings, 4" DWV PVC (20% of Pipe)	K Ln Ft	Plumber	Contract	88.3558	968.00	0	None	30	Major	Yes
Pipe & Fittings, 6" PVC										
Replace 10' Section, Pipe & Fittings, 6" DWV PVC	K Ln Ft	Plumber	Contract	5.3726	85.10	0	None	10	Major	No
Replace Pipe & Fittings, 6" DWV PVC (20% of Pipe)	K Ln Ft	Plumber	Contract	107.4518	1,702.00	0	None	30	Major	Yes
Pipe & Fittings, 8" PVC										
Replace 10' Section, Pipe & Fittings, 8" DWV PVC	K Ln Ft	Plumber	Contract	6.4500	114.30	0	None	10	Major	No
Replace Pipe & Fittings, 8" DWV PVC (20% of Pipe)	K Ln Ft	Plumber	Contract	129.0000	2,286.00	0	None	30	Major	Yes
Roof Drain, 2"										
Maintain Roof Drain, 2"	Each	Staff Plumber	Staff	.3900	.46	0	None	1	PM	No
Replace Roof Drain, 2"	Each	Plumber	Contract	2.4000	142.25	0	None	40	Major	Yes
Roof Drain, 4-6"										
Maintain Roof Drain, 4-6"	Each	Staff Plumber	Staff	.3900	.46	0	None	1	PM	No
Replace Roof Drain, 4-6"	Each	Plumber	Contract	2.4000	210.75	0	None	40	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D2040 Rain Water Drainage										
Storm Water & Drain Lift Station, 2 HP										
Maintain Storm Water & Drain Lift Station, 2 HP	Each	Staff Plumber	Staff	8.0000	11.30	0	None	1	PM	No
Repair Storm Water & Drain Lift Station, 2 HP	Each	Plumber	Contract	10.0000	734.47	0	None	4	Major	No
Replace Storm Water & Drain Lift Station, 2 HP	Each	Plumber	Contract	11.8600	3,841.79	0	None	12	Major	Yes
Storm Water & Drain Lift Station, 5 HP										
Maintain Storm Water & Drain Lift Station, 5 HP	Each	Staff Plumber	Staff	8.0000	11.30	0	None	1	PM	No
Repair Storm Water & Drain Lift Station, 5 HP	Each	Plumber	Contract	10.0000	2,429.36	0	None	4	Major	No
Replace Storm Water & Drain Lift Station, 5 HP	Each	Plumber	Contract	11.8600	4,293.77	0	None	12	Major	Yes
Sump Pump, 1/2 HP										
Inspect & Lubricate Sump Pump, 1/2 HP	Each	Staff Plumber	Staff	.3300	2.44	0	None	1	PM	No
Overhaul Sump Pump, 1/2 HP	Each	Staff Plumber	Staff	.6800	4.21	0	None	5	PM	No
Replace Pump & Motor Assembly, Sump Pump, 1/2 HP	Each	Plumber	Contract	3.3800	225.00	0	None	20	Major	Yes
Sump Pump, 1 HP										
Inspect & Lubricate Sump Pump, 1 HP	Each	Staff Plumber	Staff	.3300	2.44	0	None	1	PM	No
Overhaul Sump Pump, 1 HP	Each	Staff Plumber	Staff	.6800	4.21	0	None	5	PM	No
Replace Pump & Motor Assembly, Sump Pump, 1 HP	Each	Plumber	Contract	3.3800	339.00	0	None	20	Major	Yes
Sump Pump, 3 HP										
Inspect & Lubricate Sump Pump, 3 HP	Each	Staff Plumber	Staff	.3300	2.44	0	None	1	PM	No
Overhaul Sump Pump, 3 HP	Each	Staff Plumber	Staff	.6800	4.21	0	None	5	PM	No
Replace Pump & Motor Assembly, Sump Pump, 3 HP	Each	Plumber	Contract	3.3800	795.00	0	None	20	Major	Yes
Sump Pump, 20 HP										
Inspect & Lubricate Sump Pump, 20 HP	Each	Staff Plumber	Staff	.3300	2.44	0	None	1	PM	No
Overhaul Sump Pump, 20 HP	Each	Staff Plumber	Staff	.6800	4.21	0	None	5	PM	No
Replace Pump & Motor Assembly, Sump Pump, 20 HP	Each	Plumber	Contract	16.0000	2,444.27	4	2T Forklift	20	Major	Yes
D2090 Other Plumbing Systems										
Air Compressor, 3/4 HP										
Check & Adjust, Air Compressor, 3/4 HP	Each	Staff Plumber	Staff	1.1100	.00	0	None	1	PM	No
Repair Air Compressor, 3/4 HP	Each	Plumber	Contract	10.2100	27.97	0	None	4	Major	No
Replace Air Compressor, 3/4 HP	Each	Plumber	Contract	3.0800	2,875.63	0	None	25	Major	Yes
Air Compressor, 2 HP										
Check & Adjust, Air Compressor, 2 HP	Each	Staff Plumber	Staff	1.1100	.00	0	None	1	PM	No
Repair Air Compressor, 2 HP	Each	Plumber	Contract	10.2100	31.25	0	None	4	Major	No
Replace Air Compressor, 2 HP	Each	Plumber	Contract	3.0800	4,853.33	0	None	25	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D2090 Other Plumbing Systems										
Air Compressor, 5 HP										
Check & Adjust, Air Compressor, 5 HP	Each	Staff Plumber	Staff	1.1100	.00	0	None	1	PM	No
Repair Air Compressor, 5 HP	Each	Plumber	Contract	10.2100	39.30	0	None	4	Major	No
Replace Air Compressor, 5 HP	Each	Plumber	Contract	6.0000	5,892.33	0	None	25	Major	Yes
Air Compressor, 10 HP										
Check & Adjust, Air Compressor, 10 HP	Each	Staff Plumber	Staff	1.1100	.00	0	None	1	PM	No
Repair Air Compressor, 10 HP	Each	Plumber	Contract	13.3700	39.30	0	None	4	Major	No
Replace Air Compressor, 10 HP	Each	Plumber	Contract	10.0000	7,624.00	0	None	25	Major	Yes
Air Compressor, 15 HP										
Check & Adjust, Air Compressor, 15 HP	Each	Staff Plumber	Staff	1.1100	.00	0	None	1	PM	No
Repair Air Compressor, 15 HP	Each	Plumber	Contract	13.3700	41.16	0	None	4	Major	No
Replace Air Compressor, 15 HP	Each	Plumber	Contract	20.0000	8,358.33	0	None	25	Major	Yes
Air Compressor, 25 HP										
Check & Adjust, Air Compressor, 25 HP	Each	Staff Plumber	Staff	1.1100	.00	0	None	1	PM	No
Repair Air Compressor, 25 HP	Each	Plumber	Contract	13.3700	41.16	0	None	4	Major	No
Replace Air Compressor, 25 HP	Each	Plumber	Contract	40.0000	12,819.00	0	None	25	Major	Yes
Air Compressor, 50 HP										
Check & Adjust, Air Compressor, 50 HP	Each	Staff Plumber	Staff	1.1100	.00	0	None	1	PM	No
Repair Air Compressor, 50 HP	Each	Plumber	Contract	13.3700	41.16	0	None	4	Major	No
Replace Air Compressor, 50 HP	Each	Plumber	Contract	80.0000	45,113.21	0	None	25	Major	Yes
Air Compressor, 150 HP										
Check & Adjust, Air Compressor, 150 HP	Each	Staff Plumber	Staff	1.1100	.00	0	None	1	PM	No
Repair Air Compressor, 150 HP	Each	Plumber	Contract	13.3700	73.04	0	None	4	Major	No
Replace Air Compressor, 150 HP	Each	Plumber	Contract	208.0000	129,176.80	0	None	25	Major	Yes
Air Compressor, 250 HP, 1,000 Cfm										
Check & Adjust, Air Compressor, 250 HP, 1,000 Cfm	Each	Staff Plumber	Staff	1.1100	.00	0	None	1	PM	No
Repair Air Compressor, 250 HP, 1,000 Cfm	Each	Plumber	Contract	13.3700	73.04	0	None	4	Major	No
Replace Air Compressor, 250 HP, 1,000 Cfm	Each	Plumber	Contract	208.0000	298,825.00	0	None	25	Major	Yes
Air Compressor, 500 HP, 2,000 Cfm										
Check & Adjust, Air Compressor, 500 HP, 2,000 Cfm	Each	Staff Plumber	Staff	1.1100	.00	0	None	1	PM	No
Repair Air Compressor, 500 HP, 2,000 Cfm	Each	Plumber	Contract	13.3700	146.07	0	None	4	Major	No
Replace Air Compressor, 500 HP, 2,000 Cfm	Each	Plumber	Contract	208.0000	597,651.00	0	None	25	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D2090 Other Plumbing Systems										
Air Compressor, 700 HP, 3,000 Cfm										
Check & Adjust, Air Compressor, 700 HP, 3,000 Cfm,	Each	Staff Plumber	Staff	1.1100	.00	0	None	1	PM	No
Repair Air Compressor, 700 HP, 3,000 Cfm	Each	Plumber	Contract	13.3700	219.12	0	None	4	Major	No
Replace Air Compressor, 700 HP, 3,000 Cfm	Each	Plumber	Contract	208.0000	896,476.00	0	None	25	Major	Yes
Compressed Air Dryer										
Check & Adjust Compressed Air Dryer	Each	Staff Plumber	Staff	.5000	.00	0	None	1	PM	No
Recharge Compressed Air Dryer	Each	Staff Plumber	Staff	.5000	22.01	0	None	5	PM	No
Replace Compressor, Compressed Air Dryer	Each	Plumber	Contract	1.7500	922.47	0	None	10	Major	No
Replace Compressed Air Dryer	Each	Plumber	Contract	2.0000	2,973.30	0	None	15	Major	Yes
Gas Compressor, 7 1/2 HP										
Check & Adjust, Gas Compressor, 7 1/2 HP	Each	Staff Plumber	Staff	1.1100	.00	0	None	1	PM	No
Repair Gas Compressor, 7 1/2 HP	Each	Plumber	Contract	10.2100	39.30	0	None	4	Major	No
Replace Gas Compressor, 7 1/2 HP	Each	Plumber	Contract	6.0000	6,989.00	0	None	25	Major	Yes
Reverse Osmosis/Deionized Water System										
Maintain Reverse Osmosis/Deionized Water System	Each	Staff Plumber	Staff	4.0000	.00	0	None	1	PM	No
Replace Reverse Osmosis/Deionized Water System	Each	Plumber	Contract	32.0000	9,378.59	0	None	15	Major	Yes
D30 HVAC										
D3010 Energy Supply										
Fluid Storage Tank, 5,000 Gal.										
Maintain Storage Tank, Fluid, 5,000 Gal.	Each	Staff HVAC Tech	Staff	14.3500	.00	0	None	1	PM	No
Replace Storage Tank, Fluid, 5,000 Gal.	Each	HVAC Technician	Contract	10.0200	7,207.33	0	None	30	Major	Yes
Oil Storage Tank, 15,000 Gal.										
Maintain Oil Storage Tank, 15,000 Gal.	Each	Staff HVAC Tech	Staff	3.9400	.00	0	None	1	PM	No
Replace Oil Storage Tank, 15,000 Gal.	Each	HVAC Technician	Contract	18.9500	24,910.93	0	None	30	Major	Yes
Fuel Oil Day Tank, 100 Gal.										
Maintain Fuel Oil Day Tank, 100 Gal.	Each	Staff HVAC Tech	Staff	3.1100	.00	0	None	1	PM	No
Replace Fuel Oil Day Tank, 100 Gal.	Each	HVAC Technician	Contract	2.4900	157.79	0	None	30	Major	Yes
Fuel Oil Pump, 1/2 HP										
Maintain Fuel Oil Pump, 1/2 HP	Each	Staff HVAC Tech	Staff	.3300	.85	0	None	1	PM	No
Repair Fuel Oil Pump, 1/2 HP	Each	HVAC Technician	Contract	3.5300	39.13	0	None	10	Major	No
Replace Fuel Oil Pump, 1/2 HP	Each	HVAC Technician	Contract	5.2000	903.95	0	None	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3010 Energy Supply										
Fuel Oil Pump, 1 1/2 HP										
Maintain Fuel Oil Pump, 1 1/2 HP	Each	Staff HVAC Tech	Staff	.5000	.00	0	None	1	PM	No
Repair Fuel Oil Pump, 1 1/2 HP	Each	HVAC Technician	Contract	3.5300	39.13	0	None	10	Major	No
Replace Fuel Oil Pump, 1 1/2 HP	Each	HVAC Technician	Contract	5.2000	999.99	0	None	15	Major	Yes
Fuel Oil Pump, 3 HP										
Maintain Fuel Oil Pump, 3 HP	Each	Staff HVAC Tech	Staff	.5000	12.92	0	None	1	PM	No
Repair Fuel Oil Pump, 3 HP	Each	HVAC Technician	Contract	3.5300	49.35	0	None	10	Major	No
Replace Fuel Oil Pump, 3 HP	Each	HVAC Technician	Contract	7.4000	1,144.06	0	None	15	Major	Yes
Fuel Oil Pump, 5 HP										
Maintain Fuel Oil Pump, 5 HP	Each	Staff HVAC Tech	Staff	.5000	18.36	0	None	1	PM	No
Repair Fuel Oil Pump, 5 HP	Each	HVAC Technician	Contract	3.5300	71.20	0	None	10	Major	No
Replace Fuel Oil Pump, 5 HP	Each	HVAC Technician	Contract	7.4000	1,336.15	0	None	15	Major	Yes
Fuel Oil Pump, 10 HP										
Maintain Fuel Oil Pump, 10 HP	Each	Staff HVAC Tech	Staff	.5000	33.30	0	None	1	PM	No
Repair Fuel Oil Pump, 10 HP	Each	HVAC Technician	Contract	3.5300	117.45	0	None	10	Major	No
Replace Fuel Oil Pump, 10 HP	Each	HVAC Technician	Contract	8.6000	1,816.37	0	None	15	Major	Yes
Generator Day Tank, 65 Gal.										
Maintain Generator Day Tank, 65 Gal.	Each	Staff HVAC Tech	Staff	3.9100	.00	0	None	1	PM	No
Replace Generator Day Tank, 65 Gal.	Each	HVAC Technician	Contract	4.0000	305.62	0	None	30	Major	Yes
Generator Day Tank, 275 Gal.										
Maintain Generator Day Tank, 275 Gal.	Each	Staff HVAC Tech	Staff	3.9100	.00	0	None	1	PM	No
Replace Generator Day Tank, 275 Gal.	Each	HVAC Technician	Contract	4.0000	1,293.02	0	None	30	Major	Yes
Leak Detection, Panel & Float Assembly										
Replace Leak Detection, Panel & Float Assembly	Each	HVAC Technician	Contract	16.0000	3,127.85	0	None	30	Major	Yes
Oil Storage Tank, 275 Gal.										
Maintain Oil Storage Tank, 275 Gal.	Each	Staff HVAC Tech	Staff	3.1100	.00	0	None	1	PM	No
Replace Oil Storage Tank, 275 Gal.	Each	HVAC Technician	Contract	2.4900	402.13	0	None	30	Major	Yes
Oil Storage Tank, 25,000 Gal.										
Maintain Oil Storage Tank, 25,000 Gal.	Each	Staff HVAC Tech	Staff	3.9400	.00	0	None	1	PM	No
Replace Oil Storage Tank, 25,000 Gal.	Each	HVAC Technician	Contract	27.8200	42,247.10	0	None	30	Major	Yes
Oil Storage Tank, 75,000 Gal.										
Maintain Oil Storage Tank, 75,000 Gal.	Each	Staff HVAC Tech	Staff	11.8200	.00	0	None	1	PM	No
Replace Oil Storage Tank, 75,000 Gal.	Each	HVAC Technician	Contract	83.4600	113,408.00	0	None	30	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3010 Energy Supply										
Oil Storage Tank, 250,000 Gal.										
Maintain Oil Storage Tank, 250,000 Gal.	Each	Staff HVAC Tech	Staff	39.4000	.00	0	None	1	PM	No
Replace Oil Storage Tank, 250,000 Gal.	Each	HVAC Technician	Contract	278.2000	378,026.00	0	None	30	Major	Yes
Oil Storage Tank, Fiberglass, 500 Gal.										
Maintain Oil Storage Tank, Fiberglass, 500 Gal.	Each	Staff HVAC Tech	Staff	3.1100	.00	0	None	1	PM	No
Replace Oil Storage Tank, Fiberglass, 500 Gal.	Each	HVAC Technician	Contract	5.9900	2,561.32	0	None	30	Major	Yes
Oil Storage Tank, Steel, 1,500 Gal.										
Maintain Oil Storage Tank Steel, 1,500 Gal.	Each	Staff HVAC Tech	Staff	3.3800	.00	0	None	1	PM	No
Replace Oil Storage Tank Steel, 1,500 Gal.	Each	HVAC Technician	Contract	7.0000	4,639.92	0	None	30	Major	Yes
Pipe & Fittings, 1/2" Copper, Fuel Oil										
Resolder Joint, Pipe & Fittings, 2" Copper, Fuel Oil	K Ln Ft	HVAC Technician	Contract	5.6800	19.30	0	None	10	Major	No
Replace 10' Section, Pipe & Fittings, 1/2" Copper, Fuel Oil	K Ln Ft	HVAC Technician	Contract	1.9261	23.80	0	None	20	Major	No
Replace Pipe & Fittings, 1/2" Copper, Fuel Oil (20% of Pipe)	K Ln Ft	HVAC Technician	Contract	38.5220	476.00	0	None	25	Major	Yes
Pipe & Fittings, 1" Copper, Fuel Oil										
Resolder Joint, Pipe & Fittings, 1" Copper, Fuel Oil	K Ln Ft	HVAC Technician	Contract	5.6800	10.05	0	None	10	Major	No
Replace 10' Section, Pipe & Fittings, 1" Copper, Fuel Oil	K Ln Ft	HVAC Technician	Contract	2.3100	57.30	0	None	20	Major	No
Replace Pipe & Fittings, 1" Copper, Fuel Oil (20% of Pipe)	K Ln Ft	HVAC Technician	Contract	46.2000	1,146.00	0	None	25	Major	Yes
Pipe & Fittings, 2" Copper, Fuel Oil										
Resolder Joint, Pipe & Fittings, 2" Copper, Fuel Oil	K Ln Ft	HVAC Technician	Contract	5.6800	10.05	0	None	10	Major	No
Replace 10' Section, Pipe & Fittings, 2" Copper, Fuel Oil	K Ln Ft	HVAC Technician	Contract	3.9000	153.80	0	None	20	Major	No
Replace Pipe & Fittings, 2" Copper, Fuel Oil (20% of Pipe)	K Ln Ft	HVAC Technician	Contract	78.0000	3,076.00	0	None	25	Major	Yes
Pipe & Fittings, 2" Steel, Gas										
Replace 10' Section, Pipe & Fittings, 2" Steel, Gas	K Ln Ft	HVAC Technician	Contract	2.3192	44.53	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 2" Steel, Gas	K Ln Ft	HVAC Technician	Contract	1.6540	4.84	0	None	25	Major	No
Replace Pipe & Fittings, 2" Steel, Gas (20% of Pipe)	K Ln Ft	HVAC Technician	Contract	46.3836	890.60	0	None	75	Major	Yes
Pipe & Fittings, 3" Steel, Gas										
Replace 10' Section, Pipe & Fittings, 3" Steel, Gas	K Ln Ft	HVAC Technician	Contract	2.4646	83.76	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 3" Steel, Gas	K Ln Ft	HVAC Technician	Contract	1.8900	5.00	0	None	25	Major	No
Replace Pipe & Fittings, 3" Steel, Gas (20% of Pipe)	K Ln Ft	HVAC Technician	Contract	49.2916	1,675.20	0	None	75	Major	Yes
Pipe & Fittings, 4" Steel, Gas										
Replace 10' Section, Pipe & Fittings, 4" Steel, Gas	K Ln Ft	HVAC Technician	Contract	3.4756	117.90	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 4" Steel, Gas	K Ln Ft	HVAC Technician	Contract	2.6000	9.00	0	None	25	Major	No
Replace Pipe & Fittings, 4" Steel, Gas (20% of Pipe)	K Ln Ft	HVAC Technician	Contract	69.5118	2,358.00	0	None	75	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3010 Energy Supply										
Pipe & Fittings, 6" Steel, Gas										
Replace 10' Section, Pipe & Fittings, 6" Steel, Gas	K Ln Ft	HVAC Technician	Contract	3.9000	201.70	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 6" Steel, Gas	K Ln Ft	HVAC Technician	Contract	3.4660	14.80	0	None	25	Major	No
Replace Pipe & Fittings, 6" Steel, Gas (20% of Pipe)	K Ln Ft	HVAC Technician	Contract	78.0000	4,034.00	0	None	75	Major	Yes
Solar Panel, 3'x8'										
Replace Solar Panel, 3'x8'	Each	Electrician	Contract	5.6800	709.66	0	None	15	Major	Yes
D3020 Heat Generating Systems										
Air Separator, 2"										
Maintain Air Separator, 2"	Each	Staff HVAC Tech	Staff	1.0000	.00	0	None	1	PM	No
Replace Air Separator, 2"	Each	HVAC Technician	Contract	1.0000	897.39	0	None	15	Major	Yes
Air Separator, 4"										
Maintain Air Separator, 4"	Each	Staff HVAC Tech	Staff	1.0000	.00	0	None	1	PM	No
Replace Air Separator, 4"	Each	HVAC Technician	Contract	5.3000	1,825.00	0	None	15	Major	Yes
Air Separator, 8"										
Maintain Air Separator, 8"	Each	Staff HVAC Tech	Staff	1.0000	.00	0	None	1	PM	No
Replace Air Separator, 8"	Each	HVAC Technician	Contract	5.3000	3,788.24	0	None	15	Major	Yes
Ball Valve, 1"										
Lubricate, Repack Gland, Ball Valve, 1"	Each	Staff HVAC Tech	Staff	1.1700	1.03	0	None	1	PM	No
Replace Ball Valve, 1"	Each	HVAC Technician	Contract	2.0600	145.20	0	None	20	Major	Yes
Ball Valve, 2"										
Lubricate, Repack Gland, Ball Valve, 2"	Each	Staff HVAC Tech	Staff	1.1700	1.03	0	None	1	PM	No
Replace Ball Valve, 2"	Each	HVAC Technician	Contract	2.0600	272.75	0	None	20	Major	Yes
Ball Valve, 4"										
Lubricate, Repack Gland, Ball Valve, 4"	Each	Staff HVAC Tech	Staff	1.1700	1.03	0	None	1	PM	No
Replace Ball Valve, 4"	Each	HVAC Technician	Contract	2.0600	495.49	0	None	20	Major	Yes
Ball Valve, 6"										
Lubricate, Repack Gland, Ball Valve, 6"	Each	Staff HVAC Tech	Staff	1.1700	1.03	0	None	1	PM	No
Replace Ball Valve, 6"	Each	HVAC Technician	Contract	2.0600	1,158.27	0	None	20	Major	Yes
Boiler Blowoff System										
Repair Boiler Blowoff System	Each	HVAC Technician	Contract	4.9500	437.55	0	None	7	Major	No
Replace Boiler Blowoff System	Each	HVAC Technician	Contract	8.3200	2,817.13	0	None	30	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3020 Heat Generating Systems										
Chemical Feed System										
Maintain Chemical Feed System	Each	Staff HVAC Tech	Staff	22.0000	1,139.23	0	None	1	PM	No
Replace Chemical Feed System	Each	HVAC Technician	Contract	6.4400	6,259.32	0	None	15	Major	Yes
Circulation Pump, 5 HP, Hot Water										
Maintain Circulation Pump, 5 HP, Hot Water	Each	Staff HVAC Tech	Staff	.3300	13.03	0	None	1	PM	No
Repair Circulation Pump, 5 HP, Hot Water	Each	HVAC Technician	Contract	.4900	42.13	0	None	5	Major	No
Replace Circulation Pump, 5 HP, Hot Water	Each	HVAC Technician	Contract	4.5000	2,577.00	0	None	15	Major	Yes
Circulation Pump, 7 1/2 HP, Hot Water										
Maintain Circulation Pump, 7 1/2 HP, Hot Water	Each	Staff HVAC Tech	Staff	.3300	13.03	0	None	1	PM	No
Repair Circulation Pump, 7 1/2 HP, Hot Water	Each	HVAC Technician	Contract	.5700	42.13	0	None	5	Major	No
Replace Circulation Pump, 7 1/2 HP, Hot Water	Each	HVAC Technician	Contract	5.6800	2,950.00	0	None	15	Major	Yes
Circulation Pump, 10 HP, Hot Water										
Maintain Circulation Pump, 10 HP, Hot Water	Each	Staff HVAC Tech	Staff	.3300	13.03	0	None	1	PM	No
Repair Circulation Pump, 10 HP, Hot Water	Each	HVAC Technician	Contract	.6500	72.19	0	None	5	Major	No
Replace Circulation Pump, 10 HP, Hot Water	Each	HVAC Technician	Contract	5.6800	3,323.00	0	None	15	Major	Yes
Circulation Pump, 25 HP, Hot Water										
Maintain Circulation Pump, 25 HP, Hot Water	Each	Staff HVAC Tech	Staff	.3300	15.64	0	None	1	PM	No
Repair Circulation Pump, 25 HP, Hot Water	Each	HVAC Technician	Contract	1.1400	84.23	0	None	5	Major	No
Replace Circulation Pump, 25 HP, Hot Water	Each	HVAC Technician	Contract	8.0000	5,561.00	4	2T Forklift	15	Major	Yes
Circulation Pump, 75 HP, Hot Water										
Maintain Circulation Pump, 75 HP, Hot Water	Each	Staff HVAC Tech	Staff	.3300	16.96	0	None	1	PM	No
Repair Circulation Pump, 75 HP, Hot Water	Each	HVAC Technician	Contract	1.4400	270.39	0	None	5	Major	No
Replace Circulation Pump, 75 HP, Hot Water	Each	HVAC Technician	Contract	10.0000	19,962.62	4	2T Forklift	15	Major	Yes
Circulation Pump, 100 HP, Hot Water										
Maintain Circulation Pump, 100 HP, Hot Water	Each	Staff HVAC Tech	Staff	.3300	19.56	0	None	1	PM	No
Repair Circulation Pump, 100 HP, Hot Water	Each	HVAC Technician	Contract	1.4400	306.45	0	None	5	Major	No
Replace Circulation Pump, 100 HP, Hot Water	Each	HVAC Technician	Contract	10.0000	27,219.06	4	2T Forklift	15	Major	Yes
Circulation Pump, 150 HP, Hot Water										
Maintain Circulation Pump, 150 HP, Hot Water	Each	Staff HVAC Tech	Staff	.3700	20.75	0	None	1	PM	No
Repair Circulation Pump, 150 HP, Hot Water	Each	HVAC Technician	Contract	2.2400	492.57	0	None	5	Major	No
Replace Circulation Pump, 150 HP, Hot Water	Each	HVAC Technician	Contract	16.0000	41,731.94	4	2T Forklift	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3020 Heat Generating Systems										
Condensate Receiver Station, 10-15 Gal.										
Maintain Condensate Receiver Station, 10-15 Gal.	Each	Staff HVAC Tech	Staff	1.0000	.00	0	None	1	PM	No
Repair Condensate Receiver Station, 10-15 Gal.	Each	HVAC Technician	Contract	1.5800	264.65	0	None	3	Major	No
Repair Condensate Receiver Station, Motor, 10-15 Gal.	Each	HVAC Technician	Contract	.5100	1,435.51	0	None	5	Major	No
Replace Condensate Receiver Station, 10-15 Gal.	Each	HVAC Technician	Contract	12.0000	4,073.75	0	None	15	Major	Yes
Condensing Heat Exchanger, Gas/Oil, 10 Mbh										
Maintain Condensing Heat Exchanger, Gas, 10 Mbh	Each	Staff HVAC Tech	Staff	1.1900	.00	0	None	1	PM	No
Repair Condensing Heat Exchanger, Gas, 10 Mbh	Each	HVAC Technician	Contract	16.7700	6,284.17	0	None	7	Major	No
Replace Condensing Heat Exchanger, Gas, 10 Mbh	Each	HVAC Technician	Contract	336.0000	43,807.53	0	None	30	Major	Yes
Condensing Heat Exchanger, Gas/Oil, 20 Mbh										
Maintain Condensing Heat Exchanger, Gas/Oil, 20 Mbh	Each	Staff HVAC Tech	Staff	1.1900	.00	0	None	1	PM	No
Repair Condensing Heat Exchanger, Gas/Oil, 20 Mbh	Each	HVAC Technician	Contract	22.5100	12,013.94	0	None	7	Major	No
Replace Condensing Heat Exchanger, Gas/Oil, 20 Mbh	Each	HVAC Technician	Contract	643.0000	83,750.17	0	None	30	Major	Yes
Deaerator										
Maintain Deaerator	Each	Staff HVAC Tech	Staff	1.5100	34.71	0	None	1	PM	No
Repair Deaerator	Each	HVAC Technician	Contract	15.5600	3,859.13	0	None	10	Major	No
Replace Deaerator	Each	HVAC Technician	Contract	268.8800	25,801.84	0	None	20	Major	Yes
Electric Boiler, 24 kw										
Maintain Electric Boiler, 24 kw	Each	Staff HVAC Tech	Staff	3.8300	63.84	0	None	1	PM	No
Repair Electric Boiler, 24 kw	Each	HVAC Technician	Contract	16.0000	1,903.22	0	None	15	Major	No
Replace Electric Boiler, 24 kw	Each	HVAC Technician	Contract	24.0000	3,701.00	0	None	30	Major	Yes
Electric Boiler, 270 kw										
Maintain Electric Boiler, 270 kw	Each	Staff HVAC Tech	Staff	3.8300	63.84	0	None	1	PM	No
Repair Electric Boiler, 270 kw	Each	HVAC Technician	Contract	16.0000	1,903.22	0	None	15	Major	No
Replace Electric Boiler, 270 kw	Each	HVAC Technician	Contract	65.0000	11,864.56	4	2T Lift/45T Crane	30	Major	Yes
Electric Boiler, Steam, 1,025 Mbh										
Inspect & Test Electric Boiler, Steam, 1,025 Mbh	Each	Staff HVAC Tech	Staff	3.8300	.00	0	None	1	PM	No
Repair Electric Boiler, Steam, 1,025 Mbh	Each	HVAC Technician	Contract	20.0000	3,552.70	0	None	5	Major	No
Replace Electric Boiler, Steam, 1,025 Mbh	Each	HVAC Technician	Contract	60.0000	17,465.59	0	None	20	Major	Yes
Electric Heater, Duct										
Maintain Electric Heater, Duct	Each	Staff HVAC Tech	Staff	1.1400	.00	0	None	1	PM	No
Repair Electric Heater, Duct	Each	HVAC Technician	Contract	1.6400	476.62	0	None	10	Major	No
Replace Electric Heater, Duct	Each	HVAC Technician	Contract	2.6600	1,517.79	0	None	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3020 Heat Generating Systems										
Expansion Tank, 10 Gal.										
Maintain Expansion Tank, 10 Gal.	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Replace Expansion Tank, 10 Gal.	Each	HVAC Technician	Contract	1.1000	536.15	0	None	50	Major	Yes
Expansion Tank, 30 Gal.										
Maintain Expansion Tank, 30 Gal.	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Replace Expansion Tank, 30 Gal.	Each	HVAC Technician	Contract	2.2200	828.99	0	None	50	Major	Yes
Expansion Tank, 60 Gal.										
Maintain Expansion Tank, 60 Gal.	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Replace Expansion Tank, 60 Gal.	Each	HVAC Technician	Contract	3.9000	1,268.25	0	None	50	Major	Yes
Expansion Tank, 100 Gal.										
Maintain Expansion Tank, 100 Gal.	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Replace Expansion Tank, 100 Gal.	Each	HVAC Technician	Contract	7.8000	1,988.79	0	None	50	Major	Yes
Expansion Tank, 175 Gal.										
Maintain Expansion Tank, 175 Gal.	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Replace Expansion Tank, 175 Gal.	Each	HVAC Technician	Contract	7.8000	3,464.48	0	None	50	Major	Yes
Expansion Tank, 250 Gal.										
Maintain Expansion Tank, 250 Gal.	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Replace Expansion Tank, 250 Gal.	Each	HVAC Technician	Contract	9.5000	4,690.86	0	None	50	Major	Yes
Expansion Tank, 400 Gal.										
Maintain Expansion Tank, 400 Gal.	Each	Staff HVAC Tech	Staff	1.3000	.00	0	None	1	PM	No
Replace Expansion Tank, 400 Gal.	Each	HVAC Technician	Contract	11.1600	7,392.93	0	None	50	Major	Yes
Expansion Tank, 800 Gal.										
Maintain Expansion Tank, 800 Gal.	Each	Staff HVAC Tech	Staff	8.0000	57.60	0	None	1	PM	No
Replace Expansion Tank, 800 Gal.	Each	HVAC Technician	Contract	18.3000	18,716.23	0	None	50	Major	Yes
Expansion Tank, 1,500 Gal.										
Maintain Expansion Tank, 1,500 Gal.	Each	Staff HVAC Tech	Staff	8.0000	57.60	0	None	1	PM	No
Replace Expansion Tank, 1,500 Gal.	Each	HVAC Technician	Contract	18.3000	27,208.11	0	None	50	Major	Yes
Feed Water Pump, <1,000 kbtu Boiler										
Maintain Feed Water Pump, <1,000 kbtu Boiler	Each	Staff HVAC Tech	Staff	12.9600	575.10	0	None	1	PM	No
Repair Feed Water Pump, <1,000 kbtu Boiler	Each	HVAC Technician	Contract	2.4200	1,451.29	0	None	5	Major	No
Replace Feed Water Pump, <1,000 kbtu Boiler	Each	HVAC Technician	Contract	8.0000	5,982.87	4	2T Forklift	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3020 Heat Generating Systems										
Feed Water Pump, 1,000-3,000 kbtu Boiler										
Maintain Feed Water Pump, 1,000-3,000 kbtu Boiler	Each	Staff HVAC Tech	Staff	12.9600	1,535.79	0	None	1	PM	No
Repair Feed Water Pump, 1,000-3,000 kbtu Boiler	Each	HVAC Technician	Contract	2.4200	1,451.29	0	None	5	Major	No
Replace Feed Water Pump, 1,000-3,000 kbtu Boiler	Each	HVAC Technician	Contract	10.0000	10,070.17	4	2T Forklift	15	Major	Yes
Flash Tank, 24 Gal.										
Maintain Flash Tank, 24 Gal.	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Repair Flash Tank, 24 Gal.	Each	HVAC Technician	Contract	5.9400	70.35	0	None	5	Major	No
Replace Flash Tank, 24 Gal.	Each	HVAC Technician	Contract	2.2200	470.18	0	None	15	Major	Yes
Furnace, Duct, Gas/Oil, 450 Mbh										
Maintain Furnace, Duct, Gas/Oil, 450 Mbh	Each	Staff HVAC Tech	Staff	3.1000	.00	0	None	1	PM	No
Repair Furnace, Duct, Gas/Oil, 450 Mbh	Each	HVAC Technician	Contract	2.6000	924.00	0	None	10	Major	No
Replace Furnace, Duct, Gas/Oil, 450 Mbh	Each	HVAC Technician	Contract	16.0000	6,042.49	0	None	15	Major	Yes
Furnace, Electric, 25 Mbh										
Maintain Furnace, Electric, 25 Mbh	Each	Staff HVAC Tech	Staff	1.5000	.00	0	None	1	PM	No
Repair Furnace, Electric, 25 Mbh	Each	HVAC Technician	Contract	5.7000	567.66	0	None	10	Major	No
Replace Furnace, Electric, 25 Mbh	Each	HVAC Technician	Contract	8.4800	1,244.00	0	None	15	Major	Yes
Furnace, Electric, 50 Mbh										
Maintain Furnace, Electric, 50 Mbh	Each	Staff HVAC Tech	Staff	1.5000	.00	0	None	1	PM	No
Repair Furnace, Electric, 50 Mbh	Each	HVAC Technician	Contract	6.2000	645.03	0	None	10	Major	No
Replace Furnace, Electric, 50 Mbh	Each	HVAC Technician	Contract	9.2800	1,284.10	0	None	15	Major	Yes
Furnace, Electric, 85 Mbh										
Maintain Furnace, Electric, 85 Mbh	Each	Staff HVAC Tech	Staff	1.5000	.00	0	None	1	PM	No
Repair Furnace, Electric, 85 Mbh	Each	HVAC Technician	Contract	6.6800	745.60	0	None	10	Major	No
Replace Furnace, Electric, 85 Mbh	Each	HVAC Technician	Contract	10.8400	2,201.64	0	None	15	Major	Yes
Furnace, Gas, 25 Mbh										
Maintain Furnace, Gas, 25 Mbh	Each	Staff HVAC Tech	Staff	3.1000	.00	0	None	1	PM	No
Repair Furnace, Gas, 25 Mbh	Each	HVAC Technician	Contract	6.2000	403.80	0	None	10	Major	No
Replace Furnace, Gas, 25 Mbh	Each	HVAC Technician	Contract	7.2400	681.50	0	None	15	Major	Yes
Furnace, Gas, 50 Mbh										
Maintain Furnace, Gas, 50 Mbh	Each	Staff HVAC Tech	Staff	3.1000	.00	0	None	1	PM	No
Repair Furnace, Gas, 50 Mbh	Each	HVAC Technician	Contract	6.7700	506.97	0	None	10	Major	No
Replace Furnace, Gas, 50 Mbh	Each	HVAC Technician	Contract	8.0800	933.33	0	None	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3020 Heat Generating Systems										
Furnace, Gas, 100 Mbh										
Maintain Furnace, Gas, 100 Mbh	Each	Staff HVAC Tech	Staff	3.1000	.00	0	None	1	PM	No
Repair Furnace, Gas, 100 Mbh	Each	HVAC Technician	Contract	7.9000	597.00	0	None	10	Major	No
Replace Furnace, Gas, 100 Mbh	Each	HVAC Technician	Contract	9.7400	1,437.00	0	None	15	Major	Yes
Furnace, Gas, 200 Mbh										
Maintain Furnace, Gas, 200 Mbh	Each	Staff HVAC Tech	Staff	3.1000	.00	0	None	1	PM	No
Repair Furnace, Gas, 200 Mbh	Each	HVAC Technician	Contract	12.0100	744.00	0	None	10	Major	No
Replace Furnace, Gas, 200 Mbh	Each	HVAC Technician	Contract	17.8800	2,444.33	0	None	15	Major	Yes
Furnace, Oil, 55 Mbh										
Maintain Furnace, Oil, 55 Mbh	Each	Staff HVAC Tech	Staff	3.1000	.00	0	None	1	PM	No
Repair Furnace, Oil, 55 Mbh	Each	HVAC Technician	Contract	8.6700	456.46	0	None	10	Major	No
Replace Furnace, Oil, 55 Mbh	Each	HVAC Technician	Contract	17.8400	1,194.70	0	None	15	Major	Yes
Furnace, Oil, 100 Mbh										
Maintain Furnace, Oil, 100 Mbh	Each	Staff HVAC Tech	Staff	3.1000	.00	0	None	1	PM	No
Repair Furnace, Oil, 100 Mbh	Each	HVAC Technician	Contract	9.1800	597.00	0	None	10	Major	No
Replace Furnace, Oil, 100 Mbh	Each	HVAC Technician	Contract	17.9200	2,020.00	0	None	15	Major	Yes
Furnace, Oil, 200 Mbh										
Maintain Furnace, Oil, 200 Mbh	Each	Staff HVAC Tech	Staff	3.1000	.00	0	None	1	PM	No
Repair Furnace, Oil, 200 Mbh	Each	HVAC Technician	Contract	12.0100	744.00	0	None	10	Major	No
Replace Furnace, Oil, 200 Mbh	Each	HVAC Technician	Contract	17.9800	3,854.00	0	None	15	Major	Yes
Gas Boiler, 125 Mbh										
Inspect & Test Gas Boiler, 125 Mbh	Each	Staff HVAC Tech	Staff	4.4000	.00	0	None	1	PM	No
Clean Fire Box, Gas Boiler, 125 Mbh	Each	Staff HVAC Tech	Staff	1.1000	.00	0	None	2	PM	No
Repair Gas Boiler, 125 Mbh	Each	HVAC Technician	Contract	4.7000	1,484.92	0	None	7	Major	No
Replace Gas Boiler, 125 Mbh	Each	HVAC Technician	Contract	60.0000	2,289.00	4	2T Lift/45T Crane	30	Major	Yes
Gas Boiler, 250 Mbh										
Inspect & Test Gas Boiler, 250 Mbh	Each	Staff HVAC Tech	Staff	4.4000	.00	0	None	1	PM	No
Clean Fire Box, Gas Boiler, 250 Mbh	Each	Staff HVAC Tech	Staff	1.1000	.00	0	None	2	PM	No
Repair Gas Boiler, 250 Mbh	Each	HVAC Technician	Contract	4.7000	1,484.92	0	None	7	Major	No
Replace Gas Boiler, 250 Mbh	Each	HVAC Technician	Contract	65.6600	3,119.26	4	2T Lift/45T Crane	30	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3020 Heat Generating Systems										
Gas Boiler, 300 Mbh										
Inspect & Test Gas Boiler, 300 Mbh	Each	Staff HVAC Tech	Staff	5.0200	.00	0	None	1	PM	No
Clean Fire Box, Gas Boiler, 300 Mbh	Each	Staff HVAC Tech	Staff	1.1000	.00	0	None	2	PM	No
Repair Gas Boiler, 300 Mbh	Each	HVAC Technician	Contract	4.7000	1,484.92	0	None	7	Major	No
Replace Gas Boiler, 300 Mbh	Each	HVAC Technician	Contract	68.1000	3,489.46	4	2T Lift/45T Crane	30	Major	Yes
Gas Boiler, 750 Mbh										
Inspect & Test Gas Boiler, 750 Mbh	Each	Staff HVAC Tech	Staff	10.6300	.00	0	None	1	PM	No
Clean Fire Box, Gas Boiler, 750 Mbh	Each	Staff HVAC Tech	Staff	1.1000	.00	0	None	2	PM	No
Repair Gas Boiler, 750 Mbh	Each	HVAC Technician	Contract	9.8700	1,805.09	0	None	7	Major	No
Replace Gas Boiler, 750 Mbh	Each	HVAC Technician	Contract	90.0000	6,821.25	4	2T Lift/45T Crane	30	Major	Yes
Gas Boiler, 1,000 Mbh										
Inspect & Test Gas Boiler, 1,000 Mbh	Each	Staff HVAC Tech	Staff	14.1500	.00	0	None	1	PM	No
Clean Fire Box, Gas Boiler, 1,000 Mbh	Each	Staff HVAC Tech	Staff	1.1000	.00	0	None	2	PM	No
Repair Gas Boiler, 1,000 Mbh	Each	HVAC Technician	Contract	9.8700	1,928.22	0	None	7	Major	No
Replace Gas Boiler, 1,000 Mbh	Each	HVAC Technician	Contract	125.0000	8,672.24	4	2T Lift/45T Crane	30	Major	Yes
Gas Boiler, 2,000 Mbh										
Inspect & Test Gas Boiler, 2,000 Mbh	Each	Staff HVAC Tech	Staff	28.2900	.00	0	None	1	PM	No
Clean Fire Box, Gas Boiler, 2,000 Mbh	Each	Staff HVAC Tech	Staff	1.1000	.00	0	None	2	PM	No
Repair Gas Boiler, 2,000 Mbh	Each	HVAC Technician	Contract	19.5100	2,351.90	0	None	7	Major	No
Replace Gas Boiler, 2,000 Mbh	Each	HVAC Technician	Contract	152.1400	16,076.22	4	2T Lift/45T Crane	30	Major	Yes
Gas Boiler, 2,500 Mbh										
Inspect & Test Gas Boiler, 2,500 Mbh	Each	Staff HVAC Tech	Staff	28.2900	.00	0	None	1	PM	No
Clean Fire Box, Gas Boiler, 2,500 Mbh	Each	Staff HVAC Tech	Staff	1.1000	.00	0	None	2	PM	No
Repair Gas Boiler, 2,500 Mbh	Each	HVAC Technician	Contract	19.5100	2,351.90	0	None	7	Major	No
Replace Gas Boiler, 2,500 Mbh	Each	HVAC Technician	Contract	166.7600	19,778.20	4	2T Lift/45T Crane	30	Major	Yes
Gas Boiler, 4,200 Mbh										
Inspect & Test Gas Boiler, 4,200 Mbh	Each	Staff HVAC Tech	Staff	28.2900	.00	0	None	1	PM	No
Clean Fire Box, Gas Boiler, 4,200 Mbh	Each	Staff HVAC Tech	Staff	1.1000	.00	0	None	2	PM	No
Repair Gas Boiler, 4,200 Mbh	Each	HVAC Technician	Contract	19.5100	3,806.06	0	None	7	Major	No
Replace Gas Boiler, 4,200 Mbh	Each	HVAC Technician	Contract	366.9200	43,525.76	4	2T Lift/45T Crane	30	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3020 Heat Generating Systems										
Gas Boiler, 10,000 Mbh										
Inspect & Test Gas Boiler, 10,000 Mbh	Each	Staff HVAC Tech	Staff	28.2900	.00	0	None	1	PM	No
Clean Fire Box, Gas Boiler, 10,000 Mbh	Each	Staff HVAC Tech	Staff	1.1000	.00	0	None	2	PM	No
Repair Gas Boiler, 10,000 Mbh	Each	HVAC Technician	Contract	38.0500	5,844.70	0	None	7	Major	No
Replace Gas Boiler, 10,000 Mbh	Each	HVAC Technician	Contract	1086.4000	115,892.74	4	2T Lift/45T Crane	30	Major	Yes
Gas Boiler, Steam, 50,000 Lb/hr, 1,449 HP, 150 PSI										
Inspect & Test Gas Boiler, Steam, 50,000 Lb/hr, 1,449 HP, 150 PSI	Each	Staff HVAC Tech	Staff	28.2900	.00	0	None	1	PM	No
Clean Fire Box, Gas Boiler, Steam, 50,000 Lb/hr, 1,449 HP, 150 PSI	Each	Staff HVAC Tech	Staff	2.2000	.00	0	None	2	PM	No
Repair Gas Boiler, Steam, 50,000 Lb/hr, 1,449 HP, 150 PSI	Each	HVAC Technician	Contract	38.0500	49,392.01	0	None	7	Major	No
Replace Gas Boiler, Steam, 50,000 Lb/hr, 1,449 HP, 150 PSI	Each	HVAC Technician	Contract	2400.0000	587,522.00	4	4T Lift/90T Crane	30	Major	Yes
Gas Boiler, Steam, 55,000 Lb/hr, 1,594 HP, 150 PSI										
Inspect & Test Gas Boiler, Steam, 55,000 Lb/hr, 1,594 HP, 150 PSI	Each	Staff HVAC Tech	Staff	28.2900	.00	0	None	1	PM	No
Clean Fire Box, Gas Boiler, Steam, 55,000 Lb/hr, 1,594 HP, 150 PSI	Each	Staff HVAC Tech	Staff	2.2000	.00	0	None	2	PM	No
Repair Gas Boiler, Steam, 55,000 Lb/hr, 1,594 HP, 150 PSI	Each	HVAC Technician	Contract	38.0500	54,331.00	0	None	7	Major	No
Replace Gas Boiler, Steam, 55,000 Lb/hr, 1,594 HP, 150 PSI	Each	HVAC Technician	Contract	2400.0000	624,707.00	4	4T Lift/90T Crane	30	Major	Yes
Gas Boiler, Steam, 100,000 Lb/hr, 2,898 HP, 150 PSI										
Inspect & Test Gas Boiler, Steam, 100,000 Lb/hr, 2,898 HP, 150 PSI	Each	Staff HVAC Tech	Staff	28.2900	.00	0	None	1	PM	No
Clean Fire Box, Gas Boiler, Steam, 100,000 Lb/hr, 2,898 HP, 150 PSI	Each	Staff HVAC Tech	Staff	4.4000	.00	0	None	2	PM	No
Repair Gas Boiler, Steam, 100,000 Lb/hr, 2,898 HP, 150 PSI	Each	HVAC Technician	Contract	38.0500	98,783.99	0	None	7	Major	No
Replace Gas Boiler, Steam, 100,000 Lb/hr, 2,898 HP, 150 PSI	Each	HVAC Technician	Contract	2400.0000	1,189,918.00	4	4T Lift/90T Crane	30	Major	Yes
Gas Boiler, Steam, 24,000 Lb/hr										
Inspect & Test Gas Boiler, Steam, 24,000 Lb/hr	Each	Staff HVAC Tech	Staff	28.2900	.00	0	None	1	PM	No
Clean Fire Box, Gas Boiler, Steam, 24,000 Lb/hr	Each	Staff HVAC Tech	Staff	1.1000	.00	0	None	2	PM	No
Repair Gas Boiler, Steam, 24,000 Lb/hr	Each	HVAC Technician	Contract	48.0300	19,008.15	0	None	7	Major	No
Replace Gas Boiler, Steam, 24,000 Lb/hr	Each	HVAC Technician	Contract	2400.0000	202,945.98	4	4T Lift/90T Crane	30	Major	Yes
Gas/Oil Boiler, 2,000 Mbh										
Inspect & Test Gas/Oil Boiler, 2,000 Mbh	Each	Staff HVAC Tech	Staff	28.2900	.00	0	None	1	PM	No
Clean Fire Box, Gas/Oil Boiler, 2,000 Mbh	Each	Staff HVAC Tech	Staff	1.1000	.00	0	None	2	PM	No
Repair Gas/Oil Boiler, 2,000 Mbh	Each	HVAC Technician	Contract	22.9200	2,234.91	0	None	7	Major	No
Replace Gas/Oil Boiler, 2,000 Mbh	Each	HVAC Technician	Contract	172.7600	22,914.61	4	2T Lift/45T Crane	30	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3020 Heat Generating Systems										
Gas/Oil Boiler, 20,000 Mbh										
Inspect & Test Gas/Oil Boiler, 20,000 Mbh	Each	Staff HVAC Tech	Staff	28.2900	.00	0	None	1	PM	No
Clean Fire Box, Gas/Oil Boiler, 20,000 Mbh	Each	Staff HVAC Tech	Staff	1.1000	.00	0	None	2	PM	No
Repair Gas/Oil Boiler, 20,000 Mbh	Each	HVAC Technician	Contract	43.2900	13,883.53	0	None	7	Major	No
Replace Gas/Oil Boiler, 20,000 Mbh	Each	HVAC Technician	Contract	4684.2000	197,977.43	4	2T Lift/45T Crane	30	Major	Yes
Gas/Oil Boiler, 40,000 Mbh										
Inspect & Test Gas/Oil Boiler, 40,000 Mbh	Each	Staff HVAC Tech	Staff	28.2900	.00	0	None	1	PM	No
Clean Fire Box, Gas/Oil Boiler, 40,000 Mbh	Each	Staff HVAC Tech	Staff	1.1000	.00	0	None	2	PM	No
Repair Gas/Oil Boiler, 40,000 Mbh	Each	HVAC Technician	Contract	43.2900	19,911.26	0	None	7	Major	No
Replace Gas/Oil Boiler, 40,000 Mbh	Each	HVAC Technician	Contract	4684.2000	311,213.84	4	2T Lift/45T Crane	30	Major	Yes
Gas/Oil Boiler, 80,000 Mbh										
Inspect & Test Gas/Oil Boiler, 80,000 Mbh	Each	Staff HVAC Tech	Staff	28.2900	.00	0	None	1	PM	No
Clean Fire Box, Gas/Oil Boiler, 80,000 Mbh	Each	Staff HVAC Tech	Staff	1.1000	.00	0	None	2	PM	No
Repair Gas/Oil Boiler, 80,000 Mbh	Each	HVAC Technician	Contract	43.2900	26,004.58	0	None	7	Major	No
Replace Gas/Oil Boiler, 80,000 Mbh	Each	HVAC Technician	Contract	4684.2000	596,493.19	4	2T Lift/45T Crane	30	Major	Yes
Gate Valve, 2-3"										
Rearrange Gland, Gate Valve, 2-3"	Each	HVAC Technician	Contract	1.1500	13.08	0	None	10	Major	No
Replace Gate Valve, 2-3"	Each	HVAC Technician	Contract	2.0600	273.50	0	None	20	Major	Yes
Gate Valve, 4"										
Rearrange Gland, Gate Valve, 4"	Each	HVAC Technician	Contract	1.1500	13.08	0	None	10	Major	No
Replace Gate Valve, 4"	Each	HVAC Technician	Contract	12.2400	509.00	0	None	20	Major	Yes
Gate Valve, 6"										
Rearrange Gland, Gate Valve, 6"	Each	HVAC Technician	Contract	1.1500	13.08	0	None	10	Major	No
Replace Gate Valve, 6"	Each	HVAC Technician	Contract	15.0000	867.00	0	None	20	Major	Yes
Gate Valve, 8"										
Rearrange Gland, Gate Valve, 8"	Each	HVAC Technician	Contract	1.1500	13.08	0	None	10	Major	No
Replace Gate Valve, 8"	Each	HVAC Technician	Contract	15.0000	1,710.18	0	None	20	Major	Yes
Gate Valve, 10"										
Rearrange Gland, Gate Valve, 10"	Each	HVAC Technician	Contract	1.1500	13.08	0	None	10	Major	No
Replace Gate Valve, 10"	Each	HVAC Technician	Contract	17.5800	2,615.74	0	None	20	Major	Yes
Gate Valve, 12"										
Rearrange Gland, Gate Valve, 12"	Each	HVAC Technician	Contract	1.1500	13.08	0	None	10	Major	No
Replace Gate Valve, 12"	Each	HVAC Technician	Contract	17.5800	3,521.30	0	None	20	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3020 Heat Generating Systems										
Gate Valve, 24"										
Rearrange Gland, Gate Valve, 24"	Each	HVAC Technician	Contract	1.1500	13.08	0	None	10	Major	No
Replace Gate Valve, 24"	Each	HVAC Technician	Contract	60.0000	5,600.47	0	None	20	Major	Yes
Heat Exchanger, Steam-to-Water, 40 Gpm										
Maintain Heat Exchanger, Steam-to-Water, 40 Gpm	Each	Staff HVAC Tech	Staff	1.1900	.00	0	None	1	PM	No
Repair Heat Exchanger, Steam-to-Water, 40 Gpm	Each	HVAC Technician	Contract	3.2500	248.41	0	None	7	Major	No
Replace Heat Exchanger, Steam-to-Water, 40 Gpm	Each	HVAC Technician	Contract	6.2400	3,089.38	0	None	30	Major	Yes
Heat Exchanger, Steam-to-Water, 130 Gpm										
Maintain Heat Exchanger, Steam-to-Water, 130 Gpm	Each	Staff HVAC Tech	Staff	2.9600	.00	0	None	1	PM	No
Repair Heat Exchanger, Steam-to-Water, 130 Gpm	Each	HVAC Technician	Contract	3.9400	385.46	0	None	7	Major	No
Replace Heat Exchanger, Steam-to-Water, 130 Gpm	Each	HVAC Technician	Contract	17.6600	8,700.10	0	None	30	Major	Yes
Heat Exchanger, Water-to-Water, 40 Gpm										
Maintain Heat Exchanger, Water-to-Water, 40 Gpm	Each	Staff HVAC Tech	Staff	1.1900	.00	0	None	1	PM	No
Repair Heat Exchanger, Water-to-Water, 40 Gpm	Each	HVAC Technician	Contract	16.0000	1,473.05	0	None	7	Major	No
Replace Heat Exchanger, Water-to-Water, 40 Gpm	Each	HVAC Technician	Contract	6.2400	3,931.58	0	None	30	Major	Yes
Heat Exchanger, Water-to-Water, 130 Gpm										
Maintain Heat Exchanger, Water-to-Water, 130 Gpm	Each	Staff HVAC Tech	Staff	2.9600	.00	0	None	1	PM	No
Repair Heat Exchanger, Water-to-Water, 130 Gpm	Each	HVAC Technician	Contract	3.9400	229.61	0	None	7	Major	No
Replace Heat Exchanger, Water-to-Water, 130 Gpm	Each	HVAC Technician	Contract	14.9800	13,761.60	0	None	30	Major	Yes
Heat Exchanger, Water-to-Water, 380 Gpm										
Maintain Heat Exchanger, Water-to-Water, 380 Gpm	Each	Staff HVAC Tech	Staff	2.9600	.00	0	None	1	PM	No
Repair Heat Exchanger, Water-to-Water, 380 Gpm	Each	HVAC Technician	Contract	7.8800	438.76	0	None	7	Major	No
Replace Heat Exchanger, Water-to-Water, 380 Gpm	Each	HVAC Technician	Contract	36.9400	27,825.00	0	None	30	Major	Yes
House Furnace, Electric 25 Mbh, 8 kw										
Maintain House Furnace, Electric 25 Mbh, 8 kw	Each	Staff HVAC Tech	Staff	1.5000	.00	0	None	1	PM	No
Repair House Furnace, Electric 25 Mbh, 8 kw	Each	HVAC Technician	Contract	5.7000	567.66	0	None	10	Major	No
Replace House Furnace, Electric 25 Mbh, 8 kw	Each	HVAC Technician	Contract	8.4800	1,244.00	0	None	15	Major	Yes
House Furnace, Electric 100 Mbh, 30 kw										
Maintain House Furnace, Electric 100 Mbh, 30 kw	Each	Staff HVAC Tech	Staff	1.5000	.00	0	None	1	PM	No
Repair House Furnace, Electric 100 Mbh, 30 kw	Each	HVAC Technician	Contract	5.7000	745.60	0	None	10	Major	No
Replace House Furnace, Electric 100 Mbh, 30 kw	Each	HVAC Technician	Contract	10.8400	2,201.64	0	None	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3020 Heat Generating Systems										
House Furnace, Gas/Oil, 25 Mbh										
Maintain House Furnace, Gas/Oil, 25 Mbh	Each	Staff HVAC Tech	Staff	3.1000	.00	0	None	1	PM	No
Repair House Furnace, Gas/Oil, 25 Mbh	Each	HVAC Technician	Contract	6.2000	403.80	0	None	10	Major	No
Replace House Furnace, Gas/Oil, 25 Mbh	Each	HVAC Technician	Contract	6.0000	958.00	0	None	15	Major	Yes
House Furnace, Gas/Oil, 100 Mbh										
Maintain House Furnace, Gas/Oil, 100 Mbh	Each	Staff HVAC Tech	Staff	3.1000	.00	0	None	1	PM	No
Repair House Furnace, Gas/Oil, 100 Mbh	Each	HVAC Technician	Contract	6.2000	597.00	0	None	10	Major	No
Replace House Furnace, Gas/Oil, 100 Mbh	Each	HVAC Technician	Contract	9.7400	1,643.00	0	None	15	Major	Yes
Oil Boiler, 250 Mbh										
Inspect & Test Oil Boiler, 250 Mbh	Each	Staff HVAC Tech	Staff	4.4000	.00	0	None	1	PM	No
Clean Fire Box, Oil Boiler, 250 Mbh	Each	Staff HVAC Tech	Staff	1.1000	.00	0	None	2	PM	No
Repair Oil Boiler, 250 Mbh	Each	HVAC Technician	Contract	5.6000	952.35	0	None	7	Major	No
Replace Oil Boiler, 250 Mbh	Each	HVAC Technician	Contract	73.4000	3,764.13	4	2T Lift/45T Crane	30	Major	Yes
Oil Boiler, 2,000 Mbh										
Inspect & Test Oil Boiler, 2,000 Mbh	Each	Staff HVAC Tech	Staff	8.4000	.00	0	None	1	PM	No
Clean Fire Box, Oil Boiler, 2,000 Mbh	Each	Staff HVAC Tech	Staff	1.1000	.00	0	None	2	PM	No
Repair Oil Boiler, 2,000 Mbh	Each	HVAC Technician	Contract	10.7600	1,565.05	0	None	7	Major	No
Replace Oil Boiler, 2,000 Mbh	Each	HVAC Technician	Contract	205.7600	14,815.64	4	2T Lift/45T Crane	30	Major	Yes
Metal Flue, Stainless Steel, 10"										
Replace Metal Flue, Stainless Steel, 10"	K Ln Ft	HVAC Technician	Contract	483.0000	76,823.16	0	None	15	Major	Yes
Oil Boiler, 10,000 Mbh										
Inspect & Test Oil Boiler, 10,000 Mbh	Each	Staff HVAC Tech	Staff	8.4000	.00	0	None	1	PM	No
Clean Fire Box, Oil Boiler, 10,000 Mbh	Each	Staff HVAC Tech	Staff	1.1000	.00	0	None	2	PM	No
Repair Oil Boiler, 10,000 Mbh	Each	HVAC Technician	Contract	11.1700	3,129.15	0	None	7	Major	No
Replace Oil Boiler, 10,000 Mbh	Each	HVAC Technician	Contract	894.0000	126,179.85	4	2T Lift/45T Crane	30	Major	Yes
Metal Flue, Stainless Steel, 16"										
Replace Metal Flue, Stainless Steel, 40"	K Ln Ft	HVAC Technician	Contract	1000.0000	371,598.76	0	None	15	Major	Yes
Metal Flue, Stainless Steel, 18"										
Replace Metal Flue, Stainless Steel, 18"	K Ln Ft	HVAC Technician	Contract	483.0000	150,350.82	0	None	15	Major	Yes
Metal Flue, Stainless Steel, 40"										
Replace Metal Flue, Stainless Steel, 16"	K Ln Ft	HVAC Technician	Contract	483.0000	89,477.07	0	None	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3020 Heat Generating Systems										
Pipe & Fittings, 3/4" Copper										
Resolder Joint, Pipe & Fittings, 3/4" Copper	K Ln Ft	Plumber	Contract	5.6800	10.05	0	None	10	Major	No
Replace 10' Section, Pipe & Fittings, 3/4" Copper	K Ln Ft	Plumber	Contract	2.1000	49.90	0	None	20	Major	No
Replace Pipe & Fittings, 3/4" Copper (20% of Pipe)	K Ln Ft	Plumber	Contract	42.0000	998.00	0	None	25	Major	Yes
Pipe & Fittings, 2" Copper										
Resolder Joint, Pipe & Fittings, 2" Copper	K Ln Ft	Plumber	Contract	5.6800	10.05	0	None	10	Major	No
Replace 10' Section, Pipe & Fittings, 2" Copper	K Ln Ft	Plumber	Contract	3.9000	153.80	0	None	20	Major	No
Replace Pipe & Fittings, 2" Copper (20% of Pipe)	K Ln Ft	Plumber	Contract	78.0000	3,076.00	0	None	25	Major	Yes
Pipe & Fittings, 10" Steel										
Replace 10' Section, Pipe & Fittings, 10" Steel	K Ln Ft	Plumber	Contract	4.8800	425.80	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 10" Steel	K Ln Ft	Plumber	Contract	3.4660	14.80	0	None	25	Major	No
Replace Pipe & Fittings, 10" Steel (20% of Pipe)	K Ln Ft	Plumber	Contract	97.6000	9,714.00	0	None	75	Major	Yes
Pipe & Fittings, 12" Steel										
Replace 10' Section, Pipe & Fittings, 12" Steel	K Ln Ft	Plumber	Contract	5.3500	556.30	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 12" Steel	K Ln Ft	Plumber	Contract	3.4660	14.80	0	None	25	Major	No
Replace Pipe & Fittings, 12" Steel (20% of Pipe)	K Ln Ft	Plumber	Contract	107.0000	11,894.00	0	None	75	Major	Yes
Pipe Insulation, Fiberglass, Heating Water/Steam										
Re-Tape Pipe Insulation, Fiberglass, Heating Water/Steam	K Ln Ft	Staff Plumber	Staff	.2600	166.50	0	None	5	PM	No
Replace Pipe Insulation, Fiberglass, Heating Water/Steam (20% of Insulation)	K Ln Ft	Plumber	Contract	4.7200	615.07	0	None	25	Major	Yes
Plate Heat Exchanger, 400 Gpm										
Maintain Plate Heat Exchanger, 400 Gpm	Each	Staff HVAC Tech	Staff	1.1900	.00	0	None	1	PM	No
Repair Plate Heat Exchanger, 400 Gpm	Each	HVAC Technician	Contract	8.3300	179.88	0	None	7	Major	No
Replace Plate Heat Exchanger, 400 Gpm	Each	HVAC Technician	Contract	30.0000	28,796.45	0	None	30	Major	Yes
Plate Heat Exchanger, 800 Gpm										
Maintain Plate Heat Exchanger, 800 Gpm	Each	Staff HVAC Tech	Staff	1.1900	.00	0	None	1	PM	No
Repair Plate Heat Exchanger, 800 Gpm	Each	HVAC Technician	Contract	9.8700	286.95	0	None	7	Major	No
Replace Plate Heat Exchanger, 800 Gpm	Each	HVAC Technician	Contract	48.0000	49,543.50	0	None	30	Major	Yes
Plate Heat Exchanger, 1,200 Gpm										
Maintain Plate Heat Exchanger, 1,200 Gpm	Each	Staff HVAC Tech	Staff	1.1900	.00	0	None	1	PM	No
Repair Plate Heat Exchanger, 1,200 Gpm	Each	HVAC Technician	Contract	16.0000	643.43	0	None	7	Major	No
Replace Plate Heat Exchanger, 1,200 Gpm	Each	HVAC Technician	Contract	96.0000	73,691.71	0	None	30	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3020 Heat Generating Systems										
Pressure Reducer Valve, 1/2"										
Maintain Pressure Reducer Valve, 1/2"	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Replace Pressure Reducer Valve, 1/2"	Each	HVAC Technician	Contract	.6600	85.85	0	None	6	Major	Yes
Pressure Reducer Valve, 1"										
Maintain Pressure Reducer Valve, 1"	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Replace Pressure Reducer Valve, 1"	Each	HVAC Technician	Contract	.8400	104.60	0	None	6	Major	Yes
Pressure Reducer Valve, 1-1/2"										
Maintain Pressure Reducer Valve, 1-1/2"	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Replace Pressure Reducer Valve, 1-1/2"	Each	HVAC Technician	Contract	1.2000	316.75	0	None	6	Major	Yes
Pressure Reducer Valve, 2"										
Maintain Pressure Reducer Valve, 2"	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Replace Pressure Reducer Valve, 2"	Each	HVAC Technician	Contract	1.4200	444.75	0	None	6	Major	Yes
Radiator, Finned, Wall										
Replace Radiator, Finned, Wall	Each	HVAC Technician	Contract	2.0000	35.35	0	None	20	Major	Yes
Steam Converter, 200 Gph										
Inspect & Maintain Steam Converter, 200 Gph	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Repair Steam Converter, 200 Gph	Each	HVAC Technician	Contract	5.9400	1,518.57	0	None	5	Major	No
Replace Steam Converter, 200 Gph	Each	HVAC Technician	Contract	6.2400	10,407.24	0	None	30	Major	Yes
Steam Converter, Domestic Hot Water, 10 Gpm										
Inspect Steam Converter, Domestic Hot Water, 10 Gpm	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Repair Steam Converter, Domestic Hot Water, 10 Gpm	Each	HVAC Technician	Contract	4.9500	170.84	0	None	5	Major	No
Replace Steam Converter, Domestic Hot Water, 10 Gpm	Each	HVAC Technician	Contract	5.2000	1,360.42	0	None	20	Major	Yes
Steam Trap, F&T, 2"										
Maintain Steam Trap, F&T, 2"	Each	Staff HVAC Tech	Staff	.5000	.00	0	None	1	PM	No
Repair Steam Trap, F&T, 2"	Each	HVAC Technician	Contract	.4200	294.11	0	None	3	Major	No
Replace Steam Trap, F&T, 2"	Each	HVAC Technician	Contract	2.6000	401.37	0	None	10	Major	Yes
Steam Turbine 1,000 kw										
Inspect & Test Steam Turbine 1,000 kw	Each	Staff HVAC Tech	Staff	28.3000	.00	0	None	1	PM	No
Repair Steam Turbine 1,000 kw	Each	HVAC Technician	Contract	48.0000	23,708.00	0	None	7	Major	No
Replace Steam Turbine 1,000 kw	Each	HVAC Technician	Contract	2400.0000	183,739.00	0	None	30	Major	Yes
Surge Tank, 1,000 Gal.										
Replace Surge Tank, 1,000 Gal.	Each	HVAC Technician	Contract	4.0000	2,481.19	0	None	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3020 Heat Generating Systems										
Valve, Non-Drain, 2"										
Lubricate, Repack Gland, Valve, Non Drain, 2"	Each	Staff HVAC Tech	Staff	1.1500	11.68	0	None	1	PM	No
Replace Valve, Non-Drain, 2"	Each	HVAC Technician	Contract	2.4000	667.03	0	None	20	Major	Yes
Valve, Non-Drain, 4"										
Lubricate, Repack Gland, Valve, Non Drain, 4"	Each	Staff HVAC Tech	Staff	1.1500	1.03	0	None	1	PM	No
Replace Valve, Non-Drain, 4"	Each	HVAC Technician	Contract	12.2400	819.15	0	None	20	Major	Yes
Valve, Non-Drain, 6"										
Lubricate, Repack Gland, Valve, Non Drain, 6"	Each	Staff HVAC Tech	Staff	1.1500	1.03	0	None	1	PM	No
Replace Valve, Non-Drain, 6"	Each	HVAC Technician	Contract	15.0200	1,135.11	0	None	20	Major	Yes
Valve, Non-Drain, 8"										
Lubricate, Repack Gland, Valve, Non Drain, 8"	Each	Staff HVAC Tech	Staff	1.1500	1.03	0	None	1	PM	No
Replace Valve, Non-Drain, 8"	Each	HVAC Technician	Contract	16.2400	1,960.13	0	None	20	Major	Yes
Valve, Non-Drain, 10"										
Lubricate, Repack Gland, Valve, Non Drain, 10"	Each	Staff HVAC Tech	Staff	1.1500	1.03	0	None	1	PM	No
Replace Valve, Non-Drain, 10"	Each	HVAC Technician	Contract	17.5800	3,422.90	0	None	20	Major	Yes
Valve, Non-Drain, 12"										
Lubricate, Repack Gland, Valve, Non Drain, 12"	Each	Staff HVAC Tech	Staff	1.1500	1.03	0	None	1	PM	No
Replace Valve, Non-Drain, 12"	Each	HVAC Technician	Contract	17.5800	3,924.63	0	None	20	Major	Yes
Valve, Non-Drain, 14"										
Lubricate, Repack Gland, Valve, Non Drain, 14"	Each	Staff HVAC Tech	Staff	1.1500	1.03	0	None	1	PM	No
Replace Valve, Non-Drain, 14"	Each	HVAC Technician	Contract	17.5800	4,578.75	0	None	20	Major	Yes
Valve, Non-Drain, 16"										
Lubricate, Repack Gland, Valve, Non Drain, 16"	Each	Staff HVAC Tech	Staff	1.1500	1.03	0	None	1	PM	No
Replace Valve, Non-Drain, 16"	Each	HVAC Technician	Contract	17.5800	5,232.85	0	None	20	Major	Yes
D3030 Cooling Generating Systems										
Accumulator, Hydraulic, 1/2 CF										
Maintain Accumulator Hydraulic, 1/2 CF	Each	Staff HVAC Tech	Staff	.5000	.00	0	None	1	PM	No
Replace Accumulator, Hydraulic, 1/2 CF	Each	HVAC Technician	Contract	3.0000	4,940.65	0	None	10	Major	Yes
Accumulator, Hydraulic, 2 CF										
Maintain Accumulator Hydraulic, 2 CF	Each	Staff HVAC Tech	Staff	.5000	.00	0	None	1	PM	No
Replace Accumulator, Hydraulic, 2 CF	Each	HVAC Technician	Contract	3.0000	24,100.72	0	None	10	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3030 Cooling Generating Systems										
Butterfly Valve, 3"										
Lubricate, Repack Gland, Butterfly Valve, 3"	Each	Staff HVAC Tech	Staff	1.1500	13.08	0	None	1	PM	No
Replace Butterfly Valve, 3"	Each	HVAC Technician	Contract	2.0000	133.70	0	None	20	Major	Yes
Butterfly Valve, 4"										
Lubricate, Repack Gland, Butterfly Valve, 4"	Each	Staff HVAC Tech	Staff	1.1500	13.08	0	None	1	PM	No
Replace Butterfly Valve, 4"	Each	HVAC Technician	Contract	12.2400	170.00	0	None	20	Major	Yes
Butterfly Valve, 6"										
Lubricate, Repack Gland, Butterfly Valve, 6"	Each	Staff HVAC Tech	Staff	1.1500	13.08	0	None	1	PM	No
Replace Butterfly Valve, 6"	Each	HVAC Technician	Contract	15.6000	235.75	0	None	20	Major	Yes
Butterfly Valve, 8"										
Lubricate, Repack Gland, Butterfly Valve, 8"	Each	Staff HVAC Tech	Staff	1.1500	13.08	0	None	1	PM	No
Replace Butterfly Valve, 8"	Each	HVAC Technician	Contract	16.2400	320.75	0	None	20	Major	Yes
Butterfly Valve, 10"										
Lubricate, Repack Gland, Butterfly Valve, 10"	Each	Staff HVAC Tech	Staff	1.1500	13.08	0	None	1	PM	No
Replace Butterfly Valve, 10"	Each	HVAC Technician	Contract	17.5800	597.00	0	None	20	Major	Yes
Butterfly Valve, 12"										
Lubricate, Repack Gland, Butterfly Valve, 12"	Each	Staff HVAC Tech	Staff	1.1500	13.08	0	None	1	PM	No
Replace Butterfly Valve, 12"	Each	HVAC Technician	Contract	18.5000	928.00	0	None	20	Major	Yes
Butterfly Valve, 36"										
Lubricate, Repack Gland, Butterfly Valve, 36"	Each	Staff HVAC Tech	Staff	1.1500	13.08	0	None	1	PM	No
Replace Butterfly Valve, 36"	Each	HVAC Technician	Contract	60.0000	4,900.00	0	None	20	Major	Yes
Check Valve, 3-4"										
Inspect, Clean, & Verify Opening/Closing, Check Valve, 3-4"	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Replace Check Valve, 3-4"	Each	HVAC Technician	Contract	12.2400	666.30	0	None	20	Major	Yes
Check Valve, 6"										
Inspect, Clean, & Verify Opening/Closing, Check Valve, 6"	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Replace Check Valve, 6"	Each	HVAC Technician	Contract	12.2400	1,096.95	0	None	20	Major	Yes
Check Valve, 10"										
Inspect, Clean, & Verify Opening/Closing, Check Valve, 10"	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Replace Check Valve, 10"	Each	HVAC Technician	Contract	12.2400	4,137.11	0	None	20	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Unifomat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3030 Cooling Generating Systems										
Chiller, Absorption, 100 Ton										
Maintain Chiller, Absorption, 100 Ton	Each	Staff HVAC Tech	Staff	10.1000	175.41	0	None	1	PM	No
Repair Chiller, Absorption, 100 Ton	Each	HVAC Technician	Contract	32.8000	12,208.00	0	None	10	Major	No
Replace Chiller, Absorption, 100 Ton	Each	HVAC Technician	Contract	65.0000	143,257.24	4	4T Lift/90T Crane	20	Major	Yes
Chiller, Absorption, 350 Ton										
Maintain Chiller, Absorption, 350 Ton	Each	Staff HVAC Tech	Staff	12.9000	175.41	0	None	1	PM	No
Repair Chiller, Absorption, 350 Ton	Each	HVAC Technician	Contract	40.0000	12,811.00	0	None	10	Major	No
Replace Chiller, Absorption, 350 Ton	Each	HVAC Technician	Contract	114.4000	226,872.70	4	4T Lift/90T Crane	20	Major	Yes
Chiller, Absorption, 950 Ton										
Maintain Chiller, Absorption, 950 Ton	Each	Staff HVAC Tech	Staff	12.9000	175.41	0	None	1	PM	No
Repair Chiller, Absorption, 950 Ton	Each	HVAC Technician	Contract	49.2000	15,810.00	0	None	10	Major	No
Replace Chiller, Absorption, 950 Ton	Each	HVAC Technician	Contract	184.6000	464,270.42	4	4T Lift/90T Crane	20	Major	Yes
Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 100 Ton										
Maintain Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 100 Ton	Each	Staff HVAC Tech	Staff	29.5000	242.08	0	None	1	PM	No
Repair Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 100 Ton	Each	HVAC Technician	Contract	25.7000	23,688.04	0	None	10	Major	No
Replace Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 100 Ton	Each	HVAC Technician	Contract	68.9000	57,887.63	4	4T Lift/90T Crane	20	Major	Yes
Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 200 Ton										
Maintain Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 200 Ton	Each	Staff HVAC Tech	Staff	29.5000	242.08	0	None	1	PM	No
Repair Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 200 Ton	Each	HVAC Technician	Contract	25.7000	35,088.04	0	None	10	Major	No
Replace Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 200 Ton	Each	HVAC Technician	Contract	88.4000	147,734.47	4	4T Lift/90T Crane	20	Major	Yes
Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 250 Ton										
Maintain Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 250 Ton	Each	Staff HVAC Tech	Staff	29.5000	242.08	0	None	1	PM	No
Repair Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 250 Ton	Each	HVAC Technician	Contract	25.7000	51,488.04	0	None	10	Major	No
Replace Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 250 Ton	Each	HVAC Technician	Contract	98.1600	167,182.01	4	4T Lift/90T Crane	20	Major	Yes
Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 300 Ton										
Maintain Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 300 Ton	Each	Staff HVAC Tech	Staff	29.5000	242.08	0	None	1	PM	No
Repair Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 300 Ton	Each	HVAC Technician	Contract	25.7000	53,258.04	0	None	10	Major	No
Replace Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 300 Ton	Each	HVAC Technician	Contract	107.9000	186,629.54	4	4T Lift/90T Crane	20	Major	Yes
Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 500 Ton										
Maintain Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 500 Ton	Each	Staff HVAC Tech	Staff	29.5000	242.08	0	None	1	PM	No
Repair Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 500 Ton	Each	HVAC Technician	Contract	34.3000	86,557.69	0	None	10	Major	No
Replace Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 500 Ton	Each	HVAC Technician	Contract	131.3000	264,419.70	4	4T Lift/90T Crane	20	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Unifomat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3030 Cooling Generating Systems										
Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 900 Ton										
Maintain Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 900 Ton	Each	Staff HVAC Tech	Staff	29.5000	242.08	0	None	1	PM	No
Repair Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 900 Ton	Each	HVAC Technician	Contract	51.5000	152,732.52	0	None	10	Major	No
Replace Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 900 Ton	Each	HVAC Technician	Contract	178.1000	420,000.00	4	4T Lift/90T Crane	20	Major	Yes
Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 1,000 Ton										
Maintain Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 1,000 Ton	Each	Staff HVAC Tech	Staff	29.5000	242.08	0	None	1	PM	No
Repair Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 1,000 Ton	Each	HVAC Technician	Contract	51.5000	168,732.52	0	None	10	Major	No
Replace Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 1,000 Ton	Each	HVAC Technician	Contract	190.0000	458,895.08	4	4T Lift/90T Crane	20	Major	Yes
Chiller, Reciprocal Air-Cooled Hermetic, 5 Ton										
Maintain Chiller, Reciprocal Air Cooled Hermetic, 5 Ton	Each	Staff HVAC Tech	Staff	9.3000	45.62	0	None	1	PM	No
Repair Chiller, Reciprocal Air Cooled Hermetic, 5 Ton	Each	HVAC Technician	Contract	18.9000	1,251.09	0	None	10	Major	No
Replace Chiller, Reciprocal Air Cooled Hermetic, 5 Ton	Each	HVAC Technician	Contract	15.6000	3,712.99	4	2T Lift/45T Crane	20	Major	Yes
Chiller, Reciprocal Air-Cooled Hermetic, 10 Ton										
Maintain Chiller, Reciprocal Air Cooled Hermetic, 10 Ton	Each	Staff HVAC Tech	Staff	13.5000	45.62	0	None	1	PM	No
Repair Chiller, Reciprocal Air Cooled Hermetic, 10 Ton	Each	HVAC Technician	Contract	18.9000	2,116.80	0	None	10	Major	No
Replace Chiller, Reciprocal Air Cooled Hermetic, 10 Ton	Each	HVAC Technician	Contract	20.8000	7,367.52	4	2T Lift/45T Crane	20	Major	Yes
Chiller, Reciprocal Air-Cooled Hermetic w/ Scroll Compressor, 10 Ton										
Maintain Chiller, Reciprocal Air Cooled Hermetic w/ Scroll Compressor, 10 Ton	Each	Staff HVAC Tech	Staff	13.5000	45.62	0	None	1	PM	No
Repair Chiller, Reciprocal Air Cooled Hermetic w/ Scroll Compressor, 10 Ton	Each	HVAC Technician	Contract	18.9000	2,116.80	0	None	10	Major	No
Replace Chiller, Reciprocal Air Cooled Hermetic w/ Scroll Compressor, 10 Ton	Each	HVAC Technician	Contract	20.8000	34,000.00	4	2T Lift/45T Crane	20	Major	Yes
Chiller, Reciprocal Air-Cooled Hermetic, 15 Ton										
Maintain Chiller, Reciprocal Air Cooled Hermetic, 15 Ton	Each	Staff HVAC Tech	Staff	17.5000	45.62	0	None	1	PM	No
Repair Chiller, Reciprocal Air Cooled Hermetic, 15 Ton	Each	HVAC Technician	Contract	18.9000	3,305.68	0	None	10	Major	No
Replace Chiller, Reciprocal Air Cooled Hermetic, 15 Ton	Each	HVAC Technician	Contract	28.6000	14,735.03	4	2T Lift/45T Crane	20	Major	Yes
Chiller, Reciprocal Air-Cooled Hermetic, 20 Ton										
Maintain Chiller, Reciprocal Air Cooled Hermetic, 20 Ton	Each	Staff HVAC Tech	Staff	17.5000	45.62	0	None	1	PM	No
Repair Chiller, Reciprocal Air Cooled Hermetic, 20 Ton	Each	HVAC Technician	Contract	18.9000	15,723.50	0	None	10	Major	No
Replace Chiller, Reciprocal Air Cooled Hermetic, 20 Ton	Each	HVAC Technician	Contract	28.6000	27,949.79	4	2T Lift/45T Crane	20	Major	Yes
Chiller, Reciprocal Air-Cooled Hermetic w/ Scroll Compressor, 20 Ton										
Maintain Chiller, Reciprocal Air Cooled Hermetic w/ Scroll Compressor, 20 Ton	Each	Staff HVAC Tech	Staff	17.5000	45.16	0	None	1	PM	No
Repair Chiller, Reciprocal Air Cooled Hermetic w/ Scroll Compressor, 20 Ton	Each	HVAC Technician	Contract	18.9000	15,723.50	0	None	10	Major	No
Replace Chiller, Reciprocal Air Cooled Hermetic w/ Scroll Compressor, 20 Ton	Each	HVAC Technician	Contract	28.6000	44,000.00	4	2T Lift/45T Crane	20	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3030 Cooling Generating Systems										
Chiller, Reciprocal Air-Cooled Hermetic, 40 Ton										
Maintain Chiller, Reciprocal Air Cooled Hermetic, 40 Ton	Each	Staff HVAC Tech	Staff	21.5000	65.49	0	None	1	PM	No
Repair Chiller, Reciprocal Air Cooled Hermetic, 40 Ton	Each	HVAC Technician	Contract	18.9000	15,236.50	0	None	10	Major	No
Replace Chiller, Reciprocal Air Cooled Hermetic, 40 Ton	Each	HVAC Technician	Contract	36.4000	37,305.35	4	2T Lift/45T Crane	20	Major	Yes
Chiller, Reciprocal Air-Cooled Hermetic, 50 Ton										
Maintain Chiller, Reciprocal Air Cooled Hermetic, 50 Ton	Each	Staff HVAC Tech	Staff	21.5000	65.49	0	None	1	PM	No
Repair Chiller, Reciprocal Air Cooled Hermetic, 50 Ton	Each	HVAC Technician	Contract	18.9000	18,436.50	0	None	10	Major	No
Replace Chiller, Reciprocal Air Cooled Hermetic, 50 Ton	Each	HVAC Technician	Contract	40.3000	45,433.02	4	2T Lift/45T Crane	20	Major	Yes
Chiller, Reciprocal Air-Cooled Hermetic, 60 Ton										
Maintain Chiller, Reciprocal Air Cooled Hermetic, 60 Ton	Each	Staff HVAC Tech	Staff	21.5000	65.49	0	None	1	PM	No
Repair Chiller, Reciprocal Air Cooled Hermetic, 60 Ton	Each	HVAC Technician	Contract	18.9000	18,436.50	0	None	10	Major	No
Replace Chiller, Reciprocal Air Cooled Hermetic, 60 Ton	Each	HVAC Technician	Contract	46.8000	53,560.67	4	2T Lift/45T Crane	20	Major	Yes
Chiller, Reciprocal Air-Cooled Hermetic, 100 Ton										
Maintain Chiller, Reciprocal Air Cooled Hermetic, 100 Ton	Each	Staff HVAC Tech	Staff	26.5000	65.49	0	None	1	PM	No
Repair Chiller, Reciprocal Air Cooled Hermetic, 100 Ton	Each	HVAC Technician	Contract	33.5000	22,981.50	0	None	10	Major	No
Replace Chiller, Reciprocal Air Cooled Hermetic, 100 Ton	Each	HVAC Technician	Contract	72.8000	78,352.94	4	2T Lift/45T Crane	20	Major	Yes
Chiller, Reciprocal Air-Cooled Hermetic, 200 Ton										
Maintain Chiller, Reciprocal Air Cooled Hermetic, 200 Ton	Each	Staff HVAC Tech	Staff	31.5000	65.49	0	None	1	PM	No
Repair Chiller, Reciprocal Air Cooled Hermetic, 200 Ton	Each	HVAC Technician	Contract	33.5000	45,069.25	0	None	10	Major	No
Replace Chiller, Reciprocal Air Cooled Hermetic, 200 Ton	Each	HVAC Technician	Contract	137.8000	135,405.23	4	2T Lift/45T Crane	20	Major	Yes
Chiller, Reciprocal Air-Cooled Hermetic, 300 Ton										
Maintain Chiller, Reciprocal Air Cooled Hermetic, 300 Ton	Each	Staff HVAC Tech	Staff	31.5000	65.49	0	None	1	PM	No
Repair Chiller, Reciprocal Air Cooled Hermetic, 300 Ton	Each	HVAC Technician	Contract	33.5000	64,696.60	0	None	10	Major	No
Replace Chiller, Reciprocal Air Cooled Hermetic, 300 Ton	Each	HVAC Technician	Contract	137.8000	201,071.12	4	2T Lift/45T Crane	20	Major	Yes
Chiller, Reciprocal Water-Cooled Hermetic, 20 Ton										
Maintain Chiller, Reciprocal Water-Cooled Hermetic, 20 Ton	Each	Staff HVAC Tech	Staff	17.5000	45.62	0	None	1	PM	No
Repair Chiller, Reciprocal Water-Cooled Hermetic, 20 Ton	Each	HVAC Technician	Contract	19.7000	14,996.00	0	None	10	Major	No
Replace Chiller, Reciprocal Water-Cooled Hermetic, 20 Ton	Each	HVAC Technician	Contract	29.9000	16,138.37	4	2T Lift/45T Crane	20	Major	Yes
Chiller, Reciprocal Water-Cooled Hermetic, 50 Ton										
Maintain Chiller, Reciprocal Water-Cooled Hermetic, 50 Ton	Each	Staff HVAC Tech	Staff	17.5000	52.63	0	None	1	PM	No
Repair Chiller, Reciprocal Water-Cooled Hermetic, 50 Ton	Each	HVAC Technician	Contract	36.1400	17,392.00	0	None	10	Major	No
Replace Chiller, Reciprocal Water-Cooled Hermetic, 50 Ton	Each	HVAC Technician	Contract	48.1000	34,147.85	4	2T Lift/45T Crane	20	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Unifomat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3030 Cooling Generating Systems										
Chiller, Reciprocal Water-Cooled Hermetic, 60 Ton										
Maintain Chiller, Reciprocal Water-Cooled Hermetic, 60 Ton	Each	Staff HVAC Tech	Staff	17.5000	52.63	0	None	1	PM	No
Repair Chiller, Reciprocal Water-Cooled Hermetic, 60 Ton	Each	HVAC Technician	Contract	36.1400	17,392.00	0	None	10	Major	No
Replace Chiller, Reciprocal Water-Cooled Hermetic, 60 Ton	Each	HVAC Technician	Contract	48.1000	40,566.00	4	2T Lift/45T Crane	20	Major	Yes
Chiller, Reciprocal Water-Cooled Hermetic, 100 Ton										
Maintain Chiller, Reciprocal Water-Cooled Hermetic, 100 Ton	Each	Staff HVAC Tech	Staff	17.5000	52.63	0	None	1	PM	No
Repair Chiller, Reciprocal Water-Cooled Hermetic, 100 Ton	Each	HVAC Technician	Contract	62.0100	22,330.00	0	None	10	Major	No
Replace Chiller, Reciprocal Water-Cooled Hermetic, 100 Ton	Each	HVAC Technician	Contract	74.1000	60,811.24	4	2T Lift/45T Crane	20	Major	Yes
Chiller, Reciprocal Water-Cooled Hermetic, 165 Ton										
Maintain Chiller, Reciprocal Water-Cooled Hermetic, 165 Ton	Each	Staff HVAC Tech	Staff	17.5000	52.63	0	None	1	PM	No
Repair Chiller, Reciprocal Water-Cooled Hermetic, 165 Ton	Each	HVAC Technician	Contract	62.0100	34,387.94	0	None	10	Major	No
Replace Chiller, Reciprocal Water-Cooled Hermetic, 165 Ton	Each	HVAC Technician	Contract	74.1000	84,375.60	4	2T Lift/45T Crane	20	Major	Yes
Chiller, Reciprocal Water-Cooled Hermetic, 200 Ton										
Maintain Chiller, Reciprocal Water-Cooled Hermetic, 200 Ton	Each	Staff HVAC Tech	Staff	17.5000	52.63	0	None	1	PM	No
Repair Chiller, Reciprocal Water-Cooled Hermetic, 200 Ton	Each	HVAC Technician	Contract	106.4200	44,650.00	0	None	10	Major	No
Replace Chiller, Reciprocal Water-Cooled Hermetic, 200 Ton	Each	HVAC Technician	Contract	126.1000	97,064.08	4	2T Lift/45T Crane	20	Major	Yes
Chiller, Reciprocal Water-Cooled Hermetic, 300 Ton										
Maintain Chiller, Reciprocal Water-Cooled Hermetic, 300 Ton	Each	Staff HVAC Tech	Staff	17.5000	52.63	0	None	1	PM	No
Repair Chiller, Reciprocal Water-Cooled Hermetic, 300 Ton	Each	HVAC Technician	Contract	106.4200	52,600.72	0	None	10	Major	No
Replace Chiller, Reciprocal Water-Cooled Hermetic, 300 Ton	Each	HVAC Technician	Contract	126.1000	114,344.64	4	2T Lift/45T Crane	20	Major	Yes
Circulation Pump, 5 HP, Chiller & Condenser Water										
Maintain Circulation Pump, 5 HP, Chiller & Condenser Water	Each	Staff HVAC Tech	Staff	.3300	13.99	0	None	1	PM	No
Repair Circulation Pump, 5 HP, Chiller & Condenser Water	Each	HVAC Technician	Contract	.4900	50.89	0	None	5	Major	No
Replace Circulation Pump, 5 HP, Chiller & Condenser Water	Each	HVAC Technician	Contract	4.5000	2,577.00	0	None	15	Major	Yes
Circulation Pump, 7 1/2 HP, Chiller & Condenser Water										
Maintain Circulation Pump, 7 1/2 HP, Chiller & Condenser Water	Each	Staff HVAC Tech	Staff	.3300	13.99	0	None	1	PM	No
Repair Circulation Pump, 7 1/2 HP, Chiller & Condenser Water	Each	HVAC Technician	Contract	.5700	59.63	0	None	5	Major	No
Replace Circulation Pump, 7 1/2 HP, Chiller & Condenser Water	Each	HVAC Technician	Contract	4.5000	2,950.00	0	None	15	Major	Yes
Circulation Pump, 10 HP, Chiller & Condenser Water										
Maintain Circulation Pump, 10 HP, Chiller & Condenser Water	Each	Staff HVAC Tech	Staff	.3300	13.99	0	None	1	PM	No
Repair Circulation Pump, 10 HP, Chiller & Condenser Water	Each	HVAC Technician	Contract	.6500	70.40	0	None	5	Major	No
Replace Circulation Pump, 10 HP, Chiller & Condenser Water	Each	HVAC Technician	Contract	5.6800	3,323.00	0	None	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3030 Cooling Generating Systems										
Circulation Pump, 15 HP, Chiller & Condenser Water										
Maintain Circulation Pump, 15 HP, Chiller & Condenser Water	Each	Staff HVAC Tech	Staff	.3300	13.99	0	None	1	PM	No
Repair Circulation Pump, 15 HP, Chiller & Condenser Water	Each	HVAC Technician	Contract	.8200	80.80	0	None	5	Major	No
Replace Circulation Pump, 15 HP, Chiller & Condenser Water	Each	HVAC Technician	Contract	5.6800	4,069.00	0	None	15	Major	Yes
Circulation Pump, 25 HP, Chiller & Condenser Water										
Maintain Circulation Pump, 25 HP, Chiller & Condenser Water	Each	Staff HVAC Tech	Staff	.3300	16.55	0	None	1	PM	No
Repair Circulation Pump, 25 HP, Chiller & Condenser Water	Each	HVAC Technician	Contract	1.1400	102.04	0	None	5	Major	No
Replace Circulation Pump, 25 HP, Chiller & Condenser Water	Each	HVAC Technician	Contract	8.0000	5,561.00	4	2T Forklift	15	Major	Yes
Circulation Pump, 50 HP, Chiller & Condenser Water										
Maintain Circulation Pump, 50 HP, Chiller & Condenser Water	Each	Staff HVAC Tech	Staff	.3300	17.32	0	None	1	PM	No
Repair Circulation Pump, 50 HP, Chiller & Condenser Water	Each	HVAC Technician	Contract	1.1400	102.04	0	None	5	Major	No
Replace Circulation Pump, 50 HP, Chiller & Condenser Water	Each	HVAC Technician	Contract	8.0000	12,706.17	4	2T Forklift	15	Major	Yes
Circulation Pump, 75 HP, Chiller & Condenser Water										
Maintain Circulation Pump, 75 HP, Chiller & Condenser Water	Each	Staff HVAC Tech	Staff	.3300	17.87	0	None	1	PM	No
Repair Circulation Pump, 75 HP, Chiller & Condenser Water	Each	HVAC Technician	Contract	1.4400	263.72	0	None	5	Major	No
Replace Circulation Pump, 75 HP, Chiller & Condenser Water	Each	HVAC Technician	Contract	10.0000	19,962.62	4	2T Forklift	15	Major	Yes
Circulation Pump, 100 HP, Chiller & Condenser Water										
Maintain Circulation Pump, 100 HP, Chiller & Condenser Water	Each	Staff HVAC Tech	Staff	.3300	20.34	0	None	1	PM	No
Repair Circulation Pump, 100 HP, Chiller & Condenser Water	Each	HVAC Technician	Contract	1.4400	305.30	0	None	5	Major	No
Replace Circulation Pump, 100 HP, Chiller & Condenser Water	Each	HVAC Technician	Contract	10.0000	27,219.06	4	2T Forklift	15	Major	Yes
Circulation Pump, 150 HP, Chiller & Condenser Water										
Maintain Circulation Pump, 150 HP, Chiller & Condenser Water	Each	Staff HVAC Tech	Staff	.3700	21.63	0	None	1	PM	No
Repair Circulation Pump, 150 HP, Chiller & Condenser Water	Each	HVAC Technician	Contract	2.2400	367.04	0	None	5	Major	No
Replace Circulation Pump, 150 HP, Chiller & Condenser Water	Each	HVAC Technician	Contract	16.0000	41,731.94	4	2T Forklift	15	Major	Yes
Circulation Pump, 200 HP, Chiller & Condenser Water										
Maintain Circulation Pump, 200 HP, Chiller & Condenser Water	Each	Staff HVAC Tech	Staff	.3700	21.63	0	None	1	PM	No
Repair Circulation Pump, 200 HP, Chiller & Condenser Water	Each	HVAC Technician	Contract	2.2400	367.04	0	None	5	Major	No
Replace Circulation Pump, 200 HP, Chiller & Condenser Water	Each	HVAC Technician	Contract	23.2600	56,244.82	4	2T Forklift	15	Major	Yes
Circulation Pump, 350 HP, Chiller & Condenser Water										
Maintain Circulation Pump, 350 HP, Chiller & Condenser Water	Each	Staff HVAC Tech	Staff	.3700	21.63	0	None	1	PM	No
Repair Circulation Pump, 350 HP, Chiller & Condenser Water	Each	HVAC Technician	Contract	2.2400	366.77	0	None	5	Major	No
Replace Circulation Pump, 350 HP, Chiller & Condenser Water	Each	HVAC Technician	Contract	45.0000	99,783.46	4	2T Forklift	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3030 Cooling Generating Systems										
Condenser, Air Cooled, 2 Ton										
Maintain Condenser, Air-Cooled, 2 Ton	Each	Staff HVAC Tech	Staff	1.8000	.00	0	None	1	PM	No
Repair Condenser, Air-Cooled, 2 Ton	Each	HVAC Technician	Contract	5.0000	297.00	0	None	10	Major	No
Replace Condenser, Air-Cooled, 2 Ton	Each	HVAC Technician	Contract	6.7600	1,017.00	4	2T Lift/45T Crane	15	Major	Yes
Condenser, Air Cooled, 5 Ton										
Maintain Condenser, Air-Cooled, 5 Ton	Each	Staff HVAC Tech	Staff	1.8000	.00	0	None	1	PM	No
Repair Condenser, Air-Cooled, 5 Ton	Each	HVAC Technician	Contract	5.0000	350.75	0	None	10	Major	No
Replace Condenser, Air-Cooled, 5 Ton	Each	HVAC Technician	Contract	9.1000	1,738.00	4	2T Lift/45T Crane	15	Major	Yes
Condenser, Air Cooled, 7 1/2 Ton										
Maintain Condenser, Air-Cooled, 7 1/2 Ton	Each	Staff HVAC Tech	Staff	1.8000	.00	0	None	1	PM	No
Repair Condenser, Air-Cooled, 7 1/2 Ton	Each	HVAC Technician	Contract	5.0000	490.90	0	None	10	Major	No
Replace Condenser, Air-Cooled, 7 1/2 Ton	Each	HVAC Technician	Contract	11.0400	2,338.83	4	2T Lift/45T Crane	15	Major	Yes
Condenser, Air-Cooled, 20 Ton										
Maintain Condenser, Air-Cooled, 20 Ton	Each	Staff HVAC Tech	Staff	1.8000	.00	0	None	1	PM	No
Repair Condenser, Air-Cooled, 20 Ton	Each	HVAC Technician	Contract	5.0000	829.00	0	None	10	Major	No
Replace Condenser, Air-Cooled, 20 Ton	Each	HVAC Technician	Contract	20.8000	5,343.00	4	2T Lift/45T Crane	15	Major	Yes
Condenser, Air-Cooled, 40 Ton										
Maintain Condenser, Air-Cooled, 40 Ton	Each	Staff HVAC Tech	Staff	3.2000	.00	0	None	1	PM	No
Repair Condenser, Air-Cooled, 40 Ton	Each	HVAC Technician	Contract	15.5000	1,151.50	0	None	10	Major	No
Replace Condenser, Air-Cooled, 40 Ton	Each	HVAC Technician	Contract	31.0000	10,149.67	4	2T Lift/45T Crane	15	Major	Yes
Condenser, Air-Cooled, 50 Ton										
Maintain Condenser, Air-Cooled, 50 Ton	Each	Staff HVAC Tech	Staff	3.2000	.00	0	None	1	PM	No
Repair Condenser, Air-Cooled, 50 Ton	Each	HVAC Technician	Contract	15.5000	1,480.50	0	None	10	Major	No
Replace Condenser, Air-Cooled, 50 Ton	Each	HVAC Technician	Contract	36.4200	12,553.00	4	2T Lift/45T Crane	15	Major	Yes
Condenser, Air-Cooled, 60 Ton										
Maintain Condenser, Air-Cooled, 60 Ton	Each	Staff HVAC Tech	Staff	3.2000	.00	0	None	1	PM	No
Repair Condenser, Air-Cooled, 60 Ton	Each	HVAC Technician	Contract	15.5000	1,718.50	0	None	10	Major	No
Replace Condenser, Air-Cooled, 60 Ton	Each	HVAC Technician	Contract	44.0400	14,956.33	4	2T Lift/45T Crane	15	Major	Yes
Condenser, Air-Cooled, 100 Ton										
Maintain Condenser, Air-Cooled, 100 Ton	Each	Staff HVAC Tech	Staff	3.2000	.00	0	None	1	PM	No
Repair Condenser, Air-Cooled, 100 Ton	Each	HVAC Technician	Contract	24.5000	2,033.50	0	None	10	Major	No
Replace Condenser, Air-Cooled, 100 Ton	Each	HVAC Technician	Contract	70.5000	24,569.67	4	2T Lift/45T Crane	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3030 Cooling Generating Systems										
Condenser, Evaporative, 20 Ton										
Maintain Condenser, Evaporative, 20 Ton	Each	Staff HVAC Tech	Staff	6.4000	.00	0	None	1	PM	No
Repair Condenser, Evaporative, 20 Ton	Each	HVAC Technician	Contract	8.9000	1,814.80	0	None	10	Major	No
Replace Condenser, Evaporative, 20 Ton	Each	HVAC Technician	Contract	36.4000	5,555.22	4	2T Lift/45T Crane	15	Major	Yes
Condenser, Evaporative, 100 Ton										
Maintain Condenser, Evaporative, 100 Ton	Each	Staff HVAC Tech	Staff	10.5000	.00	0	None	1	PM	No
Repair Condenser, Evaporative, 100 Ton	Each	HVAC Technician	Contract	8.9000	4,836.40	0	None	10	Major	No
Replace Condenser, Evaporative, 100 Ton	Each	HVAC Technician	Contract	100.1000	15,078.46	4	2T Lift/45T Crane	15	Major	Yes
Condenser, Evaporative, 300 Ton										
Maintain Condenser, Evaporative, 300 Ton	Each	Staff HVAC Tech	Staff	10.5000	.00	0	None	1	PM	No
Repair Condenser, Evaporative, 300 Ton	Each	HVAC Technician	Contract	8.9000	10,338.60	0	None	10	Major	No
Replace Condenser, Evaporative, 300 Ton	Each	HVAC Technician	Contract	182.0000	40,222.06	4	2T Lift/45T Crane	15	Major	Yes
Cooling Tower, 50 Ton										
Maintain Cooling Tower, 50 Ton	Each	Staff HVAC Tech	Staff	3.5000	32.75	0	None	1	PM	No
Repair Cooling Tower, 50 Ton	Each	HVAC Technician	Contract	8.1700	1,454.10	0	None	10	Major	No
Replace Cooling Tower, 50 Ton	Each	HVAC Technician	Contract	31.1800	6,385.18	4	2T Lift/45T Crane	15	Major	Yes
Cooling Tower, 100 Ton										
Maintain Cooling Tower, 100 Ton	Each	Staff HVAC Tech	Staff	10.9000	59.06	0	None	1	PM	No
Repair Cooling Tower, 100 Ton	Each	HVAC Technician	Contract	28.5000	2,243.40	0	None	10	Major	No
Replace Cooling Tower, 100 Ton	Each	HVAC Technician	Contract	42.8600	11,197.46	4	2T Lift/45T Crane	15	Major	Yes
Cooling Tower, 200 Ton										
Maintain Cooling Tower, 200 Ton	Each	Staff HVAC Tech	Staff	12.7000	59.06	0	None	1	PM	No
Repair Cooling Tower, 200 Ton	Each	HVAC Technician	Contract	35.5000	3,790.35	0	None	10	Major	No
Replace Cooling Tower, 200 Ton	Each	HVAC Technician	Contract	50.0000	21,342.40	4	2T Lift/45T Crane	15	Major	Yes
Cooling Tower, 250 Ton										
Maintain Cooling Tower, 250 Ton	Each	Staff HVAC Tech	Staff	12.7000	59.06	0	None	1	PM	No
Repair Cooling Tower, 250 Ton	Each	HVAC Technician	Contract	35.5000	4,664.70	0	None	10	Major	No
Replace Cooling Tower, 250 Ton	Each	HVAC Technician	Contract	60.0000	26,429.50	4	2T Lift/45T Crane	15	Major	Yes
Cooling Tower, 300 Ton										
Maintain Cooling Tower, 300 Ton	Each	Staff HVAC Tech	Staff	12.7000	59.06	0	None	1	PM	No
Repair Cooling Tower, 300 Ton	Each	HVAC Technician	Contract	42.5000	5,044.50	0	None	10	Major	No
Replace Cooling Tower, 300 Ton	Each	HVAC Technician	Contract	108.8600	30,756.45	4	4T Lift/90T Crane	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3030 Cooling Generating Systems										
Cooling Tower, 500 Ton										
Maintain Cooling Tower, 500 Ton	Each	Staff HVAC Tech	Staff	12.7000	59.06	0	None	1	PM	No
Repair Cooling Tower, 500 Ton	Each	HVAC Technician	Contract	42.5000	6,461.60	0	None	10	Major	No
Replace Cooling Tower, 500 Ton	Each	HVAC Technician	Contract	108.8600	45,608.42	4	4T Lift/90T Crane	15	Major	Yes
Cooling Tower, 1,000 Ton										
Maintain Cooling Tower, 1,000 Ton	Each	Staff HVAC Tech	Staff	13.8000	130.97	0	None	1	PM	No
Repair Cooling Tower, 1,000 Ton	Each	HVAC Technician	Contract	77.5000	9,922.50	0	None	10	Major	No
Replace Cooling Tower, 1,000 Ton	Each	HVAC Technician	Contract	313.0400	82,446.01	4	4T Lift/90T Crane	15	Major	Yes
Cooling Tower, 1,400 Ton										
Maintain Cooling Tower, 1,400 Ton	Each	Staff HVAC Tech	Staff	13.8000	130.97	0	None	1	PM	No
Repair Cooling Tower, 1,400 Ton	Each	HVAC Technician	Contract	77.5000	12,139.10	0	None	10	Major	No
Replace Cooling Tower, 1,400 Ton	Each	HVAC Technician	Contract	313.0400	101,157.16	4	4T Lift/90T Crane	15	Major	Yes
Evaporative Cooler, Direct, Packaged w/ Heat, 4 Ton										
Maintain Evaporative Cooler, Direct, Packaged w/ Heat, 4 Ton	Each	Staff HVAC Tech	Staff	3.3000	27.61	0	None	1	PM	No
Replace Evaporative Cooler, Direct, Packaged w/ Heat, 4 Ton	Each	HVAC Technician	Contract	71.0000	11,510.99	0	None	20	Major	Yes
Evaporative Cooler, Indirect, 2,000 Scfm										
Maintain Evaporative Cooler, Indirect, 2,000 Scfm	Each	Staff HVAC Tech	Staff	4.2000	33.90	0	None	1	PM	No
Replace Evaporative Cooler, Indirect, 2,000 Scfm	Each	HVAC Technician	Contract	44.0000	7,113.78	0	None	20	Major	Yes
Evaporative Cooler, Indirect, 5,000 Scfm										
Maintain Evaporative Cooler, Indirect, 5,000 Scfm	Each	Staff HVAC Tech	Staff	4.2000	33.90	0	None	1	PM	No
Replace Evaporative Cooler, Indirect, 5,000 Scfm	Each	HVAC Technician	Contract	68.0000	11,058.02	0	None	20	Major	Yes
Evaporative Cooler, Indirect, 15,000 Scfm										
Maintain Evaporative Cooler, Indirect, 15,000 Scfm	Each	Staff HVAC Tech	Staff	13.2000	33.90	0	None	1	PM	No
Replace Evaporative Cooler, Indirect, 15,000 Scfm	Each	HVAC Technician	Contract	181.0000	29,745.90	0	None	20	Major	Yes
Evaporative Cooler, Indirect & Direct, Packaged w/ Heat, 4 Ton										
Maintain Evaporative Cooler, Indirect & Direct, Pkg'd w/ Heat, 4 Ton	Each	Staff HVAC Tech	Staff	3.3000	27.61	0	None	1	PM	No
Replace Evaporative Cooler, Indirect & Direct, Pkg'd w/ Heat, 4 Ton	Each	HVAC Technician	Contract	65.0000	10,475.70	0	None	20	Major	Yes
Evaporative Cooler, Indirect & Direct, Packaged w/ Heat, 20 Ton										
Maintain Evaporative Cooler, Indirect & Direct, Pkg'd w/ Heat, 20 Ton	Each	Staff HVAC Tech	Staff	13.2000	27.61	0	None	1	PM	No
Replace Evaporative Cooler, Indirect & Direct, Pkg'd w/ Heat, 20 Ton	Each	HVAC Technician	Contract	181.0000	29,228.58	0	None	20	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3030 Cooling Generating Systems										
Flow Control Valve, Motorized, 1"										
Maintain Flow Control Valve & Actuator, 1"	Each	Staff HVAC Tech	Staff	1.0000	13.25	0	None	1	PM	No
Replace Valve Actuator, 1"	Each	HVAC Technician	Contract	1.2000	304.01	0	None	15	Major	No
Replace Flow Control Valve, Motorized, 1"	Each	HVAC Technician	Contract	1.2000	304.01	0	None	17	Major	Yes
Flow Control Valve, Motorized, 2"										
Maintain Flow Control Valve & Actuator, 2"	Each	Staff HVAC Tech	Staff	1.0000	13.25	0	None	1	PM	No
Replace Valve Actuator, 2"	Each	HVAC Technician	Contract	2.4000	690.64	0	None	15	Major	No
Replace Flow Control Valve, Motorized, 2"	Each	HVAC Technician	Contract	2.4000	1,002.67	0	None	17	Major	Yes
Flow Control Valve, Motorized, 4"										
Maintain Flow Control Valve & Actuator, 4"	Each	Staff HVAC Tech	Staff	1.0000	13.25	0	None	1	PM	No
Replace Valve Actuator, 4"	Each	HVAC Technician	Contract	12.2400	690.64	0	None	15	Major	No
Replace Flow Control Valve, Motorized, 4"	Each	HVAC Technician	Contract	12.2400	1,563.73	0	None	17	Major	Yes
Flow Control Valve, Motorized, 6"										
Maintain Flow Control Valve & Actuator, 6"	Each	Staff HVAC Tech	Staff	1.0000	13.25	0	None	1	PM	No
Replace Valve Actuator, 6"	Each	HVAC Technician	Contract	15.0200	2,507.21	0	None	15	Major	No
Replace Flow Control Valve, Motorized, 6"	Each	HVAC Technician	Contract	15.0200	2,453.40	0	None	17	Major	Yes
Flow Control Valve, Motorized, 8"										
Maintain Flow Control Valve & Actuator, 8"	Each	Staff HVAC Tech	Staff	1.0000	13.25	0	None	1	PM	No
Replace Valve Actuator, 8"	Each	HVAC Technician	Contract	16.2400	2,453.41	0	None	15	Major	No
Replace Flow Control Valve, Motorized, 8"	Each	HVAC Technician	Contract	16.2400	3,857.44	0	None	17	Major	Yes
Flow Control Valve, Motorized, 10"										
Maintain Flow Control Valve & Actuator, 10"	Each	Staff HVAC Tech	Staff	1.0000	13.25	0	None	1	PM	No
Replace Valve Actuator, 10"	Each	HVAC Technician	Contract	17.5800	5,014.43	0	None	15	Major	No
Replace Flow Control Valve, Motorized, 10"	Each	HVAC Technician	Contract	17.5800	7,840.84	0	None	17	Major	Yes
Flow Control Valve, Motorized, 12"										
Maintain Flow Control Valve & Actuator, 12"	Each	Staff HVAC Tech	Staff	1.0000	13.25	0	None	1	PM	No
Replace Valve Actuator, 12"	Each	HVAC Technician	Contract	17.5800	5,014.43	0	None	15	Major	No
Replace Flow Control Valve, Motorized, 12"	Each	HVAC Technician	Contract	17.5800	14,325.35	0	None	17	Major	Yes
Globe Valve, 6"										
Lubricate, Repack Gland, Globe Valve, 6"	Each	Staff HVAC Tech	Staff	1.1500	1.03	0	None	1	PM	No
Replace Globe Valve, 6"	Each	HVAC Technician	Contract	15.0000	1,116.72	0	None	20	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3030 Cooling Generating Systems										
Pipe & Fittings, 1" Copper										
Resolder Joint, Pipe & Fittings, 1" Copper	K Ln Ft	HVAC Technician	Contract	5.6800	10.05	0	None	10	Major	No
Replace 10' Section, Pipe & Fittings, 1" Copper	K Ln Ft	HVAC Technician	Contract	2.3100	57.30	0	None	20	Major	No
Replace Pipe & Fittings, 1" Copper (20% of Pipe)	K Ln Ft	HVAC Technician	Contract	46.2000	1,146.00	0	None	25	Major	Yes
Pipe & Fittings, 2" Copper										
Resolder Joint, Pipe & Fittings, 2" Copper	K Ln Ft	HVAC Technician	Contract	5.6800	10.05	0	None	10	Major	No
Replace 10' Section, Pipe & Fittings, 2" Copper	K Ln Ft	HVAC Technician	Contract	3.9000	153.80	0	None	20	Major	No
Replace Pipe & Fittings, 2" Copper (20% of Pipe)	K Ln Ft	HVAC Technician	Contract	78.0000	3,076.00	0	None	25	Major	Yes
Pipe & Fittings, 3" Copper										
Resolder Joint, Pipe & Fittings, 3" Copper	K Ln Ft	HVAC Technician	Contract	5.6800	10.05	0	None	10	Major	No
Replace 10' Section, Pipe & Fittings, 3" Copper	K Ln Ft	HVAC Technician	Contract	6.0550	355.80	0	None	20	Major	No
Replace Pipe & Fittings, 3" Copper (20% of Pipe)	K Ln Ft	HVAC Technician	Contract	121.1000	6,961.98	0	None	25	Major	Yes
Pipe & Fittings, 4" Copper										
Resolder Joint, Pipe & Fittings, 4" Copper	K Ln Ft	HVAC Technician	Contract	5.6800	10.05	0	None	10	Major	No
Replace 10' Section, Pipe & Fittings, 4" Copper	K Ln Ft	HVAC Technician	Contract	8.2100	588.20	0	None	20	Major	No
Replace Pipe & Fittings, 4" Copper (20% of Pipe)	K Ln Ft	HVAC Technician	Contract	164.2000	11,764.00	0	None	25	Major	Yes
Pipe & Fittings, 6" Copper										
Resolder Joint, Pipe & Fittings, 6" Copper	K Ln Ft	HVAC Technician	Contract	5.6800	10.05	0	None	10	Major	No
Replace 10' Section, Pipe & Fittings, 6" Copper	K Ln Ft	HVAC Technician	Contract	12.1650	1,863.90	0	None	20	Major	No
Replace Pipe & Fittings, 6" Copper (20% of Pipe)	K Ln Ft	HVAC Technician	Contract	243.3000	37,278.00	0	None	25	Major	Yes
Pipe & Fittings, 8" Copper										
Resolder Joint, Pipe & Fittings, 8" Copper	K Ln Ft	HVAC Technician	Contract	5.6800	10.05	0	None	10	Major	No
Replace 10' Section, Pipe & Fittings, 8" Copper	K Ln Ft	HVAC Technician	Contract	16.1200	3,490.50	0	None	20	Major	No
Replace Pipe & Fittings, 8" Copper (20% of Pipe)	K Ln Ft	HVAC Technician	Contract	322.4000	69,810.00	0	None	25	Major	Yes
Pipe & Fittings, 3/4" Steel										
Replace 10' Section, Pipe & Fittings, 3/4" Steel	K Ln Ft	HVAC Technician	Contract	1.8720	15.05	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 3/4" Steel	K Ln Ft	HVAC Technician	Contract	1.6540	4.84	0	None	25	Major	No
Replace Pipe & Fittings, 3/4" Steel (20% of Pipe)	K Ln Ft	HVAC Technician	Contract	37.4400	301.00	0	None	75	Major	Yes
Pipe & Fittings, 1" Steel										
Replace 10' Section, Pipe & Fittings, 1" Steel	K Ln Ft	HVAC Technician	Contract	1.8720	22.79	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 1" Steel	K Ln Ft	HVAC Technician	Contract	1.6540	4.84	0	None	25	Major	No
Replace Pipe & Fittings, 1" Steel (20% of Pipe)	K Ln Ft	HVAC Technician	Contract	37.4400	455.80	0	None	75	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3030 Cooling Generating Systems										
Pipe & Fittings, 2" Steel										
Replace 10' Section, Pipe & Fittings, 2" Steel	K Ln Ft	HVAC Technician	Contract	2.3192	44.53	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 2" Steel	K Ln Ft	HVAC Technician	Contract	1.6540	4.84	0	None	25	Major	No
Replace Pipe & Fittings, 2" Steel (20% of Pipe)	K Ln Ft	HVAC Technician	Contract	46.3836	890.60	0	None	75	Major	Yes
Pipe & Fittings, 3" Steel										
Replace 10' Section, Pipe & Fittings, 3" Steel	K Ln Ft	HVAC Technician	Contract	2.4646	83.76	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 3" Steel	K Ln Ft	HVAC Technician	Contract	1.8900	5.00	0	None	25	Major	No
Replace Pipe & Fittings, 3" Steel (20% of Pipe)	K Ln Ft	HVAC Technician	Contract	49.2916	1,675.20	0	None	75	Major	Yes
Pipe & Fittings, 4" Steel										
Replace 10' Section, Pipe & Fittings, 4" Steel	K Ln Ft	HVAC Technician	Contract	3.4756	117.90	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 4" Steel	K Ln Ft	HVAC Technician	Contract	2.6000	9.00	0	None	25	Major	No
Replace Pipe & Fittings, 4" Steel (20% of Pipe)	K Ln Ft	HVAC Technician	Contract	69.5118	2,358.00	0	None	75	Major	Yes
Pipe & Fittings, 6" Steel										
Replace 10' Section, Pipe & Fittings, 6" Steel	K Ln Ft	HVAC Technician	Contract	3.9000	201.70	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 6" Steel	K Ln Ft	HVAC Technician	Contract	3.4660	14.80	0	None	25	Major	No
Replace Pipe & Fittings, 6" Steel (20% of Pipe)	K Ln Ft	HVAC Technician	Contract	78.0000	4,034.00	0	None	75	Major	Yes
Pipe & Fittings, 8" Steel										
Replace 10' Section, Pipe & Fittings, 8" Steel	K Ln Ft	HVAC Technician	Contract	4.4499	301.50	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 8" Steel	K Ln Ft	HVAC Technician	Contract	3.4700	14.80	0	None	25	Major	No
Replace Pipe & Fittings, 8" Steel (20% of Pipe)	K Ln Ft	HVAC Technician	Contract	88.9980	6,852.00	0	None	75	Major	Yes
Pipe & Fittings, 10" Steel										
Replace 10' Section, Pipe & Fittings, 10" Steel	K Ln Ft	Plumber	Contract	4.8800	425.80	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 10" Steel	K Ln Ft	Plumber	Contract	3.4660	14.80	0	None	25	Major	No
Replace Pipe & Fittings, 10" Steel (20% of Pipe)	K Ln Ft	Plumber	Contract	97.6000	9,714.00	0	None	75	Major	Yes
Pipe & Fittings, 12" Steel										
Replace 10' Section, Pipe & Fittings, 12" Steel	K Ln Ft	Plumber	Contract	5.3500	556.30	0	None	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 12" Steel	K Ln Ft	Plumber	Contract	3.4660	14.80	0	None	25	Major	No
Replace Pipe & Fittings, 12" Steel (20% of Pipe)	K Ln Ft	Plumber	Contract	107.0000	11,894.00	0	None	75	Major	Yes
Pipe Insulation, Fiberglass, Chilled Water										
Re-tape Pipe Insulation, Fiberglass, Chilled Water	K Ln Ft	Staff Plumber	Staff	.2600	166.50	0	None	5	PM	No
Replace Pipe Insulation, Fiberglass, Chilled Water (20% of Insulation)	K Ln Ft	Plumber	Contract	4.7200	346.60	0	None	25	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3030 Cooling Generating Systems										
Plug Valve, 6"										
Maintain Lubricate, Repack Gland, Plug Valve, 6"	Each	Staff HVAC Tech	Staff	1.1500	1.03	0	None	1	PM	No
Replace Plug Valve, 6"	Each	HVAC Technician	Contract	15.0000	803.04	0	None	20	Major	Yes
Plug Valve, 8"										
Maintain Lubricate, Repack Gland, Plug Valve, 8"	Each	Staff HVAC Tech	Staff	1.1500	1.03	0	None	1	PM	No
Replace Plug Valve, 8"	Each	HVAC Technician	Contract	15.0000	1,309.30	0	None	20	Major	Yes
D3040 Distribution Systems										
Air Curtain, 1,000 Cfm										
Maintain Air Curtain, 1,000 Cfm	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Replace Fan & Motor, Air Curtain, 1,000 Cfm	Each	HVAC Technician	Contract	1.2000	100.89	0	None	15	Major	No
Replace Air Curtain, 1,000 Cfm	Each	HVAC Technician	Contract	2.5000	685.03	0	None	20	Major	Yes
Air Filters, HEPA										
Replace Air Filters, HEPA	Each	Staff HVAC Tech	Staff	2.0000	277.75	0	None	1	Major	Yes
Air Handler, Exhaust, 15,000 Cfm										
Maintain Air Handler, Exhaust, 15,000 Cfm	Each	Staff HVAC Tech	Staff	3.6200	336.98	0	None	1	PM	No
Repair Air Handler, Exhaust, 15,000 Cfm	Each	HVAC Technician	Contract	24.3700	633.96	0	None	10	Major	No
Replace Air Handler, Exhaust, 15,000 Cfm	Each	HVAC Technician	Contract	61.5400	18,213.42	0	None	20	Major	Yes
Air Handler, Exhaust, 20,000 Cfm										
Maintain Air Handler, Exhaust, 20,000 Cfm	Each	Staff HVAC Tech	Staff	3.6200	336.98	0	None	1	PM	No
Repair Air Handler, Exhaust, 20,000 Cfm	Each	HVAC Technician	Contract	24.3700	792.45	0	None	10	Major	No
Replace Air Handler, Exhaust, 20,000 Cfm	Each	HVAC Technician	Contract	80.0000	22,566.31	0	None	20	Major	Yes
Air Handler, Exhaust, 40,000 Cfm										
Maintain Air Handler, Exhaust, 40,000 Cfm	Each	Staff HVAC Tech	Staff	3.6200	336.98	0	None	1	PM	No
Repair Air Handler, Exhaust, 40,000 Cfm	Each	HVAC Technician	Contract	24.3700	1,507.24	0	None	10	Major	No
Replace Air Handler, Exhaust, 40,000 Cfm	Each	HVAC Technician	Contract	153.8400	39,977.88	0	None	20	Major	Yes
Air Handler, Multizone, 2,500 Cfm										
Maintain Air Handler, Multizone, 2,500 Cfm	Each	Staff HVAC Tech	Staff	4.7700	84.65	0	None	1	PM	No
Repair Air Handler, Multizone, 2,500 Cfm	Each	HVAC Technician	Contract	18.7000	311.90	0	None	10	Major	No
Replace Air Handler, Multizone, 2,500 Cfm	Each	HVAC Technician	Contract	16.0000	4,754.70	4	2T Lift/45T Crane	15	Major	Yes
Air Handler, Multizone, 5,200 Cfm										
Maintain Air Handler, Multizone, 5,200 Cfm	Each	Staff HVAC Tech	Staff	4.7700	93.50	0	None	1	PM	No
Repair Air Handler, Multizone, 5,200 Cfm	Each	HVAC Technician	Contract	23.9200	337.27	0	None	10	Major	No
Replace Air Handler, Multizone, 5,200 Cfm	Each	HVAC Technician	Contract	17.3200	9,261.34	4	2T Lift/45T Crane	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3040 Distribution Systems										
Air Handler, Multizone, 6,500 Cfm										
Maintain Air Handler, Multizone, 6,500 Cfm	Each	Staff HVAC Tech	Staff	4.7700	93.50	0	None	1	PM	No
Repair Air Handler, Multizone, 6,500 Cfm	Each	HVAC Technician	Contract	26.0400	337.27	0	None	10	Major	No
Replace Air Handler, Multizone, 6,500 Cfm	Each	HVAC Technician	Contract	18.4600	11,569.54	4	2T Lift/45T Crane	15	Major	Yes
Air Handler, Multizone, 10,000 Cfm										
Maintain Air Handler, Multizone, 10,000 Cfm	Each	Staff HVAC Tech	Staff	5.4900	366.36	0	None	1	PM	No
Repair Air Handler, Multizone, 10,000 Cfm	Each	HVAC Technician	Contract	26.0400	451.39	0	None	10	Major	No
Replace Air Handler, Multizone, 10,000 Cfm	Each	HVAC Technician	Contract	22.5800	17,052.98	4	2T Lift/45T Crane	15	Major	Yes
Air Handler, Multizone, 15,000 Cfm										
Maintain Air Handler, Multizone, 15,000 Cfm	Each	Staff HVAC Tech	Staff	5.4900	366.36	0	None	1	PM	No
Repair Air Handler, Multizone, 15,000 Cfm	Each	HVAC Technician	Contract	32.4800	594.66	0	None	10	Major	No
Replace Air Handler, Multizone, 15,000 Cfm	Each	HVAC Technician	Contract	28.4800	23,545.19	4	2T Lift/45T Crane	15	Major	Yes
Air Handler, Multizone, 20,000 Cfm										
Maintain Air Handler, Multizone, 20,000 Cfm	Each	Staff HVAC Tech	Staff	5.4900	366.36	0	None	1	PM	No
Repair Air Handler, Multizone, 20,000 Cfm	Each	HVAC Technician	Contract	35.0300	792.45	0	None	10	Major	No
Replace Air Handler, Multizone, 20,000 Cfm	Each	HVAC Technician	Contract	35.4400	31,272.09	4	2T Lift/45T Crane	15	Major	Yes
Air Handler, Multizone, 25,000 Cfm										
Maintain Air Handler, Multizone, 25,000 Cfm	Each	Staff HVAC Tech	Staff	5.4900	466.30	0	None	1	PM	No
Repair Air Handler, Multizone, 25,000 Cfm	Each	HVAC Technician	Contract	37.0500	843.17	0	None	10	Major	No
Replace Air Handler, Multizone, 25,000 Cfm	Each	HVAC Technician	Contract	44.8000	36,885.03	4	2T Lift/45T Crane	15	Major	Yes
Air Handler, Multizone, 40,000 Cfm										
Maintain Air Handler, Multizone, 40,000 Cfm	Each	Staff HVAC Tech	Staff	6.0700	466.30	0	None	1	PM	No
Repair Air Handler, Multizone, 40,000 Cfm	Each	HVAC Technician	Contract	39.0000	2,469.51	0	None	10	Major	No
Replace Air Handler, Multizone, 40,000 Cfm	Each	HVAC Technician	Contract	80.0000	52,692.90	4	2T Lift/45T Crane	15	Major	Yes
Air Handler, Multizone, 50,000 Cfm										
Maintain Air Handler, Multizone, 50,000 Cfm	Each	Staff HVAC Tech	Staff	6.0700	466.30	0	None	1	PM	No
Repair Air Handler, Multizone, 50,000 Cfm	Each	HVAC Technician	Contract	39.0000	2,766.60	0	None	10	Major	No
Replace Air Handler, Multizone, 50,000 Cfm	Each	HVAC Technician	Contract	137.1400	73,148.23	4	2T Lift/45T Crane	15	Major	Yes
Air Handler, Multizone, 65,000 Cfm										
Maintain Air Handler, Multizone, 65,000 Cfm	Each	Staff HVAC Tech	Staff	6.0700	466.30	0	None	1	PM	No
Repair Air Handler, Multizone, 65,000 Cfm	Each	HVAC Technician	Contract	39.0000	3,420.34	0	None	10	Major	No
Replace Air Handler, Multizone, 65,000 Cfm	Each	HVAC Technician	Contract	222.8600	103,831.21	4	2T Lift/45T Crane	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3040 Distribution Systems										
Air Handler, Multizone, Variable Volume w/ Exhaust Recovery Wheel, 2,500 Cfm										
Maintain Air Handler, Multizone, Var. Vol. w/ Exhaust Recov. Wheel, 2,500 Cfm	Each	Staff HVAC Tech	Staff	4.7700	84.65	0	None	1	PM	No
Repair Air Handler, Multizone, Var. Vol. w/ Exhaust Recov. Wheel, 2,500 Cfm	Each	HVAC Technician	Contract	18.7000	311.90	0	None	10	Major	No
Replace Air Handler, Multizone, Var. Vol. w/ Exhaust Recov. Wheel, 2,500 Cfm	Each	HVAC Technician	Contract	16.0000	9,086.00	4	2T Lift/45T Crane	15	Major	Yes
Air Handler, Multizone, Variable Volume w/ Exhaust Recovery Wheel, 20,000 Cfm										
Maintain Air Handler, Multizone, Var. Vol. w/ Exhaust Recov. Wheel, 20,000 Cfm	Each	Staff HVAC Tech	Staff	5.4900	366.36	0	None	1	PM	No
Repair Air Handler, Multizone, Var. Vol. w/ Exhaust Recov. Wheel, 20,000 Cfm	Each	HVAC Technician	Contract	35.0300	792.45	0	None	10	Major	No
Replace Air Handler, Multizone, Var. Vol. w/ Exhaust Recov. Wheel, 20,000 Cfm	Each	HVAC Technician	Contract	35.4400	72,688.00	4	2T Lift/45T Crane	15	Major	Yes
Air Handler, Multizone, Variable Volume w/ Exhaust Recovery Wheel, 40,000 Cfm										
Maintain Air Handler, Multizone, Var. Vol. w/ Exhaust Recov. Wheel, 40,000 Cfm	Each	Staff HVAC Tech	Staff	6.0700	466.30	0	None	1	PM	No
Repair Air Handler, Multizone, Var. Vol. w/ Exhaust Recov. Wheel, 40,000 Cfm	Each	HVAC Technician	Contract	39.0000	2,469.51	0	None	10	Major	No
Replace Air Handler, Multizone, Var. Vol. w/ Exhaust Recov. Wheel, 40,000 Cfm	Each	HVAC Technician	Contract	80.0000	145,376.00	4	2T Lift/45T Crane	15	Major	Yes
Air Handler, Single Zone, 1,300 Cfm										
Maintain Air Handler, Single Zone, 1,300 Cfm	Each	Staff HVAC Tech	Staff	3.6200	84.65	0	None	1	PM	No
Repair Air Handler, Single Zone, 1,300 Cfm	Each	HVAC Technician	Contract	17.8400	311.90	0	None	10	Major	No
Replace Air Handler, Single Zone, 1,300 Cfm	Each	HVAC Technician	Contract	13.3200	2,978.29	4	2T Lift/45T Crane	15	Major	Yes
Air Handler, Single Zone, 6,500 Cfm										
Maintain Air Handler, Single Zone, 6,500 Cfm	Each	Staff HVAC Tech	Staff	5.4900	93.50	0	None	1	PM	No
Repair Air Handler, Single Zone, 6,500 Cfm	Each	HVAC Technician	Contract	18.2600	337.27	0	None	10	Major	No
Replace Air Handler, Single Zone, 6,500 Cfm	Each	HVAC Technician	Contract	18.4600	10,080.38	4	2T Lift/45T Crane	15	Major	Yes
Air Handler, Single Zone, 10,000 Cfm										
Maintain Air Handler, Single Zone, 10,000 Cfm	Each	Staff HVAC Tech	Staff	5.4900	366.36	0	None	1	PM	No
Repair Air Handler, Single Zone, 10,000 Cfm	Each	HVAC Technician	Contract	18.2600	451.39	0	None	10	Major	No
Replace Air Handler, Single Zone, 10,000 Cfm	Each	HVAC Technician	Contract	22.5800	14,722.14	4	2T Lift/45T Crane	15	Major	Yes
Air Handler, Single Zone, 15,000 Cfm										
Maintain Air Handler, Single Zone, 15,000 Cfm	Each	Staff HVAC Tech	Staff	5.4900	366.36	0	None	1	PM	No
Repair Air Handler, Single Zone, 15,000 Cfm	Each	HVAC Technician	Contract	20.0400	621.92	0	None	10	Major	No
Replace Air Handler, Single Zone, 20,000 Cfm	Each	HVAC Technician	Contract	28.4400	20,648.84	4	2T Lift/45T Crane	15	Major	Yes
Air Handler, Single Zone, 20,000 Cfm										
Maintain Air Handler, Single Zone, 20,000 Cfm	Each	Staff HVAC Tech	Staff	5.4900	366.36	0	None	1	PM	No
Repair Air Handler, Single Zone, 20,000 Cfm	Each	HVAC Technician	Contract	21.8200	792.45	0	None	10	Major	No
Replace Air Handler, Single Zone, 20,000 Cfm	Each	HVAC Technician	Contract	34.2800	26,575.54	4	2T Lift/45T Crane	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3040 Distribution Systems										
Air Handler, Single Zone, 30,000 Cfm										
Maintain Air Handler, Single Zone, 30,000 Cfm	Each	Staff HVAC Tech	Staff	5.4900	366.36	0	None	1	PM	No
Repair Air Handler, Single Zone, 30,000 Cfm	Each	HVAC Technician	Contract	32.8100	1,450.51	0	None	10	Major	No
Replace Air Handler, Single Zone, 30,000 Cfm	Each	HVAC Technician	Contract	67.2400	38,115.70	4	2T Lift/45T Crane	15	Major	Yes
Air Handler, Single Zone, 50,000 Cfm										
Maintain Air Handler, Single Zone, 50,000 Cfm	Each	Staff HVAC Tech	Staff	5.9600	466.30	0	None	1	PM	No
Repair Air Handler, Single Zone, 50,000 Cfm	Each	HVAC Technician	Contract	54.7900	2,766.60	0	None	10	Major	No
Replace Air Handler, Single Zone, 50,000 Cfm	Each	HVAC Technician	Contract	133.1600	61,196.02	4	2T Lift/45T Crane	15	Major	Yes
Air Handler, Single Zone, 100,000 Cfm										
Maintain Air Handler, Single Zone, 100,000 Cfm	Each	Staff HVAC Tech	Staff	5.9600	466.30	0	None	1	PM	No
Repair Air Handler, Single Zone, 100,000 Cfm	Each	HVAC Technician	Contract	76.7200	4,863.75	0	None	10	Major	No
Replace Air Handler, Single Zone, 100,000 Cfm	Each	HVAC Technician	Contract	238.3400	117,795.37	4	2T Lift/45T Crane	15	Major	Yes
Air Handler, Single Zone, 120,000 Cfm										
Maintain Air Handler, Single Zone, 120,000 Cfm	Each	Staff HVAC Tech	Staff	5.9600	466.30	0	None	1	PM	No
Repair Air Handler, Single Zone, 120,000 Cfm	Each	HVAC Technician	Contract	96.5700	5,156.63	0	None	10	Major	No
Replace Air Handler, Single Zone, 120,000 Cfm	Each	HVAC Technician	Contract	269.0000	141,468.98	4	2T Lift/45T Crane	15	Major	Yes
Air Handler, Single Zone, 135,000 Cfm										
Maintain Air Handler, Single Zone, 135,000 Cfm	Each	Staff HVAC Tech	Staff	5.9600	499.91	0	None	1	PM	No
Repair Air Handler, Single Zone, 135,000 Cfm	Each	HVAC Technician	Contract	262.3700	5,512.92	0	None	10	Major	No
Replace Air Handler, Single Zone, 135,000 Cfm	Each	HVAC Technician	Contract	292.0000	159,224.21	4	2T Lift/45T Crane	15	Major	Yes
Air Handler, Single Zone, 150,000 Cfm										
Maintain Air Handler, Single Zone, 150,000 Cfm	Each	Staff HVAC Tech	Staff	5.9600	555.06	0	None	1	PM	No
Repair Air Handler, Single Zone, 150,000 Cfm	Each	HVAC Technician	Contract	262.3700	5,840.55	0	None	10	Major	No
Replace Air Handler, Single Zone, 150,000 Cfm	Each	HVAC Technician	Contract	315.0000	176,979.41	4	2T Lift/45T Crane	15	Major	Yes
Booster Fan, 120,000 Cfm										
Maintain Booster Fan, 120,000 Cfm	Each	Staff HVAC Tech	Staff	5.3000	431.82	0	None	1	PM	No
Repair Booster Fan, 120,000 Cfm	Each	HVAC Technician	Contract	23.2000	1,305.00	0	None	10	Major	No
Replace Booster Fan, 120,000 Cfm	Each	HVAC Technician	Contract	129.0000	104,873.55	4	2T Forklift	20	Major	Yes
Ceiling Panel, Radiant, Hydronic										
Replace Ceiling Panel, Radiant, Hydronic	Sq Ft	HVAC Technician	Contract	.2500	10.93	0	None	50	Major	Yes
Dehumidifier & Control, 120-150 lbs, 4,500 Cfm										
Maintain Dehumidifier & Control, 120-150 lbs, 4,500 Cfm	Each	Staff HVAC Tech	Staff	6.5000	179.51	0	None	1	PM	No
Replace Dehumidifier & Control, 120-150 lbs, 4,500 Cfm	Each	HVAC Technician	Contract	12.0000	58,197.11	0	None	20	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3040 Distribution Systems										
Duct Insulation, Fiberglass Blanket										
Replace Duct Insulation (20% of Insulation)	Sq Ft	HVAC Technician	Contract	.0100	.17	0	None	30	Major	Yes
Ductwork										
Replace Existing Ductwork (20% of Ductwork)	Lbs	HVAC Technician	Contract	.0220	.21	0	None	30	Major	Yes
Ductwork, Stainless Steel										
Replace Existing Ductwork (20% of Ductwork)	Lbs	HVAC Technician	Contract	.0220	.36	0	None	30	Major	Yes
Exhaust Fan, Ceiling, 200-500 Cfm										
Maintain Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	Each	Staff HVAC Tech	Staff	.3500	23.55	0	None	1	PM	No
Replace Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	Each	HVAC Technician	Contract	3.9000	336.64	0	None	20	Major	Yes
Exhaust Fan, Centrifugal, 250 Cfm										
Maintain Exhaust Fan, Centrifugal, 250 Cfm	Each	Staff HVAC Tech	Staff	.3500	23.55	0	None	1	PM	No
Repair Exhaust Fan, Centrifugal, 250 Cfm	Each	HVAC Technician	Contract	2.4000	36.25	0	None	10	Major	No
Replace Exhaust Fan, Centrifugal, 250 Cfm	Each	HVAC Technician	Contract	4.5000	196.06	0	None	20	Major	Yes
Exhaust Fan, Centrifugal, 800 Cfm										
Maintain Exhaust Fan, Centrifugal, 800 Cfm	Each	Staff HVAC Tech	Staff	1.0000	23.55	0	None	1	PM	No
Repair Exhaust Fan, Centrifugal, 800 Cfm	Each	HVAC Technician	Contract	2.4000	36.25	0	None	10	Major	No
Replace Exhaust Fan, Centrifugal, 800 Cfm	Each	HVAC Technician	Contract	7.8000	483.44	0	None	20	Major	Yes
Exhaust Fan, Centrifugal, 2,000 Cfm										
Maintain Exhaust Fan, Centrifugal, 2,000 Cfm	Each	Staff HVAC Tech	Staff	1.0000	23.55	0	None	1	PM	No
Repair Exhaust Fan, Centrifugal, 2,000 Cfm	Each	HVAC Technician	Contract	2.4000	36.25	0	None	10	Major	No
Replace Exhaust Fan, Centrifugal, 2,000 Cfm	Each	HVAC Technician	Contract	10.0000	743.74	0	None	20	Major	Yes
Exhaust Fan, Centrifugal, 5,000 Cfm										
Maintain Exhaust Fan, Centrifugal, 5,000 Cfm	Each	Staff HVAC Tech	Staff	1.0000	23.55	0	None	1	PM	No
Repair Exhaust Fan, Centrifugal, 5,000 Cfm	Each	HVAC Technician	Contract	2.4000	36.25	0	None	10	Major	No
Replace Exhaust Fan, Centrifugal, 5,000 Cfm	Each	HVAC Technician	Contract	12.0000	1,859.38	0	None	20	Major	Yes
Exhaust Fan, Centrifugal, 8,000 Cfm										
Maintain Exhaust Fan, Centrifugal, 8,000 Cfm	Each	Staff HVAC Tech	Staff	1.0000	23.55	0	None	1	PM	No
Repair Exhaust Fan, Centrifugal, 8,000 Cfm	Each	HVAC Technician	Contract	2.4000	36.25	0	None	10	Major	No
Replace Exhaust Fan, Centrifugal, 8,000 Cfm	Each	HVAC Technician	Contract	15.0000	2,504.44	0	None	20	Major	Yes
Exhaust Fan, Centrifugal, 10,000 Cfm										
Maintain Exhaust Fan, Centrifugal, 10,000 Cfm	Each	Staff HVAC Tech	Staff	1.0000	23.55	0	None	1	PM	No
Repair Exhaust Fan, Centrifugal, 10,000 Cfm	Each	HVAC Technician	Contract	2.4000	36.25	0	None	10	Major	No
Replace Exhaust Fan, Centrifugal, 10,000 Cfm	Each	HVAC Technician	Contract	15.0000	3,203.25	0	None	20	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3040 Distribution Systems										
Exhaust Fan, Centrifugal, 16,000 Cfm										
Maintain Exhaust Fan, Centrifugal, 16,000 Cfm	Each	Staff HVAC Tech	Staff	2.0000	23.55	0	None	1	PM	No
Repair Exhaust Fan, Centrifugal, 16,000 Cfm	Each	HVAC Technician	Contract	2.4000	72.50	0	None	10	Major	No
Replace Exhaust Fan, Centrifugal, 16,000 Cfm	Each	HVAC Technician	Contract	15.0000	5,299.70	4	2T Forklift	20	Major	Yes
Exhaust Fan, Centrifugal, 25,000 Cfm										
Maintain Exhaust Fan, Centrifugal, 25,000 Cfm	Each	Staff HVAC Tech	Staff	2.0000	71.45	0	None	1	PM	No
Repair Exhaust Fan, Centrifugal, 25,000 Cfm	Each	HVAC Technician	Contract	4.7000	217.50	0	None	10	Major	No
Replace Exhaust Fan, Centrifugal, 25,000 Cfm	Each	HVAC Technician	Contract	18.0000	8,592.27	4	2T Forklift	20	Major	Yes
Exhaust Fan, Centrifugal, 30,000 Cfm										
Maintain Exhaust Fan, Centrifugal, 30,000 Cfm	Each	Staff HVAC Tech	Staff	2.0000	71.45	0	None	1	PM	No
Repair Exhaust Fan, Centrifugal, 30,000 Cfm	Each	HVAC Technician	Contract	4.7000	217.50	0	None	10	Major	No
Replace Exhaust Fan, Centrifugal, 30,000 Cfm	Each	HVAC Technician	Contract	20.0000	10,446.25	4	2T Forklift	20	Major	Yes
Exhaust Fan, Centrifugal, 60,000 Cfm										
Maintain Exhaust Fan, Centrifugal, 60,000 Cfm	Each	Staff HVAC Tech	Staff	2.0000	71.45	0	None	1	PM	No
Repair Exhaust Fan, Centrifugal, 60,000 Cfm	Each	HVAC Technician	Contract	8.7000	435.00	0	None	10	Major	No
Replace Exhaust Fan, Centrifugal, 60,000 Cfm	Each	HVAC Technician	Contract	34.7000	28,305.96	4	4T Forklift	20	Major	Yes
Exhaust Fan, Propeller, 375 Cfm										
Maintain Exhaust Fan, Propeller, 375 Cfm	Each	Staff HVAC Tech	Staff	1.0000	23.55	0	None	1	PM	No
Repair Exhaust Fan, Propeller, 375 Cfm	Each	HVAC Technician	Contract	2.4000	36.25	0	None	10	Major	No
Replace Exhaust Fan, Propeller, 375 Cfm	Each	HVAC Technician	Contract	3.9000	336.64	0	None	20	Major	Yes
Exhaust Fan, Propeller, 800 Cfm										
Maintain Exhaust Fan, Propeller, 800 Cfm	Each	Staff HVAC Tech	Staff	1.0000	23.55	0	None	1	PM	No
Repair Exhaust Fan, Propeller, 800 Cfm	Each	HVAC Technician	Contract	2.4000	36.25	0	None	10	Major	No
Replace Exhaust Fan, Propeller, 800 Cfm	Each	HVAC Technician	Contract	5.0000	428.14	0	None	20	Major	Yes
Exhaust Fan, Propeller, 1,000 Cfm										
Maintain Exhaust Fan, Propeller, 1,000 Cfm	Each	Staff HVAC Tech	Staff	1.0000	23.55	0	None	1	PM	No
Repair Exhaust Fan, Propeller, 1,000 Cfm	Each	HVAC Technician	Contract	2.4000	36.25	0	None	10	Major	No
Replace Exhaust Fan, Propeller, 1,000 Cfm	Each	HVAC Technician	Contract	4.8800	521.97	0	None	20	Major	Yes
Exhaust Fan, Propeller, 4,700 Cfm										
Maintain Exhaust Fan, Propeller, 4,700 Cfm	Each	Staff HVAC Tech	Staff	1.0000	23.55	0	None	1	PM	No
Repair Exhaust Fan, Propeller, 4,700 Cfm	Each	HVAC Technician	Contract	2.4000	36.25	0	None	10	Major	No
Replace Exhaust Fan, Propeller, 4,700 Cfm	Each	HVAC Technician	Contract	7.8000	832.81	0	None	20	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3040 Distribution Systems										
Exhaust Fan, Propeller, 7,500 Cfm										
Maintain Exhaust Fan, Propeller, 7,500 Cfm	Each	Staff HVAC Tech	Staff	1.0000	23.55	0	None	1	PM	No
Repair Exhaust Fan, Propeller, 7,500 Cfm	Each	HVAC Technician	Contract	2.4000	36.25	0	None	10	Major	No
Replace Exhaust Fan, Propeller, 7,500 Cfm	Each	HVAC Technician	Contract	8.3200	1,068.04	0	None	20	Major	Yes
Exhaust Fan, Propeller, 10,000 Cfm										
Maintain Exhaust Fan, Propeller, 10,000 Cfm	Each	Staff HVAC Tech	Staff	2.0000	23.55	0	None	1	PM	No
Repair Exhaust Fan, Propeller, 10,000 Cfm	Each	HVAC Technician	Contract	2.4000	36.25	0	None	10	Major	No
Replace Exhaust Fan, Propeller, 10,000 Cfm	Each	HVAC Technician	Contract	10.0000	1,278.07	0	None	20	Major	Yes
Exhaust Fan, Roof Mounted, 800 Cfm										
Maintain Exhaust Fan, Roof Mounted, 800 Cfm	Each	Staff HVAC Tech	Staff	1.0000	23.55	0	None	1	PM	No
Repair Exhaust Fan, Roof Mounted, 800 Cfm	Each	HVAC Technician	Contract	2.4000	36.25	0	None	10	Major	No
Replace Exhaust Fan, Roof Mounted, 800 Cfm	Each	HVAC Technician	Contract	7.8000	428.14	0	None	20	Major	Yes
Exhaust Fan, Roof Mounted, 1,000 Cfm										
Maintain Exhaust Fan, Roof Mounted, 1,000 Cfm	Each	Staff HVAC Tech	Staff	1.0000	23.55	0	None	1	PM	No
Repair Exhaust Fan, Roof Mounted, 1,000 Cfm	Each	HVAC Technician	Contract	2.4000	36.25	0	None	10	Major	No
Replace Exhaust Fan, Roof Mounted, 1,000 Cfm	Each	HVAC Technician	Contract	4.8800	521.97	0	None	20	Major	Yes
Exhaust Fan, Roof Mounted, 2,000 Cfm										
Maintain Exhaust Fan, Roof Mounted, 2,000 Cfm	Each	Staff HVAC Tech	Staff	1.0000	23.55	0	None	1	PM	No
Repair Exhaust Fan, Roof Mounted, 2,000 Cfm	Each	HVAC Technician	Contract	2.4000	36.25	0	None	10	Major	No
Replace Exhaust Fan, Roof Mounted, 2,000 Cfm	Each	HVAC Technician	Contract	9.7600	545.43	0	None	20	Major	Yes
Exhaust Fan, Roof Mounted, 5,000 Cfm										
Maintain Exhaust Fan, Roof Mounted, 5,000 Cfm	Each	Staff HVAC Tech	Staff	1.0000	23.55	0	None	1	PM	No
Repair Exhaust Fan, Roof Mounted, 5,000 Cfm	Each	HVAC Technician	Contract	4.0000	36.25	0	None	10	Major	No
Replace Exhaust Fan, Roof Mounted, 5,000 Cfm	Each	HVAC Technician	Contract	11.5000	832.81	0	None	20	Major	Yes
Exhaust Fan, Roof Mounted, 8,500 Cfm										
Maintain Exhaust Fan, Roof Mounted, 8,500 Cfm	Each	Staff HVAC Tech	Staff	1.0000	23.55	0	None	1	PM	No
Repair Exhaust Fan, Roof Mounted, 8,500 Cfm	Each	HVAC Technician	Contract	4.0000	36.25	0	None	10	Major	No
Replace Exhaust Fan, Roof Mounted, 8,500 Cfm	Each	HVAC Technician	Contract	13.0000	1,788.79	0	None	20	Major	Yes
Exhaust Fan, Roof Mounted, 10,000 Cfm										
Maintain Exhaust Fan, Roof Mounted, 10,000 Cfm	Each	Staff HVAC Tech	Staff	2.0000	23.55	0	None	1	PM	No
Repair Exhaust Fan, Roof Mounted, 10,000 Cfm	Each	HVAC Technician	Contract	4.0000	36.25	0	None	10	Major	No
Replace Exhaust Fan, Roof Mounted, 10,000 Cfm	Each	HVAC Technician	Contract	13.0000	2,308.41	0	None	20	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3040 Distribution Systems										
Exhaust Fan, Roof Mounted, 20,000 Cfm										
Maintain Exhaust Fan, Roof Mounted, 20,000 Cfm	Each	Staff HVAC Tech	Staff	2.0000	71.45	0	None	1	PM	No
Repair Exhaust Fan, Roof Mounted, 20,000 Cfm	Each	HVAC Technician	Contract	5.3300	36.25	0	None	10	Major	No
Replace Exhaust Fan, Roof Mounted, 20,000 Cfm	Each	HVAC Technician	Contract	39.0000	5,249.06	0	None	20	Major	Yes
Fan, Axial Flow, 3,800 Cfm										
Maintain Fan, Axial Flow, 3,800 Cfm	Each	Staff HVAC Tech	Staff	1.0000	23.55	0	None	1	PM	No
Repair Fan, Axial Flow, 3,800 Cfm	Each	HVAC Technician	Contract	2.4000	36.25	0	None	10	Major	No
Replace Fan, Axial Flow, 3,800 Cfm	Each	HVAC Technician	Contract	11.4800	4,603.92	0	None	20	Major	Yes
Fan, Axial Flow, 5,000 Cfm										
Maintain Fan, Axial Flow, 5,000 Cfm	Each	Staff HVAC Tech	Staff	1.0000	23.55	0	None	1	PM	No
Repair Fan, Axial Flow, 5,000 Cfm	Each	HVAC Technician	Contract	4.0000	36.25	0	None	10	Major	No
Replace Fan, Axial Flow, 5,000 Cfm	Each	HVAC Technician	Contract	11.4800	4,847.53	0	None	20	Major	Yes
Fan, Axial Flow, 6,400 Cfm										
Maintain Fan, Axial Flow, 6,400 Cfm	Each	Staff HVAC Tech	Staff	1.0000	23.55	0	None	1	PM	No
Repair Fan, Axial Flow, 6,400 Cfm	Each	HVAC Technician	Contract	4.0000	36.25	0	None	10	Major	No
Replace Fan, Axial Flow, 6,400 Cfm	Each	HVAC Technician	Contract	13.9200	5,131.75	0	None	20	Major	Yes
Fan, Axial Flow, 10,000 Cfm										
Maintain Fan, Axial Flow, 10,000 Cfm	Each	Staff HVAC Tech	Staff	2.0000	23.55	0	None	1	PM	No
Repair Fan, Axial Flow, 10,000 Cfm	Each	HVAC Technician	Contract	4.0000	36.25	0	None	10	Major	No
Replace Fan, Axial Flow, 10,000 Cfm	Each	HVAC Technician	Contract	13.9200	6,279.23	0	None	20	Major	Yes
Fan, Axial Flow, 15,000 Cfm										
Maintain Fan, Axial Flow, 15,000 Cfm	Each	Staff HVAC Tech	Staff	2.0000	23.55	0	None	1	PM	No
Repair Fan, Axial Flow, 15,000 Cfm	Each	HVAC Technician	Contract	4.0000	36.25	0	None	10	Major	No
Replace Fan, Axial Flow, 15,000 Cfm	Each	HVAC Technician	Contract	18.0000	8,064.19	0	None	20	Major	Yes
Fan, Axial Flow, 30,000 Cfm										
Maintain Fan, Axial Flow, 30,000 Cfm	Each	Staff HVAC Tech	Staff	2.0000	71.45	0	None	1	PM	No
Repair Fan, Axial Flow, 30,000 Cfm	Each	HVAC Technician	Contract	4.0000	36.25	0	None	10	Major	No
Replace Fan, Axial Flow, 30,000 Cfm	Each	HVAC Technician	Contract	25.0000	13,841.09	0	None	20	Major	Yes
Humidifier, Electric, Duct w/ Controls										
Maintain Humidifier, Electric, Duct w/ Controls	Each	Staff HVAC Tech	Staff	2.5000	.00	0	None	1	PM	No
Replace Humidifier, Electric, Duct w/ Controls	Each	HVAC Technician	Contract	4.0000	1,971.44	0	None	20	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3040 Distribution Systems										
Humidifier, Steam, Duct w/ Controls										
Maintain Humidifier, Steam, Duct w/ Controls	Each	Staff HVAC Tech	Staff	2.5000	.00	0	None	1	PM	No
Replace Humidifier, Steam, Duct w/ Controls	Each	HVAC Technician	Contract	4.0000	3,971.11	0	None	20	Major	Yes
Steel Damper										
Refinish Steel Damper	Each	Painter	Contract	.5000	.32	0	None	10	Major	No
Replace Steel Damper	Each	HVAC Technician	Contract	.6800	209.85	0	None	60	Major	Yes
Steel Damper, Motorized										
Clean, Lubricate, and Inspect Steel Damper, Motorized	Each	Staff HVAC Tech	Staff	.2500	6.17	0	None	5	PM	No
Refinish Steel Damper, Motorized	Each	Painter	Contract	1.0000	.66	0	None	10	Major	No
Replace Steel Damper, Motorized	Each	HVAC Technician	Contract	1.1600	526.34	0	None	60	Major	Yes
Steel Damper, Motorized, w/ Actuator										
Clean, Lubricate, and Inspect Steel Damper, Motorized, w/ Actuator	Each	Staff HVAC Tech	Staff	.2500	6.17	0	None	5	PM	No
Refinish Steel Damper, Motorized, w/ Actuator	Each	Painter	Contract	1.0000	.66	0	None	10	Major	No
Replace Steel Damper, Motorized, w/ Actuator	Each	Staff HVAC Tech	Staff	1.0000	632.50	0	None	20	Major	Yes
Supply Fan, Roof Mounted, 1,000 Cfm										
Maintain Supply Fan, Roof Mounted, 1,000 Cfm	Each	Staff HVAC Tech	Staff	1.0000	.00	0	None	1	PM	No
Repair Supply Fan, Roof Mounted, 1,000 Cfm	Each	HVAC Technician	Contract	3.0000	217.50	0	None	10	Major	No
Replace Supply Fan, Roof Mounted, 1,000 Cfm	Each	HVAC Technician	Contract	2.8600	450.99	0	None	20	Major	Yes
Supply Fan, Roof Mounted, 5,000 Cfm										
Maintain Supply Fan, Roof Mounted, 5,000 Cfm	Each	Staff HVAC Tech	Staff	1.0000	.00	0	None	1	PM	No
Repair Supply Fan, Roof Mounted, 5,000 Cfm	Each	HVAC Technician	Contract	3.0000	326.25	0	None	10	Major	No
Replace Supply Fan, Roof Mounted, 5,000 Cfm	Each	HVAC Technician	Contract	4.0000	1,481.79	0	None	20	Major	Yes
Supply Fan, Roof Mounted, 10,000 Cfm										
Maintain Supply Fan, Roof Mounted, 10,000 Cfm	Each	Staff HVAC Tech	Staff	3.4000	.00	0	None	1	PM	No
Repair Supply Fan, Roof Mounted, 10,000 Cfm	Each	HVAC Technician	Contract	3.2200	725.00	0	None	10	Major	No
Replace Supply Fan, Roof Mounted, 10,000 Cfm	Each	HVAC Technician	Contract	5.0000	2,061.62	0	None	20	Major	Yes
Variable Air Volume Box, 10,000 Cfm										
Maintain Variable Air Volume Box, 10,000 Cfm	Each	Staff HVAC Tech	Staff	5.0700	25.77	0	None	1	PM	No
Repair Variable Air Volume Box, 10,000 Cfm	Each	HVAC Technician	Contract	1.5600	25.49	0	None	10	Major	No
Replace Variable Air Volume Box, 10,000 Cfm	Each	HVAC Technician	Contract	32.5000	7,050.36	0	None	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3040 Distribution Systems										
Variable Air Volume Box, 25,000 Cfm										
Maintain Variable Air Volume Box, 25,000 Cfm	Each	Staff HVAC Tech	Staff	5.0700	25.77	0	None	1	PM	No
Repair Variable Air Volume Box, 25,000 Cfm	Each	HVAC Technician	Contract	1.5600	25.49	0	None	10	Major	No
Replace Variable Air Volume Box, 25,000 Cfm	Each	HVAC Technician	Contract	42.9000	11,177.38	0	None	15	Major	Yes
Variable Air Volume Box, 50,000 Cfm										
Maintain Variable Air Volume Box, 50,000 Cfm	Each	Staff HVAC Tech	Staff	5.0700	25.77	0	None	1	PM	No
Repair Variable Air Volume Box, 50,000 Cfm	Each	HVAC Technician	Contract	1.5600	62.31	0	None	10	Major	No
Replace Variable Air Volume Box, 50,000 Cfm	Each	HVAC Technician	Contract	75.4000	18,055.77	0	None	15	Major	Yes
Variable Air Volume Box, 65,000 Cfm										
Maintain Variable Air Volume Box, 65,000 Cfm	Each	Staff HVAC Tech	Staff	5.0700	79.84	0	None	1	PM	No
Repair Variable Air Volume Box, 65,000 Cfm	Each	HVAC Technician	Contract	1.5600	124.60	0	None	10	Major	No
Replace Variable Air Volume Box, 65,000 Cfm	Each	HVAC Technician	Contract	105.3000	32,099.13	0	None	15	Major	Yes
Variable Air Volume Control Box										
Maintain Variable Air Volume Control Box	Each	Staff HVAC Tech	Staff	.6600	6.28	0	None	1	PM	No
D3050 Terminal & Package Units										
Air Conditioner, Computer Room, Air Cooled, 3 Ton										
Maintain Air Conditioner, Computer Room, Air Cooled, 3 Ton	Each	Staff HVAC Tech	Staff	5.9000	79.73	0	None	1	PM	No
Repair Air Conditioner, Computer Room, Air Cooled, 3 Ton	Each	HVAC Technician	Contract	13.3400	1,929.59	0	None	10	Major	No
Replace Air Conditioner, Computer Room, Air Cooled, 3 Ton	Each	HVAC Technician	Contract	28.8200	12,628.40	4	2T Lift/45T Crane	20	Major	Yes
Air Conditioner, Computer Room, Air Cooled, 5 Ton										
Maintain Air Conditioner, Computer Room, Air Cooled, 5 Ton	Each	Staff HVAC Tech	Staff	5.9000	79.73	0	None	1	PM	No
Repair Air Conditioner, Computer Room, Air Cooled, 5 Ton	Each	HVAC Technician	Contract	28.4400	2,024.81	0	None	10	Major	No
Replace Air Conditioner, Computer Room, Air Cooled, 5 Ton	Each	HVAC Technician	Contract	48.5600	17,082.95	4	2T Lift/45T Crane	20	Major	Yes
Air Conditioner, Computer Room, Air Cooled, 10 Ton										
Maintain Air Conditioner, Computer Room, Air Cooled, 10 Ton	Each	Staff HVAC Tech	Staff	5.9000	91.17	0	None	1	PM	No
Repair Air Conditioner, Computer Room, Air Cooled, 10 Ton	Each	HVAC Technician	Contract	66.2000	9,382.66	0	None	10	Major	No
Replace Air Conditioner, Computer Room, Air Cooled, 10 Ton	Each	HVAC Technician	Contract	97.9000	28,219.31	4	2T Lift/45T Crane	20	Major	Yes
Air Conditioner, Computer Room, Air Cooled, 15 Ton										
Maintain Air Conditioner, Computer Room, Air Cooled, 15 Ton	Each	Staff HVAC Tech	Staff	5.9000	91.17	0	None	1	PM	No
Repair Air Conditioner, Computer Room, Air Cooled, 15 Ton	Each	HVAC Technician	Contract	89.5600	13,516.35	0	None	10	Major	No
Replace Air Conditioner, Computer Room, Air Cooled, 15 Ton	Each	HVAC Technician	Contract	105.8600	31,571.03	4	2T Lift/45T Crane	20	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3050 Terminal & Package Units										
Air Conditioner, Computer Room, Air Cooled, 20 Ton										
Maintain Air Conditioner, Computer Room, Air Cooled, 20 Ton	Each	Staff HVAC Tech	Staff	5.9000	102.61	0	None	1	PM	No
Repair Air Conditioner, Computer Room, Air Cooled, 20 Ton	Each	HVAC Technician	Contract	99.7800	17,257.02	0	None	10	Major	No
Replace Air Conditioner, Computer Room, Air Cooled, 20 Ton	Each	HVAC Technician	Contract	123.0400	37,625.75	4	2T Lift/45T Crane	20	Major	Yes
Air Conditioner, Computer Room, Chilled Water, 5 Ton										
Maintain Air Conditioner, Computer Room, Chilled Water, 5 Ton	Each	Staff HVAC Tech	Staff	5.9000	79.73	0	None	1	PM	No
Repair Air Conditioner, Computer Room, Chilled Water, 5 Ton	Each	HVAC Technician	Contract	34.1200	4,103.69	0	None	10	Major	No
Replace Air Conditioner, Computer Room, Chilled Water, 5 Ton	Each	HVAC Technician	Contract	41.0800	11,028.24	4	2T Lift/45T Crane	20	Major	Yes
Air Conditioner, Computer Room, Chilled Water, 10 Ton										
Maintain Air Conditioner, Computer Room, Chilled Water, 10 Ton	Each	Staff HVAC Tech	Staff	5.9000	91.17	0	None	1	PM	No
Repair Air Conditioner, Computer Room, Chilled Water, 10 Ton	Each	HVAC Technician	Contract	34.1200	4,143.71	0	None	10	Major	No
Replace Air Conditioner, Computer Room, Chilled Water, 10 Ton	Each	HVAC Technician	Contract	76.0000	17,407.32	4	2T Lift/45T Crane	20	Major	Yes
Air Conditioner, Computer Room, Chilled Water, 15 Ton										
Maintain Air Conditioner, Computer Room, Chilled Water, 15 Ton	Each	Staff HVAC Tech	Staff	5.9000	91.17	0	None	1	PM	No
Repair Air Conditioner, Computer Room, Chilled Water, 15 Ton	Each	HVAC Technician	Contract	44.3000	5,405.99	0	None	10	Major	No
Replace Air Conditioner, Computer Room, Chilled Water, 15 Ton	Each	HVAC Technician	Contract	85.3800	18,704.75	4	2T Lift/45T Crane	20	Major	Yes
Air Conditioner, Computer Room, Chilled Water, 20 Ton										
Maintain Air Conditioner, Computer Room, Chilled Water, 20 Ton	Each	Staff HVAC Tech	Staff	5.9000	102.61	0	None	1	PM	No
Repair Air Conditioner, Computer Room, Chilled Water, 20 Ton	Each	HVAC Technician	Contract	54.4600	8,109.00	0	None	10	Major	No
Replace Air Conditioner, Computer Room, Chilled Water, 20 Ton	Each	HVAC Technician	Contract	94.7600	19,137.24	4	2T Lift/45T Crane	20	Major	Yes
Air Conditioner, Computer Room, Chilled Water, 30 Ton										
Maintain Air Conditioner, Computer Room, Chilled Water, 30 Ton	Each	Staff HVAC Tech	Staff	5.9000	92.25	0	None	1	PM	No
Repair Air Conditioner, Computer Room, Chilled Water, 30 Ton	Each	HVAC Technician	Contract	64.6200	10,710.38	0	None	10	Major	No
Replace Air Conditioner, Computer Room, Chilled Water, 30 Ton	Each	HVAC Technician	Contract	104.1400	19,385.78	4	2T Lift/45T Crane	20	Major	Yes
Air Conditioner, Indoor DX Packaged, Air Cooled, 5 Ton										
Maintain Air Conditioner, Indoor DX Packaged, Air Cooled, 5 Ton	Each	Staff HVAC Tech	Staff	2.8000	.00	0	None	1	PM	No
Repair Air Conditioner, Indoor DX Packaged, Air Cooled, 5 Ton	Each	HVAC Technician	Contract	27.6400	1,738.50	0	None	10	Major	No
Replace Air Conditioner, Indoor DX Packaged, Air Cooled, 5 Ton	Each	HVAC Technician	Contract	39.0000	3,992.00	0	None	20	Major	Yes
Air Conditioner, Indoor DX Packaged, Air Cooled, 10 Ton										
Maintain Air Conditioner, Indoor DX Packaged, Air Cooled, 10 Ton	Each	Staff HVAC Tech	Staff	5.3000	.00	0	None	1	PM	No
Repair Air Conditioner, Indoor DX Packaged, Air Cooled, 10 Ton	Each	HVAC Technician	Contract	54.7800	6,955.23	0	None	10	Major	No
Replace Air Conditioner, Indoor DX Packaged, Air Cooled, 10 Ton	Each	HVAC Technician	Contract	81.9000	14,309.32	0	None	20	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3050 Terminal & Package Units										
Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton										
Maintain Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	Each	Staff HVAC Tech	Staff	7.1000	.00	0	None	1	PM	No
Repair Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	Each	HVAC Technician	Contract	97.6300	17,361.25	0	None	10	Major	No
Replace Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	Each	HVAC Technician	Contract	69.3400	11,269.00	4	2T Lift/45T Crane	20	Major	Yes
Air Conditioner, Indoor DX Packaged, Air Cooled, 50 Ton										
Maintain Air Conditioner, Indoor DX Packaged, Air Cooled, 50 Ton	Each	Staff HVAC Tech	Staff	9.1000	.00	0	None	1	PM	No
Repair Air Conditioner, Indoor DX Packaged, Air Cooled, 50 Ton	Each	HVAC Technician	Contract	265.8400	24,806.89	0	None	10	Major	No
Replace Air Conditioner, Indoor DX Packaged, Air Cooled, 50 Ton	Each	HVAC Technician	Contract	124.6800	26,113.00	4	2T Lift/45T Crane	20	Major	Yes
Air Conditioner, Multizone, Variable Refrigerant Vol., Pre-Cond., 6.5 Ton										
Maintain Air Conditioner, Multizone, Variable Refrig. Vol., Pre-Cond., 6.5 Ton	Each	Staff HVAC Tech	Staff	2.8000	.00	0	None	1	PM	No
Repair Air Conditioner, Multizone, Variable Refrig. Vol., Pre-Cond., 6.5 Ton	Each	HVAC Technician	Contract	27.6400	1,738.50	0	None	10	Major	No
Replace Air Conditioner, Multizone, Variable Refrig. Vol., Pre-Cond., 6.5 Ton	Each	HVAC Technician	Contract	39.0000	18,750.00	0	2T Lift/45T Crane	15	Major	Yes
Air Conditioner, Multizone, Variable Refrigerant Vol., Pre-Cond., 50 Ton										
Maintain Air Conditioner, Multizone, Variable Refrig. Vol., Pre-Cond., 50 Ton	Each	Staff HVAC Tech	Staff	9.1000	.00	0	None	1	PM	No
Repair Air Conditioner, Multizone, Variable Refrig. Vol., Pre-Cond., 50 Ton	Each	HVAC Technician	Contract	265.8400	24,806.89	0	None	10	Major	No
Replace Air Conditioner, Multizone, Variable Refrig. Vol., Pre-Cond., 50 Ton	Each	HVAC Technician	Contract	124.6800	150,000.00	0	2T Lift/45T Crane	15	Major	Yes
Air Conditioner, Multizone, Variable Refrigerant Vol., Pre-Cond., 100 Ton										
Maintain Air Conditioner, Multizone, Variable Refrig. Vol., Pre-Cond., 100 Ton	Each	Staff HVAC Tech	Staff	399.6200	349,613.78	0	None	1	PM	No
Repair Air Conditioner, Multizone, Variable Refrig. Vol., Pre-Cond., 100 Ton	Each	HVAC Technician	Contract	39.0000	2,411.82	0	None	10	Major	No
Replace Air Conditioner, Multizone, Variable Refrig. Vol., Pre-Cond., 100 Ton	Each	HVAC Technician	Contract	80.0000	300,000.00	4	2T Lift/45T Crane	15	Major	Yes
Air Conditioner, Multizone, Variable Volume, 50 Ton										
Maintain Air Conditioner, Multizone, Variable Volume, 50 Ton	Each	Staff HVAC Tech	Staff	7.3000	176.25	0	None	1	PM	No
Repair Air Conditioner, Multizone, Variable Volume, 50 Ton	Each	HVAC Technician	Contract	251.4000	18,940.28	0	None	10	Major	No
Replace Air Conditioner, Multizone, Variable Volume, 50 Ton	Each	HVAC Technician	Contract	379.0000	96,465.84	4	2T Lift/45T Crane	15	Major	Yes
Air Conditioner, Multizone, Variable Volume, 70 Ton										
Maintain Air Conditioner, Multizone, Variable Volume, 70 Ton	Each	Staff HVAC Tech	Staff	7.8000	187.69	0	None	1	PM	No
Repair Air Conditioner, Multizone, Variable Volume, 70 Ton	Each	HVAC Technician	Contract	251.5200	21,815.54	0	None	10	Major	No
Replace Air Conditioner, Multizone, Variable Volume, 70 Ton	Each	HVAC Technician	Contract	535.0000	134,467.54	4	2T Lift/45T Crane	15	Major	Yes
Air Conditioner, Multizone, Variable Volume, 90 Ton										
Maintain Air Conditioner, Multizone, Variable Volume, 90 Ton	Each	Staff HVAC Tech	Staff	7.8000	199.13	0	None	1	PM	No
Repair Air Conditioner, Multizone, Variable Volume, 90 Ton	Each	HVAC Technician	Contract	273.9800	22,079.92	0	None	10	Major	No
Replace Air Conditioner, Multizone, Variable Volume, 90 Ton	Each	HVAC Technician	Contract	691.0000	154,929.99	4	2T Lift/45T Crane	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3050 Terminal & Package Units										
Air Conditioner, Multizone, Variable Volume, 105 Ton										
Maintain Air Conditioner, Multizone, Variable Volume, 105 Ton	Each	Staff HVAC Tech	Staff	7.8000	210.57	0	None	1	PM	No
Repair Air Conditioner, Multizone, Variable Volume, 105 Ton	Each	HVAC Technician	Contract	301.3200	26,066.01	0	None	10	Major	No
Replace Air Conditioner, Multizone, Variable Volume, 105 Ton	Each	HVAC Technician	Contract	791.0000	173,053.87	4	2T Lift/45T Crane	15	Major	Yes
Air Conditioner, Multizone, Variable Volume, 140 Ton										
Maintain Air Conditioner, Multizone, Variable Volume, 140 Ton	Each	Staff HVAC Tech	Staff	7.8000	222.01	0	None	1	PM	No
Repair Air Conditioner, Multizone, Variable Volume, 140 Ton	Each	HVAC Technician	Contract	367.7600	29,678.04	0	None	10	Major	No
Replace Air Conditioner, Multizone, Variable Volume, 140 Ton	Each	HVAC Technician	Contract	1108.0000	212,224.85	4	2T Lift/45T Crane	15	Major	Yes
Air Conditioner, Rooftop, Multizone, 3 Ton										
Maintain Air Conditioner, Rooftop, Multizone, 3 Ton	Each	Staff HVAC Tech	Staff	6.0000	79.73	0	None	1	PM	No
Repair Air Conditioner, Rooftop, Multizone, 3 Ton	Each	HVAC Technician	Contract	44.8600	875.44	0	None	10	Major	No
Replace Air Conditioner, Rooftop, Multizone, 3 Ton	Each	HVAC Technician	Contract	50.0000	3,193.00	0	None	15	Major	Yes
Air Conditioner, Rooftop, Multizone, 5 Ton										
Maintain Air Conditioner, Rooftop, Multizone, 5 Ton	Each	Staff HVAC Tech	Staff	6.0000	79.73	0	None	1	PM	No
Repair Air Conditioner, Rooftop, Multizone, 5 Ton	Each	HVAC Technician	Contract	49.6000	1,474.32	0	None	10	Major	No
Replace Air Conditioner, Rooftop, Multizone, 5 Ton	Each	HVAC Technician	Contract	74.1600	5,149.00	0	None	15	Major	Yes
Air Conditioner, Rooftop, Multizone, 7-1/2 Ton										
Maintain Air Conditioner, Rooftop, Multizone, 7-1/2 Ton	Each	Staff HVAC Tech	Staff	6.0000	79.73	0	None	1	PM	No
Repair Air Conditioner, Rooftop, Multizone, 7-1/2 Ton	Each	HVAC Technician	Contract	55.5400	2,222.92	0	None	10	Major	No
Replace Air Conditioner, Rooftop, Multizone, 7-1/2 Ton	Each	HVAC Technician	Contract	105.0000	7,594.00	0	None	15	Major	Yes
Air Conditioner, Rooftop, Multizone, 10 Ton										
Maintain Air Conditioner, Rooftop, Multizone, 10 Ton	Each	Staff HVAC Tech	Staff	6.0000	91.17	0	None	1	PM	No
Repair Air Conditioner, Rooftop, Multizone, 10 Ton	Each	HVAC Technician	Contract	61.4800	2,971.53	0	None	10	Major	No
Replace Air Conditioner, Rooftop, Multizone, 10 Ton	Each	HVAC Technician	Contract	141.6400	10,039.00	0	None	15	Major	Yes
Air Conditioner, Rooftop, Multizone, 15 Ton										
Maintain Air Conditioner, Rooftop, Multizone, 15 Ton	Each	Staff HVAC Tech	Staff	6.0000	91.17	0	None	1	PM	No
Repair Air Conditioner, Rooftop, Multizone, 15 Ton	Each	HVAC Technician	Contract	73.3400	4,107.10	0	None	10	Major	No
Replace Air Conditioner, Rooftop, Multizone, 15 Ton	Each	HVAC Technician	Contract	164.7000	14,929.00	0	None	15	Major	Yes
Air Conditioner, Rooftop, Multizone, 20 Ton										
Maintain Air Conditioner, Rooftop, Multizone, 20 Ton	Each	Staff HVAC Tech	Staff	6.0000	102.61	0	None	1	PM	No
Repair Air Conditioner, Rooftop, Multizone, 20 Ton	Each	HVAC Technician	Contract	85.2000	5,965.92	0	None	10	Major	No
Replace Air Conditioner, Rooftop, Multizone, 20 Ton	Each	HVAC Technician	Contract	187.7600	19,819.00	4	2T Lift/45T Crane	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3050 Terminal & Package Units										
Air Conditioner, Rooftop, Multizone, 25 Ton										
Maintain Air Conditioner, Rooftop, Multizone, 25 Ton	Each	Staff HVAC Tech	Staff	6.0000	102.61	0	None	1	PM	No
Repair Air Conditioner, Rooftop, Multizone, 25 Ton	Each	HVAC Technician	Contract	97.0600	9,413.50	0	None	10	Major	No
Replace Air Conditioner, Rooftop, Multizone, 25 Ton	Each	HVAC Technician	Contract	210.8000	24,709.00	4	2T Lift/45T Crane	15	Major	Yes
Air Conditioner, Rooftop, Multizone, 40 Ton										
Maintain Air Conditioner, Rooftop, Multizone, 40 Ton	Each	Staff HVAC Tech	Staff	6.0000	176.25	0	None	1	PM	No
Repair Air Conditioner, Rooftop, Multizone, 40 Ton	Each	HVAC Technician	Contract	123.9600	14,949.14	0	None	10	Major	No
Replace Air Conditioner, Rooftop, Multizone, 40 Ton	Each	HVAC Technician	Contract	323.0000	39,379.00	4	2T Lift/45T Crane	15	Major	Yes
Air Conditioner, Rooftop, Multizone, 50 Ton										
Maintain Air Conditioner, Rooftop, Multizone, 50 Ton	Each	Staff HVAC Tech	Staff	7.8000	176.25	0	None	1	PM	No
Repair Air Conditioner, Rooftop, Multizone, 50 Ton	Each	HVAC Technician	Contract	166.3800	17,984.97	0	None	10	Major	No
Replace Air Conditioner, Rooftop, Multizone, 50 Ton	Each	HVAC Technician	Contract	380.3400	49,159.00	4	2T Lift/45T Crane	15	Major	Yes
Air Conditioner, Rooftop, Multizone, 70 Ton										
Maintain Air Conditioner, Rooftop, Multizone, 70 Ton	Each	Staff HVAC Tech	Staff	7.8000	187.69	0	None	1	PM	No
Repair Air Conditioner, Rooftop, Multizone, 70 Ton	Each	HVAC Technician	Contract	215.3400	21,815.54	0	None	10	Major	No
Replace Air Conditioner, Rooftop, Multizone, 70 Ton	Each	HVAC Technician	Contract	495.0000	68,719.00	4	2T Lift/45T Crane	15	Major	Yes
Air Conditioner, Rooftop, Multizone, 140 Ton										
Maintain Air Conditioner, Rooftop, Multizone, 140 Ton	Each	Staff HVAC Tech	Staff	7.8000	222.01	0	None	1	PM	No
Repair Air Conditioner, Rooftop, Multizone, 140 Ton	Each	HVAC Technician	Contract	273.0200	33,270.02	0	None	10	Major	No
Replace Air Conditioner, Rooftop, Multizone, 140 Ton	Each	HVAC Technician	Contract	737.0000	137,179.00	4	2T Lift/45T Crane	15	Major	Yes
Air Conditioner, Rooftop, Single Zone, 3 Ton										
Maintain Air Conditioner, Rooftop, Single Zone, 3 Ton	Each	Staff HVAC Tech	Staff	5.9000	79.73	0	None	1	PM	No
Repair Air Conditioner, Rooftop, Single Zone, 3 Ton	Each	HVAC Technician	Contract	17.8400	875.44	0	None	10	Major	No
Replace Air Conditioner, Rooftop, Single Zone, 3 Ton	Each	HVAC Technician	Contract	38.4800	3,111.00	0	None	15	Major	Yes
Air Conditioner, Rooftop, Single Zone, 5 Ton										
Maintain Air Conditioner, Rooftop, Single Zone, 5 Ton	Each	Staff HVAC Tech	Staff	5.9000	79.73	0	None	1	PM	No
Repair Air Conditioner, Rooftop, Single Zone, 5 Ton	Each	HVAC Technician	Contract	18.2800	1,273.00	0	None	10	Major	No
Replace Air Conditioner, Rooftop, Single Zone, 5 Ton	Each	HVAC Technician	Contract	56.5600	5,149.00	0	None	15	Major	Yes
Air Conditioner, Rooftop, Single Zone, 7-1/2 Ton										
Maintain Air Conditioner, Rooftop, Single Zone, 7-1/2 Ton	Each	Staff HVAC Tech	Staff	5.9000	79.73	0	None	1	PM	No
Repair Air Conditioner, Rooftop, Single Zone, 7-1/2 Ton	Each	HVAC Technician	Contract	21.8400	2,222.92	0	None	10	Major	No
Replace Air Conditioner, Rooftop, Single Zone, 7-1/2 Ton	Each	HVAC Technician	Contract	69.0200	7,696.50	0	None	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3050 Terminal & Package Units										
Air Conditioner, Rooftop, Single Zone, 10 Ton										
Maintain Air Conditioner, Rooftop, Single Zone, 10 Ton	Each	Staff HVAC Tech	Staff	5.9000	91.17	0	None	1	PM	No
Repair Air Conditioner, Rooftop, Single Zone, 10 Ton	Each	HVAC Technician	Contract	54.8000	9,046.16	0	None	10	Major	No
Replace Air Conditioner, Rooftop, Single Zone, 10 Ton	Each	HVAC Technician	Contract	81.9000	10,244.00	0	None	15	Major	Yes
Air Conditioner, Rooftop, Single Zone, 15 Ton										
Maintain Air Conditioner, Rooftop, Single Zone, 15 Ton	Each	Staff HVAC Tech	Staff	5.9000	91.17	0	None	1	PM	No
Repair Air Conditioner, Rooftop, Single Zone, 15 Ton	Each	HVAC Technician	Contract	76.7200	13,306.55	0	None	10	Major	No
Replace Air Conditioner, Rooftop, Single Zone, 15 Ton	Each	HVAC Technician	Contract	106.3800	15,339.00	0	None	15	Major	Yes
Air Conditioner, Rooftop, Single Zone, 20 Ton										
Maintain Air Conditioner, Rooftop, Single Zone, 20 Ton	Each	Staff HVAC Tech	Staff	5.9000	102.61	0	None	1	PM	No
Repair Air Conditioner, Rooftop, Single Zone, 20 Ton	Each	HVAC Technician	Contract	86.6400	16,582.36	0	None	10	Major	No
Replace Air Conditioner, Rooftop, Single Zone, 20 Ton	Each	HVAC Technician	Contract	130.0200	20,434.00	4	2T Lift/45T Crane	15	Major	Yes
Air Conditioner, Rooftop, Single Zone, 25 Ton										
Maintain Air Conditioner, Rooftop, Single Zone, 25 Ton	Each	Staff HVAC Tech	Staff	5.9000	102.61	0	None	1	PM	No
Repair Air Conditioner, Rooftop, Single Zone, 25 Ton	Each	HVAC Technician	Contract	96.5600	19,858.16	0	None	10	Major	No
Replace Air Conditioner, Rooftop, Single Zone, 25 Ton	Each	HVAC Technician	Contract	153.6600	25,529.00	4	2T Lift/45T Crane	15	Major	Yes
Air Conditioner, Rooftop, Single Zone, 50 Ton										
Maintain Air Conditioner, Rooftop, Single Zone, 50 Ton	Each	Staff HVAC Tech	Staff	6.8000	176.25	0	None	1	PM	No
Repair Air Conditioner, Rooftop, Single Zone, 50 Ton	Each	HVAC Technician	Contract	215.0000	20,662.55	0	None	10	Major	No
Replace Air Conditioner, Rooftop, Single Zone, 50 Ton	Each	HVAC Technician	Contract	307.4800	51,004.00	4	2T Lift/45T Crane	15	Major	Yes
Air Conditioner, Rooftop, Single Zone, 60 Ton										
Maintain Air Conditioner, Rooftop, Single Zone, 60 Ton	Each	Staff HVAC Tech	Staff	6.8000	176.25	0	None	1	PM	No
Repair Air Conditioner, Rooftop, Single Zone, 60 Ton	Each	HVAC Technician	Contract	262.3600	20,984.30	0	None	10	Major	No
Replace Air Conditioner, Rooftop, Single Zone, 60 Ton	Each	HVAC Technician	Contract	369.0000	61,194.00	4	2T Lift/45T Crane	15	Major	Yes
Air Conditioner, Rooftop, Single Zone, 100 Ton										
Maintain Air Conditioner, Rooftop, Single Zone, 100 Ton	Each	Staff HVAC Tech	Staff	6.8000	210.57	0	None	1	PM	No
Repair Air Conditioner, Rooftop, Single Zone, 100 Ton	Each	HVAC Technician	Contract	298.6800	22,686.65	0	None	10	Major	No
Replace Air Conditioner, Rooftop, Single Zone, 100 Ton	Each	HVAC Technician	Contract	600.0000	101,954.00	4	2T Lift/45T Crane	15	Major	Yes
Air Conditioner, Single Zone, Variable Volume, 20 Ton										
Maintain Air Conditioner, Single Zone, Variable Volume, 20 Ton	Each	Staff HVAC Tech	Staff	5.9000	102.61	0	None	1	PM	No
Repair Air Conditioner, Single Zone, Variable Volume, 20 Ton	Each	HVAC Technician	Contract	79.7600	15,901.31	0	None	10	Major	No
Replace Air Conditioner, Single Zone, Variable Volume, 20 Ton	Each	HVAC Technician	Contract	136.5000	25,852.85	4	2T Lift/45T Crane	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3050 Terminal & Package Units										
Air Conditioner, Single Zone, Variable Volume, 30 Ton										
Maintain Air Conditioner, Single Zone, Variable Volume, 30 Ton	Each	Staff HVAC Tech	Staff	5.9000	102.61	0	None	1	PM	No
Repair Air Conditioner, Single Zone, Variable Volume, 30 Ton	Each	HVAC Technician	Contract	114.5400	17,991.99	0	None	10	Major	No
Replace Air Conditioner, Single Zone, Variable Volume, 30 Ton	Each	HVAC Technician	Contract	196.2800	36,914.25	4	2T Lift/45T Crane	15	Major	Yes
Air Conditioner, Single Zone, Variable Volume, 40 Ton										
Maintain Air Conditioner, Single Zone, Variable Volume, 40 Ton	Each	Staff HVAC Tech	Staff	5.9000	176.25	0	None	1	PM	No
Repair Air Conditioner, Single Zone, Variable Volume, 40 Ton	Each	HVAC Technician	Contract	123.3400	22,666.78	0	None	10	Major	No
Replace Air Conditioner, Single Zone, Variable Volume, 40 Ton	Each	HVAC Technician	Contract	265.1000	46,689.46	4	2T Lift/45T Crane	15	Major	Yes
Air Conditioner, Single Zone, Variable Volume, 60 Ton										
Maintain Air Conditioner, Single Zone, Variable Volume, 60 Ton	Each	Staff HVAC Tech	Staff	6.8000	176.25	0	None	1	PM	No
Repair Air Conditioner, Single Zone, Variable Volume, 60 Ton	Each	HVAC Technician	Contract	298.0200	23,900.37	0	None	10	Major	No
Replace Air Conditioner, Single Zone, Variable Volume, 60 Ton	Each	HVAC Technician	Contract	374.0000	58,136.74	4	2T Lift/45T Crane	15	Major	Yes
Air Conditioner, Window, 1 Ton										
Maintain Air Conditioner, Window, 1 Ton	Each	Staff HVAC Tech	Staff	1.3000	23.96	0	None	1	PM	No
Repair Air Conditioner, Window, 1 Ton	Each	HVAC Technician	Contract	1.0700	1.85	0	None	10	Major	No
Replace Air Conditioner, Window, 1 Ton	Each	HVAC Technician	Contract	3.3000	747.00	0	None	20	Major	Yes
Air Conditioner, Window, 2 Ton										
Maintain Air Conditioner, Window, 2 Ton	Each	Staff HVAC Tech	Staff	1.3000	23.96	0	None	1	PM	No
Repair Air Conditioner, Window, 2 Ton	Each	HVAC Technician	Contract	1.1300	3.67	0	None	10	Major	No
Replace Air Conditioner, Window, 2 Ton	Each	HVAC Technician	Contract	7.8000	1,075.00	0	None	20	Major	Yes
Air Conditioner, Window, 4 Ton										
Maintain Air Conditioner, Window, 4 Ton	Each	Staff HVAC Tech	Staff	1.3000	23.96	0	None	1	PM	No
Repair Air Conditioner, Window, 4 Ton	Each	HVAC Technician	Contract	1.4000	11.02	0	None	10	Major	No
Replace Air Conditioner, Window, 4 Ton	Each	HVAC Technician	Contract	44.6200	2,597.33	0	None	20	Major	Yes
Baseboard Radiator 10 ft.										
Replace Baseboard Radiator, 10 ft.	Each	HVAC Technician	Contract	4.0000	297.77	0	None	20	Major	Yes
Electric Cabinet Heater										
Inspect & Maintain Electric Cabinet Heater	Each	Staff Electrician	Staff	1.0000	22.61	0	None	1	PM	No
Replace Electric Cabinet Heater	Each	Electrician	Contract	3.3400	1,812.32	0	None	15	Major	Yes
Explosion Proof Suspended Heater										
Inspect & Maintain Explosion Proof Suspended Heater	Each	Staff Electrician	Staff	1.1400	.00	0	None	1	PM	No
Replace Contactor, Explosion Proof Suspended Heater	Each	Electrician	Contract	.4600	79.95	0	None	2	Major	No
Replace Explosion Proof Suspended Heater	Each	HVAC Technician	Contract	4.6200	4,163.15	0	None	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D3050 Terminal & Package Units										
Fan Coil Unit, 1 Ton										
Maintain Fan Coil Unit, 1 Ton	Each	Staff HVAC Tech	Staff	3.3300	27.24	0	None	1	PM	No
Repair Fan Coil Unit, 1 Ton	Each	HVAC Technician	Contract	3.1600	173.00	0	None	10	Major	No
Replace Fan Coil Unit, 1 Ton	Each	HVAC Technician	Contract	5.2000	775.00	4	2T Forklift	15	Major	Yes
Fan Coil Unit, 3 Ton										
Maintain Fan Coil Unit, 3 Ton	Each	Staff HVAC Tech	Staff	3.3300	27.24	0	None	1	PM	No
Repair Fan Coil Unit, 3 Ton	Each	HVAC Technician	Contract	3.1600	252.00	0	None	10	Major	No
Replace Fan Coil Unit, 3 Ton	Each	HVAC Technician	Contract	7.8000	1,650.00	4	2T Forklift	15	Major	Yes
Fan Coil Unit, 5 Ton										
Maintain Fan Coil Unit, 5 Ton	Each	Staff HVAC Tech	Staff	3.3300	27.24	0	None	1	PM	No
Repair Fan Coil Unit, 5 Ton	Each	HVAC Technician	Contract	3.5200	264.00	0	None	10	Major	No
Replace Fan Coil Unit, 5 Ton	Each	HVAC Technician	Contract	8.0600	1,833.00	4	2T Forklift	15	Major	Yes
Fan Coil Unit, 10 Ton										
Maintain Fan Coil Unit, 10 Ton	Each	Staff HVAC Tech	Staff	3.3300	27.24	0	None	1	PM	No
Repair Fan Coil Unit, 10 Ton	Each	HVAC Technician	Contract	3.7200	269.00	0	None	10	Major	No
Replace Fan Coil Unit, 10 Ton	Each	HVAC Technician	Contract	34.6200	3,075.00	4	2T Forklift	15	Major	Yes
Fan Coil Unit, 20 Ton										
Maintain Fan Coil Unit, 20 Ton	Each	Staff HVAC Tech	Staff	3.3300	27.24	0	None	1	PM	No
Repair Fan Coil Unit, 20 Ton	Each	HVAC Technician	Contract	3.9200	370.00	0	None	10	Major	No
Replace Fan Coil Unit, 20 Ton	Each	HVAC Technician	Contract	58.5400	5,500.00	4	2T Forklift	15	Major	Yes
Fan Coil Unit, 30 Ton										
Maintain Fan Coil Unit, 30 Ton	Each	Staff HVAC Tech	Staff	3.3300	27.24	0	None	1	PM	No
Repair Fan Coil Unit, 30 Ton	Each	HVAC Technician	Contract	4.4000	635.00	0	None	10	Major	No
Replace Fan Coil Unit, 30 Ton	Each	HVAC Technician	Contract	77.9200	8,150.00	4	2T Forklift	15	Major	Yes
Fan Coil, Two-Pipe, 400 Cfm										
Maintain Fan Coil, Two-Pipe, 400 Cfm	Each	Staff HVAC Tech	Staff	.8000	28.57	0	None	1	PM	No
Repair Fan Coil, Two-Pipe, 400 Cfm	Each	HVAC Technician	Contract	1.2000	173.00	0	None	10	Major	No
Replace Fan Coil, Two-Pipe, 400 Cfm	Each	HVAC Technician	Contract	2.6800	1,319.60	0	None	15	Major	Yes
Fan Coil, Two-Pipe, 1,800 Cfm										
Maintain Fan Coil, Two-Pipe, 1,800 Cfm	Each	Staff HVAC Tech	Staff	3.3000	56.36	0	None	1	PM	No
Repair Fan Coil, Two-Pipe, 1,800 Cfm	Each	HVAC Technician	Contract	3.5000	252.00	0	None	10	Major	No
Replace Fan Coil, Two-Pipe, 1,800 Cfm	Each	HVAC Technician	Contract	4.4000	2,805.86	0	None	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3050 Terminal & Package Units										
Finned Radiator										
Replace Finned Radiator, 10 ft.	Each	HVAC Technician	Contract	10.4000	399.13	0	None	20	Major	Yes
Heat Pump, 1 Ton										
Maintain Heat Pump, 1 Ton	Each	Staff HVAC Tech	Staff	2.8000	38.00	0	None	1	PM	No
Repair Heat Pump, 1 Ton	Each	HVAC Technician	Contract	16.0000	786.90	0	None	10	Major	No
Replace Heat Pump, 1 Ton	Each	HVAC Technician	Contract	25.5800	2,348.20	0	None	20	Major	Yes
Heat Pump, 2 Ton										
Maintain Heat Pump, 2 Ton	Each	Staff HVAC Tech	Staff	2.8000	38.00	0	None	1	PM	No
Repair Heat Pump, 2 Ton	Each	HVAC Technician	Contract	16.0000	862.10	0	None	10	Major	No
Replace Heat Pump, 2 Ton	Each	HVAC Technician	Contract	25.5800	2,691.40	0	None	20	Major	Yes
Heat Pump, 5 Ton										
Maintain Heat Pump, 5 Ton	Each	Staff HVAC Tech	Staff	2.8000	38.00	0	None	1	PM	No
Repair Heat Pump, 5 Ton	Each	HVAC Technician	Contract	17.6800	1,282.70	0	None	10	Major	No
Replace Heat Pump, 5 Ton	Each	HVAC Technician	Contract	62.3600	3,721.00	0	None	20	Major	Yes
Heat Pump, 10 Ton										
Maintain Heat Pump, 10 Ton	Each	Staff HVAC Tech	Staff	7.1000	63.51	0	None	1	PM	No
Repair Heat Pump, 10 Ton	Each	HVAC Technician	Contract	23.7400	2,254.15	0	None	10	Major	No
Replace Heat Pump, 10 Ton	Each	HVAC Technician	Contract	123.2200	9,498.82	4	2T Lift/45T Crane	20	Major	Yes
Heat Pump, 25 Ton										
Maintain Heat Pump, 25 Ton	Each	Staff HVAC Tech	Staff	9.1000	63.51	0	None	1	PM	No
Repair Heat Pump, 25 Ton	Each	HVAC Technician	Contract	23.7400	5,238.60	0	None	10	Major	No
Replace Heat Pump, 25 Ton	Each	HVAC Technician	Contract	310.0000	21,322.73	4	2T Lift/45T Crane	20	Major	Yes
Heat Pump, 50 Ton										
Maintain Heat Pump, 50 Ton	Each	Staff HVAC Tech	Staff	9.1000	63.51	0	None	1	PM	No
Repair Heat Pump, 50 Ton	Each	HVAC Technician	Contract	23.7400	19,053.30	0	None	10	Major	No
Replace Heat Pump, 50 Ton	Each	HVAC Technician	Contract	622.0000	43,325.98	4	2T Lift/45T Crane	20	Major	Yes
Heater Electric, Convector, 12,000 Watt										
Maintain Heater Electric, Convector, 12,000 Watt	Each	Staff HVAC Tech	Staff	1.7600	.00	0	None	1	PM	No
Replace Heater Electric, Convector, 12,000 Watt	Each	HVAC Technician	Contract	2.6700	1,920.00	0	None	15	Major	Yes
Radiant Heating Panel, Electric, 8 sf										
Maintain Radiant Heating Panel, Electric, 8 sf	Each	Staff Electrician	Staff	1.6900	.00	0	None	1	PM	No
Repair Wiring, Radiant Heating Panel, Electric, 8 sf	Each	Electrician	Contract	.4600	5.18	0	None	2	Major	No
Replace Radiant Heating Panel, Electric, 8 sf	Each	Electrician	Contract	1.9200	230.22	0	None	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3050 Terminal & Package Units										
Secondary Coil, 12" x 24"										
Replace Secondary Coil, 12" x 24"	Each	HVAC Technician	Contract	1.9700	290.35	0	None	25	Major	Yes
Secondary Coil, 24" x 24"										
Replace Secondary Coil, 24" x 24"	Each	HVAC Technician	Contract	5.1500	328.92	0	None	25	Major	Yes
Secondary Coil, 24" x 36"										
Replace Secondary Coil, 24" x 36"	Each	HVAC Technician	Contract	7.7400	442.34	0	None	25	Major	Yes
Secondary Coil, 30" x 72"										
Replace Secondary Coil, 30" x 72"	Each	HVAC Technician	Contract	13.0000	646.48	0	None	25	Major	Yes
Secondary Coil, 36" x 36"										
Replace Secondary Coil, 36" x 36"	Each	HVAC Technician	Contract	11.6000	510.38	0	None	25	Major	Yes
Suspended Electric Heater, Infrared, 240 V										
Maintain Suspended Electric Heater, Infrared, 240 V	Each	Staff HVAC Tech	Staff	1.3100	22.61	0	None	1	PM	No
Replace Suspended Electric Heater, Infrared, 240 V	Each	HVAC Technician	Contract	2.7800	157.95	0	None	15	Major	Yes
Suspended Electric Heater, Standard, 240 V										
Maintain Suspended Electric Heater, Standard, 240 V	Each	Staff Electrician	Staff	1.3100	22.61	0	None	1	PM	No
Replace Suspended Electric Heater, Standard, 240 V	Each	HVAC Technician	Contract	3.8600	369.99	0	None	15	Major	Yes
Suspended Heater, Hot Water, 1,200 Cfm, 55 Mbh										
Maintain Suspended Heater, Hot Water, 1,200 Cfm, 55 Mbh	Each	Staff HVAC Tech	Staff	3.6000	.00	0	None	1	PM	No
Repair Suspended Heater, Hot Water, 1,200 Cfm, 55 Mbh	Each	HVAC Technician	Contract	1.8400	240.85	0	None	10	Major	No
Replace Suspended Heater, Hot Water, 1,200 Cfm, 55 Mbh	Each	HVAC Technician	Contract	3.8600	2,361.31	0	None	15	Major	Yes
Suspended Heater, Hot Water, 4,000 Cfm, 180 Mbh										
Maintain Suspended Heater, Hot Water, 4,000 Cfm, 180 Mbh	Each	Staff HVAC Tech	Staff	3.6000	.00	0	None	1	PM	No
Repair Suspended Heater, Hot Water, 4,000 Cfm, 180 Mbh	Each	HVAC Technician	Contract	1.8400	244.97	0	None	10	Major	No
Replace Suspended Heater, Hot Water, 4,000 Cfm, 180 Mbh	Each	HVAC Technician	Contract	3.8600	3,548.19	0	None	15	Major	Yes
Suspended Heater, Hot Water, 8,000 Cfm, 360 Mbh										
Maintain Suspended Heater, Hot Water, 8,000 Cfm, 360 Mbh	Each	Staff HVAC Tech	Staff	3.6000	.00	0	None	1	PM	No
Repair Suspended Heater, Hot Water, 8,000 Cfm, 360 Mbh	Each	HVAC Technician	Contract	1.8400	244.97	0	None	10	Major	No
Replace Suspended Heater, Hot Water, 8,000 Cfm, 360 Mbh	Each	HVAC Technician	Contract	3.8600	4,430.57	0	None	15	Major	Yes
Suspended Natural Gas Heater, 300 kbtu										
Maintain Suspended Natural Gas Heater, 300 kbtu	Each	Staff HVAC Tech	Staff	1.4000	22.61	0	None	1	PM	No
Replace Suspended Natural Gas Heater, 300 kbtu	Each	HVAC Technician	Contract	3.8600	1,706.52	0	None	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3050 Terminal & Package Units										
Terminal Reheat Unit, 10,000 Cfm										
Maintain Terminal Reheat Unit, 10,000 Cfm	Each	Staff HVAC Tech	Staff	4.4000	56.85	0	None	1	PM	No
Repair Terminal Reheat Unit, 10,000 Cfm	Each	HVAC Technician	Contract	2.2000	170.69	0	None	10	Major	No
Replace Terminal Reheat Unit, 10,000 Cfm	Each	HVAC Technician	Contract	11.5600	958.82	0	None	15	Major	Yes
Terminal Reheat Unit, 25,000 Cfm										
Maintain Terminal Reheat Unit, 25,000 Cfm	Each	Staff HVAC Tech	Staff	4.4000	151.30	0	None	1	PM	No
Repair Terminal Reheat Unit, 25,000 Cfm	Each	HVAC Technician	Contract	4.0000	224.34	0	None	10	Major	No
Replace Terminal Reheat Unit, 25,000 Cfm	Each	HVAC Technician	Contract	53.8200	2,923.21	0	None	15	Major	Yes
Unit Heater, 12 Mbh										
Maintain Unit Heater, 12 Mbh	Each	Staff HVAC Tech	Staff	1.4000	22.61	0	None	1	PM	No
Repair Unit Heater, 12 Mbh	Each	HVAC Technician	Contract	3.1200	173.00	0	None	10	Major	No
Replace Unit Heater, 12 Mbh	Each	HVAC Technician	Contract	2.6000	306.58	0	None	15	Major	Yes
Unit Heater, 36 Mbh										
Maintain Unit Heater, 36 Mbh	Each	Staff HVAC Tech	Staff	1.4000	22.61	0	None	1	PM	No
Repair Unit Heater, 36 Mbh	Each	HVAC Technician	Contract	3.1200	225.00	0	None	10	Major	No
Replace Unit Heater, 36 Mbh	Each	HVAC Technician	Contract	3.9000	635.00	0	None	15	Major	Yes
Unit Heater, 85 Mbh										
Maintain Unit Heater, 85 Mbh	Each	Staff HVAC Tech	Staff	1.4000	22.61	0	None	1	PM	No
Repair Unit Heater, 85 Mbh	Each	HVAC Technician	Contract	3.1200	252.00	0	None	10	Major	No
Replace Unit Heater, 85 Mbh	Each	HVAC Technician	Contract	4.8000	777.00	0	None	15	Major	Yes
Unit Heater, 250 Mbh										
Maintain Unit Heater, 250 Mbh	Each	Staff HVAC Tech	Staff	1.4000	22.61	0	None	1	PM	No
Repair Unit Heater, 250 Mbh	Each	HVAC Technician	Contract	3.6600	264.00	0	None	10	Major	No
Replace Unit Heater, 250 Mbh	Each	HVAC Technician	Contract	12.4800	1,702.00	0	None	15	Major	Yes
Unit Heater, 400 Mbh										
Maintain Unit Heater, 400 Mbh	Each	Staff HVAC Tech	Staff	1.4000	22.61	0	None	1	PM	No
Repair Unit Heater, 400 Mbh	Each	HVAC Technician	Contract	3.6600	267.00	0	None	10	Major	No
Replace Unit Heater, 400 Mbh	Each	HVAC Technician	Contract	19.5000	2,130.00	0	None	15	Major	Yes
D3060 Controls & Instrumentation										
Direct Digital Controls, System Points										
Maintain Direct Digital Controls, System Points	Each	Staff HVAC Tech	Staff	.3300	36.29	0	None	1	PM	No
Replace Direct Digital Controls, System Points	Each	Electrician	Contract	1.5000	401.19	0	None	10	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D3060 Controls & Instrumentation										
HVAC Control Panel										
Inspect & Maintain HVAC Control Panel	Each	Staff HVAC Tech	Staff	.8000	.00	0	None	1	PM	No
Minor Repair, HVAC Control Panel	Each	Electrician	Contract	1.2900	106.19	0	None	5	Major	No
Replace HVAC Control Panel	Each	Electrician	Contract	3.1300	2,215.00	0	None	15	Major	Yes
Thermostat										
Maintain Thermostat	Each	Staff HVAC Tech	Staff	.3300	.00	0	None	1	PM	No
Replace Thermostat	Each	Electrician	Contract	1.0000	225.82	0	None	10	Major	Yes
D40 Fire Protection										
D4010 Sprinklers										
Fire Alarm Booster Pump, 1/2 HP										
Test & Maintain Fire Alarm Booster Pump, 1/2 HP	Each	Staff Plumber	Staff	1.1000	.83	0	None	1	PM	No
Overhaul Fire Alarm Booster Pump, 1/2 HP	Each	Staff Plumber	Staff	.6800	3.83	0	None	5	PM	No
Replace Fire Alarm Booster Pump, 1/2 HP	Each	Plumber	Contract	1.4200	353.19	0	None	20	Major	Yes
Fire Alarm Control Panel										
Inspect & Test Fire Alarm Control Panel	Each	Electrician	Contract	2.1300	.00	0	None	1	PM	No
Repair Fire Alarm Control Panel	Each	Electrician	Contract	1.2900	27.36	0	None	5	Major	No
Replace Fire Alarm Control Panel	Each	Electrician	Contract	17.1800	1,542.00	0	None	15	Major	Yes
Fire Alarm Control Panel, Firecycle										
Inspect & Test Fire Alarm Control Panel, Firecycle	Each	Electrician	Contract	3.2000	.00	0	None	1	PM	No
Repair Fire Alarm Control Panel, Firecycle	Each	Electrician	Contract	1.2900	27.36	0	None	5	Major	No
Replace Fire Alarm Control Panel, Firecycle	Each	Electrician	Contract	40.0000	10,526.08	0	None	15	Major	Yes
Fire Sprinkler Head										
Inspect Fire Sprinkler Head	Each	Staff Plumber	Staff	.0100	.00	0	None	1	PM	No
Test Fire Sprinkler Head	Each	Electrician	Contract	.5000	.00	0	None	10	PM	No
Replace Fire Sprinkler Head	Each	Plumber	Contract	.9800	6.39	0	None	50	Major	Yes
Fire Sprinkler System										
Maintain Fire Sprinkler System	Each	Plumber	Contract	13.0200	.00	0	None	1	PM	No
Test Gages & Valves, Fire Sprinkler System	Each	Plumber	Contract	12.0000	.00	0	None	1	PM	No
Replace Fire Sprinkler System	Each	Plumber	Contract	.0000	.00	0	None	100	PM	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D4010 Sprinklers										
Fire Suppression System Water Pump, 10 HP										
Inspect & Test Fire Suppression System Water Pump, 10 HP										
Each	Staff Plumber	Staff	3.0000	.00	0	None	1	PM	No	
Maintain Fire Suppression System Water Pump, 10 HP	Each	Staff Plumber	Staff	4.0000	99.91	0	None	1	PM	No
Replace Fire Suppression System Water Pump, 10 HP	Each	Plumber	Contract	14.1200	3,384.00	0	None	15	Major	Yes
Pipe & Fittings, 1" Cast Iron										
Replace 10' Section, Pipe & Fittings, 1" Cast Iron										
K Ln Ft	Plumber	Contract	1.1800	37.73	0	None	12	Major	No	
Install New Gasket & Bolts, Pipe & Fittings, 1" Cast Iron	K Ln Ft	Plumber	Contract	1.6540	9.00	0	None	25	Major	No
Replace Pipe & Fittings, 1" Cast Iron (20% of Pipe)	K Ln Ft	Plumber	Contract	23.5800	754.60	0	None	75	Major	Yes
Pipe & Fittings, 2" Cast Iron										
Replace 10' Section, Pipe & Fittings, 2" Cast Iron										
K Ln Ft	Plumber	Contract	1.9200	38.72	0	None	12	Major	No	
Install New Gasket & Bolts, Pipe & Fittings, 2" Cast Iron	K Ln Ft	Plumber	Contract	1.6540	4.84	0	None	25	Major	No
Replace Pipe & Fittings, 2" Cast Iron (20% of Pipe)	K Ln Ft	Plumber	Contract	38.4600	774.40	0	None	75	Major	Yes
Pipe & Fittings, 3" Cast Iron										
Replace 10' Section, Pipe & Fittings, 3" Cast Iron										
K Ln Ft	Plumber	Contract	2.6700	113.70	0	None	12	Major	No	
Install New Gasket & Bolts, Pipe & Fittings, 3" Cast Iron	K Ln Ft	Plumber	Contract	1.8900	5.00	0	None	25	Major	No
Replace Pipe & Fittings, 3" Cast Iron (20% of Pipe)	K Ln Ft	Plumber	Contract	53.4000	2,274.00	0	None	75	Major	Yes
Pipe & Fittings, 1" Steel										
Replace 10' Section, Pipe & Fittings, 1" Steel										
K Ln Ft	Plumber	Contract	1.8720	22.79	0	None	12	Major	No	
Install New Gasket & Bolts, Pipe & Fittings, 1" Steel	K Ln Ft	Plumber	Contract	1.6540	4.84	0	None	25	Major	No
Replace Pipe & Fittings, 1" Steel (20% of Pipe)	K Ln Ft	Plumber	Contract	37.4400	455.80	0	None	75	Major	Yes
Pipe & Fittings, 2" Steel										
Replace 10' Section, Pipe & Fittings, 2" Steel										
K Ln Ft	Plumber	Contract	2.3192	44.53	0	None	12	Major	No	
Install New Gasket & Bolts, Pipe & Fittings, 2" Steel	K Ln Ft	Plumber	Contract	1.6540	4.84	0	None	25	Major	No
Replace Pipe & Fittings, 2" Steel (20% of Pipe)	K Ln Ft	Plumber	Contract	46.3836	890.60	0	None	75	Major	Yes
Pipe & Fittings, 3" Steel										
Replace 10' Section, Pipe & Fittings, 3" Steel										
K Ln Ft	Plumber	Contract	2.4646	83.76	0	None	12	Major	No	
Install New Gasket & Bolts, Pipe & Fittings, 3" Steel	K Ln Ft	Plumber	Contract	1.8900	5.00	0	None	25	Major	No
Replace Pipe & Fittings, 3" Steel (20% of Pipe)	K Ln Ft	Plumber	Contract	49.2916	1,675.20	0	None	75	Major	Yes
D4020 Stand-Pipes										
Fire Standpipe System										
Inspect Hose & Valves, Fire Standpipe System	Each	Plumber	Contract	2.0000	.00	0	None	1	PM	No
Test Hose & Valves, Fire Standpipe System	Each	Plumber	Contract	8.0000	.00	0	None	5	PM	No

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D4030 Fire Protection Specialties										
Fire Doors										
Maintain Fire Doors	Each	Gen Maint Worker	Staff	.3300	.00	0	None	1	PM	No
Repair Fire Doors	Each	Carpenter	Contract	.8400	92.19	0	None	7	Major	No
Replace Fire Doors	Each	Carpenter	Contract	2.1000	930.13	0	None	40	Major	Yes
Fire Extinguisher										
Inspect & Test Fire Extinguisher	Each	Carpenter	Contract	.5000	.00	0	None	5	PM	No
Replace Fire Extinguisher	Each	Carpenter	Contract	.5000	192.75	0	None	12	Major	Yes
Fire Shutter 12'x12', Motor-Operated										
Maintain Fire Shutter 12'x12', Motor-Operated	Each	Gen Maint Worker	Staff	2.6600	.00	0	None	1	PM	No
Refinish Fire Shutter 12'x12', Motor-Operated	Each	Painter	Contract	1.6400	36.16	0	None	5	Major	No
Repair Fire Shutter 12'x12', Motor-Operated	Each	Carpenter	Contract	1.2700	442.04	0	None	10	Major	No
Replace Fire Shutter 12'x12', Motor-Operated	Each	Carpenter	Contract	4.3500	4,921.86	0	None	35	Major	Yes
Finish Replaced Fire Shutter 12'x12', Motor-Operated	Each	Painter	Contract	1.5900	36.16	0	None	35	Major	No
D4090 Other Fire Protection Systems										
Fire Damper										
Inspect & Test Fire Damper	Each	Gen Maint Worker	Staff	1.0000	.00	0	None	2	PM	No
Replace Fire Damper	Each	Carpenter	Contract	.7200	45.77	0	None	15	Major	Yes
Kitchen Fire Suppression System (CO2)										
Inspect & Test Kitchen Fire Suppression System (CO2)	Each	Plumber	Contract	2.0000	.00	0	None	1	PM	No
Replace Extinguisher, Kitchen Fire Suppression System (CO2)	Each	Plumber	Contract	2.6700	1,054.20	0	None	10	Major	No
D50 Electrical										
D5010 Electrical Service & Distribution										
Bus Duct & Fittings, AL, 800-4,000 Amp.										
Replace Bus Duct & Fittings, AL, 800-4,000 Amp.	Ln Ft	Electrician	Contract	1.5526	417.48	0	None	35	Major	Yes
Bus Duct & Fittings, CU, 800-4,000 Amp.										
Replace Bus Duct & Fittings, CU, 800-4,000 Amp.	Ln Ft	Electrician	Contract	1.5526	541.41	0	None	35	Major	Yes
Bus Switch, 60 Amp.										
Replace Bus Switch, 60 Amp.	Each	Electrician	Contract	2.2000	690.06	0	None	10	Major	Yes
Bus Switch, 100 Amp.										
Replace Bus Switch, 100 Amp.	Each	Electrician	Contract	3.0000	1,046.79	0	None	10	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D5010 Electrical Service & Distribution										
Cable, Copper, 4 Gauge										
Replace Cable, Copper, 4 Gauge	Ln Ft	Electrician	Contract	.0500	1.14	0	None	35	Major	Yes
Cable, Copper, 3 Gauge										
Replace Cable, Copper, 3 Gauge	Ln Ft	Electrician	Contract	.0500	1.41	0	None	35	Major	Yes
Cable, Copper, 2 Gauge										
Replace Cable, Copper, 2 Gauge	Ln Ft	Electrician	Contract	.0500	1.77	0	None	35	Major	Yes
Cable, Copper, 1 Gauge										
Replace Cable, Copper, 1 Gauge	Ln Ft	Electrician	Contract	.0500	2.29	0	None	35	Major	Yes
Cable, Copper, 1/0 Gauge										
Replace Cable, Copper, 1/0 Gauge	Ln Ft	Electrician	Contract	.0500	2.79	0	None	35	Major	Yes
Bus Switch, 200 Amp.										
Replace Bus Switch, 200 Amp.	Each	Electrician	Contract	5.0000	1,871.35	0	None	10	Major	Yes
Bus Switch, 400 Amp.										
Replace Bus Switch, 400 Amp.	Each	Electrician	Contract	11.0000	5,497.10	0	None	10	Major	Yes
Circuit Breaker, 600 V, 30-60 Amp., 3Ph.										
Maintain Circuit Breaker, 600 V, 30-60 Amp., 3 Ph.	Each	Staff Electrician	Staff	.4000	.00	0	None	1	PM	No
Repair Circuit Breaker, 600 V, 30-60 Amp., 3 Ph.	Each	Electrician	Contract	2.1000	198.78	0	None	10	Major	No
Replace Circuit Breaker, 600 V, 30-60 Amp., 3 Ph.	Each	Electrician	Contract	3.0200	520.00	0	None	50	Major	Yes
Circuit Breaker, 600 V, 70-100 Amp., 3 Ph.										
Maintain Circuit Breaker, 600 V, 70-100 Amp., 3 Ph.	Each	Staff Electrician	Staff	.4000	.00	0	None	1	PM	No
Repair Circuit Breaker, 600 V, 70-100 Amp., 3 Ph.	Each	Electrician	Contract	2.1000	198.78	0	None	10	Major	No
Replace Circuit Breaker, 600 V, 70-100 Amp., 3 Ph.	Each	Electrician	Contract	4.2000	604.00	0	None	50	Major	Yes
Circuit Breaker, 600 V, 125-400 Amp.										
Maintain Circuit Breaker, 600 V, 125-400 Amp., 3 Ph.	Each	Staff Electrician	Staff	.4000	.00	0	None	1	PM	No
Repair Circuit Breaker, 600 V, 125-400 Amp., 3 Ph.	Each	Electrician	Contract	2.1000	198.78	0	None	10	Major	No
Replace Circuit Breaker, 600 V, 125-400 Amp., 3 Ph.	Each	Electrician	Contract	4.5500	2,039.00	0	None	50	Major	Yes
Circuit Breaker, Main, 240 V, 15-60 Amp., 3 Ph.										
Maintain Circuit Breaker, 240 V, 15-60 Amp., 3 Ph.	Each	Staff Electrician	Staff	.4000	.00	0	None	1	PM	No
Repair Circuit Breaker, 240 V, 15-60 Amp., 3 Ph.	Each	Electrician	Contract	2.1000	198.78	0	None	10	Major	No
Replace Circuit Breaker, Main, 240 V, 15-60 Amp., 3 Ph.	Each	Electrician	Contract	3.1500	381.00	0	None	50	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D5010 Electrical Service & Distribution										
Circuit Breaker, Main, 600 V, 800 Amp., 3 Ph.										
Maintain Circuit Breaker, Main, 600 V, 800 Amp., 3 Ph.	Each	Staff Electrician	Staff	.4000	.00	0	None	1	PM	No
Repair Circuit Breaker, Main, 600 V, 800 Amp., 3 Ph.	Each	Electrician	Contract	2.1000	388.81	0	None	10	Major	No
Replace Circuit Breaker, Main, 600 V, 800 Amp., 3 Ph.	Each	Electrician	Contract	4.5500	7,072.00	0	None	50	Major	Yes
Circuit Breaker, Main, 600 V, 1,200 Amp., 1 Ph.										
Maintain Circuit Breaker, Main, 600 V, 1,200 Amp., 1 Ph.	Each	Staff Electrician	Staff	.4000	.00	0	None	1	PM	No
Repair Circuit Breaker, Main, 600 V, 1,200 Amp., 1 Ph.	Each	Electrician	Contract	2.1000	388.81	0	None	10	Major	No
Replace Circuit Breaker, Main, 600 V, 1,200 Amp., 1 Ph.	Each	Electrician	Contract	8.8900	6,041.69	0	None	50	Major	Yes
Circuit Breaker, Main, 600 V, 1,600 Amp., 1 Ph.										
Maintain Circuit Breaker, Main, 600 V, 1,600 Amp., 1 Ph.	Each	Staff Electrician	Staff	.9300	.00	0	None	1	PM	No
Repair Circuit Breaker, Main, 600 V, 1,600 Amp., 1 Ph.	Each	Electrician	Contract	2.1000	388.81	0	None	10	Major	No
Replace Circuit Breaker, Main, 600 V, 1,600 Amp., 1 Ph.	Each	Electrician	Contract	19.0500	12,926.33	0	None	50	Major	Yes
Circuit Breaker, Main, 600 V, 3,000-4,000 Amp.										
Maintain Circuit Breaker, Main, 600 V, 3,000-4,000 Amp.	Each	Staff Electrician	Staff	.9300	.00	0	None	1	PM	No
Repair Circuit Breaker, Main, 600 V, 3,000-4,000 Amp.	Each	Electrician	Contract	2.1000	388.81	0	None	10	Major	No
Replace Circuit Breaker, Main, 600 V, 3,000-4,000 Amp.	Each	Electrician	Contract	23.5500	78,400.96	0	None	50	Major	Yes
Circuit Breaker, Main, MV, 600 V, 1,600 Amp.										
Maintain Circuit Breaker, Main, MV, 600 V, 1,600 Amp.	Each	Staff Electrician	Staff	.9300	.00	0	None	1	PM	No
Repair Circuit Breaker, Main, MV, 600 V, 1,600 Amp.	Each	Electrician	Contract	2.1000	388.81	0	None	10	Major	No
Replace Circuit Breaker, Main, MV, 600 V, 1,600 Amp.	Each	Electrician	Contract	23.5500	39,200.48	0	None	50	Major	Yes
Disconnect Switch, 30 Amp.										
Maintain Disconnect Switch, 30 Amp.	Each	Staff Electrician	Staff	.3300	.00	0	None	1	PM	No
Repair Disconnect Switch, 30 Amp.	Each	Electrician	Contract	2.0000	3.40	0	None	10	Major	No
Replace Disconnect Switch, 30 Amp.	Each	Electrician	Contract	3.0200	114.75	0	None	50	Major	Yes
Disconnect Switch, 60 Amp.										
Maintain Disconnect Switch, 60 Amp.	Each	Staff Electrician	Staff	.3300	.00	0	None	1	PM	No
Repair Disconnect Switch, 60 Amp.	Each	Electrician	Contract	2.0000	4.94	0	None	10	Major	No
Replace Disconnect Switch, 60 Amp.	Each	Electrician	Contract	3.0200	227.25	0	None	50	Major	Yes
Disconnect Switch, 100 Amp.										
Maintain Disconnect Switch, 100 Amp.	Each	Staff Electrician	Staff	.9300	.00	0	None	1	PM	No
Repair Disconnect Switch, 100 Amp.	Each	Electrician	Contract	2.2000	9.33	0	None	10	Major	No
Replace Disconnect Switch, 100 Amp.	Each	Electrician	Contract	6.1000	421.75	0	None	50	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D5010 Electrical Service & Distribution										
Disconnect Switch, 200 Amp.										
Maintain Disconnect Switch, 200 Amp.	Each	Staff Electrician	Staff	.9300	.00	0	None	1	PM	No
Repair Disconnect Switch, 200 Amp.	Each	Electrician	Contract	2.2000	12.61	0	None	10	Major	No
Replace Disconnect Switch, 200 Amp.	Each	Electrician	Contract	6.1000	583.00	0	None	50	Major	Yes
Disconnect Switch, 400 Amp.										
Maintain Disconnect Switch, 400 Amp.	Each	Staff Electrician	Staff	.9300	.00	0	None	1	PM	No
Repair Disconnect Switch, 400 Amp.	Each	Electrician	Contract	2.2000	60.28	0	None	10	Major	No
Replace Disconnect Switch, 400 Amp.	Each	Electrician	Contract	6.1000	2,583.00	0	None	50	Major	Yes
Disconnect Switch, 600 Amp.										
Maintain Disconnect Switch, 600 Amp.	Each	Staff Electrician	Staff	.9300	.00	0	None	1	PM	No
Repair Disconnect Switch, 600 Amp.	Each	Electrician	Contract	2.2000	60.28	0	None	10	Major	No
Replace Disconnect Switch, 600 Amp.	Each	Electrician	Contract	6.1000	4,576.47	0	None	50	Major	Yes
Distribution Panel Board										
Maintain Distribution Panel Board	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Distribution Panel Board	Each	Electrician	Contract	5.0600	8,185.75	0	None	30	Major	Yes
Distribution Switch, Fused, <600 V										
Maintain Distribution Switch, Fused, <600 V	Each	Staff Electrician	Staff	.3300	.00	0	None	3	PM	No
Repair Distribution Switch, Fused, <600 V	Each	Electrician	Contract	.3300	60.28	0	None	10	Major	No
Replace Distribution Switch, Fused, <600 V	Each	Electrician	Contract	.5800	2,024.65	0	None	30	Major	Yes
Main Switchgear, 480 V, 400 Amp.										
Maintain Main Switchgear, 480 V, 400 Amp.	Each	Staff Electrician	Staff	.8000	.00	0	None	1	PM	No
Repair Main Switchgear, 480 V, 400 Amp.	Each	Electrician	Contract	6.7000	601.32	0	None	5	Major	No
Replace Main Switchgear, 480 V, 400 Amp.	Each	Electrician	Contract	36.0000	51,340.30	0	None	20	Major	Yes
Main Switchgear, 480 V, 800 Amp.										
Maintain Main Switchgear, 480 V, 800 Amp.	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Main Switchgear, 480 V, 800 Amp.	Each	Electrician	Contract	10.0000	601.32	0	None	5	Major	No
Replace Main Switchgear, 480 V, 800 Amp.	Each	Electrician	Contract	60.0100	61,924.65	0	None	20	Major	Yes
Main Switchgear, 480 V, 1,000 Amp.										
Maintain Main Switchgear, 480 V, 1,000 Amp.	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Main Switchgear, 480 V, 1,000 Amp.	Each	Electrician	Contract	14.0000	601.32	0	None	5	Major	No
Replace Main Switchgear, 480 V, 1,000 Amp.	Each	Electrician	Contract	68.0100	119,598.00	0	None	20	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D5010 Electrical Service & Distribution										
Main Switchgear, 480 V, 2,000 Amp.										
Maintain Main Switchgear, 480 V, 2,000 Amp.	Each	Staff Electrician	Staff	4.0000	.00	0	None	1	PM	No
Repair Main Switchgear, 480 V, 2,000 Amp.	Each	Electrician	Contract	16.0000	1,803.94	0	None	5	Major	No
Replace Main Switchgear, 480 V, 2,000 Amp.	Each	Electrician	Contract	90.0100	175,507.11	0	None	20	Major	Yes
Main Switchgear, 480 V, 4,000 Amp.										
Maintain Main Switchgear, 480 V, 4,000 Amp.	Each	Staff Electrician	Staff	4.0000	.00	0	None	1	PM	No
Repair Main Switchgear, 480 V, 4,000 Amp.	Each	Electrician	Contract	20.0000	4,007.54	0	None	5	Major	No
Replace Main Switchgear, 480 V, 4,000 Amp.	Each	Electrician	Contract	134.0100	273,560.79	0	None	20	Major	Yes
Main Switchgear, Double-Ended, 480 V, 2,000 Amp.										
Maintain Main Switchgear, Double-Ended, 480 V, 2,000 Amp.	Each	Staff Electrician	Staff	12.0000	.00	0	None	1	PM	No
Repair Main Switchgear, Double-Ended, 480 V, 2,000 Amp.	Each	Electrician	Contract	24.0000	3,006.57	0	None	5	Major	No
Replace Main Switchgear, Double-Ended, 480 V, 2,000 Amp.	Each	Electrician	Contract	360.0000	268,506.53	0	None	20	Major	Yes
Main Switchgear, Double-Ended, 480 V, 4,000 Amp.										
Maintain Main Switchgear, Double-Ended, 480 V, 4,000 Amp.	Each	Staff Electrician	Staff	16.0000	.00	0	None	1	PM	No
Repair Main Switchgear, Double-Ended, 480 V, 4,000 Amp.	Each	Electrician	Contract	40.0000	6,013.15	0	None	5	Major	No
Replace Main Switchgear, Double-Ended, 480 V, 4,000 Amp.	Each	Electrician	Contract	480.0000	505,169.79	0	None	20	Major	Yes
Main Switchgear, <1,200 Amp.										
Maintain Main Switchgear, <1,200 Amp.	Each	Staff Electrician	Staff	.8000	.00	0	None	1	PM	No
Repair Main Switchgear, <1,200 Amp.	Each	Electrician	Contract	6.7000	1,127.13	0	None	5	Major	No
Replace Main Switchgear, <1,200 Amp.	Each	Electrician	Contract	29.8200	2,398.76	0	None	20	Major	Yes
Main Switchgear, >1,200 Amp.										
Maintain Main Switchgear, >1,200 Amp.	Each	Staff Electrician	Staff	.8000	.00	0	None	1	PM	No
Repair Main Switchgear, >1,200 Amp.	Each	Electrician	Contract	6.7000	1,127.13	0	None	5	Major	No
Replace Main Switchgear, >1,200 Amp.	Each	Electrician	Contract	29.8200	4,153.51	0	None	20	Major	Yes
Main Switchgear, MV, >1,200 Amp.										
Maintain MV Switchgear, >1,200 Amp.	Each	Staff Electrician	Staff	.8000	.00	0	None	1	PM	No
Repair MV Switchgear, >1,200 Amp.	Each	Electrician	Contract	5.1500	856.24	0	None	5	Major	No
Replace MV Switchgear, >1,200 Amp.	Each	Electrician	Contract	68.0100	477,013.54	0	None	20	Major	Yes
Motor Control Center										
Maintain Motor Control Center	Each	Staff Electrician	Staff	1.5000	.00	0	None	1	PM	No

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D5010 Electrical Service & Distribution										
Motor Control Center w/ Main Breaker, 480 V, 600 Amp.										
Maintain Motor Control Center w/ Main Breaker, 480 V, 600 Amp.	Each	Staff Electrician	Staff	1.5000	.00	0	None	1	PM	No
Repair Motor Control Center w/ Main Breaker, 480 V, 600 Amp.	Each	Electrician	Contract	2.0000	582.34	0	None	10	Major	No
Replace Motor Control Center w/ Main Breaker, 480 V, 600 Amp.	Each	Electrician	Contract	20.0000	13,142.38	0	None	20	Major	Yes
Motor Starter, 5-20 HP, <600 V										
Inspect & Clean Motor Starter, 5-20 HP, <600 V	Each	Staff Electrician	Staff	.6700	.00	0	None	1	PM	No
Replace Coil, Motor Starter, 5-20 HP, <600 V	Each	Electrician	Contract	2.1000	46.46	0	None	3	Major	No
Replace Motor Starter, 5-20 HP, <600 V	Each	Electrician	Contract	4.5400	310.00	0	None	18	Major	Yes
Motor Starter, 21-50 HP, <600 V										
Inspect & Clean Motor Starter, 21-50 HP, <600 V	Each	Staff Electrician	Staff	.6700	.00	0	None	1	PM	No
Replace Coil, Motor Starter, 21-50 HP, <600 V	Each	Electrician	Contract	2.1000	40.03	0	None	3	Major	No
Replace Motor Starter, 21-50 HP, <600 V	Each	Electrician	Contract	4.5400	959.00	0	None	18	Major	Yes
Motor Starter, 51-75 HP, <600 V										
Inspect & Clean Motor Starter, 51-75 HP, <600 V	Each	Staff Electrician	Staff	.6700	.00	0	None	1	PM	No
Replace Coil, Motor Starter, 51-75 HP, <600 V	Each	Electrician	Contract	6.7000	139.94	0	None	3	Major	No
Replace Motor Starter, 51-75 HP, <600 V	Each	Electrician	Contract	16.8500	2,231.00	0	None	18	Major	Yes
Motor Starter, 125-200 HP										
Inspect & Clean Motor Starter, 125-200 HP	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Coil, Motor Starter, 125-200 HP	Each	Electrician	Contract	6.7000	232.94	0	None	3	Major	No
Replace Motor Starter, 125-200 HP	Each	Electrician	Contract	20.0000	12,066.37	0	None	18	Major	Yes
Motor Starter, 600 HP										
Inspect & Clean Motor Starter, 600 HP	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Coil, Motor Starter, 600 HP	Each	Electrician	Contract	6.7000	841.07	0	None	3	Major	No
Replace Motor Starter, 600 HP	Each	Electrician	Contract	16.8500	29,874.10	0	None	18	Major	Yes
Motor Starter, 1,000 HP										
Inspect & Clean Motor Starter, 1,000 HP	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Coil, Motor Starter, 1,000 HP	Each	Electrician	Contract	6.7000	582.35	0	None	3	Major	No
Replace Motor Starter, 1,000 HP	Each	Electrician	Contract	25.0000	50,775.23	0	None	18	Major	Yes
Power Panel Board, 208 Y/120 V, 100 Amp.										
Maintain Power Panel Board, 208 Y/120 V, 100 Amp.	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Power Panel Board, 208 Y/120 V, 100 Amp.	Each	Electrician	Contract	1.5100	4.29	0	None	10	Major	No
Replace Power Panel Board, 208 Y/120 V, 100 Amp.	Each	Electrician	Contract	14.0000	2,300.12	0	None	30	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D5010 Electrical Service & Distribution										
Power Panel Board, 208 Y/120 V, 200 Amp.										
Maintain Power Panel Board, 208 Y/120 V, 200 Amp.	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Power Panel Board, 208 Y/120 V, 200 Amp.	Each	Electrician	Contract	1.5100	4.29	0	None	10	Major	No
Replace Power Panel Board, 208 Y/120 V, 200 Amp.	Each	Electrician	Contract	18.0000	3,475.12	0	None	30	Major	Yes
Power Panel Board, 208 Y/120 V, 225 Amp										
Maintain Power Panel Board, 208 Y/120 V, 225 Amp.	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Power Panel Board, 208 Y/120 V, 225 Amp.	Each	Electrician	Contract	1.5100	4.29	0	None	10	Major	No
Replace Power Panel Board, 208 Y/120 V, 225 Amp.	Each	Electrician	Contract	18.0000	3,578.43	0	None	30	Major	Yes
Power Panel Board, 208 Y/120 V, 400 Amp.										
Maintain Power Panel Board, 208 Y/120 V, 400 Amp.	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Power Panel Board, 208 Y/120 V, 400 Amp.	Each	Electrician	Contract	1.5100	4.29	0	None	10	Major	No
Replace Power Panel Board, 208 Y/120 V, 400 Amp.	Each	Electrician	Contract	22.0100	4,199.56	0	None	30	Major	Yes
Power Panel Board, 480 V, 100 Amp.										
Maintain Power Panel Board, 480 V, 100 Amp.	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Power Panel Board, 480 V, 100 Amp.	Each	Electrician	Contract	1.5100	4.29	0	None	10	Major	No
Replace Power Panel Board, 480 V, 100 Amp.	Each	Electrician	Contract	18.0000	3,622.21	0	None	30	Major	Yes
Power Panel Board, 480 V, 200 Amp.										
Maintain Power Panel Board, 480 V, 200 Amp.	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Power Panel Board, 480 V, 200 Amp.	Each	Electrician	Contract	1.5100	4.29	0	None	10	Major	No
Replace Power Panel Board, 480 V, 200 Amp.	Each	Electrician	Contract	22.0100	4,842.37	0	None	30	Major	Yes
Power Panel Board, 480 V, 400 Amp.										
Maintain Power Panel Board, 480 V, 400 Amp.	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Power Panel Board, 480 V, 400 Amp.	Each	Electrician	Contract	1.5100	27.37	0	None	10	Major	No
Replace Power Panel Board, 480 V, 400 Amp.	Each	Electrician	Contract	22.0100	5,814.67	0	None	30	Major	Yes
Power Panel Board, 480 V, 1,000 Amp.										
Maintain Power Panel Board, 480 V, 1,000 Amp.	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Power Panel Board, 480 V, 1,000 Amp.	Each	Electrician	Contract	1.5100	434.37	0	None	10	Major	No
Replace Power Panel Board, 480 V, 1,000 Amp.	Each	Electrician	Contract	22.0100	8,834.22	0	None	30	Major	Yes
Power Panel Board, 480 V, 4,000 Amp.										
Maintain Power Panel Board, 480 V, 4,000 Amp.	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Power Panel Board, 480 V, 4,000 Amp.	Each	Electrician	Contract	1.5100	434.37	0	None	10	Major	No
Replace Power Panel Board, 480 V, 4,000 Amp.	Each	Electrician	Contract	22.0100	24,139.62	0	None	30	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D5010 Electrical Service & Distribution										
Primary Transformer, Dry, 225 kVA										
Maintain Primary Transformer, Dry, 225 kVA	Each	Staff Electrician	Staff	.5000	.00	0	None	1	PM	No
Repair Primary Transformer, Dry, 225 kVA	Each	Electrician	Contract	2.0000	45.02	0	None	15	Major	No
Replace Primary Transformer, Dry, 225 kVA	Each	Electrician	Contract	48.0000	23,232.30	4	2T Lift/45T Crane	30	Major	Yes
Primary Transformer, Dry, 300 kVA										
Maintain Primary Transformer, Dry, 300 kVA	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Primary Transformer, Dry, 300 kVA	Each	Electrician	Contract	2.0000	45.02	0	None	15	Major	No
Replace Primary Transformer, Dry, 300 kVA	Each	Electrician	Contract	54.4000	26,812.96	4	2T Lift/45T Crane	30	Major	Yes
Primary Transformer, Dry, 500 kVA										
Maintain Primary Transformer, Dry, 500 kVA	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Primary Transformer, Dry, 500 kVA	Each	Electrician	Contract	2.0000	137.00	0	None	15	Major	No
Replace Primary Transformer, Dry, 500 kVA	Each	Electrician	Contract	85.1400	34,483.47	8	2T Lift/45T Crane	30	Major	Yes
Primary Transformer, Dry, 750 kVA										
Maintain Primary Transformer, Dry, 750 kVA	Each	Staff Electrician	Staff	2.0000	.00	0	None	1	PM	No
Repair Primary Transformer, Dry, 750 kVA	Each	Electrician	Contract	2.0000	137.00	0	None	15	Major	No
Replace Primary Transformer, Dry, 750 kVA	Each	Electrician	Contract	93.5000	44,625.50	8	2T Lift/45T Crane	30	Major	Yes
Primary Transformer, Dry, 1,000 kVA										
Maintain Primary Transformer, Dry, 1,000 kVA	Each	Staff Electrician	Staff	2.0000	.00	0	None	1	PM	No
Repair Primary Transformer, Dry, 1,000 kVA	Each	Electrician	Contract	4.0000	534.23	0	None	15	Major	No
Replace Primary Transformer, Dry, 1,000 kVA	Each	Electrician	Contract	99.6600	51,348.88	8	2T Lift/45T Crane	30	Major	Yes
Primary Transformer, Dry, 3,000 kVA										
Maintain Primary Transformer, Dry, 3,000 kVA	Each	Staff Electrician	Staff	4.0000	.00	0	None	1	PM	No
Repair Primary Transformer, Dry, 3,000 kVA	Each	Electrician	Contract	4.0000	534.23	0	None	15	Major	No
Replace Primary Transformer, Dry, 3,000 kVA	Each	Electrician	Contract	111.0000	75,588.89	8	2T Lift/45T Crane	30	Major	Yes
Primary Transformer, Dry, 3,500 kVA										
Maintain Primary Transformer, Dry, 3,500 kVA	Each	Staff Electrician	Staff	4.0000	.00	0	None	1	PM	No
Repair Primary Transformer, Dry, 3,500 kVA	Each	Electrician	Contract	4.0000	580.08	0	None	15	Major	No
Replace Primary Transformer, Dry, 3,500 kVA	Each	Electrician	Contract	113.8400	76,744.71	8	2T Lift/45T Crane	30	Major	Yes
Primary Transformer, Dry, <500 kVA										
Maintain Primary Transformer, Dry, <500 kVA	Each	Staff Electrician	Staff	.5000	.00	0	None	1	PM	No
Repair Primary Transformer, Dry, <500 kVA	Each	Electrician	Contract	1.5000	137.00	0	None	15	Major	No
Replace Primary Transformer, Dry, <500 kVA	Each	Electrician	Contract	70.9400	41,268.61	4	2T Lift/45T Crane	30	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D5010 Electrical Service & Distribution										
Primary Transformer, Dry, >500 kVA										
Maintain Primary Transformer, Dry, >500 kVA	Each	Staff Electrician	Staff	.5000	.00	0	None	1	PM	No
Repair Primary Transformer, Dry, >500 kVA	Each	Electrician	Contract	1.5000	137.00	0	None	15	Major	No
Replace Primary Transformer, Dry, >500 kVA	Each	Electrician	Contract	70.9400	41,268.61	4	2T Lift/45T Crane	30	Major	Yes
Primary Transformer, Oil Filled, 500 kVA										
Maintain Primary Transformer, Oil Filled, 500 kVA	Each	Staff Electrician	Staff	.5000	.00	0	None	1	PM	No
Repair Primary Transformer, Oil Filled, 500 kVA	Each	Electrician	Contract	3.9600	2,054.14	0	None	10	Major	No
Replace Primary Transformer, Oil Filled, 500 kVA	Each	Electrician	Contract	63.8000	19,618.80	4	2T Lift/45T Crane	30	Major	Yes
Primary Transformer, Oil Filled, 750 kVA										
Maintain Primary Transformer, Oil Filled, 750 kVA	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Primary Transformer, Oil Filled, 750 kVA	Each	Electrician	Contract	3.9600	2,377.33	0	None	10	Major	No
Replace Primary Transformer, Oil Filled, 750 kVA	Each	Electrician	Contract	63.8000	20,582.45	4	2T Lift/45T Crane	30	Major	Yes
Primary Transformer, Oil Filled, 1,000 kVA										
Maintain Primary Transformer, Oil Filled, 1,000 kVA	Each	Staff Electrician	Staff	1.5000	.00	0	None	1	PM	No
Repair Primary Transformer, Oil Filled, 1,000 kVA	Each	Electrician	Contract	5.0000	2,377.33	0	None	10	Major	No
Replace Primary Transformer, Oil Filled, 1,000 kVA	Each	Electrician	Contract	63.8000	24,403.14	4	2T Lift/45T Crane	30	Major	Yes
Primary Transformer, Oil Filled, <500 kVA										
Maintain Primary Transformer, Oil Filled, <500 kVA	Each	Staff Electrician	Staff	.5000	.00	0	None	1	PM	No
Repair Primary Transformer, Oil Filled, <500 kVA	Each	Electrician	Contract	3.9600	2,054.14	0	None	10	Major	No
Replace Primary Transformer, Oil Filled, <500 kVA	Each	Electrician	Contract	63.8000	19,618.80	4	2T Lift/45T Crane	30	Major	Yes
Primary Transformer, Oil Filled, >500 kVA										
Maintain Primary Transformer, Oil Filled, >500 kVA	Each	Staff Electrician	Staff	.5000	.00	0	None	1	PM	No
Repair Primary Transformer, Oil Filled, >500 kVA	Each	Electrician	Contract	3.9600	2,054.14	0	None	10	Major	No
Replace Primary Transformer, Oil Filled, >500 kVA	Each	Electrician	Contract	63.8000	19,618.80	4	2T Lift/45T Crane	30	Major	Yes
Safety Switch, Fused, 400 Amp., 3 Ph.										
Maintain Safety Switch, Fused, 400 Amp., 3 Ph.	Each	Staff Electrician	Staff	.6100	.00	0	None	1	PM	No
Repair Safety Switch, Fused, 400 Amp., 3 Ph.	Each	Electrician	Contract	.3800	60.28	0	None	8	Major	No
Replace Safety Switch, Fused, 400 Amp., 3 Ph.	Each	Electrician	Contract	.4300	1,520.82	0	None	25	Major	Yes
Secondary Transformer, Dry, 2 kVA										
Maintain Secondary Transformer, Dry, 2 kVA	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Secondary Transformer, Dry, 2 kVA	Each	Electrician	Contract	1.0000	137.00	0	None	10	Major	No
Replace Secondary Transformer, Dry, 2 kVA	Each	Electrician	Contract	5.5000	1,206.00	0	None	30	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D5010 Electrical Service & Distribution										
Secondary Transformer, Dry, 5 kVA										
Maintain Secondary Transformer, Dry, 5 kVA	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Secondary Transformer, Dry, 5 kVA	Each	Electrician	Contract	1.0000	137.00	0	None	10	Major	No
Replace Secondary Transformer, Dry, 5 kVA	Each	Electrician	Contract	5.5000	1,406.83	0	None	30	Major	Yes
Secondary Transformer, Dry, 10 kVA										
Maintain Secondary Transformer, Dry, 10 kVA	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Secondary Transformer, Dry, 10 kVA	Each	Electrician	Contract	1.5000	137.00	0	None	10	Major	No
Replace Secondary Transformer, Dry, 10 kVA	Each	Electrician	Contract	18.3600	1,622.52	4	2T Forklift	30	Major	Yes
Secondary Transformer, Dry, 15 kVA										
Maintain Secondary Transformer, Dry, 15 kVA	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Secondary Transformer, Dry, 15 kVA	Each	Electrician	Contract	1.0000	137.00	0	None	10	Major	No
Replace Secondary Transformer, Dry, 15 kVA	Each	Electrician	Contract	18.3600	1,792.56	4	2T Forklift	30	Major	Yes
Secondary Transformer, Dry, 30 kVA										
Maintain Secondary Transformer, Dry, 30 kVA	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Secondary Transformer, Dry, 30 kVA	Each	Electrician	Contract	1.5000	137.00	0	None	10	Major	No
Replace Secondary Transformer, Dry, 30 kVA	Each	Electrician	Contract	18.3600	2,331.54	4	2T Forklift	30	Major	Yes
Secondary Transformer, Dry, 45 kVA										
Maintain Secondary Transformer, Dry, 45 kVA	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Secondary Transformer, Dry, 45 kVA	Each	Electrician	Contract	1.5000	137.00	0	None	10	Major	No
Replace Secondary Transformer, Dry, 45 kVA	Each	Electrician	Contract	18.3600	2,871.10	4	2T Forklift	30	Major	Yes
Secondary Transformer, Dry, 50 kVA										
Maintain Secondary Transformer, Dry, 50 kVA	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Secondary Transformer, Dry, 50 kVA	Each	Electrician	Contract	1.5000	137.00	0	None	10	Major	No
Replace Secondary Transformer, Dry, 50 kVA	Each	Electrician	Contract	18.3600	2,871.10	4	2T Forklift	30	Major	Yes
Secondary Transformer, Dry, 75 kVA										
Maintain Secondary Transformer, Dry, 75 kVA	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Secondary Transformer, Dry, 75 kVA	Each	Electrician	Contract	1.5000	137.00	0	None	10	Major	No
Replace Secondary Transformer, Dry, 75 kVA	Each	Electrician	Contract	29.1200	3,750.92	4	2T Forklift	30	Major	Yes
Secondary Transformer, Dry, 112-1/2 kVA										
Maintain Secondary Transformer, Dry, 112-1/2 kVA	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Secondary Transformer, Dry, 112-1/2 kVA	Each	Electrician	Contract	1.5000	137.00	0	None	10	Major	No
Replace Secondary Transformer, Dry, 112-1/2 kVA	Each	Electrician	Contract	29.1200	4,957.74	4	2T Forklift	30	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D5010 Electrical Service & Distribution										
Secondary Transformer, Dry, 150 kVA										
Maintain Secondary Transformer, Dry, 150 kVA	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Secondary Transformer, Dry, 150 kVA	Each	Electrician	Contract	1.5000	137.00	0	None	10	Major	No
Replace Secondary Transformer, Dry, 150 kVA	Each	Electrician	Contract	29.1200	6,164.55	4	2T Forklift	30	Major	Yes
Secondary Transformer, Dry, 225 kVA										
Maintain Secondary Transformer, Dry, 225 kVA	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Secondary Transformer, Dry, 225 kVA	Each	Electrician	Contract	2.2500	162.51	0	None	10	Major	No
Replace Secondary Transformer, Dry, 225 kVA	Each	Electrician	Contract	29.1200	9,130.00	4	2T Forklift	30	Major	Yes
Secondary Transformer, Dry, 300 kVA										
Maintain Secondary Transformer, Dry, 300 kVA	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Secondary Transformer, Dry, 300 kVA	Each	Electrician	Contract	3.5000	356.87	0	None	10	Major	No
Replace Secondary Transformer, Dry, 300 kVA	Each	Electrician	Contract	58.7200	11,608.80	4	2T Forklift	30	Major	Yes
Secondary Transformer, Dry, 500 kVA										
Maintain Secondary Transformer, Dry, 500 kVA	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Secondary Transformer, Dry, 500 kVA	Each	Electrician	Contract	1.5000	137.00	0	None	10	Major	No
Replace Secondary Transformer, Dry, 500 kVA	Each	Electrician	Contract	58.7200	19,030.42	4	2T Forklift	30	Major	Yes
Secondary Transformer, Dry, 750 kVA										
Maintain Secondary Transformer, Dry, 750 kVA	Each	Staff Electrician	Staff	2.0000	.00	0	None	1	PM	No
Repair Secondary Transformer, Dry, 750 kVA	Each	Electrician	Contract	2.5000	267.12	0	None	10	Major	No
Replace Secondary Transformer, Dry, 750 kVA	Each	Electrician	Contract	58.7200	25,473.59	10	2T Forklift	30	Major	Yes
Secondary Transformer, High Efficiency, Dry, 45 kVA										
Maintain Secondary Transformer, High Efficiency, Dry, 45 kVA	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Secondary Transformer, High Efficiency, Dry, 45 kVA	Each	Electrician	Contract	1.5000	137.00	0	None	10	Major	No
Replace Secondary Transformer, High Efficiency, Dry, 45 kVA	Each	Electrician	Contract	18.3600	5,175.00	4	2T Forklift	40	Major	Yes
Secondary Transformer, High Efficiency, Dry, 50 kVA										
Maintain Secondary Transformer, High Efficiency, Dry, 50 kVA	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Repair Secondary Transformer, High Efficiency, Dry, 50 kVA	Each	Electrician	Contract	1.5000	137.00	0	None	10	Major	No
Replace Secondary Transformer, High Efficiency, Dry, 50 kVA	Each	Electrician	Contract	18.3600	5,750.00	4	2T Forklift	40	Major	Yes
Secondary Transformer, Oil Filled, >600 V										
Maintain Secondary Transformer, Oil Filled, >600 V	Each	Staff Electrician	Staff	.6700	.00	0	None	1	PM	No
Repair Secondary Transformer, Oil Filled, >600 V	Each	Electrician	Contract	1.3500	41.08	0	None	25	Major	No
Replace Secondary Transformer, Oil Filled, >600 V	Each	Electrician	Contract	30.7600	5,911.06	0	None	50	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D5010 Electrical Service & Distribution										
Switchboard, 800 Amp.										
Maintain Switchboard, 800 Amp.	Each	Staff Electrician	Staff	.3300	.00	0	None	1	PM	No
Replace Switchboard, 800 Amp.	Each	Electrician	Contract	2.0000	15,330.51	0	None	30	Major	Yes
Switchgear, Indoor, <600 V										
Maintain Switchgear, Indoor <600 V	Each	Staff Electrician	Staff	.5000	.00	0	None	3	PM	No
Repair Switchgear, Indoor <600 V (5% of total fuses)	Each	Electrician	Contract	.5500	150.29	0	None	10	Major	No
Replace Switchgear, Indoor, <600 V	Each	Electrician	Contract	17.4600	1,820.75	0	None	20	Major	Yes
Switchgear, Indoor, 600 V										
Maintain Switchgear, Indoor, 600 V	Each	Staff Electrician	Staff	.5000	.00	0	None	3	PM	No
Repair Switchgear, Indoor, 600 V (5% of total fuses)	Each	Electrician	Contract	.5500	233.53	0	None	10	Major	No
Replace Switchgear, Indoor, 600 V	Each	Electrician	Contract	20.0600	2,109.77	0	None	20	Major	Yes
Transfer Switch, Auto, 270/280 V, 1,200 Amp.										
Inspect & Clean Transfer Switch, Auto, 270/280 V, 1,200 Amp.	Each	Staff Electrician	Staff	.3300	.00	0	None	1	PM	No
Repair Transfer Switch, Auto, 270/280 V, 1,200 Amp.	Each	Electrician	Contract	2.0000	44.63	0	None	5	Major	No
Replace Transfer Switch, Auto, 270/280 V, 1,200 Amp.	Each	Electrician	Contract	37.9900	17,987.50	0	None	18	Major	Yes
Transfer Switch, Auto, 600 V, 40 Amp.										
Inspect & Clean Transfer Switch, Auto, 600 V, 40 Amp.	Each	Staff Electrician	Staff	.3300	.00	0	None	1	PM	No
Repair Transfer Switch, Auto, 600 V, 40 Amp.	Each	Electrician	Contract	2.0000	55.64	0	None	5	Major	No
Replace Transfer Switch, Auto, 600 V, 40 Amp.	Each	Electrician	Contract	10.0100	3,300.00	0	None	18	Major	Yes
Transfer Switch, Auto, 600 V, 400 Amp.										
Inspect & Clean Transfer Switch, Auto, 600 V, 400 Amp.	Each	Staff Electrician	Staff	.3300	.00	0	None	1	PM	No
Repair Transfer Switch, Auto, 600 V, 400 Amp.	Each	Electrician	Contract	2.0000	55.64	0	None	5	Major	No
Replace Transfer Switch, Auto, 600 V, 400 Amp.	Each	Electrician	Contract	10.0100	8,219.09	0	None	18	Major	Yes
Transfer Switch, Auto, 600 V, 800 Amp.										
Inspect & Clean Transfer Switch, Auto, 600 V, 800 Amp.	Each	Staff Electrician	Staff	.3300	.00	0	None	1	PM	No
Repair Transfer Switch, Auto, 600 V, 800 Amp.	Each	Electrician	Contract	2.0000	55.64	0	None	5	Major	No
Replace Transfer Switch, Auto, 600 V, 800 Amp.	Each	Electrician	Contract	24.0100	12,085.32	0	None	18	Major	Yes
Transfer Switch, HV, Auto, 600 V										
Inspect & Clean Transfer Switch, HV, Auto, 600 V	Each	Staff Electrician	Staff	.3300	.00	0	None	1	PM	No
Repair Transfer Switch, HV, Auto, 600 V	Each	Electrician	Contract	2.6700	230.47	0	None	5	Major	No
Replace Transfer Switch, HV, Auto, 600 V	Each	Electrician	Contract	8.0000	42,742.25	0	None	18	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D5010 Electrical Service & Distribution										
Transfer Switch, Auto, 600 V, 1,600 Amp.										
Inspect & Clean Transfer Switch, Auto, 600 V, 1,600 Amp.	Each	Staff Electrician	Staff	.3300	.00	0	None	1	PM	No
Repair Transfer Switch, Auto, 600 V, 1,600 Amp.	Each	Electrician	Contract	2.0000	54.23	0	None	5	Major	No
Replace Transfer Switch, Auto, 600 V, 1,600 Amp.	Each	Electrician	Contract	52.0100	19,939.94	0	None	18	Major	Yes
Variable Frequency Drive, <600 V										
Inspect & Clean Variable Frequency Drive, <600 V	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Coil, Variable Frequency Drive, <600V	Each	Electrician	Contract	1.5000	31.50	0	None	5	Major	No
Replace Variable Frequency Drive, <600V	Each	Electrician	Contract	48.0000	9,061.71	0	None	18	Major	Yes
D5020 Lighting & Branch Wiring										
Compact Fluorescent Lighting Fixture, Digital Addressable Ballast, 32 w										
Replace Ballast & Lamps, Compact Fluorescent Light Fix., Dig. Add. Ballast, 32 w	Each	Electrician	Contract	.4400	109.62	0	None	10	Major	No
Replace Compact Fluorescent Light Fix., Dig. Add. Ballast, 32 w	Each	Electrician	Contract	.5700	42.60	0	None	20	Major	Yes
Compact Fluorescent Lighting Fixture, Ballast, 32 w										
Replace Ballast & Lamps, Compact Fluorescent Lighting Fixture, Ballast, 32w	Each	Electrician	Contract	.4400	38.07	0	None	10	Major	No
Replace Compact Fluorescent Lighting Fixture, Ballast, 32 w	Each	Electrician	Contract	.5700	42.60	0	None	20	Major	Yes
Compact Fluorescent Lighting Fixture, Magnetic Ballast, 32 w										
Replace Ballast & Lamps, Compact Fluorescent Lighting Fix., Mag. Ballast, 32 w	Each	Electrician	Contract	.4400	44.42	0	None	10	Major	No
Replace Compact Fluorescent Lighting Fix., Mag. Ballast, 32 w	Each	Electrician	Contract	.5700	42.60	0	None	20	Major	Yes
Emergency Horn & Strobe										
Maintain Emergency Horn & Strobe	Each	Staff Electrician	Staff	.1500	.00	0	None	1	PM	No
Replace Emergency Horn & Strobe	Each	Electrician	Contract	1.5000	106.61	0	None	20	Major	Yes
Emergency Lighting Pack, 2 Light w/ Battery										
Replace Lamp, Replace Emergency Lighting Pack, 2 Light w/ Battery	Each	Staff Electrician	Staff	.4000	28.34	0	None	2	PM	No
Replace Lens, Replace Emergency Lighting Pack, 2 Light w/ Battery	Each	Electrician	Contract	.3000	9.76	0	None	10	Major	No
Replace Emergency Lighting Pack, 2 Light w/ Battery	Each	Electrician	Contract	2.4200	647.65	0	None	20	Major	Yes
Exit Lighting Fixture, LED										
Replace Exit Lighting Fixture, LED	Each	Electrician	Contract	1.0800	149.60	0	None	20	Major	Yes
Exit Lighting Fixture, w/ Battery										
Replace Lamp, Exit Lighting Fixture, w/ Battery	Each	Staff Electrician	Staff	.0900	43.35	0	None	5	PM	No
Replace Exit Lighting Fixture, w/ Battery	Each	Electrician	Contract	1.0800	141.82	0	None	20	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D5020 Lighting & Branch Wiring										
Flood Light, Exterior, 100 w										
Replace Lamp, Flood Light, Exterior, 100 w	Each	Electrician	Contract	.2000	268.06	0	None	10	Major	No
Replace Flood Light, Exterior, 100 w	Each	Electrician	Contract	.7800	582.25	0	None	20	Major	Yes
Fluorescent Lighting Fixture, 80 w										
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 80 w	Each	Electrician	Contract	.4400	53.68	0	None	10	Major	No
Replace Fluorescent Lighting Fixture, 80 w	Each	Electrician	Contract	.5700	78.65	0	None	20	Major	Yes
Fluorescent Lighting Fixture, 160 w										
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160 w	Each	Electrician	Contract	.4400	69.86	0	None	10	Major	No
Replace Fluorescent Lighting Fixture, 160 w	Each	Electrician	Contract	.5700	97.95	0	None	20	Major	Yes
Grounded Fault Circuit Interruptor, 15 Amp.										
Replace Grounded Fault Circuit Interruptor, 15 Amp.	Each	Electrician	Contract	.3600	28.57	0	None	20	Major	Yes
High Pressure Sodium Lighting Fixture, 250 w										
Replace Ballast & Lamp, HP Sodium Lighting Fixture, 250 w	Each	Electrician	Contract	.4700	373.20	0	None	10	Major	No
Replace HP Sodium Lighting Fixture, 250 w	Each	Electrician	Contract	.7800	630.92	0	None	20	Major	Yes
Incandescent Lighting Fixture, Basic, 100 w										
Replace Lamp, Incandescent Lighting Fixture, Basic, 100 w	Each	Staff Electrician	Staff	.0900	2.95	0	None	5	PM	No
Replace Incandescent Lighting Fixture, Basic, 100 w	Each	Electrician	Contract	.3400	73.50	0	None	20	Major	Yes
Incandescent Lighting Fixture, Basic, 200 w										
Replace Lamp, Incandescent Lighting Fixture, Basic, 200 w	Each	Staff Electrician	Staff	.0900	3.98	0	None	5	PM	No
Replace Incandescent Lighting Fixture, Basic, 200 w	Each	Electrician	Contract	.3400	73.50	0	None	20	Major	Yes
Light Dimming Panel										
Inspect & Maintain Light Dimming Panel	Each	Staff Electrician	Staff	.5300	.00	0	None	1	PM	No
Replace Dimmer Switch, Light Dimming Panel	Each	Electrician	Contract	.4600	53.15	0	None	5	Major	No
Replace Light Dimming Panel	Each	Electrician	Contract	9.7700	484.20	0	None	15	Major	Yes
Light Dimming Panel, Digital Multi-Purpose Time Control Clock										
Inspect & Maintain Light Dim. Panel, Dig. Multi-Purp. Time Ctrl Clock	Each	Staff Electrician	Staff	.5300	.00	0	None	1	PM	No
Replace Dimmer Switch, Light Dim. Panel, Dig. Multi-Purp. Time Ctrl Clock	Each	Electrician	Contract	.4600	53.15	0	None	5	Major	No
Replace Light Dim. Panel, Dig. Multi-Purp. Time Ctrl Clock	Each	Electrician	Contract	9.7700	1,960.00	0	None	20	Major	Yes
Light Dimming Panel, Digital Multi-Purpose Time Control Clock & Photosensor										
Inspect & Maintain Light Dim. Panel, Dig. Multi-Purp. Time Ctrl & Photo.	Each	Staff Electrician	Staff	.5300	.00	0	None	1	PM	No
Replace Dimmer Switch, Light Dim. Panel, Dig. Multi-Purp. Time Ctrl & Photo.	Each	Electrician	Contract	.4600	53.15	0	None	5	Major	No
Replace Light Dim. Panel, Dig. Multi-Purp. Time Ctrl & Photo.	Each	Electrician	Contract	10.2700	2,054.60	0	None	20	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D5020 Lighting & Branch Wiring										
Metal Halide Lighting Fixture, Low Bay, 250 w										
Replace Lamp, Metal Halide Lighting Fixture, Low Bay, 250 w	Each	Staff Electrician	Staff	.4600	46.22	0	None	5	PM	No
Replace Ballast, Metal Halide Lighting Fixture, Low Bay, 250 w	Each	Electrician	Contract	.4600	153.00	0	None	10	Major	No
Replace Metal Halide Lighting Fixture, Low Bay, 250 w	Each	Electrician	Contract	.3400	383.00	0	None	20	Major	Yes
Metal Halide Lighting Fixture, High Bay, 400 w										
Replace Lamp, Metal Halide Lighting Fixture, High Bay, 400 w	Each	Staff Electrician	Staff	.4600	68.65	0	None	5	PM	No
Replace Ballast, Metal Halide Lighting Fixture, High Bay, 400 w	Each	Electrician	Contract	.4600	200.75	0	None	10	Major	No
Replace Metal Halide Lighting Fixture, High Bay, 400 w	Each	Electrician	Contract	.3400	404.50	0	None	20	Major	Yes
Metal Halide Lighting Fixture, High Bay, 1,000 w										
Replace Lamp, Metal Halide Lighting Fixture, High Bay, 1,000 w	Each	Staff Electrician	Staff	.4600	131.50	0	None	5	PM	No
Replace Ballast, Metal Halide Lighting Fixture, High Bay, 1,000 w	Each	Electrician	Contract	.4600	300.25	0	None	10	Major	No
Replace Metal Halide Lighting Fixture, High Bay, 1,000 w	Each	Electrician	Contract	.3400	613.00	0	None	20	Major	Yes
Metal Halide Lighting Fixture, Wall Mount, 150 w										
Replace Lamp, Metal Halide Lighting Fixture, Wall Mount, 150 w	Each	Staff Electrician	Staff	.4600	47.50	0	None	5	PM	No
Replace Ballast, Metal Halide Lighting Fixture, Wall Mount, 150 w	Each	Electrician	Contract	.4600	127.65	0	None	10	Major	No
Replace Metal Halide Lighting Fixture, Wall Mount, 150 w	Each	Electrician	Contract	.3400	352.50	0	None	20	Major	Yes
Receptacle, 120 V, 15 Amp.										
Replace Receptacle, 120 V, 15 Amp.	Each	Electrician	Contract	.3500	.00	0	None	20	Major	Yes
Receptacle, 120 V, 20 Amp.										
Replace Receptacle, 120 V, 20 Amp.	Each	Electrician	Contract	.7400	19.22	0	None	20	Major	Yes
Receptacle, 208 V, 3 phase										
Replace Receptacle, 208 V, 3 phase	Each	Electrician	Contract	.7400	51.40	0	None	20	Major	Yes
TV Cable Outlet										
Repair TV Cable Outlet	Each	Electrician	Contract	.6200	2.20	0	None	10	Major	No
Replace TV Cable Outlet	Each	Electrician	Contract	.8200	15.94	0	None	20	Major	Yes
Welding Receptacle										
Clean and Inspect Welding Receptacle	Each	Staff Electrician	Staff	.3300	.00	0	None	1	PM	No
Replace Welding Receptacle	Each	Electrician	Contract	2.0000	351.12	0	None	30	Major	Yes
Wiring Device, Switch										
Repair Wiring Device, Switch	Each	Electrician	Contract	.5000	2.11	0	None	10	Major	No
Replace Wiring Device, Switch	Each	Electrician	Contract	.3400	.00	0	None	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D5030 Communications & Security										
Alarm Siren										
Maintain Alarm Siren	Each	Staff Electrician	Staff	.3300	.00	0	None	1	PM	No
Replace Alarm Siren	Each	Electrician	Contract	1.0000	32.60	0	None	10	Major	Yes
Annunciation Panel										
Maintain Annunciation Panel	Each	Staff Electrician	Staff	.5300	.00	0	None	1	PM	No
Replace Annunciation Panel	Each	Electrician	Contract	7.9300	311.54	0	None	15	Major	Yes
Camera Controller, Extension Module, Headend, Closed Circuit										
Replace Camera Controller, Extension Module, Headend, Closed Circuit	Each	Electrician	Contract	.5000	172.63	0	None	5	Major	Yes
Camera Controller, Headend, Closed Circuit										
Replace Camera Controller, Headend, Closed Circuit	Each	Electrician	Contract	.5000	1,491.92	0	None	5	Major	Yes
Camera Fiber Optics Patch Panel, Headend, Closed Circuit										
Replace Camera Fiber Optics Patch Panel, Headend, Closed Circuit	Each	Electrician	Contract	6.0000	110.74	0	None	10	Major	Yes
Camera Fiber Optics Power Supply, Closed Circuit										
Maintain Camera Fiber Optics Power Supply, Closed Circuit	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Camera Fiber Optics Power Supply, Closed Circuit	Each	Electrician	Contract	2.0000	1,065.66	0	None	10	Major	Yes
Camera Fiber Optics Receiver Rack Mount w/ Power Supply, Closed Circuit										
Maintain Camera Fiber Optics Receiver Rack Mount w/ Power Sup., Closed Circ.	Each	Staff Electrician	Staff	.3300	.00	0	None	1	PM	No
Replace Camera Fiber Optics Receiver Rack Mount w/ Power Sup., Closed Circ.	Each	Electrician	Contract	1.0000	1,065.66	0	None	10	Major	Yes
Camera Fiber Optics Receiver Rack, Closed Circuit										
Replace Camera Fiber Optics Receiver Rack, Closed Circuit	Each	Electrician	Contract	8.0000	213.13	0	None	10	Major	Yes
Camera Fiber Optics Receiver/Transmitter, Closed Circuit										
Maintain Camera Fiber Optics Receiver/Transmitter, Closed Circuit	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Camera Fiber Optics Receiver/Transmitter, Closed Circuit	Each	Electrician	Contract	2.0000	852.53	0	None	10	Major	Yes
Camera Infrared Illuminator, Exterior, Closed Circuit										
Maintain Camera Infrared Illuminator, Exterior, Closed Circuit	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Camera Infrared Illuminator, Exterior, Closed Circuit	Each	Electrician	Contract	8.0000	639.40	0	None	10	Major	Yes
Camera Light, Badging										
Maintain Camera Light, Badging	Each	Staff Electrician	Staff	.5000	.00	0	None	1	PM	No
Replace Camera Light, Badging	Each	Electrician	Contract	1.0000	106.57	0	None	5	Major	Yes
Camera Multiplexer, Headend, Closed Circuit										
Maintain Camera Multiplexer, Headend, Closed Circuit	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Camera Multiplexer, Headend, Closed Circuit	Each	Electrician	Contract	2.0000	2,131.32	0	None	7	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D5030 Communications & Security										
Camera PTZ Receiver/Driver, Closed Circuit										
Maintain Camera PTZ Receiver/Driver, Closed Circuit	Each	Staff Electrician	Staff	.5000	.00	0	None	1	PM	No
Replace Camera PTZ Receiver/Driver, Closed Circuit	Each	Electrician	Contract	1.0000	1,238.30	0	None	5	Major	Yes
Camera Tape Backup, Closed Circuit										
Maintain Camera Tape Backup, Closed Circuit	Each	Staff Electrician	Staff	.3300	.00	0	None	1	PM	No
Replace Camera Tape Backup, Closed Circuit	Each	Electrician	Contract	.5000	2,237.89	0	None	10	Major	Yes
Camera Video Quad Processor, Headend, Closed Circuit										
Maintain Camera Video Quad Processor, Headend, Closed Circuit	Each	Staff Electrician	Staff	.5000	.00	0	None	1	PM	No
Replace Camera Video Quad Processor, Headend, Closed Circuit	Each	Electrician	Contract	8.0000	1,598.49	0	None	5	Major	Yes
Camera Video Receiver/Transmitter, Closed Circuit										
Maintain Camera Video Receiver/Transmitter, Closed Circuit	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Camera Video Receiver/Transmitter, Closed Circuit	Each	Electrician	Contract	2.0000	852.53	0	None	10	Major	Yes
Camera, Badging										
Maintain Camera, Badging	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Camera, Badging	Each	Electrician	Contract	1.0000	532.84	0	None	5	Major	Yes
Camera, Exterior, Closed Circuit, Fixed B/W										
Maintain Camera, Exterior, Closed Circuit, Fixed B/W	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Camera, Exterior, Closed Circuit, Fixed B/W	Each	Electrician	Contract	2.0000	1,684.88	0	None	5	Major	Yes
Camera, Exterior, Closed Circuit, Fixed Color										
Maintain Camera, Exterior, Closed Circuit, Fixed Color	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Camera, Exterior, Closed Circuit, Fixed Color	Each	Electrician	Contract	2.0000	2,106.10	0	None	5	Major	Yes
Camera, Exterior, Closed Circuit, PTZ B/W										
Maintain Camera, Exterior, Closed Circuit, PTZ B/W	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Camera, Exterior, Closed Circuit, PTZ B/W	Each	Electrician	Contract	2.0000	2,106.10	0	None	5	Major	Yes
Camera, Exterior, Closed Circuit, PTZ Color										
Maintain Camera, Exterior, Closed Circuit, PTZ Color	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Camera, Exterior, Closed Circuit, PTZ Color	Each	Electrician	Contract	2.0000	3,159.15	0	None	5	Major	Yes
Camera, Interior, Closed Circuit, Fixed B/W										
Maintain Camera, Interior, Closed Circuit, Fixed B/W	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Camera, Interior, Closed Circuit, Fixed B/W	Each	Electrician	Contract	2.0000	842.44	0	None	5	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D5030 Communications & Security										
Camera, Interior, Closed Circuit, Fixed Color										
Maintain Camera, Interior, Closed Circuit, Fixed Color	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Camera, Interior, Closed Circuit, Fixed Color	Each	Electrician	Contract	2.0000	1,053.05	0	None	5	Major	Yes
Camera, Interior, Closed Circuit, PTZ B/W										
Maintain Camera, Interior, Closed Circuit, PTZ B/W	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Camera, Interior, Closed Circuit, PTZ B/W	Each	Electrician	Contract	2.0000	1,601.52	0	None	5	Major	Yes
Camera, Interior, Closed Circuit, PTZ Color										
Maintain Camera, Interior, Closed Circuit, PTZ Color	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Camera, Interior, Closed Circuit, PTZ Color	Each	Electrician	Contract	2.0000	2,106.10	0	None	5	Major	Yes
Camera, Security System										
Maintain Camera, Security System	Each	Staff Electrician	Staff	2.0000	.00	0	None	1	PM	No
Replace Camera, Security System	Each	Electrician	Contract	3.0000	1,016.80	0	None	5	Major	Yes
Card Die Cutter, Badging										
Replace Card Die Cutter, Badging	Each	Electrician	Contract	4.0000	321.71	0	None	12	Major	Yes
Card Printer, Badging										
Maintain Card Printer, Badging	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Card Printer, Badging	Each	Electrician	Contract	4.0000	3,646.13	0	None	5	Major	Yes
Card Reader										
Maintain Card Reader	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Card Reader	Each	Electrician	Contract	2.5000	418.33	0	None	5	Major	Yes
Card Reader w/ Keypad										
Maintain Card Reader w/ Keypad	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Access Card Reader w/ Keypad	Each	Electrician	Contract	2.0000	593.50	0	None	5	Major	Yes
Card Signature Pad, Badging										
Replace Card Signature Pad, Badging	Each	Electrician	Contract	4.0000	857.92	0	None	2	Major	Yes
Communications Duress Button										
Maintain Communications Duress Button	Each	Staff Electrician	Staff	.3300	.00	0	None	1	PM	No
Replace Communications Duress Button	Each	Electrician	Contract	.5000	107.25	0	None	10	Major	Yes
Electric Lock										
Replace Electric Lock	Each	Electrician	Contract	2.0000	107.25	0	None	10	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D5030 Communications & Security										
Exit Alarm										
Maintain Exit Alarm	Each	Staff Electrician	Staff	.4000	.00	0	None	1	PM	No
Replace Exit Alarm	Each	Electrician	Contract	2.0000	233.75	0	None	5	Major	Yes
Exit Button										
Maintain Exit Button	Each	Staff Electrician	Staff	.3300	.00	0	None	1	PM	No
Replace Exit Button	Each	Electrician	Contract	1.5000	126.00	0	None	10	Major	Yes
Exit Pushbar										
Maintain Exit Pushbar	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Exit Pushbar	Each	Electrician	Contract	2.0000	1,769.45	0	None	10	Major	Yes
Exit Sensor										
Maintain Exit Sensor	Each	Staff Electrician	Staff	.5000	.00	0	None	1	PM	No
Replace Exit Sensor	Each	Electrician	Contract	1.0000	128.68	0	None	20	Major	Yes
Fire Alarm Bell, 6"										
Replace Fire Alarm Bell, 6"	Each	Electrician	Contract	1.0600	62.80	0	None	20	Major	Yes
Fire Alarm Horn & Strobe										
Replace Fire Alarm Horn & Strobe	Each	Electrician	Contract	1.0000	64.10	0	None	20	Major	Yes
Handicap Door Access Interface										
Maintain Handicap Door Access Interface	Each	Staff Electrician	Staff	.5000	.00	0	None	1	PM	No
Replace Handicap Door Access Interface	Each	Electrician	Contract	2.0000	81.62	0	None	10	Major	Yes
Headend Panel Input Component, Closed Circuit										
Maintain Headend Panel Input Component, Closed Circuit	Each	Staff Electrician	Staff	.3300	.00	0	None	1	PM	No
Replace Headend Panel Input Component, Closed Circuit	Each	Electrician	Contract	.5000	2,989.97	0	None	10	Major	Yes
Headend Panel Output Component, Closed Circuit										
Maintain Headend Panel Output Component, Closed Circuit	Each	Staff Electrician	Staff	.3300	.00	0	None	1	PM	No
Replace Headend Panel Output Component, Closed Circuit	Each	Electrician	Contract	.5000	1,882.58	0	None	10	Major	Yes
Headend Panel, Closed Circuit										
Maintain Headend Panel, Closed Circuit	Each	Staff Electrician	Staff	.3300	.00	0	None	1	PM	No
Replace Headend Panel, Closed Circuit	Each	Electrician	Contract	.5000	1,661.10	0	None	10	Major	Yes
Heat Detector										
Check Operation, Heat Detector	Each	Staff Electrician	Staff	.3300	.00	0	None	1	PM	No
Repair Heat Detector	Each	Electrician	Contract	.6000	6.78	0	None	10	Major	No
Replace Heat Detector	Each	Electrician	Contract	1.6200	28.96	0	None	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D5030 Communications & Security										
Intercom Master Station										
Maintain Intercom Master Station	Each	Staff Electrician	Staff	2.0000	.00	0	None	1	PM	No
Replace Intercom Master Station	Each	Electrician	Contract	3.0000	1,634.00	0	None	7	Major	Yes
Intercom Speaker										
Maintain Intercom Speaker	Each	Staff Electrician	Staff	.5000	.00	0	None	1	PM	No
Replace Intercom Speaker	Each	Electrician	Contract	1.0000	279.00	0	None	20	Major	Yes
Intercom Substation										
Maintain Intercom Substation	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Intercom Substation	Each	Electrician	Contract	2.0000	280.57	0	None	7	Major	Yes
Intrusion Detection Balanced Magnetic Switch										
Replace Intrusion Detection Balanced Magnetic Switch	Each	Electrician	Contract	2.0000	107.25	0	None	10	Major	Yes
Intrusion Detection Fence Sensor, Exterior										
Maintain Intrusion Detection Fence Sensor, Exterior	Each	Staff Electrician	Staff	4.3000	.00	0	None	1	PM	No
Repair Intrusion Detection Fence Sensor, Exterior	Each	Electrician	Contract	1.0000	107.25	0	None	2	Major	No
Replace Intrusion Detection Fence Sensor, Exterior	Each	Electrician	Contract	20.0000	2,144.78	0	None	10	Major	Yes
Intrusion Detection Glassbreak Sensor, Interior										
Maintain Intrusion Detection Glassbreak Sensor, Interior	Each	Staff Electrician	Staff	.4000	.00	0	None	1	PM	No
Replace Intrusion Detection Glassbreak Sensor, Interior	Each	Electrician	Contract	1.0000	85.79	0	None	10	Major	Yes
Intrusion Detection Infrared Beam, Exterior										
Maintain Intrusion Detection Infrared Beam, Exterior	Each	Staff Electrician	Staff	.4000	.00	0	None	1	PM	No
Replace Intrusion Detection Infrared Beam, Exterior	Each	Electrician	Contract	2.0000	69.72	0	None	20	Major	Yes
Intrusion Detection Motion Detector, Exterior										
Maintain Intrusion Detection Motion Detector, Exterior	Each	Staff Electrician	Staff	.5000	.00	0	None	1	PM	No
Replace Intrusion Detection Motion Detector, Exterior	Each	Electrician	Contract	1.5000	374.25	0	None	10	Major	Yes
Intrusion Detection Motion Detector, Interior										
Maintain Intrusion Detection Motion Detector, Interior	Each	Staff Electrician	Staff	.5000	.00	0	None	1	PM	No
Replace Intrusion Detection Motion Detector, Interior	Each	Electrician	Contract	1.5000	374.25	0	None	10	Major	Yes
Intrusion Detection Switch, Interior										
Maintain Intrusion Detection Switch, Interior	Each	Staff Electrician	Staff	.5000	.00	0	None	1	PM	No
Replace Intrusion Detection Switch, Interior	Each	Electrician	Contract	1.0000	123.25	0	None	10	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D5030 Communications & Security										
Keypad										
Maintain Keypad	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Access Keypad	Each	Electrician	Contract	2.0000	242.75	0	None	5	Major	Yes
Magnetic Lock										
Maintain Magnetic Lock	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Magnetic Lock	Each	Electrician	Contract	4.0000	282.93	0	None	10	Major	Yes
Manual Pull Station										
Check & Repair Manual Pull Station	Each	Electrician	Contract	.4000	18.57	0	None	10	Major	No
Replace Manual Pull Station	Each	Electrician	Contract	1.0300	.00	0	None	15	Major	Yes
Monitor, Command										
Replace Monitor, Command	Each	Electrician	Contract	1.5000	2,176.30	0	None	5	Major	Yes
Monitor, Large, Closed Circuit										
Replace Monitor, Large, Closed Circuit	Each	Electrician	Contract	1.5000	3,264.46	0	None	5	Major	Yes
Monitor, Medium, Closed Circuit										
Replace Monitor, Medium, Closed Circuit	Each	Electrician	Contract	1.5000	2,176.30	0	None	5	Major	Yes
Monitor, Small, Closed Circuit										
Replace Monitor, Small, Closed Circuit	Each	Electrician	Contract	1.5000	1,196.96	0	None	5	Major	Yes
Nurse Call Station										
Maintain Nurse Call Station	Each	Staff Electrician	Staff	.3300	.00	0	None	1	PM	No
Replace Nurse Call Station	Each	Electrician	Contract	1.3200	195.83	0	None	15	Major	Yes
Power Supply, Closed Circuit										
Maintain Power Supply, Closed Circuit	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Power Supply, Closed Circuit	Each	Electrician	Contract	8.0000	1,088.15	0	None	10	Major	Yes
Public Address Speaker										
Maintain Public Address Speaker	Each	Staff Electrician	Staff	.3300	.00	0	None	1	PM	No
Replace Public Address Speaker	Each	Electrician	Contract	1.4400	128.00	0	None	15	Major	Yes
Screening Explosive Detector										
Maintain Screening Explosive Detector	Each	Staff Electrician	Staff	.5000	.00	0	None	1	PM	No
Replace Screening Explosive Detector	Each	Electrician	Contract	5.0000	53,619.52	0	None	10	Major	Yes
Screening Magnetometer										
Maintain Screening Magnetometer	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Screening Magnetometer	Each	Electrician	Contract	1.5000	2,938.34	0	None	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D5030 Communications & Security										
Screening X-Ray Machine										
Maintain Screening X-Ray Machine	Each	Staff Electrician	Staff	2.0000	.00	0	None	1	PM	No
Replace Screening X-Ray Machine	Each	Electrician	Contract	5.0000	37,533.66	0	None	7	Major	Yes
Security Control Panel										
Inspect & Maintain Security Control Panel	Each	Staff Electrician	Staff	.8000	.00	0	None	1	PM	No
Repair Security Control Panel	Each	Electrician	Contract	1.2900	308.05	0	None	5	Major	No
Replace Security Control Panel	Each	Electrician	Contract	1.3700	3,999.95	0	None	15	Major	Yes
Security System Panel										
Maintain Security System Panel	Each	Staff Electrician	Staff	1.0000	.00	0	None	4	PM	No
Replace Security System Panel	Each	Electrician	Contract	1.3700	362.00	0	None	10	Major	Yes
Signal Distribution Unit, Headend, Closed Circuit										
Maintain Signal Distribution Unit, Headend, Closed Circuit	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Signal Distribution Unit, Headend, Closed Circuit	Each	Electrician	Contract	8.0000	818.04	0	None	7	Major	Yes
Smoke Detector										
Replace Batteries & Check Operation, Smoke Detector	Each	Staff Electrician	Staff	.1500	6.25	0	None	1	PM	No
Repair Smoke Detector	Each	Electrician	Contract	.6000	3.59	0	None	10	Major	No
Replace Smoke Detector	Each	Electrician	Contract	.6500	74.85	0	None	15	Major	Yes
Sound System, 7 Channel										
Maintain Sound System, 7 Channel	Each	Staff Electrician	Staff	.3300	.00	0	None	1	PM	No
Replace Sound System, 7 Channel	Each	Electrician	Contract	1.4400	1,631.80	0	None	15	Major	Yes
Surge Suppressor, Closed Circuit										
Maintain Surge Suppressor, Closed Circuit	Each	Staff Electrician	Staff	.5000	.00	0	None	1	PM	No
Replace Surge Suppressor, Closed Circuit	Each	Electrician	Contract	.5000	153.43	0	None	10	Major	Yes
Time Control Clock										
Maintain Time Control Clock	Each	Staff Electrician	Staff	.5300	.00	0	None	1	PM	No
Repair Time Control Clock	Each	Electrician	Contract	1.3000	46.02	0	None	10	Major	No
Replace Time Control Clock	Each	Electrician	Contract	1.6200	78.08	0	None	15	Major	Yes
Turnstile										
Maintain Turnstile	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Turnstile	Each	Electrician	Contract	3.0000	9,793.35	0	None	10	Major	Yes
Vehicle Control Automatic Barrier, Metal										
Maintain Vehicle Control Automatic Barrier, Metal	Each	Staff Electrician	Staff	8.0000	.00	0	None	1	PM	No
Replace Vehicle Control Automatic Barrier, Metal	Each	Electrician	Contract	60.0000	54,407.52	0	None	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D5030 Communications & Security										
Vehicle Control Bollard										
Maintain Vehicle Control Bollard	Each	Staff Electrician	Staff	8.0000	.00	0	None	1	PM	No
Replace Vehicle Control Bollard	Each	Electrician	Contract	60.0000	3,264.46	0	None	15	Major	Yes
Vehicle Control Crash Gate										
Maintain Vehicle Control Crash Gate	Each	Staff Electrician	Staff	8.0000	.00	0	None	1	PM	No
Replace Vehicle Control Crash Gate	Each	Electrician	Contract	30.0000	54,407.52	0	None	15	Major	Yes
Vehicle Control Gate Control Interface										
Maintain Vehicle Control Gate Control Interface	Each	Staff Electrician	Staff	.4000	.00	0	None	1	PM	No
Replace Vehicle Control Gate Control Interface	Each	Electrician	Contract	4.0000	217.63	0	None	10	Major	Yes
Vehicle Control Gate Operator										
Maintain Vehicle Control Gate Operator	Each	Staff Electrician	Staff	8.0000	.00	0	None	1	PM	No
Replace Vehicle Control Gate Operator	Each	Electrician	Contract	60.0000	2,176.30	0	None	15	Major	Yes
Vehicle Control Gate w/ Controller										
Maintain Vehicle Control Gate w/ Controller	Each	Staff Electrician	Staff	1.3300	.00	0	None	1	PM	No
Replace Vehicle Control Gate w/ Controller	Each	Electrician	Contract	16.0000	4,679.04	0	None	15	Major	Yes
Vehicle Control Loop Detector										
Maintain Vehicle Control Loop Detector	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Vehicle Control Loop Detector	Each	Electrician	Contract	24.0000	1,088.15	0	None	15	Major	Yes
Vehicle Control Manual Barrier										
Maintain Vehicle Control Manual Barrier	Each	Staff Electrician	Staff	8.0000	.00	0	None	1	PM	No
Replace Vehicle Control Manual Barrier	Each	Electrician	Contract	60.0000	3,264.46	0	None	15	Major	Yes
Video Distribution Amplifier, Headend, Closed Circuit										
Maintain Video Distribution Amplifier, Headend, Closed Circuit	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Video Distribution Amplifier, Headend, Closed Circuit	Each	Electrician	Contract	2.0000	319.69	0	None	7	Major	Yes
Video Matrix Switcher, Closed Circuit										
Maintain Video Matrix Switcher, Closed Circuit	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Video Matrix Switcher, Closed Circuit	Each	Electrician	Contract	3.0000	6,393.95	0	None	7	Major	Yes
Video Recorder, Analog, Headend, Closed Circuit										
Maintain Video Recorder, Analog, Headend, Closed Circuit	Each	Staff Electrician	Staff	.5000	.00	0	None	1	PM	No
Replace Video Recorder, Analog, Headend, Closed Circuit	Each	Electrician	Contract	1.0000	532.84	0	None	7	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
D5030 Communications & Security										
Video Recorder, Digital, Headend, Closed Circuit										
Maintain Video Recorder, Digital, Headend, Closed Circuit	Each	Staff Electrician	Staff	.5000	.00	0	None	1	PM	No
Replace Video Recorder, Digital, Headend, Closed Circuit	Each	Electrician	Contract	8.0000	4,262.64	0	None	5	Major	Yes
D5090 Other Electrical Systems										
Battery, UPS, Dry, 12 V, 75 Amp.										
Maintain Battery, UPS, Dry, 12 V, 75 Amp.	Each	Staff Electrician	Staff	.5000	.00	0	None	1	PM	No
Replace Battery, UPS, Dry, 12 V, 75 Amp.	Each	Electrician	Contract	.3300	212.00	0	None	5	Major	Yes
Generator, Diesel, 2,000 kw										
Electrical Testing, Generator, Diesel, 2,000 kw	Each	Staff Electrician	Staff	12.0000	.00	0	None	1	PM	No
Replace Generator, Diesel, 2,000 kw	Each	Electrician	Contract	217.1400	583,664.05	8	4T Lift/90T Crane	25	Major	Yes
Generator Battery, Wet										
Clean Terminals, Check Water & Test Generator Battery, Wet	Each	Staff Electrician	Staff	.5000	.00	0	None	1	PM	No
Replace Generator Battery, Wet	Each	Electrician	Contract	.4000	354.25	0	None	10	Major	Yes
Generator Switchgear										
Maintain Generator Switchgear	Each	Staff Electrician	Staff	6.0000	.00	0	None	1	PM	No
Replace Generator Switchgear	Each	Electrician	Contract	.6000	7,465.30	0	None	18	Major	Yes
Generator, Diesel, 30 kw										
Electrical Testing, Generator, Diesel, 30 kw	Each	Staff Electrician	Staff	.8000	.00	0	None	1	PM	No
Replace Generator, Diesel, 30 kw	Each	Electrician	Contract	47.6200	21,854.17	8	2T Lift/45T Crane	25	Major	Yes
Generator, Diesel, 60 kw										
Electrical Testing, Generator, Diesel, 60 kw	Each	Staff Electrician	Staff	.8000	.00	0	None	1	PM	No
Replace Generator, Diesel, 60 kw	Each	Electrician	Contract	47.6200	41,249.75	8	2T Lift/45T Crane	25	Major	Yes
Generator, Diesel, 125 kw										
Electrical Testing, Generator, Diesel, 125 kw	Each	Staff Electrician	Staff	.8000	.00	0	None	1	PM	No
Replace Generator, Diesel, 125 kw	Each	Electrician	Contract	68.9600	80,040.89	8	2T Lift/45T Crane	25	Major	Yes
Generator, Diesel, 500 kw										
Electrical Testing, Generator, Diesel, 500 kw	Each	Staff Electrician	Staff	12.0000	.00	0	None	1	PM	No
Replace Generator, Diesel, 500 kw	Each	Electrician	Contract	217.1400	112,685.58	8	4T Lift/90T Crane	25	Major	Yes
Generator, Diesel, 1,000 kw										
Electrical Testing, Generator, Diesel, 1,000 kw	Each	Staff Electrician	Staff	12.0000	.00	0	None	1	PM	No
Replace Generator, Diesel, 1,000 kw	Each	Electrician	Contract	217.1400	177,667.45	8	4T Lift/90T Crane	25	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
D5090 Other Electrical Systems										
Generator, Propane, 30 kw										
Maintain & Repair Generator, Propane, 30 kw	Each	Staff Electrician	Staff	12.0000	.00	0	None	1	PM	No
Replace Generator, Propane, 30 kw	Each	Electrician	Contract	36.3400	16,390.63	0	None	25	Major	Yes
Lightning Protection System										
Maintain & Repair General Wiring, Lightning Protection System	Each	Staff Electrician	Staff	1.0500	8.16	0	None	1	PM	No
Replace Lightning Protection General Wiring	Each	Electrician	Contract	8.8700	2,045.23	0	None	25	Major	Yes
Skylight Shade System Program & Controls										
Maintain Skylight Shade System Program & Controls	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Uninterruptible Power Supply, 8.0 kVA										
Maintain Uninterruptible Power Supply, 8.0 kVA	Each	Staff Electrician	Staff	.5000	.00	0	None	1	PM	No
Replace Uninterruptible Power Supply Battery, 8.0 kVA	Each	Electrician	Contract	.3300	212.00	0	None	10	Major	No
Replace Uninterruptible Power Supply Motor Generator, 8.0 kVA	Each	Electrician	Contract	4.1000	8,500.00	0	None	15	Major	Yes
Uninterruptible Power Supply, 750 kVA										
Maintain Uninterruptible Power Supply, 750 kVA	Each	Staff Electrician	Staff	.5000	.00	0	None	1	PM	No
Replace Uninterruptible Power Supply Battery, 750 kVA	Each	Electrician	Contract	.3300	212.00	0	None	10	Major	No
Replace Uninterruptible Power Supply Motor Generator, 750 kVA	Each	Electrician	Contract	4.1000	65,000.00	0	None	15	Major	Yes
E10 Equipment										
E1010 Commercial Equipment										
Coffee Brewer, 5 Burners										
Maintain Coffee Brewer, 5 Burners	Each	Staff Electrician	Staff	4.6500	28.25	0	None	1	PM	No
Replace Coffee Brewer, 5 Burners	Each	Electrician	Contract	2.6700	1,115.08	0	None	10	Major	Yes
Cooking Range, Commercial										
Maintain Cooking Range, Commercial	Each	Staff Electrician	Staff	11.2400	71.03	0	None	1	PM	No
Replace Cooking Range, Commercial	Each	Electrician	Contract	5.5000	1,394.13	0	None	10	Major	Yes
Cooking Range, Domestic										
Maintain Cooking Range, Domestic	Each	Staff Electrician	Staff	.5000	35.52	0	None	1	PM	No
Replace Cooking Range, Domestic	Each	Electrician	Contract	2.7500	763.91	0	None	10	Major	Yes
Dishwasher, Commercial										
Maintain Dishwasher, Commercial	Each	Staff Plumber	Staff	9.0000	.00	0	None	1	PM	No
Replace Dishwasher, Commercial	Each	Plumber	Contract	9.7500	14,073.32	0	None	10	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
E1010 Commercial Equipment										
Disposal, Garbage, Electric										
Maintain Disposal, Garbage, Electric	Each	Staff Plumber	Staff	1.5200	24.00	0	None	1	PM	No
Replace Disposal, Garbage, Electric	Each	Plumber	Contract	2.0000	221.77	0	None	10	Major	Yes
Fryer, Deep Fat										
Maintain Fryer, Deep Fat	Each	Staff Electrician	Staff	2.5800	71.05	0	None	1	PM	No
Replace Fryer, Deep Fat	Each	Electrician	Contract	2.5000	3,883.62	0	None	10	Major	Yes
Icemaker, Commercial										
Maintain Icemaker, Commercial	Each	Staff Plumber	Staff	14.0000	.00	0	None	1	PM	No
Replace Icemaker, Commercial	Each	Plumber	Contract	16.0000	11,493.11	0	None	10	Major	Yes
Kitchen Exhaust Hood, Commercial										
Maintain Kitchen Exhaust Hood, Commercial	Each	Gen Maint Worker	Staff	1.0000	.00	0	None	1	PM	No
Replace Kitchen Exhaust Hood, Commercial	Each	Carpenter	Contract	4.4000	5,399.50	0	None	15	Major	Yes
Microwave Oven										
Maintain Microwave Oven	Each	Gen Maint Worker	Staff	.5000	.00	0	None	1	PM	No
Replace Microwave Oven	Each	Maint Worker	Contract	1.0000	273.83	0	None	10	Major	Yes
Refrigerator, Domestic										
Maintain Refrigerator, Domestic	Each	Gen Maint Worker	Staff	.4100	11.25	0	None	1	PM	No
Replace Refrigerator, Domestic	Each	Maint Worker	Contract	3.2000	746.10	0	None	10	Major	Yes
Trash Compactor, 600 lbs										
Maintain Trash Compactor, 600 lbs	Each	Staff Electrician	Staff	23.0000	.00	0	None	1	PM	No
Replace Trash Compactor, 600 lbs	Each	Electrician	Contract	24.0000	8,971.96	0	None	10	Major	Yes
Walk-In Freezer/Cooler w/ Desuperheater, Commercial										
Maintain Walk-In Freezer/Cooler w/ Desuperheater, Commercial	Each	Staff Plumber	Staff	7.0000	.00	0	None	1	PM	No
Replace Walk-In Freezer/Cooler w/ Desuperheater, Commercial	Each	Plumber	Contract	64.0000	25,960.00	0	None	10	Major	Yes
Walk-In Freezer/Cooler w/ KoolStar, Commercial										
Maintain Walk-In Freezer/Cooler w/ KoolStar, Commercial	Each	Staff Plumber	Staff	7.0000	.00	0	None	1	PM	No
Replace Walk-In Freezer/Cooler w/ KoolStar, Commercial	Each	Plumber	Contract	64.0000	15,364.00	0	None	10	Major	Yes
Walk-In Freezer/Cooler, Commercial										
Maintain Walk-In Freezer/Cooler, Commercial	Each	Staff Plumber	Staff	7.0000	.00	0	None	1	PM	No
Replace Walk-In Freezer/Cooler, Commercial	Each	Plumber	Contract	64.0000	11,844.44	0	None	10	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
E1020 Institutional Equipment										
Anesthesia Vacuum Pump, <16 HP										
Maintain Anesthesia Vacuum Pump, <16 HP	Each	Staff HVAC Tech	Staff	5.0000	.00	0	None	1	PM	No
Replace Anesthesia Vacuum Pump, <16 HP	Each	HVAC Technician	Contract	4.5000	29,628.07	0	None	10	Major	Yes
Vacuum Pump, 30 HP										
Maintain Vacuum Pump, 30 HP	Each	Staff HVAC Tech	Staff	5.0000	.00	0	None	1	PM	No
Replace Vacuum Pump, 30 HP	Each	HVAC Technician	Contract	4.5000	8,242.97	0	None	10	Major	Yes
Automatic Cart Washer										
Maintain Automatic Cart Washer	Each	Gen Maint Worker	Staff	126.0000	.00	0	None	1	PM	No
Chart Recorder										
Maintain Chart Recorder	Each	Staff Electrician	Staff	18.0000	.00	0	None	1	PM	No
Clean Room (Air Shower) Class 10,000										
Maintain Clean Room (Air Shower) Class 10,000	Each	Staff Plumber	Staff	1.0000	891.14	0	None	1	PM	No
Repair Clean Room (Air Shower) Class 10,000	Each	Plumber	Contract	2.4000	2,762.55	0	None	5	Major	No
Replace Clean Room (Air Shower) Class 10,000	Each	Plumber	Contract	44.0000	11,050.21	0	None	20	Major	Yes
Dental Vacuum Pump, <11 HP										
Maintain Dental Vacuum Pump, <11 HP	Each	Staff Plumber	Staff	16.0000	.00	0	None	1	PM	No
Replace Dental Vacuum Pump, <11 HP	Each	Plumber	Contract	18.5000	17,282.70	0	None	10	Major	Yes
Detention Doors & Hardware										
Maintain & Repair Detention Doors & Hardware	Each	Staff Carpenter	Staff	.3300	.00	0	None	1	PM	No
Replace Detention Doors & Hardware	Each	Carpenter	Contract	2.2600	1,944.92	0	None	80	Major	Yes
Dust Collection System										
Maintain Dust Collection System	Each	Staff Electrician	Staff	2.5000	.00	0	None	1	PM	No
Replace Dust Collection System	Each	Electrician	Contract	40.0000	4,130.08	0	None	30	Major	Yes
Laboratory Exhaust Hood, 4'										
Maintain Laboratory Exhaust Hood, 4'	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Laboratory Exhaust Hood, 4'	Each	Electrician	Contract	6.6000	1,418.21	0	None	15	Major	Yes
Laboratory Exhaust Hood, 6'										
Maintain Laboratory Exhaust Hood, 6'	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Laboratory Exhaust Hood, 6'	Each	Electrician	Contract	6.6000	2,489.00	0	None	15	Major	Yes
Laboratory Exhaust Hood, Variable Volume, 4'										
Maintain Laboratory Exhaust Hood, Variable Volume, 4'	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Laboratory Exhaust Hood, Variable Volume, 4'	Each	Electrician	Contract	6.6000	4,796.00	0	None	25	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
E1020 Institutional Equipment										
Laboratory Exhaust Hood, Variable Volume, 6'										
Maintain Laboratory Exhaust Hood, Variable Volume, 6'	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Laboratory Exhaust Hood, Variable Volume, 6'	Each	Electrician	Contract	6.6000	7,155.00	0	None	15	Major	Yes
Laboratory Exhaust Hood, Variable Volume w/ Occupancy Control, 4'										
Maintain Laboratory Exhaust Hood, Variable Volume w/ Occupancy Control, 4'	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Laboratory Exhaust Hood, Variable Volume w/ Occupancy Control, 4'	Each	Electrician	Contract	7.1000	4,966.00	0	None	25	Major	Yes
Laboratory Exhaust Hood, Variable Volume w/ Occupancy Control, 6'										
Maintain Laboratory Exhaust Hood, Variable Volume w/ Occupancy Control, 6'	Each	Staff Electrician	Staff	1.0000	.00	0	None	1	PM	No
Replace Laboratory Exhaust Hood, Variable Volume w/ Occupancy Control, 6'	Each	Electrician	Contract	7.1000	7,325.00	0	None	15	Major	Yes
Medical Gas Alarm Panel										
Maintain Medical Gas Alarm Panel	Each	Staff Plumber	Staff	.5000	.00	0	None	1	PM	No
Replace Medical Gas Alarm Panel	Each	Plumber	Contract	1.3700	695.00	0	None	15	Major	Yes
Medical Gas Compressor/Dryer										
Maintain Medical Gas Compressor/Dryer	Each	Staff Plumber	Staff	1.1100	.00	0	None	1	PM	No
Replace Medical Gas Compressor/Dryer	Each	Plumber	Contract	1.5000	823.60	0	None	15	Major	Yes
Medical Gas Outlet										
Maintain Medical Gas Outlet	Each	Staff Plumber	Staff	.3300	.00	0	None	1	PM	No
Replace Medical Gas Outlet	Each	Plumber	Contract	2.5000	60.54	0	None	25	Major	Yes
Medical Waste Incinerator										
Replace Medical Waste Incinerator	Each	Plumber	Contract	48.0000	21,326.03	0	None	10	Major	Yes
Mortuary Unit Cooler										
Maintain Mortuary Unit Cooler	Each	Staff Plumber	Staff	3.5000	.00	0	None	1	PM	No
Replace Mortuary Unit Cooler	Each	Plumber	Contract	25.0000	24,310.97	0	None	10	Major	Yes
Nourishment Station										
Maintain Nourishment Station	Each	Gen Maint Worker	Staff	4.5000	.00	0	None	1	PM	No
Silver Recovery System										
Maintain Silver Recovery System	Each	Staff Plumber	Staff	32.0000	.00	0	None	1	PM	No
Sink, Epoxy Resin, Laboratory										
Replace Faucet Washer & Clean Trap, Sink, Epoxy	Each	Staff Plumber	Staff	.3300	.34	0	None	2	PM	No
Repair Strainer, Sink, Epoxy	Each	Plumber	Contract	.9000	3.10	0	None	8	Major	No
Replace Valve Set, Sink, Epoxy	Each	Plumber	Contract	.6400	57.95	0	None	10	Major	No
Replace Sink, Epoxy, Laboratory	Each	Plumber	Contract	3.0600	203.34	0	None	15	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
E1020 Institutional Equipment										
Vacuum Pump, 10 HP										
Maintain Vacuum Pump, 10 HP	Each	Staff HVAC Tech	Staff	5.0000	.00	0	None	1	PM	No
Repair Vacuum Pump	Each	HVAC Technician	Contract	.6500	66.76	0	None	5	Major	No
Replace Vacuum Pump	Each	HVAC Technician	Contract	4.5000	2,894.58	0	None	15	Major	Yes
Waste Acid Neutralization System										
Chemical Balancing and Testing, Waste Acid Neutralization System	Each	Staff Plumber	Staff	4.0000	1,025.87	0	None	1	PM	No
Replace Waste Acid Neutralization System	Each	Plumber	Contract	50.0000	17,952.70	0	None	20	Major	Yes
G20 Site Improvements										
G2010 Roadways										
Asphaltic Pavement, Highways										
Patch and Seal Cracks, Asphaltic Pavement, Highways (2% of Pavement)	Sq Ft	Staff Road Worker	Staff	.0006	.07	0	None	5	PM	No
Resurface Asphaltic Pavement, Highways	Sq Ft	Road Worker	Contract	.0127	.46	0	Ver/Roller, Smooth	10	Major	No
Repair Asphaltic Pavement, Highways (25% of Pavement)	Sq Ft	Road Worker	Contract	.0073	.80	0	r/Paver/Roller, Smoc	25	Major	Yes
Asphaltic Pavement, Roadways										
Patch and Seal Cracks, Asphaltic Pavement, Roadways (2% of Pavement)	Sq Ft	Staff Road Worker	Staff	.0006	.07	0	None	5	PM	No
Resurface Asphaltic Pavement, Roadways	Sq Ft	Road Worker	Contract	.0127	.46	0	Ver/Roller, Smooth	15	Major	No
Repair Asphaltic Pavement, Roadways (25% of Pavement)	Sq Ft	Road Worker	Contract	.0073	.80	0	r/Paver/Roller, Smoc	25	Major	Yes
Steel Guard Rail										
Replace Steel Guard Rail	Ln Ft	Road Worker	Contract	.3200	17.13	0	None	25	Major	Yes
G2020 Parking Lots										
Asphaltic Pavement, Parking Lot										
Patch and Seal Cracks, Asphaltic Pavement, Parking Lot (2% of Pavement)	Sq Ft	Staff Road Worker	Staff	.0006	.07	0	None	5	PM	No
Resurface Asphaltic Pavement, Parking Lot	Sq Ft	Road Worker	Contract	.0127	.46	0	Ver/Roller, Smooth	15	Major	No
Repair Asphaltic Pavement, Parking Lot (25% of Pavement)	Sq Ft	Road Worker	Contract	.0073	.80	0	r/Paver/Roller, Smoc	25	Major	Yes
Bike Rack										
Replace Bike Rack	Each	Maint Worker	Contract	2.0000	605.00	0	None	25	Major	Yes
Concrete Pavement										
Minor Repair, Concrete Pavement	Sq Ft	Road Worker	Contract	.0066	1.15	0	None	15	Major	No
Refinish Concrete Pavement	Sq Ft	Road Worker	Contract	.0117	.80	0	None	25	Major	No
Replace Concrete Pavement	Sq Ft	Road Worker	Contract	.0704	2.70	0	r/Paver/Roller, Smoc	75	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
G2020 Parking Lots										
Parking Control Equipment, Barrier Gate & Controller										
Inspect & Test Barrier Gate & Controller	Each	Staff Electrician	Staff	5.0000	.00	0	None	1	PM	No
Replace Barrier Gate & Controller	Each	Electrician	Contract	5.3300	3,711.54	0	None	10	Major	Yes
Parking Control Equipment, Card Reader										
Inspect & Test Parking Control Equipment, Card Reader	Each	Staff Electrician	Staff	1.0000	.00	0	None	5	PM	No
Replace Parking Control Equipment, Card Reader	Each	Electrician	Contract	4.0000	2,038.31	0	None	10	Major	Yes
Parking Stall Lines										
Paint Parking Stall Lines	Each	Painter	Contract	.1100	3.99	0	None	10	Major	No
G2030 Pedestrian Paving										
Asphalt Curb or Berm										
Repair Asphalt Curb or Berm (25% of Curb or Berm)	Ln Ft	Road Worker	Contract	.0425	.36	0	Curb Builder	25	Major	Yes
Asphalt Sidewalk										
Repair Asphalt Sidewalk, 4' Wide (25% of Sidewalk)	Ln Ft	Road Worker	Contract	.0442	3.19	0	None	15	Major	Yes
Concrete Curb & Gutter										
Repair Concrete Curb & Gutter (25% of Curb & Gutter)	Ln Ft	Road Worker	Contract	.0425	1.12	0	Curb Builder	25	Major	Yes
Concrete Sidewalk, 4' Wide										
Repair Concrete Sidewalk, 4' Wide (25% of Sidewalk)	Ln Ft	Road Worker	Contract	.0492	2.70	0	None	15	Major	Yes
G2040 Site Development										
Chain Link Fence, 8'										
Maintain Chain Link Fence, 8'	Ln Ft	Gen Maint Worker	Staff	.0418	.15	0	None	1	PM	No
Replace Chain Link Fence, 8'	Ln Ft	Maint Worker	Contract	.4230	28.00	0	None	30	Major	Yes
Chain Link Fence Swing Gate, Electric										
Maintain Chain Link Fence Swing Gate, Electric	Each	Gen Maint Worker	Staff	2.8000	7.10	0	None	1	PM	No
Replace Chain Link Fence Swing Gate Motor, Electric	Each	Electrician	Contract	4.0000	563.41	0	None	5	Major	No
Replace Chain Link Fence Swing Gate, Electric	Each	Carpenter	Contract	20.0000	7,086.57	0	None	20	Major	Yes
Sliding Gate, Motor Operated										
Maintain Sliding Gate, Motor-Operated	Each	Gen Maint Worker	Staff	4.7700	6.74	0	None	1	PM	No
Replace Sliding Gate Motor	Each	Electrician	Contract	4.0000	281.70	0	None	10	Major	No
Replace Sliding Gate, Motor-Operated	Each	Carpenter	Contract	20.0000	2,724.05	0	None	20	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
G30 Site Mechanical Utilities										
G3010 Water Supply										
Fire Hydrant										
Inspect & Test Fire Hydrant	Each	Staff Plumber	Staff	1.0000	.00	0	None	1	PM	No
Replace Fire Hydrant	Each	Plumber	Contract	27.1500	1,610.72	0	None	50	Major	Yes
Pipe & Fittings, 2" Copper										
Resolder Joint, Pipe & Fittings, 2" Copper	K Ln Ft	Plumber	Contract	9.6800	10.05	4	le, Hydraulic, 3/4 CY	10	Major	No
Replace 10' Section, Pipe & Fittings, 2" Copper	K Ln Ft	Plumber	Contract	7.9000	98.35	4	le, Hydraulic, 3/4 CY	20	Major	No
Replace Pipe & Fittings, 2" Copper	K Ln Ft	Plumber	Contract	421.7800	9,835.00	32	le, Hydraulic, 3/4 CY	25	Major	Yes
Pipe & Fittings, 4" Copper										
Resolder Joint, Pipe & Fittings, 4" Copper	K Ln Ft	Plumber	Contract	9.6800	10.05	4	le, Hydraulic, 3/4 CY	10	Major	No
Replace 10' Section, Pipe & Fittings, 4" Copper	K Ln Ft	Plumber	Contract	12.2100	588.20	4	le, Hydraulic, 3/4 CY	20	Major	No
Replace Pipe & Fittings, 4" Copper	K Ln Ft	Plumber	Contract	852.7800	58,820.00	32	le, Hydraulic, 3/4 CY	25	Major	Yes
Pipe & Fittings, 6" Copper										
Resolder Joint, Pipe & Fittings, 6" Copper	K Ln Ft	Plumber	Contract	9.6800	10.05	4	le, Hydraulic, 3/4 CY	10	Major	No
Replace 10' Section, Pipe & Fittings, 6" Copper	K Ln Ft	Plumber	Contract	16.1650	1,863.90	4	le, Hydraulic, 3/4 CY	20	Major	No
Replace Pipe & Fittings, 6" Copper	K Ln Ft	Plumber	Contract	1248.2800	186,390.00	32	le, Hydraulic, 3/4 CY	25	Major	Yes
Pipe & Fittings, 6" Ductile Iron										
Replace 10' Section, Pipe & Fittings, 6" Ductile Iron	K Ln Ft	Plumber	Contract	6.5000	519.00	4	le, Hydraulic, 3/4 CY	12	Major	No
Replace Pipe & Fittings, 6" Ductile Iron	K Ln Ft	Plumber	Contract	281.7800	51,900.00	32	le, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 10" Ductile Iron										
Replace 10' Section, Pipe & Fittings, 10" Ductile Iron	K Ln Ft	Plumber	Contract	7.5000	933.00	4	le, Hydraulic, 3/4 CY	12	Major	No
Replace Pipe & Fittings, 10" Ductile Iron	K Ln Ft	Plumber	Contract	381.7800	22,000.00	32	le, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 14" Ductile Iron										
Replace 10' Section, Pipe & Fittings, 14" Ductile Iron	K Ln Ft	Plumber	Contract	8.0000	1,486.00	4	le, Hydraulic, 3/4 CY	12	Major	No
Replace Pipe & Fittings, 14" Ductile Iron	K Ln Ft	Plumber	Contract	431.7800	148,600.00	32	le, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 18" Ductile Iron										
Replace 10' Section, Pipe & Fittings, 18" Ductile Iron	K Ln Ft	Plumber	Contract	28.0000	2,000.00	4	le, Hydraulic, 3/4 CY	12	Major	No
Replace Pipe & Fittings, 18" Ductile Iron	K Ln Ft	Plumber	Contract	2431.7800	200,000.00	32	le, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 24" Ductile Iron										
Replace 10' Section, Pipe & Fittings, 24" Ductile Iron	K Ln Ft	Plumber	Contract	28.0000	2,843.00	4	le, Hydraulic, 3/4 CY	12	Major	No
Replace Pipe & Fittings, 24" Ductile Iron	K Ln Ft	Plumber	Contract	2431.7800	284,300.00	32	le, Hydraulic, 3/4 CY	75	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
G3010 Water Supply										
Pipe & Fittings, 2" PVC										
Replace 10' Section, Pipe & Fittings, 2" DWV PVC	K Ln Ft	Plumber	Contract	7.7987	23.42	4	ie, Hydraulic, 3/4 CY	10	Major	No
Replace Pipe & Fittings, 2" DWV PVC	K Ln Ft	Plumber	Contract	411.6490	2,342.00	32	ie, Hydraulic, 3/4 CY	30	Major	Yes
Pipe & Fittings, 4" PVC										
Replace 10' Section, Pipe & Fittings, 4" DWV PVC	K Ln Ft	Plumber	Contract	8.4178	48.40	4	ie, Hydraulic, 3/4 CY	10	Major	No
Replace Pipe & Fittings, 4" DWV PVC	K Ln Ft	Plumber	Contract	473.5590	4,840.00	32	ie, Hydraulic, 3/4 CY	30	Major	Yes
Pipe & Fittings, 6" PVC										
Replace 10' Section, Pipe & Fittings, 6" DWV PVC	K Ln Ft	Plumber	Contract	9.3726	85.10	4	ie, Hydraulic, 3/4 CY	10	Major	No
Replace Pipe & Fittings, 6" DWV PVC	K Ln Ft	Plumber	Contract	569.0390	8,510.00	32	ie, Hydraulic, 3/4 CY	30	Major	Yes
Pipe & Fittings, 8" PVC										
Replace 10' Section, Pipe & Fittings, 8" DWV PVC	K Ln Ft	Plumber	Contract	10.4500	114.30	4	ie, Hydraulic, 3/4 CY	10	Major	No
Replace Pipe & Fittings, 8" DWV PVC	K Ln Ft	Plumber	Contract	676.7800	11,430.00	32	ie, Hydraulic, 3/4 CY	30	Major	Yes
Pipe & Fittings, 8" Steel										
Replace 10' Section, Pipe & Fittings, 8" Steel	K Ln Ft	Plumber	Contract	8.4499	342.60	4	ie, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 8" Steel	K Ln Ft	Plumber	Contract	7.4700	14.80	4	ie, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 8" Steel	K Ln Ft	Plumber	Contract	476.7700	34,260.00	32	ie, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 10" Steel										
Replace 10' Section, Pipe & Fittings, 10" Steel	K Ln Ft	Plumber	Contract	8.8800	485.70	4	ie, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 10" Steel	K Ln Ft	Plumber	Contract	7.4660	14.80	4	ie, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 10" Steel	K Ln Ft	Plumber	Contract	519.7800	48,570.00	32	ie, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 12" Steel										
Replace 10' Section, Pipe & Fittings, 12" Steel	K Ln Ft	Plumber	Contract	9.3500	594.70	4	ie, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 12" Steel	K Ln Ft	Plumber	Contract	7.4660	14.80	4	ie, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 12" Steel	K Ln Ft	Plumber	Contract	566.7800	59,470.00	32	ie, Hydraulic, 3/4 CY	75	Major	Yes
Valve, Non-Drain, 24"										
Lubricate, Repack Gland, Valve, Non-Drain, 24"	Each	Staff Plumber	Staff	1.1500	11.42	0	None	1	PM	No
Replace Valve, Non-Drain, 24"	Each	Plumber	Contract	17.5800	3,470.97	0	None	20	Major	Yes
Water Storage Tank, 20,000 Gal.										
Maintain Water Storage Tank, 20,000 Gal.	Each	Staff Plumber	Staff	1.5600	.00	0	None	1	PM	No
Replace Water Storage Tank, 20,000 Gal.	Each	Crane and Forklift Team	Contract	92.0100	25,669.00	4	2T Lift/45T Crane	50	Major	Yes
Water Storage Tank, 100,000 Gal.										
Maintain Water Storage Tank, 100,000 Gal.	Each	Staff Plumber	Staff	2.9900	.00	0	None	1	PM	No
Replace Water Storage Tank, 100,000 Gal.	Each	Crane and Forklift Team	Contract	460.0100	128,345.00	4	2T Lift/45T Crane	50	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
G3010 Water Supply										
Water Storage Tank, 250,000 Gal.										
Maintain Water Storage Tank, 250,000 Gal.	Each	Staff Plumber	Staff	4.4900	.00	0	None	1	PM	No
Replace Water Storage Tank, 250,000 Gal.	Each	Crane and Forklift Team	Contract	1149.9900	173,878.10	4	2T Lift/45T Crane	50	Major	Yes
G3020 Sanitary Sewer										
Pipe, Drain & Sewage, 6"-8" Vitrified Clay										
Replace Pipe, Drain & Sewage, 6"-8" Vitrified Clay	K Ln Ft	Plumber	Contract	191.7800	3,475.55	32	Re, Hydraulic, 3/4 CY	25	Major	Yes
Pipe, Drain & Sewage, 10"-12" Vitrified Clay										
Replace Pipe, Drain & Sewage, 10"-12" Vitrified Clay	K Ln Ft	Plumber	Contract	221.7800	17,377.75	32	Re, Hydraulic, 3/4 CY	25	Major	Yes
Pipe, Drain & Sewage, 15"-18" Vitrified Clay										
Replace Pipe, Drain & Sewage, 15"-18" Vitrified Clay	K Ln Ft	Plumber	Contract	281.7800	7,530.36	32	Re, Hydraulic, 3/4 CY	25	Major	Yes
Pipe & Fittings, 10" Cast Iron										
Replace 10' Section, Pipe & Fittings, 10" Cast Iron	K Ln Ft	Plumber	Contract	9.9300	658.10	4	Re, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 10" Cast Iron	K Ln Ft	Plumber	Contract	6.6000	16.95	4	Re, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 10" Cast Iron	K Ln Ft	Plumber	Contract	624.7800	65,810.00	32	Re, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 12" Cast Iron										
Replace 10' Section, Pipe & Fittings, 12" Cast Iron	K Ln Ft	Plumber	Contract	10.6700	956.10	4	Re, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 12" Cast Iron	K Ln Ft	Plumber	Contract	6.6000	16.95	4	Re, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 12" Cast Iron	K Ln Ft	Plumber	Contract	698.7800	95,610.00	32	Re, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 18" Cast Iron										
Replace 10' Section, Pipe & Fittings, 18" Cast Iron	K Ln Ft	Plumber	Contract	12.2650	1,397.20	4	Re, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 18" Cast Iron	K Ln Ft	Plumber	Contract	6.6000	16.95	4	Re, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 18" Cast Iron	K Ln Ft	Plumber	Contract	858.2800	139,720.00	32	Re, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 4" PVC										
Replace 10' Section, Pipe & Fittings, 4" DWV PVC	K Ln Ft	Plumber	Contract	8.4178	48.40	4	Re, Hydraulic, 3/4 CY	10	Major	No
Replace Pipe & Fittings, 4" DWV PVC	K Ln Ft	Plumber	Contract	473.5590	4,840.00	32	Re, Hydraulic, 3/4 CY	30	Major	Yes
Pipe & Fittings, 6" PVC										
Replace 10' Section, Pipe & Fittings, 6" DWV PVC	K Ln Ft	Plumber	Contract	9.3726	85.10	4	Re, Hydraulic, 3/4 CY	10	Major	No
Replace Pipe & Fittings, 6" DWV PVC	K Ln Ft	Plumber	Contract	569.0390	8,510.00	32	Re, Hydraulic, 3/4 CY	30	Major	Yes
Pipe & Fittings, 8" PVC										
Replace 10' Section, Pipe & Fittings, 8" DWV PVC	K Ln Ft	Plumber	Contract	10.4500	114.30	4	Re, Hydraulic, 3/4 CY	10	Major	No
Replace Pipe & Fittings, 8" DWV PVC	K Ln Ft	Plumber	Contract	676.7800	11,430.00	32	Re, Hydraulic, 3/4 CY	30	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.	Task Type	Repl. Task
G3030 Storm Sewer										
Catch Basin, 12"										
Maintain Catch Basin, 12"	Each	Staff Plumber	Staff	1.0000	.00	0	None	1	PM	No
Raise Catch Basin Frame and Cover, 12"	Each	Plumber	Contract	6.1300	22.78	0	None	10	Major	Yes
Pipe & Fittings, 10" Cast Iron										
Replace 10' Section, Pipe & Fittings, 10" Cast Iron	K Ln Ft	Plumber	Contract	9.9300	658.10	4	ie, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 10" Cast Iron	K Ln Ft	Plumber	Contract	6.6000	16.95	4	ie, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 10" Cast Iron	K Ln Ft	Plumber	Contract	624.7800	65,810.00	32	ie, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 12" Cast Iron										
Replace 10' Section, Pipe & Fittings, 12" Cast Iron	K Ln Ft	Plumber	Contract	10.6700	956.10	4	ie, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 12" Cast Iron	K Ln Ft	Plumber	Contract	6.6000	16.95	4	ie, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 12" Cast Iron	K Ln Ft	Plumber	Contract	698.7800	95,610.00	32	ie, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 18" Cast Iron										
Replace 10' Section, Pipe & Fittings, 18" Cast Iron	K Ln Ft	Plumber	Contract	12.2650	1,397.20	4	ie, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 18" Cast Iron	K Ln Ft	Plumber	Contract	6.6000	16.95	4	ie, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 18" Cast Iron	K Ln Ft	Plumber	Contract	858.2800	139,720.00	32	ie, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 15" Concrete										
Replace 10' Section, Pipe & Fittings, 15" Concrete	K Ln Ft	Plumber	Contract	16.0000	213.63	4	ie, Hydraulic, 3/4 CY	12	Major	No
Replace Pipe & Fittings, 15" Concrete	K Ln Ft	Plumber	Contract	1231.7800	21,362.54	32	ie, Hydraulic, 3/4 CY	75	Major	Yes
G3040 Heating Distribution										
Pipe & Fittings, 2" Steel										
Replace 10' Section, Pipe & Fittings, 2" Steel	K Ln Ft	HVAC Technician	Contract	6.3192	44.53	4	ie, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 2" Steel	K Ln Ft	HVAC Technician	Contract	5.6540	4.84	4	ie, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 2" Steel	K Ln Ft	HVAC Technician	Contract	263.6980	4,740.00	32	ie, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 4" Steel										
Replace 10' Section, Pipe & Fittings, 4" Steel	K Ln Ft	HVAC Technician	Contract	7.4756	117.90	4	ie, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 4" Steel	K Ln Ft	HVAC Technician	Contract	6.6000	9.00	4	ie, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 4" Steel	K Ln Ft	HVAC Technician	Contract	379.3390	11,790.00	32	ie, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 6" Steel										
Replace 10' Section, Pipe & Fittings, 6" Steel	K Ln Ft	HVAC Technician	Contract	7.9000	201.70	4	ie, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 6" Steel	K Ln Ft	HVAC Technician	Contract	7.4660	14.80	4	ie, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 6" Steel	K Ln Ft	HVAC Technician	Contract	421.7800	20,170.00	32	ie, Hydraulic, 3/4 CY	75	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
G3040 Heating Distribution										
Pipe & Fittings, 8" Steel										
Replace 10' Section, Pipe & Fittings, 8" Steel	K Ln Ft	HVAC Technician	Contract	8.4499	301.50	4	re, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 8" Steel	K Ln Ft	HVAC Technician	Contract	7.4700	14.80	4	re, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 8" Steel	K Ln Ft	HVAC Technician	Contract	476.7700	34,260.00	32	re, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 10" Steel										
Replace 10' Section, Pipe & Fittings, 10" Steel	K Ln Ft	HVAC Technician	Contract	8.8800	425.80	4	re, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 10" Steel	K Ln Ft	HVAC Technician	Contract	7.4660	14.80	4	re, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 10" Steel	K Ln Ft	HVAC Technician	Contract	519.7800	48,570.00	32	re, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 12" Steel										
Replace 10' Section, Pipe & Fittings, 12" Steel	K Ln Ft	HVAC Technician	Contract	9.3500	556.30	4	re, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 12" Steel	K Ln Ft	HVAC Technician	Contract	7.4660	14.80	4	re, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 12" Steel	K Ln Ft	HVAC Technician	Contract	566.7800	59,470.00	32	re, Hydraulic, 3/4 CY	75	Major	Yes
G3050 Cooling Distribution										
Pipe & Fittings, 2" Steel										
Replace 10' Section, Pipe & Fittings, 2" Steel	K Ln Ft	HVAC Technician	Contract	6.3192	44.53	4	re, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 2" Steel	K Ln Ft	HVAC Technician	Contract	5.6540	4.84	4	re, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 2" Steel	K Ln Ft	HVAC Technician	Contract	263.6980	4,740.00	32	re, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 4" Steel										
Replace 10' Section, Pipe & Fittings, 4" Steel	K Ln Ft	HVAC Technician	Contract	7.4756	117.90	4	re, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 4" Steel	K Ln Ft	HVAC Technician	Contract	6.6000	9.00	4	re, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 4" Steel	K Ln Ft	HVAC Technician	Contract	379.3390	11,790.00	32	re, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 6" Steel										
Replace 10' Section, Pipe & Fittings, 6" Steel	K Ln Ft	HVAC Technician	Contract	7.9000	201.70	4	re, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 6" Steel	K Ln Ft	HVAC Technician	Contract	7.4660	14.80	4	re, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 6" Steel	K Ln Ft	HVAC Technician	Contract	421.7800	20,170.00	32	re, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 8" Steel										
Replace 10' Section, Pipe & Fittings, 8" Steel	K Ln Ft	HVAC Technician	Contract	8.4499	301.50	4	re, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 8" Steel	K Ln Ft	HVAC Technician	Contract	7.4700	14.80	4	re, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 8" Steel	K Ln Ft	HVAC Technician	Contract	476.7700	34,260.00	32	re, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 10" Steel										
Replace 10' Section, Pipe & Fittings, 10" Steel	K Ln Ft	HVAC Technician	Contract	8.8800	425.80	4	re, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 10" Steel	K Ln Ft	HVAC Technician	Contract	7.4660	14.80	4	re, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 10" Steel	K Ln Ft	HVAC Technician	Contract	519.7800	48,570.00	32	re, Hydraulic, 3/4 CY	75	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
G3050 Cooling Distribution										
Pipe & Fittings, 12" Steel										
Replace 10' Section, Pipe & Fittings, 12" Steel	K Ln Ft	HVAC Technician	Contract	9.3500	556.30	4	re, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 12" Steel	K Ln Ft	HVAC Technician	Contract	7.4660	14.80	4	re, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 12" Steel	K Ln Ft	HVAC Technician	Contract	566.7800	59,470.00	32	re, Hydraulic, 3/4 CY	75	Major	Yes
G3060 Fuel Distribution										
Pipe & Fittings, 8" Copper										
Resolder Joint, Pipe & Fittings, 8" Copper	K Ln Ft	HVAC Technician	Contract	5.6800	10.05	0	None	10	Major	No
Replace 10' Section, Pipe & Fittings, 8" Copper	K Ln Ft	HVAC Technician	Contract	20.1200	3,490.50	4	re, Hydraulic, 3/4 CY	20	Major	No
Replace Pipe & Fittings, 8" Copper	K Ln Ft	HVAC Technician	Contract	1643.7800	349,050.00	32	re, Hydraulic, 3/4 CY	25	Major	Yes
Pipe & Fittings, 2" Steel										
Replace 10' Section, Pipe & Fittings, 2" Steel	K Ln Ft	HVAC Technician	Contract	6.3192	44.53	4	re, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 2" Steel	K Ln Ft	HVAC Technician	Contract	5.6540	4.84	4	re, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 2" Steel	K Ln Ft	HVAC Technician	Contract	263.6980	4,740.00	32	re, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 4" Steel										
Replace 10' Section, Pipe & Fittings, 4" Steel	K Ln Ft	HVAC Technician	Contract	7.4756	117.90	4	re, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 4" Steel	K Ln Ft	HVAC Technician	Contract	6.6000	9.00	4	re, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 4" Steel	K Ln Ft	HVAC Technician	Contract	379.3390	11,790.00	32	re, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 6" Steel										
Replace 10' Section, Pipe & Fittings, 6" Steel	K Ln Ft	HVAC Technician	Contract	7.9000	201.70	4	re, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 6" Steel	K Ln Ft	HVAC Technician	Contract	7.4660	14.80	4	re, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 6" Steel	K Ln Ft	HVAC Technician	Contract	421.7800	20,170.00	32	re, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 8" Steel										
Replace 10' Section, Pipe & Fittings, 8" Steel	K Ln Ft	HVAC Technician	Contract	8.4499	301.50	4	re, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 8" Steel	K Ln Ft	HVAC Technician	Contract	7.4700	14.80	4	re, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 8" Steel	K Ln Ft	HVAC Technician	Contract	476.7700	34,260.00	32	re, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 10" Steel										
Replace 10' Section, Pipe & Fittings, 10" Steel	K Ln Ft	HVAC Technician	Contract	8.8800	425.80	4	re, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 10" Steel	K Ln Ft	HVAC Technician	Contract	7.4660	14.80	4	re, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 10" Steel	K Ln Ft	HVAC Technician	Contract	519.7800	48,570.00	32	re, Hydraulic, 3/4 CY	75	Major	Yes
Pipe & Fittings, 12" Steel										
Replace 10' Section, Pipe & Fittings, 12" Steel	K Ln Ft	HVAC Technician	Contract	9.3500	556.30	4	re, Hydraulic, 3/4 CY	12	Major	No
Install New Gasket & Bolts, Pipe & Fittings, 12" Steel	K Ln Ft	HVAC Technician	Contract	7.4660	14.80	4	re, Hydraulic, 3/4 CY	25	Major	No
Replace Pipe & Fittings, 12" Steel	K Ln Ft	HVAC Technician	Contract	566.7800	59,470.00	32	re, Hydraulic, 3/4 CY	75	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.

Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.1 Components and M&R Tasks

Uniformat / Component / M&R Task	Units	Trade	Labor Type	Labor Hours	Material Costs	Equip Hours	Equipment Type	Freq Yrs.*	Task Type	Repl. Task
G40 Site Electrical Utilities										
G4020 Site Lighting										
Pole Light, Exterior, 400 w										
Replace Lamp, Ballast, & Fixtures, Pole Light, Exterior, 400 w	Each	Electrician	Contract	13.3300	788.00	0	None	10	Major	No
Replace Pole Light, Exterior, 400 w	Each	Electrician	Contract	40.6100	3,057.50	0	None	20	Major	Yes

*Task frequency for Washington D.C. See section 5.2 for alternative frequencies for HVAC systems.
Components ordered by UNIFORMAT II Classifications. Sources: Discussed in Chapter 6.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

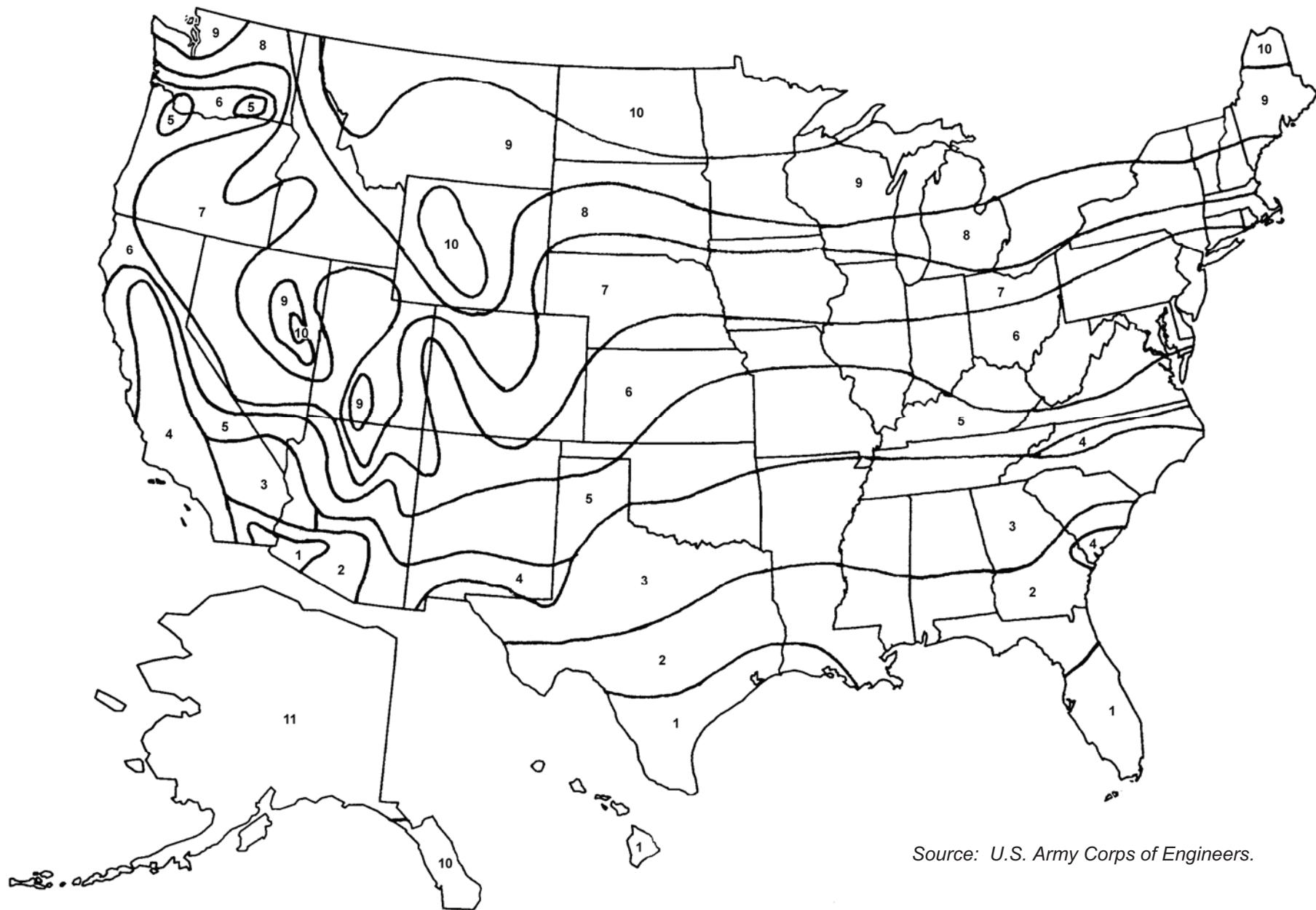
The frequency of M&R tasks for HVAC components is dependent on local climate conditions. These conditions are summarized in terms of 11 climate zones. Climate zone designations for 368 U.S., Canadian, and other international areas are listed in Table 5-1. Broad climate zones for the U.S. are shown in Figure 5-1.

Table 5-1
Areas by Climate Zone

City, State	Zone	Columbia, SC	4	Jersey City, NJ	6	Owensboro, KY	5	Toledo, OH	7
Aberdeen, SD	9	Columbus, GA	3	Juneau, AK	10	Oxnard, CA	4	Topeka, KS	6
Abilene, TX	3	Columbus, OH	6	Kahului, HI	1	Paducah KY	5	Trenton, NJ	6
Akron, OH	7	Concord, NH	8	Kalamazoo, MI	8	Parkersburg, WV	6	Tucson, AZ	2
Alamogordo, NM	4	Concordia, KS	6	Kalispell, MT	9	Pendleton, OR	6	Tulsa, OK	5
Alamosa, CO	9	Corpus Christi, TX	1	Kansas City, MO	6	Pensacola, FL	2	Tupelo, MS	4
Albany, NY	8	Cumberland, MD	6	Key West, FL	1	Peoria, IL	7	Tuscaloosa, AL	3
Albuquerque, NM	5	Dallas, TX	3	King Salmon, AK	11	Philadelphia, PA	6	Unalakleet, AK	11
Allentown, PA	7	Danbury, CT	6	Knoxville, TN	5	Phoenix, AZ	2	Utica, NY	8
Alpena, MI	9	Davenport, IA	7	Kodiak, AK	9	Pierre, SD	8	Valdez, AK	10
Altus, OK	3	Dayton, OH	6	Kokomo, IN	6	Pittsburgh, PA	6	Valentine, NE	8
Amarillo, TX	5	Daytona Beach, FL	1	Kotzebue, AK	11	Pocatello, ID	8	Vero Beach, FL	1
Anacortes, WA	9	Del Rio, TX	2	La Crosse, WI	8	Port Arthur, TX	2	Victoria, TX	2
Anaheim, CA	4	Denver, CO	7	Lake Charles, LA	2	Portland, ME	8	Virginia Beach, VA	5
Anchorage, AK	11	Des Moines, IA	7	Lander, WY	8	Portland, OR	5	Waco, TX	2
Ann Arbor, MI	8	Detroit, MI	8	Lansing, MI	8	Providence, RI	7	Wallops Island, VA	5
Annapolis, MD	6	Dodge City, KS	6	Las Cruces, NM	3	Pueblo, CO	6	Washington, DC	6
Annette, AK	8	Dover, DE	6	Las Vegas, NV	3	Quillayute, WA	7	Waterbury, CT	6
Apalachicola, FL	2	Dubuque, IA	8	Lawton, OK	3	Raleigh, NC	5	Waterloo, IA	8
Asheville, NC	6	Duluth, MN	10	Lewiston, ID	6	Raleigh-Durham, NC	4	Watertown, NY	8
Astoria, OR	7	Eau Claire, WI	9	Lewiston, ME	8	Rapid City, SD	8	West Palm Beach, FL	1
Athens, GA	4	El Paso, TX	3	Lexington, KY	6	Reading, PA	6	Wichita Falls, TX	3
Atlanta, GA	3	Elkins, WV	7	Lihue, HI	1	Redding, CA	4	Wichita, KS	5
Atlantic City, NJ	6	Elko, NV	8	Lincoln, NE	7	Reno, NV	7	Williamsport, PA	7
Augusta, GA	4	Ely, NV	8	Little Rock, AR	3	Richland, WA	5	Williston, ND	9
Augusta, ME	9	Erie, PA	7	Los Angeles, CA	4	Richmond, VA	5	Wilmington, DE	6
Austin, TX	2	Eugene, OR	6	Louisville, KY	6	Riverside, CA	4	Wilmington, NC	4
Avoca, PA	7	Eureka, CA	6	Lowell, MA	7	Roanoke, VA	6	Winnemucca, NV	7
Bakersfield, CA	4	Evansville, IN	5	Lubbock, TX	5	Rochester, MN	8	Winslow, AZ	6
Baltimore, MD	6	Fairbanks, AK	11	Lynchburg, VA	6	Rochester, NY	8	Winston-Salem, NC	6
Barrow, AK	11	Fall River, MA	11	Macon, GA	3	Rockford, IL	8	Worcester, MA	8
Baton Rouge, LA	2	Fargo, ND	9	Madison, WI	8	Roswell, NM	4	Yakima, WA	7
Battle Creek, MI	8	Fayetteville, AR	5	Manchester, NH	7	Rutland, VT	8	Yakutat, AK	10
Beaufort, SC	1	Flagstaff, AZ	8	Mansfield, OH	7	Sacramento, CA	4	Yonkers, NY	6
Beaumont, TX	1	Flint, MI	8	Marquette, MI	9	Saginaw, MI	8	Youngstown, OH	7
Beckley, WV	7	Fort Lauderdale, FL	1	McGrath, AK	11	Salem, OR	6	Yuma, AZ	1
Bethel, AK	11	Fort Myers, FL	1	Medford, OR	6	Salt Lake City, UT	7		
Bettles, AK	11	Fort Smith, AR	4	Memphis, TN	3	San Angelo, TX	3	Canadian Cities	
Big Delta, AK	11	Fort Wayne, IN	7	Meridian, MS	3	San Antonio, TX	2		
Billings, MT	8	Fort Worth, TX	3	Miami, FL	1	San Diego, CA	4	Calgary, AB	10
Biloxi, MS	2	Frankfort, KY	6	Midland-Odessa, TX	4	San Francisco, CA	5	Edmonton, AB	11
Binghamton, NY	8	Fresno, CA	4	Milford, UT	7	San Jose, CA	5	Halifax, NS	9
Birmingham, AL	3	Gainesville, FL	2	Milwaukee, WI	8	San Juan, PR	1	Hamilton, ON	8
Bishop, CA	5	Galveston, TX	2	Minneapolis, MN	9	Santa Barbara, CA	4	London, ON	8
Bismarck, ND	9	Gary, IN	7	Missoula, MT	9	Santa Maria, CA	5	Montreal, QC	9
Blue Hill, MA	7	Glasgow, MT	9	Mobile, AL	2	Sante Fe, NM	6	Ottawa, QC	9
Boise, ID	7	Goodland, KS	7	Moline, IL	7	Sault Ste. Marie, MI	10	Quebec, QC	10
Boston, MA	7	Grand Island, NE	7	Montgomery, AL	3	Savannah, GA	3	Regina, SK	10
Boulder, CO	8	Grand Junction, CO	6	Montpelier, VT	9	Scottsbluff, NE	7	St. John's, NL	10
Bowling Green, KY	5	Grand Rapids, MI	8	Morriston, NJ	6	Scranton, PA	6	Toronto, ON	7
Bridgeport, CT	7	Great Falls, MT	8	Mount Shasta, CA	7	Seattle, WA	8	Vancouver, B.C.	7
Bristol, TN	6	Green Bay, WI	9	Mt. Washington, NH	11	Sexton Summit, OR	8	Victoria, B.C.	9
Brockton, MA	7	Greensboro, NC	5	Muncie, IN	6	Sheridan, WY	8	Winnipeg, MB	11
Brownsville, TX	1	Greenville, SC	4	Muskegon, MI	8	Shreveport, LA	3		
Buffalo, NY	8	Gulkana, AK	11	Nashville, TN	5	Sioux City, IA	7	International Cities	
Burlington, VT	9	Hagatna, GU	1	New Brunswick, NJ	6	Sioux Falls, SD	8		
Burns, OR	9	Hampton, VA	5	New Haven, CT	7	South Bend, IN	7	Beijing, CHN	6
Camden, NJ	6	Harrisburg, PA	6	New Orleans, LA	2	Spokane, WA	8	Berlin, DEU	8
Cape Hatteras, NC	4	Hartford, CT	7	New York, NY	6	Springfield, IL	6	Buenos Aires, ARG	4
Caribou, ME	10	Helena, MT	9	Newark, NJ	6	Springfield, MA	7	Cairo, EGY	2
Carson City NV	7	Hilo, HI	1	Newport News, VA	5	Springfield, MO	6	Istanbul, TUR	5
Casper, WY	8	Homer, AK	10	Nome, AK	11	Springfield, OH	6	Johannesburg, ZAF	4
Cedar Rapids, IA	6	Honolulu, HI	1	Norfolk, NE	7	St. Cloud, MN	9	Karachi, PAK	1
Charleston, SC	3	Houghton Lake, MI	9	Norfolk, VA	5	St. George, UT	6	London, GBR	7
Charleston, WV	6	Houston, TX	2	North Little Rock, AR	4	St. Louis, MO	5	Mexico City, MEX	4
Charlotte, NC	4	Huntington, WV	6	North Platte, NE	8	St. Paul Island, AK	11	Moscow, RUS	9
Chattanooga, TN	5	Huntsville, AL	3	Norwalk, CT	6	St. Paul, MN	9	Mumbai, IND	1
Cheyenne, WY	8	Huron, SD	8	Norwich, CT	7	Stamford, CT	6	Paris, FRA	7
Chicago, IL	7	Indianapolis, IN	6	Oak Ridge, TN	5	Stockton, CA	4	Riyadh, SAU	1
Cincinnati, OH	6	International Falls, MN	11	Oakland, CA	5	Syracuse, NY	8	São Paulo, BRA	3
Clayton, NM	6	Islip, NY	7	Ogden, UT	7	Tacoma, WA	8	Seoul, KOR	6
Cleveland, OH	7	Jackson, KY	6	Oklahoma City, OK	5	Talkeetna, AK	11	Shanghai, CHN	4
Cold Bay, AK	10	Jackson, MS	3	Olympia, WA	8	Tallahassee, FL	3	Sydney, AUS	1
Colorado Springs, CO	7	Jacksonville, FL	2	Omaha, NE	7	Tampa, FL	1	Tokyo, JPN	4
Columbia, MO	6	Jefferson City, MO	5	Orlando, FL	1	Terre Haute, IN	6	Zurich, CHE	8

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Figure 5-1
U.S. HVAC Climate Zones



Source: U.S. Army Corps of Engineers.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D30 HVAC											
D3010 Energy Supply											
Fluid Storage Tank, 5,000 Gal.											
Maintain Storage Tank, Fluid, 5,000 Gal.	1	1	1	1	1	1	1	1	1	1	1
Replace Storage Tank, Fluid, 5,000 Gal.	>50	>50	40	37	32	30	26	25	23	22	22
Oil Storage Tank, 15,000 Gal.											
Maintain Oil Storage Tank, 15,000 Gal.	1	1	1	1	1	1	1	1	1	1	1
Replace Oil Storage Tank, 15,000 Gal.	>50	>50	40	37	32	30	26	25	23	22	22
Fuel Oil Day Tank, 100 Gal.											
Maintain Fuel Oil Day Tank, 100 Gal.	1	1	1	1	1	1	1	1	1	1	1
Replace Fuel Oil Day Tank, 100 Gal.	>50	>50	40	37	32	30	26	25	23	22	22
Fuel Oil Pump, 1/2 HP											
Maintain Fuel Oil Pump, 1/2 HP	1	1	1	1	1	1	1	1	1	1	1
Repair Fuel Oil Pump, 1/2 HP	24	19	13	12	11	10	9	8	8	7	7
Replace Fuel Oil Pump, 1/2 HP	38	28	20	19	16	15	13	13	12	11	11
Fuel Oil Pump, 1-1/2 HP											
Maintain Fuel Oil Pump, 1-1/2 HP	1	1	1	1	1	1	1	1	1	1	1
Repair Fuel Oil Pump, 1-1/2 HP	24	19	13	12	11	10	9	8	8	7	7
Replace Fuel Oil Pump, 1-1/2 HP	38	28	20	19	16	15	13	13	12	11	11
Fuel Oil Pump, 3 HP											
Maintain Fuel Oil Pump, 3 HP	1	1	1	1	1	1	1	1	1	1	1
Repair Fuel Oil Pump, 3 HP	24	19	13	12	11	10	9	8	8	7	7
Replace Fuel Oil Pump, 3 HP	38	28	20	19	16	15	13	13	12	11	11
Fuel Oil Pump, 5 HP											
Maintain Fuel Oil Pump, 5 HP	1	1	1	1	1	1	1	1	1	1	1
Repair Fuel Oil Pump, 5 HP	24	19	13	12	11	10	9	8	8	7	7
Replace Fuel Oil Pump, 5 HP	38	28	20	19	16	15	13	13	12	11	11
Fuel Oil Pump, 10 HP											
Maintain Fuel Oil Pump, 10 HP	1	1	1	1	1	1	1	1	1	1	1
Repair Fuel Oil Pump, 10 HP	24	19	13	12	11	10	9	8	8	7	7
Replace Fuel Oil Pump, 10 HP	38	28	20	19	16	15	13	13	12	11	11
Generator Day Tank, 65 Gal.											
Maintain Generator Day Tank, 65 Gal.	1	1	1	1	1	1	1	1	1	1	1
Replace Generator Day Tank, 65 Gal.	>50	>50	40	37	32	30	26	25	23	22	22

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3010 Energy Supply											
Generator Day Tank, 275 Gal.											
Maintain Generator Day Tank, 275 Gal.	1	1	1	1	1	1	1	1	1	1	1
Replace Generator Day Tank, 275 Gal.	>50	>50	40	37	32	30	26	25	23	22	22
Leak Detection, Panel & Float Assembly											
Replace Leak Detection, Panel & Float Assembly	30	30	30	30	30	30	30	30	30	30	30
Oil Storage Tank, 275 Gal.											
Maintain Oil Storage Tank, 275 Gal.	1	1	1	1	1	1	1	1	1	1	1
Replace Oil Storage Tank, 275 Gal.	>50	>50	40	37	32	30	26	25	23	22	22
Oil Storage Tank, 25,000 Gal.											
Maintain Oil Storage Tank, 25,000 Gal.	1	1	1	1	1	1	1	1	1	1	1
Replace Oil Storage Tank, 25,000 Gal.	>50	>50	40	37	32	30	26	25	23	22	22
Oil Storage Tank, 75,000 Gal.											
Maintain Oil Storage Tank, 75,000 Gal.	1	1	1	1	1	1	1	1	1	1	1
Replace Oil Storage Tank, 75,000 Gal.	>50	>50	40	37	32	30	26	25	23	22	22
Oil Storage Tank, 250,000 Gal.											
Maintain Oil Storage Tank, 250,000 Gal.	1	1	1	1	1	1	1	1	1	1	1
Replace Oil Storage Tank, 250,000 Gal.	>50	>50	40	37	32	30	26	25	23	22	22
Oil Storage Tank, Fiberglass, 500 Gal.											
Maintain Oil Storage Tank, Fiberglass, 500 Gal.	1	1	1	1	1	1	1	1	1	1	1
Replace Oil Storage Tank, Fiberglass, 500 Gal.	>50	>50	40	37	32	30	26	25	23	22	22
Oil Storage Tank, Steel, 1,500 Gal.											
Maintain Oil Storage Tank Steel, 1,500 Gal.	1	1	1	1	1	1	1	1	1	1	1
Replace Oil Storage Tank Steel, 1,500 Gal.	>50	>50	40	37	32	30	26	25	23	22	22
Pipe & Fittings, 1/2" Copper, Fuel Oil											
Resolder Joint, Pipe & Fittings, 2" Copper, Fuel Oil	10	10	10	10	10	10	10	10	10	10	10
Replace 10' Section, Pipe & Fittings, 1/2" Copper, Fuel Oil	20	20	20	20	20	20	20	20	20	20	20
Replace Pipe & Fittings, 1/2" Copper, Fuel Oil (20% of Pipe)	25	25	25	25	25	25	25	25	25	25	25
Pipe & Fittings, 1" Copper, Fuel Oil											
Resolder Joint, Pipe & Fittings, 1" Copper, Fuel Oil	10	10	10	10	10	10	10	10	10	10	10
Replace 10' Section, Pipe & Fittings, 1" Copper, Fuel Oil	20	20	20	20	20	20	20	20	20	20	20
Replace Pipe & Fittings, 1" Copper, Fuel Oil (20% of Pipe)	25	25	25	25	25	25	25	25	25	25	25

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3010 Energy Supply											
Pipe & Fittings, 2" Copper, Fuel Oil											
Resolder Joint, Pipe & Fittings, 2" Copper, Fuel Oil	10	10	10	10	10	10	10	10	10	10	10
Replace 10' Section, Pipe & Fittings, 2" Copper, Fuel Oil	20	20	20	20	20	20	20	20	20	20	20
Replace Pipe & Fittings, 2" Copper, Fuel Oil (20% of Pipe)	25	25	25	25	25	25	25	25	25	25	25
Pipe & Fittings, 2" Steel, Gas											
Replace 10' Section, Pipe & Fittings, 2" Steel, Gas	12	12	12	12	12	12	12	12	12	12	12
Install New Gasket & Bolts, Pipe & Fittings, 2" Steel, Gas	25	25	25	25	25	25	25	25	25	25	25
Replace Pipe & Fittings, 2" Steel, Gas (20% of Pipe)	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50
Pipe & Fittings, 3" Steel, Gas											
Replace 10' Section, Pipe & Fittings, 3" Steel, Gas	12	12	12	12	12	12	12	12	12	12	12
Install New Gasket & Bolts, Pipe & Fittings, 3" Steel, Gas	25	25	25	25	25	25	25	25	25	25	25
Replace Pipe & Fittings, 3" Steel, Gas (20% of Pipe)	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50
Pipe & Fittings, 4" Steel, Gas											
Replace 10' Section, Pipe & Fittings, 4" Steel, Gas	12	12	12	12	12	12	12	12	12	12	12
Install New Gasket & Bolts, Pipe & Fittings, 4" Steel, Gas	25	25	25	25	25	25	25	25	25	25	25
Replace Pipe & Fittings, 4" Steel, Gas (20% of Pipe)	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50
Pipe & Fittings, 6" Steel, Gas											
Replace 10' Section, Pipe & Fittings, 6" Steel, Gas	12	12	12	12	12	12	12	12	12	12	12
Install New Gasket & Bolts, Pipe & Fittings, 6" Steel, Gas	25	25	25	25	25	25	25	25	25	25	25
Replace Pipe & Fittings, 6" Steel, Gas (20% of Pipe)	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50
Solar Panel, 3'x8'											
Replace Solar Panel, 3'x8'	15	15	15	15	15	15	15	15	15	15	15
D3020 Heat Generating Systems											
Air Separator, 2"											
Maintain Air Separator, 2"	1	1	1	1	1	1	1	1	1	1	1
Replace Air Separator, 2"	38	24	18	17	14	15	12	12	10	9	9
Air Separator, 4"											
Maintain Air Separator, 4"	1	1	1	1	1	1	1	1	1	1	1
Replace Air Separator, 4"	38	24	18	17	14	15	12	12	10	9	9
Air Separator, 8"											
Maintain Air Separator, 8"	1	1	1	1	1	1	1	1	1	1	1
Replace Air Separator, 8"	38	24	18	17	14	15	12	12	10	9	9

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3020 Heat Generating Systems											
Ball Valve, 1"											
Lubricate, Repack Gland, Ball Valve, 1"	1	1	1	1	1	1	1	1	1	1	1
Replace Ball Valve, 1"	38	32	24	22	19	20	15	15	14	12	12
Ball Valve, 2"											
Lubricate, Repack Gland, Ball Valve, 2"	1	1	1	1	1	1	1	1	1	1	1
Replace Ball Valve, 2"	38	32	24	22	19	20	15	15	14	12	12
Ball Valve, 4"											
Lubricate, Repack Gland, Ball Valve, 4"	1	1	1	1	1	1	1	1	1	1	1
Replace Ball Valve, 4"	38	32	24	22	19	20	15	15	14	12	12
Ball Valve, 6"											
Lubricate, Repack Gland, Ball Valve, 6"	1	1	1	1	1	1	1	1	1	1	1
Replace Ball Valve, 6"	38	32	24	22	19	20	15	15	14	12	12
Boiler Blowoff System											
Repair Boiler Blowoff System	19	11	8	8	7	7	5	5	5	4	4
Replace Boiler Blowoff System	>50	49	36	33	28	30	23	23	20	18	18
Chemical Feed System											
Maintain Chemical Feed System	1	1	1	1	1	1	1	1	1	1	1
Replace Chemical Feed System	38	24	18	17	14	15	12	12	10	9	9
Circulation Pump, 5 HP, Hot Water											
Maintain Circulation Pump, 5 HP, Hot Water	1	1	1	1	1	1	1	1	1	1	1
Repair Circulation Pump, 5 HP, Hot Water	8	8	6	6	5	5	4	4	3	3	3
Replace Circulation Pump, 5 HP, Hot Water	38	24	18	17	14	15	12	12	10	9	9
Circulation Pump, 7 1/2 HP, Hot Water											
Maintain Circulation Pump, 7 1/2 HP, Hot Water	1	1	1	1	1	1	1	1	1	1	1
Repair Circulation Pump, 7 1/2 HP, Hot Water	8	8	6	6	5	5	4	4	3	3	3
Replace Circulation Pump, 7 1/2 HP, Hot Water	38	24	18	17	14	15	12	12	10	9	9
Circulation Pump, 10 HP, Hot Water											
Maintain Circulation Pump, 10 HP, Hot Water	1	1	1	1	1	1	1	1	1	1	1
Repair Circulation Pump, 10 HP, Hot Water	8	8	6	6	5	5	4	4	3	3	3
Replace Circulation Pump, 10 HP, Hot Water	38	24	18	17	14	15	12	12	10	9	9
Circulation Pump, 25 HP, Hot Water											
Maintain Circulation Pump, 25 HP, Hot Water	1	1	1	1	1	1	1	1	1	1	1
Repair Circulation Pump, 25 HP, Hot Water	8	8	6	6	5	5	4	4	3	3	3
Replace Circulation Pump, 25 HP, Hot Water	38	24	18	17	14	15	12	12	10	9	9

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3020 Heat Generating Systems											
Circulation Pump, 75 HP, Hot Water											
Maintain Circulation Pump, 75 HP, Hot Water	1	1	1	1	1	1	1	1	1	1	1
Repair Circulation Pump, 75 HP, Hot Water	8	8	6	6	5	5	4	4	3	3	3
Replace Circulation Pump, 75 HP, Hot Water	38	24	18	17	14	15	12	12	10	9	9
Circulation Pump, 100 HP, Hot Water											
Maintain Circulation Pump, 100 HP, Hot Water	1	1	1	1	1	1	1	1	1	1	1
Repair Circulation Pump, 100 HP, Hot Water	8	8	6	6	5	5	4	4	3	3	3
Replace Circulation Pump, 100 HP, Hot Water	38	24	18	17	14	15	12	12	10	9	9
Circulation Pump, 150 HP, Hot Water											
Maintain Circulation Pump, 150 HP, Hot Water	1	1	1	1	1	1	1	1	1	1	1
Repair Circulation Pump, 150 HP, Hot Water	8	8	6	6	5	5	4	4	3	3	3
Replace Circulation Pump, 150 HP, Hot Water	38	24	18	17	14	15	12	12	10	9	9
Condensate Receiver Station, 10-15 Gal.											
Maintain Condensate Receiver Station, 10-15 Gal.	1	1	1	1	1	1	1	1	1	1	1
Repair Condensate Receiver Station, 10-15 Gal.	5	5	4	3	3	3	2	2	2	2	2
Repair Condensate Receiver Station, Motor, 10-15 Gal.	8	8	6	6	5	5	4	4	3	3	3
Replace Condensate Receiver Station, 10-15 Gal.	38	24	18	17	14	15	12	12	10	9	9
Condensing Heat Exchanger, Gas/Oil, 10 Mbh											
Maintain Condensing Heat Exchanger, Gas, 10 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair Condensing Heat Exchanger, Gas, 10 Mbh	19	11	8	8	7	7	5	5	5	4	4
Replace Condensing Heat Exchanger, Gas, 10 Mbh	>50	49	36	33	28	30	23	23	20	18	18
Condensing Heat Exchanger, Gas/Oil, 20 Mbh											
Maintain Condensing Heat Exchanger, Gas/Oil, 20 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair Condensing Heat Exchanger, Gas/Oil, 20 Mbh	19	11	8	8	7	7	5	5	5	4	4
Replace Condensing Heat Exchanger, Gas/Oil, 20 Mbh	>50	49	36	33	28	30	23	23	20	18	18
Deaerator											
Maintain Deaerator	1	1	1	1	1	1	1	1	1	1	1
Repair Deaerator	19	16	12	11	9	10	8	8	7	6	6
Replace Deaerator	38	32	24	22	19	20	15	15	14	12	12
Electric Boiler, 24 kw											
Maintain Electric Boiler, 24 kw	1	1	1	1	1	1	1	1	1	1	1
Repair Electric Boiler, 24 kw	38	24	18	17	14	15	12	12	10	9	9
Replace Electric Boiler, 24 kw	>50	49	36	33	28	30	23	23	20	18	18

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3020 Heat Generating Systems											
Electric Boiler, 270 kw											
Maintain Electric Boiler, 270 kw	1	1	1	1	1	1	1	1	1	1	1
Repair Electric Boiler, 270 kw	38	24	18	17	14	15	12	12	10	9	9
Replace Electric Boiler, 270 kw	>50	49	36	33	28	30	23	23	20	18	18
Electric Boiler, Steam, 1,025 Mbh											
Inspect & Test Electric Boiler, Steam, 1,025 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair Electric Boiler, Steam, 1,025 Mbh	8	8	6	6	5	5	4	4	3	3	3
Replace Electric Boiler, Steam, 1,025 Mbh	38	32	24	22	19	20	15	15	14	12	12
Electric Heater, Duct											
Maintain Electric Heater, Duct	1	1	1	1	1	1	1	1	1	1	1
Repair Electric Heater, Duct	19	16	12	11	9	10	8	8	7	6	6
Replace Electric Heater, Duct	38	24	18	17	14	15	12	12	10	9	9
Expansion Tank, 10 Gal.											
Maintain Expansion Tank, 10 Gal.	1	1	1	1	1	1	1	1	1	1	1
Replace Expansion Tank, 10 Gal.	50	50	50	50	50	50	50	50	50	50	50
Expansion Tank, 30 Gal.											
Maintain Expansion Tank, 30 Gal.	1	1	1	1	1	1	1	1	1	1	1
Replace Expansion Tank, 30 Gal.	50	50	50	50	50	50	50	50	50	50	50
Expansion Tank, 60 Gal.											
Maintain Expansion Tank, 60 Gal.	1	1	1	1	1	1	1	1	1	1	1
Replace Expansion Tank, 60 Gal.	50	50	50	50	50	50	50	50	50	50	50
Expansion Tank, 100 Gal.											
Maintain Expansion Tank, 100 Gal.	1	1	1	1	1	1	1	1	1	1	1
Replace Expansion Tank, 100 Gal.	50	50	50	50	50	50	50	50	50	50	50
Expansion Tank, 175 Gal.											
Maintain Expansion Tank, 175 Gal.	1	1	1	1	1	1	1	1	1	1	1
Replace Expansion Tank, 175 Gal.	50	50	50	50	50	50	50	50	50	50	50
Expansion Tank, 250 Gal.											
Maintain Expansion Tank, 250 Gal.	1	1	1	1	1	1	1	1	1	1	1
Replace Expansion Tank, 250 Gal.	50	50	50	50	50	50	50	50	50	50	50
Expansion Tank, 400 Gal.											
Maintain Expansion Tank, 400 Gal.	1	1	1	1	1	1	1	1	1	1	1
Replace Expansion Tank, 400 Gal.	50	50	50	50	50	50	50	50	50	50	50

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3020 Heat Generating Systems											
Expansion Tank, 800 Gal.											
Maintain Expansion Tank, 800 Gal.	1	1	1	1	1	1	1	1	1	1	1
Replace Expansion Tank, 800 Gal.	50	50	50	50	50	50	50	50	50	50	50
Expansion Tank, 1,500 Gal.											
Maintain Expansion Tank, 1,500 Gal.	1	1	1	1	1	1	1	1	1	1	1
Replace Expansion Tank, 1,500 Gal.	50	50	50	50	50	50	50	50	50	50	50
Feed Water Pump, <1,000 kbtu Boiler											
Maintain Feed Water Pump, <1,000 kbtu Boiler	1	1	1	1	1	1	1	1	1	1	1
Repair Feed Water Pump, <1,000 kbtu Boiler	8	8	6	6	5	5	4	4	3	3	3
Replace Feed Water Pump, <1,000 kbtu Boiler	38	24	18	17	14	15	12	12	10	9	9
Feed Water Pump, 1,000-3,000 kbtu Boiler											
Maintain Feed Water Pump, 1,000-3,000 kbtu Boiler	1	1	1	1	1	1	1	1	1	1	1
Repair Feed Water Pump, 1,000-3,000 kbtu Boiler	8	8	6	6	5	5	4	4	3	3	3
Replace Feed Water Pump, 1,000-3,000 kbtu Boiler	38	24	18	17	14	15	12	12	10	9	9
Flash Tank, 24 Gal.											
Maintain Flash Tank, 24 Gal.	1	1	1	1	1	1	1	1	1	1	1
Repair Flash Tank, 24 Gal.	8	8	6	6	5	5	4	4	3	3	3
Replace Flash Tank, 24 Gal.	38	24	18	17	14	15	12	12	10	9	9
Furnace, Duct, Gas/Oil, 450 Mbh											
Maintain Furnace, Duct, Gas/Oil, 450 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair Furnace, Duct, Gas/Oil, 450 Mbh	19	16	12	11	9	10	8	8	7	6	6
Replace Furnace, Duct, Gas/Oil, 450 Mbh	38	24	18	17	14	15	12	12	10	9	9
Furnace, Electric, 25 Mbh											
Maintain Furnace, Electric, 25 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair Furnace, Electric, 25 Mbh	19	16	12	11	9	10	8	8	7	6	6
Replace Furnace, Electric, 25 Mbh	38	24	18	17	14	15	12	12	10	9	9
Furnace, Electric, 50 Mbh											
Maintain Furnace, Electric, 50 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair Furnace, Electric, 50 Mbh	19	16	12	11	9	10	8	8	7	6	6
Replace Furnace, Electric, 50 Mbh	38	24	18	17	14	15	12	12	10	9	9
Furnace, Electric, 85 Mbh											
Maintain Furnace, Electric, 85 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair Furnace, Electric, 85 Mbh	19	16	12	11	9	10	8	8	7	6	6
Replace Furnace, Electric, 85 Mbh	38	24	18	17	14	15	12	12	10	9	9

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3020 Heat Generating Systems											
Furnace, Gas, 25 Mbh											
Maintain Furnace, Gas, 25 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair Furnace, Gas, 25 Mbh	19	16	12	11	9	10	8	8	7	6	6
Replace Furnace, Gas, 25 Mbh	38	24	18	17	14	15	12	12	10	9	9
Furnace, Gas, 50 Mbh											
Maintain Furnace, Gas, 50 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair Furnace, Gas, 50 Mbh	19	16	12	11	9	10	8	8	7	6	6
Replace Furnace, Gas, 50 Mbh	38	24	18	17	14	15	12	12	10	9	9
Furnace, Gas, 100 Mbh											
Maintain Furnace, Gas, 100 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair Furnace, Gas, 100 Mbh	19	16	12	11	9	10	8	8	7	6	6
Replace Furnace, Gas, 100 Mbh	38	24	18	17	14	15	12	12	10	9	9
Furnace, Gas, 200 Mbh											
Maintain Furnace, Gas, 200 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair Furnace, Gas, 200 Mbh	19	16	12	11	9	10	8	8	7	6	6
Replace Furnace, Gas, 200 Mbh	38	24	18	17	14	15	12	12	10	9	9
Furnace, Oil, 55 Mbh											
Maintain Furnace, Oil, 55 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair Furnace, Oil, 55 Mbh	19	16	12	11	9	10	8	8	7	6	6
Replace Furnace, Oil, 55 Mbh	38	24	18	17	14	15	12	12	10	9	9
Furnace, Oil, 100 Mbh											
Maintain Furnace, Oil, 100 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair Furnace, Oil, 100 Mbh	19	16	12	11	9	10	8	8	7	6	6
Replace Furnace, Oil, 100 Mbh	38	24	18	17	14	15	12	12	10	9	9
Furnace, Oil, 200 Mbh											
Maintain Furnace, Oil, 200 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair Furnace, Oil, 200 Mbh	19	16	12	11	9	10	8	8	7	6	6
Replace Furnace, Oil, 200 Mbh	38	24	18	17	14	15	12	12	10	9	9
Gas Boiler, 125 Mbh											
Inspect & Test Gas Boiler, 125 Mbh	1	1	1	1	1	1	1	1	1	1	1
Clean Fire Box, Gas Boiler, 125 Mbh	2	2	2	2	2	2	2	2	2	2	2
Repair Gas Boiler, 125 Mbh	19	11	8	8	7	7	5	5	5	4	4
Replace Gas Boiler, 125 Mbh	>50	49	36	33	28	30	23	23	20	18	18

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3020 Heat Generating Systems											
Gas Boiler, 250 Mbh											
Inspect & Test Gas Boiler, 250 Mbh	1	1	1	1	1	1	1	1	1	1	1
Clean Fire Box, Gas Boiler, 250 Mbh	2	2	2	2	2	2	2	2	2	2	2
Repair Gas Boiler, 250 Mbh	19	11	8	8	7	7	5	5	5	4	4
Replace Gas Boiler, 250 Mbh	>50	49	36	33	28	30	23	23	20	18	18
Gas Boiler, 300 Mbh											
Inspect & Test Gas Boiler, 300 Mbh	1	1	1	1	1	1	1	1	1	1	1
Clean Fire Box, Gas Boiler, 300 Mbh	2	2	2	2	2	2	2	2	2	2	2
Repair Gas Boiler, 300 Mbh	19	11	8	8	7	7	5	5	5	4	4
Replace Gas Boiler, 300 Mbh	>50	49	36	33	28	30	23	23	20	18	18
Gas Boiler, 750 Mbh											
Inspect & Test Gas Boiler, 750 Mbh	1	1	1	1	1	1	1	1	1	1	1
Clean Fire Box, Gas Boiler, 750 Mbh	2	2	2	2	2	2	2	2	2	2	2
Repair Gas Boiler, 750 Mbh	19	11	8	8	7	7	5	5	5	4	4
Replace Gas Boiler, 750 Mbh	>50	49	36	33	28	30	23	23	20	18	18
Gas Boiler, 1,000 Mbh											
Inspect & Test Gas Boiler, 1,000 Mbh	1	1	1	1	1	1	1	1	1	1	1
Clean Fire Box, Gas Boiler, 1,000 Mbh	2	2	2	2	2	2	2	2	2	2	2
Repair Gas Boiler, 1,000 Mbh	19	11	8	8	7	7	5	5	5	4	4
Replace Gas Boiler, 1,000 Mbh	>50	49	36	33	28	30	23	23	20	18	18
Gas Boiler, 2,000 Mbh											
Inspect & Test Gas Boiler, 2,000 Mbh	1	1	1	1	1	1	1	1	1	1	1
Clean Fire Box, Gas Boiler, 2,000 Mbh	2	2	2	2	2	2	2	2	2	2	2
Repair Gas Boiler, 2,000 Mbh	19	11	8	8	7	7	5	5	5	4	4
Replace Gas Boiler, 2,000 Mbh	>50	49	36	33	28	30	23	23	20	18	18
Gas Boiler, 2,500 Mbh											
Inspect & Test Gas Boiler, 2,500 Mbh	1	1	1	1	1	1	1	1	1	1	1
Clean Fire Box, Gas Boiler, 2,500 Mbh	2	2	2	2	2	2	2	2	2	2	2
Repair Gas Boiler, 2,500 Mbh	19	11	8	8	7	7	5	5	5	4	4
Replace Gas Boiler, 2,500 Mbh	>50	49	36	33	28	30	23	23	20	18	18
Gas Boiler, 4,200 Mbh											
Inspect & Test Gas Boiler, 4,200 Mbh	1	1	1	1	1	1	1	1	1	1	1
Clean Fire Box, Gas Boiler, 4,200 Mbh	2	2	2	2	2	2	2	2	2	2	2
Repair Gas Boiler, 4,200 Mbh	19	11	8	8	7	7	5	5	5	4	4
Replace Gas Boiler, 4,200 Mbh	>50	49	36	33	28	30	23	23	20	18	18

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3020 Heat Generating Systems											
Gas Boiler, 10,000 Mbh											
Inspect & Test Gas Boiler, 10,000 Mbh	1	1	1	1	1	1	1	1	1	1	1
Clean Fire Box, Gas Boiler, 10,000 Mbh	2	2	2	2	2	2	2	2	2	2	2
Repair Gas Boiler, 10,000 Mbh	19	11	8	8	7	7	5	5	5	4	4
Replace Gas Boiler, 10,000 Mbh	>50	49	36	33	28	30	23	23	20	18	18
Gas Boiler, Steam, 50,000 Lb/hr, 1,449 HP, 150 PSI											
Inspect & Test Gas Boiler, Steam, 50,000 Lb/hr, 1,449 HP, 150 PSI	1	1	1	1	1	1	1	1	1	1	1
Clean Fire Box, Gas Boiler, Steam, 50,000 Lb/hr, 1,449 HP, 150 PSI	2	2	2	2	2	2	2	2	2	2	2
Repair Gas Boiler, Steam, 50,000 Lb/hr, 1,449 HP, 150 PSI	19	11	8	8	7	7	5	5	5	4	4
Replace Gas Boiler, Steam, 50,000 Lb/hr, 1,449 HP, 150 PSI	>50	49	36	33	28	30	23	23	20	18	18
Gas Boiler, Steam, 55,000 Lb/hr, 1,594 HP, 150 PSI											
Inspect & Test Gas Boiler, Steam, 55,000 Lb/hr, 1,594 HP, 150 PSI	1	1	1	1	1	1	1	1	1	1	1
Clean Fire Box, Gas Boiler, Steam, 55,000 Lb/hr, 1,594 HP, 150 PSI	2	2	2	2	2	2	2	2	2	2	2
Repair Gas Boiler, Steam, 55,000 Lb/hr, 1,594 HP, 150 PSI	19	11	8	8	7	7	5	5	5	4	4
Replace Gas Boiler, Steam, 55,000 Lb/hr, 1,594 HP, 150 PSI	>50	49	36	33	28	30	23	23	20	18	18
Gas Boiler, Steam, 100,000 Lb/hr, 2,898 HP, 150 PSI											
Inspect & Test Gas Boiler, Steam, 100,000 Lb/hr, 2,898 HP, 150 PSI	1	1	1	1	1	1	1	1	1	1	1
Clean Fire Box, Gas Boiler, Steam, 100,000 Lb/hr, 2,898 HP, 150 PSI	2	2	2	2	2	2	2	2	2	2	2
Repair Gas Boiler, Steam, 100,000 Lb/hr, 2,898 HP, 150 PSI	19	11	8	8	7	7	5	5	5	4	4
Replace Gas Boiler, Steam, 100,000 Lb/hr, 2,898 HP, 150 PSI	>50	49	36	33	28	30	23	23	20	18	18
Gas Boiler, Steam, 24,000 Lb/hr											
Inspect & Test Gas Boiler, Steam, 24,000 Lb/hr	1	1	1	1	1	1	1	1	1	1	1
Clean Fire Box, Gas Boiler, Steam, 24,000 Lb/hr	2	2	2	2	2	2	2	2	2	2	2
Repair Gas Boiler, Steam, 24,000 Lb/hr	19	11	8	8	7	7	5	5	5	4	4
Replace Gas Boiler, Steam, 24,000 Lb/hr	>50	49	36	33	28	30	23	23	20	18	18
Gas/Oil Boiler, 2,000 Mbh											
Inspect & Test Gas/Oil Boiler, 2,000 Mbh	1	1	1	1	1	1	1	1	1	1	1
Clean Fire Box, Gas/Oil Boiler, 2,000 Mbh	2	2	2	2	2	2	2	2	2	2	2
Repair Gas/Oil Boiler, 2,000 Mbh	19	11	8	8	7	7	5	5	5	4	4
Replace Gas/Oil Boiler, 2,000 Mbh	>50	49	36	33	28	30	23	23	20	18	18
Gas/Oil Boiler, 20,000 Mbh											
Inspect & Test Gas/Oil Boiler, 20,000 Mbh	1	1	1	1	1	1	1	1	1	1	1
Clean Fire Box, Gas/Oil Boiler, 20,000 Mbh	2	2	2	2	2	2	2	2	2	2	2
Repair Gas/Oil Boiler, 20,000 Mbh	19	11	8	8	7	7	5	5	5	4	4
Replace Gas/Oil Boiler, 20,000 Mbh	>50	49	36	33	28	30	23	23	20	18	18

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3020 Heat Generating Systems											
Gas/Oil Boiler, 40,000 Mbh											
Inspect & Test Gas/Oil Boiler, 40,000 Mbh	1	1	1	1	1	1	1	1	1	1	1
Clean Fire Box, Gas/Oil Boiler, 40,000 Mbh	2	2	2	2	2	2	2	2	2	2	2
Repair Gas/Oil Boiler, 40,000 Mbh	19	11	8	8	7	7	5	5	5	4	4
Replace Gas/Oil Boiler, 40,000 Mbh	>50	49	36	33	28	30	23	23	20	18	18
Gas/Oil Boiler, 80,000 Mbh											
Inspect & Test Gas/Oil Boiler, 80,000 Mbh	1	1	1	1	1	1	1	1	1	1	1
Clean Fire Box, Gas/Oil Boiler, 80,000 Mbh	2	2	2	2	2	2	2	2	2	2	2
Repair Gas/Oil Boiler, 80,000 Mbh	19	11	8	8	7	7	5	5	5	4	4
Replace Gas/Oil Boiler, 80,000 Mbh	>50	49	36	33	28	30	23	23	20	18	18
Gate Valve, 2-3"											
Rearrange Gland, Gate Valve, 2-3"	19	16	12	11	9	10	8	8	7	6	6
Replace Gate Valve, 2-3"	38	32	24	22	19	20	15	15	14	12	12
Gate Valve, 4"											
Rearrange Gland, Gate Valve, 4"	19	16	12	11	9	10	8	8	7	6	6
Replace Gate Valve, 4"	38	32	24	22	19	20	15	15	14	12	12
Gate Valve, 6"											
Rearrange Gland, Gate Valve, 6"	19	16	12	11	9	10	8	8	7	6	6
Replace Gate Valve, 6"	38	32	24	22	19	20	15	15	14	12	12
Gate Valve, 8"											
Rearrange Gland, Gate Valve, 8"	19	16	12	11	9	10	8	8	7	6	6
Replace Gate Valve, 8"	38	32	24	22	19	20	15	15	14	12	12
Gate Valve, 10"											
Rearrange Gland, Gate Valve, 10"	19	16	12	11	9	10	8	8	7	6	6
Replace Gate Valve, 10"	38	32	24	22	19	20	15	15	14	12	12
Gate Valve, 12"											
Rearrange Gland, Gate Valve, 12"	19	16	12	11	9	10	8	8	7	6	6
Replace Gate Valve, 12"	38	32	24	22	19	20	15	15	14	12	12
Gate Valve, 24"											
Rearrange Gland, Gate Valve, 24"	19	16	12	11	9	10	8	8	7	6	6
Replace Gate Valve, 24"	38	32	24	22	19	20	15	15	14	12	12

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3020 Heat Generating Systems											
Heat Exchanger, Steam-to-Water, 40 Gpm											
Maintain Heat Exchanger, Steam-to-Water, 40 Gpm	1	1	1	1	1	1	1	1	1	1	1
Repair Heat Exchanger, Steam-to-Water, 40 Gpm	19	11	8	8	7	7	5	5	5	4	4
Replace Heat Exchanger, Steam-to-Water, 40 Gpm	>50	49	36	33	28	30	23	23	20	18	18
Heat Exchanger, Steam-to-Water, 130 Gpm											
Maintain Heat Exchanger, Steam-to-Water, 130 Gpm	1	1	1	1	1	1	1	1	1	1	1
Repair Heat Exchanger, Steam-to-Water, 130 Gpm	19	11	8	8	7	7	5	5	5	4	4
Replace Heat Exchanger, Steam-to-Water, 130 Gpm	>50	49	36	33	28	30	23	23	20	18	18
Heat Exchanger, Water-to-Water, 40 Gpm											
Maintain Heat Exchanger, Water-to-Water, 40 Gpm	1	1	1	1	1	1	1	1	1	1	1
Repair Heat Exchanger, Water-to-Water, 40 Gpm	19	11	8	8	7	7	5	5	5	4	4
Replace Heat Exchanger, Water-to-Water, 40 Gpm	>50	49	36	33	28	30	23	23	20	18	18
Heat Exchanger, Water-to-Water, 130 Gpm											
Maintain Heat Exchanger, Water-to-Water, 130 Gpm	1	1	1	1	1	1	1	1	1	1	1
Repair Heat Exchanger, Water-to-Water, 130 Gpm	19	11	8	8	7	7	5	5	5	4	4
Replace Heat Exchanger, Water-to-Water, 130 Gpm	>50	49	36	33	28	30	23	23	20	18	18
Heat Exchanger, Water-to-Water, 380 Gpm											
Maintain Heat Exchanger, Water-to-Water, 380 Gpm	1	1	1	1	1	1	1	1	1	1	1
Repair Heat Exchanger, Water-to-Water, 380 Gpm	19	11	8	8	7	7	5	5	5	4	4
Replace Heat Exchanger, Water-to-Water, 380 Gpm	>50	49	36	33	28	30	23	23	20	18	18
House Furnace, Electric 25 Mbh, 8 kw											
Maintain House Furnace, Electric 25 Mbh, 8 kw	1	1	1	1	1	1	1	1	1	1	1
Repair House Furnace, Electric 25 Mbh, 8 kw	19	16	12	11	9	10	8	8	7	6	6
Replace House Furnace, Electric 25 Mbh, 8 kw	38	24	18	17	14	15	12	12	10	9	9
House Furnace, Electric 100 Mbh, 30 kw											
Maintain House Furnace, Electric 100 Mbh, 30 kw	1	1	1	1	1	1	1	1	1	1	1
Repair House Furnace, Electric 100 Mbh, 30 kw	19	16	12	11	9	10	8	8	7	6	6
Replace House Furnace, Electric 100 Mbh, 30 kw	38	24	18	17	14	15	12	12	10	9	9
House Furnace, Gas/Oil, 25 Mbh											
Maintain House Furnace, Gas/Oil, 25 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair House Furnace, Gas/Oil, 25 Mbh	19	16	12	11	9	10	8	8	7	6	6
Replace House Furnace, Gas/Oil, 25 Mbh	38	24	18	17	14	15	12	12	10	9	9

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3020 Heat Generating Systems											
House Furnace, Gas/Oil, 100 Mbh											
Maintain House Furnace, Gas/Oil, 100 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair House Furnace, Gas/Oil, 100 Mbh	19	16	12	11	9	10	8	8	7	6	6
Replace House Furnace, Gas/Oil, 100 Mbh	38	24	18	17	14	15	12	12	10	9	9
Oil Boiler, 250 Mbh											
Inspect & Test Oil Boiler, 250 Mbh	1	1	1	1	1	1	1	1	1	1	1
Clean Fire Box, Oil Boiler, 250 Mbh	2	2	2	2	2	2	2	2	2	2	2
Repair Oil Boiler, 250 Mbh	19	11	8	8	7	7	5	5	5	4	4
Replace Oil Boiler, 250 Mbh	>50	49	36	33	28	30	23	23	20	18	18
Oil Boiler, 2,000 Mbh											
Inspect & Test Oil Boiler, 2,000 Mbh	1	1	1	1	1	1	1	1	1	1	1
Clean Fire Box, Oil Boiler, 2,000 Mbh	2	2	2	2	2	2	2	2	2	2	2
Repair Oil Boiler, 2,000 Mbh	19	11	8	8	7	7	5	5	5	4	4
Replace Oil Boiler, 2,000 Mbh	>50	49	36	33	28	30	23	23	20	18	18
Metal Flue, Stainless Steel, 10"											
Replace Metal Flue, Stainless Steel, 10"	15	15	15	15	15	15	15	15	15	15	15
Oil Boiler, 10,000 Mbh											
Inspect & Test Oil Boiler, 10,000 Mbh	1	1	1	1	1	1	1	1	1	1	1
Clean Fire Box, Oil Boiler, 10,000 Mbh	2	2	2	2	2	2	2	2	2	2	2
Repair Oil Boiler, 10,000 Mbh	19	11	8	8	7	7	5	5	5	4	4
Replace Oil Boiler, 10,000 Mbh	>50	49	36	33	28	30	23	23	20	18	18
Metal Flue, Stainless Steel, 16"											
Replace Metal Flue, Stainless Steel, 40"	15	15	15	15	15	15	15	15	15	15	15
Metal Flue, Stainless Steel, 18"											
Replace Metal Flue, Stainless Steel, 18"	15	15	15	15	15	15	15	15	15	15	15
Metal Flue, Stainless Steel, 40"											
Replace Metal Flue, Stainless Steel, 16"	15	15	15	15	15	15	15	15	15	15	15
Pipe & Fittings, 3/4" Copper											
Resolder Joint, Pipe & Fittings, 3/4" Copper	10	10	10	10	10	10	10	10	10	10	10
Replace 10' Section, Pipe & Fittings, 3/4" Copper	20	20	20	20	20	20	20	20	20	20	20
Replace Pipe & Fittings, 3/4" Copper (20% of Pipe)	25	25	25	25	25	25	25	25	25	25	25

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3020 Heat Generating Systems											
Pipe & Fittings, 2" Copper											
Resolder Joint, Pipe & Fittings, 2" Copper	10	10	10	10	10	10	10	10	10	10	10
Replace 10' Section, Pipe & Fittings, 2" Copper	20	20	20	20	20	20	20	20	20	20	20
Replace Pipe & Fittings, 2" Copper (20% of Pipe)	25	25	25	25	25	25	25	25	25	25	25
Pipe & Fittings, 10" Steel											
Replace 10' Section, Pipe & Fittings, 10" Steel	12	12	12	12	12	12	12	12	12	12	12
Install New Gasket & Bolts, Pipe & Fittings, 10" Steel	25	25	25	25	25	25	25	25	25	25	25
Replace Pipe & Fittings, 10" Steel (20% of Pipe)	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50
Pipe & Fittings, 12" Steel											
Replace 10' Section, Pipe & Fittings, 12" Steel	12	12	12	12	12	12	12	12	12	12	12
Install New Gasket & Bolts, Pipe & Fittings, 12" Steel	25	25	25	25	25	25	25	25	25	25	25
Replace Pipe & Fittings, 12" Steel (20% of Pipe)	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50
Pipe Insulation, Fiberglass, Heating Water/Steam											
Re-Tape Pipe Insulation, Fiberglass, Heating Water/Steam	5	5	5	5	5	5	5	5	5	5	5
Replace Pipe Insulation, Fiberglass, Heating Water/Steam (20% of Insulation)	25	25	25	25	25	25	25	25	25	25	25
Plate Heat Exchanger, 400 Gpm											
Maintain Plate Heat Exchanger, 400 Gpm	1	1	1	1	1	1	1	1	1	1	1
Repair Plate Heat Exchanger, 400 Gpm	19	11	8	8	7	7	5	5	5	4	4
Replace Plate Heat Exchanger, 400 Gpm	>50	49	36	33	28	30	23	23	20	18	18
Plate Heat Exchanger, 800 Gpm											
Maintain Plate Heat Exchanger, 800 Gpm	1	1	1	1	1	1	1	1	1	1	1
Repair Plate Heat Exchanger, 800 Gpm	19	11	8	8	7	7	5	5	5	4	4
Replace Plate Heat Exchanger, 800 Gpm	>50	49	36	33	28	30	23	23	20	18	18
Plate Heat Exchanger, 1,200 Gpm											
Maintain Plate Heat Exchanger, 1,200 Gpm	1	1	1	1	1	1	1	1	1	1	1
Repair Plate Heat Exchanger, 1,200 Gpm	19	11	8	8	7	7	5	5	5	4	4
Replace Plate Heat Exchanger, 1,200 Gpm	>50	49	36	33	28	30	23	23	20	18	18
Pressure Reducer Valve, 1/2"											
Maintain Pressure Reducer Valve, 1/2"	1	1	1	1	1	1	1	1	1	1	1
Replace Pressure Reducer Valve, 1/2"	23	10	7	7	6	6	5	5	4	4	4
Pressure Reducer Valve, 1"											
Maintain Pressure Reducer Valve, 1"	1	1	1	1	1	1	1	1	1	1	1
Replace Pressure Reducer Valve, 1"	23	10	7	7	6	6	5	5	4	4	4

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3020 Heat Generating Systems											
Pressure Reducer Valve, 1-1/2"											
Maintain Pressure Reducer Valve, 1-1/2"	1	1	1	1	1	1	1	1	1	1	1
Replace Pressure Reducer Valve, 1-1/2"	23	10	7	7	6	6	5	5	4	4	4
Pressure Reducer Valve, 2"											
Maintain Pressure Reducer Valve, 2"	1	1	1	1	1	1	1	1	1	1	1
Replace Pressure Reducer Valve, 2"	23	10	7	7	6	6	5	5	4	4	4
Radiator, Finned, Wall											
Replace Radiator, Finned, Wall	20	20	20	20	20	20	20	20	20	20	20
Steam Converter, 200 Gph											
Inspect & Maintain Steam Converter, 200 Gph	1	1	1	1	1	1	1	1	1	1	1
Repair Steam Converter, 200 Gph	8	8	6	6	5	5	4	4	3	3	3
Replace Steam Converter, 200 Gph	>50	49	36	33	28	30	23	23	20	18	18
Steam Converter, Domestic Hot Water, 10 Gpm											
Inspect Steam Converter, Domestic Hot Water, 10 Gpm	1	1	1	1	1	1	1	1	1	1	1
Repair Steam Converter, Domestic Hot Water, 10 Gpm	8	8	6	6	5	5	4	4	3	3	3
Replace Steam Converter, Domestic Hot Water, 10 Gpm	38	32	24	22	19	20	15	15	14	12	12
Steam Trap, F&T, 2"											
Maintain Steam Trap, F&T, 2"	1	1	1	1	1	1	1	1	1	1	1
Repair Steam Trap, F&T, 2"	11	5	4	3	3	3	2	2	2	2	2
Replace Steam Trap, F&T, 2"	19	16	12	11	9	10	8	8	7	6	6
Steam Turbine 1,000 kw											
Inspect & Test Steam Turbine 1,000 kw	1	1	1	1	1	1	1	1	1	1	1
Repair Steam Turbine 1,000 kw	19	11	8	8	7	7	5	5	5	4	4
Replace Steam Turbine 1,000 kw	>50	49	36	33	28	30	23	23	20	18	18
Surge Tank, 1,000 Gal.											
Replace Surge Tank, 1,000 Gal.	38	24	18	17	14	15	12	12	10	9	9
Valve, Non-Drain, 2"											
Lubricate, Repack Gland, Valve, Non Drain, 2"	1	1	1	1	1	1	1	1	1	1	1
Replace Valve, Non-Drain, 2"	38	32	24	22	19	20	15	15	14	12	12
Valve, Non-Drain, 4"											
Lubricate, Repack Gland, Valve, Non Drain, 4"	1	1	1	1	1	1	1	1	1	1	1
Replace Valve, Non-Drain, 4"	38	32	24	22	19	20	15	15	14	12	12

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3020 Heat Generating Systems											
Valve, Non-Drain, 6"											
Lubricate, Repack Gland, Valve, Non Drain, 6"	1	1	1	1	1	1	1	1	1	1	1
Replace Valve, Non-Drain, 6"	38	32	24	22	19	20	15	15	14	12	12
Valve, Non-Drain, 8"											
Lubricate, Repack Gland, Valve, Non Drain, 8"	1	1	1	1	1	1	1	1	1	1	1
Replace Valve, Non-Drain, 8"	38	32	24	22	19	20	15	15	14	12	12
Valve, Non-Drain, 10"											
Lubricate, Repack Gland, Valve, Non Drain, 10"	1	1	1	1	1	1	1	1	1	1	1
Replace Valve, Non-Drain, 10"	38	32	24	22	19	20	15	15	14	12	12
Valve, Non-Drain, 12"											
Lubricate, Repack Gland, Valve, Non Drain, 12"	1	1	1	1	1	1	1	1	1	1	1
Replace Valve, Non-Drain, 12"	38	32	24	22	19	20	15	15	14	12	12
Valve, Non-Drain, 14"											
Lubricate, Repack Gland, Valve, Non Drain, 14"	1	1	1	1	1	1	1	1	1	1	1
Replace Valve, Non-Drain, 14"	38	32	24	22	19	20	15	15	14	12	12
Valve, Non-Drain, 16"											
Lubricate, Repack Gland, Valve, Non Drain, 16"	1	1	1	1	1	1	1	1	1	1	1
Replace Valve, Non-Drain, 16"	38	32	24	22	19	20	15	15	14	12	12
D3030 Cooling Generating Systems											
Accumulator, Hydraulic, 1/2 CF											
Maintain Accumulator Hydraulic, 1/2 CF	1	1	1	1	1	1	1	1	1	1	1
Replace Accumulator, Hydraulic, 1/2 CF	9	10	15	15	20	10	32	46	46	>50	>50
Accumulator, Hydraulic, 2 CF											
Maintain Accumulator Hydraulic, 2 CF	1	1	1	1	1	1	1	1	1	1	1
Replace Accumulator, Hydraulic, 2 CF	9	10	15	15	20	10	32	46	46	>50	>50
Butterfly Valve, 3"											
Lubricate, Repack Gland, Butterfly Valve, 3"	1	1	1	1	1	1	1	1	1	1	1
Replace Butterfly Valve, 3"	18	19	30	30	32	20	39	46	46	>50	>50
Butterfly Valve, 4"											
Lubricate, Repack Gland, Butterfly Valve, 4"	1	1	1	1	1	1	1	1	1	1	1
Replace Butterfly Valve, 4"	18	19	30	30	32	20	39	46	46	>50	>50

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3030 Cooling Generating Systems											
Butterfly Valve, 6"											
Lubricate, Repack Gland, Butterfly Valve, 6"	1	1	1	1	1	1	1	1	1	1	1
Replace Butterfly Valve, 6"	18	19	30	30	32	20	39	46	46	>50	>50
Butterfly Valve, 8"											
Lubricate, Repack Gland, Butterfly Valve, 8"	1	1	1	1	1	1	1	1	1	1	1
Replace Butterfly Valve, 8"	18	19	30	30	32	20	39	46	46	>50	>50
Butterfly Valve, 10"											
Lubricate, Repack Gland, Butterfly Valve, 10"	1	1	1	1	1	1	1	1	1	1	1
Replace Butterfly Valve, 10"	18	19	30	30	32	20	39	46	46	>50	>50
Butterfly Valve, 12"											
Lubricate, Repack Gland, Butterfly Valve, 12"	1	1	1	1	1	1	1	1	1	1	1
Replace Butterfly Valve, 12"	18	19	30	30	32	20	39	46	46	>50	>50
Butterfly Valve, 36"											
Lubricate, Repack Gland, Butterfly Valve, 36"	1	1	1	1	1	1	1	1	1	1	1
Replace Butterfly Valve, 36"	18	19	30	30	32	20	39	46	46	>50	>50
Check Valve, 3-4"											
Inspect, Clean, & Verify Opening/Closing, Check Valve, 3-4"	1	1	1	1	1	1	1	1	1	1	1
Replace Check Valve, 3-4"	18	19	30	30	32	20	39	46	46	>50	>50
Check Valve, 6"											
Inspect, Clean, & Verify Opening/Closing, Check Valve, 6"	1	1	1	1	1	1	1	1	1	1	1
Replace Check Valve, 6"	18	19	30	30	32	20	39	46	46	>50	>50
Check Valve, 10"											
Inspect, Clean, & Verify Opening/Closing, Check Valve, 10"	1	1	1	1	1	1	1	1	1	1	1
Replace Check Valve, 10"	18	19	30	30	32	20	39	46	46	>50	>50
Chiller, Absorption, 100 Ton											
Maintain Chiller, Absorption, 100 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Absorption, 100 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Absorption, 100 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Chiller, Absorption, 350 Ton											
Maintain Chiller, Absorption, 350 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Absorption, 350 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Absorption, 350 Ton	18	19	30	30	32	20	39	46	46	>50	>50

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3030 Cooling Generating Systems											
Chiller, Absorption, 950 Ton											
Maintain Chiller, Absorption, 950 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Absorption, 950 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Absorption, 950 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 100 Ton											
Maintain Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 100 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 100 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 100 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 200 Ton											
Maintain Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 200 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 200 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 200 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 250 Ton											
Maintain Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 250 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 250 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 250 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 300 Ton											
Maintain Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 300 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 300 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 300 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 500 Ton											
Maintain Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 500 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 500 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 500 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 900 Ton											
Maintain Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 900 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 900 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 900 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Chiller, Centrifugal Hermetic, Bundled w/ Condenser, 1,000 Ton											
Maintain Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 1,000 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 1,000 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Centrifugal Hermetic, Bnd'd w/ Condenser, 1,000 Ton	18	19	30	30	32	20	39	46	46	>50	>50

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3030 Cooling Generating Systems											
Chiller, Reciprocal Air-Cooled Hermetic, 5 Ton											
Maintain Chiller, Reciprocal Air Cooled Hermetic, 5 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Reciprocal Air Cooled Hermetic, 5 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Reciprocal Air Cooled Hermetic, 5 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Chiller, Reciprocal Air-Cooled Hermetic, 10 Ton											
Maintain Chiller, Reciprocal Air Cooled Hermetic, 10 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Reciprocal Air Cooled Hermetic, 10 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Reciprocal Air Cooled Hermetic, 10 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Chiller, Reciprocal Air-Cooled Hermetic w/ Scroll Compressor, 10 Ton											
Maintain Chiller, Reciprocal Air Cooled Hermetic w/ Scroll Compressor, 10 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Reciprocal Air Cooled Hermetic w/ Scroll Compressor, 10 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Reciprocal Air Cooled Hermetic w/ Scroll Compressor, 10 Ton	18	19	30	30	20	20	39	46	46	>50	>50
Chiller, Reciprocal Air-Cooled Hermetic, 15 Ton											
Maintain Chiller, Reciprocal Air Cooled Hermetic, 15 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Reciprocal Air Cooled Hermetic, 15 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Reciprocal Air Cooled Hermetic, 15 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Chiller, Reciprocal Air-Cooled Hermetic, 20 Ton											
Maintain Chiller, Reciprocal Air Cooled Hermetic, 20 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Reciprocal Air Cooled Hermetic, 20 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Reciprocal Air Cooled Hermetic, 20 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Chiller, Reciprocal Air-Cooled Hermetic w/ Scroll Compressor, 20 Ton											
Maintain Chiller, Reciprocal Air Cooled Hermetic w/ Scroll Compressor, 20 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Reciprocal Air Cooled Hermetic w/ Scroll Compressor, 20 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Reciprocal Air Cooled Hermetic w/ Scroll Compressor, 20 Ton	18	19	30	30	20	20	39	46	46	>50	>50
Chiller, Reciprocal Air-Cooled Hermetic, 40 Ton											
Maintain Chiller, Reciprocal Air Cooled Hermetic, 40 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Reciprocal Air Cooled Hermetic, 40 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Reciprocal Air Cooled Hermetic, 40 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Chiller, Reciprocal Air-Cooled Hermetic, 50 Ton											
Maintain Chiller, Reciprocal Air Cooled Hermetic, 50 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Reciprocal Air Cooled Hermetic, 50 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Reciprocal Air Cooled Hermetic, 50 Ton	18	19	30	30	32	20	39	46	46	>50	>50

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3030 Cooling Generating Systems											
Chiller, Reciprocal Air-Cooled Hermetic, 60 Ton											
Maintain Chiller, Reciprocal Air Cooled Hermetic, 60 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Reciprocal Air Cooled Hermetic, 60 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Reciprocal Air Cooled Hermetic, 60 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Chiller, Reciprocal Air-Cooled Hermetic, 100 Ton											
Maintain Chiller, Reciprocal Air Cooled Hermetic, 100 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Reciprocal Air Cooled Hermetic, 100 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Reciprocal Air Cooled Hermetic, 100 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Chiller, Reciprocal Air-Cooled Hermetic, 200 Ton											
Maintain Chiller, Reciprocal Air Cooled Hermetic, 200 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Reciprocal Air Cooled Hermetic, 200 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Reciprocal Air Cooled Hermetic, 200 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Chiller, Reciprocal Air-Cooled Hermetic, 300 Ton											
Maintain Chiller, Reciprocal Air Cooled Hermetic, 300 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Reciprocal Air Cooled Hermetic, 300 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Reciprocal Air Cooled Hermetic, 300 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Chiller, Reciprocal Water-Cooled Hermetic, 20 Ton											
Maintain Chiller, Reciprocal Water-Cooled Hermetic, 20 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Reciprocal Water-Cooled Hermetic, 20 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Reciprocal Water-Cooled Hermetic, 20 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Chiller, Reciprocal Water-Cooled Hermetic, 50 Ton											
Maintain Chiller, Reciprocal Water-Cooled Hermetic, 50 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Reciprocal Water-Cooled Hermetic, 50 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Reciprocal Water-Cooled Hermetic, 50 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Chiller, Reciprocal Water-Cooled Hermetic, 60 Ton											
Maintain Chiller, Reciprocal Water-Cooled Hermetic, 60 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Reciprocal Water-Cooled Hermetic, 60 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Reciprocal Water-Cooled Hermetic, 60 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Chiller, Reciprocal Water-Cooled Hermetic, 100 Ton											
Maintain Chiller, Reciprocal Water-Cooled Hermetic, 100 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Reciprocal Water-Cooled Hermetic, 100 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Reciprocal Water-Cooled Hermetic, 100 Ton	18	19	30	30	32	20	39	46	46	>50	>50

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3030 Cooling Generating Systems											
Chiller, Reciprocal Water-Cooled Hermetic, 165 Ton											
Maintain Chiller, Reciprocal Water-Cooled Hermetic, 165 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Reciprocal Water-Cooled Hermetic, 165 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Reciprocal Water-Cooled Hermetic, 165 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Chiller, Reciprocal Water-Cooled Hermetic, 200 Ton											
Maintain Chiller, Reciprocal Water-Cooled Hermetic, 200 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Reciprocal Water-Cooled Hermetic, 200 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Reciprocal Water-Cooled Hermetic, 200 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Chiller, Reciprocal Water-Cooled Hermetic, 300 Ton											
Maintain Chiller, Reciprocal Water-Cooled Hermetic, 300 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Chiller, Reciprocal Water-Cooled Hermetic, 300 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Chiller, Reciprocal Water-Cooled Hermetic, 300 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Circulation Pump, 5 HP, Chiller & Condenser Water											
Maintain Circulation Pump, 5 HP, Chiller & Condenser Water	1	1	1	1	1	1	1	1	1	1	1
Repair Circulation Pump, 5 HP, Chiller & Condenser Water	4	5	8	7	10	5	16	23	23	29	33
Replace Circulation Pump, 5 HP, Chiller & Condenser Water	13	14	23	22	29	15	32	46	46	>50	>50
Circulation Pump, 7 1/2 HP, Chiller & Condenser Water											
Maintain Circulation Pump, 7 1/2 HP, Chiller & Condenser Water	1	1	1	1	1	1	1	1	1	1	1
Repair Circulation Pump, 7 1/2 HP, Chiller & Condenser Water	4	5	8	7	10	5	16	23	23	29	33
Replace Circulation Pump, 7 1/2 HP, Chiller & Condenser Water	13	14	23	22	29	15	32	46	46	>50	>50
Circulation Pump, 10 HP, Chiller & Condenser Water											
Maintain Circulation Pump, 10 HP, Chiller & Condenser Water	1	1	1	1	1	1	1	1	1	1	1
Repair Circulation Pump, 10 HP, Chiller & Condenser Water	4	5	8	7	10	5	16	23	23	29	33
Replace Circulation Pump, 10 HP, Chiller & Condenser Water	13	14	23	22	29	15	32	46	46	>50	>50
Circulation Pump, 15 HP, Chiller & Condenser Water											
Maintain Circulation Pump, 15 HP, Chiller & Condenser Water	1	1	1	1	1	1	1	1	1	1	1
Repair Circulation Pump, 15 HP, Chiller & Condenser Water	4	5	8	7	10	5	16	23	23	29	33
Replace Circulation Pump, 15 HP, Chiller & Condenser Water	13	14	23	22	29	15	32	46	46	>50	>50
Circulation Pump, 25 HP, Chiller & Condenser Water											
Maintain Circulation Pump, 25 HP, Chiller & Condenser Water	1	1	1	1	1	1	1	1	1	1	1
Repair Circulation Pump, 25 HP, Chiller & Condenser Water	4	5	8	7	10	5	16	23	23	29	33
Replace Circulation Pump, 25 HP, Chiller & Condenser Water	13	14	23	22	29	15	32	46	46	>50	>50

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3030 Cooling Generating Systems											
Circulation Pump, 50 HP, Chiller & Condenser Water											
Maintain Circulation Pump, 50 HP, Chiller & Condenser Water	1	1	1	1	1	1	1	1	1	1	1
Repair Circulation Pump, 50 HP, Chiller & Condenser Water	4	5	8	7	10	5	16	23	23	29	33
Replace Circulation Pump, 50 HP, Chiller & Condenser Water	13	14	23	22	29	15	32	46	46	>50	>50
Circulation Pump, 75 HP, Chiller & Condenser Water											
Maintain Circulation Pump, 75 HP, Chiller & Condenser Water	1	1	1	1	1	1	1	1	1	1	1
Repair Circulation Pump, 75 HP, Chiller & Condenser Water	4	5	8	7	10	5	16	23	23	29	33
Replace Circulation Pump, 75 HP, Chiller & Condenser Water	13	14	23	22	29	15	32	46	46	>50	>50
Circulation Pump, 100 HP, Chiller & Condenser Water											
Maintain Circulation Pump, 100 HP, Chiller & Condenser Water	1	1	1	1	1	1	1	1	1	1	1
Repair Circulation Pump, 100 HP, Chiller & Condenser Water	4	5	8	7	10	5	16	23	23	29	33
Replace Circulation Pump, 100 HP, Chiller & Condenser Water	13	14	23	22	29	15	32	46	46	>50	>50
Circulation Pump, 150 HP, Chiller & Condenser Water											
Maintain Circulation Pump, 150 HP, Chiller & Condenser Water	1	1	1	1	1	1	1	1	1	1	1
Repair Circulation Pump, 150 HP, Chiller & Condenser Water	4	5	8	7	10	5	16	23	23	29	33
Replace Circulation Pump, 150 HP, Chiller & Condenser Water	13	14	23	22	29	15	32	46	46	>50	>50
Circulation Pump, 200 HP, Chiller & Condenser Water											
Maintain Circulation Pump, 200 HP, Chiller & Condenser Water	1	1	1	1	1	1	1	1	1	1	1
Repair Circulation Pump, 200 HP, Chiller & Condenser Water	4	5	8	7	10	5	16	23	23	29	33
Replace Circulation Pump, 200 HP, Chiller & Condenser Water	13	14	23	22	29	15	32	46	46	>50	>50
Circulation Pump, 350 HP, Chiller & Condenser Water											
Maintain Circulation Pump, 350 HP, Chiller & Condenser Water	1	1	1	1	1	1	1	1	1	1	1
Repair Circulation Pump, 350 HP, Chiller & Condenser Water	4	5	8	7	10	5	16	23	23	29	33
Replace Circulation Pump, 350 HP, Chiller & Condenser Water	13	14	23	22	29	15	32	46	46	>50	>50
Condenser, Air Cooled, 2 Ton											
Maintain Condenser, Air-Cooled, 2 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Condenser, Air-Cooled, 2 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Condenser, Air-Cooled, 2 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Condenser, Air Cooled, 5 Ton											
Maintain Condenser, Air-Cooled, 5 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Condenser, Air-Cooled, 5 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Condenser, Air-Cooled, 5 Ton	13	14	23	22	29	15	32	46	46	>50	>50

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3030 Cooling Generating Systems											
Condenser, Air Cooled, 7 1/2 Ton											
Maintain Condenser, Air-Cooled, 7 1/2 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Condenser, Air-Cooled, 7 1/2 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Condenser, Air-Cooled, 7 1/2 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Condenser, Air-Cooled, 20 Ton											
Maintain Condenser, Air-Cooled, 20 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Condenser, Air-Cooled, 20 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Condenser, Air-Cooled, 20 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Condenser, Air-Cooled, 40 Ton											
Maintain Condenser, Air-Cooled, 40 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Condenser, Air-Cooled, 40 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Condenser, Air-Cooled, 40 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Condenser, Air-Cooled, 50 Ton											
Maintain Condenser, Air-Cooled, 50 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Condenser, Air-Cooled, 50 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Condenser, Air-Cooled, 50 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Condenser, Air-Cooled, 60 Ton											
Maintain Condenser, Air-Cooled, 60 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Condenser, Air-Cooled, 60 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Condenser, Air-Cooled, 60 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Condenser, Air-Cooled, 100 Ton											
Maintain Condenser, Air-Cooled, 100 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Condenser, Air-Cooled, 100 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Condenser, Air-Cooled, 100 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Condenser, Evaporative, 20 Ton											
Maintain Condenser, Evaporative, 20 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Condenser, Evaporative, 20 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Condenser, Evaporative, 20 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Condenser, Evaporative, 100 Ton											
Maintain Condenser, Evaporative, 100 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Condenser, Evaporative, 100 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Condenser, Evaporative, 100 Ton	13	14	23	22	29	15	32	46	46	>50	>50

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3030 Cooling Generating Systems											
Condenser, Evaporative, 300 Ton											
Maintain Condenser, Evaporative, 300 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Condenser, Evaporative, 300 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Condenser, Evaporative, 300 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Cooling Tower, 50 Ton											
Maintain Cooling Tower, 50 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Cooling Tower, 50 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Cooling Tower, 50 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Cooling Tower, 100 Ton											
Maintain Cooling Tower, 100 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Cooling Tower, 100 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Cooling Tower, 100 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Cooling Tower, 200 Ton											
Maintain Cooling Tower, 200 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Cooling Tower, 200 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Cooling Tower, 200 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Cooling Tower, 250 Ton											
Maintain Cooling Tower, 250 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Cooling Tower, 250 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Cooling Tower, 250 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Cooling Tower, 300 Ton											
Maintain Cooling Tower, 300 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Cooling Tower, 300 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Cooling Tower, 300 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Cooling Tower, 500 Ton											
Maintain Cooling Tower, 500 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Cooling Tower, 500 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Cooling Tower, 500 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Cooling Tower, 1,000 Ton											
Maintain Cooling Tower, 1,000 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Cooling Tower, 1,000 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Cooling Tower, 1,000 Ton	13	14	23	22	29	15	32	46	46	>50	>50

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3030 Cooling Generating Systems											
Cooling Tower, 1,400 Ton											
Maintain Cooling Tower, 1,400 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Cooling Tower, 1,400 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Cooling Tower, 1,400 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Evaporative Cooler, Direct, Packaged w/ Heat, 4 Ton											
Maintain Evaporative Cooler, Direct, Packaged w/ Heat, 4 Ton	1	1	1	1	1	1	1	1	1	1	1
Replace Evaporative Cooler, Direct, Packaged w/ Heat, 4 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Evaporative Cooler, Indirect, 2,000 Scfm											
Maintain Evaporative Cooler, Indirect, 2,000 Scfm	1	1	1	1	1	1	1	1	1	1	1
Replace Evaporative Cooler, Indirect, 2,000 Scfm	18	19	30	30	32	20	39	46	46	>50	>50
Evaporative Cooler, Indirect, 5,000 Scfm											
Maintain Evaporative Cooler, Indirect, 5,000 Scfm	1	1	1	1	1	1	1	1	1	1	1
Replace Evaporative Cooler, Indirect, 5,000 Scfm	18	19	30	30	32	20	39	46	46	>50	>50
Evaporative Cooler, Indirect, 15,000 Scfm											
Maintain Evaporative Cooler, Indirect, 15,000 Scfm	1	1	1	1	1	1	1	1	1	1	1
Replace Evaporative Cooler, Indirect, 15,000 Scfm	18	19	30	30	32	20	39	46	46	>50	>50
Evaporative Cooler, Indirect & Direct, Packaged w/ Heat, 4 Ton											
Maintain Evaporative Cooler, Indirect & Direct, Pkg'd w/ Heat, 4 Ton	1	1	1	1	1	1	1	1	1	1	1
Replace Evaporative Cooler, Indirect & Direct, Pkg'd w/ Heat, 4 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Evaporative Cooler, Indirect & Direct, Packaged w/ Heat, 20 Ton											
Maintain Evaporative Cooler, Indirect & Direct, Pkg'd w/ Heat, 20 Ton	1	1	1	1	1	1	1	1	1	1	1
Replace Evaporative Cooler, Indirect & Direct, Pkg'd w/ Heat, 20 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Flow Control Valve, Motorized, 1"											
Maintain Flow Control Valve & Actuator, 1"	1	1	1	1	1	1	1	1	1	1	1
Replace Valve Actuator, 1"	13	14	23	22	29	15	32	46	46	>50	>50
Replace Flow Control Valve, Motorized, 1"	15	16	26	25	33	17	36	>50	>50	>50	>50
Flow Control Valve, Motorized, 2"											
Maintain Flow Control Valve & Actuator, 2"	1	1	1	1	1	1	1	1	1	1	1
Replace Valve Actuator, 2"	13	14	23	22	29	15	32	46	46	>50	>50
Replace Flow Control Valve, Motorized, 2"	15	16	26	25	33	17	36	>50	>50	>50	>50
Flow Control Valve, Motorized, 4"											
Maintain Flow Control Valve & Actuator, 4"	1	1	1	1	1	1	1	1	1	1	1
Replace Valve Actuator, 4"	13	14	23	22	29	15	32	46	46	>50	>50
Replace Flow Control Valve, Motorized, 4"	15	16	26	25	33	17	36	>50	>50	>50	>50

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3030 Cooling Generating Systems											
Flow Control Valve, Motorized, 6"											
Maintain Flow Control Valve & Actuator, 6"	1	1	1	1	1	1	1	1	1	1	1
Replace Valve Actuator, 6"	13	14	23	22	29	15	32	46	46	>50	>50
Replace Flow Control Valve, Motorized, 6"	15	16	26	25	33	17	36	>50	>50	>50	>50
Flow Control Valve, Motorized, 8"											
Maintain Flow Control Valve & Actuator, 8"	1	1	1	1	1	1	1	1	1	1	1
Replace Valve Actuator, 8"	13	14	23	22	29	15	32	46	46	>50	>50
Replace Flow Control Valve, Motorized, 8"	15	16	26	25	33	17	36	>50	>50	>50	>50
Flow Control Valve, Motorized, 10"											
Maintain Flow Control Valve & Actuator, 10"	1	1	1	1	1	1	1	1	1	1	1
Replace Valve Actuator, 10"	13	14	23	22	29	15	32	46	46	>50	>50
Replace Flow Control Valve, Motorized, 10"	15	16	26	25	33	17	36	>50	>50	>50	>50
Flow Control Valve, Motorized, 12"											
Maintain Flow Control Valve & Actuator, 12"	1	1	1	1	1	1	1	1	1	1	1
Replace Valve Actuator, 12"	13	14	23	22	29	15	32	46	46	>50	>50
Replace Flow Control Valve, Motorized, 12"	15	16	26	25	33	17	36	>50	>50	>50	>50
Globe Valve, 6"											
Lubricate, Repack Gland, Globe Valve, 6"	1	1	1	1	1	1	1	1	1	1	1
Replace Globe Valve, 6"	18	19	30	30	32	20	39	46	46	>50	>50
Pipe & Fittings, 1" Copper											
Resolder Joint, Pipe & Fittings, 1" Copper	10	10	10	10	10	10	10	10	10	10	10
Replace 10' Section, Pipe & Fittings, 1" Copper	20	20	20	20	20	20	20	20	20	20	20
Replace Pipe & Fittings, 1" Copper (20% of Pipe)	25	25	25	25	25	25	25	25	25	25	25
Pipe & Fittings, 2" Copper											
Resolder Joint, Pipe & Fittings, 2" Copper	10	10	10	10	10	10	10	10	10	10	10
Replace 10' Section, Pipe & Fittings, 2" Copper	20	20	20	20	20	20	20	20	20	20	20
Replace Pipe & Fittings, 2" Copper (20% of Pipe)	25	25	25	25	25	25	25	25	25	25	25
Pipe & Fittings, 3" Copper											
Resolder Joint, Pipe & Fittings, 3" Copper	10	10	10	10	10	10	10	10	10	10	10
Replace 10' Section, Pipe & Fittings, 3" Copper	20	20	20	20	20	20	20	20	20	20	20
Replace Pipe & Fittings, 3" Copper (20% of Pipe)	25	25	25	25	25	25	25	25	25	25	25

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3030 Cooling Generating Systems											
Pipe & Fittings, 4" Copper											
Resolder Joint, Pipe & Fittings, 4" Copper	10	10	10	10	10	10	10	10	10	10	10
Replace 10' Section, Pipe & Fittings, 4" Copper	20	20	20	20	20	20	20	20	20	20	20
Replace Pipe & Fittings, 4" Copper (20% of Pipe)	25	25	25	25	25	25	25	25	25	25	25
Pipe & Fittings, 6" Copper											
Resolder Joint, Pipe & Fittings, 6" Copper	10	10	10	10	10	10	10	10	10	10	10
Replace 10' Section, Pipe & Fittings, 6" Copper	20	20	20	20	20	20	20	20	20	20	20
Replace Pipe & Fittings, 6" Copper (20% of Pipe)	25	25	25	25	25	25	25	25	25	25	25
Pipe & Fittings, 8" Copper											
Resolder Joint, Pipe & Fittings, 8" Copper	10	10	10	10	10	10	10	10	10	10	10
Replace 10' Section, Pipe & Fittings, 8" Copper	20	20	20	20	20	20	20	20	20	20	20
Replace Pipe & Fittings, 8" Copper (20% of Pipe)	25	25	25	25	25	25	25	25	25	25	25
Pipe & Fittings, 3/4" Steel											
Replace 10' Section, Pipe & Fittings, 3/4" Steel	12	12	12	12	12	12	12	12	12	12	12
Install New Gasket & Bolts, Pipe & Fittings, 3/4" Steel	25	25	25	25	25	25	25	25	25	25	25
Replace Pipe & Fittings, 3/4" Steel (20% of Pipe)	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50
Pipe & Fittings, 1" Steel											
Replace 10' Section, Pipe & Fittings, 1" Steel	12	12	12	12	12	12	12	12	12	12	12
Install New Gasket & Bolts, Pipe & Fittings, 1" Steel	25	25	25	25	25	25	25	25	25	25	25
Replace Pipe & Fittings, 1" Steel (20% of Pipe)	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50
Pipe & Fittings, 2" Steel											
Replace 10' Section, Pipe & Fittings, 2" Steel	12	12	12	12	12	12	12	12	12	12	12
Install New Gasket & Bolts, Pipe & Fittings, 2" Steel	25	25	25	25	25	25	25	25	25	25	25
Replace Pipe & Fittings, 2" Steel (20% of Pipe)	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50
Pipe & Fittings, 3" Steel											
Replace 10' Section, Pipe & Fittings, 3" Steel	12	12	12	12	12	12	12	12	12	12	12
Install New Gasket & Bolts, Pipe & Fittings, 3" Steel	25	25	25	25	25	25	25	25	25	25	25
Replace Pipe & Fittings, 3" Steel (20% of Pipe)	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50
Pipe & Fittings, 4" Steel											
Replace 10' Section, Pipe & Fittings, 4" Steel	12	12	12	12	12	12	12	12	12	12	12
Install New Gasket & Bolts, Pipe & Fittings, 4" Steel	25	25	25	25	25	25	25	25	25	25	25
Replace Pipe & Fittings, 4" Steel (20% of Pipe)	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3030 Cooling Generating Systems											
Pipe & Fittings, 6" Steel											
Replace 10' Section, Pipe & Fittings, 6" Steel	12	12	12	12	12	12	12	12	12	12	12
Install New Gasket & Bolts, Pipe & Fittings, 6" Steel	25	25	25	25	25	25	25	25	25	25	25
Replace Pipe & Fittings, 6" Steel (20% of Pipe)	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50
Pipe & Fittings, 8" Steel											
Replace 10' Section, Pipe & Fittings, 8" Steel	12	12	12	12	12	12	12	12	12	12	12
Install New Gasket & Bolts, Pipe & Fittings, 8" Steel	25	25	25	25	25	25	25	25	25	25	25
Replace Pipe & Fittings, 8" Steel (20% of Pipe)	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50
Pipe & Fittings, 10" Steel											
Replace 10' Section, Pipe & Fittings, 10" Steel	12	12	12	12	12	12	12	12	12	12	12
Install New Gasket & Bolts, Pipe & Fittings, 10" Steel	25	25	25	25	25	25	25	25	25	25	25
Replace Pipe & Fittings, 10" Steel (20% of Pipe)	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50
Pipe & Fittings, 12" Steel											
Replace 10' Section, Pipe & Fittings, 12" Steel	12	12	12	12	12	12	12	12	12	12	12
Install New Gasket & Bolts, Pipe & Fittings, 12" Steel	25	25	25	25	25	25	25	25	25	25	25
Replace Pipe & Fittings, 12" Steel (20% of Pipe)	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50
Pipe Insulation, Fiberglass, Chilled Water											
Re-tape Pipe Insulation, Fiberglass, Chilled Water	5	5	5	5	5	5	5	5	5	5	5
Replace Pipe Insulation, Fiberglass, Chilled Water (20% of Insulation)	25	25	25	25	25	25	25	25	25	25	25
Plug Valve, 6"											
Lubricate, Repack Gland, Plug Valve, 6"	1	1	1	1	1	1	1	1	1	1	1
Replace Plug Valve, 6"	18	19	30	30	32	20	39	46	46	>50	>50
Plug Valve, 8"											
Lubricate, Repack Gland, Plug Valve, 8"	1	1	1	1	1	1	1	1	1	1	1
Replace Plug Valve, 8"	18	19	30	30	32	20	39	46	46	>50	>50
D3040 Distribution Systems											
Air Curtain, 1,000 Cfm											
Maintain Air Curtain, 1,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Replace Fan & Motor, Air Curtain, 1,000 Cfm	13	13	13	14	15	15	16	17	18	19	26
Replace Air Curtain, 1,000 Cfm	18	17	18	19	19	20	22	23	24	26	35
Air Filters, HEPA											
Replace Air Filters, HEPA	1	1	1	1	1	1	1	1	1	1	1

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3040 Distribution Systems											
Air Handler, Exhaust, 15,000 Cfm											
Maintain Air Handler, Exhaust, 15,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Exhaust, 15,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Exhaust, 15,000 Cfm	18	17	18	19	19	20	22	23	24	26	35
Air Handler, Exhaust, 20,000 Cfm											
Maintain Air Handler, Exhaust, 20,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Exhaust, 20,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Exhaust, 20,000 Cfm	18	17	18	19	19	20	22	23	24	26	35
Air Handler, Exhaust, 40,000 Cfm											
Maintain Air Handler, Exhaust, 40,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Exhaust, 40,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Exhaust, 40,000 Cfm	18	17	18	19	19	20	22	23	24	26	35
Air Handler, Multizone, 2,500 Cfm											
Maintain Air Handler, Multizone, 2,500 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Multizone, 2,500 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Multizone, 2,500 Cfm	13	13	13	14	15	15	16	17	18	19	26
Air Handler, Multizone, 5,200 Cfm											
Maintain Air Handler, Multizone, 5,200 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Multizone, 5,200 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Multizone, 5,200 Cfm	13	13	13	14	15	15	16	17	18	19	26
Air Handler, Multizone, 6,500 Cfm											
Maintain Air Handler, Multizone, 6,500 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Multizone, 6,500 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Multizone, 6,500 Cfm	13	13	13	14	15	15	16	17	18	19	26
Air Handler, Multizone, 10,000 Cfm											
Maintain Air Handler, Multizone, 10,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Multizone, 10,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Multizone, 10,000 Cfm	13	13	13	14	15	15	16	17	18	19	26
Air Handler, Multizone, 15,000 Cfm											
Maintain Air Handler, Multizone, 15,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Multizone, 15,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Multizone, 15,000 Cfm	13	13	13	14	15	15	16	17	18	19	26

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3040 Distribution Systems											
Air Handler, Multizone, 20,000 Cfm											
Maintain Air Handler, Multizone, 20,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Multizone, 20,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Multizone, 20,000 Cfm	13	13	13	14	15	15	16	17	18	19	26
Air Handler, Multizone, 25,000 Cfm											
Maintain Air Handler, Multizone, 25,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Multizone, 25,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Multizone, 25,000 Cfm	13	13	13	14	15	15	16	17	18	19	26
Air Handler, Multizone, 40,000 Cfm											
Maintain Air Handler, Multizone, 40,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Multizone, 40,000 Cfm	8	9	9	10	10	10	11	11	12	13	18
Replace Air Handler, Multizone, 40,000 Cfm	13	13	13	14	15	15	16	17	18	19	26
Air Handler, Multizone, 50,000 Cfm											
Maintain Air Handler, Multizone, 50,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Multizone, 50,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Multizone, 50,000 Cfm	13	13	13	14	15	15	16	17	18	19	26
Air Handler, Multizone, 65,000 Cfm											
Maintain Air Handler, Multizone, 65,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Multizone, 65,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Multizone, 65,000 Cfm	13	13	13	14	15	15	16	17	18	19	26
Air Handler, Multizone, Variable Volume w/ Exhaust Recovery Wheel, 2,500 Cfm											
Maintain Air Handler, Multizone, Var. Vol. w/ Exhaust Recov. Wheel, 2,500 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Multizone, Var. Vol. w/ Exhaust Recov. Wheel, 2,500 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Multizone, Var. Vol. w/ Exhaust Recov. Wheel, 2,500 Cfm	13	13	13	14	15	15	16	17	18	19	26
Air Handler, Multizone, Variable Volume w/ Exhaust Recovery Wheel, 20,000 Cfm											
Maintain Air Handler, Multizone, Var. Vol. w/ Exhaust Recov. Wheel, 20,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Multizone, Var. Vol. w/ Exhaust Recov. Wheel, 20,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Multizone, Var. Vol. w/ Exhaust Recov. Wheel, 20,000 Cfm	13	13	13	14	15	15	16	17	18	19	26
Air Handler, Multizone, Variable Volume w/ Exhaust Recovery Wheel, 40,000 Cfm											
Maintain Air Handler, Multizone, Var. Vol. w/ Exhaust Recov. Wheel, 40,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Multizone, Var. Vol. w/ Exhaust Recov. Wheel, 40,000 Cfm	8	9	9	10	10	10	11	11	12	13	18
Replace Air Handler, Multizone, Var. Vol. w/ Exhaust Recov. Wheel, 40,000 Cfm	13	13	13	14	15	15	16	17	18	19	26

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3040 Distribution Systems											
Air Handler, Single Zone, 1,300 Cfm											
Maintain Air Handler, Single Zone, 1,300 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Single Zone, 1,300 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Single Zone, 1,300 Cfm	13	13	13	14	15	15	16	17	18	19	26
Air Handler, Single Zone, 6,500 Cfm											
Maintain Air Handler, Single Zone, 6,500 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Single Zone, 6,500 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Single Zone, 6,500 Cfm	13	13	13	14	15	15	16	17	18	19	26
Air Handler, Single Zone, 10,000 Cfm											
Maintain Air Handler, Single Zone, 10,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Single Zone, 10,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Single Zone, 10,000 Cfm	13	13	13	14	15	15	16	17	18	19	26
Air Handler, Single Zone, 15,000 Cfm											
Maintain Air Handler, Single Zone, 15,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Single Zone, 15,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Single Zone, 20,000 Cfm	13	13	13	14	15	15	16	17	18	19	26
Air Handler, Single Zone, 20,000 Cfm											
Maintain Air Handler, Single Zone, 20,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Single Zone, 20,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Single Zone, 20,000 Cfm	13	13	13	14	15	15	16	17	18	19	26
Air Handler, Single Zone, 30,000 Cfm											
Maintain Air Handler, Single Zone, 30,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Single Zone, 30,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Single Zone, 30,000 Cfm	13	13	13	14	15	15	16	17	18	19	26
Air Handler, Single Zone, 50,000 Cfm											
Maintain Air Handler, Single Zone, 50,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Single Zone, 50,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Single Zone, 50,000 Cfm	13	13	13	14	15	15	16	17	18	19	26
Air Handler, Single Zone, 100,000 Cfm											
Maintain Air Handler, Single Zone, 100,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Single Zone, 100,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Single Zone, 100,000 Cfm	13	13	13	14	15	15	16	17	18	19	26

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3040 Distribution Systems											
Air Handler, Single Zone, 120,000 Cfm											
Maintain Air Handler, Single Zone, 120,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Single Zone, 120,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Single Zone, 120,000 Cfm	13	13	13	14	15	15	16	17	18	19	26
Air Handler, Single Zone, 135,000 Cfm											
Maintain Air Handler, Single Zone, 135,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Single Zone, 135,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Single Zone, 135,000 Cfm	13	13	13	14	15	15	16	17	18	19	26
Air Handler, Single Zone, 150,000 Cfm											
Maintain Air Handler, Single Zone, 150,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Air Handler, Single Zone, 150,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Air Handler, Single Zone, 150,000 Cfm	13	13	13	14	15	15	16	17	18	19	26
Booster Fan, 120,000 Cfm											
Maintain Booster Fan, 120,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Booster Fan, 120,000 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Booster Fan, 120,000 Cfm	38	32	24	22	19	20	15	15	14	12	12
Ceiling Panel, Radiant, Hydronic											
Replace Ceiling Panel, Radiant, Hydronic	>50	>50	>50	46	46	50	39	39	34	30	30
Dehumidifier & Control, 120-150 lbs, 4,500 Cfm											
Maintain Dehumidifier & Control, 120-150 lbs, 4,500 Cfm	1	1	1	1	1	1	1	1	1	1	1
Replace Dehumidifier & Control, 120-150 lbs, 4,500 Cfm	18	17	18	19	19	20	22	23	24	26	35
Duct Insulation, Fiberglass Blanket											
Replace Duct Insulation (20% of Insulation)	>50	>50	40	37	32	30	26	25	23	22	22
Ductwork											
Replace Existing Ductwork (20% of Ductwork)	>50	>50	40	37	32	30	26	25	23	22	22
Ductwork, Stainless Steel											
Replace Existing Ductwork (20% of Ductwork)	>50	>50	40	37	32	30	26	25	23	22	22
Exhaust Fan, Ceiling, 200-500 Cfm											
Maintain Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	1	1	1	1	1	1	1	1	1	1	1
Replace Fan & Motor, Exhaust Fan, Ceiling 200-500 Cfm	18	17	18	19	19	20	22	23	24	26	35

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3040 Distribution Systems											
Exhaust Fan, Centrifugal, 250 Cfm											
Maintain Exhaust Fan, Centrifugal, 250 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Exhaust Fan, Centrifugal, 250 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Exhaust Fan, Centrifugal, 250 Cfm	38	32	24	22	19	20	15	15	14	12	12
Exhaust Fan, Centrifugal, 800 Cfm											
Maintain Exhaust Fan, Centrifugal, 800 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Exhaust Fan, Centrifugal, 800 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Exhaust Fan, Centrifugal, 800 Cfm	38	32	24	22	19	20	15	15	14	12	12
Exhaust Fan, Centrifugal, 2,000 Cfm											
Maintain Exhaust Fan, Centrifugal, 2,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Exhaust Fan, Centrifugal, 2,000 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Exhaust Fan, Centrifugal, 2,000 Cfm	38	32	24	22	19	20	15	15	14	12	12
Exhaust Fan, Centrifugal, 5,000 Cfm											
Maintain Exhaust Fan, Centrifugal, 5,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Exhaust Fan, Centrifugal, 5,000 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Exhaust Fan, Centrifugal, 5,000 Cfm	38	32	24	22	19	20	15	15	14	12	12
Exhaust Fan, Centrifugal, 8,000 Cfm											
Maintain Exhaust Fan, Centrifugal, 8,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Exhaust Fan, Centrifugal, 8,000 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Exhaust Fan, Centrifugal, 8,000 Cfm	38	32	24	22	19	20	15	15	14	12	12
Exhaust Fan, Centrifugal, 10,000 Cfm											
Maintain Exhaust Fan, Centrifugal, 10,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Exhaust Fan, Centrifugal, 10,000 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Exhaust Fan, Centrifugal, 10,000 Cfm	38	32	24	22	19	20	15	15	14	12	12
Exhaust Fan, Centrifugal, 16,000 Cfm											
Maintain Exhaust Fan, Centrifugal, 16,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Exhaust Fan, Centrifugal, 16,000 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Exhaust Fan, Centrifugal, 16,000 Cfm	38	32	24	22	19	20	15	15	14	12	12
Exhaust Fan, Centrifugal, 25,000 Cfm											
Maintain Exhaust Fan, Centrifugal, 25,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Exhaust Fan, Centrifugal, 25,000 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Exhaust Fan, Centrifugal, 25,000 Cfm	38	32	24	22	19	20	15	15	14	12	12

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3040 Distribution Systems											
Exhaust Fan, Centrifugal, 30,000 Cfm											
Maintain Exhaust Fan, Centrifugal, 30,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Exhaust Fan, Centrifugal, 30,000 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Exhaust Fan, Centrifugal, 30,000 Cfm	38	32	24	22	19	20	15	15	14	12	12
Exhaust Fan, Centrifugal, 60,000 Cfm											
Maintain Exhaust Fan, Centrifugal, 60,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Exhaust Fan, Centrifugal, 60,000 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Exhaust Fan, Centrifugal, 60,000 Cfm	38	32	24	22	19	20	15	15	14	12	12
Exhaust Fan, Propeller, 375 Cfm											
Maintain Exhaust Fan, Propeller, 375 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Exhaust Fan, Propeller, 375 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Exhaust Fan, Propeller, 375 Cfm	38	32	24	22	19	20	15	15	14	12	12
Exhaust Fan, Propeller, 800 Cfm											
Maintain Exhaust Fan, Propeller, 800 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Exhaust Fan, Propeller, 800 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Exhaust Fan, Propeller, 800 Cfm	38	32	24	22	19	20	15	15	14	12	12
Exhaust Fan, Propeller, 1,000 Cfm											
Maintain Exhaust Fan, Propeller, 1,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Exhaust Fan, Propeller, 1,000 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Exhaust Fan, Propeller, 1,000 Cfm	38	32	24	22	19	20	15	15	14	12	12
Exhaust Fan, Propeller, 4,700 Cfm											
Maintain Exhaust Fan, Propeller, 4,700 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Exhaust Fan, Propeller, 4,700 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Exhaust Fan, Propeller, 4,700 Cfm	38	32	24	22	19	20	15	15	14	12	12
Exhaust Fan, Propeller, 7,500 Cfm											
Maintain Exhaust Fan, Propeller, 7,500 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Exhaust Fan, Propeller, 7,500 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Exhaust Fan, Propeller, 7,500 Cfm	38	32	24	22	19	20	15	15	14	12	12
Exhaust Fan, Propeller, 10,000 Cfm											
Maintain Exhaust Fan, Propeller, 10,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Exhaust Fan, Propeller, 10,000 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Exhaust Fan, Propeller, 10,000 Cfm	38	32	24	22	19	20	15	15	14	12	12

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3040 Distribution Systems											
Exhaust Fan, Roof Mounted, 800 Cfm											
Maintain Exhaust Fan, Roof Mounted, 800 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Exhaust Fan, Roof Mounted, 800 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Exhaust Fan, Roof Mounted, 800 Cfm	38	32	24	22	19	20	15	15	14	12	12
Exhaust Fan, Roof Mounted, 1,000 Cfm											
Maintain Exhaust Fan, Roof Mounted, 1,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Exhaust Fan, Roof Mounted, 1,000 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Exhaust Fan, Roof Mounted, 1,000 Cfm	38	32	24	22	19	20	15	15	14	12	12
Exhaust Fan, Roof Mounted, 2,000 Cfm											
Maintain Exhaust Fan, Roof Mounted, 2,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Exhaust Fan, Roof Mounted, 2,000 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Exhaust Fan, Roof Mounted, 2,000 Cfm	38	32	24	22	19	20	15	15	14	12	12
Exhaust Fan, Roof Mounted, 5,000 Cfm											
Maintain Exhaust Fan, Roof Mounted, 5,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Exhaust Fan, Roof Mounted, 5,000 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Exhaust Fan, Roof Mounted, 5,000 Cfm	38	32	24	22	19	20	15	15	14	12	12
Exhaust Fan, Roof Mounted, 8,500 Cfm											
Maintain Exhaust Fan, Roof Mounted, 8,500 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Exhaust Fan, Roof Mounted, 8,500 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Exhaust Fan, Roof Mounted, 8,500 Cfm	38	32	24	22	19	20	15	15	14	12	12
Exhaust Fan, Roof Mounted, 10,000 Cfm											
Maintain Exhaust Fan, Roof Mounted, 10,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Exhaust Fan, Roof Mounted, 10,000 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Exhaust Fan, Roof Mounted, 10,000 Cfm	38	32	24	22	19	20	15	15	14	12	12
Exhaust Fan, Roof Mounted, 20,000 Cfm											
Maintain Exhaust Fan, Roof Mounted, 20,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Exhaust Fan, Roof Mounted, 20,000 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Exhaust Fan, Roof Mounted, 20,000 Cfm	38	32	24	22	19	20	15	15	14	12	12
Fan, Axial Flow, 3,800 Cfm											
Maintain Fan, Axial Flow, 3,800 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Fan, Axial Flow, 3,800 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Fan, Axial Flow, 3,800 Cfm	38	32	24	22	19	20	15	15	14	12	12

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3040 Distribution Systems											
Fan, Axial Flow, 5,000 Cfm											
Maintain Fan, Axial Flow, 5,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Fan, Axial Flow, 5,000 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Fan, Axial Flow, 5,000 Cfm	38	32	24	22	19	20	15	15	14	12	12
Fan, Axial Flow, 6,400 Cfm											
Maintain Fan, Axial Flow, 6,400 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Fan, Axial Flow, 6,400 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Fan, Axial Flow, 6,400 Cfm	38	32	24	22	19	20	15	15	14	12	12
Fan, Axial Flow, 10,000 Cfm											
Maintain Fan, Axial Flow, 10,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Fan, Axial Flow, 10,000 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Fan, Axial Flow, 10,000 Cfm	38	32	24	22	19	20	15	15	14	12	12
Fan, Axial Flow, 15,000 Cfm											
Maintain Fan, Axial Flow, 15,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Fan, Axial Flow, 15,000 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Fan, Axial Flow, 15,000 Cfm	38	32	24	22	19	20	15	15	14	12	12
Fan, Axial Flow, 30,000 Cfm											
Maintain Fan, Axial Flow, 30,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Fan, Axial Flow, 30,000 Cfm	24	19	13	12	11	10	9	8	8	7	7
Replace Fan, Axial Flow, 30,000 Cfm	38	32	24	22	19	20	15	15	14	12	12
Humidifier, Electric, Duct w/ Controls											
Maintain Humidifier, Electric, Duct w/ Controls	1	1	1	1	1	1	1	1	1	1	1
Replace Humidifier, Electric, Duct w/ Controls	38	32	24	22	19	20	15	15	14	12	12
Humidifier, Steam, Duct w/ Controls											
Maintain Humidifier, Steam, Duct w/ Controls	1	1	1	1	1	1	1	1	1	1	1
Replace Humidifier, Steam, Duct w/ Controls	38	32	24	22	19	20	15	15	14	12	12
Steel Damper											
Refinish Steel Damper	10	10	10	10	10	10	10	10	10	10	10
Replace Steel Damper	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50
Steel Damper, Motorized											
Clean, Lubricate, and Inspect Steel Damper, Motorized	5	5	5	5	5	5	5	5	5	5	5
Refinish Steel Damper, Motorized	10	10	10	10	10	10	10	10	10	10	10
Replace Steel Damper, Motorized	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50	>50

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3040 Distribution Systems											
Steel Damper, Motorized, w/ Actuator											
Clean, Lubricate, and Inspect Steel Damper, Motorized, w/ Actuator	5	5	5	5	5	5	5	5	5	5	5
Refinish Steel Damper, Motorized, w/ Actuator	10	10	10	10	10	10	10	10	10	10	10
Replace Steel Damper, Motorized, w/ Actuator	20	20	20	20	20	20	20	20	20	20	20
Supply Fan, Roof Mounted, 1,000 Cfm											
Maintain Supply Fan, Roof Mounted, 1,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Supply Fan, Roof Mounted, 1,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Supply Fan, Roof Mounted, 1,000 Cfm	18	17	18	19	19	20	22	23	24	26	35
Supply Fan, Roof Mounted, 5,000 Cfm											
Maintain Supply Fan, Roof Mounted, 5,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Supply Fan, Roof Mounted, 5,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Supply Fan, Roof Mounted, 5,000 Cfm	18	17	18	19	19	20	22	23	24	26	35
Supply Fan, Roof Mounted, 10,000 Cfm											
Maintain Supply Fan, Roof Mounted, 10,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Supply Fan, Roof Mounted, 10,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Supply Fan, Roof Mounted, 10,000 Cfm	18	17	18	19	19	20	22	23	24	26	35
Variable Air Volume Box, 10,000 Cfm											
Maintain Variable Air Volume Box, 10,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Variable Air Volume Box, 10,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Variable Air Volume Box, 10,000 Cfm	13	13	13	14	15	15	16	17	18	19	26
Variable Air Volume Box, 25,000 Cfm											
Maintain Variable Air Volume Box, 25,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Variable Air Volume Box, 25,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Variable Air Volume Box, 25,000 Cfm	13	13	13	14	15	15	16	17	18	19	26
Variable Air Volume Box, 50,000 Cfm											
Maintain Variable Air Volume Box, 50,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Variable Air Volume Box, 50,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Variable Air Volume Box, 50,000 Cfm	13	13	13	14	15	15	16	17	18	19	26
Variable Air Volume Box, 65,000 Cfm											
Maintain Variable Air Volume Box, 65,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Variable Air Volume Box, 65,000 Cfm	9	8	9	10	10	10	11	11	12	13	18
Replace Variable Air Volume Box, 65,000 Cfm	13	13	13	14	15	15	16	17	18	19	26
Variable Air Volume Control Box											
Maintain Variable Air Volume Control Box	1	1	1	1	1	1	1	1	1	1	1

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3050 Terminal & Package Units											
Air Conditioner, Computer Room, Air Cooled, 3 Ton											
Maintain Air Conditioner, Computer Room, Air Cooled, 3 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Computer Room, Air Cooled, 3 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Computer Room, Air Cooled, 3 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Air Conditioner, Computer Room, Air Cooled, 5 Ton											
Maintain Air Conditioner, Computer Room, Air Cooled, 5 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Computer Room, Air Cooled, 5 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Computer Room, Air Cooled, 5 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Air Conditioner, Computer Room, Air Cooled, 10 Ton											
Maintain Air Conditioner, Computer Room, Air Cooled, 10 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Computer Room, Air Cooled, 10 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Computer Room, Air Cooled, 10 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Air Conditioner, Computer Room, Air Cooled, 15 Ton											
Maintain Air Conditioner, Computer Room, Air Cooled, 15 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Computer Room, Air Cooled, 15 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Computer Room, Air Cooled, 15 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Air Conditioner, Computer Room, Air Cooled, 20 Ton											
Maintain Air Conditioner, Computer Room, Air Cooled, 20 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Computer Room, Air Cooled, 20 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Computer Room, Air Cooled, 20 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Air Conditioner, Computer Room, Chilled Water, 5 Ton											
Maintain Air Conditioner, Computer Room, Chilled Water, 5 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Computer Room, Chilled Water, 5 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Computer Room, Chilled Water, 5 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Air Conditioner, Computer Room, Chilled Water, 10 Ton											
Maintain Air Conditioner, Computer Room, Chilled Water, 10 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Computer Room, Chilled Water, 10 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Computer Room, Chilled Water, 10 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Air Conditioner, Computer Room, Chilled Water, 15 Ton											
Maintain Air Conditioner, Computer Room, Chilled Water, 15 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Computer Room, Chilled Water, 15 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Computer Room, Chilled Water, 15 Ton	18	19	30	30	32	20	39	46	46	>50	>50

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3050 Terminal & Package Units											
Air Conditioner, Computer Room, Chilled Water, 20 Ton											
Maintain Air Conditioner, Computer Room, Chilled Water, 20 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Computer Room, Chilled Water, 20 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Computer Room, Chilled Water, 20 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Air Conditioner, Computer Room, Chilled Water, 30 Ton											
Maintain Air Conditioner, Computer Room, Chilled Water, 30 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Computer Room, Chilled Water, 30 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Computer Room, Chilled Water, 30 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Air Conditioner, Indoor DX Packaged, Air Cooled, 5 Ton											
Maintain Air Conditioner, Indoor DX Packaged, Air Cooled, 5 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Indoor DX Packaged, Air Cooled, 5 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Indoor DX Packaged, Air Cooled, 5 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Air Conditioner, Indoor DX Packaged, Air Cooled, 10 Ton											
Maintain Air Conditioner, Indoor DX Packaged, Air Cooled, 10 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Indoor DX Packaged, Air Cooled, 10 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Indoor DX Packaged, Air Cooled, 10 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton											
Maintain Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Indoor DX Packaged, Air Cooled, 20 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Air Conditioner, Indoor DX Packaged, Air Cooled, 50 Ton											
Maintain Air Conditioner, Indoor DX Packaged, Air Cooled, 50 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Indoor DX Packaged, Air Cooled, 50 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Indoor DX Packaged, Air Cooled, 50 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Air Conditioner, Multizone, Variable Refrigerant Vol., Pre-Cond., 6.5 Ton											
Maintain Air Conditioner, Multizone, Variable Refrig. Vol., Pre-Cond., 6.5 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Multizone, Variable Refrig. Vol., Pre-Cond., 6.5 Ton	9	8	9	10	10	10	11	11	12	13	18
Replace Air Conditioner, Multizone, Variable Refrig. Vol., Pre-Cond., 6.5 Ton	13	13	13	14	15	15	16	17	18	19	26
Air Conditioner, Multizone, Variable Refrigerant Vol., Pre-Cond., 50 Ton											
Maintain Air Conditioner, Multizone, Variable Refrig. Vol., Pre-Cond., 50 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Multizone, Variable Refrig. Vol., Pre-Cond., 50 Ton	9	8	9	10	10	10	11	11	12	13	18
Replace Air Conditioner, Multizone, Variable Refrig. Vol., Pre-Cond., 50 Ton	13	13	13	14	15	15	16	17	18	19	26

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3050 Terminal & Package Units											
Air Conditioner, Multizone, Variable Refrigerant Vol., Pre-Cond., 100 Ton											
Maintain Air Conditioner, Multizone, Variable Refrig. Vol., Pre-Cond., 100 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Multizone, Variable Refrig. Vol., Pre-Cond., 100 Ton	8	9	9	10	10	10	11	11	12	13	18
Replace Air Conditioner, Multizone, Variable Refrig. Vol., Pre-Cond., 100 Ton	13	13	13	14	15	15	16	17	18	19	26
Air Conditioner, Multizone, Variable Volume, 50 Ton											
Maintain Air Conditioner, Multizone, Variable Volume, 50 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Multizone, Variable Volume, 50 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Multizone, Variable Volume, 50 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Multizone, Variable Volume, 70 Ton											
Maintain Air Conditioner, Multizone, Variable Volume, 70 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Multizone, Variable Volume, 70 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Multizone, Variable Volume, 70 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Multizone, Variable Volume, 90 Ton											
Maintain Air Conditioner, Multizone, Variable Volume, 90 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Multizone, Variable Volume, 90 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Multizone, Variable Volume, 90 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Multizone, Variable Volume, 105 Ton											
Maintain Air Conditioner, Multizone, Variable Volume, 105 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Multizone, Variable Volume, 105 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Multizone, Variable Volume, 105 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Multizone, Variable Volume, 140 Ton											
Maintain Air Conditioner, Multizone, Variable Volume, 140 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Multizone, Variable Volume, 140 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Multizone, Variable Volume, 140 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Rooftop, Multizone, 3 Ton											
Maintain Air Conditioner, Rooftop, Multizone, 3 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Rooftop, Multizone, 3 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Rooftop, Multizone, 3 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Rooftop, Multizone, 5 Ton											
Maintain Air Conditioner, Rooftop, Multizone, 5 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Rooftop, Multizone, 5 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Rooftop, Multizone, 5 Ton	13	14	23	22	29	15	32	46	46	>50	>50

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3050 Terminal & Package Units											
Air Conditioner, Rooftop, Multizone, 7-1/2 Ton											
Maintain Air Conditioner, Rooftop, Multizone, 7-1/2 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Rooftop, Multizone, 7-1/2 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Rooftop, Multizone, 7-1/2 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Rooftop, Multizone, 10 Ton											
Maintain Air Conditioner, Rooftop, Multizone, 10 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Rooftop, Multizone, 10 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Rooftop, Multizone, 10 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Rooftop, Multizone, 15 Ton											
Maintain Air Conditioner, Rooftop, Multizone, 15 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Rooftop, Multizone, 15 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Rooftop, Multizone, 15 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Rooftop, Multizone, 20 Ton											
Maintain Air Conditioner, Rooftop, Multizone, 20 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Rooftop, Multizone, 20 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Rooftop, Multizone, 20 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Rooftop, Multizone, 25 Ton											
Maintain Air Conditioner, Rooftop, Multizone, 25 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Rooftop, Multizone, 25 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Rooftop, Multizone, 25 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Rooftop, Multizone, 40 Ton											
Maintain Air Conditioner, Rooftop, Multizone, 40 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Rooftop, Multizone, 40 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Rooftop, Multizone, 40 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Rooftop, Multizone, 50 Ton											
Maintain Air Conditioner, Rooftop, Multizone, 50 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Rooftop, Multizone, 50 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Rooftop, Multizone, 50 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Rooftop, Multizone, 70 Ton											
Maintain Air Conditioner, Rooftop, Multizone, 70 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Rooftop, Multizone, 70 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Rooftop, Multizone, 70 Ton	13	14	23	22	29	15	32	46	46	>50	>50

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3050 Terminal & Package Units											
Air Conditioner, Rooftop, Multizone, 140 Ton											
Maintain Air Conditioner, Rooftop, Multizone, 140 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Rooftop, Multizone, 140 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Rooftop, Multizone, 140 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Rooftop, Single Zone, 3 Ton											
Maintain Air Conditioner, Rooftop, Single Zone, 3 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Rooftop, Single Zone, 3 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Rooftop, Single Zone, 3 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Rooftop, Single Zone, 5 Ton											
Maintain Air Conditioner, Rooftop, Single Zone, 5 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Rooftop, Single Zone, 5 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Rooftop, Single Zone, 5 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Rooftop, Single Zone, 7-1/2 Ton											
Maintain Air Conditioner, Rooftop, Single Zone, 7-1/2 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Rooftop, Single Zone, 7-1/2 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Rooftop, Single Zone, 7-1/2 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Rooftop, Single Zone, 10 Ton											
Maintain Air Conditioner, Rooftop, Single Zone, 10 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Rooftop, Single Zone, 10 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Rooftop, Single Zone, 10 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Rooftop, Single Zone, 15 Ton											
Maintain Air Conditioner, Rooftop, Single Zone, 15 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Rooftop, Single Zone, 15 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Rooftop, Single Zone, 15 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Rooftop, Single Zone, 20 Ton											
Maintain Air Conditioner, Rooftop, Single Zone, 20 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Rooftop, Single Zone, 20 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Rooftop, Single Zone, 20 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Rooftop, Single Zone, 25 Ton											
Maintain Air Conditioner, Rooftop, Single Zone, 25 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Rooftop, Single Zone, 25 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Rooftop, Single Zone, 25 Ton	13	14	23	22	29	15	32	46	46	>50	>50

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3050 Terminal & Package Units											
Air Conditioner, Rooftop, Single Zone, 50 Ton											
Maintain Air Conditioner, Rooftop, Single Zone, 50 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Rooftop, Single Zone, 50 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Rooftop, Single Zone, 50 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Rooftop, Single Zone, 60 Ton											
Maintain Air Conditioner, Rooftop, Single Zone, 60 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Rooftop, Single Zone, 60 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Rooftop, Single Zone, 60 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Rooftop, Single Zone, 100 Ton											
Maintain Air Conditioner, Rooftop, Single Zone, 100 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Rooftop, Single Zone, 100 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Rooftop, Single Zone, 100 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Single Zone, Variable Volume, 20 Ton											
Maintain Air Conditioner, Single Zone, Variable Volume, 20 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Single Zone, Variable Volume, 20 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Single Zone, Variable Volume, 20 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Single Zone, Variable Volume, 30 Ton											
Maintain Air Conditioner, Single Zone, Variable Volume, 30 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Single Zone, Variable Volume, 30 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Single Zone, Variable Volume, 30 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Single Zone, Variable Volume, 40 Ton											
Maintain Air Conditioner, Single Zone, Variable Volume, 40 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Single Zone, Variable Volume, 40 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Single Zone, Variable Volume, 40 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Single Zone, Variable Volume, 60 Ton											
Maintain Air Conditioner, Single Zone, Variable Volume, 60 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Single Zone, Variable Volume, 60 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Single Zone, Variable Volume, 60 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Air Conditioner, Window, 1 Ton											
Maintain Air Conditioner, Window, 1 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Window, 1 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Window, 1 Ton	18	19	30	30	32	20	39	46	46	>50	>50

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3050 Terminal & Package Units											
Air Conditioner, Window, 2 Ton											
Maintain Air Conditioner, Window, 2 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Window, 2 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Window, 2 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Air Conditioner, Window, 4 Ton											
Maintain Air Conditioner, Window, 4 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Air Conditioner, Window, 4 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Air Conditioner, Window, 4 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Baseboard Radiator 10 ft.											
Replace Baseboard Radiator, 10 ft.	38	32	24	22	19	20	15	15	14	12	12
Electric Cabinet Heater											
Inspect & Maintain Electric Cabinet Heater	1	1	1	1	1	1	1	1	1	1	1
Replace Electric Cabinet Heater	13	14	23	22	29	15	32	46	46	>50	>50
Explosion Proof Suspended Heater											
Inspect & Maintain Explosion Proof Suspended Heater	1	1	1	1	1	1	1	1	1	1	1
Replace Contactor, Explosion Proof Suspended Heater	2	2	2	2	2	2	2	2	2	2	2
Replace Explosion Proof Suspended Heater	13	14	23	22	29	15	32	46	46	>50	>50
Fan Coil Unit, 1 Ton											
Maintain Fan Coil Unit, 1 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Fan Coil Unit, 1 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Fan Coil Unit, 1 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Fan Coil Unit, 3 Ton											
Maintain Fan Coil Unit, 3 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Fan Coil Unit, 3 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Fan Coil Unit, 3 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Fan Coil Unit, 5 Ton											
Maintain Fan Coil Unit, 5 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Fan Coil Unit, 5 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Fan Coil Unit, 5 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Fan Coil Unit, 10 Ton											
Maintain Fan Coil Unit, 10 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Fan Coil Unit, 10 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Fan Coil Unit, 10 Ton	13	14	23	22	29	15	32	46	46	>50	>50

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3050 Terminal & Package Units											
Fan Coil Unit, 20 Ton											
Maintain Fan Coil Unit, 20 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Fan Coil Unit, 20 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Fan Coil Unit, 20 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Fan Coil Unit, 30 Ton											
Maintain Fan Coil Unit, 30 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Fan Coil Unit, 30 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Fan Coil Unit, 30 Ton	13	14	23	22	29	15	32	46	46	>50	>50
Fan Coil, Two-Pipe, 400 Cfm											
Maintain Fan Coil, Two-Pipe, 400 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Fan Coil, Two-Pipe, 400 Cfm	9	10	15	15	16	10	20	23	23	29	33
Replace Fan Coil, Two-Pipe, 400 Cfm	13	14	23	22	29	15	32	46	46	>50	>50
Fan Coil, Two-Pipe, 1,800 Cfm											
Maintain Fan Coil, Two-Pipe, 1,800 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Fan Coil, Two-Pipe, 1,800 Cfm	9	10	15	15	16	10	20	23	23	29	33
Replace Fan Coil, Two-Pipe, 1,800 Cfm	13	14	23	22	29	15	32	46	46	>50	>50
Finned Radiator											
Replace Finned Radiator, 10 ft.	38	32	24	22	19	20	15	15	14	12	12
Heat Pump, 1 Ton											
Maintain Heat Pump, 1 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Heat Pump, 1 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Heat Pump, 1 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Heat Pump, 2 Ton											
Maintain Heat Pump, 2 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Heat Pump, 2 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Heat Pump, 2 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Heat Pump, 5 Ton											
Maintain Heat Pump, 5 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Heat Pump, 5 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Heat Pump, 5 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Heat Pump, 10 Ton											
Maintain Heat Pump, 10 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Heat Pump, 10 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Heat Pump, 10 Ton	18	19	30	30	32	20	39	46	46	>50	>50

Components ordered by UNIFORMAT II Classifications.

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

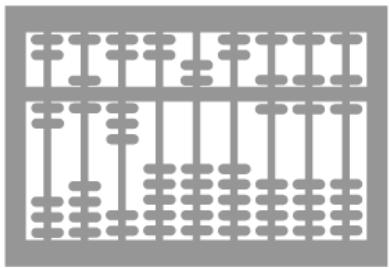
Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3050 Terminal & Package Units											
Heat Pump, 25 Ton											
Maintain Heat Pump, 25 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Heat Pump, 25 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Heat Pump, 25 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Heat Pump, 50 Ton											
Maintain Heat Pump, 50 Ton	1	1	1	1	1	1	1	1	1	1	1
Repair Heat Pump, 50 Ton	9	10	15	15	16	10	20	23	23	29	33
Replace Heat Pump, 50 Ton	18	19	30	30	32	20	39	46	46	>50	>50
Heater Electric, Convector, 12,000 Watt											
Maintain Heater Electric, Convector, 12,000 Watt	1	1	1	1	1	1	1	1	1	1	1
Replace Heater Electric, Convector, 12,000 Watt	13	13	13	14	15	15	16	17	18	19	26
Radiant Heating Panel, Electric, 8 sf											
Maintain Radiant Heating Panel, Electric, 8 sf	1	1	1	1	1	1	1	1	1	1	1
Repair Wiring, Radiant Heating Panel, Electric, 8 sf	2	2	2	2	2	2	2	2	2	2	2
Replace Radiant Heating Panel, Electric, 8 sf	13	14	23	22	29	15	32	46	46	>50	>50
Secondary Coil, 12" x 24"											
Replace Secondary Coil, 12" x 24"	46	41	30	28	23	25	19	19	17	15	15
Secondary Coil, 24" x 24"											
Replace Secondary Coil, 24" x 24"	46	41	30	28	23	25	19	19	17	15	15
Secondary Coil, 24" x 36"											
Replace Secondary Coil, 24" x 36"	46	41	30	28	23	25	19	19	17	15	15
Secondary Coil, 30" x 72"											
Replace Secondary Coil, 30" x 72"	46	41	30	28	23	25	19	19	17	15	15
Secondary Coil, 36" x 36"											
Replace Secondary Coil, 36" x 36"	46	41	30	28	23	25	19	19	17	15	15
Suspended Electric Heater, Infrared, 240 V											
Maintain Suspended Electric Heater, Infrared, 240 V	1	1	1	1	1	1	1	1	1	1	1
Replace Suspended Electric Heater, Infrared, 240 V	13	13	13	14	15	15	16	17	18	19	26
Suspended Electric Heater, Standard, 240 V											
Maintain Suspended Electric Heater, Standard, 240 V	1	1	1	1	1	1	1	1	1	1	1
Replace Suspended Electric Heater, Standard, 240 V	13	13	13	14	15	15	16	17	18	19	26

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3050 Terminal & Package Units											
Suspended Heater, Hot Water, 1,200 Cfm, 55 Mbh											
Maintain Suspended Heater, Hot Water, 1,200 Cfm, 55 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair Suspended Heater, Hot Water, 1,200 Cfm, 55 Mbh	9	10	15	15	16	10	20	23	23	29	33
Replace Suspended Heater, Hot Water, 1,200 Cfm, 55 Mbh	13	14	23	22	29	15	32	46	46	>50	>50
Suspended Heater, Hot Water, 4,000 Cfm, 180 Mbh											
Maintain Suspended Heater, Hot Water, 4,000 Cfm, 180 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair Suspended Heater, Hot Water, 4,000 Cfm, 180 Mbh	9	10	15	15	16	10	20	23	23	29	33
Replace Suspended Heater, Hot Water, 4,000 Cfm, 180 Mbh	13	14	23	22	29	15	32	46	46	>50	>50
Suspended Heater, Hot Water, 8,000 Cfm, 360 Mbh											
Maintain Suspended Heater, Hot Water, 8,000 Cfm, 360 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair Suspended Heater, Hot Water, 8,000 Cfm, 360 Mbh	9	10	15	15	16	10	20	23	23	29	33
Replace Suspended Heater, Hot Water, 8,000 Cfm, 360 Mbh	13	14	23	22	29	15	32	46	46	>50	>50
Suspended Natural Gas Heater, 300 kbtu											
Maintain Suspended Natural Gas Heater, 300 kbtu	1	1	1	1	1	1	1	1	1	1	1
Replace Suspended Natural Gas Heater, 300 kbtu	13	13	13	14	15	15	16	17	18	19	26
Terminal Reheat Unit, 10,000 Cfm											
Maintain Terminal Reheat Unit, 10,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Terminal Reheat Unit, 10,000 Cfm	9	10	15	15	16	10	20	23	23	29	33
Replace Terminal Reheat Unit, 10,000 Cfm	13	14	23	22	29	15	32	46	46	>50	>50
Terminal Reheat Unit, 25,000 Cfm											
Maintain Terminal Reheat Unit, 25,000 Cfm	1	1	1	1	1	1	1	1	1	1	1
Repair Terminal Reheat Unit, 25,000 Cfm	9	10	15	15	16	10	20	23	23	29	33
Replace Terminal Reheat Unit, 25,000 Cfm	13	14	23	22	29	15	32	46	46	>50	>50
Unit Heater, 12 Mbh											
Maintain Unit Heater, 12 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair Unit Heater, 12 Mbh	9	10	15	15	16	10	20	23	23	29	33
Replace Unit Heater, 12 Mbh	13	14	23	22	29	15	32	46	46	>50	>50
Unit Heater, 36 Mbh											
Maintain Unit Heater, 36 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair Unit Heater, 36 Mbh	9	10	15	15	16	10	20	23	23	29	33
Replace Unit Heater, 36 Mbh	13	14	23	22	29	15	32	46	46	>50	>50

5.2 M&R Task Frequencies of HVAC Components by Climate Zone

Uniformat / Component / M&R Task	Climate Zone										
	1	2	3	4	5	6	7	8	9	10	11
D3050 Terminal & Package Units											
Unit Heater, 85 Mbh											
Maintain Unit Heater, 85 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair Unit Heater, 85 Mbh	9	10	15	15	16	10	20	23	23	29	33
Replace Unit Heater, 85 Mbh	13	14	23	22	29	15	32	46	46	>50	>50
Unit Heater, 250 Mbh											
Maintain Unit Heater, 250 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair Unit Heater, 250 Mbh	9	10	15	15	16	10	20	23	23	29	33
Replace Unit Heater, 250 Mbh	13	14	23	22	29	15	32	46	46	>50	>50
Unit Heater, 400 Mbh											
Maintain Unit Heater, 400 Mbh	1	1	1	1	1	1	1	1	1	1	1
Repair Unit Heater, 400 Mbh	9	10	15	15	16	10	20	23	23	29	33
Replace Unit Heater, 400 Mbh	13	14	23	22	29	15	32	46	46	>50	>50
D3060 Controls & Instrumentation											
Direct Digital Controls, System Points											
Maintain Direct Digital Controls, System Points	1	1	1	1	1	1	1	1	1	1	1
Replace Direct Digital Controls, System Points	10	10	10	10	10	10	10	10	10	10	10
HVAC Control Panel											
Inspect & Maintain HVAC Control Panel	1	1	1	1	1	1	1	1	1	1	1
Minor Repair, HVAC Control Panel	5	5	5	5	5	5	5	5	5	5	5
Replace HVAC Control Panel	15	15	15	15	15	15	15	15	15	15	15
THERMOSTAT											
Maintain Thermostat	1	1	1	1	1	1	1	1	1	1	1
Replace Thermostat	10	10	10	10	10	10	10	10	10	10	10



Chapter 6

Definitions and Methods

6. Definitions and Methods

In this chapter we define key terms and describe the methods and assumptions behind Whitestone statistics. The discussion is loosely organized by chapter, with the exception of a number of terms that are used throughout the book and need to be defined at the outset.

Maintenance and repair (M&R) is defined as the collection of activities necessary for keeping an asset in good working order. Included in this definition are regularly scheduled adjustments and inspections, preventative maintenance tasks, emergency response and service calls for minor repairs, and the periodic major repair or replacement of asset components. Other tasks associated with facility operation such as custodial services, landscaping, waste disposal, and the provision of central utilities are not included in our definition of M&R.

M&R activities can be divided into three types:

Preventative maintenance (PM) and minor repair consists of scheduled tasks that sustain a component's level of service during a prescribed lifetime. These tasks are usually done frequently and require a relatively constant amount of labor and materials. In generating the cost profiles in Chapter 2, we assume that the facility staff does PM and minor repairs.

Unscheduled maintenance consists of service calls, emergency response, and other tasks that cannot be individually anticipated. Like PM and minor repair, these tasks tend to consume a steady level of annual facility resources. In estimating asset cost profiles, we assume that the facility staff is responsible for unscheduled maintenance. The details of estimating unscheduled maintenance are discussed later in this chapter.

Renewal and replacement consists of component overhaul or replacement tasks. These are tasks that extend a component lifetime, and reset the schedule of PM and minor repair tasks. These tasks tend to be expensive, infrequent, and require specialized expertise and equipment. In generating model cost profiles, we assume this work is done by contract.

Maintenance and repair does not include the collection of related costs often considered capital expenditures. The distinction is summarized neatly in a taxonomy that has been adopted in U.S. Federal accounting language. **Sustainment** costs include the three types of costs presented in this book, while **Restoration and Modernization** costs are those required to restore or improve the productive capability of an asset.⁹

In addition to Sustainment and Restoration, **Operations** makes up a third component of the cost of facilities. M&R (Sustainment) is often reported as part of operations costs, particularly in commercial charts of accounts. The *Whitestone Facility Operations Cost Reference* includes M&R costs as well as the individual operations costs shown in Table 6-1. Note that this table focuses only on annual facility cost flows and does not include the one-time construction or disposal costs that would be part of a full life-cycle analysis.

**Table 6-1
Annual Facility Requirements**

Sustainment:	Preventative maintenance & minor repair Unscheduled maintenance Renewal & replacement
Restoration & Modernization:	Replacement due to obsolescence Change in use modifications Policy mandated retrofits Catastrophic damage Repairs from neglect Long-lived components
Operations:	Custodial Energy Grounds Management Pest Control Refuse Road Clearance Security Telecommunications Water/Sewer

⁹ For more on the distinction between sustainment and restoration & modernization, see Whitestone Report: A Standard Terminology for Describing Maintenance and Repair Requirements. Santa Barbara: Whitestone Research, July 2003. For an in depth discussion of restoration & modernization costs estimation, see Lufkin, Desai, and Janke "Estimating the Restoration and Modernization Costs of Infrastructure and Facilities," Public Works Management & Policy, July 2005.

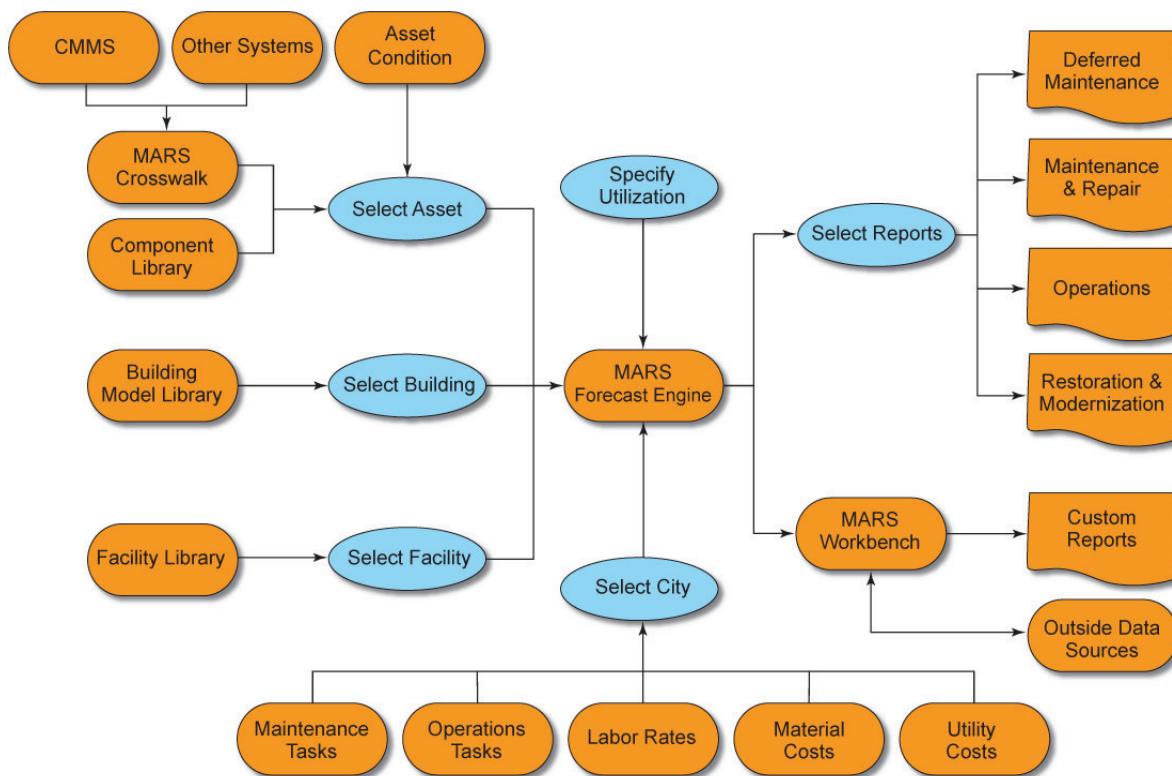
A final cost is incurred at the end of the facility service life. While not considered an annual expense, the costs of disposal, or more precisely Transition and Disposition (T&D), are considerable and should be included in accounting for full costs over the facility life-cycle. We are currently working to develop a full catalog of T&D costs for all Whitestone asset types.¹⁰

Chapter 2: M&R Cost Profiles

The profiles presented in Chapter 2 provide a comprehensive estimate of M&R costs over a 50-year period, beginning with the completion of construction. Profiles were estimated for 72 common asset types, a sample intended to reflect the diversity of commercial and institutional inventories, and provide cost analysts with a useful set of models. Selection of components was based on surveys and staff judgment of industry design practices. Particular care was taken to select HVAC equipment appropriate for each asset's estimated heating and cooling loads.

We assume most model titles are self explanatory, with one possible exception—the Data Center, Tier III. Data centers are characterized in terms of the redundancy and independence of their power supplies, and their mechanical and computer equipment. A Tier III data center has both redundant components and multiple independent distribution paths, with a single path serving the computer equipment at any one time. A Tier IV data center has similar redundancies, with multiple independent distribution paths simultaneously serving the computer equipment.¹¹

Figure 6-1
MARS Cost Forecast Model



The estimation of each profile requires two basic inputs: the facility location (which establishes local labor rates and the frequency of climate-specific maintenance tasks), and an inventory of asset components. The component inventory includes those components required for a safe and comfortable environment consistent with asset usage. Not included in the inventories are furniture, fixtures, appliances, or specialized equipment; notable examples include movable partitions in office buildings, restaurant

¹⁰ *Infrastructure Cost Support for NNSA Enterprise Modeling: Final Report of findings*. Prepared for National Nuclear Security Administration by Whitestone Research, February 2, 2009.

¹¹ Koomey, J. *A Simple Model for Determining True Total Cost of Ownership for Data Centers*. Santa Fe, MN: Uptime Institute, 2007

equipment, gymnasium seating, bowling lanes and pin-setting equipment. Certain specialized equipment is included in component inventories for the jail and hospital models.

Also not included are components that typically require little or no major maintenance within 50 years, such as foundations and electrical wiring.¹² No explicit provision is made for the costs of remediation measures such as asbestos or lead paint removal.

The actual estimation of M&R costs is done with the MARS Facility Cost Forecast System, a software tool developed by Whitestone Research and now in its eighth version. The estimation process (shown in Figure 6-1) draws from a relational database that includes asset templates, component-related maintenance tasks, in-house shop rates and contract trade rates, and material and equipment costs. Output from the MARS system is a detailed year-by-year forecast of M&R tasks and costs presented at various levels of aggregation, as shown in the Chapter 2 profiles. There are over 100 pre-defined reports for the user to select from and, with the MARS Workbench option, the user is free to define Ad Hoc queries and additional reports. MARS is used to generate similar profiles for operation costs in the *Whitestone Facility Operations Cost Reference*.

Note that a new module for estimating Restoration and Modernization cost has been added to the latest edition of MARS (version 8.5)

MARS MARS is an assessment and budgeting tool currently used by many government agencies, corporations, and large individual facilities. Technical details, case studies, and ordering information are available at www.whitestoneresearch.com.

Accuracy of the Whitestone cost profiles. Ideally, the accuracy of Whitestone forecasts could be measured by direct comparison with actual M&R costs. Unfortunately, data strictly comparable in detail and definition is not available. Information that is available from industry surveys tends to address a broad collection of facility services, rather than focusing on M&R. Moreover, these surveys tend to emphasize operating costs and revenues, with little information on capital expenditures. This makes it difficult to get a complete view of M&R costs, as many major repairs are defined as capital improvements rather than operating expenses. To the extent this is true, M&R costs estimates derived from such surveys can underestimate actual costs.¹³

Studies of deferred maintenance have shown that the MARS system produces estimates close to those made by traditional condition inspections. An experiment by the Department of Energy found that MARS-based estimates of deferred maintenance were within 6 percent of costs determined by physical inspection, but required only a fraction of the costs.¹⁴

Sensitivity of the estimated profiles. In Table 6-2, the 2 Story Office Building model (shown in Chapter 2) is used to demonstrate the sensitivity of Whitestone estimates to a variety of alternative assumptions and MARS model settings.

Changing individual components can have an appreciable affect on average costs, and changing combinations of components can substantially alter M&R requirements. Substituting terrazzo flooring for carpeting, for example, can reduce M&R costs by an estimated 9 percent over a 50-year period. Type of asset use can also affect M&R costs, both in terms of the number and type of components, and the necessary frequency of repair. An office building with high lighting requirements would require M&R expenditures an estimated 8 percent greater than those for the original asset. The same office building with more frequent wall repainting—typical of many public assets, for example—would require expenditures an estimated 7 percent greater than the model asset.

¹² Slab on grade for structures and heavy gauge wire in data centers are exceptions.

¹³ M&R costs reported by one survey (*2008 BOMA Experience Exchange Report*) averaged \$2.58 per rentable square foot for a sample of 52 office buildings in downtown Washington, D.C. The use of survey-based cost data is reviewed in *Whitestone Report: Notes on M&R Cost Benchmarks*. Santa Barbara: Whitestone Research, August 1996.

¹⁴ See *Parametric Estimation of Deferred Maintenance, Phase 1 Prototype at Lawrence Livermore National Laboratory*. Prepared for the National Nuclear Security Administration by Whitestone Research and Jacobs Facilities, May 2004. Also see *Whitestone Report: Current and Future M&R Funding Needs for a Historic School*. Santa Barbara: Whitestone Research, July 2002.

The sensitivity of estimated costs to geographic location is demonstrated clearly in the Local Maintenance Cost Index presented in Chapter 3. M&R costs for the same model range from \$2.13 per GSFT in San Juan, PR to \$3.93 in New York, NY.

Table 6-2 Sensitivity of Average Annual M&R Cost Estimates	
2 Story Office Building, in Wash. D.C., as described in Chapter 2.	100%
Component Selection:	
• Select terrazzo flooring in place of carpet (75% of GSFT)	- 9%
• Select painted stucco exterior in place of clay brick	- 5%
• Increase lighting from 3 watts per GSFT to 6 watts	+ 8%
• Change painting frequency of interior walls from every 4 to every 2 years.	+ 7%
Location:	
• Washington, D.C.	100%
• San Juan, PR	- 32%
• New York, NY	+ 26%
Average Unscheduled Maintenance Multiplier:	
• 2.10	100%
• 1.00	- 15%
• 3.00	+ 18%
Average In-house Shop Markup Rate:	
• 2.00	100%
• 1.00	- 9%
• 3.00	+ 9%
Utilization:	
• Typical Schedule	100%
• Three Shift, 24/7	+ 37%
• Minimal use	- 20%

Source: Whitestone Research.

Cost forecasts are affected by different assumptions about unscheduled maintenance multipliers. Setting all multiplier values to 1 (there is a separate multiplier for each asset system) implies there is no unscheduled maintenance, and reduces model costs by 15 percent. Alternatively, raising all multipliers to 3 increases model costs by 18 percent. Multiplier values range from 1.0 to 2.7, according to survey results discussed in a following section.

Shop markup is the multiplier applied to direct staff wages to establish a shop rate, the hourly rate a facility shop (carpentry, HVAC, etc.) must bill internal clients to fully recoup operating costs. For the purposes of this study, we assume a markup rate of 2 for each of eight staff trade categories. An alternative markup rate of 1 reduces forecast M&R costs by 9 percent, while a markup rate of 3 increases forecast costs by 9 percent.

Different types of utilization can affect asset M&R costs. Alternative utilization scenarios can be described in terms of hours of operation, type of clientele, and volume of users.¹⁵ Two alternative scenarios were defined based just on hours of operation. Around the clock operation increases estimated costs by 37 percent over a typical schedule, defined as 41 to 80 hours per week. Minimal operation—40 hours or less per week—which extends PM schedules and reduces service calls, would have estimated M&R costs of just 80 percent of typical usage. Unused warehouses reduced to a status of “cold, dark, and dry” reported M&R costs of 49 percent of normal requirements.¹⁶

Extraordinary work environments can also affect M&R costs. In one study, high security requirements (requiring full-time contractor accompaniment) increased M&R costs by 15 percent.¹⁷ In addition, travel to and from remote work sites can increase labor costs by an additional 15 percent as recommended by Davis Bacon Wage Agreements for projects involving travel exceeding sixty miles.¹⁸ For nuclear related

facilities, total costs can be over three times higher than typical costs due to elaborate permitting and safety requirements.¹⁹

Testing the variation in M&R estimates. While the sensitivity of estimates in key assumptions are set out in Table 6-2, this does not show how estimates vary when assumptions (input values) are changed in combination. To estimate the variation in a formal manner, a Monte Carlo simulation was conducted.²⁰ In randomly varying the inputs of 11 variables in the MARS model for the 2 story office building, we found M&R estimates varied plus or minus 30 percent within a 95 percent confidence interval over the 50-year profile.

¹⁵ The impact of alternative utilization rates on M&R costs is discussed in the project report: *Implementation of the Department of Defense Sustainment Model*. Prepared for the Office of the Deputy Under Secretary of Defense (Installations & Environment) by Jacobs Facilities and Whitestone Research, April 2001.

¹⁶ *Validation of Area Cost Factors for Selected Installations, Final Report*. Prepared for Air Force Research Laboratory, Edwards AFB by Whitestone Research, February 25, 2004.

¹⁷ *The Measurement of Condition and Utilization of Facilities*. Prepared for the Office of the Deputy Under Secretary of Defense (Installations & Environment) by Jacobs Facilities and Whitestone Research, March 2005.

¹⁸ Ibid., 19.

¹⁹ *Condition Assessment and MARS Modeling Support for Pacific Northwest National Laboratory*. Prepared for Pacific Northwest National Laboratory by The Environmental Company and Whitestone Research, March 2003.

²⁰ *Infrastructure Cost Support for NNSA Enterprise Modeling: Monte Carlo Simulations, Final Report*. Prepared for National Nuclear Security Administration by Whitestone Research, April 4, 2009.

Component service life. The service life of a asset component determines the planned schedule of retirement and ultimately the costs of renewal and replacement. In 2006, a study of data from Lawrence Livermore National Laboratory (LLNL) suggested that the service lives of selected mechanical equipment could be considerably longer—twice as long, for some equipment—as suggested in the technical literature.²¹ Table 6-3 compares the median service lives taken from an ASHRAE publication and estimates from the LLNL data. Preliminary experiments employing the extended lives indicated that total M&R costs might be reduced by 5 percent or more over a 50-year investment period.

Table 6-3
Service Life Comparison, Selected Equipment

Asset Description	N	Estimated ¹	ASHRAE ²
Window or Wall Mounted A/C Unit, 5,000-29,000 BTUH	874	25	10
Self-Contained Heat Pump Type A/C, 1.5-50 Ton	1,270	25	19
Self-Contained Variable Air Volume Type A/C Unit, 1.5-200 Ton	1,147	25	15
A/C Unit Heating and/or Cooling, 5,000-63,000 CFM	1,464	41	20
Circulation Pump, 1-25 HP	684	42	20
Refrigeration Condensing Unit, 1.25-30 Ton	286	31	20

¹Median Service Life, the age at which 50% of equipment is still in use. Estimated from LLNL equipment records.

²ASHRAE (2003); note Hiller's (2000) criticism of the ASHRAE Estimates.

Source: Whitestone Research.

Although methodologically rigorous, the study findings are limited to one location: Livermore, California. Further research is necessary to determine any additional costs associated with the extended service lives and to corroborate the findings at other locations.

Unscheduled maintenance multipliers. Unscheduled maintenance costs are often overlooked in component life-cycle based studies. For example, a major shortcoming in the Maintenance Resource Prediction Model (MRPM), a pioneering system developed by the U.S. Army Corps of Engineers in the 1980's, was that it failed to account for maintenance costs that could not be defined as scheduled tasks.²² One study found that the MRPM underestimated costs by 24 to 40 percent over a 50-year lifetime.²³

The MARS model is the only methodology we are aware of that explicitly recognizes unscheduled maintenance costs. Unscheduled maintenance costs are estimated using a multiplier applied to scheduled PM and minor repair labor hours. A separate multiplier is defined for each asset system. For example, a asset may have a predicted 100 hours of PM and minor repair for interior surfaces in a given year; applying a multiplier value of 1.67, the total required for interior surfaces would be 167 hours (100 scheduled and 67 unscheduled). The values of the multipliers by asset system, shown in Table 6-4, were determined by a Whitestone survey.²⁴

Table 6-4
Unscheduled Maintenance Multipliers by Asset System

Asset System	Unschd Percent ¹	Unschd Multiplier ²
Exterior Closure	60.3	2.52
Roofing	51.7	2.07
Interior Construction	63.0	2.70
Staircases	55.0	2.22
Interior Finishes	40.1	1.67
Conveying Systems	21.3	1.27
Plumbing	62.5	2.67
HVAC	43.8	1.78
Fire Protection	24.2	1.32
Electrical	47.4	1.90
Equipment	49.7	1.99

¹Unscheduled maintenance hours as a percentage of total (unscheduled and scheduled PM) minor repairs.

²Used in MARS to estimate total minor repair as a function of scheduled PM hours: $M = 1 / (1 - \text{Unscheduled Percent})$.

Source: Whitestone Research.

²¹ Whitestone Report: Service Life Study has M&R Funding Implications. Santa Barbara: Whitestone Research, July 2006. Also see: ASHRAE. 2003 ASHRAE Handbook: HVAC Applications, Atlanta: ASHRAE. 2003. Chapter 36, Table 3; Hiller, Carl "Determining Equipment Service Life", ASHRAE Journal, August 2000.

²² See Neely and Neathammer, *Maintenance Resource Prediction in the Facility Life-Cycle Process*. Technical Report P-91/10. Champaign: U.S. Army Corps of Engineers, May 1991.

²³ Lufkin and Desai, *The Estimation of Building Maintenance and Repair Costs*. Seattle: Science Applications International Corporation, 1992.

²⁴ Whitestone Report: Estimates of Unscheduled Facility Maintenance. Santa Barbara: Whitestone Research, April 1999.

Unscheduled maintenance is expressed as a multiple of scheduled PM and minor repair, rather than all M&R tasks, because historical cost data for scheduled PM and minor repairs is readily available. Most facilities can use their work order histories to compute the simple percentage of unscheduled maintenance to their total workload by asset system (not including renewal and replacement work).

These percentages allow us, and other MARS users, to calibrate the model based on actual experience. The definition of asset systems corresponds to level 2 group elements of the Uniformat II classification shown in the Appendix.

Asset replacement costs. M&R costs are commonly expressed as a percentage of replacement costs, as in the summary section of each profile in Chapter 2. Replacement costs are derived from a Whitestone survey of actual federal projects normalized to Washington, D.C. Included in replacement costs are: supervision, inspection, and overhead (typically 6 percent of base construction costs); design and planning (9 percent); contingencies (5 percent).²⁵

Chapter 3: Local M&R Costs

Adjusting the profiles for other areas. The primary use of the local maintenance cost index shown in Chapter 3.1 is for localizing the cost profiles shown in Chapter 2. This index is based on cost forecasts made for the same model for each of the 234 areas addressed in this book. The 2 Story Office Building described in Chapter 2 was used as the model. Each index value is calculated as the simple ratio of costs for a selected area over costs for Washington, D.C., where the Washington, D.C. value equals 100. These measures are also useful for inter-regional comparisons of M&R costs, as shown in our reported rankings.

In-House Shop Rates. In estimating the cost profiles shown in Chapter 2, we assumed that the facility staff does PM, minor repair tasks, and unscheduled maintenance. The labor costs of these tasks are estimated with shop rates specific to selected trades and management positions. The shop rate includes direct wages and a shop markup. Whitestone estimates direct wages using knowledge of the typical distribution of wages across trades and their relationship to commercial contract rates.

The shop markup includes fringe and required benefits, non-productive time, support and supervision, and most tools and equipment costs. It is expressed as a multiplier applied to direct wages. For example, a staff carpenter in Washington, D.C. has a direct wage rate of \$41.62, a markup of \$83.24 given a multiplier value of 2, and a total shop rate of \$124.86. In actual experience, the markup rate is unique to every facility—the amount of non-productive time and support and supervision costs rolled into the rate, for example, are a function of workload and facility policy. The markup rate of 2 used in this book is an approximation based on our interviews with facility management and a review of secondary sources. Note that a facility markup rate can easily vary within a range from 1 to 3; the cost implications of this range are shown in Table 6-2.

Contract Labor Rates are the basis for the hourly rates used in generating cost forecasts for renewal and replacement tasks. Specified by trade for each area, contract labor costs include basic wage and fringe, compensation insurance, and other required benefits. These costs are burdened with an overhead and profit multiplier of 1.30, a rate common in light construction contracts.

Table 6-5 illustrates estimated construction wage changes, including fringe and other benefits, by geographic region as reported by the Construction Labor Research Council (CLRC). The weighted national average is expected to increase 4.4 percent for 2009. This increase is based on union wage agreements, and is slightly higher than the 4.1 percent increase foreseen in Chapter 4 for general construction labor.

**Table 6-5
Estimated Construction Wage Changes, 2009**

Region/State	
New England	
CT, MA, ME, NH, RI, VT	4.1%
Middle Atlantic	
D.C., DE, MD, NJ, NY, PA	4.6%
Southeast	
AL, FL, GA, KY, MS, NC, SC, TN, VA	3.8%
East North Central	
IL, IN, MI, MN, OH, WI, WV	4.2%
West North Central	
IA, KS, MO, NE CO, MT, ND, SD, UT, WY	3.7%
South Central	
AR, LA, NM, OK, TX	3.8%
Southwest Pacific	
AZ, CA, HI, NV	5.1%
Northwest	
AK, ID, OR, WA	4.8%
National	4.4%

Source: Construction Labor Research Council.

²⁵ Noted markup rates were taken from the Department of Defense (DoD) Facilities Pricing Guide, released July 2007.

Basic wage and fringe rates were taken primarily from surveys of local wages conducted by the U.S. Department of Labor under the Davis-Bacon Act. These surveys are conducted regularly to determine the wage rate to be used in evaluating construction bids for federal projects. Both union and non-union wages are considered in determining prevailing rates by locality. State and local wage surveys were also used when available.

Table 6-6
Average Compensation Insurance Rates, 2009

	NCCI Code	Rate*
Carpenter	5403	\$15.82
Carpet layer	5478	9.47
Electrician	5190	6.11
Plumber	5183	7.75
Painter	5474	10.76
Elevator Mechanic	5160	6.23
Brick Layer	5022	12.90
Roofer	5551	26.60
Crane Operator	9534	11.95
Fork Lift Driver	9534	11.95

*Per \$100 of payroll

Compensation insurance rates were provided by National Council on Compensation Insurance (NCCI) and individual state compensation insurance rating boards. We believe these are reasonable approximations of prevailing insurance rates, although there is considerable variation among the state programs and differing rates for M&R contractors depending on their past claim performance. Table 6-6 shows the average distribution of insurance rates by trade for the 234 areas represented in this book.

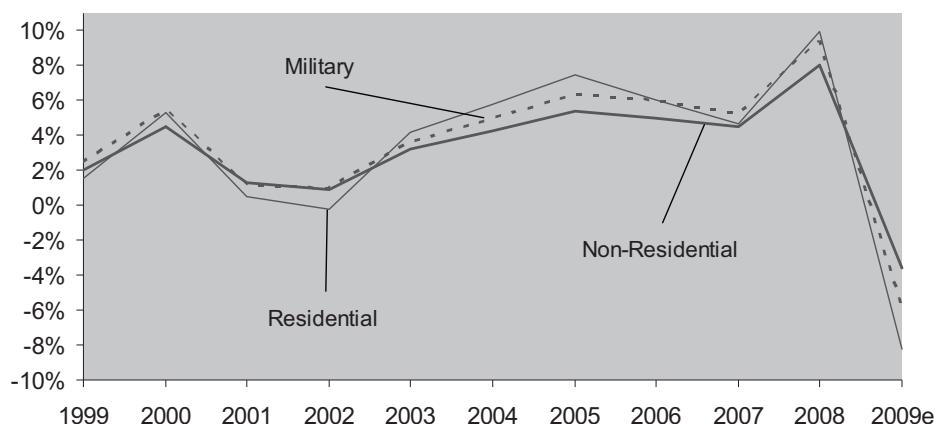
Other required benefits include social security, state and federal unemployment insurance, and insurance benefits—life, health, short and long term disability. These costs were provided by the U.S. Department of Labor.

Chapter 4: M&R Construction Indexes

Cost trends vary among the different divisions within the M&R construction industry. To capture these differences we estimate three specific M&R indexes: *Non-Residential Buildings M&R*, which applies to repairs and improvements to commercial and public assets; *Residential Buildings M&R*, which applies to owner-occupied and rental units—not including major additions or alterations, or repairs to mobile homes; and *Military Facilities M&R*, which applies to overall military M&R expenditures, including roads, airfields, utilities, docks, and other assets.²⁶

The comparison in Figure 6-2 shows only slight differences in the annual rate of change among the indexes for most years, particularly for military facilities and non-residential assets. The similarity is due in large part to the almost identical weight given to labor, the single most important component in these measures. A number of commodities and

Figure 6-2
Comparison of M&R Indexes



services are inputs to the various industries, but labor accounts for 47-50 percent of total production costs, except in the residential M&R construction industry. Much of the labor in residential M&R is uncompensated work done by the owner-resident or landlord, thus labor makes up a smaller portion of total costs.

The components of the index and their respective weights are defined using national input/output relationships for the selected maintenance construction industries. Costs are taken from U.S. Bureau of Labor Statistics (producer and consumer price indexes). The *New Construction Index* shown in Chapter 4 is also computed using national input/output data for commercial and institutional construction. Each of the indexes reported is standardized to the base month of December, 2003 (i.e., December, 2003=100).

²⁶ For an overview of index use and construction, see Frumkin, Norman, *Guide to Economic Indicators*. Armonk, New York: M.E. Sharpe, 1994. Pp. 3-21. Park and Sharpe-Bette, *Advanced Engineering Economics*. New York: John Wiley & Sons, 1990, is a good source on the use of indexes in financial and economic analysis. Also see Allen R.G.D., *Index Numbers in Theory and Practice*. New York: Palgrave, 1975.

Projections of average 2009 values are based on second quarter to second quarter changes from 2008 to 2009.



A selection of construction and operation cost indexes are updated monthly at www.whitestoneresearch.com/indexes/index.htm. More detailed indexes are available by subscription. Call (800) 210-0137 for more information.

Chapter 5: Component Data

The original source of the component data was the Maintenance Task Database developed by the U.S. Army Corps of Engineers.²⁷ A detailed example of the task data is shown in Box 6-1. Developed in the 1980's, much of the labor information for this database is based on Engineered Performance Standards developed jointly by the U.S. Navy, Army, and Air Force.²⁸ For our purposes, this data was revised with models and components common to civilian construction (such as elevators, storefront doors and windows, and detailed wall and floor coverings). Labor requirements and material costs were updated through extensive interviews with manufacturers, distributors, and service providers. Equipment requirements are shown only for heavy HVAC and electrical equipment and roads. For most M&R tasks it is assumed that the necessary equipment is included in contract overhead costs. The Whitestone database has over 1,200 components and more than 15,000 related M&R tasks and subtasks, but for space reasons, only summary tasks are reported in Chapter 5.

During the 2009 data review process, we examined the cost and life-cycle data on the replacement of roofing and green house components. After conducting a survey of manufacturers, distributors, service providers, and facility managers, we concluded that costs in previous editions of this *Reference* were likely understated for roofing components and overstated in the case of green house components. We revised the replacement tasks to reflect these surveys. For the 2 Story Office Building, the total M&R costs over 50 years increased by 10 percent. For the Research Greenhouse, the total M&R costs over 50 years decreased by 16 percent.

Box 6-1 Example of a Maintenance Task: Membrane Removal & Replacement for a Built-up Roof

Labor:		Material:	
Subtask	Hours per GSFT	Description	Cost per GSFT
Set up, secure, and take down ladder	0.000160	Insulation, membrane	3.0462612
Sweep ballast	0.005000	& ballast	
Tear off existing membrane & insulation	0.035500		
Replace insulation	0.011400		
Replace flashing & membrane	0.028300		
Replace ballast	0.003886		
Clean up	0.010000		
	0.094246		3.0462612

Task frequencies shown in Chapter 5.1 are the expected incidence of repair or replacement in the Washington, D.C. area. These frequencies are assumed to hold for other regions. The major exception to this assumption is HVAC equipment, for which specific frequencies are reported in Chapter 5.2 for each climate zone. M&R task frequencies for roofing surfaces are also thought to vary by climatic zone, but we have found no data to statistically support this hypothesis.²⁹ Moreover, interviews with experts indicate that roof service life might vary by climate, but quality of installation has a much greater influence.

²⁷ See *Maintenance Task Data Base for Buildings [Various Systems]*, U.S. Army Corps of Engineers, May 1991.

²⁸ See *Engineered Performance Standards, Public Works Maintenance [Various Handbooks]*, Naval Facilities Engineering Command et. al., February 1982.

²⁹ Our review of a large U.S. sample of home repair data showed no significant regional patterns in the incident of roof repairs or average roof age. See NAHB Research Center, Inc., *1999 Consumer Repair and Replacement Data Files and Documentation, CD-ROM*. Upper Marlboro, 2000.

Equipment Costs are a function of equipment and operator labor costs in a given area. The rates used in estimating the profiles in Chapter 2 are shown in Table 6-7.

While the labor rates shown are applicable to the Washington, D.C. area, they can be modified for other areas by substituting the appropriate contract labor rate shown in Chapter 3.3; equipment rental costs are similar across areas and require no adjustment. Note that these rates do not include contractor markup for overhead and fees (typically an additional 30 percent for light construction).

Appendix 1: Reference Tables

Model Replacement Costs. Replacement costs for the models shown in Chapter 2 are summarized in Table A-1.

Asset M&R Labor Requirements. The MARS model used for generating M&R cost profiles can also be used to generate labor requirements. In fact, the same type of detailed asset profile shown in Chapter 2 could be prepared for M&R labor requirements. This type of analysis can be used for a variety of purposes, including benchmarking staff size and composition for existing facilities, and anticipating the labor requirements of planned facilities. Table 6-8 provides an example of labor requirements computed for the 2 Story Office Building shown in Chapter 2. A summary of average labor requirements for all models is shown in Table A-2 in the Appendix.

Uniformat II Classification of Asset Elements. Uniformat is a common classification system for construction information and is used to organize component listings in this book. The Uniformat II hierarchy is shown in Table A-3.

Table 6-8
Average Annual Labor Requirements:
2 Story Office Building

	In-House Staff	Contract Labor	Total Hours
PM & Minor Repair	261	74	335
Unscheduled Maintenance	270	21	291
Renewal & Replacement	0	1,026	1,026
Total	531	1,121	1,652

Includes only direct labor (not including supervision or support) for the 2 Story Office Building model described in Chapter 2. Average annual requirements are calculated over a 50-year asset lifetime.

Source: Whitestone Research.

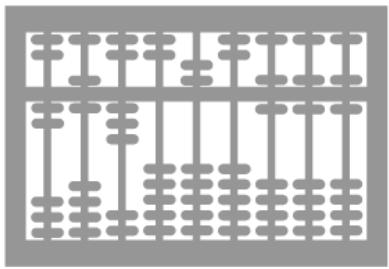
Table 6-7
Equipment Rates, 2009

	Rental Rate	Contract Labor	Hourly Rate*
2 ton forklift	\$31.00	\$40.56	\$71.56
45 ton crane	128.00	43.84	171.84
4 ton forklift	56.00	40.56	96.56
90 ton crane	225.00	43.84	268.84
2t forklift, 45t crane	159.00	84.40	243.40
4t forklift, 90t crane	281.00	84.40	365.40
Backhoe, Hydraulic, 3/4 CY Capacity	85.00	47.89	132.89
Roller, Pneumatic Tire, 120 HP	75.00	47.89	122.89
Roller, Smooth Drum, 125 HP	81.00	47.89	128.89
Truck, Dump, Tandem, 12 Ton	65.00	47.89	112.89
Truck, Flatbed, 3 Ton	36.00	47.89	83.89
Curb Builder	30.00	47.89	77.89
Paver, 150 HP	213.00	47.89	260.89
Pavement Profiler, 6' Wide, 450 HP	425.00	47.89	472.89
Paver/Roller	294.00	47.89	341.89
Profiler/Paver/Roller, Smooth Drum	719.00	47.89	766.89

*Hourly rate in Washington, D.C., including equipment rental, set-up fee, and operator (average hourly rates were calculated assuming a minimum one-day rental period). Does not include contractor markup. Labor rates can be adjusted for other areas using contract rates in Chapter 3.4.

Service Lives of Assets and Infrastructure.

The service life of a facility is a key variable in long-range M&R planning. Service life estimates provide an end-point for asset depreciation schedules and, similarly, are used for calculating required capital investment in facilities. For example, with a large portfolio of assets, knowledge of facility replacement value and estimated service life can be used to approximate the annual rate of capital expenditures required to maintain the portfolio asset value ($\text{replacement cost} \div \text{target service life} = \text{annual recapitalization}$). Service lives are used to calculate the remaining service life of facilities—a common metric—and are used more broadly for estimating the value of national capital stocks. Estimated service lives for selected asset and infrastructure types are shown in Table A-4.



Additional Reading

Additional Reading

M&R Planning and Funding

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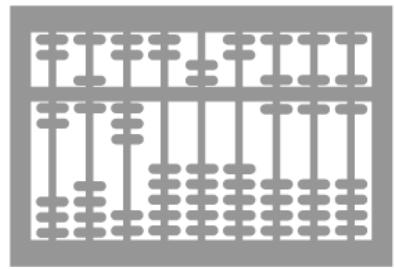
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Appendix 1

Model Replacement
Costs

M&R Labor
Requirements by
Asset Type

Uniformat II

Service Lives of
Assets and
Infrastructures

Table A-1
Model Replacement Costs, 2009

Model	GSFT	Replacement Cost*	Repl. Cost per GSFT
Aircraft Hangar	32,000	\$9,170,554	\$286.58
Apartments, 1-3 Story	22,500	4,606,183	204.72
Apartments, 4-7 Story	60,000	43,615,330	198.25
Apartments, 24 Story	220,000	11,900,540	198.34
Auto Salesroom	21,000	3,276,000	156.00
Bank, Branch	4,100	1,041,400	254.00
Bowling Center	20,000	4,840,000	242.00
Cafeteria	21,500	6,923,000	322.00
Car Wash	800	240,800	301.00
Central Plant, Boiler	1,100	691,900	629.00
Central Plant, Chilled Water	9,175	6,927,125	755.00
Central Plant, Steam	43,500	43,935,000	1,010.00
Club, Social	22,000	5,077,313	230.79
Clubhouse, Golf	6,000	1,628,664	271.44
College Auditorium	24,000	4,224,000	176.00
College Dormitory, 50 Room	25,000	6,429,866	257.19
College Lecture Classrooms	90,000	17,982,662	199.81
College Student Union	25,000	5,300,000	212.00
Community Center	10,000	2,558,919	255.89
Court House	30,000	8,080,357	269.35
Data Center, Tier III	25,000	48,000,000	1,920.00
Day Care Center	12,000	2,882,846	240.24
Electrical Power, Backup	240	768,720	3,203.00
Electrical Power, Substation	220	314,600	1,430.00
Elementary School	47,000	9,701,531	206.42
Fire Station	6,000	1,504,190	250.70
Garage, Parking	110,800	11,454,275	103.38
Garage, Service Station	1,400	372,233	265.88
Greenhouse, Research	2,100	447,300	213.00
Guard House	100	40,900	409.00
Health Club w/Gymnasium	40,000	8,506,074	212.65
Hospital, General	125,000	47,948,865	383.59
Hospital, Research	540,200	173,225,704	320.67
Jail, County	318,455	63,427,887	199.17
Laboratory, Agricultural	27,000	9,949,841	368.51
Laboratory, Electronics	30,200	10,039,947	332.45
Laboratory, General	56,000	18,450,880	329.48
Laboratory, Life Science	27,400	10,732,918	391.71
Laundry, Self-Service	3,000	645,000	215.00
Maintenance Shop	12,100	2,528,312	208.95
Manufacturing Plant, Light	45,000	10,668,264	237.07
Manufacturing Plant, Machinery	384,000	82,856,363	215.77
Manufacturing Plant, Process	50,700	11,838,131	233.49
Medical Clinic	13,000	3,995,623	307.36
Mortuary	10,000	2,340,000	234.00
Motel, 18 Units	8,000	1,720,000	215.00
Motel, 40 Units	18,000	3,606,280	200.35
Movie Theater	10,000	2,090,424	209.04
Municipal Building	11,000	2,860,000	260.00
Office Building, 2 Story	83,000	48,871,302	195.49
Office Building, 15 Story	250,000	16,255,022	195.84
Office Park	65,000	12,782,311	196.65
Passenger Terminal	12,000	2,592,000	216.00
Post Office	13,000	1,885,000	145.00
Public Library, 3 Story	60,000	13,509,303	225.16
Public Restroom	500	135,054	270.11
Pump House	195	122,655	629.00
Religious Assembly	17,000	4,243,987	249.65
Religious Education	10,000	2,673,587	267.36
Restaurant	10,000	3,064,095	306.41
Restaurant, Fast Food	4,000	1,244,062	311.02
Skating Rink	30,000	5,090,082	169.67
Store, Convenience	4,000	812,000	203.00
Store, Department	94,000	15,118,934	160.84
Store, Retail	8,000	1,624,000	203.00
Supermarket	96,000	16,122,380	167.94
Telecom Central Office	5,000	1,415,000	283.00
Visitor Center	20,700	4,812,210	232.47
Warehouse, Dry	80,000	8,306,188	103.83
Warehouse, Hazardous Materials	3,680	785,003	213.32
Warehouse, Self-storage	24,000	2,760,552	115.02
Warehouse, Temperature Controlled	8,200	1,161,509	141.65

* Washington, D.C. Area

Table A-2
Average Annual M&R Labor Requirements by Asset Type, 2009

Model	GSFT	Direct Hours ¹			Overhead ²	Total	FTE ³	GSFT / FTE
		In-house	Contract	Total				
Aircraft Hangar	32,000	312	513	824	1,648	2,472	1.2	26,926
Apartments, 1-3 Story	22,500	743	806	1,549	3,098	4,647	2.2	10,071
Apartments, 4-7 Story	60,000	1,920	2,106	4,025	8,050	12,075	5.8	10,335
Apartments, 24 Story	220,000	2,388	6,486	8,874	17,748	26,622	12.8	17,189
Auto Salesroom	21,000	108	360	468	936	1,404	0.7	31,111
Bank, Branch	4,100	82	99	181	362	543	0.3	15,705
Bowling Center	20,000	107	379	487	974	1,461	0.7	28,474
Cafeteria	21,500	549	491	1,040	2,080	3,120	1.5	14,333
Car Wash	800	28	23	51	102	153	0.1	10,876
Central Plant, Boiler	1,100	197	93	291	582	873	0.4	2,621
Central Plant, Chilled Water	9,175	269	264	533	1,066	1,599	0.8	11,935
Central Plant, Steam	43,500	1,279	1,447	2,727	5,454	8,181	3.9	11,060
Club, Social	22,000	162	420	583	1,166	1,749	0.8	26,164
Clubhouse, Golf	6,000	97	167	264	528	792	0.4	15,758
College Auditorium	24,000	193	544	737	1,474	2,211	1.1	22,578
College Dormitory, 50 Room	25,000	398	739	1,137	2,274	3,411	1.6	15,245
College Lecture Classrooms	90,000	557	1,592	2,149	4,298	6,447	3.1	29,037
College Student Union	25,000	256	568	824	1,648	2,472	1.2	21,036
Community Center	10,000	106	230	336	672	1,008	0.5	20,635
Court House	30,000	234	751	984	1,968	2,952	1.4	21,138
Data Center, Tier III	25,000	1,157	1,157	2,313	4,626	6,939	3.3	7,494
Day Care Center	12,000	94	218	313	626	939	0.5	26,581
Electrical Power, Backup	240	58	24	81	162	243	0.1	2,054
Electrical Power, Substation	220	12	7	19	38	57	0.0	8,028
Elementary School	47,000	314	980	1,295	2,590	3,885	1.9	25,163
Fire Station	6,000	102	189	291	582	873	0.4	14,296
Garage, Parking	110,800	157	982	1,139	2,278	3,417	1.6	67,446
Garage, Service Station	1,400	47	45	92	184	276	0.1	10,551
Greenhouse, Research	2,100	49	56	106	212	318	0.2	13,736
Guard House	100	22	8	30	60	90	0.0	2,311
Health Club w/Gymnasium	40,000	453	826	1,280	2,560	3,840	1.8	21,667
Hospital, General	125,000	1,638	2,974	4,612	9,224	13,836	6.7	18,792
Hospital, Research	540,200	10,203	10,251	20,454	40,908	61,362	29.5	18,311
Jail, County	318,455	2,209	6,319	8,528	17,056	25,584	12.3	25,891
Laboratory, Agricultural	27,000	1,252	821	2,073	4,146	6,219	3.0	9,030
Laboratory, Electronics	30,200	1,174	833	2,008	4,016	6,024	2.9	10,428
Laboratory, General	56,000	2,078	1,073	3,150	6,300	9,450	4.5	12,326
Laboratory, Life Science	27,400	1,165	661	1,826	3,652	5,478	2.6	10,404
Laundry, Self-Service	3,000	79	62	141	282	423	0.2	14,752
Maintenance Shop	12,100	123	229	352	704	1,056	0.5	23,833
Manufacturing Plant, Light	45,000	260	838	1,097	2,194	3,291	1.6	28,441
Manufacturing Plant, Machinery	384,000	2,418	5,090	7,508	15,016	22,524	10.8	35,461
Manufacturing Plant, Process	50,700	494	1,268	1,762	3,524	5,286	2.5	19,950
Medical Clinic	13,000	120	336	457	914	1,371	0.7	19,723
Mortuary	10,000	80	187	267	534	801	0.4	25,968
Motel, 18 Units	8,000	193	233	426	852	1,278	0.6	13,020
Motel, 40 Units	18,000	355	497	852	1,704	2,556	1.2	14,648
Movie Theater	10,000	85	296	382	764	1,146	0.6	18,150
Municipal Building	11,000	96	234	330	660	990	0.5	23,111
Office Building, 2 Story	83,000	532	1,124	1,655	3,310	4,965	2.4	34,771
Office Building, 15 Story	250,000	1,083	3,792	4,875	9,750	14,625	7.0	35,556
Office Park	65,000	221	962	1,184	2,368	3,552	1.7	38,063
Passenger Terminal	12,000	113	252	366	732	1,098	0.5	22,732
Post Office	13,000	112	323	435	870	1,305	0.6	20,720
Public Library, 3 Story	60,000	304	2,132	2,437	4,874	7,311	3.5	17,070
Public Restroom	500	16	17	32	64	96	0.0	10,833
Pump House	195	16	11	27	54	81	0.0	5,007
Religious Assembly	17,000	293	338	630	1,260	1,890	0.9	18,709
Religious Education	10,000	171	268	438	876	1,314	0.6	15,830
Restaurant	10,000	254	316	570	1,140	1,710	0.8	12,164
Restaurant, Fast Food	4,000	150	118	268	536	804	0.4	10,348
Skating Rink	30,000	391	440	831	1,662	2,493	1.2	25,030
Store, Convenience	4,000	74	66	140	280	420	0.2	19,810
Store, Department	94,000	433	1,385	1,817	3,634	5,451	2.6	35,869
Store, Retail	8,000	91	141	232	464	696	0.3	23,908
Supermarket	96,000	551	1,581	2,132	4,264	6,396	3.1	31,220
Telecom Central Office	5,000	64	113	177	354	531	0.3	19,586
Visitor Center	20,700	272	554	827	1,654	2,481	1.2	17,354
Warehouse, Dry	80,000	593	997	1,590	3,180	4,770	2.3	34,885
Warehouse, Hazardous Materials	3,680	72	170	243	486	729	0.4	10,500
Warehouse, Self-storage	24,000	187	561	748	1,496	2,244	1.1	22,246
Warehouse, Temperature Controlled	8,200	74	170	244	488	732	0.4	23,301
Average	48,887	591	981	1,571	3,143	4,714	2.3	19,574

¹Annual average requirements based on the 50-year profiles shown in Chapter 2. Preventative maintenance, minor repair, and unscheduled maintenance tasks done by the in-house staff; renewal and replacement tasks are assumed done by contract.

²An overhead rate of 2 (times direct hours) approximates support & supervision, non-productive time, and other indirect hours.

³Full time equivalents (FTE) are estimated as total (direct & overhead) hours / 2,080 hours.

Table A-3**UNIFORMAT II Classification of Asset Elements**

Level 1 Major Group Elements	Level 2 Group Elements	Level 3 Individual Elements
A SUBSTRUCTURE	A10 Foundations	A1010 Standard Foundations A1020 Special Foundations A1030 Slab on Grade
	A20 Basement Construction	A2010 Basement Excavation A2020 Basement Walls
B SHELL	B10 Super Structure	B1010 Floor Construction B1020 Roof Construction
	B20 Exterior Enclosure	B2010 Exterior Walls B2020 Exterior Windows B2030 Exterior Doors
	B30 Roofing	B3010 Roof Coverings B3020 Roof Openings
C INTERIORS	C10 Interior Construction	C1010 Partitions C1020 Interior Doors C1030 Fittings
	C20 Stairs	C2010 Stair Construction C2020 Stair Finishes
	C30 Interior Finishes	C3010 Wall Finishes C3020 Floor Finishes C3030 Ceiling Finishes
D SERVICES	D10 Conveying	D1010 Elevators & Lifts D1020 Escalators & Moving Walks D1090 Other Conveying Systems
	D20 Plumbing	D2010 Plumbing Fixtures D2020 Domestic Water Distribution D2030 Sanitary Waste D2040 Rain Water Drainage D2090 Other Plumbing Systems
	D30 HVAC	D3010 Energy Supply D3020 Heat Generating Systems D3030 Cooling Generating Systems D3040 Distribution Systems D3050 Terminal & Package Units D3060 Controls & Instrumentation D3070 Systems Testing & Balancing D3090 Other HVAC Systems & Equipment
	D40 Fire Protection	D4010 Sprinklers D4020 Standpipes D4030 Fire Protection Specialties D4090 Other Fire Protection Systems
	D50 Electrical	D5010 Electrical Service & Distribution D5020 Lighting & Branch Wiring D5030 Communication & Security D5090 Other Electrical Systems
	E10 Equipment	E1010 Commercial Equipment E1020 Institutional Equipment E1030 Vehicular Equipment E1090 Other Equipment
	E20 Furnishings	E2010 Fixed Furnishings E2030 Movable Furnishings
F SPECIAL CONSTRUCTION & DEMOLITION	F10 Special Construction	F1010 Special Structures F1020 Integrated Construction F1030 Special Construction Systems F1040 Special Facilities F1050 Special Controls and Instrumentation
	F20 Selective Building Demolition	F2010 Building Elements Demolition F2020 Hazardous Components Abatement

Table A-3**UNIFORMAT II Classification of Asset Elements (continued)**

Level 1 Major Group Elements	Level 2 Group Elements	Level 3 Individual Elements
G BUILDING SITEWORK	G10 Site Preparation	G1010 Site Clearing G1020 Site Demolition and Relocations G1030 Site Earthwork G1040 Hazardous Waste Remediation
	G20 Site Improvements	G2010 Roadways G2020 Parking Lots G2030 Pedestrian Paving G2040 Site Development G2050 Landscaping
	G30 Site Mechanical Utilities	G3010 Water Supply G3020 Sanitary Sewer G3030 Storm Sewer G3040 Heating Distribution G3050 Cooling Distribution G3060 Fuel Distribution G3090 Other Site Mechanical Utilities
	G40 Site Electrical Utilities	G4010 Electrical Distribution G4020 Site Lighting G4030 Site Communications & Security G4090 Other Site Electrical Utilities
	G90 Other Site Construction	G9010 Service and Pedestrian Tunnels G9090 Other Site Systems & Equipment

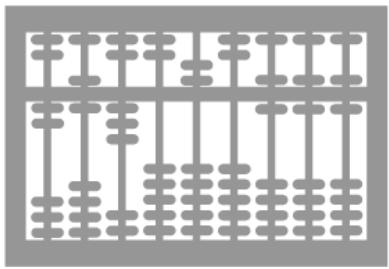
Note: Shaded elements are usually not included in component inventories for M&R cost modeling.

Source: ASTM Standard E 1557-97, with permission. Contact ASTM Customer Service at (610) 832-9585.

Table A-4
Service Lives of Buildings and Infrastructure

Facility Type	Service Life (Years)	Facility Type	Service Life (Years)
Aircraft Hangar	31	Other Industrial and Commercial Construction	26
Bridges, Trestles, and Overpasses	46	Other Institutional Construction	36
Broadcast and Communication	33	Other Marine Construction	37
Bulk Storage Tank	24	Other Oil and Gas Facilities	34
Canals and Waterways	48	Other Railroad Structures	54
Car Wash	35	Other Sewage System Construction	24
Church	47	Other Transportation Construction	18
Communication Towers, Antennae Station	16	Other Waterworks Construction	33
Day Care Center	42	Outdoor Recreational Facility	25
Docks, Wharves and Piers	31	Parking, Lots and Garages	32
Dormitory, Student	44	Passenger Terminal	33
Dredging and Pile Driving	29	Penitentiaries and Courthouses	41
Dry Cleaner	66	Pollution Control	24
Electrical Power, Distribution Line	45	Power, Stand-By/Emergency	45
Electrical Power, Substation, and Switching	45	Public Library	35
Farm Building	37	Pumping Stations, Gas	34
Fire Station	28	Rail Track, Roadbeds, and Signals	40
Garage, Auto Sales	28	Railway and Engine House	30
Garage, Maintenance and Repair	30	Reservoir, Including Dam	39
Gas Mains and Services	36	Residential, 1-4 Unit Structures	80
Gas Pipelines	36	Residential, 5 or More Unit Structures	65
Gas Station	38	Residential, Mobile Home	20
Grain Elevator and Terminal	30	Residential, Single Family Housing	80
Highways, Roads, and Streets	28	Restaurant, Fast Food	27
Hospital and Clinic	40	Runway, Including Lighting	20
Hotel, Motel or Convention Center	41	Sanitary and Storm Sewer	34
Indoor Recreational Building	36	Schools, Colleges, and Universities	41
Irrigation and Land Reclamation	48	Service Station	22
Laboratory, Research Center	36	Sewage Treatment and Disposal Plant	29
Lagoon	24	Shopping Center	38
Light Manufacturing Plant	30	Telephone and Cable Lines	28
Lighting, Exterior Lines	45	Theater, Performing Arts	37
Mining Exploration Shfts and Wells	20	Treatment Plant and Pumping Station	43
Mobile Offices	16	Trunk and Distribution Main	33
Museum	49	Tunnels	60
Natural Gas Processing Plant	21	Warehouse and Freight Terminal	36
Nursing Home	37	Waste Disposal Facility	19
Office Building	41	Wildlife Management Area	60
Oil Pipeline	20		
Oil Refinery	21		
Other Communication Construction	19		

Sources: Statistics Canada, U.S. Bureau of Economic Analysis, and Whitestone Research.



Appendix 2

Sample Residential
Cost Profile

Whitestone also provides cost forecasts for single-family residences. Only an address is required to generate a detailed forecast of common homeowner costs, as shown below. This service is available for no charge at www.brickbits.com.



Customized estimates of your annual housing costs. **Free!**

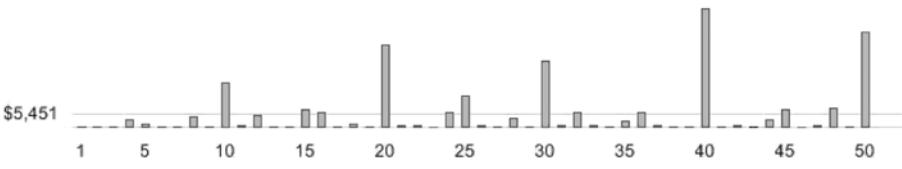
Finished! View your estimate

Zip code:	20015	Year built:	1964	Lot size (SqFt):	7250
Home size (SqFt):	1,900	Year remodeled:	1964	Landscape (SqFt):	6300
Bedrooms:	3	Bathrooms:	2.00	Heat type:	Gas Furnace
Occupants:	4	Stories:	2.00	AC type:	Central
Purchase price:	\$880,000				

Service	Annual Total	Percent of Total	
Cleaning	\$4,690	18.6 %	
Trash / Recycling	\$328	1.3 %	
Maintenance and repair*	\$2,291	9.1 %	
Energy	\$5,179	20.5 %	
Water / Sewer	\$305	1.2 %	
Landscaping	\$1,569	6.2 %	
Pest Control	\$506	2.0 %	
Security	\$458	1.8 %	
Phone	\$292	1.2 %	
TV	\$550	2.2 %	
Internet	\$600	2.4 %	
Property Tax	\$8,448	33.5 %	
Total	\$25,216	100.0%	

* Maintenance and repair cost is the average for the next five years (graphic below shows costs by year).

Your maintenance and repair schedule



Year	Cost (\$)
1	~\$100
5	~\$100
10	~\$1000
15	~\$100
20	~\$1500
25	~\$100
30	~\$1000
35	~\$100
40	~\$1500
45	~\$100
50	~\$1500

Click on a year in the graph for details. Dark bar shows your home's age since built or remodeled.

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Whitestone Facility Maintenance and Repair Cost Reference 2009-2010

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Notes

The Whitestone Facility Operations Cost Reference 2009-2010

Now in its third annual edition, this companion volume to the Whitestone Facility Maintenance & Repair Cost Reference provides detailed operation cost statistics for 72 building and other structure models in 234 U.S. and Canadian areas. Data is included for 3 levels of service for 11 building operations including: custodial, energy, grounds, maintenance & repair, management, pest control, refuse, road clearance, security, telecommunications, and water & sewer. Also included are unique national and local cost indexes.

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Whitestone Research

2050 Alameda Padre Serra, Suite 200
Santa Barbara, California 93103

PHONE: +1-800-210-0137, +1-805-884-9174

E-MAIL: contact@whitestoneresearch.com

WEB: <http://www.whitestoneresearch.com>

