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LEED[®] Cost Study

Final Report

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Executive Summary:

GSA LEED Cost Study

The U.S. General Services Administration (GSA) commissioned this study to estimate the costs to develop “green” federal facilities using the U.S. Green Building Council’s *Leadership in Energy and Environmental Design* (LEED) Building Rating System, Version 2.1. The report provides a detailed and structured review of both the hard cost and soft cost implications of achieving Certified, Silver, and Gold LEED ratings for two GSA building types, using GSA’s established design standards as the point of comparison.

The two building types examined in the study are:

1. A new mid-rise federal Courthouse (five stories, 262,000 GSF, including 15,000 GSF of underground parking; base construction cost is approximately \$220/GSF)
2. A mid-rise federal Office Building modernization (nine stories, 306,600 GSF, including 40,700 GSF of underground parking; base construction cost is approximately \$130/GSF).

These building types reflect a significant percentage of GSA’s planned capital projects over the next five to ten years.

Construction Cost Impacts

For each of the two building types, baseline construction cost estimates were developed to

reflect applicable federal design requirements, as defined in GSA’s *Facilities Standards for the Public Buildings Service* (document PBS-P100, 2003), and, for Courthouses, the Administrative Office of the United States Courts’ *U. S. Courts Design Guide*. The design standards were also used as the basis for evaluating each LEED prerequisite and credit. An analysis was performed to identify green building measures—above and beyond those included in GSA’s standards—that would likely be implemented to meet the specific LEED prerequisite and credit requirements. From these measures, cost impact estimates were developed for each prerequisite and credit, with variations defined for both the Courthouse and Office Building models. The individual credit costs were also categorized, using the following key:

1. GSA mandate (no cost)
2. No Cost/Potential Cost Decrease
3. Low Cost (< \$50K)
4. Moderate Cost (\$50K-\$150K)
5. High Cost (>\$150K)

From these individual credit assessments, overall project cost estimates were developed for 12 LEED rating “scenarios” (6 for each building type). The scenarios were defined as follows:

- *New Courthouse*. Two estimates were developed at the Certified, Silver, and Gold rating levels. At each rating level, one “low cost” and one

“high cost” scenario was defined in order to bracket the LEED costs.

- *Office Building Modernization.* Two estimates were developed at the Certified, Silver, and Gold rating levels. At each rating level, one scenario reflected a “minimal façade renovation” (window replacement, minor repairs) and the other reflected a “full façade renovation” (new cladding and façade design, new windows, new insulation). The different façade scenarios reflect one of the most significant scope variations in GSA’s modernization projects and were therefore

used as the basis for bracketing the LEED Office Building costs.

The point totals used for each rating level were as follows: 28 points for a Certified rating, 35 points for a Silver rating, and 41 points for a Gold rating. These totals are purposely 2 points higher than the LEED minimums, as it is common practice to submit additional credits to ensure that a rating is achieved (i.e., in the case that one or two credits are denied during the LEED certification process with the USGBC).

The construction cost impacts for the 12 rating scenarios are identified in Tables **ES-1A** and **ES-1B**.

TABLE ES-1A

TABLE ES-1A		NEW COURTHOUSE (262,000 GSF, Base Construction Cost = \$220/GSF)					
		Certified		Silver		Gold	
		1A Low Cost	2A High Cost	3A Low Cost	4A High Cost	5A Low Cost	6A High Cost
LEED CONSTRUCTION COST IMPACTS*							
	\$/GSF	(\$0.76)	\$2.18	(\$0.07)	\$9.57	\$2.97	\$17.79
	% CHANGE	-0.4%	1.0%	-0.03%	4.4%	1.4%	8.1%

TABLE ES-1B

TABLE ES-1B		OFFICE BUILDING MODERNIZATION (306,600 GSF, Base Construction Cost = \$130/GSF)					
		Certified		Silver		Gold	
		1B Min. Facade	2B Full Facade	3B Min. Facade	4B Full Facade	5B Min. Facade	6B Full Facade
LEED CONSTRUCTION COST IMPACTS*							
	\$/GSF	\$1.78	\$2.73	\$3.94	\$5.55	\$10.58	\$10.22
	% CHANGE	1.4%	2.1%	3.1%	4.2%	8.2%	7.8%

* Construction cost estimates reflect a reference date of October 2003 (GSA FY04) and a reference location of Washington, DC.

The construction cost estimates reflect a number of GSA-specific design features and project assumptions; as such ***the numbers must be used with caution***. The cost impacts may not be directly transferable to other project types or building owners. These issues are reviewed in greater detail in the “Cost Estimate Qualifiers” section below.

Soft Cost Impacts

Soft cost impacts were defined for LEED-related tasks that were above and beyond standard GSA project requirements. Tasks were defined in two categories:

- *LEED Design Costs:* Those tasks that increase the design team's scope of work during the design and construction stages of a project
- *LEED Documentation Costs:* Those tasks associated with documenting and submitting a LEED application to the U.S. Green Building Council.

As with the construction cost analysis, soft cost impacts were defined for six Courthouse and six Office Building rating scenarios.

Soft costs were also evaluated based on two different design team approaches. In the "Expert Consultant" approach, the design team works with specialized "green building" consultants, who guide the LEED process and perform a number of LEED-specific tasks. In the "Experienced Design/Construction Team" approach, all LEED tasks are performed by the core design and construction management teams, who have previous LEED project experience.

The soft cost impacts for the twelve rating scenarios are identified in Tables **ES-2A** and **ES-2B**.

TABLE ES-2A

NEW COURTHOUSE (262,000 GSF, Base Construction Cost = \$220/GSF)						
Certified		Silver		Gold		
1A Low Cost	2A High Cost	3A Low Cost	4A High Cost	5A Low Cost	6A High Cost	
LEED SOFT COST IMPACTS						
EXPERT CONSULTANT APPROACH (\$/GSF)	\$0.41	\$0.46	\$0.41	\$0.55	\$0.61	\$0.80
EXPERIENCED DESIGN TEAM APPROACH (\$/GSF)	\$0.43	\$0.45	\$0.44	\$0.54	\$0.56	\$0.73

TABLE ES-2B

OFFICE BUILDING MODERNIZATION (306,600 GSF, Base Construction Cost = \$130/GSF)						
Certified		Silver		Gold		
1B Min. Facade	2B Full Facade	3B Min. Facade	4B Full Facade	5B Min. Facade	6B Full Facade	
LEED SOFT COST IMPACTS						
EXPERT CONSULTANT APPROACH (\$/GSF)	\$0.41	\$0.41	\$0.44	\$0.49	\$0.70	\$0.69
EXPERIENCED DESIGN TEAM APPROACH (\$/GSF)	\$0.35	\$0.35	\$0.38	\$0.44	\$0.59	\$0.58

As with the construction cost estimates, the soft cost estimates reflect a number of GSA-specific project assumptions. As such, *the numbers must be used with caution.*

The cost impacts may not be directly transferable to other project types or building owners. These issues are reviewed in greater detail in the “Cost Estimate Qualifiers” section below.

Cost Estimate Qualifiers

The cost impacts derived in the study are subject to a number of qualifiers, which are important in understanding how the costs may relate to other building types, building sizes, and non-GSA projects. Key qualifiers are reviewed as follows:

1. Building Program and Site Assumptions

The specific programmatic requirements of the Courthouse and Office Building play an important role in determining the applicable LEED credits and the resulting LEED cost impacts. Significantly different building types (e.g., laboratories, schools, and residential buildings) would likely develop a different overall profile of LEED credits, and might use significantly different approaches to achieve common credits.

The programmatic differences between new construction (Courthouse) and renovation (Office Building) also factor into the credit selections and resulting costs. The program for the Office Building, for example, does not include site renovation or roof replacement, based on typical GSA modernization scopes. This significantly limits the number of LEED site credits available in the Office Building model, as compared to the new construction Courthouse.

The scenarios in the study are also subject to a number of specific site assumptions (e.g., urban locations, brownfield redevelopment, no above-grade parking, large site acreage for the Courthouse based on security setbacks). As with the programmatic assumptions, these specific site characteristics determine the feasibility of a number of the LEED credits. Buildings in suburban or rural settings, for instance, would develop a different profile of credits in the Sustainable Sites category, which would result in different cost impacts in those areas.

2. GSA-Specific Design Requirements

In addition to the general programmatic and site issues discussed above, GSA’s comprehensive design criteria differentiate their projects from

many “market-rate” commercial developments. A number of GSA’s design criteria are consistent with LEED credit requirements and therefore assist their projects in earning LEED points. For the purposes of this study, these features or practices are not considered part of the LEED premium.

Conversely, in a few cases, GSA’s policies and practices limit the applicability of LEED credits that might be more easily included in non-GSA projects. Some of the most significant GSA-specific criteria are listed as follows:

- *Commissioning.* GSA already requires a total building commissioning process for its projects and therefore does not consider it to be a LEED cost. For the purposes of this study, GSA’s commissioning efforts are assumed to earn both the LEED commissioning prerequisite and credit EA-3, Additional Commissioning.
- *Energy efficiency.* GSA sets energy performance targets for their buildings, which are typically more stringent than local energy codes or the ASHRAE standard 90.1-1999, which is used as the baseline in LEED. For the Courthouse, a target of 45,000 to 50,000 BTU/GSF/year was set, which translated to 1 LEED point (approximately a 17 percent improvement) under LEED credit EA-1. Similarly, the Office Building modernization started with an energy use target of 50,000 to 55,000 BTU/GSF/year, which translated to 2 LEED points (approximately a 14 percent improvement) in the minimal façade renovation case, and 3 LEED points (approximately an 18 percent improvement) in the full façade renovation case.
- *Underfloor air delivery system.* For new construction projects, GSA’s P100 (2003) encourages the use of underfloor air delivery systems in appropriate applications. In the Courthouse model of this study, an underfloor air system has been included in the base costs. The system allowed the building to earn credit EQ-2 (Ventilation Effectiveness) and assisted in earning credit EQ-6.2 (Increased Occupant Control).
- *Dedicated ventilation system.* GSA’s P100 (2003) requires dedicated outside air ventilation units for both perimeter and interior spaces. This design approach is used to provide greater

control of outside air and to maintain positive pressure in perimeter spaces to reduce the potential for moisture/condensation buildup in exterior wall assemblies. For the purposes of this study, the dedicated ventilation system was assumed to be eligible for a LEED Innovation credit.

- *Recycled-content materials.* GSA projects are required to incorporate recycled content materials, to the maximum extent feasible, as identified in the U.S. Environmental Protection Agency's (EPA) Comprehensive Procurement Guidelines (CPG). Recycled-content products listed in the CPG include concrete (with flyash or blast furnace slag), building insulations, carpets and carpet cushions, and shower or toilet partitions. The study assumes that all of the applicable CPG product types are used in the Courthouse and Office Building models, assisting the scenarios to achieve credits MR-4.1 and 4.2 (Recycled Content). It should be noted that many of the CPG products could be incorporated into non-GSA projects at no cost premium.
- *HCFC refrigerants.* LEED credit EA-4 prohibits the use of HCFCs or Halons in building-level HVAC, refrigeration, or fire-suppression systems. GSA's P100 defines acceptable HVAC refrigerants through the EPA's *Significant New Alternatives Policy* (SNAP). The SNAP alternatives currently include HCFC-22; therefore, GSA does not rule out the use of this refrigerant on any project. Because of this policy, credit EA-4 has not been included in any of the Courthouse or Office Building scenarios.
- *Green power.* LEED credit EA-6 can be earned by purchasing electricity generated from renewable resources such as wind, solar, or biomass (the credit defines the amount of electricity that must be purchased and its certification). Although GSA does purchase green power for some of its facilities, the determination is made by regional managers on a case-by-case basis. Overall, the credit was considered an operational issue outside of the scope of this study. Credit EA-6 has not been included in any of the Courthouse or Office Building scenarios.

Additional design criteria issues are reviewed in the "Individual Credit Reviews" section of the study.

3. No Programmatic Trade-offs

For the purposes of the study, no programmatic adjustments were made between the LEED and non-LEED buildings; i.e., space allocations were not adjusted, material finishes were kept consistent, glazing areas remained the same, etc. In some LEED projects, these types of programmatic trade-offs can be used to offset increases in first cost derived from high-performance building components (e.g., better quality glazings, more efficient HVAC equipment, and formaldehyde-free casework). Although this approach can be an effective means of cost control, it was purposely not pursued in the study. The intent of the study was to identify potential LEED cost impacts based on identical programmatic requirements.

The one exception to this rule that occurs in the study is in site development. As there is often a degree of flexibility to the site and landscaping programs in GSA projects, adjustments have been allowed in site paving areas, planting areas, and irrigation systems in order to achieve various LEED credits in the Sustainable Sites and Water Efficiency categories.

4. Building Size

The study has identified cost impacts for two mid-rise buildings of approximately 260,000 to 300,000 gross square feet. The scope of the study did not include an evaluation of how the costs may vary for buildings that are significantly smaller or larger than these mid-rise models. It is generally assumed that some adjustments would be required. The soft cost estimates in particular are assumed to be very sensitive to the project scale, with the \$/gross square foot (GSF) fees becoming significantly higher in smaller buildings and correspondingly lower in larger projects. The *total* dollar costs for LEED-related services are expected to level out after they cross certain "low end" and "high end" thresholds.

5. Variations in Baseline Project Costs

The building program, site assumptions, and design criteria determine the baseline project costs for the two models. The differences in the baseline costs (\$220/GSF for the Courthouse versus \$130/GSF

for the Office Building Modernization) are important to note, because they directly influence the percentage-based calculations of LEED cost impacts. For example, LEED-based measures that had similar total costs in the two projects (e.g., water-efficient plumbing fixtures, carbon dioxide sensors) have significantly different impacts as a percentage of the total project costs. It is therefore important to consider both the \$/GSF and percentage-based impacts when evaluating the overall LEED costs.

6. Costs Based on LEED Version 2.1

All credit cost assumptions are based on LEED Version 2.1, which was the current rating system at the time of the study. As LEED is a constantly evolving program, new versions are expected in the near future (versions 2.2 and 3.0 are already in progress, with projected release dates in 2005 and 2006, respectively). While the specific changes to LEED are unknown at the time of this report, it is expected that the new versions will warrant adjustments to the cost impacts derived in the study.

Because of these varying cost estimate qualifiers, simple cost extrapolations from the overall results of the study cannot be considered reliable for projects of significantly different scope or scale. However, the detailed cost breakdowns included in the study can provide a basis for other projects to evaluate LEED costs. The “apples to apples” comparisons of the Individual Credit Reviews and Cost Estimates (Section 2 and Appendices C and D) can serve as a starting point in understanding the typical scope and potential cost implications of various LEED measures. Additionally, the soft cost summaries and breakdowns included in Section 4 and Appendices G and H can provide a basis for understanding the extent and costs of LEED-related professional services.

Addressing LEED Cost Variables

The study indicates that there is an inherent degree of variability to LEED construction cost impacts. The primary factors creating this variability include the following:

1. There is no correlation between the point value of a LEED credit and its cost. There are many “no cost” and “low cost” LEED credits (such

as development density, proximity to public transportation, no irrigation systems, use of locally manufactured materials, low-VOC adhesives, low-emission carpets) that earn 1 point each. At the other extreme, the study illustrates that some credits (renewable energy, for example) can cost hundreds of thousands of dollars each—and still earn 1 point. The selection of credits used to achieve a LEED rating can therefore result in a wide range of resultant costs.

2. A range of different strategies can often be used to earn the same individual LEED credit.

Many of the LEED credit criteria are performance based rather than prescriptive. This allows design teams flexibility in defining an approach to credit compliance. Different strategies can also result in significantly different cost impacts. An example from the cost study is credit SS-6.1, Stormwater Management (Rate and Quantity), used in the Courthouse model. In the “low cost” scenarios, the credit was earned by increasing the amount of site plantings and reducing the amount of site paving. This approach actually reduced construction costs. In one of the “high cost” Gold rating scenarios, a vegetated roof system was installed as an alternative approach. The premium for the vegetated roof system was approximately \$580,000. While the vegetated roof has additional benefits and was used to earn an additional LEED credit (SS-7.2, Heat Island Reduction), it still represented a significantly more expensive approach to credit compliance.

3. The cost of some credits varies significantly based on the building type and building program.

For example, in the Office Building model, earning credit MR-7 (Certified Wood) involved a moderate cost premium (approximately \$77,000) because wood use in the building was limited (some doors and a small amount of casework). In the Courthouse model, on the other hand, the cost premium to earn the credit was almost \$600,000. The Courthouse has extensive wood finishes, including paneling, doors, casework, and fixed furnishings in the courtrooms and judges’ chambers.

4. Some credit costs vary based on region-specific or project-specific issues. Two examples illustrate this point. In some parts of the country, earning and exceeding the requirements of credits MR-5.1/5.2 (Local/Regional Materials) can be easily accomplished at no cost. In other locations, a

premium may be paid to use brick, stone, or other major construction materials that are locally manufactured or sourced. A second example involves credit MR-2.1/2.2 (Construction Waste Management). Costs to earn this credit can vary significantly depending on the recycling infrastructure in the region, the experience of the contractors and construction/demolition crews, and the space constraints of the project site.

Overall, the study illustrates that when GSA projects take advantage of many “no cost” or “low cost” credit opportunities, the overall construction cost premium can be surprisingly limited, even at the higher rating levels. Under certain conditions, it is even possible for projects to show a slight cost decrease. However, when few low-cost credits are available to a project, the premiums increase significantly. The level of variability is most clearly illustrated in the Gold rating scenarios of the Courthouse model, which ranged from only a 1.4 percent premium in the “low cost” case (approximately \$3.00/GSF) to an 8.1 percent premium (almost \$18/GSF) in the “high cost” case.

By contrast, the cost premiums for the Office Modernization model showed much less variation at each rating level. This was intentional to a large degree, because the cost bracketing was based primarily on one issue (the impact of the different façade renovations) rather than on the more diverse “low cost vs. high cost” approach used for the Courthouse. The Office Building model also demonstrated, however, that when the choice of LEED credits is more limited, the cost premiums tend to be more predictable. The Office Building model had fewer credits to choose from because the scope of work did not include site renovations or roof replacement, which limited the number of applicable Sustainable Sites and Water Efficiency credits.

Beyond the issue of cost variations, the broader implication derived from the Courthouse and Office Building models is that GSA’s green building costs can be managed, and to some degree predicted, if a consistent approach is applied from project to project. A structured approach to LEED would include the following steps:

- Identify and incorporate all LEED credits that are “automatically” earned based on GSA design standards.

- Identify and incorporate those LEED credits that can be earned at no cost or minimal cost based on the particular site conditions and programmatic requirements of the project.
- Evaluate and incorporate appropriate no-cost or minimal-cost LEED credits. Examples include items such as water efficiency (plumbing fixtures) or low-emission paints, adhesives, and sealants. Many of these credits do not affect the project design but rather involve product selection and specification issues.
- Evaluate and select appropriate credits at the moderate and high-cost levels. Analysis of these credits should weigh first costs against the immediate and long-term value of the measures (e.g., lower operating costs, improved workplace environment, significant community or environmental benefits). At this level, a strong emphasis should be placed on identifying and exploiting inter-credit synergies.

An analysis of this type, performed early in the design process, can provide clear direction to a design team and help establish realistic LEED goals. In addition, the analysis can help teams identify the significant design and performance challenges for a project, which require integrated thinking and full team participation. These design-related issues often have the most significant impacts on cost and performance (e.g., approaches to daylighting, energy efficiency, stormwater management) and therefore require an early focus.

This structured approach is the basis of GSA’s *LEED Applications Guide*, the companion document to the LEED Cost Study. The *Applications Guide* provides a more detailed review of the process and issues outlined above.

Implications for GSA Projects

GSA’s P100 requires all new construction and major modernization projects to be certified through the LEED program, with an emphasis on obtaining Silver ratings. Individual client agencies may also work with GSA to pursue even higher levels of LEED certification. Using the results of the LEED Cost Study, the GSA intends to refine the amount of “sustainability” funding provided for future projects (prior to the Cost Study, GSA has

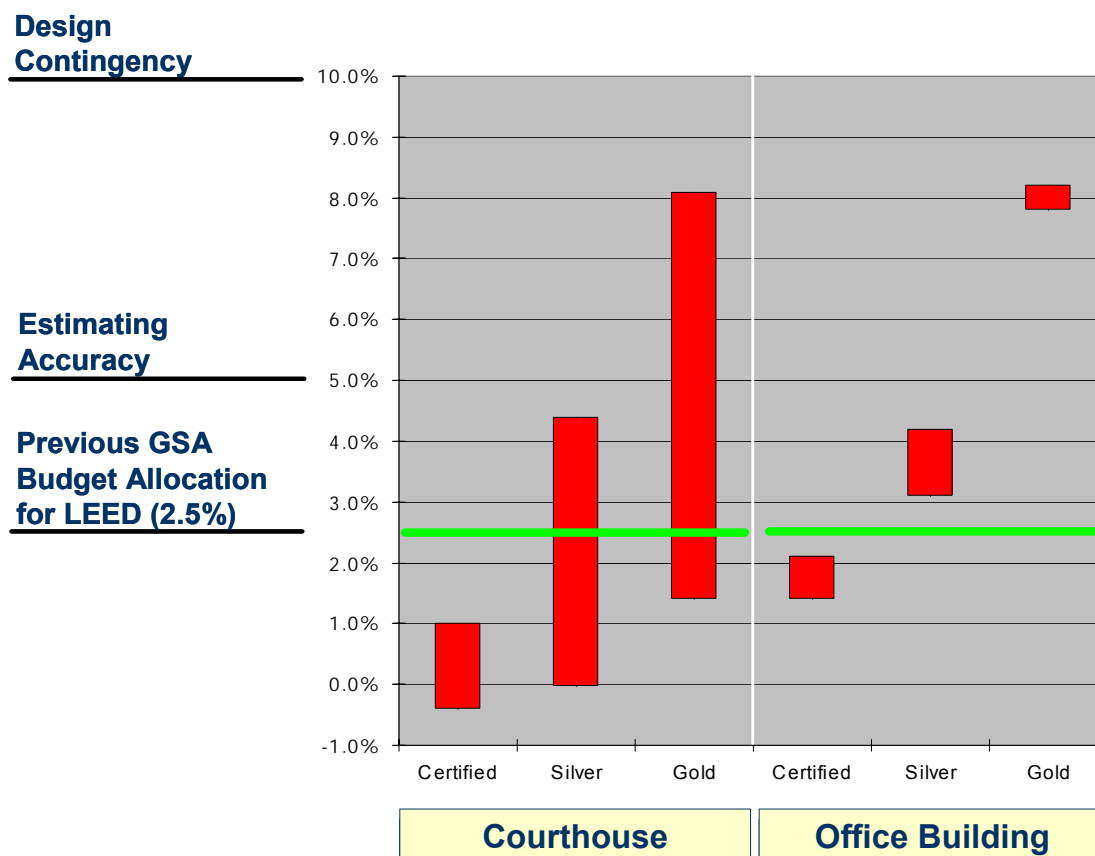
allocated a 2.5% budget increase for green building construction costs). The new budget allocation will be enough to ensure that projects can achieve LEED Certified ratings; however, project teams will be encouraged to achieve the highest level of LEED rating that is practical within the overall budget. With the revised budget allotments (which will likely vary between 2.5% and 4.0%, depending on the project), the study indicates that many Silver rated buildings should be possible, as well as occasional Gold rated projects.

The opportunity to achieve Silver ratings or higher is also supported by GSA's general project contingencies and by the accuracy allowances of the cost estimates themselves. As illustrated in **Figure ES-1**, the range of estimated construction cost

impacts for the Certified and Silver rated scenarios falls below the 5% estimating accuracy that would normally be expected of early conceptual estimates. In addition, the construction cost impacts for all of the rated scenarios, including Gold, fall below the 10% design contingency that is carried in most GSA project budgets at the concept phase. These numbers imply that in some scenarios (depending on the design solution, market conditions, and other contingency factors), a LEED rating could potentially be achieved within a standard GSA project budget (without a green building budget allowance). By including a dedicated green building allowance, the potential for GSA buildings to achieve higher LEED rating levels - with the attended benefits - is substantially greater.

FIGURE ES-1

GSA LEED Construction Cost Impacts vs. Estimating Accuracy and Design Contingency



Introduction:

GSA LEED Cost Study

Background

The U.S. General Services Administration (GSA) is one of the largest building owners and managers in the nation, with over 8,300 owned and leased facilities serving over one million federal employees. Over the past decade, energy efficiency and resource conservation goals have increasingly been emphasized within GSA's building design requirements, both in response to federal mandates, and as part of GSA's overall efforts to improve the quality and value of their properties. Through the *Facilities Standards for the Public Buildings Service* (document PBS-P100, 2003), GSA identifies Sustainability and Energy Performance as basic tenets of their General Design Philosophy. The P100 document also specifically references the *Leadership in Energy and Environmental Design* (LEED®) Green Building Rating System of the U.S. Green Building Council. GSA requires all new construction, and major renovation and modernization projects to be certified through the LEED program, with project teams strongly encouraged to achieve LEED "Silver" ratings. Individual client agencies may also work with GSA to pursue even higher levels of LEED certification (i.e., Gold or Platinum ratings).

With this level of commitment to sustainable design, GSA has had a clear need to address the associated costs and benefits. In 1997-1998, GSA sponsored its first Green Buildings Cost Study,

which analyzed a wide range of design and construction recommendations made by a nationally-recognized panel of green building experts. Using a new GSA Courthouse building as a case study, the report defined a series of "high", "medium" and "low" cost green measures. The results of the study did not correspond directly to LEED ratings, however, as LEED Version 1.0 was still in a pilot phase at that time. In subsequent years, LEED has evolved from Version 1.0 and 2.0 to the current Version 2.1, making the differences between LEED and the early cost study even more pronounced. GSA therefore commissioned this report to update the agency's understanding of green building costs, and to align their cost assumptions with the latest LEED criteria.

Methodology and Scope

As with the earlier Green Buildings Cost Study, the LEED Cost Study uses common GSA building types as the basis for the cost evaluations. The LEED Cost Study focuses on two building types that represent a significant portion of GSA's current and upcoming project load:

- 1) A new mid-rise Federal Courthouse; and
- 2) A mid-rise Federal Office Building modernization.

Unlike the earlier cost study, the building models used for the LEED Cost Study are not based on actual GSA projects. They are instead based on building prototypes that GSA had previously defined for project budgeting purposes (not including LEED premiums). The budget models are defined in sufficient detail to establish a full range of reference project costs, with estimates reported in a Uniformat Level Three breakdown. For the purposes of the study, both buildings are assumed to be located in Washington DC.

Some of the key features of the building models are defined as follows.

New Mid-Rise Courthouse

- Building Area:
262,000 GSF, including 15,000 GSF of underground parking
- Number of Stories: Five
- Structural System:
Pile foundations/grade beams/cast-in place basement walls
Cast-in-place structural slab system for basement level
Structural steel floor framing for upper floors and roof. Steel deck w/concrete fill for floors.
- Cladding System:
Limestone panels over c.m.u. for first two floors. Precast concrete panel system for upper floors.
- Fenestration:
Combination of aluminum curtainwall system and aluminum punched window system. Insulated, tinted low-e glazings.
- HVAC:
Three water-cooled chillers sized for 50%, 50%, and 20% of the cooling load
Dual fuel (gas/oil) boilers
Underfloor air distribution system with ceiling plenum return
Humidification system
- Total Site Area: Approximately 3.1 acres

- Reference Cost:

\$219.14/GSF (based on a November 2003 start date)

Sample schematic floor plans for the mid-rise Courthouse are illustrated in Figures 1 and 2 below.

Mid-Rise Office Building Modernization

The mid-rise Office Building reference model includes two variants – a “minimal façade renovation” and a “full façade renovation”, as noted under the Cladding/Fenestration System Retrofit heading below.

- Building Area:

306,600 GSF, including 40,700 GSF of underground parking

- Number of Stories: Nine

- Structural System retrofit:

Upgrade framing to achieve resistance to progressive collapse

- Cladding/Fenestration System retrofit:

Option A (minimal façade renovation):

Clean and caulk existing stone cladding. Replace existing windows and curtainwall with new aluminum framed systems (fenestration is assumed to comprise 60% of the wall area). Provide new insulated, tinted low-e glazings.

Option B (full façade renovation):

Clean and caulk existing stone cladding on floors 1 and 2. Strip existing cladding and replace with new precast concrete panel system for floors 3-9. Replace existing windows and curtainwall with new aluminum framed systems. Provide new insulated, tinted low-e glazings. Reduce area of fenestration on upper floors to 40% of wall area.

- Roof retrofit: None assumed

- Interior retrofit: Patching and repairing of partitions at core spaces. New interior partitions and finishes for all other spaces.

- MEP retrofit:

New HVAC, electrical service/distribution, lighting, plumbing, and fire protection

systems. No reuse of existing systems is assumed, other than utility tie-ins.

Overhead air distribution system (ceiling-mounted supply and return registers).

- Site Retrofit: None assumed

- Reference Costs:

Option A (minimal façade renovation):

\$128.44/GSF (based on an October 2003 start date)

Option B (full façade renovation):

\$131.91/GSF (based on an October 2003 start date)

Sample schematic floor plans for the mid-rise Office Building are illustrated in Figures 3 and 4 below.

Sample Plans: Courthouse Model

Figure 1:

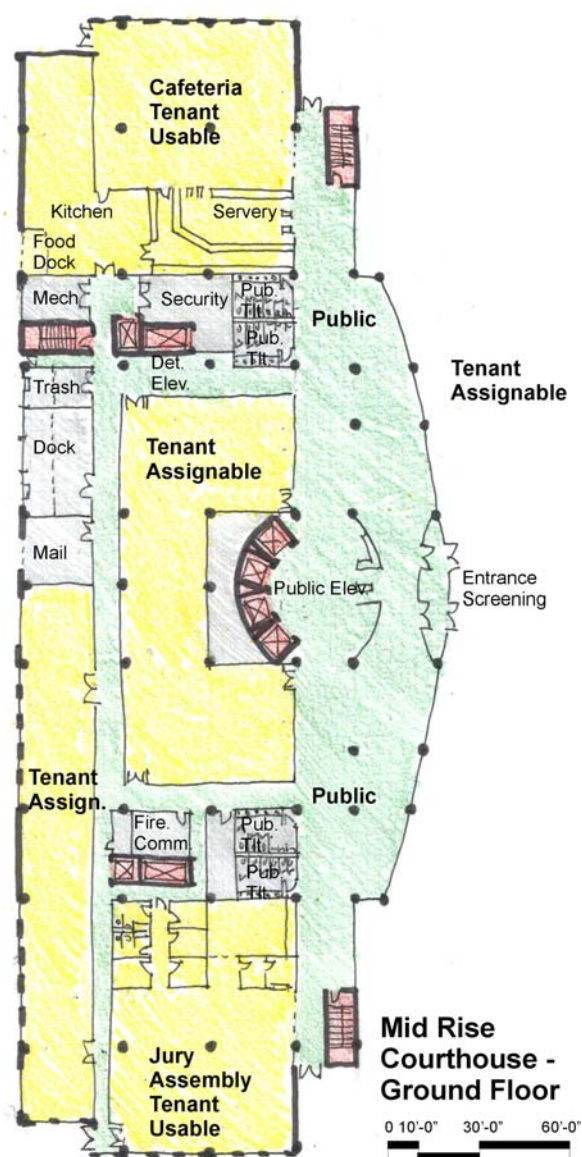
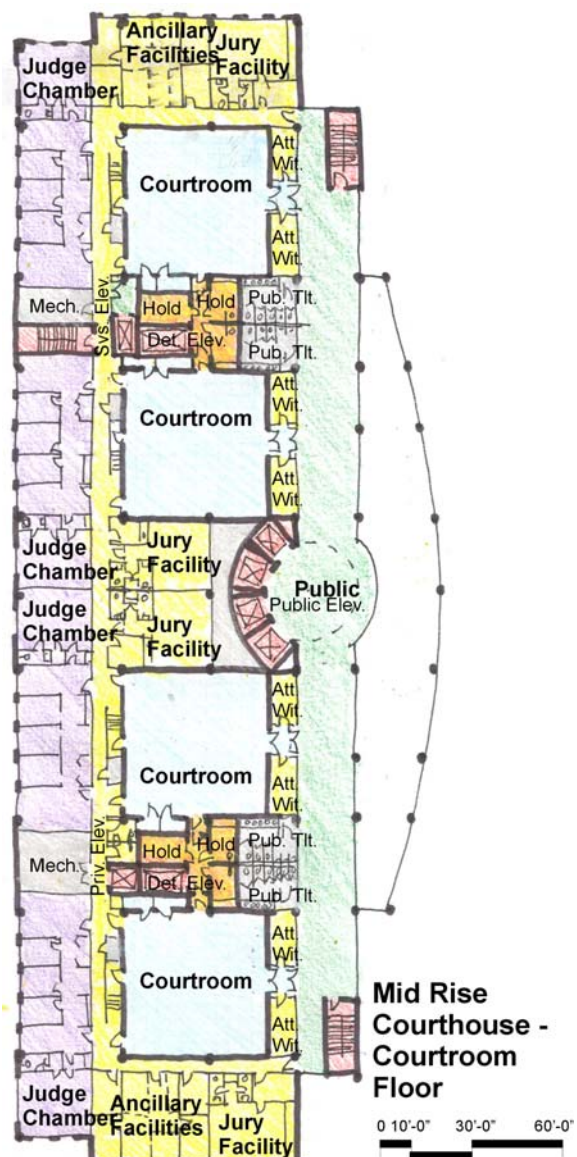


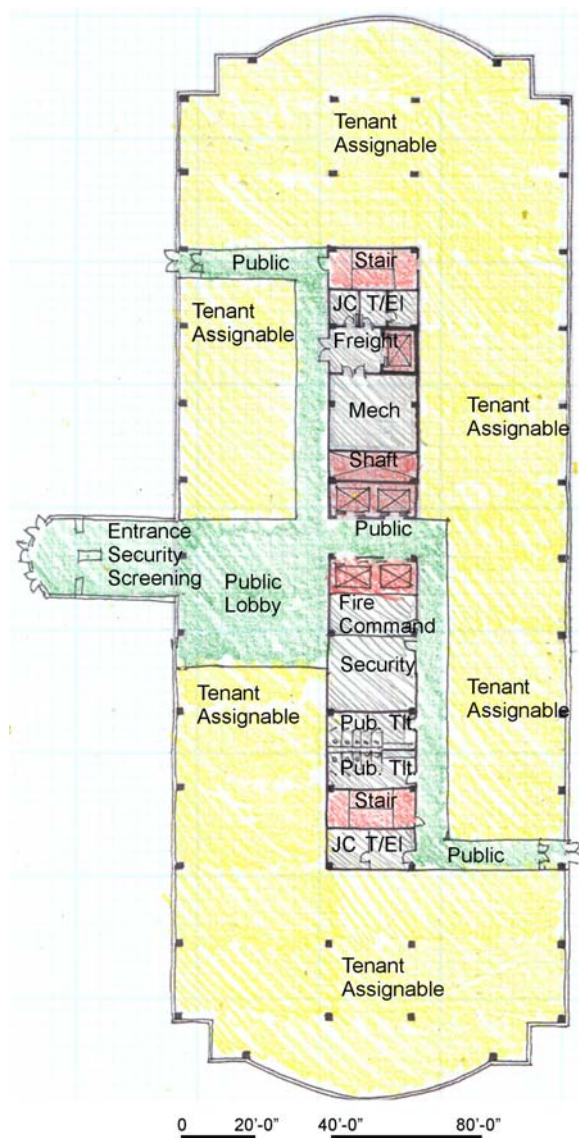
Figure 2:



Drawing Credit: Brian Conway, The Planning Site, LLC

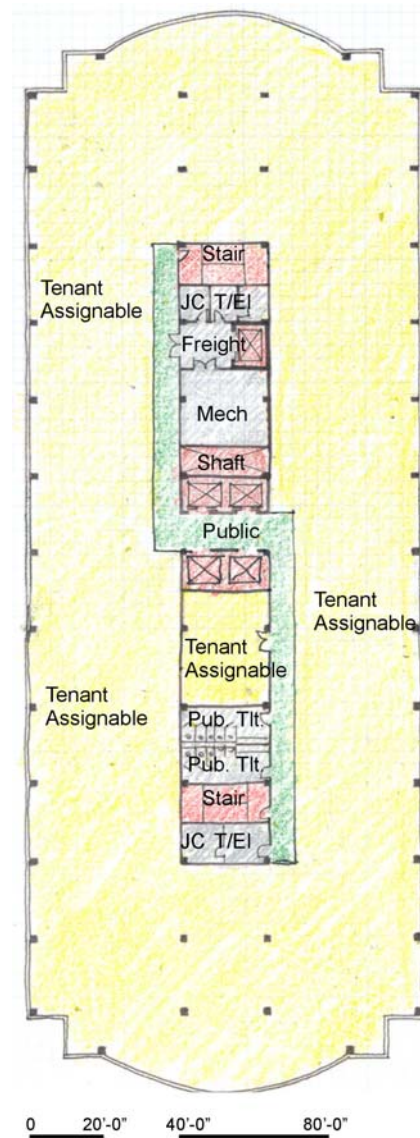
Sample Plans: Office Building Model

Figure 3:



**Mid Rise Office Shell Type
Ground Floor Plan**

Figure 4:



**Mid Rise Office Shell Type
Level 2 thru 9 Floor Plan**

Drawing Credit: Brian Conway, The Planning Site, LLC

Using the prototype models as the take-off point, the LEED Cost Study involved a series of analyses to estimate the costs to achieve individual LEED credits, and subsequently, overall LEED ratings at the Certified, Silver, and Gold rating levels. The evaluation process is described in the following sections:

Individual LEED Credit Cost Analysis

A detailed review of each LEED Version 2.1 prerequisite and credit was performed to define “typical” strategies and approaches that could be pursued in GSA projects. Where required, LEED calculations were performed to confirm that the proposed strategies met the specific LEED performance criteria. For the LEED energy-efficiency credits (EA-1), computer energy models were developed for both the Courthouse and Office Building models to evaluate strategies and confirm the number of LEED points that could be earned.

Credit costs were defined for those measures that were *above and beyond* the design requirements of GSA’s PBS-P100 and, for Courthouses, the Administrative Office of the U.S. Courts’ *U.S. Courts Design Guide*. Separate credit costs were developed for both the Courthouse and Office Building models.

Based on the resulting cost impacts, the individual credits were categorized using the following key:

1. GSA mandate (no cost);
2. No Cost/Potential Cost Decrease;
3. Low Cost (< \$50K);
4. Moderate Cost (\$50K-150K); and
5. High Cost (>\$150K).

LEED Rating Scenarios

Using the individual credit costs as the basis, six LEED rating scenarios were developed for both the Courthouse and Office Building models (12 scenarios total). The rating scenarios were defined as follows:

Courthouse Model:

Two estimates were developed at the Certified, Silver, and Gold rating levels. At each rating level, one “low cost” and one “high cost” scenario was defined in order to bracket the LEED costs.

Office Building Modernization Model:

Two estimates were developed at the Certified, Silver, and Gold rating levels. At each rating level, one scenario reflected the “minimal façade renovation” and one reflected the “full façade renovation” (as previously defined). As these different façade scenarios reflect one of the most significant scope variations in GSA’s modernization projects, they were used as the basis for bracketing the LEED Office Building modernization costs.

The credit totals used in the rating scenarios were as follows: 28 credits for a Certified rating, 35 credits for a Silver rating, and 41 credits for a Gold rating. These point totals are purposely 2 credits higher than the LEED minimums, as it is common practice to submit additional credits to ensure that a rating is achieved (i.e., in case one or two credits are denied during the LEED certification process with the USGBC).

For the rating scenario cost estimates, some of the individual credit costs were also modified to reflect credit synergies. This was done by developing a number of “synergistic credit” combinations for both the Courthouse and Office Building models. The synergistic credits merge related LEED credits into one overall cost estimate, which then replaces the individual credit estimates. For example, if a vegetated roof system was used to earn both credit SS-6.1 (Stormwater Management, Rate and Quantity) and credit SS-7.2 (Heat Islands, Roof), a new synergistic credit was defined for those two credits in combination, and the individual credit costs for SS-6.1 and SS-7.2 were eliminated.

For the purposes of the study, synergistic credits were defined when: 1) a combination of LEED credits was *less expensive* than the sum of the individual credit costs (i.e., the measures to achieve one credit also helped to achieve one or more other credits); or 2) a combination of LEED credits was *more expensive* than the sum of the individual credit costs (i.e., the measures to achieve one credit were made more difficult and expensive because of the simultaneous pursuit of another LEED credit).

LEED-related Soft Costs

The twelve LEED rating scenarios were also used to define soft cost impacts. Soft cost premiums

were defined for any LEED-related tasks considered above and beyond standard GSA project requirements. Tasks were defined in two categories:

- *LEED Design Costs*: Those tasks that increase the design team's scope of work during the design and construction stages of a project; and
- *LEED Documentation Costs*: Those tasks associated with documenting and submitting a LEED application to the U.S. Green Building Council.

The soft cost impacts were developed using: 1) hourly estimates of specific LEED-related tasks; and 2) additional design fees derived from the LEED construction cost premiums (assuming that the design team's fee is based on a percentage of the project construction cost).

LEED Applications Guide

A separate "LEED Applications Guide" has also been developed for GSA project managers and design teams. The Applications Guide documents insights gained through the cost study, and presents a general process to assist design teams in pursuing LEED in a cost-effective manner.

Report Exclusions

It is important to note that the scope of the study does not include Cost/Benefit analysis of the LEED measures. The study is limited to first cost considerations only.

Contents of the Cost Study

The GSA LEED Cost Study is organized into four main sections, each of which is supported by one or more appendices. A general description of each section and appendix is provided below.

Section 1: Twelve LEED Rating Scenarios

This section primarily consists of a master Summary Table that illustrates the credits included in each of the twelve LEED rating scenarios developed for the study. The table uses a color-coded key to categorize the level of cost impact associated with each credit. The table also identifies credit synergies that were accounted for

in the cost estimates. The table summarizes the total cost impact for each LEED rating scenario.

Section 1 is supported by the following appendices:

Appendix A:

Cost Estimate Summaries – Courthouse Scenarios

These cost estimate tables summarize the construction cost impacts for each of the six LEED Courthouse scenarios. The tables include all of the targeted credits that have a cost impact (i.e., credits that have no cost impact are not shown), using a Uniformat Level Two format. Adjustments are also made in each scenario for applicable synergistic credits. The credit costs in the tables are fully burdened, including allowances for design and construction contingencies, general conditions and profit, and Art-in-Architecture budgets.

Appendix B:

Cost Estimate Summaries – Office Building Scenarios

These cost estimate tables summarize the construction cost impacts for each of the six Office Building modernization scenarios. The scope and level of detail are the same as in Appendix A. For the Office Building, the burdened costs also include a phasing premium, since the construction is assumed to be implemented in a series of phases while the building remains partially occupied.

Section 2: Individual LEED Credit Reviews

This section provides a detailed analysis of each LEED Version 2.1 prerequisite and credit. GSA-appropriate strategies, approaches and technologies are identified to meet the requirements of each credit. Resulting construction cost estimates for measures above and beyond GSA standards are summarized. Each credit review also identifies possible synergies with other credits, which are further discussed in Section 3.

Section 2 is supported by the following appendices:

Appendix C:

Individual Credit Cost Estimates – Courthouse

These detailed cost estimates identify the construction cost impacts for each of the credits included in the six LEED Courthouse scenarios. The appendix begins with a Summary Table, which

lists all of the credit costs in a Uniformal Level Two format. The costs in the Summary table are fully burdened; i.e., they include various contingencies, allowances, overhead and profit. Following the Summary Table, the Appendix includes individual credit cost breakdowns, defined in a Uniformal Level Three format. These estimates identify the direct construction costs only, without the contingencies and other allowances added in the Summary Table.

Appendix D:

Individual Credit Cost Estimates – Office Building

These detailed cost estimates identify the construction cost impacts for each of the credits included in the six LEED Office Building modernization scenarios. The scope and level of detail are the same as in Appendix C.

Section 3: Synergistic Credit Reviews

This section provides a detailed analysis of each synergistic credit combination identified in the study—nine altogether. Descriptions of synergistic issues are included, followed by their associated first cost impacts and the applicable LEED scenarios (Courthouse or Office Building) in which they are used.

Section 3 is supported by the following appendices:

Appendix E:

Synergistic Credit Cost Estimates – Courthouse

These detailed cost estimates identify the construction cost impacts for each of the synergistic credit combinations included in the LEED Courthouse scenarios. The estimates are defined in a Uniformal Level Three format, and identify the direct construction costs only (i.e., without contingencies and other allowances). The fully burdened costs for the synergistic credit combinations are included in the tables of Appendix A.

Appendix F:

Synergistic Credit Cost Estimates – Office Building

These detailed cost estimates identify the construction cost impacts for each of the synergistic credit combinations included in the LEED Office Building scenarios. The scope and level of detail are the same as in Appendix E.

Section 4: LEED-Related Soft Costs

This section provides a detailed analysis of LEED-related soft costs for the Courthouse and Office Building models. The section includes a description of the methodology used, and a summary of the estimated soft cost premiums for each of the six Courthouse and six Office Building scenarios. Qualifications to the findings are discussed in detail, including the structure of the design team (“expert consultant” vs. “experienced design team”), the types of tasks being performed, and project variables that can influence soft costs.

Section 4 is supported by the following appendices:

Appendix G:

Soft Cost Estimate Summaries

These tables itemize the soft cost impacts for each of the six Courthouse and six Office Building scenarios. The tables identify the total calculated costs for: 1) individual credit-specific tasks; 2) “LEED process” tasks (such as initial LEED charrettes or LEED-related specifications which apply to multiple credits); and 3) LEED documentation tasks. Separate estimates are defined for “expert consultant” and “experienced design team” approaches.

Appendix H:

Detailed Soft Cost Estimates

These tables provide detailed breakdowns of the identified soft cost premiums of Appendix G. The estimates define the professional disciplines, hourly rates and attended time commitments for each identified task. Similar to Appendix G, the cost premiums are calculated separately for “expert consultant” and “experienced design team” approaches.

Additional Appendices

Appendix I:

DOE-2 Energy Modeling Summary – Courthouse

This appendix describes the input and results of the computer energy model developed for the Courthouse. The energy model was used for the following purposes: 1) to define the level of energy efficiency of the reference model compared to the ASHRAE/IESNA Standard 90.1-1999; and 2) to define additional energy-efficiency measures that could be implemented to achieve additional LEED

points under credit EA-1 (Optimize Energy Performance). The energy model was also used to determine the amount of renewable energy required for credit EA-2 (Renewable Energy).

Appendix J:

DOE-2 Energy Modeling Summary – Office Building

This appendix describes the input and results of the computer energy model developed for the Office Building. The scope and level of detail are the same as in Appendix I.

Appendix K:

Reference Cost Estimate – Courthouse

This appendix consists of the complete reference estimate for the new Courthouse. The estimate defines the baseline construction costs for the project, including all key features mandated through PBS-P100 and the U.S. Courts Design Guide. The reference estimate is the point of comparison for all of the LEED measures defined for the Courthouse.

Appendix L:

Reference Cost Estimate – Office Building, Minimal Façade Renovation

This appendix consists of the complete reference estimate for the Office Building modernization with the minimal façade renovation. The estimate defines the baseline construction costs for the project, including all key features mandated through P100. The reference estimate is the point of comparison for all of the LEED measures defined for the minimal façade renovation variant of the Office Building.

Appendix M:

Reference Cost Estimate – Office Building, Full Façade Renovation

This appendix consists of the complete reference estimate for the Office Building modernization with the full façade renovation. The estimate defines the baseline construction costs for the project, including all key features mandated through P100. The reference estimate is the point of comparison for all of the LEED measures defined for the full façade renovation variant of the Office Building.

Section 1:

Twelve LEED Rating Scenarios

Introduction

This section of the LEED Cost Study consists of **Table 1-1**, which summarizes the twelve LEED Rating Scenarios developed for the study's Courthouse and Office Building models. For each of the two building types, six LEED rating scenarios are defined: two Certified rating scenarios, two Silver rating scenarios, and two Gold rating scenarios. The table identifies the individual LEED credits included in each scenario, and the number of points associated with each credit. In addition, a color coding system indicates the generalized level of cost impact associated with each prerequisite and credit, based on the specific credit evaluations and cost estimates developed for the study (see Section Two). For a select number of credits, the table also includes "Synergistic Credit Tags." These tags identify pairs or groups of credits which, when pursued in tandem, have synergistic cost impacts; i.e., the total cost is either lower or higher than the sum of the individual credit costs (see Section Three for synergistic credit evaluations and cost estimates).

Point totals are included at the end of each scenario. The totals are purposely two points higher than the minimum LEED requirement for each rating level (e.g., twenty-eight points for a Certified rating as opposed to twenty-six). This reflects the common practice of carrying "insurance credits" to assure that a rating is

achieved, even in instances where one or two credits may be denied during the LEED certification process

At the end of the table, the cumulative cost impacts are identified for each scenario on both a dollar per gross square foot basis, and as a percentage of the total construction cost.

Basis for Credit Selection

A consistent approach was used to develop the twelve rating scenarios, based on the following key concepts:

- 1) Select the "Low-Hanging Fruit" First

In general, each LEED rating scenario was developed by selecting the applicable no-cost or low-cost credits first. In particular, a number of LEED credits were identified that could "automatically" be earned based on existing GSA design requirements (as identified through the *Facilities Standards for the Public Buildings Service, P100-2003*; and the U.S. *Courts Design Guide*). These credits were included in all applicable situations.

After including the applicable no and low cost credits, moderate or high cost items were added to each scenario, as needed, to achieve

the targeted rating level. These higher cost credits were generally selected based on the added value they could bring to a project (e.g., lower operating costs, improved indoor environmental quality). Synergistic cost impacts were also a factor in moderate to high cost credit selections.

2) “Bracket” the Costs

In the Courthouse model, one “low cost” and one “high cost” scenario was defined at each rating level in order to bracket the potential LEED costs. The low cost scenarios include a number of no-cost credits that may not be attainable (or achievable at no cost) in all GSA projects. Examples of these “conditional” no-cost credits include Site Selection (SS-1), Development Density (SS-3), Reduced Site Disturbance (SS-4), Water Efficient Landscaping (WE-1), Recycled Content Materials (MR-4), and Regional Materials (MR-5). In the high cost scenarios, most of the conditional no cost credits are excluded. The high cost scenarios are therefore forced to include additional credits with moderate or high cost premiums.

In the Office Building model, a “minimal façade renovation” and a “full façade renovation” scenario was defined at each rating level. The different façade renovations reflect one of the most significant scope variations in GSA’s modernization projects; as such, they were used as the basis for bracketing the potential LEED Office Building costs. The differences in the façade renovations affect a number of credits in the Energy and Atmosphere, Materials and Resources, and Indoor Environmental Quality sections of LEED.

3) Use an Additive Approach to Achieve Higher Rating Levels

In both the Courthouse and Office Building models, the higher rating levels were “built-up” from the lower rating scenarios. For example, Silver ratings were developed by using the same credits included in the Certified rating scenarios, plus seven additional credits. Gold ratings were then built-up from the Silver ratings. This methodology allows the cost changes from one rating level to the next

to be more clearly identified. A few isolated exceptions to the methodology occur when synergistic credits are involved.

Supporting Information

Cost estimate summaries for each of the twelve scenarios are included in Appendices A and B of this report.

The individual credit evaluations and costs are included in Section Two and Appendices C and D of this report.

The synergistic credit evaluations and costs are included in Section Three and Appendices E and F of this report.

TABLE 1-1: 12 LEED SCENARIOS (Part 1 of 4)

		CREDIT TOTALS											
		NEW COURTHOUSE						OFFICE BUILDING MODERNIZATION					
Rating:		Certified		Silver		Gold		Certified		Silver		Gold	
Case #:		1A	2A	3A	4A	5A	6A	1B	2B	3B	4B	5B	6B
ID#	LEED Prerequisite or Credit	Low	High	Low	High	Low	High	Min Fac	Full Fac	Min Fac	Full Fac	Min Fac	Full Fac
SS SUSTAINABLE SITES													
SS-P1	Erosion and Sedimentation Control	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.
SS-1	Site Selection	1		1		1		1		1		1	
SS-2	Development Density	1		1		1		1		1		1	
SS-3	Brownfield Redevelopment	1		1		1							
SS-4.1	Alternative Transportation- Public Transportation Access	1	1	1	1	1	1	1	1	1	1	1	1
SS-4.2	Alternative Transportation- Bicycle Storage & Changing Rooms						1			1		1	1
SS-4.3	Alternative Transportation- Alternative Fuel Vehicles								1		1		1
SS-4.4	Alternative Transportation- Parking Capacity							1	1	1	1	1	1
SS-5.1	Reduced Site Disturbance- Protect or Restore Open Space	1		1		1							
SS-5.2	Reduced Site Disturbance- Development Footprint	1		1		1							
SS-6.1	Stormwater Management- Rate and Quantity	1		1		1	1						
SS-6.2	Stormwater Management- Treatment						1						
SS-7.1	Heat Island Effect - Non-roof	1	1	1	1	1	1		1		1		1
SS-7.2	Heat Island Effect - Roof	1	1	1	1	1	1						
SS-8	Light Pollution Reduction	1		1		1							
	SS Totals (14 Possible Points)	10	3	10	3	10	6	4	4	5	4	5	5
WE WATER EFFICIENCY													
WE-1.1	Water-Efficient Landscaping - Reduce by 50%	1	1	1	1	1	1						
WE-1.2	Water-Efficient Landscaping - No Potable Use or No Irrigation	1		1		1							
WE-2	Innovative Wastewater Technologies												
WE-3.1	Water Use Reduction- 20% Reduction	1	1	1	1	1	1	1	1	1	1	1	1
WE-3.2	Water Use Reduction - 30% Reduction		1		1	1	1			1	1	1	1
	WE Totals (5 Possible Points)	3	3	3	3	4	3	1	1	2	2	2	2

KEY

	Measures that are met based on GSA standards or mandates (no premium)
	Measures with no cost premiums, or with potential cost decreases
	Measures with low cost premiums (<50K)
	Measures with moderate cost premiums (50K - 150K)
	Measures with high cost premiums (>150K), or that present design challenges
	Measures not applicable to the project
	Measures not pursued, although technically viable


	Synergistic Credit Tag - Courthouse (Credits with the same tag number have synergistic properties)
	Synergistic Credit Tag - Office Building (Credits with the same tag number have synergistic properties)

TABLE 1-1: 12 LEED SCENARIOS (Part 2 of 4)

		CREDIT TOTALS											
		NEW COURTHOUSE						OFFICE BUILDING MODERNIZATION					
Rating:		Certified		Silver		Gold		Certified		Silver		Gold	
Case #:		1A	2A	3A	4A	5A	6A	1B	2B	3B	4B	5B	6B
ID#	LEED Prerequisite or Credit	Low	High	Low	High	Low	High	Min Fac	Full Fac	Min Fac	Full Fac	Min Fac	Full Fac
EA ENERGY AND ATMOSPHERE													
EA-P1	Fundamental Building Systems Commissioning	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.
EA-P2	Minimum Energy Performance	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.
EA-P3	CFC Reduction in HVAC&R Equipment	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.
EA-1	Optimize Energy Performance	1	3	3	5 ³	5 ³	6 ³	3	5 ^{1A}	5 ^{1B}	8 ^{1C}	8 ^{1D}	9 ^{1C}
EA-2	Renewable Energy						1 ²					1	1
EA-3	Additional Commissioning	1	1	1	1	1	1	1	1	1	1	1	1
EA-4	Ozone Protection												
EA-5	Measurement and Verification		1		1	1	1	1	1	1	1	1	1
EA-6	Green Power												
	EA Totals (17 Possible Points)	2	5	4	7	7	9	5	7	7	10	11	12
MATERIALS AND RESOURCES													
MR-P1	Storage and Collection of Recyclables	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.
MR-1.1	Building Reuse - Maintain 75% of Existing Walls, Floors and Roof							1		1		1	
MR-1.2	Building Reuse - Maintain 100% of Existing Walls, Floors and Roof							1		1		1	
MR-1.3	Building Reuse - Maintain 100% Shell/Structure & 50% Non-Shell												
MR-2.1	Construction Waste Management - Divert 50% from Landfill		1	1	1	1	1	1	1	1	1	1	1
MR-2.2	Construction Waste Management - Divert 75% from Landfill				1	1	1			1		1	
MR-3.1	Resource Reuse - 5%												
MR-3.2	Resource Reuse - 10%												
MR-4.1	Recycled Content - 5% (post-consumer + 1/2 post-industrial)	1	1	1	1	1	1	1	1	1	1	1	1
MR-4.2	Recycled Content - 10% (post-consumer + 1/2 post-industrial)	1		1	1	1	1				1 ²		1 ²
MR-5.1	Regional Materials - 20% Manufactured Regionally	1	1	1	1	1	1	1	1	1	1	1	1
MR-5.2	Regional Materials - 50% Extracted Regionally	1		1		1		1	1	1	1 ²	1	1 ²
MR-6	Rapidly Renewable Materials												
MR-7	Certified Wood				1 ⁴		1 ⁵	1 ³	1 ³	1 ⁴	1 ⁴	1 ⁴	1 ⁴
	MR Totals (13 Possible Points)	4	3	5	6	6	6	7	5	8	6	8	6

KEY

	Measures that are met based on GSA standards or mandates (no premium)
	Measures with no cost premiums, or with potential cost decreases
	Measures with low cost premiums (<50K)
	Measures with moderate cost premiums (50K - 150K)
	Measures with high cost premiums (>150K), or that present design challenges
	Measures not applicable to the project
	Measures not pursued, although technically viable

 Synergistic Credit Tag - Courthouse
(Credits with the same tag number have synergistic properties)










 Synergistic Credit Tag - Office Building
(Credits with the same tag number have synergistic properties)

TABLE 1-1: 12 LEED SCENARIOS (Part 3 of 4)

		CREDIT TOTALS											
		NEW COURTHOUSE						OFFICE BUILDING MODERNIZATION					
Rating:		Certified		Silver		Gold		Certified		Silver		Gold	
Case #:		1A	2A	3A	4A	5A	6A	1B	2B	3B	4B	5B	6B
ID#	LEED Prerequisite or Credit	Low	High	Low	High	Low	High	Min Fac	Full Fac	Min Fac	Full Fac	Min Fac	Full Fac
EQ INDOOR ENVIRONMENTAL QUALITY													
EQ-P1	Minimum IAQ Performance	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.
EQ-P2	Environmental Tobacco Smoke (ETS) Control	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.	PRE.
EQ-1	Carbon Dioxide Monitoring		1		1 ³	1 ³	1 ³	1	1 ^{1A}	1 ^{1B}	1 ^{1C}	1 ^{1D}	1 ^{1C}
EQ-2	Ventilation Effectiveness	1	1	1	1	1	1	1	1	1	1	1	1
EQ-3.1	Construction IAQ Management Plan- During Construction		1	1	1	1	1	1	1	1	1	1	1
EQ-3.2	Construction IAQ Management Plan- Before Occupancy		1	1	1	1	1	1	1	1	1	1	1
EQ-4.1	Low-Emitting Materials- Adhesives and Sealants	1	1	1	1	1	1	1	1	1	1	1	1
EQ-4.2	Low-Emitting Materials- Paints and Coatings	1	1	1	1	1	1	1	1	1	1	1	1
EQ-4.3	Low-Emitting Materials- Carpet	1	1	1	1	1	1	1	1	1	1	1	1
EQ-4.4	Low-Emitting Materials- Composite Wood				1 ⁴		1 ⁵	1 ³	1 ³	1 ⁴	1 ⁴	1 ⁴	1 ⁴
EQ-5	Indoor Chemical and Pollutant Source Control	1	1	1	1	1	1	1	1	1	1	1	1
EQ-6.1	Controllability of Systems- Perimeter Spaces											1	1
EQ-6.2	Controllability of Systems- Non-Perimeter Spaces	1	1	1	1	1	1						
EQ-7.1	Thermal Comfort- Compliance with ASHRAE 55-1992	1	1	1	1	1	1						1
EQ-7.2	Thermal Comfort- Permanent Monitoring System	1	1	1	1	1	1						1
EQ-8.1	Daylight and Views- Daylight 75% of Spaces												
EQ-8.2	Daylight and Views- Views for 90% of Spaces											1	
	EQ Totals (15 Possible Points)	8	11	10	12	11	12	9	9	9	9	11	12

KEY

	Measures that are met based on GSA standards or mandates (no premium)
	Measures with no cost premiums, or with potential cost decreases
	Measures with low cost premiums (<50K)
	Measures with moderate cost premiums (50K - 150K)
	Measures with high cost premiums (>150K), or that present design challenges
	Measures not applicable to the project
	Measures not pursued, although technically viable

 Synergistic Credit Tag - Courthouse
(Credits with the same tag number have synergistic properties)











 Synergistic Credit Tag - Office Building
(Credits with the same tag number have synergistic properties)

TABLE 1-1: 12 LEED SCENARIOS (Part 4 of 4)

		CREDIT TOTALS											
		NEW COURTHOUSE						OFFICE BUILDING MODERNIZATION					
Rating:		Certified		Silver		Gold		Certified		Silver		Gold	
Case #:		1A	2A	3A	4A	5A	6A	1B	2B	3B	4B	5B	6B
ID#	LEED Prerequisite or Credit	Low	High	Low	High	Low	High	Min Fac	Full Fac	Min Fac	Full Fac	Min Fac	Full Fac
ID INNOVATION AND DESIGN PROCESS													
ID-1.1	Innovation in Design - Dedicated Ventilation System		1	1	1	1	1	1	1	1	1	1	1
ID-1.2	Innovation in Design - Exceed Local Materials Criteria (40%)			1		1							
ID-1.3	Innovation in Design - Educational Display		1		1		1			1	1	1	1
ID-1.4A	Innovation in Design - Exceed Heat Island Effect, Non-Roof criteria				1		1						
ID-1.4B	Innovation in Design - Exceed Certified Wood criteria (75%)						1 ⁵			1 ⁴	1 ⁴	1 ⁴	1 ⁴
ID-2	LEED Accredited Professional	1	1	1	1	1	1	1	1	1	1	1	1
	ID Totals (5 Possible Points)	1	3	3	4	3	5	2	2	4	4	4	4
CASE STUDY TOTALS		28	28	35	35	41	41	28	28	35	35	41	41
COST IMPACT (\$/GSF)		(\$0.76)	\$2.18	(\$0.07)	\$9.57	\$2.97	\$17.79	\$1.78	\$2.73	\$3.94	\$5.55	\$10.58	\$10.22
COST IMPACT (% OF TCC)		-0.4%	1.0%	-0.03%	4.4%	1.4%	8.1%	1.4%	2.1%	3.1%	4.2%	8.2%	7.8%

KEY

	Measures that are met based on GSA standards or mandates (no premium)
	Measures with no cost premiums, or with potential cost decreases
	Measures with low cost premiums (<50K)
	Measures with moderate cost premiums (50K - 150K)
	Measures with high cost premiums (>150K), or that present design challenges
	Measures not applicable to the project
	Measures not pursued, although technically viable

	Synergistic Credit Tag - Courthouse (Credits with the same tag number have synergistic properties)
	Synergistic Credit Tag - Office Building (Credits with the same tag number have synergistic properties)

LEED Ratings

Certified:	26 - 32 points
Silver:	33 - 38 points
Gold:	39 - 51 points
Platinum:	52 - 69 points

Section 2:

Individual LEED Credit Reviews

Introduction

In this Section of the GSA LEED Cost Study, all seven LEED prerequisites and sixty-nine LEED credits are individually evaluated. The evaluation process is used to:

- 1) determine the applicability of a prerequisite or credit to typical GSA project types;
- 2) establish how LEED requirements compare to existing GSA design standards; and
- 3) estimate the potential cost impact to achieve a prerequisite or credit, using the Courthouse and Office Building models as references.

The individual credit costs defined in this section are the basis for the overall LEED scenario costs identified in Section One of the study (with the exception of the Synergistic Credit costs, which are defined in Section Three of the study). The estimates also provide a basis for gauging the potential cost implications of each prerequisite or credit on other GSA projects, outside of the study.

A standard format has been used for each credit evaluation, as defined in the following pages.

LEED® Prerequisite or Credit Title

Intent:

This section lists the intent of each prerequisite or credit, as written in the LEED Version 2.1 rating system.

Requirement:

This section lists the specific prerequisite or credit requirements, as written in the LEED Version 2.1 rating system.

(X points)

This section lists the number of LEED points that can be earned under the credit.

Cost Impact = X

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

The Cost Impact scale identifies the generalized cost impacts associated with each LEED prerequisite or credit, as derived from the detailed cost estimates. The cost impacts are categorized on a five point scale, with the lower numbers signifying GSA mandates or other no-cost/low-cost items, and the higher numbers representing moderate to high cost impacts. The color coding system used in the Cost Impact scale is identical to the color coding used in the 12 LEED Scenarios Summary Table from Section One of the study.

For some prerequisites or credits, more than one Cost Impact number is identified in the scale. This occurs in situations where:

- 1) The prerequisite or credit cost varies significantly between the Courthouse model and Office Building model;
- 2) The prerequisite or credit cost varies significantly because of different strategies identified for the “low cost” and “high cost” versions of the Courthouse model; or

- 3) The prerequisite or credit cost varies significantly because of different strategies identified for the “minimal façade renovation” and “full façade renovation” variants of the Office Building model.

The generalized Cost Impacts are supported by actual credit costs identified in the “Summary of First Cost Impacts” section below.

Practical Applications

This section identifies typical design strategies, building systems, or material types that can be employed in GSA projects to earn the specific LEED prerequisite or credit. The section also identifies how current GSA design standards (particularly those defined in GSA’s *Facilities Standards for the Public Buildings Service, PBS-P100, 2003*) compare to the LEED requirements.

Basis for Cost Assumption

This section identifies the specific assumptions used to develop the detailed prerequisite or credit cost estimates for both the Courthouse and Office Building models. Specific approaches and/or technologies identified in the “Practical Applications” section are incorporated to meet the LEED criteria.

Summary of First Cost Impacts

This section identifies the total prerequisite or credit cost impacts, as developed from the detailed cost estimates in Appendices C and D. The costs listed are the total Estimated Construction Costs (ECCs), which include the following allowances and contingencies:

- Design contingency (10%)
- Phasing premium (5%, Office Building only)
- General Conditions and Profit (15%)
- LEED-related additional General Conditions (where applicable, depending in the credit)
- Cost of Art-in-Architecture (0.5%)
- Construction Contingency (5% for the Courthouse, 7% for the Office Building)

The estimated Direct Construction Costs, which do not include the above allowances, are included

in the detailed credit breakdowns of Appendices C and D.

The summary ECCs are reported in the following format:

Courthouse (New Construction, 262,000 GSF)

Total Credit Cost \$X
Cost Impact (\$/GSF) \$X/GSF
Cost Impact (%) X%

Office Building (Modernization, 306,600 GSF)

Total Credit Cost \$X
Cost Impact (\$/GSF) \$X/GSF
Cost Impact (%), Min. Facade X%
Cost Impact (%), Full Facade X%

Additional Considerations

This section addresses additional key issues related to the design strategies, building systems, or material types that have been identified to earn the LEED prerequisite or credit.

Synergistic Credits

This section identifies other LEED prerequisites or credits that may be synergistically related to the credit being reviewed. The section specifically identifies the synergistic credit scenarios that have been developed into synergistic cost estimates, per Section Three of the study.

Supporting Calculations

Where applicable, this section includes calculations to support the assumptions used in the “Basis for Cost Assumption” section above.

LEED® SS Prerequisite 1: Erosion and Sedimentation Control

Intent:

Control erosion to reduce negative impacts on water and air quality.

Requirements:

Design to a site sediment and erosion control plan, specific to the site, that conforms to United States Environmental Protection Agency (EPA) Document No. EPA 832/R-92-005 (September 1992), *Storm Water Management for Construction Activities*, Chapter 3, OR local erosion and sedimentation control standards and codes, whichever is more stringent. The plan shall meet the following objectives:

- Prevent loss of soil during construction by stormwater runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse.
- Prevent sedimentation of storm sewer or receiving streams.
- Prevent polluting the air with dust and particulate matter.

Cost Impact = 2

1	2	3	4	5
GSA Mandate (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

To meet the requirements of this prerequisite, an Erosion Control Plan must be developed that addresses all of the following components:

- A statement of erosion and stormwater control objectives
- A comparison of post-development stormwater runoff conditions with predevelopment conditions

- A description of all temporary and permanent erosion control and stormwater control measures implemented on the project site
- A description of the type and frequency of maintenance activities that will be required for the erosion control measures utilized

The plan can incorporate site and/or landscape construction documents, project specifications, and other information prepared by the design and construction teams.

The referenced EPA guidelines for erosion control are generally considered good practice, and are often consistent with local erosion and sedimentation control requirements. Typical strategies include:

- **Silt fencing** as a temporary sedimentation control measure
- **Buffer zones** or **vegetated filter strips** to catch sediment and decrease the velocity of runoff for erosion control
- **Diversion ditches** to keep up-slope runoff from crossing areas at high risk of erosion and to channel that runoff to temporary sediment trapping basins
- **Storm drain inlet protection filters**
- **Stabilized construction entrances** to prevent construction vehicles from tracking soil off site
- **Temporary seeding** to stabilize disturbed areas and reduce erosion
- **Sediment basins** to act as settling ponds for capturing sediment produced by construction activities

Basis for Cost Assumption

Erosion and sedimentation control measures are typically addressed in GSA projects. GSA's P100 notes that Site Planning and Landscape Design drawings are to include a planting plan that addresses erosion control, among other issues. Although the formal Erosion Plan required in LEED may require more documentation than is typical for a GSA project, no additional construction costs are assumed.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

No identified cost premiums.

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit SS-1: Site Selection

Intent:

Avoid development of inappropriate sites and reduce the environmental impact from the location of a building on a site.

Requirement

Do not develop buildings, roads or parking areas on portions of sites that meet any one of the following criteria:

- Prime farmland as defined by the United States Department of Agriculture in the United States Code of Federal Regulations, Title 7, Volume 6, Parts 400 to 699, Section 657.5 (citation 7CFR657.5).
- Land whose elevation is lower than 5 feet above the elevation of the 100-year flood as defined by the Federal Emergency Management Agency (FEMA).
- Land which is specifically identified as habitat for any species on Federal or State threatened or endangered lists.
- Within 100 feet of any water including wetlands as defined by United States Code of Federal Regulations 40 CFR, Parts 230-233 and Part 22, and isolated wetlands or areas of special concern identified by state or local rule, OR greater than distances given in state or local regulations as defined by local or state rule or law, whichever is more stringent.
- Land which prior to acquisition for the project was public parkland, unless land of equal or greater value as parkland is accepted in trade by the public landowner (Park Authority projects are exempt).

(1 point)

Cost Impact = 2

1	2	3	4	5
GSA Mandate (no cost)	No premium, possible savings	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

Project site selection is outside the scope of this study; however, it can generally be assumed that many GSA project sites will comply with the requirements of this credit, while some will not. As the majority of GSA's projects are sited in urban locations, the most likely restriction to obtaining the credit is the land elevation provision. In some locations, whole sections of a city may be at or below the 100-year flood elevation defined by FEMA. The other credit restrictions may also disqualify a limited number of GSA project sites.

Basis for Cost Assumption

While GSA's site selection guidelines include a number of goals that are consistent with this credit, the site selection process itself is outside the scope of this study. It is therefore assumed that no construction cost premium is involved for sites that meet all of the credit requirements.

Because it cannot be assumed that all GSA projects will meet the credit criteria, this credit is assumed to be earned in only half of the Courthouse and Office Building scenarios. In the Courthouse model, the credit is included in the "low cost" cases, but not in the "high cost" cases. For the Office Building scenarios, the credit is included in the "minimum façade renovation" cases, but not in the "full façade renovation" cases.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

No identified cost premiums.

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit SS-2: Development Density

Intent

Channel development to urban areas with existing infrastructure, protect greenfields, and preserve habitat and natural resources.

Requirement

Increase localized density to conform to existing or desired density goals by utilizing sites that are located within an existing minimum development density of 60,000 square feet per acre (two-story downtown development).

(1 point)

Cost Impact = 2

1	2	3	4	5
GSA Mandate (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

Project site selection is outside the scope of this study; however, it can generally be assumed that many GSA project sites will comply with the requirements of this credit, while some will not. As the majority of GSA's projects are sited in urban locations, the expectation is that most projects will meet the criteria. However, previous projects (particularly in smaller cities) have demonstrated that some available sites may be located just outside of the densest urban areas, which prevents them from meeting the 60,000 square feet per acre requirement.

Basis for Cost Assumption

Because the site selection process is outside the scope of this study, no construction cost premium is attributed to sites that meet the credit requirements.

Because it cannot be assumed that all GSA projects will meet the credit criteria, this credit is assumed to be earned in only half of the Courthouse and Office Building scenarios. In the Courthouse model, the credit is included in the "low cost" cases, but not in the "high cost" cases. For the Office Building scenarios, the credit is included in the "minimum façade renovation" cases, but not in the "full façade renovation" cases.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

No identified cost premiums.

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit SS-3: Brownfield Redevelopment

Intent

Rehabilitate damaged sites where development is complicated by real or perceived environmental contamination, reducing pressure on undeveloped land.

Requirement

Develop on a site documented as contaminated (by means of an ASTM E1903–97 Phase II Environmental Site Assessment) *or* on a site classified as a brownfield by a local, state, or federal government agency. Effectively remediate site contamination.

(1 point)

Cost Impact = 2

1	2	3	4	5
GSA Mandate (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

Project site selection is outside the scope of this study; however, it can generally be assumed that some GSA project sites will comply with the requirements of this credit, while some will not. The majority of GSA's projects are sited in urban locations, and most involve previously developed sites. Remediation work has been required in the past, with some of GSA's project sites officially categorized as brownfields. The LEED credit would be earned in these situations.

The USGBC has also ruled that asbestos remediation in an existing building can qualify for this credit, assuming that the cleanup is performed to meet a generally accepted remediation standard, such as the Resource Conservation and Recovery Act (RCRA) and/or the National Emissions Standards for Hazardous Air Pollutants

(NESHAPS). This option may apply to some GSA modernization projects.

Basis for Cost Assumption

The decision to develop on a brownfield site is part of a broader real estate market survey and site analysis performed by GSA prior to purchasing or leasing a property. As this process is outside of GSA's LEED requirements for buildings, site remediation costs are not associated with GSA's LEED directive. No construction cost premiums are therefore attributed to sites that meet the credit requirements.

Because it cannot be assumed that all GSA projects will meet the credit criteria, this credit is assumed to be earned in only half of the Courthouse scenarios. The credit is included in the "low cost" Courthouse cases, but not in the "high cost" cases.

Because site development is not included in the scope of the Office Building modernization, the credit is not considered applicable to those scenarios. For the purposes of the study, asbestos remediation is also not part of the Office Building modernization (no remediation work is required).

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

The credit is not applicable.

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit SS-4.1: Alternative Transportation – Public Transportation Access

Intent

Reduce pollution and land development impacts from automobile use.

Requirement

Locate project within 1/2 mile of a commuter rail, light rail or subway station or 1/4 mile of two or more public or campus bus lines usable by building occupants.

(1 point)

Cost Impact = 2

1	2	3	4	5
GSA Mandate (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

Project site selection is outside the scope of this study; however, access to public transportation is given specific emphasis in GSA projects. The Site Circulation Design section of GSA's P100 notes that "GSA encourages the use of public transportation among employees and visitors. The potential need for a bus stop should be considered early in the design of a GSA building in an urban setting and should be discussed with planners of the mass transit system."

Basis for Cost Assumption

Because the site selection process is outside the scope of this study, no construction cost premium is attributed to sites that meet the credit requirements. Any on-site accommodations for mass transit (e.g., covered waiting areas for buses) are costs that GSA would have assumed prior to its LEED directive; therefore, there is no additional LEED-related cost. This credit is assumed to be earned in all of the Courthouse and Office Building scenarios of this study.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

No identified cost premiums.

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit SS-4.2: Alternative Transportation – Bicycle Storage and Changing Rooms

Intent

Reduce pollution and land development impacts from automobile use.

Requirement

For commercial or institutional buildings, provide secure bicycle storage with convenient changing/shower facilities (within 200 yards of the building) for 5% or more of regular building occupants. For residential buildings, provide covered storage facilities for securing bicycles for 15% or more of building occupants in lieu of changing/shower facilities.

(1 point)

Cost Impact = 5

1	2	3	4	5
GSA Mandate (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

GSA generally encourages the installation of bicycle racks, as noted in the Site Furniture section of the P100 standards. However, due to security concerns in federal facilities, bicycle racks are only provided for GSA employees, and must be located in restricted access areas. Shower facilities are not specifically required in most GSA projects (see Additional Considerations).

Basis for Cost Assumption

In both the Courthouse and Office Building models, bicycle racks are assumed to be housed in key-accessed bicycle storage rooms located at the basement level (adjacent to underground parking).

Wall-mounted vertical racks are assumed for space efficiency. For the Courthouse, the bicycle room is sized at 300 square feet and includes 48 racks (based on a full-time occupant assumption of 950 persons). Because the bicycle storage room is not included in a typical Courthouse program, additional costs are assumed for both the raw space and for the room fit-out. For the Office Building, the bicycle room is sized at 400 square feet and includes 65 racks (based on a full-time occupant assumption of 1,300 persons). There is no raw space cost component in the Office Building scenarios (it is assumed that the space is taken from the existing building parking and utility areas).

Shower rooms are also provided in both the Courthouse and Office Building scenarios. In the Courthouse, 2 shower rooms are included (men's/women's) at 350 square feet each. Each room contains 3 shower stalls (1 ADA compliant), 1 ADA-compliant toilet room, 2 lavatories, 12 lockers, and 2 benches. In the Office Building, 2 shower rooms are included at 400 square feet each. Each room contains 4 shower stalls (1 ADA compliant), 1 ADA-compliant toilet room, 2 lavatories, 16 lockers, and 2 benches. Additional costs for the raw space of the shower rooms are included in the Courthouse scenarios, but not in the Office Building scenarios.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

Total Credit Cost..... \$248,743
 Cost Impact (\$/GSF) \$0.95/GSF
 Cost Impact (%) 0.43%

Office Building (Modernization, 306,600 GSF)

Total Credit Cost..... \$239,637
 Cost Impact (\$/GSF) \$0.78/GSF
 Cost Impact (%), Min. Facade 0.60%
 Cost Impact (%), Full Facade..... 0.59%

Additional Considerations

Some GSA projects include a programmatic requirement for an exercise room with associated

shower facilities. In these cases, if the shower facilities are sized to accommodate 5 percent of the building occupants (the U.S. Green Building Council allows 1 shower to serve 8 persons), this aspect of the credit may be satisfied at no additional cost, or at a greatly reduced cost.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit SS-4.3: Alternative Transportation – Alternative Fuel Vehicles

Intent

Reduce pollution and land development impacts from automobile use.

Requirement

Provide alternative fuel vehicles for 3% of building occupants AND provide preferred parking for these vehicles, OR install alternative-fuel refueling stations for 3% of the total vehicle parking capacity of the site. Liquid or gaseous fueling facilities must be separately ventilated or located outdoors.

(1 point)

Cost Impact = 3

1	2	3	4	5
GSA Mandate (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

For most GSA projects, it is assumed that this credit would be pursued using one of the following two measures:

1. Install electric car recharging stations (and designate assigned parking spaces). This would be appropriate primarily in instances where GSA has, or intends to purchase, a fleet of electric vehicles for its general use.
2. Purchase hybrid fuel vehicles (and designate assigned parking spaces). This would be appropriate primarily in instances where GSA intends to start or expand a fleet of hybrid fuel vehicles for its general use.

Liquid or gaseous fueling facilities were not deemed likely for GSA buildings because of cost, security, and practicality concerns.

Basis for Cost Assumption

In new GSA Courthouses, parking is provided only for judges and a limited number of court officers and officials. Access to parking is severely restricted due to security concerns. Because of these limitations, designated parking spaces for alternative fuel vehicles are not considered practical or achievable in the Courthouse scenarios.

In the Office Building scenarios, electric-vehicle recharging stations are included in 3 of the 6 cases. Based on a total parking count of 102 spaces (2 levels of underground parking), 3 interior charging stations are included. The stations are assumed to have integral metering capability. Associated electrical distribution costs are included in the premium.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

The credit is not applicable.

Office Building (Modernization, 306,600 GSF)

Total Credit Cost..... \$16,426
 Cost Impact (\$/GSF) \$0.05/GSF
 Cost Impact (%), Min. Facade 0.04%
 Cost Impact (%), Full Facade..... 0.04%

Additional Considerations

Although the costs associated with electric-vehicle recharging stations are relatively low, this strategy should not typically be pursued without review from appropriate GSA officials. The market for electric vehicles is unclear for the near future, as more vehicle options are becoming available with hybrid engine technology. The applicability and value of electric vehicle recharging stations should be clearly justified before they are included in a project.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit SS-4.4: Alternative Transportation – Parking Capacity

Intent

Reduce pollution and land development impacts from single occupancy vehicle use.

Requirement

Size parking capacity not to exceed minimum local zoning requirements AND provide preferred parking for carpools or van-pools capable of serving 5% of the building occupants; OR add no new parking for rehabilitation projects AND provide preferred parking for carpools or vanpools capable of serving 5% of the building occupants.

(1 point)

Cost Impact = 3

1	2	3	4	5
GSA Mandate (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

The number of parking spaces typically developed in a GSA project is limited, primarily because the majority of the projects are sited in urban locations. In some cases, as with Courthouses, security issues limit the amount of building-related parking that GSA will allow. These restrictions generally keep GSA's parking developments at or below the levels called for in local zoning regulations. GSA generally emphasizes public transit, shared parking facilities (e.g., using existing municipal lots or garages), and carpooling to compensate for reduced parking development.

A significant consideration in pursuing this LEED credit is the ratio of carpooling spaces relative to the overall amount of parking provided. If the total number of developed spaces is small, the number

of required carpool spaces (determined by the number of building occupants) can approach 25 to 50 percent of the total (see Basis for Cost Assumption below for an example). This ratio should be assessed on a project-specific basis.

Basis for Cost Assumption

In new GSA Courthouses, parking is provided only for judges and a limited number of court officers and officials. Access to parking is severely restricted due to security concerns. Because of these limitations, carpooling is not considered achievable in the Courthouse scenarios.

In the Office Building scenarios, no new parking spaces are being added. A total of 33 parking spaces (out of 102 overall) are assigned for carpooling. A minor premium is defined for pavement painting and signage to designate the carpool spaces. This credit is assumed to be earned in all 6 Office Building scenarios.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

The credit is not applicable.

Office Building (Modernization, 306,600 GSF)

Total Credit Cost.....	\$969
Cost Impact (\$/GSF)	\$0.003/GSF
Cost Impact (%), Min. Facade	0.00%
Cost Impact (%), Full Facade.....	0.00%

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit SS-5.1: Reduced Site Disturbance – Protect or Restore Open Space

Intent

Conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity.

Requirement

On greenfield sites, limit site disturbance including earthwork and clearing of vegetation to 40 feet beyond the building perimeter, 5 feet beyond primary roadway curbs, walkways and main utility branch trenches, and 25 feet beyond constructed areas with permeable surfaces (such as pervious paving areas, stormwater detention facilities and playing fields) that require additional staging areas in order to limit compaction in the constructed area.

OR

On previously developed sites, restore a minimum of 50% of the site area (excluding the building footprint) by replacing impervious surfaces with native or adapted vegetation.

(1 point)

Cost Impact = 2

1	2	3	4	5
GSA Mandate (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

As the majority of GSA's projects involve previously developed sites, this credit will typically involve restoring 50 percent or more of the open site area with native or adaptive landscape vegetation. For the purposes of this credit, the

LEED program defines open-site area as everything outside of the building footprint.

The urban nature of most of GSA's project sites may limit the applicability of this credit. On urban lots where the building footprint occupies the vast majority of the site, the remaining open area may require significant paving for pedestrians and vehicular access, thus limiting the viability of achieving the 50 percent planting area criteria.

For other sites, however, this credit may be readily achievable if it is called for as a programmatic goal of the project site design. For example, GSA's new courthouses have significant security-driven setback requirements that result in relatively large site areas surrounding the buildings. It is viable in these cases to achieve the LEED credit by requiring the site design to accommodate the 50 percent native vegetation threshold. The requirement will likely limit the amount of paved areas and lawn areas used in the project (note: lawns areas are not considered native/adaptive vegetation in LEED) and will require more site area dedicated to groundcovers, shrubbery, and trees. Designing to these site parameters can potentially reduce project costs, because landscaping areas can be less expensive overall than paved site areas.

Basis for Cost Assumption

For the purposes of this study, Credit SS 5.1 was pursued only in the Courthouse model—the scope of the Office building modernization does not include site work.

For the Courthouse, a Base Case of site development features was defined based on several current GSA courthouse projects. In the Base Case, approximately 60 percent of the open site area is dedicated to paved surfaces (sidewalks, plazas, roads, service areas), while 6 percent is dedicated to turf grass. The remaining 34% of the site area consists of groundcovers, perennials, shrubbery and trees, which are assumed to be native or adapted plantings per GSA's P100 recommendations (listings of site plantings used in the study are included in the descriptions for credits WE-1.1 and WE-1.2).

In the credit-compliant design scenario, the paved surfaces are reduced to 47 percent of the site area,

while the turf grass areas are reduced to 3 percent. The areas of groundcovers and mixed, non-turf vegetation are increased to 50 percent of the site area. Since landscape irrigation is assumed in the Base Case design, the irrigation system in the credit-compliant design is expanded to cover the additional landscaped areas.

Additional details of the cost assumptions, including plant species, are included in the detailed cost estimates.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

Total Credit Cost (\$110,616)
Cost Impact (\$/GSF) (\$0.42)/GSF
Cost Impact (%) (0.19)%

Office Building (Modernization, 306,600 GSF)

The credit is not applicable.

Additional Considerations

In some GSA projects (e.g., Courthouses) a portion of the open site may be reserved for long-term building expansion. If expansion is known to be likely at a given site, the area of native landscaping should be evaluated based on the expected post-expansion site areas.

Synergistic Credits

Item SN-1 (Courthouse) of Section 3 reviews the cost implications of earning credit SS-5.1 in conjunction with credit SS-6.1 (Stormwater Management: Rate and Quantity) and credit WE-1.2 (Water-efficient Landscaping: No Potable Use or No Irrigation).

LEED® Credit SS-5.2: Reduced Site Disturbance – Development Footprint

Intent

Conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity.

Requirement

Reduce the development footprint (defined as entire building footprint, access roads and parking) to exceed the local zoning's open space requirement for the site by 25%. For areas with no local zoning requirements (e.g., some university campuses and military bases), designate open space area adjacent to the building that is equal to the development footprint.

(1 point)

Cost Impact = 2

1	2	3	4	5
GSA Mandate (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

Factors that determine the viability of this credit include the following:

- Local zoning requirements for open space
- The amount of design flexibility in a project (i.e., can a taller building with a smaller footprint be developed in lieu of a lower building with a larger footprint)
- The amount of hardscape and landscape programmed for the open site areas

While it is generally assumed that the urban nature of most GSA project sites will limit the applicability of this credit, there are situations where projects may comply with little difficulty.

For example, GSA's new courthouses have significant security-driven setback requirements that result in relatively large site areas surrounding the buildings. In some instances, these landscaped site areas may exceed the local zoning requirements for open space by 25 percent.

While GSA is technically not required to meet local zoning regulations, it is generally assumed that surpassing local zoning requirements for open space is the only viable way to earn the credit. The alternative credit requirement (to provide open vegetated site areas equal in size to the development footprint) is not considered viable for most GSA projects, because the site area is typically limited, and the development footprint includes the building and all hardscape, access roads, and parking areas.

Creating an alternative building design with a smaller building footprint was considered outside of the scope of the study.

Basis for Cost Assumption

For the purposes of this study, Credit SS 5.2 was pursued only in the Courthouse model—the scope of the Office building modernization does not include site work, and it is assumed that most of GSA's existing office building sites will not meet the credit criteria.

As noted in credit SS-5.1, a Base Case site was defined for the Courthouse, which includes approximately 0.8 acres of landscaped area (26 percent of the entire site). It was generally assumed that this amount of open landscaped space would exceed some local zoning requirements by 25 percent. No construction cost premium is assumed for these cases.

Because it cannot be assumed that all GSA projects will meet the credit criteria, the credit is assumed to be earned in only half of the Courthouse scenarios. The credit is included in the “low cost” cases but not in the “high cost” cases.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

The credit is not applicable.

Additional Considerations

In some projects, a design team may find that the overall open site area exceeds the local open space requirement by 25 percent, but the amount of landscape area must be increased (relative to the hardscape area) to meet the LEED criteria. In these situations, the increase in landscape area is assumed to result in no cost increase, or a possible cost decrease, as demonstrated in credit SS-5.1.

In some GSA projects (e.g., Courthouses) a portion of the open site may be reserved for long-term building expansion. If expansion is known to be likely at a given site, the area of the open space should be evaluated based on the expected post-expansion site areas.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit SS-6.1: Stormwater Management – Rate and Quantity

Intent

Limit disruption and pollution of natural water flows by managing stormwater runoff.

Requirement

If existing imperviousness is less than or equal to 50%, implement a stormwater management plan that prevents the post-development 1.5 year, 24 hour peak discharge rate from exceeding the pre-development 1.5 year, 24 hour peak discharge rate.

OR

If existing imperviousness is greater than 50%, implement a stormwater management plan that results in a 25% decrease in the rate and quantity of stormwater runoff.

(1 point)

Cost Impact = 2 or 5

1	2	3	4	5
GSA Mandate (no cost)	No premium, possible savings	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

Because the majority of GSA's projects involve previously developed sites in urban areas, this credit will typically involve reducing the rate and quantity of stormwater runoff by 25 percent compared to existing conditions. Typical strategies to achieve these reductions include:

- Increased landscape areas;
- Use of pervious paving systems, including unit pavers (for plazas), pervious asphalt or concrete (for walkways, vehicle access, and parking), or "grass pave" units (for fire lanes); and

- Subsurface retention systems that allow stormwater to infiltrate the site.

Vegetated roof systems can also be used to achieve the credit, although their applicability may be limited by the attended costs (see "Summary of First Cost Impacts" below). Also, although technically viable, stormwater collection tanks for on-site water reuse (primarily assumed for landscape irrigation or cooling tower make-up) are considered unlikely for most GSA projects.

Factors that may influence the viability of the credit include the level of imperviousness of the existing site, the lot coverage of the new building footprint, the amount of hardscape and landscape areas assumed for the new development, and the porosity of the existing soils. Where the credit is deemed viable, preliminary calculations may be required to develop an overall approach, and to set site design parameters.

Basis for Cost Assumption

For the purposes of this study, Credit SS 6.1 was pursued only in the Courthouse model—the scope of the Office building modernization does not include site work.

For the Courthouse, two approaches were estimated: 1) a scenario that relies on increased landscaped areas to achieve the credit, and 2) a scenario that relies on a vegetated roof system to achieve the credit. These approaches are described in the following sections. In both cases, it has been assumed that the existing site (prior to GSA's purchase) consists of 90 percent buildings and hardscape and 10 percent turf and plantings.

Increased Landscape Areas

As noted in credit SS-5.1, a Base Case of site development features was defined for the Courthouse model based on several current GSA courthouse projects. In the Base Case, approximately 60 percent of the open site area is dedicated to paved surfaces (sidewalks, plazas, roads, service areas), while 6 percent is dedicated to turf grass. The remaining 34 percent of the site area consists of groundcovers, perennials, shrubbery, and trees. The calculated imperviousness of this Base Case site does not reduce runoff by 25 percent compared to the

existing site conditions; therefore the ratios of hardscape and landscape are adjusted.

In the credit-compliant design scenario, the paved surfaces are reduced to 40 percent of the site area, while the turf grass areas are reduced to 3 percent. The areas of groundcovers and mixed, non-turf vegetation are increased to 57 percent of the site area. These adjustments result in a reduction in site imperviousness of 25.5 percent, as demonstrated in Table SS6.1-1 at the end of this section.

Since landscape irrigation is assumed in the Base Case design, the irrigation system in the credit-compliant design is expanded to cover the additional landscaped areas.

Because this approach involves a significant reduction in paved site area, it is not assumed to be viable in all cases. It is only included in the three “low cost” Courthouse scenarios.

Vegetated Roof

In this scenario, a 4-inch-deep (extensive) vegetated roof covers 72 percent of the uppermost roof of the Courthouse (65 percent of the overall roof area of the building). No changes are made to the Base Case site development features. The addition of the vegetated roof results in a reduction in site imperviousness of 25.8 percent, as demonstrated in Table SS6.1-2 at the end of this section. Because the vegetated roof is only 4 inches in total thickness (containing lightweight soils and only mosses and sedums as plant material), the dead load does not increase enough to require upgrading of the roof structure (as compared to the Base Case ballasted EPDM roof system). As the vegetated roof is based on an inverted roof assembly, it is assumed that the remaining areas of the upper roof also employ the inverted system, using ballast and pavers above the membrane and rigid insulation.

Because of its expense, the vegetated roof approach is only included in the “high cost” Gold rating scenario for the Courthouse.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

Increased Landscape Areas:

Total Credit Cost.....	(\$165,055)
Cost Impact (\$/GSF)	(\$0.63)/GSF
Cost Impact (%)	(0.29)%

Vegetated Roof:

Total Credit Cost.....	\$578,170
Cost Impact (\$/GSF)	\$2.21/GSF
Cost Impact (%)	1.01%

Office Building (Modernization, 306,600 GSF)

The credit is not applicable.

Additional Considerations

In some projects, the reductions in stormwater runoff achieved through expanded landscape areas or vegetated roofs may result in lower costs for on-site stormwater collection and/or detention systems (e.g., catch basins, piping, detention tanks).

In some GSA projects (e.g., Courthouses), a portion of the open site may be reserved for long-term building expansion. If expansion is known to be likely at a given site, the stormwater runoff reduction should be evaluated based on the expected post-expansion site/building areas.

Synergistic Credits

Item SN-1 (Courthouse) of Section 3 reviews the cost implications of earning credit SS-6.1 (Increased Landscape Areas option) in conjunction with credit SS-5.1 (Reduced Site Disturbance: Protect or Restore Open Space) and credit WE-1.2 (Water-Efficient Landscaping: No Potable Use or No Irrigation).

Item SN-2 (Courthouse) of Section 3 reviews the cost implications of earning credit SS-6.1 (Vegetated Roof option) in conjunction with credit SS-7.2 (Heat Island Effect: Roof) and credit EA-2.1 (Renewable Energy).

Supporting Calculations

Imperviousness calculations are included in Table SS6.1-1 and Table SS6.1-2.

Table SS6.1-1: Landscape Revisions to Achieve 25% Stormwater Runoff Reduction

Total Lot Area (SF): **133,423**

Non-Building Site Area (SF): **86,450**

Design Case Table						
#	Surface Type	% of Total Lot	% of Non-Building Site	Area (SF)	Runoff Coefficient	Impervious Area (SF)
Courthouse Building:						
1	Lower Roof	2.8%	n/a	3,700	0.95	3,515
2	Upper Roof	32.4%	n/a	43,273	0.95	41,109
	Building Total	35.2%	--	46,973	--	44,624
Paving:						
3	Vehicle access paving	3.2%	5.0%	4,323	0.95	4,106
4	Sidewalk paving and curb	10.4%	16.0%	13,832	0.95	13,140
5	Plaza paving	10.4%	16.0%	13,832	0.95	13,140
6	Steps and landings	1.3%	2.0%	1,729	0.95	1,643
	Paving Total	25.3%	39.0%	33,716	--	32,030
Water Feature:						
7	Pool/fountain	0.6%	1.0%	865	0.95	821
	Water Feature Total	0.6%	1.0%	865	--	821
Street Trees:						
8	Street Trees (3" caliper)	0.6%	1.0%	865	0.35	303
9	Street Trees (2" caliper)	0.6%	1.0%	865	0.35	303
	Trees Total	1.3%	2.0%	1,729	--	605
Mixed Vegetation:						
10	Shrubs/Trees in Barrier Garden	14.6%	22.5%	19,451	0.20	3,890
11	Shrubs and Perennials	3.2%	5.0%	4,323	0.20	865
	Mixed Total	17.8%	27.5%	23,774	--	4,755
Groundcover only:						
12	Groundcover mix	17.8%	27.5%	23,774	0.20	4,755
	Groundcover Total	17.8%	27.5%	23,774	--	4,755
Turfgrass:						
13	Turf areas	1.9%	3.0%	2,594	0.35	908
	Turfgrass Total	1.9%	3.0%	2,594	--	908
Total Area: 133,423 Total Impervious Area: 88,498 Imperviousness: 66.3%						
Baseline Case Table						
#	Surface Type	% of Total Lot	% of Non-Building Site	Area (SF)	Runoff Coefficient	Impervious Area (SF)
Buildings and Site Paving:						
1	Existing building roofs and site paving surfaces	90%	--	120,081	0.95	114,077
	Impervious Area Total	90%		120,081		114,077
Landscape:						
2	Existing site plantings	10%	n/a	13,342	0.35	4,670
	Landscape Area Total	10%		13,342		4,670
Total Area: 133,423 Total Impervious Area: 118,746 Imperviousness: 89.0%						

Imperviousness decrease is: **25.5%**

Table SS6.1-2: Vegetated Roof to Achieve 25% Stormwater Runoff Reduction

Total Lot Area (SF):	133,423
Non-Building Site Area (SF):	86,450

Design Case Table						
#	Surface Type	% of Total Lot	% of Non-Building Site	Area (SF)	Runoff Coefficient	Impervious Area (SF)
Courthouse Building:						
1	Lower Roof	2.8%	n/a	3,700	0.95	3,515
2	Upper Roof - Vegetated, 4" thick (65% of total roof area)	22.9%	n/a	30,550	0.50	15,275
3	Upper Roof (IRMA)	9.5%	n/a	12,723	0.95	12,087
	Building Total	25.7%	--	46,973	--	30,877
Paving:						
4	Vehicle access paving	3.2%	5.0%	4,323	0.95	4,106
5	Sidewalk paving and curb	10.4%	16.0%	13,832	0.95	13,140
6	Plaza paving	21.4%	33.0%	28,529	0.95	27,102
7	Steps and landings	3.2%	5.0%	4,323	0.95	4,106
	Paving Total	38.2%	59.0%	51,006	--	48,455
Water Feature:						
8	Pool/fountain	0.6%	1.0%	865	0.95	821
	Water Feature Total	0.6%	1.0%	865	--	821
Street Trees:						
9	Street Trees (3" caliper)	0.6%	1.0%	865	0.35	303
10	Street Trees (2" caliper)	0.6%	1.0%	865	0.35	303
	Trees Total	1.3%	2.0%	1,729	--	605
Mixed Vegetation:						
11	Shrubs/Trees in Barrier Garden	7.1%	11.0%	9,510	0.20	1,902
12	Shrubs and Perennials	3.2%	5.0%	4,323	0.20	865
	Mixed Total	10.4%	16.0%	13,832	--	2,766
Groundcover only:						
13	Groundcover mix	10.4%	16.0%	13,832	0.20	2,766
	Groundcover Total	10.4%	16.0%	13,832	--	2,766
Turfgrass:						
14	Turf areas	3.9%	6.0%	5,187	0.35	1,815
	Turfgrass Total	3.9%	6.0%	5,187	--	1,815
Total Area: 133,423 Total Impervious Area: 88,107 Imperviousness: 66.0%						
Baseline Case Table						
#	Surface Type	% of Total Lot	% of Non-Building Site	Area (SF)	Runoff Coefficient	Impervious Area (SF)
Buildings and Site Paving:						
1	Existing building roofs and site paving surfaces	90%	--	120,081	0.95	114,077
	Impervious Area Total	90%		120,081		114,077
Landscape:						
2	Existing site plantings	10%	n/a	13,342	0.35	4,670
	Landscape Area Total	10%		13,342		4,670
Total Area: 133,423 Total Impervious Area: 118,746 Imperviousness: 89.0%						

Imperviousness decrease is: **25.8%**

LEED® Credit SS-6.2: Stormwater Management – Treatment

Intent

Limit disruption of natural water flows by eliminating stormwater runoff, increasing on-site infiltration, and eliminating contaminants.

Requirement

Construct site stormwater treatment systems designed to remove 80% of the average annual post-development total suspended solids (TSS) and 40% of the average annual post-development total phosphorous (TP) based on the average annual loadings from all storms less than or equal to the 2-year/24-hour storm. Do so by implementing Best Management Practices (BMPs) outlined in Chapter 4, Part 2 (Urban Runoff), of the United States Environmental Protection Agency's (EPA's) *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*, January 1993 (Document No. EPA-840-B-92-002) or the local government's BMP document (whichever is more stringent).

(1 point)

Cost Impact = 4

1	2	3	4	5
GSA Mandate (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

As the majority of GSA's projects are developed on urban sites with limited amounts of open space, many of the landscape-based Best Management Practices (e.g., infiltration basins, vegetated filter strips, constructed wetlands, ponds) will have limited applicability. Exceptions may include new Courthouse projects, where security-driven setback requirements result in relatively large site areas surrounding the buildings. In these cases, some of

the landscape-based Best Management Practices may be feasible to treat a portion of the site's stormwater runoff.

Another approach to achieving the credit is the use of subsurface water quality inlets with sand filters. Depending on the filter design and the contaminant concentrations of the influent, sand filters can reduce both TSS and TP at rates at or above those defined in the credit criteria.

The U.S. Green Building Council has also determined that the phosphorous reduction requirement of this credit can be achieved through a "source reduction" approach that involves minimized fertilization of landscape plantings, low- or no-phosphate cleaning agents, and similar strategies. These measures need to be specified in a building/landscape maintenance plan. If this approach is used, it may be feasible to meet the TSS criteria through other types of water quality inlets (besides sand filters).

The use of porous pavement can also contribute to this credit if used for some walkways or light duty vehicular access drives.

Basis for Cost Assumption

For the purposes of this study, Credit SS-6.2 was pursued only in the Courthouse model—the scope of the Office building modernization does not include site work.

For the Courthouse, a subsurface sand filter system has been included. The system is sized to treat a two-acre impervious area and includes costs for connections, excavation, and backfill.

Because this type of system has attended maintenance costs and is not typically required for GSA projects, it has only been included in one of the Gold rating scenarios.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

Total Credit Cost	\$100,117
Cost Impact (\$/GSF)	\$0.38/GSF
Cost Impact (%)	0.17%

Office Building (Modernization, 306,600 GSF)

The credit is not applicable.

Additional Considerations

The maintenance requirements of sand filters and other water quality inlets need to be considered as part of the credit assessment. Most of these systems require regular maintenance and, for sand filters, periodic media replacement over time. Sand filters may also be less effective in cold climates.

Synergistic Credits

If landscape-based Best Management Practices are employed, there are potential synergies with credits SS-5.1 (Reduced Site Disturbance: Protect or Restore Open Space), SS-5.2 (Development Footprint), SS-6.1 (Stormwater Management – Rate and Quantity), and WE-1.1/1.2 (Water-Efficient Landscaping).

With the sand filter system, reductions in the impervious surfaces on the site can potentially reduce the size of the overall system. In this regard, credits SS-5.1 (Reduced Site Disturbance: Protect or Restore Open Space) and SS-6.1 (Stormwater Management – Rate and Quantity) can be considered synergistic. For the purposes of this study, however, the reduction in runoff from these credits was not considered large enough to result in a cost reduction for the sand filter system.

LEED® Credit SS-7.1: Heat Island Reduction – Non-Roof

Intent

Reduce heat islands (thermal gradient differences between developed and undeveloped open areas) to minimize the impact on microclimate and human and wildlife habitat.

Requirements

Provide shade (within 5 years) and/or use light colored/high-albedo materials (reflectance of at least 0.3) and/or open grid pavement for at least 30% of the site's non-roof impervious surfaces, including parking lots, walkways, plazas, etc;

OR

Place a minimum of 50% of parking spaces underground or covered by structured parking;

OR

Use an open-grid pavement system (less than 50% impervious) for a minimum of 50% of the parking lot area.

(1 point)

Cost Impact = 2

1	2	3	4	5
GSA Mandate (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

As the majority of GSA's projects are developed on urban sites, only a limited number of parking spaces are typically provided, and these are usually accommodated below grade. Many GSA projects are therefore expected to earn this credit by meeting or exceeding the 50 percent underground parking criteria.

The use of light-colored paving may also be a viable approach in many projects. Most GSA sites include more plaza and sidewalk area than drives or surface parking. This means that the impervious paving in most GSA projects will tend to be concrete and stone, as opposed to asphalt. In many cases, standard concrete paving (without colorants) will meet the credit-specified reflectance of 0.3. The U.S. Green Building Council (USGBC) also allows a weighted area calculation to be used for the paving; i.e., it is possible to use a surface material with a reflectance of less than 0.3 if it is used for more than 30 percent of the paved area.

Some GSA projects may also earn the credit through the use of shading. This will primarily depend on the design of the sidewalks/plazas and landscape features. The USGBC also allows the shading strategy to be combined with high-reflectance paving. For example, if only 15 percent of the paved areas were in shade, but another 15 percent of the paved areas had high reflectance, the credit could be earned.

Basis for Cost Assumption

In the Courthouse models, all parking is provided below grade. The credit is earned without any cost premium.

The scope of the Office building modernization does not include site work. It was generally acknowledged, however, that many of GSA's existing office buildings accommodate all or most of their parking below grade or in structured parking. The credit is therefore assumed to be earned in half of the Office Building scenarios, at no cost premium.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

No identified cost premiums.

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit SS-7.2: Heat Island Reduction – Roof

Intent:

Reduce heat islands (Thermal gradient differences between developed and undeveloped areas) to minimize the impact on microclimate and human and wildlife habitat.

Requirements:

Use ENERGY STAR compliant (high reflective) AND low emissivity roofing (emissivity of at least 0.9 when tested in accordance with ASTM 408) for a minimum of 75% of the roof surface;

OR

Install a “green” (vegetated) roof for at least 50% of the roof area. Combinations of the high albedo and vegetated roof can be used providing they collectively cover 75% of the roof area.

(1 point)

Cost Impact = 2 or 5

1	2	3	4	5
GSA Mandate (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

The most direct strategy for meeting this credit is to install a white or light-colored roof membrane system. Typical systems include the following:

- White TPO
- White PVC
- White EPDM

A vegetated roofing system might also be considered in some projects, particularly in situations where stormwater management is a concern, or in cases where the green roof provides an additional building function (e.g., exterior programmed space).

Basis for Cost Assumption

The Base Case model for the Courthouse assumes the use of a ballasted EPDM roof system. Two approaches were estimated to meet the credit criteria, as described below.

ENERGY STAR® Roof

The EPDM roof is replaced by a white thermoplastic polyolefin (TPO) roof membrane system, direct glue-down. There was no cost increase identified with this system change.

Vegetated Roof

A 4-inch-deep (extensive) vegetated roof system covers 55 percent of the uppermost roof of the Courthouse (50 percent of the overall roof area of the building). Because the vegetated roof is only 4 inches in total thickness (containing lightweight soils and only mosses and sedums as plant material), the dead load does not increase enough to require upgrading of the roof structure (as compared to the Base Case ballasted roof system). As the vegetated roof is based on an inverted roof assembly, it is assumed that the remaining areas of the upper roof also employ the inverted system, using ballast and pavers above the membrane and rigid insulation.

Because of its expense, the vegetated roof approach is only included in the “high cost” Gold rating scenario for the Courthouse.

As roofing replacement is categorized as an ongoing maintenance expense for GSA buildings, it is not typically included in the scope of an Office Building modernization. The credit is therefore not included in any of the Office Building scenarios.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

Energy Star Roof

No identified cost premiums.

Vegetated Roof

Total Credit Cost\$495,353
 Cost Impact (\$/GSF) \$1.89/GSF
 Cost Impact (%)..... 0.86%

Office Building (Modernization, 306,600 GSF)

The credit is not applicable.

Additional Considerations

The location of highly reflective ENERGY STAR® roofs needs to be carefully coordinated with the building design. Reflective roofs that are adjacent to building glazing (e.g., at building setbacks) can cause excessive glare and heat gain in occupied spaces.

Vegetated roof systems designed for more elaborate plantings than mosses and sedums will typically require deeper soils. This will require strengthening of the roof structure. More elaborate roof plantings may also warrant an irrigation system.

Synergistic Credits

Item SN-2 (Courthouse) of Section 3 reviews the cost implications of earning credit SS-7.2 (Heat Island Effect: Roof, Vegetated Roof option) in conjunction with credit SS-6.1 (Stormwater Management, Rate and Quantity) and credit EA-2.1 (Renewable Energy).

LEED® Credit SS-8: Light Pollution Reduction

Intent

Eliminate light trespass from the building site, improve night sky access, and reduce development impact on nocturnal environments.

Requirements

Meet or provide lower light levels and uniformity ratios than those recommended by the Illumination Engineering Society of North America (IESNA) *Recommended Practice Manual; Lighting for Exterior Environments* (RFP-33-99). Design exterior lighting such that all exterior luminaires with more than 1000 initial lamp lumens are shielded and all luminaires with more than 3500 initial lamp lumens meet the full Cutoff IESNA Classification. The maximum candela value of all interior lighting shall fall within the building (not out through windows) and the maximum candela value of all exterior lighting shall fall within the property boundary shall have shielding such that no light from that luminaire crosses the property boundary.

(1 point)

Cost Impact = 2

1	2	3	4	5
GSA Mandate (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

Achieving this credit will typically require a combination of the following strategies:

- Designing exterior lighting for plazas and sidewalks based on the *minimum* illumination levels and uniformity ratios specified in IESNA RFP-33-99 (the standard also specifies lighting levels for the floodlighting of buildings and monuments)

- Designing exterior lighting for parking lots and parking garages (where applicable) based on the *minimum* illumination levels and uniformity ratios specified in IESNA RFP-20-98
- Designing exterior lighting for on-site roadways (where applicable) based on the *minimum* illumination levels and uniformity ratios as specified in IESNA RP-8-00
- Selecting and specifying shielded and full cutoff exterior luminaires for all or most of the site, building, and landscape lighting
- Carefully selecting site lighting fixtures for use at property boundaries
- Checking interior lighting layouts at spaces along the building perimeter to ensure that luminaires are not directing most of their light out of windows

The specific lighting targets need to be placed in the context of an overall exterior lighting approach that balances security, aesthetic, and functional considerations.

Basis for Cost Assumption

The design and fixture selection issues required for this credit are not expected to impact construction costs. Shielded and full cutoff exterior luminaires are already commonly used in GSA projects. In addition, GSA's P100 notes that lighting levels for exterior spaces should be based on IES values.

It is acknowledged, however, that security-driven lighting requirements could limit the applicability of this credit. On some sites, illumination levels might be set above the minimums defined in the IESNA guidelines in order to match local or project-specific criteria. Because it cannot be assumed that all GSA projects will meet the credit requirements, this credit is assumed to be earned in only half of the Courthouse scenarios. The credit is included in the "low cost" Courthouse cases but not in the "high cost" cases.

For the purposes of this study, the credit was not included in any of the Office Building models—the scope of the Office building modernization does not include site work.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

The credit is not applicable.

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit WE-1.1: Water-Efficient Landscaping - Reduce by 50%

Intent

Limit or eliminate the use of potable water for landscape irrigation.

Requirement

Use high efficiency irrigation technology, OR use captured rain or recycled site water to reduce potable water consumption for irrigation by 50% over conventional means.

(1 point)

Cost Impact = 2

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

Irrigation systems are commonly installed in GSA projects. Strategies for reducing irrigation water by 50 percent include the following:

- Select native and adapted plant species that require minimal (or no) supplemental watering after establishment. Limit turf grass areas.
- Employ automatic irrigation system controls, particularly for sprinkler systems. Controls include timers, rain sensors, and soil moisture sensors.
- Employ drip irrigation systems in lieu of sprinkler systems for non-turf planting areas.

A combination of the above strategies will typically be required to meet the 50 percent water reduction threshold.

The use of greywater and/or captured stormwater can also be used to achieve this credit. However,

these technologies are considered unlikely for most GSA projects.

Basis for Cost Assumption

For the purposes of this study, Credit WE-1.1 was pursued only in the Courthouse model—the scope of the Office building modernization does not include site work.

For the Courthouse, calculations were performed (using the procedures developed in the LEED Version 2.1 Reference Guide) to determine measures that would achieve a 50 percent reduction in irrigation water use. Details of the calculation procedures are included in the “Supporting Calculations” section below.

The calculations revealed that the credit could be achieved using the following combination of strategies:

- Limit turf grass to 15 percent of the site’s total planting area. This was already the default assumption for the Courthouse site; therefore there was no cost impact.
- Employ timer and rain sensor controls for the pop-up sprinkler irrigation system (the sprinkler system extends to all planting areas on the site other than street trees). GSA’s P100 requires these types of irrigation controls, so no cost premium is included.
- Specify groundcovers with low water consumption needs (classified as having a low “species factor” in the LEED calculations). Low-water use groundcover species are available in most areas at no cost premium; therefore this measure was not assumed to impact costs. GSA’s P100 also encourages plant species selection to minimize the need for supplemental watering.

The credit was therefore considered to be achievable with no cost impact.

For the purposes of the study, planting selections were based on a Washington, DC site location. The representative plantings assumed for this credit are listed as follows:

- *Street trees:* Honeylocust and Japanese Zelkova
- *Understory trees in planting beds:* Mix of Eastern Redbud, Flowering Dogwood, Bald Cypress

- *Shrubs in “barrier gardens”*: Mix of Wax Myrtle, Beautyberry, Wild Hydrangea
- *Shrubs and perennials in planter areas*: Mix of Wax Myrtle with various perennials (New England Aster, Wild Bergamont, Blue False Indigo, Early Coneflower, Black-eyed Susan and others)
- *Groundcovers*: Mix of Leadwort, Striped Wintergreen, Fragrant Sumac, Mountain Stonecrop
- *Turf grass*: Fescue blend sod

The listed plantings are not intended to constitute a full landscape design, but rather are used to indicate the types of species that could be chosen to meet the credit criteria in the specified climate.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

The credit is not applicable.

Additional Considerations

Water reduction measures must be balanced with other landscape design issues (e.g., aesthetics, functional use of the exterior spaces, maintenance requirements, stormwater management). In some projects, these parameters may limit the viability of achieving this credit.

Also, while the Base Case planting scheme for the Courthouse was budgeted to include a high percentage of groundcovers and mixed plantings, it is acknowledged that other projects may have a landscape budget that assumes a high percentage of turf grass. The initial costs for groundcovers can be approximately 5 to 10 times higher than those for sod. Mixed planting areas can be significantly more expensive, depending on the number of shrubs and trees included. Reductions in landscape maintenance and water use can partially offset the initial costs of the more expensive plantings.

Synergistic Credits

Potential synergies exist between this credit and credit SS-5.1 (Reduced Site Disturbance: Protect or Restore Open Space), credit SS-6.1 (Stormwater Management: Rate and Quantity), and credit WE-1.2 (Water-Efficient Landscaping: No Potable Use or No Irrigation). These synergies are addressed in this study when credit WE-1.2 is pursued.

Supporting Calculations

Calculations were performed, using the procedures developed in the LEED Version 2.1 Reference Guide, to evaluate how different strategies and systems could contribute to a 50 percent reduction in irrigation water use. A key consideration in the calculation procedure was defining a “typical” landscape scheme with which to compare. For a commercial/institutional project of this scale (with approximately 34,600 square feet of planting area), it was assumed that the following planting breakdown represented a reasonable baseline:

- Turf grass: 65 percent of the planting area
- Mixed vegetation (shrubs, groundcovers, perennials, understory trees): 15 percent of the planting area
- Groundcovers only: 15 percent of the planting area
- Street trees: 5 percent of the planting area

Additional assumptions for the baseline included the following:

- The turf grass, mixed vegetation, and groundcover areas are all served by a pop-up sprinkler system. The irrigation efficiency of the system is 0.625. No automatic controls are included.
- Other key aspects of the LEED calculation - the Species Factor, Density Factor, and Microclimatic Factor – are assumed to be “average.”

A more detailed breakdown of the baseline is included in Table WE1.1-1 at the end of this section.

From the baseline, the following comparisons were made:

Employing Irrigation System Efficiencies Only

In this evaluation, the planting areas remain the same as in the baseline; however, the irrigation system efficiencies are improved. Irrigation for the groundcover- and mixed-vegetation-areas is changed from sprinklers to drip irrigation. In addition, the sprinkler system used for the turf grass areas includes timer and rain sensor controls. The controls are assumed to reduce the sprinkler system water use by 25 percent (the efficiency improves from 0.625 to 0.825).

Overall, these improvements reduce the overall water use for irrigation by 26 percent, as shown in Table WE1.1-2.

GSA Base Case Planting Assumptions

In this evaluation, a combination of planting changes and irrigation controls was reviewed. A “GSA Base Case” of site planting assumptions was developed for the Courthouse model, based on a review of several current GSA Courthouse projects. The planting assumptions for the model were as follows:

- Turf grass: 15 percent of the planting area
- Mixed vegetation (shrubs, groundcovers, perennials, understory trees): 40 percent of the planting area
- Groundcovers only: 40 percent of the planting area
- Street trees: 5 percent of the planting area

In addition, the sprinkler system (used for all plantings except for the street trees) includes timer and rain sensor controls.

Overall, these measures reduce the overall water use for irrigation by 35 percent, as shown in Table WE1.1-3.

GSA Base Case With Low Water Use Groundcovers

This scenario is the same as the previous, with one exception: the groundcover plantings, which represent 40 percent of the overall planting area, are selected to be low-water use species. Thus, the Species Factor of the groundcovers is changed from “average” to “low.”

This scenario results in 50 percent water use reduction, as shown in Table WE1.1-4.

Table WE1.1-1**Generic Institutional Building Baseline Site**

Landscape Type	Area % [%]	Area [SF]	Species Factor (k_s)	Density Factor (k_d)	Microclimate Factor (k_{mc})	K_L	ET_L	IE	TPWA [gal]
Trees	5%	1,729	Avg	Avg	Avg	1.0		None 0.000	
Groundcovers	15%	5,187	Avg 0.5	Avg	1.0	Avg	1.0 0.5 4.00	Sprinkler 0.625	33,197
Mixed	15%	5,187	Avg 0.5	Avg	1.1	Avg	1.0 0.6 4.40	Sprinkler 0.625	36,516
Turfgrass	65%	22,477	Avg 0.7	Avg	1.0	Avg	1.0 0.7 5.60	Sprinkler 0.625	201,394
Total		34,580						Net GPWA [gal]	271,107

Table WE1.1-2**Generic Institutional Building Site with Irrigation Efficiencies**

Landscape Type	Area % [%]	Area [SF]	Species Factor (k_s)	Density Factor (k_d)	Microclimate Factor (k_{mc})	K_L	ET_L	IE	TPWA [gal]
Street trees	5%	1,729	Avg	Avg	Avg			None 0.000	
Groundcovers	15%	5,187	Avg 0.5	Avg 1.0	Avg 1.0	0.5	4.00	Drip 0.900	23,053
Mixed	15%	5,187	Avg 0.5	Avg 1.1	Avg 1.0	0.6	4.40	Drip 0.900	25,359
Turfgrass	65%	22,477	Avg 0.7	Avg 1.0	Avg 1.0	0.7	5.60	Sprinkler w/ controls 0.825	152,571
Total		34,580						Subtotal [gal]	200,983
								July Graywater Harvest [gal]	
								Net GPWA [gal]	200,983
Potable Water Use Reduction Compared to Baseline									26%

Table WE1.1-3**GSA Courthouse Base Case Site**

Landscape Type	Area % [%]	Area [SF]	Species Factor (k_s)	Density Factor (k_d)	Microclimate Factor (k_{mc})	K_L	ET_L	IE	TPWA [gal]
Street trees	5%	1,729	Avg	Avg	Avg			None 0.000	
Groundcovers	40%	13,832	Avg 0.5	Avg 1.0	Avg 1.0	0.5	4.00	Sprinkler w/ controls 0.825	67,064
Mixed	40%	13,832	Avg 0.5	Avg 1.1	Avg 1.0	0.6	4.40	Sprinkler w/ controls 0.825	73,771
Turfgrass	15%	5,187	Avg 0.7	Avg 1.0	Avg 1.0	0.7	5.60	Sprinkler w/ controls 0.825	35,209
Total		34,580						Subtotal [gal]	176,044
								July Graywater Harvest [gal]	
								Net GPWA [gal]	176,044
Potable Water Use Reduction Compared to Baseline									35%

Table WE1.1-4**GSA Courthouse Base Case Site w/ Low Ks for Groundcovers**

Landscape Type	Area % [%]	Area [SF]	Species Factor (k _s)	Density Factor (k _d)	Microclimate Factor (k _{mc})	K _L	ET _L	IE	TPWA [gal]
Street trees	5%	1,729	Avg	Avg	Avg			None 0.000	
Groundcovers	40%	13,832	Low 0.2	Avg 1.0	Avg 1.0	0.2	1.60	Sprinkler w/ controls 0.825	26,826
Mixed	40%	13,832	Avg 0.5	Avg 1.1	Avg 1.0	0.6	4.40	Sprinkler w/ controls 0.825	73,771
Turfgrass	15%	5,187	Avg 0.7	Avg 1.0	Avg 1.0	0.7	5.60	Sprinkler w/ controls 0.825	35,209
Total		34,580						Subtotal [gal]	135,805
								July Graywater Harvest [gal]	
								Net GPWA [gal]	135,805
Potable Water Use Reduction Compared to Baseline									50%

LEED® Credit WE-1.2: Water-Efficient Landscaping - No Potable Use or No Irrigation

Intent

Limit or eliminate the use of potable water for landscape irrigation.

Requirement

Use only captured rain or recycled site water to eliminate all potable water use for site irrigation (except for initial watering to establish plants), OR do not install permanent landscape irrigation systems.

(1 point)

Cost Impact = 2

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

The simplest and least expensive means of achieving this credit is to select native and/or adapted landscape plantings that eliminate the need for a permanent irrigation system. Well-integrated landscape designs may include additional Low Impact Development strategies, such as rain gardens or vegetated swales, to both eliminate irrigation and retain stormwater runoff on-site.

Systems that collect, store, and recycle greywater or stormwater can also be used to achieve this credit; however, these technologies are considered unlikely for most GSA projects.

Basis for Cost Assumption

For the purposes of this study, Credit WE-1.2 was pursued only in the Courthouse model—the scope of the Office building modernization does not include site work.

As noted in credit WE-1.1, a “GSA Base Case” of site planting assumptions was developed for the Courthouse model, based on a review of several current GSA Courthouse projects. The general planting assumptions for the model (based on approximately 34,600 square feet of planting area) were as follows:

- Turf grass: 15 percent of the planting area
- Mixed vegetation (shrubs, groundcovers, perennials, understory trees): 40 percent of the planting area
- Groundcovers only: 40 percent of the planting area
- Street trees: 5 percent of the planting area.

Since GSA’s P100 already encourages the selection of plant species to minimize supplemental watering, the assumption made for this credit is that, in some projects, plantings can be specified that eliminate the need for an irrigation system.

Representative plant selections were made based on a Washington, DC site location. The following planting list is similar to the one from credit WE-1.1; however, some of the undercover trees and shrubs have been changed to reflect lower water use species:

- *Street trees*: Honeylocust and Japanese Zelkova
- *Understory trees in planting beds*: Mix of Crepe Myrtle, Virginia Pine, and Eastern Red Cedar
- *Shrubs in “barrier gardens”*: Mix of Wax Myrtle, Maple-leaved Viburnum, and American Holly
- *Shrubs and perennials in planter areas*: Mix of Wax Myrtle with various perennials (New England Aster, Wild Bergamont, Blue False Indigo, Early Coneflower, Black-eyed Susan and others)
- *Groundcovers*: Mix of Leadwort, Striped Wintergreen, Fragrant Sumac, and Mountain Stonecrop
- *Turf grass*: Fescue blend sod

The listed plantings are not intended to constitute a full landscape design, but rather are used to indicate the types of species that could be chosen to meet the credit criteria in the specified climate.

The low-water use plantings do not increase the landscape costs. Conversely, a cost deduction results from eliminating the sprinkler system in the Courthouse Base Case estimate.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

Total Credit Cost	(\$39,467)
Cost Impact (\$/GSF)	(\$0.15)/GSF
Cost Impact (%)	(0.07)%

Office Building (Modernization, 306,600 GSF)

The credit is not applicable.

Also, while the Base Case planting scheme for the Courthouse was budgeted to include a high percentage of groundcovers and mixed plantings, it is acknowledged that other projects may have a landscape budget that assumes a high percentage of turf grass. The initial costs for groundcovers can be approximately 5 to 10 times higher than those for sod. Mixed-planting areas can be significantly more expensive, depending on the number of shrubs and trees included. Reductions in landscape maintenance and water use can partially offset the initial costs of the more expensive plantings.

Synergistic Credits

Item SN-1 (Courthouse) of Section 3 reviews the cost implications of earning credit WE-1.2 in conjunction with credit SS-5.1 (Reduced Site Disturbance: Protect or Restore Open Space) and credit SS-6.1 (Stormwater Management: Rate and Quantity, Increased Landscape Areas option).

Additional Considerations

Water reduction measures must be balanced with other landscape design issues (e.g., aesthetics, functional use of the exterior spaces, maintenance requirements, stormwater management). In some projects, these parameters may limit the viability of achieving this credit.

LEED® Credit WE-2: Innovative Wastewater Technologies

Intent

Reduce the generation of wastewater and potable water demand, while increasing the local aquifer recharge.

Requirement

Reduce the use of municipally provided potable water for building sewage conveyance by a minimum of 50%;

OR

Treat 100% of wastewater on site to tertiary standards.

(1point)

Cost Impact: Not Pursued

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

Fixture types that could contribute toward this credit include:

- Waterless urinals
- Dual flush toilets (1.6/0.8 gallons per flush [gpf])
- Ultra low flush toilets (1.1 to 1.4 gpf).

LEED calculations, however, indicated that these fixture types alone could not achieve 50 percent water use reduction for sewage conveyance. In addition, the dual flush and ultra low flush toilets are currently available only as tank type fixtures, as opposed to flush valve fixtures that would typically be specified for large commercial or institutional buildings.

Achieving the credit would therefore require one of the following options:

- Stormwater collection (from the roof or site) and treatment systems
- Greywater collection and treatment systems
- Blackwater collection and treatment systems
- Composting toilets

These systems were not considered likely for most GSA buildings.

Basis for Cost Assumption

For the purposes of this study, this credit was not pursued in either the Courthouse or Office Building models. Water collection and treatment systems for interior uses typically have a significant first cost, and would be difficult to justify economically in either of the model projects, which are assumed to be located in urban areas with existing infrastructure. Additional considerations include potential code-related obstacles and ongoing maintenance and operation costs for the systems.

Water collection and treatment systems might be feasible for buildings located on remote sites, such as some of GSA's Land Port (Border Station) projects.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

The credit was not pursued.

Office Building (Modernization, 306,600 GSF)

The credit was not pursued.

Additional Considerations

None identified.

Synergistic Credits

Potential synergies exist between this credit and credits WE-3.1 and WE-3.2 (Water Use Reduction).

LEED® Credit WE-3.1: Water Use Reduction – 20% Reduction

Intent

Maximize water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.

Requirement

Employ strategies that in aggregate use 20% less water than the water use baseline calculated for the building (not including irrigation) after meeting Energy Policy Act of 1992 fixture performance requirements.

(1 point)

Cost Impact = 1

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

This LEED credit addresses internal plumbing fixtures, specifically faucets, showers, toilets, and urinals. Additional building water use sources, such as cooling towers and dishwashers, are considered “process loads” and are specifically not included. Because of this defined scope, the strategies that would likely be employed to meet the credit criteria include the following:

- Low-flow lavatory faucets/aerators (rated at 2.0 gpm or less)
- Ultra-low flow lavatory faucets (rated at 0.5 gpm)
- Electronic (infrared) sensors to automatically turn faucets on and off
- Low-flow kitchen sinks (rated at 2.0 gpm or less)
- Low-flow showerheads (rated at 2.0 gpm or less)

Additional strategies that might be considered include:

- Dual flush toilets (1.6/0.8 gpf)
- Ultra low flush toilets (1.1 – 1.4/gpf)
- Foot pedal controls for lavatories
- Low flow urinals (rated at 0.5 gal/flush)
- Waterless urinals

Strategies that were deemed unlikely for typical GSA buildings for cost or practicality purposes include:

- Stormwater collection and treatment systems
- Greywater collection and treatment systems
- Blackwater collection and treatment systems
- Composting toilets

Basis for Cost Assumption

In the Courthouse and Office Building models, water use reductions of 20 percent or more were demonstrated through the following approaches:

1. *Specifying 0.5 gpm faucets at bathroom lavatories.* This measure is enough to achieve the credit in all the Courthouse and Office Building scenarios, with or without employee showers.
2. *Specifying 1.0 gpm faucets at bathroom lavatories and 1.5 gpm faucets at pantry sinks.* In projects that include employee showers, 2.0 gpm showerheads are also included. This approach works for the Office Building but does not work for the Courthouse scenarios (where significant use of public restrooms is assumed).

Project assumptions are included in the “Supporting Calculations” section below.

While other combinations of fixtures or controls could also be used to meet the 20 percent reduction goal, the aforementioned approaches demonstrate that the credit can typically be achieved with common, inexpensive fixture types. As GSA’s P100 criteria state that water conservation shall be a requirement of all plumbing systems, and that water saving plumbing fixtures shall be used, this credit was classified as a GSA standard, with no cost impact.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

No identified cost premiums.

Synergistic Credits

None identified (with construction cost impacts).

Supporting Calculations

Tables WE3.1-1, WE3.1-2, and WE3.1-3 demonstrate the approaches used in the cost estimates (Office Building model only).

Additional Considerations

None identified.

Table WE3.1-1

Baseline Water Use Table - Office Building

Flush Fixture	Daily Uses	Flowrate [GPF]	Duration [flush]	Auto Controls N/A	Occupants	Water Use [gal]
Conventional Water Closet						
Male	1	1.6	1	--	550	880
Female	3	1.6	1	--	550	2,640
Conventional Urinal						
Male	2	1.0	1	--	550	1,100
Female	0	1.0	1	--	550	0
Flow Fixture	Daily Uses	Flowrate [GPM]	Duration [sec]	Auto Controls [% savings]	Occupants	Water Use [gal]
Lavatory	3	2.5	15	--	1,100	2,063
Shower	0.05	2.5	300	--	1,100	688
Pantry Sink	0.75	2.5	15	--	1,100	516
Total Daily Volume [gal]						7,886
Annual Work Days						260
Annual Volume [gal]						2,050,263
Annual Graywater or Stormwater Reuse [gal]						0
TOTAL ANNUAL VOLUME [gal]						2,050,263

Table WE3.1-2**20% Water Use Reduction – 0.5 gpm Faucets (Office Building)**

Flush Fixture	Daily Uses	Flowrate [GPF]	Duration [flush]	Auto Controls N/A	Occupants	Water Use [gal]
Conventional Water Closet						
Male	1	1.6	1	--	550	880
Female	3	1.6	1	--	550	2,640
Conventional Urinal						
Male	2	1.0	1	--	550	1,100
Female	0	1.0	1	--	550	0
Flow Fixture	Daily Uses	Flowrate [GPM]	Duration [sec]	Auto Controls [% savings]	Occupants	Water Use [gal]
Ultra-Low Flow Lavatory	3	0.5	15	--	1,100	413
Shower	0.05	2.5	300	--	1,100	688
Pantry Sink	0.75	2.5	15	--	1,100	516
Total Daily Volume [gal]						6,236
Annual Work Days						260
Annual Volume [gal]						1,621,263
Annual Graywater or Stormwater Reuse [gal]						0
TOTAL ANNUAL VOLUME [gal]						1,621,263

Water Use Reduction (compared to Baseline)	21%
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Table WE3.1-3**20% Water Use Reduction – Low Flow Faucets/Showers (Office Building)**

Flush Fixture	Daily Uses	Flowrate [GPF]	Duration [flush]	Auto Controls N/A	Occupants	Water Use [gal]
Conventional Water Closet						
Male	1	1.6	1	--	550	880
Female	3	1.6	1	--	550	2,640
Conventional Urinal						
Male	2	1.0	1	--	550	1,100
Female	0	1.0	1	--	550	0
Flow Fixture	Daily Uses	Flowrate [GPM]	Duration [sec]	Auto Controls [% savings]	Occupants	Water Use [gal]
Low Flow Lavatory	3	1.0	15	--	1,100	825
Low Flow Shower	0.05	2.0	300	--	1,100	550
Low Flow Pantry Sink	0.75	1.5	15	--	1,100	309
Total Daily Volume [gal]						6,304
Annual Work Days						260
Annual Volume [gal]						1,639,138
Annual Graywater or Stormwater Reuse [gal]						0
TOTAL ANNUAL VOLUME [gal]						1,639,138

Water Use Reduction (compared to Baseline)	20%
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LEED® Credit WE-3.2: Water Use Reduction – 30% Reduction

Intent

Maximize water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.

Requirement

Employ strategies that in aggregate use 30% less water than the water use baseline calculated for the building (not including irrigation) after meeting Energy Policy Act of 1992 fixture performance requirements.

(1 point)

Cost Impact = 4

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

As with credit WE-3.1, this credit addresses internal plumbing fixtures, specifically faucets, showers, toilets, and urinals. Additional building water use sources, such as cooling towers and dishwashers, are considered “process loads” and are not included. Because of this defined scope, the strategies that would likely be employed to meet the credit criteria include the following:

- Low flow lavatory faucets/aerators (rated at 2.0 gpm or less)
- Ultra-low flow lavatory faucets (rated at 0.5 gpm)
- Electronic (infrared) sensors to automatically turn faucets on and off
- Low flow kitchen sinks (rated at 2.0 gpm or less)
- Low flow showerheads (rated at 2.0 gpm or less)

Additional strategies that might be considered include:

- Dual flush toilets (1.6/0.8 gpf)
- Ultra low flush toilets (1.1 to 1.4 gpf)
- Foot pedal controls for lavatories
- Low flow urinals (rated at 0.5 gal/flush)
- Waterless urinals

Strategies that were deemed unlikely for typical GSA buildings for cost or practicality purposes include:

- Stormwater collection and treatment systems
- Greywater collection and treatment systems
- Blackwater collection and treatment systems
- Composting toilets

Basis for Cost Assumption

In the Courthouse and Office Building models, water use reductions of 30 percent or more are demonstrated by combining the following systems:

- 0.5 gpm faucets at bathroom lavatories
- Infrared sensor controls on lavatory faucets (hard-wired system)
- 0.5 gpf urinals (including hard-wired electronic controls)
- 2.0 gpm showers (where showers are included in the program)

Project assumptions are included in the “Supporting Calculations” section below.

Of the listed systems, cost premiums are defined for the infrared sensor controls (including wiring) and 0.5 gpf urinals (including wiring).

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

Total Credit Cost\$62,467
Cost Impact (\$/GSF).....\$0.24/GSF
Cost Impact (%)..... 0.11%

Office Building (Modernization, 306,600 GSF)

Total Credit Cost\$56,413
Cost Impact (\$/GSF).....\$0.19/GSF
Cost Impact (%), Min. Facade..... 0.14%
Cost Impact (%), Full Facade 0.14%

Additional Considerations

The ultra-low flow urinals (less than 1.0 gpf) are currently offered by a limited number of manufacturers in the United States.

Waterless urinals, which could also have been used to achieve the credit, have the potential to save significant amounts of water. The products are still relatively new and are in the process of gaining code acceptance nationwide. Waterless urinals require different cleaning and maintenance procedures than standard urinals.

Additional calculations have shown that, in some cases, it is possible to reach the 30 percent threshold in the Office Building by combining only low-flow faucets, infrared sensor controls, and ultra-low flow showerheads. This approach, however, may result in inappropriate fixture use (e.g., 0.5 gpm faucets in kitchens) or in poor performing fixtures (e.g., ultra-low flow showerheads that provide inadequate spray). Fixtures should be carefully selected to match their intended use.

Synergistic Credits

None identified (with construction cost impacts).

Supporting Calculations

Tables WE3.2-1 and WE3.2-2 demonstrate the 30 percent water reduction approach used in the cost estimates (Office Building model only).

Table WE3.2-1**Baseline Water Use Table - Office Building**

Flush Fixture	Daily Uses	Flowrate [GPF]	Duration [flush]	Auto Controls N/A	Occupants	Water Use [gal]
Conventional Water Closet						
Male	1	1.6	1	--	550	880
Female	3	1.6	1	--	550	2,640
Conventional Urinal						
Male	2	1.0	1	--	550	1,100
Female	0	1.0	1	--	550	0
Flow Fixture	Daily Uses	Flowrate [GPM]	Duration [sec]	Auto Controls [% savings]	Occupants	Water Use [gal]
Lavatory	3	2.5	15	--	1,100	2,063
Shower	0.05	2.5	300	--	1,100	688
Pantry Sink	0.75	2.5	15	--	1,100	516
Total Daily Volume [gal]						7,886
Annual Work Days						260
Annual Volume [gal]						2,050,263
Annual Graywater or Stormwater Reuse [gal]						0
TOTAL ANNUAL VOLUME [gal]						2,050,263

Table WE3.2-2**30% Water Use Reduction - Low Flow Faucets/Urinals (Office Building)**

Flush Fixture	Daily Uses	Flowrate [GPF]	Duration [flush]	Auto Controls N/A	Occupants	Water Use [gal]
Conventional Water Closet						
Male	1	1.6	1	--	550	880
Female	3	1.6	1	--	550	2,640
Conventional Urinal						
Male	2	0.5	1	--	550	550
Female	0	0.5	1	--	550	0
Flow Fixture	Daily Uses	Flowrate [GPM]	Duration [sec]	Auto Controls [% savings]	Occupants	Water Use [gal]
Ultra-Low Flow Lavatory	3	0.5	15	20%	1100	330
Low Flow Shower	0.05	2.0	300	--	1100	550
Pantry Sink	0.75	2.5	15	--	1100	516
Total Daily Volume [gal]						5,466
Annual Work Days						260
Annual Volume [gal]						1,421,063
Annual Graywater or Stormwater Reuse [gal]						0
TOTAL ANNUAL VOLUME [gal]						1,421,063

Water Use Reduction (compared to Baseline)	31%
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LEED® EA Prerequisite 1: Fundamental Building Systems Commissioning

Intent:

Verify and ensure that fundamental building elements and systems are designed, installed and calibrated to operate as intended.

Requirement:

Implement all of the following fundamental best practice commissioning procedures:

- Engage a commissioning team that does not include individuals directly responsible for the project design or construction management.
- Review design intent and basis of design documentation.
- Incorporate commissioning requirements in the construction documents.
- Develop and utilize a commissioning plan.
- Verify installation, functional performance, training and operation and maintenance documentation.
- Complete a commissioning report.

Cost Impact = 1

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

GSA has developed a total building commissioning process that is consistent with the LEED prerequisite and Additional Commissioning (Credit EA-3) requirements. On most GSA projects, a commissioning authority is contracted through a professional services support contract at about the same time as the design architect/engineer (prior to the Schematic Design/Preliminary Concepts stage). The commissioning authority is typically

part of, or a subcontractor to, a Construction Management firm not affiliated with the design/delivery team. The commissioning authority's responsibility is to act as GSA's champion for quality control and quality assurance throughout the project. He/she counsels, advises, and critiques the project delivery process to ensure that the delivery team does not lose sight of quality-related issues. The commissioning authority's tasks include:

- Reviewing established program goals and performance parameters for the project
- Creating, reviewing, or modifying the Commissioning Plan for the project¹
- Providing input to the A/E team's definition of systems, including a review of the design intent and basis of design
- Identifying performance testing requirements to be reflected in the contract documents and specifications (with the delivery team)
- Establishing and approving testing and quality control plans for construction (with the delivery team)
- Witnessing performance/acceptance tests
- Compiling or assisting in the testing documentation and commissioning reports
- Ensuring that the construction contractor coordinates training of the operating staff in accordance with the specification requirements
- Verifying building performance against goals set at the start of the project

This scope addresses all the key elements of the LEED commissioning prerequisite.

Basis for Cost Assumption

GSA considers total building commissioning to be a project requirement independent of LEED. As such, there is no LEED-related premium

¹ GSA's Web-based Commissioning Plan Tool (CPT), a component of the agency's Project Planning Tools, allows GSA Project Managers and other delivery team members to generate comprehensive Commissioning Plans that align with LEED criteria. The CPT Commissioning Plans define the scope, schedule, and responsible party for all delivery team tasks, including those tasks performed by the commissioning authority.

associated with this prerequisite or for Credit EA-3, Additional Commissioning.

The cost level associated with the Prerequisite commissioning is estimated to be \$0.75–\$1.00/GSF for projects of the scale and complexity of the Courthouse and Office building models. The majority of these costs are soft cost fees for the commissioning authority’s work in the design and construction phases of the project. Approximately 20 percent of the cost (\$0.15–\$0.20/GSF) is attributed to additional fees from the mechanical system subcontractors for executing the functional performance tests. These subcontractor fees would typically be considered part of the project’s construction costs, as they would be included in the contractor’s bids based on the testing requirements included in the project specifications.

GSA’s total building commissioning fees are assumed to be slightly higher than the \$0.75–\$1.00/GSF range, as GSA’s commissioning scope is more comprehensive than the LEED requirements.

Additional commissioning cost information is included under Credit EA-3, Additional Commissioning, and in Section 4 of this report.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

No identified cost premiums.

Additional Considerations

None identified.

Synergistic Credits

The tasks defined in Credit EA-3, Additional Commissioning, are also included in GSA’s total building commissioning process. For the purposes of this study, however, no synergistic cost impacts apply.

LEED® EA Prerequisite 2: Minimum Energy Performance

Intent:

Establish the minimum level of energy efficiency for the base building and systems.

Requirement:

Design the building to comply with ASHRAE/IESNA Standard 90.1-1999 (without amendments) or the local energy code, whichever is more stringent.

Cost Impact = 1

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

As noted in GSA's P100 facilities standards, federal legislation directs GSA to adhere to voluntary commercial energy standards as reflected within the Code of Federal Regulations, 10–CFR 434. ASHRAE/IESNA Standard 90.1 meets or exceeds 10–CFR 434 and may be substituted as an equivalent reference. The one exception is lighting system performance, which is separately addressed in P100. GSA's lighting standards are similar to those in Standard 90.1-1999; however, there are some differences. In P100, a number of spaces types are assigned a lower allowable lighting power density than in 90.1, while in other cases space types are assigned higher allowable lighting power densities. Equivalence to 90.1 would normally be expected overall.

GSA projects are also subject to Executive Order 13123, a national program that requires the federal building stock to reduce its energy use by 35 percent by 2010, compared with a 1985 baseline. To achieve this goal, GSA assigns specific energy use targets to all major new construction and

renovation projects. These energy use targets result in buildings that are more efficient than buildings that merely comply with the 90.1 standard.

Credit EA-1, Optimize Energy Performance, includes additional information on the GSA energy targets used in the study.

Basis for Cost Assumption

GSA's energy use targets are considered project requirements independent of LEED. As such, there is no LEED-related premium associated with this prerequisite.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

No identified cost premiums.

Additional Considerations

None identified.

Synergistic Credits

GSA's energy use targets apply to this prerequisite and to Credit EA-1, Optimize Energy Performance. For the purposes of this study, however, no synergistic cost impacts apply.

LEED® EA Prerequisite 3: CFC Reduction in HVAC&R Equipment

Intent:

Reduce ozone depletion.

Requirement:

Zero use of CFC-based refrigerants in new base building HVAC&R systems. When reusing existing base building HVAC equipment, complete a comprehensive CFC phase-out conversion.

Cost Impact = 1

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

CFC-based refrigerants are no longer available in the United States for new HVAC&R equipment. GSA also prohibits the use of CFCs through the P100 standards. In addition to new buildings, GSA's major modernization projects are expected to comply with this prerequisite, as these projects typically involve full replacement of existing HVAC equipment.

Basis for Cost Assumption

The Courthouse and Office Building models both assume all new HVAC&R equipment; therefore the prerequisite is earned at no cost.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

No identified cost premiums.

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit EA-1: Optimize Energy Performance

Intent:

Achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use.

Requirement:

Reduce design energy cost compared to the energy cost budget for energy systems regulated by ASHRAE/IESNA Standard 90.1–1999 (without amendments), as demonstrated by a whole building simulation using the Energy Cost Budget Method described in Section 11 of the Standard.

<u>New Bldgs.</u>	<u>Existing Bldgs.</u>	<u>Points</u>
15%	5%	1
20%	10%	2
25%	15%	3
30%	20%	4
35%	25%	5
40%	30%	6
45%	35%	7
50%	40%	8
55%	45%	9
60%	50%	10

Cost Impact = 1, 2 or 5

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

In response to Executive Order 13123—a national mandate that requires the federal building stock to reduce its energy use by 35 percent by 2010, compared with a 1985 baseline—GSA assigns specific energy use targets to all of its major new construction and renovation projects. The energy use targets are established based on the building type and geographic region and are expressed in terms of maximum allowable BTU/GSF/year. While the energy use targets vary from project to project, they generally result in buildings that are more efficient than those that minimally comply with the referenced ASHRAE/IESNA Standard 90.1–1999. It is therefore expected that most GSA projects will be able to earn 1 or more points under this LEED credit.

Both the GSA and LEED energy targets are performance based¹; i.e., they do not prescriptively dictate the energy efficiency measures to be incorporated in a project. As such, computer energy modeling is required to evaluate proposed energy efficiency measures (EEMs) and to verify the overall building energy performance. GSA's P100 notes that energy modeling is required to evaluate the life cycle costs of major building systems and to verify compliance with the assigned energy use target.

Overall, GSA favors energy-efficient designs based on proven techniques and technologies, which have favorable life cycle costs and do not place undue burden on the building's operations and maintenance personnel. The measures included in the Courthouse and Office Building models (see below) exemplify some of these options.

Basis for Cost Assumption

Computer energy models were created for both the Courthouse and Office Building case studies. The GSA energy use targets, baseline building assumptions, and supplemental energy efficiency measures are summarized below.

¹ Although both GSA and LEED use performance-based energy targets, GSA's goals are energy-based (BTUs), while LEED uses dollar-based (annual energy cost) comparisons.

New Courthouse

The GSA energy use target for this building is 45,000–50,000 BTU/GSF/year, based on a Washington, DC location. The baseline Courthouse model—defined in the Reference Cost Estimates of Appendix K—includes a number of specific building and mechanical, electrical, and plumbing (MEP) system features to meet the target. These include:

- High-Performance Glazings ($U_{\text{center of glass}} = 0.32$, Solar Heat Gain Coefficient = 0.30, Visible Transmittance = 57 percent)
- Opaque Walls with overall R values of 8.4 on the lower two floors and 15.2 on floors 3-5 (R-values include air films)
- Roofs with overall R values of 23.8 (R-values include air films)
- Lighting power densities of 1.1 watts/SF for offices, jury rooms, and judges chambers
- Underfloor air distribution – Because this system uses a displacement ventilation approach, the zone air temperatures for cooling are assumed to be, on average, 1.5 degrees higher than in the ASHRAE 90.1 case, which assumes overhead supply and return.
- Variable speed drive fans at air handlers
- Variable speed drive pumps (30 percent minimum part load ratio)
- Waterside economizer at cooling towers
- Wetbulb reset at cooling towers
- Carbon monoxide control of garage ventilation fans

The heating and cooling plants (boilers and chillers) in the baseline model meet the minimum ASHRAE performance requirements. For the cooling plant, GSA's P100 requires at least three chillers when the building load is over 500 tons. Because of this, the Courthouse model includes two 325-ton water-cooled centrifugal chillers and one 130-ton water-cooled screw chiller, as compared to two 390-ton centrifugal chillers in the ASHRAE case (a more typical approach). This results in different load management strategies between the two cases, which are reflected in the energy model.

Overall, the baseline building has a calculated annual energy use of 47,800 BTU/GSF/year. Using the ASHRAE Energy Cost Budget Method, the baseline building's annual energy cost was calculated to be 16.9 percent less than a "code-compliant" energy model that meets the minimal requirements of ASHRAE 90.1–1999. This results in 1 LEED energy point, which is achieved at no additional cost to the project (since it is a GSA requirement and is included in the baseline costs).

Two additional energy-efficiency scenarios were created to earn 3 and 5 LEED energy points, respectively. The additional EEMs required to achieve the points are identified in **Table EA1-1**. A description of the cost impact assumptions for the individual EEMs follows.

Table EA1-1**Additional Energy Efficiency Measures (EEMs) to Earn Three and Five Energy Points (Courthouse)**

Case	LEED Rating	LEED Points	Imprvmnt over ASHRAE	Energy Efficiency Measures Included (Marked 'X')								
				1.0 watts/SF lighting	Daylight dimming	Occ Sensors	Prem Eff Motors	Mod Cond Boiler	0.49 kw/ton Chiller w/VFD	VFD Cooling Tower Fans	Energy Recovery	CO2 Sensor Control of O.A.
1A Low Cost	Certified	1	16.9%									
2A High Cost	Certified	3	25.4%	X	X	X	X					
3A Low Cost	Silver	3	25.4%	X	X	X	X					
4A High Cost	Silver	5	35.2%	X	X	X	X	X	X	X	X	X
5A Low Cost	Gold	5	35.2%	X	X	X	X	X	X	X	X	X
6A High Cost	Gold	5	35.2%	X	X	X	X	X	X	X	X	X

Courthouse EEMs

- Reduced Lighting Power Density in offices, jury rooms, and judges chambers (1.0 watts/SF) – This measure is not expected to add to the cost of the project, as the lower lighting power density can typically be achieved through careful lighting design or through the use of low-power factor ballasts in the lighting fixtures, which are no more expensive than standard ballasts.
- Daylight dimming systems at perimeter offices (both private offices and open office areas) – Cost premiums are defined for dimmable ballasts, daylight sensors, and local controllers used in the dimming system.
- Occupancy Sensor controls for lighting in all enclosed offices and conference rooms – Cost premiums are defined for wall mounted sensors, and, where applicable, for ceiling-mounted occupancy/daylight sensors.
- Premium efficiency motors – Cost premiums are defined for pump and fan motors.
- Modulating condensing boilers (93 percent nominal efficiency) – Cost premiums are defined to upgrade from the two standard efficiency boilers of the baseline (3,500,000 BTU/h each) to four condensing boilers (2,000,000 BTU/h each).
- High-efficiency chillers (0.49 kw/ton) with variable frequency drives – Cost premiums are defined to upgrade the two 325-ton centrifugal chillers.
- Variable frequency drive cooling tower fans – No cost premium was identified for this measure.
- Energy recovery – Cost premiums are defined to add enthalpy wheel heat recovery units. The units are sized for a total of 45,900 cfm of outside air. The costs include additional ducting to the units and additional Building Management System (BMS) controls.
- Carbon dioxide sensors to modulate outside air based on occupancy in the courtrooms, conference rooms, and office spaces – Cost premiums are defined for CO₂ sensors, for sensor tie-ins to the BMS, and for additional controls programming.

Office Building Modernization

The GSA energy use target for this building is 50,000–55,000 BTU/GSF/year, based on a Washington, D.C. location.

As previously noted, two variants of the Office Building modernization are tracked in the study—one which includes a minimal façade renovation (window replacements and cleaning/recaulking of the exterior facade); and one that includes a full façade renovation (new windows, new precast concrete panels for floors 3–9, reduced glazing areas on floors 3–9). The baseline models of both of these scenarios—defined in the Reference Cost Estimates of Appendices L and M—include a number of specific building and MEP system features to meet the energy use target. Most of the key building features in the Office Building models are identical to those described in the Courthouse baseline. The common features include:

- High-Performance Glazings ($U_{\text{center of glass}} = 0.32$, Solar Heat Gain Coefficient = 0.30, Visible Transmittance = 57 percent)
- Efficient Lighting (1.1. watts/SF for office areas)
- Variable speed drive fans at air handlers
- Variable speed drive pumps (30 percent minimum part load ratio)
- Waterside economizer at cooling towers
- Wetbulb reset at cooling towers
- Carbon monoxide control of garage ventilation fans

Differences include the following:

- The opaque walls in the minimal façade renovation scenarios have an overall R-value of 10 (R-values include air films). The opaque walls in the full façade renovation scenarios have an overall R-value of 10 on the lower two floors and 15.2 on floors 3–9 (R-values include air films).
- The roofs have an overall R-value of 16.1 (R-values include air films). This meets the minimum ASHRAE requirement.
- The office buildings use overhead air distribution systems (as opposed to the underfloor air distribution system in the Courthouse). There are no savings in the

Office Building models associated with increased zone air temperatures.

As with the Courthouse, the baseline heating and cooling plants in the Office Building models are assumed to meet the minimum ASHRAE performance requirements. For the cooling plant, the GSA reference includes two 330-ton water-cooled centrifugal chillers and one 135-ton water-cooled screw chiller, as compared to two 397.5-ton centrifugal chillers in the ASHRAE case. This results in different load management strategies between the two cases, which are reflected in the energy model.

Overall, the minimal façade renovation baseline has a calculated annual energy use of 49,200 BTU/GSF/year. Using the ASHRAE Energy Cost Budget Method, the building's annual energy cost was calculated to be 14.4 percent less than a “code compliant” energy model that meets the minimal requirements of ASHRAE 90.1–1999. This results in 2 LEED energy points using the “Existing Buildings” point scale. For the purposes of the study, all of the “minimal façade” Office Building scenarios have added additional EEMs in order to achieve 3, 5, or 7 energy points respectively, as shown in **Table EA1-2**.

The full façade renovation baseline has a calculated annual energy use of 47,600 BTU/GSF/year. The lower energy use is primarily attributable to the reduced area of glazing in the full facade scenario (40 percent of the overall wall area vs. 60 percent in the minimal façade case). Using the Energy Cost Budget Method, the building's annual energy cost was calculated to be 18 percent less than the 90.1 model. This results in 3 LEED energy points using the “Existing Buildings” point scale. For the purposes of the study, all of the “full façade” Office Building scenarios have added additional EEMs in order to achieve 5 or 8 energy points respectively, as shown in **Table EA1-2**.

Table EA1-2**Additional Energy Efficiency Measures (EEMs) to Earn Three to Eight Energy Points (Office Building)**

Case	LEED Rating	LEED Points	Imprvmnt over ASHRAE	Energy Efficiency Measures Included (Marked 'X')										
				1.0 watts/SF lighting	Daylight dimming	Occ Sensors	Prem Eff Motors	Mod Cond Boiler	0.54 kw/ton Chiller	0.54 kw/ton Chiller w/VFD	0.49 kw/ton Chiller w/VFD	VFD Cooling Tower Fans	Energy Recovery	CO2 Sensor Control of O.A.
Ref. min. fac.	--	2	14.4%											
Ref. full fac.	--	3	18.0%											
1B min. fac.	Certified	3	17.7%	X										
2B full fac.	Certified	5	25.6%	X		X	X		X					X
3B min. fac.	Silver	5	27.2%	X		X	X			X				X
4B full fac.	Silver	8	41.7%	X	X	X	X	X			X	X	X	X
5B min. fac.	Gold	7	35.4%	X	X	X	X	X			X	X	X	X
6B full fac.	Gold	8	41.7%	X	X	X	X	X			X	X	X	X

Office Building EEMs

The majority of the EEMs defined for the Office Building scenarios are the same as those defined for the Courthouse. A description of the cost impact assumptions for the individual EEMs follows:

- Reduced Lighting Power Density in offices, (1.0 watts/SF) – As noted in the Courthouse descriptions, this measure is not expected to add cost to the project.
- Daylight dimming systems at perimeter offices (both private offices and open office areas) – Cost premiums are defined for dimmable ballasts, daylight sensors, and local controllers used in the dimming system.
- Occupancy Sensor controls for lighting in all enclosed offices and conference rooms – Cost premiums are defined for wall mounted sensors, and where applicable, for ceiling mounted occupancy/daylight sensors.
- Premium efficiency motors – Cost premiums are defined for pump and fan motors.
- Modulating condensing boilers (93 percent nominal efficiency) – Cost premiums are defined to upgrade from the two standard

efficiency boilers of the baseline (3,800,000 BTU/h each) to four condensing boilers (2,000,000 BTU/h each).

- High-efficiency chillers (0.54 kw/ton) – Cost premiums are defined to upgrade the two 330-ton centrifugal chillers. This chiller scenario is used only in Case 2B (full façade renovation).
- High-efficiency chillers (0.54 kw/ton) with variable frequency drives – Cost premiums are defined to upgrade the two 330-ton centrifugal chillers. This chiller scenario is used only in Case 3B (minimal façade renovation).
- High-efficiency chillers (0.49 kw/ton) with variable frequency drives – Cost premiums are defined to upgrade the two 330-ton centrifugal chillers. This chiller scenario is used in Cases 4B and 6B (full façade renovation) and in Case 5B (minimal façade renovation).
- Variable frequency drive cooling tower fans – No cost premium was identified for this measure.
- Energy recovery – Cost premiums are defined to add enthalpy wheel heat recovery units. The units are sized for a total of 29,500 cfm

of outside air. The costs include additional ducting to the units and additional BMS controls.

- Carbon dioxide sensors to modulate outside air based on occupancy in the conference rooms and office spaces – Cost premiums are defined for CO₂ sensors, for sensor tie-ins to the BMS, and for additional controls programming.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

1 Energy Point

No identified cost premiums.

3 Energy Points

Total Credit Cost\$151,262
 Cost Impact (\$/GSF).....\$0.58/GSF
 Cost Impact (%)..... 0.26%

5 Energy Points

Total Credit Cost\$756,101
 Cost Impact (\$/GSF).....\$2.89/GSF
 Cost Impact (%)..... 1.32%

Office Building (Modernization, 306,600 GSF)

Minimal Façade Renovation

3 Energy Points

No identified cost premiums.

5 Energy Points

Total Credit Cost\$357,775
 Cost Impact (\$/GSF).....\$1.17/GSF
 Cost Impact (%)..... 0.91%

7 Energy Points

Total Credit Cost\$941,426
 Cost Impact (\$/GSF).....\$3.07/GSF
 Cost Impact (%)..... 2.39%

Office Building (Modernization, 306,600 GSF)

Full Façade Renovation

5 Energy Points

Total Credit Cost.....\$243,508
 Cost Impact (\$/GSF)\$0.79/GSF
 Cost Impact (%)0.62%

8 Energy Points

Total Credit Cost.....\$941,426
 Cost Impact (\$/GSF)\$3.07/GSF
 Cost Impact (%)2.33%

Additional Considerations

In most high-performance buildings, the additional costs that may be incurred for load-reduction strategies (e.g., better glazings, more insulation, more efficient lighting) can be offset in full or in part by reductions in the size of the HVAC equipment and components (chillers, boilers, ducts, pipes, motors, etc.). While this is a key cost control strategy for green buildings, savings of this type are not specifically reflected in the study. This is primarily because a number of load reduction measures are already included in the reference buildings that meet GSA's energy use targets. The HVAC equipment in the reference models is therefore assumed to be "right-sized" to the reduced loads. The additional load reduction strategies simulated for the study (i.e., lower lighting power density, lighting controls, and heat recovery) were calculated to have only a small *additional* downsizing effect on the building HVAC systems. For the purposes of the study, it was decided to conservatively assume no additional downsizing. In actual GSA projects, it is expected that all load reduction measures will be considered in tandem when determining HVAC system sizes, to take full advantage of the downsizing opportunities.

Synergistic Credits

Item SN-3 (Courthouse) of Section 3 reviews the cost implications of earning Credit EA-1 in conjunction with Credit EQ-1 (Carbon Dioxide Monitoring). Similarly, Items SN-1A through SN-1D (Office Building) of Section 3 review the cost implications of earning Credit EA-1 in conjunction with Credit EQ-1 in the Office Building scenarios.

There are also synergies between Credit EA-1 and Credit EA-2 (Renewable Energy). Any on-site renewable energy production that applies toward Credit EA-2 (e.g., electricity generated from photovoltaic panels or wind turbines) can also be deducted from a building's regulated energy use in the EA-1 calculations. Thus, in cases where renewable energy systems are installed to earn a point under Credit EA-2 (scenario 6A of the Courthouse models and scenarios 5B and 6B of the Office Building), an additional point is also earned under Credit EA-1.

Supporting Calculations

Appendix I provides a detailed description of the DOE-2 computer energy simulations developed for the Courthouse. The appendix also includes the Energy Cost Budget forms for each of the Courthouse energy point scenarios (i.e., 1 point, 3 points, and 5 points).

Appendix J provides a detailed description of the DOE-2 computer energy simulations developed for the Office Building (both the minimal façade and full façade renovation variants). The appendix includes the Energy Cost Budget forms for each of the Office Building energy point scenarios (i.e., 3 points, 5 points, 7 points, and 8 points).

LEED® Credit EA-2: Renewable Energy

Intent:

Encourage and recognize increasing levels of on-site renewable energy self supply in order to reduce environmental impacts associated with fossil fuel energy use.

Requirement:

Supply at least 5% of the building's total energy use (as expressed as a fraction of annual energy cost) through the use of on-site renewable energy systems.

(1 point)

Supply at least 10% of the building's total energy use (as expressed as a fraction of annual energy cost) through the use of on-site renewable energy systems.

(1 additional point)

Supply at least 20% of the building's total energy use (as expressed as a fraction of annual energy cost) through the use of on-site renewable energy systems.

(1 additional point)

Cost Impact = 5

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

The LEED 2.1 Reference Guide emphasizes that this credit is targeted to on-site renewable energy systems that convert energy from sun, wind, or biomass into usable energy. Systems that would likely be considered for GSA projects include:

- Photovoltaics (building-integrated, roof mounted, or site mounted); and

- Wind turbines.

Systems that were not deemed likely for typical GSA buildings for cost or practicality purposes include:

- High-temperature solar;
- Geothermal energy;
- Biomass; and
- Bio-gas.

The LEED 2.1 Reference Guide notes that passive solar design, solar hot water heating, ground-source heat pumps, and daylighting do *not* qualify for points under this credit, because they do not generate power. These strategies are accounted for in Credit EA-1.

Basis for Cost Assumption

Using the computer energy modeling results and Energy Cost Budget forms from Credit EA-1, the annual regulated energy costs for the Courthouse and Office Building are used to define the annual kilowatt-hour production required to meet the 5 percent LEED threshold (1 point). From these target numbers, cost estimates are defined for roof-mounted photovoltaic (PV) systems as follows:

Courthouse (used only in Scenario 6A)

A monocrystalline PV panel array of 6,000 square feet (60 kW peak) is installed on a mounting structure on the upper building roof. The PV system is utility grid connected without battery back-up or generator. The cost includes all system components including inverters, disconnects, wiring/conduit, and a data acquisition system.

Office Building, Minimum Facade Renovation (used only in Scenario 5B)

A monocrystalline PV panel array of 6,750 square feet (67.5 kW peak) is installed on the upper roof. The system components are similar to those defined for the Courthouse model.

Office Building, Full Facade Renovation (used only in Scenario 6B)

A monocrystalline PV panel array of 6,200 square feet (62 kW peak) is installed on the upper roof. The system components are similar to those defined for the Courthouse model.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

Total Credit Cost\$787,586
Cost Impact (\$/GSF).....\$3.01/GSF
Cost Impact (%)..... 1.37%

Office Building (Modernization, 306,600 GSF)

Minimal Façade Renovation

Total Credit Cost\$956,912
Cost Impact (\$/GSF).....\$3.12/GSF
Cost Impact (%)..... 2.43%

Full Façade Renovation

Total Credit Cost\$881,282
Cost Impact (\$/GSF).....\$2.87/GSF
Cost Impact (%)..... 2.18%

Synergistic Credits

Any on-site renewable energy production that applies toward Credit EA-2 can also be deducted from a building's regulated energy use in the EA-1 calculations. Thus, in the Courthouse and Office Building scenarios where the photovoltaic systems are installed to earn a point, an additional point is also earned under Credit EA-1.

Item SN-2 (Courthouse) of Section 3 reviews the cost implications of earning Credit EA-2 in conjunction with Credit SS-6.1 (Stormwater Management, Rate and Quantity) and Credit SS-7.2 (Heat Island Reduction, Roof). Credit EA-2 is included in this scenario only because of the roof areas involved (the required areas for the green roof and PV panel array are too large to fit on the upper roof – the lower roof above the first floor entry is therefore converted to a green roof as well).

Additional Considerations

There is an inherent relationship between this credit and Credit EA-1 (Optimize Energy Performance). By lowering the overall energy use of the building (the goal of EA-1), the required amount of renewable power to achieve this credit is also reduced. Since energy conservation measures are typically less costly than renewable power (on a cost-per-kilowatt-hour basis) it is important to implement measures that reduce a building's energy use *first* and then size the renewable energy system accordingly.

Additional synergies between Credit EA-2 and EA-1 are reviewed below.

LEED® Credit EA-3: Additional Commissioning

Intent:

Verify and ensure that the entire building is designed, constructed, and calibrated to operate as intended.

Requirement:

In addition to the Fundamental Building Commissioning prerequisite, implement or have a contract in place to implement the following additional commissioning tasks:

- A commissioning authority independent of the design team shall conduct a review of the design prior to the construction documents phase.
- An independent commissioning authority shall conduct a review of the construction documents near completion of the construction documents development and prior to issuing the contract documents for construction.
- An independent commissioning authority shall review the contractor submittals relative to systems being commissioned.
- Provide the owner with a single manual that contains the information required for re-commissioning building systems
- Have a contract in place to review building operation with O&M staff, including a plan for resolution of outstanding commissioning related issues within one year after construction completion date.

(1 point)

Cost Impact = 1

1	2	3	4	5
GSA Standard (no cost)	No premium, possible savings	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

As noted under EA Prerequisite 1, GSA has developed a total building commissioning process that is consistent with the LEED prerequisite and Additional Commissioning requirements. On GSA projects, the commissioning authority is typically part of (or a subcontractor to) a Construction Management firm not affiliated with the design/delivery team, thus qualifying them as third party agents. The commissioning authority's responsibilities include the following tasks, which encompass (and in some cases surpass) the LEED credit requirements:

- Reviewing design concepts and providing cost estimates of the preferred design concept
- Participating in Interdisciplinary Design Team Review meetings to assure adequate due diligence coordination and quality control checks of drawings and specifications
- Providing periodic design reviews to verify that proposed systems and design features meet the performance and quality goals of the project
- Reviewing design development submissions for owner's expectations, code compliance, and constructability
- Participating in Program Review Workshops to identify specification issues, manufacturer's testing requirements, construction testing/inspection, turnover procedures, certification requirements, and use of operation and maintenance service contracts
- Reviewing construction document submissions for owner's expectations, code compliance, and constructability
- Reviewing and approving/rejecting all required shop drawings and product/equipment submittals
- Reviewing each contract modification against established program goals

In addition, GSA Project Managers (in coordination with a commissioning authority) typically initiate service contracts with equipment manufacturers or contractors to help operate and maintain the building equipment during the building's first year of service. During that time, the service contract personnel train the operating staff on the design intent of the building systems,

and on running the systems in all modes of operation. After the first year of operational support, the architect/engineer(s) and contractor/manufacturer(s) are under contract to provide recommissioning of selected building systems and additional training of the operating staff (if needed). GSA also plans to require a recommissioning management manual from their commissioning authorities along with their commissioning reports.

GSA routinely conducts Post-Occupancy Evaluations (POE), also known as Facility Performance Evaluations (FPE), on major new construction and renovation projects. For practical reasons, the GSA Project Manager or a consultant independent of the original delivery team and commissioning authority performs the FPE. Currently, GSA is developing a Web-based tool to facilitate the FPE process.

Basis for Cost Assumption

GSA considers total building commissioning to be a project requirement independent of LEED. As such, there is no LEED-related premium associated with this credit or for EA Prerequisite 1, Fundamental Building Systems Commissioning.

The cost level associated with the Additional Commissioning credit is estimated to be \$0.10–\$0.15/GSF for projects of the scale and complexity of the Courthouse and Office building models. GSA's total building commissioning fees are assumed to be slightly higher than this, as GSA's commissioning scope is more comprehensive than the LEED requirements.

Additional commissioning cost information is included under EA Prerequisite 1, Fundamental Building Systems Commissioning, and in Section 4 of this report.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

No identified cost premiums.

Additional Considerations

None identified.

Synergistic Credits

The tasks defined in EA Prerequisite 1, Fundamental Building Systems Commissioning, are also included in GSA's total building commissioning process. For the purposes of this study, however, no synergistic cost impacts apply.

LEED® Credit EA-4: Ozone Depletion

Intent:

Reduce ozone depletion and support early compliance with the Montreal Protocol.

Requirements:

Install base building level HVAC and refrigeration equipment and fire suppression systems that do not contain HCFC's or Halons.

(1 point)

Cost Impact: Not Applicable

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

Achieving this credit will primarily require the selection of HVAC equipment with zero ozone depletion potential. Options include the following:

- Vapor compression chillers with HFC refrigerants (e.g., 134a, 407c)
- Absorption chillers
- Packaged direct-expansion (DX) equipment with HFC refrigerants (e.g., 410a)

The U.S. Green Building Council has determined that small HVAC units used to cool equipment support rooms, such as computer, telephone, and data rooms, are not considered part of the “base building” system and are not subject to the requirements of this credit. The capacity of this ancillary equipment must represent less than 15 percent of the total installed HVAC capacity of the building.

In general, it is assumed that GSA projects do not involve base building refrigeration systems. In addition, GSA’s P100 notes that clean agent fire extinguishing systems (including Halon systems) cannot be installed in new construction or renovation projects.

Basis for Cost Assumption

GSA’s P100 defines acceptable HVAC refrigerants through the EPA’s Significant New Alternatives Policy (SNAP), which was established to address Section 612 of the Clean Air Act (Stratospheric Ozone Protection). The SNAP refrigerant alternatives include HCFC-123 and HCFC-22 (among other HCFC options), which do not qualify under the LEED credit criteria.

Because GSA does not exclude the use of SNAP-compliant HCFCs, Credit EA-4 is not included in any of the Courthouse or Office Building scenarios. In actual projects, however, it is possible that the installed HVAC equipment will comply with the credit requirements.

Vapor compression chillers using HFC refrigerants can typically be purchased with minimal or no cost impact compared to HCFC chillers at similar performance levels. With smaller equipment (e.g., heat pumps) there are currently limited options for products that utilize HFCs. Costs for this type of equipment can be moderately more expensive than standard products that use HCFCs (e.g., R-22).

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

The credit is not applicable.

Office Building (Modernization, 306,600 GSF)

The credit is not applicable.

Additional Considerations

Currently, the most efficient vapor compression chillers utilize HCFC refrigerants. In some projects, the pursuit of non-ozone-depleting equipment may therefore limit the building's overall energy efficiency and result in a point tradeoff in the project's LEED rating. This issue should be reviewed on a project-by-project basis.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit EA-5: Measurement and Verification

Intent:

Provide for the ongoing accountability and optimization of building energy and water consumption performance over time.

Requirement:

Install continuous metering equipment for the following end-uses:

- Lighting systems and controls
- Constant and variable motor loads
- Variable frequency drive (VFD) operation
- Chiller efficiency at variable loads (kW/ton)
- Cooling load
- Air and water economizer and heat recovery cycles
- Air distribution static pressures and ventilation air volumes
- Boiler efficiencies
- Building-related process energy systems and equipment
- Indoor water risers and outdoor irrigation systems

Develop a Measurement and Verification plan that incorporates the monitoring information from the above end-uses and is consistent with Option B,C or D of the 2001 *International Performance Measurement & Verification Protocol (IPMVP) Volume I: Concepts and Options for Determining Energy and Water Savings*.

(1 point)

Cost Impact = 4

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

GSA's P100 lists a minimum number of control and monitoring points that are required for installed HVAC equipment. In addition, P100 notes that building automation systems (BAS) are required for all projects over 100,000 square feet. Because of these baseline requirements, the additional measures needed to comply with this credit will typically involve:

- Additional meters and/or panels to fully monitor the building systems listed in the credit requirement
- Additional BAS tie-ins for the new meters and panels
- Additional trend log programming for the BAS system

In addition, the design teams will need to develop a Measurement and Verification (M&V) Plan, based on the referenced IPMVP Standard, that includes:

- A listing of systems and equipment to be monitored
- A definition of building baseline energy performance
- A methodology to verify projected savings
- Suggested procedures for system/equipment corrections.

The M&V Plan is considered a project soft cost, and is addressed in Section Four of this report.

Basis for Cost Assumption

For both the Courthouse and Office Building models, additional metering equipment is identified, above and beyond GSA requirements, to meet the credit criteria. The equipment includes:

- Lighting panel meters at all tenant lighting panels
- Gas flow meters at supply lines feeding the boilers
- Receptacle panel meters at all tenant receptacle panels
- Domestic water flow meters

In addition, cost premiums are included for tie-ins from the new meters to the BAS system. BAS tie-in costs are also defined for the building chiller

amp meters, and for the flow meters for the cooling tower make-up water (these meters are assumed to be in the Reference Building costs). A trend log programming cost is also defined based on the more extensive metering.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

Total Credit Cost\$107,058
Cost Impact (\$/GSF)\$0.41/GSF
Cost Impact (%) 0.19%

Office Building (Modernization, 306,600 GSF)

Total Credit Cost\$121,980
Cost Impact (\$/GSF)\$0.40/GSF
Cost Impact (%), Min. Facade 0.31%
Cost Impact (%), Full Facade 0.30%

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit EA-6: Green Power

Intent:

Encourage the development and use of grid source, renewable energy technologies on a net zero pollution basis.

Requirement:

Provide at least 50% of the buildings electricity from renewable sources by engaging in at least a two-year renewable energy contract. Renewable sources are as defined by the Center for Resource Solutions (CRS) Green-e products certification requirements.

(1 point)

Cost Impact: Not Applicable

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

Green power, as defined by the referenced Green-e program, is electricity that meets the following standards:

- One or more of the following renewable resources generates at least 50 percent of the electricity: solar electric, wind, geothermal, biomass, small hydro facilities, or certified low-impact hydro facilities.
- If a portion of the electricity is nonrenewable, the air emissions to produce the power are equal to or lower than those produced by conventional electricity generation.
- There are no specific purchases of nuclear power.
- The product meets the Green-e new renewable requirement (i.e., the renewable generation facility must have come on-line

after 1997 or 1998, depending on the location).

Green-e certified power is available in some parts of the United States through local utility companies or competitive electricity service providers. In these areas, green power is purchased through a contract between the building owner or manager and the green power supplier.

In areas where green power is not available through these means, users can purchase Tradable Renewable Certificates (TRCs), also referred to as “green tags” or “renewable energy certificates.” TRCs can be structured as a “lump sum” one-time purchase, based on the projected energy use of a facility. The purchase of a TRC by an electricity user covers the additional costs to displace fossil fuel energy with renewable energy. TRCs do not involve changes with the local utility company or electricity service provider.

While the costs for green power vary based on the supplier, location, and quantity purchased, the premiums generally range from 1.25–2.5 cents/kWh. For multiyear contracts or very large purchases (e.g., greater than 8,000 MWh/year), the cost premium per kWh may be as low as 1 cent.

Basis for Cost Assumption

Although GSA does purchase green power for some of its facilities, the determination is made by regional managers on a case-by-case basis. Overall, the credit was considered an operational issue (rather than a construction cost issue) outside the scope of this study. Credit EA-6 has not been included in any of the Courthouse or Office Building scenarios.

For reference purposes, calculations were performed to estimate the costs of achieving this credit for the Courthouse and Office Building models, using an assumed green power premium of \$0.02/kWh. The premiums ranged from approximately \$24,000 to \$32,000, depending on the calculated energy use of the building (see Additional Considerations below).

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

The credit is not applicable.

Office Building (Modernization, 306,600 GSF)

The credit is not applicable.

Additional Considerations

There is an inherent relationship between this credit and Credit EA-1 (Optimize Energy Performance). By lowering the overall energy use of the building (the goal of EA-1), the required amount of green power to purchase to achieve this credit is also reduced.

Synergistic Credits

None identified (with construction cost impacts).

LEED® MR Prerequisite 1: Storage & Collection of Recyclables

Intent

Facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills.

Requirement

Provide an easily accessible area that serves the entire building and is dedicated to the separation, collection and storage of materials for recycling including (at a minimum) paper, corrugated cardboard, glass, plastics, and metals.

Cost Impact = 2

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

To achieve the prerequisite, design teams need to provide dedicated areas in a building for sorting, storing, and collecting recyclables. While the LEED program does not mandate minimum recycling storage areas, design teams must demonstrate that the areas provided are large enough to handle the recycling material volumes anticipated from the building occupants. The LEED 2.1 Reference Guide also provides recycling area guidelines based on an ordinance from the city of Seattle. An area of at least 500 square feet, for instance, is recommended for buildings over 200,000 square feet in area (such as the Courthouse and Office Building models used in this study).

Overall, design teams and building owners/building managers need to consider:

- How recyclables will be collected from individuals on the various floors of a building (e.g., bins at each desk and bins in central

locations such as pantries, lounges, and cafeterias)

- How often recyclables will be collected from each floor
- Where recyclables will be collected and stored prior to pick-ups
- How frequent the recyclables will be hauled based on municipal recycling programs and private recycling haulers

These considerations will typically determine the areas required for an effective recycling program.

Basis for Cost Assumption

GSA's P100 requires trash rooms adjacent to loading docks or service entrances that are adequately sized for three days' worth of trash, and for sorting paper, glass, and metals for recycling. To meet the LEED criteria, corrugated cardboard and plastics also need to be included. For the purposes of this study, it is assumed that these additional materials can be accommodated in GSA projects at no additional cost.

P100 also requires that project teams analyze the refuse removal, and recycled materials storage and removal, of their proposed building. This satisfies the LEED requirement for project teams to justify the square footage of the recycling areas provided.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

No identified cost premiums.

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit MR-1.1: Building Reuse

Intent

Extend the life cycle of existing building stock, conserve resources, retain cultural resources, reduce waste and reduce environmental impacts of new buildings as they relate to materials manufacturing and transport.

Requirement

Maintain at least 75% of existing building structure and shell (exterior skin and framing, excluding window assemblies and non-structural roofing material).

(1 point)

Cost Impact = 2

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

This credit is targeted toward projects that are reusing, restoring, or renovating an existing building. The major consideration will typically be whether 75 percent of the structure and shell can be retained. If a GSA modernization or renovation project involves façade recladding, or significant demolition to accommodate new additions, the 75 percent preservation criteria may not be viable.

Basis for Cost Assumption

The decision to renovate an existing building (versus new construction) is outside the scope of this study. However, many GSA projects do involve building renovation, and in these cases it is assumed that this credit can often be achieved. The extent of building preservation will likely be determined by the functional requirements of each project; i.e., the LEED objectives would not typically override these criteria, although they

might influence the process. Because of these assumptions, there is no cost premium assumed for earning this credit.

Credit MR-1.1 only applies to the Office Building modernization model. It is only included in the “minimal façade renovation” scenarios, because the “full façade renovation” scenarios involve removal of a significant percentage of the existing building shell.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

The credit is not applicable.

Office Building (Modernization, 306,600 GSF)

Minimal Façade Renovation

No identified cost premiums.

Full Façade Renovation

The credit is not applicable.

Additional Considerations

In those cases where a project reuses a portion of an existing building (but not enough to merit a point under this credit), the project may apply the tonnage of reused building toward Credit MR-2 (Construction Waste Management). The building materials have, in essence, been diverted from the landfill.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit MR-1.2: Building Reuse

Intent

Extend the life cycle of existing building stock, conserve resources, retain cultural resources, reduce waste and reduce environmental impacts of new buildings as they relate to materials manufacturing and transport.

Requirement

Maintain an additional 25% (100% total) of existing building structure and shell (exterior skin and framing, excluding window assemblies and non-structural roofing material).

(1 point)

Cost Impact = 2

1	2	3	4	5
GSA Standard (no cost)	No premium, possible savings	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

This credit is targeted toward projects that are reusing, restoring, or renovating an existing building. The major consideration will typically be whether 100 percent of the structure and shell can be retained. If a GSA modernization or renovation project involves façade recladding, or demolition to accommodate new additions, the 100 percent preservation criteria will not be viable.

Basis for Cost Assumption

The decision to renovate an existing building (versus new construction) is outside the scope of this study. However, many GSA projects do involve building renovation, and in these cases it is assumed that this credit can sometimes be achieved. The extent of building preservation will likely be determined by the functional requirements of each project; i.e., the LEED objectives would

not typically override these criteria, although they might influence the process. Because of these assumptions, there is no cost premium assumed for earning this credit.

Credit MR-1.2 only applies to the Office Building modernization model. It is only included in the “minimal façade renovation” scenarios because the “full façade renovation” scenarios involve removal of a significant percentage of the existing building shell.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

The credit is not applicable.

Office Building (Modernization, 306,600 GSF)

Minimal Façade Renovation

No identified cost premiums.

Full Façade Renovation

The credit is not applicable.

Additional Considerations

In those cases where a project reuses a portion of an existing building (but not enough to merit a point under this credit or Credit MR-1.1), the project may apply the tonnage of reused building toward Credit MR-2 (Construction Waste Management). The building materials have, in essence, been diverted from the landfill.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit MR-1.3: Building Reuse

Intent

Extend the life cycle of existing building stock, conserve resources, retain cultural resources, reduce waste, and reduce environmental impacts of new buildings as they relate to materials manufacturing and transport.

Requirement

Maintain 100% of existing building structure and shell (exterior skin and framing, excluding window assemblies and non-structural roofing material) AND at least 50% of non-shell areas (interior walls, doors, floor coverings and ceiling systems).

(1 point)

Cost Impact: Not Applicable

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

This credit is considered unlikely for most GSA modernization projects, which involve significant removal of existing interior partitions and finishes. The only GSA projects that could potentially earn this credit are restorations of historical landmarks. Since restoration projects are relatively rare, the credit is generally considered not applicable.

Basis for Cost Assumption

Neither the Courthouse nor the Office Building modernization scenarios qualify for this credit.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

The credit is not applicable.

Office Building (Modernization, 306,600 GSF)

The credit is not applicable.

Additional Considerations

In those cases where a project reuses a portion of an existing building (but not enough to merit a point under this credit or Credits MR-1.1 and MR-1.2), the project may apply the tonnage of reused building toward Credit MR-2 (Construction Waste Management). The building materials have, in essence, been diverted from the landfill.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit MR-2.1: Construction Waste Management, 50%

Intent

Divert construction, demolition, and land clearing debris from landfill disposal. Redirect recyclable material back to the manufacturing process. Redirect reusable materials to appropriate sites.

Requirement

Develop and implement a waste management plan, quantifying material diversion goals. Recycle and/or salvage at least 50% of construction, demolition and land clearing waste. Calculations can be done by weight or volume but must be consistent throughout.

(1 point)

Cost Impact = 2, 3, or 4

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

This credit requires actions by both the design team and construction contractors. The design team develops a Construction Waste Management (CWM) specification, which is included in the construction documents. A CWM specification defines the overall project goals (e.g., 50 percent recycling/salvage), lists the requirements of the CWM Plan (to be developed and issued by the General Contractor or Construction Manager), and identifies the scope of tracking and documentation for CWM activities¹.

¹ Soft costs associated with developing “green” specifications on LEED projects are addressed in Section 4 of this report.

In response to the CWM specifications, the General Contractor (GC) or Construction Manager (CM) initially develops a formal CWM plan, which is submitted to the owner’s representative or design team for approval prior to construction. The CWM plan lists the materials to be recycled and describes the process by which they will be sorted, hauled, and documented. Typically the GC or CM will either manage the waste recycling effort themselves or employ an independent waste management company to handle the sorting, hauling, and documentation tasks.

The degree of difficulty to achieve the 50 percent waste recycling goal can vary based on a number of factors, including:

- The project scope (i.e., Is demolition or land clearing involved? Does the demolition involve removal of hazardous materials?)
- The project site (i.e., Is there enough site area to accommodate multiple dumpsters for on-site sorting, or must sorting occur off-site?)
- The experience level and standard practices of the construction/demolition contractors
- The local landfill tipping fees (i.e., Is it more cost effective to recycle waste than to send it to a landfill?)
- The regional recycling infrastructure
- The local laws related to construction/demolition waste recycling

Because of these variables, the costs associated with construction waste recycling are likely to vary considerably across GSA’s range of projects. In some areas, CWM practices may be considered standard practice, and the costs for CWM may be negligible. In other situations, cost premiums may be paid for: 1) additional labor to sort the recyclable materials; 2) rentals for additional dumpsters on the site; 3) additional transport fees to send materials to regional recycling facilities (as opposed to local landfills); and 4) increased administration fees for the GC or CM.

Basis for Cost Assumption

In the Courthouse model, different assumptions have been used in the “low cost” and “high cost” scenarios. The low-cost scenarios assume that no additional fees are required to achieve the 50 percent recycling threshold. In the high-cost

scenarios, a \$30,000 increase is included in the project's General Conditions to cover additional labor, expenses, and administration.

In the Office Building model, increases to the General Conditions costs have been included in both the "minimal façade renovation" and "full façade renovation" scenarios¹. The fee increases (\$60,000 for the minimal façade cases and \$75,000 in the full façade cases) are higher than those predicted for the Courthouse building because of the demolition involved and because of the phased nature of the Office Building work.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

Low Cost

No identified cost premiums.

High Cost

Total Credit Cost\$31,658
 Cost Impact (\$/GSF).....\$0.12/GSF
 Cost Impact (%)..... 0.06%

Office Building (Modernization, 306,600 GSF)

Minimal Façade Renovation

Total Credit Cost\$64,521
 Cost Impact (\$/GSF).....\$0.21/GSF
 Cost Impact (%)..... 0.16%

Full Façade Renovation

Total Credit Cost\$80,651
 Cost Impact (\$/GSF).....\$0.26/GSF
 Cost Impact (%)..... 0.20%

Additional Considerations

In cases where a modernization project does not qualify for Credits MR-1.1 - MR-1.3 (Building Reuse), the project may apply the tonnage of reused building toward Credit MR-2. The building materials have, in essence, been diverted from the landfill. In these cases, the 50 percent waste reduction criteria may be achieved at no cost.

Synergistic Credits

Credit MR-2.2 (Construction Waste Management, 75 percent) is essentially a continuation of the process and efforts defined for this credit. For the purposes of this study, the Credit MR-2.2 analysis defines the cost premiums *above and beyond* those defined for this credit.

¹ Because there is no "low cost" variant in the Office Building scenarios, a "no cost" CWM option was purposely not included.

LEED® Credit MR-2.2: Construction Waste Management, 75%

Intent

Divert construction, demolition, and land clearing debris from landfill disposal. Redirect recyclable material back to the manufacturing process. Redirect reusable materials to appropriate sites.

Requirement

Develop and implement a waste management plan, quantifying material diversion goals. Recycle and/or salvage an additional 25% (75% total) of construction, demolition and land clearing waste. Calculations can be done by weight or volume but must be consistent throughout.

(1 point)

Cost Impact = 3*

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

* Assumes that Credit MR-2.1 is already being pursued, with associated costs.

Practical Applications

This credit is an extension of Credit MR-2.1 (Construction Waste Management, 50 percent) with a higher threshold requirement. The Practical Applications section of Credit MR-2.1 describes the typical range of Construction Waste Management (CWM) tasks in LEED projects.

The likelihood of a project meeting the 75 percent threshold depends primarily on the type and quantity of recyclable waste generated on the site, the degree of diligence by the contractors who sort and collect the material, and the proximity of recycling processors and haulers to the project site.

The 75 percent threshold may also require a higher degree of oversight and coordination on the part of the General Contractor or Construction Manager to ensure that all significant opportunities to recycle are acted upon.

As noted under Credit MR-2.1, the costs associated with construction waste recycling are likely to vary considerably across GSA's range of projects. While there is more likelihood that a cost premium will be paid when pursuing the 75 percent recycling threshold, it may still be possible in some projects to earn the credit with no appreciable cost impact.

Basis for Cost Assumption

The cost premiums defined for this credit are *above and beyond* those defined for Credit MR-2.1. For the purposes of this study, the full costs to achieve 75 percent construction waste recycling are defined as the costs from Credit MR-2.1 plus the costs estimated for this credit.

In the Courthouse model, a \$20,000 General Conditions cost increase is included in the project to cover additional labor, expenses, and administration. This fee applies in both the "low cost" and "high cost" Courthouse scenarios.

In the Office Building model, a \$30,000 General Conditions cost increase is included in the "minimal façade renovation" scenarios. The 75 percent threshold is only assumed to be viable if extensive recycling occurs during the demolition phase, including recycling of mechanical/electrical components (piping, ductwork, wire) and salvage/recycling of heavy equipment (chillers, boilers). The credit is not pursued in the full façade renovation scenarios, on the assumption that the concrete, masonry, or stone from the existing façade may not be recyclable in some locations, making the achievement of 75 percent recycling unviable.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

Total Credit Cost\$21,105
Cost Impact (\$/GSF).....\$0.08/GSF
Cost Impact (%)..... 0.04%

Office Building (Modernization, 306,600 GSF)

Minimal Façade Renovation

Total Credit Cost\$32,261
Cost Impact (\$/GSF).....\$0.11/GSF
Cost Impact (%)..... 0.08%

Full Façade Renovation

The credit is not pursued.

Additional Considerations

In cases where a modernization project does not qualify for Credits MR-1.1 - MR-1.3 (Building Reuse), the project may apply the tonnage of reused building toward Credit MR-2. The building materials have, in essence, been diverted from the landfill. In these cases, the 75 percent waste reduction criteria may be achieved at limited or no cost.

Synergistic Credits

Credit MR-2.1 (Construction Waste Management, 50 percent) reviews the cost impacts for achieving 50 percent recycling of construction and demolition waste.

LEED® Credit MR-3.1: Resource Reuse, 5%

Intent

Reuse building materials and products in order to reduce demand for virgin materials and to reduce waste, thereby reducing impacts associated with the extraction and processing of virgin resources.

Requirement

Use salvaged, refurbished or reused materials, products and furnishings for at least 5% of building materials.

(1 point)

Cost Impact: Not Pursued

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

According to the LEED 2.1 Reference Guide, only materials that have been purchased from salvaged, refurbished, or reused material retailers qualify for this credit (i.e., materials that have been salvaged on site do not qualify). Typical refurbished materials that might be considered for a GSA project include the following:

- Wood flooring or paneling
- Wood/metal doors and frames
- Furniture items

Of these three material types, refurbished systems furniture is the one category that might approach the credit's 5 percent threshold; however, furniture budgets are not included in most GSA construction projects. For these reasons, this credit has not been pursued in this study.

Basis for Cost Assumption

Furniture systems are not included in either the Courthouse or Office Building budgets. The credit is therefore not pursued.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

The credit is not pursued.

Office Building (Modernization, 306,600 GSF)

The credit is not pursued.

Additional Considerations

None identified.

Synergistic Credits

Credit MR-3.2 (Resource Reuse, 10 percent) is an extension of this credit with a 10 percent threshold.

LEED® Credit MR-3.2: Resource Reuse, 10%

Intent

Reuse building materials and products in order to reduce demand for virgin materials and to reduce waste, thereby reducing impacts associated with the extraction and processing of virgin resources.

Requirement

Use salvaged, refurbished or reused materials, products and furnishings for at least 10% of building materials.

(1 point)

Cost Impact: Not Pursued

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

As noted for Credit MR-3.1 (Resource Reuse, 5 percent), only materials that have been purchased from salvaged, refurbished, or reused material retailers qualify for this credit (i.e., materials that have been salvaged on site do not qualify). Typical refurbished materials that might be considered for a GSA project include the following:

- Wood flooring or paneling
- Doors and frames
- Furniture items

Of these three material types, refurbished systems furniture is the one category that might approach the credit's 10 percent threshold; however, furniture budgets are not included in most GSA construction projects. For these reasons, this credit has not been pursued in this study.

Basis for Cost Assumption

Furniture systems are not included in either the Courthouse or Office Building budgets. The credit is therefore not pursued.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

The credit is not pursued.

Office Building (Modernization, 306,600 GSF)

The credit is not pursued.

Additional Considerations

None identified.

Synergistic Credits

Credit MR-3.1 (Resource Reuse, 5 percent) is the first point that can be earned under Credit MR-3.

LEED® Credit MR-4.1: Recycled Content, 5%

Intent

Increase the demand for building products that incorporate recycled content materials, therefore reducing the impacts resulting from extraction and processing of new virgin materials.

Requirement

Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the post-industrial content constitutes at least 5% of the total value of the materials in the project.

The value of the recycled content portion of a material or furnishing shall be determined by dividing the weight of recycled content in the item by the total weight of all material in the item, then multiplying the resulting percentage by the total value of the item

Mechanical and electrical components shall not be included in this calculation. Recycled content materials shall be defined in accordance with the federal Trade Commission document, *Guidelines for the use of Environmental Marketing Claims*, 16 CFR 260.7 (e), available at www.ftc.gov/bcp/grnrule/guides980427.htm.

(1 point)

Cost Impact = 2

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

As noted in GSA's P100 standards, the Resource Conservation and Recovery Act (RCRA) and Executive Order 13101 require that federal agencies buy recycled-content products designated by the EPA. The EPA's Comprehensive

Procurement Guidelines (CPG) identify a number of available recycled-content materials, and designate the minimum levels of recycled content that should be specified. For construction materials, CPG items include:

- Building insulation products
- Carpet (PET fiber)
- Carpet cushion
- Concrete containing coal fly ash or ground granulated blast furnace slag
- Consolidated and reprocessed latex paint
- Floor tiles
- Flowable fill
- Laminated paperboard
- Patio blocks
- Shower and restroom dividers/partitions
- Structural fiberboard

In addition to CPG-targeted materials, a number of other commonly used building products incorporate recycled content as standard industry practice. Examples of these materials include:

- Steel (including structural shapes, cold formed framing, reinforcing bar, doors and frames, and most steel accessories)
- Mineral-fiber-based acoustical ceiling tiles
- Mineral-fiber-based, spray-applied fireproofing
- Wood particleboard and medium density fiberboard (mdf)
- Gypsum wallboard (paper facings)

In many GSA projects, particularly steel-framed buildings, achieving recycled content at the 5 percent threshold can be accomplished by incorporating a number of the materials listed above, most or all of which have no cost impact.

Reaching the 5 percent threshold in concrete or wood framed buildings will typically be more difficult. In these cases, additional recycled-content materials will need to be incorporated, some of which may limit finish options or impact project costs. Examples of these additional materials include recycled-content ceramic tiles, recycled-content nylon carpets and carpet tiles, and "synthetic" gypsum wallboard. Some of these items are reviewed further under Credit MR-4.2 (Recycled Content, 10 percent).

Basis for Cost Assumption

For both the Courthouse and Office Building models, LEED calculations have been developed to demonstrate that the 5 percent recycled-content threshold can be achieved with no cost impact (See “Supporting Calculations” below).

In the Courthouse model, different calculations are used for the “low cost” and “high cost” scenarios. In the low-cost options, the building’s steel structure is assumed to contain 90 percent recycled-content steel (60 percent post-consumer, 30 percent post-industrial). This high level of recycled content is common for steel products manufactured in “mini-mills,” which use an electric arc furnace to produce new products primarily from recovered steel scrap. The majority of structural steel building products produced in the United States contain steel from electric arc furnaces. At 90 percent recycled content, the structural steel alone surpasses the 5 percent LEED credit threshold in the Courthouse model.

In the high-cost cases for the Courthouse, the structural steel products are assumed to contain only 30 percent recycled content (20 percent post-consumer, 10 percent post-industrial), which represents the overall average recycling rate for the steel industry at large. The 30 percent assumption is purposely conservative to account for situations where steel may be coming from imported sources, or where the information on recycled content is unavailable or difficult to track. With the lower recycled steel assumption, the Courthouse model relies on additional recycled-content materials to reach the 5 percent credit threshold. The materials include additional steel products (decking, reinforcing bar, doors, studs, raised flooring, ceiling suspension grid, toilet partitions), flyash in concrete, mineral fiber ceiling tiles, fiberglass insulation, and spray-applied fireproofing. The credit is still achieved with no cost premium.

In the Office Building model, different calculations are used for the “minimal façade renovation” and “full façade renovation” scenarios. In both cases, the recycled-content materials are focused on interior construction and finishes, as the building structure already exists.

In the minimum façade renovation, recycled content is accounted for in a number of “industry

standard” materials: steel products (studs, ceiling grid, toilet partitions, railings, etc.), gypsum wallboard (paper facings), and wood particleboard or mdf (millwork substrates). To reach the 5 percent threshold, however, at least one of three major finish materials must be specified with high recycled content: gypsum wallboard, mineral fiber ceiling tiles, or carpet tiles. For the purposes of the study, both the ceiling tile and carpet tile options can be incorporated with no impact on project costs (the reference budget assumes quality materials for these items, therefore there is no cost premium to specify high recycled-content options). The calculations in the study use the high recycled-content ceiling tiles.

The full façade renovation scenario employs a similar approach. By including high-recycled-content ceiling tiles with the other “standard” recycled-content materials, the 5 percent threshold is attained.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

No identified cost premiums.

Additional Considerations

Some recycled-content products, such as carpet tiles, ceramic tiles, resilient flooring, or wall coverings, are available in a limited set of styles, colors, and sizes. Designers should familiarize themselves with the product options early in the design process to ensure that potential product limitations do not conflict with the project’s overall design goals. For competitive bidding purposes, designers must also avoid selecting recycled-content materials that are available from only one manufacturer.

Synergistic Credits

On most projects, a number of the targeted recycled-content materials will also apply to other LEED credits. Examples include agrifiber substrate board (strawboard) that can be considered both a recycled and rapidly renewable material, or recycled-content carpet tiles that also meet the emission standards of Credit EQ-4.4 (Low-Emitting Materials, Carpet). Material synergies are relatively common in LEED projects; however, as in the case of the Courthouse and Office Building models of this study, they may not result in appreciable cost impacts.

Supporting Calculations

Tables **MR4.1-1** and **MR4.1-2** identify the materials used to achieve this credit in the “low cost” and “high cost” Courthouse scenarios, respectively. LEED calculations demonstrate that the 5 percent threshold is attained.

Tables **MR4.1-3** and **MR4.1-4** identify the materials used to achieve this credit in the “minimal façade renovation” and “full façade renovation” Office Building scenarios, respectively. LEED calculations demonstrate that the 5 percent threshold is attained.

Table MR4.1-1: 5 Percent Recycled Content, “Low Cost” Courthouse Scenario

Total Construction Cost **\$ 43,542,871** For Case 5A (Gold), worst case scenario
Total Materials Cost **\$ 16,795,900** Calculated Materials Cost for Case 5A (excludes all MEP, labor and equipment)

Product	Installed Cost	Product Cost %	Product Cost	Recycled Content		Weighted \$ Value	% of Total Materials Cost
				% Post Consumer	% Post Industrial		
STEEL							
Structural steel floor and roof framing, including columns	\$ 3,033,774	55%	\$ 1,668,576	60.0%	30.0%	\$ 1,251,432	7.45%

Project Totals: **\$ 1,251,432** **7.45%**
 1 Point Earned

Table MR4.1-2: 5 Percent Recycled Content, "High Cost" Courthouse Scenario

Total Construction Cost \$ 43,336,295 For Case 2A (Certified)
Total Materials Cost \$ 16,904,758 Calculated Materials Cost for Case 2A (excludes all MEP, all labor and equipment)

Product	Installed Cost	Product Cost %	Product Cost	Recycled Content		Weighted \$ Value	Weighted \$ Value as % of Total Cost
				% Post Consumer	% Post Industrial		
CONCRETE							
Concrete fill, 14" dia pipe pile foundations	\$ 597,163	33%	\$ 197,064	0.0%	2.5%	\$ 2,463	0.01%
CIP concrete reinforced basement wall, elevator pit, escalator pit	\$ 469,433	20%	\$ 93,887	0.0%	2.5%	\$ 1,174	0.01%
CIP concrete foundation grade beams at pile foundations	\$ 234,865	13%	\$ 30,532	0.0%	2.5%	\$ 382	0.00%
CIP concrete slab on grade 4"/3000 psi and 6"/4000 psi	\$ 245,823	30%	\$ 73,747	0.0%	2.5%	\$ 922	0.01%
CIP structural slab building system, complete with columns, beams, etc.	\$ 475,351	10%	\$ 47,535	0.0%	2.5%	\$ 594	0.00%
Concrete fill, steel roof/floor deck	\$ 1,265,868	21%	\$ 265,832	0.0%	2.5%	\$ 3,323	0.02%
STEEL							
Resteel @ foundation grade beams	\$ 234,865	21%	\$ 49,322	20.0%	10.0%	\$ 12,330	0.07%
14" dia pipe pile foundations	\$ 597,163	22%	\$ 131,376	20.0%	10.0%	\$ 32,844	0.19%
Resteel @ reinforced concrete basement wall (main bldg and parking)	\$ 469,433	2%	\$ 9,389	20.0%	10.0%	\$ 2,347	0.01%
Resteel @ 4"/3000 psi and 6"/4000 psi reinforced concrete slab on grade	\$ 245,823	3%	\$ 6,146	20.0%	10.0%	\$ 1,536	0.01%
Resteel @ CIP structural slab building system, complete with cols, bms, etc.	\$ 475,351	5%	\$ 23,292	20.0%	10.0%	\$ 5,823	0.03%
Structural steel floor and roof framing, incl cols	\$ 3,033,774	55%	\$ 1,668,576	20.0%	10.0%	\$ 417,144	2.47%
20Ga steel roof/floor deck (includes ltwt conc fill)	\$ 1,265,868	25%	\$ 316,467	20.0%	10.0%	\$ 79,117	0.47%
18 gauge steel canopy and cable	\$ 52,250	65%	\$ 33,963	20.0%	10.0%	\$ 8,491	0.05%
Staircase, metal pan filled w/ conc	\$ 98,524	45%	\$ 44,336	20.0%	10.0%	\$ 11,084	0.07%
Resteel @ Precast systm w/ drywall, insul etc.	\$ 1,526,940	8%	\$ 122,155	20.0%	10.0%	\$ 30,539	0.18%
Steel studs @ Precast systm w/ drywall, insul etc.	\$ 1,526,940	3%	\$ 45,808	20.0%	10.0%	\$ 11,452	0.07%
18" raised floor of 1.5" conc in metal pans on pedestal system	\$ 1,602,763	54%	\$ 865,492	20.0%	10.0%	\$ 216,373	1.28%
18" raised floor of 4" cmu at 2' oc w/ polystyrene infill, 20Ga metal deck, conc fill	\$ 413,527	15%	\$ 62,029	20.0%	10.0%	\$ 15,507	0.09%
ACT Steel Suspension Grid	\$ 611,043	15%	\$ 91,656	20.0%	10.0%	\$ 22,914	0.14%
Steel furring @ suspended GWB ceilings	\$ 233,888	15%	\$ 35,083	20.0%	10.0%	\$ 8,771	0.05%
Misc. Stainless steel ceilings, doors, benches, cell grilles	\$ 249,142	80%	\$ 199,314	20.0%	10.0%	\$ 49,828	0.29%
Steel studs @ interior partitions, two sides, FR and non-FR, uninsulated	\$ 981,551	11%	\$ 107,971	20.0%	10.0%	\$ 26,993	0.16%
Steel studs @ double layer GWB staggered stud partitions	\$ 826,328	12%	\$ 99,159	20.0%	10.0%	\$ 24,790	0.15%
Steel studs @ interior partitions, FR and non FR	\$ 458,511	10%	\$ 45,851	20.0%	10.0%	\$ 11,463	0.07%
Steel studs @ Shaftwalls and chases	\$ 146,427	9%	\$ 13,178	20.0%	10.0%	\$ 3,295	0.02%
Steel studs @ interior partition, GWB one side	\$ 111,506	15%	\$ 16,726	20.0%	10.0%	\$ 4,181	0.02%

Table continues on next page

Section 2: Individual LEED Credit Reviews

Product	Installed Cost	Product Cost %	Product Cost	Recycled Content		Weighted \$ Value	Weighted \$ Value as % of Total Cost
				% Post Consumer	% Post Industrial		
STEEL (continued)							
Steel studs @ Misc. GWB assemblies	\$ 111,468	10%	\$ 11,147	20.0%	10.0%	\$ 2,787	0.02%
Steel studs @ furred out partitions	\$ 68,153	20%	\$ 13,631	20.0%	10.0%	\$ 3,408	0.02%
Steel Toilet/Urinal Partitions	\$ 214,303	85%	\$ 182,158	20.0%	10.0%	\$ 45,539	0.27%
INSULATION & FIREPROOFING							
Batt insulation at precast wall system	\$ 1,526,940	2%	\$ 30,539	18.0%	7.0%	\$ 6,566	0.04%
Fiberglass sound batts at double layer GWB partitions, staggered studs	\$ 826,328	7%	\$ 57,843	18.0%	7.0%	\$ 12,436	0.07%
Fiberglass sound batts at GWB partitions, rated and unrated	\$ 458,511	5%	\$ 22,926	18.0%	7.0%	\$ 4,929	0.03%
Batt insulation @ Shaftwalls and chases	\$ 146,427	6%	\$ 8,786	18.0%	7.0%	\$ 1,889	0.01%
Fiberglass sound batts at interior partitions, GWB one side	\$ 111,506	8%	\$ 8,920	18.0%	7.0%	\$ 1,918	0.01%
Batt insulation @ Misc. GWB assemblies	\$ 111,468	4%	\$ 4,459	18.0%	7.0%	\$ 959	0.01%
Sprayed-on fireproofing	\$ 199,124	40%	\$ 79,650	0.0%	75.0%	\$ 29,869	0.18%
STEEL DOORS AND FRAMES							
Hollow metal frames at solid core wood doors	\$ 871,756	13%	\$ 113,328	20.0%	10.0%	\$ 28,332	0.17%
2" thick swinging detention doors w/14GA HM frame	\$ 72,772	40%	\$ 29,109	20.0%	10.0%	\$ 7,277	0.04%
Solid slat auto overhead insulated coiling sally-port door, detention type, blast-crash resist	\$ 10,727	70%	\$ 7,509	20.0%	10.0%	\$ 1,877	0.01%
HM double doors and frames	\$ 11,250	40%	\$ 4,500	20.0%	10.0%	\$ 1,125	0.01%
Overhead coiling loading dock door: Metal	\$ 16,300	65%	\$ 10,595	20.0%	10.0%	\$ 2,649	0.02%
ACOUSTICAL CEILING PANELS							
ACT panels	\$ 611,043	35%	\$ 213,865	0.0%	25.0%	\$ 26,733	0.16%

Project Totals: **\$ 1,183,972** **7.00%**

1 Point Earned

Table MR4.1-3: 5 Percent Recycled Content, "Minimal Façade Renovation" Office Building Scenario

Total Construction Cost \$ 29,746,173 For Case 5B (Gold), worst case scenario
Total Materials Cost \$ 5,383,574 Calculated Materials Cost for Case 5B (excludes all MEP, all labor and equipment)

Product	Installed Cost	Product Cost %	Product Cost	Recycled Content		Weighted \$ Value	Weighted \$ Value as % of Total Cost
				% Post Consumer	% Post Industrial		
STEEL							
ACT Steel Suspension Grid	\$ 716,896	15%	\$ 107,534	20.0%	10.0%	\$ 26,884	0.50%
Steel studs @ interior partitions, FR and non FR	\$ 688,099	12%	\$ 82,572	20.0%	10.0%	\$ 20,643	0.38%
Architectural Metals at exterior	\$ 148,539	55%	\$ 81,696	20.0%	10.0%	\$ 20,424	0.38%
Steel panel sheets and framing @ penthouse enclosure	\$ 93,365	42%	\$ 39,213	20.0%	10.0%	\$ 9,803	0.18%
Steel studs @ furred out partitions	\$ 261,660	33%	\$ 86,348	20.0%	10.0%	\$ 21,587	0.40%
Steel pipe handrails	\$ 20,353	66%	\$ 13,450	20.0%	10.0%	\$ 3,362	0.06%
Stainless steel 18 gauge steel canopy and cable	\$ 17,250	65%	\$ 11,213	20.0%	10.0%	\$ 2,803	0.05%
Steel Toilet/Urinal Partitions and Telephone Dividers	\$ 106,010	85%	\$ 90,109	20.0%	10.0%	\$ 22,527	0.42%
INSULATION & FIREPROOFING							
Batt insulation @ interior partitions	\$ 688,099	10%	\$ 68,810	18.0%	7.0%	\$ 14,794	0.27%
Batt insulation @ furred out partitions	\$ 261,660	23%	\$ 60,182	18.0%	7.0%	\$ 12,939	0.24%
Sprayed-on fireproofing (patch/repair)	\$ 214,812	30%	\$ 64,444	0.0%	75.0%	\$ 24,166	0.45%
STEEL DOORS AND FRAMES							
Hollow metal frames at solid core wood doors	\$ 782,967	13%	\$ 101,786	20.0%	10.0%	\$ 25,446	0.47%
HM double doors and frames	\$ 16,172	40%	\$ 6,469	20.0%	10.0%	\$ 1,617	0.03%
Overhead coiling loading dock door	\$ 12,937	65%	\$ 8,409	20.0%	10.0%	\$ 2,102	0.04%
GYPSUM WALLBOARD							
GWB @ interior partitions, FR and non FR	\$ 688,099	19%	\$ 130,739	0.0%	5.0%	\$ 3,268	0.06%
Patch and repair existing GWB	\$ 361,060	10%	\$ 36,106	0.0%	5.0%	\$ 903	0.02%
GWB over existing partitions	\$ 36,092	40%	\$ 14,437	0.0%	5.0%	\$ 361	0.01%
GWB @ furred out partitions	\$ 261,660	13%	\$ 34,016	0.0%	5.0%	\$ 850	0.02%
ACOUSTICAL CEILING PANELS							
ACT panels	\$ 716,896	35%	\$ 250,914	0.0%	75.0%	\$ 94,093	1.75%
CASEWORK							
MDF Substrate for casework (wood veneer and PLAM finishes)	\$ 46,499	22%	\$ 10,230	0.0%	75.0%	\$ 3,836	0.07%

Project Totals: **\$ 312,410** **5.80%**

1 Point Earned

Table MR4.1-4: 5 Percent Recycled Content, "Full Façade Renovation" Office Building Scenario

Total Construction Cost \$ 28,816,530 For Case 2B (Certified)
Total Materials Cost \$ 5,554,861 Calculated Materials Cost for Case 2B (excludes all MEP, all labor and equipment)

Product	Installed Cost	Product Cost %	Product Cost	Recycled Content		Weighted \$ Value	Weighted \$ Value as % of Total Cost
				% Post Consumer	% Post Industrial		
STEEL							
ACT Steel Suspension Grid	\$ 716,896	15%	\$ 107,534	20.0%	10.0%	\$ 26,884	0.48%
Steel studs @ interior partitions, FR and non FR	\$ 688,099	12%	\$ 82,572	20.0%	10.0%	\$ 20,643	0.37%
Steel Studs @ precast concrete wall system	\$ 2,034,630	3%	\$ 61,039	20.0%	10.0%	\$ 15,260	0.27%
Architectural Metals at exterior	\$ 148,539	55%	\$ 81,696	20.0%	10.0%	\$ 20,424	0.37%
Resteel @ precast concrete wall system	\$ 2,034,630	2%	\$ 40,693	60.0%	30.0%	\$ 30,519	0.55%
Steel panel sheets and framing @ penthouse enclosure	\$ 93,365	42%	\$ 39,213	20.0%	10.0%	\$ 9,803	0.18%
Steel studs @ furred out partitions	\$ 45,354	33%	\$ 14,967	20.0%	10.0%	\$ 3,742	0.07%
Steel pipe handrails	\$ 20,353	66%	\$ 13,450	20.0%	10.0%	\$ 3,362	0.06%
Stainless steel 18 gauge steel canopy and cable	\$ 17,250	65%	\$ 11,213	20.0%	10.0%	\$ 2,803	0.05%
Steel Toilet/Urinal Partitions and Telephone Dividers	\$ 106,010	85%	\$ 90,109	20.0%	10.0%	\$ 22,527	0.41%
INSULATION & FIREPROOFING							
Batt insulation @ interior partitions	\$ 688,099	10%	\$ 68,810	18.0%	7.0%	\$ 14,794	0.27%
Batt insulation @ precast concrete wall system	\$ 2,034,630	3%	\$ 50,866	18.0%	7.0%	\$ 10,936	0.20%
Batt insulation @ furred out partitions	\$ 45,354	23%	\$ 10,431	18.0%	7.0%	\$ 2,243	0.04%
Sprayed-on fireproofing (patch/repair)	\$ 214,812	30%	\$ 64,444	0.0%	75.0%	\$ 24,166	0.44%
STEEL DOORS AND FRAMES							
Hollow metal frames at solid core wood doors	\$ 782,967	13%	\$ 101,786	20.0%	10.0%	\$ 25,446	0.46%
HM double doors and frames	\$ 16,172	40%	\$ 6,469	20.0%	10.0%	\$ 1,617	0.03%
Overhead coiling loading dock door	\$ 12,937	65%	\$ 8,409	20.0%	10.0%	\$ 2,102	0.04%
GYPSUM WALLBOARD							
GWB @ precast concrete wall system	\$ 2,034,630	1%	\$ 20,346	0.0%	5.0%	\$ 509	0.01%
GWB @ interior partitions, FR and non FR	\$ 688,099	19%	\$ 130,739	0.0%	5.0%	\$ 3,268	0.06%
Patch and repair existing GWB	\$ 361,060	10%	\$ 36,106	0.0%	5.0%	\$ 903	0.02%
GWB over existing partitions	\$ 36,092	40%	\$ 14,437	0.0%	5.0%	\$ 361	0.01%
GWB @ furred out partitions	\$ 45,354	13%	\$ 5,896	0.0%	5.0%	\$ 147	0.00%
ACOUSTICAL CEILING PANELS							
ACT panels	\$ 716,896	35%	\$ 250,914	0.0%	75.0%	\$ 94,093	1.69%
CASEWORK							
MDF Substrate for casework (wood veneer and PLAM finishes)	\$ 49,754	22%	\$ 10,946	0.0%	75.0%	\$ 4,105	0.07%

Project Totals: \$ 340,658 6.13%

1 Point Earned

LEED® Credit MR-4.2: Recycled Content, 10%

Intent

Increase the demand for building products that have incorporated recycled content materials, therefore reducing the impacts resulting from the extraction and processing of new virgin materials.

Requirement

Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the post-industrial content constitutes at least 10% of the total value of the materials in the project.

The value of the recycled content portion of a material or furnishing shall be determined by dividing the weight of recycled content in the item by the total weight of all material in the item, then multiplying the resulting percentage by the total value of the item

Mechanical and electrical components shall not be included in this calculation. Recycled content materials shall be defined in accordance with the federal Trade Commission document, *Guidelines for the use of Environmental Marketing Claims*, 16 CFR 260.7 (e), available at www.ftc.gov/bcp/grnrule/guides980427.htm.

(1 point)

Cost Impact = 2, 3 or 4

1	2	3	4	5
GSA Standard (no cost)	No premium, possible savings	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

As with Credit MR 4.1 (Recycled Content, 5 percent), some GSA projects will attain this credit by simply incorporating recycled-content materials identified in the EPA's Comprehensive

Procurement Guidelines (e.g., concrete with flyash or slag) in addition to products that incorporate recycled content as standard industry practice (e.g., steel).

In other projects, attaining the credit's 10 percent performance threshold will require the selection and specification of a number of specific high-recycled-content products. Examples include:

- Nylon carpets or carpet tiles with recycled nylon and/or PVC
- "Synthetic" gypsum wallboard
- Mineral-fiber based ceiling tiles (greater than 50 percent recycled content)
- Ceramic tiles with recycled glass or mining tailings
- Biocomposite countertops with recycled newsprint
- Wallcoverings with recycled paper and/or polymers
- Resilient flooring with recycled rubber, polymers, or cork

These types of materials must be carefully reviewed by design teams to determine how they may impact design options and/or project costs.

Basis for Cost Assumption

For both the Courthouse and Office Building models, LEED calculations have been developed to demonstrate how the 10 percent recycled-content threshold can potentially be achieved (see "Supporting Calculations" below).

Courthouse

In the Courthouse model, different calculations are used for the "low cost" and "high cost" scenarios. In the low-cost options, the building's steel structure is assumed to contain 90 percent recycled-content steel, which represents over 5 percent recycled content for the building overall (see Credit MR-4.1). In addition to the structural steel, a number of other "no cost" recycled-content materials are included, such as flyash in concrete, additional steel items (decking, reinforcing bar, doors, studs, ceiling suspension grids, raised flooring, and toilet partitions), mineral fiber ceiling tiles, fiberglass insulation, and wood particleboard and mdf. The 10 percent threshold is achieved with no cost premium.

In the high-cost cases for the Courthouse, the structural steel products are assumed to contain only 30 percent recycled content. Because of this more conservative estimate for the steel, the project includes a wider range of additional recycled-content materials. These include all of the products noted for the “low cost” Courthouse scenario, as well as the following:

- Nylon carpet tiles with recycled nylon fiber and recycled PVC backings
- “Synthetic” gypsum wallboard (greater than 90 percent post-industrial recycled content)
- Mineral-fiber based ceiling tiles (greater than 70 percent post-industrial recycled content)

Of these three additional materials, only the synthetic gypsum wallboard is assumed to add cost (the reference budget assumes quality materials for the carpet tiles and ceiling tiles; therefore there is no cost premium to specify high recycled-content options). While the 90 percent synthetic gypsum wallboard itself is not assumed to cost more than standard wallboard, it is available from a limited number of plants throughout the country. The cost premium in the study is therefore based on additional shipping charges that would be incurred to obtain the wallboard from plants outside the normal shipping distances.¹

Office Building

In the Office Building model, different calculations are used for the “minimal façade renovation” and “full façade renovation” scenarios. In both cases, the recycled-content materials are focused on interior construction and finishes, as the building structure already exists.

In the minimum façade renovation, recycled content is accounted for in a number of “industry standard” materials, primarily in steel products (studs, ceiling grid, toilet partitions, railings, etc.) and wood particleboard or mdf (millwork substrates). To reach the 10 percent threshold, the same three high-recycled-content finish materials identified in the “high cost” Courthouse option (carpet tiles, synthetic gypsum wallboard, mineral

fiber ceiling tiles) must be included. As with the Courthouse model, a premium is only included for the synthetic gypsum wallboard to address additional shipping costs.

The full façade renovation scenario employs a similar approach. By including recycled-content carpet tiles, synthetic gypsum wallboard, and high-recycled-content ceiling tiles with the other “standard” recycled-content materials, the 10 percent threshold is attained.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

Low Cost

No identified cost premiums.

High Cost

Total Credit Cost.....	\$79,331
Cost Impact (\$/GSF)	\$0.30/GSF
Cost Impact (%)	0.14%

Office Building (Modernization, 306,600 GSF)

Total Credit Cost.....	\$32,394
Cost Impact (\$/GSF)	\$0.11/GSF
Cost Impact (%), Min. Facade	0.08%
Cost Impact (%), Full Facade.....	0.08%

Additional Considerations

Some recycled-content products, such as carpet tiles, ceramic tiles, resilient flooring, or wall coverings, are available in a limited set of styles, colors, and sizes. Designers should familiarize themselves with the product options early in the design process to ensure that potential product limitations do not conflict with the project’s overall design goals. For competitive bidding purposes, designers must also avoid selecting recycled-content materials that are available from only one manufacturer.

¹ This assumption will not apply to all locations. In some parts of the country, synthetic gypsum products are available locally at no additional cost. In other parts of the country, the synthetic gypsum plants are too far away to make shipping a viable option.

Synergistic Credits

Item SN-2 (Office Building) reviews the cost implications of earning Credit MR-4.2 in conjunction with Credit MR-5.2 (Regional Materials, 50 percent extracted regionally). The synergistic case applies only in the full façade renovation scenarios.

Supporting Calculations

Tables **MR4.2-1** and **MR4.2-2** identify the materials used to achieve this credit in the “low cost” and “high cost” Courthouse scenarios,

respectively. LEED calculations demonstrate that the 10 percent threshold is attained.

Tables **MR4.2-3** and **MR4.2-4** identify the materials used to achieve this credit in the “minimal façade renovation” and “full façade renovation” Office Building scenarios, respectively. LEED calculations demonstrate that the 10 percent threshold is attained.

Table MR4.2-1: 10 Percent Recycled Content, "Low Cost" Courthouse Scenario

Total Construction Cost \$ 43,542,871 For Case 5A (Gold), worst case scenario
Total Materials Cost \$ 16,795,900 Calculated Materials Cost for Case 5A (excludes all MEP, labor and equipment)

Product	Installed Cost	Product Cost %	Product Cost	Recycled Content		Weighted \$ Value	Weighted \$ Value as % of Total Cost
				% Post Consumer	% Post Industrial		
STEEL							
Resteel @ foundation grade beams	\$ 234,865	21%	\$ 49,322	20.0%	10.0%	\$ 12,330	0.07%
14" dia pipe pile foundations	\$ 597,163	22%	\$ 131,376	60.0%	30.0%	\$ 98,532	0.59%
Resteel @ reinforced concrete basement wall (main bldg and parking)	\$ 469,433	2%	\$ 9,389	20.0%	10.0%	\$ 2,347	0.01%
Resteel @ 4"/3000 psi and 6"/4000 psi reinforced concrete slab on grade	\$ 245,823	3%	\$ 6,146	20.0%	10.0%	\$ 1,536	0.01%
Resteel @ CIP structural slab building system, complete with cols, bms, etc.	\$ 475,351	5%	\$ 23,292	20.0%	10.0%	\$ 5,823	0.03%
Structural steel floor and roof framing, incl cols	\$ 3,033,774	55%	\$ 1,668,576	60.0%	30.0%	\$ 1,251,432	7.45%
20Ga steel roof/floor deck (includes ltwt conc fill)	\$ 1,265,868	25%	\$ 316,467	20.0%	10.0%	\$ 79,117	0.47%
18 gauge steel canopy and cable	\$ 52,250	65%	\$ 33,963	20.0%	10.0%	\$ 8,491	0.05%
Staircase, metal pan filled w/ conc	\$ 98,524	45%	\$ 44,336	20.0%	10.0%	\$ 11,084	0.07%
Resteel @ Precast systm w/ drywall, insul etc.	\$ 1,526,940	8%	\$ 122,155	60.0%	30.0%	\$ 91,616	0.55%
Steel studs @ Precast systm w/ drywall, insul etc.	\$ 1,526,940	3%	\$ 45,808	20.0%	10.0%	\$ 11,452	0.07%
18" raised floor of 1.5" conc in metal pans on pedestal system	\$ 1,602,763	54%	\$ 865,492	20.0%	10.0%	\$ 216,373	1.29%
18" raised floor of 4" cmu at 2' oc w/ polystyrene infill, 20Ga metal deck, conc fill	\$ 413,527	15%	\$ 62,029	20.0%	10.0%	\$ 15,507	0.09%
ACT Steel Suspension Grid	\$ 611,043	15%	\$ 91,656	20.0%	10.0%	\$ 22,914	0.14%
Steel furring @ suspended GWB ceilings	\$ 233,888	15%	\$ 35,083	20.0%	10.0%	\$ 8,771	0.05%
Misc. Stainless steel ceilings, doors, benches, cell grilles	\$ 249,142	80%	\$ 199,314	20.0%	10.0%	\$ 49,828	0.30%
Steel studs @ interior partitions, two sides, FR and non-FR, uninsulated	\$ 981,551	11%	\$ 107,971	20.0%	10.0%	\$ 26,993	0.16%
Steel studs @ double layer GWB staggered stud partitions	\$ 826,328	12%	\$ 99,159	20.0%	10.0%	\$ 24,790	0.15%
Steel studs @ interior partitions, FR and non FR	\$ 458,511	10%	\$ 45,851	20.0%	10.0%	\$ 11,463	0.07%
Steel studs @ Shaftwalls and chases	\$ 146,427	9%	\$ 13,178	20.0%	10.0%	\$ 3,295	0.02%
Steel studs @ interior partition, GWB one side	\$ 111,506	15%	\$ 16,726	20.0%	10.0%	\$ 4,181	0.02%
Steel studs @ Misc. GWB assemblies	\$ 111,468	10%	\$ 11,147	20.0%	10.0%	\$ 2,787	0.02%
Steel studs @ furred out partitions	\$ 68,153	20%	\$ 13,631	20.0%	10.0%	\$ 3,408	0.02%
Steel Toilet/Urinal Partitions	\$ 214,303	85%	\$ 182,158	20.0%	10.0%	\$ 45,539	0.27%

Table continues on next page

Section 2: Individual LEED Credit Reviews

Product	Installed Cost	Product Cost %	Product Cost	Recycled Content		Weighted \$ Value	Weighted \$ Value as % of Total Cost
				% Post Consumer	% Post Industrial		
INSULATION & FIREPROOFING							
Batt insulation at precast wall system	\$ 1,526,940	2%	\$ 30,539	18.0%	7.0%	\$ 6,566	0.04%
Fiberglass sound batts at double layer GWB partitions, staggered studs	\$ 826,328	7%	\$ 57,843	18.0%	7.0%	\$ 12,436	0.07%
Fiberglass sound batts at GWB partitions, rated and unrated	\$ 458,511	5%	\$ 22,926	18.0%	7.0%	\$ 4,929	0.03%
Batt insulation @ Shaftwalls and chases	\$ 146,427	6%	\$ 8,786	18.0%	7.0%	\$ 1,889	0.01%
Fiberglass sound batts at interior partitions, GWB one side	\$ 111,506	8%	\$ 8,920	18.0%	7.0%	\$ 1,918	0.01%
Batt insulation @ Misc. GWB assemblies	\$ 111,468	4%	\$ 4,459	18.0%	7.0%	\$ 959	0.01%
Sprayed-on fireproofing	\$ 199,124	40%	\$ 79,650	0.0%	75.0%	\$ 29,869	0.18%
STEEL DOORS AND FRAMES							
Hollow metal frames at solid core wood doors	\$ 871,756	13%	\$ 113,328	20.0%	10.0%	\$ 28,332	0.17%
2" thick swinging detention doors w/14GA HM frame	\$ 72,772	40%	\$ 29,109	20.0%	10.0%	\$ 7,277	0.04%
Solid slat auto overhead insulated coiling sally-port door, detention type, blast-crash resist	\$ 10,727	70%	\$ 7,509	20.0%	10.0%	\$ 1,877	0.01%
HM double doors and frames	\$ 11,250	40%	\$ 4,500	20.0%	10.0%	\$ 1,125	0.01%
Overhead coiling loading dock door: Metal	\$ 16,300	65%	\$ 10,595	20.0%	10.0%	\$ 2,649	0.02%
ACOUSTICAL CEILING PANELS							
ACT panels	\$ 611,043	35%	\$ 213,865	0.0%	25.0%	\$ 26,733	0.16%

Project Totals:

\$ 2,136,168

12.72%

2 Points Earned

Table MR4.2-2: 10 Percent Recycled Content, "High Cost" Courthouse Scenario

Total Construction Cost \$ 46,399,975 For Case 6A (Gold), worst case scenario
Total Materials Cost \$ 17,998,582 Calculated Materials Cost for Case 6A (excludes all MEP, all labor and equipment)

Product	Installed Cost	Product Cost %	Product Cost	Recycled Content		Weighted \$ Value	Weighted \$ Value as % of Total Cost
				% Post Consumer	% Post Industrial		
CONCRETE							
Concrete fill, 14" dia pipe pile foundations	\$ 597,163	33%	\$ 197,064	0.0%	2.5%	\$ 2,463	0.01%
CIP concrete reinforced basement wall, elevator pit, escalator pit	\$ 469,433	20%	\$ 93,887	0.0%	2.5%	\$ 1,174	0.01%
CIP concrete foundation grade beams at pile foundations	\$ 234,865	13%	\$ 30,532	0.0%	2.5%	\$ 382	0.00%
CIP concrete slab on grade 4"/3000 psi and 6"/4000 psi	\$ 245,823	30%	\$ 73,747	0.0%	2.5%	\$ 922	0.01%
CIP structural slab building system, complete with columns, beams, etc.	\$ 475,351	10%	\$ 47,535	0.0%	2.5%	\$ 594	0.00%
Concrete fill, steel roof/floor deck	\$ 1,265,868	21%	\$ 265,832	0.0%	2.5%	\$ 3,323	0.02%
STEEL							
Resteel @ foundation grade beams	\$ 234,865	21%	\$ 49,322	20.0%	10.0%	\$ 12,330	0.07%
14" dia pipe pile foundations	\$ 597,163	22%	\$ 131,376	20.0%	10.0%	\$ 32,844	0.18%
Resteel @ reinforced concrete basement wall (main bldg and parking)	\$ 469,433	2%	\$ 9,389	20.0%	10.0%	\$ 2,347	0.01%
Resteel @ 4"/3000 psi and 6"/4000 psi reinforced concrete slab on grade	\$ 245,823	3%	\$ 6,146	20.0%	10.0%	\$ 1,536	0.01%
Resteel @ CIP structural slab building system, complete with cols, bms, etc.	\$ 475,351	5%	\$ 23,292	20.0%	10.0%	\$ 5,823	0.03%
Structural steel floor and roof framing, incl cols	\$ 3,033,774	55%	\$ 1,668,576	20.0%	10.0%	\$ 417,144	2.32%
20Ga steel roof/floor deck (includes ltwt conc fill)	\$ 1,265,868	25%	\$ 316,467	20.0%	10.0%	\$ 79,117	0.44%
18 gauge steel canopy and cable	\$ 52,250	65%	\$ 33,963	20.0%	10.0%	\$ 8,491	0.05%
Staircase, metal pan filled w/ conc	\$ 98,524	45%	\$ 44,336	20.0%	10.0%	\$ 11,084	0.06%
Resteel @ Precast systm w/ drywall, insul etc.	\$ 1,526,940	8%	\$ 122,155	20.0%	10.0%	\$ 30,539	0.17%
Steel studs @ Precast systm w/ drywall, insul etc.	\$ 1,526,940	3%	\$ 45,808	20.0%	10.0%	\$ 11,452	0.06%
18" raised floor of 1.5" conc in metal pans on pedestal system	\$ 1,602,763	54%	\$ 865,492	20.0%	10.0%	\$ 216,373	1.20%
18" raised floor of 4" cmu at 2' oc w/ polystyrene infill, 20Ga metal deck, conc fill	\$ 413,527	15%	\$ 62,029	20.0%	10.0%	\$ 15,507	0.09%
ACT Steel Suspension Grid	\$ 611,043	15%	\$ 91,656	20.0%	10.0%	\$ 22,914	0.13%
Steel furring @ suspended GWB ceilings	\$ 233,888	15%	\$ 35,083	20.0%	10.0%	\$ 8,771	0.05%
Misc. Stainless steel ceilings, doors, benches, cell grilles	\$ 249,142	80%	\$ 199,314	20.0%	10.0%	\$ 49,828	0.28%
Steel studs @ interior partitions, two sides, FR and non-FR, uninsulated	\$ 981,551	11%	\$ 107,971	20.0%	10.0%	\$ 26,993	0.15%
Steel studs @ double layer GWB staggered stud partitions	\$ 826,328	12%	\$ 99,159	20.0%	10.0%	\$ 24,790	0.14%
Steel studs @ interior partitions, FR and non FR	\$ 458,511	10%	\$ 45,851	20.0%	10.0%	\$ 11,463	0.06%
Steel studs @ Shaftwalls and chases	\$ 146,427	9%	\$ 13,178	20.0%	10.0%	\$ 3,295	0.02%
Steel studs @ interior partition, GWB one side	\$ 111,506	15%	\$ 16,726	20.0%	10.0%	\$ 4,181	0.02%

Table continues on next page

Section 2: Individual LEED Credit Reviews

Product	Installed Cost	Product Cost %	Product Cost	Recycled Content		Weighted \$ Value	Weighted \$ Value as % of Total Cost
				% Post Consumer	% Post Industrial		
STEEL (continued)							
Steel studs @ Misc. GWB assemblies	\$ 111,468	10%	\$ 11,147	20.0%	10.0%	\$ 2,787	0.02%
Steel studs @ furred out partitions	\$ 68,153	20%	\$ 13,631	20.0%	10.0%	\$ 3,408	0.02%
Steel Toilet/Urinal Partitions	\$ 214,303	85%	\$ 182,158	20.0%	10.0%	\$ 45,539	0.25%
INSULATION & FIREPROOFING							
Batt insulation at precast wall system	\$ 1,526,940	2%	\$ 30,539	18.0%	7.0%	\$ 6,566	0.04%
Fiberglass sound batts at double layer GWB partitions, staggered studs	\$ 826,328	7%	\$ 57,843	18.0%	7.0%	\$ 12,436	0.07%
Fiberglass sound batts at GWB partitions, rated and unrated	\$ 458,511	5%	\$ 22,926	18.0%	7.0%	\$ 4,929	0.03%
Batt insulation @ Shaftwalls and chases	\$ 146,427	6%	\$ 8,786	18.0%	7.0%	\$ 1,889	0.01%
Fiberglass sound batts at interior partitions, GWB one side	\$ 111,506	8%	\$ 8,920	18.0%	7.0%	\$ 1,918	0.01%
Batt insulation @ Misc. GWB assemblies	\$ 111,468	4%	\$ 4,459	18.0%	7.0%	\$ 959	0.01%
Sprayed-on fireproofing	\$ 199,124	40%	\$ 79,650	0.0%	75.0%	\$ 29,869	0.17%
STEEL DOORS AND FRAMES							
Hollow metal frames at solid core wood doors	\$ 871,756	13%	\$ 113,328	20.0%	10.0%	\$ 28,332	0.16%
2" thick swinging detention doors w/14GA HM frame	\$ 72,772	40%	\$ 29,109	20.0%	10.0%	\$ 7,277	0.04%
Solid slat auto overhead insulated coiling sally-port door, detention type, blast-crash resist	\$ 10,727	70%	\$ 7,509	20.0%	10.0%	\$ 1,877	0.01%
HM double doors and frames	\$ 11,250	40%	\$ 4,500	20.0%	10.0%	\$ 1,125	0.01%
Overhead coiling loading dock door: Metal	\$ 16,300	65%	\$ 10,595	20.0%	10.0%	\$ 2,649	0.01%
GYPSUM WALLBOARD							
GWB @ precast concrete wall system	\$ 1,526,940	1%	\$ 15,269	0.0%	95.0%	\$ 7,253	0.04%
GWB @ interior partitions, two sides, FR and non-FR, uninsulated	\$ 981,551	24%	\$ 235,572	0.0%	95.0%	\$ 111,897	0.62%
Double layer GWB, staggered studs, sound insulation	\$ 826,328	26%	\$ 214,845	0.0%	95.0%	\$ 102,052	0.57%
Suspended GWB	\$ 233,888	45%	\$ 105,250	0.0%	95.0%	\$ 49,994	0.28%
GWB @ interior partitions, two sides, FR and non FR, sound insulation	\$ 458,511	23%	\$ 105,458	0.0%	95.0%	\$ 50,092	0.28%
GWB @ Shaftwalls and chases	\$ 146,427	29%	\$ 42,464	0.0%	95.0%	\$ 20,170	0.11%
GWB @ interior partition, one side, sound insulation	\$ 111,506	17%	\$ 18,956	0.0%	95.0%	\$ 9,004	0.05%
Misc. GWB assemblies	\$ 111,468	15%	\$ 16,720	0.0%	95.0%	\$ 7,942	0.04%
GWB taped and finished one side on furring studs	\$ 68,153	18%	\$ 12,268	0.0%	95.0%	\$ 5,827	0.03%
ACOUSTICAL CEILING PANELS							
ACT panels	\$ 611,043	35%	\$ 213,865	0.0%	75.0%	\$ 80,199	0.45%
FLOORING							
Carpet tile with cushioned back	\$ 752,228	88%	\$ 661,961	22.0%	32.0%	\$ 251,545	1.40%
CASEWORK							
MDF Substrate for fixed furniture and casework (wood veneer and PLAM finishes)	\$ 1,231,581	22%	\$ 270,948	0.0%	75.0%	\$ 101,605	0.56%

Project Totals: \$ 1,954,819 10.86%

2 Points Earned

Table MR4.2-3: 10 Percent Recycled Content, "Minimal Façade Renovation" Office Building Scenario

Total Construction Cost \$ 29,746,173 For Case 5B (Gold), worst case scenario
Total Materials Cost \$ 5,383,574 Calculated Materials Cost for Case 5B (excludes all MEP, all labor and equipment)

Product	Installed Cost	Product Cost %	Product Cost	Recycled Content		Weighted \$ Value	Weighted \$ Value as % of Total Cost
				% Post Consumer	% Post Industrial		
STEEL							
ACT Steel Suspension Grid	\$ 716,896	15%	\$ 107,534	20.0%	10.0%	\$ 26,884	0.50%
Steel studs @ interior partitions, FR and non FR	\$ 688,099	12%	\$ 82,572	20.0%	10.0%	\$ 20,643	0.38%
Architectural Metals at exterior	\$ 148,539	55%	\$ 81,696	20.0%	10.0%	\$ 20,424	0.38%
Steel panel sheets and framing @ penthouse enclosure	\$ 93,365	42%	\$ 39,213	20.0%	10.0%	\$ 9,803	0.18%
Steel studs @ furred out partitions	\$ 261,660	33%	\$ 86,348	20.0%	10.0%	\$ 21,587	0.40%
Steel pipe handrails	\$ 20,353	66%	\$ 13,450	20.0%	10.0%	\$ 3,362	0.06%
Stainless steel 18 gauge steel canopy and cable	\$ 17,250	65%	\$ 11,213	20.0%	10.0%	\$ 2,803	0.05%
Steel Toilet/Urinal Partitions and Telephone Dividers	\$ 106,010	85%	\$ 90,109	20.0%	10.0%	\$ 22,527	0.42%
INSULATION & FIREPROOFING							
Batt insulation @ interior partitions	\$ 688,099	10%	\$ 68,810	18.0%	7.0%	\$ 14,794	0.27%
Batt insulation @ furred out partitions	\$ 261,660	23%	\$ 60,182	18.0%	7.0%	\$ 12,939	0.24%
Sprayed-on fireproofing (patch/repair)	\$ 214,812	30%	\$ 64,444	0.0%	75.0%	\$ 24,166	0.45%
STEEL DOORS AND FRAMES							
Hollow metal frames at solid core wood doors	\$ 782,967	13%	\$ 101,786	20.0%	10.0%	\$ 25,446	0.47%
HM double doors and frames	\$ 16,172	40%	\$ 6,469	20.0%	10.0%	\$ 1,617	0.03%
Overhead coiling loading dock door	\$ 12,937	65%	\$ 8,409	20.0%	10.0%	\$ 2,102	0.04%
GYPSUM WALLBOARD							
GWB @ interior partitions, FR and non FR	\$ 688,099	19%	\$ 130,739	0.0%	95.0%	\$ 62,101	1.15%
Patch and repair existing GWB	\$ 361,060	10%	\$ 36,106	0.0%	95.0%	\$ 17,150	0.32%
GWB over existing partitions	\$ 36,092	40%	\$ 14,437	0.0%	95.0%	\$ 6,857	0.13%
GWB @ furred out partitions	\$ 261,660	13%	\$ 34,016	0.0%	95.0%	\$ 16,158	0.30%
ACOUSTICAL CEILING PANELS							
ACT panels	\$ 716,896	35%	\$ 250,914	0.0%	75.0%	\$ 94,093	1.75%
FLOORING							
Carpet tile with cushioned back	\$ 506,220	88%	\$ 445,474	22.0%	32.0%	\$ 169,280	3.14%
CASEWORK							
MDF Substrate for casework (wood veneer and PLAM finishes)	\$ 46,499	22%	\$ 10,230	0.0%	75.0%	\$ 3,836	0.07%

Project Totals: **\$ 578,574** **10.75%**

2 Points Earned

Table MR4.2-4: 10 Percent Recycled Content, "Full Façade Renovation" Office Building Scenario

Total Construction Cost \$ 30,423,255 For Case 6B (Gold), worst case scenario
Total Materials Cost \$ 5,695,150 Calculated Materials Cost for Case 6B (excludes all MEP, all labor and equipment)

Product	Installed Cost	Product Cost %	Product Cost	Recycled Content		Weighted \$ Value	Weighted \$ Value as % of Total Cost
				% Post Consumer	% Post Industrial		
STEEL							
ACT Steel Suspension Grid	\$ 716,896	15%	\$ 107,534	20.0%	10.0%	\$ 26,884	0.47%
Steel studs @ interior partitions, FR and non FR	\$ 688,099	12%	\$ 82,572	20.0%	10.0%	\$ 20,643	0.36%
Steel Studs @ precast concrete wall system	\$ 2,034,630	3%	\$ 61,039	20.0%	10.0%	\$ 15,260	0.27%
Architectural Metals at exterior	\$ 148,539	55%	\$ 81,696	20.0%	10.0%	\$ 20,424	0.36%
Resteel @ precast concrete wall system	\$ 2,034,630	2%	\$ 40,693	60.0%	30.0%	\$ 30,519	0.54%
Steel panel sheets and framing @ penthouse enclosure	\$ 93,365	42%	\$ 39,213	20.0%	10.0%	\$ 9,803	0.17%
Steel studs @ furred out partitions	\$ 45,354	33%	\$ 14,967	20.0%	10.0%	\$ 3,742	0.07%
Steel pipe handrails	\$ 20,353	66%	\$ 13,450	20.0%	10.0%	\$ 3,362	0.06%
Stainless steel 18 gauge steel canopy and cable	\$ 17,250	65%	\$ 11,213	20.0%	10.0%	\$ 2,803	0.05%
Steel Toilet/Urinal Partitions and Telephone Dividers	\$ 106,010	85%	\$ 90,109	20.0%	10.0%	\$ 22,527	0.40%
INSULATION & FIREPROOFING							
Batt insulation @ interior partitions	\$ 688,099	10%	\$ 68,810	18.0%	7.0%	\$ 14,794	0.26%
Batt insulation @ precast concrete wall system	\$ 2,034,630	3%	\$ 50,866	18.0%	7.0%	\$ 10,936	0.19%
Batt insulation @ furred out partitions	\$ 45,354	23%	\$ 10,431	18.0%	7.0%	\$ 2,243	0.04%
Sprayed-on fireproofing (patch/repair)	\$ 214,812	30%	\$ 64,444	0.0%	75.0%	\$ 24,166	0.42%
STEEL DOORS AND FRAMES							
Hollow metal frames at solid core wood doors	\$ 782,967	13%	\$ 101,786	20.0%	10.0%	\$ 25,446	0.45%
HM double doors and frames	\$ 16,172	40%	\$ 6,469	20.0%	10.0%	\$ 1,617	0.03%
Overhead coiling loading dock door	\$ 12,937	65%	\$ 8,409	20.0%	10.0%	\$ 2,102	0.04%
GYPSUM WALLBOARD							
GWB @ precast concrete wall system	\$ 2,034,630	1%	\$ 20,346	0.0%	95.0%	\$ 9,664	0.17%
GWB @ interior partitions, FR and non FR	\$ 688,099	19%	\$ 130,739	0.0%	95.0%	\$ 62,101	1.09%
Patch and repair existing GWB	\$ 361,060	10%	\$ 36,106	0.0%	95.0%	\$ 17,150	0.30%
GWB over existing partitions	\$ 36,092	40%	\$ 14,437	0.0%	95.0%	\$ 6,857	0.12%
GWB @ furred out partitions	\$ 45,354	13%	\$ 5,896	0.0%	95.0%	\$ 2,801	0.05%
ACOUSTICAL CEILING PANELS							
ACT panels	\$ 716,896	35%	\$ 250,914	0.0%	75.0%	\$ 94,093	1.65%
FLOORING							
Carpet tile with cushioned back	\$ 506,220	88%	\$ 445,474	22.0%	32.0%	\$ 169,280	2.97%
CASEWORK							
MDF Substrate for casework (wood veneer and PLAM finishes)	\$ 49,754	22%	\$ 10,946	0.0%	75.0%	\$ 4,105	0.07%

Project Totals: \$ 603,324 10.59%

2 Points Earned

LEED® Credit MR-5.1: Regional Materials: 20% Manufactured Regionally

Intent

Increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the regional economy and reducing the environmental impacts resulting from transportation.

Requirement

Use a minimum of 20% of building materials and products that are manufactured* regionally within a radius of 500 miles.

* Manufacturing refers to the final assembly of components into the building product that is furnished and installed by the tradesmen. For example, if the hardware comes from Dallas, Texas, the lumber from Vancouver, British Columbia, and the joist is assembled in Kent, Washington; then the location of the final assembly is Kent, Washington.

(1 point)

Cost Impact = 2 or 4

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

The focus of this credit will typically be the manufacturing locations for a limited group of “big ticket” construction materials. These typically include:

- Concrete masonry units
- Windows, storefront, and curtain wall systems
- Steel studs
- Gypsum wallboard
- Carpet
- Resilient flooring
- Acoustical ceiling tiles
- Doors and frames
- Millwork and casework items

Of the above materials, items such as cast-in-place concrete, concrete masonry units, and gypsum wallboard tend to be manufactured within 500 miles of most project sites. With many of the other materials, the proximity of manufacturers will vary considerably depending on the part of the country the project is located in.

In many cases, the 20 percent credit threshold can be attained with no cost impact, simply by tracking the materials that are normally produced and supplied within 500 miles of a project site. In some cases, however, reaching the 20 percent threshold may involve targeting certain materials (e.g. specific types of stone or brick) or limiting the number of manufacturers whose products will be considered in the project bids. In these cases, cost premiums may be incurred.

Basis for Cost Assumption

For both the Courthouse and Office Building models, LEED calculations have been developed to demonstrate how the 20 percent regional materials threshold can potentially be achieved (see “Supporting Calculations” below).

Courthouse

In the Courthouse model, different calculations are used for the “low cost” and “high cost” scenarios. In the low-cost cases, it is assumed that the following materials, at a minimum, are typically provided from local manufacturers:

- Cast-in-place concrete
- Concrete masonry units
- Precast concrete panels
- Gypsum wallboard
- Millwork and casework items

There is no cost premium to earn the credit.

In the high-cost Courthouse cases, it is assumed that the gypsum wallboard manufacturing plant is beyond 500 miles from the project site (a possible scenario if synthetic gypsum is targeted for high recycled content). The gypsum wallboard therefore does not qualify for the credit. It is further assumed that a premium is paid to purchase the project's precast concrete wall panels from a manufacturer located within 500 miles. The cost premium is based on the assumption that the local manufacturer is not necessarily the lowest bidder for the project.

Office Building

In the Office Building model, different calculations are used for the “minimal façade renovation” and “full façade renovation” scenarios. In the minimum façade renovation, which is almost exclusively interior construction, only a few of the materials are assumed to come from regional manufacturers: gypsum wallboard, architectural metals, fiberglass batt insulation, casework, and interior float glass. To reach the 20 percent credit threshold, a premium is defined to purchase the following additional materials from regional manufacturers:

- Acoustical ceiling tiles
- Porcelain tile and base
- Steel studs for interior partitions

The cost premiums are based on the assumption that the local manufacturer is not necessarily the lowest bidder for the project.

In the full façade renovation scenarios, a premium is defined to purchase the new exterior precast concrete panels from a regional manufacturer rather than paying a premium for the three material types defined in the minimum façade scenarios. The cost premiums, again, are based on the assumption that the local precast manufacturer is not necessarily the lowest bidder for the project.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

Low Cost

No identified cost premiums.

High Cost

Total Credit Cost.....	\$115,903
Cost Impact (\$/GSF)	\$0.44/GSF
Cost Impact (%)	0.20%

Office Building (Modernization, 306,600 GSF)

Minimal Façade Renovation

Total Credit Cost.....	\$83,277
Cost Impact (\$/GSF)	\$0.27/GSF
Cost Impact (%)	0.21%

Full Façade Renovation

Total Credit Cost.....	\$145,307
Cost Impact (\$/GSF)	\$0.47/GSF
Cost Impact (%)	0.36%

Additional Considerations

For competitive bidding purposes, designers must avoid selecting regional materials that are available from only one manufacturer. The credit scenarios used in the study assume that multiple manufacturers can bid on a job, but that the owner reserves the right to select a local manufacturer if their cost is competitive.

Synergistic Credits

Some materials that are manufactured regionally also obtain their raw materials from the same region, which contributes to Credit MR-5.2 (Regional Materials, 50 percent extracted regionally). For the purposes of the study, it is assumed that the precast concrete panels and acoustical ceiling tiles for which cost premiums are paid (for regional manufacture) also obtain their raw materials within the same region. The cost premiums therefore contribute to 2 LEED credits.

Supporting Calculations

Tables **MR5-1** and **MR5-2** identify the materials used to achieve this credit in the “low cost” and “high cost” Courthouse scenarios, respectively. LEED calculations demonstrate that the 20 percent threshold is attained.

Tables **MR5-3** and **MR5-4** identify the materials used to achieve this credit in the “minimal façade renovation” and “full façade renovation” Office Building scenarios, respectively. LEED calculations demonstrate that the 20 percent threshold is attained.

Table MR5-1: 20 Percent Regional Materials, "Low Cost" Courthouse Scenario

Total Construction Cost \$ 43,542,871 For Case 5A (Gold), worst case scenario
Total Materials Cost \$ 16,795,900 Calculated Materials Cost for Case 5A (excl. MEP, labor & equip.)

Product	Installed Cost	Product Cost %	Product Cost	Regionally-Manufactured Products	Regionally-Extracted Products
CONCRETE					
Concrete fill, 14" dia pipe pile foundations	\$ 597,163	33%	\$ 197,064	\$ 197,064	\$ 197,064
CIP concrete reinforced basement wall, elevator pit, escalator pit	\$ 469,433	20%	\$ 93,887	\$ 93,887	\$ 93,887
CIP concrete foundation grade beams at pile foundations	\$ 234,865	13%	\$ 30,532	\$ 30,532	\$ 30,532
CIP concrete slab on grade 4"/3000 psi and 6"/4000 psi	\$ 245,823	30%	\$ 73,747	\$ 73,747	\$ 73,747
CIP structural slab building system, complete with columns, beams, etc.	\$ 475,351	10%	\$ 47,535	\$ 47,535	\$ 47,535
Concrete fill, steel roof/floor deck	\$ 1,265,868	21%	\$ 265,832	\$ 265,832	\$ 265,832
CONCRETE MASONRY UNITS					
CMU walls, 6" or 8" thick, grouted solid	\$ 513,208	33%	\$ 169,359	\$ 169,359	\$ 169,359
CMU at raised floor	\$ 413,527	20%	\$ 82,705	\$ 82,705	\$ 82,705
CMU backup at limestone panels	\$ 1,490,039	3%	\$ 44,701	\$ 44,701	\$ 44,701
CMU backup for parapet wall, 24" high	\$ 182,634	5%	\$ 9,132	\$ 9,132	\$ 9,132
PRECAST CONCRETE WALL SYSTEM					
Precast Concrete Wall System (concrete and steel reinforcing components)	\$ 1,709,574	43%	\$ 735,117	\$ 735,117	\$ 735,117
GYPSUM WALLBOARD					
GWB @ precast concrete wall system	\$ 1,526,940	1%	\$ 15,269	\$ 15,269	\$ 15,269
GWB @ interior partitions, two sides, FR and non-FR, uninsulated	\$ 981,551	24%	\$ 235,572	\$ 235,572	\$ 235,572
Double layer GWB, staggered studs, sound insulation	\$ 826,328	26%	\$ 214,845	\$ 214,845	\$ 214,845
Suspended GWB	\$ 233,888	45%	\$ 105,250	\$ 105,250	\$ 105,250
GWB @ interior partitions, two sides, FR and non-FR, sound insulation	\$ 458,511	23%	\$ 105,458	\$ 105,458	\$ 105,458
GWB @ Shaftwalls and chases	\$ 146,427	29%	\$ 42,464	\$ 42,464	\$ 42,464
GWB @ interior partition, one side, sound insulation	\$ 111,506	17%	\$ 18,956	\$ 18,956	\$ 18,956
Misc. GWB assemblies	\$ 111,468	15%	\$ 16,720	\$ 16,720	\$ 16,720
GWB taped and finished one side on furring studs	\$ 68,153	18%	\$ 12,268	\$ 12,268	\$ 12,268
CASEWORK					
Fixed furniture, casework and paneling (wood veneer and PLAM finishes)	\$ 3,049,365	67%	\$ 2,043,075	\$ 2,043,075	--

PROJECT TOTALS:

Regionally-Manufactured Products (\$):

\$ 4,559,487

Regionally-Manufactured Products (%):

27.1%

Regionally-Extracted Products (\$):

\$ 2,516,412

Regionally-Extracted Products (% of Total Matls. Cost):

15.0%

Table MR5-2: 20 Percent Regional Materials, "High Cost" Courthouse Scenario

Total Construction Cost **\$ 46,399,975** For Case 6A (Gold), worst case scenario
Total Materials Cost **\$ 17,998,582** Calculated Materials Cost for Case 6A (excl. MEP, labor & equip.)

Product	Installed Cost	Product Cost %	Product Cost	Regionally-Manufactured Products	Regionally-Extracted Products
CONCRETE					
Concrete fill, 14" dia pipe pile foundations	\$ 597,163	33%	\$ 197,064	\$ 197,064	--
CIP concrete reinforced basement wall, elevator pit, escalator pit	\$ 469,433	20%	\$ 93,887	\$ 93,887	--
CIP concrete foundation grade beams at pile foundations	\$ 234,865	13%	\$ 30,532	\$ 30,532	--
CIP concrete slab on grade 4"/3000 psi and 6"/4000 psi	\$ 245,823	30%	\$ 73,747	\$ 73,747	--
CIP structural slab building system, complete with columns, beams, etc.	\$ 475,351	10%	\$ 47,535	\$ 47,535	--
Concrete fill, steel roof/floor deck	\$ 1,265,868	21%	\$ 265,832	\$ 265,832	--
CONCRETE MASONRY UNITS					
CMU walls, 6" or 8" thick, grouted solid	\$ 513,208	33%	\$ 169,359	\$ 169,359	--
CMU at raised floor	\$ 413,527	20%	\$ 82,705	\$ 82,705	--
CMU backup at limestone panels	\$ 1,490,039	3%	\$ 44,701	\$ 44,701	--
CMU backup for parapet wall, 24" high	\$ 182,634	5%	\$ 9,132	\$ 9,132	--
PRECAST CONCRETE WALL SYSTEM					
Precast Concrete Wall System (concrete and steel reinforcing components)	\$ 1,796,400	43%	\$ 772,452	\$ 772,452	--
CASEWORK					
Fixed furniture, casework and paneling (wood veneer and PLAM finishes)	\$ 3,735,153	67%	\$ 2,502,553	\$ 2,502,553	--

PROJECT TOTALS:		Regionally-Manufactured Products (\$):	\$ 4,289,499
		Regionally-Manufactured Products (%):	23.8%
		Regionally-Extracted Products (\$):	\$ -
		Regionally-Extracted Products (% of Total Matrls. Cost):	0.0%

Table MR5-3: 20 Percent Regional Materials, "Minimal Façade Renovation" Office Building Scenario

Total Construction Cost \$ 29,746,173 For Case 5B (Gold), worst case scenario
Total Materials Cost \$ 5,383,574 Calculated Materials Cost for Case 5B (excl. MEP, labor & equip.)

Product	Installed Cost	Product Cost %	Product Cost	Regionally-Manufactured Products	Regionally-Extracted Products
STEEL					
Architectural Metals at exterior	\$ 148,539	55%	\$ 81,696	\$ 81,696	--
Steel studs @ interior partitions, FR and non FR	\$ 722,504	12%	\$ 86,700	\$ 86,700	--
Steel studs @ furred out partitions	\$ 274,743	33%	\$ 90,665	\$ 90,665	--
Stainless steel 18 gauge steel canopy and cable	\$ 17,250	65%	\$ 11,213	\$ 11,213	--
GYPSUM WALLBOARD					
GWB @ interior partitions, FR and non FR	\$ 688,099	19%	\$ 130,739	\$ 130,739	\$ 130,739
Patch and repair existing GWB	\$ 361,060	10%	\$ 36,106	\$ 36,106	\$ 36,106
GWB over existing partitions	\$ 36,092	40%	\$ 14,437	\$ 14,437	\$ 14,437
GWB @ furred out partitions	\$ 261,660	13%	\$ 34,016	\$ 34,016	\$ 34,016
INSULATION & FIREPROOFING					
Batt insulation @ interior partitions	\$ 688,099	10%	\$ 68,810	\$ 68,810	--
Batt insulation @ furred out partitions	\$ 261,660	23%	\$ 60,182	\$ 60,182	--
ACOUSTICAL CEILING PANELS					
ACT panels	\$ 788,586	35%	\$ 276,005	\$ 276,005	\$ 276,005
PORCELAIN TILE					
Porcelain tile @ walls	\$ 78,249	50%	\$ 39,125	\$ 39,125	\$ 39,125
Porcelain tile @ floors	\$ 76,715	50%	\$ 38,358	\$ 38,358	\$ 38,358
Porcelain tile base	\$ 14,484	50%	\$ 7,242	\$ 7,242	\$ 7,242
INTERIOR GLAZING					
1/4" float glass @ fixed transoms (for credit EQ-8.2)	\$ 242,500	35%	\$ 84,875	\$ 84,875	--
CASEWORK					
Casework (wood veneer and PLAM finishes)	\$ 47,764	67%	\$ 32,002	\$ 32,002	--

PROJECT TOTALS:		Regionally-Manufactured Products (\$):	\$ 1,092,169
		Regionally-Manufactured Products (%):	20.3%
Regionally-Extracted Products (\$):			\$ 576,026
Regionally-Extracted Products (% of Total Matls. Cost):			10.7%

Table MR5-4: 20 Percent Regional Materials, "Full Façade Renovation" Office Building Scenario

Total Construction Cost \$ 30,423,255 For Case 6B (Gold), worst case scenario
Total Materials Cost \$ 5,695,150 Calculated Materials Cost for Case 6B (excl. MEP, labor & equip.)

Product	Installed Cost	Product Cost %	Product Cost	Regionally-Manufactured Products	Regionally-Extracted Products
STEEL					
Architectural Metals at exterior	\$ 148,539	55%	\$ 81,696	\$ 81,696	--
Stainless steel 18 gauge steel canopy and cable	\$ 17,250	65%	\$ 11,213	\$ 11,213	--
PRECAST CONCRETE WALL SYSTEM					
Precast Concrete Wall System (concrete and steel reinforcing components)	\$ 2,034,630	43%	\$ 874,891	\$ 874,891	\$ 834,198
GYPSUM WALLBOARD					
GWB @ precast concrete wall system	\$ 2,034,630	1%	\$ 20,346	\$ 20,346	\$ 20,346
GWB @ interior partitions, FR and non FR	\$ 688,099	19%	\$ 130,739	\$ 130,739	\$ 130,739
Patch and repair existing GWB	\$ 361,060	10%	\$ 36,106	\$ 36,106	\$ 36,106
GWB over existing partitions	\$ 36,092	40%	\$ 14,437	\$ 14,437	\$ 14,437
GWB @ furred out partitions	\$ 45,354	13%	\$ 5,896	\$ 5,896	\$ 5,896
INSULATION & FIREPROOFING					
Batt insulation @ interior partitions	\$ 688,099	10%	\$ 68,810	\$ 68,810	--
Batt insulation @ furred out partitions	\$ 261,660	23%	\$ 60,182	\$ 60,182	--
CASEWORK					
Casework (wood veneer and PLAM finishes)	\$ 47,764	67%	\$ 32,002	\$ 32,002	--

PROJECT TOTALS:

Regionally-Manufactured Products (\$):	\$ 1,336,317
Regionally-Manufactured Products (%):	23.5%
Regionally-Extracted Products (\$):	\$ 1,041,722
Regionally-Extracted Products (% of Total Matls. Cost):	18.3%

LEED® Credit MR-5.2: Regional Materials: 50% Extracted Regionally

Intent

Increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the regional economy and reducing the environmental impacts resulting from transportation.

Requirement

Of the regionally manufactured materials documented for MR Credit 5.1, use a minimum of 50% of building materials and products that are extracted, harvested or recovered (as well as manufactured) within 500 miles of the project site.

(1 point)

Cost Impact = 2

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

As with Credit MR 5.1 (Regional Materials, 20 percent manufactured regionally), the focus of this credit will typically be a limited group of “big ticket” construction materials. The most likely candidates include:

- Cast-in-place concrete
- Structural steel
- Stone
- Brick
- Precast concrete panels
- Concrete masonry units
- Gypsum wallboard
- Acoustical ceiling tiles

Because this credit tracks the raw materials used in construction products, it is generally more viable to target products with relatively few material constituents (e.g., concrete, brick) than more complex products such as glazings, carpets, or finished casework. Products that incorporate high amounts of recycled content, such as steel, may also be difficult to track from a raw materials standpoint.

Basis for Cost Assumption

For both the Courthouse and Office Building models, LEED calculations have been developed to demonstrate how the 50 percent extracted materials threshold can potentially be achieved (see “Supporting Calculations” below).

Courthouse

In the Courthouse model, different assumptions are used for the “low cost” and “high cost” scenarios. In the low-cost cases, it is assumed that the cast-in-place concrete, precast concrete, and concrete masonry are all produced from regionally extracted materials and that no cost premium applies.

In the high-cost scenarios, the credit is purposely considered unattainable. This reflects situations where materials such as Portland cement are not regionally extracted, thereby preventing concrete and concrete masonry from being used to achieve the credit.

Office Building

In the Office Building model, different calculations are used for the “minimal façade renovation” and “full façade renovation” scenarios. In the minimum façade renovation, which is almost exclusively interior construction, it is assumed that the gypsum wallboard, acoustical ceiling tiles, and porcelain tiles are produced from regionally extracted materials. No cost premium applies in this scenario.¹

In the full façade renovation scenarios, the raw materials for the concrete in the new exterior precast concrete panels are assumed to be

¹ Premiums have already been accounted for in Credit MR-5.1 to obtain acoustical ceiling tiles and porcelain tiles from regional manufacturers.

regionally extracted. No cost premium applies in this scenario.¹

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

Low Cost

No identified cost premiums.

High Cost

The credit is not attainable.

Office Building (Modernization, 306,600 GSF)

Minimal Façade Renovation

No identified cost premiums.

Full Façade Renovation

No identified cost premiums.

Supporting Calculations

Table MR5-1 (see Credit MR-5.1) identifies the materials used to achieve this credit in the “low cost” Courthouse scenarios. LEED calculations demonstrate that the credit threshold is attained. *(Note: the Table confirms that at least 10% of the total project material costs are from regionally-extracted products. This is equivalent to the “50% of 20%” credit requirement.)*

Tables MR5-3 and MR5-4 (see Credit MR-5.1) identify the materials used to achieve this credit in the “minimal façade renovation” and “full façade renovation” Office Building scenarios, respectively. LEED calculations demonstrate that the credit threshold is attained. *(Note: the Tables confirm that at least 10% of the total project material costs are from regionally-extracted products. This is equivalent to the “50% of 20%” credit requirement.)*

Additional Considerations

For competitive bidding purposes, designers must avoid selecting regional materials that are available from only one manufacturer. The credit scenarios used in the study assume that multiple manufacturers can bid on a job, but that the owner reserves the right to select a local manufacturer if their cost is competitive.

Synergistic Credits

Item SN-2 (Office Building) reviews the cost implications of earning Credit MR-5.2 in conjunction with Credit MR-4.2 (Recycled Content, 10 percent). The synergistic case applies only in the full façade renovation scenarios.

¹ A premium is already accounted for in Credit MR-5.1 to obtain precast concrete panels from a regional manufacturer.

LEED® Credit MR-6: Rapidly Renewable Materials

Intent

Reduce the use and depletion of finite raw materials and long-cycle renewable materials by replacing them with rapidly renewable materials.

Requirement

Use rapidly renewable building materials and product (made from plants that are typically harvested within a ten-year cycle or shorter) for 5% of the total value of the all building materials and products used in the project.

(1 point)

Cost Impact: Not Pursued

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

While a number of rapidly renewable building products are available, it is very difficult for mid- and large-scale commercial or institutional projects to meet the 5 percent threshold of this credit. GSA courthouses, for instance, would likely need to incorporate the following rapidly renewable materials to even approach the 5 percent criteria:

- Linoleum flooring (typically an alternative to vinyl flooring)
- Agrifiber (straw-based) substrates for casework (typically an alternative to plywood, particleboard, or medium-density fiberboards)
- Cork flooring (typically an alternative to wood, resilient flooring, or carpeting)
- Bamboo flooring (typically an alternative to wood flooring)

As a number of these products are still relatively new to the construction market, it is currently unlikely that they would all be incorporated into a new Courthouse design, particularly at the levels needed to reach the 5 percent cost threshold.

With office buildings, the opportunities to install rapidly renewable materials are even more limited (they have far less casework or wood flooring than Courthouses), making the likelihood of achieving the 5 percent threshold even more remote.

In most GSA projects, it is therefore unlikely that the LEED credit will be earned, although the use of some rapidly renewable materials may be desirable for aesthetic, economic, or environmental reasons. In addition, some types of rapidly renewable materials (e.g., strawboard, cork flooring) may also contain recycled content and therefore contribute to LEED Credits MR-4.1 and 4.2. The strawboard substrates are also manufactured without urea-formaldehyde binders, which allow them to contribute to Credit EQ-4.4, Low-Emitting Materials, Composite Wood.

Basis for Cost Assumption

The credit is not pursued in any of the Courthouse or Office Building scenarios.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

The credit is not pursued.

Office Building (Modernization, 306,600 GSF)

The credit is not pursued.

Additional Considerations

None identified.

Synergistic Credits

As noted above, some products that qualify as rapidly renewable materials may also contribute to Credit MR-4 (Recycled Content) or Credit EQ-4.4 (Low-Emitting Materials, Composite Wood).

LEED® Credit MR-7: Certified Wood

Intent

Encourage environmentally responsible forest management.

Requirement

Use a minimum of 50% of wood based materials and products, certified in accordance with the Forest Stewardship Council's Principles and Criteria, for wood building components including but not limited to, structural framing and general dimensional framing, flooring, finishes, furnishings, and non-rented temporary construction applications such as bracing, concrete formwork and pedestrian barriers.

(1 point)

Cost Impact = 4 or 5

1	2	3	4	5
GSA Standard (no cost)	No premium, possible savings	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

This credit requires that at least 50 percent of a project's wood come from FSC-certified sources. Certified wood products that are most widely available include:

- Hardwoods and veneers for trim, paneling, millwork, and casework
- Hardwood flooring
- Solid core wood doors

Certified wood products that are available but more limited include:

- Plywood or particleboard
- Construction grade lumber
- Pre-fabricated cabinetry

Because FSC-certified products currently represent only a small share of all wood products available, it is important for project teams to investigate the availability and lead times associated with certain wood species, grades, and products, particularly for large orders.

Basis for Cost Assumption

For both the Courthouse and Office Building models, LEED calculations have been developed to demonstrate how the 50 percent certified wood threshold can potentially be achieved (see "Supporting Calculations" below).

Courthouse

In the Courthouse model, all the fixed furnishings in the Courtrooms and Judges' Chambers are fabricated from certified woods. Cost premiums are defined for FSC-certified hardwoods, veneers, and plywood.

Office Building

In the Office Building model, all the unrated solid core wood doors in the Closed Office areas are FSC-certified. Cost premiums are defined for the certified doors, which are assumed to have solid stave cores to achieve the FSC certification.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

Total Credit Cost..... \$596,597
 Cost Impact (\$/GSF) \$2.28/GSF
 Cost Impact (%) 1.04%

Office Building (Modernization, 306,600 GSF)

Total Credit Cost..... \$77,332
 Cost Impact (\$/GSF) \$0.25/GSF
 Cost Impact (%), Min. Facade 0.20%
 Cost Impact (%), Full Facade..... 0.19%

Additional Considerations

For LEED calculation purposes, post-consumer recycled-content wood material, as found in some composite wood products, can be deducted from the total wood calculation for the building.

The certified wood credit becomes more complicated when it is pursued in conjunction with Credit EQ 4.4 (Low Emitting Materials, Composite Wood). The issues are reviewed in more detail as part of the “synergistic credit” write-ups of Section 3.

Synergistic Credits

Item SN-4 (Courthouse) reviews the cost implications of earning Credit MR-7 in conjunction with Credit EQ-4.4 (Low-Emitting Materials, Composite Wood). Item SN-5 (Courthouse) reviews the cost implications of earning Credit MR-7 in conjunction with Credit EQ-4.4 (Low-Emitting Materials, Composite Wood) and Credit ID-1.4B (Exceed Certified Wood Criteria, 75 percent).

Item SN-3 (Office Building) reviews the cost implications of earning Credit MR-7 in conjunction with Credit EQ-4.4 (Low-Emitting Materials, Composite Wood). Item SN-5 (Office Building) reviews the cost implications of earning Credit MR-7 in conjunction with Credit EQ-4.4 (Low-Emitting Materials, Composite Wood) and Credit ID-1.4B (Exceed Certified Wood Criteria, 75 percent).

Supporting Calculations

Table **MR7-1** identifies the wood products used to achieve this credit in the Courthouse scenarios. LEED calculations demonstrate that the 50 percent threshold is attained.

Table **MR7-2** identifies the wood products used to achieve this credit in the Office Building scenarios. LEED calculations demonstrate that the 50 percent threshold is attained.

Table MR7-1: Targeted Wood Products to Earn Credit MR-7 (Courthouse Model)

#	ITEM	Installed Costs from Reference Estimate (Appendix K)	Base Wood Material Costs	Targeted Wood Products (w/cost premiums) to earn Credit MR-7
1	Coiling overhead wood door (S&C)	\$1,250	\$400	\$400
2	Sld core hardwd veneer single door w/ metal door frame (S&C)	\$19,000	\$6,080	\$6,080
3	Sld core hardwd veneer single door w/ metal door frame (S&C)	\$31,050	\$9,936	\$9,936
4	ABS Plastic clad door (S&C)	\$4,200	\$1,344	\$1,344
5	Sld core hardwd veneer single door w/ metal door frame (S&C)	\$1,900	\$608	\$608
6	Sld core hardwd veneer single door w/ metal door frame (S&C)	\$3,450	\$1,104	\$1,104
7	Hardwood base (S&C)	\$40,111	\$26,874	\$26,874
8	Plastic Laminate Counter (S&C)	\$23,424	\$7,027	\$7,027
9	Hd wood and veneer cabinets (S&C)	\$128,100	\$61,488	\$61,488
10	Sld core hardwd veneer single door w/ metal door frame, rated (EO)	\$34,930	\$11,178	\$11,178
11	Sld core hardwd veneer single door w/ metal door frame (EO)	\$94,334	\$30,187	\$30,187
12	Sld core hardwd veneer single door w/ metal door frame (EO)	\$687,092	\$219,869	\$219,869
13	Hardwood base (EO)	\$407,169	\$272,803	\$272,803
14	Fixed Furnishings and Casework (EO)	\$124,416	\$59,720	\$59,720
15	Sld core hardwd veneer door w/ glass panel and frame (DT)	\$14,824	\$4,744	\$4,744
16	Base cabinet, PLAM (DT)	\$2,254	\$676	\$676
17	Solid core hardwood veneer double door and wd frame (CR)	\$101,880	\$52,978	\$52,978
18	Solid core hardwood veneer single door and wd frame (CR)	\$88,943	\$46,250	\$46,250
19	Hardwood veneer paneling wainscott (CR)	\$269,234	\$129,232	\$129,232
20	Fixed furnishings (combined - Courtrooms)	\$2,045,541	\$981,860	\$1,187,437
				\$102,277
21	Sld core hardwd veneer door (Chambers)	\$474,364	\$246,669	\$246,669
22	Bi-folding double door w/wd frame (Chambers)	\$6,587	\$2,108	\$2,108
23	Sld core hardwd veneer door w/frame (Chambers)	\$4,959	\$2,579	\$2,579
24	Hardwood base (Chambers)	\$86,940	\$58,250	\$58,250
25	Fixed furnishings (Chambers)	\$583,453	\$280,057	\$338,694
				\$29,173
	Wood Cost Totals	\$5,279,405	\$2,514,021	\$2,909,685

Target \$ Value to achieve 50% Certified Wood: \$1,454,842

Actual \$ Value of Certified Wood Items: \$1,526,131

% FSC Certified Wood: 52.5%

Color Key:


	Targeted FSC Certified Wood Materials, including cost premiums
	Costs for miscellaneous wood blocking and other wood components that are not FSC certified

Table MR7-2: Targeted Wood Products to Earn Credit MR-7 (Office Building Models)

#	ITEM	Installed Costs from Reference Estimate (Appnd. L & M)	Base Wood Material Costs	Targeted Wood Products (w/cost premiums) to earn Credit MR-7
1	Coiling overhead wood slat door (S&C)	\$1,348	\$431	\$431
2	Solid core hardwd veneer single door w/ hm door frame (S&C)	\$18,241	\$5,837	\$5,837
3	Solid core hardwd veneer double door w/ hm door frame (S&C)	\$12,177	\$3,897	\$3,897
4	Solid core hardwd veneer double door w/ hm door frame (S&C)	\$6,760	\$2,163	\$2,163
5	Solid core hardwd veneer single door w/ hm door frame (S&C)	\$80,588	\$25,788	\$25,788
6	Solid core hardwd veneer single door w/ hm door frame (S&C)	\$2,480	\$794	\$794
7	Hardwood trim (S&C)	\$6,501	\$4,356	\$4,356
8	Hardwood base (S&C)	\$28,800	\$19,296	\$19,296
9	Reception counter (S&C)	\$9,018	\$4,329	\$4,329
10	Mail room furnishings (S&C)	\$2,695	\$1,294	\$1,294
11	Solid core hardwd veneer single door w/ hm door frame (Closed Office)	\$483,397	\$154,687	\$208,828
12	Solid core hardwd veneer double door w/ hm door frame (Closed Office)	\$6,765	\$2,165	\$2,165
13	Solid core hardwd veneer single door w/ hm door frame (Closed Office)	\$29,756	\$9,522	\$9,522
14	Solid core hardwd vnr dble door w/ hm door frame, fire rated (Closed Office)	\$9,703	\$3,105	\$3,105
15	Hardwd Base (Closed Office)	\$4,986	\$3,341	\$3,341
16	Casework (Closed Office)	\$10,290	\$4,939	\$4,939
17	Solid core hardwd veneer single door w/ hm door frame (Open Office)	\$67,680	\$35,194	\$35,194
18	Solid core hardwd veneer double door w/ hm door frame (Open Office)	\$13,530	\$7,036	\$7,036
19	Solid core hardwd vnr. single door w/ hm frame, fire rated (Open Office)	\$29,756	\$15,473	\$15,473
20	Solid core hardwd veneer double door w/ hm door frame, fire rated (Open Office)	\$9,703	\$5,046	\$5,046
21	Hardwd Base (Open Office)	\$2,187	\$1,465	\$1,465
22	Casework (Open Office)	\$10,289	\$4,939	\$4,939
Wood Cost Totals		\$846,650	\$315,094	\$369,235

Target \$ Value to achieve 50% Certified Wood: \$184,617

Actual \$ Value of Certified Wood Items: \$208,828

% FSC Certified Wood: **56.6%****Color Key:**
 Targeted FSC Certified Wood Materials, including cost premiums

LEED® EQ Prerequisite 1: Minimum IAQ Performance

Intent

Establish minimum indoor air quality (IAQ) performance to prevent the development of indoor air quality problems in buildings, thus contributing to the comfort and well-being of the occupants

Requirement

Meet the minimum requirements of voluntary consensus standard ASHRAE 62-1999, Ventilation for Acceptable Indoor Air Quality, and approved Addenda (see ASHRAE 62-2001, Appendix H, for a complete compilation of Addenda) using the Ventilation Rate Procedure.

Cost Impact = 1

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

The ASHRAE 62 Ventilation Rate Procedure prescriptively defines the amount of outside air to be supplied for a given occupancy type (e.g., 20 cfm of outside air per person in an office environment). ASHRAE 62 is a common design standard for HVAC engineers, and is also referenced in many building codes.

Basis for Cost Assumption

Compliance with ASHRAE 62 (latest version) is a stated requirement for GSA projects, per P100. There is no cost impact associated with this prerequisite.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

No identified cost premiums.

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

LEED® EQ Prerequisite 2: Environmental Tobacco Smoke

Intent

Prevent exposure of building occupants and systems to Environmental Tobacco Smoke (ETS).

Requirement

Zero exposure of nonsmokers to Environmental Tobacco Smoke (ETS) by EITHER:

- Prohibiting smoking in the building and locating any exterior designated smoking areas away from entries and operable windows;
- OR
- Providing a designated smoking room designed to effectively contain, capture and remove ETS from the building. At a minimum, the smoking room shall be directly exhausted to the outdoors with no re-circulation of ETS-containing air to the non-smoking area of the building, enclosed with impermeable structural deck to deck partitions and operated at a negative pressure compared with the surrounding spaces of at least 7 PA (0.03 inches of water gauge).
 - Performance of smoking rooms shall be verified using tracer gas testing methods as described in the ASHRAE Standard 129-1997. Acceptable exposure in non-smoking areas is defined as less than 1% of the tracer gas concentration in the smoking room detectable in the adjoining non-smoking areas. Smoking room testing as described in the ASHRAE Standard 129-1997 is required in the contract documents and critical smoking facility systems testing results must be included in the building commissioning plan and report or as a separate document.

Cost Impact = 2 or 3

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

Compliance with this credit may be achieved through two means:

- Prohibition of smoking in the building (with no exterior smoking areas allowed at building entries or near operable windows); or
- Creation of designated smoking rooms meeting the LEED construction and ventilation criteria.

Basis for Cost Assumption

While the majority of GSA facilities are smoke-free, GSA standards and Executive Order 13058 do currently allow for smoking rooms in federal facilities. Per P100, smoking rooms in GSA buildings are to be operated under negative pressure and exhausted directly to the outdoors, which is consistent with the LEED requirements. For the purposes of this study, it is also assumed that structural deck-to-deck partitions are installed to meet the P100 criteria.

The P100 standards do not, however, specify a minimum negative pressure that must be maintained, nor require tracer gas testing of the facility prior to occupancy. The cost premium for this prerequisite is therefore based on providing tracer gas testing for each designated smoking room. For the Courthouse model, testing for nine rooms is included, based on the assumption that judges are allowed to smoke in their private chambers (there are nine courtrooms and nine sets of judge's chambers in the building). For the Office Building model, testing for eight rooms is included, based on the assumption that there is one smoking lounge per floor on floors two through nine. The estimates for tracer gas testing include costs for set-up and mobilization, testing of the identified spaces, equipment calibration, and final reporting of results.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

Total Credit Cost\$26,381
Cost Impact (\$/GSF).....\$0.10/GSF
Cost Impact (%)..... 0.05%

Office Building (Modernization, 306,600 GSF)

Total Credit Cost\$21,507
Cost Impact (\$/GSF).....\$0.07/GSF
Cost Impact (%), Min. Facade..... 0.05%
Cost Impact (%), Full Facade 0.05%

Additional Considerations

If a GSA facility is designated as non-smoking, and no exterior smoking areas are allowed at building entries or near operable windows, no cost premiums are associated with this credit.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit EQ-1: Carbon Dioxide Monitoring

Intent

Provide capacity for indoor air quality (IAQ) monitoring to help sustain long term occupant comfort and well-being.

Requirement

Install a permanent carbon dioxide (CO₂) monitoring system that provides feedback on space ventilation performance in a form that affords operational adjustments. Refer to the CO₂ differential for all types of occupancy in accordance with ASHRAE 62-2001, Appendix D.

(1 point)

Cost Impact = 4

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

To achieve this credit, carbon dioxide sensors are installed in selected spaces within a building to monitor the ventilation system performance. High concentrations of CO₂ generally indicate that the amount of outside air delivered to a space is inadequate for the number of occupants (due to improper air balancing, improper setting of the outside air dampers, or other issues). Targeted spaces include those with variable occupancy (e.g., courtrooms, conference rooms, cafeterias), and spaces served by the longest lengths of ductwork. The credit does not require that the CO₂ monitoring system provide automatic outside air damper control (typically through tie-ins with the building management system[BMS]); however, this strategy may be pursued in many projects to provide better ventilation control, and to

potentially provide energy savings (see “Synergistic Credits” below).

Basis for Cost Assumption

For the Courthouse model, a total of forty-five carbon dioxide sensors are installed. Targeted spaces include courtrooms, jury rooms, judge’s chambers, conference rooms, the cafeteria, the Jury Assembly room, and a few additional spaces at the end of duct runs.

For the Office Building model, a total of sixty carbon dioxide sensors are installed. Targeted spaces include conference rooms, open office areas at the end of duct runs, and a few miscellaneous spaces.

For the purposes of the study, the CO₂ sensors are assumed to interface with the BMS only to display sensor readings. The estimates do not assume that the BMS is programmed to provide automatic outside air damper control based on CO₂ sensor input (this level of control is assumed in Credit EA-1 the “Synergistic Credits” identified below).

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

Total Credit Cost..... \$64,876
 Cost Impact (\$/GSF) \$0.25/GSF
 Cost Impact (%) 0.11%

Office Building (Modernization, 306,600 GSF)

Total Credit Cost..... \$92,556
 Cost Impact (\$/GSF) \$0.30/GSF
 Cost Impact (%), Min. Facade 0.24%
 Cost Impact (%), Full Facade..... 0.23%

Additional Considerations

Carbon dioxide sensors require initial and ongoing calibration to perform effectively. For the purposes of the study, a five-year calibration sensor is the assumed standard, in order to minimize maintenance requirements.

Synergistic Credits

Item SN-3 (Courthouse) of Section 3 reviews the cost implications of earning credit EQ-1 in conjunction with credit EA-1 (Optimize Energy Performance). Similarly, Items SN-1A through SN-1D (Office Building) of Section 3 review the cost implications of earning credit EQ-1 in conjunction with credit EA-1 for the Office Building scenarios.

LEED® Credit EQ-2: Increase Ventilation Effectiveness

Intent

Provide for the effective delivery and mixing of fresh air to support the safety, comfort and well-being of building occupants.

Requirement

For mechanically ventilated buildings, design ventilation systems that result in an air change effectiveness (Eac) greater than or equal to 0.9 as determined by ASHRAE 129-1997. For naturally ventilated spaces demonstrate a distribution and laminar flow pattern that involves not less than 90% of the room or zone area in the direction of air flow for at least 95% of hours of occupancy.

(1 point)

Cost Impact = 1 or 2

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

Both overhead and underfloor air distribution systems can meet the performance criteria for this credit. For overhead (ceiling) distribution systems, project engineers must demonstrate that the ventilation designs for all the major space types in a building meet acceptable Air Diffusion Performance Index (ADPI) targets. ADPI selection procedures, which address diffuser types, diffuser spacings, and air velocities, are used as parameters for achieving good comfort and air mixing within a given space. ADPI calculations, which are defined in ASHRAE Fundamentals Chapter 31 (Space Air Diffusion), are often not performed or formally submitted as part of a typical HVAC system design. The ADPI parameters, however, do not typically result in significant changes to HVAC

designs or diffuser layouts. The process can be seen as a means of confirming and refining initial design assumptions.

Buildings with underfloor air delivery systems can demonstrate credit compliance through design narratives and drawings indicating diffuser locations, air velocities, and the predicted air distribution in the upper and lower stratification zones. ADPI-type calculations are not required for underfloor air systems.

For the purposes of this study, it is assumed that natural ventilation strategies meeting the LEED credit criteria are unlikely for most GSA building types.

Basis for Cost Assumption

The Courthouse model includes an underfloor air distribution system as a GSA standard; it is therefore assumed to comply with the credit requirements at no additional cost.

In the Office Building model, the credit is earned with a well-designed overhead air distribution system. There is no construction cost premium to achieve the credit; however, projects may incur additional soft costs for performing and documenting the ADPI calculations (see Section 4 of this study).

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

No identified cost premiums.

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit EQ-3.1: Construction IAQ Management Plan – During Construction

Intent

Prevent indoor air quality problems resulting from the construction/renovation process in order to help sustain the comfort and well-being of construction workers and building occupants.

Requirement

Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the building as follows:

- During construction meet or exceed the recommended Design Approaches of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings under Construction, 1995, Chapter 3.
- Protect stored on-site or installed absorptive materials from moisture damage.
- If air handlers must be used during construction, filtration media with a Minimum Efficiency Reporting Value of 8 must be used at each return air grill, as determined by ASHRAE 52.2-1999.
- Replace all filtration media immediately prior to occupancy. Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 13, as determined by ASHRAE 52.2-1999 for media installed at the end of construction.

(1 point)

Cost Impact = 3

1	2	3	4	5
GSA Mandate (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

This credit requires the general contractor or construction manager to develop and submit a Construction IAQ Management Plan for the project. Upon approval by the client and/or design team, all contractors are responsible for implementing the provisions of the plan throughout the construction process. SMACNA's IAQ Guideline for Occupied Buildings under Construction covers control measures in the following five areas:

- HVAC protection
- Source Control
- Pathway Interruption
- Housekeeping
- Scheduling

Typical measures that would be implemented include:

- Sealing off construction areas from occupied spaces (including HVAC system isolation);
- Covering/sealing of ductwork openings - when stored on-site, and when installed;
- Sequencing ductwork installations to avoid exposure to dust-producing activities;
- Providing local exhaust for any construction activities that generate combustion fumes or high levels of air pollutants;
- Sequencing finish material installations to avoid contamination of absorbent materials by highly-emitting materials; and
- Using low-emitting cleaning products throughout the construction process.

In addition to the SMACNA requirements, the filtration and material storage provisions outlined in the credit must be included in the scope of the IAQ plan.

Basis for Cost Assumption

In the Courthouse model, the cost to develop an IAQ Management Plan and implement the SMACNA requirements is estimated based on two different assumptions. In the "low cost" scenarios, the SMACNA guidelines are already considered part of the construction teams' practices, and no additional labor cost is required. In the "high cost"

scenarios, an additional labor cost is included to manage the Construction IAQ Plan.

It is further assumed that the air handling units (AHUs) in the Courthouse will be operated during the construction process. Per the LEED credit criteria, MERV 8 filters must therefore be used at all return air grilles. Since the majority of the building is expected to use the ceiling plenum for return air (as opposed to return air ducts), it is assumed that openings are made in the mechanical room walls above the ceiling height to allow return air back to the air handlers¹. These openings, estimated to be approximately twenty square feet per mechanical room, would typically be covered with blanket filters during the construction process. The filters would typically be replaced weekly. To meet the LEED requirement, MERV 8 filters are used instead of the blanket filters. Because of their greater effectiveness in trapping particulates, the MERV 8 filters are changed every two weeks.

Since the air handlers are operated during construction, their filters must be replaced immediately prior to occupancy. This is considered standard practice on GSA projects, therefore no cost premium is assumed. AHU filters with MERV 13 ratings or better are also considered standard per GSA's P100, which requires 85 percent spot efficiency removal and filtering down to 3.0 microns. Filter replacements are also assumed for all fan-powered VAV boxes prior to occupancy. This is considered standard GSA practice, with no cost premium.

In the Office Building model, no labor cost premiums are assumed to meet the SMACNA IAQ requirements. GSA typically requires measures of this type for extensive building renovations that involve complex phasing and occupied spaces.

As with the Courthouse, it is assumed that the air handling units in the Office Building will be operated during construction. MERV 8 filters are installed at the mechanical rooms, based on the same assumptions used for the Courthouse.

¹ For spaces that have plenum returns, it is assumed that acoustical ceiling panels and return air registers will not be installed until after significant dust-producing activities have been completed (e.g., drywall work). Filters are therefore not an issue at the registers.

End of construction filter replacements for the air handlers and fan-powered VAV boxes are also assumed for the Office Building. As with the Courthouse, these filter replacements are considered standard GSA practice, and do not add to project costs.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

Low Cost

Total Credit Cost.....	\$8,519
Cost Impact (\$/GSF)	\$0.03/GSF
Cost Impact (%)	0.01%

High Cost

Total Credit Cost.....	\$45,452
Cost Impact (\$/GSF)	\$0.17/GSF
Cost Impact (%)	0.08%

Office Building (Modernization, 306,600 GSF)

Total Credit Cost.....	\$14,212
Cost Impact (\$/GSF)	\$0.05/GSF
Cost Impact (%), Min. Facade	0.04%
Cost Impact (%), Full Facade.....	0.04%

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit EQ-3.2: Construction IAQ Management Plan – Before Occupancy

Intent

Prevent indoor air quality problems resulting from construction/renovation process, in order help sustain the comfort and well-being of construction workers and building occupants.

Requirement

Develop and implement an Indoor Air Quality (IAQ) Management Plan for the pre-occupancy phase as follows:

- After construction ends and prior to occupancy conduct a minimum two-week building flush-out with new Minimum Efficiency Reporting Value (MERV) 13 filtration media at 100% outside air. After the flush-out, replace the filtration media with new MERV 13 filtration media, except the filters solely processing outside air.

OR

- Conduct a baseline indoor air quality testing procedure consistent with the United States Environmental Protection Agency's current *Protocol for Environmental Requirements, Baseline IAQ and Materials, for the Research Triangle Park Campus, Section 01445*.

(1 point)

Cost Impact = 3

1	2	3	4	5
GSA Standard (no cost)	No premium, possible savings	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

For most GSA projects, it is assumed that a two week building flush-out will be the means to achieve this credit. Project teams will need to include the flush-out period as part of the overall construction schedule, and determine what limited commissioning or set-up activities can occur in the building during the two week period. A significant consideration for some projects will be the scheduling of furniture installations (e.g., workstations)—the USGBC has ruled that absorbent furnishings cannot be moved into a building until the flush-out has been completed. Similarly, painting touch-ups and other punch-list items that involve VOC-emitting materials cannot be performed during the flush-out period.

Commissioning activities can occur during the flush-out; however, these would typically be limited by the fact that the HVAC systems are operating in a fixed flush-out mode. Commissioning of lighting systems, the building envelope, or other non-HVAC systems (e.g., elevators, fire safety) is possible.

The referenced EPA Baseline IAQ testing is not assumed to be likely for most GSA projects; costs have not been estimated for this option.

Basis for Cost Assumption

In both the Courthouse and Office Building models, constant volume dedicated ventilation units are provided (per P100 requirements) on each floor, which provide 100 percent outside air. The flush-outs are therefore implemented by running these dedicated ventilation units during the designated two week period. It is also assumed that fan powered VAV boxes at the perimeter zones will operate.

Prior to the flush-out, filter replacements are assumed for all air handlers and for all fan-powered VAV boxes. As noted under credit EQ-3.1 (Construction IAQ Management Plan, During Construction), these filter replacements are considered standard practices in GSA projects. Since the dedicated ventilation units process only outside air, it is not necessary to replace their filters after the flush-out. It is assumed, however, that the filters in the fan-powered VAV boxes will need to be replaced after the flush-out in order to meet the

credit requirements. A cost premium is defined for these filter replacements.

For the purposes of the study, a premium is also defined for the projects' general conditions costs. In both the Courthouse and Office Building cases, it is assumed that a small crew from the General Contracting or Construction Management firm will remain at the site during the two week flush-out period, even though most of the construction team has been demobilized.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

Total Credit Cost	\$21,330
Cost Impact (\$/GSF)	\$0.08/GSF
Cost Impact (%)	0.04%

Office Building (Modernization, 306,600 GSF)

Total Credit Cost	\$22,289
Cost Impact (\$/GSF)	\$0.07/GSF
Cost Impact (%), Min. Facade	0.06%
Cost Impact (%), Full Facade	0.06%

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit EQ-4.1: Low-Emitting Materials – Adhesives and Sealants

Intent

Reduce the quantity of indoor air contaminants that are odorous, potentially irritating and/or harmful to the comfort and well-being of installers and occupants.

Requirement

The VOC content of adhesives and sealants used must be less than the current VOC content limits of South Coast Air Quality Management District (SCAQMD) Rule # 1168, AND all sealants used as fillers must meet or exceed the requirements of the Bay Area Quality Management District Regulation 8, Rule 51.

(1 point)

Cost Impact = 2

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

This credit requires the selection and specification of adhesives and sealants that meet the referenced VOC limits. The requirements apply only to those adhesive and sealant products used in interior applications. These would typically include:

- Flooring adhesives (carpet, resilient flooring, wood, tile, etc.)
- Wall covering adhesives
- Caulks/sealants used at drywall, millwork, and casework joints
- Interior glazing sealants
- Plumbing fixture adhesives and sealants
- Ductwork and other HVAC-related adhesives and sealants

In almost all product categories, adhesives and sealants are readily available that meet the referenced VOC limits. In many cases (e.g., carpet and resilient flooring adhesives), low-VOC formulations have become the manufacturer's standard products.

To ensure that the credit is achieved, project teams will need to include specific VOC limits in the project specifications for the targeted adhesive and sealant products. During construction, the project team will need to review product submittals to confirm VOC content compliance.

Basis for Cost Assumption

As low-VOC adhesives and sealants are widely available, there is no construction cost premium assumed for this credit. The development of additional specification language, and subsequent submittal reviews, is addressed as part of the soft cost analysis in Section 4 of this report.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

No identified cost premiums.

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit EQ-4.2: Low-Emitting Materials – Paints

Intent

Reduce the quantity of indoor air contaminants that are odorous, potentially irritating and/or harmful to the comfort and well-being of installers and occupants.

Requirement

VOC emissions from paints and coatings must not exceed the VOC and chemical component limits of Green Seal's Standard GS-11 requirements.

(1 point)

Cost Impact = 2

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

This credit requires the selection and specification of interior paints that do not exceed the VOC and chemical component limits of the referenced Green Seal standard¹. For typical drywall, plaster and wood applications, most major paint manufacturers offer one or more water-based latex/acrylic paint lines that can meet the Green Seal requirements. Green Seal-compliant paints are also available for other surface types (metals, concrete, masonry); however, design teams will typically need to research the appropriate products offered by different manufacturers. Oil-based (alkyd) paints do not meet the Green Seal VOC criteria.

¹ The VOC limits of the standard are as follows:
Flat Paints: 50 grams/liter
Non-flat Paints: 150 grams/liter

To ensure that the credit is achieved, project teams will need to include specific VOC and chemical component limits in the project's paint specifications (for interior products). During construction, the project team will need to review product submittals to confirm compliance with the VOC and prohibited chemical criteria.

Basis for Cost Assumption

Low VOC paints meeting the Green Seal criteria are available from a number of manufacturers nationwide. Low-VOC paint costs are typically comparable to other quality paint products; as such, no construction cost premium was identified for this credit. The development of additional specification language, and subsequent submittal reviews, is addressed as part of the soft cost analysis in Section 4 of this report.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

No identified cost premiums.

Additional Considerations

In situations where alkyd paints or other non-compliant paint products are required for small areas in a building, it is still possible to earn this credit using a "VOC budget" methodology. Project teams must track the number of gallons of paint used for all interior applications, and demonstrate that the combined VOC content of the paint used is less than or equal to the maximum VOC content allowed in the Green Seal standard. For example, by using a zero-VOC product for large drywall areas, a project could also use an alkyd-based paint for metal handrails at a stairway.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit EQ-4.3: Low-Emitting Materials – Carpet

Intent

Reduce the quantity of indoor air contaminants that are odorous, potentially irritating and/or harmful to the comfort and well-being of installers and occupants.

Requirement

Carpet systems must meet or exceed the requirements of the Carpet and Rug Institute Green Label Indoor Air Quality Test Program.

(1 point)

Cost Impact = 1

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

The Carpet and Rug Institute (CRI) Green Label program was established to test and identify carpets that meet specific emission standards for total volatile organic compounds (TVOCs), 4-PC (4-Phenylcyclohexene), formaldehyde, and styrene. Most commercial and institutional carpets from the major carpet manufacturers in the United States comply with the CRI standard. There is typically no cost premium associated with Green Label rated carpets.

Basis for Cost Assumption

GSA's P100 requires that carpets in GSA projects meet the CRI Green Label emission criteria. There is no cost impact associated with this credit.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

No identified cost premiums.

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit EQ-4.4: Low-Emitting Materials – Composite Wood

Intent

Reduce the quantity of indoor air contaminants that are odorous, potentially irritating and/or harmful to the comfort and well-being of installers and occupants.

Requirement

Composite wood or agrifiber products must contain no added urea-formaldehyde resins.

(1 point)

Cost Impact = 4 or 5

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

Urea formaldehyde is commonly used in composite wood products such as hardwood plywood, particleboard, and medium density fiberboard (mdf). In commercial buildings, these board products are typically used as substrates for cabinetry, paneling and other millwork items, as miscellaneous blocking or mounting panels, and as cores or stabilizing layers in wood doors. Composite wood and agrifiber boards are also used in many furniture items; however, moveable furniture is not included in the scope of this LEED credit. Acceptable binders for composite wood and agrifiber products include phenol-formaldehyde and MDI (methyl diisocyanate), a polyurethane-based binder.

To earn this LEED credit, projects will likely need to implement the following measures:

- Millwork substrate boards must be specified to ensure that urea-formaldehyde binders are excluded. Acceptable options include:
 - Mdf using an MDI binder
 - Plywood using a phenol-formaldehyde binder (typically sanded, exterior grade softwood panels)
 - Particleboard using a phenol-formaldehyde binder
 - Straw-based particleboard/mdf using an MDI binder
 - All solid wood components
- Wood doors must be specified to ensure that any composite wood or agrifiber material included in the door assembly does not contain urea-formaldehyde binders. Acceptable options include:
 - For rails and stiles: Solid wood, or laminated strand lumber (LSL) that uses an MDI binder
 - For solid cores: Solid wood (stave core), particleboard that uses a phenol-formaldehyde binder, mdf that uses an MDI binder, or LSL that uses an MDI binder
 - Cross-banding layers: Hardboard that does not contain urea formaldehyde
- Miscellaneous blocking or mounting panels must be specified to ensure that urea-formaldehyde binders are excluded. Acceptable options include:
 - Plywood using a phenol-formaldehyde binder (typically exterior grade softwood panels)
 - Other options noted under the millwork section above

Basis for Cost Assumption

The study assumes that none of the urea formaldehyde-free composite wood and agrifiber products listed above are typical for GSA projects, with the exception of the softwood plywood panels used for blocking or mounting panels. In all other applications, it is assumed that urea-formaldehyde-free products are substituted for more traditional

materials (i.e. plywood, particleboard, or mdf manufactured with urea formaldehyde).

In both the Courthouse and Office Building models, cost premiums have been defined for all wood casework items and wood doors. For the casework items, standard particleboard, plywood, or mdf substrate boards are replaced with an mdf substrate using an MDI binder. For solid core wood doors, the standard particleboard cores and cross-banding layers are replaced with LSL cores and formaldehyde-free cross-banding.

Item SN-5 (Office Building) reviews the cost implications of earning credit EQ-4.4 in conjunction with credit MR-7 (Certified Wood) and credit ID-1.4B (Exceed Certified Wood Criteria, 75%).

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

Total Credit Cost	\$455,308
Cost Impact (\$/GSF)	\$1.74/GSF
Cost Impact (%)	0.79%

Office Building (Modernization, 306,600 GSF)

Total Credit Cost	\$91,429
Cost Impact (\$/GSF)	\$0.30/GSF
Cost Impact (%), Min. Facade	0.23%
Cost Impact (%), Full Facade	0.23%

Additional Considerations

The composite wood credit becomes more complicated when it is pursued in conjunction with Credit MR-7 (Certified Wood). The issues are reviewed in more detail as part of the “synergistic credit” write-ups of Section 3.

Synergistic Credits

Item SN-4 (Courthouse) reviews the cost implications of earning credit EQ-4.4 in conjunction with credit MR-7 (Certified Wood). Item SN-5 (Courthouse) reviews the cost implications of earning credit EQ-4.4 in conjunction with credit MR-7 (Certified Wood) and credit ID-1.4B (Exceed Certified Wood Criteria, 75%).

Item SN-3 (Office Building) reviews the cost implications of earning credit EQ-4.4 in conjunction with credit MR-7 (Certified Wood).

LEED® Credit EQ-5: Indoor Chemical & Pollutant Source Control

Intent

Avoid exposure of building occupants to potentially hazardous chemicals that adversely impact air quality.

Requirement

Design to minimize pollutant cross-contamination of regularly occupied areas:

- Employ permanent entry way systems (grills, grates, etc.) to capture dirt, particulates, etc. from entering the building at all high volume entryways.
- Where chemical use occurs (including housekeeping areas and copying/printing rooms), provide segregated areas with deck to deck partitions with separate outside exhaust at a rate of at least 0.50 cubic feet per minute per square foot, no air re-circulation and maintaining a negative pressure of at least 7 PA (0.03 inches of water gauge).
- Provide drains plumbed for appropriate disposal of liquid waste in spaces where water and chemical concentrate mixing occurs.

(1 point)

Cost Impact = 2 or 3

1	2	3	4	5
GSA Standard (no cost)	No premium, possible savings	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

A number of the requirements for this credit are consistent with GSA standards. The use of permanent walk-off mats, for instance, is specifically called for in P100. Providing negative

pressure and segregated exhaust for all janitor's closets/housekeeping areas is also a P100 requirement¹. While not specifically included in P100, provisions for sinks in all janitor's closets, and appropriate drainage for concentrated chemicals in other specialized spaces (e.g., in laboratories), are also standard expectations in GSA projects.

Basis for Cost Assumption

For the Courthouse model, the credit provisions are assumed to be GSA standards, requiring no additional costs. In the Office Building model, a cost premium is defined to install a permanent entryway system (grille or grate) into an existing vestibule or lobby space. It is assumed that some of the older GSA buildings do not include these systems. The other credit provisions are assumed to be met as GSA standards for the modernization.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

Total Credit Cost..... \$4,199
 Cost Impact (\$/GSF) \$0.01/GSF
 Cost Impact (%), Min. Facade 0.01%
 Cost Impact (%), Full Facade..... 0.01%

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

¹ Although P100 does not specify a pressure differential for these rooms, the 7 PA threshold defined for the credit is considered readily achievable. Pressure testing for these spaces would typically be performed by the TAB contractor or Commissioning Agent using a manometer.

LEED® Credit EQ-6.1: Controllability of Systems – Perimeter Spaces

Intent

Provide a high level of thermal, ventilation and lighting system control by individual occupants or specific groups in multi-occupants spaces (i.e. classrooms or conference areas) to promote the productivity, comfort and well-being of building occupants.

Requirement

Provide at least an average of one operable window and one lighting control zone per 200 square feet for all regularly occupied areas within 15 feet of the perimeter wall.

(1 point)

Cost Impact = 4 or 5

1	2	3	4	5
GSA Standard (no cost)	No premium, possible savings	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

Achieving this credit will typically involve:

- Operable windows throughout all of the regularly occupied spaces along the building perimeter.
- Individual lighting controls for each occupant with an office, workstation, or desk within 15 feet of the perimeter. Acceptable lighting controls include standard light switches for overhead fixtures (typical for private offices), hard-wired task lighting (for workstations or desks), or remote controlled overhead lighting (controlled via computer terminal or remote control device).
- Multiple lighting controls for multi-occupant spaces (e.g., conference rooms, classrooms) along the perimeter. The number of required

controls is determined based on the size of the space (details are in the LEED 2.1 Reference Guide); however the minimum number is three. The LEED program allows occupancy sensors, daylighting controls, dimming controls, and “manual on/automatic off” switches to be counted as two lighting controls each.

Basis for Cost Assumption

For security reasons, GSA Courthouses do not, as a rule, have operable windows. The credit is therefore not pursued in the Courthouse model.

In the Office Building model, cost premiums are defined to provide operable windows in both the minimal façade renovation and full façade renovation scenarios (the reference cases assume all fixed windows). In the minimal façade renovation, approximately 12 percent of the fenestration area is changed to operable windows. This represents an approach in which operable awning units are integrated into the larger window and curtainwall systems along the façade. In the full façade renovation, which uses a similar approach, approximately 15 percent of the fenestration area is changed to operable windows (the percentage of operable window area is larger because the overall area of fenestration in the full façade scenario is smaller).

The Office Buildings are assumed to have task lighting and/or individual light switches at each workstation or office along the perimeter. Because this is considered a GSA standard, no cost premium is associated with this feature. Similarly conference rooms or other multi-occupant spaces along the perimeter are assumed to have at least two lighting controls, with one being either an occupancy sensor or daylight dimming control (based on the features included for credit EA-1, Optimize Energy Performance).

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

The credit is not pursued.

Office Building (Modernization, 306,600 GSF)

Minimal Façade Renovation

Total Credit Cost	\$151,175
Cost Impact (\$/GSF)	\$0.49/GSF
Cost Impact (%)	0.38%

Full Façade Renovation

Total Credit Cost	\$143,686
Cost Impact (\$/GSF)	\$0.47/GSF
Cost Impact (%)	0.36%

Additional Considerations

When considering operable windows for large scale commercial or institutional buildings, careful consideration must be given to the interaction between the window operation and the building HVAC system operation. To avoid potential problems such as errant energy loss (windows left open under severe heating or cooling conditions), rain intrusion, fluctuating building pressurization, or other issues, building occupants must be educated on the responsibilities associated with operable windows. More sophisticated approaches, such as indicator lights to inform occupants when exterior conditions are best suited for opening windows, are possible but less likely for implementation due to associated costs.

In addition, window locks and other security-related concerns must be addressed as part of an operable window installation.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit EQ-6.2: Controllability of Systems – Non-Perimeter Spaces

Intent

Provide a high level of thermal, ventilation and lighting system control by individual occupants or specific groups in multi-occupants spaces (i.e. classrooms or conference areas) to promote the productivity, comfort and well-being of building occupants.

Requirement

Provide controls for each individual for airflow, temperature and lighting for at least 50% of the occupants in non-perimeter, regularly occupied areas.

(1 point)

Cost Impact = 1*

1	2	3	4	5
GSA Standard (no cost)	No premium, possible savings	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

* In GSA projects with underfloor air delivery systems.

Practical Applications

In GSA projects designed with underfloor air distribution systems, each occupant typically has direct control of the diffuser supplying tempered air to his/her office or workspace. This level of control meets the airflow and temperature requirements of the credit. In buildings with overhead air distribution, the LEED 2.1 Reference Guide notes that VAV systems can comply if they are designed to provide one terminal box and controller for every two occupants. This approach is considered unlikely in most GSA projects due to the associated costs.

In addition to the individual airflow and temperature control measures, this credit will typically involve:

- Individual lighting controls for occupants who work in offices or workstations, or at desks. Acceptable lighting controls include standard light switches for overhead fixtures (typical for private offices), hard-wired task lighting (for workstations or desks), or remote controlled overhead lighting (controlled via computer terminal or remote control device).
- Multiple lighting, temperature, and airflow controls for multi-occupant spaces (e.g., conference rooms, classrooms, courtrooms) in the non-perimeter areas of the building. The number of required controls is determined based on the size of the space (details are in the LEED 2.1 Reference Guide); however at least three lighting controls, one airflow control, and one temperature control are required for every 2,500 square feet of area. The LEED program allows occupancy sensors, dimming controls, and “manual on/automatic off” switches to be counted as two lighting controls each.

Since the credit requirement stipulates controls for 50 percent of the building occupants located in non-perimeter areas, not all spaces in the building need comply.

Basis for Cost Assumption

The Courthouse model includes an underfloor air distribution system as a GSA standard; it is therefore assumed to comply with the air and temperature requirements of this credit at no additional cost. The office areas within the Courthouse are also assumed to have task lighting and/or individual light switches as a GSA standard; again, no cost premium is associated with this feature. Similarly courtrooms, conference rooms and other multi-occupant spaces are assumed to have at least two lighting controls, with one being an occupancy sensor (based on the features included for credit EA-1, Optimize Energy Performance). Overall, the credit is earned based on GSA standards.

The Office Building modernization does not include underfloor air distribution. The credit is therefore not pursued due to the cost expectations of providing individual airflow and temperature controls through additional VAV terminal boxes and controllers.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

The credit is not pursued.

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit EQ-7.1: Thermal Comfort – Compliance w/ ASHRAE 55-1992

Intent

Provide a thermally comfortable environment that supports the productive and well-being of building occupants.

Requirement

Comply with ASHRAE Standard 55-1992, Addenda 1995, for thermal comfort standards including humidity control within established ranges per climate zone. For naturally ventilated buildings, utilize the adaptive comfort temperature boundaries, using the 90% acceptability limits as defined in the California High Performance Schools (CHPS) Best Practices Manual, Appendix C – A Filed Based Thermal Comfort Standard for Naturally Ventilated Buildings, Figure 2.

(1 point)

Cost Impact = 1 or 5

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

For most GSA projects, the viability of this credit will depend upon the temperature and relative humidity ranges that are maintained in the building year-round. GSA's P100 includes criteria for indoor design temperatures and relative humidity (RH). The listed temperatures (winter and summer) and maximum RH (summer) are consistent with the established comfort ranges of ASHRAE Standard 55-1992. P100 also requires minimum wintertime relative humidity in Courtrooms and Communications/Telephone Frame rooms, and

notes that humidification of general office spaces can be considered if severe winter conditions would likely cause the relative humidity to fall below 30 percent. Projects that provide this active humidification, or that are located in mild climates where winter humidification is not required, will meet the full credit requirements.

For the purposes of this study, it is assumed that natural ventilation strategies meeting the LEED credit criteria are unlikely for most GSA building types.

Basis for Cost Assumption

In the Courthouse model, building-wide humidification is included in the reference cost budget. No premium is assumed to meet the credit requirements.

The Office Building model does not include humidification in the baseline reference costs. Premiums have therefore been defined to provide a pneumatic atomizing humidification system. The system costs include humidifiers, air compressors, and water deionizers, as well as RH sensors and system tie-backs to the Building Management System.

Because of moisture condensation concerns, this credit is only considered viable in the full façade renovation scenarios. As part of the façade re-cladding, rigid insulation is provided within the new pre-cast concrete panels. This “exterior” insulation reduces the possibility of moisture condensation within the exterior wall assembly. In the minimal façade renovation scenarios, only interior batt insulation is provided at the exterior walls. Humidification is not considered prudent in these cases because condensation can potentially form within the exterior wall cavities and lead to mold growth and premature deterioration of the wall assembly.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

Minimal Façade Renovation

The credit is not pursued.

Full Façade Renovation

Total Credit Cost	\$166,829
Cost Impact (\$/GSF)	\$0.54/GSF
Cost Impact (%)	0.41%

Additional Considerations

As noted in the “Basis for Cost Assumption” section above, providing active humidification in a building requires careful consideration of moisture condensation issues. Exterior wall and roof constructions, in particular, must be carefully designed and analyzed to ensure that air-borne moisture does not readily condense and accumulate within the assemblies.

Synergistic Credits

For the purposes of this study, humidity monitoring and control systems are considered part of the total humidification system cost. The monitoring and control components directly apply to credit EQ-7.2 (Thermal Comfort, Permanent Monitoring System).

LEED® Credit EQ-7.2: Thermal Comfort – Permanent Monitoring System

Intent

Provide a thermally comfortable environment that supports the productivity and well-being of building occupants.

Requirement

Install a permanent temperature and humidity monitoring system configured to provide operators control over thermal comfort performance and the effectiveness of humidification and/or dehumidification systems in the building.

(1 point)

Cost Impact = 1 or 2

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

This credit can only be earned if the requirements of credit EQ-7.1 (Thermal Comfort, Compliance with ASHRAE 55-1992) are also achieved.

Per GSA's P100, a direct digital control (DDC) system is required for all GSA projects. The DDC system allows building operators to monitor and control building temperatures, which meets one part of the LEED credit requirements. In GSA buildings that have active humidification systems, P100 also requires relative humidity sensors and controls that are tied back to the DDC system. This will meet the second part of the LEED requirement; however, it will not be applicable on all GSA projects.

Basis for Cost Assumption

In the Courthouse model, building-wide humidification is included in the reference cost budget. The building includes a DDC system that monitors and controls temperature and humidity. No premium is assumed to meet the credit requirements.

While the Office Building model does include a DDC system in the baseline costs, a humidification system and related sensors are not included. The credit is only assumed to be earned in one case—Scenario 6B, full façade renovation—where credit EQ-7.1 has also been pursued. As the full costs for the humidification system (including RH sensors and tie-backs to the BMS/DDC system) have been defined for credit EQ-7.1, no additional costs are included to achieve this credit.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

No identified cost premiums.

Additional Considerations

None identified.

Synergistic Credits

As noted, this credit is directly related to credit EQ-7.1 (Thermal Comfort, Compliance with ASHRAE 55-1992).

LEED® Credit EQ-8.1: Daylight & Views – Daylight in 75% of Spaces

Intent

Provide for the building occupants a connection between indoor spaces and the outdoors through the introduction of daylight and views into the regularly occupied areas of the building.

Requirement

Achieve a minimum Daylight Factor of 2% (excluding all direct sunlight penetration) in 75% of all space occupied for critical visual tasks. Spaces excluded from this requirement include copy rooms, storage areas, mechanical plant rooms, laundry and other low occupancy support areas. Other exceptions for spaces where tasks would be hindered by the use of daylight will be considered on their merits.

(1 point)

Cost Impact: Not Pursued

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

To achieve this credit, design teams need to understand the implications of the 2 percent daylight factor requirement. For large buildings of the type typically constructed by GSA, this one criterion can affect the building form, footprint, and orientation; the floor-to-ceiling heights; the size and layout of the fenestration; the arrangement of interior spaces; and other significant design considerations. Buildings with deep floor plates and standard floor-to-ceiling heights (e.g., 9'-0"), will typically be unable to achieve the 2 percent daylight factor for 75 percent of the required space.

Effective daylighting also involves strategies to control glare and excessive solar heat gain. Measures can range from lightshelves and exterior shading devices, to tinted or fritted glazings, and interior blinds or shades. The cost impacts vary considerably, depending on the approach pursued.

Overall, design teams should assume a significant level of design effort is involved in achieving this LEED credit. In some cases, site or programmatic constraints may make the credit requirements unachievable. Budgetary constraints may also be a significant factor, as some daylighting features (e.g., lightshelves, increased floor-to-floor heights) carry a definite cost premium. Integrating the building's daylighting approach with the overall architectural concept is typically the most cost-effective means to achieve effective daylighting, while also keeping the project within budget.

Basis for Cost Assumption

While daylighting is generally encouraged in GSA projects, the specific LEED credit requirements are not considered viable for the two building models used in this study.

In the Courthouse model, the courtrooms are located away from the building perimeter due to security considerations. While the perimeter office areas are daylit, this does not translate to 75% of the regularly-occupied building areas that could benefit from daylighting. Revisions to the building form and overall design would be required to pursue the credit. This is outside the scope of the study.

In the Office Building modernization model, the floor plate is too deep to achieve the 2 percent daylight factor in 75 percent of the regularly-occupied spaces. This is assumed to be the case for much of GSA's existing building stock, particularly office buildings built in the 1960s and 1970s, which constitute the majority of GSA's modernization projects.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

The credit is not pursued.

Office Building (Modernization, 306,600 GSF)

The credit is not pursued.

Additional Considerations

In some projects, daylighting analysis of complex spaces may be required, either through computer modeling or through testing of scale models. Additional soft costs may be required to perform these analyses. Appendix H of this study includes an estimate of the soft cost expectations for computer daylight modeling (for one to two selected building spaces).

Synergistic Credits

In an optimized daylighting design, the electrical lighting system compliments the daylighting measures, allowing energy savings via switching options and/or automatic daylight dimming controls. A potential synergy therefore exists between this credit and credit EA-1 (Optimize Energy Performance). Additional synergies exist with credit EQ-8.2 (Daylight & Views, Views in 90% of Spaces).

LEED® Credit EQ-8.2: Daylight & Views – Views in 90% of Spaces

Intent

Provide for the building occupants a connection between indoor spaces and the outdoors through the introduction of daylight and views into the regularly occupied areas of the building.

Requirement

Achieve direct line of sight to vision glazing for building occupants in 90% of all regularly occupied spaces. Examples of exceptions include copy rooms, storage areas, mechanical, laundry and other low occupancy support areas. Other exceptions will be considered on their merits.

(1 point)

Cost Impact = 5

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

This credit will typically involve a combination of space planning and architectural development considerations. Likely strategies for GSA buildings include the following:

- Minimize the number of enclosed spaces within the building and provide significant “open” work areas (e.g., areas with workstations).
- Minimize the number of enclosed spaces located along the building perimeter.
- Incorporate view windows (interior glazing panels) in enclosed spaces. This applies both to spaces along the perimeter of the building that may block views to the exterior and to interior enclosed spaces.
- Select systems furniture with at least some low-height panels to allow for “view corridors”.

The viability of the credit will largely depend on the degree to which the above strategies work with the building program and overall building design.

Basis for Cost Assumption

In the Courthouse model, the courtrooms are located away from the building perimeter due to security considerations. While views to the exterior are available from some of the perimeter office areas, this does not translate to 90 percent of the regularly-occupied space. Revisions to the building design would be required to pursue the credit. This is outside the scope of the study.

In the Office Building model, 50 percent of the work space is dedicated to open workstations, and other 50 percent is dedicated to enclosed offices. It is assumed that space planning layouts can be developed to maximize the view potential of these spaces. A cost premium is defined for adding fixed interior glazing panels at the enclosed offices and support spaces (conference rooms, etc.). Approximately 9,700 square feet of glazing area has been defined, based on the installation of panels that are 5'-0" wide by 3'-6" high.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

The credit is not pursued.

Office Building (Modernization, 306,600 GSF)

Minimal Façade Renovation

Total Credit Cost.....	\$346,371
Cost Impact (\$/GSF)	\$1.13/GSF
Cost Impact (%), Min. Façade	0.88%
Cost Impact (%), Full Façade.....	0.86%

Additional Considerations

Access to views must be balanced with considerations for acoustical privacy. Designs employing open work areas, low partition heights, and interior glazing panels must be carefully executed to maintain good acoustical quality within the work spaces and acceptable acoustical separation between spaces.

Synergistic Credits

Many of the strategies that increase access to views will also increase the penetration of daylight into a building. A potential synergy therefore exists between this credit and credit EQ-8.1 (Daylight & Views, Daylight in 75% of Spaces).

LEED® Credit ID-1.1: Dedicated Ventilation System

Intent (for all Innovation in Design Credits)

To provide design teams and projects the opportunity to be awarded points for exceptional performance above and beyond the requirements set by the LEED Green Building Rating System and/or innovative performance in Green Building categories not specifically addressed by the LEED Green Building Rating System.

Requirement

In writing, identify the intent of the proposed innovation credit, the proposed requirement for compliance, the proposed submittals to demonstrate compliance, and the design approach (strategies) that might be used to meet the requirements.

(1 point)

Cost Impact = 1

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

A LEED Innovation and Design (ID) credit can potentially be earned based on GSA's P100 requirement to provide 100 percent outside air dedicated ventilation systems in all new buildings and major renovation projects. The dedicated ventilation units provide tempered, dehumidified air to the building, and are independent of other air distribution systems. By separating and conditioning the outside air through the dedicated ventilation units, GSA intends to achieve the following benefits:

- Greater control of the amount of outside air supplied to specific building zones.
- Continuous building pressurization during the non-occupied hours of the building. The pressurization forces dry, tempered air to exfiltrate the building, thereby reducing the amount of outside air that can infiltrate during humid weather (the system runs at neutral pressure during cold weather). The exfiltrating air can also act to dry out moisture that may have condensed within the exterior wall assemblies of the building. Overall, the intent of the pressurization is to reduce the potential for moisture build-up and mold growth in the building envelope.
- Reduced use of the larger HVAC systems during after-hour operations. The dedicated ventilation units can be used to provide conditioning in the building when small groups of employees are working off-hours. This reduces the building's energy use during these periods.

Although it is comprised of standard HVAC system components, the dedicated ventilation system is an innovative approach to building ventilation that has potential long-term indoor air quality and durability benefits.

Basis for Cost Assumption

Both the Courthouse and Office Building models include dedicated ventilation systems in the baseline reference costs. The systems are comprised of 4,000 cfm air handling units (1 per floor), with associated air distribution ductwork, controls, and electric power wiring. While there is no LEED cost premium to provide these systems, the reference cost estimates identify the following costs for the dedicated ventilation systems:

- Courthouse: \$370,500
- Office Building: \$429,624

These are estimated Direct Construction Costs, which do not include contingencies and other allowances.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

No identified cost premiums.

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit ID-1.2: Exceed Regional Materials Criteria (40%)

Intent (for all Innovation in Design Credits)

To provide design teams and projects the opportunity to be awarded points for exceptional performance above and beyond the requirements set by the LEED Green Building Rating System and/or innovative performance in Green Building categories not specifically addressed by the LEED Green Building Rating System.

Requirement

In writing, identify the intent of the proposed innovation credit, the proposed requirement for compliance, the proposed submittals to demonstrate compliance, and the design approach (strategies) that might be used to meet the requirements.

(1 point)

Cost Impact = 2

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

A LEED innovation and design credit can be earned for exceeding the requirements of credit MR-5.1 (Regional Materials, 20 percent Manufactured Regionally). The threshold to achieve an innovation credit is 40 percent. In many projects, regionally-manufactured materials are available to reach the 40 percent threshold at no additional cost. The credit is more likely to be achieved in new construction projects than in renovations. See the MR-5.1 credit review for additional information on typical materials that can be targeted to achieve this credit.

Basis for Cost Assumption

This credit is only pursued in the “low cost” Courthouse scenarios. No cost premium is included, based on the assumption that many GSA projects will earn this credit simply by tracking the location of the manufacturing facilities that supply their materials¹. For the Courthouse, it is assumed that many of the major building materials (e.g., concrete, masonry, gypsum wallboard, steel components, millwork/casework) are manufactured within 500 miles of the site, which allows the project to reach the 40 percent threshold.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

The credit is not pursued.

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

¹ A significant majority of LEED-certified projects listed at the time of this study had achieved this ID credit, indicating that it is achievable in many situations.

LEED® Credit ID-1.3: Educational Display

Intent (for all Innovation in Design Credits)

To provide design teams and projects the opportunity to be awarded points for exceptional performance above and beyond the requirements set by the LEED Green Building Rating System and/or innovative performance in Green Building categories not specifically addressed by the LEED Green Building Rating System.

Requirement

In writing, identify the intent of the proposed innovation credit, the proposed requirement for compliance, the proposed submittals to demonstrate compliance, and the design approach (strategies) that might be used to meet the requirements.

(1 point)

Cost Impact = 3

1	2	3	4	5
GSA Mandate (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

A LEED innovation and design credit can be earned for providing educational signage throughout a building, and for providing an educational case study brochure on the building's green features (which can be shared with the USGBC). Informational kiosks or websites can also be used toward this credit. The goal is to educate building occupants and other interested parties on the building's performance enhancements, and on the health and environmental benefits associated with the building's green design approach.

Basis for Cost Assumption

In the Courthouse model, a premium is defined to provide educational building signage and graphics (25 pieces total) and engraved paving stones on the site (7 total). In addition, five fixed internal windows are included, to illustrate "hidden" building systems and green technologies. Costs are also included to develop and print a case study brochure for the building.

A similar approach is used for the Office Building model. The number of signs is increased to 36, and there are nine fixed internal windows. A case study brochure is developed for the building.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

Total Credit Cost..... \$38,912
 Cost Impact (\$/GSF) \$0.15/GSF
 Cost Impact (%) 0.07%

Office Building (Modernization, 306,600 GSF)

Total Credit Cost..... \$42,750
 Cost Impact (\$/GSF) \$0.14/GSF
 Cost Impact (%), Min. Facade 0.11%
 Cost Impact (%), Full Facade..... 0.11%

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

LEED® Credit ID-1.4A: Exceed Heat Island Effect, Non-Roof

Intent (for all Innovation in Design Credits)

To provide design teams and projects the opportunity to be awarded points for exceptional performance above and beyond the requirements set by the LEED Green Building Rating System and/or innovative performance in Green Building categories not specifically addressed by the LEED Green Building Rating System.

Requirement

In writing, identify the intent of the proposed innovation credit, the proposed requirement for compliance, the proposed submittals to demonstrate compliance, and the design approach (strategies) that might be used to meet the requirements.

(1 point)

Cost Impact = 5

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

A LEED innovation and design credit can potentially be earned for exceeding the requirements of credit SS-7.1 (Heat Island Effect, Non-Roof). The proposed strategies for exceeding the credit requirement include the following:

- Provide 100 percent of the building parking underground.
- Use light-colored paving materials (with an average albedo of 0.3 or higher) for over 75 percent of the on-site impervious paving areas.

- Use tree plantings to provide shade for additional on-site impervious paving areas.

Basis for Cost Assumption

This innovation credit is only pursued in the Courthouse model—the scope of the Office Building modernization does not include site work. For the Courthouse model, a cost premium is defined through two changes to the site paving materials:

- White Portland cement concrete is used instead of standard gray concrete for sidewalks and other pathways.
- Light-colored granite pavers (white, pink and light grey tones) are used instead of medium-to-dark grey granite pavers. The premium defined for the light-colored pavers is primarily for additional transportation costs.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

Total Credit Cost.....	\$235,337
Cost Impact (\$/GSF)	\$0.90/GSF
Cost Impact (%)	0.41%

Office Building (Modernization, 306,600 GSF)

The credit is not applicable.

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

Supporting Calculations

LEED® Credit ID-1.4B: Exceed Certified Wood Criteria (75%)

Intent (for all Innovation in Design Credits)

To provide design teams and projects the opportunity to be awarded points for exceptional performance above and beyond the requirements set by the LEED Green Building Rating System and/or innovative performance in Green Building categories not specifically addressed by the LEED Green Building Rating System.

Requirement

In writing, identify the intent of the proposed innovation credit, the proposed requirement for compliance, the proposed submittals to demonstrate compliance, and the design approach (strategies) that might be used to meet the requirements.

(1 point)

Cost Impact = 4 or 5

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

A LEED innovation and design credit can be earned for exceeding the requirements of credit MR-7 (Certified Wood). The threshold to achieve an innovation credit is 75 percent. The credit is more likely to be achieved in projects with less overall wood use (e.g., office facilities) than in projects such as Courthouses, which have extensive wood paneling and casework. See the credit MR-7 evaluation for additional information on typical materials that can be targeted to achieve this credit.

Basis for Cost Assumption

For both the Courthouse and Office Building models, LEED calculations have been developed to demonstrate how the 75 percent certified wood threshold can potentially be achieved (see “Supporting Calculations” below).

Courthouse

In the Courthouse model, all the fixed furnishings in the Courtrooms and Judges’ Chambers are fabricated from certified woods. Additional certified wood items include the unrated solid core wood doors in the Courtrooms and Judge’s Chambers, additional casework in the Executive offices, and a portion of the building’s hardwood base. Cost premiums are defined for FSC-certified hardwoods, veneers, plywood, and doors (stave core).

Office Building

In the Office Building model, the FSC-certified products include unrated solid core wood doors (stave core) and hardwood base.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

Total Credit Cost.....\$912,098
 Cost Impact (\$/GSF)\$3.48/GSF
 Cost Impact (%)1.59%

Office Building (Modernization, 306,600 GSF)

Total Credit Cost.....\$128,460
 Cost Impact (\$/GSF)\$0.42/GSF
 Cost Impact (%), Min. Facade0.33%
 Cost Impact (%), Full Facade.....0.32%

Additional Considerations

For LEED calculation purposes, post-consumer recycled-content wood material, as found in some composite wood products, can be deducted from the total wood calculation for the building.

The certified wood credit becomes more complicated when it is pursued in conjunction with Credit EQ 4.4 (Low Emitting Materials, Composite Wood). The issues are reviewed in more detail as part of the “synergistic credit” write-ups of Section 3.

Synergistic Credits

Item SN-5 (Courthouse) reviews the cost implications of earning Credit ID-1.4B in conjunction with Credit MR-7 (Certified Wood) and Credit EQ-4.4 (Low-Emitting Materials, Composite Wood).

Item SN-5 (Office Building) reviews the cost implications of earning Credit ID-1.4B in conjunction with Credit MR-7 (Certified Wood) and Credit EQ-4.4 (Low-Emitting Materials, Composite Wood).

Supporting Calculations

Table **ID-1** identifies the wood products used to achieve this credit in the Courthouse scenarios. LEED calculations demonstrate that the 75 percent threshold is attained.

Table **ID-2** identifies the wood products used to achieve this credit in the Office Building scenarios. LEED calculations demonstrate that the 75 percent threshold is attained.

Table ID-1: Targeted Wood Products to Earn Credit ID-1.4B, 75% Certified Wood (Courthouse Model)

#	ITEM	Installed Costs from Reference Estimate (Appendix K)	Base Wood Material Costs	Targeted Wood Products (w/cost premiums) to earn Credit ID-1.4B
1	Coiling overhead wood door (S&C)	\$1,250	\$400	\$400
2	Sld core hardwd veneer single door w/ metal door frame (S&C)	\$19,000	\$6,080	\$6,080
3	Sld core hardwd veneer single door w/ metal door frame (S&C)	\$31,050	\$9,936	\$9,936
4	ABS Plastic clad door (S&C)	\$4,200	\$1,344	\$1,344
5	Sld core hardwd veneer single door w/ metal door frame (S&C)	\$1,900	\$608	\$608
6	Sld core hardwd veneer single door w/ metal door frame (S&C)	\$3,450	\$1,104	\$1,104
7	Hardwood base (S&C)	\$40,111	\$26,874	\$36,280
8	Plastic Laminate Counter (S&C)	\$23,424	\$7,027	\$7,027
9	Hd wood and veneer cabinets (S&C)	\$128,100	\$61,488	\$74,362
				\$6,405
10	Sld core hardwd veneer single door w/ metal door frame, rated (EO)	\$34,930	\$11,178	\$11,178
11	Sld core hardwd veneer single door w/ metal door frame (EO)	\$94,334	\$30,187	\$30,187
12	Sld core hardwd veneer single door w/ metal door frame (EO)	\$687,092	\$219,869	\$219,869
13	Hardwood base (EO)	\$407,169	\$272,803	\$272,803
14	Fixed Furnishings and Casework (EO)	\$124,416	\$59,720	\$72,223
				\$6,221
15	Sld core hardwd veneer door w/ glass panel and frame (DT)	\$14,824	\$4,744	\$4,744
16	Base cabinet, PLAM (DT)	\$2,254	\$676	\$676
17	Solid core hardwood veneer double door and wd frame (CR)	\$101,880	\$52,978	\$68,769
				\$2,038
18	Solid core hardwood veneer single door and wd frame (CR)	\$88,943	\$46,250	\$60,037
				\$1,779
19	Hardwood veneer paneling wainscott (CR)	\$269,234	\$129,232	\$156,290
				\$13,462
20	Fixed furnishings (combined - Courtrooms)	\$2,045,541	\$981,860	\$1,187,437
				\$102,277
21	Sld core hardwd veneer door (Chambers)	\$474,364	\$246,669	\$320,196
				\$9,487
22	Bi-folding double door w/wd frame (Chambers)	\$6,587	\$2,108	\$4,446
				\$132
23	Sld core hardwd veneer door w/frame (Chambers)	\$4,959	\$2,579	\$3,347
				\$99
24	Hardwood base (Chambers)	\$86,940	\$58,250	\$78,637
25	Fixed furnishings (Chambers)	\$583,453	\$280,057	\$338,694
				\$29,173
	Wood Cost Totals	\$5,279,405	\$2,514,021	\$3,137,747

Target \$ Value to achieve 75% Certified Wood: \$2,353,311

Actual \$ Value of Certified Wood Items: \$2,400,719

% FSC Certified Wood: 76.5%

Color Key:

	Targeted FSC Certified Wood Materials, including cost premiums
	Costs for miscellaneous wood blocking and other wood components that are not FSC certified


Table ID-2: Targeted Wood Products to Earn Credit ID-1.4B, 75% Certified Wood (Office Building Model)

#	ITEM	Installed Costs from Reference Estimate (Appnd. L & M)	Base Wood Material Costs	Targeted Wood Products (w/cost premiums) to earn Credit ID-1.4B
1	Coiling overhead wood slat door (S&C)	\$1,348	\$431	\$431
2	Solid core hardwd veneer single door w/ hm door frame (S&C)	\$18,241	\$5,837	\$7,880
3	Solid core hardwd veneer double door w/ hm door frame (S&C)	\$12,177	\$3,897	\$5,260
4	Solid core hardwd veneer double door w/ hm door frame (S&C)	\$6,760	\$2,163	\$2,920
5	Solid core hardwd veneer single door w/ hm door frame (S&C)	\$80,588	\$25,788	\$34,814
6	Solid core hardwd veneer single door w/ hm door frame (S&C)	\$2,480	\$794	\$1,071
7	Hardwood trim (S&C)	\$6,501	\$4,356	\$4,356
8	Hardwood base (S&C)	\$28,800	\$19,296	\$26,050
9	Reception counter (S&C)	\$9,018	\$4,329	\$4,329
10	Mail room furnishings (S&C)	\$2,695	\$1,294	\$1,294
11	Solid core hardwd veneer single door w/ hm door frame (Closed Office)	\$483,397	\$154,687	\$208,828
12	Solid core hardwd veneer double door w/ hm door frame (Closed Office)	\$6,765	\$2,165	\$2,922
13	Solid core hardwd veneer single door w/ hm door frame (Closed Office)	\$29,756	\$9,522	\$12,855
14	Solid core hardwd vnr dble door w/ hm door frame, fire rated (Closed Office)	\$9,703	\$3,105	\$4,192
15	Hardwd Base (Closed Office)	\$4,986	\$3,341	\$3,341
16	Casework (Closed Office)	\$10,290	\$4,939	\$4,939
17	Solid core hardwd veneer single door w/ hm door frame (Open Office)	\$67,680	\$35,194	\$35,194
18	Solid core hardwd veneer double door w/ hm door frame (Open Office)	\$13,530	\$7,036	\$7,036
19	Solid core hardwd vnr. single door w/ hm frame, fire rated (Open Office)	\$29,756	\$15,473	\$15,473
20	Solid core hardwd veneer double door w/ hm door frame, fire rated (Open Office)	\$9,703	\$5,046	\$5,046
21	Hardwd Base (Open Office)	\$2,187	\$1,465	\$1,465
22	Casework (Open Office)	\$10,289	\$4,939	\$4,939
Wood Cost Totals		\$846,650	\$315,094	\$394,633

Target \$ Value to achieve 75% Certified Wood: \$295,975

Actual \$ Value of Certified Wood Items: \$306,792

% FSC Certified Wood: 77.7%

Color Key:
 Targeted FSC Certified Wood Materials, including cost premiums

LEED® Credit ID-2: LEED Accredited Professional

Intent

To support and encourage the design integration required by a LEED Green Building project and to streamline the application and certification process.

Requirement

At least one principal participant of the project team that has successfully completed the LEED Accredited Professional exam.

(1 point)

Cost Impact = 2

1	2	3	4	5
GSA Standard (no cost)	No premium, psble svgs	Low premium (<50K)	Moderate premium (50-150K)	High premium (>150K)

Practical Applications

Because of GSA's overall requirement to achieve LEED certification on all new construction and major renovation projects, it is expected that all design teams contracted by GSA will have a number of LEED accredited professionals on their team.

Basis for Cost Assumption

In both the Courthouse and Office Building models, it is assumed that one or more of the key project team participants is LEED accredited. No cost premium is assumed.

Summary of First Cost Impacts

Courthouse (New Construction, 262,000 GSF)

No identified cost premiums.

Office Building (Modernization, 306,600 GSF)

No identified cost premiums.

Additional Considerations

None identified.

Synergistic Credits

None identified (with construction cost impacts).

Section 3:

Synergistic Credits

Introduction

In many cases, the green building measures used to achieve one LEED credit will also apply to a number of additional LEED credits. For instance, efforts to restore native or adaptive plantings on a site (Credit SS-5.1), can also contribute to reduced water use for irrigation (Credit WE-1). Carbon dioxide sensors installed for indoor air quality purposes (Credit EQ-1) may also be part of a demand ventilation control strategy (adjusting the supply of outside air based on the occupancy of a space), that saves heating and cooling energy (Credit EA-1). Identifying and exploiting the synergies among LEED credits is often a key step in achieving successful, cost-effective green projects. By using an integrated design approach, multiple project benefits can often be achieved with reduced or minimized first cost premiums.

Because of the potential for credit synergies, the costs of a LEED project cannot typically be determined by simply adding together the costs for the individual credits. For the purposes of this study, each of the twelve LEED rating scenarios developed in Section 1 was evaluated to determine where credit synergies existed. The identified synergistic credit combinations were then used to create new “synergistic credit” cost estimates, which replaced the individual credit estimates.

Within the LEED Cost Study, five synergistic credit combinations are defined in the Courthouse scenarios, while four synergistic credit combinations are defined in the Office Building scenarios. These combinations are not intended to represent all of the synergies that may occur on a LEED project, or all of the opportunities for integrated design. For the purposes of the study, synergistic credits are defined only when: 1) a combination of LEED credits is *less expensive* than the sum of the individual credit costs (i.e., the measures to achieve one credit also help to achieve one or more other credits); or 2) a combination of LEED credits is *more expensive* than the sum of the individual credit costs (i.e., the measures to achieve one credit are made more difficult and expensive because of the simultaneous pursuit of another LEED credit). Additional credit synergies that have no overall cost impact are not specifically identified (e.g., materials that contribute to both recycled content and local manufacturing credits, but have no identified cost premium).

The synergistic credits for the Courthouse and Office Building models are reviewed in the following pages. Appendices E and F of the study contain the corresponding cost estimates developed for each synergistic combination.

Courthouse: Credit SN-1

Combines:

- Credit SS-5.1
Reduce Site Disturbance, Protect/Restore Open Space
 - Credit SS-6.1
Stormwater Management, Rate and Quantity
 - Credits WE-1.1/1.2
Water-Efficient Landscaping, No potable Use or No Irrigation
-

Description

Credit SN-1 acknowledges the synergies available through careful landscape design and plant species selection. The synergistic credit scenario is based on a Courthouse site where the area of plantings is set at approximately 60% of the available site area (excluding the building footprint). The majority of the plantings are groundcovers, shrubs, and mixed vegetation, with only about 3% of the planting area used for turfgrass. The plantings are native and adaptive species that have low or no supplemental watering requirements after establishment. By following these design parameters, the project achieves the following LEED goals: 1) stormwater reduction of 25% versus existing conditions (Credit SS-6.1); 2) restoration of over 50% of the non-building site area with native/adaptive species (Credit SS-5.1); and 3) elimination of a permanent irrigation system (Credits WE-1.1/1.2). Four LEED credits are earned.

Basis for Cost Assumption

Credit SN-1 uses the planting and paving areas defined in the individual credit estimate SS 6.1a; however, the additional irrigation system costs of 6.1a are not included. In addition, the irrigation system cost deduct from credit WE 1.2 is included.

Summary of First Cost Impacts

Individual Credit Costs

Credit SS-5.1	(\$110,616)
Credit SS-6.1a	(\$165,055)
Credit WE-1.2	(\$39,467)

Synergistic Credit SN-1

Total Credit Cost	(\$225,295)
Cost Impact (\$/GSF)	(\$0.86)/GSF
Cost Impact (%)	(0.39)%

Applicable Scenarios

Credit SN-1 is used in the Courthouse scenarios 1A (Certified), 3A (Silver), and 5A (Gold).

Courthouse: Credit SN-2

Combines:

- Credit SS-6.1
Stormwater Management, Rate and Quantity
- Credit SS-7.2
Heat Island Effect, Roof
- Credit EA-2.1
Renewable Energy, 5%

Description

Credit SN-2 identifies the synergies available through a vegetated roof installation. The synergistic credit scenario is based on a 4-inch-deep (extensive) vegetated roof covering 65 percent of the overall roof area of the Courthouse (approximately 30,550 square feet). The vegetated roof results in a reduction in site imperviousness of 25.8 percent, meeting the stormwater criteria of SS-6.1 (25 percent decrease in the rate and quantity of stormwater runoff). At the same time, it also meets the heat island reduction criteria of credit SS-7.2 (vegetated roof for at least 50 percent of the roof area).

For the purposes of the study, credit EA-2.1 (Renewable Energy, 5%) is also included in this synergistic credit combination. This is because the 30,550 SF of vegetated roof area, together with the 6,000 SF of photovoltaic panels needed to achieve credit EA-2.1 (supply at least 5 percent of the building's total energy use through on-site renewable systems), requires an overall roof area that is greater than the upper roof of the Courthouse (assuming cooling towers, access areas, etc.). To compensate, the lower roof over the second floor also becomes a vegetated roof system.

Three LEED credits are achieved with credit SN-2.

Basis for Cost Assumption

The cost premiums for Credit SN-2 are based on the installation of 30,550 SF of vegetated roof area (3,700 SF on the roof above the 2nd floor), plus the PV panel area (6,000 SF) and electrical distribution costs defined in the individual credit estimate EA-2.1.

Summary of First Cost Impacts

Individual Credit Costs

Credit SS-6.1b	\$578,170
Credit SS-7.2b	\$495,353
Credit EA-2.1	\$787,586

Synergistic Credit SN-2

Total Credit Cost	\$1,378,943
Cost Impact (\$/GSF).....	\$5.26/GSF
Cost Impact (%)	2.40%

Applicable Scenarios

Credit SN-2 is used in the Courthouse scenario 6A (Gold).

Courthouse: Credit SN-3

Combines:

- Credit EA-1
Optimize Energy Performance
 - Credit EQ-1
Carbon Dioxide (CO₂) Monitoring
-

Description

Credit SN-3 reflects a synergy that is available when designing carbon dioxide (CO₂) monitoring systems. The synergistic credit scenario is based on the installation of CO₂ sensors in variable occupancy spaces, and at the end of major duct runs, to earn credit EQ-1. Additional controls programming is provided for the building management system (BMS), which allows the CO₂ sensors to be used for demand control ventilation. The demand control ventilation contributes to the 35 percent energy savings that earns 5 points under credit EA-1. Overall, six LEED credits are achieved through this synergistic combination.

Basis for Cost Assumption

The synergistic cost for credit SN-3 is the cost of the individual credit EA-1 (5) in its entirety—the costs for the CO₂ monitoring system of credit EQ-1 are already included.

Summary of First Cost Impacts

Individual Credit Costs

Credit EA-1(5)	\$756,101
Credit EQ-1	\$64,876

Synergistic Credit SN-3

Total Credit Cost	\$756,101
Cost Impact (\$/GSF)	\$2.89/GSF
Cost Impact (%)	1.32%

Applicable Scenarios

Credit SN-3 is used in the Courthouse scenarios 4A (Silver), 5A (Gold), and 6A (Gold).

Courthouse: Credit SN-4

Combines:

- Credit MR-7
Certified Wood
- Credit EQ-4.4
Low-Emitting Materials: Composite Wood

Description

Credit SN-4 reflects the cost synergies, and potential product purchasing complications, that can arise when projects simultaneously pursue credit MR-7 (at least 50 percent of wood-based materials are certified using Forest Stewardship Council [FSC] criteria) and credit EQ-4.4 (composite wood and agrifiber products contain no added urea formaldehyde resins). The synergistic credit reflects the specific impacts of the two credit requirements on wood casework and wood doors in the Courthouse model.

For wood casework, the two credit requirements primarily impact the selection of engineered-fiber substrate boards. It is currently very difficult to obtain plywood, particleboard, or medium density fiberboard (mdf) that is both FSC certified and manufactured without urea formaldehyde binders. In most projects, it is more likely that a substrate board will be selected that is not FSC certified, but is free urea-formaldehyde resins. The hardwoods and veneers of the casework can be obtained from FSC-certified sources; their costs must be broken out for the LEED certified wood calculations.

For wood doors to earn FSC certification, at least 70 percent (by weight) of the door must consist of certified wood material. This typically means that FSC certified doors will have stave-cores instead of particleboard cores. In addition, to meet the EQ-4.4 criteria, any engineered wood components in the doors (potentially frames, rails, stiles, or crossbanding layers, depending on the product and manufacturer) cannot contain urea formaldehyde resins. Currently, a limited number of manufacturers offer both the certified wood and formaldehyde-free options.

Two LEED credits are earned by implementing the measures in item SN-4.

Basis for Cost Assumption

For this synergistic credit, all casework substrates are assumed to be a wood-based mdf that is not certified, but is free of urea formaldehyde binders (meeting credit EQ-4.4). The hardwood and wood veneers in the millwork are assumed to be FSC-certified. In order to achieve the 50 percent certified wood criteria of credit MR-7, a combination of millwork items, doors, and solid wood base are included. Doors meeting both credits MR-7 and EQ-4.4 criteria are assumed to be solid stave-core doors with an additional premium paid to use non-urea formaldehyde crossbanding layers. Additional wood doors (that are not FSC-certified) are specified with formaldehyde-free cores and crossbanding layers (see credit EQ-4.4).

Table **SN4C-1** lists all of the wood items required to achieve the credits.

Summary of First Cost Impacts

Individual Credit Costs

Credit MR-7	\$596,597
Credit EQ-4.4.....	\$455,308

Synergistic Credit SN-4

Total Credit Cost	\$965,007
Cost Impact (\$/GSF).....	\$3.68/GSF
Cost Impact (%)	1.68%

Applicable Scenarios

Credit SN-4 is used in the Courthouse scenarios 4A (Silver) and 6A (Gold).

Table SN4C-1: Targeted Wood Products to Earn Credits MR-7 & EQ-4.4 (Courthouse Model)

#	ITEM	Installed Costs from Reference Estimate (Appendix K)	Base Wood Material Costs	Targeted Wood Products (w/cost premiums) to earn Credit SN-4
1	Coiling overhead wood door (S&C)	\$1,250	\$400	\$500
2	Sld core hardwd veneer single door w/ metal door frame (S&C)	\$19,000	\$6,080	\$7,600
3	Sld core hardwd veneer single door w/ metal door frame (S&C)	\$31,050	\$9,936	\$12,420
4	ABS Plastic clad door (S&C)	\$4,200	\$1,344	\$1,680
5	Sld core hardwd veneer single door w/ metal door frame (S&C)	\$1,900	\$608	\$760
6	Sld core hardwd veneer single door w/ metal door frame (S&C)	\$3,450	\$1,104	\$1,380
7	Hardwood base (S&C)	\$40,111	\$26,874	\$26,874
8	Plastic Laminate Counter (S&C)	\$23,424	\$7,027	\$8,198
9	Hd wood and veneer cabinets (S&C)	\$128,100	\$61,488	\$67,893
10	Sld core hardwd veneer single door w/ metal door frame, rated (EO)	\$34,930	\$11,178	\$13,972
11	Sld core hardwd veneer single door w/ metal door frame (EO)	\$94,334	\$30,187	\$37,734
12	Sld core hardwd veneer single door w/ metal door frame (EO)	\$687,092	\$219,869	\$274,837
13	Hardwood base (EO)	\$407,169	\$272,803	\$368,284
14	Fixed Furnishings and Casework (EO)	\$124,416	\$59,720	\$67,893
15	Sld core hardwd veneer door w/ glass panel and frame (DT)	\$14,824	\$4,744	\$5,930
16	Base cabinet, PLAM (DT)	\$2,254	\$676	\$789
17	Solid core hardwood veneer double door and wd frame (CR)	\$101,880	\$52,978	\$70,195
				\$2,038
18	Solid core hardwood veneer single door and wd frame (CR)	\$88,943	\$46,250	\$61,282
				\$1,779
19	Hardwood veneer paneling wainscott (CR)	\$269,234	\$129,232	\$83,597
				\$80,770
20	Fixed furnishings (combined - Courtrooms)	\$2,045,541	\$981,860	\$635,140
				\$613,662
21	Sld core hardwd veneer door (Chambers)	\$474,364	\$246,669	\$326,837
				\$9,487
22	Bi-folding double door w/wd frame (Chambers)	\$6,587	\$2,108	\$4,538
				\$132
23	Sld core hardwd veneer door w/frame (Chambers)	\$4,959	\$2,579	\$3,417
				\$99
24	Hardwood base (Chambers)	\$86,940	\$58,250	\$78,637
25	Fixed furnishings (Chambers)	\$583,453	\$280,057	\$309,230
	Wood Cost Totals	\$5,279,405	\$2,514,021	\$3,177,585

Target \$ Value to achieve 50% Certified Wood: \$1,588,793

Actual \$ Value of Certified Wood Items: \$1,631,928

% FSC Certified Wood: 51.4%

Color Key:

	Targeted FSC Certified Wood Materials, including cost premiums
	Costs for miscellaneous wood blocking and other wood components that are not FSC certified
	Targeted Urea Formaldehyde-free Wood Materials, including cost premiums

Courthouse: Credit SN-5

Combines:

- Credit MR-7
Certified Wood
- Credit EQ-4.4
Low-Emitting Materials: Composite Wood
- Credit ID-1.4.B
Exceed Certified Hardwood Trim & Millwork Criteria (75%)

Description

Similar to credit SN-4, credit SN-5 acknowledges the synergies as well as the challenges of pursuing the LEED certified wood and prohibited urea-formaldehyde credits simultaneously. As with item SN-4, the wood casework components and wood doors in the Courthouse are specifically affected by these credits. In addition, because of the 75% certified wood criteria pursued for the Innovation credit, a further strategy is considered. On a custom order basis, it is possible to obtain casework-grade hardwood plywood that is FSC-certified and produced with a polyvinyl acetate (PVA) binder instead of urea formaldehyde. The cost of this customized production will typically restrict the applicability of this approach; however, for the purposes of the study it was applied in the “high cost” Gold rating scenario.

Three LEED credits are achieved with item SN-5.

Basis for Cost Assumption

In addition to the strategies noted in SN-4, the credit assumes that FSC certified plywood with a PVA binder will be used for the fixed furnishings in the Courtrooms.

Table **SN5C-1** lists all of the wood items required to achieve the credits.

Summary of First Cost Impacts

Individual Credit Costs

Credit MR-7	\$596,597
Credit EQ-4.4	\$455,308
Credit ID-1.4B	\$912,098

Synergistic Credit SN-5

Total Credit Cost	\$1,391,342
Cost Impact (\$/GSF)	\$5.31/GSF
Cost Impact (%)	2.42%

Applicable Scenarios

Credit SN-5 is used in the Courthouse scenario 6A (Gold).

Table SN5C-1: Targeted Wood Products to Earn Credits MR-7, EQ-4.4, & ID-1.4B (Courthouse Model)

#	ITEM	Installed Costs from Reference Estimate (Appendix K)	Base Wood Material Costs	Targeted Wood Products (w/cost premiums) to earn Credit SN-5
1	Coiling overhead wood door (S&C)	\$1,250	\$400	\$500
2	Sld core hardwd veneer single door w/ metal door frame (S&C)	\$19,000	\$6,080	\$7,600
3	Sld core hardwd veneer single door w/ metal door frame (S&C)	\$31,050	\$9,936	\$12,420
4	ABS Plastic clad door (S&C)	\$4,200	\$1,344	\$1,680
5	Sld core hardwd veneer single door w/ metal door frame (S&C)	\$1,900	\$608	\$760
6	Sld core hardwd veneer single door w/ metal door frame (S&C)	\$3,450	\$1,104	\$1,380
7	Hardwood base (S&C)	\$40,111	\$26,874	\$26,874
8	Plastic Laminate Counter (S&C)	\$23,424	\$7,027	\$8,198
9	Hd wood and veneer cabinets (S&C)	\$128,100	\$61,488	\$67,893
10	Sld core hardwd veneer single door w/ metal door frame, rated (EO)	\$34,930	\$11,178	\$13,972
11	Sld core hardwd veneer single door w/ metal door frame (EO)	\$94,334	\$30,187	\$37,734
12	Sld core hardwd veneer single door w/ metal door frame (EO)	\$687,092	\$219,869	\$307,817
13	Hardwood base (EO)	\$407,169	\$272,803	\$368,284
14	Fixed Furnishings and Casework (EO)	\$124,416	\$59,720	\$67,893
15	Sld core hardwd veneer door w/ glass panel and frame (DT)	\$14,824	\$4,744	\$5,930
				\$296
16	Base cabinet, PLAM (DT)	\$2,254	\$676	\$789
17	Solid core hardwood veneer double door and wd frame (CR)	\$101,880	\$52,978	\$70,195
				\$2,038
18	Solid core hardwood veneer single door and wd frame (CR)	\$88,943	\$46,250	\$61,282
				\$1,779
19	Hardwood veneer paneling wainscott (CR)	\$269,234	\$129,232	\$83,597
				\$80,770
20	Fixed furnishings (combined - Courtrooms) - Note: These items include FSC-certified plywood w/PVA binders	\$2,045,541	\$981,860	\$1,380,740
				\$102,277
21	Sld core hardwd veneer door (Chambers)	\$474,364	\$246,669	\$326,837
				\$9,487
22	Bi-folding double door w/wd frame (Chambers)	\$6,587	\$2,108	\$4,538
				\$132
23	Sld core hardwd veneer door w/frame (Chambers)	\$4,959	\$2,579	\$3,417
				\$99
24	Hardwood base (Chambers)	\$86,940	\$58,250	\$58,250
25	Fixed furnishings (Chambers)	\$583,453	\$280,057	\$309,230
	Wood Cost Totals	\$5,279,405	\$2,514,021	\$3,424,689

Target \$ Value to achieve 75% Certified Wood: \$2,568,517

Actual \$ Value of Certified Wood Items: \$2,606,708

% FSC Certified Wood: **76.1%****Color Key:**

	Targeted FSC Certified Wood Materials, including cost premiums
	Costs for miscellaneous wood blocking and other wood components that are not FSC certified
	Targeted Urea Formaldehyde-free Wood Materials, including cost premiums

Office Building: Credits SN-1A-1D

Combines:

- Credit EA-1
Optimize Energy Performance
- Credit EQ-1
Carbon Dioxide (CO₂) Monitoring

Description

Credits SN-1A – 1D reflect a synergy that is available when designing carbon dioxide (CO₂) monitoring systems. The synergistic credit scenario is based on the installation of CO₂ sensors in variable occupancy spaces, and at the end of major duct runs, to earn credit EQ-1. Additional controls programming is provided for the building management system (BMS), which allows the CO₂ sensors to be used for demand control ventilation. The demand control ventilation contributes to the energy savings that earns points under credit EA-1.

For SN-1A / Full Façade, six LEED credits are achieved; for SN-1B / Minimal Façade, six LEED credits are achieved; for SN-1C / Full Façade, nine LEED credits are achieved; and for SN-1D / Minimal Façade, eight LEED credits are achieved.

Basis for Cost Assumption

The synergistic costs for credit SN-1A is the cost of the individual credit EA-1 (5) / Full Façade in its entirety—the costs for the CO₂ monitoring system of credit EQ-1 are already included.

The synergistic cost for credit SN-1B is the cost of the individual credit EA-1 (5) / Minimal Façade in its entirety—the costs for the CO₂ monitoring system of credit EQ-1 are already included.

The synergistic cost for credit SN-1C is the cost of the individual credit EA-1 (8) / Full Façade in its entirety—the costs for the CO₂ monitoring system of credit EQ-1 are already included.

The synergistic cost for credit SN-1D is the cost of the individual credit EA-1 (7) / Minimal Façade in

its entirety—the costs for the CO₂ monitoring system of credit EQ-1 are already included.

Summary of First Cost Impacts

Individual Credit Costs

Credit EA-1(5), Full Façade.....	\$243,508
Credit EQ-1	\$92,556

Synergistic Credit SN-1A

Total Credit Cost	\$243,508
Cost Impact (\$/GSF).....	\$0.79/GSF
Cost Impact (%)	0.60%

Individual Credit Costs

Credit EA-1(5), Min. Façade	\$357,775
Credit EQ-1	\$92,556

Synergistic Credit SN-1B

Total Credit Cost	\$357,775
Cost Impact (\$/GSF).....	\$1.17/GSF
Cost Impact (%)	0.91%

Individual Credit Costs

Credit EA-1(8), Full Façade.....	\$941,426
Credit EQ-1	\$92,556

Synergistic Credit SN-1C

Total Credit Cost	\$941,426
Cost Impact (\$/GSF).....	\$3.07/GSF
Cost Impact (%)	2.33%

Individual Credit Costs

Credit EA-1(7), Min. Façade.....	\$941,426
Credit EQ-1	\$92,556

Synergistic Credit SN-1D

Total Credit Cost	\$941,426
Cost Impact (\$/GSF).....	\$3.07/GSF
Cost Impact (%).....	2.39%

Applicable Scenarios

Credit SN-1A is used in the Office Building / Full Façade scenario 2B (Certified).

Credit SN-1B is used in the Office Building / Minimal Façade scenario 3B (Silver).

Credit SN-1C is used in the Office Building / Full Façade scenarios 4B (Silver) and 6B (Gold).

Credit SN-1D is used in the Office Building / Minimal Façade scenario 5B (Gold).

Office Building: Credit SN-2

Combines:

- Credit MR 4.2
Recycled Content, 10 percent
- Credit MR 5.2
Regional Materials, 50 percent extracted regionally

Description

Credit SN-2 credit is an example of the complications that can arise when pursuing the LEED recycled content material and regional harvesting credits simultaneously. In the Office Building “Full Façade Renovation” scenarios, it is assumed that “synthetic” gypsum wallboard (with 90% or greater post-industrial recycled content) is procured to achieve credit MR-4.2 (recycled content for 10 percent of the total value of materials). However, since the plants that make this high recycled content gypsum wallboard are limited, it assumed that the material is shipped from beyond a 500 mile radius of the site. This disqualifies the gypsum wallboard from applying to the Regional Material credits (MR-5.1 and MR-5.2).

To achieve the MR-5.2 material extraction credit, it is therefore assumed that a regionally manufactured ceiling tile is procured. For the purposes of the study, it is assumed that the raw materials for the ceiling tiles are obtained within a 500 mile radius of the site. A cost premium is defined based on the assumption that the regional ceiling tile manufacturer may not be the low bidder for the project.

Two credits are achieved with the SN-2.

Basis for Cost Assumption

The synergistic cost for credit SN-2 is defined as the individual credit cost of MR-4.2 / Full Façade (which is the premium to use synthetic gypsum wallboard) plus a premium for purchasing regionally-produced acoustical ceiling tiles.

Summary of First Cost Impacts

Individual Credit Costs

Credit MR-4.2\$32,394
Credit MR-5.2no identified cost impact

Synergistic Credit SN-2

Total Credit Cost\$83,592
Cost Impact (\$/GSF).....\$0.27/GSF
Cost Impact (%)0.21%

Applicable Scenarios

Credit SN-2 is used in the Office Building/Full Façade Renovation scenarios 4B (Silver) and 6B (Gold).

Office Building: Credit SN-3

Combines:

- Credit MR-7
Certified Wood
- Credit EQ-4.4
Low-Emitting Materials: Composite Wood

Description

Credit SN-3 reflects the cost synergies, and potential product purchasing complications, that can arise when projects simultaneously pursue credit MR-7 (at least 50 percent of wood-based materials are certified using Forest Stewardship Council [FSC] criteria) and credit EQ-4.4 (composite wood and agrifiber products contain no added urea formaldehyde resins). The synergistic credit reflects the specific impacts of the two credit requirements on wood doors in the Office Building model.

For wood doors to earn FSC certification, at least 70 percent (by weight) of the door must consist of certified wood material. This typically means that FSC certified doors will have stave-cores instead of particleboard cores. In addition, to meet the EQ-4.4 criteria, all other engineered wood components in the doors (potentially frames, rails, stiles, or crossbanding layers, depending on the product and manufacturer) cannot contain urea formaldehyde resins. Currently, a limited number of manufacturers offer both the certified wood and formaldehyde-free options.

Two LEED credits are earned by implementing the measures in item SN-3.

Basis for Cost Assumption

In order to achieve the 50 percent certified wood criteria of credit MR-7, the majority of the solid core, non-rated wood doors in the closed office areas are targeted. These doors are assumed to be solid stave-core, FSC-certified doors with an additional premium paid to use non-urea formaldehyde crossbanding layers. Additional wood doors (that are not FSC-certified) are specified with formaldehyde-free cores and crossbanding layers (see credit EQ-4.4). All casework substrates are assumed to be a wood-based mdf that is not certified, but is free of urea formaldehyde binders.

Table **SN30-1** lists all of the wood items required to achieve the credits.

Summary of First Cost Impacts

Individual Credit Costs

Credit MR-7.....	\$77,332
Credit EQ-4.4.....	\$91,429

Synergistic Credit SN-3

Total Credit Cost	\$124,572
Cost Impact (\$/GSF).....	\$0.41/GSF
Cost Impact (%), Min. Facade.....	0.32%
Cost Impact (%), Full Facade.....	0.31%

Applicable Scenarios

Credit SN-3 is used in the Office Building scenarios 1B/Minimal Facade Renovation (Certified) and 2B/Full Façade Renovation (Certified).

Table SN30-1: Targeted Wood Products to Earn Credits MR-7 & EQ-4.4 (Office Building Model)

#	ITEM	Installed Costs from Reference Estimate (Appnd. L & M)	Base Wood Material Costs	Targeted Wood Products (w/cost premiums) to earn Credit SN-3
1	Coiling overhead wood slat door (S&C)	\$1,348	\$431	\$539
2	Solid core hardwd veneer single door w/ hm door frame (S&C)	\$18,241	\$5,837	\$7,296
3	Solid core hardwd veneer double door w/ hm door frame (S&C)	\$12,177	\$3,897	\$4,871
4	Solid core hardwd veneer double door w/ hm door frame (S&C)	\$6,760	\$2,163	\$2,704
5	Solid core hardwd veneer single door w/ hm door frame (S&C)	\$80,588	\$25,788	\$32,235
6	Solid core hardwd veneer single door w/ hm door frame (S&C)	\$2,480	\$794	\$992
7	Hardwood trim (S&C)	\$6,501	\$4,356	\$4,356
8	Hardwood base (S&C)	\$28,800	\$19,296	\$19,296
9	Reception counter (S&C)	\$9,018	\$4,329	\$4,780
10	Mail room furnishings (S&C)	\$2,695	\$1,294	\$1,294
11	Solid core hardwd veneer single door w/ hm door frame (Closed Office)	\$483,397	\$154,687	\$216,562
12	Solid core hardwd veneer double door w/ hm door frame (Closed Office)	\$6,765	\$2,165	\$2,706
13	Solid core hardwd veneer single door w/ hm door frame (Closed Office)	\$29,756	\$9,522	\$11,902
14	Solid core hardwd vnr dbble door w/ hm door frame, fire rated (Closed Office)	\$9,703	\$3,105	\$3,881
15	Hardwd Base (Closed Office)	\$4,986	\$3,341	\$3,341
16	Casework (Closed Office)	\$10,290	\$4,939	\$5,454
17	Solid core hardwd veneer single door w/ hm door frame (Open Office)	\$67,680	\$35,194	\$43,992
18	Solid core hardwd veneer double door w/ hm door frame (Open Office)	\$13,530	\$7,036	\$8,795
19	Solid core hardwd vnr. single door w/ hm frame, fire rated (Open Office)	\$29,756	\$15,473	\$19,341
20	Solid core hardwd veneer double door w/ hm door frame, fire rated (Open Office)	\$9,703	\$5,046	\$6,307
21	Hardwd Base (Open Office)	\$2,187	\$1,465	\$1,465
22	Casework (Open Office)	\$10,289	\$4,939	\$5,453
	Wood Cost Totals	\$846,650	\$315,094	\$407,561

Target \$ Value to achieve 50% Certified Wood: \$203,781

Actual \$ Value of Certified Wood Items: \$216,562

% FSC Certified Wood: 53.1%

Color Key:

	Targeted FSC Certified Wood Materials, including cost premiums
	Targeted Urea Formaldehyde-free Wood Materials, including cost premiums

Office Building: Credit SN-4

Combines:

- Credit MR-7
Certified Wood
- Credit EQ-4.4
Low-Emitting Materials: Composite Wood
- Credit ID-1.4.B
Exceed Certified Hardwood Trim & Millwork Criteria (75%)

Description

Similar to credit SN-3, credit SN-4 acknowledges the synergies as well as the challenges of pursuing the LEED certified wood and prohibited urea-formaldehyde credits simultaneously. The wood doors in the Office Building are specifically affected by these credits (see description under credit SN-3).

Three LEED credits are achieved with item SN-4.

Basis for Cost Assumption

In order to achieve the 75 percent certified wood criteria of credit MR-7, the majority of the solid core, non-rated wood doors throughout the building are targeted, in addition to solid wood base. The doors are assumed to be solid stave-core, FSC-certified doors with an additional premium paid to use non-urea formaldehyde crossbanding layers. Additional wood doors (that are not FSC-certified) are specified with formaldehyde-free cores and crossbanding layers (see credit EQ-4.4). All casework substrates are assumed to be a wood-based mdf that is not certified, but is free of urea formaldehyde binders.

Table **SN4O-1** lists all of the wood items required to achieve the credits.

Summary of First Cost Impacts

Individual Credit Costs

Credit MR-7.....	\$77,332
Credit EQ-4.4.....	\$91,429
Credit ID-1.4B	\$128,460

Synergistic Credit SN-4

Total Credit Cost	\$150,155
Cost Impact (\$/GSF).....	\$0.49/GSF
Cost Impact (%), Min. Facade.....	0.38%
Cost Impact (%), Full Facade.....	0.37%

Applicable Scenarios

Credit SN-4 is used in the Office Building scenarios 3B/Minimal Facade Renovation (Silver), 4B/Full Facade Renovation (Silver), 5B/Minimal Facade Renovation (Gold), and 6B/Full Facade Renovation (Gold).

Table SN40-1: Targeted Wood Products to Earn Credits MR-7, EQ-4.4, & ID-1.4B (Office Building Model)

#	ITEM	Installed Costs from Reference Estimate (Appnd. L & M)	Base Wood Material Costs	Targeted Wood Products (w/cost premiums) to earn Credit SN-4
1	Coiling overhead wood slat door (S&C)	\$1,348	\$431	\$539
2	Solid core hardwd veneer single door w/ hm door frame (S&C)	\$18,241	\$5,837	\$8,172
3	Solid core hardwd veneer double door w/ hm door frame (S&C)	\$12,177	\$3,897	\$5,455
4	Solid core hardwd veneer double door w/ hm door frame (S&C)	\$6,760	\$2,163	\$3,028
5	Solid core hardwd veneer single door w/ hm door frame (S&C)	\$80,588	\$25,788	\$36,103
6	Solid core hardwd veneer single door w/ hm door frame (S&C)	\$2,480	\$794	\$1,111
7	Hardwood trim (S&C)	\$6,501	\$4,356	\$5,880
8	Hardwood base (S&C)	\$28,800	\$19,296	\$26,050
9	Reception counter (S&C)	\$9,018	\$4,329	\$4,780
10	Mail room furnishings (S&C)	\$2,695	\$1,294	\$1,294
11	Solid core hardwd veneer single door w/ hm door frame (Closed Office)	\$483,397	\$154,687	\$216,562
12	Solid core hardwd veneer double door w/ hm door frame (Closed Office)	\$6,765	\$2,165	\$3,031
13	Solid core hardwd veneer single door w/ hm door frame (Closed Office)	\$29,756	\$9,522	\$13,331
14	Solid core hardwd vnr dbble door w/ hm door frame, fire rated (Closed Office)	\$9,703	\$3,105	\$4,347
15	Hardwd Base (Closed Office)	\$4,986	\$3,341	\$4,510
16	Casework (Closed Office)	\$10,290	\$4,939	\$5,454
17	Solid core hardwd veneer single door w/ hm door frame (Open Office)	\$67,680	\$35,194	\$43,992
18	Solid core hardwd veneer double door w/ hm door frame (Open Office)	\$13,530	\$7,036	\$8,795
19	Solid core hardwd vnr. single door w/ hm frame, fire rated (Open Office)	\$29,756	\$15,473	\$19,341
20	Solid core hardwd veneer double door w/ hm door frame, fire rated (Open Office)	\$9,703	\$5,046	\$6,307
21	Hardwd Base (Open Office)	\$2,187	\$1,465	\$1,978
22	Casework (Open Office)	\$10,289	\$4,939	\$5,453
Wood Cost Totals		\$846,650	\$315,094	\$425,512

Target \$ Value to achieve 75% Certified Wood: \$319,134

Actual \$ Value of Certified Wood Items: \$329,558

% FSC Certified Wood: 77.4%

Color Key:

	Targeted FSC Certified Wood Materials, including cost premiums
	Targeted Urea Formaldehyde-free Wood Materials, including cost premiums

Section 4:

LEED–Related Soft Costs

Introduction

For many design firms, working with LEED will require some adjustments to their typical design and production process. The LEED program encourages an integrated design approach, in which architects, engineers, and consultants work collaboratively to produce a project that meets specific LEED building performance targets. LEED issues must be addressed and tracked throughout all design phases to ensure that initial project goals are developed and refined in conjunction with the overall project development. LEED-specific tasks are often required, ranging from initial goal setting sessions or charrettes, to research on new or unfamiliar products and systems, to calculations of energy-efficiency, water use, and material properties (e.g., recycled content), to specification revisions and comprehensive construction submittals tracking.

GSA’s *Facilities Standards for the Public Buildings Service* (document PBS-P100, 2003, herein referred to as P100) includes specific green building performance requirements that are either consistent with, or similar to, a corresponding range of LEED credits. Certain tasks, such as computer energy modeling, total building commissioning, and research on recycled-content materials, are therefore considered standard GSA requirements. It can generally be assumed, however, that the full range of services to deliver a LEED-rated building will be beyond the scope of a “pre-LEED” GSA project, and that this

additional effort will be factored into most design teams’ fees. This section of the Cost Study addresses the level of fee impact that can be expected, using the two GSA building prototypes (new mid-rise Courthouse and mid-rise Office Building modernization) and twelve LEED rating scenarios from Section Two as case studies. The analysis tracks LEED-specific tasks and associated costs in two areas:

1. **LEED Design Costs:** Those tasks that increase the design team’s scope of work during the design and construction stages
2. **LEED Documentation Costs:** Those tasks associated with documenting and submitting a LEED application to the U.S. Green Building Council

Based on Sections One, Two and Three of this study, it has been determined that additional construction costs will often be needed to achieve LEED ratings. Since the design fees for most GSA projects are contractually set as a percentage of the construction cost, a key question to be addressed is, “Does the increase in design fee that derives from the LEED-based increase in construction cost cover all additional work the design team must perform?” The answer clearly depends on a number of variables, including the LEED construction cost premium assumed, the design team’s base fee, the structure and experience of the design team, the specific LEED credits being pursued, and the

overall rating level that is targeted. These variables are addressed, to varying degrees, as part of this study.

Methodology

To understand the range of tasks and additional services associated with LEED projects, a survey and interview was conducted with a group of architects, construction managers, and consultants who had recently completed (or were currently involved in) GSA LEED projects. The interview, which occurred over a one-and-a-half-day period, involved a detailed “credit-by-credit” review of LEED-specific tasks. The participants were asked to comment on their efforts in previous or current LEED projects, and to assess the level of effort they would expect in future LEED projects, specifically for the prototype GSA buildings considered in this study.

Overall, the survey and interview process was used to develop a set of parameters for approximating LEED-specific soft costs. The following items were defined:

1. The approaches used by design teams to achieve LEED ratings, including the structure of the team and the assignment of LEED responsibilities.
2. A comprehensive listing of LEED-specific tasks, with differentiation between those tasks that would be performed within the design team’s base fee, and those that would be considered additional services. For the purposes of the interview, the group was told to assume that a LEED Silver rating was the base expectation, and that a construction cost increase of approximately 2.5 percent would be included in the project budgets.
3. An assessment of the level of difficulty and perceived professional risk associated with each LEED credit.
4. Approximations of the time commitments and experience levels needed to perform the LEED tasks that were specifically subject to additional fees.

Using the above information, a series of tables and spreadsheets were developed to document the LEED task assessments, and to formally estimate

soft costs for the two case study GSA projects. The resulting documents are included as Appendices G and H of this report.

Findings

Results of Survey and Interview Process

The survey and interview process confirmed that LEED soft costs will vary depending on the structure of the design team, the types of tasks being performed, the number of credits being pursued, and other project variables. A number of these issues are addressed in the following sections.

Team Structure: Expert Consultant vs. Experienced Design/Construction Team

The interviews revealed that two significantly different approaches are being used to address LEED requirements in GSA projects: 1) an “Expert Consultant” approach, where the design team retains a specialized LEED/green building consultant to manage LEED issues; and 2) an “Experienced Design/Construction Team” approach, in which all LEED tasks are performed by the core design and construction management teams, which have previous LEED experience. The key characteristics of these two approaches, as defined for the study, are defined below.

Expert Consultant Approach

The Expert Consultant approach is often used by design teams without significant LEED experience; however, it is also used by design teams that seek innovative ideas and expert opinions related to high-performance buildings. In many cases, the expert consultant is not only responsible for managing and tracking LEED issues, but is also responsible for other specialized project tasks such as computer energy modeling, daylighting analysis, or renewable energy systems design.

Key characteristics of this approach include the following:

- The consultant serves as the “point person” for coordinating LEED issues.
- The consultant assists the design team in organizing and facilitating an initial LEED charrette or goal setting session.

- The consultant tracks the status of the LEED goals throughout the project. The consultant supports the design team by providing design suggestions and material and system options, and by performing LEED-specific calculations where needed. The consultant defines “action items” for other members of the design team during each project phase.
- The consultant may provide additional specialized services such as energy modeling, daylighting analyses, or renewable energy systems design.
- The consultant coordinates the development of “green” specification language.
- The consultant provides LEED-related submittal reviews during construction.
- The consultant assembles the final LEED documentation submission, with assistance from the design team.
- The architect acts as general coordinator and integrator for the LEED initiatives proposed by the consultant.

The potential benefits of this approach include the following:

- One entity, the expert consultant, focuses exclusively on the LEED issues for the project.
- The consultant’s specialization in high-performance buildings may bring innovative ideas and cost-effective strategies to the design team. This can potentially lead to lower hard costs on LEED projects, particularly with inexperienced design teams.
- The consultant typically provides detailed deliverables during each design phase. This enables the client to clearly track the project’s progress toward achieving the desired LEED rating.
- The consultant is likely to be up-to-date on specific LEED issues, including updates to the rating system and credit ruling interpretations, as well as new products or systems that are available to meet LEED criteria.
- The consultant can assist in educating design team members and contractors on green building issues.

The potential disadvantages include the following:

- The LEED-related soft costs may be higher in this approach. In addition to the consultant’s fees, there are also LEED-related administration fees for the design team, which cover their time to integrate the LEED directives, administer the consultant’s contracts, and evaluate unfamiliar strategies, materials, or systems. The extent of these integration and management fees will vary depending on the experience level of the design team and their business perspective regarding LEED (for some design teams, LEED is seen as a future business opportunity, and they are willing to invest time on a project to learn the process).

Experienced Design/Construction Team Approach

This approach is typically used when the primary design team members (i.e., architect; landscape architect; civil, structural, and mechanical/electrical/plumbing engineers; construction manager) have previous LEED experience and have a demonstrated track record of producing high-performance buildings.

Key characteristics of this approach include the following:

- The architect, engineer, or construction manager designates a point person among their team for LEED issues.
- The architect, engineer, or construction manager coordinates an initial LEED charrette or review, and performs the LEED analyses and updates throughout each project phase. All LEED-specific calculations, materials research, specifications, construction documents, submittal reviews, and documentation are provided by the design team.
- The design/construction team is capable of performing specialized tasks such as energy modeling, daylighting analyses, or renewable energy systems design.

The potential benefits of this approach include the following:

- Additional soft costs can be lower than in the Expert Consultant approach, because the LEED tasks are performed directly by the design/construction team (i.e., most of the

LEED administration fees of the expert consultant approach are not required).

- LEED strategies can be seamlessly incorporated into the design and construction process.
- There is good potential for the development of integrated, cost-effective design solutions.
- Less time is needed to educate members of the design team about LEED.

The potential disadvantages include the following:

- The multiple responsibilities of the design team (e.g., budget, deadlines, overall design coordination) can result in a loss of focus on LEED issues.
- Fewer (or less detailed) LEED deliverables may be developed for the client to track progress during the design stages.
- The design team may not be up-to-date on changes/updates in the LEED system.

As indicated above, both approaches have advantages and disadvantages. This study does not attempt to promote one approach over the other, but rather acknowledges that either option might be used in current and future GSA projects. Because of this, the two approaches are used to define two separate sets of soft cost estimates, thereby providing a range of expected soft cost impacts.

It is also understood that variations to the above two approaches will likely occur (e.g., an expert consultant assists the design team only in the early design stages, or a specialized consultant is used only for daylighting analysis). Variations of this type, however, were not tracked in the study. It is generally assumed that the additional soft costs of these variations will fall somewhere within the range of the two sets of estimates that were developed.

LEED Tasks: Multiple Credit / “LEED Process” Tasks vs. Credit-Specific Tasks

The interviews revealed that there are two distinct ways to define LEED-based tasks: 1) tasks that apply to multiple LEED credits and to an overall “LEED Process”; and 2) tasks that are specific to an individual LEED credit. The distinction between the two has important implications in defining the soft cost estimates.

Multiple Credit/LEED Process Tasks

While a LEED rating ultimately comprised of a collection of individual credits, many LEED-specific tasks are tied to multiple, rather than individual, LEED measures. For instance, creating project specifications that include LEED criteria is typically considered one discrete task, even though it covers many of the LEED credits being pursued. The extent and content of the LEED specification language will vary depending on the individual LEED credits that are targeted, but the task itself is still considered one task. These types of multiple credit tasks ultimately define what may be called a “LEED Process.”

In general, the LEED process starts with the team’s initial assessment of the LEED credits that will be pursued for the project. Once a number of credits have been targeted, the design team (in either the Expert Consultant or Experienced Design/Construction Team approach) tends to assess and develop the entire collection of LEED measures concurrently with the development of the overall project. Many LEED process tasks are therefore defined relative to a specific design phase.

For the purposes of this study, a majority of the LEED-related tasks have been categorized as Multiple Credit/LEED Process items rather than as Credit-Specific tasks. This is particularly relevant for the Expert Consultant scenarios, because the consultants often structure their fees based on LEED Process deliverables, rather than on individual credits (the consultants often do not know the specific LEED credits that will be selected for projects prior to developing their fee proposals).

The specific LEED Process tasks identified for the study are as follows:

- Facilitation of a LEED Charrette or LEED Feasibility Review (Concept Design Phase)
- Development and coordination of LEED action items with the entire design team (Design Development [DD] and Construction Documents [CD] Phases)
- Materials and systems research for LEED credits (DD and CD Phases)
- LEED calculations for Site, Water, Material, and IEQ Credits (DD and CD Phases)

- LEED credit interpretation reviews and/or submissions to the U.S. Green Building Council (DD Phase)
- Development of LEED specification language for materials, equipment, submittal procedures, Construction Waste Management, and Construction Indoor Air Quality Management (CD Phase)
- Review of LEED submittal procedures and special LEED requirements with the Construction Manager/Construction Contractor and/or subcontractors (Construction Procurement or Construction Phases)
- Review of Contractor submittals for LEED compliance/Tracking of LEED credits and periodic LEED review meetings (Construction Phase, 36 month duration assumed)
- Assembly of the LEED Documentation submission (Construction Phase)

Commissioning tasks, which can also be considered part of the LEED process, are purposely not included in this list. This is because GSA considers commissioning a project requirement independent of LEED, and therefore not subject to LEED-related fees (see further discussion of this issue in the “Additional Considerations” section below).

Credit-Specific Tasks

Credit-Specific tasks, as defined in this study, are those efforts associated with a specific LEED credit that involve significant increases in the scope of *design work*. In most cases, these credits involve either a clear addition to the scope of the building (e.g., adding changing/shower rooms that were not originally in the program), or involve new or atypical design features that require additional design time, construction drawings, specifications, and project coordination. Credit-specific tasks are considered separate from the LEED process tasks because: 1) the increased design and production effort is significant; 2) the systems or design features would not have been anticipated as part of the base project; and 3) the additional effort only applies if the particular LEED credit is being pursued.

Examples of credit-specific tasks defined for the study are included below.

Sustainable Sites Credit SS-7.2: Landscape and Exterior Design to Reduce Heat Islands (Roof)

Additional soft costs are incurred for the design of a vegetated roof system. Tasks include the design of rooftop planting areas, plant and soil type selections, associated construction documents, and the development of a maintenance manual (Responsibility: Landscape Architect).

Energy and Atmosphere Credit EA-2: Renewable Energy

Additional soft costs are incurred for the design of a renewable energy system (e.g., photovoltaic [PV] panels). Tasks include initial system evaluations and product research, computer modeling of PVs to estimate annual kwh output, system design and engineering, construction documents, and construction contract administration (Responsibility: MEP Engineers or Renewable Energy Consultant).

Estimates developed for the credit-specific tasks are used in both the Expert Consultant and Experienced Design/Construction Team scenarios.

Estimate Results

The Multiple Credit/LEED Process tasks and Credit-Specific tasks were combined to develop soft cost estimates for the six Courthouse and six Office Building Modernization scenarios. Separate estimates were defined for the Expert Consultant and Experienced Design/Construction Team approaches.

Assumptions

The following sections describe the assumptions used in Expert Consultant and Experienced Design/Construction Team cases.

Expert Consultant Approach

The fees developed for these scenarios are based solely on hourly estimates, using a range of professional positions and associated hourly rates. The scope of services includes the defined LEED Process tasks, performed by the expert consultant, and a series of Credit-Specific tasks, which are performed by various members of the design/construction team. The Credit-Specific tasks in these scenarios include all significant design measures that are above and beyond GSA's P100

requirements. The estimates also include LEED administration and coordination efforts by the architect. LEED Design and LEED Documentation costs are tracked separately.

Experienced Design/Construction Team Approach

The fees developed for these scenarios are based on a combination of two types of estimates:

1. *Construction-cost-based fee increases.* These are used to define a “lump sum” fee that covers all the design and construction phase LEED Process tasks performed by the design/construction team. The assumptions used for these fees are as follows: a 2.5 percent construction cost increase is applied to the New Courthouse (assumed to achieve a LEED Silver rating), with a 6percent design team fee. A 3 percent construction cost increase is applied to the Office Building Modernization (assumed to achieve a LEED Silver rating), with a 6 percent design team fee.
2. *Hourly estimates.* These are used to define fees for all Credit-Specific design tasks that are considered to be above and beyond the scope of a “typical” LEED Silver-rated building. The tasks include measures that only apply to the Gold rating scenarios (e.g., green roof, photovoltaics), and the following tasks that apply to both Gold and Silver scenarios:
 - *Energy and Atmosphere Credit EA-1: Optimize Energy Performance.* Additional services are incurred when high-energy point totals are pursued (in Gold and some “high-cost” Silver rating scenarios). The additional fees are for extended computer energy modeling and evaluations and for additional engineering design and production time (Responsibility: MEP Engineers and/or Energy Modeling Consultant).
 - *Energy and Atmosphere Credit EA-5: Measurement and Verification.* Additional soft costs are incurred to develop a detailed Measurement and Verification Plan that includes a listing of systems and equipment to be monitored, a definition of building baseline energy performance, a methodology to verify projected savings, and suggested procedures for

system/equipment corrections
(Responsibility: MEP Engineers).

Hourly estimates are also used to define LEED Documentation costs. The interviewed professionals maintained that LEED Documentation would be an additional service even in the Experienced Design Team approach. Although LEED Version 2.1 has reduced the amount of documentation that must be submitted (as compared to LEED Version 2.0), the professionals believed that significant time is still required for tracking submittals, creating drawings, and preparing calculations in anticipation of potential credit audits. The LEED Documentation fees in these scenarios include increased time for submittal reviews and contractor education as well as time to assemble the final documentation package.

Results

In the Expert Consultant approach, the soft cost totals (including both design and documentation costs) for the six New Courthouse scenarios ranged from **\$0.41/GSF** to **\$0.80/GSF**, as detailed in Table 4-1A. The soft cost totals for the six Office Building Modernization scenarios ranged from **\$0.41/GSF** to **\$0.70/GSF**, as detailed in Table 4-1B.

In the Experienced Design/Construction Team approach, the soft cost totals for the six New Courthouse scenarios ranged from **\$0.43/GSF** to **\$0.73/GSF**, as detailed in Table 4-2A. The soft cost totals for the six Office Building Modernization scenarios ranged from **\$0.35/GSF** to **\$0.59/GSF**, as detailed in Table 4-2B.

Expert Consultant Approach

TABLE 4-1A

		NEW COURTHOUSE (262,000 GSF)					
		Certified		Silver		Gold	
		1A Low	2A High	3A Low	4A High	5A Low	6A High
LEED DESIGN COSTS							
	CREDIT-SPECIFIC TASKS	\$0	\$13,920	\$0	\$37,100	\$37,100	\$85,600
	MULTIPLE CREDIT / LEED PROCESS TASKS	\$77,810	\$77,810	\$77,810	\$77,810	\$90,910	\$90,910
	SUBTOTAL (Including reimbursables)	\$83,810	\$97,730	\$83,810	\$120,910	\$134,010	\$182,510
LEED DOCUMENTATION COSTS							
	FULL DOCUMENTATION (Including registration fees, certification fees, and reimbursables)	\$22,350	\$22,350	\$23,650	\$23,650	\$25,950	\$25,950
	SOFT COST TOTALS (Design + Documentation)	\$106,160	\$120,080	\$107,460	\$144,560	\$159,960	\$208,460
	COST IMPACT (\$/GSF)	\$0.41	\$0.46	\$0.41	\$0.55	\$0.61	\$0.80

TABLE 4-1B

		OFFICE MODERNIZATION (306,600 GSF)					
		Certified		Silver		Gold	
		1B Min. Fac.	2B Full Fac.	3B Min. Fac.	4B Full Fac.	5B Min. Fac.	6B Full Fac.
LEED DESIGN COSTS							
	CREDIT-SPECIFIC TASKS	\$13,920	\$16,160	\$23,560	\$39,340	\$87,340	\$84,060
	MULTIPLE CREDIT / LEED PROCESS TASKS	\$77,810	\$77,810	\$77,810	\$77,810	\$90,910	\$90,910
	SUBTOTAL (Including Reimbursables)	\$97,730	\$99,970	\$107,370	\$123,150	\$184,250	\$180,970
LEED DOCUMENTATION COSTS							
	FULL DOCUMENTATION (Including registration fees, certification fees, and reimbursables)	\$26,730	\$26,730	\$28,030	\$28,030	\$30,330	\$30,330
	SOFT COST TOTALS (Design + Documentation)	\$124,460	\$126,700	\$135,400	\$151,180	\$214,580	\$211,300
	COST IMPACT (\$/GSF)	\$0.41	\$0.41	\$0.44	\$0.49	\$0.70	\$0.69

Experienced Design / Construction Team Approach

TABLE 4-2A

		NEW COURTHOUSE (262,000 GSF)					
		Certified		Silver		Gold	
		1A Low	2A High	3A Low	4A High	5A Low	6A High
LEED DESIGN COSTS							
	CREDIT-SPECIFIC TASKS	\$0	\$5,160	\$0	\$28,340	\$28,340	\$72,400
	MULTIPLE CREDIT / LEED PROCESS TASKS (Assumes a 6% design fee and a 2.5% construction cost increase)	\$86,122	\$86,122	\$86,122	\$86,122	\$86,122	\$86,122
	SUBTOTAL (Including reimbursables)	\$88,122	\$93,282	\$88,122	\$116,462	\$116,462	\$160,522
LEED DOCUMENTATION COSTS							
	FULL DOCUMENTATION (Including registration fees, certification fees, and reimbursables)	\$24,290	\$24,290	\$25,970	\$25,970	\$29,530	\$29,530
	SOFT COST TOTALS (Design + Documentation)	\$112,412	\$117,572	\$114,092	\$142,432	\$145,992	\$190,052
	COST IMPACT (\$/GSF)	\$0.43	\$0.45	\$0.44	\$0.54	\$0.56	\$0.73

TABLE 4-2B

		OFFICE MODERNIZATION (306,600 GSF)					
		Certified		Silver		Gold	
		1B Min. Fac.	2B Full Fac.	3B Min. Fac.	4B Full Fac.	5B Min. Fac.	6B Full Fac.
LEED DESIGN COSTS							
	CREDIT-SPECIFIC TASKS	\$5,160	\$5,160	\$14,800	\$28,340	\$74,140	\$68,620
	MULTIPLE CREDIT / LEED PROCESS TASKS (Assumes a 6% design fee and a 3.0% construction cost increase)	\$70,886	\$72,798	\$70,886	\$72,798	\$70,886	\$72,798
	SUBTOTAL (Including reimbursables)	\$78,046	\$79,958	\$87,686	\$103,138	\$147,026	\$143,418
LEED DOCUMENTATION COSTS							
	FULL DOCUMENTATION (Including registration fees, certification fees, and reimbursables)	\$28,670	\$28,670	\$30,350	\$30,350	\$33,910	\$33,910
	SOFT COST TOTALS (Design + Documentation)	\$106,716	\$108,628	\$118,036	\$133,488	\$180,936	\$177,328
	COST IMPACT (\$/GSF)	\$0.35	\$0.35	\$0.38	\$0.44	\$0.59	\$0.58

Discussion of Findings

The difference in costs between the two approaches warrants an assessment. As noted, the Expert Consultant fees were developed using hourly estimates of listed tasks. This was done to establish a soft cost fee independent of construction costs. The Experienced Design/Construction Team estimates, on the other hand, were developed using construction-cost-based fee increases for the LEED Process tasks, with gross assumptions for the construction cost increases and design team fees. This was done as a check and comparison to the first approach, to assess how consistent the results would be.

As the estimates were developed, it was generally assumed that the Expert Consultant approach would be somewhat more expensive than the Experienced Design/Construction Team approach. As previously noted, this is because the soft costs include both the consultant's fees and the design team's fees for their own learning and coordination efforts. As calculated in the expert consultant models, these additional coordination costs (identified primarily through task MC-9 of Table H-1 in Appendix H) represent about 20 to 35 percent of the total LEED soft cost fee, or about 1 percent of the total design fee for projects of this size¹.

Using these numbers as a guide, it was assumed that the experienced design/construction team's LEED fees should generally be anywhere from 0 to 35 percent less than the fees in the Expert Consultant model. The degree of cost reduction is assumed to vary based on the experience level of the design team, their negotiated fees, and the LEED-based construction cost increase included in the project.

The Experienced Design/Construction Team estimates generally confirm these assumptions, as the soft costs in 10 of the 12 LEED scenarios are 1.5 to 20 percent lower than their corresponding estimates in the Expert Consultant models. In two of the scenarios (1A and 3A), the soft costs are

¹ Assuming an overall design fee based on 6% of the project construction cost. For the baseline Courthouse building, the 6% fee is approximately \$3.4 million. The architect's coordination fees from item MC-9 range from \$31,000 - \$38,000. The coordination fees are therefore about 1% of the total design fee – before any adjustments for “green” construction costs.

approximately 6 percent higher than in the corresponding Expert Consultant cases. This variation is primarily attributed to the approximate nature of tying soft costs to construction costs, and also to the specific assumptions used for the construction cost increase and design team fee.

Overall, however, the two sets of estimates tend to reinforce the following range of soft costs for the twelve case studies (rounded off to the nearest \$0.05/GSF):

Certified Rating: \$0.35–\$0.45/GSF

Silver Rating: \$0.40–\$0.55/GSF

Gold Rating: \$0.55–\$0.80/GSF

It is noteworthy that the range of projected soft costs increases as the rating level moves from Certified to Silver to Gold. This generally corresponds to the increasing range of hard costs that were identified for each LEED rating level in Section One of the study.

Additional Considerations

Commissioning

Commissioning is one of the most significant soft costs that can be incurred on a LEED project. Fundamental Building Systems Commissioning is a prerequisite in LEED, while Additional Commissioning (Credit EA-3) can be earned for performing additional commissioning tasks and using a Commissioning Authority independent of the design team. As noted in Section 2 of this report, commissioning is already a requirement in GSA projects, independent of LEED. A Commissioning Authority, typically from a Construction Management firm, is hired independently of the A/E team, and provides a range of GSA-mandated services that qualify projects for both the LEED Prerequisite and Additional Commissioning credit. For the purposes of this study, commissioning costs are not considered LEED-based premiums.

The soft costs associated with the LEED Prerequisite commissioning requirements are estimated to be in the range of \$0.60–\$0.80/GSF for projects of the scale and complexity of the Courthouse and Office building models used in this

study¹. Additional commissioning services to achieve Credit EA-3 are estimated to add another \$0.10 - \$0.15/GSF to projects of this scale. GSA's total building commissioning fees are assumed to be slightly higher than these estimates, as GSA's commissioning scope is more comprehensive than the LEED requirements.

Energy Modeling

Another significant soft cost that is already included in GSA projects is computer energy modeling. The level of soft cost associated with energy modeling for buildings of the size and complexity of the Courthouse and Office building models ranges from \$0.15 to \$0.30 GSF.

Additional Factors That Can Influence Soft Costs

While the estimates defined for the Courthouse and Office Building models provide a useful indicator of expected soft costs, a range of factors can potentially influence the numbers and should be considered when assessing soft cost impacts for other projects. These factors include:

1. *Project Scale.* LEED soft costs are expected to be similar to other architectural and engineering fees; i.e., fees will tend to scale up for small projects and down for larger buildings where there are economies of scale. The soft cost estimates in this study were based on mid-rise buildings that are approximately 250,000–300,000 GSF in size. In small projects, the potential increase in construction cost for “green” features, and resulting fee increase, may not be in line with the amount of LEED-specific work required of the design team. The design team may pursue additional fees in these scenarios, or propose a higher base design fee percentage. Conversely, with larger projects it is expected that the LEED-related soft costs will level off rapidly. This is because the “LEED Process” tasks generally require the same (or similar) levels of effort, even as a project increases in size.

2. *Extended Time Schedules/Project Phasing.* If the construction schedule for a GSA project is particularly long (e.g., over three years), as in the case of some of the phased office modernization projects, the LEED soft cost fees may rise – particularly in the Expert Consultant approach. The extended schedule potentially complicates the tracking of LEED submittals and the assembly of a complete documentation submission.
3. *Separation of Base Building and Tenant Improvement Projects.* If a GSA project involves separate base building and tenant improvement projects, with different design teams involved, the LEED process will become more complicated and soft costs will likely rise. To manage these scenarios, close information transfer between the design teams is required, which can be difficult. In many of these situations, it may be preferable to manage the project using the separate LEED Core and Shell and LEED Commercial Interiors systems, rather than using LEED New Construction system.

Supporting Information

The following supporting documents are included as part of the LEED-related Soft Costs study:

- Appendix G: Soft Cost Estimate Summaries (for the Twelve LEED Scenarios)
 - Table G-1: Expert Consultant Model
 - Table G-2: Experienced Design Team Model
- Appendix H: Detailed Soft Cost Estimates (for Credit-Specific Tasks and Multiple Credit/LEED Process Tasks)
 - Table H-1: Expert Consultant Model
 - Table H-2: Experienced Design Team Model

¹ An additional \$0.15 - \$0.20/GSF is estimated for commissioning-related premiums from HVAC contractors. For the purposes of this study, these costs are considered hard costs, since they are typically included in the contractor's construction bids.

Appendix A:

Cost Estimate Summaries – Courthouse Scenarios

LEED Cost Study
(GS-11P-99-MAD-0565)

Mid Rise Courthouse LEED Scenarios
Combined Incremental First Costs of LEED Credits

COURTHOUSE LEED SCENARIO 1A: Certified/Low	(0.4%)	-\$0.76/GSF
COURTHOUSE LEED SCENARIO 2A: Certified/High	1.0%	\$2.18/GSF
COURTHOUSE LEED SCENARIO 3A: Silver/Low	(0.03%)	-\$0.07/GSF
COURTHOUSE LEED SCENARIO 4A: Silver/High	4.4%	\$9.57/GSF
COURTHOUSE LEED SCENARIO 5A: Gold/Low	1.4%	\$2.97/GSF
COURTHOUSE LEED SCENARIO 6A: Gold/High	8.1%	\$17.79/GSF

COURTHOUSE LEED SCENARIO 1A: Certified/Low
Construction Start Date *1 October 2003*
Estimate Prepared Date *14 May 2004*

[illegible]

Incremental First Costs of LEED Credits

COURTHOUSE LEED SCENARIO 2A: Certified/High

Construction Start Date 1 October 2003

Estimate Prepared Date 14 May 2004

SYNERGISTIC ITEMS		SS	WE	WE3.2a	WE3.2b	EA	EA 1.1-10 ³ Optimize Energy Performance (To achieve 3 LEED Points)	EA 5 Measurement & Verification	MIR	MIR 2.1b	MIR 2.2	EQ	EQ p2 Environmental tobacco smoke (ETS) control	EQ 1 Install CO2 sensors & 5-year calibration	EQ 3.1b Construction IAQ Management Plan - During Construction ("High Cost Scenarios")	EQ 3.2 Construction IAQ Management Plan - Before Occupancy
DESCRIPTION	A10 Foundations				0	0	0	0						0	0	0
	A20 On Grade/Below Grade Construction				0	0	0	0						0	0	0
	B10 Superstructure				0	0	0	0						0	0	0
	B20 Exterior Enclosure				0	0	0	0						0	0	0
	B30 Roofing				0	0	0	0						0	0	0
	C10 Interior Construction				0	0	0	0						0	0	0
	C30 Interior Finishes				0	0	0	0						0	0	0
	D10 Conveying Systems				0	0	0	0						0	0	0
	D20 Plumbing				27,165	8,580	0	0						0	0	0
	D30 HVAC				0	0	6,300	80,200						48,600	6,382	1,157
	D40 Fire Protection				0	0	0	0						0	0	0
	D50 Electrical				9,840	1,210	107,014	0						0	0	0
	E10 Equipment				0	0	0	0						0	0	0
	E20 Furnishings				0	0	0	0						0	0	0
	F10 Special Construction				0	0	0	0						0	0	0
	F20 Selective Building Demolition				0	0	0	0						0	0	0
	G10 Building Sitework				0	0	0	0						0	0	0
	Estimated Direct Construction Cost				37,005	9,790	113,314	80,200						48,600	6,382	1,157
10% 0% 15%	Design Contingency - Allowance				3,701	979	11,331	8,020		0	0	0		4,860	638	116
	Phasing Premium				0	0	0	0		0	0	0		0	0	0
	General Conditions and Profit - Allowance				6,106	1,615	18,697	13,233		0	0	0		8,019	1,053	191
	LEED - related additional General Conditions									30,000*	20,000*		25,000*	35,000	43,073	18,750
	Estimated Construction Cost at Bid				46,812	12,384	143,342	101,453		30,000	20,000		25,000	61,479	43,073	20,214
	Cost of Art-in-Architecture - Allowance				234	62	717	507		150	100		125	307	215	101
	Construction Contingency - Allowance				2,352	622	7,203	5,098		1,508	1,005		1,256	3,089	2,164	1,016
	Estimated Construction Cost				49,398	13,069	151,262	107,058		31,658	21,105		26,381	64,876	45,452	21,330
	Incremental Cost / Project GSF				0.19	0.05	0.58	0.41		0.12	0.08		0.10	0.25	0.17	0.08
	Total Area w/Parking 262,000 GSF															
Incremental Cost (% of Reference Cost)					0.09%	0.02%	0.26%	0.19%		0.06%	0.04%		0.05%	0.11%	0.08%	0.04%
Unit cost (where applicable)																
Unit of Measure																

* Tracer gas testing

*Increased transportation costs and labor

Incremental First Costs of LEED Credits

COURTHOUSE LEED SCENARIO 2A: Certified/High

Construction Start Date 1 October 2003

Estimate Prepared Date 14 May 2004

DESCRIPTION	ID	INNOVATION & DESIGN	ID 1.3 Educational display	Total Incremental Cost \$	GSA Reference Estimate \$	% Incremental Cost %
A10 Foundations			0	0	856,528	0.0%
A20 On Grade/Below Grade Construction			0	0	1,044,724	0.0%
B10 Superstructure			0	0	5,126,366	0.0%
B20 Exterior Enclosure			0	0	5,592,113	0.0%
B30 Roofing			0	0	588,238	0.0%
C10 Interior Construction			29,150	29,150	7,933,317	0.4%
C30 Interior Finishes			0	0	4,840,728	0.0%
D10 Conveying Systems			0	0	1,514,298	0.0%
D20 Plumbing			0	35,745	1,189,314	3.0%
D30 HVAC			0	142,639	4,194,512	3.4%
D40 Fire Protection			0	0	533,641	0.0%
D50 Electrical			0	118,064	4,464,497	2.6%
E10 Equipment			0	0	148,200	0.0%
E20 Furnishings			0	0	3,255,221	0.0%
F10 Special Construction			0	0	0	0
F20 Selective Building Demolition			0	0	0	0
G10 Building Sitework			0	0	1,729,000	0.0%
Estimated Direct Construction Cost			29,150	325,598	43,010,697	
Design Contingency - Allowance	10%		2,915	32,560	4,301,070	
Phasing Premium	0%		0	0	0	
General Conditions and Profit - Allowance	15%		4,810	53,724	7,096,765	
LEED - related additional General Conditions				128,750	0	
Estimated Construction Cost at Bid			36,875	540,631	54,408,532	
Cost of Art-in-Architecture - Allowance	0.5%		184	2,703	272,043	
Construction Contingency - Allowance	5%		1,853	27,167	2,734,029	
Estimated Construction Cost			38,912	570,501	57,414,603	1.0%
Incremental Cost / Project GSF			0.15			\$2.18/GSF
Total Area w/Parking 262,000 GSF						
Incremental Cost (% of Reference Cost)			0.07%			
Unit cost (where applicable)						
Unit of Measure						

Incremental First Costs of LEED Credits

COURTHOUSE LEED SCENARIO 3A: Silver/Low

Construction Start Date 1 October 2003

Estimate Prepared Date 14 May 2004

SYNERGISTIC ITEMS	SN 1 Synergistic Credit (SS5.1 + SS 6.1a + WE 1.2)	SS SUSTAINABLE SITES	SS 5.1 Native/adaptive vegetation for 50% for the site	SS 6.1a Stormwater Management by reducing paved areas	WE WATER EFFICIENCY	WE 1.2 Water efficient landscaping, No potable water or irrigation	EA ENERGY & ATMOSPHERE	EA 1.1-10 ³ Optimize Energy Performance (To achieve 3 LEED Points)	MIR MATERIALS & RESOURCES	EQ INDOOR AIR QUALITY	EQ p2 Environmental tobacco smoke (ETS) control	EQ 3.1a Construction IAQ Management Plan - During Construction ("Low Cost Scenarios")	EQ 3.2 Construction IAQ Management Plan - Before Occupancy	ID INNOVATION & DESIGN	Total Incremental Cost
A10 Foundations								0				0	0		0
A20 On Grade/Below Grade Construction								0				0	0		0
B10 Superstructure								0				0	0		0
B20 Exterior Enclosure								0				0	0		0
B30 Roofing								0				0	0		0
C10 Interior Construction								0				0	0		0
C30 Interior Finishes								0				0	0		0
D10 Conveying Systems								0				0	0		0
D20 Plumbing								0				0	0		0
D30 HVAC								6,300				6,382	1,157		13,839
D40 Fire Protection								0				0	0		0
D50 Electrical								107,014				0	0		107,014
E10 Equipment								0				0	0		0
E20 Furnishings								0				0	0		0
F10 Special Construction								0				0	0		0
F20 Selective Building Demolition								0				0	0		0
G10 Building Sitework								0				0	0		(168,774)
Estimated Direct Construction Cost								113,314				6,382	1,157		-47,921
Design Contingency - Allowance								11,331				638	116		-4,792
Phasing Premium								0				0	0		0
General Conditions and Profit - Allowance								18,697				1,053	191		-7,907
LEED - related additional General Conditions												25,000*	0		43,750
Estimated Construction Cost at Bid								143,342				8,073	20,214		-16,871
Cost of Art-in-Architecture - Allowance								717				40	101		-84
Construction Contingency - Allowance								7,203				1,256	406		-848
Estimated Construction Cost								151,262				8,519	21,330		-17,803
Incremental Cost / Project GSF								0.58				0.03	0.08		
Total Area w/Parking 262,000 GSF								0.26%				0.01%	0.04%		
Incremental Cost (% of Reference Cost)															
Unit cost (where applicable)															
Unit of Measure															

* Tracer gas testing

DESCRIPTION	GSA Reference Estimate	% Incremental Cost
A10 Foundations	856,528	0.0%
A20 On Grade/Below Grade Construction	1,044,724	0.0%
B10 Superstructure	5,126,366	0.0%
B20 Exterior Enclosure	5,592,113	0.0%
B30 Roofing	588,238	0.0%
C10 Interior Construction	7,933,317	0.0%
C30 Interior Finishes	4,840,728	0.0%
D10 Conveying Systems	1,514,298	0.0%
D20 Plumbing	1,189,314	0.0%
D30 HVAC	4,194,512	0.3%
D40 Fire Protection	533,641	0.0%
D50 Electrical	4,464,497	2.4%
E10 Equipment	148,200	0.0%
E20 Furnishings	3,255,221	0.0%
F10 Special Construction	0	0
F20 Selective Building Demolition	0	0
G10 Building Sitework	1,729,000	(9.8%)
Estimated Direct Construction Cost	43,010,697	
Design Contingency - Allowance	4,301,070	
Phasing Premium	0	
General Conditions and Profit - Allowance	7,096,765	
LEED - related additional General Conditions	0	
Estimated Construction Cost at Bid	54,408,532	
Cost of Art-in-Architecture - Allowance	272,043	
Construction Contingency - Allowance	2,734,029	
Estimated Construction Cost	57,414,603	(0.0%)
Incremental Cost / Project GSF		
Total Area w/Parking 262,000 GSF		
Incremental Cost (% of Reference Cost)		
Unit cost (where applicable)		
Unit of Measure		

Estimate Prepared Date 14 May 2004

See Synergistic Item SN 4

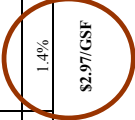
COURTHOUSE LEED SCENARIO 4A: Silver/High

Estimate Prepared Date 14 May 2004

[illegible]

Estimate Prepared Date 14 May 2004

DESCRIPTION	EQ p2 Environmental tobacco smoke (ETS) control	EQ 1 Install CO2 sensors & 5-year calibration	EQ 3.1a Construction IAQ Management Plan - During Construction ("Low Cost Scenarios")	EQ 3.2 Construction IAQ Management Plan - Before Occupancy	ID INNOVATION & DESIGN	Total Incremental Cost \$	GSA Reference Estimate \$	% Incremental Cost %
A10 Foundations				0		0	856,528	0.0%
A20 On Grade/Below Grade Construction				0		0	1,044,724	0.0%
B10 Superstructure				0		0	5,126,366	0.0%
B20 Exterior Enclosure				0		0	5,592,113	0.0%
B30 Roofing				0		0	588,238	0.0%
C10 Interior Construction				0		0	7,933,317	0.0%
C30 Interior Finishes				0		0	4,840,728	0.0%
D10 Conveying Systems				0		0	1,514,298	0.0%
D20 Plumbing				0		35,745	1,189,314	3.0%
D30 HVAC			6,382	1,157		547,139	4,194,512	13.0%
D40 Fire Protection				0		0	533,641	0.0%
D50 Electrical				0		118,064	4,464,497	2.6%
E10 Equipment				0		0	148,200	0.0%
E20 Furnishings				0		0	3,255,221	0.0%
F10 Special Construction				0		0	0	0.0%
F20 Selective Building Demolition				0		0	0	0.0%
G10 Building Sitework				0		(168,774)	1,729,000	(9.8%)
Estimated Direct Construction Cost				1,157		532,174	43,010,697	
Design Contingency - Allowance	10%			638	116	53,217	4,301,070	
Phasing Premium	0%			0	0	0	0	
General Conditions and Profit - Allowance	15%			1,053	191	87,809	7,096,765	
LEED - related additional General Conditions		25,000*		0	18,750	63,750	0	
Estimated Construction Cost at Bid		25,000		8,073	20,214	736,950	54,408,532	
Cost of Art-in-Architecture - Allowance	0.5%	125		40	101	3,685	272,043	
Construction Contingency - Allowance	5%	1,256		406	1,016	37,032	2,734,029	
Estimated Construction Cost		26,381		8,519	21,330	777,667	57,414,603	1.4%
Incremental Cost / Project GSF		0.10		0.03	0.08			\$2.97/GSF
Total Area w/Parking 262,000 GSF								
Incremental Cost (% of Reference Cost)		0.05%		0.01%	0.04%			
Unit cost (where applicable)								
Unit of Measure		^a Tracer gas testing						



See Synergistic Item SN 3

DESCRIPTION	EA 2.1a	EA 5	MIR	MIR 2.1b	MIR 2.2	MIR 4.2	MIR 5.1	MIR 7	EQ	EQ p2	EQ 1	EQ 3.1b	EQ 3.2	EQ 4.4	ID	ID 1.3
A10 Foundations	See Synergistic Item SN 2	0	0				0	0					0	0		0
A20 On Grade/Below Grade Construction		0	0				0	0					0	0		0
B10 Superstructure		0	0				0	0					0	0		0
B20 Exterior Enclosure		0	0				0	86,826					0	0		0
B30 Roofing		0	0				0	0					0	0		0
C10 Interior Construction		0	0				0	0					0	0		0
C30 Interior Finishes		0	0				59,429	0					0	0		29,150
D10 Conveying Systems		0	0				0	0					0	0		0
D20 Plumbing		0	0				0	0					0	0		0
D30 HVAC		80,200	0				0	0				6,382	1,157			0
D40 Fire Protection		0	0				0	0				0	0			0
D50 Electrical		0	0				0	0				0	0			0
E10 Equipment		0	0				0	0				0	0			0
E20 Furnishings		0	0				0	0				0	0			0
F10 Special Construction		0	0				0	0				0	0			0
F20 Selective Building Demolition		0	0				0	0				0	0			0
G10 Building Siework		0	0				0	0				0	0			0
Estimated Direct Construction Cost		80,200				59,429	86,826						6,382	1,157		29,150
Design Contingency - Allowance	10%	8,020			0	0	5,943	8,683					638	116		2,915
Phasing Premium	0%	0			0	0	0	0					0	0		0
General Conditions and Profit - Allowance	15%	13,233			0	0	9,806	14,326					1,053	191		4,810
LEED - related additional General Conditions					30,000*	20,000*					25,000*		35,000	18,750		
Estimated Construction Cost at Bid		101,453			30,000	20,000	75,178	109,835			25,000		43,073	20,214		36,875
Cost of Art-in-Architecture - Allowance	0.5%	507			150	100	376	549			125		215	101		184
Construction Contingency - Allowance	5%	5,098			1,508	1,005	3,778	5,519			1,256		2,164	1,016		1,853
Estimated Construction Cost		107,058			31,658	21,105	79,331	115,903			26,381		45,452	21,330		38,912
Incremental Cost / Project GSF		0.41			0.12	0.08	0.30	0.44			0.10		0.17	0.08		0.15
Total Area w/Parking 262,000 GSF																
Incremental Cost (% of Reference Cost)		0.19%		0.06%	0.04%	0.14%	0.20%			0.05%			0.08%	0.04%		0.07%
Unit cost (where applicable)										* Tracer gas testing						
Unit of Measure																

*Increased transportation costs & labor

Incremental First Costs of LEED Credits

COURTHOUSE LEED SCENARIO 6A: Gold/High

Construction Start Date 1 October 2003

Estimate Prepared Date 14 May 2004

DESCRIPTION	ID 1.4a Exceed Heat Island Effect, Non-roof area	ID 1.4b Exceed Certified Wood Criteria (75%)	Total Incremental Cost \$	GSA Reference Estimate \$	% Incremental Cost
A10 Foundations	0		13,300	856,528	1.6%
A20 On Grade/Below Grade Construction	0		18,300	1,044,724	1.8%
B10 Superstructure	0		5,400	5,126,366	0.1%
B20 Exterior Enclosure	0		86,826	5,592,113	1.6%
B30 Roofing	0		443,001	588,238	75.3%
C10 Interior Construction	0		306,864	7,933,317	3.9%
C30 Interior Finishes	0		218,962	4,840,728	4.5%
D10 Conveying Systems	0		0	1,514,298	0.0%
D20 Plumbing	0		65,208	1,189,314	5.5%
D30 HVAC	0		571,404	4,194,512	13.6%
D40 Fire Protection	0		1,881	533,641	0.4%
D50 Electrical	0		148,064	4,464,497	3.3%
E10 Equipment	0		14,800	148,200	10.0%
E20 Furnishings	0		673,972	3,255,221	20.7%
F10 Special Construction	0		570,000	0	0
F20 Selective Building Demolition	0		0	0	0
G10 Building Sitework	176,297		251,297	1,729,000	14.5%
Estimated Direct Construction Cost	176,297		3,389,278	43,010,697	7.9%
Design Contingency - Allowance	17,630		338,928	4,301,070	
Phasing Premium	0		0	0	
General Conditions and Profit - Allowance	29,089		559,231	7,096,765	
LEED - related additional General Conditions			128,750	0	
Estimated Construction Cost at Bid	223,016		4,416,186	54,408,532	
Cost of Art-in-Architecture - Allowance	1,115		22,081	272,043	
Construction Contingency - Allowance	11,207		221,913	2,734,029	
Estimated Construction Cost	235,337		4,660,181	57,414,603	8.1%
Incremental Cost / Project GSF	0.90				\$17.79/GSF
Total Area w/Parking 262,000 GSF					
Incremental Cost (% of Reference Cost)	0.00%				
Unit cost (where applicable)					
Unit of Measure					

Appendix B:

Cost Estimate Summaries – Office Building Scenarios

LEED Cost Study
(GS-11P-99-MAD-0565)

Mid Rise Office Modernization LEED Scenarios
Combined Incremental First Costs of LEED Credits

OFFICE LEED SCENARIO 1A: Certified/Minimal Façade Renovation	1.4%	\$1.78/GSF
OFFICE LEED SCENARIO 2A: Certified/Full Façade Renovation	2.1%	\$2.73/GSF
OFFICE LEED SCENARIO 3A: Silver/Minimal Façade Renovation	3.1%	\$3.94/GSF
OFFICE LEED SCENARIO 4A: Silver/Full Façade Renovation	4.2%	\$5.55/GSF
OFFICE LEED SCENARIO 5A: Gold/Minimal Façade Renovation	8.2%	\$10.58/GSF
OFFICE LEED SCENARIO 6A: Gold/Full Façade Renovation	7.8%	\$10.22/GSF

OFFICE LEED SCENARIO 1B: Certified/Min Façade Renovation
Construction Start Date *1 October 2003*
Estimate Prepared Date *14 May 2004*

See Synergistic Item SN 3

OFFICE LEED SCENARIO 1B: Certified/Min Façade Renova
Construction Start Date *1 October 2003*
Estimate Prepared Date *14 May 2004*

(a)	(b)	(c)	EQ 4.4 Low-Emitting Materials, Composite Wood - formaldehyde-free MDF	EQ 5 Indoor chemical and pollutant source control	ID INNOVATION & DESIGN	(f) Total Incremental Cost \$	(g) GSA Reference Estimate Minimal Façade Renovation \$	(h) % Incremental Cost
A10	Foundations			0		0	0	
A20	On Grade/Below Grade Construction			0		0	0	
B10	Superstructure			0		0	214,812	0.0%
B20	Exterior Enclosure			0		0	4,411,186	0.0%
B30	Roofing			0		0	17,250	0.0%
C10	Interior Construction			0		100,023	2,233,924	4.5%
C30	Interior Finishes			0		40,261	2,244,939	1.8%
D10	Conveying Systems			0		0	141,231	0.0%
D20	Plumbing			0		0	871,523	0.0%
D30	HVAC			0		161,639	4,130,566	3.9%
D40	Fire Protection			0		0	651,774	0.0%
D50	Electrical			0		0	4,552,209	0.0%
E10	Equipment			0		0	161,499	0.0%
E20	Furnishings			0		2,261	46,499	4.9%
F10	Special Construction			2,100		2,100	0	
F20	Selective Building Demolition			840		840	7,893,930	0.0%
G10	Building Stewardship			0		0	0	
	Estimated Direct Construction Cost			2,940		307,123	27,571,342	1.1%
	Design Contingency - Allowance	10%		294		30,712	2,757,134	
	Phasing Premium	5%		162		16,892	1,516,424	
	General Conditions and Profit - Allowance	15%		509		53,209	4,776,735	
	LEED - related additional General Conditions					98,750	0	
	Estimated Construction Cost at Bid			3,905		506,686	36,621,635	
	Cost of Art-in-Architecture - Allowance	0.5%		20		2,533	183,108	
	Construction Contingency - Allowance	7%		275		35,645	2,576,332	
	Estimated Construction Cost			4,199		544,865	39,381,075	1.38%
	Incremental Cost / Project GSF			0.01			1.78	1.38%
	Total Area w/Parking 306,600 GSF							
	Incremental Cost (% of Reference Cost)			0.01%				
	Unit cost (where applicable)							
	Unit of Measure							

OFFICE LEED SCENARIO 2B: Certified/Full Façade Renovation
Construction Start Date *1 October 2003*
Estimate Prepared Date *14 May 2004*

[illegible]

OFFICE LEED SCENARIO 2B: Certified/Full Façade Renovation
Construction Start Date *1 October 2003*
Estimate Prepared Date *14 May 2004*

[illegible]

Estimate Prepared Date 14 May 2004

See Synergistic Item SN 1b

OFFICE LEED SCENARIO 3B: Silver/Minimum Façade Reno
Construction Start Date *1 October 2003*
Estimate Prepared Date *14 May 2004*

[illegible]

OFFICE LEED SCENARIO 4B: Silver/Full Façade Renovation
Construction Start Date *1 October 2003*
Estimate Prepared Date *14 May 2004*

See Synergistic Item SN 1c

Estimate Prepared Date 14 May 2004

[illegible]

OFFICE LEED SCENARIO 5B: Gold/Min Façade Renovation
Construction Start Date *1 October 2003*
Estimate Prepared Date *14 May 2004*

See Synergistic Item SN 1d

OFFICE LEED SCENARIO 5B: Gold/Min Façade Renovation
Construction Start Date *1 October 2003*
Estimate Prepared Date *14 May 2004*

(a)	(b)	(c)
DESCRIPTION		
MIR 2.2	Waste management (divert 75%)	MIR 5.1a Local/regional materials, 20% manufactured locally (Cases IB, JB, SB)
MIR 7	Certified Interior wood doors	
EQ	ENVIRONMENTAL QUALITY	
EQ p2	Environmental tobacco smoke (ETS) control	
EQ 1	Install CO2 sensors & 5-year calibration	
EQ 3.1	Construction IAQ Management Plan - During Construction	
EQ 3.2	Construction IAQ Management Plan - Before Occupancy	
EQ 4.4	Low-Emitting Materials, Composite Wood - formaldehyde-free MDF	
EQ 5	Indoor chemical and pollutant source control	
EQ 6.1a	Provide Operable in lieu of Fixed Windows at 12% of the Glazed Area (Case SB)	
EQ 8.2	Daylight & Views for Daylight 90% of Spaces, Add Interior Glazing	
ID	INNOVATION & DESIGN	
ID 1.3	Educational display	
ID 1.4b	Exceed Certified Wood Criteria (75%)	
<div>See Synergistic Item SN 4</div>		
<div>Estimated Direct Construction Cost</div>		
Design Contingency - Allowance		
Phasing Premium		
General Conditions and Profit - Allowance		
LEED - related additional General Conditions		
<div>Estimated Construction Cost at Bid</div>		
Cost of Art-in-Architecture - Allowance		
Construction Contingency - Allowance		
<div>Estimated Construction Cost</div>		
Incremental Cost / Project GSF		
Total Area w/Parking 306,600 GSF		
Incremental Cost (% of Reference Cost)		
Unit cost (where applicable)		
Unit of Measure		

Incremental First Costs of LEED Credits

OFFICE LEED SCENARIO 5B: Gold/Min Façade Renovation

Construction Start Date 1 October 2003

Estimate Prepared Date 14 May 2004

(a)	(b)	(c)	(f)	(g)	(h)
	DESCRIPTION	Total Incremental Cost	\$	GSA Reference Estimate Minimal Façade Renovation	% Incremental Cost
A10	Foundations		0	0	
A20	On Grade/Below Grade Construction		0	0	
B10	Superstructure		0	214,812	0.0%
B20	Exterior Enclosure		105,840	4,411,186	2.4%
B30	Roofing		8,700	17,250	50.4%
C10	Interior Construction		431,551	2,233,924	19.3%
C30	Interior Finishes		77,114	2,244,939	3.4%
D10	Conveying Systems		0	141,231	0.0%
D20	Plumbing		64,448	871,523	7.4%
D30	HVAC		536,088	4,130,566	13.0%
D40	Fire Protection		1,881	651,774	0.3%
D50	Electrical		282,934	4,552,209	6.2%
E10	Equipment		19,825	161,499	12.3%
E20	Furnishings		2,261	46,499	4.9%
F10	Special Construction		643,350	0	0
F20	Selective Building Demolition		840	7,893,930	0.0%
G10	Building Sitework		0	0	
	Estimated Direct Construction Cost		2,174,831	27,571,342	7.9%
	Design Contingency - Allowance	10%	217,483	2,757,134	
	Phasing Premium	5%	119,616	1,516,424	
	General Conditions and Profit - Allowance	15%	376,790	4,776,735	
	LEED - related additional General Conditions		128,750	0	
	Estimated Construction Cost at Bid		3,017,470	36,621,635	
	Cost of Art-in-Architecture - Allowance	0.5%	15,087	183,108	
	Construction Contingency - Allowance	7%	212,279	2,576,332	
	Estimated Construction Cost		3,244,836	39,381,075	8.24%
	Incremental Cost / Project GSF				10.58
	Total Area w/Parking 306,600 GSF				
	Incremental Cost (% of Reference Cost)				8.24%
	Unit cost (where applicable)				
	Unit of Measure				

Estimate Prepared Date 14 May 2004

See Synergistic Item SN 1c

OFFICE LEED SCENARIO 6B: Gold/Full Façade Renovation

Construction Start Date 1 October 2003

[illegible]

OFFICE LEED SCENARIO 6B: Gold/Full Façade Renovation
Construction Start Date *1 October 2003*
Estimate Prepared Date *14 May 2004*

7.75%	10.22	7.75%
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Appendix C:

Individual Credit Cost Estimates – Courthouse

LEED Cost Study
(GS-11P-99-MAD-0565)

Mid Rise Courthouse Model
Incremental First Costs of LEED Credits

Estimate Prepared Date 14 May 2004

Unit of Measure

Estimate Prepared Date 14 May 2004

No Cost Premium

SS 4.2a

Bicycle racks

SUMMARY IN UNIFORMAT

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction	0	5,700	5,700
B10	Superstructure	0	5,400	5,400
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction	0	12,148	12,148
C30	Interior Finishes	0	2,916	2,916
D10	Conveying Systems			
D20	Plumbing	0	2,400	2,400
D30	HV/AC	0	4,500	4,500
D40	Fire Protection	0	627	627
D50	Electrical	0	3,000	3,000
E10	Equipment	0	10,800	10,800
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		0	47,491	47,491

(f) GSA Reference Estimate

See Appendix K

(g) LEED Point Estimate

See Section 2

(h) Estimating Assumptions

Add 300 GSF in the basement area. Assume an allowance of \$19/USF to provide additional basement Below Grade Construction and \$18/USF for additional basement superstructure.
See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(j) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
A	SUBSTRUCTURE					A	SUBSTRUCTURE				
A10	Foundations					A10	Foundations Allowance to provide 300 SF of additional garage area	300	SF	\$19.00	\$5,700
	Total A10 Foundations				\$0		Total A10 Foundations				\$5,700
A20	On Grade/Below Grade Construction					A20	On Grade/Below Grade Construction Allowance to provide 300 SF of additional garage area	300	SF	\$18.00	\$5,400
	Total A20 On Grade/Below Grade Construction				\$0		Total A20 On Grade/Below Grade Construction				\$5,400
C	INTERIORS					C	INTERIORS				
C10 C1009	Interior Construction <u>Partitions and Doors</u> <u>Partitions:</u>					C10 C1009	Interior Construction <u>Partitions and Doors</u> <u>Partitions:</u> 6" CMU Wall grouted solid	1,200	SF	\$9.00	\$10,800
	<u>Doors:</u>						<u>Doors:</u> Hollow metal double door 6' x 7' complete w/ frame & hardware	1	EA	\$1,347.53	\$1,348
	Total C10 Interior Construction				\$0		Total C10 Interior Construction				\$12,148
C30 C3010	Interior Finishes <u>Wall Finishes</u>					C30 C3010	Interior Finishes <u>Wall Finishes</u> Paint Wall	2,400	SF	\$0.75	\$1,800
C3020	<u>Floor Finishes</u>					C3020	<u>Floor Finishes</u> Seal Concrete	300	EA	\$0.54	\$162
C3030	<u>Ceiling Finishes</u>					C3030	<u>Ceiling Finishes</u> Suspended 24" x 24" ACT	300	SF	\$3.18	\$954
	Total C30 Interior Finishes				\$0		Total C30 Interior Finishes				\$2,916

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(j) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
D	SERVICES					D	SERVICES				
D20	Plumbing					D20	Plumbing				
D2010						D2010	Plumbing allowance for bike room (Floor Drain)	300	SF	\$8.00	\$2,400
	Total D20 Plumbing				\$0		Total D20 Plumbing				\$2,400
D30	HVAC					D30	HVAC				
							HVAC allowance for bike room (Exhaust Fan)	300	SF	\$15.00	\$4,500
	Total D30 HVAC				\$0		Total D30 HVAC				\$4,500
D40	Fire Protection					D40	Fire Protection				
D4010							Fire protection allowance for bike room	300	SF	\$2.09	\$627
	Total D40 Fire Protection				\$0		Total D40 Fire Protection				\$627
D50	Electrical					D50	Electrical				
D5010						D5010	Electrical allowance for bike room	300	SF	\$10.00	\$3,000
	Total D50 Electrical				\$0		Total D50 Electrical				\$3,000
E	EQUIPMENT & FURNISHINGS					E	EQUIPMENT & FURNISHINGS				
E10	Equipment					E10	Equipment				
E1009	Commercial / Institutional Equipment					E1009	Commercial / Institutional Equipment				
							Bicycle Rack Interior	48	EA	\$125.00	\$6,000
							Install Racks	48	EA	\$100.00	\$4,800
	Total E10 Equipment				\$0		Total E10 Equipment				\$10,800

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction	0	13,300	13,300
B10	Superstructure	0	12,600	12,600
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction	0	33,320	33,320
C30	Interior Finishes	0	20,546	20,546
D10	Conveying Systems			
D20	Plumbing	0	27,063	27,063
D30	HV/AC	0	19,765	19,765
D40	Fire Protection	0	1,254	1,254
D50	Electrical	0	7,000	7,000
E10	Equipment	0	4,000	4,000
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		0	138,848	138,848

(f) Estimating Assumptions

Add 700 GSF in the basement area. Assume an allowance of \$19/USF to provide additional basement Below Grade Construction and \$18/USF for additional basement superstructure.
See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
A	SUBSTRUCTURE					A	SUBSTRUCTURE				
A10	Foundations					A10	Foundations Allowance to provide 300 SF of additional garage area	700	SF	\$19.00	\$13,300
	Total A10 Foundations				\$0		Total A10 Foundations				\$13,300
A20	On Grade/Below Grade Construction					A20	On Grade/Below Grade Construction Allowance to provide 300 SF of additional garage area	700	SF	\$18.00	\$12,600
	Total A20 On Grade/Below Grade Construction				\$0		Total A20 On Grade/Below Grade Construction				\$12,600
C	INTERIORS					C	INTERIORS				
C10 C1009	Interior Construction Partitions and Doors Partitions:					C10 C1009	Interior Construction Partitions and Doors Partitions: 6" CMU Wall solid	2,800	SF	\$9.00	\$25,200
	Doors:						Doors: Solid Core Hardwood veneer door 3'x7' with frame and hardware	2	E/A	\$1,024	\$2,048
C1030	Specialties					C1030	Specialties Toilet Paper Holder Paper Towel dispenser combination waste Soap Dispenser Mirror with brushed brass edge 18"x24" Toilet seat cover dispenser, stainless steel Shower seats Shower Curtain w/rod Stainless Steel toilet Partition, ceiling hung SS Grab bars	2 4 10 4 2 2 6 2 4	E/A E/A E/A E/A E/A E/A E/A E/A E/A	\$26.00 \$372.00 \$600 \$130.00 \$130.00 \$150.00 \$60.00 \$1,126 \$60.00	\$52 \$1,488 \$600 \$520 \$260 \$300 \$360 \$2,252 \$240
	Total C10 Interior Construction				\$0		Total C10 Interior Construction				\$33,320

GSA Reference Estimate						LEED Point Estimate					
(a)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(k)	(l)	(m)	(n)
Uniformat	Description	Quantity	Unit	Rate	Total	Uniformat	Description	Quantity	Unit	Rate	Total
C30	Interior Finishes					C30	Interior Finishes				
C3010	Wall Finishes					C3010	Wall Finishes Paint Walls	5,760	SF	\$0.75	\$4,320
C3020	Floor Finishes					C3020	Floor Finishes Ceramic Tile	700	SF	\$18.06	\$12,642
C3030	Ceiling Finishes					C3030	Ceiling Finishes Drywall Ceiling Painted	700	SF	\$5.12	\$3,584
	Total C30 Interior Finishes				\$0		Total C30 Interior Finishes				\$20,546
D	SERVICES					D	SERVICES				
D20	Plumbing					D20	Plumbing Plumbing	700	SF	\$38.66	\$27,063
	Total D20 Plumbing				\$0		Total D20 Plumbing				\$27,063
D30	HVAC					D30	HVAC HVAC	700	SF	\$28.24	\$19,765
	Total D30 HVAC				\$0		Total D30 HVAC				\$19,765
D40	Fire Protection					D40	Fire Protection Fire Protection	700	SF	\$1.79	\$1,254
	Total D40 Fire Protection				\$0		Total D40 Fire Protection				\$1,254
D50	Electrical					D50	Electrical Electrical	700	SF	\$10.00	\$7,000
	Total D50 Electrical				\$0		Total D50 Electrical				\$7,000
E	EQUIPMENT & FURNISHINGS					E	EQUIPMENT & FURNISHINGS				
E10	Equipment					E10	Equipment				
E1009	Commercial / Institutional Equipment					E1009	Commercial / Institutional Equipment Lockers Lockers Benches	24 4	EA EA	\$150.00 \$100.00	\$3,600 \$400
	Total E10 Equipment				\$0		Total E10 Equipment				\$4,000

SS 5.1

Native/adaptive vegetation for 50% for the site

SUMMARY IN UNIFORMAT

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HVAC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition	1,413,874	1,331,009	(82,865)
G10	Building Sitework			
	Estimated Direct Construction Cost	1,413,874	1,331,009	(82,865)

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

SS 5.1 Native/adaptive vegetation for 50% for the site

Detailed Estimate in Uniformat Breakdown

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
G	BUILDING SITEWORK					G	BUILDING SITEWORK				
G10	Sitework	4,323	SF	\$8.00	\$34,584	G10	Sitework	4,323	SF	\$8.00	\$34,584
	Concrete traffic paving	13,832	SF	\$5.00	\$69,160		Concrete traffic paving	13,832	SF	\$5.00	\$69,160
	Sidewalk paving	28,529	SF	\$20.00	\$570,580		Sidewalk paving	19,451	SF	\$20.00	\$389,020
	Plaza paving	4,323	SF	\$45.00	\$194,535		Plaza paving	2,161	SF	\$45.00	\$97,245
	Steps & landings	865	SF	\$80.00	\$69,200		Steps & landings	865	SF	\$80.00	\$69,200
	Pool/fountain						Pool/fountain				
	Street Trees:						Street Trees:				
	Honey Locust, 3" caliper	20	EA	\$600.00	\$12,000		Honey Locust, 3" caliper	20	EA	\$600.00	\$12,000
	Street Trees:						Street Trees:				
	Zelkova, 2" caliper	25	EA	\$500.00	\$12,500		Zelkova, 2" caliper	25	EA	\$500.00	\$12,500
	Tree Grates, recycled plastic	45	EA	\$700.00	\$31,500		Tree Grates, recycled plastic	45	EA	\$700.00	\$31,500
	Trees in Planting Beds:						Trees in Planting Beds:				
	Mix of Eastern Redbud, Flowering						Mix of Eastern Redbud, Flowering				
	Dogwood, Bald Cypress	30	EA	\$450.00	\$13,500		Dogwood, Bald Cypress	30	EA	\$450.00	\$13,500
	Shrubs in Barrier Garden:						Shrubs in Barrier Garden:				
	Mix of Wax Myrtle, Beautyberry, Wild						Mix of Wax Myrtle, Beautyberry, Wild				
	Hydrangea	10,374	SF	\$16.00	\$165,984		Hydrangea	17,290	SF	\$16.00	\$276,640
	Shrubs and Perennials in Planter Areas:						Shrubs and Perennials in Planter Areas:				
	Mix of Wax Myrtle with various perennials						Mix of Wax Myrtle with various perennials				
	(New England Aster, Wild Bergamont,						(New England Aster, Wild Bergamont,				
	Blue False Indigo, Early Coneflower, Black-						Blue False Indigo, Early Coneflower, Black-				
	eyed Susan and others)						eyed Susan and others)				
	Groundcovers:						Groundcovers:				
	Mix of Leadwort, Striped Wintergreen,						Mix of Leadwort, Striped Wintergreen,				
	Fragrant Sumac, Mountain Stonecrop	13,832	SF	\$12.00	\$165,984		Fragrant Sumac, Mountain Stonecrop	20,748	SF	\$12.00	\$248,976
	Turf grass:						Turf grass:				
	Fescue blend sod including ground prep	5,187	EA	\$3.00	\$15,561		Fescue blend sod including ground prep	2,594	EA	\$3.00	\$7,782
	Irrigation system				In above		Increase irrigation system	11,240	SF	\$0.90	\$10,116
	Total G10 Building Sitework				\$1,413,874		Total G10 Building Sitework				\$1,331,009

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition	1,413,874	1,290,227	(123,647)
G10	Building Sitework			
	Estimated Direct Construction Cost	1,413,874	1,290,227	(123,647)

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate		LEED Point Estimate				
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	
G	BUILDING SITEWORK					
G10	Sitework					
	Concrete traffic paving	4,323	SF	\$8.00	\$34,584	
	Sidewalk paving	13,832	SF	\$5.00	\$69,160	
	Plaza paving	28,529	SF	\$20.00	\$570,580	
	Steps & landings	4,323	SF	\$45.00	\$194,535	
	Pool/fountain	865	SF	\$80.00	\$69,200	
	<u>Street Trees:</u>					
	Honey Locust, 3" caliper	20	EA	\$600.00	\$12,000	
	<u>Street Trees:</u>					
	Zelkova, 2" caliper	25	EA	\$500.00	\$12,500	
	<u>Tree Grates, recycled plastic</u>	45	EA	\$700.00	\$31,500	
	<u>Trees in Planting Beds:</u>					
	Mix of Eastern Redbud, Flowering					
	Dogwood, Bald Cypress	30	EA	\$450.00	\$13,500	
	<u>Shrubs in Barrier Garden:</u>					
	Mix of Wax Myrtle, Beautyberry, Wild					
	Hydrangea	10,374	SF	\$16.00	\$165,984	
	<u>Shrubs and Perennials in Planter Areas:</u>					
	Mix of Wax Myrtle with various perennials					
	(New England Aster, Wild Bergamont,					
	Blue False Indigo, Early Coneflower, Black-					
	eyed Susan and others)					
	<u>Groundcovers:</u>					
	Mix of Leadwort, Striped Wintergreen,	3,458	SF	\$17.00	\$58,786	
	Fragrant Sumac, Mountain Stonecrop	13,832	SF	\$12.00	\$165,984	
	<u>Turf grass:</u>					
	Fescue blend sod including ground prep	5,187	EA	\$3.00	\$15,561	
	Irrigation system				In above	
	Total G10 Building Sitework				\$1,413,874	
G	BUILDING SITEWORK					
G10	Sitework					
	Concrete traffic paving	4,323	SF	\$8.00	\$34,584	
	Sidewalk paving	13,832	SF	\$5.00	\$69,160	
	Plaza paving	28,529	SF	\$20.00	\$570,580	
	Steps & landings	4,323	SF	\$45.00	\$194,535	
	Pool/fountain	865	SF	\$80.00	\$69,200	
	<u>Street Trees:</u>					
	Honey Locust, 3" caliper	20	EA	\$600.00	\$12,000	
	<u>Street Trees:</u>					
	Zelkova, 2" caliper	25	EA	\$500.00	\$12,500	
	<u>Tree Grates, recycled plastic</u>	45	EA	\$700.00	\$31,500	
	<u>Trees in Planting Beds:</u>					
	Mix of Eastern Redbud, Flowering					
	Dogwood, Bald Cypress	30	EA	\$450.00	\$13,500	
	<u>Shrubs in Barrier Garden:</u>					
	Mix of Wax Myrtle, Beautyberry, Wild					
	Hydrangea	19,451	SF	\$16.00	\$311,216	
	<u>Shrubs and Perennials in Planter Areas:</u>					
	Mix of Wax Myrtle with various perennials					
	(New England Aster, Wild Bergamont,					
	Blue False Indigo, Early Coneflower, Black-					
	eyed Susan and others)					
	<u>Groundcovers:</u>					
	Mix of Leadwort, Striped Wintergreen,	4,323	SF	\$17.00	\$73,491	
	Fragrant Sumac, Mountain Stonecrop	23,774	SF	\$12.00	\$285,288	
	<u>Turf grass:</u>					
	Fescue blend sod including ground prep	2,594	EA	\$3.00	\$7,782	
	Increase irrigation system					
	Total G10 Building Sitework				\$1,290,227	

SS 6.1b

Vegetated Roof System @ 65% of Upper Roof

SUMMARY IN UNIFORMAT

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing	548,421	981,542	433,122
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
	Estimated Direct Construction Cost	548,421	981,542	433,122

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

SS 6.1b Vegetated Roof System @ 65% of Upper Roof

Detailed Estimate in Uniformat Breakdown

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
B30 B3010	Roofing <u>Roof Coverings and Insulation</u>					B30 B3010	Roofing <u>Roof Coverings and Insulation</u>				
	Premium quality EPDM single ply membrane roofing system complete with ballast, insulation, etc	42,450	SF	\$7.33	\$311,159		America Hydrotech 4" deep vegetated roofing system.	30,550	SF	\$20.00	\$611,000
	Trims and flashing to roof, allowance roof accessories	46,150	SF	\$2.80	\$129,220		Hydrech inverted membrane roofing (IRMA) system complete with insulation, etc	11,900	SF	\$10.00	\$119,000
	Roof accessories, allowance	46,150	SF	\$0.54	\$24,921		Pavers on 20% of IRMA roof	2,380	SF	\$6.00	\$14,280
	Premium quality EPDM single ply membrane roofing system complete with ballast, insulation, etc (2nd Floor Roof)	3,700	SF	\$7.33	\$27,121		Trims and flashing to roof, allowance roof accessories	46,150	SF	\$2.80	\$129,220
	18 Gauge steel canopy with cantilever cable support struts, complete with factory paint finish and structure	1,000	SF	\$56.00	\$56,000		Premium quality EPDM single ply membrane roofing system complete with ballast, insulation, etc (2nd Floor Roof)	3,700	SF	\$7.33	\$27,121
						Roof accessories, allowance	46,150	SF	\$0.54	\$24,921	
							18 Gauge steel canopy with cantilever cable support struts, complete with factory paint finish and structure	1,000	SF	\$56.00	\$56,000
	Total B30 Roofing				\$548,421		Total B30 Roofing				\$981,542

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition	0	75,000	75,000
G10	Building Sitework			
Estimated Direct Construction Cost		0	75,000	75,000

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions

Sand Filter system complete with connections, excavation and backfill. Based on average cost of installation and tie-ins serving a building of this size.
See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
G	BUILDING SITEWORK					G	BUILDING SITEWORK				
G10	Sitework No Sand Filter System		EA		\$0	G10	Sitework Standard DC Sand Filter System, average cost for 2 acre impervious run-off	1	EA	\$75,000	\$75,000
	Total G10 Building Sitework				\$0		Total G10 Building Sitework				\$75,000

SS 7.2b

Vegetated Roof System

SUMMARY IN UNIFORMAT

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing	548,421	919,502	371,082
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		548,421	919,502	371,082

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
B	SHELL					B	SHELL				
B30 B3010	Roofing <u>Roof Coverings and Insulation</u>					B30 B3010	Roofing <u>Roof Coverings and Insulation</u>				
	Premium quality EPDM single ply membrane roofing system complete with ballast, insulation, etc	42,450	SF	\$7.33	\$311,159		4" deep vegetated roofing system.	23,500	SF	\$20.00	\$470,000
	Trims and flashing to roof allowance	46,150	SF	\$2.80	\$129,220		Inverted membrane roofing (IRMA) system complete with insulation, etc	18,950	SF	\$10.00	\$189,500
	Roof accessories, allowance	46,150	SF	\$0.54	\$24,921		Pavers for 20% of IRMA roof system	3,790	SF	\$6.00	\$22,740
	Premium quality EPDM single ply membrane roofing system complete with ballast, insulation, etc (2nd Floor Roof)	3,700	SF	\$7.33	\$27,121		Trims and flashing to roof, allowance	46,150	SF	\$2.80	\$129,220
	18 Gauge steel canopy with cantilever cable support struts, complete with factory paint finish and structure	1,000	SF	\$56.00	\$56,000		Premium quality EPDM single ply membrane roofing system complete with ballast, insulation, etc (2nd Floor Roof)	3,700	SF	\$7.33	\$27,121
							Roof accessories, allowance	46,150	SF	\$0.54	\$24,921
							18 Gauge steel canopy with cantilever cable support struts, complete with factory paint finish and structure	1,000	SF	\$56.00	\$56,000
	Total B30 Roofing				\$548,421		Total B30 Roofing				\$919,502

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework	1,413,874	1,384,308	(29,566)
	Estimated Direct Construction Cost	1,413,874	1,384,308	(29,566)

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions

This estimate deducts the irrigation system as included in the GSA reference design.
See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
G	BUILDING SITEWORK					G	BUILDING SITEWORK				
G10	Sitework					G10	Sitework				
	Concrete traffic paving	4,323	SF	\$8.00	\$34,584		Concrete traffic paving	4,323	SF	\$8.00	\$34,584
	Sidewalk paving	13,832	SF	\$5.00	\$69,160		Sidewalk paving	13,832	SF	\$5.00	\$69,160
	Plaza paving	28,529	SF	\$20.00	\$570,580		Plaza paving	28,529	SF	\$20.00	\$570,580
	Steps & landings	4,323	SF	\$45.00	\$194,535		Steps & landings	4,323	SF	\$45.00	\$194,535
	Pool/fountain	865	SF	\$80.00	\$69,200		Pool/fountain	865	SF	\$80.00	\$69,200
	Street Trees: Honey Locust, 3" caliper	20	EA	\$600.00	\$12,000		Street Trees: Honey Locust, 3" caliper	20	EA	\$600.00	\$12,000
	Street Trees: Zelkova, 2" caliper	25	EA	\$500.00	\$12,500		Street Trees: Zelkova, 2" caliper	25	EA	\$500.00	\$12,500
	Tree Grates, recycled plastic	45	EA	\$700.00	\$31,500		Tree Grates, recycled plastic	45	EA	\$700.00	\$31,500
	Trees in Planting Beds: Mix of Eastern Redbud, Flowering Dogwood, Bald Cypress	30	EA	\$450.00	\$13,500		Trees in Planting Beds: Mix of Crepe Myrtle, Virginia Pine, Eastern Red Cedar	30	EA	\$450.00	\$13,500
	Shrubs in Barrier Garden: Mix of Wax Myrtle, Beautyberry, Wild Hydrangea	10,374	SF	\$16.00	\$165,984		Shrubs in Barrier Garden: Mix of Wax Myrtle, Maple-leaved Viburnum, American Holly	10,374	SF	\$16.00	\$165,984
	Shrubs and Perennials in Planter Areas: Mix of Wax Myrtle with various perennials (New England Aster, Wild Bergamont, Blue False Indigo, Early Coneflower, Black-eyed Susan and others)	3,458	SF	\$17.00	\$58,786		Shrubs and Perennials in Planter Areas: Mix of Wax Myrtle with various perennials (New England Aster, Wild Bergamont, Blue False Indigo, Early Coneflower, Black-eyed Susan and others)	3,458	SF	\$17.00	\$58,786
	Groundcovers: Mix of Leadwort, Striped Wintergreen, Fragrant Sumac, Mountain Stonecrop	13,832	SF	\$12.00	\$165,984		Groundcovers: Mix of Leadwort, Striped Wintergreen, Fragrant Sumac, Mountain Stonecrop	13,832	SF	\$12.00	\$165,984
	Turf grass: Fescue blend sod including ground prep	5,187	EA	\$3.00	\$15,561		Turf grass: Fescue blend sod including ground prep	5,187	EA	\$3.00	\$15,561
	Irrigation system			In above			Delete irrigation system	32,851	SF	(\$0.90)	(\$29,566)
	Total G10 Building Sitework				\$1,413,874		Total G10 Building Sitework				\$1,384,308

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing	23,438	50,603	27,165
D30	HV/AC			
D40	Fire Protection			
D50	Electrical	0	9,840	9,840
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		23,438	60,443	37,005

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

(a)	(b)	(c) GSA Reference Estimate \$	(d) LEED Point Estimate \$	(e) Incremental Cost \$	DESCRIPTION
PARAMETRIC SUMMARY (UNIFORMAT)					
A10	Foundations				(f) GSA Reference Estimate See Appendix K
A20	On Grade/Below Grade Construction				
B10	Superstructure				
B20	Exterior Enclosure				
B30	Roofing				
C10	Interior Construction				
C30	Interior Finishes				
D10	Conveying Systems				
D20	Plumbing	23,438	50,603	27,165	
D30	HV/AC				
D40	Fire Protection				(g) LEED Point Estimate See Section 2
D50	Electrical	0	9,840	9,840	
E10	Equipment				
E20	Furnishings				
F10	Special Construction				
F20	Selective Building Demolition				
G10	Building Sitework				
Estimated Direct Construction Cost		23,438	60,443	37,005	(h) Estimating Assumptions See Section 2

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing	15,439	24,019	8,580
D30	HV/AC			
D40	Fire Protection			
D50	Electrical	0	1,210	1,210
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		15,439	25,229	9,790

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate						LEED Point Estimate						
(a)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)
Uniformat	Description	Quantity	Unit	Rate	Total	Uniform at	Description	Quantity	Unit	Rate	Total	
D	SERVICES					D	SERVICES					
D20	Plumbing					D20	Plumbing					
D2010	Standard Wall Hung Urinal	22	EA	\$701.77	\$15,439	D2010	Low Flush Urinal-vitreous china w/itregal automatic flush system	22	EA	\$1,091.77	\$24,019	
	Total D20 Plumbing				\$15,439		Total D20 Plumbing				\$24,019	
D50	Electrical					D50	Electrical					
	Total D50 Electrical				\$0		Electrical connections	22	EA	\$55.00	\$1,210	
							Total D50 Electrical				\$1,210	

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HVAC	0	6,300	6,300
D40	Fire Protection			
D50	Electrical	16,166	123,180	107,014
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		16,166	129,480	113,314

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate						LEED Point Estimate						
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total	
D30	HVAC					D30	HVAC				excluded	
								High Efficiency Chillers				excluded
								VFD Cooling Tower Fans				excluded
								Energy Recovery				excluded
								Modulating Condensing Boilers				excluded
						Premium Efficiency Pump Motors	17	E/A	\$121	\$2,050		
						Premium Efficiency AHU Motors	40	E/A	\$106	\$4,250		
	Total D30 HVAC				\$0		Total D30 HVAC				\$6,300	
D50	Electrical					D50	Electrical					
								Dimming Ballasts	388	E/A	\$150.00	\$58,200
								Daylight Sensors	19	E/A	\$160.00	\$3,040
								Microwatt Panel (local controller)	90	E/A	\$135.00	\$12,150
								Occupancy Sensors, wall mtd.	218	E/A	\$160.00	\$34,880
						Combined daylight/occupancy sensors, ceiling mtd.	71	E/A	\$210.00	\$14,910		
	Total D50 Electrical				\$16,166		Total D50 Electrical				\$123,180	

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HVAC	0	459,400	459,400
D40	Fire Protection			
D50	Electrical	16,166	123,180	107,014
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		16,166	582,580	566,414

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical	0	20,000	20,000
E10	Equipment			
E20	Furnishings			
F10	Special Construction	0	570,000	570,000
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		0	590,000	590,000

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate					LEED Point Estimate						
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniformat	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
D50	Electrical					D50	Electrical				
						D5010	Electrical Distribution	1	LS	\$20,000.00	\$20,000
	Total D50 Electrical				\$0		Total D50 Electrical				\$20,000
F	SPECIAL CONSTRUCTION & DEMOLITION					F	SPECIAL CONSTRUCTION & DEMOLITION				
F10	Special Construction					F10	Special Construction				
							6000 SF(60 KW) roof mounted monocrystalline-cells	6,000	SF	\$85.00	\$510,000
							Labor to Install	6,000	SF	\$10.00	\$60,000
	Total F10 Special Construction				\$0		Total F10 Special Construction				\$570,000

(a)	(b)	(c)	(d)	(e)	DESCRIPTION
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$	
A10	Foundations				(f) GSA Reference Estimate
A20	On Grade/Below Grade Construction				See Appendix K
B10	Superstructure				
B20	Exterior Enclosure	337,980	0	(337,980)	
B30	Roofing				
C10	Interior Construction				(g) LEED Point Estimate
C30	Interior Finishes				See Section 2
D10	Conveying Systems				
D20	Plumbing				
D30	HV/AC				
D40	Fire Protection				
D50	Electrical	0	25,000	25,000	
E10	Equipment				
E20	Furnishings				
F10	Special Construction	0	780,000	780,000	
F20	Selective Building Demolition				
G10	Building Sitework				
	Estimated Direct Construction Cost	337,980	805,000	467,020	(h) Estimating Assumptions
					See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniformat	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
B20	Exterior Enclosure					B20	Exterior Enclosure				
B2020	Exterior Windows and Doors Aluminum curtain wall system with 3 coat "Kynar" aluminum framing, double glazed low E (with some articulation	6,000	SF	\$56.33	\$337,980	B2020	Exterior Windows and Doors				
	Total B20 Exterior Closure				\$337,980		Total B20 Exterior Closure				\$0
D50	Electrical					D50	Electrical				
	Total D50 Electrical				\$0	D5010	Electrical Distribution	1	LS	\$25,000	\$25,000
							Total D50 Electrical				\$25,000
F	SPECIAL CONSTRUCTION & DEMOLITION					F	SPECIAL CONSTRUCTION & DEMOLITION				
F10	Special Construction					F10	Special Construction				
							60 KW Curtain wall integrated PV system Install PV Panels	6,000 6,000	SF SF	\$120.00 \$10.00	\$720,000 \$60,000
	Total F10 Special Construction				\$0		Total F10 Special Construction				\$780,000

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC	0	80,200	80,200
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		0	80,200	80,200

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
D	SERVICES					D	SERVICES				
D30	HVAC Tenant Area Lighting Panels	12	EA		incl.	D30	HVAC Add Lighting Panel meters and connect to BMS	12	EA	\$1,600.00	\$19,200
	Amp meters on chiller motor starters	3	EA		incl.		Connect chiller amp meters to BMS	3	EA	\$1,200.00	\$3,600
	NO gas meters in natural gas lines to each boiler	4	EA		\$0		Add gas flow meters and connect to BMS	4	EA	\$4,000.00	\$16,000
	Tenant Receptacle Panels	12	EA		incl.		Add Receptacle Panel meters and connect to BMS	12	EA	\$1,600.00	\$19,200
	NO flow meters in domestic water risers	5	EA		\$0		Add domestic water flow meters and connect to BMS	5	EA	\$3,200.00	\$16,000
	Flow meter on cooling tower make-up water	1	EA		incl.		Connect cooling tower make-up water meter to BMS	1	EA	\$1,200.00	\$1,200
							Provide trend log programming for chiller efficiency, tenant lighting, tenant receptacles, natural gas and boilers	1	EA	\$5,000.00	\$5,000
	Total D30 HVAC				\$0		Total D30 HVAC				\$80,200

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing	2,822,940	2,882,369	59,429
D30	HV/AC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
	Estimated Direct Construction Cost	2,822,940	2,882,369	59,429

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions

The cost of fly ash concrete is the same, as portland cement concrete.
There is no cost premium between the Interface recycled carpet and the standard spec carpet.
The premium cost of the recyclable drywall is the shipping cost from the factory to the jobsite.
The cost for acoustic ceiling carried in the reference estimate at \$3.18/SF is adequate to provide an Ultima/Cirrus level higher recycled content tile.
See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniformat	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
C	INTERIORS					C	INTERIORS				
C30	Interior Finishes					C30	Interior Finishes				
CORE & SHELL	Interior partition - GWB on both sides and including metal studs at 16" o.c., insulated, fire rated	4,280	SF	\$4.85	\$20,758		Interior partition - GWB on both sides and including metal studs at 16" o.c., insulated, fire rated	4,280	SF	\$4.95	\$21,186
	Interior partition - one layer GWB on one side only and including metal studs at 16" o.c., insulated	36,108	SF	\$3.23	\$116,629		Interior partition - one layer GWB on one side only and including metal studs at 16" o.c., insulated	36,108	SF	\$3.28	\$118,434
	Interior partition - GWB both sides on metal studs at 16" O.C. Insulated	31,364	SF	\$4.85	\$152,115		Interior partition - GWB both sides on metal studs at 16" O.C. Insulated	31,364	SF	\$4.95	\$155,252
	Interior partition - GWB both sides on metal studs at 16" OC	10,050	SF	\$4.53	\$45,527		Interior partition - GWB both sides on metal studs at 16" OC	10,050	SF	\$4.63	\$46,532
	Interior partition - 2 layers GWB both sides, sound insulated, on metal studs @ 16" o.c. (mech rooms)	16,390	SF	\$8.46	\$138,659		Interior partition - 2 layers GWB both sides, sound insulated, on metal studs @ 16" o.c. (mech rooms)	16,390	SF	\$8.66	\$141,937
	Shaft/chase formed of 2 hr 50 STC rated Type X GWB shaft wall system, with 1 layer 1" shaftwall and one layer GWB, sound insulated.	4,104	SF	\$10.73	\$44,036		Shaft/chase formed of 2 hr 50 STC rated Type X GWB shaft wall system, with 1 layer 1" shaftwall and one layer GWB, sound insulated.	4,104	SF	\$10.73	\$44,036
	GWB on metal furring channels attached to wall (wall elsewhere)	20,868	SF	\$2.80	\$58,430		GWB on metal furring channels attached to wall (wall elsewhere)	20,868	SF	\$2.85	\$59,474
	Interior partition - GWB on both sides and including metal studs at 16" o.c., insulated, fire rated	320	SF	\$4.85	\$1,552		Interior partition - GWB on both sides and including metal studs at 16" o.c., insulated, fire rated	320	SF	\$4.95	\$1,584
	Interior partition - 2 layers GWB both sides, sound insulated, on metal studs @ 16" o.c. (mech rooms)	1,795	SF	\$8.46	\$15,186		Interior partition - 2 layers GWB both sides, sound insulated, on metal studs @ 16" o.c. (mech rooms)	1,795	SF	\$8.66	\$15,545
	Shaft/chase formed of 2 hr 50 STC rated Type X GWB shaft wall system, with 1 layer 1" shaftwall and one layer GWB, sound insulated.	775	SF	\$10.73	\$8,316		Shaft/chase formed of 2 hr 50 STC rated Type X GWB shaft wall system, with 1 layer 1" shaftwall and one layer GWB, sound insulated.	775	SF	\$10.73	\$8,316
	Interior partition - one layer GWB on one side only and including metal studs at 16" o.c., insulated	1,061	SF	\$3.23	\$3,427		Interior partition - one layer GWB on one side only and including metal studs at 16" o.c., insulated	1,061	SF	\$3.28	\$3,480
	GWB on metal furring channels attached to wall (wall elsewhere)	824	SF	\$2.80	\$2,307		GWB on metal furring channels attached to wall (wall elsewhere)	824	SF	\$2.85	\$2,348
Improve ments	GWB painted ceiling, premium over ACT ceiling	39,712	SF	\$1.94	\$77,041		GWB painted ceiling, premium over ACT ceiling	39,712	SF	\$1.99	\$79,027
	Interior partition - GWB both sides on metal studs at 16" OC	207,360	SF	\$4.53	\$939,341		Interior partition - GWB both sides on metal studs at 16" OC	207,360	SF	\$4.63	\$960,077

GSA Reference Estimate		LEED Point Estimate				
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniformat
		(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
COURTR OOM	Interior partition - GWB on both sides and including metal studs at 16" o.c., insulated, Interior partition - 2 layers GWB both sides, sound insulated, on metal studs @	29,361	SF	\$5.07	\$148,860	Interior partition - GWB on both sides and including metal studs at 16" o.c., insulated, Interior partition - 2 layers GWB both sides, sound insulated, on metal studs @
	Interior partition - CMU/GWB construction with 2 layers gwb on metal studs on 4" cmu wall, with 2 layers gwb on metal furring on other side of cmu wall, sound insulated	11,100	SF	\$7.33	\$81,363	Interior partition - CMU/GWB construction with 2 layers gwb on metal studs on 4" cmu wall, with 2 layers gwb on metal furring on other side of cmu wall, sound insulated
	Interior partition - 2 layers GWB on each side of metal studs staggered at 16" o.c., insulated, fire rated	2,277	SF	\$14.66	\$33,381	Interior partition - 2 layers GWB on each side of metal studs staggered at 16" o.c., insulated, fire rated
	Raised GWB coffer with perimeter cove, premium over ACT ceiling	45,616	SF	\$7.33	\$334,365	Raised GWB coffer with perimeter cove, premium over ACT ceiling
		4,510	SF	\$16.93	\$76,354	
CHAMBE RS	Interior partition - GWB on both sides and including metal studs at 16" o.c., insulated	30,477	SF	\$4.85	\$147,813	Interior partition - GWB on both sides and including metal studs at 16" o.c., insulated
	Interior partition - 2 layers GWB on each side of metal studs staggered at 16" o.c., Stair shaft formed of 2 hr 50 STC rated Type X GWB shaft wall system, with 1 layer 1" shaftwall and one layer GWB, sound insulated.	36,541	SF	\$7.33	\$267,846	Interior partition - 2 layers GWB on each side of metal studs staggered at 16" o.c., Stair shaft formed of 2 hr 50 STC rated Type X GWB shaft wall system, with 1 layer 1" shaftwall and one layer GWB, sound insulated.
	GWB on metal furring channels attached to wall (wall elsewhere)	9,122	SF	\$10.73	\$97,879	GWB on metal furring channels attached to wall (wall elsewhere)
		4,198	SF	\$2.80	\$11,754	
Total C30 Interior Finishes		Total C30 Interior Finishes			\$2,822,940	Total C30 Interior Finishes
						\$2,882,369

MR 5.1

Local/regional materials, 20% manufactured locally

SUMMARY IN UNIFORMAT

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure	1,709,574	1,796,400	86,826
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
	Estimated Direct Construction Cost	1,709,574	1,796,400	86,826

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate			LEED Point Estimate								
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
B	SHELL					B	SHELL				
B20 B2010	Exterior Enclosure Exterior Walls Precast panel system 24" High Parapet with Precast Veneer	44,910	SF	\$34.00	\$1,526,940	B20 B2010	Exterior Enclosure Exterior Walls Precast panel system 24" High Parapet with Precast Veneer	44,910	SF	\$35.80	\$1,607,778
B2020	<u>Exterior Windows and Doors</u>	2,495	LF	\$73.20	\$182,634	B2020	<u>Exterior Windows and Doors</u>	2,495	LF	\$75.60	\$188,622
	Total B20 Exterior Closure				\$1,709,574		Total B20 Exterior Closure				\$1,796,400

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings	2,628,975	3,075,901	446,926
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
	Estimated Direct Construction Cost	<u>2,628,975</u>	<u>3,075,901</u>	<u>446,926</u>

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

(a)	(b)	(c) GSA Reference Estimate \$	(d) LEED Point Estimate \$	(e) Incremental Cost \$	DESCRIPTION
PARAMETRIC SUMMARY (UNIFORMAT)					
A10	Foundations				(f) GSA Reference Estimate See Appendix K
A20	On Grade/Below Grade Construction				
B10	Superstructure				
B20	Exterior Enclosure				
B30	Roofing				
C10	Interior Construction				
C30	Interior Finishes				
D10	Conveying Systems				
D20	Plumbing				
D30	HV/AC	0	48,600	48,600	
D40	Fire Protection				(g) LEED Point Estimate See Section 2
D50	Electrical				
E10	Equipment				
E20	Furnishings				
F10	Special Construction				
F20	Selective Building Demolition				
G10	Building Sitework				
Estimated Direct Construction Cost				0 48,600 48,600	(h) Estimating Assumptions See Section 2

GSA Reference Estimate						LEED Point Estimate						
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniformat	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total	
D30	HVAC					D30	HVAC CO2 Sensors (5-year calibration) including cost to tie-in the sensors to the BMS	45	EA	\$1,080.00	\$48,600	
Total D30 HVAC						Total D30 HVAC						\$48,600

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HVAC	11,041	17,423	6,382
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
	Estimated Direct Construction Cost	11,041	17,423	6,382
	Additional LEED Related GC's			0

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate						LEED Point Estimate						
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total	
D30	HVAC Blanket Filter	8,740	SF	\$0.35	\$3,059	D30	HVAC MERV 8	1,610	Filter	\$5.25	\$8,453	
	Labor	307	Hr	\$26	\$7,982		Labor MERV 8	345	Hr	\$26	\$8,970	
	Total D30 HVAC						Total D30 HVAC					\$17,423

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HVAC	0	1,157	1,157
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		0	1,157	1,157

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions

Additional General Conditions needed to run a skeleton crew during the 2-week flush-out period. Assuming General Conditions average \$150,000/month.
\$150k x 1/4 x 1/2 = \$18,750.
See Section 2

Additional LEED Related GC's

18,750

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
D30	HVAC					D30	HVAC MERV 8 Filters installed for Fan powered boxes				
							MERV 8 Labor	105 23	Filter Hr	\$5.25 \$26.00	\$551 \$606
	Total D30 HVAC						Total D30 HVAC				\$1,157
					\$0						

(a)	(b)	(c)	(d)	(e)	DESCRIPTION
PARAMETRIC SUMMARY (UNIFORMAT)					
A10	Foundations				(f) GSA Reference Estimate See Appendix K
A20	On Grade/Below Grade Construction				
B10	Superstructure				
B20	Exterior Enclosure				
B30	Roofing				
C10	Interior Construction	1,568,764	1,687,498	118,734	
C30	Interior Finishes	269,243	288,090	18,847	
D10	Conveying Systems				
D20	Plumbing				
D30	HV/AC				(g) LEED Point Estimate
D40	Fire Protection				
D50	Electrical				See Section 2
E10	Equipment				
E20	Furnishings	2,907,169	3,110,671	203,502	
F10	Special Construction				
F20	Selective Building Demolition				
G10	Building Sitework				
Estimated Direct Construction Cost		4,745,176	5,086,259	341,083	(h) Estimating Assumptions See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
C	INTERIORS					C	INTERIORS				
C10	Interior Construction					C10	Interior Construction				
C1009	Partitions and Doors					C1009	Partitions and Doors				
	Doors:						Doors:				
	Coiling Overhead Wood Slat Door	1	EA	\$1,250.00	\$1,250		Coiling Overhead Wood Slat Door	1	EA	\$1,350.00	\$1,350
	Solid core hardwood veneer door	20	EA	\$950.00	\$19,000		Solid core hardwood veneer door	20	EA	\$1,026.00	\$20,520
	Fire rated solid core hardwood door	27	EA	\$1,150.00	\$31,050		Fire rated solid core hardwood door	27	EA	\$1,242.00	\$33,534
	ABS Plastic Clad Door	3	PR	\$1,400.00	\$4,200		ABS Plastic Clad Door	3	PR	\$1,512.00	\$4,536
	Solid core hardwood veneer door	2	EA	\$950.00	\$1,900		Solid core hardwood veneer door	2	EA	\$1,026.00	\$2,052
	Fire rated solid core hardwood door	3	EA	\$1,150.00	\$3,450		Fire rated solid core hardwood door	3	EA	\$1,242.00	\$3,726
	Solid core hardwood veneer door	12	EA	\$2,910.87	\$34,930		Solid core hardwood veneer door	12	EA	\$3,143.74	\$37,725
	Solid core hardwood veneer door	35	EA	\$2,695.25	\$94,334		Solid core hardwood veneer door	35	EA	\$2,910.87	\$101,880
	Solid core hardwood veneer door	678	EA	\$1,013.41	\$687,092		Solid core hardwood veneer door	678	EA	\$1,094.48	\$742,059
	Solid core hardwood door w/view panel	5	EA	\$2,964.78	\$14,824		Solid core hardwood door w/view panel	5	EA	\$3,201.96	\$16,010
	Pair of wood doors with transoms	21	PR	\$4,851.45	\$101,880		Pair of wood doors with transoms	21	PR	\$5,191.05	\$109,012
	Solid core veneer door (court bldg. use)	33	EA	\$2,695.25	\$88,943		Solid core veneer door (court bldg. use)	33	EA	\$2,883.92	\$95,169
	Solid core veneer door (court bldg. use)	176	EA	\$2,695.25	\$474,364		Solid core veneer door (court bldg. use)	176	EA	\$2,883.92	\$507,569
	Bi-folding doors in chamber	13	EA	\$506.71	\$6,587		Bi-folding doors in chamber	13	EA	\$542.18	\$7,048
	Fire rated solid core door in chamber	4	EA	\$1,239.82	\$4,959		Fire rated solid core door in chamber	4	EA	\$1,326.61	\$5,306
	Sub Total C10 Interior Const				\$1,568,764		Sub Total C10 Interior Const				\$1,687,498
C30	Interior Finishes					C30	Interior Finishes				
	Hardwood Veneer Paneling	9,551	SF	\$28.19	\$269,243		Hardwood Veneer Paneling	9,551	SF	\$30.16	\$288,090
	Total C30 Interior Finishes				\$269,243		Total C30 Interior Finishes				\$288,090
E20	Furnishings					E20	Furnishings				
E2010	Non Courtroom Furnishings					E2010	Non Courtroom Furnishings				
	Plam Counter	320	LF	\$73.20	\$23,424		Plam Counter	320	LF	\$78.32	\$25,064
	Hardwood Veneer Cabinets	183	LF	\$700.00	\$128,100		Hardwood Veneer Cabinets	183	LF	\$749.00	\$137,067
	Furnishings Allowance	115,200	SF	\$1.08	\$124,416		Furnishings Allowance	115,200	SF	\$1.16	\$133,125
	Plam Base Cabinet (DT)	8	LF	\$281.76	\$2,254		Plam Base Cabinet (DT)	8	LF	\$301.48	\$2,412
	Sub Total				\$278,194		Sub Total				\$297,668
E2010	Fixed Furnishings & Casework - Courtrooms					E2010	Fixed Furnishings & Casework - Courtrooms				

GSA Reference Estimate						LEED Point Estimate						
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(j) Quantity	(k) Unit	(l) Rate	(n) Total	
	Raised platform at Judges Bench	5,013	SF	\$10.57	\$52,987		Raised platform at Judges Bench	5,013	SF	\$11.31	\$56,697	
	Raised platform at US Attorney's bench	302	SF	\$11.27	\$3,404		Raised platform at US Attorney's bench	302	SF	\$12.06	\$3,642	
	Spectator Bench	1,374	LF	\$216.16	\$297,004		Spectator Bench	1,374	LF	\$231.29	\$317,794	
	Spectator Rail	384	LF	\$673.81	\$258,743		Spectator Rail	384	LF	\$720.98	\$276,855	
	Deputy Clerk, etc stations	11	EA	\$28,570	\$314,270		Deputy Clerk, etc stations	11	EA	\$30,569.90	\$336,269	
	Court Reporter station	1	EA	\$14,554	\$14,554		Court Reporter station	1	EA	\$15,572.78	\$15,573	
	Baliff Station	11	EA	\$8,625	\$94,875		Baliff Station	11	EA	\$9,228.75	\$101,516	
	Judges bench	11	EA	\$43,124	\$474,364		Judges bench	11	EA	\$46,142.68	\$507,569	
	Jury Box (16 persons)	4	EA	\$24,257	\$97,028		Jury Box (16 persons)	4	EA	\$25,954.99	\$103,820	
	Jury Box (12 persons)	4	EA	\$23,718	\$94,872		Jury Box (12 persons)	4	EA	\$25,378.26	\$101,513	
	Jury Box (8 persons)	2	EA	\$22,101	\$44,202		Jury Box (8 persons)	2	EA	\$23,648.07	\$47,296	
	Jury Table	48	LF	\$394	\$18,912		Jury Table	48	LF	\$421.58	\$20,236	
	Pair of Gates	11	EA	\$3,773.00	\$41,503		Pair of Gates	11	EA	\$4,037.11	\$44,408	
	Witness Box	11	EA	\$11,859.00	\$130,449		Witness Box	11	EA	\$12,689.13	\$139,580	
	Witness Box	1	EA	\$8,086.00	\$8,086		Witness Box	1	EA	\$8,652.02	\$8,652	
	Foreperson Box	1	EA	\$8,086.00	\$8,086		Foreperson Box	1	EA	\$8,652.02	\$8,652	
	US Attorney Box	1	EA	\$32,882	\$32,882		US Attorney Box	1	EA	\$35,183.74	\$35,184	
	Lecturn	11	EA	\$5,391.00	\$59,301		Lecturn	11	EA	\$5,768.37	\$63,452	
	SubTotal E20 Furnishings				\$2,045,522		Sub Total E20 Furnishings				\$2,188,708	
	Fixed Furnishings & Casework - Chambers						Fixed Furnishings & Casework - Chambers					
	Wall Cabinet in Robing Room	13	EA	\$8,452.31	\$109,880		Wall Cabinet in Robing Room	13	EA	\$9,043.97	\$117,572	
	Base Cabinet	194	LF	\$452.80	\$87,843		Base Cabinet	194	LF	\$484.50	\$93,992	
	Vanity Cabinet	52	LF	\$242.58	\$12,614		Vanity Cabinet	52	LF	\$259.56	\$13,497	
	Upper Cabinet	194	LF	\$344.99	\$66,928		Upper Cabinet	194	LF	\$369.14	\$71,613	
	Chambers Library Wall Shelving	518	LF	\$566.00	\$293,188		Chambers Library Wall Shelving	518	LF	\$605.62	\$313,711	
	Hardwood Veneer Locker	13	EA	\$1,000.00	\$13,000		Hardwood Veneer Locker	13	EA	\$1,070.00	\$13,910	
	SubTotal E20 Furnishings				\$583,453		SubTotal E20 Furnishings				\$624,295	
	Total E20 Furnishings				\$2,907,169						\$3,110,671	

(a)	(b)	(c)	(d)	(e)	DESCRIPTION
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$	
A10	Foundations				(f) GSA Reference Estimate
A20	On Grade/Below Grade Construction				
B10	Superstructure	0	0	0	See Appendix K
B20	Exterior Enclosure				
B30	Roofing				
C10	Interior Construction				
C30	Interior Finishes				
D10	Conveying Systems				
D20	Plumbing				
D30	HV/AC				(g) LEED Point Estimate
D40	Fire Protection				
D50	Electrical				See Section 2
E10	Equipment				
E20	Furnishings				
F10	Special Construction				
F20	Selective Building Demolition				
G10	Building Sitework				
Estimated Direct Construction Cost		0	0	0	(h) Estimating Assumptions
					See Section 2

GSA Reference Estimate					LEED Point Estimate						
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction	0	29,150	29,150
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		0	29,150	29,150

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
C	INTERIORS					C	INTERIORS				
C10	Interior Construction					C10	Interior Construction				
C1030	<u>Specialties</u>					C1030	<u>Specialties</u>				
							Signs (24"x36" Prints)	25	EA	\$200	\$5,000
							Engraved paving stones (24"x24")	7	EA	\$400	\$2,800
							View windows	30	SF	\$45	\$1,350
							Case Study Manual	1	LS	\$20,000	\$20,000
	Total C10 Interior Construction				\$0		Total C10 Interior Construction				\$29,150

ID 1.4a

Exceed Heat Island Effect, Non-Roof Criteria

SUMMARY IN UNIFORMAT

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition	674,324	850,621	176,297
G10	Building Sitework			
	Estimated Direct Construction Cost	674,324	850,621	176,297

A10

A20

B10

B20

B30

C10

C30

D10

D20

D30

D40

D50

E10

E20

F10

F20

G10

Foundations

On Grade/Below Grade Construction

Superstructure

Exterior Enclosure

Roofing

Interior Construction

Interior Finishes

Conveying Systems

Plumbing

HV/AC

Fire Protection

Electrical

Equipment

Furnishings

Special Construction

Selective Building Demolition

Building Sitework

Estimated Direct Construction Cost

(f) GSA Reference Estimate

See Appendix K

(g) LEED Point Estimate

See Section 2

(h) Estimating Assumptions

See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
G	BUILDING SITEWORK					G	BUILDING SITEWORK				
G10	Sitework Concrete traffic paving Sidewalk paving Plaza paving	4,323 13,832 28,529	SF SF SF	\$8.00 \$5.00 \$20.00	\$34,584 \$69,160 \$570,580	G10	Sitework Concrete traffic paving Sidewalk paving Plaza paving	4,323 13,832 28,529	SF SF SF	\$11.43 \$8.43 \$24.00	\$49,390 \$116,535 \$684,696 \$0
Total G10 Building Sitework						Total G10 Building Sitework					
						\$850,621					

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction	676,734	795,163	118,428
C30	Interior Finishes	396,294	471,287	74,993
D10	Conveying Systems			
D20	Plumbing			
D30	HVAC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings	2,881,491	3,371,345	489,854
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
	Estimated Direct Construction Cost	3,954,519	4,637,794	683,275

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniformat	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
C	INTERIORS					C	INTERIORS				
C30	Interior Finishes Hardwood Base Hardwood Base	9,660 3,838	LF LF	\$9.00 \$10.45	\$86,940 \$40,111	C30	Interior Finishes Hardwood Base Hardwood Base	9,660 3,838	LF LF	\$11.07 \$12.85	\$106,936 \$49,337
	Total C30 Interior Finishes				\$127,051		Total C30 Interior Finishes				\$156,273
E20	Furnishings					E20	Furnishings				
E2010	Non Courtroom Furnishings Hardwood Veneer Cabinets Furnishings Allowance	183 115,200	LF SF	\$700.00 \$1.08	\$128,100 \$124,416	E2010	Non Courtroom Furnishings Hardwood Veneer Cabinets Furnishings Allowance	183 115,200	LF SF	\$819.00 \$1.26	\$149,877 \$145,567
	Sub Total Non Courtroom or Chambers				\$252,516		Sub Total Non Courtroom or Chambers				\$295,444
	Fixed Furnishings & Casework - Chambers						Fixed Furnishings & Casework - Chambers				
	Wall Cabinet in Robing Room Base Cabinet Vanity Cabinet Upper Cabinet Chambers Library Wall Shelving Hardwood Veneer Locker	13 194 52 194 518 13	EA LF LF LF LF EA	\$8,452.31 \$452.80 \$242.58 \$344.99 \$566.00 \$1,000.00	\$109,880 \$87,843 \$12,614 \$66,928 \$293,188 \$13,000		Wall Cabinet in Robing Room Base Cabinet Vanity Cabinet Upper Cabinet Chambers Library Wall Shelving Hardwood Veneer Locker	13 194 52 194 518 13	EA LF LF LF LF EA	\$9,889.20 \$529.78 \$283.82 \$403.64 \$662.22 \$1,170.00	\$128,560 \$102,777 \$14,759 \$78,306 \$343,030 \$15,210
	SubTotal E20 Furnishings				\$583,453		SubTotal E20 Furnishings				\$682,641
	Total Furnishings				\$835,969		Total Furnishings				\$978,084
C	INTERIORS					C	INTERIORS				
C10	Interior Construction					C10	Interior Construction				
	Solid Core Veneer Double Door Solid Core Veneer Single Door Solid Core Veneer Single Door Bi-folding doors in chamber Fire rated solid core door in chamber	21 33 176 13 4	PR EA EA EA EA	\$4,851.45 \$2,695.25 \$2,695.25 \$506.71 \$1,239.82	\$101,880 \$88,943 \$474,364 \$6,587 \$4,959		Solid Core Veneer Double Door Solid Core Veneer Single Door Solid Core Veneer Single Door Bi-folding doors in chamber Fire rated solid core door in chamber	21 33 176 13 4	PR EA EA EA EA	\$5,700.45 \$3,166.92 \$3,166.92 \$595.38 \$1,456.79	\$119,710 \$104,508 \$557,378 \$7,740 \$5,827

Appendix D:

Individual Credit Cost Estimates – Office Building

LEED Cost Study
(GS-11P-99-MAD-0565)

**Mid Rise Office Modernization Model
Incremental First Costs of LEED Credits**

Estimate Prepared Date 14 May 2004

No Cost Premium

Estimate Prepared Date 14 May 2004

Unit of Measure

Estimate Prepared Date 14 May 2004

Unit of Measure

SS 4.2a

Bicycle racks

SUMMARY IN UNIFORMAT

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction	0	15,748	15,748
C30	Interior Finishes	0	3,888	3,888
D10	Conveying Systems			
D20	Plumbing	0	3,200	3,200
D30	HV/AC	0	6,000	6,000
D40	Fire Protection	0	627	627
D50	Electrical	0	4,000	4,000
E10	Equipment	0	14,625	14,625
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		0	48,088	48,088

(f) GSA Reference Estimate

See Appendices L & M

(g) LEED Point Estimate

See Section 2

(h) Estimating Assumptions

Set aside 400 GSF of existing contiguous space in the basement area.
See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
A	SUBSTRUCTURE					A	SUBSTRUCTURE				
C	INTERIORS					C	INTERIORS				
C10 C1009	Interior Construction <u>Partitions and Doors</u> <u>Partitions:</u>					C10 C1009	Interior Construction <u>Partitions and Doors</u> <u>Partitions:</u> 6" CMU Wall grouted solid	1,600	SF	\$9.00	\$14,400
	<u>Doors:</u>						<u>Doors:</u> Hollow metal double door 6' x 7' complete w/ frame & hardware	1	EA	\$1,347.53	\$1,348
	Total C10 Interior Construction				\$0		Total C10 Interior Construction				\$15,748
C30 C3010	Interior Finishes <u>Wall Finishes</u>					C30 C3010	Interior Finishes <u>Wall Finishes</u> Paint Wall	3,200	SF	\$0.75	\$2,400
C3020	<u>Floor Finishes</u>					C3020	Floor Finishes Seal Concrete	400	EA	\$0.54	\$216
C3030	<u>Ceiling Finishes</u>					C3030	<u>Ceiling Finishes</u> Suspended 24" x 24" ACT	400	SF	\$3.18	\$1,272
	Total C30 Interior Finishes				\$0		Total C30 Interior Finishes				\$3,888

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
D	SERVICES					D	SERVICES				
D20	Plumbing					D20	Plumbing				
D2010						D2010	Plumbing allowance for bike room (Floor Drain)	400	SF	\$8.00	\$3,200
	Total D20 Plumbing				\$0		Total D20 Plumbing				\$3,200
D30	HVAC					D30	HVAC				
							HVAC allowance for bike room (Exhaust Fan)	400	SF	\$15.00	\$6,000
	Total D30 HVAC				\$0		Total D30 HVAC				\$6,000
D40	Fire Protection					D40	Fire Protection				
D4010							Fire protection allowance for bike room	400	SF	\$2.09	\$627
	Total D40 Fire Protection				\$0		Total D40 Fire Protection				\$627
D50	Electrical					D50	Electrical				
D5010						D5010	Electrical allowance for bike room	400	SF	\$10.00	\$4,000
	Total D50 Electrical				\$0		Total D50 Electrical				\$4,000
E	EQUIPMENT & FURNISHINGS					E	EQUIPMENT & FURNISHINGS				
E10	Equipment					E10	Equipment				
E1009	Commercial / Institutional Equipment					E1009	Commercial / Institutional Equipment				
							Bicycle Rack Interior	65	EA	\$125.00	\$8,125
							Install Racks	65	EA	\$100.00	\$6,500
	Total E10 Equipment				\$0		Total E10 Equipment				\$14,625

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction	0	35,360	35,360
C30	Interior Finishes	0	23,044	23,044
D10	Conveying Systems			
D20	Plumbing	0	27,063	27,063
D30	HV/AC	0	19,765	19,765
D40	Fire Protection	0	1,254	1,254
D50	Electrical	0	8,000	8,000
E10	Equipment	0	5,200	5,200
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		0	119,686	119,686

(f) GSA Reference Estimate

See Appendices L & M

(g) LEED Point Estimate

See Section 2

(h) Estimating Assumptions

Allocate 800 GSF in the basement area and modify to provide shower and changing rooms.

See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(k)	(l)	(m)	(n)
Uniformat	Description	Quantity	Unit	Rate	Total	Uniformat	Description	Quantity	Unit	Rate	Total
C	INTERIORS					C	INTERIORS				
C10 C1009	Interior Construction Partitions and Doors Partitions:					C10 C1009	Interior Construction Partitions and Doors Partitions: 6" CMU Wall solid	3,000	SF	\$9.00	\$27,000
	Doors:						Doors: Solid Core Hardwood veneer door 3'x7' with frame and hardware	2	EA	\$1,024	\$2,048
C1030	Specialties					C1030	Specialties Toilet Paper Holder Paper Towel dispenser combination waste Soap Dispenser Mirror with brushed brass edge 18"x24" Toilet seat cover dispenser, stainless steel Shower seats Shower Curtain w/rod Stainless Steel toilet Partition, ceiling hung SS Grab bars	2 4 12 4 2 2 8 2 4	EA EA EA EA EA EA EA EA EA	\$26.00 \$372.00 \$60.00 \$130.00 \$130.00 \$150.00 \$60.00 \$1,126 \$60.00	\$52 \$1,488 \$720 \$520 \$260 \$300 \$480 \$2,252 \$240
	Total C10 Interior Construction				\$0		Total C10 Interior Construction				\$35,360

GSA Reference Estimate					LEED Point Estimate						
(a)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(k)	(l)	(m)	(n)
Uniformat	Description	Quantity	Unit	Rate	Total	Uniform at	Description	Quantity	Unit	Rate	Total

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical	0	11,500	11,500
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		0	11,500	11,500

(f) GSA Reference Estimate
See Appendices L & M

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate							LEED Point Estimate						
(a) <i>Uniform</i>	(b) <i>CSI</i>	(c) <i>Code</i>	(d) <i>Description</i>	(e) <i>Quantity</i>	(f) <i>Unit</i>	(g) <i>Rate</i>	(h) <i>Uniform</i> <i>at</i>	(i) <i>CSI</i> <i>Code</i>	(j) <i>Description</i>	(k) <i>Quantity</i>	(l) <i>Unit</i>	(m) <i>Rate</i>	(n) <i>Total</i>
							D						
							SERVICES						
							D50						
							Electrical						
							D5010						
									Charging Stations	3	EA	\$2,500.00	\$7,500
									Electrical Distribution	1	LS	\$4,000.00	\$4,000
			Total D50 Electrical						Total D50 Electrical				\$11,500

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction	0	679	679
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		0	679	679

(f) GSA Reference Estimate
See Appendices L & M

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions

Existing spaces are designated as carpool spaces. No new parking is added.
See Section 2

GSA Reference Estimate							LEED Point Estimate						
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)
Uniformat	CSI Code	Description	Quantity	Unit	Rate	Total	Uniformat at	CSI Code	Description	Quantity	Unit	Rate	Total
C		INTERIORS					C		INTERIORS				
C10		Interior Construction					C10		Interior Construction				
C1030		Specialties					C1030		Specialties				
									Parking lines, and paint carpool logo	340	LF	\$0.54	\$184
									Signage allowance	33	EA	\$15.00	\$495
		Total C10 Interior Construction				\$0			Total C10 Interior Construction				\$679

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing	23,438	54,571	31,133
D30	HV/AC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		23,438	54,571	31,133

(f) GSA Reference Estimate
See Appendices L & M

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) <i>Uniformat</i>	(c) <i>Description</i>	(d) <i>Quantity</i>	(e) <i>Unit</i>	(f) <i>Rate</i>	(g) <i>Total</i>	(h) <i>Uniform at</i>	(i) <i>Description</i>	(k) <i>Quantity</i>	(l) <i>Unit</i>	(m) <i>Rate</i>	(n) <i>Total</i>
D	SERVICES					D	SERVICES				
D20 D2010	Plumbing Manual Lavatory Faucet	36	EA	\$651.05	\$23,438	D20 D2010	Plumbing Lav faucet with battery pak	36	EA	\$1,515.86	\$54,571
	Total D20 Plumbing				\$23,438		Total D20 Plumbing				\$54,571

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing	23,438	50,603	27,165
D30	HV/AC			
D40	Fire Protection			
D50	Electrical	0	4,320	4,320
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		23,438	54,923	31,485

(f) GSA Reference Estimate

See Appendices L & M

(g) LEED Point Estimate

See Section 2

(h) Estimating Assumptions

See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
D	SERVICES					D	SERVICES				
D20 D2010	Plumbing Manual Lavtory Faucet	36	EA	\$286	\$23,438	D20 D2010	Plumbing Lav faucet with electronic control	36	EA	\$617	\$50,603
	Total D20 Plumbing				\$23,438		Total D20 Plumbing				\$50,603
D50 D5010	Electrical					D50 D5010	Electrical Electrical Connections	36	EA	\$120.00	\$4,320
	Total D50 Electrical				\$0		Total D50 Electrical				\$4,320

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing	12,632	19,652	7,020
D30	HV/AC			
D40	Fire Protection			
D50	Electrical	0	990	990
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		12,632	20,642	8,010

(f) GSA Reference Estimate
See Appendices L & M

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniformat	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
D	SERVICES					D	SERVICES				
D20 D2010	Plumbing Standard Wall Hung Urinal	18	EA	\$701.77	\$12,632	D20 D2010	Plumbing Low Flush Urinal-vitreous china	18	EA	\$1,091.77	\$19,652
	Total D20 Plumbing				\$12,632		Total D20 Plumbing				\$19,652
D50	Electrical					D50	Electrical Electrical connections	18	EA	\$55.00	\$990
	Total D50 Electrical				\$0		Total D50 Electrical				\$990

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HVAC	0	205,484	205,484
D40	Fire Protection			
D50	Electrical	12,600	57,600	45,000
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
	Estimated Direct Construction Cost	12,600	263,084	250,484

(f) GSA Reference Estimate
See Appendices L & M

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
D30	HVAC					D30	HVAC High Efficiency Chillers (0.54 kw/ton) without VFD Cost to Furnish VFD for Cent. Chiller & Tie-in to EMS. VFD Cooling Tower Fans (Included as Industry Standard) Energy Recovery Modulating Condensing Boilers Premium Efficiency Pump Motors Premium Efficiency AHU Motors CO2 Sensors Including Tie-in to BMS Programming to control outside air dampers Total D30 HVAC	2	EA	\$25,000	\$50,000
								2	EA	\$40,000	\$80,000
											excluded
											excluded
											excluded
								17	EA	\$121	\$2,050
								63	EA	\$118	\$7,434
								60	EA	\$1,080.00	\$64,800
								1	LS	\$1,200.00	\$1,200
D50	Electrical Single pole switches Total D50 Electrical					D50	Electrical Occupancy Sensors, wall mtd. Total D50 Electrical	360	EA	\$160.00	\$57,600
					\$0						
					\$12,600						\$57,600
					\$12,600						\$57,600

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HVAC	0	125,484	125,484
D40	Fire Protection			
D50	Electrical	12,600	57,600	45,000
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		12,600	183,084	170,484

(f) GSA Reference Estimate
See appendices L & M

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate						LEED Point Estimate						
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total	
D30	HVAC					D30	HVAC					
								High Efficiency Chillers (0.54 kw/ton) with no VFD	2	EA	\$25,000	\$50,000
								VFD Cooling Tower Fans (Now Industry Design Standard)				excluded
								Energy Recovery				excluded
								Modulating Condensing Boilers				excluded
								Premium Efficiency Pump Motors	17	EA	\$121	\$2,050
								Premium Efficiency AHU Motors	63	EA	\$118	\$7,434
								CO2 Sensors (5-year calibration Including Cost to "Tie-in" To BMS)	60	EA	\$1,080.00	\$64,800
								Programming to control outside air dampers	1	LS	\$1,200.00	\$1,200
								Total D30 HVAC				
D50	Electrical				\$0	D50	Electrical					
								Occupancy Sensors, wall mtd.	360	EA	\$160.00	\$57,600
								Total D50 Electrical				\$57,600

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HVAC	0	413,484	413,484
D40	Fire Protection			
D50	Electrical	40,276	285,900	245,624
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		40,276	699,384	659,108

(f) GSA Reference Estimate
Se Appendices L & M

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
D30	HVAC					D30	HVAC				
							High Efficiency Chillers (0.49 kw/ton) without VFD	2	EA	\$45,000	\$90,000
							Furnish VFD for Centrifugal Chiller Including Costs to "Tie-in" to BMS	2	EA	\$40,000	\$80,000
							VFD Cooling Tower Fans - based on current design approaches, there is no cost increase in this area.				
							Energy Recovery	29,500	CFM	\$4.00	\$118,000
							Modulating Condensing Boilers	4	EA	\$12,500	\$50,000
							Premium Efficiency Pump Motors	17	EA	\$121	\$2,050
							Premium Efficiency AHU Motors	63	EA	\$118	\$7,434
							CO2 Sensors (5-year calibration) Including Costs To "Tie-in" To BMS	60	EA	\$1,080.00	\$64,800
							Programming to modulate outside air dampers	1	LS	\$1,200.00	\$1,200
	Total D30 HVAC				\$0		Total D30 HVAC				\$413,484
D50	Electrical					D50	Electrical				
							Dimming Ballasts	1,258	EA	\$150.00	\$188,700
							Daylight Sensors	27	EA	\$160.00	\$4,320
							Microwatt Panel (local controler)	198	EA	\$135.00	\$26,730
							Occupancy Sensors, wall mtd.	189	EA	\$160.00	\$30,240
							Combined daylight/occupancy sensors, ceiling mtd.	171	EA	\$210.00	\$35,910
	Total D50 Electrical				\$40,276		Total D50 Electrical				\$285,900

EA 1.1-10 ⁷ Optimize Energy Performance (to achieve 7 LEED points)			Minimum Façade Renovation			Detailed Estimate in Uniformat Breakdown					
GSA Reference Estimate			LEED Point Estimate								
(a) <i>Uniform at</i>	(c) <i>Description</i>	(d) <i>Quantity</i>	(e) <i>Unit</i>	(f) <i>Rate</i>	(g) <i>Total</i>	(h) <i>Uniform at</i>	(i) <i>Description</i>	(k) <i>Quantity</i>	(l) <i>Unit</i>	(m) <i>Rate</i>	(n) <i>Total</i>

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HVAC	0	413,484	413,484
D40	Fire Protection			
D50	Electrical	40,276	285,900	245,624
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		40,276	699,384	659,108

(f) GSA Reference Estimate
See Appendices L & M

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

EA 1.1-10 ⁸ Optimize Energy Performance (to achieve 8 LEED points)				Full Façade Renovation		Detailed Estimate in Uniformat Breakdown					
GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
D30	HVAC					D30	HVAC				
							High Efficiency Chillers (0.49 kw/ton)	2	EA	\$45,000	\$90,000
							Cost To Furnish VFD For Centr. Chiller Including "Tie-in" To BMS	2	EA	\$40,000	\$80,000
							VFD Cooling Tower Fans (Current Industry Design Standards)				No Premium
							Energy Recovery	29,500	CFM	\$4.00	\$118,000
							Modulating Condensing Boilers	4	EA	\$12,500	\$50,000
							Premium Efficiency Pump Motors	17	EA	\$121	\$2,050
							Premium Efficiency AHU Motors	63	EA	\$118	\$7,434
							CO2 Sensors (5-year calibration) Including Cost To "Tie-in" To BMS	60	EA	\$1,080.00	\$64,800
							Programming to modulate outside air dampers	1	LS	\$1,200.00	\$1,200
	Total D30 HVAC				\$0		Total D30 HVAC				\$413,484
D50	Electrical					D50	Electrical				
							Dimming Ballasts	1,258	EA	\$150.00	\$188,700
							Daylight Sensors	27	EA	\$160.00	\$4,320
							Microwatt Panel (local controler)	198	EA	\$135.00	\$26,730
							Occupancy Sensors, wall mtd.	189	EA	\$160.00	\$30,240
						Combined daylight/occupancy sensors, ceiling mtd.	171	EA	\$210.00	\$35,910	
	Total D50 Electrical				\$40,276		Total D50 Electrical				\$285,900

EA 1.1-10 ⁸ Optimize Energy Performance (to achieve 8 LEED points)				Full Façade Renovation		Detailed Estimate in Uniformat Breakdown					
GSA Reference Estimate				LEED Point Estimate							
(a) <i>Uniform at</i>	(c) <i>Description</i>	(d) <i>Quantity</i>	(e) <i>Unit</i>	(f) <i>Rate</i>	(g) <i>Total</i>	(h) <i>Uniform at</i>	(i) <i>Description</i>	(k) <i>Quantity</i>	(l) <i>Unit</i>	(m) <i>Rate</i>	(n) <i>Total</i>

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing	0	8,700	8,700
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical	0	20,000	20,000
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition	0	641,250	641,250
G10	Building Sitework			
Estimated Direct Construction Cost		0	669,950	669,950

(f) GSA Reference Estimate
See Appendices L & M

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniformat	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
B30	Roofing					B30	Roofing				
							Allowance to patch existing EPDM roofing.	1	LS	\$8,700.00	\$8,700
	Total B30 Roofing				\$0		Total B30 Roofing				\$8,700
D50	Electrical					D50	Electrical				
						D5010	Electrical Distribution	1	LS	\$20,000.00	\$20,000
	Total D50 Electrical				\$0		Total D50 Electrical				\$20,000
F	SPECIAL CONSTRUCTION & DEMOLITION					F	SPECIAL CONSTRUCTION & DEMOLITION				
F10	Special Construction					F10	Special Construction				
							6750 SF roof mounted monocrystalline-cells	6,750	SF	\$85.00	\$573,750
							Labor to Install	6,750	SF	\$10.00	\$67,500
	Total F10 Special Construction				\$0		Total F10 Special Construction				\$641,250

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing	0	8,000	8,000
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical	0	20,000	20,000
E10	Equipment			
E20	Furnishings			
F10	Special Construction	0	589,000	589,000
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		0	617,000	617,000

(f) GSA Reference Estimate
See Appendices L & M

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniformat	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
B30	Roofing					B30	Roofing				
							Allowance to patch existing EPDM roofing.	1	LS	\$8,000.00	\$8,000
	Total B30 Roofing				\$0		Total B30 Roofing				\$8,000
D50	Electrical					D50	Electrical				
						D5010	Electrical Distribution	1	LS	\$20,000.00	\$20,000
	Total D50 Electrical				\$0		Total D50 Electrical				\$20,000
F	SPECIAL CONSTRUCTION & DEMOLITION					F	SPECIAL CONSTRUCTION & DEMOLITION				
F10	Special Construction					F10	Special Construction				
							6200 SF roof mounted monocrystalline-cells	6,200	SF	\$85.00	\$527,000
							Labor to Install	6,200	SF	\$10.00	\$62,000
	Total F10 Special Construction				\$0		Total F10 Special Construction				\$589,000

(a)	(b)	(c) GSA Reference Estimate \$	(d) LEED Point Estimate \$	(e) Incremental Cost \$	DESCRIPTION
PARAMETRIC SUMMARY (UNIFORMAT)					
A10	Foundations				(f) GSA Reference Estimate See Appendices L & M
A20	On Grade/Below Grade Construction				
B10	Superstructure				
B20	Exterior Enclosure				
B30	Roofing				
C10	Interior Construction				
C30	Interior Finishes				
D10	Conveying Systems				
D20	Plumbing				
D30	HVAC	0	85,400	85,400	
D40	Fire Protection				(g) LEED Point Estimate See Section 2
D50	Electrical				
E10	Equipment				
E20	Furnishings				
F10	Special Construction				
F20	Selective Building Demolition				
G10	Building Sitework				
Estimated Direct Construction Cost		0	85,400	85,400	(h) Estimating Assumptions See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
D30	HVAC					D30	HVAC				
	Tenant Area Lighting Panels	18	EA		incl.		Add Lighting Panel meters and connect to BMS	18	EA	\$1,600.00	\$28,800
	Amp meters on chiller motor starters	3	EA		incl.		Connect chiller amp meters to BMS	3	EA	\$1,200.00	\$3,600
	NO gas meters in natural gas lines to each boiler	4	EA		\$0		Add gas flow meters and connect to BMS	4	EA	\$2,500.00	\$10,000
	Tenant Receptacle Panels	18	EA		incl.		Add Receptacle Panel meters and connect to BMS	18	EA	\$1,600.00	\$28,800
	NO flow meters in domestic water risers	2	EA		\$0		Add domestic water flow meters and connect to BMS	2	EA	\$4,000.00	\$8,000
	Flow meter on cooling tower make-up water	1	EA		incl.		Connect cooling tower make-up water meter to BMS	1	EA	\$1,200.00	\$1,200
							Provide trend log programming for chiller efficiency, tenant lighting, tenant receptacles, natural gas and boilers	1	EA	\$5,000.00	\$5,000
	Total D30 HVAC				\$0		Total D30 HVAC				\$85,400

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction	1,085,250	1,107,543	22,293
C30	Interior Finishes	2,463	2,850	387
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		1,087,713	1,110,393	22,680

(f) GSA Reference Estimate

See appendices L & M

(g) LEED Point Estimate

See Section 2

(h) Estimating Assumptions

The premium cost of the recyclable drywall is the shipping cost from the factory to the jobsite.
See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniformat	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
C	INTERIORS					C	INTERIORS				
C10	Interior Construction					C10	Interior Construction				
C1009	Partition and Doors Shell & Core					C1009	Partition and Doors				
	Patch & repair existing GWB walls	128,950	SF	\$2.80	\$361,060		Patch & repair existing GWB walls	128,950	SF	\$2.85	\$367,508
	Closed Office						Interior partition - GWB on both sides and including metal studs at 16" o.c., insulated, fire rated	113,210	SF	\$4.95	\$560,390
	Interior partition - GWB on both sides and including metal studs at 16" o.c., insulated, fire rated						One layer GWB on interior partition, GWB only (taped and jointed)	19,586	SF	\$1.29	\$25,266
	Open Office						Interior partition - GWB both sides on metal studs at 16" O.C.	30,691	SF	\$4.63	\$142,099
	One layer GWB on interior partition, GWB only (taped and jointed)						One layer GWB on interior partition, GWB only (taped and jointed)	9,520	SF	\$1.29	\$12,281
	Total C10 Interior Construction				\$1,085,250		Total C10 Interior Construction				\$1,107,543
C30	Interior Finishes					C30	Interior Finishes				
C3030	Ceiling Finishes					C3030	Ceiling Finishes				
	Closed Office						Closed Office				
	GW/B soffit over counters, premium over ACT	716	SF	\$1.72	\$1,232		GW/B soffit over counters, premium over ACT	716	SF	\$1.99	\$1,425
	Open Office						Open Office				

GSA Reference Estimate						LEED Point Estimate					
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
	GWB soffit over counters, premium over ACT	716	SF	\$1.72	\$1,232		GWB soffit over counters, premium over ACT	716	SF	\$1.99	\$1,425
Total C30 Interior Finishes					\$2,463	Total C30 Interior Finishes					\$2,850

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction	688,099	702,489	14,390
C30	Interior Finishes	878,276	922,190	43,914
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
	Estimated Direct Construction Cost	1,566,374	1,624,678	58,304

(f) GSA Reference Estimate
See Appendices L & M

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) <i>Uniformat</i>	(c) <i>Description</i>	(d) <i>Quantity</i>	(e) <i>Unit</i>	(f) <i>Rate</i>	(g) <i>Total</i>	(h) <i>Uniform at</i>	(i) <i>Description</i>	(k) <i>Quantity</i>	(l) <i>Unit</i>	(m) <i>Rate</i>	(n) <i>Total</i>
C	INTERIOR CONSTRUCTION					C	INTERIOR CONSTRUCTION				
C10	Interior Construction					C10	Interior Construction				
Closed Office	Interior partition - GWB on both sides and including metal studs at 16" o.c., insulated, fire rated	113,210	SF	\$4.85	\$549,069		Interior partition - GWB on both sides and including metal studs at 16" o.c., insulated, fire rated	113,210	SF	\$4.95	\$560,390
Open Office	Interior partition - GWB both sides on metal studs at 16" O.C.	30,691	SF	\$4.53	\$139,030		Interior partition - GWB both sides on metal studs at 16" O.C.	30,691	SF	\$4.63	\$142,099
	Total C10 Interior Construction						Total C10 Interior Construction				
					\$688,099						\$702,489
C 30	Interior Finishes					C 30	Interior Finishes				
Shell & Core	3/8" Textured Porcelain tile wainscot	5,508	SF	\$13.53	\$74,523		3/8" Textured Porcelain tile wainscot	5,508	SF	\$14.21	\$78,249
	Porcelain tile base	1,224	LF	\$11.27	\$13,794		Porcelain tile base	1,224	LF	\$11.83	\$14,484
	3/8" Textured Porcelain tile (flooring)	5,400	SF	\$13.53	\$73,062		3/8" Textured Porcelain tile (flooring)	5,400	SF	\$14.21	\$76,715
	Suspended 24" x 24" ACT	214,146	SF	\$3.18	\$680,984		Suspended 24" x 24" ACT	214,146	SF	\$3.34	\$715,033
	Suspended 24" x 24" ACT	11,293	SF	\$3.18	\$35,912		Suspended 24" x 24" ACT	11,293	SF	\$3.34	\$37,707
	Total C30 Interior Finishes						Total C30 Interior Finishes				
					\$878,276						\$922,190

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure	2,034,630	2,136,362	101,732
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		2,034,630	2,136,362	101,732

(f) GSA Reference Estimate
See Appendices L & M

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(k)	(l)	(m)	(n)
Uniformat	Description	Quantity	Unit	Rate	Total	Uniform at	Description	Quantity	Unit	Rate	Total
B	SHELL					B	SHELL				
B20 B2010	Exterior Enclosure Exterior Walls Precast panel system	55,500	SF	\$36.66	\$2,034,630	B20 B2010	Exterior Enclosure Exterior Walls Precast panel system	55,500	SF	\$38.49	\$2,136,362
B2020	<u>Exterior Windows and Doors</u>					B2020	<u>Exterior Windows and Doors</u>				
	Total B20 Exterior Closure				\$2,034,630		Total B20 Exterior Closure				\$2,136,362

<i>(a)</i>	<i>(b)</i>	<i>(c)</i>	<i>(d)</i>	<i>(e)</i>
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction	483,397	537,538	54,141
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HVAC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		483,397	537,538	54,141

(f) GSA Reference Estimate
See Appendices L & M

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate			LEED Point Estimate								
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
C	INTERIORS					C	INTERIORS				
C10 C1009	Interior Construction <u>Partitions and Doors</u>					C10 C1009	Interior Construction <u>Partitions and Doors</u>				
	<u>Doors:</u>						<u>Doors:</u>				
	Solid Core Single Door 3' x 7'	477	EA	\$1,013.41	\$483,397		Certified Solid Core Single Door 3' x 7'	477	EA	\$1,126.91	\$537,538
	Total C10 Interior Construction				\$483,397		Total C10 Interior Construction				\$537,538

(a)	(b)	(c) GSA Reference Estimate \$	(d) LEED Point Estimate \$	(e) Incremental Cost \$	DESCRIPTION
PARAMETRIC SUMMARY (UNIFORMAT)					
A10	Foundations				(f) GSA Reference Estimate See Appendices L & M
A20	On Grade/Below Grade Construction				
B10	Superstructure				
B20	Exterior Enclosure				
B30	Roofing				
C10	Interior Construction				
C30	Interior Finishes				
D10	Conveying Systems				
D20	Plumbing				
D30	HV/AC	0	64,800	64,800	(g) LEED Point Estimate
D40	Fire Protection				See Section 2
D50	Electrical				
E10	Equipment				
E20	Furnishings				
F10	Special Construction				
F20	Selective Building Demolition				
G10	Building Sitework				
Estimated Direct Construction Cost		0	64,800	64,800	(h) Estimating Assumptions

See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
D30	HVAC					D30	HVAC CO2 Sensors (5-year calibration) Including Cost to "Tie-in" To BMS	60	EA	\$1,080.00	\$64,800
	Total D30 HVAC				\$0		Total D30 HVAC				\$64,800

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HVAC	17,320	27,270	9,950
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		17,320	27,270	9,950
Additional LEED Related GC's				0

(f) GSA Reference Estimate
See Appendices L & M

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
D30	HVAC	13,680	SF	\$0.35	\$4,788	D30	HVAC	2,520	Chg	\$5.25	\$13,230
	Blanket Filter						MERV 8				
	Labor	482	Hr	\$26.00	\$12,532		Labor	540	Hr	\$26.00	\$14,040
	Total D30 HVAC				\$17,320		Total D30 HVAC				

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HVAC	0	1,489	1,489
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		0	1,489	1,489
Additional LEED Related GC's				18,750

(f) GSA Reference Estimate
See Appendices L & M

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
GSA Reference Estimate						LEED Point Estimate					
D30	HVAC						D30	HVAC MERV 8 Filters installed for Fan powered boxes			
								MERV 8			
								Labor			
	Total D30 HVAC				\$0	Total D30 HVAC					
						\$1,489					

(a)	(b)	(c)	(d)	(e)	DESCRIPTION
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$	
A10	Foundations				(f) GSA Reference Estimate
A20	On Grade/Below Grade Construction				See Appendices L & M
B10	Superstructure				
B20	Exterior Enclosure				
B30	Roofing				
C10	Interior Construction	771,883	833,633	61,751	
C30	Interior Finishes				
D10	Conveying Systems				
D20	Plumbing				(g) LEED Point Estimate
D30	HV/AC				See Section 2
D40	Fire Protection				
D50	Electrical				
E10	Equipment				
E20	Furnishings	32,293	34,554	2,261	
F10	Special Construction				
F20	Selective Building Demolition				
G10	Building Sitework				
Estimated Direct Construction Cost		804,176	868,187	64,011	(h) Estimating Assumptions
					See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
C	INTERIORS					C	INTERIORS				
C10	Interior Construction					C10	Interior Construction				
C1009	Partitions and Doors					C1009	Partitions and Doors				
	Doors:						Doors:				
	Coiling Overhead Wood Slat Door	1	EA	\$1,348	\$1,348		Coiling Overhead Wood Slat Door	1	EA	\$1,455	\$1,455
	Solid Core Single Door 3' x 7'	18	EA	\$1,013	\$18,241		Solid Core Single Door 3' x 7'	18	EA	\$1,094	\$19,701
	Solid Core Pair of Doors	9	PR	\$1,353	\$12,177		Solid Core Pair of Doors	9	PR	\$1,461	\$13,151
	Solid Core Pair of Doors w/Security	3	PR	\$2,253	\$6,760		Solid Core Pair of Doors w/Security	3	PR	\$2,433	\$7,300
	Solid Core Single Door 3' x 7'	65	EA	\$1,240	\$80,588		Solid Core Single Door 3' x 7'	65	EA	\$1,339	\$87,035
	Solid Core Single Door 3' x 7'	2	EA	\$1,240	\$2,480		Solid Core Single Door 3' x 7'	2	EA	\$1,339	\$2,678
	Solid Core Single Door 3' x 7'	477	EA	\$1,013	\$483,397		Solid Core Single Door 3' x 7'	477	EA	\$1,094	\$522,068
	Solid Core Pair of Doors	5	EA	\$1,353	\$6,765		Solid Core Pair of Doors	5	EA	\$1,461	\$7,306
	Solid Core Single Door 3' x 7'	24	EA	\$1,240	\$29,756		Solid Core Single Door 3' x 7'	24	EA	\$1,339	\$32,136
	Solid Core Pair of Doors	5	PR	\$1,941	\$9,703		Solid Core Pair of Doors	5	PR	\$2,096	\$10,479
	Solid Core Single Door 3' x 7'	72	EA	\$940	\$67,680		Solid Core Single Door 3' x 7'	72	EA	\$1,015	\$73,094
	Solid Core Pair of Doors	10	PR	\$1,353	\$13,530		Solid Core Pair of Doors	10	PR	\$1,461	\$14,613
	Solid Core Single Door 3' x 7'	24	EA	\$1,240	\$29,756		Solid Core Single Door 3' x 7'	24	EA	\$1,339	\$32,136
	Solid Core Pair of Doors	5	PR	\$1,941	\$9,703		Solid Core Pair of Doors	5	PR	\$2,096	\$10,479
	Total C10 Interior Construction				\$771,883		Total C10 Interior Construction				\$833,633
E20	Furnishings					E20	Furnishings				
E2010	Fixed Furnishings & Casework					E2010	Fixed Furnishings & Casework				
	Entrance reception counter	1	EA	\$9,018.31	\$9,018		Entrance reception counter	1	EA	\$9,649.59	\$9,650
	Mail Room Furnishings	500	SF	\$5.39	\$2,695		Mail Room Furnishings	500	SF	\$5.77	\$2,884
	Casework Allowance	1	LS	\$10,290	\$10,290		Casework Allowance	1	LS	\$11,010.30	\$11,010
	Casework Allowance	1	LS	\$10,290	\$10,290		Casework Allowance	1	LS	\$11,010.30	\$11,010
	Total E20 Furnishings				\$32,293		Total E20 Furnishings				\$34,554

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
F	SPECIAL CONSTRUCTION & DEMOLITION					F	SPECIAL CONSTRUCTION & DEMOLITION				
F10	Special Construction					F10	Special Construction Walk-off matt	84	SF	\$25.00	\$2,100
	Total F10 Special Construction				\$0		Total F10 Special Construction				\$2,100
F20	Selective Building Demolition					F20	Selective Building Demolition Remove concrete for recessed mat	84	SF	\$10.00	\$840
	Total F20 Selective Building Demolition				\$0		Total F20 Selective Building Demolition				\$840

EQ 6.1a

Provide Operable in lieu of Fixed Windows at 12% of the Glazed Area (5B)

SUMMARY IN UNIFORMAT 2

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure	3,272,588	3,378,428	105,840
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
	Estimated Direct Construction Cost	3,272,588	3,378,428	105,840

(f) GSA Reference Estimate
See Appendices L & M

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

EQ 6.1: Provide Operable in lieu of Fixed Windows at 12% of the Glazed Area (5B)

Detailed Estimate in Uniform Breakdown

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
B	SHELL					B	SHELL				
B20 B2020	Exterior Enclosure Exterior Windows and Doors Aluminum curtain wall system with 3 coats "Kynar" aluminum framing double glazing, low E Aluminum framed punched window system, insulated, double glazed, Low E	36,750	SF	\$50.72	\$1,863,960	B20 B2020	Exterior Enclosure Exterior Windows and Doors Aluminum curtain wall system with 3 coats "Kynar" aluminum framing double glazing, low E Aluminum curtain wall system with 3 coats "Kynar" aluminum framing double glazing, low E, operable awning windows Aluminum framed punched window system, insulated, double glazed, Low E Aluminum framed punched window system, insulated, double glazed, Low E, operable awning windows	32,340	SF	\$50.72	\$1,640,285
		36,750	SF	\$38.33	\$1,408,628			4,410	SF	\$62.72	\$276,595
								32,340	SF	\$38.33	\$1,239,592
								4,410	SF	\$50.33	\$221,955
	Total B20 Exterior Closure				\$3,272,588		Total B20 Exterior Closure				\$3,378,428

EQ 6.1b

Provide Operable in lieu of Fixed Windows at 15% of the Glazed Area (6B)

SUMMARY IN UNIFORMAT 2

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure	2,609,126	2,709,723	100,597
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
	Estimated Direct Construction Cost	2,609,126	2,709,723	100,597

(f) GSA Reference Estimate
See Appendices L & M

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

EQ 6.1b Provide Operable in lieu of Fixed Windows at 15% of the Glazed Area (6B)

Detailed Estimate in Uniformat Breakdown

GSA Reference Estimate						LEED Point Estimate					
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniformat	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
B	SHELL					B	SHELL				
B20 B2020	Exterior Enclosure Exterior Windows and Doors Aluminum curtain wall system with 3 coats " Kynar" aluminum framing double glazing, low E level 3-9(40% of wall) Aluminum framed punched window system, insulated, double glazed, Low E levels 1&2 (60% of wall)	37,000	SF	\$50.72	\$1,876,640	B20 B2020	Exterior Enclosure Exterior Windows and Doors Aluminum curtain wall system with 3 coats " Kynar" aluminum framing double glazing, low E level 3-9(40% of wall) Aluminum curtain wall system with 3 coats " Kynar" aluminum framing double glazing, low E level 3-9(40% of wall), operable awning windows Aluminum framed punched window system, insulated, double glazed, Low E levels 1&2 (60% of wall) Aluminum framed punched window system, insulated, double glazed, Low E levels 1&2 (60% of wall), operable awning windows	31,450	SF	\$50.72	\$1,595,144
		19,110	SF	\$38.33	\$732,486			5,550	SF	\$62.72	\$348,096
								16,235	SF	\$38.33	\$622,288
								2,865	SF	\$50.33	\$144,195
	Total B20 Exterior Closure				\$2,609,126		Total B20 Exterior Closure				\$2,709,723

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HVAC	0	98,800	98,800
D40	Fire Protection			
D50	Electrical	0	18,000	18,000
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		0	116,800	116,800

(f) GSA Reference Estimate
See Appendices L & M

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate							LEED Point Estimate						
(a) Uniform at	(b) CSI Code	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(b) CSI Code	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
D30		HVAC					D30		HVAC Humidifier: Pneumatic Atomizing Humidifiers, 200#/hour capacity each	9	EA	\$7,000.00	\$63,000
									Relative Humidity sensors	9	EA	\$200.00	\$1,800
									Tie back to the BMS	9	EA	\$1,000.00	\$9,000
									Air Compressor	1	EA	\$10,000.00	\$10,000
									Deionized Water	1	EA	\$15,000.00	\$15,000
		Total D30 HVAC				\$0			Total D30 HVAC				\$98,800
D50		Electrical					D50		Electrical Electrical connections for humidification system	9	EA	\$2,000.00	\$18,000
		Total D50 Electrical				\$0			Total D50 Electrical				\$18,000

EQ 8.2

Daylight & Views for Daylight 90% of Spaces (Add Interior Glazing)

SUMMARY IN UNIFORMAT

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction	0	242,500	242,500
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		0	242,500	242,500

(f) GSA Reference Estimate
See Appendices L & M

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate							LEED Point Estimate						
(a) Uniform at	(b) CSI Code	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(b) CSI Code	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
C		INTERIORS					C		INTERIORS				
C10	C1009	Interior Construction Partitions and Doors <u>Partitions:</u>					C10	C1009	Interior Construction Partitions and Doors <u>Partitions:</u>				
									Interior Glazing, 5'x3'-6" fixed transoms 1/4" float glass in aluminium glazing channels w/ painted wood trim	9,700	SF	\$25.00	\$242,500
		Total C10 Interior Construction				\$0			Total C10 Interior Construction				\$242,500

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction	0	29,930	29,930
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		0	29,930	29,930

(f) GSA Reference Estimate
See Appendices L & M

(g) LEED Point Estimate
See Section 2

(h) Estimating Assumptions
See Section 2

GSA Reference Estimate						LEED Point Estimate							
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total		
C	INTERIORS					C	INTERIORS						
C10	Interior Construction					C10	Interior Construction						
C1030	Specialties					C1030	Specialties Signs (24"x36" Prints) View windows Case Study Manual	1 54 1	LS SF LS	\$7,500 \$45 \$20,000	\$7,500 \$2,430 \$20,000		
Total C10 Interior Construction						\$0	Total C10 Interior Construction						\$29,930

ID 1.4b

Exceed Certified Wood Criteria (75%)

SUMMARY IN UNIFORMAT

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction	649,866	733,049	83,183
C30	Interior Finishes	28,800	35,554	6,754
D10	Conveying Systems			
D20	Plumbing			
D30	HVAC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
	Estimated Direct Construction Cost	678,666	768,603	89,937

(f) GSA Reference Estimate

See Appendices L & M

(g) LEED Point Estimate

See Section 2

(h) Estimating Assumptions

See Section 2

GSA Reference Estimate						LEED Point Estimate					
(a) <i>Uniformat</i>	(c) <i>Description</i>	(d) <i>Quantity</i>	(e) <i>Unit</i>	(f) <i>Rate</i>	(g) <i>Total</i>	(h) <i>Uniformat</i>	(i) <i>Description</i>	(k) <i>Quantity</i>	(l) <i>Unit</i>	(m) <i>Rate</i>	(n) <i>Total</i>
C	INTERIORS					C	INTERIORS				
C10 C1009	Interior Construction <u>Partitions and Doors</u>					C10 C1009	Interior Construction <u>Partitions and Doors</u>				
	Doors:						Doors:				
	Solid Core Single Door 3' x 7'	18	EA	\$1,013	\$18,241		Solid Core Single Door 3' x 7'	18	EA	\$1,127	\$20,576
	Solid Core Pair of Doors	9	PR	\$1,353	\$12,177		Solid Core Pair of Doors	9	PR	\$1,505	\$13,735
	Solid Core Pair of Doors w/Security	3	PR	\$2,253	\$6,760		Solid Core Pair of Doors w/Security	3	PR	\$2,506	\$7,625
	Solid Core Single Door 3' x 7'	65	EA	\$1,240	\$80,588		Solid Core Single Door 3' x 7'	65	EA	\$1,379	\$90,903
	Solid Core Single Door 3' x 7'	2	EA	\$1,240	\$2,480		Solid Core Single Door 3' x 7'	2	EA	\$1,379	\$2,797
	Solid Core Single Door 3' x 7'	477	EA	\$1,013	\$483,397		Solid Core Single Door 3' x 7'	477	EA	\$1,127	\$545,272
	Solid Core Pair of Doors	5	EA	\$1,353	\$6,765		Solid Core Pair of Doors	5	EA	\$1,505	\$7,631
	Solid Core Single Door 3' x 7'	24	EA	\$1,240	\$29,756		Solid Core Single Door 3' x 7'	24	EA	\$1,379	\$33,565
	Solid Core Pair of Doors	5	PR	\$1,941	\$9,703		Solid Core Pair of Doors	5	PR	\$2,158	\$10,945
	Total C10 Interior Construction				\$649,866		Total C10 Interior Construction				\$733,049
C30 C3010	Interior Finishes <u>Wall Finishes</u> Hardwood Base					C30	Interior Finishes <u>Wall Finishes</u> Hardwood Base				
		3,200	LF	\$9.00	\$28,800			3,200	LF	\$11	\$35,554
	Total Interior Finishes				\$28,800		Total Interior Finishes				\$35,554

Appendix E:

Synergistic Credit Cost Estimates – Courthouse

SN 1

Synergistic Credit (SS5.1 + SS 6.1a + WE 1.2)

SUMMARY IN UNIFORMAT

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework	1,413,874	1,245,100	(168,774)
	Estimated Direct Construction Cost	1,413,874	1,245,100	(168,774)

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 3

(h) Estimating Assumptions
See Section 3

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
G	BUILDING SITEWORK					G	BUILDING SITEWORK				
G10	Sitework					G10	Sitework				
	Concrete traffic paving	4,323	SF	\$8.00	\$34,584		Concrete traffic paving	4,323	SF	\$8.00	\$34,584
	Sidewalk paving	13,832	SF	\$5.00	\$69,160		Sidewalk paving	13,832	SF	\$5.00	\$69,160
	Plaza paving	28,529	SF	\$20.00	\$570,580		Plaza paving	13,832	SF	\$20.00	\$276,640
	Steps & landings	4,323	SF	\$45.00	\$194,535		Steps & landings	1,729	SF	\$45.00	\$77,805
	Pool/fountain	865	SF	\$80.00	\$69,200		Pool/fountain	865	SF	\$80.00	\$69,200
	Street Trees:						Street Trees:				
	Honey Locust, 3" caliper	20	EA	\$600.00	\$12,000		Honey Locust, 3" caliper	20	EA	\$600.00	\$12,000
	Street Trees:						Street Trees:				
	Zelkova, 2" caliper	25	EA	\$500.00	\$12,500		Zelkova, 2" caliper	25	EA	\$500.00	\$12,500
	Tree Grates, recycled plastic	45	EA	\$700.00	\$31,500		Tree Grates, recycled plastic	45	EA	\$700.00	\$31,500
	Trees in Planting Beds:						Trees in Planting Beds:				
	Mix of Eastern Redbud, Flowering						Mix of Crepe Myrtle, Virginia Pine,				
	Dogwood, Bald Cypress	30	EA	\$450.00	\$13,500		Eastern Red Cedar	30	EA	\$450.00	\$13,500
	Shrubs in Barrier Garden:						Shrubs in Barrier Garden:				
	Mix of Wax Myrtle, Beautyberry, Wild						Mix of Wax Myrtle, Maple-leaved				
	Hydrangea	10,374	SF	\$16.00	\$165,984		Viburnum, American Holly	19,451	SF	\$16.00	\$311,216
	Shrubs and Perennials in Planter Areas:						Shrubs and Perennials in Planter Areas:				
	Mix of Wax Myrtle with various perennials						Mix of Wax Myrtle with various perennials				
	(New England Aster, Wild Bergamont,						(New England Aster, Wild Bergamont,				
	Blue False Indigo, Early Coneflower, Black-						Blue False Indigo, Early Coneflower, Black-				
	eyed Susan and others)						eyed Susan and others)				
	Groundcovers:						Groundcovers:				
	Mix of Leadwort, Striped Wintergreen,	3,458	SF	\$17.00	\$58,786		Mix of Leadwort, Striped Wintergreen,	4,323	SF	\$17.00	\$73,491
	Fragrant Sumac, Mountain Stonecrop	13,832	SF	\$12.00	\$165,984		Fragrant Sumac, Mountain Stonecrop	23,774	SF	\$12.00	\$285,288
	Turf grass:						Turf grass:				
	Fescue blend sod including ground prep	5,187	EA	\$3.00	\$15,561		Fescue blend sod including ground prep	2,594	EA	\$3.00	\$7,782
	Irrigation system				In above		Delete irrigation system	32,851	SF	(\$0.90)	(\$29,566)
	Total G10 Building Sitework				\$1,413,874		Total G10 Building Sitework				\$1,245,100

SN 2

SS 6.1b + SS 7.2b + EA 2.1

SUMMARY IN UNIFORMAT

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing	548,421	991,421	443,001
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical	0	20,000	20,000
E10	Equipment			
E20	Furnishings			
F10	Special Construction	0	570,000	570,000
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		548,421	1,581,421	1,033,001

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 3

(h) Estimating Assumptions
See Section 3

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HVAC	0	459,400	459,400
D40	Fire Protection			
D50	Electrical	16,166	123,180	107,014
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		16,166	582,580	566,414

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 3

(h) Estimating Assumptions
See Section 3

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
D30	HVAC					D30	HVAC				
							High Efficiency Chillers	2	EA	\$45,000	\$90,000
							Premium for VFD in chillers	2	EA	\$40,000	\$80,000
							VFD Cooling Tower Fans - based on current design approaches, there is no cost increase in this area.	3	Ea	\$0	\$0
							Energy Recovery Costs - include additional sheet metal, automatic controls and installation	45,900	CFM	\$4.00	\$183,600
							Modulating Condensing Boilers	4	EA	\$12,500	\$50,000
							Premium Efficiency Pump Motors	17	EA	\$121	\$2,050
							Premium Efficiency AHU Motors	40	EA	\$106	\$4,250
							CO2 Sensors (5-year calibration) including tie-in to BMS	45	EA	\$1,080.00	\$48,600
							Programming to control outside air dampers based on CO2 sensors	1	LS	\$900	\$900
	Total D30 HVAC				\$0		Total D30 HVAC				\$459,400
D50	Electrical Standard Ballasts Single pole switches					D50	Electrical Dimming Ballasts	388	EA	\$150.00	\$58,200
							Daylight Sensors	19	EA	\$160.00	\$3,040
							Microwatt Panel (local controler)	90	EA	\$135.00	\$12,150
							Occupancy Sensors, wall mtd. Combined daylight/occupancy sensors, ceiling mtd.	218 71	EA EA	\$160.00 \$210.00	\$34,880 \$14,910

GSA Reference Estimate						LEED Point Estimate						
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total	
Total D50 Electrical						Total D50 Electrical						\$123,180
						\$16,166						

SN 4

MR 7 + EQ 4.4

SUMMARY IN UNIFORMAT

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction	1,568,764	1,768,029	199,265
C30	Interior Finishes	763,352	919,854	156,502
D10	Conveying Systems			
D20	Plumbing			
D30	HVAC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings	2,907,169	3,274,313	367,144
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		5,239,285	5,962,196	722,911

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 3

(h) Estimating Assumptions
Cost of pursuing MR1 (certified wood) and EQ4.4 (composite wood or agrifiber)
TOGETHER
See Section 3

GSA Reference Estimate		LEED Point Estimate										
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total	
Formaldehyde Free Wood Items												
C	INTERIORS											
C10	Interior Construction											
C1009	Partitions and Doors											
	Doors:											
	Coiling Overhead Wood Slat Door	1	EA	\$1,250.00	\$1,250			1	EA	\$1,350.00	\$1,350	
	Solid core hardwood veneer door	20	EA	\$950.00	\$19,000			20	EA	\$1,026.00	\$20,520	
	Fire rated solid core hardwood door	27	EA	\$1,150.00	\$31,050			27	EA	\$1,242.00	\$33,534	
	ABS Plastic Clad Door	3	PR	\$1,400.00	\$4,200			3	PR	\$1,512.00	\$4,536	
	Solid core hardwood veneer door	2	EA	\$950.00	\$1,900			2	EA	\$1,026.00	\$2,052	
	Fire rated solid core hardwood door	3	EA	\$1,150.00	\$3,450			3	EA	\$1,242.00	\$3,726	
	Solid core hardwood veneer door	12	EA	\$2,910.87	\$34,930			12	EA	\$3,143.74	\$37,725	
	Solid core hardwood veneer door	35	EA	\$2,695.25	\$94,334			35	EA	\$2,910.87	\$101,880	
	Solid core hardwood veneer door	678	EA	\$1,013.41	\$687,092			678	EA	\$1,094.48	\$742,059	
	Solid core hardwood door w/view panel	5	EA	\$2,964.78	\$14,824			5	EA	\$3,201.96	\$16,010	
	Sub Total C10 Interior Const					\$892,030		Sub Total C10 Interior Const				\$963,392
E20	Furnishings											
E2010	Non Courtroom Furnishings											
	Plam Counter	320	LF	\$73.20	\$23,424			320	LF	\$78.32	\$25,064	
	Hardwood Veneer Cabinets	183	LF	\$700.00	\$128,100			183	LF	\$749.00	\$137,067	
	Furnishings Allowance	115,200	SF	\$1.08	\$124,416			115,200	SF	\$1.16	\$133,125	
	Plam Base Cabinet (DT)	8	LF	\$281.76	\$2,254			8	LF	\$301.48	\$2,412	
	Sub Total Non Courtroom or Chambers					\$278,194		Sub Total Non Courtroom or Chambers				\$297,668
	Fixed Furnishings & Casework - Chambers											
	Wall Cabinet in Robing Room	13	EA	\$8,452.31	\$109,880			13	EA	\$9,043.97	\$117,572	
	Base Cabinet	194	LF	\$452.80	\$87,843			194	LF	\$484.50	\$93,992	
	Vanity Cabinet	52	LF	\$242.58	\$12,614			52	LF	\$259.56	\$13,497	
	Upper Cabinet	194	LF	\$344.99	\$66,928			194	LF	\$369.14	\$71,613	
	Chambers Library Wall Shelving	518	LF	\$566.00	\$293,188			518	LF	\$605.62	\$313,711	
	Hardwood Veneer Locker	13	EA	\$1,000.00	\$13,000			13	EA	\$1,070.00	\$13,910	
	SubTotal E20 Furnishings					\$583,453		SubTotal E20 Furnishings				\$624,295

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
Total Furnishings						Total Furnishings					
\$861,648						\$921,963					
Formaldehyde Free & Certified Wood Items											
C	INTERIORS					C	INTERIORS				
C10	Interior Construction					C10	Interior Construction				
	Solid Core Veneer Double Door	21	PR	\$4,851.45	\$101,880		Solid Core Veneer Double Door	21	PR	\$5,768.37	\$121,136
	Solid Core Veneer Single Door	33	EA	\$2,695.25	\$88,943		Solid Core Veneer Single Door	33	EA	\$3,204.65	\$105,754
	Solid Core Veneer Single Door	176	EA	\$2,695.25	\$474,364		Solid Core Veneer Single Door	176	EA	\$3,204.65	\$564,019
	Bi-folding doors in chamber	13	EA	\$506.71	\$6,587		Bi-folding doors in chamber	13	EA	\$602.48	\$7,832
	Fire rated solid core door in chamber	4	EA	\$1,239.82	\$4,959		Fire rated solid core door in chamber	4	EA	\$1,474.15	\$5,897
	Sub Total Interior Construction	\$676,734					Sub Total Interior Construction	\$804,637			
C30	Interior Finishes					C30	Interior Finishes				
	Hardwood Base	45,241	LF	\$9.00	\$407,169		Hardwood Base	45,241	LF	\$11.12	\$502,854
	Hardwood Base	9,660	LF	\$9.00	\$86,940		Hardwood Base	9,660	LF	\$11.12	\$107,371
	Hardwood Veneer Paneling	9,551	SF	\$28.19	\$269,243		Hardwood Veneer Paneling	9,551	SF	\$32.42	\$309,629
	Sub Total Interiors Finishes	\$763,352					Sub Total Interiors Finishes	\$919,854			
E	EQUIPMENT & FURNISHINGS					E	EQUIPMENT & FURNISHINGS				
E20	Furnishings					E20	Furnishings				
E2010	Fixed Furnishings & Casework - Courtrooms					E2010	Fixed Furnishings & Casework - Courtrooms				
	Raised platform at Judges Bench	5,013	SF	\$10.57	\$52,987		Raised platform at Judges Bench	5,013	SF	\$12.16	\$60,936
	Raised platform at US Attorney's bench	302	SF	\$11.27	\$3,404		Raised platform at US Attorney's bench	302	SF	\$12.96	\$3,914
	Spectator Bench	1,374	LF	\$216.16	\$297,004		Spectator Bench	1,374	LF	\$249	\$341,554
	Spectator Rail	384	LF	\$673.81	\$258,743		Spectator Rail	384	LF	\$775	\$297,554
	Deputy Clerk, etc stations	11	EA	\$28,570	\$314,270		Deputy Clerk, etc stations	11	EA	\$32,856	\$361,411
	Court Reporter station	1	EA	\$14,554	\$14,554		Court Reporter station	1	EA	\$16,737	\$16,737
	Baliff Station	11	EA	\$8,625	\$94,875		Baliff Station	11	EA	\$9,919	\$109,106
	Judges bench	11	EA	\$43,124	\$474,364		Judges bench	11	EA	\$49,593	\$545,519
	Jury Box (16 persons)	4	EA	\$24,257	\$97,028		Jury Box (16 persons)	4	EA	\$27,896	\$111,582
	Jury Box (12 persons)	4	EA	\$23,718	\$94,872		Jury Box (12 persons)	4	EA	\$27,276	\$109,103
	Jury Box (8 persons)	2	EA	\$22,101	\$44,202		Jury Box (8 persons)	2	EA	\$25,416	\$50,832

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
	Jury Table	48	LF	\$394	\$18,912		Jury Table	48	LF	\$453	\$21,749
	Pair of Gates	11	EA	\$3,773.00	\$41,503		Pair of Gates	11	EA	\$4,339	\$47,728
	Witness Box	11	EA	\$11,859.00	\$130,449		Witness Box	11	EA	\$13,638	\$150,016
	Witness Box	1	EA	\$8,086.00	\$8,086		Witness Box	1	EA	\$9,299	\$9,299
	Foreperson Box	1	EA	\$8,086.00	\$8,086		Foreperson Box	1	EA	\$9,299	\$9,299
	US Attorney Box	1	EA	\$32,882	\$32,882		US Attorney Box	1	EA	\$37,814	\$37,814
	Lecturn	11	EA	\$5,391.00	\$59,301		Lecturn	11	EA	\$6,200	\$68,196
	SubTotal E20 Furnishings				\$2,045,522		Sub Total E20 Furnishings				\$2,352,350

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction	1,568,764	1,801,010	232,246
C30	Interior Finishes	676,412	812,483	136,071
D10	Conveying Systems			
D20	Plumbing			
D30	HVAC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings	2,907,169	3,581,141	673,972
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		5,152,345	6,194,634	1,042,289

(f) GSA Reference Estimate
See Appendix K

(g) LEED Point Estimate
See Section 3

(h) Estimating Assumptions
See Section 3

GSA Reference Estimate						LEED Point Estimate					
(a)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(k)	(l)	(m)	(n)
Uniformat	Description	Quantity	Unit	Rate	Total	Uniformat	Description	Quantity	Unit	Rate	Total
<hr/>											
	Formaldehyde Free & Certified Wood Items										
C	INTERIORS					C	INTERIORS				
C10	Interior Construction					C10	Interior Construction				
	Solid Core Veneer Double Door	21	PR	\$4,851.45	\$101,880		Solid Core Veneer Double Door	21	PR	\$5,768.37	\$121,136
	Solid Core Veneer Single Door	33	EA	\$2,695.25	\$88,943		Solid Core Veneer Single Door	33	EA	\$3,204.65	\$105,754
	Solid core hardwood veneer door	678	EA	\$1,013.41	\$687,092		Solid core hardwood veneer door	678	EA	\$1,143.13	\$775,040
	Solid Core Veneer Single Door	176	EA	\$2,695.25	\$474,364		Solid Core Veneer Single Door	176	EA	\$3,204.65	\$564,019
	Bi-folding doors in chamber	13	EA	\$506.71	\$6,587		Bi-folding doors in chamber	13	EA	\$602.48	\$7,832
	Fire rated solid core door in chamber	4	EA	\$1,239.82	\$4,959		Fire rated solid core door in chamber	4	EA	\$1,474.15	\$5,897
	Sub Total Interior Construction				\$1,363,826		Sub Total Interior Construction				\$1,579,677
C30	Interior Finishes					C30	Interior Finishes				
	Hardwood Base	45,241	LF	\$9.00	\$407,169		Hardwood Base	45,241	LF	\$11.12	\$502,854
	Hardwood Veneer Paneling	9,551	SF	\$28.19	\$269,243		Hardwood Veneer Paneling	9,551	SF	\$32.42	\$309,629
	Sub Total Interiors Finishes				\$676,412		Sub Total Interiors Finishes				\$812,483
E	EQUIPMENT & FURNISHINGS					E	EQUIPMENT & FURNISHINGS				
E20	Furnishings					E20	Furnishings				
E2010	Fixed Furnishings & Casework - Courtrooms					E2010	Fixed Furnishings & Casework - Courtrooms				
	Raised platform at Judges Bench	5,013	SF	\$10.57	\$52,987		Raised platform at Judges Bench	5,013	SF	\$13.74	\$68,884
	Raised platform at US Attorney's bench	302	SF	\$11.27	\$3,404		Raised platform at US Attorney's bench	302	SF	\$14.65	\$4,425
	Spectator Bench	1,374	LF	\$216.16	\$297,004		Spectator Bench	1,374	LF	\$281.01	\$386,105
	Spectator Rail	384	LF	\$673.81	\$258,743		Spectator Rail	384	LF	\$875.95	\$336,366
	Deputy Clerk, etc stations	11	EA	\$28,570	\$314,270		Deputy Clerk, etc stations	11	EA	\$37,141	\$408,551
	Court Reporter station	1	EA	\$14,554	\$14,554		Court Reporter station	1	EA	\$18,920	\$18,920
	Baliff Station	11	EA	\$8,625	\$94,875		Baliff Station	11	EA	\$11,213	\$123,338
	Judges bench	11	EA	\$43,124	\$474,364		Judges bench	11	EA	\$56,061	\$616,673
	Jury Box (16 persons)	4	EA	\$24,257	\$97,028		Jury Box (16 persons)	4	EA	\$31,534	\$126,136
	Jury Box (12 persons)	4	EA	\$23,718	\$94,872		Jury Box (12 persons)	4	EA	\$30,833	\$123,334
	Jury Box (8 persons)	2	EA	\$22,101	\$44,202		Jury Box (8 persons)	2	EA	\$28,731	\$57,463
	Jury Table	48	LF	\$394	\$18,912		Jury Table	48	LF	\$512.20	\$24,586

GSA Reference Estimate		LEED Point Estimate				
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniformat
						(i) Description
						(j) Quantity
						(k) Unit
						(l) Rate
						(m) Total
	Pair of Gates	11	EA	\$3,773.00	\$41,503	Pair of Gates
	Witness Box	11	EA	\$11,859.00	\$130,449	Witness Box
	Witness Box	1	EA	\$8,086.00	\$8,086	Witness Box
	Foreperson Box	1	EA	\$8,086.00	\$8,086	Foreperson Box
	US Attorney Box	1	EA	\$32,882	\$32,882	US Attorney Box
	Lectum	11	EA	\$5,391.00	\$59,301	Lectum
	SubTotal E20 Furnishings				\$2,045,522	Sub Total E20 Furnishings
						\$2,659,178

Appendix F:

Synergistic Credit Cost Estimates – Office Building

SN 1a

EA 1.1-10^{5b}+ EQ 1

SUMMARY IN UNIFORMAT

(a)	(b)	(c)	(d)	(e)	DESCRIPTION
PARAMETRIC SUMMARY (UNIFORMAT)					
A10	Foundations				(f) GSA Reference Estimate See appendices L & M
A20	On Grade/Below Grade Construction				
B10	Superstructure				
B20	Exterior Enclosure				
B30	Roofing				
C10	Interior Construction				
C30	Interior Finishes				
D10	Conveying Systems				
D20	Plumbing				
D30	HVAC	0	125,484	125,484	(g) LEED Point Estimate
D40	Fire Protection				See Section 3
D50	Electrical	12,600	57,600	45,000	
E10	Equipment				
E20	Furnishings				
F10	Special Construction				
F20	Selective Building Demolition				
G10	Building Sitework				
Estimated Direct Construction Cost		12,600	183,084	170,484	(h) Estimating Assumptions

See Section 3

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
D30	HVAC					D30	HVAC				
							High Efficiency Chillers (0.54 kw/ton) without VFD	2	EA	\$25,000	\$50,000
							VFD Cooling Tower Fans				excluded
							Energy Recovery				excluded
							Modulating Condensing Boilers				excluded
							Premium Efficiency Pump Motors	17	EA	\$121	\$2,050
							Premium Efficiency AHU Motors	63	EA	\$118	\$7,434
							CO2 Sensors (5-year calibration) including tie-in to BMS	60	EA	\$1,080.00	\$64,800
							Programming to control outside air dampers	1	LS	\$1,200.00	\$1,200
							Total D30 HVAC				
D50	Electrical Single pole switches					D50	Electrical Occupancy Sensors, wall mtd.				
		360	EA	\$35.00	\$12,600		360	EA	\$160.00	\$57,600	
							Total D50 Electrical				\$57,600

(a)	(b)	(c) GSA Reference Estimate \$	(d) LEED Point Estimate \$	(e) Incremental Cost \$	DESCRIPTION
PARAMETRIC SUMMARY (UNIFORMAT)					
A10	Foundations				(f) GSA Reference Estimate
A20	On Grade/Below Grade Construction				See Appendices L & M
B10	Superstructure				
B20	Exterior Enclosure				
B30	Roofing				
C10	Interior Construction				
C30	Interior Finishes				
D10	Conveying Systems				
D20	Plumbing				
D30	HVAC	0	205,484	205,484	(g) LEED Point Estimate
D40	Fire Protection				See Section 3
D50	Electrical	12,600	57,600	45,000	
E10	Equipment				
E20	Furnishings				
F10	Special Construction				
F20	Selective Building Demolition				
G10	Building Sitework				
Estimated Direct Construction Cost		12,600	263,084	250,484	(h) Estimating Assumptions

See Section 3

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
D30	HVAC					D30	HVAC				
							High Efficiency Chillers (0.54 kw/ton) without VFD	2	EA	\$25,000	\$50,000
							Cost to Furnish VFD for Cent. Chiller & Tie-in to EMS.	2	EA	\$40,000	\$80,000
							VFD Cooling Tower Fans				excluded
							Energy Recovery				excluded
							Modulating Condensing Boilers				excluded
							Premium Efficiency Pump Motors	17	EA	\$121	\$2,050
							Premium Efficiency AHU Motors	63	EA	\$118	\$7,434
							CO2 Sensors (5-year calibration) including tie-in to BMS	60	EA	\$1,080.00	\$64,800
							Programming to control outside air dampers	1	LS	\$1,200.00	\$1,200
	Total D30 HVAC				\$0		Total D30 HVAC				\$205,484
D50	Electrical Single pole switches					D50	Electrical Occupancy Sensors, wall mtd.	360	EA	\$160.00	\$57,600
							Total D50 Electrical				

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction			
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HVAC	0	413,484	413,484
D40	Fire Protection			
D50	Electrical			
E10	Equipment	40,276	285,900	245,624
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		40,276	699,384	659,108

(f) GSA Reference Estimate
See Appendices L & M

(g) LEED Point Estimate
See Section 3

(h) Estimating Assumptions
See Section 3

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
D30	HVAC					D30	HVAC				
							High Efficiency Chillers (0.49 kw/ton)	2	EA	\$45,000	\$90,000
							Furnish VFD for Centrifugal Chiller Including Costs to "Tie-in" to BMS	2	EA	\$40,000	\$80,000
							VFD Cooling Tower Fans				No Premium
							Energy Recovery	29,500	CFM	\$4.00	\$118,000
							Modulating Condensing Boilers	4	EA	\$12,500	\$50,000
							Premium Efficiency Pump Motors	17	EA	\$121	\$2,050
							Premium Efficiency AHU Motors	63	EA	\$118	\$7,434
							CO2 Sensors (5-year calibration) including tie-in to BMS	60	EA	\$1,080.00	\$64,800
							Programming to modulate outside air dampers	1	LS	\$1,200.00	\$1,200
	Total D30 HVAC				\$0		Total D30 HVAC				\$413,484
D50	Electrical					D50	Electrical				
							Dimming Ballasts	1,258	EA	\$150.00	\$188,700
							Daylight Sensors	27	EA	\$160.00	\$4,320
							Microwatt Panel (local controler)	198	EA	\$135.00	\$26,730
							Occupancy Sensors, wall mtd.	189	EA	\$160.00	\$30,240
	Total D50 Electrical				\$40,276		Combined daylight/occupancy sensors, ceiling mtd.	171	EA	\$210.00	\$35,910
	Total D50 Electrical				\$40,276		Total D50 Electrical				\$285,900

SN 1c	EA 1.1-10 ⁸ + EQ 1	Full Façade Renovation	Detailed Estimate in Uniformat Breakdown								
GSA Reference Estimate			LEED Point Estimate								
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total

SN 1d

EA 1.1-10⁷ + EQ1
Minimum Façade Renovation

SUMMARY IN UNIFORMAT

(a)	(b)	(c) GSA Reference Estimate \$	(d) LEED Point Estimate \$	(e) Incremental Cost \$	DESCRIPTION
PARAMETRIC SUMMARY (UNIFORMAT)					
A10	Foundations				(f) GSA Reference Estimate See Appendices L & M
A20	On Grade/Below Grade Construction				
B10	Superstructure				
B20	Exterior Enclosure				
B30	Roofing				
C10	Interior Construction				
C30	Interior Finishes				
D10	Conveying Systems				
D20	Plumbing				
D30	HVAC	0	413,484	413,484	(g) LEED Point Estimate
D40	Fire Protection				See Section 3
D50	Electrical	40,276	285,900	245,624	
E10	Equipment				
E20	Furnishings				
F10	Special Construction				
F20	Selective Building Demolition				
G10	Building Sitework				
Estimated Direct Construction Cost		40,276	699,384	659,108	(h) Estimating Assumptions

See Section 3

GSA Reference Estimate						LEED Point Estimate					
(a) Uniform at	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
D30	HVAC					D30	HVAC				
							High Efficiency Chillers (0.49 kw/ton) without VFD	2	EA	\$45,000	\$90,000
							Premium to provide VFD in chiller.	2	EA	\$40,000	\$80,000
							VFD Cooling Tower Fans - based on current design approaches, there is no cost increase in this area.				
							Energy Recovery	29,500	CFM	\$4.00	\$118,000
							Modulating Condensing Boilers	4	EA	\$12,500	\$50,000
							Premium Efficiency Pump Motors	17	EA	\$121	\$2,050
							Premium Efficiency AHU Motors	63	EA	\$118	\$7,434
							CO2 Sensors (5-year calibration) including tie-in to BMS	60	EA	\$1,080.00	\$64,800
							Programming to modulate outside air dampers	1	LS	\$1,200.00	\$1,200
	Total D30 HVAC				\$0		Total D30 HVAC				\$413,484
D50	Electrical					D50	Electrical				
							Dimming Ballasts	1,258	EA	\$150.00	\$188,700
							Daylight Sensors	27	EA	\$160.00	\$4,320
							Microwatt Panel (local controller)	198	EA	\$135.00	\$26,730
							Occupancy Sensors, wall mtd.	189	EA	\$160.00	\$30,240
						Combined daylight/occupancy sensors, ceiling mtd.	171	EA	\$210.00	\$35,910	
	Total D50 Electrical				\$40,276		Total D50 Electrical				\$285,900

SN 2

MR 4.2 + MR 5.2

SUMMARY IN UNIFORMAT

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction	1,085,250	1,107,543	22,293
C30	Interior Finishes	719,359	755,591	36,231
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings			
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		1,804,609	1,863,134	58,524

(f) GSA Reference Estimate
See Appendices L & M

(g) LEED Point Estimate
See Section 3

(h) Estimating Assumptions

The premium cost of the recyclable drywall is the shipping cost from the factory to the jobsite.

See Section 3

GSA Reference Estimate						LEED Point Estimate					
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniformat	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
C	INTERIORS					C	INTERIORS				
C30	Interior Finishes					C10	Interior Construction				
C1009	Partition and <u>Doors</u> Shell & Core Patch & repair existing GWB walls	128,950	SF	\$2.80	\$361,060	C1009	Partition and <u>Doors</u> Patch & repair existing GWB walls	128,950	SF	\$2.85	\$367,508
	Closed Office Interior partition - GWB on both sides and including metal studs at 16" o.c., insulated, fire rated	113,210	SF	\$4.85	\$549,069		Interior partition - GWB on both sides and including metal studs at 16" o.c., insulated, fire rated	113,210	SF	\$4.95	\$560,390
	One layer GWB on interior partition, GWB only (taped and jointed)	19,586	SF	\$1.24	\$24,287		One layer GWB on interior partition, GWB only (taped and jointed)	19,586	SF	\$1.29	\$25,266
	Open Office Interior partition - GWB both sides on metal studs at 16" O.C.	30,691	SF	\$4.53	\$139,030		Interior partition - GWB both sides on metal studs at 16" O.C.	30,691	SF	\$4.63	\$142,099
	One layer GWB on interior partition, GWB only (taped and jointed)	9,520	SF	\$1.24	\$11,805		One layer GWB on interior partition, GWB only (taped and jointed)	9,520	SF	\$1.29	\$12,281
	Total C10 Interior Construction				\$1,085,250		Total C10 Interior Construction				\$1,107,543
C30	Interior Finishes					C30	Interior Finishes				
C3030	<u>Ceiling Finishes</u> Suspended 24" x 24" ACT Suspended 24" x 24" ACT Closed Office	214,146 11,293	SF SF	\$3.18 \$3.18	\$680,984 \$35,912	C3030	<u>Ceiling Finishes</u> Suspended 24" x 24" ACT Suspended 24" x 24" ACT Closed Office	214,146 11,293	SF SF	\$3.34 \$3.34	\$715,033 \$37,707

GSA Reference Estimate						LEED Point Estimate					
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniform at	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
	GWB soffit over counters, premium over ACT	716	SF	\$1.72	\$1,232		GWB soffit over counters, premium over ACT	716	SF	\$1.99	\$1,425
	Open Office GWB soffit over counters, premium over ACT	716	SF	\$1.72	\$1,232		Open Office GWB soffit over counters, premium over ACT	716	SF	\$1.99	\$1,425
	Total C30 Interior Finishes				\$719,359		Total C30 Interior Finishes				\$755,591

SN 3

MR 7 + EQ 4.4

SUMMARY IN UNIFORMAT

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction	771,883	856,837	84,954
C30	Interior Finishes			
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings	32,293	34,554	2,261
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		804,176	891,391	87,215

(f) GSA Reference Estimate
See Appendices L & M

(g) LEED Point Estimate
See Section 3

(h) Estimating Assumptions
See Section 3

GSA Reference Estimate		LEED Point Estimate									
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniformat	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
Formaldehyde-Free Wood Items											
C	INTERIORS					C	INTERIORS				
C10	Interior Construction					C10	Interior Construction				
C1009	Partitions and Doors					C1009	Partitions and Doors				
	Doors:						Doors:				
	Coiling Overhead Wood Slat Door	1	EA	\$1,348	\$1,348		Coiling Overhead Wood Slat Door	1	EA	\$1,456	\$1,456
	Solid Core Single Door 3' x 7'	18	EA	\$1,013	\$18,241		Solid Core Single Door 3' x 7'	18	EA	\$1,094	\$19,701
	Solid Core Pair of Doors	9	PR	\$1,353	\$12,177		Solid Core Pair of Doors	9	PR	\$1,461	\$13,151
	Solid Core Pair of Doors w/Security	3	PR	\$2,253	\$6,760		Solid Core Pair of Doors w/Security	3	PR	\$2,434	\$7,301
	Solid Core Single Door 3' x 7'	65	EA	\$1,240	\$80,588		Solid Core Single Door 3' x 7'	65	EA	\$1,339	\$87,035
	Solid Core Single Door 3' x 7'	2	EA	\$1,240	\$2,480		Solid Core Single Door 3' x 7'	2	EA	\$1,339	\$2,678
	Solid Core Pair of Doors	5	EA	\$1,353	\$6,765		Solid Core Pair of Doors	5	EA	\$1,461	\$7,306
	Solid Core Single Door 3' x 7'	24	EA	\$1,240	\$29,756		Solid Core Single Door 3' x 7'	24	EA	\$1,339	\$32,136
	Solid Core Pair of Doors	5	PR	\$1,941	\$9,703		Solid Core Pair of Doors	5	PR	\$2,096	\$10,479
	Solid Core Single Door 3' x 7'	72	EA	\$940	\$67,680		Solid Core Single Door 3' x 7'	72	EA	\$1,015	\$73,094
	Solid Core Pair of Doors	10	PR	\$1,353	\$13,530		Solid Core Pair of Doors	10	PR	\$1,461	\$14,613
	Solid Core Single Door 3' x 7'	24	EA	\$1,240	\$29,756		Solid Core Single Door 3' x 7'	24	EA	\$1,339	\$32,136
	Solid Core Pair of Doors	5	PR	\$1,941	\$9,703		Solid Core Pair of Doors	5	PR	\$2,096	\$10,479
	Total C10 Interior Construction				\$288,486		Total C10 Interior Construction				\$311,565
E20	Furnishings					E20	Furnishings				
E2010	Fixed Furnishings & Casework					E2010	Fixed Furnishings & Casework				
	Entrance reception counter	1	EA	\$9,018.31	\$9,018		Entrance reception counter	1	EA	\$9,650	\$9,650
	Mail Room Furnishings	500	SF	\$5.39	\$2,695		Mail Room Furnishings	500	SF	\$6	\$2,884
	Casework Allowance	1	LS	\$10,290	\$10,290		Casework Allowance	1	LS	\$11,010	\$11,010
	Casework Allowance	1	LS	\$10,290	\$10,290		Casework Allowance	1	LS	\$11,010	\$11,010
	Total E20 Furnishings				\$32,293		Total E20 Furnishings				\$34,554
Formaldehyde-Free and Certified Wood Items											
C	INTERIORS					C	INTERIORS				

GSA Reference Estimate						LEED Point Estimate					
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniformat	(i) Description	(k) Quantity	(l) Unit	(m) Rate	(n) Total
C10 C1009	Interior Construction Partitions and Doors Doors: Solid Core Single Door 3' x 7' Total C10 Interior Construction	477	EA	\$1,013	\$483,397	C10 C1009	Interior Construction Partitions and Doors Doors: Solid Core Single Door 3' x 7' Total C10 Interior Construction	477	EA	\$1,143	\$545,272
					\$483,397						\$545,272

SN 4

MR 7 + EQ 4.4 + ID 1.4b

SUMMARY IN UNIFORMAT

(a)	(b)	(c)	(d)	(e)
	PARAMETRIC SUMMARY (UNIFORMAT)	GSA Reference Estimate \$	LEED Point Estimate \$	Incremental Cost \$
A10	Foundations			
A20	On Grade/Below Grade Construction			
B10	Superstructure			
B20	Exterior Enclosure			
B30	Roofing			
C10	Interior Construction	771,883	870,860	98,977
C30	Interior Finishes	42,474	52,395	9,921
D10	Conveying Systems			
D20	Plumbing			
D30	HV/AC			
D40	Fire Protection			
D50	Electrical			
E10	Equipment			
E20	Furnishings	32,293	34,554	2,261
F10	Special Construction			
F20	Selective Building Demolition			
G10	Building Sitework			
Estimated Direct Construction Cost		846,650	957,809	111,159
		Estimating Assumptions		
		See Section 3		

(f) GSA Reference Estimate
See Appendices L & M

(g) LEED Point Estimate
See Section 3

GSA Reference Estimate		LEED Point Estimate				
(a) Uniformat	(c) Description	(d) Quantity	(e) Unit	(f) Rate	(g) Total	(h) Uniformat
(i) Description	(j) Quantity	(k) Unit	(l) Rate	(m) Total		
C	INTERIORS					C
C10	Interior Construction					C10
C1009	Partitions and Doors					C1009
	<u>Doors:</u>					
	Coiling Overhead Wood Slat Door	1	EA	\$1,348	\$1,348	
	Solid Core Single Door 3' x 7'	72	EA	\$940	\$67,680	
	Solid Core Pair of Doors	10	PR	\$1,353	\$13,530	
	Solid Core Single Door 3' x 7'	24	EA	\$1,240	\$29,756	
	Solid Core Pair of Doors	5	PR	\$1,941	\$9,703	
	Total C10 Interior Construction				\$122,016	
E20	Furnishings					E20
E2010	<u>Fixed Furnishings & Casework</u>					E2010
	Entrance reception counter	1	EA	\$9,018.31	\$9,018	
	Mail Room Furnishings	500	SF	\$5.39	\$2,695	
	Casework Allowance	1	LS	\$10,290	\$10,290	
	Casework Allowance	1	LS	\$10,290	\$10,290	
	Total E20 Furnishings				\$32,293	
Formaldehyde-Free and Certified Wood Items						
C	INTERIORS					C
C10	Interior Construction					C10
C1009	Partitions and Doors					C1009
	<u>Doors:</u>					
	Solid Core Single Door 3' x 7'	18	EA	\$1,013	\$18,241	
	Solid Core Pair of Doors	9	PR	\$1,353	\$12,177	
	Solid Core Pair of Doors w/Security	3	PR	\$2,253	\$6,760	
	Solid Core Single Door 3' x 7'	65	EA	\$1,240	\$80,588	
	Solid Core Single Door 3' x 7'	2	EA	\$1,240	\$2,480	
	Solid Core Single Door 3' x 7'	477	EA	\$1,013	\$483,397	
	Solid Core Pair of Doors	5	EA	\$1,353	\$6,765	
	Total C10 Interior Construction				\$608,309	
E20	Furnishings					E20
E2010	<u>Fixed Furnishings & Casework</u>					E2010
	Entrance reception counter	1	EA	\$9,650	\$9,650	
	Mail Room Furnishings	500	SF	\$5.77	\$2,884	
	Casework Allowance	1	LS	\$11,010	\$11,010	
	Casework Allowance	1	LS	\$11,010	\$11,010	
	Total E20 Furnishings				\$34,554	

GSA Reference Estimate						LEED Point Estimate					
(a)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(k)	(l)	(m)	(n)
Uniformat	Description	Quantity	Unit	Rate	Total	Uniformat	Description	Quantity	Unit	Rate	Total
C30 C3010	Solid Core Single Door 3' x 7'	24	EA	\$1,240	\$29,756	C30	Solid Core Single Door 3' x 7'	24	EA	\$1,399	\$33,564
	Solid Core Pair of Doors	5	PR	\$1,941	\$9,703		Solid Core Pair of Doors	5	PR	\$2,189	\$10,945
	Total C10 Interior Construction				\$649,866		Total C10 Interior Construction				\$733,049
	Interior Finishes						Interior Finishes				
	Wall Finishes						Wall Finishes				
	Hardwood Trim on Walls						Hardwood Trim on Walls				
	Hardwood Base	384	LF	\$16.93	\$6,501		Hardwood Base	384	LF	\$20.82	\$7,996
	Hardwood Base	3,200	LF	\$9.00	\$28,800		Hardwood Base	3,200	LF	\$11.07	\$35,554
	Hardwood Base	554	LF	\$9.00	\$4,986		Hardwood Base	554	LF	\$11.07	\$6,155
	Hardwood Base	243	LF	\$9.00	\$2,187		Hardwood Base	243	LF	\$11.07	\$2,690
	Total Interior Finishes				\$42,474		Total Interior Finishes				\$52,395

Appendix G:

Soft Cost Estimate Summaries

Summary of LEED Soft Cost Premiums
Table G-1:
 Design Team with Expert Consultants

New Courthouse										Office Modernization					
Certified			Silver			Gold				Certified		Silver		Gold	
1A Low	2A High	3A Low	4A High	5A Low	6A High	1B Min Fac	2B Full Fac	3B Min Fac		4B Full Fac	5B Min Fac	6B Full Fac			
B. MULTIPLE LEED CREDITS (Note: The following tasks apply to multiple LEED credits and to the overall LEED process. Tasks MC-1 - MC-8 are performed by the Expert Consultant)															
MC-1	LEED Feasibility Review/Charrette					\$ 5,760	\$ 5,760	\$ 5,760	\$ 5,760	\$ 5,760	\$ 5,760	\$ 5,760	\$ 5,760	\$ 5,760	\$ 5,760
MC-2	Coordination of LEED "Action Items" with Design Team					\$ 6,580	\$ 6,580	\$ 6,580	\$ 8,300	\$ 8,300	\$ 6,580	\$ 6,580	\$ 6,580	\$ 8,300	\$ 8,300
MC-3	Materials and Systems Research for LEED Credits					\$ 3,540	\$ 3,540	\$ 3,540	\$ 4,160	\$ 4,160	\$ 3,540	\$ 3,540	\$ 3,540	\$ 4,160	\$ 4,160
MC-4	LEED Calculations for Site, Water, Material, and IEQ Credits					\$ 3,480	\$ 3,480	\$ 3,480	\$ 4,360	\$ 4,360	\$ 3,480	\$ 3,480	\$ 3,480	\$ 4,360	\$ 4,360
MC-5	LEED Credit Interpretation Reviews and/or Submissions					\$ 1,150	\$ 1,150	\$ 1,150	\$ 1,150	\$ 1,150	\$ 1,150	\$ 1,150	\$ 1,150	\$ 1,150	\$ 1,150
MC-6	Development of LEED Specification Language					\$ 8,480	\$ 8,480	\$ 8,480	\$ 9,920	\$ 9,920	\$ 8,480	\$ 8,480	\$ 8,480	\$ 9,920	\$ 9,920
MC-7	Meeting(s) to Review LEED Submittal Procedures and Special LEED Requirements with CM/GC and/or Subcontractors					\$ 3,420	\$ 3,420	\$ 3,420	\$ 3,420	\$ 3,420	\$ 3,420	\$ 3,420	\$ 3,420	\$ 3,420	\$ 3,420
MC-8	Review of Contractor Submittals for LEED Compliance, Tracking of LEED Credits and Periodic LEED Review Meetings					\$ 14,200	\$ 14,200	\$ 14,200	\$ 15,640	\$ 15,640	\$ 14,200	\$ 14,200	\$ 14,200	\$ 15,640	\$ 15,640
MC-9	General LEED Integration Efforts (Architect)					\$ 31,200	\$ 31,200	\$ 31,200	\$ 38,200	\$ 38,200	\$ 31,200	\$ 31,200	\$ 31,200	\$ 38,200	\$ 38,200
	SUBTOTALS (MULTIPLE LEED CREDITS)					\$ 77,810	\$ 77,810	\$ 77,810	\$ 90,910	\$ 90,910	\$ 77,810	\$ 77,810	\$ 77,810	\$ 90,910	\$ 90,910
	Reimbursable Expenses (for all Design Tasks)					\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000
	TOTALS FOR ALL LEED DESIGN COSTS (INDIVIDUAL/MULTIPLE CREDIT TASKS + REIMB.)					\$ 83,810	\$ 97,730	\$ 83,810	\$ 120,910	\$ 134,010	\$ 182,510	\$ 97,730	\$ 99,970	\$ 123,150	\$ 180,970
2. LEED DOCUMENTATION COSTS															
DCT-1 - DCT-5	LEED Documentation (Assembled by Expert Consultant w/ Admin. by Design Team)					\$ 12,600	\$ 12,600	\$ 13,900	\$ 16,200	\$ 16,200	\$ 16,980	\$ 16,980	\$ 18,280	\$ 20,580	\$ 20,580
	LEED Registration and Certification Fees					\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000
	Reimbursable Expenses					\$ 750	\$ 750	\$ 750	\$ 750	\$ 750	\$ 750	\$ 750	\$ 750	\$ 750	\$ 750
	TOTALS FOR LEED DOCUMENTATION					\$ 22,350	\$ 22,350	\$ 23,650	\$ 25,950	\$ 25,950	\$ 26,730	\$ 26,730	\$ 28,030	\$ 30,330	\$ 30,330
SOFT COST TOTALS: ALL DESIGN AND DOCUMENTATION TASKS															
COST IMPACT (\$/GSF)															

Summary of LEED Soft Cost Premiums
Table G-2:
 Design Team with Extensive LEED Experience

Summary of LEED Soft Cost Premiums Table G-2: Design Team with Extensive LEED Experience																	
New Courthouse										Office Modernization							
Certified			Silver			Gold				Certified		Silver			Gold		
1A Low	2A High	3A Low	4A High	5A Low	6A High					1B Min Fac	2B Full Fac	3B Min Fac	4B Full Fac	5B Min Fac	6B Full Fac		
1. LEED DESIGN COSTS:																	
A. CREDIT-SPECIFIC TASKS (Note: The following credits involve identified increases to the scope of design work beyond "standard" LEED Silver assumptions.)																	
SS SUSTAINABLE SITES																	
SS-4.2	Alternative Transportation - Bike Storage & Changing Rooms												\$ 9,640		\$ 9,640	\$ 9,640	
SS-6.2	Stormwater Management - Treatment													\$ 2,600			
SS-7.2	Landscape / Exterior Design to Reduce Heat Islands - Roof					\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,960						
	SS SUBTOTALS					\$ -	\$ -	\$ -	\$ -	\$ -	\$ 18,200	\$ -	\$ -	\$ 9,640	\$ -	\$ 9,640	
WE WATER EFFICIENCY																	
	No items subject to Additional Service fees (for credits pursued)					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
EA ENERGY AND ATMOSPHERE																	
EA-1	Optimize Energy Performance					\$ -	\$ -	\$ -	\$ 23,180	\$ 23,180	\$ 23,180	\$ -	\$ -	\$ 23,180	\$ 23,180	\$ 23,180	
EA-2	Renewable Energy										\$ 25,860				\$ 25,860	\$ 25,860	
EA-5	Measurement and Verification					\$ 5,160		\$ 5,160	\$ 5,160	\$ 5,160	\$ 5,160	\$ 5,160	\$ 5,160	\$ 5,160	\$ 5,160	\$ 5,160	
	EA SUBTOTALS					\$ -	\$ 5,160	\$ -	\$ 28,340	\$ 28,340	\$ 54,200	\$ 5,160	\$ 5,160	\$ 28,340	\$ 54,200	\$ 54,200	
MR MATERIALS AND RESOURCES																	
	No items subject to Additional Service fees (for credits pursued)					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
EQ INDOOR ENVIRONMENTAL QUALITY																	
EQ-7.1	Thermal Comfort- Comply with ASHRAE Standard 55-1992					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -					\$ 4,780	
EQ-8.2	Daylight and Views- Views for 90% of Spaces														\$ 10,300		
	EQ SUBTOTALS					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 10,300	\$ 4,780	
ID INNOVATION AND DESIGN PROCESS																	
	No items subject to Additional Service fees (for credits pursued)					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
	SUBTOTALS (ALL INDIVIDUAL CREDITS)					\$ -	\$ 5,160	\$ -	\$ 28,340	\$ 28,340	\$ 72,400	\$ 5,160	\$ 5,160	\$ 14,800	\$ 28,340	\$ 74,140	\$ 68,620

Summary of LEED Soft Cost Premiums
Table G-2:
 Design Team with Extensive LEED Experience

Summary of LEED Soft Cost Premiums Table G-2: Design Team with Extensive LEED Experience																
New Courthouse									Office Modernization							
Certified			Silver			Gold			Certified		Silver			Gold		
1A Low	2A High	3A Low	4A High	5A Low	6A High	1B Min Fac	2B Full Fac	3B Min Fac	4B Full Fac	5B Min Fac	6B Full Fac					
B. MULTIPLE LEED CREDITS (Note: The following tasks apply to multiple LEED credits and to the overall LEED process)																
MC-1	All Multiple Credit/LEED Process Tasks: Includes initial LEED charter/review, LEED analyses and updates throughout each project phase, LEED-specific calculations, material and equipment research, and LEED-related specifications language.															
	Fee assumptions for Courthouse - 2.5% construction cost increase (to obtain LEED Silver) and a 6% design team fee															
	Fee assumptions for Office Building - 3.0% construction cost increase (to obtain LEED Silver) and a 6% design team fee															
	SUBTOTALS (MULTIPLE LEED CREDITS)															
	Reimbursable Expenses															
	TOTALS FOR ALL LEED DESIGN COSTS (INDIVIDUAL/MULTIPLE CREDIT TASKS + REIMB.)															
2. LEED DOCUMENTATION COSTS																
DCT-1 - LEED Documentation (Assembled by Design Team)	\$ 14,940	\$ 14,940	\$ 16,620	\$ 20,180	\$ 20,180	\$ 19,320	\$ 19,320	\$ 21,000	\$ 21,000	\$ 24,560	\$ 24,560					
LEED Registration and Certification Fees	\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000					
Reimbursable Expenses	\$ 350	\$ 350	\$ 350	\$ 350	\$ 350	\$ 350	\$ 350	\$ 350	\$ 350	\$ 350	\$ 350					
TOTALS FOR LEED DOCUMENTATION	\$ 24,290	\$ 24,290	\$ 25,970	\$ 29,530	\$ 29,530	\$ 28,670	\$ 28,670	\$ 30,350	\$ 30,350	\$ 33,910	\$ 33,910					
SOFT COST TOTALS: ALL DESIGN AND DOCUMENTATION TASKS																
COST IMPACT (\$/GSF)																

Appendix H:

Detailed Soft Cost Estimates

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LEED Soft Cost Premiums: Detailed Estimates of Individual Tasks
Table H-1: Design Team with Expert Consultants

Discipline: Position: Estimated Hourly Rate:		Architecture						MEP Engineering						Renewable Energy Systems						SUB-TOTAL
		Principal		Proj. Mngr/ Sr. Arch.		Intmtd. Architect		Dsgnr/ Drftsprsn		Principal		Proj. Mngr/ Sr. Engr.		Intmtd. Engineer		Dsgnr/ Drftsprsn				
		Hrs	\$	Hrs	\$	Hrs	\$	Hrs	\$	Hrs	\$	Hrs	\$	Hrs	\$	Hrs	\$			
1. LEED DESIGN COSTS:																				
A. INDIVIDUAL LEED CREDITS (Note: The following credits involve increases to the scope of design work in a project. Additional LEED Credits section of this Table.)																				
WE WATER EFFICIENCY																				
		No Additional Service fees (for credits pursued)																		
EA ENERGY AND ATMOSPHERE																				
EA-1 Design	Optimize Energy Performance: Additional design time to incorporate the following energy-efficiency measures (per the Courthouse and Office Building models): 1) Daylight dimming systems; 2) Modular condensing boilers; 3) Energy recovery system; 4) 0.49 kw/ton chillers; 5) VFD fan cooling towers; 6) Occupancy sensors; 7) Premium efficiency motors. Additional time for construction documents, CCA. (Note: Design time for CO2 sensors is included under credit EQ-1)																			
	12	\$2,400	40	\$5,000	48	\$4,320	48	\$3,120												
EA-1 Model	Optimize Energy Performance (Note: Additional services are assumed only for highest energy point totals [i.e., in Gold and some Silver rating scenarios]). Additional computer energy modeling to evaluate further energy-efficiency measures, and to achieve high LEED energy point total. Additional modeling includes specialized systems such as photovoltaic panels.																			
	8	1,600	20	\$2,500	24	\$2,160	32	\$2,080												
																				\$ 14,840
																				\$ 8,340

- Table Continues on Next Page -

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- Table Continues on Next Page -

LEED Soft Cost Premiums: Detailed Estimates of Individual Tasks
Table H-1: Design Team with Expert Consultants

Discipline: Position: Estimated Hourly Rate:		Architecture						MEP Engineering						Lighting/Daylighting Design						SUB-TOTAL	
		Principal	Proj. Mngtr/ Sr. Arch.	Intmtd. Architect	Dsgnr/ Drftsprsn	Principal	Proj. Mngtr/ Sr. Engr.	Intmtd. Engineer	Dsgnr/ Drftsprsn	Principal	Proj. Mngtr/ Sr. Dsgnr.	Intmtd. Dsgnr.	Dsgnr/ Drftsprsn								
		\$175	\$100	\$80	\$65	\$200	\$125	\$90	\$65	\$150	\$100	\$80	\$65								
		Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs							
1. LEED DESIGN COSTS:																					
A. INDIVIDUAL LEED CREDITS <i>(Note: The following credits involve increases to the scope of design work in a project. Additional LEED-related tasks are included in the Multiple LEED Credits section of this Table.)</i>																					
EQ-8.2	Daylight and Views - Views for 90% of Spaces Additional design time for layout and detailing of glass transoms/interior view windows. Associated construction documents, CCA.																				
		12	\$2,100	24	\$ 2,400	40	\$ 3,200	40	\$ 2,600											\$ 10,300	
ID INNOVATION AND DESIGN PROCESS																					
No Additional Service fees (for credits pursued)																					

- Table Continues on Next Page -

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- Table Continues on Next Page -

LEED Soft Cost Premiums: Detailed Estimates of Individual Tasks
Table H-1: Design Team with Expert Consultants

Discipline:		Architecture										Green Building "Expert" Consultant										SUB-TOTAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
		Proj. Mngnr/ Sr. Arch.					Intmrd. Architect					Dsgnr/ Drftsprsn					Principal						Proj. Mngnr/ Sr. Arch/Eng					Intmrd. Archt/Eng.					Arch/Eng. Technician																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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	MC-1	LEED Feasibility Review/Charrette. Includes meeting preparation, day-long session with design team, follow-up report to document goals and analysis.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				</

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LEED Soft Cost Premiums: Detailed Estimates of Individual Tasks
Table H-1: Design Team with Expert Consultants

Discipline:		Architecture										MEP Engineering						Green Building "Expert" Consultant						SUB-TOTAL			
		Principal		Proj. Mngr/ Sr. Arch.		Intmtd. Architect		Dsgnr/ Drftsprsn		Principal		Proj. Mngr/ Sr. Engr.		Intmtd. Engineer		Dsgnr/ Drftsprsn		Principal		Proj. Mngr/ Sr. Arc/Eng		Intmtd. Arch/Eng.			Arch/Eng. Technician		
Estimated Hourly Rate:		Hrs	\$	Hrs	\$	Hrs	\$	Hrs	\$	Hrs	\$	Hrs	\$	Hrs	\$	Hrs	\$	Hrs	\$	Hrs	\$	Hrs	\$	Hrs	\$		
2. LEED DOCUMENTATION COSTS:																											
	DCT-1	LEED Documentation (Certified Rating): Prepare LEED 2.1 Letter Templates for 28 credits , including final LEED calculations and drawings. Prepare narratives and supporting calculations for LEED Innovation Credits. Assemble drawings, specifications, cut-sheets, submittals and other documentation for 6 audited credits. Provide additional follow-up information requested by the USGBC.																									
	DCT-2	LEED Documentation (Silver Rating): Prepare LEED 2.1 Letter Templates for 35 credits , including final LEED calculations and drawings. Prepare narratives and supporting calculations for LEED Innovation Credits. Assemble drawings, specifications, cut-sheets, submittals and other documentation for 6 audited credits. Provide additional follow-up information requested by the USGBC.																									
	DCT-3	LEED Documentation (Gold Rating): Prepare LEED 2.1 Letter Templates for 41 credits , including final LEED calculations and drawings. Prepare narratives and supporting calculations for LEED Innovation Credits. Assemble drawings, specifications, cut-sheets, submittals and other documentation for 6 audited credits. Provide additional follow-up information requested by the USGBC.																									

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LEED Soft Cost Premiums: Detailed Estimates of Individual Tasks
Table H-1: Design Team with Expert Consultants

Discipline: Position: Estimated Hourly Rate:		Architecture						MEP Engineering						Green Building "Expert" Consultant						SUB-TOTAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
		Principal	Proj. Mngr/ Sr. Arch.	Intrmd. Architect	Dsgnr/ Drftsprsn	Principal	Proj. Mngr/ Sr. Engr.	Intrmd. Engineer	Dsgnr/ Drftsprsn	Principal	Proj. Mngr/ Sr. Arc/Eng	Intrmd. Arch/Eng.	Arch/Eng. Technician																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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		Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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DCT-4	Administration of Expert Consultant Contract and Deliverables (Documentation Phase)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														

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LEED Soft Cost Premiums: Detailed Estimates of Individual Tasks
Table H-2: Design Team with Extensive LEED Experience

Discipline: Position: Estimated Hourly Rate:		Architecture						MEP Engineering						Landscape Design						SUB-TOTAL
		Principal		Proj. Mngr/ Sr. Arch.	Intmtd. Architect	Dsgnr/ Drftsprsn	Principal	Proj. Mngr/ Sr. Engr.	Intmtd. Engineer	Dsgnr/ Drftsprsn	Principal	Proj. Mngr/ Sr. Dsgnr.	Intmtd. Dsgnr.	Dsgnr/ Drftsprsn						
		\$	Hrs	\$	Hrs	\$	Hrs	\$	Hrs	\$	Hrs	\$	Hrs	\$	Hrs					
		\$175		\$100	\$80	\$65	\$200	\$125	\$90	\$65	\$150	\$100	\$80	\$65						
1. LEED DESIGN COSTS:		Hrs																		
A. INDIVIDUAL LEED CREDITS (Note: The following design-related tasks are identified for those credits used primarily in the Gold rating scenarios. Additional LEED-related tasks are included in the Multiple LEED Credits section of this Table.)																				
SS SUSTAINABLE SITES																				
SS-4.2	Alternative Transportation - Bike Storage & Changing Rooms Design of designated bicycle storage rooms and shower rooms, associated construction documents, CCA.																			
		20	\$ 2,000	24	\$1,920	32	\$ 2,080		8	\$1,000	12	\$1,080	24	\$1,560						
SS-6.2 (A)	Stormwater Management- Treatment Design of sand filter treatment system for stormwater, associated construction documents, CCA, maintenance manual.																			
SS-6.2 (B)	Stormwater Management - Treatment Design of bio-retention areas for stormwater collection and treatment, associated construction documents. (Note: This soft cost is not applied to any of the LEED Courthouse or Office Building Scenarios developed for this study. It is included for informational purposes only.)																			
SS-7.2	Landscape and Exterior Design to Reduce Heat Islands - Roof (Note: Additional services are assumed for vegetated roof options only.) Design of rooftop planting areas ("extensive" green roof system), species selection, associated construction documents, maintenance manual.																			
WE WATER EFFICIENCY																				
No Additional Service fees (for credits pursued)																				

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LEED Soft Cost Premiums: Detailed Estimates of Individual Tasks

Table H-2: Design Team with Extensive LEED Experience

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LEED Soft Cost Premiums: Detailed Estimates of Individual Tasks

Table H-2: Design Team with Extensive LEED Experience

Discipline:															SUB-TOTAL																																		
Position:																																																	
Estimated Hourly Rate:																																																	
1. LEED DESIGN COSTS:																																																	
A. INDIVIDUAL LEED CREDITS (Note: The following design-related tasks are identified for those credits used primarily in the Gold rating scenarios. Additional LEED-related tasks are included in the Multiple LEED Credits section of this Table.)																																																	
MR MATERIALS AND RESOURCES																																																	
No Additional Service fees (for credits pursued)																																																	
EQ INDOOR ENVIRONMENTAL QUALITY																																																	
<div>EQ-7.1 / EQ-7.2</div> <div>Thermal Comfort - Comply with ASHRAE Standard 55-1992 / Permanent Monitoring System Design of humidification system (Office Building model) including monitoring and controls. Associated construction documents, CCA.</div>																																																	
<div>EQ-8.1</div> <div>Daylight and Views - Daylight 75% of Spaces Computer daylighting models (e.g., Radiance) and/or physical model testing to evaluate daylighting designs and verify 2% daylight factor. . Assumption for estimate: computer modeling of 2 defined spaces (e.g., courtroom, typical office bays). (Note: This soft cost is not applied to any of the LEED Courthouse or Office Building Scenarios developed for this study. It is included for informational purposes only.)</div>															<div>4</div> <div>\$ 800 12 \$1,500 16 \$1,440 16 \$1,040</div>																									\$ 4,780									
<div>EQ-8.2</div> <div>Daylight and Views - Views for 90% of Spaces Additional design time for glass transoms/interior view windows. Associated construction documents, CCA.</div>															<div>12</div> <div>\$2,100 24 \$2,400 40 \$3,200 40 \$2,600</div>																									\$ 11,360									
ID INNOVATION AND DESIGN PROCESS																																																	
No Additional Service fees (for credits pursued)																																																	

LEED Soft Cost Premiums: Detailed Estimates of Individual Tasks
Table H-2: Design Team with Extensive LEED Experience

Discipline:		Architecture						MEP Engineering						Lighting/Daylighting Design						SUB-TOTAL							
		Principal		Proj. Mngr/ Sr. Arch.		Intrmd. Architect		Dsgnr/ Drftsprsn		Principal		Proj. Mngr/ Sr. Engr.		Intrmd. Engineer		Dsgnr/ Drftsprsn		Principal			Proj. Mngr/ Sr. Dsgnr.		Intrmd. Dsgnr.		Dsgnr/ Drftsprsn		
		\$		\$		\$		\$		\$		\$		\$		\$		\$			\$		\$		\$		
		Hrs		Hrs		Hrs		Hrs		Hrs		Hrs		Hrs		Hrs		Hrs			Hrs		Hrs		Hrs		
Position:		\$175		\$100		\$80		\$65		\$200		\$125		\$90		\$65		\$150		\$100		\$80		\$65			
Estimated Hourly Rate:																											
1. LEED DESIGN COSTS:																											
B. MULTIPLE LEED CREDITS (Note: The following tasks apply to multiple LEED credits and to the overall LEED process)																											
	Multiple Credits Tasks: Includes initial LEED charrette/review, LEED analyses and updates throughout each project phase, LEED-specific calculations, material and equipment research, and LEED-related specifications language.																										
MC-1	Fee assumptions for Courthouse - 2.5% construction cost increase (to obtain LEED Silver) and a 6% design team fee (Fee increase = \$86,122).	n/a																									
	Fee assumptions for Office Building - 3.0% construction cost increase (to obtain LEED Silver) and a 6% design team fee (Fee increase = \$70,886 for minimal facade renovation case, \$72,798 for full facade renovation case).	n/a																									

- Table Continues on Next Page -

LEED Soft Cost Premiums: Detailed Estimates of Individual Tasks
Table H-2: Design Team with Extensive LEED Experience

Discipline: Position: Estimated Hourly Rate:			Architecture						MEP Engineering						SUB-TOTAL						
			Principal		Proj. Mngr/ Sr. Arch.		Intrmd. Architect		Dsgnr/ Drftsprsn		Principal		Proj. Mngr/ Sr. Engr.			Intrmd. Engineer		Dsgnr/ Drftsprsn			
			Hrs	\$	Hrs	\$	Hrs	\$	Hrs	\$	Hrs	\$	Hrs	\$		Hrs	\$	Hrs	\$		
2. LEED DOCUMENTATION COSTS:																					
	DCT-1	LEED Documentation (Certified Rating): Collect and organize LEED-relevant submittals throughout the construction phase. Prepare LEED 2.1 Letter Templates for 28 credits , including final LEED calculations and drawings. Prepare narratives and supporting calculations for LEED Innovation Credits. Assemble drawings, specifications, cut-sheets, submittals and other documentation for 6 audited credits. Provide additional follow-up information requested by the USGBC.	12	\$ 2,100	32	\$ 3,200	88	\$ 7,040	40	\$ 2,600											\$ 14,940
	DCT-2	LEED Documentation (Silver Rating): Collect and organize LEED-relevant submittals throughout the construction phase. Prepare LEED 2.1 Letter Templates for 35 credits , including final LEED calculations and drawings. Prepare narratives and supporting calculations for LEED Innovation Credits. Assemble drawings, specifications, cut-sheets, submittals and other documentation for 6 audited credits. Provide additional follow-up information requested by the USGBC.	12	\$ 2,100	32	\$ 3,200	96	\$ 7,680	56	\$ 3,640											\$ 16,620
	DCT-3	LEED Documentation (Gold Rating): Collect and organize LEED-relevant submittals throughout the construction phase. Prepare LEED 2.1 Letter Templates for 41 credits , including final LEED calculations and drawings. Prepare narratives and supporting calculations for LEED Innovation Credits. Assemble drawings, specifications, cut-sheets, submittals and other documentation for 6 audited credits. Provide additional follow-up information requested by the USGBC.	12	\$ 2,100	40	\$ 4,000	124	\$ 9,920	64	\$ 4,160											\$ 20,180
	DCT-4	LEED Documentation for Credit EQ-2: (Ventilation Effectiveness) Note: for overhead air systems only (Office Building). Prepare plans showing outlet types, characteristic room lengths, return/exhaust openings, air velocities, and the predicted Air Diffusion Performance Index (ADPI) for 5-10 spaces. Prepare narrative describing the ventilation system design.																			
		LEED Registration and Certification Fees (assumes USGBC Member rate)																			\$ 9,000
		Reimbursable Expenses																			\$ 350

- End of Table -

Appendix I:

DOE-2 Energy Modeling Summary – Courthouse

APPENDIX I:

DOE-2 Energy Modeling Summary - Courthouse

The following report summarizes the energy use simulations performed for the *GSA LEED Cost Study* Courthouse model, using the computer program DOE2.1-E. The report includes the following information:

- 1) A description of the “baseline” building assumptions, including the building geometry, construction assemblies, building systems, schedules, and utility rates.
- 2) A comparison of the baseline building to a LEED Reference Case that meets the minimal prescriptive requirements of ASHRAE/IESNA 90.1-1999.
- 3) A description of the individual Energy Efficiency Measures (EEMs) simulated to achieve energy savings beyond the Baseline case.
- 4) A listing of the combined EEMs that were assembled to achieve three and five energy points under LEED credit EA-1, Optimize Energy Performance.
- 5) Energy Cost Budget forms to document the points earned under credit EA-1.

A. GENERAL INFORMATION

The Mid-Rise Courthouse for this analysis is a six floor courthouse building (including basement), located in Washington DC.

The simulation models for each scheme were created to ensure that the models met the requirements of the following:

- Facilities Standards for the Public Buildings Service (PBS-P100)
- U.S. Courts Design Guide (1997)
- ASHRAE / IES Standard 90.1 - Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings
- Department of Energy Standard 10CFR, Part 435 - Energy Conservation Voluntary Performance Standards for Commercial and Multi-Family high Rise Residential Buildings: Mandatory for New Federal Buildings, Interim Rule

General information regarding the building geometry, construction materials, internal loads and HVAC systems used for the "Baseline Case" DOE-2.1E annual energy simulation is provided below.

Weather File:

DOE-2.1E Weather file: Washington DC

Building Area (as simulated in DOE-2.1E):

Approximately 256,000 ft² of conditioned space

Number of Floors:

5 floors, plus basement

Floor-to-Floor Height:

Basement: 16' - 0" (12' - 0" Floor-to Ceiling)

First Floor: 20' - 0" (13' - 0" Floor-to Ceiling)

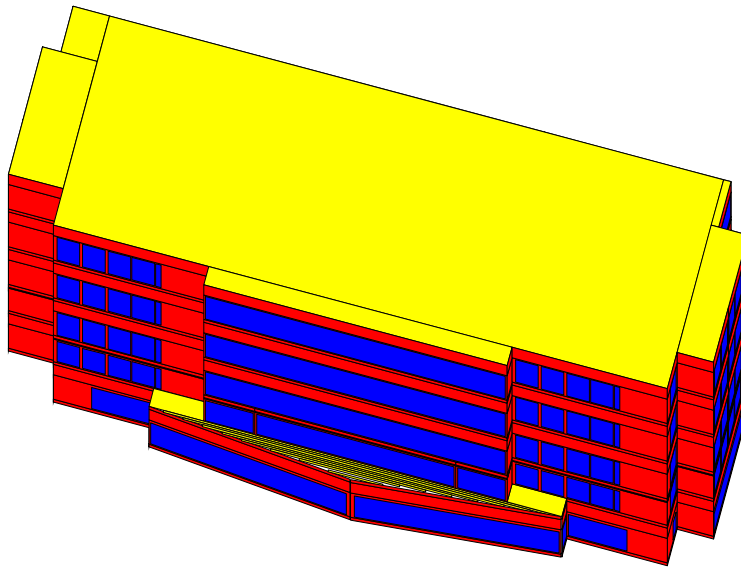
Second Floor: 14' - 0" (10' - 0" Floor-to Ceiling)

Third Floor: 20' - 0" (13' - 0" Floor-to Ceiling)

Fourth Floor: 20' - 0" (13' - 0" Floor-to Ceiling)

Fifth Floor: 20' - 0" (13' - 0" Floor-to Ceiling)

(Courtrooms have floor-to ceiling heights of 16'-0")



Axonometric view of Courthouse Model



BUILDING ENVELOPE AND INTERIOR WALL CONSTRUCTIONS

Building Envelope Constructions:

Windows:

- Double pane, Low-e
- $U_{\text{center of glass}}$ 0.32
- Visible transmittance 57%
- Shading coefficient 0.35
- Thermally broken aluminum frames
- $U_{\text{fenestration}}$ 0.43

Windows (Curtain Wall):

- Double pane, Low-e
- $U_{\text{center of glass}}$ 0.32
- Visible transmittance 57%
- Shading coefficient 0.35
- Without thermally broken aluminum frames
- $U_{\text{fenestration}}$ 0.59

Exterior wall construction (basement - between parking and conditioned) :

- 8" concrete masonry units (CMU)
- 3 $\frac{5}{8}$ " steel studs @ 24" o.c. w/R-11 fiberglass batt insulation
- $\frac{5}{8}$ " gypsum board
- Effective $U_{\text{value}} = 0.113$

Exterior wall construction (basement - between ground and conditioned) :

- 12" concrete walls
- Effective $U_{\text{value}} = 0.02$

Exterior wall construction (1st & 2nd floors):

- 3" handset stone
- 1" air space
- 8" CMU
- 1" extruded polystyrene insulation (R-5/in.)
- $\frac{5}{8}$ " gypsum board
- $U_{\text{value}} = 0.119$ (includes air films)

Exterior wall construction (3rd thru 5th floors):

- Precast concrete panels
- 1" extruded polystyrene insulation (R-5/in.)
- 6" steel stud @ 16" o.c. w/ R-19 fiberglass batt insulation
- $\frac{1}{2}$ " gypsum wallboard
- $U_{\text{value}} = 0.066$ (includes air films)

Slab on grade construction (lower basement level):

- 4" concrete slab
- Effective $U_{\text{value}} = 0.025$

Roof construction:

- Gravel
- EPDM
- 4" extruded polystyrene (R-5/in.)
- 4" concrete slab on steel deck
- $U_{\text{value}} = 0.042$ (includes air films)

Interior Wall Constructions:*CMU construction (next to unconditioned spaces):*

- 8" concrete masonry units (CMU)
- 3 $\frac{5}{8}$ " steel studs @ 24" o.c. w/R-11 fiberglass batt insulation
- $\frac{5}{8}$ " gypsum board

Gypsum wallboard construction

- $\frac{5}{8}$ " gypsum board
- 3 $\frac{5}{8}$ " steel studs
- $\frac{5}{8}$ " gypsum board

Concrete interior floor slab

- 6 $\frac{1}{2}$ " concrete slab on steel deck
- carpet

Ceiling tile

- $\frac{5}{8}$ " mineral fiber acoustic ceiling tile

B. BUILDING OCCUPANCY PATTERNS**General Office Areas:**

General occupancy 143 ft²/person (per ASHRAE 62-1999) for first and second floors.

Chamber ancillary offices occupancy 400 - 450 ft²/person (District occupancy is 5 staff and 10 visitors, Magistrate occupancy is 3 staff and 10 visitors - USCDG 1997) for floors three through five.

Weekdays	Midnight - 7am	0%	Weekends & Holidays	All Hours	0%
	7am - 8am	25%			
	8am - 9am	75%			
	9am - Noon	90%			
	Noon - 1pm	50%			
	1pm - 2 pm	75%			
	2pm - 5pm	90%			
	5pm - 6pm	50%			
	6pm - Midnight	0%			

Judges Chambers:

District Judges:

Occupancy 1 person

Weekdays		
	Midnight - 7am	0%
	7am - 6pm	60%
	6pm - Midnight	0%

Weekends & Holidays		
	All Hours	0%

Jury Assembly:

Max. Occupancy 250 people

Monday	Midnight - 8am	0%	Monday	Midnight - 8am	0%
	8am - 9am	46%	twice per	8am - 9am	100%
	9am - 10am	34.5%	year	9am - 10am	75%
	10am - 11am	23%	(Feb & Jul)	10am - 11am	50%
	11am - Noon	11.5%		11am - Noon	25%
	Noon - Midnight	0%		Noon - Midnight	0%
Tuesday thru	Midnight - 8am	0%	Weekends	All Hours	0%
Friday	8am - 5pm	5%	& Holidays		
	5pm - Midnight	0%			

Holding Cells:

Max. Occupancy 6 people

Weekdays	Midnight - 7am	0%	Weekends & Holidays	All Hours	0%
	7am - 5pm	75%			
	5pm - Midnight	0%			

District & Special Proceedings Jury Rooms:

Max. Occupancy 18 people

3 day trial

Monday	Midnight - 10am	0%
	10am - 11am	150%
	11am - Midnight	0%
Tuesday	Midnight - 8am	0%
	8am - 9am	78%
	9am - Noon	0%
	Noon - 1pm	56%
	1pm - Midnight	0%
Wednesday	Midnight - 8am	0%
	8am - 3pm	78%
	3pm - Midnight	0%
Thursday & Friday	All Hours	0%
Weekends & Holidays	All Hours	0%

4 day trial

Monday	Midnight - 10am	0%
	10am - 11am	150%
	11am - Midnight	0%
Tuesday	Midnight - 8am	0%
	8am - 9am	78%
	9am - Noon	0%
	Noon - 1pm	56%
	1pm - Midnight	0%
Wednesday & Thursday	Midnight - 8am	0%
	8am - 3pm	78%
	3pm - Midnight	0%
Friday	All Hours	0%
Weekends & Holidays	All Hours	0%

(For annual jury room schedules see table C.1)

District Courtrooms:

Max. Occupancy - Magistrate Courtroom 69 people, District Courtroom 96 people

Day Schedules:

SD: Small	Midnight - 8am	0%	MD: Med	Midnight - 8am	0%
	8am - Noon	25%		8am - Noon	50%
	Noon - 1pm	0%		Noon - 1pm	0%
	1pm - 6pm	25%		1pm - 6pm	50%
	6pm - Midnight	0%		6pm - Midnight	0%
SDD: Small w/dark hrs	Midnight - 8am	0%	MDD: Med w/dark hrs	Midnight - 8am	0%
	8am - Noon	25%		8am - Noon	50%
	Noon - 1pm	0%		Noon - 1pm	0%
	1pm - 3pm	25%		1pm - 3pm	50%
	3pm - Midnight	0%		3pm - Midnight	0%
SMD: Mixed small & med	Midnight - 8am	0%	MLD: Mixed med.&lg.	Midnight - 8am	0%
	8am - Noon	25%		8am - Noon	100%
	Noon - 1pm	0%		Noon - 1pm	0%
	1pm - 6pm	50%		1pm - 6pm	50%
	6pm - Midnight	0%		6pm - Midnight	0%
SLD: Mixed sm. & lg.	Midnight - 8am	0%	WEHD: Weekends & Holidays	All Hours	0%
	8am - Noon	100%			
	Noon - 1pm	0%			
	1pm - 6pm	25%			
	6pm - Midnight	0%			

Week Schedules:

SW: Small	Weekdays	SD	MW: Medium	Weekdays	MD
	Weekend/Hol	WEHD		Weekend/Hol	WEHD
SDDW: Small and Small w/dark days	Monday SDD		MDDW: Medium and Medium w/dark days	Monday MDD	
	Tuesday	SD		Tuesday	MD
	Wednesday	SD		Wednesday	MD
	Thursday	SD		Thursday	MD
	Friday	SDD		Friday	MDD
	Weekend/Hol	WEHD		Weekend/Hol	WEHD
SSMW: Small and Mixed sml & med days	Monday SD		MSMW: Small and Mixed sml & med days	Monday MD	
	Tuesday	SMD		Tuesday	MD
	Wednesday	SMD		Wednesday	SMD
	Thursday	SD		Thursday	SMD
	Friday	SD		Friday	MD
	Weekend/Hol	WEHD		Weekend/Hol	WEHD
SSLW: Monday Small and Mixed sml & lg days	Monday SD		MMLW: Small and Mixed sml & med days	Monday MD	
	Tuesday	SD		Tuesday	MLD
	Wednesday	SD		Wednesday	MD
	Thursday	SLD		Thursday	MD
	Friday	SD		Friday	MD
	Weekend/Hol	WEHD		Weekend/Hol	WEHD

(For annual courtroom schedules see table C.2)

Table C.1: Annual Jury Room Occupancy Schedules

[illegible]

Table C.2: Annual Courtroom Occupancy Schedules:

Floor	Court	Number	January				February				March				April				May				June				
			1	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21	28	4	11	18	25			
3	District	1	SDDW	SDDW	MMLW	MSMW	MSMW	MSMW	SW	SW	SSLW	SSLW	MDDW	MDDW	MDDW	MMLW	MW	MW	MW	MMLW	SSMW	SSMW	SSMW	SSLW			
	District	2	MMLW	SW	SW	SSLW	SSMW	SSMW	SSLW	MDDW	MDDW	MDDW	MMLW	MW	MW	MW	SSLW	MDDW	MDDW	MDDW	MMLW	MW	MW				
4	District	1	MW	MW	MW	SSLW	SDDW	SDDW	SDDW	MMLW	MSMW	MSMW	MMLW	SW	SW	SSLW	SSMW	SSMW	SSLW	MW	MW	MMLW	MDDW				
	District	2	MMLW	MW	MW	MMLW	MSMW	MSMW	SDDW	SDDW	SSLW	SSMW	SSMW	MSMW	MSMW	SSLW	SW	SW	SSLW	MSMW	MSMW	MMLW	MW				
4	District	3	MSMW	MSMW	MSMW	MMLW	MDDW	MDDW	MDDW	SSLW	SW	SW	SSLW	MMLW	MDDW	MDDW	MDDW	MDDW	MDDW	SDDW	SDDW	SDDW	SSLW				
	Magistrate	1	MW	MW	MW	MMLW	MDDW	MDDW	SSLW	SW	SW	SW	MMLW	MSMW	MSMW	MSMW	MMLW	MDDW	MDDW	MMLW	SDDW	SDDW	MMLW				
5	Magistrate	2	MW	MW	MW	MMLW	MSMW	MSMW	SSLW	SDDW	SDDW	SDDW	SSLW	MMLW	MDDW	MDDW	MDDW	MDDW	MMLW	SSMW	SSMW	SSMW	SSLW				
	District	3	MSMW	MMLW	MDDW	MDDW	SSLW	SSMW	SSMW	MMLW	MW	MW	SSLW	SW	SW	SSLW	MMLW	MSMW	MSMW	MSMW	MMLW	SW	SW				
5	Magistrate	4	SW	SSLW	SSLW	SDDW	SDDW	SDDW	MMLW	MDDW	MDDW	MMLW	MW	MW	MW	SSLW	SSMW	SSMW	SSLW	SW	SW	MMLW	MSMW				
Floor	Court	Number	July				August				September				October				November				December				
			2	9	16	23	30	6	13	20	27	3	10	17	24	1	8	15	22	29	5	12	19	26	3	10	17
3	District	1	SSLW	MDDW	MMLW	MW	MW	SSLW	SDDW	SDDW	SDDW	MMLW	MSMW	MSMW	MMLW	SSMW	SSMW	SSMW	SSLW	MW	MW	MW	SSLW	SDDW	SDDW	SDDW	MW
	District	2	MSMW	SSMW	SSMW	SSLW	MSMW	MSMW	MSMW	MSMW	MMLW	SSMW	SSMW	SSMW	SSMW	SSLW	MW	MW	MMLW	MDDW	MDDW	SDDW	SDDW	SDDW	MSMW	MSMW	
4	District	1	MDDW	MMLW	SW	SW	SW	MMLW	SSMW	SSMW	SSLW	MDDW	MDDW	MDDW	MMLW	SDDW	SDDW	SDDW	SDDW	SSLW	MSMW	MSMW	MMLW	MW	MW	MMLW	MDDW
	District	2	SDDW	SDDW	SSLW	SSMW	SSMW	MMLW	MW	MW	MW	MSMW	MSMW	MSMW	MSMW	MSMW	SDDW	SDDW	SDDW	MMLW	MW	MW	SSLW	SW	SW	SW	
4	District	3	MSMW	MSMW	MSMW	MMLW	MDDW	MDDW	MDDW	MMLW	SSLW	SW	SW	SW	MMLW	MW	MW	SSLW	MSMW	MSMW	MSMW	MMLW	MSMW	MSMW	MMLW	MW	
	Magistrate	1	MW	MW	SSLW	SSMW	SSMW	MMLW	MDDW	MDDW	MMLW	SW	SW	SW	SSLW	SDDW	SDDW	SDDW	SSLW	SSMW	SSMW	MMLW	SW	SW	MMLW	MW	
5	Magistrate	2	MW	MW	MW	MMLW	MSMW	MSMW	MMLW	SSLW	SDDW	SDDW	SDDW	MMLW	MDDW	MDDW	SDDW	SDDW	SSLW	MW	MW	MMLW	MSMW	MMLW	MDDW	MDDW	
	Magistrate	3	SW	SSLW	SDDW	SDDW	SSLW	SW	SW	SSLW	SSLW	SSLW	SSMW	SSMW	SSMW	SSMW	SSMW	SSMW	SSMW	SSLW	SDDW	SDDW	MMLW	MW	MW		
5	Magistrate	4	MSMW	MMLW	SSMW	SSMW	SSMW	SSLW	MW	MW	MW	SSLW	MDDW	MDDW	SDDW	SSLW	SW	SW	MMLW	SSMW	SSMW	SSMW	SSLW	SW	SW	SW	

C. LIGHTING AND MISCELLANEOUS EQUIPMENT LOADS

Lighting Schedules (power density):

Lighting Power Density:

• Office	1.1 W/ft ²
• Office (Task)	0.3 W/ft ²
• Corridor	0.75 W/ft ²
• Holding Cells	1.1 W/ft ²
• Cafeteria	1.4 W/ft ²
• Kitchen	2.2 W/ft ²
• Judge's Chambers	1.1 W/ft ²
• Jury Assembly	1.1 W/ft ²
• Jury Rooms	1.1 W/ft ²
• Courtrooms	2.1 W/ft ²
• Mechanical	0.75 W/ft ²
• Security	1.1 W/ft ²

General Office Areas, Chamber Ancillary Offices, Corridors and Holding Cells:

Weekdays	Midnight - 7am	5%
	7am - 7pm	100%
	7pm - Midnight	5%

Weekends & Holidays	All Hours	5%
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General Office Areas - Task Lighting:

Weekdays	Midnight - 7am	0%	Weekends & Holidays	All Hours	0%
	7am - 8am	30%			
	8am - Noon	100%			
	Noon - 1pm	60%			
	1pm - 5pm	100%			
	5pm - Midnight	0%			

Cafeteria and Kitchen:

Weekdays	Midnight - 8am	5%	Weekends & Holidays	All Hours	5%
	8am - 6pm	100%			
	6pm - Midnight	5%			

Judges Chambers:

Weekdays	Midnight - 7am	5%	Weekends & Holidays	All Hours	5%
	7am - 7pm	80%			
	7pm - Midnight	5%			

Jury Assembly:

Monday	Midnight - 7am	5%	Weekends & Holidays	All Hours	5%
	7am - 1pm	100%			
	1pm - Midnight	5%			
Tues - Fri	Midnight - 7am	5%			
	7am - 6pm	100%			
	6pm - Midnight	5%			

Jury Rooms:*3 day trial*

Monday	Midnight - 10am	5%
	10am - 11am	100%
	11am - Midnight	5%
Tuesday	Midnight - 8am	5%
	8am - 1pm	100%
	1pm - Midnight	5%
Wednesday	Midnight - 7am	5%
	7am - 3pm	100%
	3pm - Midnight	5%
Thursday & Friday	All Hours	5%
Weekends & Holidays	All Hours	5%

4 day trial

Monday	Midnight - 10am	5%
	10am - 11am	100%
	11am - Midnight	5%
Tuesday	Midnight - 8am	5%
	8am - 1pm	100%
	1pm - Midnight	5%
Wednesday & Thursday	Midnight - 7am	5%
	8am - 3pm	100%
	3pm - Midnight	5%
Friday	All Hours	5%
Weekends & Holidays	All Hours	5%

Courtrooms:

Weekdays	Midnight - 7am	5%	Weekends & Holidays	All Hours	5%
	7am - 7pm	100%			
	7pm - Midnight	5%			

Security:

Weekdays, Weekends & Holidays	All Hours	100%
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Miscellaneous Electrical Equipment Schedules (power density):**General Office Areas, Judges Chambers, Security (1.0 W/ft²):**

Weekdays	Midnight - 6am	10%	Weekends & Holidays	All Hours	10%
	6am - 7pm	100%			
	7pm - Midnight	10%			

Courtrooms, Jury Rooms (0.25 W/ft²)

Weekdays	Midnight - 6am	10%	Weekends & Holidays	All Hours	10%
	6am - 7pm	100%			
	7pm - Midnight	10%			

D. HVAC OPERATING SCHEDULES AND SYSTEM DESCRIPTION**Heating and Cooling Seasons**

Heating available all year to allow for reheat

Cooling available all year (to provide cooling to core zones)

Heating/Cooling SchedulesOffice

Cooling

Sept 16 - May 15

Weekdays	6 a.m. - 7 p.m.	78°F
	7 p.m. - 6 a.m.	no cooling
Weekends, Holidays	All hours	no cooling

May 16 - Sept 15

Weekdays	6 a.m. - 7 p.m.	75°F occupied zone ¹
	7 p.m. - 6 a.m.	no cooling
Weekends, Holidays	All hours	no cooling

Heating

Oct 16 - May 15

Weekdays	6 a.m. - 7 p.m.	72°F
	7 p.m. - 6 a.m.	60°F
Weekends, Holidays	All hours	60°F

May 16 - Sept 15

Weekdays	7 a.m. - 7 p.m.	68°F (reheat overcooled spaces to this temperature)
	7 p.m. - 7 a.m.	no reheat
Weekends, Holidays	All hours	no reheat

¹ Simulation assumes an average space temperature of 76.5°F to account for stratification associated with the underfloor air distribution.

Sept 15 - Oct 15				
Weekdays	6 a.m. - 7 p.m.	70°F	(reheat overcooled spaces to this temperature)	
	7 p.m. - 6 a.m.	55°F	(limited reheat space temperature minimum, per P100)	
Weekends, Holidays	All hours	55°F	(limited reheat space temperature minimum, per P100)	

Corridor

Cooling

Sept 16 - May 15				
Weekdays	6 a.m. - 7 p.m.	78°F		
	7 p.m. - 6 a.m.	no cooling		
Weekends, Holidays	All hours	no cooling		
May 16 - Sept 15				
Weekdays	6 a.m. - 7 p.m.	75°F		
	7 p.m. - 6 a.m.	no cooling		
Weekends, Holidays	All hours	no cooling		

Heating

Oct 16 - May 15				
Weekdays	6 a.m. - 7 p.m.	72°F		
	7 p.m. - 6 a.m.	60°F		
Weekends, Holidays	All hours	60°F		
May 16 - Sept 15				
Weekdays	7 a.m. - 7 p.m.	68°F		
	7 p.m. - 7 a.m.	no reheat		
Weekends, Holidays	All hours	no reheat		
Sept 15 - Oct 15				
Weekdays	6 a.m. - 7 p.m.	70°F		
	7 p.m. - 6 a.m.	60°F	(limited reheat)	
Weekends, Holidays	All hours	60°F	(limited reheat)	

Mechanical Areas

Cooling no cooling

Heating

All year				
All week	All hours	55°F	(minimum, per P100)	

Air Handling Unit (AHU) Fan ScheduleGeneral

May 16 - Sept 15

Weekdays	6 a.m. - 7 a.m.	AHU off unless setback recovery required
	7 a.m. - 8 p.m.	AHU fans on
	8 p.m. - 6 a.m.	AHU fans off
Weekends, Holidays	All hours	AHU fans off

Sept 16 - May 15

Weekdays	6 a.m. - 8 p.m.	AHU fans on
	8 p.m. - 6 a.m.	AHU fans off
Weekends, Holidays	All hours	AHU fans off

Mechanical

All year

Weekdays	6 a.m. - 8 p.m.	AHU fans on
	8 p.m. - 6 a.m.	AHU fans off unless heating or cooling required
Weekends, Holidays	8 p.m. - 6 a.m.	AHU fans off unless heating or cooling required

Parking Area

All year

Weekdays	6 a.m. - 10 a.m.	AHU fans on
	10 a.m. - 3 p.m.	AHU fans off
	3 p.m. - 8 p.m.	AHU fans on
	8 p.m. - 6 a.m.	AHU fans off
Weekends, Holidays	All hours	AHU fans off

*(The Parking Area fan schedule reflects carbon monoxide sensor controls.)***Ventilation and Exhaust Air**Ventilation Air Amounts

Requirements per ASHRAE 62-1999

General	20 cfm per person
Holding cells	0.16 cfm/ft ²
Corridors	0.05 cfm/ft ²
Parking and sallyport	1.5 cfm/ft ²

Ventilation Air System Sequence of Operation

Minimum ventilation air is provided through the primary air handlers during occupied hours.

Small secondary air handlers are used to ventilate the building when the building is unoccupied.

The secondary air handlers do not run during occupied hours.

Ventilation air through the primary air handler follows the schedules described in Section B, *Building Occupancy Patterns*. When no ventilation is required, 2% of the rated fan flow is assumed to leak through the outside air damper.

The secondary air handler provides 100% outside air at 25% of the minimum ventilation rate during occupied hours. The system cools the air to 55°F for humidity control and reheats to the occupied space temperature. When the outside air temperature is below 55°F no mechanical cooling occurs.

Ventilation System Fans

Efficiency 50% (combined fan and motor efficiency)
Static pressure drop 1.75 in. W.C.

Exhaust Fans

Efficiency 65% (combined fan and motor efficiency)
Static pressure drop 2 in. W.C.
Schedule follows AHU fan schedule

Air Distribution

Basement AHUs

The basement floor is served by two (2) variable volume air handling units (AHUs) per floor with a hot water preheat coil, a chilled water coil, and variable speed supply and return fans. Supply air is overhead and return air is via ceiling plenum.

Operating Parameters:

- Proportional zone thermostats for heating and cooling; throttling range $\pm 1.5^\circ\text{F}$
- Minimum cfm ratio is 0.4 cfm/ft²
- Supply fan static pressure 2.0" H₂O
- Return fan static pressure 0.6" H₂O
- Fan efficiencies (combined: fan and motor): Supply - 50%; return - 25%
- Cooling deck temperature reset to satisfy the cooling load to the warmest zone

Access Floor AHUs (Floors one through five)

Each floor is served by two (2) variable volume air handling units (AHUs) with a hot water preheat coil, a chilled water coil, and variable speed supply and return fans. Airflow distribution is via an access floor for all spaces except public lobbies, restrooms and utilitarian areas in basement. Return air is via ceiling plenum. Perimeter spaces have baseboard hot water radiant heat. Ventilation air control and delivery is described above in "Ventilation and Exhaust Air".

Operating Parameters:

- Proportional zone thermostats for heating and cooling; throttling range $\pm 1.5^\circ\text{F}$
- Minimum cfm ratio is 0.4
- Supply fan static pressure 1.75" H₂O
- Return fan static pressure 0.6" H₂O
- Fan efficiencies (combined: fan and motor): Supply - 50%; return - 25%
- Cooling deck temperature reset to satisfy the cooling load to the warmest zone

Corridor, toilet rooms and elevator lobbies AHUs (Floors one through five)

Public lobbies, restrooms and utilitarian areas are conditioned via ducted ceiling supplies and ceiling return plenum.

Operating parameters:

- Proportional zone thermostats for heating and cooling; throttling range $\pm 1.5^{\circ}\text{F}$
- Minimum cfm ratio is 0.4
- Supply fan static pressure 2.0" H₂O
- Return fan static pressure 0.6" H₂O
- Fan efficiencies (combined: fan and motor): Supply - 50%; return - 25%
- Cooling deck temperature reset to satisfy the cooling load to the warmest zone

Mechanical rooms are served by unit ventilators with hot water heating coils. The parking area is served by a separate constant volume ventilation system with no heating or cooling capability.

Cooling Plant

Two (2) 325-ton water cooled, centrifugal chillers (6.1 COP @ 100%), and one (1) 130-ton water cooled screw chiller (4.45 COP @ 100%). Two (2) cooling towers with two speed fans to cool condenser water. Chilled water economizer via strainer cycle with a heat exchanger between chilled water and tower water.

Operating ParametersChiller:

- Chilled water supply temperature 44°F; throttling range $\pm 1.25^{\circ}\text{F}$
- Chilled water return temperature 56°F (temperature rise 12°F)
- Design condenser water temperature rise 10°F
- Condenser water flow rate 3 gpm/ton
- Economizer (waterside):
 - Strainer cycle with chilled-water/tower-water heat exchanger
 - Economizer operates when outdoor temperature is less than 55°F

Cooling Tower:

- Design wetbulb temperature 74°F (per ASHRAE 1%, Washington DC)
- Design approach 10°F
- Design range 10°F
- Wetbulb reset
- Tower outlet water temperature 85°F; throttling range $\pm 2.5^{\circ}\text{F}$
- Minimum water temperature 66°F
- Two speed cooling tower fans (high speed, 100%; low speed, 35%)
- Tower capacity control: maximum cells possible at lowest fan speeds

Primary Chilled Water Pump

- 20 ft pump head
- 77% impeller efficiency

- 90% motor efficiency
- Constant speed

Secondary Chilled Water Pump

- 40 ft pump head
- 77% impeller efficiency
- 90% motor efficiency
- Variable speed; 30% minimum pump speed

Condenser Water Pump

- 60 ft pump head
- 77% impeller efficiency
- 90% motor efficiency

Heating Plant

Two (2) 105 BHP natural gas fired, hot water boilers (80% nominal efficiency, reduced to 76% to account for standby loss and O₂ de-calibration).

Operating Parameters

- Heating plant operates winter and summer (to provide reheat)
- Water loop temperature drop 50°F

Hot Water Pump

- 60 ft pump head
- 77% impeller efficiency
- 90% motor efficiency
- Variable speed; 50% minimum pump speed

Domestic Hot Water Heating Plant

One gas fired domestic hot water boiler (80% efficiency).

Operating Parameters

- Daily hot water use 3,931 gallons (weekdays only, no hot water use on weekends or holidays).
- Peak hot water use 1,092 gallons per hour (during one hour each weekday).
- Domestic hot water supply temperature 140°F.

E. UTILITY COSTS**Electricity Rates**

Utility: PEPCO
 Service Class: Time Metered General Service - Primary Service
 Rate Schedule: Schedule "GT-LV"

Distribution Service Charge	<u>June-October</u> Summer	<u>November-May</u> Winter
Customer Charge	\$20.93	\$20.93
Kilowatt-hour Charge	1.029¢ per kWh	1.029¢ per kWh
Kilowatt Charge		
Maximum	\$4.80 per kW	\$4.80 per kW
Transmission Service Charge		
Kilowatt-hour Charge	0.219¢ per kWh	0.219¢ per kWh
Kilowatt Charge		
On Peak	\$0.71 per kW	-
Maximum	\$0.59 per kW	\$0.59 per kW
Generation Service Charge		
Kilowatt-hour Charge		
On Peak	2.253¢ per kWh	2.110¢ per kWh
Intermediate	2.253¢ per kWh	2.110¢ per kWh
Off Peak	2.253¢ per kWh	2.110¢ per kWh
Kilowatt Charge		
On Peak	\$10.41 per kW	-
Maximum	\$3.70 per kW	\$3.70 per kW

Natural Gas Rate

Monthly Charges:

Includes first 3 therms	\$25.19
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Energy Charges:

Next 277 therms	\$0.50/therm
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F. LEED™ ENERGY ANALYSIS

A LEED Reference Case was developed to determine the number of credits earned by the Baseline GSA building.

SUMMARY OF DIFFERENCES BETWEEN BASELINE CASE AND LEED™ REFERENCE CASE

GSA Baseline Case

Windows (Base glass):

- 1" Insulating glass (2 - 1/4" panes with 1/2" air space), low-E
- $U_{\text{center of glass}}$ 0.32
- Visible transmittance 57%
- Shading coefficient 0.35
- With thermally broken aluminum frame
- $U_{\text{fenestration}}$ 0.43

Windows (Curtain wall glass):

- 1" Insulating glass (2 - 1/4" panes with 1/2" air space), low-E
- $U_{\text{center of glass}}$ 0.32
- Visible transmittance 57%
- Shading coefficient 0.35
- Without thermally broken aluminum frame
- $U_{\text{fenestration}}$ 0.59

Exterior wall construction (Stone wall)

- 3" Stone
- 1" Air space
- 8" CMU
- 1" Extruded polystyrene (R-5/in.)
- 5/8" Gypsum wallboard
- U-value=0.119 (includes air films)

Exterior wall construction (Panel wall)

- 4" Concrete
- 1" Extruded polystyrene (R-5/in.)
- 6" Steel stud w/R-19 batt insulation
- 1/2" Gypsum wallboard
- U-value=0.066 (includes air films)

LEED™ Reference Case (ASHRAE 90.1)

Windows:

- Shading coefficient 0.45
- Visible transmittance 78%
- $U_{\text{fenestration}}$ 0.57

Windows:

- Shading coefficient 0.45
- Visible transmittance 78%
- $U_{\text{fenestration}}$ 0.57

Exterior wall construction

- 3" Stone
- 1" Air space
- 8" CMU
- ASHRAE insulation
- 5/8" Gypsum wallboard
- U-value= 0.151 (includes air films)

Exterior wall construction

- 4" Concrete
- ASHRAE insulation
- 1/2" Gypsum wallboard
- U-value= 0.151 (includes air films)

Roof

- Gravel
- EPDM
- 4" Extruded polystyrene (R-5/in.)
- 4" Concrete
- Steel deck
- U-value = 0.042 (includes air films)

Lighting (overall)

- Office 1.1 W/ft²
- Office (Task) 0.1 W/ft²
- Corridor 0.75 W/ft²
- Holding Cells 1.1 W/ft²
- Cafeteria 1.4 W/ft²
- Kitchen 2.2 W/ft²
- Judge's Chambers 1.1 W/ft²
- Jury Assembly 1.1 W/ft²
- Jury Rooms 1.1 W/ft²
- Courtrooms 2.1 W/ft²
- Security 1.1 W/ft²
- Mechanical 0.75 W/ft²

AHU (Parking garage)

- CO control of fan (intermittent operation)

Zone Air (Basement AHUs)

- Fan control - variable speed

Zone Air (Access floor AHUs)

- Fan control - variable speed
- Supply temperature is 65°F
- Zone air temperature average 76.5°F for cooling
- No air-side economizer

Zone Air (Corridor, toilet rooms, elevator lobbies AHUs)

- Fan control - variable speed

Roof

- Gravel
- EPDM
- ASHRAE insulation
- 4" Concrete
- Steel deck
- U-value = 0.063 (includes air films)

Lighting (overall)

- Office 1.5 W/ft²
- Office (Task) 0.3 W/ft²
- Corridor 0.7 W/ft²
- Holding Cells 1.1 W/ft²
- Cafeteria 1.4 W/ft²
- Kitchen 2.2 W/ft²
- Judge's Chambers 1.1 W/ft²
- Jury Assembly 1.3 W/ft²
- Jury Rooms 1.3 W/ft²
- Courtrooms 2.1 W/ft²
- Security 1.5 W/ft²
- Mechanical 1.3 W/ft²

AHU (Parking garage)

- No CO control of fan (constant operation - 24 hours during weekdays)

Zone Air (Basement AHUs)

- Fan control - inlet guide vanes

Zone Air (Non access floor AHUs)

- Fan control - inlet guide vanes
- Supply temperature is 55°F
- Zone air temperature is 75°F for cooling
- Air-side economizer

Zone Air (Corridor, toilet rooms, elevator lobbies AHUs)

- Fan control - inlet guide vanes

Chilled Water Pumps

- Constant speed primary loop
- Variable speed drive on secondary loop
- Minimum part load ratio is 30%

Hot Water Pumps (Variable speed)

- Minimum part load ratio is 30%

Cooling Towers

- Design capacity 85°F
- Maximum cells with lowest fan speed
- Waterside economizer below 50°F
- Wetbulb reset
- Tower setpoint is 85°F, but reset based on wetbulb
- Two speed fans

Chiller Plant

- Two 325 ton centrifugal chillers (6.1 COP @ 100%)
- One 130 ton screw chiller (4.45 COP @ 100%)

100%	0.791 kW/ton
75%	0.677 kW/ton
50%	0.530 kW/ton
25%	0.482 kW/ton

Load Management

- First stage: One 130 ton chiller to operate to 50%
- Second stage: One 325 ton chiller up to 80%
- Third stage: Two 325 ton chillers up to 95%
- Fourth stage: All three chillers operate to meet maximum load

Chilled Water Pumps

- Variable speed drive on primary loop (in lieu of reset control)
- No secondary loop
- Minimum part load ratio is 50%

Hot Water Pumps (Variable speed)

- Minimum part load ratio is 50%

Cooling Towers

- Design capacity 84°F
- Minimum cells
- No waterside economizer
- Fixed
- Tower setpoint is 70°F
- Two speed fans

Chiller Plant

- Two 390 ton centrifugal chillers (6.1 COP @ 100%)

Load Management

- 390 ton chillers staged as needed

G. DESCRIPTION OF ENERGY EFFICIENT MEASURES

1.0 W/SF Lighting

The lighting Watts per Square Foot power consumption for all office spaces, jury rooms and judges chambers were reduced to 1.0 W/SqFt.

Daylight dimming control for perimeter office areas

Continuous daylight dimming controls can reduce the lighting output down to 10% of total lighting output; at 10% of the total lighting output, the fixture power consumption is reduced down to 21% of the total watts. The controls are set to maintain at least 50 footcandle at 30 inches off the finished floor. The daylighted area is as defined in ASHRAE/IES Standard 90.1-1989 User's Manual.

Additionally, a daylight dimming system saves electricity even during nighttime. The mean lamp output is rated at 40% of its expected life. Because of this, during the first 2-3 years of operation lamps emit more light than specified in the design. The dimming system reduces that light level to design specifications and saves energy whenever the lights are “on” during these first 2-3 years of operation saving about 4% in electricity use.

Occupancy sensors in enclosed offices

Occupancy sensors are assumed to reduced lighting by 30% during occupied hours in enclosed offices and conference rooms. The 30% Power Adjustment Factor is that given in ASHRAE 90.1-1989 Table 6-3 for occupancy sensors.

Infrared occupancy sensors detect the change in the heat patterns occurring in a room. If portions of a room are not in direct line-of-sight with an infrared sensor, then a second sensor must be mounted or an ultrasound sensor must be used instead of the infrared. (Ultrasound sensors emit signals, like a bat, that bounce off obstacles in a room. These sensors “see” around partitions but are more expensive than infrared sensors; they are also less reliable in large, open spaces with soft enclosures, because the signals cannot bounce back very well.)

When infrared sensor technology was initially commercialized, some sensors would turn the lights off if there was little movement in the room (e.g., only hands moved to type). This problem has long been resolved. Today’s infrared occupancy sensors have better sensing ability and, just as important, can be set to turn lights off after specific time interval, (e.g., 1 minute, 5 minutes, 15 minutes, up to 30 minutes). A sufficiently long time interval ensures that even a sensor that does not discriminate fine movement will still accomplish its function properly since a person that types or reads will move the neck, back, or arm every few minutes to be comfortable.

Premium-efficiency fan and pump motors

Replace standard efficiency HVAC pump and fan motors with premium efficiency motors. The motor efficiency was increased by an average of 2% for fan and pump motors.

Modulating Condensing Boilers (*AltS3*)

The average operating efficiency of the boilers was increased from 80% to 93%, representing typical efficiency for a modulating condensing boiler.

0.54 kW/ton Chiller

The centrifugal chillers were upgraded to high efficiency chillers, with a full load COP of 6.51 (0.54 kW/ton).

0.54 kW/ton Chiller with VFD

The centrifugal chillers were upgraded to high efficiency variable flow chillers, with a full load COP of 6.51 (0.54 kW/ton).

0.49 kW/ton Chiller with VFD

The centrifugal chillers were upgraded to high efficiency variable flow chillers, with a full load COP of 7.18 (0.49 kW/ton).

VFD Cooling Tower Fans

The baseline two speed cooling tower fans were changed to variable speed fans. The fans modulate the cooling tower air flow continuously (down to a minimum flow of 25%) to achieve desired condenser water temperature.

Energy Recovery (Enthalpy Wheel)

The outdoor air supply is tempered with an enthalpy wheel total energy recovery system (pre-heating the air in heating season and pre-cooling the air during the cooling season). The enthalpy wheel is assumed to have the following characteristics:

- Total Air Volume 45,900 cfm
- Supply Static Pressure drop 0.5"
- Return Static Pressure drop 0.5"
- Total HR effectiveness 67%

CO₂ Sensor Control of O.A.

Each air handler is equipped with a CO₂ sensors in spaces with variable occupant densities (e.g., conference rooms, courtrooms, auditoriums, training rooms, etc.) and those locations within the space served by the longest lengths of ductwork. The difference in CO₂ concentration between the return air of each space and outside air is an indicator of the amount of ventilation air required by the spaces served by the air handler. CO₂ sensors, when properly calibrated, allow the flow of fresh air to be reduced during periods of lower occupancy. This strategy has the potential to significantly reduce the outside air load on the building at any time an air handler is not operating in an economizer mode.

Combined EEMs

The EEMs listed above were simulated in combinations to achieve various energy savings thresholds. The combinations and associated savings are described in the chart on the following page.

GSA LEED COST STUDY

Energy Efficiency Measures for Credit EA-1

COURTHOUSE

Case	LEED Rating	LEED Points	Imprvmnt over ASHRAE	Energy Efficiency Measures Included (Marked 'X')										
				1.0 watts/SF lighting	Daylight dimming	Occ Sensors	Prem Eff Motors	Mod Condens Boiler	0.54 kw/ton Chiller	0.54 kw/ton Chiller w/VFD	0.49 kw/ton Chiller w/VFD	VFD Cooling Tower Fans	Energy Recovery	CO2 Sensor Control of O.A.
1A Low Cost	Certified	1	16.9%											
2A High Cost	Certified	3	25.4%	X	X	X	X							
3A Low Cost	Silver	3	25.4%	X	X	X	X							
4A High Cost	Silver	5	35.2%	X	X	X	X	X			X	X	X	X
5A Low Cost	Gold	5	35.2%	X	X	X	X	X			X	X	X	X
6A High Cost	Gold	5	35.2%	X	X	X	X	X			X	X	X	X

Energy Cost Budget (ECB) Compliance

Project Name: GSA LEED Cost Study - Courthouse: #1A (Certified)
 Contact Person: Adrian Tuluca, Steven Winter Associates, Inc.

Energy Summary by End Use

End Use	Energy Type*	Proposed Building		Budget Building		Proposed / Budget Energy (%)
		Energy (10 ³ Btu)	Peak (10 ³ Btu/h)	Energy (10 ³ Btu)	Peak (10 ³ Btu/h)	
Regulated						
Lighting - Conditioned	E	2,999,766	909	3,354,030	1025	89.4%
Space Heating (1)	E	29,398	19	46,444	19	63.3%
Space Heating (2)	NG	3,807,500	603	5,109,700	603	74.5%
Space Heating (3)	S	-	0	-	0	NA
Space Heating (4)	HW	-	0	-	0	NA
Space Cooling (1)	E	788,643	947	941,640	1094	83.8%
Space Cooling (2)	S	-	0	-	0	NA
Space Cooling (3)	CW	-	0	-	0	NA
Space Cooling (4)	NG	-	0	-	0	NA
Pumps	E	111,013	64	146,191	65	75.9%
Heat Rejection	E	220,036	156	345,274	221	63.7%
Fans	E	980,431	711	1,370,283	456	71.5%
Service water heating (1)	E	-	0	-	0	NA
Service water heating (2)	NG	373,700	32	373,700	32	100.0%
Service water heating (3)	S	-	0	-	0	NA
Service water heating (4)	HW	-	0	-	0	NA
Sub-Total Regulated		9,310,487		11,687,262		79.7%
Non-Regulated/Process						
Equipment	E	2,721,561	714	2,721,561	714	100.0%
Task Lighting	E	206,945	93	206,945	93	100.0%
Lighting - Exterior	E	156,918	34	156,918	34	100.0%
Elevators & escalators	E	136,490	96	136,490	96	100.0%
Refrigeration (food, etc.)		NA	NA	NA	NA	NA
Cooking	NG	10	0	10	0	100.0%
Sub-Total Non-Regulated/Process		3,221,924		3,221,924		100.0%
Total Building Consumption		12,532,411		14,909,186		84.1%

* E = Electricity; NG = Natural Gas; FO2 = #2 Fuel Oil; FO6 = #6 Fuel Oil; S = Steam;
 CW = Chilled Water

Energy and Cost Summary by Fuel Type

	Proposed Building (DEC")		Budget Building (ECB')		Proposed / Budget (DEC" / ECB')	
	Energy (10 ³ Btu)	Cost (\$)	Energy (10 ³ Btu)	Cost (\$)	Energy (%)	Cost (%)
Electricity	5,129,287	135,804	6,203,862	161,290	82.7%	84.2%
Natural Gas	4,181,200	21,191	5,483,400	27,702	76.3%	76.5%
Steam	-	-	-	-	-	-
Chilled Water	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-
Total Nonsolar	9,310,487	156,995	11,687,262	188,992	79.7%	83.1%
Occupancy Sensors	-	-				
Total Including Occupancy Sensors	9,310,487	156,995	11,687,262	188,992	79.7%	83.1%
Solar or site recovered	-	-				
Total	9,310,487	156,995	11,687,262	188,992	79.7%	83.1%

* These results use assumptions for showing compliance during a typical year; actual energy costs may be substantially different.

Percent Savings = (ECB' \$ - DEC" \$)/ECB' \$ = 16.93%
 Scale 2.1
 EA Credit 1 Points = 1

Building Area 262000 sf kBtu/sf
 47.8

Energy Cost Budget (ECB) Compliance

Project Name: GSA LEED Cost Study - Courthouse: #2A (Certified) & #3A (Silver)
 Contact Person: Adrian Tuluca, Steven Winter Associates, Inc.

Energy Summary by End Use

End Use	Energy Type*	Proposed Building		Budget Building		Proposed / Budget Energy (%)
		Energy (10³ Btu)	Peak (10³ Btu/h)	Energy (10³ Btu)	Peak (10³ Btu/h)	
Regulated						
Lighting - Conditioned	E	2,496,431	783	3,354,030	1025	74.4%
Space Heating (1)	E	29,862	19	46,444	19	64.3%
Space Heating (2)	NG	3,939,600	603	5,109,700	603	77.1%
Space Heating (3)	S	-	0	-	0	NA
Space Heating (4)	HW	-	0	-	0	NA
Space Cooling (1)	E	739,541	907	941,640	1094	78.5%
Space Cooling (2)	S	-	0	-	0	NA
Space Cooling (3)	CW	-	0	-	0	NA
Space Cooling (4)	NG	-	0	-	0	NA
Pumps	E	107,072	62	146,191	65	73.2%
Heat Rejection	E	206,467	151	345,274	221	59.8%
Fans	E	919,292	678	1,370,283	456	67.1%
Service water heating (1)	E	-	0	-	0	NA
Service water heating (2)	NG	373,700	32	373,700	32	100.0%
Service water heating (3)	S	-	0	-	0	NA
Service water heating (4)	HW	-	0	-	0	NA
Sub-Total Regulated		8,811,964		11,687,262		75.4%
Non-Regulated/Process						
Equipment	E	2,721,561	714	2,721,561	714	100.0%
Task Lighting	E	206,945	93	206,945	93	100.0%
Lighting - Exterior	E	156,918	34	156,918	34	100.0%
Elevators & escalators	E	136,490	96	136,490	96	100.0%
Refrigeration (food, etc.)		NA	NA	NA	NA	NA
Cooking	NG	10	0	10	0	100.0%
Sub-Total Non-Regulated/Process		3,221,924		3,221,924		100.0%
Total Building Consumption		12,033,888		14,909,186		80.7%

* E = Electricity; NG = Natural Gas; FO2 = #2 Fuel Oil; FO6 = #6 Fuel Oil; S = Steam;
 CW = Chilled Water

Energy and Cost Summary by Fuel Type

	Proposed Building (DEC")		Budget Building (ECB')		Proposed / Budget (DEC" / ECB')	
	Energy (10 ³ Btu)	Cost (\$)	Energy (10 ³ Btu)	Cost (\$)	Energy (%)	Cost (%)
Electricity	4,498,664	119,174	6,203,862	161,290	72.5%	73.9%
Natural Gas	4,313,300	21,850	5,483,400	27,702	78.7%	78.9%
Steam	-	-	-	-	-	-
Chilled Water	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-
Total Nonsolar	8,811,964	141,025	11,687,262	188,992	75.4%	74.6%
Occupancy Sensors	-	-				
Total Including Occupancy Sensors	8,811,964	141,025	11,687,262	188,992	75.4%	74.6%
Solar or site recovered	-	-				
Total	8,811,964	141,025	11,687,262	188,992	75.4%	74.6%

* These results use assumptions for showing compliance during a typical year; actual energy costs may be substantially different.

Percent Savings = (ECB' \$ - DEC" \$)/ECB' \$ = 25.38%
 Scale 2.1
 EA Credit 1 Points = 3

Building Area 262000 sf kBtu/sf
 45.9

Energy Cost Budget (ECB) Compliance

Project Name: GSA LEED Cost Study - Courthouse: #4A (Silver), #5A (Gold) & #6A (Gold)
 Contact Person: Adrian Tuluca, Steven Winter Associates, Inc.

Energy Summary by End Use

End Use	Energy Type*	Proposed Building		Budget Building		Proposed / Budget Energy (%)
		Energy (10 ³ Btu)	Peak (10 ³ Btu/h)	Energy (10 ³ Btu)	Peak (10 ³ Btu/h)	
Regulated						
Lighting - Conditioned	E	2,496,431	783	3,354,030	1025	74.4%
Space Heating (1)	E	23,263	19	46,444	19	50.1%
Space Heating (2)	NG	2,423,600	545	5,109,700	603	47.4%
Space Heating (3)	S	-	0	-	0	NA
Space Heating (4)	HW	-	0	-	0	NA
Space Cooling (1)	E	382,622	430	941,640	1094	40.6%
Space Cooling (2)	S	-	0	-	0	NA
Space Cooling (3)	CW	-	0	-	0	NA
Space Cooling (4)	NG	-	0	-	0	NA
Pumps	E	115,077	58	146,191	65	78.7%
Heat Rejection	E	251,594	133	345,274	221	72.9%
Fans	E	991,374	750	1,370,283	456	72.3%
Service water heating (1)	E	-	0	-	0	NA
Service water heating (2)	NG	373,700	32	373,700	32	100.0%
Service water heating (3)	S	-	0	-	0	NA
Service water heating (4)	HW	-	0	-	0	NA
Sub-Total Regulated		7,057,660		11,687,262		60.4%
Non-Regulated/Process						
Equipment	E	2,721,561	714	2,721,561	714	100.0%
Task Lighting	E	206,945	93	206,945	93	100.0%
Lighting - Exterior	E	156,918	34	156,918	34	100.0%
Elevators & escalators	E	136,490	96	136,490	96	100.0%
Refrigeration (food, etc.)		NA	NA	NA	NA	NA
Cooking	NG	10	0	10	0	100.0%
Sub-Total Non-Regulated/Process		3,221,924		3,221,924		100.0%
Total Building Consumption		10,279,584		14,909,186		68.9%

* E = Electricity; NG = Natural Gas; FO2 = #2 Fuel Oil; FO6 = #6 Fuel Oil; S = Steam;
 CW = Chilled Water

Energy and Cost Summary by Fuel Type

	Proposed Building (DEC")		Budget Building (ECB')		Proposed / Budget (DEC" / ECB')	
	Energy (10 ³ Btu)	Cost (\$)	Energy (10 ³ Btu)	Cost (\$)	Energy (%)	Cost (%)
Electricity	4,260,360	108,184	6,203,862	161,290	68.7%	67.1%
Natural Gas	2,797,300	14,270	5,483,400	27,702	51.0%	51.5%
Steam	-	-	-	-	-	-
Chilled Water	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-
Total Nonsolar	7,057,660	122,455	11,687,262	188,992	60.4%	64.8%
Occupancy Sensors	-	-				
Total Including Occupancy Sensors	7,057,660	122,455	11,687,262	188,992	60.4%	64.8%
Solar or site recovered	-	-				
Total	7,057,660	122,455	11,687,262	188,992	60.4%	64.8%

* These results use assumptions for showing compliance during a typical year; actual energy costs may be substantially different.

Percent Savings = (ECB' \$ - DEC" \$)/ECB' \$ = 35.21%
 Scale 2.1
 EA Credit 1 Points = 5

Building Area 262000 sf
 kBtu/sf 39.2

Appendix J:

DOE-2 Energy Modeling Summary – Office Building

APPENDIX J:

DOE-2 Energy Modeling Summary - Office Building

The following report summarizes the energy use simulations performed for the *GSA LEED Cost Study* Office Building models, using the computer program DOE2.1-E. Simulations were developed for both the minimal facade renovation and full facade renovation variants of the Office Building. The report includes the following information:

- 1) A description of the “baseline” buildings, including the building geometries, construction assemblies, building systems, schedules, and utility rates.
- 2) A comparison of the baseline buildings to a LEED Reference Case that meets the minimal prescriptive requirements of ASHRAE/IESNA 90.1-1999.
- 3) A description of the individual Energy Efficiency Measures (EEMs) simulated to achieve energy savings beyond the Baseline cases.
- 4) A listing of the combined EEMs that were assembled to achieve three, five, and seven energy points (minimal facade renovation), or five and eight energy points (full facade renovation) under LEED credit EA-1, Optimize Energy Performance.
- 5) Energy Cost Budget forms to document the points earned under credit EA-1.

A. GENERAL INFORMATION

The building for this analysis is a nine floor office building (including basement), located in Washington DC.

General information regarding the building geometry, construction materials, internal loads and HVAC systems used for the "Baseline Case" DOE2.1-E annual energy simulation is provided below.

Weather File:

DOE-2.1E Weather file: Washington DC

Building Area (as simulated in DOE-2.1E):

Approximately 271,300 ft² of conditioned space

Number of Floors:

9 floors, plus basement and penthouse

Floor-to-Floor Height:

Basement: 16' - 0" (12' - 0" Floor-to Ceiling)

First Floor: 19' - 6" (9' - 0" Floor-to Ceiling)

Second Floor: 13' - 6" (9' - 0" Floor-to Ceiling)

Third Floor: 13' - 6" (9' - 0" Floor-to Ceiling)

Fourth Floor: 13' - 6" (9' - 0" Floor-to Ceiling)

Fifth Floor: 13' - 6" (9' - 0" Floor-to Ceiling)

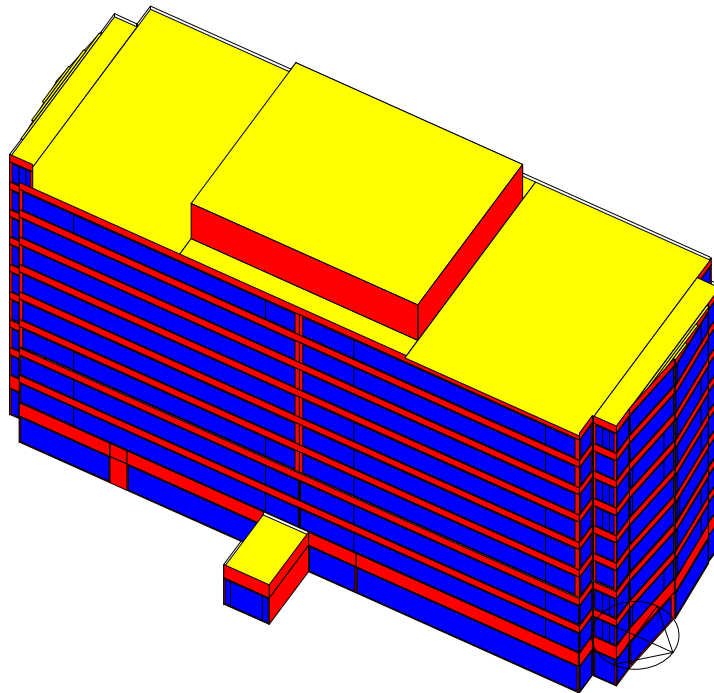
Sixth Floor: 13' - 6" (9' - 0" Floor-to Ceiling)

Seventh Floor: 13' - 6" (9' - 0" Floor-to Ceiling)

Eighth Floor: 13' - 6" (9' - 0" Floor-to Ceiling)

Ninth Floor: 13' - 6" (9' - 0" Floor-to Ceiling)

Penthouse: 20' - 0" (20' - 0" Floor-to Ceiling)



Mid-rise office building with 60% glazing (minimal facade renovation variant)
Full facade renovation not shown

BUILDING ENVELOPE AND INTERIOR WALL CONSTRUCTIONSMinimal Facade Renovation:*Windows:*

- Double pane, Low-e
- $U_{\text{center of glass}}$ 0.32
- Visible transmittance 57%
- Shading coefficient 0.35
- Thermally broken aluminum frames
- $U_{\text{fenestration}}$ 0.43

Exterior wall construction (basement - between parking and conditioned):

- 8" concrete masonry units (CMU)
- 3 5/8" steel studs @ 24" o.c. w/R-11 batt insulation
- 5/8" gypsum board
- Effective $U_{\text{value}} = 0.113$

Exterior wall construction (basement - between ground and conditioned):

- 12" concrete walls
- Effective $U_{\text{value}} = 0.02$

Exterior wall construction (1st & 2nd floors):

- 3" handset stone
- 1" air space
- 8" CMU
- 3 5/8" steel studs @ 24" o.c. w/R-11 batt insulation
- 5/8" gypsum board
- $U_{\text{value}} = 0.10$ (includes air films)

Exterior wall construction (3rd thru 9th floors):

- Precast concrete panels
- 1" board insulation
- 6" steel stud @ 16" o.c. w/ R-19 fiberglass batt insulation
- 1/2" gypsum wallboard
- $U_{\text{value}} = 0.066$ (includes air films)

Full Facade Renovations*Windows:*

Same as in minimal facade renovation - area of window changes

Exterior wall construction (basement - between parking and conditioned):

Same as in minimal facade renovation - area of window changes

Same as in minimal facade renovation - area of window changes

Same as in minimal facade renovation - area of window changes

Slab on grade construction (lower basement level):

- 4" concrete slab
- Effective $U_{\text{value}} = 0.025$

Same as in minimal facade renovation - area of window changes

Roof construction:

- Gravel
- EPDM
- 3" extruded polystyrene
- 4" concrete slab on steel deck
- $U_{\text{value}} = 0.062$ (includes air films)

Minimal Facade Renovation:

Full Facade Renovations

Same as in minimal facade renovation - area of window changes

CMU construction (next to unconditioned spaces):

- 8" concrete masonry units (CMU)
- 3 5/8" steel studs @ 24" o.c. w/R-11 fiberglass batt insulation
- 5/8" gypsum board

Same as in minimal facade renovation - area of window changes

Gypsum wallboard construction

- 5/8" gypsum board
- 3 5/8" steel studs
- 5/8" gypsum board

Same as in minimal facade renovation - area of window changes

Concrete interior floor slab

- 6 1/2" concrete slab on steel deck
- carpet

Ceiling tile

- 5/8" mineral fiber acoustic ceiling tile

B. BUILDING OCCUPANCY PATTERNS**General Office Areas:**Max. Occupancy 143 ft²/person (per ASHRAE 62-1999)

Weekdays	Midnight - 7am	0%	Weekends & Holidays	All Hours	0%
	7am - 8am	25%			
	8am - 9am	75%			
	9am - Noon	90%			
	Noon - 1pm	50%			
	1pm - 2 pm	75%			
	2pm - 5pm	90%			
	5pm - 6pm	50%			
	6pm - Midnight	0%			

C. LIGHTING AND MISCELLANEOUS EQUIPMENT LOADS

Lighting Schedules (power density):

Lighting Power Density:

• Office	1.1 W/ft ²
• Office (Task)	0.3 W/ft ²
• Corridor	0.75 W/ft ²
• Mechanical	1.0 W/ft ²
• Security	1.1 W/ft ²
• Parking	0.2 W/ft ²

General Office Areas:

Weekdays	Midnight - 7am	5%	Weekends & Holidays	All Hours	5%
	7am - 7pm	100%			
	7pm - Midnight	5%			

General Office Areas - Task Lighting:

Weekdays	Midnight - 7am	0%	Weekends & Holidays	All Hours	0%
	7am - 8am	30%			
	8am - Noon	100%			
	Noon - 1pm	60%			
	1pm - 5pm	100%			
	5pm - Midnight	0%			

Miscellaneous Electrical Equipment Schedules (power density):

General Office Areas (1.30 W/ft²), Core/Public Areas (0.5 W/ft²):

Weekdays	Midnight - 6am	10%	Weekends & Holidays	All Hours	10%
	6am - 7pm	100%			
	7pm - Midnight	10%			

Computer Room (65 W/ft²):

All	Midnight - Midnight	100%
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D. HVAC OPERATING SCHEDULES AND SYSTEM DESCRIPTION**Heating and Cooling Seasons**

Heating available all year to allow for reheat

Cooling available all year (to provide cooling to core zones)

Heating/Cooling SchedulesOffice**Cooling**

Sept 16 - May 15

Weekdays	6 a.m. - 7 p.m.	78°F
	7 p.m. - 6 a.m.	no cooling
Weekends, Holidays	All hours	no cooling

May 16 - Sept 15

Weekdays	6 a.m. - 7 p.m.	75°F
	7 p.m. - 6 a.m.	no cooling
Weekends, Holidays	All hours	no cooling

Heating

Oct 16 - May 15

Weekdays	6 a.m. - 7 p.m.	72°F
	7 p.m. - 6 a.m.	60°F
Weekends, Holidays	All hours	60°F

May 16 - Sept 15

Weekdays	7 a.m. - 7 p.m.	68°F	(reheat overcooled spaces to this temperature)
	7 p.m. - 7 a.m.	no reheat	
Weekends, Holidays	All hours	no reheat	

Sept 15 - Oct 15

Weekdays	6 a.m. - 7 p.m.	70°F	(reheat overcooled spaces to this temperature)
	7 p.m. - 6 a.m.	55°F	(limited reheat space temperature minimum, per P100)
Weekends, Holidays	All hours	55°F	(limited reheat space temperature minimum, per P100)

Corridor

Cooling

Sept 16 - May 15

Weekdays	6 a.m. - 7 p.m.	78°F
	7 p.m. - 6 a.m.	no cooling
Weekends, Holidays	All hours	no cooling

May 16 - Sept 15

Weekdays	6 a.m. - 7 p.m.	75°F
	7 p.m. - 6 a.m.	no cooling
Weekends, Holidays	All hours	no cooling

Heating

Oct 16 - May 15

Weekdays	6 a.m. - 7 p.m.	72°F
	7 p.m. - 6 a.m.	60°F
Weekends, Holidays	All hours	60°F

May 16 - Sept 15

Weekdays	7 a.m. - 7 p.m.	68°F
	7 p.m. - 7 a.m.	no reheat
Weekends, Holidays	All hours	no reheat

Sept 15 - Oct 15

Weekdays	6 a.m. - 7 p.m.	70°F
	7 p.m. - 6 a.m.	60°F (limited reheat)
Weekends, Holidays	All hours	60°F (limited reheat)

Mechanical Areas

Cooling no cooling

Heating

All year

All week	All hours	55°F (minimum, per P100)
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Air Handling Unit (AHU) Fan ScheduleGeneral

May 16 - Sept 15

Weekdays	6 a.m. - 7 a.m.	AHU off unless setback recovery required
	7 a.m. - 8 p.m.	AHU fans on
	8 p.m. - 6 a.m.	AHU fans off
Weekends, Holidays	All hours	AHU fans off

Sept 16 - May 15

Weekdays	6 a.m. - 8 p.m.	AHU fans on
	8 p.m. - 6 a.m.	AHU fans off
Weekends, Holidays	All hours	AHU fans off

Computer Room

All year		
Weekdays	All hours	AHU fans on
Weekends, Holidays	All hours	AHU fans on

Mechanical

All year		
Weekdays	6 a.m. - 8 p.m. 8 p.m. - 6 a.m.	AHU fans on AHU fans off unless heating or cooling required
Weekends, Holidays	8 p.m. - 6 a.m.	AHU fans off unless heating or cooling required

Parking Area

All year		
Weekdays	6 a.m. - 10 a.m. 10 a.m. - 3 p.m. 3 p.m. - 8 p.m. 8 p.m. - 6 a.m.	AHU fans on AHU fans off AHU fans on AHU fans off
Weekends, Holidays	All hours	AHU fans off

(The Parking Area fan schedule reflects carbon monoxide sensor controls.)

Ventilation and Exhaust AirVentilation Air Amounts

Requirements per ASHRAE 62-1999

General	20 cfm per person
Corridors	0.05 cfm/ft ²
Parking	1.5 cfm/ft ²

Ventilation Air Schedules

Ventilation air schedules follow the schedules described in Section B, *Building Occupancy Patterns*. When no ventilation is required, 2% of the rated fan flow is assumed due to damper leakage.

Exhaust fans

Efficiency	65% (combined fan and motor efficiency)
Static pressure drop	2 in. W.C.
Schedule	follows AHU fan schedule

Air Distribution

AHUs for perimeter and core office spaces (Floors one through nine)

Two variable volume air handling units (AHUs) with a hot water preheat coil, a chilled water coil, and variable speed supply and return fans at each floor. Airflow distribution is ceiling air supply with ceiling return air plenum. Perimeter spaces have series fan-powered boxes with hot water reheat coils.

Operating parameters:

- Proportional zone thermostats for heating and cooling; throttling range $\pm 1.5^{\circ}\text{F}$
- Minimum cfm ratio is 0.4 cfm/ft²
- Supply fan static pressure 3.0" H₂O
- Return fan static pressure 1" H₂O
- Fan efficiencies (combined: fan and motor): Supply - 50%; return - 25%
- Cooling deck temperature reset to satisfy the cooling load to the warmest zone

AHUs for corridor, toilet rooms and elevator lobbies (Floors one through nine)

One variable volume air handling unit (AHUs) with a hot water preheat coil, a chilled water coil, and variable speed supply and return fans at each floor. Airflow distribution is ceiling air supply with ceiling return air plenum.

Operating parameters:

- Proportional zone thermostats for heating and cooling; throttling range $\pm 1.5^{\circ}\text{F}$
- Minimum cfm ratio is 0.4 cfm/ft²
- Supply fan static pressure 3.0" H₂O
- Return fan static pressure 1" H₂O
- Fan efficiencies (combined: fan and motor): Supply - 50%; return - 25%
- Cooling deck temperature reset to satisfy the cooling load to the warmest zone

A computer room is served by a single constant volume system.

Mechanical rooms are served by unit ventilators with hot water heating coils. The parking area is served by a separate constant volume ventilation system with no heating or cooling capability.

Cooling Plant

Two (2) 330-ton water cooled, centrifugal chillers (6.1 COP @ 100%), and one (1) 135-ton water cooled screw chiller (4.45 COP @ 100%). Two (2) cooling towers with two speed fans to cool condenser water. Chilled water economizer via strainer cycle with a heat exchanger between chilled water and tower water.

Operating Parameters

Chiller:

- Chilled water supply temperature 44°F; throttling range $\pm 1.25^{\circ}\text{F}$
- Chilled water return temperature 56°F (temperature rise 12°F)
- Design condenser water temperature rise 10°F
- Condenser water flow rate 3 gpm/ton

- Economizer (waterside):
Strainer cycle with chilled-water/tower-water heat exchanger
Economizer operates when outdoor temperature is less than 55°F

Cooling Tower:

- Design wetbulb temperature 74°F (per ASHRAE 1%, Washington DC)
- Design approach 11°F
- Design range 10°F
- Wetbulb reset
- Tower outlet water temperature 85°F; throttling range $\pm 2.5^\circ\text{F}$
- Minimum water temperature 66°F
- Two speed cooling tower fans (high speed, 100%; low speed, 40%)
- Tower capacity control: maximum cells possible at lowest fan speeds

Primary Chilled Water Pump

- 20 ft pump head
- 77% impeller efficiency
- 90% motor efficiency
- Constant speed

Secondary Chilled Water Pump

- 40 ft pump head
- 77% impeller efficiency
- 90% motor efficiency
- Variable speed; 30% minimum pump speed

Condenser Water Pump

- 60 ft pump head
- 77% impeller efficiency
- 90% motor efficiency

Heating Plant

Two (2) 115 BHP natural gas fired, hot water boilers (80% nominal efficiency, reduced to 76% to account for standby loss and O₂ de-calibration).

Operating Parameters

- Heating plant operates winter and summer (to provide reheat)
- Water loop temperature drop 50°F

Hot Water Pump

- 60 ft pump head
- 77% impeller efficiency
- 90% motor efficiency
- Variable speed; 30% minimum pump speed

Domestic Hot Water Heating Plant

One gas fired domestic hot water boiler (80% efficiency).

Operating Parameters

- Daily hot water use 2,043 gallons (weekdays only, no hot water use on weekends or holidays).
- Peak hot water use 568 gallons per hour (during one hour each weekday).
- Domestic hot water supply temperature 140°F.

E. UTILITY COSTS**Electricity Rates**

Utility: PEPCO
 Service Class: Time Metered General Service - Primary Service
 Rate Schedule: Schedule "GT-LV"

Distribution Service Charge	<u>June-October</u> Summer	<u>November-May</u> Winter
Customer Charge	\$20.93	\$20.93
Kilowatt-hour Charge	1.029¢ per kWh	1.029¢ per kWh
Kilowatt Charge		
Maximum	\$4.80 per kW	\$4.80 per kW
Transmission Service Charge		
Kilowatt-hour Charge	0.219¢ per kWh	0.219¢ per kWh
Kilowatt Charge		
On Peak	\$0.71 per kW	-
Maximum	\$0.59 per kW	\$0.59 per kW
Generation Service Charge		
Kilowatt-hour Charge		
On Peak	2.253¢ per kWh	2.110¢ per kWh
Intermediate	2.253¢ per kWh	2.110¢ per kWh
Off Peak	2.253¢ per kWh	2.110¢ per kWh
Kilowatt Charge		
On Peak	\$10.41 per kW	-
Maximum	\$3.70 per kW	\$3.70 per kW

Natural Gas Rate

Monthly Charges:

Includes first 3 therms	\$25.19
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Energy Charges:

Next 277 therms	\$0.50/therm
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F. LEED™ ENERGY ANALYSIS

A LEED reference case was developed to determine the number of credits earned by the Baseline GSA buildings

SUMMARY OF DIFFERENCES BETWEEN BASELINE CASE AND LEED™ REFERENCE CASE

GSA Baseline

Windows - Full Facade Renovation Only: All Floors

- 1" Insulating glass (2 - 1/4" panes with 1/2" air space), low-E
- $U_{\text{center of glass}}$ 0.32
- Visible transmittance 57%
- Shading coefficient 0.35
- With thermally broken aluminum frame
- $U_{\text{fenestration}}$ 0.43

Windows - Minimal Facade Renovation Only: All Floors

- 1" Insulating glass (2 - 1/4" panes with 1/2" air space), low-E
- $U_{\text{center of glass}}$ 0.32
- Visible transmittance 57%
- Shading coefficient 0.35
- With thermally broken aluminum frame
- $U_{\text{fenestration}}$ 0.43

LEED Reference Case (ASHRAE 90.1)

Windows - Full Facade Renovation Only: Floors 1 & 2:

- 1" Insulating glass (2 - 1/4" panes with 1/2" air space), low-E
- $U_{\text{center of glass}}$ 0.32
- Visible transmittance 57%
- Shading coefficient 0.35
- With thermally broken aluminum frame
- $U_{\text{fenestration}}$ 0.43

Floors 3-9:

- Shading coefficient 0.45
- Visible transmittance 78%
- $U_{\text{fenestration}}$ 0.57

Windows - Minimal Facade Renovation Only: All Floors

- 1" Insulating glass (2 - 1/4" panes with 1/2" air space), low-E
- $U_{\text{center of glass}}$ 0.32
- Visible transmittance 57%
- Shading coefficient 0.35
- With thermally broken aluminum frame
- $U_{\text{fenestration}}$ 0.43

*Minimal Facade:**Exterior wall construction (1st thru 9th floors)*

- 3" Stone
- 1" Air space
- 8" CMU
- 3 5/8" steel studs @ 24" o.c. w/R-11 batt insulation
- 5/8" Gypsum wallboard
- U-value=0.10 (includes air films)

*Full Facade:**Exterior wall construction (1st & 2nd floors)*

- 3" Stone
- 1" Air space
- 8" CMU
- 3 5/8" steel studs @ 24" o.c. w/R-11 batt insulation
- 5/8" Gypsum wallboard
- U-value=0.10 (includes air films)

*Full Facade:**Exterior wall construction (3rd thru 9th floors):*

- Precast concrete panels
- 1" board insulation
- 6" steel stud @ 16" o.c. w/ R-19 fiberglass batt insulation
- 1/2" gypsum wallboard
- U_{value} = 0.066 (includes air films)

Roof

- Gravel
- EPDM
- 3" Extruded polystyrene (R-5/in.)
- 4" Concrete
- Steel deck
- U-value =0.062 (includes air films)

*Minimal Facade:**Exterior wall construction (1st thru 9th floors)*

- 3" Stone
- 1" Air space
- 8" CMU
- ASHRAE insulation
- 5/8" Gypsum wallboard
- U-value= 0.151 (includes air films)

*Full Facade:**Exterior wall construction (1st & 2nd floors)*

- 3" Stone
- 1" Air space
- 8" CMU
- ASHRAE insulation
- 5/8" Gypsum wallboard
- U-value= 0.151 (includes air films)

*Full Facade:**Exterior wall construction (3rd thru 9th floors):*

- 3" Stone
- 1" Air space
- 8" CMU
- ASHRAE insulation
- 5/8" Gypsum wallboard
- U-value= 0.151 (includes air films)

Roof

- Gravel
- EPDM
- ASHRAE insulation
- 4" Concrete
- Steel deck
- U-value = 0.063 (includes air films)

Lighting (overall)

- Office (Open) 1.1 W/ft²
- Office (Closed) 1.1 W/ft²
- Office (Task) 0.3 W/ft²
- Corridor 0.75 W/ft²
- Mechanical 1.0 W/ft²

AHU (Parking garage)

- CO control of fan (intermittent operation)

Zone Air (Basement AHUs)

- Fan control - variable speed

Zone Air (Office AHUs)

- Fan control - variable speed
- No air-side economizer

Zone Air (Corridor, toilet rooms, elevator lobbies AHUs)

- Fan control - variable speed

Chilled Water Pumps

- Constant speed primary loop
- Variable speed drive on secondary loop
- Minimum part load ratio is 30%

Hot Water Pumps (Variable speed)

- Minimum part load ratio is 30%

Cooling Towers

- Design capacity 85°F
- Maximum cells with lowest fan speed
- Waterside economizer below 50°F
- Tower approach is 11°F
- Wetbulb reset
- Tower setpoint is 85°F, but reset based on wetbulb
- Two speed fans

Lighting (overall)

- Office (Open) 1.5 W/ft²
- Office (Closed) 1.3 W/ft²
- Office (Task) 0.3 W/ft²
- Corridor 0.7 W/ft²
- Mechanical 1.3 W/ft²

AHU (Parking garage)

- No CO control of fan (constant operation - 24 hours during weekdays)

Zone Air (Basement AHUs)

- Fan control - inlet guide vanes

Zone Air (Office AHUs)

- Fan control - inlet guide vanes
- Air-side economizer

Zone Air (Corridor, toilet rooms, elevator lobbies AHUs)

- Fan control - inlet guide vanes

Chilled Water Pumps

- Variable speed drive on primary loop (in lieu of reset control)
- No secondary loop
- Minimum part load ratio is 50%

Hot Water Pumps (Variable speed)

- Minimum part load ratio is 50%

Cooling Towers

- Design capacity 84°F
- Minimum cells
- No waterside economizer
- Tower approach is 10°F
- Fixed
- Tower setpoint is 70°F
- Two speed fans

Chiller Plant

- Two 330 ton centrifugal chillers (6.1 COP @ 100%)
- One 135 ton screw chiller (4.45 COP @ 100%)

100%	0.791 kW/ton
75%	0.677 kW/ton
50%	0.530 kW/ton
25%	0.482 kW/ton

Load Management

- First stage: One 135 ton chiller to operate to 50%
- Second stage: One 330 ton chiller up to 80%
- Third stage: Two 330 ton chillers up to 95%
- Fourth stage: All three chillers operate to meet maximum load

Chiller Plant

- Two 397.5 ton centrifugal chillers (6.1 COP @ 100%)

Load Management

- 397.5 ton chillers staged as needed

G. DESCRIPTION OF ENERGY EFFICIENT MEASURES

1.0 W/SF Lighting

The lighting Watts per Square Foot power consumption for all office spaces was reduced to 1.0 W/SqFt.

Daylight dimming control for perimeter office areas

Continuous daylight dimming controls can reduce the lighting output down to 10% of total lighting output; at 10% of the total lighting output, the fixture power consumption is reduced down to 21% of the total watts. The controls are set to maintain at least 50 footcandle at 30 inches off the finished floor. The daylighted area is as defined in ASHRAE/IES Standard 90.1-1989 User's Manual.

Additionally, a daylight dimming system saves electricity even during nighttime. The mean lamp output is rated at 40% of its expected life. Because of this, during the first 2-3 years of operation lamps emit more light than specified in the design. The dimming system reduces that light level to design specifications and saves energy whenever the lights are “on” during these first 2-3 years of operation saving about 4% in electricity use.

Occupancy sensors in enclosed offices

Occupancy sensors are assumed to reduced lighting by 30% during occupied hours in enclosed offices and conference rooms. The 30% Power Adjustment Factor is that given in ASHRAE 90.1-1989 Table 6-3 for occupancy sensors.

Infrared occupancy sensors detect the change in the heat patterns occurring in a room. If portions of a room are not in direct line-of-sight with an infrared sensor, then a second sensor must be mounted or an ultrasound sensor must be used instead of the infrared. (Ultrasound sensors emit signals, like a bat, that bounce off obstacles in a room. These sensors “see” around partitions but are more expensive than infrared sensors; they are also less reliable in large, open spaces with soft enclosures, because the signals cannot bounce back very well.)

When infrared sensor technology was initially commercialized, some sensors would turn the lights off if there was little movement in the room (e.g., only hands moved to type). This problem has long been resolved. Today's infrared occupancy sensors have better sensing ability and, just as important, can be set to turn lights off after specific time interval, (e.g., 1 minute, 5 minutes, 15 minutes, up to 30 minutes). A sufficiently long time interval ensures that even a sensor that does not discriminate fine movement will still accomplish its function properly since a person that types or reads will move the neck, back, or arm every few minutes to be comfortable.

Premium-efficiency fan and pump motors

Replace standard efficiency HVAC pump and fan motors with premium efficiency motors. The motor efficiency was increased by an average of 2% for fan and pump motors.

Modulating Condensing Boilers (*AltS3*)

The average operating efficiency of the boilers was increased from 80% to 93%, representing typical efficiency for a modulating condensing boiler.

0.54 kW/ton Chiller

The centrifugal chillers were upgraded to high efficiency chillers, with a full load COP of 6.51 (0.54 kW/ton).

0.54 kW/ton Chiller with VFD

The centrifugal chillers were upgraded to high efficiency variable flow chillers, with a full load COP of 6.51 (0.54 kW/ton).

0.49 kW/ton Chiller with VFD

The centrifugal chillers were upgraded to high efficiency variable flow chillers, with a full load COP of 7.18 (0.49 kW/ton).

VFD Cooling Tower Fans

The baseline two speed cooling tower fans were changed to variable speed fans. The fans modulate the cooling tower air flow continuously (down to a minimum flow of 25%) to achieve desired condenser water temperature.

Energy Recovery (Enthalpy Wheel)

The outdoor air supply is tempered with an enthalpy wheel total energy recovery system (pre-heating the air in heating season and pre-cooling the air during the cooling season). The enthalpy wheel is assumed to have the following characteristics:

- Total Air Volume 27,500 cfm
- Supply Static Pressure drop 0.5"
- Return Static Pressure drop 0.5"
- Total HR effectiveness 67%

CO₂ Sensor Control of O.A.

Each air handler is equipped with a CO₂ sensors in spaces with variable occupant densities (e.g., conference rooms, training rooms, etc.) and those locations within the space served by the longest lengths of ductwork. The difference in CO₂ concentration between the return air of each space and outside air is an indicator of the amount of ventilation air required by the spaces served by the air handler. CO₂ sensors, when properly calibrated, allow the flow of fresh air to be reduced during periods of lower occupancy. This strategy has the potential to significantly reduce the outside air load on the building at any time an air handler is not operating in an economizer mode.

Combined EEMs

The EEMs listed above were simulated in combinations to achieve various energy savings thresholds. The combinations and associated savings are described in the chart on the following page.

GSA LEED COST STUDY

Energy Efficiency Measures for Credit EA-1

OFFICE BUILDING

Case	LEED Rating	LEED Points	Imprvmnt over ASHRAE	Energy Efficiency Measures Included (Marked 'X')										
				1.0 watts/SF lighting	Daylight dimming	Occ Sensors	Prem Eff Motors	Mod Cond Boiler	0.54 kw/ton Chiller	0.54 kw/ton Chiller w/VFD	0.49 kw/ton Chiller w/VFD	VFD Cooling Tower Fans	Energy Recovery	CO2 Sensor Control of O.A.
Ref. min. fac.	--	2	14.4%											
Ref. full fac.	--	3	18.0%											
1B min. fac.	Certified	3	17.7%	X										
2B full fac.	Certified	5	25.6%	X		X	X		X					X
3B min. fac.	Silver	5	27.2%	X		X	X			X				X
4B full fac.	Silver	8	41.7%	X	X	X	X	X			X	X	X	X
5B min. fac.	Gold	7	35.4%	X	X	X	X	X			X	X	X	X
6B full fac.	Gold	8	41.7%	X	X	X	X	X			X	X	X	X

Energy Cost Budget (ECB) Compliance

Project Name: GSA LEED Cost Study - Office - Minimal Facade Renovation - Reference
 Contact Person:

Energy Summary by End Use

End Use	Energy Type*	Proposed Building		Budget Building		Proposed / Budget Energy (%)
		Energy (10 ³ Btu)	Peak (10 ³ Btu/h)	Energy (10 ³ Btu)	Peak (10 ³ Btu/h)	
Regulated						
Lighting - Conditioned	E	2,992,983	850	3,628,263	1033	82.5%
Space Heating (1)	E	23,621	20	28,971	20	81.5%
Space Heating (2)	NG	2,442,000	596	2,990,900	536	81.6%
Space Cooling	E	1,213,010	1106	1,100,435	1061	110.2%
Pumps	E	117,472	69	125,927	59	93.3%
Heat Rejection	E	270,616	165	356,175	225	76.0%
Fans	E	1,770,794	933	2,424,117	792	73.0%
Service water heating	NG	194,200	16	194,200	16	100.0%
Sub-Total Regulated		9,024,696		10,848,988		83.2%
Non-Regulated/Process						
Office Equipment	E	3,943,201	977	3,943,201	977	100.0%
Task Lighting	E	441,035	198	441,035	198	100.0%
Lighting - Exterior	E	156,918	34	156,918	34	100.0%
Elevators & escalators	E	163,790	115	163,790	115	100.0%
Refrigeration (food, etc.)		NA	NA	NA	NA	NA
Cooking (commercial)		NA	NA	NA	NA	NA
Sub-Total Non-Regulated/Process		4,704,943		4,704,943		100.0%
Total Building Consumption		13,729,639		15,553,931		88.3%

* E = Electricity (kWh); NG = Natural Gas (Therms or CCF); FO2 = #2 Fuel Oil (gal); FO6 = #6 Fuel Oil (gal); S = Steam (mmBtu);
 CW = Chilled Water (ton-h)

Energy and Cost Summary by Fuel Type

	Proposed Building (DEC")		Budget Building (ECB')		Proposed / Budget (DEC" / ECB')	
	Energy (10 ³ Btu)	Cost (\$)	Energy (10 ³ Btu)	Cost (\$)	Energy (%)	Cost (%)
Electricity	6,388,496	164,982	7,663,888	192,297	83.4%	85.8%
Natural Gas	2,636,200	13,466	3,185,100	16,210	82.8%	83.1%
Other Fossil Fuel						
District steam						
Total Nonsolar	9,024,696	178,448	10,848,988	208,507	83.2%	85.6%
Solar or site recovered						
Total Including Solar	9,024,696	178,448	10,848,988	208,507	83.2%	85.6%

* These results use assumptions for showing compliance during a typical year; actual energy costs may be substantially different.

Percent Savings = (ECB' \$ - DEC" \$)/ECB' \$ = 14.42%
 Scale 2.1
 Renovation : EA Credit 1 Points = 2

Building Area 279000 sf kBtu/sf
 49.2

Energy Cost Budget (ECB) Compliance

Project Name: GSA LEED Cost Study - Office - Full Facade Renovation - Reference
 Contact Person:

Energy Summary by End Use

End Use	Energy Type*	Proposed Building		Budget Building		Proposed / Budget Energy (%)
		Energy (10 ³ Btu)	Peak (10 ³ Btu/h)	Energy (10 ³ Btu)	Peak (10 ³ Btu/h)	
Regulated						
Lighting - Conditioned	E	2,992,983	850	3,628,263	1033	82.5%
Space Heating (1)	E	21,414	20	29,336	20	73.0%
Space Heating (2)	NG	2,172,200	507	3,028,200	537	71.7%
Space Cooling	E	1,165,891	1037	1,100,244	1054	106.0%
Pumps	E	111,357	67	125,422	59	88.8%
Heat Rejection	E	264,167	162	355,469	225	74.3%
Fans	E	1,640,080	858	2,422,626	787	67.7%
Service water heating	NG	194,200	16	194,200	16	100.0%
Sub-Total Regulated		8,562,292		10,883,759		78.7%
Non-Regulated/Process						
Office Equipment	E	3,943,201	977	3,943,201	977	100.0%
Task Lighting	E	441,035	198	441,035	198	100.0%
Lighting - Exterior	E	156,918	34	156,918	34	100.0%
Elevators & escalators	E	163,790	115	163,790	115	100.0%
Refrigeration (food, etc.)		NA	NA	NA	NA	NA
Cooking (commercial)		NA	NA	NA	NA	NA
Sub-Total Non-Regulated/Process		4,704,943		4,704,943		100.0%
Total Building Consumption		13,267,235		15,588,703		85.1%

* E = Electricity (kWh); NG = Natural Gas (Therms or CCF); FO2 = #2 Fuel Oil (gal); FO6 = #6 Fuel Oil (gal); S = Steam (mmBtu);
 CW = Chilled Water (ton-h)

Energy and Cost Summary by Fuel Type

	Proposed Building (DEC")		Budget Building (ECB')		Proposed / Budget (DEC" / ECB')	
	Energy (10 ³ Btu)	Cost (\$)	Energy (10 ³ Btu)	Cost (\$)	Energy (%)	Cost (%)
Electricity	6,195,892	158,804	7,661,359	192,055	80.9%	82.7%
Natural Gas	2,366,400	12,117	3,222,400	16,397	73.4%	73.9%
Other Fossil Fuel						
District steam						
Total Nonsolar	8,562,292	170,921	10,883,759	208,452	78.7%	82.0%
Solar or site recovered						
Total Including Solar	8,562,292	170,921	10,883,759	208,452	78.7%	82.0%

* These results use assumptions for showing compliance during a typical year; actual energy costs may be substantially different.

Percent Savings = (ECB' \$ - DEC" \$)/ECB' \$ = 18.00%
 Scale 2.1
 Renovation : EA Credit 1 Points = 3

Building Area 279000 sf
 kBtu/sf 47.6

Energy Cost Budget (ECB) Compliance

Project Name: GSA LEED Cost Study - Office - Minimal Facade Renovation: #1B (Certified)
 Contact Person:

Energy Summary by End Use

End Use	Energy Type*	Proposed Building		Budget Building		Proposed / Budget Energy (%)
		Energy (10 ³ Btu)	Peak (10 ³ Btu/h)	Energy (10 ³ Btu)	Peak (10 ³ Btu/h)	
Regulated						
Lighting - Conditioned	E	2,765,174	784	3,628,263	1033	76.2%
Space Heating (1)	E	23,959	20	28,971	20	82.7%
Space Heating (2)	NG	2,476,800	594	2,990,900	536	82.8%
Space Cooling	E	1,192,371	1091	1,100,435	1061	108.4%
Pumps	E	116,220	69	125,927	59	92.3%
Heat Rejection	E	267,218	164	356,175	225	75.0%
Fans	E	1,753,092	920	2,424,117	792	72.3%
Service water heating	NG	194,200	16	194,200	16	100.0%
Sub-Total Regulated		8,789,033		10,848,988		81.0%
Non-Regulated/Process						
Office Equipment	E	3,943,201	977	3,943,201	977	100.0%
Task Lighting	E	441,035	198	441,035	198	100.0%
Lighting - Exterior	E	156,918	34	156,918	34	100.0%
Elevators & escalators	E	163,790	115	163,790	115	100.0%
Refrigeration (food, etc.)		NA	NA	NA	NA	NA
Cooking (commercial)		NA	NA	NA	NA	NA
Sub-Total Non-Regulated/Process		4,704,943		4,704,943		100.0%
Total Building Consumption		13,493,977		15,553,931		86.8%

* E = Electricity (kWh); NG = Natural Gas (Therms or CCF); FO2 = #2 Fuel Oil (gal); FO6 = #6 Fuel Oil (gal); S = Steam (mmBtu);
 CW = Chilled Water (ton-h)

Energy and Cost Summary by Fuel Type

	Proposed Building (DEC")		Budget Building (ECB')		Proposed / Budget (DEC" / ECB')	
	Energy (10 ³ Btu)	Cost (\$)	Energy (10 ³ Btu)	Cost (\$)	Energy (%)	Cost (%)
Electricity	6,118,033	158,012	7,663,888	192,297	79.8%	82.2%
Natural Gas	2,671,000	13,639	3,185,100	16,210	83.9%	84.1%
Other Fossil Fuel						
District steam						
Total Nonsolar	8,789,033	171,651	10,848,988	208,507	81.0%	82.3%
Solar or site recovered						
Total Including Solar	8,789,033	171,651	10,848,988	208,507	81.0%	82.3%

* These results use assumptions for showing compliance during a typical year; actual energy costs may be substantially different.

Percent Savings = (ECB' \$ - DEC" \$)/ECB' \$ = 17.68%
 Scale 2.1
 Renovation : EA Credit 1 Points = 3

Building Area 279000 sf kBtu/sf
 48.4

Energy Cost Budget (ECB) Compliance

Project Name: GSA LEED Cost Study - Office - Full Facade Renovation: #2B (Certified)
 Contact Person:

Energy Summary by End Use

End Use	Energy Type*	Proposed Building		Budget Building		Proposed / Budget Energy (%)
		Energy (10 ³ Btu)	Peak (10 ³ Btu/h)	Energy (10 ³ Btu)	Peak (10 ³ Btu/h)	
Regulated						
Lighting - Conditioned	E	2,586,890	739	3,628,263	1033	71.3%
Space Heating (1)	E	21,038	20	29,336	20	71.7%
Space Heating (2)	NG	2,117,700	471	3,028,200	537	69.9%
Space Cooling	E	1,064,254	913	1,100,244	1054	96.7%
Pumps	E	105,356	64	125,422	59	84.0%
Heat Rejection	E	253,986	156	355,469	225	71.5%
Fans	E	1,583,311	825	2,422,626	787	65.4%
Service water heating	NG	194,200	16	194,200	16	100.0%
Sub-Total Regulated		7,926,735		10,883,759		72.8%
Non-Regulated/Process						
Office Equipment	E	3,943,201	977	3,943,201	977	100.0%
Task Lighting	E	441,035	198	441,035	198	100.0%
Lighting - Exterior	E	156,918	34	156,918	34	100.0%
Elevators & escalators	E	163,790	115	163,790	115	100.0%
Refrigeration (food, etc.)		NA	NA	NA	NA	NA
Cooking (commercial)		NA	NA	NA	NA	NA
Sub-Total Non-Regulated/Process		4,704,943		4,704,943		100.0%
Total Building Consumption		12,631,678		15,588,703		81.0%

* E = Electricity (kWh); NG = Natural Gas (Therms or CCF); FO2 = #2 Fuel Oil (gal); FO6 = #6 Fuel Oil (gal); S = Steam (mmBtu);
 CW = Chilled Water (ton-h)

Energy and Cost Summary by Fuel Type

	Proposed Building (DEC")		Budget Building (ECB')		Proposed / Budget (DEC" / ECB')	
	Energy (10 ³ Btu)	Cost (\$)	Energy (10 ³ Btu)	Cost (\$)	Energy (%)	Cost (%)
Electricity	5,614,835	143,173	7,661,359	192,055	73.3%	74.5%
Natural Gas	2,311,900	11,844	3,222,400	16,397	71.7%	72.2%
Other Fossil Fuel						
District steam						
Total Nonsolar	7,926,735	155,017	10,883,759	208,452	72.8%	74.4%
Solar or site recovered						
Total Including Solar	7,926,735	155,017	10,883,759	208,452	72.8%	74.4%

* These results use assumptions for showing compliance during a typical year; actual energy costs may be substantially different.

Percent Savings = (ECB' \$ - DEC" \$)/ECB' \$ = 25.63%
 Scale 2.1
 Renovation : EA Credit 1 Points = 5

Building Area 279000 sf
 kBtu/sf 45.3

Energy Cost Budget (ECB) Compliance

Project Name: GSA LEED Cost Study - Office - Minimal Facade Renovation: #3B (Silver)
 Contact Person:

Energy Summary by End Use

End Use	Energy Type*	Proposed Building		Budget Building		Proposed / Budget Energy (%)
		Energy (10 ³ Btu)	Peak (10 ³ Btu/h)	Energy (10 ³ Btu)	Peak (10 ³ Btu/h)	
Regulated						
Lighting - Conditioned	E	2,586,890	739	3,628,263	1033	71.3%
Space Heating (1)	E	23,737	20	28,971	20	81.9%
Space Heating (2)	NG	2,430,600	523	2,990,900	536	81.3%
Space Cooling	E	733,051	825	1,100,435	1061	66.6%
Pumps	E	110,975	67	125,927	59	88.1%
Heat Rejection	E	260,503	159	356,175	225	73.1%
Fans	E	1,713,360	899	2,424,117	792	70.7%
Service water heating	NG	194,200	16	194,200	16	100.0%
Sub-Total Regulated		8,053,316		10,848,988		74.2%
Non-Regulated/Process						
Office Equipment	E	3,943,201	977	3,943,201	977	100.0%
Task Lighting	E	441,035	198	441,035	198	100.0%
Lighting - Exterior	E	156,918	34	156,918	34	100.0%
Elevators & escalators	E	163,790	115	163,790	115	100.0%
Refrigeration (food, etc.)		NA	NA	NA	NA	NA
Cooking (commercial)		NA	NA	NA	NA	NA
Sub-Total Non-Regulated/Process		4,704,943		4,704,943		100.0%
Total Building Consumption		12,758,259		15,553,931		82.0%

* E = Electricity (kWh); NG = Natural Gas (Therms or CCF); FO2 = #2 Fuel Oil (gal); FO6 = #6 Fuel Oil (gal); S = Steam (mmBtu);
 CW = Chilled Water (ton-h)

Energy and Cost Summary by Fuel Type

	Proposed Building (DEC")		Budget Building (ECB')		Proposed / Budget (DEC" / ECB')	
	Energy (10 ³ Btu)	Cost (\$)	Energy (10 ³ Btu)	Cost (\$)	Energy (%)	Cost (%)
Electricity	5,428,516	138,332	7,663,888	192,297	70.8%	71.9%
Natural Gas	2,624,800	13,409	3,185,100	16,210	82.4%	82.7%
Other Fossil Fuel						
District steam						
Total Nonsolar	8,053,316	151,741	10,848,988	208,507	74.2%	72.8%
Solar or site recovered						
Total Including Solar	8,053,316	151,741	10,848,988	208,507	74.2%	72.8%

* These results use assumptions for showing compliance during a typical year; actual energy costs may be substantially different.

Percent Savings = (ECB' \$ - DEC" \$)/ECB' \$ = 27.22%
 Scale 2.1
 Renovation : EA Credit 1 Points = 5

Building Area 279000 sf kBtu/sf
 45.7

Energy Cost Budget (ECB) Compliance

Project Name:	GSA LEED Cost Study - Office - Full Facade Renovation : #4B (Silver) & #6B (Gold)
Contact Person:	

Energy Summary by End Use

End Use	Energy Type*	Proposed Building		Budget Building		Proposed / Budget Energy (%)
		Energy (10 ³ Btu)	Peak (10 ³ Btu/h)	Energy (10 ³ Btu)	Peak (10 ³ Btu/h)	
Regulated						
Lighting - Conditioned	E	2,046,108	739	3,628,263	1033	56.4%
Space Heating (1)	E	18,459	20	29,336	20	62.9%
Space Heating (2)	NG	1,399,600	413	3,028,200	537	46.2%
Space Cooling	E	589,696	504	1,100,244	1054	53.6%
Pumps	E	125,541	63	125,422	59	100.1%
Heat Rejection	E	300,468	136	355,469	225	84.5%
Fans	E	1,534,905	805	2,422,626	787	63.4%
Service water heating	NG	194,200	16	194,200	16	100.0%
Sub-Total Regulated		6,208,977		10,883,759		57.0%
Non-Regulated/Process						
Office Equipment	E	3,943,201	977	3,943,201	977	100.0%
Task Lighting	E	441,035	198	441,035	198	100.0%
Lighting - Exterior	E	156,918	34	156,918	34	100.0%
Elevators & escalators	E	163,790	115	163,790	115	100.0%
Refrigeration (food, etc.)		NA	NA	NA	NA	NA
Cooking (commercial)		NA	NA	NA	NA	NA
Sub-Total Non-Regulated/Process		4,704,943		4,704,943		100.0%
Total Building Consumption		10,913,920		15,588,703		70.0%

* E = Electricity (kWh); NG = Natural Gas (Therms or CCF); FO2 = #2 Fuel Oil (gal); FO6 = #6 Fuel Oil (gal); S = Steam (mmbtu); CW = Chilled Water (ton-h)

Energy and Cost Summary by Fuel Type

	Proposed Building (DEC")		Budget Building (ECB')		Proposed / Budget (DEC" / ECB')	
	Energy (10 ³ Btu)	Cost (\$)	Energy (10 ³ Btu)	Cost (\$)	Energy (%)	Cost (%)
Electricity	4,615,177	113,375	7,661,359	192,055	60.2%	59.0%
Natural Gas	1,593,800	8,253	3,222,400	16,397	49.5%	50.3%
Other Fossil Fuel						
District steam						
Total Nonsolar	6,208,977	121,628	10,883,759	208,452	57.0%	58.3%
Solar or site recovered						
Total Including Solar	6,208,977	121,628	10,883,759	208,452	57.0%	58.3%

* These results use assumptions for showing compliance during a typical year; actual energy costs may be substantially different.

Percent Savings = (ECB' \$ - DEC" \$)/ECB' \$ = 41.65%
 Scale 2.1
 Renovation : EA Credit 1 Points = 8

Building Area 279000 sf
 kBtu/sf 39.1

Energy Cost Budget (ECB) Compliance

Project Name: GSA LEED Cost Study - Office - Minimal Facade Renovation: #5B (Gold)
 Contact Person:

Energy Summary by End Use

End Use	Energy Type*	Proposed Building		Budget Building		Proposed / Budget Energy (%)
		Energy (10 ³ Btu)	Peak (10 ³ Btu/h)	Energy (10 ³ Btu)	Peak (10 ³ Btu/h)	
Regulated						
Lighting - Conditioned	E	2,039,864	739	3,628,263	1033	56.2%
Space Heating (1)	E	21,311	20	28,971	20	73.6%
Space Heating (2)	NG	1,650,200	467	2,990,900	536	55.2%
Space Cooling	E	623,437	574	1,100,435	1061	56.7%
Pumps	E	132,771	66	125,927	59	105.4%
Heat Rejection	E	309,561	139	356,175	225	86.9%
Fans	E	1,669,884	882	2,424,117	792	68.9%
Service water heating	NG	194,200	16	194,200	16	100.0%
Sub-Total Regulated		6,641,228		10,848,988		61.2%
Non-Regulated/Process						
Office Equipment	E	3,943,201	977	3,943,201	977	100.0%
Task Lighting	E	441,035	198	441,035	198	100.0%
Lighting - Exterior	E	156,918	34	156,918	34	100.0%
Elevators & escalators	E	163,790	115	163,790	115	100.0%
Refrigeration (food, etc.)		NA	NA	NA	NA	NA
Cooking (commercial)		NA	NA	NA	NA	NA
Sub-Total Non-Regulated/Process		4,704,943		4,704,943		100.0%
Total Building Consumption		11,346,172		15,553,931		72.9%

* E = Electricity (kWh); NG = Natural Gas (Therms or CCF); FO2 = #2 Fuel Oil (gal); FO6 = #6 Fuel Oil (gal); S = Steam (mmBtu);
 CW = Chilled Water (ton-h)

Energy and Cost Summary by Fuel Type

	Proposed Building (DEC")		Budget Building (ECB')		Proposed / Budget (DEC" / ECB')	
	Energy (10 ³ Btu)	Cost (\$)	Energy (10 ³ Btu)	Cost (\$)	Energy (%)	Cost (%)
Electricity	4,796,828	118,918	7,663,888	192,297	62.6%	61.8%
Natural Gas	1,844,400	9,507	3,185,100	16,210	57.9%	58.6%
Other Fossil Fuel						
District steam						
Total Nonsolar	6,641,228	128,425	10,848,988	208,507	61.2%	61.6%
Solar or site recovered						
Total Including Solar	6,641,228	128,425	10,848,988	208,507	61.2%	61.6%

* These results use assumptions for showing compliance during a typical year; actual energy costs may be substantially different.

Percent Savings = (ECB' \$ - DEC" \$)/ECB' \$ = **38.41%**
 Scale **2.1**
 Renovation : EA Credit 1 Points = **7**

Building Area **279000** sf **40.7** kBtu/sf

Appendix K:

Reference Cost Estimate – Courthouse

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

New Mid Rise Courthouse Building

Parking Included

GRAND SUMMARY

1 August 2003

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

GRAND SUMMARY

Prepared: 1 August 2003
Reference Date: October 2003
Area Incl Parking: 262,000 GSF

New Mid Rise Courthouse Building
Parking Included

DESCRIPTION	Market Equivalent		Shell & Core		TOTAL		Tenant Improvements (TI)			TOTAL		Total Cost \$ /gsf	Total Cost %
	\$		No Market Comparable	\$	\$		Fitout	\$	SRCI	\$	Shell & Core + TI		
A10 Foundations	856,528		-	856,528			0	0	0	0	856,528	3.27	1.99%
A20 On Grade/Below Grade Construction	761,020			761,020			283,704	0	0	283,704	1,044,724	3.99	2.43%
B10 Superstructure	4,364,351		405,816	4,770,167			259,350	96,850	0	356,200	5,126,366	19.57	11.92%
B20 Exterior Enclosure	5,587,813			5,587,813			4,300	0	0	4,300	5,592,113	21.34	13.00%
B30 Roofing	588,238			588,238			0	0	0	0	588,238	2.25	1.37%
C10 Interior Construction	1,143,752		2,013,847	3,157,598			4,555,103	220,615	0	4,775,719	7,933,317	30.28	18.44%
C30 Interior Finishes	1,820,140			1,820,140			2,761,355	259,233	0	3,020,588	4,840,728	18.48	11.25%
D10 Conveying Systems	821,000			821,000			257,207	436,091	0	693,298	1,514,298	5.78	3.52%
D20 Plumbing	686,660		135,850	822,510			366,804	0	0	366,804	1,189,314	4.54	2.77%
D30 HVAC	3,181,360		503,880	3,685,240			176,598	332,674	0	509,272	4,194,512	16.01	9.75%
D40 Fire Protection	481,650			481,650			45,348	6,643	0	51,991	533,641	2.04	1.24%
D50 Electrical	3,163,504			3,163,504			1,175,071	125,922	0	1,300,993	4,464,497	17.04	10.38%
E10 Equipment	89,000			89,000			59,200	0	0	59,200	148,200	0.57	0.34%
E20 Furnishings	161,814			161,814			3,037,016	56,391	0	3,093,407	3,255,221	12.42	7.57%
F20 Selective Building Demolition	0			0			0	0	0	0	0	0.00	0.00%
G10 Building Sitework	1,729,000			1,729,000			0	0	0	0	1,729,000	6.60	4.02%
Estimated Direct Construction Cost	25,435,829		3,059,393	28,495,222			12,981,056	1,534,419		14,515,475	43,010,697	164.16	100.00%
Design Contingency - Allowance	10%	2,543,583	305,939	2,849,522			1,298,106	153,442		1,451,547	4,301,070	16.42	
General Conditions and Profit - Allowance	15%	4,196,912	504,800	4,701,712			2,141,874	253,179		2,395,053	7,096,765	27.09	
Estimated Construction Cost at Award		32,176,324	3,870,132	36,046,456			16,421,035	1,941,040		18,362,076	54,408,532	207.67	
Cost of Art-In-Architecture - Allowance	0.5%	160,882	19,351	180,232			82,105	9,705		91,810	272,043	1.04	
Construction Contingency - Allowance	5%	1,616,860	194,474	1,811,334			825,157	97,537		922,694	2,734,029	10.44	
Estimated Construction Cost		33,954,066	4,083,957	38,038,023			17,328,297	2,048,283		19,376,580	57,414,603	219.14	
Unit Cost		129.60	15.59	145.18			66.14	7.82		73.96	219.14		

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

New Mid Rise Courthouse Building

Parking Included

Area Summary

1 August 2003

MID RISE FEDERAL COURTHOUSE
CONSTRUCTION AREA SUMMARY SHEET

BUILDING AREA

Prepared: 1 August 2003

FLOOR	1 USF Office	2 USF Enhanced Office	3 USF Judicial Chambers	4 USF Courtroom	5 USF Detention	6 USF Parking	USF SUBTOTAL TENANT SPACE	7 USF Public Space	8 USF Common Space	9 USF Wall Thickness	USF SUBTOTAL NON-TENANT SPACE	GSF TOTAL NON - PARKING AREAS	GSF Inside Parking	TOTAL BUILDING GROSS AREA
BASEMENT 1	0	8,847	300	0	3,600	15,000	27,747	1,650	11,454	998	14,102	26,849	15,000	41,849
1ST FLOOR	0	27,703	300	0	240		28,243	14,582	3,150	998	18,730	46,973		46,973
2ND FLOOR	0	34,186	300	0	240		34,726	3,722	3,850	998	8,570	43,296		43,296
3RD FLOOR	0	25,496	3,698	4,910	240		34,344	4,044	3,910	998	8,952	43,296		43,296
4TH FLOOR	0	8,774	13,358	8,520	1,500		32,152	6,156	3,990	998	11,144	43,296		43,296
5th FLOOR	0	10,148	9,650	10,520	1,500		31,818	6,550	3,930	998	11,478	43,296		43,296
PENTHOUSE	0	0	0	0	0		0	0	0	0	0	0		0
	0	115,154	27,606	23,950	7,320	15,000	189,030	36,704	30,284	5,988	72,976	247,006	15,000	262,006
	0	115,200	27,600	24,000	7,300	15,000	189,000	36,700	30,300	6,000	73,000	247,000	15,000	262,000

Core Ratio 28%
Parking Spaces 38
Parking Ratio

AG Skin Ratio
Public Elevator Ratio
Efficiency

54%
65,500
72%

GROSS w/o PARKING
PARKING (BELOW GRADE)
ABOVE GRADE

247,000
15,000
220,157

6% of total area
94% of total area

COURTROOM TYPE & LOCATION
This model assumes the following size & location of courtroom:
on the "Court Floors".

STRUCTURAL AREA

FLOOR	S.O.G.	CONCRETE SUP.SLAB	OFFICE / CR SUP. SLAB	ROOFING	BALCONY	ROOF TERRACE	SOFFITS	HORIZ WATERP	TOTAL STRUCT.
BASEMENT 1	41,849								41,849
1ST FLOOR	5,124		41,849						46,973
2ND FLOOR			43,296	3,677					46,973
3RD FLOOR			43,296						43,296
4TH FLOOR			43,296						43,296
5th FLOOR			43,296						43,296
PENTHOUSE			0						0
PH ROOF				0					0
ROOF				43,296					43,296
	46,973	0	215,033	46,973	0	0	0	0	308,979
	47,000	0	215,000	47,000	0	0	0	0	309,000

SKIN AREA

		HT	EXTERIOR PERIM	EXTERIOR TOTAL	1.25 X EXTERIOR TOTAL
BASEMENT 1		16.00	998	15,968	19,960
1ST FLOOR		20.00	998	19,960	24,950
2ND FLOOR		14.00	998	13,972	17,465
3RD FLOOR		20.00	998	19,960	24,950
4TH FLOOR		20.00	998	19,960	24,950
5th FLOOR		20.00	998	19,960	24,950
PENTHOUSE		20.00	0	0	0
PARAPET		2.00	998	1,996	2,495
SUBTOTAL				111,776	139,720
FOUNDATION				15,968	19,960
TOTAL FINISHED SKIN				95,808	119,760

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

New Mid Rise Courthouse Building

Parking Included

MID RISE FEDERAL COURTHOUSE SHELL & CORE

1 August 2003

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

SUMMARY SHELL & CORE

Shell & Core
Courthouse Building MID RISE
Parking Included as TI

Prepared: 1 August 2003
Date: October 2003
Area excl Parking: 247,000 GSF

DESCRIPTION	Shell & Core			TOTAL RATE \$/gsf	Total Cost %
	Market Equivalent \$	No Market Comparable \$	TOTAL \$		
A10 Foundations	856,528	-	856,528	3.47	3.37%
A20 On Grade/Below Grade Construction	761,020		761,020	3.08	2.99%
B10 Superstructure	4,364,351	405,816	4,770,167	19.31	17.16%
B20 Exterior Enclosure	5,587,813		5,587,813	22.62	21.97%
B30 Roofing	588,238		588,238	2.38	2.31%
C10 Interior Construction	1,143,752	2,013,847	3,157,598	12.78	4.50%
C30 Interior Finishes	1,820,140		1,820,140	7.37	7.16%
D10 Conveying Systems	821,000		821,000	3.32	3.23%
D20 Plumbing	686,660	135,850	822,510	3.33	2.70%
D30 HVAC	3,181,360	503,880	3,685,240	14.92	12.51%
D40 Fire Protection	481,650		481,650	1.95	1.89%
D50 Electrical	3,163,504		3,163,504	12.81	12.44%
E10 Equipment	89,000		89,000	0.36	0.35%
E20 Furnishings	161,814		161,814	0.66	0.64%
F20 Selective Building Demolition	0		0	0.00	0.00%
G10 Building Sitework	1,729,000		1,729,000	7.00	6.80%
Estimated Direct Construction Cost	25,435,829	3,059,393	28,495,222	115.37	100.00%
Design Contingency - Allowance 10%	2,543,583	305,939	2,849,522	11.54	
General Conditions and Profit - Allowance 15%	4,196,912	504,800	4,701,712	19.04	
Estimated Construction Cost at Award	32,176,324	3,870,132	36,046,456	145.94	
Cost of Art-In-Architecture - Allowance 0.5%	160,882	19,351	180,232	0.73	
Construction Contingency - Allowance 5%	1,616,860	194,474	1,811,334	7.33	
Estimated Construction Cost	33,954,066	4,083,957	38,038,023	154.00	
	137.47	16.53	154.00		

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE
BACK-UP SHELL & CORE

Shell & Core
Courts Building MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 247,000 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
A SUBSTRUCTURE						
A10 Foundations						
A1010 <u>Standard Foundations</u>						
Elevator pit for single elevator	5	EA	\$3,773.35	\$17,500		
Escalator pit	2	EA	\$3,773.35	\$7,000		
Foundation grade beams at pile foundations	46,973	SF	\$5.39	\$234,865		
A1020 <u>Special Foundations</u>						
14" Diameter pipe pile foundations (1 pile per 240sf of foot print)	196	EA	\$3,234.30	\$587,163		
Mobilization	1	LS	\$10,781.00	\$10,000		
Total A10 Foundations						856,528
A20 On Grade/Below Grade Construction						
A2010 <u>Basement Excavation</u>						
Excavated subgrade level, incl backfill, haul	10,446	CY	\$16.93	\$164,001		
A2020 <u>Basement Walls</u>						
16' deep 12" wide reinforced concrete basement wall including waterproofing, insulation, etc (footings elsewhere)	998	LF	\$371.94	\$344,310		
Gravel drainage course with filter mat over 4" drainage tile	15,968	SF	\$2.16	\$31,936		
A2030 <u>Slab on Grade</u>						
4" Reinforced concrete slab on grade, 3000 PSI, including wire mesh reinforcing, moisture barrier, base, sealants, etc	46,973	SF	\$5.07	\$220,773		
Total A20 On Grade/Below Grade Construction						761,020
B SHELL						
B10 Superstructure						
B1010 <u>Floor Construction</u>						
Cast in place structural slab building system, complete with columns, beams, etc	14,102	SF	\$16.93	\$221,401		
Structural steel floor framing, including columns	1,065	Ton	\$2,156.20	\$2,129,757	(2,129,757)	
Structural steel floor framing, including columns	1,134	Ton	\$2,156.20		\$2,445,131	
20Ga steel roof/floor deck, with 4" lightweight concrete fill	173,151	SF	\$6.20	\$995,618		
Sprayed on fire protection on steel columns and beams supporting occupied space	173,151	SF	\$1.24	\$199,124		

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE
BACK-UP SHELL & CORE

Shell & Core
Courts Building MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 247,000 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
B1020 Roof Construction						
20Ga steel roof/floor deck, with 4" lightweight concrete fill	47,000	SF	\$6.20	\$270,250		
Structural steel roof framing, including columns	249	Ton	\$2,156.20	\$498,200	(498,200)	
Structural steel roof framing, including columns	273	Ton	\$2,156.20		\$588,643	
B1030 Stair Construction						
Staircase formed of metal pan treads and landings filled with concrete fill	16	FLT	\$2,695.25	\$40,000		
Staircase formed of metal pan treads and landings filled with concrete fill	4	FLT	\$2,695.25	\$10,000		
Total B10 Superstructure						4,364,351
B20 Exterior Enclosure						
B2010 Exterior Walls						
3" Handset limestone panels on and including 8" cmu backup, waterproofing, insulation, grouted Precast panel system on and including drywall, insulation, waterproofing and stud backup	25,449	SF	\$63.12	\$1,490,039		
Insulation and waterproofing membrane on skin	44,910	SF	\$36.66	\$1,526,940		
24" High parapet with precast veneer on and including cmu backup wall with precast cap	70,359	SF	\$1.40	\$91,467		
Allowance for Architectural metals, etc	2,495	LF	\$78.92	\$182,634		
Indiana limestone corner stone with chiseled lettering	119,760	SF	\$1.13	\$125,748		
	1	EA	\$2,156.20	\$2,000		
B2020 Exterior Windows and Doors						
Aluminum curtain wall system with 3 coat "Kynar" aluminum framing, double glazing, low E (with some articulation)	23,952	SF	\$56.33	\$1,251,492		
Aluminum framed punched window system, insulated, double glazed, low E	23,952	SF	\$38.33	\$851,494		
Automatic glazed double entrance doors, 7' x 7.6" high including low e glass, aluminum frame and hardware	2	PR	\$16,710.55	\$31,000		
Glazed aluminum framed double door with low e, tempered glass and glazing complete with frame and hardware	2	PR	\$9,163.85	\$17,000		
Hollow metal emergency egress double door and frame, insulated, size 6' wide by 7' 4" high complete with hardware, card reader	3	PR	\$2,156.20	\$6,000		

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE
BACK-UP SHELL & CORE

Shell & Core
Courts Building MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 247,000 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
Concealed automatic overhead coiling loading dock door complete with frame and hardware including bottom lock, weather seals (slats to be powder finish flat metal)	3	EA	\$4,312.40	\$12,000		
Total B20 Exterior Closure						5,587,813
B30 Roofing						
B3010 Roof Coverings and Insulation						
Premium quality EPDM single ply membrane roofing system complete with ballast, insulation, etc	46,150	SF	\$7.33	\$313,820		
Trims and flashing to roof, allowance	46,150	SF	\$2.80	\$119,990		
Roof accessories, allowance	46,150	SF	\$0.54	\$23,075		
18 Gauge steel canopy with cantilever cable support struts, complete with factory paint finish and structure	1,000	SF	\$56.33	\$52,250		
B3020 Roof Openings						
Interior permanent stair, extending up from emergency egress stairs, including single exterior door.	2	EA	\$2,695.25	\$5,000		
14 Gauge steel hatch and curb unit, painted	2	EA	\$1,617.15	\$3,000		
Structural rafter segmented vaulted skylight, complete with low emission tempered, insulated glass and glazing	850	SF	\$90.18	\$71,103		
Total B30 Roofing						588,238
C INTERIORS						
C10 Interior Construction						
C1009 Partitions and Doors						
<u>Partitions:</u>						
6" CMU wall grouted solid	26,508	SF	\$9.00	\$221,342		
Interior partition - GWB on both sides and including metal studs at 16" o.c., insulated, fire rated	4,280	SF	\$4.85	\$19,260		
Interior partition - GWB on both sides and including metal studs at 16" o.c., insulated	31,364	SF	\$4.85	\$141,138		
Interior partition - one layer GWB on one side only and including metal studs at 16" o.c., insulated	36,108	SF	\$3.23	\$108,324		
Interior partition - GWB both sides on metal studs at 16" O.C.	10,050	SF	\$4.53	\$42,210		
Interior partition - 2 layers GWB both sides, sound insulated, on metal studs @ 16" o.c. (mech rooms)	16,390	SF	\$8.46	\$128,662		
Shaft/chase formed of 2 hr 50 STC rated Type X GWB shaft wall system, with 1 layer 1" shaftwall and one layer GWB, sound insulated.	4,104	SF	\$10.73	\$40,835		
GWB on metal furring channels attached to wall (wall elsewhere)	20,868	SF	\$2.80	\$54,257		
Interior partition - GWB on both sides and including metal studs at 16" o.c., insulated, fire rated	320	SF	\$4.85	\$1,440		

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

BACK-UP SHELL & CORE

Shell & Core
Courts Building MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 247,000 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
Interior partition - 2 layers GWB both sides, sound insulated, on metal studs @ 16" o.c. (mech rooms)	1,795	SF	\$8.46	\$14,092		
Shaft/chase formed of 2 hr 50 STC rated Type X GWB shaft wall system, with 1 layer 1" shaftwall and one layer GWB, sound insulated.	775	SF	\$10.73	\$7,713		
Interior partition - one layer GWB on one side only and including metal studs at 16" o.c., insulated	1,061	SF	\$3.23	\$3,182		
6" CMU wall grouted solid	3,264	SF	\$9.00	\$27,254		
GWB on metal furring channels attached to wall (wall elsewhere)	824	SF	\$2.80	\$2,142		
<u>Doors:</u>						
Coiling overhead wood slat door, 6' wide x 4' high complete with frame and hardware	1	EA	\$1,347.63	\$1,250		
Solid core Hardwood veneer door, 3' x 7' high, complete with frame and hardware	20	EA	\$1,024.20	\$19,000		
Solid core Hardwood veneer single door, 3' x 7' high, fire rated, complete with frame and hardware	27	EA	\$1,239.82	\$31,050		
1" ABS Plastic Clad wood core double service door, 5' x 7' high, complete with frame and hardware	3	PR	\$1,509.34	\$4,200		
Hollow metal double door, 6' x 7' high, complete with frame and hardware	5	PR	\$1,347.63	\$6,250		
Solid core Hardwood veneer door, 3' x 7' high, complete with frame and hardware	2	EA	\$1,024.20	\$1,900		
Hollow metal double door, 6' x 7' high, complete with frame and hardware	4	PR	\$1,347.63	\$5,000		

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

BACK-UP SHELL & CORE

Shell & Core
Courts Building MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 247,000 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
Solid core Hardwood veneer single door, 3' x 7' high, fire rated, complete with frame and hardware	3	EA	\$1,239.82	\$3,450		
C1030 <u>Specialties</u>						
Pipe Handrail, welded construction with painted finish	616	LF	\$43.12	\$24,640		
Stainless steel toilet partition, ceiling hung	113	EA	\$1,126.61	\$118,085		
Premium for toilet partition, ADA (including for grab bars)	22	EA	\$328.82	\$6,710		
Urinal screen	21	EA	\$754.67	\$14,700		
Toilet paper holder	123	EA	\$26.95	\$3,075		
Feminine napkin disposal	63	EA	\$167.11	\$9,765		
Feminine napkin dispenser	11	EA	\$463.58	\$4,730		
Paper towel dispenser combination waste receptacle	22	EA	\$371.94	\$7,590		
Soap dispenser	84	EA	\$59.30	\$4,620		
Mirror with brushed brass edging, 18" x 24"	84	EA	\$129.37	\$10,080		
Baby changing table - fold down type	20	EA	\$280.31	\$5,200		
Toilet seat cover dispenser, stainless steel, recessed	40	EA	\$129.37	\$4,800		
Touch screen computer monitor programmed directory with stone veneer pedestal case	1	EA	\$8,624.80	\$8,000		
Cast plaster great seal, 24" diameter	1	EA	\$916.39	\$850		
Cantilever aluminum flag pole, mounted	1	EA	\$1,617.15	\$1,500		
Bronze 4sf, dedication plaque, with raised letters	1	EA	\$3,234.30	\$3,000		
Interior signage allowance for public areas	1	LS	\$5,390.50	\$5,000		
Steel dividers with stainless steel shelf and perforated interior face with acoustical material as telephone dividers	17	EA	\$1,078.10	\$17,000		
Miscellaneous specialties	1	LS	\$11,271.54	\$10,455		

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

BACK-UP SHELL & CORE

Shell & Core
Courts Building MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 247,000 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
C1040 Access/Platform Floors						
18" High raised floor formed of 1-1/2" thick concrete filled metal pans on pedestal support system in all non-core areas and core electrical, telephone and computer LAN closets	166,700	SF	\$9.60		\$1,600,320	
18" High raised floor formed of 4" cmu blocks at 2' o.c with polystyrene infill between cmu blocks with 20Ga metal deck with 2-1/2" lightweight fill	62,846	SF	\$6.58		\$413,527	
Total C10 Interior Construction						1,143,752
C30 Interior Finishes						
C3010 Wall Finishes						
Stone veneer paneling	2,290	SF	\$50.72	\$107,745		
Vinyl wall covering	58,520	SF	\$1.67	\$90,707		
3/8" Textured Porcelain tile wainscot	8,000	SF	\$13.53	\$100,400		
Paint walls	22,640	SF	\$0.75	\$15,848		
3/8" Textured Porcelain tile wainscot	540	SF	\$13.53	\$6,777		
Paint walls	1,215	SF	\$0.75	\$851		
Vinyl chair rail	118	LF	\$9.00	\$988		
Base:			\$0.00			
Hardwood base (court building use)	3,838	LF	\$11.27	\$40,111		
Porcelain tile base	1,600	LF	\$11.27	\$16,720		
Vinyl cove base	1,240	LF	\$1.78	\$2,046		
Porcelain tile base	88	LF	\$11.27	\$920		
Vinyl cove base	397	LF	\$1.78	\$655		
C3020 Floor Finishes						
3/4" Thick Terrazzo floor tile with mastic base, 12" x 12" with pattern	31,852	SF	\$21.56	\$637,040		
Broadloom Carpet , 32 Oz	3,602	SF	\$3.94	\$13,147		
3/8" Textured Porcelain Tile with Limestone tile banded pattern	7,860	SF	\$15.79	\$115,149		
Carpet tile with cushioned back	300	SF	\$3.07	\$855		
Vinyl composition tile	1,025	SF	\$2.05	\$1,948		
Anti-static plastic laminate floor finish	1,000	SF	\$4.85	\$4,500		
Sealed Concrete	4,800	SF	\$0.54	\$2,400		
3/8" Textured Porcelain Tile with Granite tile	240	SF	\$18.06	\$4,020		
Vinyl composition tile	140	SF	\$2.05	\$266		
Sealed Concrete	11,581	SF	\$0.54	\$5,791		

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE**BACK-UP SHELL & CORE**

Shell & Core
Courts Building MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 247,000 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
C3030 Ceiling Finishes						
Suspended 24" x 24" ACT	194,849	SF	\$3.18	\$574,805		
Painted plaster, premium over ACT ceiling	280	SF	\$7.01	\$1,820		
Exposed structure, painted, negative premium over ACT ceiling	6,000	SF	(\$2.05)	-\$11,400		
GWB painted ceiling, premium over ACT ceiling	39,712	SF	\$1.94	\$71,482		
Suspended 24" x 24" ACT	12,284	SF	\$3.18	\$36,238		
Exposed structure, painted, negative premium over ACT ceiling	11,641	SF	(\$2.05)	-\$22,118		
GWB painted ceiling, premium over ACT ceiling	240	SF	\$1.94	\$432		
Total C30 Interior Finishes						1,820,140
D SERVICES						
D10 Conveying Systems						
D1010 Elevators & Lifts						
Geared traction passenger elevator, 5 stops/ 110 lf run/ 5 openings/ 350 fpm/ 3500#	4	EA	\$97,000.00	\$388,000		
Cab allowance for passenger elevator, medium	4	EA	\$31,500.00	\$126,000		
Geared traction service elevator, 5 stops/ 110 lf run/ 5 openings/ 350 fpm/ 4500#	1	EA	\$95,000.00	\$95,000		
Cab allowance for service elevator	1	EA	\$5,000.00	\$5,000		
D1019 Escalators, Moving Walks & Other						
32" Wide glass escalator, serving floor 1 thru 2, with glass balustrade, etc	2	EA	\$103,500.00	\$207,000		
Total D10 Conveying Systems						821,000
D20 Plumbing						
D2010 Plumbing, Assumed 264 fixtures						
Wet Stack Allowance	247,000	SF	\$2.57	\$634,790	(634,790)	
Plumbing, Assumed 264 fixtures. Only one domestic water service connection.	247,000	SF	\$0.21	\$51,870	(51,870)	
Wet stack allowance	247,000	SF	\$3.12		770,640	
	247,000	SF	\$0.21		51,870	
Total D20 Plumbing						686,660

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE
BACK-UP SHELL & CORE

Shell & Core
Courts Building MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 247,000 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
D30 HVAC						
HVAC, Basis: Central Cooling Plant: 2 each 325 ton Chillers & 1 each 130 ton chiller, sized for 50%, 50% & 20% of the cooling load. Heating Plant: 2 each 105 HP boilers. Underfloor air distribution with above ceiling return air plenum. A 2 pipe reverse return system to distribute HVAC water. Perimeter heating will be above floor fin-tube radiation. Fan powered air supply terminal units underfloor (activated by a manual wall switch) will provide increased air flow to perimeter zones in response to cooling loads. System includes ultrasonic humidifiers.	247,000	SF	\$10.84		2,677,480	
<i>Note: Fuel oil tank, included with site work</i>						
BAS Automatic Temperature Controls	247,000	SF	\$2.58		637,260	
 HVAC, Basis: Central cooling plant with 2 each 390 ton chillers. Heating: Space boilers at 20 btu/r per GSF of bldg.. Heating water & chilled water pipe & pumping system. Perimeter fan-powered boxes with HW heat. All air distributed above ceiling via ducted system. Return air ceiling plenum. Plate and frame heat exchanger for free cooling application, cooling towers shall be forced draft type steel frame, fire proof fill. No humidifiers.	247,000	SF	\$10.30	2,544,100	(2,544,100)	
BAS Automatic temperature controls	247,000	SF	\$2.58	637,260	(637,260)	
Dedicated Ventilation System, 4000 cfm AHU per floor with air distribution system, controls and electric power wiring	247,000	SF	\$1.50		370,500	
Total D30 HVAC						3,181,360
D40 Fire Protection						
D4010 Fire Protection Sprinkler Systems, including fire pump	247,000	SF	\$1.95	\$481,650		
Trotal D40 Fire Protection						481,650
Note: See Construction Criteria For Core & Shell detail descriptions.						

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE
BACK-UP SHELL & CORE

Shell & Core
Courts Building MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 247,000 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
D50 Electrical						
D5010 Complete power riser system w/closet panels and transformers, k-13 xfmrs for office technology loads.	247,000	SF	\$4.09	\$1,009,664		
D5020 Modular wiring to parabolic fixture every 80 sf. Perimeter convenience outlets, mechanical wiring, Core and lobby power and lighting fitout, utility space power and lighting fitout	247,000	SF	\$4.79	\$1,183,130		
D5040 Complete Fire alarm except for tenant A/V devices. Telecom riser raceway. Emergency generator with storage tank, grounding and lightning protection, perimeter security	247,000	SF	\$3.93	\$970,710		
D5050 Communication and Security Systems, included in D5040 above		incl				
Total D50 Electrical						3,163,504
E EQUIPMENT & FURNISHINGS						
E10 Equipment						
E1009 <u>Commercial / Institutional Equipment</u>						
Dock leveler, electro-hydraulic operation	2	EA	\$5,500.00	\$11,000		
Window washing equipment	1	LS	\$15,000.00	\$15,000		
Magnetometer enclosure, allowance	2	EA	\$31,500.00	\$63,000		
Total E10 Equipment						89,000
E20 Furnishings						
E2010 <u>Fixed Furnishings & Casework</u>						
Plastic laminate counter, 24" wide	320	LF	\$73.20	\$23,424		
AWI Premium Grade Hardwood Veneer base and upper cabinet with concealed hinge doors, and brass pulls complete with PLAM counter and backsplash	183	LF	\$700.00	\$128,100		
Painted Metal Cabinet with plastic laminate counter	49	LF	\$210.00	\$10,290		
Total E20 Furnishings						161,814
G BUILDING SITEWORK						
G10 Building Sitework						
G2000 <u>Site Improvements & Landscaping</u>						
Site work allowance based on GSF of building area (Site Area to GSF ratio = 30-35%)	247,000	GSF	\$7.00	\$1,729,000		
Total G10 Building Sitework						1,729,000
Estimated Final Shell/Core Cost					3,059,393	25,435,829

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

New Mid Rise Courthouse Building

Parking Included

ENHANCED OFFICE TI

1 August 2003

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

ENHANCED OFFICE SUMMARY

Tenant Improvements
Enhanced Office MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 115,200 USF

DESCRIPTION	Tenant Improvements			RATE \$/usf	Total Cost %
	Fitout \$	SRCI \$	TOTAL \$		
A10 Foundations			0	0.00	0.00%
A20 On Grade/Below Grade Construction			0	0.00	0.00%
B10 Superstructure			0	0.00	0.00%
B20 Exterior Enclosure			0	0.00	0.00%
B30 Roofing			0	0.00	0.00%
C10 Interior Construction	2,129,409		2,129,409	18.48	42.98%
C30 Interior Finishes	1,561,251	251	1,561,502	13.55	31.52%
D10 Conveying Systems			0	0.00	0.00%
D20 Plumbing	168,192		168,192	1.46	3.39%
D30 HVAC	142,848	11,520	154,368	1.34	3.12%
D40 Fire Protection	12,672		12,672	0.11	0.26%
D50 Electrical	769,536	34,560	804,096	6.98	16.23%
E10 Equipment			0	0.00	0.00%
E20 Furnishings	124,416		124,416	1.08	2.51%
F20 Selective Building Demolition			0	0.00	0.00%
G10 Building Sitework			0	0.00	0.00%
Estimated Direct Construction Cost	4,908,324	46,331	4,954,655	43.01	100.00%
Design Contingency - Allowance	10%	490,832	4,633	495,466	4.30
General Conditions and Profit - Allowance	15%	809,874	7,645	817,518	7.10
Estimated Construction Cost at Award		6,209,030	58,609	6,267,639	54.41
Cost of Art-In-Architecture - Allowance	0.5%	31,045	293	31,338	0.27
Construction Contingency - Allowance	5%	312,004	2,945	314,949	2.73
Estimated Construction Cost		6,552,079	61,847	6,613,926	57.41

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

ENHANCED OFFICE BACK-UP

Tenant Improvements
Enhanced Office MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 115,200 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL Including SRCI	SUBTOTAL Space Related Cost Impact (SRCI)
C INTERIORS						
C10 Interior Construction						
C1009 Partitions and Doors						
<u>Partitions:</u>						
Interior partition - GWB both sides on metal studs at 16" O.C.	207,360	SF	\$4.53	\$939,341		
Interior partition - GWB on each side on metal studs at 16" o.c., insulated, fire rated	29,361	SF	\$5.07	\$148,860		
Interior partition - 2 layers GWB on each side of metal studs staggered at 16" o.c., insulated, fire rated	11,100	SF	\$7.33	\$81,363		
<u>Doors:</u>						
Solid core Hardwood veneer door 3' x 7' high, complete with frame and hardware, rated	12	EA	\$2,910.87	\$34,930		
Solid core Hardwood veneer door 3' x 7' high, complete with frame and hardware (court building use)	35	EA	\$2,695.25	\$94,334		
Solid core Hardwood veneer single door, 3' x 7' high, complete with hollow metal door frame and hardware	678	EA	\$1,013.41	\$687,092		
C1030 Specialties						
Horizontal 1" louver blinds, complete	11,018	SF	\$5.07	\$55,861		
Toilet paper holder	34	EA	\$26.95	\$916		
Paper towel dispenser combination waste receptacle	18	EA	\$371.94	\$6,695		
Soap dispenser	18	EA	\$59.30	\$1,067		
Mirror with brushed brass edging, 18" x 24"	34	EA	\$129.37	\$4,399		
Feminine napkin dispenser	18	EA	\$463.58	\$8,344		
Feminine napkin disposal	18	EA	\$167.11	\$3,008		
Stainless steel toilet partition, ceiling hung	34	EA	\$1,126.61	\$38,305		
Urinal screen	18	EA	\$754.67	\$13,584		
Premium for toilet partition, ADA (including for grab bars)	18	EA	\$328.82	\$5,919		
Allowance for interior signage	1	LS	\$5,390.50	\$5,391		
C1040 Access/Platform Floors						
<i>Included in Shell & Core</i>						
Total C10 Interior Construction					2,129,409	

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

ENHANCED OFFICE BACK-UP

Tenant Improvements
Enhanced Office MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 115,200 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL Including SRCI	SUBTOTAL Space Related Cost Impact (SRCI)
C30 Interior Finishes						
C3010 <u>Wall Finishes</u>						
3/8" Textured Porcelain tile wainscot	4,524	SF	\$13.53	\$61,210		
Vinyl wall covering	45,241	SF	\$1.67	\$75,552		
2" Thick acoustical insulated fabric covered	4,524	SF	\$16.93	\$76,591		
Paint walls	398,118	SF	\$0.75	\$298,589		
<u>Base:</u>						
Vinyl cove base	1,005	LF	\$1.78	\$1,789		
Hardwood base	45,241	LF	\$9.00	\$407,169		
Porcelain tile base	1,005	LF	\$11.27	\$11,326		
C3020 <u>Floor Finishes</u>						
Carpet tile with cushioned back	107,328	SF	\$5.39	\$578,498		
Broadloom Carpet , 42 Oz	5,800	SF	\$5.66	\$32,828		
Vinyl composition tile	1,147	SF	\$2.05	\$2,351		
3/8" Textured Porcelain Tile	925	SF	\$13.53	\$12,515		
C3030 <u>Ceiling Finishes</u>						
GWB painted ceiling, premium over ACT ceiling	1,460	SF	\$1.94	\$2,832		
GWB soffit over counters, premium over ACT	146	SF	\$1.72	\$0		\$251
Total C30 Interior Finishes					1,561,502	251
D SERVICES						
D20 Plumbing						
D2010 Plumbing, Premium for Enhanced Office Space	115,200	SF	\$1.46	\$168,192		
Total D20 Plumbing					168,192	
D30 HVAC						
HVAC, Premium for Enhanced Office Space	115,200	SF	\$1.24	\$142,848		
Acoustical transfer ducts at acoustically rated partitions in spaces	115,200	SF	\$0.05	\$0		\$5,760
Service units and private toilets direct 100% exhaust	115,200	SF	\$0.05	\$0		\$5,760
Total D30 HVAC					154,368	11,520
D40 Fire Protection						
D4010 Premium: Relocate 10% of sprinkler heads	115,200	SF	\$0.11	\$12,672		
Total D40 Fire Protection					12,672	

Note: See Construction Criteria For Tenant fitout detail descriptions.

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE**ENHANCED OFFICE BACK-UP**

Tenant Improvements
Enhanced Office MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 115,200 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL Including SRCI	SUBTOTAL Space Related Cost Impact (SRCI)
D50 Electrical						
D5020 Underfloor power distribution w/zone boxes, flush floor outlets, special floor outlets for equipment.	115,200	SF	\$3.84	\$442,368		
Dimming controls, special lighting at Attorney/Witness waiting, jury trial rooms	115,200	SF	\$0.30	\$0		34,560
D5040 Fire alarm A/V devices, telecom raceway to flush floor outlets, PA system, raceway	115,200	SF	\$2.84	\$327,168		
D5050 Communication and Security Systems		incl				
Total D50 Electrical					804,096	34,560
E EQUIPMENT & FURNISHINGS						
E20 Furnishings						
E2010 <u>Fixed Furnishings & Casework</u> Furnishing allowance	115,200	SF	\$1.08	\$124,416		
Total E20 Furnishings					124,416	
Estimated Final Tenant Improvement Cost					4,954,655	46,331

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

New Mid Rise Courthouse Building

Parking Included

DETENTION TI

1 August 2003

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

DETENTION SUMMARY

Tenant Improvements
Detention MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 7,300 USF

DESCRIPTION	Tenant Improvements			RATE \$/usf	Total Cost %
	Fitout \$	SRCI \$	TOTAL \$		
A10 Foundations			0	0.00	0.00%
A20 On Grade/Below Grade Construction			0	0.00	0.00%
B10 Superstructure		7,547	7,547	1.03	0.49%
B20 Exterior Enclosure			0	0.00	0.00%
B30 Roofing			0	0.00	0.00%
C10 Interior Construction	699,450	104,641	804,090	110.15	52.28%
C30 Interior Finishes	78,099	93,606	171,706	23.52	11.16%
D10 Conveying Systems		297,556	297,556	40.76	19.35%
D20 Plumbing	70,080		70,080	9.60	4.56%
D30 HVAC		51,538	51,538	7.06	3.35%
D40 Fire Protection		6,643	6,643	0.91	0.43%
D50 Electrical	22,411	25,842	48,253	6.61	3.14%
E10 Equipment			0	0.00	0.00%
E20 Furnishings	80,538		80,538	11.03	5.24%
F20 Selective Building Demolition			0	0.00	0.00%
G10 Building Sitework			0	0.00	0.00%
Estimated Direct Construction Cost	950,578	587,373	1,537,951	210.68	100.00%
Design Contingency - Allowance	10%	95,058	58,737	153,795	21.07
General Conditions and Profit - Allowance	15%	156,845	96,916	253,762	34.76
Estimated Construction Cost at Award		1,202,481	743,026	1,945,508	266.51
Cost of Art-In-Architecture - Allowance	0.5%	6,012	3,715	9,728	1.33
Construction Contingency - Allowance	5%	60,425	37,337	97,762	13.39
Estimated Construction Cost		1,268,919	784,078	2,052,997	281.23

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

DETENTION BACK-UP

Tenant Improvements
Detention MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 7,300 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL Including SRCI	SUBTOTAL Space Related Cost Impact (SRCI)
B SHELL						
B10 Superstructure						
B1010 Floor Construction						
Elevator pit for single elevator	2	EA	\$3,773.35	\$0		\$7,547
Total B10 Superstructure					7,547	\$7,547
C INTERIORS						
C10 Interior Construction						
C1009 <u>Partitions and Doors</u>						
<u>Partitions:</u>						
6" Glazed masonry wall, concrete filled and reinforced, glazed one face only	5,830	SF	\$16.23	\$94,621		
8" Glazed masonry wall, concrete filled and reinforced, formed of two 4" skins, each glazed	6,770	SF	\$29.27	\$198,158		
8" CMU partition, grout filled and reinforced	6,942	SF	\$10.83	\$75,182		
6" CMU wall grouted solid, elevator and stair shaftwalls	8,823	SF	\$11.86	\$0		\$104,641
6" CMU wall grouted solid	2,922	SF	\$9.00	\$26,298		
6" Glazed masonry wall (elevator shaft lining)	4,744	SF	\$16.23	\$76,995		
<u>Base:</u>						
Integral base to 4" interior glazed masonry walls	1,174	LF	\$11.86	\$13,924		
Integral base to 6" interior glazed masonry walls	859	LF	\$12.40	\$10,652		
<u>Doors:</u>						
14GA hollow metal, 2" thick swinging door (detention type), with 5" x 20" glass view panel and 14GA metal frame, complete with all hardware excluding electronic lock (by GSA)	27	EA	\$2,695.25	\$72,772		
Swing out door, formed of 2" 10GA stainless steel tubular framing with 1/4" type 304 wire woven steel rod panel infill complete with 10GA tubular door frame and all hardware (detention type)	16	EA	\$2,156.20	\$34,499		
Solid slat, automatic overhead, insulated, coiling sally port door including hardware (blast/crash resistant) (detention type)	1	EA	\$10,727.10	\$10,727		
Solid core Hardwood veneer door 3' x 7' high with 5" x 20" glass view panel, complete with frame and hardware (detention interview-attorney side)	5	EA	\$2,964.78	\$14,824		

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

DETENTION BACK-UP

Tenant Improvements
Detention MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 7,300 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL Including SRCI	SUBTOTAL Space Related Cost Impact (SRCI)
<u>Grilles & Windows:</u>						
Interior cell grille formed of 1-3/4" 10GA stainless steel tubular frame filled in with 1/4" diameter #304 woven steel rod panel in 2" diamond pattern, 10' x 16' high overall, complete with single door	4	EA	\$8,452.30	\$33,809		
Interior interview grille formed of 13GA tubesteel frame filled in with #304 woven mesh, complete	180	SF	\$53.91	\$9,704		
Ballistic resistant level 4 laminated safety glass and polycarbonate panel in and including 14GA metal frame	16	SF	\$296.48	\$4,744		
C1030 <u>Specialties</u>						
Detention type grab bars, stainless	20	EA	\$101.45	\$2,029		
Detention type toilet partition	20	EA	\$901.67	\$18,033		
Detention type, framed mirror	20	EA	\$95.79	\$1,916		
Detention type collapsable coat hook	20	EA	\$28.19	\$564		
C1040 <u>Access/Platform Floors</u> <i>included in Shell & Core</i>						
Total C10 Interior Construction					804,090	\$104,641
C30 Interior Finishes						
C3010 <u>Wall Finishes</u>						
Glazed masonry units						
Base:						
Glazed masonry units						
C3020 <u>Floor Finishes</u>						
Rolled carpet with cushioned back	160	SF	\$3.07	\$491		
Terrazzo flooring (detention)	4,776	SF	\$16.17	\$77,228		
Sealed Concrete	704	SF	\$0.54	\$380		
C3030 <u>Ceiling Finishes</u>						
Perforated stainless steel ceiling, acoutical	4,936	SF	\$18.81	\$0		\$92,846
Paint exposed structural slab, ceiling	704	SF	\$1.08	\$0		\$760
Total C30 Interior Finishes					171,706	\$93,606

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

DETENTION BACK-UP

Tenant Improvements
Detention MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 7,300 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL Including SRCI	SUBTOTAL Space Related Cost Impact (SRCI)
D SERVICES						
D10 Conveying Systems						
D1010 <u>Elevators & Lifts</u>						
Geared traction detention elevator, 3 stops/110						
lf run/ 3 openings/ 350 fpm/ 3500#	2	EA	\$92,178	\$0		\$184,355
Premium for detention elevator cab	2	EA	\$56,600	\$0		\$113,201
Total D10 Conveying Systems					297,556	\$297,556
D20 Plumbing						
D2010 Plumbing, Premium for detention area only	7,300	SF	\$9.60	\$70,080		
Total D20 Plumbing					70,080	
D30 HVAC						
Cell block area is separate zone	7,300	SF	\$0.54	\$0		3,942
Negative pressure relative to surroundings	7,300	SF	\$0.27	\$0		1,971
Maximum security supply and return air grilles	7,300	SF	\$0.16	\$0		1,168
#9 Bars at 5' o.c. horizontal and vertical grilles in ductwork passing through partitions	7,300	SF	\$0.16	\$0		1,168
100% Exhaust air for all holding areas with exhaust system interlocked with supply system	7,300	SF	\$1.08	\$0		7,884
Switched 100% exhaust from shower	7,300	SF	\$0.54	\$0		3,942
100% Exhaust air with carbon monoxide detection system; maximum security detention grille cover	7,300	SF	\$4.31	\$0		31,463
Total D30 HVAC					51,538	\$51,538
D40 Fire Protection						
D4010 Detention type, vandal resistant sprinkler heads and covers on wet pipe system and relocation of 10% sprinkler heads; no sprinkler heads inside holding cell	7,300	SF	\$0.91	\$0		6,643
Total D40 Fire Protection					6,643	\$6,643
Note: See Construction Criteria For Tenant fitout detail descriptions.						

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

DETENTION BACK-UP

Tenant Improvements
Detention MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 7,300 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL Including SRCI	SUBTOTAL Space Related Cost Impact (SRCI)
D50 Electrical						
D5020 Premium for security lighting and additional lighting in processing area. Duplex and quadplex vandal-resistant outlets, mechanical and security equipment power wiring.	7,300	SF	\$1.20	\$8,760		
			\$0.00			
All lighting on emergency power	7,300	SF	\$0.00	\$0		-
Security light fixtures	7,300	SF	\$3.26	\$0		23,798
MH fixtures in Sallyport	7,300	SF	\$0.28	\$0		2,044
D5040 Fire alarm A/V devices and detection devices required above base bldg. Security raceway for USMS equipment. Telephone and LAN outlets and raceway	7,300	SF	\$1.87	\$13,651		
D5050 Communication and Security Systems included in D5040 above		incl				
Total D50 Electrical					48,253	\$25,842
E EQUIPMENT & FURNISHINGS						
E20 Furnishings						
E2010 <u>Fixed Furnishings & Casework</u>						
Base cabinet, PLAM	8	LF	\$281.76	\$2,254		
Bench, 13GA stainless steel detention type	176	LF	\$414.80	\$73,005		
Interview shelf, 24" deep 16GA stainless steel	23	LF	\$124.47	\$2,863		
Stainless steel prisoner stool, bolted to floor	6	EA	\$168.51	\$1,011		
Staff stool, bolted to floor	6	EA	\$168.51	\$1,011		
Processing table, bolted to floor	1	EA	\$394.48	\$394		
Total E20 Furnishings					80,538	
Estimated Final Tenant Improvement Cost					1,537,951	177,629

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

New Mid Rise Courthouse Building

Parking Included

COURTROOM TI

1 August 2003

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

COURTROOMS SUMMARY

Tenant Improvements
Court Rooms MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 24,000 USF

DESCRIPTION	Tenant Improvements			RATE \$/usf	Total Cost %
	Fitout \$	SRCI \$	TOTAL \$		
A10 Foundations			0	0.00	0.00%
A20 On Grade/Below Grade Construction			0	0.00	0.00%
B10 Superstructure			0	0.00	0.00%
B20 Exterior Enclosure			0	0.00	0.00%
B30 Roofing			0	0.00	0.00%
C10 Interior Construction	737,267	0	737,267	30.72	15.99%
C30 Interior Finishes	695,935	164,261	860,195	35.84	18.66%
D10 Conveying Systems	245,807	0	245,807	10.24	5.33%
D20 Plumbing			0	0.00	0.00%
D30 HVAC		210,000	210,000	8.75	4.55%
D40 Fire Protection	2,640	0	2,640	0.11	0.06%
D50 Electrical	184,320	65,520	249,840	10.41	5.42%
E10 Equipment			0	0.00	0.00%
E20 Furnishings	2,248,609	56,391	2,305,000	96.04	49.99%
F20 Selective Building Demolition			0	0.00	0.00%
G10 Building Sitework			0	0.00	0.00%
Estimated Direct Construction Cost	4,114,578	496,172	4,610,749	192.11	100.00%
Design Contingency - Allowance	10%	411,458	49,617	461,075	19.21
General Conditions and Profit - Allowance	15%	678,905	81,868	760,774	31.70
Estimated Construction Cost at Award	5,204,941	627,657	5,832,598	243.02	
Cost of Art-In-Architecture - Allowance	0.5%	26,025	3,138	29,163	1.22
Construction Contingency - Allowance	5%	261,548	31,540	293,088	12.21
Estimated Construction Cost	5,492,514	662,335	6,154,849	256.45	

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

COURTROOMS BACK-UP

Tenant Improvements
Court Rooms MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 24,000 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL Including SRCI	SUBTOTAL Space Related Cost Impact (SRCI)
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C INTERIORS**C10 Interior Construction****C1009 Partitions and Doors**Partitions:

Interior partition - CMU/GWB construction
with 2 layers gwb on metal studs on 4" cmu
wall, with 2 layers gwb on metal furring on

other side of cmu wall, sound insulated
Interior partition - 2 layers GWB on each side of
metal studs staggered at 16" o.c., insulated, fire

rated

Class-M-15 minute attack resistant partition

2,277 SF \$14.66 \$33,381

45,616 SF \$7.33 \$334,365

4,510 SF \$16.93 \$76,354

Doors:

Solid core Hardwood veneer double door 6' x 7'
high with matching wood transom above,
complete with frame and hardware (court
building use)

21 PR \$4,851.45 \$101,880

Solid core Hardwood veneer door 3' x 7' high,
complete with frame and hardware (court
building use)

33 EA \$2,695.25 \$88,943

Security class V, type 2, vault door, complete
with day gate frame and special hardware

11 EA \$8,624.80 \$94,873

C1030 Specialties

Raised brass letters fixed along side of door

231 EA \$32.34 \$7,471

C1040 Access/Platform Floors

Included with Shell & Core

Total C10 Interior Construction

737,267

C30 Interior Finishes**C3010 Wall Finishes**

Hardwood veneer paneling wainscot (court
building use)

9,551 SF \$28.19 \$269,243

Fabric faced wall covering

7,961 SF \$9.00 \$71,649

2" Thick acoustical insulated fabric covered
paneling

15,648 SF \$16.93 \$264,921

Vinyl wall covering

3,866 SF \$1.67 \$6,456

Paint walls

3,007 SF \$0.75 \$2,255

Base:

Vinyl cove base

301 LF \$1.78 \$536

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

COURTROOMS BACK-UP

Tenant Improvements
Court Rooms MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 24,000 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL Including SRCI	SUBTOTAL Space Related Cost Impact (SRCI)
C3020 <u>Floor Finishes</u>						
Carpet tile with cushioned back	23,463	SF	\$3.40	\$79,774		
Vinyl composition tile	537	SF	\$2.05	\$1,101		
Class M-15 minute attack resistant floor, complete (exhibit)	537	SF	\$11.27	0		\$6,052
C3030 <u>Ceiling Finishes</u>						
Raised GWB coffer with perimeter cove, premium over ACT ceiling	15,714	SF	\$9.81	0		\$154,154
Class M-15 minute attack resistant ceiling, complete (exhibit), premium over ACT ceiling	537	SF	\$7.55	0		\$4,054
Total C30 Interior Finishes					860,195	164,261
D SERVICES						
D10 Conveying Systems						
D1010 <u>Elevators & Lifts</u>						
Electro hydraulic operated people lift with brass handrails	12	EA	\$20,484	\$245,807		
Total D10 Conveying Systems					245,807	
D20 Plumbing						
D2010 <i>No Premium</i>						
D30 HVAC						
Premium: Separate AHU, separate zone well & public seating, public area gets ceiling diffusers, well gets linear plus floor level vents, provide 25% more cooling capacity, acoustical treatment, controls separate at the Judge's bench and the HR clerks desk	24,000	SF	\$6.95	\$0		166,800
BAS Auto temperature control, premium	24,000	SF	\$1.80	\$0		43,200
Total D30 HVAC					210,000	210,000
D40 Fire Protection						
D4010 Premium: Relocate 10% of sprinkler heads	24,000	SF	\$0.11	\$2,640		
Total D40 Fire Protection					2,640	

Note: See Construction Criteria For Tenant
fitout detail descriptions.

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE
COURTROOMS BACK-UP

Tenant Improvements
Court Rooms MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 24,000 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL Including SRCI	SUBTOTAL Space Related Cost Impact (SRCI)
D50 Electrical						
D5020 Premium for indirect uplighting and bench downlighting, Wall, furniture and floor mtd outlets and wiring, Dedicated AHU wiring and control, power wiring to A/V equipment	24,000	SF	\$2.35	\$56,400		
MH, cove lighting at well	24,000	SF	\$1.46	\$0		35,040
CF downlights at bench	24,000	SF	\$0.91	\$0		21,840
Dimming controls	24,000	SF	\$0.23	\$0		5,520
MH, cove lighting at grand jury	24,000	SF	\$0.06	\$0		1,440
CF downlights at grand jury	24,000	SF	\$0.05	\$0		1,200
Dimming controls at grand jury	24,000	SF	\$0.02	\$0		480
D5040 Courtroom A/V equipment and wiring, Fire alarm A/V devices, many telephone and LAN outlets, infrared-assisted listening system, Security system raceway for USMS equipment.	24,000	SF	\$5.33	\$127,920		
Emergency power in shell & core	24,000	SF		\$0		
D5050 Communication and Security Systems included in D5040 above		incl				
Total D50 Electrical					249,840	65,520
E EQUIPMENT & FURNISHINGS						
E20 Furnishings						
E2010 <u>Fixed Furnishings & Casework</u> Raised platform at Judges bench, Court officials station and Jury box, with steps and/or ramps	5,013	SF	\$10.57	0		\$52,987
Raised platform at US Attorney's bench, Court officials station and Jury box, with steps and/or ramps (grand jury)	302	SF	\$11.27	0		\$3,404
Spectator bench	1,374	LF	\$216.16	\$297,004		
Spectator rail	384	LF	\$673.81	\$258,743		
Deputy Clerk, Law Clerk, Court Reporter station	11	EA	\$28,570	\$314,266		
Court Reporter station	1	EA	\$14,554	\$14,554		
Bailiff Station	11	EA	\$8,625	\$94,873		
Judges bench	11	EA	\$43,124	\$474,364		
Jury Box (16 person)	4	EA	\$24,257	\$97,029		
Jury Box (12 person)	4	EA	\$23,718	\$94,873		
Jury Box (8 person)	2	EA	\$22,101	\$44,202		

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

COURTROOMS BACK-UP

Tenant Improvements
Court Rooms MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 24,000 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL Including SRCI	SUBTOTAL Space Related Cost Impact (SRCI)
Jury table, 18" wide wood table surface on painted steel frame support	48	LF	\$394	\$18,935		
Premium for pair of gates, 6' wide	11	EA	\$3,773	\$41,507		
Witness box	11	EA	\$11,859	\$130,450		
Witness box (grand jury)	1	EA	\$8,086	\$8,086		
Foreperson box (grand jury)	1	EA	\$8,086	\$8,086		
US Attorney's box (grand jury)	1	EA	\$32,882	\$32,882		
Electric height adjustable lectern with integral command center for lighting, presentation and sound equipment complete	11	EA	\$5,391	\$59,296		
E2020 <u>Movable Furnishings</u>						
Jury Seating	160	EA	\$1,056	\$168,899		
Attorney's Table	21	EA	\$4,312	\$90,560		
<i>Loose furniture, except Attorney's tables - supplied by client agencies</i>						
Total E20 Furnishings					2,305,000	56,391
Estimated Final Tenant Improvement Cost					4,610,749	496,172

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

New Mid Rise Courthouse Building

Parking Included

CHAMBERS TI

1 August 2003

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

CHAMBERS SUMMARY

Tenant Improvements
Chambers MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 27,600 USF

DESCRIPTION	Tenant Improvements			RATE \$/usf	Total Cost %
	Fitout \$	SRCI \$	TOTAL \$		
A10 Foundations			0	0.00	0.00%
A20 On Grade/Below Grade Construction			0	0.00	0.00%
B10 Superstructure		89,303	89,303	3.24	3.44%
B20 Exterior Enclosure			0	0.00	0.00%
B30 Roofing			0	0.00	0.00%
C10 Interior Construction	961,044	115,975	1,077,018	39.02	41.50%
C30 Interior Finishes	398,362	1,115	399,476	14.47	15.39%
D10 Conveying Systems		138,536	138,536	5.02	5.34%
D20 Plumbing	70,932		70,932	2.57	2.73%
D30 HVAC		59,616	59,616	2.16	2.30%
D40 Fire Protection	3,036		3,036	0.11	0.12%
D50 Electrical	173,604		173,604	6.29	6.69%
E10 Equipment			0	0.00	0.00%
E20 Furnishings	583,453		583,453	21.14	22.48%
F20 Selective Building Demolition			0	0.00	0.00%
G10 Building Sitework			0	0.00	0.00%
Estimated Direct Construction Cost	2,190,430	404,544	2,594,974	94.02	100.00%
Design Contingency - Allowance	10%	219,043	40,454	259,497	9.40
General Conditions and Profit - Allowance	15%	361,421	66,750	428,171	15.51
Estimated Construction Cost at Award		2,770,894	511,748	3,282,642	118.94
Cost of Art-In-Architecture - Allowance	0.5%	13,854	2,559	16,413	0.59
Construction Contingency - Allowance	5%	139,237	25,715	164,953	5.98
Estimated Construction Cost		2,923,986	540,022	3,464,008	125.51

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

CHAMBERS BACK-UP

Tenant Improvements
Chambers MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 27,600 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL Including SRCI	SUBTOTAL Space Related Cost Impact (SRCI)
B SHELL						
B10 Superstructure						
B1010 <u>Floor Construction</u> 6" CMU wall grouted solid	5,131	SF	\$9.00	\$0		\$46,179
B1030 <u>Stair Construction</u> Staircase formed of metal pan treads and landings filled with concrete fill	16	FLT	\$2,695.25	\$0		\$43,124
Total B10 Superstructure					89,303	\$89,303
C INTERIORS						
C10 Interior Construction						
C1009 <u>Partitions and Doors</u> <u>Partitions:</u> Interior partition - GWB on both sides and including metal studs at 16" o.c., insulated	30,477	SF	\$4.85	\$147,813		
Interior partition - 2 layers GWB on each side of metal studs staggered at 16" o.c., insulated, fire rated	36,541	SF	\$7.33	\$267,846		
Shaft/chase formed of 2 hr 50 STC rated Type X GWB shaft wall system, with 1 layer 1" shaftwall and one layer GWB, sound insulated.	9,122	SF	\$10.73	\$0		\$97,879
GWB on metal furring channels attached to wall (wall elsewhere)	4,198	SF	\$2.80	\$11,754		
<u>Doors:</u> Solid core Hardwood veneer door 3' x 7' high, complete with frame and hardware (court building use)	176	EA	\$2,695.25	\$474,364		
Bi-folding door, 6' x 7' in chambers, including hardware	13	EA	\$506.71	\$6,587		
Solid core Hardwood veneer single door, 3' x 7' high, fire rated, complete with frame and hardware	4	EA	\$1,239.82	\$4,959		
C1030 <u>Specialties</u> Horizontal 1" louver blinds, complete	5,390	SF	\$5.07	\$27,327		
Pipe Handrail, welded construction with painted finish	363	LF	\$43.12	\$0		\$15,653
Toilet paper holder	13	EA	\$26.95	\$350		
Paper towel dispenser combination waste receptacle	13	EA	\$371.94	\$4,835		
Soap dispenser	13	EA	\$59.30	\$771		
Mirror with brushed brass edging, 18" x 24"	13	EA	\$129.37	\$1,682		
Mirror, 8' x 3' in robing room	13	EA	\$539.05	\$7,008		

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

CHAMBERS BACK-UP

Tenant Improvements
Chambers MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 27,600 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL Including SRCI	SUBTOTAL Space Related Cost Impact (SRCI)
Stainless steel grab bar	26	EA	\$86.25	\$2,243		
Interior signage	13	EA	\$269.53	\$3,504		
C1040 <u>Access/Platform Floors</u>						
Composite concrete/steel raised slab pedestal in toilet	648	SF	\$3.77	\$0		\$2,443
Total C10 Interior Construction					1,077,018	\$115,975
C30 Interior Finishes						
C3010 <u>Wall Finishes</u>						
3/8" Textured Porcelain tile wainscot	3,265	SF	\$13.53	\$44,175		
Vinyl wall covering	83,720	SF	\$1.67	\$139,812		
Paint walls	22,002	SF	\$0.75	\$16,502		
<u>Base:</u>						
Hardwood base	9,660	LF	\$9.00	\$86,940		
Porcelain tile base	363	LF	\$11.27	\$4,091		
C3020 <u>Floor Finishes</u>						
Carpet tile with cushioned back	30,326	SF	\$3.07	\$93,101		
Vinyl composition tile	2,426	SF	\$2.05	\$4,973		
3/8" Textured Porcelain Tile	648	SF	\$13.53	\$8,767		
C3030 <u>Ceiling Finishes</u>						
GWB soffit over counters, premium over ACT	648	SF	\$1.72	\$0		\$1,115
Total C30 Interior Finishes					399,476	\$1,115
D SERVICES						
D10 Conveying Systems						
D1010 <u>Elevators & Lifts</u>						
Geared traction passenger elevator, 5 stops/ 110 lf run/ 5 openings/ 350 fpm/ 3500#	1	EA	\$104,576	\$0		\$104,576
Cab allowance for passenger elevator, high	1	EA	\$33,960	\$0		\$33,960
Total D10 Conveying Systems					138,536	\$138,536
D20 Plumbing						
D2010 Plumbing, Premium , Allowance Private toilet & coffe bar sink.	27,600	SF	\$2.57	\$70,932		
Total D20 Plumbing					70,932	

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

CHAMBERS BACK-UP

Tenant Improvements
Chambers MID RISE

Prepared: 1 August 2003
Date: October 2003
Area: 27,600 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL Including SRCI	SUBTOTAL Space Related Cost Impact (SRCI)
D30 HVAC						
HVAC, Premium, Allowance Includes additional exhaust, sound treatment, separate controls with BAS override.	27,600	SF	\$2.16	\$0		\$59,616
Total D30 HVAC					59,616	\$59,616
D40 Fire Protection						
D4010 Premium: Relocate 10% of sprinkler heads	27,600	SF	\$0.11	\$3,036		
Total D40 Fire Protection					3,036	
Note: See Construction Criteria For Tenant fitout detail descriptions.						
D50 Electrical						
D5020 Convenience and special receptacles and wiring, additional mechanical equipment wiring and controls, dimming control	27,600	SF	\$2.27	\$62,652		
D5040 Fire alarm devices, telephone and LAN raceway, MATV raceway, Security system raceway for tenant furnished equipment.	27,600	SF	\$4.02	\$110,952		
D5050 Communication and Security Systems included in D5040 above		incl				
Total D50 Electrical					173,604	
E EQUIPMENT & FURNISHINGS						
E20 Furnishings						
E2010 <u>Fixed Furnishings & Casework</u>						
Wall cabinet in robing room	13	EA	\$8,452	\$109,880		
Base cabinet	194	LF	\$453	\$87,843		
Vanity cabinet	52	LF	\$243	\$12,614		
Upper cabinet	194	LF	\$345	\$66,928		
Chambers library wall shelving	518	LF	\$566	\$293,188		
Hardwood veneer locker with brass hardware, complete	13	EA	\$1,000	\$13,000		
Total E20 Furnishings					583,453	
Estimated Final Tenant Improvement Cost					2,594,974	404,544

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

New Mid Rise Courthouse Building

Parking Included

PARKING

1 August 2003

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

Prepared: 1 August 2003

Tenant Improvements

Date: October 2003

Basement Parking

Area: 15,000 USF

DESCRIPTION		Tenant Improvements			RATE \$/usf	Total Cost %
		Fitout \$	SRCI \$	TOTAL \$		
A10	Foundations	0		0	0.00	0.00%
A20	On Grade/Below Grade Construction	283,704		283,704	18.91	34.72%
B10	Superstructure	259,350		259,350	17.29	31.74%
B20	Exterior Enclosure	4,300		4,300	0.29	0.53%
B30	Roofing	0		0	0.00	0.00%
C10	Interior Construction	27,933		27,933	1.86	3.42%
C30	Interior Finishes	27,708		27,708	1.85	3.39%
D10	Conveying Systems	11,400		11,400	0.76	1.40%
D20	Plumbing	57,600		57,600	3.84	7.05%
D30	HVAC	33,750		33,750	2.25	4.13%
D40	Fire Protection	27,000		27,000	1.80	3.30%
D50	Electrical	25,200		25,200	1.68	3.08%
E10	Equipment	59,200		59,200	3.95	7.24%
E20	Furnishings	0		0	0.00	0.00%
F20	Selective Building Demolition	0		0	0.00	0.00%
G10	Building Sitework	0		0	0.00	0.00%
Estimated Direct Construction Cost		817,145	-	817,145	54.48	100.00%
Design Contingency - Allowance	10%	81,715		81,715	5.45	
General Conditions and Profit - Allowance	15%	134,829		134,829	8.99	
Estimated Construction Cost at Award		1,033,689		1,033,689	68.91	
Cost of Art-In-Architecture - Allowance	0.5%	5,168		5,168	0.34	
Construction Contingency - Allowance	5%	51,943		51,943	3.46	
Estimated Construction Cost		1,090,800		1,090,800	72.72	

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

Tenant Improvements
Basement Parking

Prepared: 1 August 2003
Date: October 2003
Area: 15,000 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL
A SUBSTRUCTURE					
A20 On Grade/Below Grade Construction					
A2010 <u>Basement Excavation</u> Excavated subgrade level, incl backfill, haul	8,333	CY	\$16.93	\$141,078	
A2020 <u>Basement Walls</u> 12' deep 12" wide reinforced concrete basement wall including waterproofing, insulation, etc (footings elsewhere)	414	LF	\$284.00	\$117,576	
A2030 <u>Slab on Grade</u> 6" Thick, 4000 PSI slab on grade, premium over 4" thick, 3000 PSI slab on grade in base building	15,000	SF	\$1.67	\$25,050	
Total A20 On Grade/Below Grade Construction					283,704
B SHELL					
B10 Superstructure					
B1010 <u>Floor Construction</u> Cast in place structural slab building system, complete with columns, beams, etc	15,000	SF	\$16.93	\$253,950	
B1030 <u>Stair Construction</u> Staircase formed of metal pan treads and landings filled with concrete fill	2	FLT	\$2,700.00	\$5,400	
Total B10 Superstructure					259,350
B20 Exterior Enclosure					
B2020 <u>Exterior Windows and Doors</u> Concealed automatic overhead coiling loading dock door complete with frame and hardware including bottom lock, weather seals (slats to be powder finish flat metal)	1	EA	\$4,300.00	\$4,300	
Total B20 Exterior Closure					4,300

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

Tenant Improvements
Basement Parking

Prepared: 1 August 2003
Date: October 2003
Area: 15,000 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL
C INTERIORS					
C10 Interior Construction					
C1009 <u>Partitions and Doors</u>					
<u>Partitions:</u>					
6" CMU wall grouted solid	1,368	SF	\$9.00	\$12,312	
Plaster on metal lath outside face with GWB inside face on metal studs at 16" o.c.	201	SF	\$8.62	\$1,733	
<u>Doors:</u>					
Aluminum door and frame complete with low e, safety glass and glazing and intermediate rail complete with hardware	1	EA	\$3,800.00	\$3,800	
C1030 <u>Specialties</u>					
Pipe Handrail, welded construction with painted finish	63	LF	\$43.12	\$2,717	
Paint "no parking" handicapped parking zone on paving	101	SF	\$1.99	\$201	
Masonry reflective paint, parking lines, etc	654	LF	\$0.54	\$353	
Concrete filled protective bollard	2	EA	\$900.00	\$1,800	
Paint ADA designated parking on pavement, complete	2	EA	\$280.00	\$560	
Precast concrete wheel stop, 6' long complete	27	EA	\$70.08	\$1,892	
Reflective metal signs complete with post and foundation	2	EA	\$733.00	\$1,466	
Interior signage allowance	1	LS	\$1,100.00	\$1,100	
Total C10 Interior Construction					27,933
C30 Interior Finishes					
C3010 <u>Wall Finishes</u>					
Painted walls	8,262	SF	\$1.35	\$11,154	
<u>Base:</u>					
Vinyl cove base	22	LF	\$1.78	\$39	
C3020 <u>Floor Finishes</u>					
1" Thick Terazzo floor tile with mastic base, 12" x 12"	56	SF	\$27.00	\$1,512	
Broomed concrete finish	14,229	SF	\$0.22	\$3,130	

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

Tenant Improvements
Basement Parking

Prepared: 1 August 2003
Date: October 2003
Area: 15,000 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL
C3030 <u>Ceiling Finishes</u>					
Exposed structure above	14,173	SF	\$0.81	\$11,480	
Painted plaster, premium over ACT ceiling	56	SF	\$7.01	\$393	
Total C30 Interior Finishes					27,708
D SERVICES					
D10 Conveying Systems					
D1010 <u>Elevators & Lifts</u>					
Additional stop for service elevator	1	EA	\$5,500.00	\$5,500	
Additional stop for passenger elevator	1	EA	\$5,900.00	\$5,900	
Total D10 Conveying Systems					11,400
D20 Plumbing					
D2010 Plumbing Storm Drain System	15,000	SF	\$3.61	\$54,150	
Water Pipe to hose bibbs	15,000	SF	\$0.23	\$3,450	
Total D20 Plumbing					57,600
D30 HVAC					
HVAC Basis: Ventilation, controls, unconditioned fans, Allow	15,000	SF	\$2.25	\$33,750	
Total D30 HVAC					33,750
D40 Fire Protection					
D4010 Fire Protection Sprinkler Systems	15,000	SF	\$1.80	\$27,000	
Total D40 Fire Protection					27,000

Note: See Construction Criteria For Tenant fitout detail descriptions.

MID RISE FEDERAL COURTHOUSE REFERENCE ESTIMATE

Tenant Improvements
Basement Parking

Prepared: 1 August 2003

Date: October 2003

Area: 15,000 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL
D50 Electrical					
D5020 Metal halide fixtures at 20' on centers, lobby and convenience receptacles, exhaust fan wiring	15,000	GSF	\$1.15	\$17,250	
D5040 Fire alarm A/V and detection devices, security office telecom raceway, emergency telephone outlets	15,000	GSF	\$0.53	\$7,950	
D5050 Communication and Security Systems included in D5040 above		incl			
Total D50 Electrical					25,200
E EQUIPMENT & FURNISHINGS					
E10 Equipment					
E1009 <u>Commercial / Institutional Equipment</u>					
Control booth at parking entry/exit complete booth and raised island as base	1	EA	\$16,100.00	\$16,100	
Hydraulic barrier as per "Nasatka Barrier Inc" at entrance and exit to garage	1	EA	\$43,100.00	\$43,100	
<i>GSA to provide parking security equipment as part of security special requirements</i>					
Total E10 Equipment					59,200
Estimated Final Cost					817,145

Appendix L:

**Reference Cost Estimate – Office Building
Minimal Façade Renovation**

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**
Parking Included

GRAND SUMMARY
1 August 2003

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

GRAND SUMMARY

Assumes Shell & Core Modernization, all-new TI and limited Garage Renovation
"Great Society" Mid Rise Office Building

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area incl Parking: 306,600 GSF

DESCRIPTION	Shell & Core		Tenant Improvements (TI)			TOTAL Shell & Core + TI	TOTAL RATE \$/gsf	Total Cost %
	Market Equivalent \$	No Market Comparable \$	TOTAL \$	Fitout \$	SRCI \$			
A10 Foundations	0	0	0	0	0	0	0.00	0.00%
A20 On Grade/Below Grade Construction	0	0	0	0	0	0	0.00	0.00%
B10 Superstructure	214,812	-	214,812	0	0	214,812	0.70	0.78%
B20 Exterior Enclosure	4,398,249		4,398,249	12,937		4,411,186	14.39	16.00%
B30 Roofing	17,250		17,250	0		17,250	0.06	0.06%
C10 Interior Construction	703,521	-	703,521	1,530,403		2,233,924	7.29	8.10%
C30 Interior Finishes	1,253,271		1,253,271	991,668		2,244,939	7.32	8.14%
D10 Conveying Systems	141,231		141,231	0		141,231	0.46	0.51%
D20 Plumbing	652,392	31,824	684,216	187,307		871,523	2.84	3.16%
D30 HVAC	2,824,380	1,063,452	3,887,832	242,734		4,130,566	13.47	14.98%
D40 Fire Protection	556,920		556,920	94,854		651,774	2.13	2.36%
D50 Electrical	3,174,444		3,174,444	1,377,765		4,552,209	14.85	16.51%
E10 Equipment	0	0	0	161,499		161,499	0.53	0.59%
E20 Furnishings	25,919		25,919	20,580		46,499	0.15	0.17%
F10 Special Construction	0	0	0	0		0	0.00	0.00%
F20 Selective Building Demolition	6,612,862		6,612,862	1,281,069		7,893,930	25.75	28.63%
G10 Building Sitework	0	0	0	0		0	0.00	0.00%
G50 Other Site Construction	0	0	0	0		0	0.00	0.00%
Estimated Direct Construction Cost	20,575,251	1,095,276	21,670,527	5,900,815	0	27,571,342	89.93	100.00%
Design Contingency - Allowance	10%	2,057,525	109,528	2,167,053	590,082	0	590,082	8.99
Phasing Premium	5%	1,131,639	60,240	1,191,879	324,545	0	324,545	4.95
General Conditions and Profit - Allowance	15%	3,564,662	189,757	3,754,419	1,022,316	0	1,022,316	15.58
Estimated Construction Cost at Award	27,329,077	1,454,800	28,783,877	7,837,758	0	36,621,635	119.44	
Cost of Art-In-Architecture - Allowance	0.5%	136,645	7,274	143,919	39,189	0	39,189	0.60
Construction Contingency - Allowance	7%	1,922,601	102,345	2,024,946	551,386	0	551,386	8.40
Estimated Construction Cost	29,388,323	1,564,420	30,952,742	8,428,333	0	39,381,075	128.44	
Unit Cost	95.85	5.10	100.95	27.49	0.00	128.44		

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**
Parking Included

AREA SUMMARY
1 August 2003

AREA SUMMARY SHEET
"Great Society" Mid Rise Office Building

Prepared: 1 August 2003

BUILDING AREA

FLOOR		1 USF Office	2 USF Parking	USF SUBTOTAL TENANT SPACE		3 USF Public Space	4 USF Common Space	5 USF Wall Thickness	USF SUBTOTAL NON-TENANT SPACE		GSF TOTAL NON - PARKING AREAS	GSF Inside Parking	TOTAL BUILDING GROSS AREA
PARKING			26,840	26,840		0	0	740	740		740	26,840	27,580
BASEMENT			13,867	13,867		0	12,233	740	12,973		12,973	13,867	26,840
1ST FLOOR		19,316		19,316		4,054	3,600	840	8,494		27,810		27,810
2ND FLOOR		22,120		22,120		1,600	2,880	740	5,220		27,340		27,340
3RD FLOOR		22,120		22,120		1,600	2,880	740	5,220		27,340		27,340
4TH FLOOR		22,120		22,120		1,600	2,880	740	5,220		27,340		27,340
5th FLOOR		22,120		22,120		1,600	2,880	740	5,220		27,340		27,340
6th FLOOR		22,120		22,120		1,600	2,880	740	5,220		27,340		27,340
7th FLOOR		22,120		22,120		1,600	2,880	740	5,220		27,340		27,340
8th FLOOR		22,120		22,120		1,600	2,880	740	5,220		27,340		27,340
9th FLOOR		22,120		22,120		1,600	2,880	740	5,220		27,340		27,340
PENTHOUSE		0		0		0	5,387	284	5,671		5,671		5,671
	0- 0	196,276- 196,300	40,707- 40,700	236,983- 237,000		16,854- 16,900	44,260- 44,300	8,524- 8,500	69,638- 69,600		265,914- 265,900	40,707- 40,700	306,621- 306,600

Core Ratio
Parking Spaces
Parking Ratio

23%
102
399

AG Skin Ratio
Public Elevator Ratio
Efficiency w/o Parking

49%
76,650
74%

GROSS 1-P
PARKING (BELOW GRADE)
ABOVE GRADE

306,621
40,707
265,914

13% of total area
87% of total area

STRUCTURAL AREA

FLOOR	S.O.G.	CONCRETE SUP. SLAB	OFFICE / CR SUP. SLAB	ROOFING	BALCONY	SOFFITS	SITE	HORIZ. WATERP	TOTAL STRUCT.
PARKING	27,580								27,580
BASEMENT	26,840								26,840
1ST FLOOR	230		27,580						27,810
2ND FLOOR			27,340	470					27,810
3RD FLOOR			27,340						27,340
4TH FLOOR			27,340						27,340
5th FLOOR			27,340						27,340
6th FLOOR			27,340						27,340
7th FLOOR			27,340						27,340
8th FLOOR			27,340						27,340
9th FLOOR			27,340						27,340
PENTHOUSE			5,671						5,671
PH ROOF			5,671						5,671
ROOF			21,669						21,669
	54,650- 54,700	0- 0	251,971- 252,000	27,810- 27,800	0- 0	0- 0	0- 0	0- 0	334,431- 334,400

SKIN AREA

		HT	EXTERIOR PERIM	EXTERIOR TOTAL	1.25 X EXTERIOR TOTAL
PARKING		10.00	740	7,400	9,250
BASEMENT		16.00	740	11,840	14,800
1ST FLOOR		18.00	840	15,120	18,900
2ND FLOOR		14.00	740	10,360	12,950
3RD FLOOR		14.00	740	10,360	12,950
4TH FLOOR		14.00	740	10,360	12,950
5th FLOOR		14.00	740	10,360	12,950
6th FLOOR		14.00	740	10,360	12,950
7th FLOOR		14.00	740	10,360	12,950
8th FLOOR		14.00	740	10,360	12,950
9th FLOOR		14.00	740	10,360	12,950
PENTHOUSE		20.00	284	5,680	7,100
PARAPET		2.00	740	1,480	1,850
					0
SUBTOTAL FOUNDATION				124,400	155,500
TOTAL FINISHED SKIN				117,000	131,450

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**
Parking Included

MID RISE OFFICE MODERNIZATION SHELL & CORE

1 August 2003

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

SHELL & CORE SUMMARY

Shell & Core
"Great Society" Mid Rise Office Building

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area excl Parking: 265,200 GSF

DESCRIPTION	Shell & Core			TOTAL RATE \$/gsf	Total Cost %
	Market Equivalent \$	No Market Comparable \$	TOTAL \$		
A10 Foundations	0		0	0.00	0.00%
A20 On Grade/Below Grade Construction	0		0	0.00	0.00%
B10 Superstructure	214,812	-	214,812	0.81	1.04%
B20 Exterior Enclosure	4,398,249		4,398,249	16.58	21.38%
B30 Roofing	17,250		17,250	0.07	0.08%
C10 Interior Construction	703,521	-	703,521	2.65	3.42%
C30 Interior Finishes	1,253,271		1,253,271	4.73	6.09%
D10 Conveying Systems	141,231		141,231	0.53	0.69%
D20 Plumbing	652,392	31,824	684,216	2.58	3.17%
D30 HVAC	2,824,380	1,063,452	3,887,832	14.66	13.73%
D40 Fire Protection	556,920		556,920	2.10	2.71%
D50 Electrical	3,174,444		3,174,444	11.97	15.43%
E10 Equipment	0		0	0.00	0.00%
E20 Furnishings	25,919		25,919	0.10	0.13%
F10 Special Construction	0		0	0.00	0.00%
F20 Selective Building Demolition	6,612,862		6,612,862	24.94	32.14%
G10 Building Sitework	0		0	0.00	0.00%
G50 Other Site Construction	0		0	0.00	0.00%
Estimated Direct Construction Cost	20,575,251	1,095,276	21,670,527	81.71	100.00%
Design Contingency - Allowance 10%	2,057,525	109,528	2,167,053	8.17	
Phasing Premium 5%	1,131,639	60,240	1,191,879	4.49	
General Conditions and Profit - Allowance 15%	3,564,662	189,757	3,754,419	14.16	
Estimated Construction Cost at Award	27,329,077	1,454,800	28,783,877	108.54	
Cost of Art-In-Architecture - Allowance 0.5%	136,645	7,274	143,919	0.54	
Construction Contingency - Allowance 7%	1,922,601	102,345	2,024,946	7.64	
Estimated Construction Cost	29,388,323	1,564,420	30,952,742	116.71	
Unit Cost	110.82	5.90	116.71		

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

SHELL & CORE BACK-UP

Shell & Core
"Great Society" Mid Rise Office Building

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 265,200 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
A SUBSTRUCTURE						
A10 Foundations						
A1010 <u>Standard Foundations</u>						No work required
A1020 <u>Special Foundations</u>						No work required
Total A10 Foundations						-
A20 On Grade/Below Grade Construction						
A2010 <u>Basement Excavation</u>						No work required
A2020 <u>Basement Walls</u>						No work required
A2030 <u>Slab on Grade</u>						No work required
Total A20 On Grade/Below Grade Construction						-
B SHELL						
B10 Superstructure						
B1010 <u>Floor Construction</u>						
Structural retrofit to achieve resistance to progressive collapse						Excluded
Patch & repair sprayed on fire protection on steel columns and beams supporting occupied	265,200	SF	\$0.81	\$214,812		

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

SHELL & CORE BACK-UP

Shell & Core
"Great Society" Mid Rise Office Building

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 265,200 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
B1020 <u>Roof Construction</u>						No work required
B1030 <u>Stair Construction</u>						No work required
Total B10 Superstructure						214,812
B20 Exterior Enclosure						
B2010 <u>Exterior Walls</u>						
Clean and caulk stone	57,950	SF	\$8.09	\$468,816		
Waterproofing membrane on skin	57,950	SF	\$1.78	\$103,151		
Interior partition - one layer GWB on one side only & furring w/2" insulation	73,500	SF	\$3.56	\$261,660		
Allowance for Architectural metals, etc	131,450	SF	\$1.13	\$148,539		
Replace insulated metal panel penthouse enclosure	7,100	SF	\$13.15	\$93,365		
B2020 <u>Exterior Windows and Doors</u>						
Aluminum curtain wall system with 3 coat "Kynar" aluminum framing, double glazing, low E	36,750	SF	\$50.72	\$1,863,960		
Aluminum framed punched window system, insulated, double glazed, low E	36,750	SF	\$38.33	\$1,408,628		
Automatic glazed double entrance doors, 7' x 7.6" high including low e glass, aluminum frame and hardware	3	PR	\$16,710.55	\$50,132		
Total B20 Exterior Closure						4,398,249
B30 Roofing						
B3010 <u>Roof Coverings and Insulation</u>						
18 Gauge steel canopy with cantilever cable support struts, complete with factory paint finish and structure	500	SF	\$34.50	\$17,250		
B3020 <u>Roof Openings</u>						
Total B30 Roofing						17,250
C INTERIORS						
C10 Interior Construction						
C1009 <u>Partitions and Doors</u>						
<u>Partitions:</u>						
Patch & repair existing GWB walls	128,950	SF	\$2.80	\$361,060		
<u>Doors:</u>						
Solid core Hardwood veneer single door, 3' x 7' high, complete with hollow metal door frame and hardware	18	EA	\$1,013.41	\$18,241		
Solid core Hardwood veneer double door, 6' x 7' high, complete with hollow metal door frame and hardware	9	PR	\$1,353.02	\$12,177		

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

SHELL & CORE BACK-UP

Shell & Core
"Great Society" Mid Rise Office Building

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 265,200 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
Solid core Hardwood veneer double door, 6' x 7' high, complete with hollow metal door frame, electric lock, overhead closer etc (card reader and remote door release control system by tenant)	3	PR	\$2,253.23	\$6,760		
Hollow metal double door, 6' x 7' high, complete with frame and hardware	9	PR	\$1,347.63	\$12,129		
Solid core Hardwood veneer single door, 3' x 7' high, rated, complete with frame and hardware	65	EA	\$1,239.82	\$80,588		
Coiling overhead wood slat door, 6' wide x 4' high complete with frame and hardware	1	EA	\$1,347.63	\$1,348		
Hollow metal double door, 6' x 7' high, complete with frame and hardware	3	PR	\$1,347.63	\$4,043		
1" ABS Plastic Clad wood core double service door, 5' x 7' high, complete with frame and hardware	2	PR	\$1,509.34	\$3,019		
Solid core Hardwood veneer single door, 3' x 7' high, rated, complete with frame and hardware	2	EA	\$1,239.82	\$2,480		

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

SHELL & CORE BACK-UP

Shell & Core
"Great Society" Mid Rise Office Building

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 265,200 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
C1030 Specialties						
Pipe Handrail, welded construction with painted finish	472	LF	\$43.12	\$20,353		
Stainless steel toilet partition, ceiling hung	72	EA	\$1,126.61	\$81,116		
Premium for toilet partition, ADA (including for grab bars)	18	EA	\$328.82	\$5,919		
Urinal screen	18	EA	\$754.67	\$13,584		
Toilet paper holder	72	EA	\$26.95	\$1,940		
Feminine napkin disposal	45	EA	\$167.11	\$7,520		
Feminine napkin dispenser	9	EA	\$463.58	\$4,172		
Paper towel dispenser combination waste receptacle	18	EA	\$371.94	\$6,695		
Soap dispenser	72	EA	\$59.30	\$4,270		
Mirror with stainless steel edging, 18" x 24"	72	EA	\$107.81	\$7,762		
Baby changing table - fold down type	18	EA	\$280.31	\$5,046		
Toilet seat cover dispenser, stainless steel, recessed	36	EA	\$129.37	\$4,657		
Touch screen computer monitor programmed directory with stone veneer pedestal case	1	EA	\$8,624.80	\$8,625		
Cast plaster great seal, 24" diameter	1	EA	\$916.39	\$916		
Cantilever aluminum flag pole, mounted complete	1	EA	\$1,617.15	\$1,617		
Bronze 4sf, dedication plaque, with raised letters	1	EA	\$3,234.30	\$3,234		
Allowance for interior signage	1	LS	\$5,390.50	\$5,391		
Fire extinguisher cabinet, 8" x 12" x 27", aluminum door and frame, wall mounted				Excluded		
Steel dividers with stainless steel shelf and perforated interior face with acoustical material as telephone dividers	5	EA	\$1,078.10	\$5,391		
Drained Entrance Grid with structural aluminum rails, drain pan and carpet tread inserts of monofilament solution died nylon fusion bonded to backing	30	SF	\$73.26	\$2,198		
Miscellaneous specialties	1	LS	\$11,271.54	\$11,272		
C1040 Access/Platform Floors						
					Excluded	
Total C10 Interior Construction						703,521

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

SHELL & CORE BACK-UP

Shell & Core
"Great Society" Mid Rise Office Building

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 265,200 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
C30 Interior Finishes						
C3010 Wall Finishes	-					
Stone veneer paneling	1,250	SF	\$50.72	\$63,400		
Vinyl wall covering	38,686	SF	\$1.67	\$64,606		
3/8" Textured Porcelain tile wainscot	5,508	SF	\$13.53	\$74,523		
Paint walls	40,554	SF	\$0.75	\$30,416		
Paint walls	16,576	SF	\$0.75	\$12,432		
Hardwood trim on walls	384	LF	\$16.93	\$6,501		
Base:						
Porcelain tile base	1,224	LF	\$11.27	\$13,794		
1-1/4" Limestone base	250	LF	\$39.46	\$9,865		
Vinyl cove base	3,894	LF	\$1.78	\$6,931		
Vinyl cove base	488	LF	\$1.78	\$869		
Hardwood base	3,200	LF	\$9.00	\$28,800		
C3020 Floor Finishes						
3/4" Thick Terrazzo floor tile with mastic base, 12" x 12" with pattern	4,230	SF	\$21.56	\$91,199		
3/8" Textured Porcelain Tile	5,400	SF	\$13.53	\$73,062		
Broadloom Carpet , 32 Oz	12,624	SF	\$3.94	\$49,739		
Carpet tile with cushioned back	480	SF	\$3.40	\$1,632		
Vinyl composition tile	5,100	SF	\$2.05	\$10,455		
Vinyl composition tile	900	SF	\$2.05	\$1,845		
Anti-static plastic laminate floor finish	2,700	SF	\$4.85	\$13,095		
Sealed Concrete	4,320	SF	\$0.54	\$2,333		
Sealed Concrete	10,393	SF	\$0.54	\$5,612		
C3030 Ceiling Finishes						
Suspended 24" x 24" ACT	214,146	SF	\$3.18	\$680,984		
Suspended 24" x 24" ACT	11,293	SF	\$3.18	\$35,912		
GWB painted ceiling, premium over ACT ceiling	3,754	SF	\$1.94	\$7,283		
Painted plaster, premium over ACT ceiling	800	SF	\$7.01	\$5,608		
Exposed structure, painted, negative premium over ACT ceiling	7,560	SF	(\$2.05)	-\$15,498		
Exposed structure, painted, negative premium over ACT ceiling	10,793	SF	(\$2.05)	-\$22,126		
Total C30 Interior Finishes						1,253,271

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

SHELL & CORE BACK-UP

Shell & Core
"Great Society" Mid Rise Office Building

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 265,200 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
D SERVICES						
D10 Conveying Systems						
D1010 Elevators & Lifts						
Cab allowance for passenger elevator, medium	4	EA	\$33,960.15	\$135,841		
Cab allowance for service elevator	1	EA	\$5,390.50	\$5,391		
Total D10 Conveying Systems						141,231
D20 Plumbing						
D2010 Plumbing, Assumed 230 fixtures	265,200	SF	\$2.26	\$599,352	(599,352)	
Wet Stack Allowance	265,200	SF	\$0.20	\$53,040		
Plumbing, Assumed 230 fixtures. Only one domestic water service connection. Gas only to resturant only. Electric water heaters at core restrooms in lieu of central hot water system.	265,200	SF	\$2.38		631,176	
Savings to retain soil stacks in place	1	LS		(\$0)		
Premium for performing all work as modernization						
Total D20 Plumbing						652,392
D30 HVAC						
HVAC, Basis: Central Cooling Plant: 2 each 330 ton Chillers & 1 each 135 ton chiller, sized for 50%, 50% & 20% of the cooling load. Heating Plant: 2 each 115 HP boilers. Ceiling plenum air distribution & return air plenum. A 2 pipe reverse return system to distribute HVAC water. Perimeter heating will be above floor fin-tube radiation. Fan powered air supply terminal units will provide increased air flow to perimeter zones in response to cooling loads.	265,200	SF	\$10.51		2,787,252	
<i>Note: Fuel oil tank, included with site work</i>						
BAS Automatic Temperature Controls	265,200	SF	\$2.53		670,956	

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

SHELL & CORE BACK-UP

Shell & Core
"Great Society" Mid Rise Office Building

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 265,200 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
HVAC, Basis: Central cooling plant with 2 each 398 ton chillers. Heating: Electric only. Only chilled water pipe & pumping system. Perimeter fan-powered boxes with electric heat. All air distributed above ceiling via ducted system. Return air ceiling plenum. Adjustable slot diffusers on perimeter and perforated diffuser on interior. Plate and frame heat exchanger for free cooling application, cooling towers shall be forced draft type steel frame, fire proof fill.	265,200	SF	\$8.25	2,187,900	(2,187,900)	
BAS Automatic temperature controls	265,200	SF	\$2.40	636,480	(636,480)	
Dedicated Ventilation System, 4000 cfm AHU per floor with air distribution system, controls and electric power wiring	265,200	SF	\$1.62		429,624	
Total D30 HVAC						2,824,380
D40 Fire Protection						
D4010 Fire Protection Sprinkler Systems, including fire pump	265,200	SF	\$2.10	\$556,920		
Total D40 Fire Protection						556,920
D50 Electrical						
D5010 Complete power riser system w/closet panels and transformers, k-13 xfmr's for office technology loads.	265,200	SF	\$3.02	\$800,904		
D5020 Modular wiring to parabolic fixture every 80 sf. Perimeter convenience outlets, mechanical wiring, Core and lobby power and lighting fitout, utility space power and lighting fitout	265,200	SF	\$5.93	\$1,572,636		
D5040 Complete Fire alarm except for tenant A/V devices. Telecom riser raceway. Emergency generator with storage tank, grounding and lightning protection, perimeter security	265,200	SF	\$3.02	\$800,904		
D5050 Communication and Security Systems, included in D5040 above		incl				
Total D50 Electrical						3,174,444

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

SHELL & CORE BACK-UP

Shell & Core
"Great Society" Mid Rise Office Building

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 265,200 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
E EQUIPMENT & FURNISHINGS						
E10 Equipment						
E1009 <u>Commercial / Institutional Equipment</u>						Not Applicable
Total E10 Equipment						-
E20 Furnishings						
E2010 <u>Fixed Furnishings & Casework</u>						
Plastic laminate counter, 24" wide	180	LF	\$78.92	\$14,206		
Entrance reception counter in main lobby	1	EA	\$9,018.31	\$9,018		
Allow for mail room furnishings	500	SF	\$5.39	\$2,695		
Total E20 Furnishings						25,919
F SPECIAL CONSTR & DEMOLITION						
F20 Building Demolition						
F2010 <u>Building Elements Demolition</u>						
TV slab and punch openings for data/telecom	265,200	GSF	\$0.27	\$71,604		
Remove drywall at interior of perimeter wall	72,402	SF	\$1.35	\$97,743		
Remove existing curtainwall	36,750	SF	\$6.47	\$237,773		
Remove existing punched windows	36,750	SF	\$5.39	\$198,083		
Gut existing (drywall) ceiling finishes from all core & shell areas	248,346	SF	\$0.86	\$213,578		
Gut existing floor finishes from all core & shell areas (no asbestos)	46,147	SF	\$0.92	\$42,455		
Gut existing wall finishes from all core & shell areas	102,574	SF	\$0.11	\$11,283		
Gut existing elevator cab finishes	5	EA	\$808.58	\$4,043		
Demolish existing domestic cold water system, existing domestic hot water system, all sanitary piping downstream of the main riser, existing drinking fountains	265,200	SF	\$0.27	\$71,604		
Demolish existing 4-pipe heating & air conditioning system in its entirety	265,200	SF	\$1.08	\$286,416		
Demolish existing vertically zoned, constant volume system including (8) air handlers and associated ductwork	265,200	SF	\$0.54	\$143,208		
Demolish existing pneumatic control system.	265,200	SF	\$0.27	\$71,604		
Demolish existing fire protection sprinkler systems, including fire pump	265,200	SF	\$0.16	\$42,432		
Demolish complete power riser system w/closet panels and transformers.	265,200	SF	\$0.43	\$114,036		
Demolish wiring to parabolic fixture every 80 sf, perimeter convenience outlets, mechanical wiring, core and lobby power and lighting fitout, utility space power and lighting fitout	265,200	SF	\$0.43	\$114,036		

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

SHELL & CORE BACK-UP

Shell & Core
"Great Society" Mid Rise Office Building

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 265,200 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
Demolish existing Fire alarm complete, telecom riser raceway, emergency generator with storage tank, grounding and lightning protection & perimeter security	265,200	SF	\$0.38	\$100,776		
Asbestos abatement allowance	265,200	SF	\$16.17	\$4,288,284		
Temporary MEP	1	ALLOW	\$450,000.00	\$450,000		
Temporary Protection	1	LS	\$53,905.00	\$53,905		
Total F20 Selective Demolition						6,612,862
F SPECIAL CONSTRUCTION						
G10 Building Sitework						
Total G10 Building Sitework						-
Estimated Final Shell/Core Cost					1,095,276	20,575,251

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**
Parking Included

100% CLOSED OFFICE
1 August 2003

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

100% CLOSED OFFICE SUMMARY

**Tenant Improvements
100% Closed Office**

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 98,160 USF

DESCRIPTION	Tenant Improvements			RATE \$/usf	Total Cost %
	Fitout \$	SRCI \$	TOTAL \$		
A10 Foundations			0	0.00	0.00%
A20 On Grade/Below Grade Construction			0	0.00	0.00%
B10 Superstructure			0	0.00	0.00%
B20 Exterior Enclosure			0	0.00	0.00%
B30 Roofing			0	0.00	0.00%
C10 Interior Construction			1,178,270	12.00	37.76%
C30 Interior Finishes			546,339	5.57	17.51%
D10 Conveying Systems			0	0.00	0.00%
D20 Plumbing			20,190	0.21	0.65%
D30 HVAC			75,583	0.77	2.42%
D40 Fire Protection			10,798	0.11	0.35%
D50 Electrical			665,525	6.78	21.33%
E10 Equipment			0	0.00	0.00%
E20 Furnishings			10,290	0.10	0.33%
F10 Special Construction			0	0.00	0.00%
F20 Selective Building Demolition			613,500	6.25	19.66%
G10 Building Sitework			0	0.00	0.00%
G50 Other Site Construction			0	0.00	0.00%
Estimated Direct Construction Cost			3,120,495	31.79	100.00%
Design Contingency - Allowance	10%		312,049	3.18	
Phasing Premium	5%		171,627	1.75	
General Conditions and Profit - Allowance	15%		540,626	5.51	
Estimated Construction Cost at Award			4,144,797	42.22	
Cost of Art-In-Architecture - Allowance	0.5%		20,724	0.21	
Construction Contingency - Allowance	7%		291,586	2.97	
Estimated Construction Cost			4,457,108	45.41	

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

100% CLOSED OFFICE BACK-UP

**Tenant Improvements
Closed Office**

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 98,160 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL
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C INTERIORS

C10 Interior Construction

C1009 Partitions and Doors

Partitions:

Interior partition - GWB on both sides and including metal studs at 16" o.c., insulated, fire rated

113,210 SF \$4.85 \$549,069

One layer GWB on interior partition, GWB only (taped and jointed)

19,586 SF \$1.24 \$24,287

Doors:

Solid core Hardwood veneer single door, 3' x 7' high, complete with hollow metal door frame and hardware

477 EA \$1,013.41 \$483,397

Solid core Hardwood veneer double door, 6' x 7' high, complete with hollow metal door frame and hardware

5 PR \$1,353.02 \$6,765

Solid core Hardwood veneer single door, 3' x 7' high, rated, complete with frame and hardware

24 EA \$1,239.82 \$29,756

Solid core Hardwood veneer double door, 6' x 7' high, rated, complete with frame and hardware

5 PR \$1,940.58 \$9,703

C1030 Specialties

Allowance for interior tenant signage, per floor

5 LS \$5,390.50 \$26,953

Horizontal 1" louver blinds, complete

9,535 SF \$5.07 \$48,342

C1040 Access/Platform Floors

Included in Shell & Core

Total C10 Interior Construction

1,178,270

C30 Interior Finishes

C3010 Wall Finishes

Vinyl wall covering

4,982 SF \$1.67 \$8,320

Paint walls

252,129 SF \$0.75 \$189,097

Base:

Vinyl cove base

29,427 LF \$1.78 \$52,380

Hardwood base

554 LF \$9.00 \$4,986

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

100% CLOSED OFFICE BACK-UP

**Tenant Improvements
Closed Office**

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 98,160 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL
C3020 <u>Floor Finishes</u>					
Vinyl composition tile	12,138	SF	\$2.05	\$24,883	
Carpet tile with cushioned back	86,463	SF	\$3.07	\$265,441	
C3030 <u>Ceiling Finishes</u>					
<i>ACT ceiling in Shell & Core</i>					
GWB soffit over counters, premium over ACT	716	SF	\$1.72	\$1,232	
Total C30 Interior Finishes					546,339
D SERVICES					
D20 Plumbing					
D2010 Plumbing Premium: Stainless steel sink	10	EA	\$1,352.52	\$13,525	
Wet Stack Allowance	10	EA	\$450.84	\$4,508	
Connect hot water to central system	5	EA	\$431.24	\$2,156	
Total D20 Plumbing					20,190
D30 HVAC					
Additional exhaust & Outside air, controls	98,160	SF	\$0.77	\$75,583	
Total D30 HVAC					75,583
D40 Fire Protection					
D4010 Premium: Relocate 10% of sprinkler heads	98,160	SF	\$0.11	\$10,798	
Total D40 Fire Protection					10,798

**Note: See Construction Criteria For Tenant
fitout detail descriptions.**

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

100% CLOSED OFFICE BACK-UP

**Tenant Improvements
Closed Office**

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 98,160 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL
D50 Electrical					
D5010 Panel and feeder	98,160	SF	\$0.16	\$15,706	
D5020 Underfloor power distribution w/zone boxes, flush floor outlets, special floor outlets for equipment.	98,160	SF	\$3.78	\$371,045	
D5040 Fire alarm A/V devices, telecom raceway to flush floor outlets, PA system, raceway	98,160	SF	\$2.84	\$278,774	
D5050 Communication and Security Systems		incl			
Total D50 Electrical					665,525
E EQUIPMENT & FURNISHINGS					
E20 Furnishings					
E2010 <u>Fixed Furnishings & Casework</u> Casework, allowance	1	LS	\$10,290.46	\$10,290	
Total E20 Furnishings					10,290
F SPECIAL CONSTR & DEMOLITION					
F20 Building Demolition					
F2010 <u>Building Elements Demolition</u> Gut existing tenant improvements	98,160	SF	\$6.25	\$613,500	
Total F20 Building Demolition					613,500
Estimated Final Tenant Improvement Cost					3,120,495

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**
Parking Included

100% OPEN OFFICE
1 August 2003

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

100% OPEN OFFICE SUMMARY

**Tenant Improvements
Open Office**

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 98,150 USF

DESCRIPTION	Tenant Improvements			RATE \$/usf	Total Cost %
	Fitout \$	SRCI \$	TOTAL \$		
A10 Foundations			0	0.00	0.00%
A20 On Grade/Below Grade Construction			0	0.00	0.00%
B10 Superstructure			0	0.00	0.00%
B20 Exterior Enclosure			0	0.00	0.00%
B30 Roofing			0	0.00	0.00%
C10 Interior Construction			346,794	3.53	16.49%
C30 Interior Finishes			381,989	3.89	18.16%
D10 Conveying Systems			0	0.00	0.00%
D20 Plumbing			20,190	0.21	0.96%
D30 HVAC			75,576	0.77	3.59%
D40 Fire Protection			10,797	0.11	0.51%
D50 Electrical			643,864	6.56	30.62%
E10 Equipment			0	0.00	0.00%
E20 Furnishings			10,289	0.10	0.49%
F10 Special Construction			0	0.00	0.00%
F20 Selective Building Demolition			613,438	6.25	29.17%
G10 Building Sitework			0	0.00	0.00%
G50 Other Site Construction			0	0.00	0.00%
Estimated Direct Construction Cost			2,102,936	21.43	100.00%
Design Contingency - Allowance	10%		210,294	2.14	
Phasing Premium	5%		115,661	1.18	
General Conditions and Profit - Allowance	15%		364,334	3.71	
Estimated Construction Cost at Award			2,793,224	28.46	
Cost of Art-In-Architecture - Allowance	0.5%		13,966	0.14	
Construction Contingency - Allowance	7%		196,503	2.00	
Estimated Construction Cost			3,003,694	30.60	

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

100% OPEN OFFICE BACK-UP

**Tenant Improvements
100% Open Office**

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 98,150 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL
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C INTERIORS

C10 Interior Construction

C1009 Partitions and Doors

Partitions:

Interior partition - GWB both sides on metal studs at 16" O.C.

30,691 SF \$4.53 \$139,030

One layer GWB on interior partition, GWB only (taped and jointed)

9,520 SF \$1.24 \$11,805

Doors:

Solid core Hardwood veneer single door, 3' x 7' high, complete with hollow metal door frame and hardware

72 EA \$940.00 \$67,680

Solid core Hardwood veneer double door, 6' x 7' high, complete with hollow metal door frame and hardware

10 PR \$1,353.02 \$13,530

Solid core Hardwood veneer single door, 3' x 7' high, rated, complete with frame and hardware

24 EA \$1,239.82 \$29,756

Solid core Hardwood veneer double door, 6' x 7' high, rated, complete with frame and hardware

5 PR \$1,940.58 \$9,703

C1030 Specialties

Allowance for interior tenant signage, per floor

5 LS \$5,390.50 \$26,953

Horizontal 1" louver blinds, complete

9,534 SF \$5.07 \$48,337

C1040 Access/Platform Floors

Included in Shell & Core

Total C10 Interior Construction

346,794

C30 Interior Finishes

C3010 Wall Finishes

Vinyl wall covering

2,190 SF \$1.67 \$3,657

Paint walls

94,614 SF \$0.75 \$70,961

Steel corner guards

191 LF \$10.78 \$2,059

Base:

Vinyl cove base

11,925 LF \$1.78 \$21,227

Hardwood base

243 LF \$9.00 \$2,187

C3020 Floor Finishes

Vinyl composition tile

20,254 SF \$2.05 \$41,521

Carpet tile with cushioned back

77,898 SF \$3.07 \$239,147

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

100% OPEN OFFICE BACK-UP

**Tenant Improvements
100% Open Office**

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 98,150 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL
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C3030 Ceiling Finishes

ACT ceiling in Shell & Core

GWB soffit over counters, premium over ACT

716 SF \$1.72 \$1,232

Total C30 Interior Finishes

381,989

D SERVICES

D20 Plumbing

D2010 Plumbing Premium: Stainless steel sink

10 EA \$1,352.52 \$13,525

Wet Stack Allowance

10 EA \$450.84 \$4,508

Connect hot water to central system

5 EA \$431.24 \$2,156

Total D20 Plumbing

20,190

D30 HVAC

Additional exhaust & outside air, controls

98,150 SF \$0.77 \$75,576

Total D30 HVAC

75,576

D40 Fire Protection

D4010 Premium: Relocate 10% of sprinkler heads

98,150 SF \$0.11 \$10,797

Total D40 Fire Protection

10,797

**Note: See Construction Criteria For Tenant
fitout detail descriptions.**

D50 Electrical

D5010 Panel and Feeder

98,150 SF \$0.16 \$15,704

D5020 Underfloor power distribution w/zone boxes,
flush floor outlets, special floor outlets for
equipment.

98,150 SF \$3.78 \$371,007

D5040 Fire alarm A/V devices, telecom raceway to
flush floor outlets, PA system, raceway

98,150 SF \$2.62 \$257,153

D5050 Communication and Security Systems

incl

Total D50 Electrical

643,864

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

100% OPEN OFFICE BACK-UP

Tenant Improvements
100% Open Office

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 98,150 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL
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E EQUIPMENT & FURNISHINGS

E20 Furnishings

E2010 Fixed Furnishings & Casework
Casework, allowance

1 LS \$10,289.39 \$10,289

Total E20 Furnishings 10,289

F SPECIAL CONSTR & DEMOLITION

F20 Building Demolition

F2010 Building Elements Demolition
Gut existing tenant improvements

98,150 SF \$6.25 \$613,438

Total F20 Building Demolition 613,438

Estimated Final Tenant Improvement Cost 2,102,936

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

Parking Included

Parking
1 August 2003

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

BASEMENT PARKING SUMMARY

**Tenant Improvements
Basement Parking**

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 40,700 USF

DESCRIPTION	Tenant Improvements			RATE \$/usf	Total Cost %
	Fitout \$	SRCI \$	TOTAL \$		
A10 Foundations	0		0	0.00	0.00%
A20 On Grade/Below Grade Construction	0		0	0.00	0.00%
B10 Superstructure	0		0	0.00	0.00%
B20 Exterior Enclosure	12,937		12,937	0.32	1.91%
B30 Roofing	0		0	0.00	0.00%
C10 Interior Construction	5,339		5,339	0.13	0.79%
C30 Interior Finishes	63,340		63,340	1.56	9.35%
D10 Conveying Systems	0		0	0.00	0.00%
D20 Plumbing	146,927		146,927	3.61	21.69%
D30 HVAC	91,575		91,575	2.25	13.52%
D40 Fire Protection	73,260		73,260	1.80	10.82%
D50 Electrical	68,376		68,376	1.68	10.09%
E10 Equipment	161,499		161,499	3.97	23.84%
E20 Furnishings	0		0	0.00	0.00%
F10 Special Construction	0		0	0.00	0.00%
F20 Selective Building Demolition	54,131		54,131	1.33	7.99%
G50 Other Site Construction	0		0	0.00	0.00%
Estimated Direct Construction Cost	677,385	-	677,385	16.64	100.00%
Design Contingency - Allowance	10%	67,738	67,738	1.66	
Phasing Premium	5%	37,256	37,256	0.92	
General Conditions and Profit - Allowance	15%	117,357	117,357	2.88	
Estimated Construction Cost at Award		899,736	899,736	22.11	
Cost of Art-In-Architecture - Allowance	0.5%	4,499	4,499	0.11	
Construction Contingency - Allowance	7%	63,296	63,296	1.56	

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

BASEMENT PARKING BACK-UP

**Tenant Improvements
Basement Parking**

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 40,700 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL
-------------	----------	------	------	----------	-------

A SUBSTRUCTURE

A20 On Grade/Below Grade Construction

A2010 Basement Excavation

A2020 Basement Walls

Wall repairs excluded

A2030 Slab on Grade

Slab repairs excluded

**Total A20 On Grade/Below Grade
Construction**

-

B SHELL

B10 Superstructure

B1010 Floor Construction

Slab repairs excluded

B1030 Stair Construction

Total B10 Superstructure

-

B20 Exterior Enclosure

B2020 Exterior Windows and Doors

Concealed automatic overhead coiling loading
dock door complete with frame and hardware
including bottom lock, weather seals (slats to be
powder finish flat metal)

3 EA

\$4,312.40

\$12,937

Total B20 Exterior Closure

12,937

C INTERIORS

C10 Interior Construction

C1009 Partitions and Doors

Partitions:

Doors:

C1030 Specialties

Paint "no parking" handicapped parking zone on
paving

273 SF

\$1.99

\$543

Masonry reflective paint, parking lines, etc

1,774 LF

\$0.54

\$958

Paint ADA designated parking on pavement,
complete

6 EA

\$280.31

\$1,682

Interior signage allowance

2 LS

\$1,078.10

\$2,156

Total C10 Interior Construction

5,339

C30 Interior Finishes

C3010 Wall Finishes

Painted walls

22,418 SF

\$1.35

\$30,264

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

BASEMENT PARKING BACK-UP

**Tenant Improvements
Basement Parking**

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 40,700 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL
<u>Base:</u> Vinyl cove base	61	LF	\$1.78	\$109	
C3020 <u>Floor Finishes</u> Floor Finishes excluded					
C3030 <u>Ceiling Finishes</u> Paint exposed structure above	40,700	SF	\$0.81	\$32,967	
Total C30 Interior Finishes					63,340
D SERVICES					
D10 Conveying Systems					
D1010 <u>Elevators & Lifts</u> Elevator renovation excluded					
Total D10 Conveying Systems					-
D20 Plumbing					
D2010 Plumbing Storm Drain System	40,700	SF	\$3.61	\$146,927	
Total D20 Plumbing					146,927
D30 HVAC					
HVAC Basis: Ventilation, controls, unconditioned fans, Allow	40,700	SF	\$2.25	\$91,575	
Total D30 HVAC					91,575
D40 Fire Protection					
D4010 Fire Protection Sprinkler Systems	40,700	SF	\$1.80	\$73,260	
Total D40 Fire Protection					73,260

**Note: See Construction Criteria For Tenant
fitout detail descriptions.**

**OFFICE BUILDING MODERNIZATION OPTION A:
MINIMAL FAÇADE RENOVATION**

BASEMENT PARKING BACK-UP

**Tenant Improvements
Basement Parking**

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 40,700 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL
D50 Electrical					
D5020 Metal halide fixtures at 20' on centers, lobby and convenience receptacles, exhaust fan wiring	40,700	GSF	\$1.15	\$46,805	
D5040 Fire alarm A/V and detection devices, security office telecom raceway, emergency telephone outlets	40,700	GSF	\$0.53	\$21,571	
D5050 Communication and Security Systems included in D5040 above		incl			
Total D50 Electrical					68,376
E EQUIPMENT & FURNISHINGS					
E10 Equipment					
E1009 <u>Commercial / Institutional Equipment</u>					
Control booth at parking entry/exit complete booth and raised island as base	2	EA	\$16,063.69	\$32,127	
Hydraulic barrier as per "Nasatka Barrier Inc" at entrance and exit to garage	3	EA	\$43,124.00	\$129,372	
<i>GSA to provide parking security equipment as part of security special requirements</i>					
Total E10 Equipment					161,499
F SPECIAL CONSTR & DEMOLITION					
F20 Building Demolition					
F2010 <u>Building Elements Demolition</u>					
Gut existing tenant improvements	40,700	SF	\$1.33	\$54,131	
Total F20 Building Demolition					54,131
Estimated Final Cost					677,385

Appendix M:

**Reference Cost Estimate – Office Building
Full Façade Renovation**

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**
Parking Included

GRAND SUMMARY
1 August 2003

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**

GRAND SUMMARY

Assumes Shell & Core Modernization, all-new TI and limited Garage Renovation
 "Great Society" Mid Rise Office Building
 Prepared: 1 August 2003
 Reference Date: 10/1/2003
 Area incl Parking: 306,600 GSF

DESCRIPTION	Shell & Core		Tenant Improvements (TI)			TOTAL Shell & Core + TI	TOTAL RATE \$/gsf	Total Cost %
	Market Equivalent \$	No Market Comparable \$	TOTAL \$	Fitout \$	SRCI \$			
A10 Foundations	0		0	0	0	0	0.00	0.00%
A20 On Grade/Below Grade Construction	0		0	0	0	0	0.00	0.00%
B10 Superstructure	214,812	-	214,812	0	0	214,812	0.70	0.76%
B20 Exterior Enclosure	5,106,890		5,106,890	12,937		5,119,827	16.70	18.08%
B30 Roofing	17,250		17,250	0		17,250	0.06	0.06%
C10 Interior Construction	703,521	-	703,521	1,530,403		2,233,924	7.29	7.89%
C30 Interior Finishes	1,253,271		1,253,271	991,668		2,244,939	7.32	7.93%
D10 Conveying Systems	141,231		141,231	0		141,231	0.46	0.50%
D20 Plumbing	652,392	31,824	684,216	187,307		871,523	2.84	3.08%
D30 HVAC	2,824,380	1,063,452	3,887,832	242,734		4,130,566	13.47	14.59%
D40 Fire Protection	556,920		556,920	94,854		651,774	2.13	2.30%
D50 Electrical	3,174,444		3,174,444	1,377,765		4,552,209	14.85	16.08%
E10 Equipment	0		0	161,499		161,499	0.53	0.57%
E20 Furnishings	25,919		25,919	20,580		46,499	0.15	0.16%
F10 Special Construction	0		0	0		0	0.00	0.00%
F20 Selective Building Demolition	6,648,091		6,648,091	1,281,069		7,929,159	25.86	28.00%
G10 Building Sitework	0		0	0		0	0.00	0.00%
G50 Other Site Construction	0		0	0		0	0.00	0.00%
Estimated Direct Construction Cost								
Design Contingency - Allowance	10%	2,131,912	1,095,276	5,900,815	0	5,900,815	28,315,212	92.35
Phasing Premium	5%	1,172,552	60,240	590,082	0	590,082	2,831,521	9.24
General Conditions and Profit - Allowance	15%	3,693,538	189,757	324,545	0	324,545	1,557,337	5.08
Estimated Construction Cost at Award								
Cost of Art-In-Architecture - Allowance	0.5%	141,586	7,274	1,022,316	0	1,022,316	4,905,610	16.00
Construction Contingency - Allowance	7%	1,992,110	2,094,455	7,837,758	0	7,837,758	37,609,680	122.67
Estimated Construction Cost								
Unit Cost		99.32	5.10	27.49	0.00	27.49	188,048	0.61
							2,645,841	8.63
							40,443,570	131.91

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**
Parking Included

AREA SUMMARY
1 August 2003

AREA SUMMARY SHEET
"Great Society" Mid Rise Office Building

Prepared: 1 August 2003

BUILDING AREA

FLOOR		1 USF Office	2 USF Parking	USF SUBTOTAL TENANT SPACE		3 USF Public Space	4 USF Common Space	5 USF Wall Thickness	USF SUBTOTAL NON-TENANT SPACE		GSF TOTAL NON - PARKING AREAS	GSF Inside Parking	TOTAL BUILDING GROSS AREA
PARKING			26,840	26,840		0	0	740	740		740	26,840	27,580
BASEMENT			13,867	13,867		0	12,233	740	12,973		12,973	13,867	26,840
1ST FLOOR		19,316		19,316		4,054	3,600	840	8,494		27,810		27,810
2ND FLOOR		22,120		22,120		1,600	2,880	740	5,220		27,340		27,340
3RD FLOOR		22,120		22,120		1,600	2,880	740	5,220		27,340		27,340
4TH FLOOR		22,120		22,120		1,600	2,880	740	5,220		27,340		27,340
5th FLOOR		22,120		22,120		1,600	2,880	740	5,220		27,340		27,340
6th FLOOR		22,120		22,120		1,600	2,880	740	5,220		27,340		27,340
7th FLOOR		22,120		22,120		1,600	2,880	740	5,220		27,340		27,340
8th FLOOR		22,120		22,120		1,600	2,880	740	5,220		27,340		27,340
9th FLOOR		22,120		22,120		1,600	2,880	740	5,220		27,340		27,340
PENTHOUSE		0		0		0	5,387	284	5,671		5,671		5,671
	0- 0	196,276- 196,300	40,707- 40,700	236,983- 237,000		16,854- 16,900	44,260- 44,300	8,524- 8,500	69,638- 69,600		265,914- 265,900	40,707- 40,700	306,621- 306,600

Core Ratio
Parking Spaces
Parking Ratio

23%
102
399

AG Skin Ratio
Public Elevator Ratio
Efficiency w/o Parking

49%
76,650
74%

GROSS 1-P
PARKING (BELOW GRADE)
ABOVE GRADE

306,621
40,707
265,914

13% of total area
87% of total area

STRUCTURAL AREA

FLOOR	S.O.G.	CONCRETE SUP. SLAB	OFFICE / CR SUP. SLAB	ROOFING	BALCONY	SOFFITS	SITE	HORIZ. WATERP	TOTAL STRUCT.
PARKING	27,580								27,580
BASEMENT	26,840								26,840
1ST FLOOR	230		27,580						27,810
2ND FLOOR			27,340	470					27,810
3RD FLOOR			27,340						27,340
4TH FLOOR			27,340						27,340
5th FLOOR			27,340						27,340
6th FLOOR			27,340						27,340
7th FLOOR			27,340						27,340
8th FLOOR			27,340						27,340
9th FLOOR			27,340						27,340
PENTHOUSE			5,671						5,671
PH ROOF			5,671						5,671
ROOF			21,669						21,669
	54,650- 54,700	0- 0	251,971- 252,000	27,810- 27,800	0- 0	0- 0	0- 0	0- 0	334,431- 334,400

SKIN AREA

		HT	EXTERIOR PERIM	EXTERIOR TOTAL	1.25 X EXTERIOR TOTAL
PARKING		10.00	740	7,400	9,250
BASEMENT		16.00	740	11,840	14,800
1ST FLOOR		18.00	840	15,120	18,900
2ND FLOOR		14.00	740	10,360	12,950
3RD FLOOR		14.00	740	10,360	12,950
4TH FLOOR		14.00	740	10,360	12,950
5th FLOOR		14.00	740	10,360	12,950
6th FLOOR		14.00	740	10,360	12,950
7th FLOOR		14.00	740	10,360	12,950
8th FLOOR		14.00	740	10,360	12,950
9th FLOOR		14.00	740	10,360	12,950
PENTHOUSE		20.00	284	5,680	7,100
PARAPET		2.00	740	1,480	1,850
				0	0
SUBTOTAL FOUNDATION				124,400	155,500
TOTAL FINISHED SKIN				117,000	131,450

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**
Parking Included

MID RISE OFFICE MODERNIZATION SHELL & CORE

1 August 2003

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**

SHELL & CORE SUMMARY

Shell & Core
"Great Society" Mid Rise Office Building

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area excl Parking: 265,200 GSF

DESCRIPTION	Shell & Core			TOTAL RATE	Total Cost
	Market Equivalent \$	No Market Comparable \$	TOTAL \$	\$/gsf	%
A10 Foundations	0		0	0.00	0.00%
A20 On Grade/Below Grade Construction	0		0	0.00	0.00%
B10 Superstructure	214,812	-	214,812	0.81	1.01%
B20 Exterior Enclosure	5,106,890		5,106,890	19.26	23.95%
B30 Roofing	17,250		17,250	0.07	0.08%
C10 Interior Construction	703,521	-	703,521	2.65	3.30%
C30 Interior Finishes	1,253,271		1,253,271	4.73	5.88%
D10 Conveying Systems	141,231		141,231	0.53	0.66%
D20 Plumbing	652,392	31,824	684,216	2.58	3.06%
D30 HVAC	2,824,380	1,063,452	3,887,832	14.66	13.25%
D40 Fire Protection	556,920		556,920	2.10	2.61%
D50 Electrical	3,174,444		3,174,444	11.97	14.89%
E10 Equipment	0		0	0.00	0.00%
E20 Furnishings	25,919		25,919	0.10	0.12%
F10 Special Construction	0		0	0.00	0.00%
F20 Selective Building Demolition	6,648,091		6,648,091	25.07	31.18%
G10 Building Sitework	0		0	0.00	0.00%
G50 Other Site Construction	0		0	0.00	0.00%
Estimated Direct Construction Cost	21,319,121	1,095,276	22,414,397	84.52	100.00%
Design Contingency - Allowance	10%	2,131,912	109,528	2,241,440	8.45
Phasing Premium	5%	1,172,552	60,240	1,232,792	4.65
General Conditions and Profit - Allowance	15%	3,693,538	189,757	3,883,294	14.64
Estimated Construction Cost at Award		28,317,122	1,454,800	29,771,922	112.26
Cost of Art-In-Architecture - Allowance	0.5%	141,586	7,274	148,860	0.56
Construction Contingency - Allowance	7%	1,992,110	102,345	2,094,455	7.90
Estimated Construction Cost		30,450,817	1,564,420	32,015,237	120.72
Unit Cost		114.82	5.90	120.72	

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**

SHELL & CORE BACK-UP

Shell & Core
"Great Society" Mid Rise Office Building

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 265,200 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
A SUBSTRUCTURE						
A10 Foundations						
A1010 <u>Standard Foundations</u>						No work required
A1020 <u>Special Foundations</u>						No work required
Total A10 Foundations						-
A20 On Grade/Below Grade Construction						
A2010 <u>Basement Excavation</u>						No work required
A2020 <u>Basement Walls</u>						No work required
A2030 <u>Slab on Grade</u>						No work required
Total A20 On Grade/Below Grade Construction						-
B SHELL						
B10 Superstructure						
B1010 <u>Floor Construction</u>						
Structural retrofit to achieve resistance to progressive collapse						Excluded
Patch & repair sprayed on fire protection on steel columns and beams supporting occupied	265,200	SF	\$0.81	\$214,812		

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**

SHELL & CORE BACK-UP

Shell & Core
"Great Society" Mid Rise Office Building

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 265,200 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
B1020 <u>Roof Construction</u>						No work required
B1030 <u>Stair Construction</u>						No work required
Total B10 Superstructure						214,812
B20 Exterior Enclosure						
B2010 <u>Exterior Walls</u>						
Clean & caulk stone levels 1-2 (40% of wall)	12,740	SF	\$8.09	\$103,067		
Precast panel system on and including drywall, insulation, waterproofing and stud backup levels 3-9 (60% of wall)	55,500	SF	\$36.66	\$2,034,630		
Waterproofing membrane @stone	12,740	SF	\$1.78	\$22,677		
Interior partition - one layer GWB on one side only & furring w/2" insulation @stone	12,740	SF	\$3.56	\$45,354		
Allowance for Architectural metals, etc	131,450	SF	\$1.13	\$148,539		
Replace insulated metal panel penthouse enclosure	7,100	SF	\$13.15	\$93,365		
B2020 <u>Exterior Windows and Doors</u>						
Aluminum curtain wall system with 3 coat "Kynar" aluminum framing, double glazing, low E levels 3-9 (40% of wall)	37,000	SF	\$50.72	\$1,876,640		
Aluminum framed punched window system, insulated, double glazed, low E levels 1&2 (60% of wall)	19,110	SF	\$38.33	\$732,486		
Automatic glazed double entrance doors, 7' x 7.6" high including low e glass, aluminum frame and hardware	3	PR	\$16,710.55	\$50,132		
Total B20 Exterior Closure						5,106,890
B30 Roofing						
B3010 <u>Roof Coverings and Insulation</u>						
18 Gauge steel canopy with cantilever cable support struts, complete with factory paint finish and structure	500	SF	\$34.50	\$17,250		
B3020 <u>Roof Openings</u>						
Total B30 Roofing						17,250
C INTERIORS						
C10 Interior Construction						
C1009 <u>Partitions and Doors</u>						
<u>Partitions:</u>						
Patch & repair existing GWB walls	128,950	SF	\$2.80	\$361,060		
<u>Doors:</u>						
Solid core Hardwood veneer single door, 3' x 7' high, complete with hollow metal door frame and hardware	18	EA	\$1,013.41	\$18,241		

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**

SHELL & CORE BACK-UP

Shell & Core
"Great Society" Mid Rise Office Building

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 265,200 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
Solid core Hardwood veneer double door, 6' x 7' high, complete with hollow metal door frame and hardware	9	PR	\$1,353.02	\$12,177		
Solid core Hardwood veneer double door, 6' x 7' high, complete with hollow metal door frame, electric lock, overhead closer etc (card reader and remote door release control system by tenant)	3	PR	\$2,253.23	\$6,760		
Hollow metal double door, 6' x 7' high, complete with frame and hardware	9	PR	\$1,347.63	\$12,129		
Solid core Hardwood veneer single door, 3' x 7' high, rated, complete with frame and hardware	65	EA	\$1,239.82	\$80,588		
Coiling overhead wood slat door, 6' wide x 4' high complete with frame and hardware	1	EA	\$1,347.63	\$1,348		
Hollow metal double door, 6' x 7' high, complete with frame and hardware	3	PR	\$1,347.63	\$4,043		
1" ABS Plastic Clad wood core double service door, 5' x 7' high, complete with frame and hardware	2	PR	\$1,509.34	\$3,019		
Solid core Hardwood veneer single door, 3' x 7' high, rated, complete with frame and hardware	2	EA	\$1,239.82	\$2,480		

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**

SHELL & CORE BACK-UP

Shell & Core
"Great Society" Mid Rise Office Building

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 265,200 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
C1030 Specialties						
Pipe Handrail, welded construction with painted finish	472	LF	\$43.12	\$20,353		
Stainless steel toilet partition, ceiling hung	72	EA	\$1,126.61	\$81,116		
Premium for toilet partition, ADA (including for grab bars)	18	EA	\$328.82	\$5,919		
Urinal screen	18	EA	\$754.67	\$13,584		
Toilet paper holder	72	EA	\$26.95	\$1,940		
Feminine napkin disposal	45	EA	\$167.11	\$7,520		
Feminine napkin dispenser	9	EA	\$463.58	\$4,172		
Paper towel dispenser combination waste receptacle	18	EA	\$371.94	\$6,695		
Soap dispenser	72	EA	\$59.30	\$4,270		
Mirror with stainless steel edging, 18" x 24"	72	EA	\$107.81	\$7,762		
Baby changing table - fold down type	18	EA	\$280.31	\$5,046		
Toilet seat cover dispenser, stainless steel, recessed	36	EA	\$129.37	\$4,657		
Touch screen computer monitor programmed directory with stone veneer pedestal case	1	EA	\$8,624.80	\$8,625		
Cast plaster great seal, 24" diameter	1	EA	\$916.39	\$916		
Cantilever aluminum flag pole, mounted complete	1	EA	\$1,617.15	\$1,617		
Bronze 4sf, dedication plaque, with raised letters	1	EA	\$3,234.30	\$3,234		
Allowance for interior signage	1	LS	\$5,390.50	\$5,391		
Fire extinguisher cabinet, 8" x 12" x 27", aluminum door and frame, wall mounted				Excluded		
Steel dividers with stainless steel shelf and perforated interior face with acoustical material as telephone dividers	5	EA	\$1,078.10	\$5,391		
Drained Entrance Grid with structural aluminum rails, drain pan and carpet tread inserts of monofilament solution died nylon fusion bonded to backing	30	SF	\$73.26	\$2,198		
Miscellaneous specialties	1	LS	\$11,271.54	\$11,272		
C1040 Access/Platform Floors						
					Excluded	
Total C10 Interior Construction						703,521

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**

SHELL & CORE BACK-UP

Shell & Core
"Great Society" Mid Rise Office Building

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 265,200 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
C30 Interior Finishes						
C3010 Wall Finishes	-					
Stone veneer paneling	1,250	SF	\$50.72	\$63,400		
Vinyl wall covering	38,686	SF	\$1.67	\$64,606		
3/8" Textured Porcelain tile wainscot	5,508	SF	\$13.53	\$74,523		
Paint walls	40,554	SF	\$0.75	\$30,416		
Paint walls	16,576	SF	\$0.75	\$12,432		
Hardwood trim on walls	384	LF	\$16.93	\$6,501		
Base:						
Porcelain tile base	1,224	LF	\$11.27	\$13,794		
1-1/4" Limestone base	250	LF	\$39.46	\$9,865		
Vinyl cove base	3,894	LF	\$1.78	\$6,931		
Vinyl cove base	488	LF	\$1.78	\$869		
Hardwood base	3,200	LF	\$9.00	\$28,800		
C3020 Floor Finishes						
3/4" Thick Terrazzo floor tile with mastic base, 12" x 12" with pattern	4,230	SF	\$21.56	\$91,199		
3/8" Textured Porcelain Tile	5,400	SF	\$13.53	\$73,062		
Broadloom Carpet , 32 Oz	12,624	SF	\$3.94	\$49,739		
Carpet tile with cushioned back	480	SF	\$3.40	\$1,632		
Vinyl composition tile	5,100	SF	\$2.05	\$10,455		
Vinyl composition tile	900	SF	\$2.05	\$1,845		
Anti-static plastic laminate floor finish	2,700	SF	\$4.85	\$13,095		
Sealed Concrete	4,320	SF	\$0.54	\$2,333		
Sealed Concrete	10,393	SF	\$0.54	\$5,612		
C3030 Ceiling Finishes						
Suspended 24" x 24" ACT	214,146	SF	\$3.18	\$680,984		
Suspended 24" x 24" ACT	11,293	SF	\$3.18	\$35,912		
GWB painted ceiling, premium over ACT ceiling	3,754	SF	\$1.94	\$7,283		
Painted plaster, premium over ACT ceiling	800	SF	\$7.01	\$5,608		
Exposed structure, painted, negative premium over ACT ceiling	7,560	SF	(\$2.05)	-\$15,498		
Exposed structure, painted, negative premium over ACT ceiling	10,793	SF	(\$2.05)	-\$22,126		
Total C30 Interior Finishes						1,253,271

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**

SHELL & CORE BACK-UP

Shell & Core
"Great Society" Mid Rise Office Building

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 265,200 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
D SERVICES						
D10 Conveying Systems						
D1010 <u>Elevators & Lifts</u>						
Cab allowance for passenger elevator, medium	4	EA	\$33,960.15	\$135,841		
Cab allowance for service elevator	1	EA	\$5,390.50	\$5,391		
Total D10 Conveying Systems						141,231
D20 Plumbing						
D2010 Plumbing, Assumed 230 fixtures	265,200	SF	\$2.26	\$599,352	(599,352)	
Wet Stack Allowance	265,200	SF	\$0.20	\$53,040		
Plumbing, Assumed 230 fixtures. Only one domestic water service connection. Gas only to resturant only. Electric water heaters at core restrooms in lieu of central hot water system.	265,200	SF	\$2.38		631,176	
Savings to retain soil stacks in place	1	LS		(\$0)		
Premium for performing all work as modernization						
Total D20 Plumbing						652,392
D30 HVAC						
HVAC, Basis: Central Cooling Plant: 2 each 330 ton Chillers & 1 each 135 ton chiller, sized for 50%, 50% & 20% of the cooling load. Heating Plant: 2 each 115 HP boilers. Ceiling plenum air distribution & return air plenum. A 2 pipe reverse return system to distribute HVAC water. Perimeter heating will be above floor fin-tube radiation. Fan powered air supply terminal units will provide increased air flow to perimeter zones in response to cooling loads.	265,200	SF	\$10.51		2,787,252	
<i>Note: Fuel oil tank, included with site work</i>						
BAS Automatic Temperature Controls	265,200	SF	\$2.53		670,956	

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**

SHELL & CORE BACK-UP

Shell & Core
"Great Society" Mid Rise Office Building

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 265,200 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
HVAC, Basis: Central cooling plant with 2 each 398 ton chillers. Heating: Electric only. Only chilled water pipe & pumping system. Perimeter fan-powered boxes with electric heat. All air distributed above ceiling via ducted system. Return air ceiling plenum. Adjustable slot diffusers on perimeter and perforated diffuser on interior. Plate and frame heat exchanger for free cooling application, cooling towers shall be forced draft type steel frame, fire proof fill.	265,200	SF	\$8.25	2,187,900	(2,187,900)	
BAS Automatic temperature controls	265,200	SF	\$2.40	636,480	(636,480)	
Dedicated Ventilation System, 4000 cfm AHU per floor with air distribution system, controls and electric power wiring	265,200	SF	\$1.62		429,624	
Total D30 HVAC						2,824,380
D40 Fire Protection						
D4010 Fire Protection Sprinkler Systems, including fire pump	265,200	SF	\$2.10	\$556,920		
Total D40 Fire Protection						556,920
D50 Electrical						
D5010 Complete power riser system w/closet panels and transformers, k-13 xfmr's for office technology loads.	265,200	SF	\$3.02	\$800,904		
D5020 Modular wiring to parabolic fixture every 80 sf. Perimeter convenience outlets, mechanical wiring, Core and lobby power and lighting fitout, utility space power and lighting fitout	265,200	SF	\$5.93	\$1,572,636		
D5040 Complete Fire alarm except for tenant A/V devices. Telecom riser raceway. Emergency generator with storage tank, grounding and lightning protection, perimeter security	265,200	SF	\$3.02	\$800,904		
D5050 Communication and Security Systems, included in D5040 above		incl				
Total D50 Electrical						3,174,444

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**

SHELL & CORE BACK-UP

Shell & Core
"Great Society" Mid Rise Office Building

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 265,200 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
E EQUIPMENT & FURNISHINGS						
E10 Equipment						
E1009 <u>Commercial / Institutional Equipment</u>						Not Applicable
Total E10 Equipment						-
E20 Furnishings						
E2010 <u>Fixed Furnishings & Casework</u>						
Plastic laminate counter, 24" wide	180	LF	\$78.92	\$14,206		
Entrance reception counter in main lobby	1	EA	\$9,018.31	\$9,018		
Allow for mail room furnishings	500	SF	\$5.39	\$2,695		
Total E20 Furnishings						25,919
F SPECIAL CONSTR & DEMOLITION						
F20 Building Demolition						
F2010 <u>Building Elements Demolition</u>						
TV slab and punch openings for data/telecom	265,200	GSF	\$0.27	\$71,604		
Remove drywall at interior of perimeter wall	12,740	SF	\$1.35	\$17,199		
Remove existing stone wall & windows complete to structural frame levels 3-9	92,500	SF	\$4.31	\$398,675		
Temporary protection levels 3-9	92,500	SF	\$0.54	\$49,950		
Remove existing punched windows	19,110	SF	\$5.39	\$103,003		
Gut existing (drywall) ceiling finishes from all core & shell areas	248,346	SF	\$0.86	\$213,578		
Gut existing floor finishes from all core & shell areas (no asbestos)	46,147	SF	\$0.92	\$42,455		
Gut existing wall finishes from all core & shell areas	102,574	SF	\$0.11	\$11,283		
Gut existing elevator cab finishes	5	EA	\$808.58	\$4,043		
Demolish existing domestic cold water system, existing domestic hot water system, all sanitary piping downstream of the main riser, existing drinking fountains	265,200	SF	\$0.27	\$71,604		
Demolish existing 4-pipe heating & air conditioning system in its entirety	265,200	SF	\$1.08	\$286,416		
Demolish existing vertically zoned, constant volume system including (8) air handlers and associated ductwork	265,200	SF	\$0.54	\$143,208		
Demolish existing pneumatic control system.	265,200	SF	\$0.27	\$71,604		
Demolish existing fire protection sprinkler systems, including fire pump	265,200	SF	\$0.16	\$42,432		
Demolish complete power riser system w/closet panels and transformers.	265,200	SF	\$0.43	\$114,036		

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**

SHELL & CORE BACK-UP

Shell & Core
"Great Society" Mid Rise Office Building

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 265,200 GSF

Description	Quantity	Unit	Rate	Market Equivalent	No Market Comparable (Premium \$)	Total Market Equivalent
Demolish wiring to parabolic fixture every 80 sf, perimeter convenience outlets, mechanical wiring, core and lobby power and lighting fitout, utility space power and lighting fitout	265,200	SF	\$0.43	\$114,036		
Demolish existing Fire alarm complete, telecom riser raceway, emergency generator with storage tank, grounding and lightning protection & perimeter security	265,200	SF	\$0.38	\$100,776		
Asbestos abatement allowance	265,200	SF	\$16.17	\$4,288,284		
Temporary MEP	1	ALLOW	\$450,000.00	\$450,000		
Temporary Protection	1	LS	\$53,905.00	\$53,905		
Total F20 Selective Demolition						6,648,091
F SPECIAL CONSTRUCTION						
G10 Building Sitework						
Total G10 Building Sitework						-
Estimated Final Shell/Core Cost					1,095,276	21,319,121

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**
Parking Included

100% CLOSED OFFICE
1 August 2003

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**

100% CLOSED OFFICE SUMMARY

**Tenant Improvements
100% Closed Office**

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 98,160 USF

DESCRIPTION	Tenant Improvements			RATE \$/usf	Total Cost %
	Fitout \$	SRCI \$	TOTAL \$		
A10 Foundations			0	0.00	0.00%
A20 On Grade/Below Grade Construction			0	0.00	0.00%
B10 Superstructure			0	0.00	0.00%
B20 Exterior Enclosure			0	0.00	0.00%
B30 Roofing			0	0.00	0.00%
C10 Interior Construction			1,178,270	12.00	37.76%
C30 Interior Finishes			546,339	5.57	17.51%
D10 Conveying Systems			0	0.00	0.00%
D20 Plumbing			20,190	0.21	0.65%
D30 HVAC			75,583	0.77	2.42%
D40 Fire Protection			10,798	0.11	0.35%
D50 Electrical			665,525	6.78	21.33%
E10 Equipment			0	0.00	0.00%
E20 Furnishings			10,290	0.10	0.33%
F10 Special Construction			0	0.00	0.00%
F20 Selective Building Demolition			613,500	6.25	19.66%
G10 Building Sitework			0	0.00	0.00%
G50 Other Site Construction			0	0.00	0.00%
Estimated Direct Construction Cost			3,120,495	31.79	100.00%
Design Contingency - Allowance	10%		312,049	3.18	
Phasing Premium	5%		171,627	1.75	
General Conditions and Profit - Allowance	15%		540,626	5.51	
Estimated Construction Cost at Award			4,144,797	42.22	
Cost of Art-In-Architecture - Allowance	0.5%		20,724	0.21	
Construction Contingency - Allowance	7%		291,586	2.97	
Estimated Construction Cost			4,457,108	45.41	

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**

100% CLOSED OFFICE BACK-UP

**Tenant Improvements
Closed Office**

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 98,160 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL
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C INTERIORS

C10 Interior Construction

C1009 Partitions and Doors

Partitions:

Interior partition - GWB on both sides and including metal studs at 16" o.c., insulated, fire rated

113,210 SF \$4.85 \$549,069

One layer GWB on interior partition, GWB only (taped and jointed)

19,586 SF \$1.24 \$24,287

Doors:

Solid core Hardwood veneer single door, 3' x 7' high, complete with hollow metal door frame and hardware

477 EA \$1,013.41 \$483,397

Solid core Hardwood veneer double door, 6' x 7' high, complete with hollow metal door frame and hardware

5 PR \$1,353.02 \$6,765

Solid core Hardwood veneer single door, 3' x 7' high, rated, complete with frame and hardware

24 EA \$1,239.82 \$29,756

Solid core Hardwood veneer double door, 6' x 7' high, rated, complete with frame and hardware

5 PR \$1,940.58 \$9,703

C1030 Specialties

Allowance for interior tenant signage, per floor

5 LS \$5,390.50 \$26,953

Horizontal 1" louver blinds, complete

9,535 SF \$5.07 \$48,342

C1040 Access/Platform Floors

Included in Shell & Core

Total C10 Interior Construction

1,178,270

C30 Interior Finishes

C3010 Wall Finishes

Vinyl wall covering

4,982 SF \$1.67 \$8,320

Paint walls

252,129 SF \$0.75 \$189,097

Base:

Vinyl cove base

29,427 LF \$1.78 \$52,380

Hardwood base

554 LF \$9.00 \$4,986

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**

100% CLOSED OFFICE BACK-UP

**Tenant Improvements
Closed Office**

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 98,160 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL
C3020 <u>Floor Finishes</u>					
Vinyl composition tile	12,138	SF	\$2.05	\$24,883	
Carpet tile with cushioned back	86,463	SF	\$3.07	\$265,441	
C3030 <u>Ceiling Finishes</u>					
<i>ACT ceiling in Shell & Core</i>					
GWB soffit over counters, premium over ACT	716	SF	\$1.72	\$1,232	
Total C30 Interior Finishes					546,339
D SERVICES					
D20 Plumbing					
D2010 Plumbing Premium: Stainless steel sink	10	EA	\$1,352.52	\$13,525	
Wet Stack Allowance	10	EA	\$450.84	\$4,508	
Connect hot water to central system	5	EA	\$431.24	\$2,156	
Total D20 Plumbing					20,190
D30 HVAC					
Additional exhaust & Outside air, controls	98,160	SF	\$0.77	\$75,583	
Total D30 HVAC					75,583
D40 Fire Protection					
D4010 Premium: Relocate 10% of sprinkler heads	98,160	SF	\$0.11	\$10,798	
Total D40 Fire Protection					10,798

**Note: See Construction Criteria For Tenant
fitout detail descriptions.**

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**

100% CLOSED OFFICE BACK-UP

**Tenant Improvements
Closed Office**

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 98,160 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL
D50 Electrical					
D5010 Panel and feeder	98,160	SF	\$0.16	\$15,706	
D5020 Underfloor power distribution w/zone boxes, flush floor outlets, special floor outlets for equipment.	98,160	SF	\$3.78	\$371,045	
D5040 Fire alarm A/V devices, telecom raceway to flush floor outlets, PA system, raceway	98,160	SF	\$2.84	\$278,774	
D5050 Communication and Security Systems		incl			
Total D50 Electrical					665,525
E EQUIPMENT & FURNISHINGS					
E20 Furnishings					
E2010 <u>Fixed Furnishings & Casework</u> Casework, allowance	1	LS	\$10,290.46	\$10,290	
Total E20 Furnishings					10,290
F SPECIAL CONSTR & DEMOLITION					
F20 Building Demolition					
F2010 <u>Building Elements Demolition</u> Gut existing tenant improvements	98,160	SF	\$6.25	\$613,500	
Total F20 Building Demolition					613,500
Estimated Final Tenant Improvement Cost					3,120,495

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**
Parking Included

100% OPEN OFFICE
1 August 2003

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**

100% OPEN OFFICE SUMMARY

**Tenant Improvements
Open Office**

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 98,150 USF

DESCRIPTION	Tenant Improvements			RATE \$/usf	Total Cost %
	Fitout \$	SRCI \$	TOTAL \$		
A10 Foundations			0	0.00	0.00%
A20 On Grade/Below Grade Construction			0	0.00	0.00%
B10 Superstructure			0	0.00	0.00%
B20 Exterior Enclosure			0	0.00	0.00%
B30 Roofing			0	0.00	0.00%
C10 Interior Construction			346,794	3.53	16.49%
C30 Interior Finishes			381,989	3.89	18.16%
D10 Conveying Systems			0	0.00	0.00%
D20 Plumbing			20,190	0.21	0.96%
D30 HVAC			75,576	0.77	3.59%
D40 Fire Protection			10,797	0.11	0.51%
D50 Electrical			643,864	6.56	30.62%
E10 Equipment			0	0.00	0.00%
E20 Furnishings			10,289	0.10	0.49%
F10 Special Construction			0	0.00	0.00%
F20 Selective Building Demolition			613,438	6.25	29.17%
G10 Building Sitework			0	0.00	0.00%
G50 Other Site Construction			0	0.00	0.00%
Estimated Direct Construction Cost			2,102,936	21.43	100.00%
Design Contingency - Allowance	10%		210,294	2.14	
Phasing Premium	5%		115,661	1.18	
General Conditions and Profit - Allowance	15%		364,334	3.71	
Estimated Construction Cost at Award			2,793,224	28.46	
Cost of Art-In-Architecture - Allowance	0.5%		13,966	0.14	
Construction Contingency - Allowance	7%		196,503	2.00	
Estimated Construction Cost			3,003,694	30.60	

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**

100% OPEN OFFICE BACK-UP

**Tenant Improvements
100% Open Office**

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 98,150 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL
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C INTERIORS

C10 Interior Construction

C1009 Partitions and Doors

Partitions:

Interior partition - GWB both sides on metal studs at 16" O.C.

30,691 SF \$4.53 \$139,030

One layer GWB on interior partition, GWB only (taped and jointed)

9,520 SF \$1.24 \$11,805

Doors:

Solid core Hardwood veneer single door, 3' x 7' high, complete with hollow metal door frame and hardware

72 EA \$940.00 \$67,680

Solid core Hardwood veneer double door, 6' x 7' high, complete with hollow metal door frame and hardware

10 PR \$1,353.02 \$13,530

Solid core Hardwood veneer single door, 3' x 7' high, rated, complete with frame and hardware

24 EA \$1,239.82 \$29,756

Solid core Hardwood veneer double door, 6' x 7' high, rated, complete with frame and hardware

5 PR \$1,940.58 \$9,703

C1030 Specialties

Allowance for interior tenant signage, per floor

5 LS \$5,390.50 \$26,953

Horizontal 1" louver blinds, complete

9,534 SF \$5.07 \$48,337

C1040 Access/Platform Floors

Included in Shell & Core

Total C10 Interior Construction

346,794

C30 Interior Finishes

C3010 Wall Finishes

Vinyl wall covering

2,190 SF \$1.67 \$3,657

Paint walls

94,614 SF \$0.75 \$70,961

Steel corner guards

191 LF \$10.78 \$2,059

Base:

Vinyl cove base

11,925 LF \$1.78 \$21,227

Hardwood base

243 LF \$9.00 \$2,187

C3020 Floor Finishes

Vinyl composition tile

20,254 SF \$2.05 \$41,521

Carpet tile with cushioned back

77,898 SF \$3.07 \$239,147

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**

100% OPEN OFFICE BACK-UP

**Tenant Improvements
100% Open Office**

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 98,150 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL
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C3030 Ceiling Finishes

ACT ceiling in Shell & Core

GWB soffit over counters, premium over ACT

716 SF \$1.72 \$1,232

Total C30 Interior Finishes

381,989

D SERVICES

D20 Plumbing

D2010 Plumbing Premium: Stainless steel sink

10 EA \$1,352.52 \$13,525

Wet Stack Allowance

10 EA \$450.84 \$4,508

Connect hot water to central system

5 EA \$431.24 \$2,156

Total D20 Plumbing

20,190

D30 HVAC

Additional exhaust & outside air, controls

98,150 SF \$0.77 \$75,576

Total D30 HVAC

75,576

D40 Fire Protection

D4010 Premium: Relocate 10% of sprinkler heads

98,150 SF \$0.11 \$10,797

Total D40 Fire Protection

10,797

**Note: See Construction Criteria For Tenant
fitout detail descriptions.**

D50 Electrical

D5010 Panel and Feeder

98,150 SF \$0.16 \$15,704

D5020 Underfloor power distribution w/zone boxes,
flush floor outlets, special floor outlets for
equipment.

98,150 SF \$3.78 \$371,007

D5040 Fire alarm A/V devices, telecom raceway to
flush floor outlets, PA system, raceway

98,150 SF \$2.62 \$257,153

D5050 Communication and Security Systems

incl

Total D50 Electrical

643,864

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**

100% OPEN OFFICE BACK-UP

Tenant Improvements
100% Open Office

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 98,150 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL
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E EQUIPMENT & FURNISHINGS

E20 Furnishings

E2010 Fixed Furnishings & Casework
Casework, allowance

1 LS \$10,289.39 \$10,289

Total E20 Furnishings 10,289

F SPECIAL CONSTR & DEMOLITION

F20 Building Demolition

F2010 Building Elements Demolition
Gut existing tenant improvements

98,150 SF \$6.25 \$613,438

Total F20 Building Demolition 613,438

Estimated Final Tenant Improvement Cost 2,102,936

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**
Parking Included

Parking
1 August 2003

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**

BASEMENT PARKING SUMMARY

**Tenant Improvements
Basement Parking**

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 40,700 USF

DESCRIPTION		Tenant Improvements			RATE \$/usf	Total Cost %
		Fitout \$	SRCI \$	TOTAL \$		
A10	Foundations	0		0	0.00	0.00%
A20	On Grade/Below Grade Construction	0		0	0.00	0.00%
B10	Superstructure	0		0	0.00	0.00%
B20	Exterior Enclosure	12,937		12,937	0.32	1.91%
B30	Roofing	0		0	0.00	0.00%
C10	Interior Construction	5,339		5,339	0.13	0.79%
C30	Interior Finishes	63,340		63,340	1.56	9.35%
D10	Conveying Systems	0		0	0.00	0.00%
D20	Plumbing	146,927		146,927	3.61	21.69%
D30	HVAC	91,575		91,575	2.25	13.52%
D40	Fire Protection	73,260		73,260	1.80	10.82%
D50	Electrical	68,376		68,376	1.68	10.09%
E10	Equipment	161,499		161,499	3.97	23.84%
E20	Furnishings	0		0	0.00	0.00%
F10	Special Construction	0		0	0.00	0.00%
F20	Selective Building Demolition	54,131		54,131	1.33	7.99%
G50	Other Site Construction	0		0	0.00	0.00%
Estimated Direct Construction Cost		677,385	-	677,385	16.64	100.00%
	Design Contingency - Allowance	10%	67,738	67,738	1.66	
	Phasing Premium	5%	37,256	37,256	0.92	
	General Conditions and Profit - Allowance	15%	117,357	117,357	2.88	
Estimated Construction Cost at Award				899,736	22.11	
	Cost of Art-In-Architecture - Allowance	0.5%	4,499	4,499	0.11	
	Construction Contingency - Allowance	7%	63,296	63,296	1.56	

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**

BASEMENT PARKING BACK-UP

Tenant Improvements
Basement Parking

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 40,700 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL
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A SUBSTRUCTURE

A20 On Grade/Below Grade Construction

A2010 Basement Excavation

A2020 Basement Walls
Wall repairs excluded

A2030 Slab on Grade
Slab repairs excluded

**Total A20 On Grade/Below Grade
Construction**

-

B SHELL

B10 Superstructure

B1010 Floor Construction
Slab repairs excluded

B1030 Stair Construction

Total B10 Superstructure

-

B20 Exterior Enclosure

B2020 Exterior Windows and Doors
Concealed automatic overhead coiling loading
dock door complete with frame and hardware
including bottom lock, weather seals (slats to be
powder finish flat metal)

3 EA \$4,312.40 \$12,937

Total B20 Exterior Closure

12,937

C INTERIORS

C10 Interior Construction

C1009 Partitions and Doors
Partitions:

Doors:

C1030 Specialties

Paint "no parking" handicapped parking zone on
paving
Masonry reflective paint, parking lines, etc
Paint ADA designated parking on pavement,
complete
Interior signage allowance

273 SF \$1.99 \$543
1,774 LF \$0.54 \$958
6 EA \$280.31 \$1,682
2 LS \$1,078.10 \$2,156

Total C10 Interior Construction

5,339

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**

BASEMENT PARKING BACK-UP

**Tenant Improvements
Basement Parking**

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 40,700 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL
C30 Interior Finishes					
C3010 <u>Wall Finishes</u>					
Painted walls	22,418	SF	\$1.35	\$30,264	
<u>Base:</u>					
Vinyl cove base	61	LF	\$1.78	\$109	
C3020 <u>Floor Finishes</u>					
Floor Finishes excluded					
C3030 <u>Ceiling Finishes</u>					
Paint exposed structure above	40,700	SF	\$0.81	\$32,967	
Total C30 Interior Finishes					63,340
D SERVICES					
D10 Conveying Systems					
D1010 <u>Elevators & Lifts</u>					
Elevator renovation excluded					
Total D10 Conveying Systems					-
D20 Plumbing					
D2010 Plumbing Storm Drain System	40,700	SF	\$3.61	\$146,927	
Total D20 Plumbing					146,927
D30 HVAC					
HVAC Basis: Ventilation, controls, unconditioned fans, Allow	40,700	SF	\$2.25	\$91,575	
Total D30 HVAC					91,575
D40 Fire Protection					
D4010 Fire Protection Sprinkler Systems	40,700	SF	\$1.80	\$73,260	
Total D40 Fire Protection					73,260
Note: See Construction Criteria For Tenant fitout detail descriptions.					

**OFFICE BUILDING MODERNIZATION OPTION B:
FULL FAÇADE RENOVATION**

BASEMENT PARKING BACK-UP

Tenant Improvements
Basement Parking

Prepared: 1 August 2003
Reference Date: 10/1/2003
Area: 40,700 USF

DESCRIPTION	QUANTITY	UNIT	RATE	SUBTOTAL	TOTAL
D50 Electrical					
D5020 Metal halide fixtures at 20' on centers, lobby and convenience receptacles, exhaust fan wiring	40,700	GSF	\$1.15	\$46,805	
D5040 Fire alarm A/V and detection devices, security office telecom raceway, emergency telephone outlets	40,700	GSF	\$0.53	\$21,571	
D5050 Communication and Security Systems included in D5040 above		incl			
Total D50 Electrical					68,376
E EQUIPMENT & FURNISHINGS					
E10 Equipment					
E1009 <u>Commercial / Institutional Equipment</u>					
Control booth at parking entry/exit complete booth and raised island as base	2	EA	\$16,063.69	\$32,127	
Hydraulic barrier as per "Nasatka Barrier Inc" at entrance and exit to garage	3	EA	\$43,124.00	\$129,372	
<i>GSA to provide parking security equipment as part of security special requirements</i>					
Total E10 Equipment					161,499
F SPECIAL CONSTR & DEMOLITION					
F20 Building Demolition					
F2010 <u>Building Elements Demolition</u>					
Gut existing tenant improvements	40,700	SF	\$1.33	\$54,131	
Total F20 Building Demolition					54,131
Estimated Final Cost					677,385