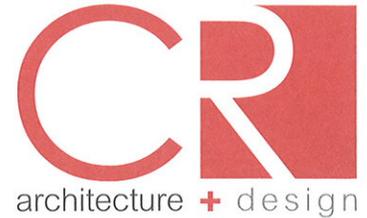


Cincinnati Museum Center Master Plan Study  
For the Hamilton County Department of Facilities  
And the Tax Levy Review Committee

CR Commission No. 409202

04/20/09





April 21, 2009

Lisa Webb  
Office of Budget and Strategic Initiatives  
Hamilton County  
138 E. Court Street  
Room 607  
Cincinnati, Ohio 45202

RE: Cincinnati Museum Center Master Plan Evaluation  
CR Project No.: 409202

Dear Ms Webb,

CR architecture + design would like to thank you for the opportunity to provide professional services on this very important evaluation. It has been a pleasure working with you, the Department of Facilities, and Cincinnati Museum Center.

We understand the critical nature of this report and have made every attempt to include all the parties involved, to solicit and incorporate their feedback and to evaluate the proposed projects in an objective manner. We believe this report is a fair and impartial evaluation of the extensive work completed in the Master Plans and prior facility studies. This report is not meant to supplant those reports; it is meant to help the TLRC better understand the issues at hand so as to make a more informed decision for the November ballot.

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We look forward to the TLRC's review and wish you luck with this important decision. If we may be of any assistance, do not hesitate to contact us.

Sincerely,

CR architecture + design

A blue ink handwritten signature, appearing to read 'Zachary E. Zettler', is written over the company name.

Zachary E. Zettler, AIA, LEED AP  
project manager



## SECTION 1 - Executive Summary

The purpose of this study is to assist the Tax Levy Review Commission (TLRC) and the Hamilton County Department of Facilities in the review of the Cincinnati Museum Center (CMC) Master Plan and to assist with their work in making recommendations to the Hamilton County Board of Commissioners for the inclusion of tax issues on the upcoming November 2009 election ballot.

Cole + Russell Architects, Inc. was retained in January, 2009 by the Hamilton County Department of Facilities to review the 2007 CMC Master Plan and supporting documents. The Master Plan was prepared by CMC and its consultants and submitted to Hamilton County as part of the tax levy renewal process. These documents include:

- *CMC Restoration and Renovation Plan Executive Summary*, dated August 2006, hereinafter referred to as the Executive Summary (ES)
- *CMC Restoration and Renovation Plan Volume I*, dated 2007, hereinafter referred to as the Master Plan or Volume I
- *CMC Restoration and Renovation Plan Volume II*, dated 2007, Appendix information is referred to by the specific document
- *CMC Hamilton County Presentation*, dated 2009, hereinafter referred to as "HCP-09 Document"
- CMC clarification letter to Hamilton County (Paula Knecht) dated February 4, 2009.

Cole + Russell Architects, Inc. has retained the following consultants to assist in the Master Plan Study and the preparation of this report:

- ThermalTech Engineering, Mechanical, Electrical, and Plumbing Engineering
- Messer Construction Company, Construction Cost Estimating

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The scope of the CMC Master Plan Study is to generally become familiar with the Master Plan, to evaluate feasibility, schedule, and proposed costs, to recommend priorities, to update costs to current 2009 dollars to provide anticipated escalated costs over the next five years, and to coordinate with other Hamilton County/TLRC consultants.

In addition to document review, the preparation of this report involved the following tasks:

- Site visits to observe existing conditions
- Preparation of a comprehensive categorized listing of renovation work scopes for analysis
- General review of Sustainable Design and LEED requirements
- General review of Secretary of the Interior Historic Preservation Standards
- Meetings, coordination and communication with the CMC staff and consultants
- Review and update of Summary of Probable Costs
- Review of project feasibility, phasing, and sequencing

Just as important as what is included in the making of this report is the clarification of what is not included or intended. This report is not intended to supplant, supersede, or replace the extensive work of the previous 2004 Report or the more current Master Plan. It is intended as a supplement and a guide for the Department of Facilities and the TLRC. The following activities were not performed in the preparation of this report:



- Extensive field observation and inspections of existing conditions
- Field testing of existing conditions
- Preliminary Architectural Design
- Preliminary Mechanical, Electrical or Plumbing Engineering Design
- Life-Cycle Cost Analysis
- Analysis of Financial and Operational Costs
- Market Analysis
- Detailed Phasing/Scheduling Plans

## CONCLUSIONS

The Master Plan outlines a comprehensive proposed project scope for the expenditure of capital funds to fully renovate and restore the Cincinnati Union Terminal Building to accommodate the current and future needs of the CMC, a modern progressive museum facility, in a manner that is respectful of the building's designation as a National Historic Landmark. The probable costs of this proposed project estimated in 2007 dollars were reasonable, however analysis of the proposed project has revealed non-construction related costs that may be incurred and that should be factored into the overall project costs. The goal of implementing sustainable design elements and features into the project is difficult to quantify and evaluate at this stage, but its implementation will have a significant positive effect on operating (energy/utility) costs.

The Master Plan initially proposed several phasing concepts for implementing the project in a piecemeal manner over extended periods of time based on financing that would be available by renewing the current tax levy. Subsequent cost analysis by the CMC and its consultants has revealed serious flaws in these concepts, and the most current plan as outlined in the HCP-09 document involves a single project - a non-phased approach. A single comprehensive renovation project represents the most efficient and effective approach both in terms of schedule, impact on current operations, minimizing capital expenditures and achieving long-term vision goals. Based on this approach, the proposed renovation scope of work and related costs represents a very reasonable and responsible strategy that is justified and appropriate.

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## ASSUMPTIONS AND RESTRICTIONS

In general, every attempt has been made to clarify available information as much as possible. Evaluations have been made in this report based on information that is beyond the scope of this report. The program includes a significant increase of special event space which presumes the depth of market demand justifies increase in these types of spaces. It is also beyond the scope of this report to evaluate the impact that the proposed project will have on revenues during the construction phase. Also it was assumed that a construction manager would be employed on a multiple prime complex renovation project of this nature.



## SECTION 2 - Overview of the Master Plan

The CMC Master Plan, published in early 2007, and the supporting documents represent a comprehensive study of the existing physical conditions and a broad approach to the future planning of the facility. The result is a large amount of information - over 900 pages - in two volumes. The Master Plan includes a variety of forms of communication: written text, drawings, photographs, spreadsheets and charts arranged in an easily readable format and organized into chapters. The report includes an analysis for every design discipline applicable to the building and grounds. These include: historic, environmental, architectural, structural, fire protection, plumbing, heating, ventilating, and air conditioning, electrical, lighting, systems controls, exhibit design, event planning technology/communications, urban and site planning, and construction cost estimating.

The group of design professionals assembled to prepare this report represents some of the best specialists in the nation in their respective areas of expertise. *glaserworks* is the local architectural firm with considerable museum design experience that has been involved in most recent renovations and modifications to the property in the last 20 + years. Their corporate knowledge of the facility and its existing conditions is an important asset to the CMC and the overall team assembled for the Master Plan. RMJM/Hillier is a nationally recognized leader in Historic Preservation. The remainder of the consultants in the corresponding disciplines also represents high quality experienced firms that practice nationwide. The techniques to analyze the existing conditions involved state of the art non-invasive testing and invasive probes. The assembling of such a team makes it clear that the CMC in its future planning has sought after the advice and guidance from some of the best available experts in the country.

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As reported in the Master Plan and the HCP-09 Document, the CMC prepared a similar study (referred to hereafter as the "2004 Report") prior to the 2004 CMC Tax Levy that analyzed existing conditions and proposed renovation and repairs. At that time, the total estimate of construction cost totaled \$20 million. Although this older study was not reviewed in the preparation of this report, the comparison of the scope between the two studies is illustrative of the change and difference in approach. *glaserworks* was involved in the preparation of the report which was preliminary in nature and did not have a team of specialty consultants engaged to provide input. This comparison also explains the difference in the total cost estimate - \$20 million versus \$120 million. In discussions with the CMC staff and *glaserworks*, the 2004 Report was predicated upon a much smaller scope of study that did not involve the degree of analytical non-destructive testing and the limited carefully performed destructive testing to verify findings. Simply put, the 2004 Report did not represent a full understanding of the extent of the problems of the existing conditions of the building envelope and structural system because the scope and approach was limited based on the resources available to the CMC at the time. In direct contrast, the more recent Master Plan as stated above is very comprehensive. The extent of the problems of the building shell and structural systems and other items and the associated repair costs has become evident.

The approach of the Master Plan is one of a long-term vision. It reports a brief history of the Cincinnati Union Terminal and its evolution into a Museum Facility. The future vision of the CMC was developed in the context of the history of the building, its architectural significance, and its cultural significance to the Cincinnati region. It is appropriate to highlight aspects of that history to explain and understand the long term vision being proposed in the Master Plan. The ongoing



renaissance of the Cincinnati Union Terminal began early in its life. In the late 1940's, travel by train began declining to be replaced by airplane and automobile travel. By 1962, less than thirty years after completion, the building was grossly underutilized and was leased to the City for one dollar per year. This period of decline and disuse continued for nearly twenty years until Joseph Skilken converted the building into a shopping center complex. From a long-term standpoint, this five year experimental venture could only be viewed as a failure as it closed in 1985. One year later the voters of Hamilton County approved a bond issue to convert the Cincinnati Union Terminal into a Museum Center. This effort involved the combining of many separate entities under one roof including existing cultural institutions, the Cincinnati Natural History Museum, the Cincinnati Historical Society (and Library), as well as a new attraction, the Omnimax Theater. Those involved in this effort can attest that it was not only an architectural and construction challenge to change the building's use, but also the plan represented a major change in fundamental operations and corporate structure of the existing entities involved.

This historical background helps one understand the approach taken during the change of use and renovation of the Cincinnati Union Terminal that was completed in 1991. The broad vision for combining the many institutions under the one roof of the Union Terminal was based on sound logic and reasoning. Rebounding from a previous failed experiment of adaptive re-use, the stakeholders involved in the care of the Cincinnati Union Terminal – the City of Cincinnati and Hamilton County - realized the risk of such an experiment, and the approach to this next adaptive re-use was necessarily cautious and tentative. The budget and design was based on expediency and efficiency, accommodating the new uses in a reasonable and cost effective manner. Based on discussions with those involved in the renovation, a long term 50 + year vision was not a strong priority at the time.

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The good news is that the experiment has been very successful. The various entities have combined and evolved into one solid organization, the CMC, which represents the interests of all components and "tenants" including the more recently added Children's Museum and other features and attractions. The CMC has established itself not only as a leading local attraction, but as a cultural institution competing with other museums on a national level to attract tourists from the Midwest region and across the country. Besides containing the cultural exhibits and artifacts, arguably the CMC's greatest artifact and treasure is the Cincinnati Union Terminal building itself. Its importance is multi-layered: an excellent, innovative and truly unique example of Art Deco Architecture, an architectural icon on the Cincinnati landscape, a public facility that has historically shaped part of the social fabric of the Cincinnati region, and a National Historic Landmark. The building is ranked 45<sup>th</sup> on the American Institute of Architects listing of the top 150 favorite works of architecture in the United States, and it is the highest ranked architectural work in Ohio/Kentucky/Indiana region. Nearly twenty years after the initial opening, the CMC has firmly established itself as a long-term tenant and user of the building. It is from this perspective that the more recent Master Plan boldly looks forward with a long term horizon and echoes the original bold vision of the architects of the Cincinnati Union Terminal.



### **SECTION 3 - Summary of Proposed Renovation Work**

The Master Plan outlines an ambitious comprehensive program for restoring and renovating the entire Cincinnati Union Terminal complex. When weighing the variety of existing conditions, uses, and project requirements, this proposition represents a major complex project. As part of any long-term planning, the master plan contains broad scope, long-term thinking that includes many "wish-list" items, as well as very tangible specific items based on the input of facility management as well as field investigation. For example, the analysis of the site concludes that the CMC would be better served by a new parking structure(s) located closely to the existing building. This would be appreciated by patrons and would allow the site to be restored to its original grandeur based on the original landscape plan. While this type of thinking provides a much needed future vision for the facility, the authors of the report determined that this item is not a current priority and does not belong in the proposed renovation project. This example is somewhat obvious, but due to the complexities and interrelated nature of the proposed work, there are many items that are not so obvious at first glance.

The following summary attempts to present an abbreviated description of the work that is actually proposed in the Master Plan and that is included in its estimate of probable costs. A more detailed listing is provided in Appendix A.

#### **HISTORIC REQUIREMENTS**

The building and site have been designated as a National Historic Landmark. The City of Cincinnati has consequently mandated that any modifications to the historically significant aspects of the building and site shall be performed according to the Secretary of the Interior's Standards for Historic Preservation. Proposed modifications will be evaluated and approved by the State Historic Preservation Officer (SHPO) In addition the Master Plan advocates adherence to the standards of the "New Orleans Charter," adopted by (among other historic organizations) the National Council of State Historic Preservation Officers. These standards apply to Museums containing historic artifacts that are located within historic structures. These requirements apply to the exterior building shell, and specific spaces designated as historic in nature that are primarily located on the Concourse and First Levels. Specific work items that must comply with these historic requirements include restoration of floor, wall and ceiling finishes, artwork, hardware, and historic lighting fixtures. These requirements represent a high level of quality of materials, procedures and treatments that is commensurate with the historic value of a National Landmark building and the elements within.

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#### **SUSTAINABILITY**

The Master Plan addresses sustainability in broad terms and with very general ideas and goals. The HCP-09 Document presents some more specific ideas, including green roofs and possibly geothermal systems but, a firm plan cannot be fully developed until the design phase(s) begin.

After the completion of the Master Plan, the Hamilton County Board of Commissioners passed a resolution in April of 2008 approving Hamilton County's Green Building Policy for new construction and major renovations of County-owned buildings. This policy mandates that all new construction and major renovations shall achieve a LEED "Silver" rating. Based on the



available information, the analysis of sustainability options is best performed by reviewing the proposed scopes of work at a detailed level and attempting to draw conclusions from these evaluations. This portion of the Master Plan Study is addressed further in later Sections of this report.

## SUB-STRUCTURE ELEMENTS

The Master Plan focuses on the existing structure and does not include any substantial new structure that would require new foundations. The foundations of the one-story northwest wing that extends parallel to the train tracks have settled and need repair. Also the portions of the Lower Level have never been finished and have a dirt floor which poses potential environmental concerns. The renovation includes new floor slabs in these areas planned for future museum exhibit space.

## BUILDING ENVELOPE

### Superstructure Elements

Generally the structure of the building is fundamentally sound however there are many annoying problems. The Dalton Street overpass structure needs to be repaired and/or replaced. Portions of concrete facing are falling off the sides of the light wells creating a life-safety hazard. The entire environment of that lower level urban space is dirty, drab and blighted. The plaza fountain is located above this area (and partially above newly proposed exhibit space) and portions of the structural slabs that support the fountain have deteriorated due to water leakage and need to be repaired. The fountain will need to be carefully disassembled and stored while the structural repairs are made and new waterproofing installed. The fountain will then be reconstructed following historic requirements. Also in the same area the building structure has several expansion joints that will need repair and new expansion joint covers installed. All of this work will necessitate the entire front "site" portion of the building, referred to as the plaza or apron area, which effectively acts as the roof of portions of the building below to be completely renovated.

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The Master Plan presents a concern about existing concrete slabs that have been exposed to moisture primarily at the intersection of the flat roofs and the base of the rotunda roof, and it recommends further analysis to determine the soundness of these slabs. More recent petrographic studies (2 samples) conducted this year have determined that the existing slabs in the study area are structurally acceptable and do not warrant complete replacement.

### Exterior Enclosure

The Master Plan includes fairly comprehensive investigative reports regarding the exterior envelope of the building. Generally the conclusion of these reports is that extensive portions of the top of the exterior walls, the parapets, have deteriorated and allowed the intrusion of water into the exterior walls. This water intrusion has caused freeze-thaw cycles to further deteriorate the parapets and the lower portions of the exterior walls. Additionally since the masonry was not originally isolated from the steel structure, the water has caused corrosion of some of the structural steel framework of the building. Most of the steel lintel angles supporting the top level window openings have also deteriorated and must be replaced.



Approximately 20% of the exterior masonry wall surface area, both stone and brick, will need to be carefully de-constructed, to enable the repair and replacement of underlying structural steel, and then the masonry walls re-constructed following the historic requirements noted above.

In addition to the masonry repair, all of the flat roofs are recommended to be replaced. The Master Plan presents the idea of a green roof, but this has not been included in its cost estimate. The metal rotunda roof is expected to last another thirty to fifty years so no renovation work is planned in this area.

## **BUILDING INTERIOR ARCHITECTURE**

The proposed interior renovation work falls into several general categories: interior spaces designated as historic, interior spaces with museum exhibits, and interior administration and circulation space. The Lower Level and Mezzanine Level have no historic designated spaces and they contain the majority of exhibit space within the CMC. A significant portion of the Lower Level that includes the entire Children's Museum has no work planned, and is planned to remain open to the public throughout the renovation. The plan includes building out the remainder of unfinished space of the Lower Level.

The Concourse Level (main entrance level) contains almost all of interior historic spaces to be restored including the Rotunda, the Ice Cream Shop, Newsreel Theater, the North and South ramps as well as numerous meeting and special event spaces. The First Level contains historic dining rooms that are being restored starting this year as part of Project One. The remainder of spaces on this level is primarily administrative. The Master Plan includes a significant increase (approximately double) in special event space that is located on the Concourse and First levels. The combination of upgrading of the existing meeting/dining spaces, plus the addition of new space will provide a boost to the revenue generating potential of the CMC in the special event market.

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The Second through Sixth levels includes primarily administrative and circulation space upgrades and the square footage involved is relatively small compared the overall renovated square footage of the building.

## **BUILDING CODE AND ACCESSIBILITY**

Previous renovations have laid the groundwork for code review and approval of future renovations of the CMC. Several important appeals related to maintaining and respecting the historic character have been granted by the local building department in the past. As the project moves into the design phases, a complete re-visiting of all code issues will be necessary. It is expected that further appeals may likely be necessary as part of the proposed historic renovation, and the granting of the previous appeals establishes a positive precedence for moving forward. The current Ohio Building Code also allows for compliance alternatives for existing buildings, and code provisions that are judged as not constituting a life safety hazard by the local building official may be exempted for historic buildings.

Previous renovations have also resolved any significant accessibility concerns. The existing historic sloped ramp areas have had lifts installed that provide access to all exhibit areas. All



future renovation work will comply with ADA requirements and will only provide the opportunity to enhance the accessibility of the facility.

## BUILDING SERVICES

The underlying philosophy of the proposed renovation is to provide the CMC with a viable, sustainable, energy efficient operation that meets the institution's current and future needs. The renovation, when complete will provide for the CMC's operations now and well into this century.

### Heating Ventilating and Air Conditioning (HVAC)

The overall long term scope for the HVAC systems is to provide a complete replacement of all of the major system components. It is estimated that all of the major HVAC components will need to be replaced in the next five to ten years. The replacement systems will provide energy efficient operation, address additional loads, maximize environmental control, and provide critical system redundancy, and allow the Museum to function properly and to better plan its future.

#### *Central Chilled Water Plant and Ice Production*

The proposed renovation includes replacing and expanding the existing central plant chillers, the primary and secondary chilled water pumps, and the primary and secondary chilled water piping, valves and accessories. The existing cooling tower, condenser water pumps, condenser water piping, valves, and accessories are to be replaced and expanded with a second cooling tower added for needed redundancy. The existing ice production plant, ice production pump(s), ice plant piping, valves and accessories are also to be replaced and expanded. The new central plant equipment will provide energy efficient operation for long term operational savings, sustainability, and redundancy. The new central plant system should be designed and installed with ease of maintenance in mind.

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#### *Central Hot Water Plant and Central Steam Heating Plant*

The steam heating plant is to be demolished and removed. It has deteriorated and been modified to maintain operation at the expense of efficiency. The demolition includes the steam boilers, boiler feed pumps, steam vacuum pump, steam condensate pumps, steam piping, valves and accessories and the steam system heating devices (radiators). The existing hot water central plant including boilers, primary and secondary piping, valves, and accessories shall be replaced and expanded to serve the entire facility now and into the future. The new hot water central plant boilers to be energy efficient modular type that will provide long term operational savings, sustainability, and redundancy. The new hot water central plant system should be designed and installed with ease of maintenance in mind.

#### *Air Handling Units, Zoning and Air Distribution*

The existing air handling units, modular air handling units, roof top units, zone control units, main and branch ductwork and air distribution accessories are to be replaced. The existing roof top equipment is to be removed and replaced with indoor air handling



units. The emphasis on air handling and air distribution will be to re-zone the facility to separate exhibit areas from non-exhibit areas as well as additional zoning for similar space operations. The intent is to minimize continuous unit operation and to be able to selectively operate units and zones as occupancy dictates.

#### *Building Energy Management*

The existing Barber-Colman / Invensys Pneumatic- electric/electronic system is to be replaced with state of the art electronic direct digital control energy, management system. This includes the recently renovated chilled water and hot water central plant control systems that are separate from the existing Barber-Colman / Invensys system. The new direct digital control energy management system to provide for closer and more stable environmental control increased operating efficiency, and more efficient facility maintenance.

### Plumbing Systems

The renovation of plumbing systems primarily responds to the needs of the new program for the building interior architecture described above.

#### *Storm Drainage Systems*

Replace the existing interior original storm drainage system as it is at or near the end of its useful life. A portion of this work is related to the exterior wall renovation work.

#### *Restrooms*

Replace the existing facility plumbing fixtures with modern energy efficient water saving fixtures.

#### *Domestic Water Heating System*

The existing domestic water heating system to be demolished and removed. The domestic water heating system to be energy efficient providing long term operational savings, sustainability, and redundancy. The new domestic water heating system should be designed and installed with ease of maintenance in mind.

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### Fire Protection Systems

The facility has variety of types of fire protection systems each for a specific purpose.

#### *Hauck Vault Halon Fire Suppression System*

Remove and replace the Halon system with an environmentally acceptable electrically non-conductive Halo carbon fire suppression system meeting FM 200 requirements and to comply with current NFPA Standards.

#### *Rotunda Smoke Purge System*

Replace the current Rotunda Smoke Purge system including the supply air and exhaust air systems and beam detectors.



*Dry system Fire Zones*

Replace the existing systems, equipment, piping and sprinkler heads as required to accommodate the proposed renovation.

*Pre-Action Fire Zones*

Replace the existing systems, equipment, piping and sprinkler heads as required to accommodate the proposed renovation.

*Wet System Fire Zones*

Replace the existing systems, equipment, piping and sprinkler heads as required to accommodate the proposed renovation.

*Fire Pumps*

There are two existing fire pumps that serve the facility. Each fire pump along with its associated Jockey Pump is capable of serving the entire facility. The fire pumps can be replaced as the renovation progresses.

## Electrical Systems

The requirements of this proposed renovation is to provide the Cincinnati Museum Center with a reliable, sustainable, and redundant electrical power source to provide the operational electrical power that meets the Museum's current and future needs well in to this century.

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*Utility Service*

The Cincinnati Museum Center currently is being fed from two (2) separate utility feeders at 12,470V, three phase through a disconnect switch to a 12,400V primary utility bus. Each of the two utility feeders is fed from separate utility substations. The primary feeder is from the Brighton Station 21 which is a dedicated feeder to the Museum. The other feeder is from Queensgate "42" Substation and supplies other loads. This feeder serves as a backup and therefore is normally open. The switching between these utility feeders is a manual operation and performed by the utility company. Each of these feeders has the capacity to serve the full load requirements.

The 12,470V primary utility bus supplies power through two fused switches to two 2000KVA utility owned transformers to step the voltage down to 480V, three phase.

The existing load demand is less than 50% of the electrical service equipment's capacity. It will be required to keep Duke Energy up date as renovation increases the electrical load demand. This will allow Duke Energy to provide in a timely fashion the required changes to their service equipment the renovation projects dictate.

*Main Switchboards*

The two existing 480V, 3000A bus main switchboards were installed new in 1989 and have the ampacity for anticipated load growth, but they should be replaced. The circuit breakers in these switchboards are not of current manufacture and there is not ample spare breakers or spaces in the switchboards to allow for future branch circuit feeder breakers.



#### *Distribution*

The existing distribution risers shall be upgraded or install new 480V distribution risers, transformers and panelboards as required to provide additional electrical power required for renovations.

#### *Emergency Power*

The existing generator shall be replaced. The generator and transfer switches shall be sized to accommodate emergency load requirements after renovation is completed and to accommodate anticipated future requirements.

### Lighting

The renovation of general interior lighting will primarily respond to the needs of the new program for the building interior architecture described above. The lighting level will be designed to meet the modern criteria appropriate for task usage in locations.

The existing historic light fixtures in following areas are to be restored: Rotunda, Losantiville Dining, Collette Gallery, Cincinnati Dining Room, Historic Private Dining (first level), Presidents Office, Board of Director's Room, Secretary's Room, Newsreel Theater, Façade Marquee, Exterior Fountain/Plaza, Exterior Entry Drive/Parking and Dalton Street decorative lighting at storefront. This renovation to provide new, lenses and finishes and low energy light sources appropriate for the area.

The security lighting along Dalton Street shall be renovated to provide ample light level for public movement into and out of area and for security surveillance enhancement. The perimeter area lighting level requires updating to provide an adequate lighting level for surveillance.

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### Communications And Data Systems

**Telecommunications:** The existing telephone switch and incoming trunk lines are adequate for anticipated renovations. Renovate with upgrades and new equipment, punch down terminals, racks and cables in main phone room in lower level and all the remote telephone closets on the other floors. The cable length requirements from phone equipment require the addition communication closets at newly renovated areas. Provide new equipment, copper and fiber cable and cable support systems for these renovations.

**Data Network:** Replace existing network servers, racks, switches and cables. Expand remote patch panels and routers. Expand the existing wireless system on third floor into other office areas and other areas to enhance renovation and exhibit functions. Upgrade network equipment of accommodate Audio-visual requirements.

**Cable TV:** Upgrade the existing system currently in first level to all levels as required to meet the functions of renovated areas.



## Security System

The existing system is relatively new consisting of card access control, intrusion detection and closed circuit cameras and monitoring and security staff. Upgrade this system to expand egress monitoring camera coverage of grounds area and improve systems to allow separation of staff and public.

## Fire Alarm System

Replace the entire fire alarm system with new state of the art and addressable system.

## SITE WORK

The Master Plan includes a comprehensive site and urban planning analysis of the CMC property as part of the long term vision for the CMC. Several key points should be recognized:

- Current parking is adequate but somewhat inconvenient, especially for families with children. Parking that is reconfigured into structures adjacent to the CMC frees up the existing surface lots for restoration.
- The restored site to the original park-like setting represents a large area of land within the urban context that would become a tremendous neighborhood asset, and a destination on its own.
- The Master Plan recognizes the potential that a site restoration will and have a positive impact on adjacent property values and stimulate neighborhood redevelopment.
- Although separated by I-75, the CMC should make every opportunity to develop and enhance connections/gateways to downtown.

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Despite these opportunities, the CMC has determined that these investments in the future are not the current priority. Based on the HCP-09 document, all site work (except the apron and fountain which are building "roof" areas) has been removed from the proposed renovation project. With the elimination of the parking from the scope of the project, it should be verified that the current parking capacity will meet the needs of the CMC for the future including growth as additional exhibit space is added to the program of the facility.

## RECENT IMPROVEMENTS

Since the Master Plan was issued, the CMC has proceeded to implement portions of the plan. The Omnimax Theater has been recently renovated, and the Arts Consortium Gallery has been enlarged. More significant is the recent implementation of an \$8 million project known as Project One which has been bid and is scheduled to start construction soon. The scope of this project has been carefully selected as a test case to learn more about the existing conditions and to better inform the planning, design and development of the later overall project. The scope of the project include a "vertical slice" of the building at the southwest corner and includes, parapet and masonry repair and restoration, structural steel repairs, removal and relocation of rooftop air handlers, renovation of the commercial kitchen, and restoration of historic interior spaces, the Cincinnati Dining Room on the Concourse level and the private dining rooms on the First Level.



These areas of work have been identified to extent possible in a more detailed manner in Appendix A. The costs of the recent improvement and Project One have been excluded from the updated estimate in the following Section.

## SCHEDULING AND MAINTAINING OPERATIONS

As evidenced by the breadth of research and analysis completed to date in the Master Plan Documents, the road map for the project is subject to:

- Prioritization of building needs
- Availability of funds
- Balance of Project(s) disturbance with continued revenue generating operations
- Ability to maintain public excitement and safety through sequenced completion.

Project One is a good example of balancing the competing interests to realize a complete project. This approach should accomplish a good test for future development through the coordination of the exterior and interior work with continued operations. The exterior facade work of Project One will provide a benchmark for the scope of the remaining entire building flashing, masonry, and window work and will allow better planning with facade packages. This will also create the critical scheduling links between the interior and exterior building infrastructure work required.

As stated in various sections of the Master Plan, restoration of the building envelope is a high priority to stop current deterioration, verify assessment of existing conditions, and prepare the project for an uninterrupted flow of interior renovations to eliminate potential rework and additional scope. The overall phasing/sequencing of work needs to be flexible to account for changes in the natural and economic environment.

Weather dependent work, such as temporary heating of materials and temporary enclosures will want to be coordinated with the calendar season to minimize the premiums associated with work that does not add value. It is likely the final detailed sequencing will vary from the initial plan when one combines minimizing the risk of partially exposed building components, funding triggers, maintaining existing operations, and revenue generators.

Multiple plausible scenarios are introduced in the Master Plan, Volume I, and each is achievable following a logical course of completion with certain benefits and hindrances. The HCP-09 document narrows the focus to one plan consisting of one project. Based on discussion with CMC staff, a single project would be sequenced in two consecutive phases with portions of the facility being shut down during each phase, and the main entrance and significant portions of the Lower Level, including the entire Children's Museum remaining operational throughout construction. This narrowed focus supports the cost effective philosophy to work from outside-to-inside to restore the building shell and work big-to-small to replace all building mechanical systems in one continuous yet swift phase. This approach also supports the shared economies of Mechanical, Electrical/Plumbing/Fire Protection pathways that minimize the number of disturbances an area or building component experiences. This approach is reasonable, minimizes costs, and holds merit to holistically restore Cincinnati Union Terminal.



If key revenue generating components of the Museum Center are required or highly desired to remain in operation during the renovation, the team will need to prioritize the components to first understand what can be shut down, then progress into the investigation for length of shut down and future needs of that component. Another potential is to analyze swing spaces such as the Future Exhibit spaces and the Changing Exhibit Hall spaces to test the rearrangement of components.

The intent of this communication is not to reduce the fabric and historical significance of the CMC into a cash flow exercise, but an attempt to maximize the opportunities to complete the renovation and set up the Museum Center for the best possible position in the near and long term. This should lead the Building Team (Owner, Designer, Constructor) to continually review past versus present versus future to optimize the benefit of each component so the total end of the projects is greater than the individual sums.



## **SECTION 4 – Summary of Probable Costs**

As is to be expected at such an early stage of programming and design, the Summary of Probable Costs is an estimate from a broad perspective. At this stage of design, the most accurate means of preparing an estimate is to utilize historical cost data from previous projects of similar scope and size. The most accurate representation of the potential costs of the Master Plan for the renovation and restoration of the CMC are the bid results from Project One (bids received March 10, 2009). The bids received provide a very accurate representation of the project as it pertains to the historical spaces that are to be renovated and restored. This data, along with data from other projects, was used in the review to verify the Summary of Probable Costs.

It should be noted that the Summary of Probable Costs was established in 2007 with the costs not updated in the HCP-09 document. The Summary of Probable Costs issued in the HCP-09 document eliminates the site restoration and parking from the scope of the project and in turn adds a project contingency. It is highly recommended that the project estimate contain a contingency at such an early stage of design.

There are significant costs that will be incurred by CMC that are not captured in the Summary of Probable Costs. One such cost is the escalation of costs to the actual dates of bid and construction of the project. This cost increase could be very significant and will be contingent upon the scheduling of the project which is anticipated to be bid in 2011. Please reference Table 4.2 for an estimate of cost escalation and its impact to the project estimate. Another cost that is not included is that of phasing/multiple packages. Currently, the renovation project is not expected to be a multi-phase project in order to avoid these costs. However, despite best intentions, it may be determined in the future that some form of phasing will become beneficial to the overall project. As a result of multi-phasing, the project schedule is extended which results in additional contractor's administrative and overhead costs, as well as the previously mentioned impact of cost escalations. With each phase that is added to the project, it should be expected that an additional 10% be added to the project costs.

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Other costs that may be incurred by the CMC include additional security during construction, moving of exhibits and personnel, developing swing space, and the hiring of additional administrative staff to administer the project. Note that the County will also need to provide staff to administer the project during construction. Please reference the Summary of Probable Costs for an estimate of these additional expenses.

It is understood that this project is to include the principles of sustainability in an effort to achieve LEED Silver certification. While many of the LEED principles are becoming minimum design standards, there is still a cost incurred to achieve this certification. Possible scopes of work that may be added to the project to achieve LEED Silver include a green roof, geothermal wells, use of certified wood, etc. While some of these items will result in a long term payback for CMC, there is an additional first cost. With the project at such an early stage in design, it is best to look at previous projects in order to forecast the cost of achieving the LEED Silver certification. Based upon previous projects, it should be expected that the project costs increase by approximately 2% (depending on the final selection of LEED credits).



The historical significance of this project is another factor that must be considered when performing a cost estimate. Of the facility's gross area of 496,306 square feet, approximately 102,400 gross square feet are classified as preservation zone 1 (existing significant and historic interiors) and approximately 32,900 gross square feet of area classified as preservation zone 2 (previously modified historic areas). It is important that these areas receive the care and attention necessary to maintain and in many cases restore the interiors to their previous condition. However, there is a cost associated with preserving these areas. Project one included area that is classified as preservation zone 1 and provides accurate costs data for such an area. This cost has been utilized in the review of the Summary of Probable Costs and has been identified as an approximate premium of \$20 per gross square foot.

While the construction industry has seen cost increases of approximately 8% since 2007 (Summary of Probable Costs is based upon 2007 costs), recent bid results have seen a decrease of approximately 10% due the current economic conditions and competitive bid market. However, it should not be anticipated that the current state will last for a prolonged period. It is likely that construction costs will return to their previous state and continue to escalate at 4% per year as has been the average since 1990.

Included below, you will find Table 4.1 which compares the Summary of Probable Costs as outlined in the HCP-09 document to the anticipated costs as derived from our analysis of the Master Plan. Table 4.2 provides the anticipated costs escalated to 2009 as well as projected escalation through 2014.

The CR-Messer estimated cost **does not** include Project One or any of the following costs: financing fees, loan fees, closing costs, interest, legal fees, accounting fees or loss of revenue during construction. Other potential costs not included in the Master Plan estimate, that have been estimated separately on the comparison spreadsheet include additional security to monitor and control access points during construction, relocation and protection of exhibits, cost to develop swing space should it be required, and additional staff to administer design and construction. It is estimated that the CMC would require one full time person with construction experience (Owner's representative) to help manage the project in design, bidding and construction phases. It is estimated that Hamilton County would need the equivalent of two full time personnel (manager and administrator(s)) to manage the project during the bidding and construction phases.

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The CR-Messer estimated cost **does** include construction manager fees and staffing costs which are included in the unit costs of each line item. It also includes non-construction related costs (soft costs) such as design fees, permits, testing, FFE, inspections, and insurances.

Based on discussions with the CMC and its consultants, newer cost information has been very recently provided for review, and this information has been included in Table 4.1. In conclusion, we have found the CMC Master Plan to be highly detailed as to the scope of work to be performed and the associated estimated costs. The notable areas of difference in the estimates are the total construction costs which may be attributed to, among other factors, escalation from the 2007 estimate and the inclusion of construction manager fees, which may not have been factored in the original estimate. The CR-Messer contingency is approximately 8% on the entire project cost, and we feel it is appropriate to carry this contingency given the complexity of the project and the early stage of design. Lastly, we believe the non-construction related costs are better estimated as an approximate 15% of total construction costs.



**Table 4.1  
SUMMARY OF PROBABLE COSTS**

**Assumptions:**

- No escalation is included
- No phasing/multiple packages
- Net area (approximate): 440,000 sq. ft.

	Master Plan Estimate - 2007			April 2009			CR-Messner Estimate - 2009*			Difference in Cost
	Unit Cost	Component Cost	Subtotal	Revision	Subtotal	Revision	Unit Cost	Component Cost	Subtotal	Difference in Cost
1. Building Envelope/Structural Repair			\$ 15,000,000							
2. Building Systems/Infrastructure										
Mechanical Systems	\$ 50 /sf	\$ 22,000,000					\$ 61 /sf	\$ 26,840,000		\$ (4,840,000)
Electrical Systems	\$ 30 /sf	\$ 13,200,000					\$ 34 /sf	\$ 14,960,000		\$ (1,760,000)
Plumbing Systems	\$ 10 /sf	\$ 4,400,000					\$ 8.50 /sf	\$ 3,740,000		\$ 660,000
Fire Alarm Systems	\$ 3 /sf	\$ 1,320,000					\$ 3.50 /sf	\$ 1,540,000		\$ (220,000)
Sprinkler/Fire Suppression	\$ 10 /sf	\$ 4,400,000					\$ 5.50 /sf	\$ 2,420,000		\$ 1,980,000
New/Enhanced Lighting	\$ 15 /sf	\$ 6,600,000					\$ 15 /sf	\$ 6,600,000		\$ -
AV/Telecom/Security		\$ 500,000						\$ 500,000		\$ -
Subtotal	\$ 118 /sf	\$ 52,420,000	\$ 52,420,000				\$ 129 /sf	\$ 56,600,000	\$ 56,600,000	\$ (4,180,000)
3. Interior Architecture	\$ 70 /sf	\$ 30,800,000	\$ 30,800,000				\$ 65 /sf	\$ 28,600,000	\$ 28,600,000	\$ (2,200,000)
4. Fountain	\$ 750 /sf	\$ 7,500,000	\$ 7,500,000				\$ 750 /sf	\$ 7,500,000	\$ 7,500,000	\$ -
5. Apron Deck Renovations	\$ 20 /sf	\$ 1,826,000	\$ 1,826,000				\$ 25 /sf	\$ 2,282,500	\$ 2,282,500	\$ (456,500)
6. Dalton Street		\$ 4,000,000	\$ 4,000,000					\$ 3,700,000	\$ 3,700,000	\$ (300,000)
Original Subtotal	\$ 254 /sf	\$ 111,546,000	\$ 111,546,000	\$ 111,546,000			\$ 256 /sf		N/A	
7. Project One (deduct)			N/A	\$ (8,000,000)					N/A	
New Subtotal			N/A	\$ 103,546,000				\$ 112,682,500	\$ 112,682,500	\$ 9,136,500
8. Project Contingency			\$ 8,454,000	\$ 5,099,400				\$ 9,317,500	\$ 9,317,500	\$ 4,218,100
Total Construction Costs	\$ 273 /sf	\$ 120,000,000	\$ 120,000,000	\$ 108,645,400			\$ 277 /sf	\$ 122,000,000	\$ 122,000,000	\$ 13,354,600
Non-construction project costs ***			\$ 11,354,600	\$ 11,354,600				\$ 17,000,000	\$ 17,000,000	\$ 5,645,400
Total Project Costs			\$ 131,354,600	\$ 120,000,000				\$ 139,000,000	\$ 139,000,000	\$ 7,645,400

**Other potential costs:**

- Additional security to monitor and control access points
- Exhibit relocation/protection
- Additional staff to administer design and construction - County
- Additional staff to administer design and construction - CMC
- Developing extra swing space

\* Scope of work does not include "Project One"

\*\* The development of swing space has not been fully reviewed by CMC. CMC is currently studying potential other opportunities that will not have an additional cost impact.

\*\*\* Design fees, permits, testing, inspections and insurances. CR-Messner estimate: approx. 15% of total construction costs



**Table 4.2  
PROJECT COSTS ESCALATED**

	2009	Estimated 2010	Estimated 2011	Estimated 2012	Estimated 2013	Estimated 2014	Estimated
	Cost	Cost	Cost	Cost	Cost	Cost	Cost
1. Building Envelope/Structural Repair	\$ 14,000,000.00	\$ 14,560,000.00	\$ 15,142,400.00	\$ 15,748,096.00	\$ 16,378,019.84	\$ 17,033,140.63	
2. Building Systems/Infrastructure							
Mechanical Systems	\$ 26,840,000	\$ 27,913,600	\$ 29,030,144	\$ 30,191,350	\$ 31,399,004	\$ 32,654,964	
Electrical Systems	\$ 14,960,000	\$ 15,558,400	\$ 16,180,736	\$ 16,827,965	\$ 17,501,084	\$ 18,201,127	
Plumbing Systems	\$ 3,740,000	\$ 3,889,600	\$ 4,045,184	\$ 4,206,991	\$ 4,375,271	\$ 4,550,282	
Fire Alarm Systems	\$ 1,540,000	\$ 1,601,600	\$ 1,665,664	\$ 1,732,291	\$ 1,801,582	\$ 1,873,645	
Sprinkler/Fire Suppression	\$ 2,420,000	\$ 2,516,800	\$ 2,617,472	\$ 2,722,171	\$ 2,831,058	\$ 2,944,300	
New/Enhanced Lighting	\$ 6,600,000	\$ 6,864,000	\$ 7,138,560	\$ 7,424,102	\$ 7,721,066	\$ 8,029,909	
AV/Telecom/Security	\$ 500,000	\$ 520,000	\$ 540,800	\$ 562,432	\$ 584,929	\$ 608,326	
Subtotal	\$ 56,600,000	\$ 58,864,000	\$ 61,218,560	\$ 63,667,302	\$ 66,213,994	\$ 68,862,554	
3. Interior Architecture	\$ 28,600,000	\$ 29,744,000	\$ 30,933,760	\$ 32,171,110	\$ 33,457,955	\$ 34,796,273	
4. Fountain	\$ 7,500,000	\$ 7,800,000	\$ 8,112,000	\$ 8,436,480	\$ 8,773,939	\$ 9,124,897	
5. Apron Deck Renovations	\$ 2,282,500	\$ 2,373,800	\$ 2,468,752	\$ 2,567,502	\$ 2,670,202	\$ 2,777,010	
6. Dalton Street	\$ 3,700,000	\$ 3,848,000	\$ 4,001,920	\$ 4,161,997	\$ 4,328,477	\$ 4,501,616	
Subtotal	\$ 112,682,500	\$ 117,189,800	\$ 121,877,392	\$ 126,752,488	\$ 131,822,587	\$ 137,095,491	
7. Project Contingency	\$ 9,317,500	\$ 9,690,200	\$ 10,077,808	\$ 10,480,920	\$ 10,900,157	\$ 11,336,163	
Total Construction Cost	\$ 122,000,000	\$ 126,880,000	\$ 131,955,200	\$ 137,233,408	\$ 142,722,744	\$ 148,431,654	
Non-construction project costs	\$ 17,000,000	\$ 17,680,000	\$ 18,387,200	\$ 19,122,688	\$ 19,887,596	\$ 20,683,099	
Total Project Costs	\$ 139,000,000	\$ 144,560,000	\$ 150,342,400	\$ 156,356,096	\$ 162,610,340	\$ 169,114,753	



## SECTION 5 – Project Priorities

Prioritizing involves making value judgments which is inherently a subjective activity. A method for prioritizing the vast array of proposed renovation work has been devised in order to evaluate each scope of work from both a detailed and broad perspective. Evaluating the parts based on clearly defined criteria introduces an approach that attempts to document the reasoning involved in the evaluation process. The criteria described below have been discussed with Hamilton County staff and represent the values believed to be in the best interest of the county taxpayer. Breaking the work into smaller parts provides better evaluation of each part and ensures that parts and their values are not excluded. This detailed method enables the prioritization and evaluation to be communicated more clearly so that summary results can be better understood.

Seven criteria have been defined to evaluate the proposed renovation work and are described in detail below. In our opinion these criteria are not weighted equally, and a simple summation of the evaluation ratings would lead to erroneous conclusions. The general weighting of each criteria in relation to one another is also described below.

### CRITERION 1 – IMPACT ON BASIC BUILDING FUNCTIONS

A building is comprised of forms and elements that create space to support specific human activities, but the basic functions of a building include providing shelter, safety and human comfort. Parts of the existing building that support these basic functions are in a variety of conditions ranging from nearly new to dilapidated and in need of urgent repair. Many issues of deferred maintenance have been reported in the Master Plan, and begin to identify the proposed scopes of work that will improve the longevity of the parts that support the basic functions of the building and have a positive impact on its overall life cycle. Examples include replacing the roofing, repairing masonry cracks, and rebuilding leaking parapets. The basic functions of a building are fundamental to its usefulness as a museum and extending the life of the building's usefulness is believed to be the most essential purpose of the proposed renovation. Therefore this criterion is considered as the highest priority and should carry more weight than all of the other criteria.

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Work scopes that generally have been rated highly according to this criterion include all of the masonry and structural repairs, and the replacement of windows, flat roofs, storm drainage system, central heating and cooling plant including ice production, and most air handling units.

In addition some parts of the structure are falling to the point of endangering the safety of the occupants and users. Those scopes of work will be specifically noted in the summary, and they shall receive the highest priority regardless of other criteria. It is recommended that they received the utmost attention both in terms of expenditures and sequencing of work. Most of this work is related to the Dalton Street repairs and upgrades.

### CRITERION 2 - IMPACT ON OPERATIONAL COSTS

The cost to operate the CMC currently is disproportionately high compared with the industry norm. This fact can be attributed to the age of the building and lack of efficiency due to



deferred maintenance that has occurred. The Master Plan indicates that some of the functioning mechanical/electrical equipment is original (over 75 years). One of the fundamental purposes of the tax levy of 2004 was to assist in coping with excessive operational costs. Clearly this is an area of major concern and evaluating scopes of work that will have a positive impact is fairly straightforward and logical. It should be noted however that this criterion is somewhat redundant with another criterion described below – Impact on Sustainability. Simply any scope of work that has a strong positive impact on reducing operational costs will also score well as a sustainable design attribute. Thus this criterion is being weighted less than other criteria and it should be considered as a “bonus” over and above the value attributed to Impact on Sustainability.

Work scopes that generally have been rated highly according to this criterion include replacing the domestic water heating, central heating and cooling plant including ice production, most air handling units, and the building energy management system.

### CRITERION 3 – IMPACT ON SUSTAINABILITY

The Master Plan addresses sustainability and identifies general goals for the proposed renovation. Sustainability has many definitions. Here are two:

- U.S. Environmental Protection Agency: “Balancing a growing economy, protection for the environment, and social responsibility, so they together lead to an improved quality of life for ourselves and future generations.
- UN. World Commission on the Environment and Development: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

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Despite the variations in definitions, the basic principles and concepts remain constant. The U.S. Green Building Council (USGBC) has established the Leadership in Energy and Environmental Design (LEED) standards for the rating of sustainable or “green” design techniques, and the recognition of the value of this approach to designing and constructing buildings has been increasing among building owners and the construction industry in recent years. As noted above, Hamilton County has recently adopted a policy that mandates that all new construction and major renovations shall achieve a LEED “Silver” rating.

The LEED ratings are classified according to the summation of a point system that measures the following categories of green design: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, and Innovation in Design Processes and Operations. The Master Plan documents do not address the Hamilton County Green Building Policy. The clear potential for conflicts between Sustainability requirements and Historic requirements was discussed with the CMC and its consultants, and two LEED rating systems were identified as applicable to the renovation project: *LEED for New Construction and Major Renovations* and *LEED for Existing Buildings: Operations and Maintenance*. Based on the available information at this stage and for the purpose of this report the various scopes of work will be evaluated on the potential to achieve LEED rating point(s) using both systems. A highly rated evaluation means that the specific scope of work has a strong likelihood of achieving LEED point(s) if selected by the Design Team from the many available options in the aforementioned LEED rating systems. This criterion is being considered at a relatively moderate level of weighting (considering the weighting of Criterion 2 above).



Work scopes that generally have been rated highly according to this criterion include replacing the windows, central heating and cooling plant including ice production, most air handling units, and the building energy management system.

#### CRITERION 4 – IMPACT OF HISTORIC VALUE

The Union Terminal Building is a notable icon in the urban landscape of Cincinnati and an excellent example of the Art Deco style of architecture. The building is listed on the National Historic Register and has obtained the elevated distinction of also being listed as a National Landmark. The Master Plan documents that the City Council of Cincinnati passed an ordinance in 1973 such that modifications to the existing building should preserve the historic character of the building according to federal standards. The Master Plan clearly identifies three categories of historic value:

- Historically significant, to be preserved and/or restored
- Previously modified historic areas, new work should be respectful of historic context
- New construction, no historical significance

The Master Plan also identifies the elements and applicable areas of the site and building that fall within each of these categories. This data was directly translated as equitably as possible into the method of prioritizing scopes of work for this report. This criterion is being considered at a relatively moderate to high level of weighting.

Work scopes that generally have been rated highly according to this criterion include the repair and restoration of the exterior walls and enclosure elements, the fountain, the restoration of interior spaces designated as preservation zone one per the Master Plan, and historic artwork restoration.

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#### CRITERION 5 - IMPACT OF INTERRELATED CONDITIONS

Many scopes of work when evaluated in isolation would not necessarily be judged as critical to the success of the project. However when looked at in the context of a major renovation, it becomes evident that there is no better time to perform such scopes of work than when the overall building is being renovated. The resource being expended to put in place the general conditions for a major renovation project (mobilization, temporary facilities and controls, safety precautions, adjustments in programming/use of the building, etc.) provides the optimum opportunity to perform the work at the lowest obtainable cost.

Simply put there is an inherent economy of scale in construction projects - especially renovation projects. The more work that is subject to be modified and improved, the less existing conditions there are that dictate constraints on the work to be done. A good example of this concept can be illustrated by a kitchen renovation in a single family home. The owner may not have a strong desire to replace an existing ceiling, but the lighting of the space is intended to be completely re-done. In this case it could be determined that tearing out and replacing the existing ceiling, while adding cost to the project, will better facilitate the installation of wiring and lighting fixtures at a lower cost, and the resulting solution represents a better overall value.



In addition some aspects of the work will need to happen first as a precondition before other scopes of work can happen. For instance the fountain will need to be de-constructed, indexed and stored before the slab below can be waterproofed. The slab needs to be prepared and re-waterproofed before the fountain can be re-constructed and restored.

Scopes of work that have an impact on sequencing of work and those that have increased value due to their interrelation with other parts of the renovation work will be evaluated more positively than those that do not. This criterion is being considered at a lower level of weighting.

Work scopes that generally have been rated highly according to this criterion include the repair and restoration of the exterior walls and enclosure elements, the fountain, replacement of flat roofs, extension of elevator to fifth floor, installation of new cooling towers and pumps, electric switchgear and distribution lines, new communication equipment room(s), and historic artwork restoration.

#### CRITERION 6 - IMPACT ON BUILDING PROGRAM FUNCTIONALITY

As described in Criterion 1, buildings function at a basic level to provide basic needs of shelter, safety, and human comfort. In addition, buildings are designed to respond and function to serve specific human activities. The use(s) of a building can be summarized by the term Building Program. As is the case with the Cincinnati Union Terminal, often a building has multiple uses and these uses change over time such that a current program can be significantly different than the original program. In such cases it is not usual for uses and functions to be assigned to existing spaces that are not best suited for a variety of reasons. The Master Plan indicates two types of interior modifications that generally respond to the needs of Building Program. One is the adjustment of space or the relocation of a function to better accommodate an existing use. The second is the modification of space and/or relocation of an existing use in order to accommodate a new use. In general, both of these types of modifications will be evaluated in the same manner. Modifications that create spaces for new uses/functions that will increase the marketability of the CMC or represent possible increase in revenue generation will be evaluated higher. However exhibit renovations and upgrades will be evaluated as having the lowest priority. It seems reasonable that the public can support the creation of space to support museum functions, but the filling of the space with exhibit content should be the responsibility of the CMC. Similarly, unless there is significant historic or other obvious value, furnishings and equipment will be evaluated at lowest priority. This criterion is being considered at a relatively moderate to low level of weighting.

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Work scopes that generally have been rated highly according to this criterion include the a majority of the interior renovations (including historic restoration) located on the Concourse and First levels, and upgraded lighting for the rotunda, marquee and the fountain. Without an actual proposed design to evaluate, the majority of the remaining interior improvements generally were rated average.



## CRITERION 7 – IMPACT ON COST-BENEFIT OF INITIAL CONSTRUCTION COSTS

Each scope of work represents both an initial cost to implement and a corresponding set of benefits that have a direct impact the overall benefit of the renovation project. This criterion represents a gauge of the “best value for the money” for each scope of work. The method involves the comparison of two sets of data related to the costs and benefits:

- Benefits: Summarize the evaluations (benefits) based on the other six criteria described in the report.
- Cost: An evaluation of the relative cost of a scope of work in relation to the total construction cost.

A scope of work that has a relatively low cost and receives a high evaluation based on the other criteria will be rated good or superior. A scope of work that has an average relative cost and receives an average evaluation based on the other criteria will be rated average. A scope of work that has relatively high cost and receives a low evaluation based on the other criteria will be rated minimal or insignificant.

For example, referring to Appendix A, Page A-1, the scope item “Replace waterproofing under fountain” has been rated fairly high in several categories indicating that such renovation work provides good value to the project. This work item was evaluated as a 4 (good) because it provides a critical function of the building enclosure that has failed and it represents a good benefit for the cost. It was not rated as a 5 because the anticipated cost will be higher than average due to the complexity of the existing conditions. This criterion is being considered at a relatively moderate to high level of weighting.

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Work scopes that generally have been rated highly according to this criterion include the repair and restoration of the exterior walls and enclosure elements, the replacement of windows, the fountain waterproofing, flat roofs, storm drainage, most air handling units, ice/chilled water production isolation, many aspects of the central heating plant, the building energy management system.

Refer to Appendix A for a detailed listing of scopes of work and evaluations based these criteria.

## OVERALL PROJECT PRIORITIES

We believe the following general assessment of priorities is reasonable based on current available information and should be regarded as a snapshot view of the project. Just as elements of the Master Plan have been updated and modified based on new information and recent developments, we expect that specific plans and priorities will change and part of a fluid process as the project moves through the design and construction phases.

These priorities are presented in broad general terms and that do not reflect the interconnectivity and interrelatedness of many parts of the project. If in the future it is determined that dividing the overall renovation work into two or more projects is beneficial, the design team assembled by the CMC would be best suited to establish project scope(s) based on a given budget.



## Top Priority

### Life-safety and significant code items

- Repair/rebuild Dalton street overpass structure. This is directly related to the fountain waterproofing listed below
- Replace Halon fire suppression system – no longer permitted by code
- Hazardous material abatement as necessary

## Urgent and Important

### Building shell repairs and replacement of inefficient and obsolete services

- Replace windows
- Replace flat roofing
- Re-build parapets
- Repair steel structure
- Repair slabs under fountain Replace waterproofing under fountain – directly related to fountain restoration listed below
- Replace building energy management system
- Replace chilled and hot water plant, pumps, piping and accessories
- Replace Roof top air handlers
- Replace and re-zone central station and modular air handling units

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## Critical for Project Success

- Renovation/restoration of interior Historic spaces (including lighting) generally concourse Level
- Renovation of revenue generating spaces, generally concourse and level one
- Restoration of fountain and lighting, apron and expansion joints
- Replace electric switchgear and new distribution
- Replace fire alarm system
- Replace telecommunications and data systems
- Restoration of existing maintenance shop wing
- Plumbing upgrades
- Elevator/security upgrades

## Important but Deferrable Items

- Non-historic building interior renovations, that are not direct revenue generating spaces
  - Exhibit space on Lower Level , Mezzanine Level
  - Staff office space upgrades
- Replace generator
- Audio Visual equipment and electronic acoustic enhancements
- New exhibit installations



## Appendix A

### Analysis of Scopes of Work

The scopes of work included in the first column have been recorded in an abbreviated format at the level of detail as presented in the Master Plan. References are included so that further expanded information can be quickly researched if desired. See Section 5 for a further explanation of the priority ratings.

### Rating Range

1. Insignificant, Unimportant
2. Minimal, Inferior
3. Fair, Average
4. Good, Improved
5. Superior, Excellent

### Sustainability Abbreviations:

1. Sustainable Sites (SS)
2. Water Efficiency (WE)
3. Energy and Atmosphere (EA)
4. Materials and Resources (MR)
5. Indoor Environmental Quality (IEQ)
6. Innovation and Design/Operations Processes (undetermined at this stage)

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**CMC Master Plan Study  
Appendix A - Analysis of Scopes of Work**

Cincinnati Museum Center - Master Plan Study			In MP Costs	Eligible	Reference			Rating	Criterion 1 - Basic Building Functions	Rating	Criterion 2 - Operational Costs	Rating	Criterion 3 - Sustainability	Rating	Criterion 4 - Historic Value	Rating	Criterion 5 - Interrelated Conditions	Rating	Criterion 6 - Building Program Functionality	Rating	Criterion 7 - Cost-Benefit of Construction Cost	
								Comment			Comment				Comment			Comment			Comment	
<b>A Substructure</b>																						
	Maintenance Shop foundations repairs	AY	Y	VI-4.3.3			4			3		1	5	Per Preserv. Standards	1		2			2	Relatively expensive	
	Dalton St. retaining wall - cleaning	Y	Y	VI-5.05			1			3		1	3		1		1			3		
	New slabs on grade (Storage PCB's)	Y	Y	VI-4.10.1			3			1		2	MR credits	1		1				3		
	Miscellaneous slab on grade repairs	AY	Y	VI-4.3.3			4			1		1	1		3		1			3		
	Addition: Planetarium foundations	N	Y																			
	Addition: Exhibition Design Workshop foundations	N	Y																			
<b>B Building Envelope</b>																						
<b>Superstructure</b>																						
<b>Dalton Street Area</b>																						
1	Repair overpass concrete slabs	Y	Y	VI-9.6	VI-4.3.3		5	Existing Life-Safety Deficiency	5	Existing Life-Safety Deficiency	5	Existing Life-Safety Deficiency	5	Existing Life-Safety Deficiency	5	Existing Life-Safety Deficiency	5	Existing Life-Safety Deficiency	5	Existing Life-Safety Deficiency	5	Existing Life-Safety Deficiency
2	Repair overpass steel structure	Y	Y	VI-9.6	VI-4.3.3		5	Existing Life-Safety Deficiency	5	Existing Life-Safety Deficiency	5	Existing Life-Safety Deficiency	5	Existing Life-Safety Deficiency	5	Existing Life-Safety Deficiency	5	Existing Life-Safety Deficiency	5	Existing Life-Safety Deficiency	5	Existing Life-Safety Deficiency
3	Repair light wells	Y	Y	VI-9.6	VI-5.05		5	Existing Life-Safety Deficiency	5	Existing Life-Safety Deficiency	5	Existing Life-Safety Deficiency	5	Existing Life-Safety Deficiency	5	Existing Life-Safety Deficiency	5	Existing Life-Safety Deficiency	5	Existing Life-Safety Deficiency	5	Existing Life-Safety Deficiency
4	Installation of new concrete	Y	Y	VI-9.6			4			1		2	MR credits	1		1				1	3	
5	Restoration of glass storefronts	Y	Y	VI-9.6	VI-5.05		3			2		3	EA + EQ + MR credits	5	Per Preserv. Standards	1			1	3		
6	Install bird control system	Y	Y	VI-9.6			4			3	Reduces maintenance	1		1		1			1	3		
7	Repair decorative finishes at portals/stairs	Y	Y	VI-9.6	VI-5.05		2			3		1		5		1			1	1		
8	Install safety lighting	Y	Y	VI-9.6			5			2		1		1		1			2	3		
9	Install security cameras	Y	Y	VI-9.6			4			2		1		1		1			2	3		
10	Install pedestrian protection at emergency exit	Y	Y	VI-9.6			5	Life-Safety	5	Life-Safety	5	Life-Safety	5	Life-Safety	5	Life-Safety	5	Life-Safety	5	Life-Safety	5	Life-Safety
11	Restore & enhance signage program	Y	Y	VI-9.6			4			1		1		1		1			3	3		
	Building Floor slabs- miscellaneous repairs	AY	Y	VI-4.3.3			5			2		1		1		3			1	3		
	Fountain: Repair deteriorated slabs under fountain	Y	Y	VI-4.3.3	VI-9.4		5			1		1		5	Per Preserv. Standards	5			1	3		
	Building structural steel repairs	Y	Y	VI-4.3.3	RSA	VI-7.3	5			1		1		4	Necessary for preservation	5	Integral to masonry restoration	1		3		
	Expansion Joints: Repair slabs and replace covers	Y	Y	VI-4.3.3			4			2		1		1		5			1	3		
<b>Exterior Enclosure</b>																						
	Repair/Re-build parapets & thruwall flashing	Y	P	VI-4.1.3			5	Necessary/Urgent	2			1		5	Per Preserv. Standards	5			1	4		
	Repair/Replace window lintels	Y	P	VI-4.1.3			5	Necessary/Urgent	1			1		5		5			1	4		
	Replace all windows	Y	P	VI-4.1.3			5	50 year LE	3			4	EA + EQ + MR credits	5	Per Preserv. Standards	4			1	5		
	Masonry Repairs - approx 20% surface area	Y	P	VI-4.1.3	VI-4.3.3	RSA	5	Necessary	1			1		5	Per Preserv. Standards	4			1	4		
	Masonry tuckpointing, general cleaning	Y	P	VI-4.1.3			5	Necessary	1			1		5	Per Preserv. Standards	4			1	4		
	Masonry - limited conservation work	Y	P	VI-4.1.3	ES-5-9		3		1			1		5	Per Preserv. Standards	4			1	4		
	Masonry and lintel repairs at Maintenance Shop	AY	Y	VI-4.3.3			4	Necessary	1			1		5	Per Preserv. Standards	3			1	3		
	Maintenance Shop roof slab repairs	AY	Y	VI-4.3.3			4	Necessary	1			2		3		3			1	3		
<b>Roofing and Waterproofing</b>																						
	Replacement of flat roofs	Y	P	VI-4.1.3			5	Necessary/Urgent	2			3	SS credits	3		5			1	5		
	Green Roofs	N	Y	VI-9.2							Additional thermal mass saves energy		SS + EA credits								Educational exhibit opportunity	
	Fountain: Replace waterproofing under fountain	Y	Y				5	Necessary	3	Reduced maintenance related to leaks		1		2		5	Integral to fountain restoration	1		4		
	Addition: Planetarium shell	N	Y																			
	Addition: Exhibit Design Workshop shell	N	Y																			
<b>C Building Interiors</b>																						
	Door Replacement: Amtrack security	Y	Y	VI-4.6			2			1		1		1		1			3	3		
<b>Lower Level</b>																						

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									Comment		Comment		Comment		Comment		Comment		Comment		Comment
LL-IR-1	Renovate: Storage area to black box exhibit space	Y	Y	VI-7.3.2	VI-6.1		1		1		3	MR & IEQ credits	1	Preservation Zone 3	3		4		3		
LL-IR-2	Renovate/reorganize: Exhibit Workshop	Y	Y	VI-7.3.2	VI-6.1		1		3		3	MR & IEQ credits	1	Preservation Zone 3	3		3		3		
LL-IR-3	Renovate/reorganize: Giftshop storage/Mailroom	Y	Y	VI-7.3.2	VI-6.1		1		3		3	MR & IEQ credits	1	Preservation Zone 3	3		3		3		
LL-IR-4	Convert: black box to exhibit space	Y	Y	VI-7.3.2	VI-6.1		1		1		3	MR & IEQ credits	1	Preservation Zone 3	3		5	Increases revenue potential	3		
<b>Mezzanine Level</b>																					
M-IR-1	Expand: Arts consortium gallery/office	Y	N	VI-7.3.3	VI-6.1								MR & IEQ credits		Preservation Zone 3						
M-IR-2	Convert: library collection photo viewing and storage into railroad club exhibit	Y	Y	VI-7.3.3	VI-6.1		1		1		3	MR & IEQ credits	1	Preservation Zone 3	3		3		3		
M-IR-3	Expand: temp/humid control collection storage	Y	Y	VI-7.3.3	VI-6.1		1		1		3	MR & IEQ credits	1	Preservation Zone 3	3		4		3		
M-IR-4	Convert: offices into central volunteer lounge	Y	Y	VI-7.3.3	VI-6.1		1		1		3	MR & IEQ credits	1	Preservation Zone 3	3		3		3		
<b>Concourse Level</b>																					
C-IR-1	Renovate: "high end" Giftshop	Y	Y	VI-7.3.4	VI-6.1		3		1		3	MR & IEQ credits	3	Preservation Zone 2	3		5	Increases revenue potential	3		
C-IR-2	Renovate: Giftshop	Y	Y	VI-7.3.4	VI-6.1		1		1		3	MR & IEQ credits	3	Preservation Zone 2	3		5	Increases revenue potential	3		
C-IR-3	Renovate/convert: Cash room & safe	Y	Y	VI-7.3.4	VI-6.1		1		1		3	MR & IEQ credits	3	Preservation Zone 2	3		3		3		
C-IR-4	Omnimax furniture/finish/equip. upgrades	Y	N	VI-7.3.4	VI-6.1									Preservation Zone 3							
C-IR-5	Renovate/expand: main visitor restrooms w/ expanded visitor services	Y	Y	VI-7.3.4	VI-6.1		3		1		3	MR & IEQ credits	1	Preservation Zone 3	3		3		1	Relatively expensive	
C-IR-6	Renovate/convert: caterer storage into event/dining	Y	Y	VI-7.3.4	VI-6.1		1		1		3	MR & IEQ credits	3	Preservation Zone 2	3		5	Increases revenue potential	3		
C-IR-7	Renovate: Kitchen facility	Y	N	VI-7.3.4	VI-6.1									Preservation Zone 3							
C-HR-1	Restore: North Ramp exhibit area	Y	Y	VI-7.3.4	VI-4.2	VI-6.1	1		1		1		5	Preservation Zone 1	3		4	Increases marketability	2	Relatively expensive	
C-HR-2	Restore/upgrade: Rookwood Ice Cream shop	Y	Y	VI-7.3.4	VI-4.2	VI-6.1	1		1		1		5	Preservation Zone 1	2		1		2	Relatively expensive	
C-HR-3	Restore/upgrade: Newsreel Theatre including original seating restoration	Y	Y	VI-7.3.4	VI-4.2	VI-6.1	1		1		1		5	Preservation Zone 1	2		5	Increases revenue potential	2	Relatively expensive	
	Acoustic treatments: Newsreel Theatre	AY	Y	VI-4.5.2			1		1		1		1		2		3		3		
C-HR-4	Restore/upgrade: Rotunda	Y	Y	VI-7.3.4	VI-4.5.2	VI-6.1	3	Most significant space	1		1		5	Preservation Zone 1	4		4	Increases marketability	3		
	Acoustic treatments: Rotunda	AY	Y	VI-4.5.2			1		1		1		1		4		3		2		
C-HR-5	Restore/upgrade: President's office, Secretary's office, and Board of Director's room	Y	Y	VI-7.3.4	VI-4.2	VI-6.1	1		1		1		5	Preservation Zone 1	2		2	Administration use.	2		
C-HR-6	Convert: Amtrak waiting area to Meeting/Event	Y	Y	VI-7.3.4	VI-4.2	VI-6.1	1		1		1		5	Preservation Zone 1	2		5	Increases revenue potential	2		
C-HR-7	Restore/upgrade: Collett Gallery	Y	Y	VI-7.3.4	VI-4.5.2	VI-6.1	1		1		1		5	Preservation Zone 1	2		5	Increases revenue potential	2		
	Acoustic treatments: Collett Gallery	AY	Y	VI-4.5.2			1		1		1		1		2		3		3		
C-HR-8	Renovate: current exposed structure to expanded meeting & event area	Y	Y	VI-7.3.4	VI-6.1		1		1		3	MR & IEQ credits	3	Preservation Zone 2	2		5	Increases revenue potential	2		
C-HR-9	Restore/upgrade: finishes at Cincinnati & Losantiville Dining Rooms	Y	P	VI-7.3.4	VI-4.5.2	VI-6.1	1	Cincinnati DR -Project 1	1		1		5	Preservation Zone 1	2		5	Increases revenue potential	2		
	Acoustic treatments: Cincinnati & Losantiville Dining Rooms	AY	P	VI-4.5.2			1		1		1		1		2		3		3		
C-HR-10	Restore: South Ramp exhibit area	Y	Y	VI-7.3.4	VI-4.2	VI-6.1	3		1		1		5	Preservation Zone 1	3		4	Increases marketability	2		
<b>First Level</b>																					
1-IR-1	Renovate: Museums department offices	Y	Y	VI-7.3.5	VI-6.1		1		1		3	MR & IEQ credits	1	Preservation Zone 3	1		3		2	Avg. cost/minimal value	
1-IR-2	Renovate: Creation of private offices	Y	Y	VI-7.3.5	VI-6.1		1		1		3	MR & IEQ credits	1	Preservation Zone 3	1		3		2	Avg. cost/minimal value	
1-IR-3	Renovate: create modern business conference center and meeting spaces	Y	Y	VI-7.3.5	VI-6.1		1		1		3	MR & IEQ credits	1	Preservation Zone 3	1		5	Increases revenue potential	3		
	Historic Restoration of period bathrooms	Y	Y	VI-4.4.12	VI-6.1		1		1		1		5	Preservation Zone 1	3		3		2	Relatively expensive	
1-HR-1	Renovate: private dining rooms including modernization of systems	Y	N	VI-7.3.5	VI-6.1								MR & IEQ credits		Preservation Zone 1						
<b>Second Level</b>																					
2-IR-1	Renovate/upgrade: areas for administration offices	Y	Y	VI-7.3.6	VI-6.1		1		1		3	MR & IEQ credits	1	Preservation Zone 3	1		3		2	Avg. cost/minimal value	
2-IR-2	Renovate/upgrade: areas for administration offices	Y	Y	VI-7.3.6	VI-6.1		1		1		3	MR & IEQ credits	1	Preservation Zone 3	1		3		2	Avg. cost/minimal value	
<b>Third Level</b>																					
3-IR-1	Renovate/upgrade: areas for administration offices and restrooms	Y	Y	VI-7.3.7	VI-6.1		1		1		3	MR & IEQ credits	1	Preservation Zone 3	1		3		2	Avg. cost/minimal value	
3-IR-2	Renovate/upgrade: areas for admin. offices	Y	Y	VI-7.3.7	VI-6.1		1		1		3	MR & IEQ credits	1	Preservation Zone 3	1		3		2	Avg. cost/minimal value	

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								Comment		Comment		Comment		Comment		Comment		Comment		Comment
<b>D</b>	<b>Building Services</b>																			
	<b>Conveying</b>																			
		Replacement and extension of elevator to fifth floor	Y	Y	VI-7.3.8		3		1		1		1		5		4	Increases revenue potential	1	Relatively high cost
	<b>Plumbing</b>																			
	Water Service																			
	1	Primary: One 8-inch main entering at the NW corner. Good condition - no work anticipated.	N																	
	2	Secondary: Main entering at the SE corner used for irrigation. Good condition - no work anticipated.	N																	
	Public Restrooms																			
	1	New Public Restrooms to be installed serving the Lower Level Cincinnati History Museum	Y	Y	VI-4.4.4.1		3		1		3	WE credits	1		3		3		3	
	2	First Level Period Restrooms to be restored to operational use	Y	Y	VI-4.4.4.1		3		1		3	WE credits	5		3		3		3	
	3	Replace existing plumbing fixtures with energy efficient water saving fixtures	Y	Y	V1- pg 11		3	Increased Life Expectancy	4	Reduces operating costs	3	WE credits	1		2		2		3	
	Storm Drainage																			
	1	Replace roof drain basket covers.	Y	Y	VI-4.4.4.2		4	Roof drain covers are deteriorating. An estimated 25% are broken.	3	Reduces maintenance	1		1		2		1		4	Relatively low cost
	2	Replace existing interior storm drainage system	Y	Y	VI-4.4.4.2	VI-4.1.3	5	Existing is original cast iron with repairs made with PVC piping.	3	Reduces maintenance	2	SS credits	1		3		1		4	
	3	Replace roof drain leaders in exterior walls	Y	P	VI-4.1.3		5	Integral to exterior masonry wall repairs	3	Reduces maintenance	2	SS credits	1		4	Integral to masonry restoration	1		4	
	4	Upgrade roof drainage system to provide for secondary overflow per code	Y	Y	VI-4.4.4.2		4	Provides Redundancy	1	Increased Maintenance	2	SS credits	1		3		1		3	
	Sanitary Drainage																			
	1	Replace existing sanitary sewer drains and vents (fair condition) as part of other building renovations	Y	Y	VI-4.4.4.3		3	Increased Life Expectancy	3	Reduces Maintenance	2	WE credits	1		3		1		3	
	Domestic Water Heating																			
	1	Replace the existing domestic water heating system with a more efficient system.			----		3	Increased Life Expectancy	4	Reduces Maintenance	4	WE + EA credits	1		2		1		3	
	<b>HVAC</b>																			
	<b>Central Cooling Plant</b>																			
	Chillers: Two (2) R-11 water cooled at 360 tons each																			
	1	Modify Air Handling Units / Zones to Reduce 24/7 usage	Y	Y	VII-4.A		4		5	Reduces Operating Costs	5	EA + IEQ Credits	1		3	Provides better zone control	4		4	
	2	Modify / isolate existing Chillers to allow for Ice Production and Chilled Water Production	Y	Y	VII-4.A		4		5	Reduces Operating Costs	5	EA + IEQ Credits	1		3		3		4	
	3	Convert the Primary Ice Production Pump from Constant Volume to Variable Volume	Y	Y	VII-4.A		4		5	Reduces Operating Costs	4	EA + IEQ Credits	1		3		3		5	
	4	Install new chilled water system isolation valves to allow chiller plant piping to be isolated from the building piping	Y	Y	VI-4.4.1.1		3		4	Reduces maintenance	4	EA + IEQ Credits	1		3		3		4	
	5	Replace existing chillers. Provide redundancy and to meet the future anticipated loads	Y	Y	ES-11	VI-7.3.2	4	Increased Life Expectancy. Provides redundancy and future expansion	5	Reduces operating costs. Reduces maintenance	4	EA + IEQ Credits. More efficient units that utilize environmentally friendly refrigerant.	1		3		3		4	
	Primary CHW Pumps: Two (2) at 25 HP each																			
	1	Replace existing primary chilled water pumps. Replacement pumps to provide redundancy	Y	Y	ES-11	VI-7.3.2	4	Increased Life Expectancy. Provides redundancy and future expansion	4	Reduces operating costs. Reduces maintenance	3	EA + IEQ Credits	1		3		1		3	
	Secondary CHW Pumps: Two (2) at 75 HP each																			

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								<b>Comment</b>		<b>Comment</b>		<b>Comment</b>		<b>Comment</b>		<b>Comment</b>		<b>Comment</b>		<b>Comment</b>
	1	Replace existing AAF Variable Speed Drives.	Y	Y	VI-4.4.1.1	VI-7.3.2		4 Drives are estimated to be at the end of their serviceable life	4	Reduces operating costs. Reduces Maintenance costs	3	EA + IEQ Credits	1		3		1		3	
	2	Replace existing secondary chilled water pumps to meet facility zoning.	Y	Y	ES-11	VI-7.3.2		4 Replacement pumps to provide redundancy	4	Reduces operating costs. Better Zone Control	3	EA + IEQ Credits	1		3		1		3	
		Cooling tower																		
		One with Two (2) 20HP Fans and one common sump																		
	1	Install new cooling tower adjacent to the existing cooling tower	Y	Y	VI-4.4.1.1	VI-7.3.2		4 Increased Life Expectancy	4		4	EA + IEQ Credits	1		4		3		4	
	2	Remove existing cooling tower and install new tower after item #1 tower is installed and operational.	Y	Y	VI-4.4.1.1	VI-7.3.2		4 Second cooling tower will provide redundancy. Increased Life Expectancy	4		4	EA + IEQ Credits	1		4		3		3	
		Condenser Water Pumps: Two (2) at 20 HP each																		
	1	Replace existing condenser water pumps. Replacement pumps to provide redundancy	Y	Y	ES-11			4 Increased Life Expectancy. Provides redundancy	4	Reduces maintenance	3	EA + IEQ Credits	1		4		3		4	
		Ice Storage (Production): 16 Tanks at 190 Ton-Hours each																		
	1	Install new ice storage pumps; one to replace the existing pump (estimated 5 year life) and one to provide for redundancy	Y	Y	VI-4.4.1.1	VI-7.3.2		4 Increased Life Expectancy. Provides redundancy	4	Reduces Maintenance	4	EA + IEQ Credits	1		4		3		3	
	2	Modify existing control valve arrangement to reduce ice usage	Y	Y	VI-4.4.1.1			4	Reduces operating costs.	4	EA + IEQ Credits	1		3		3		3		
	3	Replace existing ice storage plant. Expand capacity of the ice storage plant to allow for off peak production.	Y	Y	ES-11			4 Increased Life Expectancy.	4	Plant to provide energy savings and operating efficiency.	4	EA + IEQ Credits. Plant to provide energy savings and operating efficiency.	1		3		3		4	
		Piping and accessories: Replace existing central plant chilled water piping wherever possible. Replace all existing valves and accessories.	Y	Y	ES-11	VI-7.3.2		3 Increased Life Expectancy	3	Reduces Maintenance	2	EA + EQ Credits	1		3		2		3	
		CHW Media																		
	1	Media: 15% ethylene Glycol. Provide new isolation valves & replace existing leaking isolation valves to isolate plant piping from building piping			VI-4.4.2			4 Minimize system drain down for glycol replacement. Increased Life Expectancy.	4	Reduces maintenance. Reduces operating costs	2	EA credits	1		3		3		4	
	2	Provide automatic glycol fill system after Item 1 has been completed						3 Increased Life Expectancy	3	Reduces maintenance.	2	EA credits	1		3		3		4	
		<b>Central Heating Plant</b>			VI-4.4.1.2															
		Replace the existing hot water central plant with more efficient modular boilers.	Y	Y	ES-11	VI-7.3.2		5 Expand the plant capacity to proved redundancy and to meet the facility's anticipated loads. Increased Life Expectancy.	5	Reduces operating costs. Reduces maintenance costs. Better Zone Control	4	EA + IEQ Credits. New boilers to provide energy efficient operation.	1		3		3		4	
		Primary HW Pumps: Three (3) at 10 HP each																		
	1	Pump P-9 (250 GPM: Pump alignment to be corrected.	Y	Y	VI-4.4.1.2	VI-7.3.2		3 Increased Life Expectancy	4	Reduces Maintenance costs	3	EA + IEQ Credits	1		2		2		3	
	2	Pump P-10 (250 GPM: Pump alignment to be corrected.	Y	Y	VI-4.4.1.2	VI-7.3.2		3 Increased Life Expectancy	4	Reduces Maintenance costs	3	EA + IEQ Credits	1		2		2		3	
	3	Replace existing primary hot water pumps.	Y	Y	ES-11	VI-7.3.2		4 Replacement pumps to provide redundancy. Increased Life Expectancy.	4	Reduces operating costs. Reduces maintenance costs	3	EA + IEQ Credits	1		3		3		4	

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								Comment			Comment				Comment				Comment			Comment
		Secondary HW Pumps: 5 pairs																				
	1	Replace existing secondary hot water pumps. Secondary zones to more closely match the facility operations.	Y	Y	ES-11	VI-7.3.2		4	Replacement pumps to provide redundancy. Increased Life Expectancy	4	Reduces operating costs. Reduces maintenance costs	2	EA + IEQ Credits	1		3		3		3		3
		Piping and Accessories: Replace existing central plant hot water piping wherever possible	Y	Y	ES-11	VI-7.3.2		3	Increased Life Expectancy	3	Reduces maintenance costs	2	EA + IEQ Credits	1		3		2		3		3
		Steam Boilers: Two (2) at 3.312 MBH output each																				
		Remove Steam boilers and heating system. Facility heating needs be provided by the upgraded hot water central plant	Y	Y	VI-4.4.1.2	ES-11	VI-7.3.2	4	Existing steam boilers are estimated to require re-tubing in the next two to three years.	4	Reduces operating costs. Reduces maintenance costs. Provides for better zone control	3	EA + EQ Credits	1		3		3		3		4
		Replace Vacuum Condensate Pump: 1 Duplex unit. Not required if entire steam heating system is to be replaced	N	Y	VI-4.4.1.2	VI-7.3.2			Steam boilers to be operated at a lower pressure (4 PSI)		Reduces operating costs. Reduces maintenance costs. Provides for better zone control		EA + EQ Credits									
		Remove Boiler Feed Pumps if entire Steam Heating system is to be replaced with a hot water heating system	Y	Y	VI-7.3.2			4	Increased Life Expectancy	4	Reduces operating costs. Reduces maintenance costs. Provides for better zone control	3		1		3		3		3		4
		Remove Multiple Condensate Pumps if the entire steam heating system is to be replaced with a hot water heating system	Y	Y	VI-7.3.2			4	Increased Life Expectancy	4	Reduces operating costs. Reduces maintenance costs. Provides for better zone control	3		1		3		3		3		4
		<b>Air Handling Units and Zones</b>			VI-4.4.1.3																	
		Central Station AHUs: Eight (8) Units																				
	1	AC-1B (44,000 CFM) - Remove Small Changing Exhibit Hall. Install New AHU. New unit to operate 24/7. AC-1B to operate during occupied times	Y	Y	VII- 4.A	VI-7.3.2	ES-11	5	Increases Zone Control. Increased Life Expectancy	4	Reduces operating costs	3	EA + EQ Credits	1		3		3		3		4
	2	AC-3 (88,000 CFM) - Remove Large Changing Exhibit Hall. Install New AHU. New unit to operate 24/7. AC-3 to operate during occupied times	Y	Y	VII- 4.A	VI-7.3.2	ES-11	5	Increases Zone Control. Increased Life Expectancy	4	Reduces operating costs	3	EA + EQ Credits	1		3		3		3		4
	3	AC-3 - Add new VAV Control Units with Hot Water Heating Coils for zone control of non critical areas.	Y	Y	VII- 4.A	VI-7.3.2	ES-11	4	Increases Zone Control	4		3	EA + EQ Credits	1		3		3		3		4
	4	AC-7 (44,000 CFM) - Remove Amtrak Station. Install New Direct Expansion AHU. New unit to operate 24/7. AC-7 to operate during occupied times	Y	Y	VII- 4.A	VI-7.3.2	ES-11	5	Increases Zone Control. Increased Life Expectancy	4	Reduces operating costs	3	EA + EQ Credits	1		3		3		3		4
	5	AC-8 (250 CFM) - Special Unit serving the Bat Cave. Refurbish and clean due to bat guano odor.	Y	Y	VI-4.4.1.1	VI-7.3.2	ES-11	4	Necessary	4	Reduces Maintenance	3	EA + EQ Credits	1		3		3		3		4
	6	Replace the remaining existing central station air handling units.	Y	Y	ES-11	VI-7.3.2		4	Increased Life Expectancy. Increases zone control.	4	Reduces operating costs. Reduces maintenance costs	3	EA + EQ Credits	1		3		3		3		4
		Modular AHUs																				
	1	AC-9 (4,000 CFM) - Estimated to be at the end of its useful life. Unit to be replaced	Y	Y	VI-4.4.1.1	VI-7.3.2		5	Necessary. Increased Life Expectancy	4	Reduces Maintenance costs. Should decrease operating costs	2	EA + EQ Credits	1		3		2		2		4
	2	AC-10 (4,000 CFM) - Estimated to be serviceable for 3 years. Unit should be replaced	Y		VI-4.4.1.1	VI-7.3.2		5	Necessary. Increased Life Expectancy	4	Reduces Maintenance costs. Should decrease operating costs	2	EA + EQ Credits	1		3		2		2		4
	3	AC-15A (4,500 CFM) - Very noisy. Estimated to be serviceable for 3 years. Unit should be replaced	Y	Y	VI-4.4.1.1	VI-7.3.2		5	Necessary. Increased Life Expectancy	4	Reduces Maintenance costs. Should decrease operating costs	2	EA + EQ Credits	1		3		2		2		4
	4	AC-15B (4,500 CFM) - Very noisy. Estimated to be serviceable for 3 years. Unit should be replaced	Y	Y	VI-4.4.1.1	VI-7.3.2		5	Necessary. Increased Life Expectancy	4	Reduces Maintenance costs. Should decrease operating costs	2	EA + EQ Credits	1		3		2		2		4
	5	Replace the remaining existing modular air handling units.	Y	Y	ES-11	VI-7.3.2		4	Increased Life Expectancy	4	Reduces Maintenance costs. Should decrease operating costs	2	EA + EQ Credits	1		3		2		2		4
		Roof Top AHUs																				

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							Comment		Comment		Comment		Comment		Comment		Comment		Comment
	1	AC-16A thru AC-16E (4,000 CFM) - Cooling Only. Replacement parts are difficult to obtain. Units are estimated to be in poor condition. (2) Units inoperable, all should be replaced	Y	N	VI-4.4.1.1		Replaced in 2009.		Reduces maintenance costs. Should decrease operating costs. Provides better zone control.										
	2	AC-16F thru AC-16J (4,000 CFM) - Cooling Only. Replacement parts are difficult to obtain. Units are estimated to be in poor condition. (2) Units inoperable, all should be replaced	Y	N	VI-4.4.1.1		Replaced in 2009.		Reduces maintenance costs. Should decrease operating costs. Provides better zone control.										
	3	AC-21 (9,000 CFM) - Estimated to be serviceable for 3 years. Unit should be removed and replaced with an indoor unit if possible. IF Replaced the unit will need to be integrated into the Rotunda smoke Purge system	Y	Y	VI-4.4.1.1	5	Necessary. Increased Life Expectancy.	4	Reduces maintenance costs. Should decrease operating costs. Provides better zone control.	2		1		3		2		4	
	4	AC-22 (15,000 CFM) - Estimated to be serviceable for 3 years. Unit should be replaced. Unit can not be removed as it serves the cafeteria and there is no alternate location available.	Y	Y	VI-4.4.1.1	5	Necessary. Increased Life Expectancy.	4	Reduces maintenance costs. Should decrease operating costs. Provides better zone control.	2		1		3		2		4	
	5	Remove existing roof top units where possible	Y	Y	ES-11	4	Replace with indoor air handling units sized and zoned for the space or spaces served. Increased Life Expectancy.	4	Reduces maintenance costs. Should decrease operating costs. Provides better zone control.	2		1		3		2		4	
<b>Fire Protection</b>																			
		Fire Pumps: each fire pump can handle flow for the entire facility																	
	1	One Primary Pump Located adjacent to the existing boiler room. Replace as renovation progresses	Y	Y	V1-4.4.5	3	Increased Life Expectancy	3	Reduces maintenance costs	1		1		3		1		3	
	2	One Primary Pump Located in the west next to Dalton Street. Replace as renovation progresses	Y	Y	V1-4.4.5	3	Increased Life Expectancy	3	Reduces maintenance costs	1		1		3		1		3	
		Fire Zone - Halon																	
	1	Replace Hauck Vault Halon Fire Suppression System	Y	Y	V1-4.4.5.1	5	Necessary - Obsolete per code	5	Necessary - Obsolete per code	5	Necessary - Obsolete per code	5	Necessary - Obsolete per code	5	Necessary - Obsolete per code	5	Necessary - Obsolete per code	5	Necessary - Obsolete per code
		Fire Zone - Dry system																	
	1	Replace the existing Dry Systems and Equipment as required to accommodate the renovation	Y	Y	V1-4.4.5.1	3	Increased Life Expectancy	2		1		1		3		1		3	
		Fire Zone - Pre-action																	
	1	Replace the existing Pre-action Systems and Equipment as required to accommodate the renovation	Y	Y	V1-4.4.5.1	3	Increased Life Expectancy	2		1		1		3		1		3	
		Fire Zone - Wet																	
	1	Replace the existing Wet Systems and Equipment as required to accommodate the renovation	Y	Y	V1-4.4.5.1	3	Increased Life Expectancy	2		1		1		3		1		3	
		Smoke Purge																	
	1	Modification of existing and proposed new systems and equipment necessary for renovation	Y	Y	V1-4.4.5.1	3	Upgrades Life safety. Increased Life Expectancy	2		1		1		3		1		3	
	2	Replace Rotunda beam smoke detectors for Smoke Purge system as needed.	Y	Y	V1-4.4.5.1	3	Upgrades Life safety. Increased Life Expectancy	2		1		1		3		1		3	
<b>Electrical</b>																			
		Service: Two (2) 12.47 KV-480 V, 3 phase services from Duke Energy: Primary + back up. Current peak demand loading on the system is less than 50% capacity.	N	Y	VI-4.4.3		Duke Energy must be kept up to date as to increases in electrical usage		Upgrading should be minimal or no cost to owner. Utility owned equipment.										
		Main Switch gear: Obsolete. Replace	Y	Y	VI-4.4.3	4	Ample capacity, but replacement of an existing power breaker would require custom retrofit	4		1		1		4		3		3	

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							Comment		Comment		Comment		Comment		Comment		Comment		Comment
		Distribution: (28) existing 480 V 3 phase risers to local 480V-208/ 120V stepdown transformers and local branch panelboards.	Y	Y	VI-4.4.3	4	Upgrade to accommodate new loads. New feeder bus maybe required in renovated areas.	1		1		1		4		3		3	
1		Relocation and/or upgrade of existing distribution system and equipment as part of the proposed renovations.	Y	Y		4	Required for renovation	1		1		1		4		3		2	
2		Addition of new distribution system and equipment needed as part of the proposed renovations.	Y	Y		4	Required for renovation	1		1		1		4		3		3	
<b>Emergency Power System</b>																			
1		Replace the generator and emergency switchboard and transfer switches.	Y	Y	VI-4.4.3	3	Required for future life safety. Renovations may increase load.	2		1		1		3		3		2	
		Enhanced power outlets in Rotunda	Y	Y	VI-4.8.3	2		2		1		1		3		4		3	
<b>Lighting</b>																			
		Theatrical lighting & dimming: Rotunda	N	Y	VI-4.8.3														
		Historic Custom Lighting																	
		Lighting: Rotunda	Y	Y	VI-4.9.12a	4	Most significant space	2		3	IEQ credits	5	Per Preserv. Standards	3		4	Increased marketability	3	
		Lighting: Losantiville dining	Y	Y	VI-4.9.12a	3		2		3	IEQ credits	5	Per Preserv. Standards	3		3		2	
		Lighting: Collette Gallery	Y	Y	VI-4.9.12a	3		2		3	IEQ credits	5	Per Preserv. Standards	3		3		2	
		Lighting: Cincinnati Dining Room	Y	N	VI-4.9.12a								Per Preserv. Standards						
		Lighting: Private Dining	Y	Y	VI-4.9.12a	3		2		3	IEQ credits	5	Per Preserv. Standards	3		3		2	
		Lighting: Presidents Office	Y	Y	VI-4.9.12a	3		2		3	IEQ credits	5	Per Preserv. Standards	3		3		2	
		Lighting: Board of Director's Room	Y	Y	VI-4.9.12a	3		2		3	IEQ credits	5	Per Preserv. Standards	3		3		2	
		Lighting: Secretary's Room	Y	Y	VI-4.9.12a	3		2		3	IEQ credits	5	Per Preserv. Standards	3		3		2	
		Lighting: Newsreel Theater	Y	Y	VI-4.9.12a	3		2		3	IEQ credits	5	Per Preserv. Standards	3		3		2	
		Lighting: Façade marquee	Y	Y	VI-4.9.12a	4		2		3	SS Light Pollution Reduction	5	Per Preserv. Standards	3		4	Increased marketability	3	
		Lighting: Exterior Fountain/Plaza	Y	Y	VI-4.9.12a	1		1		3	SS Light Pollution Reduction	5	Per Preserv. Standards	3		4	Increased marketability	3	
		Lighting: Exterior Entry Drive/Parking	N	Y	VI-4.9.12a						SS Light Pollution Reduction								
		Dalton St. decorative lighting at storefront	Y	Y	VI-9.6	3		1	Increases maintenance	3	SS Light Pollution Reduction	5	Per Preserv. Standards	3		1		3	
		Dalton St. Area safety lighting	Y	Y	VI-9.6	3		2		3	SS Light Pollution Reduction	3		3		3		3	
		General Interior lighting: As necessary per building Interiors above	Y	Y	VI-7.3	3		1		3	IEQ credits	1		2		3		3	
<b>Communications</b>																			
1		Telecommunications																	
		Switch: Existing switch will provide coverage for renovation	Y	Y			Existing Switch adequate for renovation												
		Equipment Room: Expanded punchdown and patch racks as upgrades required	Y	Y		3	Upgrade with renovation	1		1		1		4		4		3	
		Equipment Closets located at area served. Will require replacement or renovation as renovation in area requires.	Y	Y		3	Equipment closet required within 90 meters of devices serviced	1		1		1		3		4		3	
		Cables: Existing Copper with fiber trunk links. Permis copper cables installed open not protected. New copper cable and fiber links required as renovation dictates	Y	Y		3		1		1		1		3		3		3	
2		Data Networks																	
		Network existing with switches, patch panels and racks in remote phone closets. Replace Network, servers and racks	Y	Y		3		1		1		1		3		3		3	
		Wireless network limited to third floor. Expand as renovation requirements dictate.	Y	Y		3		1		1		1		3		3		3	
		Audio-Visual expand Network to accommodate	Y	Y		3		1		1		1		3		3		3	

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								Comment		Comment		Comment		Comment		Comment		Comment		Comment
	3	Cable TV exist on first level only upgrade and install as renovation projects require	Y	Y			3		1		1		1		3		3		3	
<b>Security</b>																				
		Existing system consists of card access, intrusion detection and closed circuit camera monitoring, on site security staff. The system is relatively new.																		
		Security lighting: Existing inadequate upgrade internal and external	Y	Y			5		2		1		1		2		2		3	
		Egress Monitoring: Inadequate - upgrade monitoring	Y	Y			4		2		1		1		2		2		3	
		Elevators: Isolate elevator usage to public or staff	Y	Y			4		2		1		1		3		2		3	
<b>Building Energy Management</b>																				
		Install new state of the art DDC Energy Management system	Y	Y	VI-4.4.2 ES-11		3		5	New system to provide energy efficient operation.	5	EA + EQ Credits. New system to provide energy efficient operation.	1		3		3		5	
<b>Fire Alarm System</b>																				
	1	System estimated to be at the end of its operating life. The existing Notifier Panel to be replaced with a newer model	Y	Y	VI-4.4.6		4		3		1		1		3		2		3	
	2	Replace all smoke detectors and sensors	Y	Y	VI-4.4.6		4		3		1		1		3		2		3	
	3	As Air handling units are replaced new smoke detectors to be installed	Y	Y	VI-4.4.6		4		3		1		1		3		2		3	
	4	The entire fire alarm system to be replaced with an state of the art expandable and addressable system	Y	Y	VI-4.4.6		4		3		1		1		3		2		3	
<b>E Equipment and Furnishings</b>																				
		AV Equipment: Rotunda	Y	Y	VI-4.5.2	VI-4.8.3	1		1		1		1		2		3		1	
		AV Equipment: Newsreel Theater	Y	Y	VI-4.5.2	VI-4.8.12	1		1		1		1		2		3		1	
		AV Equipment: Collette Gallery	Y	Y	VI-4.5.2	VI-4.8.4	1		1		1		1		2		3		1	
		AV Equipment: Losantiville Dining	Y	Y	VI-4.5.2	VI-4.8.6	1		1		1		1		2		3		1	
		AV Equipment: Cincinnati Dining	Y	N	VI-4.5.2	VI-4.8.5														
		AV Equipment: Reakirt Auditorium	Y	Y	VI-4.5.2	VI-4.8.11	1		1		1		1		2		3		1	
		AV Equipment: Presidents Office	Y	Y	VI-4.8.10	VI-7.3.4	1		1		1		1		2		3		1	
		AV Equipment: Board of Director's Room	Y	Y	VI-4.8.10	VI-7.3.4	1		1		1		1		2		3		1	
		AV Equipment: Secretary's Room	Y	Y	VI-4.8.10	VI-7.3.4	1		1		1		1		2		3		1	
		AV Equipment: Exterior	Y	Y	VI-4.5.2		1		1		1		1		2		3		1	
		AV Equipment: Various Spaces	Y	Y	VI-4.8.7-9		1		1		1		1		2		3		1	
		AV Equipment: Amtrak Station	Y	Y	VI-4.8.13		1		1		1		1		2		3		1	
		AV Equipment: Public landing	Y	Y	VI-4.8.14		1		1		1		1		2		3		1	
		AV Equipment: Exterior Plaza	Y	Y	VI-4.8.15		1		1		1		1		2		3		1	
		AV Equipment: Roof deck	Y	Y	VI-4.8.16		1		1		1		1		2		3		1	
		AV Equipment: General	Y	Y	VI-4.8.17		1		1		1		1		2		3		1	
		Emergency Egress Monitoring Equipment	Y	Y	VI-4.6		4	General safety/security	1		1		1		2		2		3	
		Vehicular Detection System: Western Ave.	Y	Y	VI-4.6		4	General safety/security	1		1		1		2		2		3	
<b>F Special Construction / Demolition</b>																				
		Hazardous Materials Abatement - Dalton Street	Y	Y	VI-9.6		5	Life-safety	5		5		5		5		5		5	
		Hazardous Materials + Lead paint Abatement - Interior - As required	Y	Y	VI-9.4		5	Life-safety	5		5		5		5		5		5	
		Site & selective building demolition for Planetarium addition	N	Y																
		Site & selective building demolition for Exhibit Workshop addition	N	Y																
		Artwork Restoration (Canvas Murals)	AY	P	VI-4.2		1		1		1		5	Preservation Zone 1 - typical	5		2		3	

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								Comment			Comment				Comment			Comment			Comment
		Exhibit Construction and Installation																			
LL-E-1	Installation in new black box space	Y	Y	VI-7.3.2			1		1			1					2				
LL-E-2	Installation in renovated black box space	Y	Y	VI-7.3.2			1		1			1					2		4	Increased marketability	2
LL-E-3	Installation in new black box space	Y	Y	VI-7.3.2			1		1			1					2		4	Increased marketability	2
LL-E-4	Renovate existing exhibit	Y	Y	VI-7.3.2			1		1			1					2		4	Increased marketability	2
M-E-1	Renovate existing (2) independent exhibits into new connected exhibit	Y	Y	VI-7.3.3	VI-6.1		1		1			1					2		4	Increased marketability	2
CE-1	New exhibit in restored ramp area	Y	Y	VI-7.3.4			1		1			1					2		4	Increased marketability	2
CE-2	New exhibit in restored ramp area	Y	Y	VI-7.3.4			1		1			1					2		4	Increased marketability	2
5-E-1	New Control tower exhibit	Y	Y	VI-7.3.8			1		1			1					2		4	Increased marketability	2
<b>G</b>	<b>Sitework</b>																				
	Fountain: Repair and replacement	Y	Y	VI-4.3.3	ES-49	VI-5.05	1		2			3	Possible WE credit	5	Per Preserv. Standards		4		4	Increased marketability	3
	North and South Retaining wall repairs	N	Y	VI-4.3.3	VI-5.05	VI-9.3-5									Per Preserv. Standards						
	Renovate N&S Stairs to Dalton St.	N	Y	VI-5.05		VI-9.4									Per Preserv. Standards						
	Decorative Fencing at retaining walls	N	Y	VI-5.06											Per Preserv. Standards						
	New Pedestrian Walks	N	Y	VI-5.06		VI-9.5									Per Preserv. Standards						
	Replace Flagpoles	N	Y	VI-5.06	ES-49	VI-9.5									Per Preserv. Standards						
	New drainage/site irrigation system	N	Y			VI-9.5															
	New outdoor electrical/wireless system	N	Y			VI-9.5															
	New signage system	N	Y			VI-9.5															
	Re-paving program	N	Y	VI-5.07	ES-49	VI-9.5							SS Credits								
	Site Restoration: Landscaping	N	Y	VI-5.06	ES-49	VI-9.5							SS Credits								
	Geothermal System	N	Y	RMJM	ES-26	VI-9.2							See note 6								
<b>Z</b>	<b>General/Other</b>																				
	Ongoing inspections of domed roof: Interior + Exterior	Y	N	VI-4.1.3				See note 7													
	Asbestos Operations and Management Plan	Y	N	VI-4.10				See note 7													
<b>Notes</b>																					
1	Eligible: Work scopes that are "eligible" for funding from proposed tax bond levy. Work scopes that have been implemented since publishing of MP and those that are included in Project 1 have received financial support via current tax levy and are not eligible.																				
2	References: Volume and Section Number. "RSA" = Robert Silman Associates Drawings. "ES" = Executive Summary & page number																				
3	Per Preservation Standards: Building envelope and major site elements generally are all historically significant																				
4	Preservation Zones: Matches the zones designated and described in Section 6 of the Master Plan																				
	Zone 1: Historically Significant																				
	Zone 2: Previously Modified Historic Areas. Modifications shall be respectful of historic context and be readily identifiable as new.																				
	Zone 3: New construction																				
5	Abbreviations: Y = Yes, AY= Assumed Yes, N = No, AN = Assumed No, P = Partial (work included in Project 1). Scope Assumptions: Work not explicitly stated as included or excluded in the Master Plan, but that can be reasonably inferred.																				
6	EAc2 On-Site Renewable Energy. Geo-Exchange (ground source heat pump) systems are not eligible but can help with EA + EQ credits																				
7	Facility Operations and Maintenance items are not evaluated. Not a capital expense.																				
8	Life-Safety and significant code items are considered top priority and have been rated 5 in all categories.																				
9	Rating Range: 1) Insignificant, Unimportant; 2) Minimal, Inferior; 3) Fair, Average; 4) Good, Improved; 5) Superior, Excellent																				