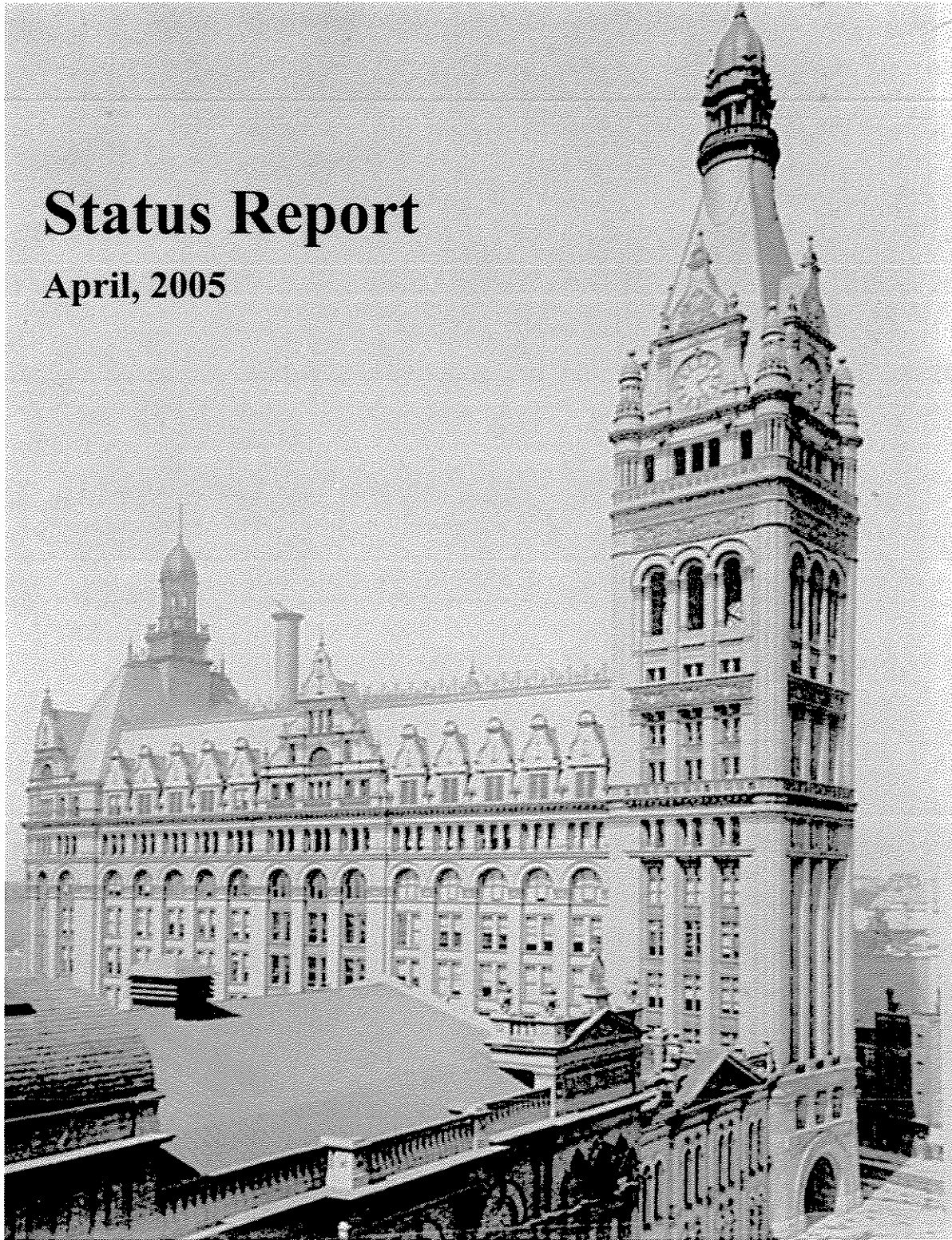


Status Report

April, 2005



Milwaukee City Hall Historic Building Restoration

Department of Public Works
Operations Division
Buildings and Fleet Services

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1. Executive Summary

The Department of Public Works is providing information on the status and progress of the Milwaukee City Hall Historic Building Restoration Project. The recently submitted construction bids have exceeded the cost estimate, placing the project in a precarious funding position. This report makes every effort to provide the current and background information needed for the Mayor's Office and the Common Council to make responsible decisions that are fiscally sound and appropriate for the restoration of this National Historic Landmark.

The planning for this restoration project included investigations, explorations, monitoring, analysis, and reviews over a four-year period that led to the development of the design approach and contract documents. It was estimated to cost approximately \$34.0 million to do the construction restoration/repair work on Milwaukee City Hall. The construction bids received on March 10, 2005, exceeded the construction estimate by over 76%. This report provides an reasons for the substantial difference between the actual bids and cost estimate and update on the status of the project.

The research was done by the Engberg Anderson Design Partnership Team (EADP), the local architectural firm leading this restoration project, and Prism Technical Management & Marketing Services (Prism), the local firm monitoring the project's construction participation provisions. They assisted the Department of Public Works (DPW) in determining the reasons for the difference in the actual bids and the cost estimate. This was a formidable challenge because the investigation was limited by the City Attorney's directive prohibiting contact with the two bidders while the bids were still under consideration.

Four major factors have come to the forefront of this research.

1. Lack of competitive bids

The cost estimate for this project was based on receiving a minimum of five competitive bids. The city received only two bids. Research has shown that when this occurs, the cost of the project can increase 15%-23%. It is estimated that the lack of competitive bids has added \$5.5-\$8 million to the cost of this project. There appear to be a number of reasons for the lack of bidders. Some contractors had enough work, while others lacked the experience to do restoration work. Another contributing factor was contractors' concern with exceeding their bonding limit. In addition, with the current increase in construction projects in southeast Wisconsin, contractors could have chosen to direct their efforts toward projects that were less challenging.

2. Underestimation of the cost to install the terra-cotta and an unexpected increase in the cost of the terra cotta material

The estimated cost for the terra cotta material was prepared working with the major material manufacturers. It's suspected that increases in the cost of the material, an underestimation of the uncertainties and difficulties with the installation and recording of existing conditions have caused a \$6 million difference in the estimated cost and the bids.

3. Non-bidding contractors inability to meet the RPP requirements

Contractors had a general concern with the availability of RPP workers, especially with the need for special trade skills on this restoration project. Many of the construction trades, where you would typically find potential RPP participation, do not exist on this project. There is also the awareness that the local labor pool is sparse, making it difficult to achieve expected goals. This factor is estimated to have added \$3.0 million to the project's estimated cost.

4. Unpredictable surge in construction costs over the past 12 months

Construction costs were estimated using a 3.5% escalation factor and the actual cost in construction rose 10%. The additional 6.5% would account for a \$2.2 million increase in the estimated cost of the project.

The project team believes these factors account for approximately \$21 million of the \$26 million difference in costs between the bids and the cost estimate.

National Historic Landmark Status

City Hall gained local and national recognition for its historical and architectural significance when it was designated as a local landmark in 1972 and listed on the National Register of Historic Places in 1973. In September 2004, the National Park System Advisory Board's Landmarks Committee reviewed the nomination of Milwaukee City Hall to National Landmark Status in Washington D.C. The Landmarks Committee unanimously approved the nomination.

On April 5th of 2005, the U.S. Secretary of the Interior signed the official documents designating Milwaukee City Hall as a "National Historic Landmark". This prestigious honor is an official recognition bestowed upon places or buildings of extraordinary national significance. Only 3% of the structures listed on the National Register of Historic Places bear this distinction, placing Milwaukee City Hall in a select group of structures in the United States. This truly establishes the national significance of Milwaukee City Hall for its high degree of political and cultural importance, and its distinguishing architectural characteristics of exceptional value.

Current Building Condition

Significant exterior repairs are needed to address aging-related deterioration of key exterior elements of the Milwaukee City Hall such as brick, terra cotta, sandstone, windows, and roofing. If repairs are not performed in the near future, the Milwaukee City Hall will continue to undergo significant deterioration. The upper parts of the four corner turrets of the Tower are severely distressed. Terra cotta soffits at the 7th floor of the Tower and the 9th floor clerestory of the Tower on the east elevation were stabilized with wood bracing. Significant displacements and diagonal cracking in the gables of the Tower related to corrosion of the embedded diagonal steel beams have occurred.

Structural analysis and monitoring of the south tower have determined that the weight of the masonry, in combination with expansion and contraction with temperature changes, have caused cracks to form at the masonry arches over openings and extend deep into these masonry walls. In some cases, these cracks extend over a full story in height, passing from the arches on one level through the massive walls to the level above. These cracks occur through the full thickness of the masonry walls, which are, in some instances, over four feet thick. In many places, members of the interior steel construction have corroded and expanded causing cracks and loosening of the terra-cotta elements and brick masonry.



The main building's gutter line/cornice, located at the base of the eighth floor dormers, leak and allow water to penetrate the exterior walls of the assistant city attorneys' offices. This moisture is continuously saturating these masonry walls causing the interior plaster to deteriorate. Temporary drywall repairs have been made in these areas; however, rebuilding of the gutter line/cornice is imperative. Unless this work is done, moisture will continue to saturate the building's masonry walls and steel members. Embedded steel floor beams will continue to corrode and compromise their structural integrity. The upper portions of the dormers need to be repaired as well. Steel members embedded in the masonry walls have corroded and caused the dormers to crack and lean outward towards the street. To correct these problems, the gutter line / cornice and portions of each dormer must be rebuilt.



Another major concern is the significant damage and loss in the architectural detailing carved into the sandstone on the first and second floors of City Hall. This deterioration is occurring during freeze/thaw cycles and is caused by water entering through open mortar joints and saturating the sandstone. Tuck-pointing is needed to resolve this problem. In addition, cracking has occurred at the ends of some of the supporting sandstone spandrel beams and temporary supports have been placed at locations where large cracks have developed.

Public Safety

Measures to protect the public have been taken in 2001 and 2003. Several temporary emergency stabilization measures were implemented and safety netting was installed as a result of building investigations. The pedestrian canopy was installed at the base of the south tower and netting was installed to snag mortar debris and prevent it from reaching the sidewalk. These types of preventive measures are common practice in the industry for preventing injury to pedestrians. DPW staff monitors this on a weekly basis. If the project is delayed and the restoration does not begin this year, additional preventative measures will need to be taken.

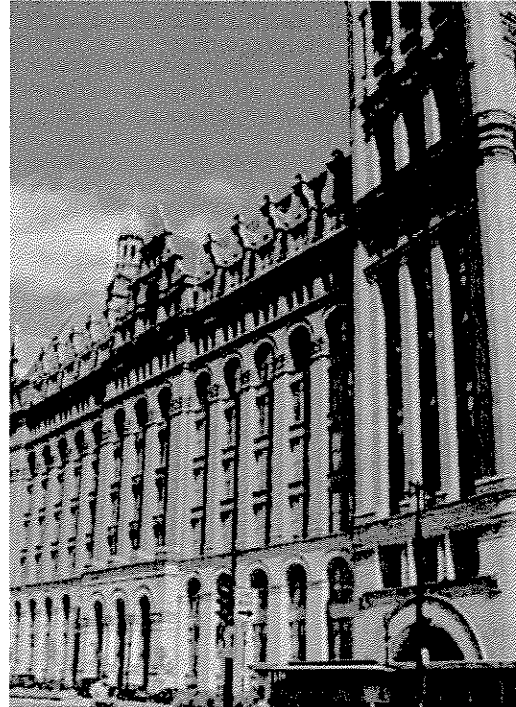


Scope Changes

Changes in the project's scope and the substitution of materials were considered on this project. However, the inherent structural deficiencies in the original design and the current condition of the south tower dictated the need to redesign and rebuild the tower's 12th level and clock dormers. The structural analysis and continuous monitoring of the south tower support this position. Major cracks have developed in the structure over the course of 110 years and these deficiencies need to be addressed. The substitution of materials was limited on this project, recognizing the proven performance of the original materials and the historic significance of City Hall. The missing non essential elements of the building were identified in the contract documents and separated out as unit price items not included in the base bid.

The condition assessment reports and the present condition of City Hall support the project's current scope of work. Changes in the repair approach will not resolve the underlying condition and root problems of the south tower, and eighth floor dormers and gutter line/cornice. These areas account for \$50.7 million in repair costs to the structure. Lessons have been learned from previous re-pointing and "repair" campaigns that have occurred between 1929 and 1973. These campaigns would "repair" the re-occurring problematic mortar and cracking in an effort to provide a watertight exterior. However, the underlying causes for the cracking were not understood at the time the repairs were made and therefore were never addressed. The "remedy" for fixing cracking and spalling of materials was surface repairs that were inadequate and in some cases destructive. Over time, these cracks have developed into a very serious condition that now require the rebuilding of a major portion of the south tower, the eighth floor dormers, and the gutter line/cornice in this restoration campaign.

City Hall's exterior envelope, above the sandstone, is constructed entirely of brick and terra cotta. The brick masonry is used to form the repeating arches, dormers and columns, while the terra cotta is used extensively to create the ornate architectural features. The architect, Henry C. Koch, used terra cotta because it is a durable, lightweight material that provided an affordable means to easily embellish architectural designs. Terra cotta became a major structural component in the make up of the exterior walls. Its hollow construction has substantial load bearing capacity and compressive properties equal to concrete. Terra cotta is far more weather and water resistant than concrete because of the glaze that's applied at the firing process.



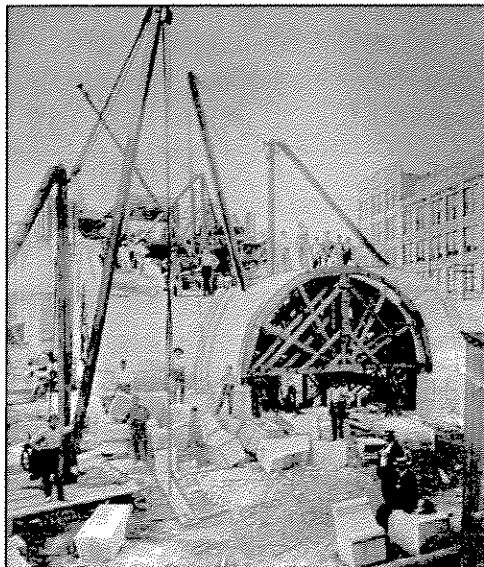
The problems City Hall faces today are not cause by the failure of the terra cotta itself, but by the faulty building construction methods that were used at the time City Hall was built. Embedded steel has corroded, expanded and caused the terra cotta to crack. The restoration design specifies construction materials and present day methods to prevent cracking from reoccurring. In addition, a good cyclical maintenance plan will ensure a long service life for this restoration. Material substitutions were limited due to the historical significance of City Hall. The Secretary of the Interior's Standards for the Treatment of Historic Properties will be followed for the repair or replacement of exterior building materials. These Standards are to be followed when designing and implementing all rehabilitation work to be performed on the exterior envelope. The opportunity for the substitution of materials was limited to core masonry locations. It was allowed in the redesign of the clock dormers and the flat arches where reinforced concrete is being substituted for the core brick masonry material. These locations will have an exterior veneer of face brick and terra cotta to conceal the reinforced concrete material. In addition, the use of through wall flashing is being allowed on this project.

Conclusion

The Milwaukee City Hall Historic Building Restoration Project is very complex. Many challenges will need to be met in restoring this Landmark, preserving its past, and serving the City's diverse community. These challenges can be summarized into four competing entities, all contributing factors of equal importance in the success of this restoration campaign.

- **Architecturally**, this landmark has local and national historic significance with architectural character and detailing that must be preserved or replaced with like materials.
- **Structurally**, this building has been built by simple means and yet, is structurally complex making it costly to repair.
- **Financially**, the City has a formidable task of providing the funding over multiple years.
- **Socially**, the City must continue its efforts to include local involvement in public improvement projects by supporting RPP participation on this restoration project. A challenging yet achievable task, that requires the training of unskilled labor on a project that requires highly skilled trades people.

All of these challenging factors have contributed to the cost of this restoration project or the "sticker shock" from the bids received on March 10, 2005. However, these are also the very factors that will contribute to the resounding success of this historic event. Future generations will appreciate and applaud this generation's decision to restore this magnificent structure. We need to remind ourselves that this historic structure was built over 110 years ago and that the Mayor, Common Council and citizens of Milwaukee met the financial challenges of their day to construct this local icon for future generations. We must now do the same as Milwaukee City Hall continues to serve as the center of our City Government.



2. Reasons for the Cost Difference

The Engberg Anderson Design Partnership Team (EADP) did an analysis with limited available information. This information included the construction bids, bid documents, addenda, the pre-bid meeting minutes, the cost estimate, and many discussions with those contractors who withdrew from the bidding process. In addition, Prism Technical Management & Marketing Services (Prism) contacted several general contractors, subcontractors and trade organization representatives to get their perspective as to why the bids were higher than expected and why there were only two bidders. A directive from the City Attorneys Office not to contact the two contractors that submitted bids, their sub-contractors and material suppliers limited a full analysis. This prevented a line by line comparison of the construction estimate and the contractor's bid. The information gathered has nevertheless identified the following factors that appear to explain the reasons for the difference in the bid prices and the cost estimate.

A. Lack of Competitive Bids

The estimate was prepared based on fully competitive bidding with a minimum of five competitive bids. The design and management team had expected considerable bidder interest on this project and anticipated that there would be several capable out of town or national general contractors submitting bids.

The City received only two bids on March 10, 2005 for the project. The bidding contractors, Hunzinger/Clark Joint Venture and J.P. Cullen & Sons are both from Wisconsin. Other potential competitors, including national contractors such as Mark 1 Restoration and Western Waterproofing Company, Inc. (with high levels of experience in these types of projects), elected not to bid, and withdrew from the competition. These withdrawals occurred after the first pre-bid meeting, when conditions for bidding the project became known. The two contractors that submitted bids surmised bidding competition would be limited with the early withdrawal of these and other local contractors.

There seems to be a number of reasons why contractors did not bid on this project. Some local firms, like the general contracting company of Voss-Jorgensen-Schueler simply had enough work; others, as C.G.Schmidt, felt they could not meet the compliance conditions, and still others lacked experience in restoration projects. In general, most local firms and trades people do not have the restorative experience to take on this project without training and supervision from an experience restoration contractor. Contractors may have been apprehensive about submitting a bid on a project that has a challenging restoration time schedule, unique and unknown conditions, potential liabilities, and the prospect of imposed sanctions if EBE/RPP provisions are not met.

Limited competition increases the bid prices. A study of this impact has been made by the United Hospital Fund of New York (UHFNY) and research by the Corps of Engineers supports this statement. The UHFNY study was concerned with the effect on price exerted by contractor's bidding strategies related to the level of competition and general market conditions. The study indicates that while a contractor's estimating process is a reasoned mathematical analysis of the resources required to build a given project, the bidding process is also judgmental and often emotional, based on the bidding conditions as he perceives them. The contractor then devises bidding strategies designed to obtain the work for the highest possible price given the number of bidders. The study indicated that the receipt of only two bids could add up to a 15%-23% increase in the bid from what would otherwise be considered a fully competitive price.

Competition was likely reduced at the subcontractor level because a substantial portion of this project's labor pool needed to come from the local market. National contractors would not be able to use their experienced labor, whose abilities they know and are willing to guarantee. The RPP requirement could have been seen as an issue of additional coordination and risk not present with other job opportunities. In addition, the finite resource of EBE and RPP labor, already shared with other public projects including Milwaukee Public Schools work, may have posed an unacceptable risk in the eyes of the bidders, locally and nationally. The training and supervision of such laborers also has cost and scheduling impacts that may have been considered an additional burden. It is likely that several of the subcontractors are on both of the bidding contractors' teams.

It's quite possible that many companies decided to "sit out" this particularly challenging project with its social initiatives, due to the current construction boom in public and private projects in Wisconsin and nationally. It was widely known, long before the bid date, that there would only be two bidders. Those that did bid possibly felt they could afford the risk of bidding higher than normal because there were only two bidders and the risks could be calculated.

The cost estimate was based on a fully competitive market condition. A limited competitive market condition for this project could account for \$5.5-\$8 million of additional cost to the project.

The following is a brief synopsis of some of the general responses shared by non-bidding contractors with Prism Technology as to why they elected not to participate in the bid.

- Possible unexpected and hidden deterioration of the building for which the general contractor would be liable.
- Lack of skilled craft persons in the trades, regardless of RPP certification

- Claims by subcontractors that they would not be able to meet the RPP requirements.
- Aggressive schedule - even with the project extended to four years.
- Limited sources for the supply of terra cotta and historic slow delivery performance by such firms.
- Bonding obligation for the entire 4 years of the project
- Fear of being "lambasted" in local media for failure to achieve the RPP goals and potential to be "barred" from future city work.
- Sanctions for not meeting EBE and RPP requirements.

B. Terra-Cotta Prices

Pricing on terra cotta in the estimate was based on information from Boston Valley Terra Cotta and on a preliminary quotation for the supply of material from Gladding McBean. These are the only two terra cotta manufactures in the United States that are capable of supplying material for a project of this size. The quotation for the supply of the terra cotta material was \$5,130,237. EADP suspects that the final bid amounts provided by the terra cotta suppliers were in excess of this amount. Information gained from informal conversations at the pre-bid meetings suggests that the terra cotta contract may be in the order of \$17 million. It is assumed that this amount is for the supply and installation of terra cotta for the entire project. The pricing used in the estimate was based on an average split of 68% for material and 32% for labor. Using the \$17 million figure, EADP calculated that the bid cost for supplying the terra cotta material could be \$11 million (68% x \$17 million). In addition, the uncertainties and difficulties of the installation work and the recording of existing building conditions could have also been underestimated. This could add \$6 million to the cost estimate.

C. RPP Sanctions and an Insufficient Labor Pool

The RPP requirement is for 25% of the labor hours (restoration trades work) on this project to come from Milwaukee's designated target area and if this requirement is not met, the City has the ability to apply sanctions by holding payments on the general contractor payment request(s).

Approximately one hundred local, state and national contractors attended the mandatory pre-bid meeting, including such local and state contractors as C.G.Schmidt, Hunzinger/Clark Joint Venture, J.H.Findorff & Sons, Inc. and J.P. Cullen & Sons; and national contractors such as Mark 1 Restoration, and Western Waterproofing Company, Inc.

Prism's conversations with contractors at the pre-bid meetings and after the bid date provided varying responses. One of the contractors that did submit a bid indicated that their price would not be affected by the RPP requirement, and another contractor stated that the lack of RPP participation may add another \$2-\$3 million to cover sanction costs. Contractors generally

expressed concerns with the availability of RPP workers, stating that it would be difficult to find workers for this type of work. They noted that many of the fields of construction where you would traditionally find potential RPP participation, such as mixing and pouring concrete, do not exist on a project of this type with its need for specialized skills in restoration work.

The estimate for the project's labor hours and subsequent RPP requirement was based on a \$34 million project cost estimate. Provided that the additional costs of the two bids (\$60 million and \$64 million) were not mainly attributed to materials, it would seem that the initial RPP labor hour estimate was far too low. With an increase in the project's labor hours, the RPP requirement would also increase. The availability of RPP workers and the trade's ability to certify additional qualified workers is not limitless. This could change the dynamic of Prism's earlier EBE/RPP report to the City.

D. General Cost Escalation and Material Price Increases

From the time the cost estimate was done in 2004, the general costs for construction and material costs have escalated at an unpredictable higher rate. The specific reasons for this increase are as follows.

1. General cost escalation

There has been substantial cost escalation over the last 12 months. Prices for steel and concrete increased substantially and this has led to a broad based escalation of construction prices. Engineering News Record (ENR) indicates the annual escalation in 2004/2005 is at 10%. Price increases started a rapid upward trend in the first quarter of 2004 and peaked in the first quarter of 2005. The estimate was prepared prior to this spike in prices and included an allowance of 3.50% per year for general price escalation. The rapid price escalation was unforeseen at the time the estimate was prepared. This would have added approximately \$2.2 million to the cost estimate.

2. Copper price escalation

In the 2nd quarter cost report of 2004, Engineering News Record (ENR) indicated that copper prices had increased 30%. Prices continue to rise. This project has a heavy use of copper as compared with a "normal" project with many trades, and price hikes in copper will have a disproportionate affect on the total project cost. We expect that the bidders had some difficulty in pinning down fixed price contracts for the copper work in this market situation. They will have to cover the risk of future escalation over a multi year project in a price volatile market. The estimate did not include this sudden unanticipated price hike. The cost impact is at least \$1 million beyond the general cost escalation.

E. Miscellaneous Scope Changes

Minor adjustments were made in the scope of work following the cost estimate. In aggregate, these changes would add approximately \$1 million to the project's cost estimate.

F Other Factors

1. Bidding / Construction Start

The estimate was based on a September 2004 bid date and included escalation amounts based on various completion dates for the various phases of work. The bid date was changed to March 10, 2005 and the scheduled construction start date is later than originally anticipated. The revised schedule would add in the order of \$1.5 million.

2. Required up-front bonding for the complete project

The City required the general contractor to provide a performance bond for the complete project. This assures the City that the project will be completed for the awarded bid price by the general contractor's bonding company if the general contractor defaulted on the contract. However, this limits the general contractor's bonding capacity to do additional projects and therefore could have increased the cost of this project.

Because of the pending boom in local construction, many firms may simply be at or near their bonding threshold, while others may be limiting their involvement on public works projects. It was universally stated by contractors, albeit in various ways, that tying up their company's bond for four years at \$40-\$60 million was a difficult option for their company to consider.

With activity in the construction industry taking shape, firms were concerned with committing bonding up-front on a four year project. Requiring general contractors to provide bonding for the complete project certainly limits their ability to take on additional projects and most likely added cost to their bids. However, it is hard to quantify the cost added to insure the project will be completed for the bid award price.

G. Summary

The following table summarizes the costs as previously described.

Lack of competitive bids	\$6,750,000
Terra cotta price	\$6,000,000
RPP sanctions and risk of insufficient labor pool	\$3,000,000
General cost escalation	\$2,200,000
Bidding / construction start	\$1,500,000
Copper price escalation	\$1,000,000
Miscellaneous scope changes	\$1,000,000
Required up-front bonding for the complete project	\$Unknown
TOTAL	\$21,450,000

3. Bid Comparisons

This table provides a breakdown of the bids received for the restoration of City Hall as described in the bid package and compares the costs of the construction estimate and the two bidders.

(A bid series location plan can be found in the appendix.)

	Estimate	J. P. Cullen	Hunzinger/Clark
Total Base Bid*:	\$33,945,123	\$59,927,218	\$63,927,000

100 Bid Series includes work on the South Tower:

100A	South Tower	\$16,252,328	\$39,801,654	\$35,477,000
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200 Bid Series includes work at the 7th Floor and above:

200A	West Elevation	\$5,714,696	\$5,625,846	\$8,000,000
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200B	East Elevation	\$5,491,099	\$4,663,133	\$6,800,000
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200C	North Elevation	\$1,677,341	\$2,685,911	\$3,400,000
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200D	Flat roof and north roof	\$746,026	\$834,567	\$850,000
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300 Bid Series includes work below the 7th Floor:

300A	West Elevation	\$1,656,823	\$2,501,227	\$4,300,000
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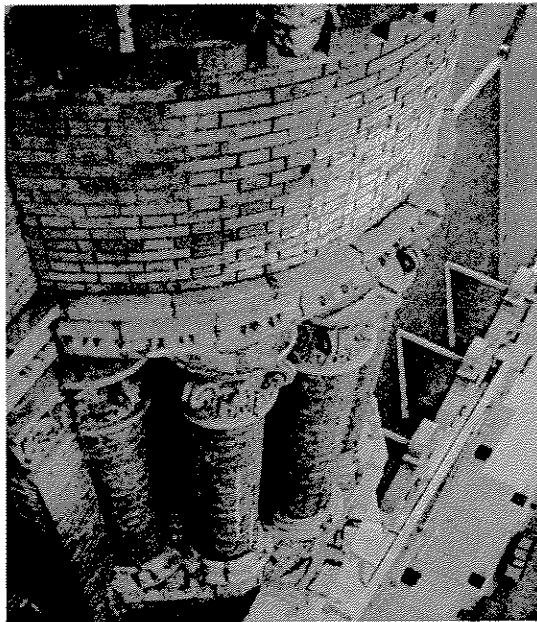
300B	East Elevation	\$1,521,627	\$2,586,298	\$3,700,000
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300C	North Elevation	\$885,183	\$1,228,582	\$1,400,000
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4. Reported Condition of Building and Public Safety

The Department of Public Works retained Simpson Gumpertz & Heger Inc. (SGH) to investigate the causes and significance of observed distress in the masonry and steel structure of the South Tower. The scope of work included the inspection of the tower, a detailed structural analysis of the tower, and monitoring of selected cracks and stresses for a period of one year. SGH also developed the recommendations for repairs for this project.

A. Observations of Distress



SGH inspected the South Tower in March 2001, October 2003, and January 2004 as a part of continuing inspections of City Hall. Their inspections show that the masonry walls and ornamental terra cotta elements have significant and numerous cracks. While some identified distress is local in nature and does not relate to the overall structural behavior of the tower, many cracks associated with structural deficiencies extend over the height of more than one level in the tower, having grown substantially in length and width.

The twelfth floor flat arches are cracked and deflected downward. The twelfth floor masonry columns, which support portions of the thirteenth floor and the roof, have advanced deterioration and exhibit very severe vertical cracks.

The copings on the north elevation clock gables have slid down the rake edge, causing severe tilting of finials and gable ends. The distress at this location changed dramatically between their first inspection in 2001 and their second inspection in 2003. In response, SGH recommended immediate stabilization of this area of the South Tower. These temporary repairs were implemented in November 2003.

Repairs have been attempted for many of the substantial cracks through a series of past pointing campaigns. Most of these cracks have subsequently opened again since they were last repaired.

This indicates that the cracking and deterioration are active and that the previous repairs have not addressed the underlying causes of distress and movement.

Some connections in the central steel structure have serious corrosion, and in many places corrosion has seriously deteriorated the steel beams where they are seated into the masonry. In addition, roof book tiles and mortar are frail and both small and large pieces of the tiles are falling onto the thirteenth floor within the confines of the clock dormers, creating an unsafe condition.

In summary, SGH observed serious deterioration of the masonry at the upper levels of the South Tower, where there are several large, active cracks, advancing deterioration, and areas of substantial loose masonry. Steel corrosion and deterioration has compromised some of the connections and supports in the central steel structure for the floors and roof.

B. Structural Monitoring

SGH installed an electronic monitoring system to record movement and related data in the South Tower. After monitoring for approximately one year, the data show the following:

- Cracks are active and respond to daily and seasonal temperature changes and temperature gradients through the wall thickness.
- At the end of one year of monitoring, some cracks did not return to their original position. While the amount of residual motion generally was small, the patterns of movements suggest that movement is cumulative from year to year.

C. Structural Analysis

A structural analysis was completed on the tower to evaluate the stresses in the masonry under the effects of the weight of the structure and temperature variations that were measured during the monitoring period. Calculations included the influence of the weight of the structure, temperature variations and other external forces. The analysis indicates the structural behavior of the upper areas (tenth floor and above) of the South Tower, with its large openings and combinations of walls and columns in the exterior planes, had the tendency to crack as it supports its own weight. Thermal stresses add substantially to the stresses induced by weight, exacerbating the tendency for the masonry to crack.

Gravity-induced stresses, in combination with expansion and contraction with temperature changes, have caused cracks to initiate at masonry arches over openings and extend into the field of the wall. In some cases, these cracks extend over a full story height, passing from arches on one level through the field of the wall to the level above. These cracks occur through the full

thickness of the masonry walls, which are, in some instances, over four feet thick. Many elements of the interior steel construction have corroded, expanded as a result, and induced cracking and loosening of the masonry.

D. Public Safety and Temporary Stabilization

To protect public safety several temporary emergency stabilization measures were implemented as a result of the series of investigations. The upper parts of the four corner turrets of the South Tower are severely distressed and netting was installed around each turret in 2001. Since then, this netting is torn and tattered and is in need of replacement if the bids are rejected. Terra cotta soffits at the 7th floor level of the Tower and the 9th floor clerestory of the Tower on the four elevations were stabilized with wood bracing in 2001 and these would also have to be re-inspected. In 2001 significant displacements and diagonal cracking in the gables of the Tower, related to corrosion of the embedded diagonal steel beams, were observed and pins were installed by the Wiss, Janney, Elstner team. The pedestrian canopy was also installed and should remain until the recommended repairs to the Tower are completed.

During the final documentation phase for the construction documents by the EADP team, the technical staff and rappelling team observed a significant change in the upper half of the north clock gable. Emergency measures were taken in October 2003 on that portion of the gable that is now cabled and netted for stabilization. This area must also be re-inspected. The project team also recommended placing a protective canopy across Market Street, however, this recommendation was not accepted in anticipation the construction would begin in a relatively short period. If the bids are rejected, it is imperative that the tower be re-inspected and additional netting be placed around the balcony and clock gables before the tower goes through another freeze-thaw cycle. The proposed temporary netting scheme provided in July, 2001 can be found in the appendix. Delays in the project would also require establishing additional shoring at the 12th Floor flat arches. This shoring would provide a reasonable measure to stabilize these areas.

5. Background

A. Project Approach

The Department of Public Works developed the following vision and mission statements to convey the goals and spirit of this project and to provide a clear direction for the project's professional/construction team.

Vision Statement

For Milwaukee City Hall to become a timeless cultural attraction and National Historical Landmark.

Mission Statement

Citizens of Milwaukee have identified with City Hall as a local landmark for the past 110 years. While relatively unknown to many professional preservation architects, Milwaukee's City Hall has become a local icon, whose unique architectural character has distinguished it as one of the most significant structures and distinctive city halls in the nation. This restoration project has recently taken on national interest and is currently the most historically significant project in the Midwest. The Department of Public Works' mission is to properly restore this magnificent structure in a manner that will preserve its lasting value for future generations. The Department of Public Works looks to achieve this mission by working together with a dedicated team of professionals and contractors whose architectural restoration philosophy follows historic preservation principles; whose passion for the successful restoration of this structure is genuine, and one that matches the affection citizens of Milwaukee have developed for this architectural treasure.

B. Project Overview

The Department of Public Works has taken a formal multi-phased approach on the restoration of City Hall. Phase One was a hands-on visual condition survey to determine the scope of the work and preliminary cost estimate. Phase Two provided a detailed investigation using testing equipment and further exploration to determine a recommended scope of work, cost estimate and timeline to complete the project. Included in Phase Two was a structural evaluation of the facade and temporary stabilization work. This systematic approach was taken to provide a clear understanding of the immediate and long-term restoration work needed on City Hall. Following these investigations, a three day Peer Review conference was held with nationally known restoration professionals from around the country, to review the findings of the Phase Two report. They agreed with the report's recommendation on most of the major repair approaches. This

provided DPW with a proposed direction for restoring City Hall. This proposal was approved by the Mayor and the Common Council. DPW then took the next step of selecting a professional restoration team. The selected team, lead by the architectural firm, Engberg Anderson Design Partnership, would provide the architectural design/contract document, and bid/award and construction services for the project. In addition, this team was to develop documentation to provide support for City Hall to receive National Historic Landmark status. The information in the WJE report along with further on-site investigations was then used to develop the design approach. The project was recently advertised and received two bids for doing the construction restoration work on City Hall. A direction on the award of a contract is pending-review. The following information will provide details on the phases of this project to date.

Investigations

The Phase One investigative work began in 2001 with two independent inspections being made on the exterior of City Hall. These included hands on visual condition surveys and written reports identifying the probable scope of work, preliminary cost estimates and timelines to complete the restoration of the exterior. (Available for review are Simpson Gumpertz & Heger Inc.'s "Façade Inspection Report" dated April 23, 2001 and Wiss, Janney, Elstner Associates, Inc.'s "Exterior Investigation: Phase I Report" dated June 15, 2001.)

The Phase Two condition evaluation/exploration and stabilization work was performed by Wiss, Janney, Elstner Associates, Inc. (WJE) in 2001. Phase Two included a close-up investigation of selected areas of the building envelope, inspection openings, removal of sample material and laboratory studies, cleaning studies, water infiltration testing, and instrumentation monitoring. This work addressed all exterior elements and materials, including brick; terra cotta; sandstone; granite; mortar and sealant; slate, copper, and membrane roofing and flashing; wood windows and glazing; and the structural steel of the South Tower. Also surveyed were interior plaster, exposed clay tile and structural steel, and windows that showed evidence of water penetration from the exterior. J.P. Cullen and Sons, Inc., assisted WJE by providing scaffolding access to the exterior facade of the building, making and repairing inspection openings, installing temporary stabilization measures, and preparing schedules and cost estimates for this report.

This study indicated that significant exterior repairs are needed to address age-related deterioration of key exterior elements of Milwaukee City Hall such as brick, terra cotta, sandstone, windows, and roofing. If repairs are not performed in the near future, City Hall will continue to undergo significant deterioration. The cost of repairs is expected to increase at an accelerated rate if repairs are not performed, as deterioration of underlying elements continues to occur.

Although particular elements of the exterior envelope have deteriorated, the building remains largely intact and continues to serve its original function.

The WJE report included a cost estimate addressing the repair or replacement of damaged materials on the exterior and interior; and the re-creation of missing or altered elements such as the third floor balustrades, metal roof cresting, and clock faces. The report incorporated the results of the Phase One study completed in 2001. Comments and suggestions from the peer review panel, which met from February 27– March 1, 2002 to discuss a draft of this report, were also included in the report.

Peer Review

As part of Phase Two, an independent panel of nationally known professionals in the field of building restoration participated in a Peer Review. The purpose of the peer review was to confirm and enhance the credibility of the planning process and to ensure the quality of the Milwaukee City Hall Restoration Project prior to the design/contract documents and construction phases. These historic preservation and technical experts examined in great detail the WJE Phase Two Report. The collective goal of the panel was to find consensus on all major findings, issues and recommendations in the report and confirm the reports cost estimates and construction schedule. The peer review committee consisted of John G. Waite of John G. Waite Associates, Albany, New York; Brent Gabby of Simpson Gumpertz & Heger, Inc., Arlington, Massachusetts; Elizabeth Corbin Murphy of Chambers, Murphy & Burge Restoration Architects, Akron, Ohio; Simon Dvoretzky of Construction Resources Management, Long Grove, Illinois; John Speweik of US Heritage Group, Chicago, Illinois; John Krouse of Boston Valley Terra Cotta, Orchard Park, New York; and Joel Becker of Hunzinger Construction Co., Milwaukee, Wisconsin. Charles Engberg of Engberg Anderson Design Partnership, Milwaukee, Wisconsin, moderated the peer review process. A meeting was held at Milwaukee City Hall from February 27 through March 1, 2002 to discuss peer reviewer comments and to develop a consensus opinion for the project approach. Alternative approaches suggested by the peer reviewers have been explained in the recommendations for each material in WJE's final report. (Available for review is the Engberg Anderson Design Partnership's "Peer Review of the Wiss Janney Elstner Phase Two Report" dated March 18, 2002.)

Selection of the Architectural Project Team

In February, 2003, the City of Milwaukee requested proposals for professional services from many local and national firms. The City was pleased with the interest in this project having received seven proposals from professional teams with local and national restoration experience. On review of these proposals, four firms were selected for interviews. Following the interviews, a

decision was made to select the Engberg Anderson Design Partnership team for the project. They would provide the design/contract documents, and bid/award and construction services. In addition, a Historic Structure Report (HSR), would be prepared with historic documentation for City Hall's nomination as a National Historic Landmark (NHL). This team of professionals includes the following firms:

- **Engberg Anderson Design Partnership, Inc.**, serving as the team leader and Architect of Record, and providing overall management of sub-consultants, preparation of contract documents, bid/aware and construction services.
- **Simpson Gumpertz & Heger, Inc.**, providing the primary technical/structural engineering role in performing the detailed exterior investigations and documentation and preparation of contract documents.
- **Quinn | Evans Architects**, preparing the Historic Structure Report, National Historic Landmark nomination, updating the HABS report, and performing internal peer review of the construction documents.
- **PSJ Engineering, Inc.**, serving as mechanical engineers responsible for the existing conditions report for the plumbing, fire protection and HVAC portions of this project.
- **Heartland Engineers**, serving as electrical engineers responsible for the existing conditions report for the electrical system portion of this project.
- **American Design Inc.**, serving as project support to all team members and providing historic research on the history of Milwaukee, the original architect Henry Koch and contractor Paul Reisen.
- **Construction Resources Management**, being responsible for the cost estimate of the project

Other project team members who provided an important role in the exterior restoration plans include:

- **Architectural Lighting Consultants, Bloom Consultants, LLC, Hunzinger Construction, Prism Technical, and Ropelink.**

Design Approach and Methodology

This restoration project is one of many such projects this building has and will undergo during its service life. The Department of Public Works acknowledged its duty to diligently restore and maintain City Hall in preserving its lasting value. The goal is to provide clear, accurate documentation of this restoration project and formulate guidelines for future cyclical maintenance and restoration work.

To develop the design/contract documents for this restoration project, the architectural design team did a thorough study of the Wiss, Janney, Elstner Associates, Inc. Phase Two-Exploration and Remedial Stabilization Report dated March 29, 2002. As part of this effort, the design team conducted another thorough on-site investigation to confirm the information in the WJE Report and used this updated information to formulate the final design alternatives for the City's final approval.

The design team reviewed and analyzed the original City Hall drawings and specifications, drawings and specifications from past City Hall remodeling and restoration projects, and historic photographs. Because the south tower exhibited the most distress and had required emergency stabilization, restoration work on the south tower was planned to go first, in an effort to prevent potential safety issues. Restoration work would then proceed thereafter on the main building.

Due to the historical significance of City Hall, the Secretary of the Interior's Standards for the Treatment of Historic Properties were followed with regards to the repair or replacement of exterior building materials. These standards are to be followed when designing and implementing all rehabilitation work to be performed on the exterior envelope. Their goal is to preserve the historic character of the structure. In order to do this, their standards are to repair existing building materials, if reasonably possible, rather than replace them. If the materials (i.e. terra cotta, brick) are beyond reasonable repair, they are to be replaced in kind, with the same material that matches in color and texture. The use of substitute materials would not be allowed. The City's Historic Preservation Commission will not support the use of substitute materials on this project.

As the construction documents were developed, many aesthetic judgments were considered. Although it is recommended to restore decorative elements that were previously removed, it may not be desirable or affordable to restore every altered element of the facade to its 1895 appearance or configuration. To this end, decorative elements were not included in the construction base bid. Pricing for the decorative elements was broken out separately should funds become available for their implementation.

C. Brief History

Since its opening in 1895, Milwaukee's City Hall has been a beloved landmark to the citizens of Milwaukee and a visual symbol of the many important roles that Milwaukee has played in American history. The restoration of this icon and its nomination as a National Historic Landmark will confirm City Hall's rightful place as one of the most significant structures in the nation.

Architecturally, City Hall is a unique representation of late Gilded Age Revival architecture, and the only American city hall to be constructed in the German Renaissance Revival style. Standing 393 feet tall, City Hall was the third tallest structure in the country at the time of its construction, and it remains today one of the largest city halls in the country, with a Common Council Chamber that likewise eclipses in size, those of larger cities.

City Hall's architect, Henry Koch, the German-born "court architect" of Milwaukee, won a fierce nationwide design competition with his vision of City Hall as a reflection of the melding of German and American culture in a city that became known as the "Deutsch-Athen(s)" of America. Taking as his model German buildings, most notably the Hamburg Rathaus (city hall), and locally significant buildings like the nearby Pabst Building (demolished in the early 1980s), Koch's City Hall is an example of German Renaissance Revival architecture unparalleled in this country, and it remains the most visible and monumental representative of Milwaukee's German heritage.

City Hall played a pivotal role in national politics from the day it first opened for city business. It became the physical prize in the midst of an increasingly turbulent political atmosphere in Milwaukee that would lead to the establishment of the Socialist party and the largest Socialist victory ever registered in an American city. The Mayor's office and Common Council Chamber were the training ground for national Socialist leaders and a model for other cities to follow. City Hall acquired a national reputation as the seat of a fiscally conservative municipal government that was generally free from the corruption plaguing other cities.

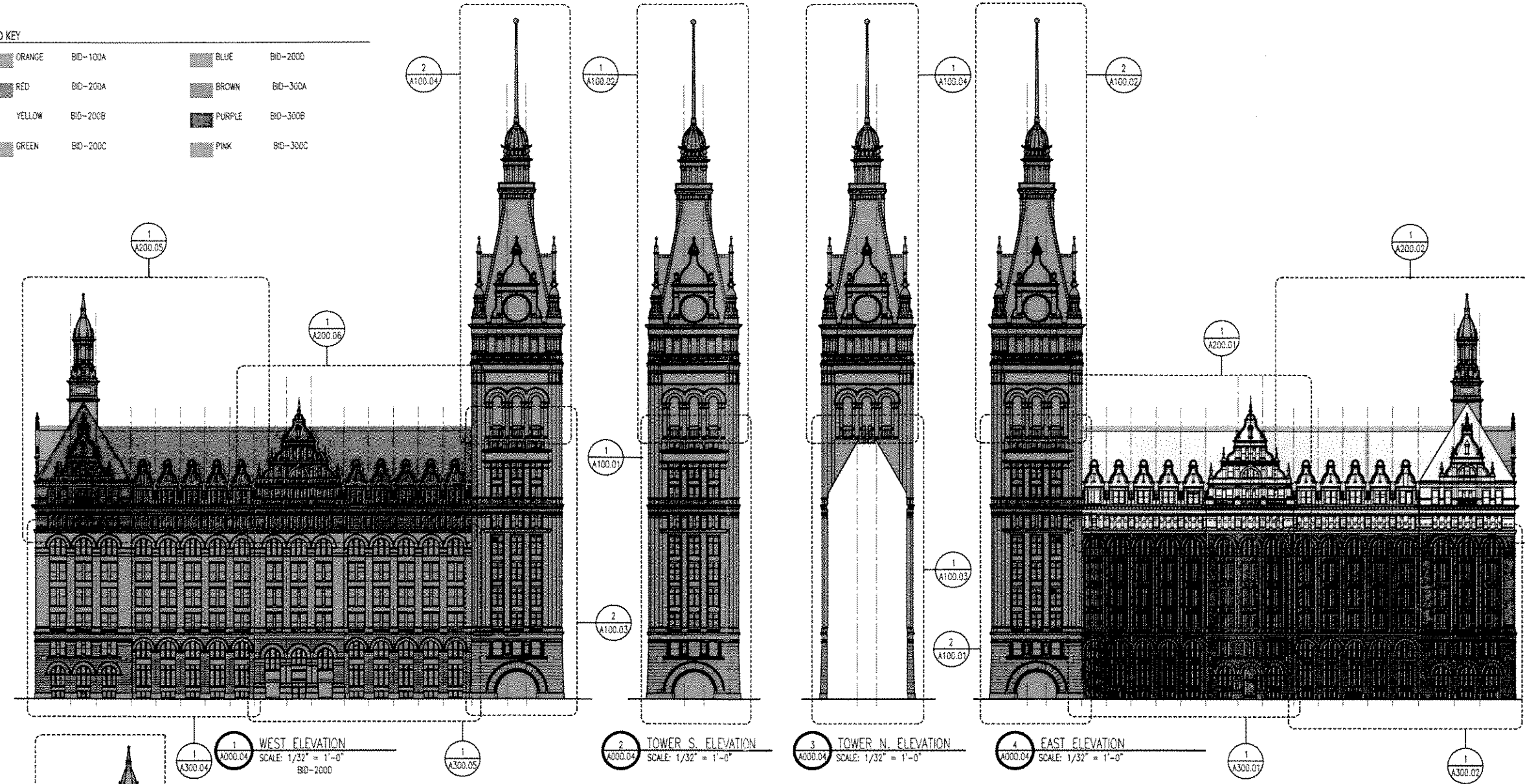
In 1972 the first major exterior restoration campaign took place that included re-pointing masonry, roof replacement, reconstruction of the truncated gables, and window sash replacement. Subsequent remodeling projects restored many of the significant interior features and spaces. With the commencement of this second major exterior restoration campaign, which includes an extensive masonry restoration, tower reconstruction, roof repair and replacement, and window glazing replacement, renewed focus has been placed on documenting the building's history and achieving National Historic Landmark status on the basis of City Hall's historical and architectural significance

6. Conclusion

After the repair/restoration work has been completed, Milwaukee's City Hall's exterior will once again be in good condition and able to perform for many years. It's anticipated that an exterior renovation of this magnitude would not be needed for at least 100 years and that repairs at that time would not be as extensive as this current repair/restoration project. Although there have been several previous exterior repair projects, the holistic approach taken on this current repair/restoration project will address deteriorated elements that had never before been repaired in the life of the building. After this restoration campaign is completed, the original aesthetic character of this National Historic Landmark will be recovered, and its prominence at the heart and center of Milwaukee's downtown activities will serve to enrich the citizens of Milwaukee.

BID KEY

ORANGE	BID-100A	BLUE	BID-200D
RED	BID-200A	BROWN	BID-300A
YELLOW	BID-200B	PURPLE	BID-300B
GREEN	BID-200C	PINK	BID-300C

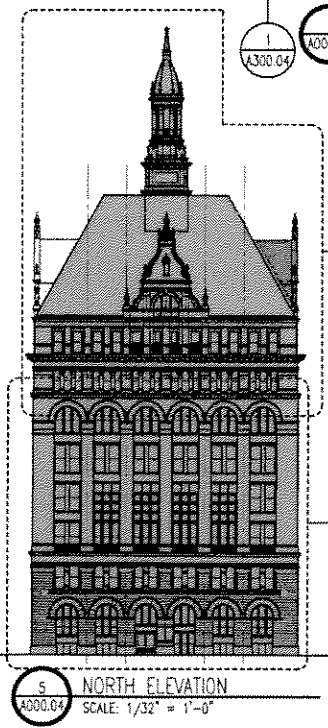


WEST ELEVATION
SCALE: 1/32" = 1'-0"
BID-200D

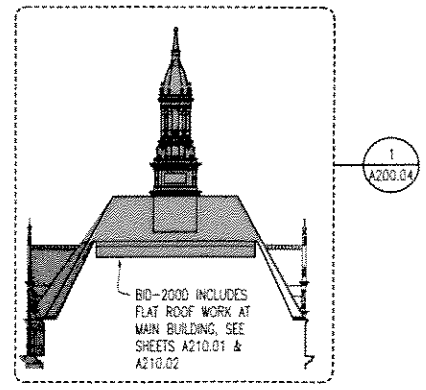
TOWER S. ELEVATION
SCALE: 1/32" = 1'-0"

TOWER N. ELEVATION
SCALE: 1/32" = 1'-0"

EAST ELEVATION
SCALE: 1/32" = 1'-0"



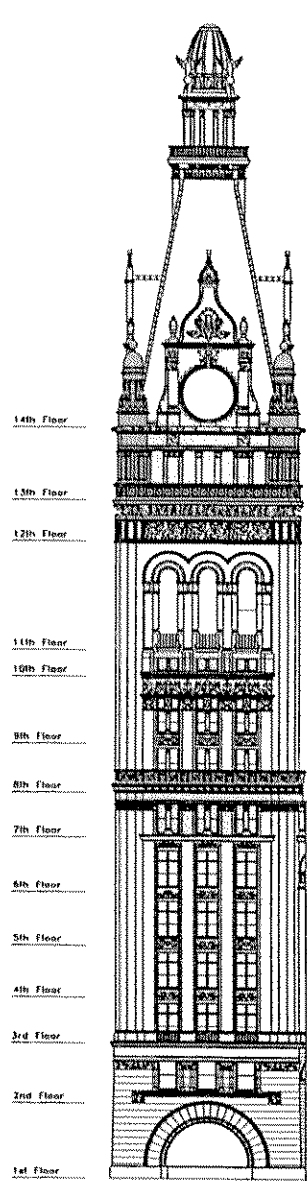
NORTH ELEVATION
SCALE: 1/32" = 1'-0"



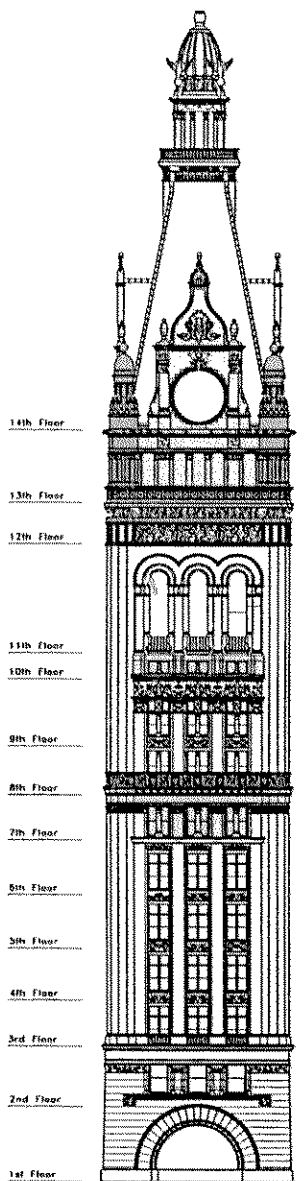
NORTH TOWER SOUTH ELEVATION
SCALE: 1/32" = 1'-0"

MILWAUKEE CITY HALL HISTORIC BUILDING RESTORATION - BID COMPARISON

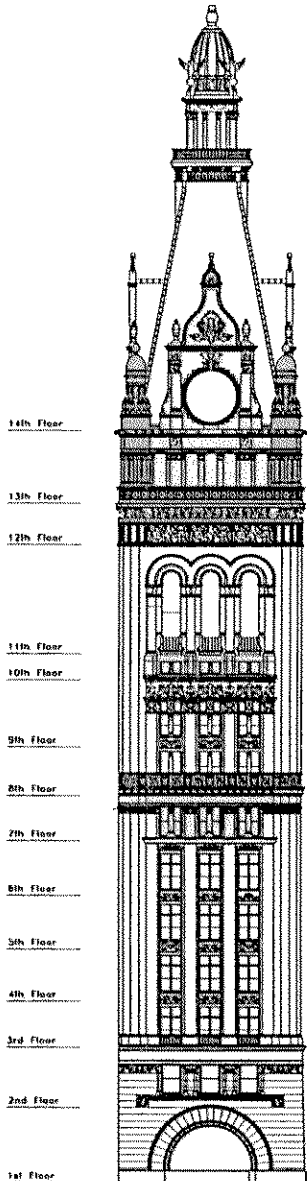
Bidder:	EADP Estimate	J.P. Cullen	Hunzinger-Clark
Total Base Bid:	\$33,945,123.00	\$59,927,218.00	\$63,927,000.00
100A South Tower	\$16,252,328.00	\$39,801,654.00	\$35,477,000.00
200A West Elev. - 7th floor & above	\$ 5,714,696.00	\$ 5,625,846.00	\$ 8,000,000.00
200B East Elev. - 7th floor & above	\$ 5,491,099.00	\$ 4,663,133.00	\$ 6,800,000.00
200C North Elev. - 7th floor & above	\$ 1,677,341.00	\$ 2,685,911.00	\$ 3,400,000.00
200D Flat roof & north roof	\$ 746,026.00	\$ 834,567.00	\$ 850,000.00
300A West Elev. - Below 7th floor	\$ 1,656,823.00	\$ 2,501,227.00	\$ 4,300,000.00
300B East Elev. - Below 7th floor	\$ 1,521,627.00	\$ 2,586,298.00	\$ 3,700,000.00
300C North Elev. - Below 7th floor	\$ 885,183.00	\$ 1,228,582.00	\$ 1,400,000.00
Recommended award of present low bid Phase One (100A + 200A + 300A)	\$ 23,623,847.00	\$47,928,727.00	\$47,777,000.00



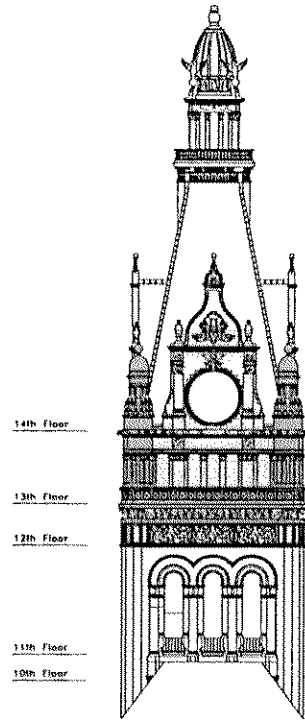
EAST ELEVATION





SOUTH ELEVATION



WEST ELEVATION



NORTH ELEVATION

 RFP Scope of Work
 Additional Recommended Scope of Work

SEM
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 Consulting Engineers
 Arlington, MA 217 Broadway, 07610-4143
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 Portland, ME 425 1/2 Center Street, Portland, ME 04101-3021
 Providence, RI 275 Weymouth Street, Providence, RI 02903-2400
 Worcester, MA 200 State Street, Worcester, MA 01602-2400
 Telephone: 603-477-3344
 Facsimile: 603-477-3343

Consultant

No.	Date	Description	By

TEMPORARY NETTING
 SOUTH TOWER
 MILWAUKEE CITY HALL
 MILWAUKEE, WI
 Project

TOWER ELEVATIONS
 Drawing Title
 Date: 1/27/02
 Drawn: SGM/vj
 Checked: HV
 Approved: [Signature]
 Date: July 2001
 Scale: 1/8" = 1'-0"
E-4
 Sheet No.