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WORLD TRADE CENTER MEMORIAL DRAFT RECOMMENDATIONS AND ANALYSIS

INTRODUCTION

On May 17, 2006, Governor George E. Pataki and Mayor Michael R. Bloomberg announced that we would help lead the effort to ensure a buildable World Trade Center Memorial. The goal of our process was to ensure the World Trade Center Memorial be brought in line with the \$500 million budget while remaining consistent with the *Reflecting Absence* vision and Daniel Libeskind's Master Plan for the World Trade Center site. This document summarizes the findings and recommendations that arose from our process.

After several phases of value engineering and analysis of the various components of the Memorial, Memorial Museum, and Visitor Orientation and Education Center (VOEC) design, we narrowed the field of options and revisions that were most promising to fulfill the vision of the *Reflecting Absence* design and the Master Plan, while providing significant cost savings and meeting the schedule to open the Memorial on September 11, 2009.

Various potential design refinements were reviewed at a meeting with the Governor and the Mayor on June 15, 2006. Upon consultation with the Governor and the Mayor, it was determined that one option best fulfilled the three guiding principles articulated below.

BACKGROUND

SELECTION OF WTC SITE MASTER PLAN

(Following are excerpts on the LMDC's process – for more information please visit:
http://www.renewnyc.com/plan_des_dev/wtc_site/Sept2003Overview.asp)

In the summer of 2002, the Lower Manhattan Development Corporation (LMDC) initiated a worldwide search for design and planning professionals to propose a visionary land use plan for the World Trade Center area. The challenge, among the greatest of our time, was to transform a 16-acre void into a place where loss is remembered and life is celebrated. The LMDC received 406 submissions from around the globe. Seven teams were selected and charged with creating a soaring vision, firmly rooted in the complexities of the World Trade Center site and guided by a program that had been shaped by months of public comment.

The selected Master Plan, *Memory Foundations* by Studio Daniel Libeskind, left portions of the slurry wall that held back the Hudson River on September 11th exposed as a symbol of the strength and endurance of American democracy, while reserving a majestic setting for the memorial and museum in the area known as the bathtub. A 1,776' tall spire creates a powerful new skyline for Lower Manhattan, while the bustling activity below reaffirms life in the aftermath of tragedy.

SELECTION OF MEMORIAL DESIGN

(Following are excerpts on the LMDC's process – for more information please visit: <http://www.renewnyc.com/Memorial/default.asp>)

From its inception, the centerpiece of the World Trade Center planning efforts has been the creation of a fitting memorial to those lost on September 11, 2001 and February 26, 1993. In April 2003, the LMDC launched what became the largest design competition in history. Across six continents, from 63 nations and 49 states, 5,201 individuals answered the call to honor all who were killed in the terrorist attacks on September 11, 2001 and February 26, 1993.

Competitors were advised to design concepts that are consistent with the Memorial Mission Statement and Program developed by committees convened by the LMDC that included family members, residents, survivors, first responders, arts and architecture professionals and community leaders. These committees premised their work on an initial memorial mission statement and program developed by the LMDC Families Advisory Council. Both documents were subject to extensive public comment and were subsequently revised based on such comment. To view the Memorial Mission Statement and Program, please visit <http://www.renewnyc.com/Memorial/memmission.asp>. For more information on the Memorial Competition, please visit: <http://www.wtcsitememorial.org/>.

On January 13, 2004, the Memorial Jury announced the selection of Michael Arad and Peter Walker's *Reflecting Absence* as the winner of the design competition.

ORIGINAL WTC MEMORIAL QUADRANT DESIGN ELEMENTS

The original design for the World Trade Center Memorial Quadrant relies on the following signature elements:

Memorial

Twin pools

Twin pools mark the footprints of the Twin Towers, serving as palpable reminders of the absence they represent.

A landscaped Memorial Plaza

The surface of the Memorial Plaza is punctuated by the linear rhythms of rows of trees, extending the experience of the Memorial through the trees' annual cycle of rebirth.

Waterfalls

Waterfalls cascade around all four sides of each footprint, feeding the pools with a continuous stream.

Gradual descent below ground

Descending below ground, visitors are removed from the sights and sounds of the City.

Contemplative Spaces

Contemplative spaces below grade give visitors a place to gather and reflect.

Names of those lost

All 2,979 names of those who perished on September 11, 2001, and February 26, 1993, are displayed around the edges of the pools.

Memorial Museum

A vast below-grade museum telling the stories of September 11, 2001, and February 26, 1993, the Memorial Museum will contain information about the lives of those lost, and convey the events of the day and the breathtaking worldwide outpouring of support in the rescue and recovery. The Museum will provide access to bedrock of the Twin Towers, the slurry wall that held back the Hudson River on September 11th, and the box-beam column remnants of the Towers.

Visitor Orientation and Education Center (VOEC)

A complement to the Memorial and Memorial Museum, the VOEC helps to create a seamless visitor's experience. The building will house exhibition space related to the events of September 11, 2001 and February 26, 1993, focusing on stories such as the creation of the World Trade Center site and New York's inspiring recovery. The VOEC will offer visitor services such as ticketing, as well as educational spaces for visiting school groups and scholars.

Please visit www.renewnyc.com for more information about the Memorial.

In its powerful, yet simple articulation of the footprints of the Twin Towers, 'Reflecting Absence' has made the voids left by the destruction the primary symbols of our loss. By allowing absence to speak for itself, the designers have made the power of these empty footprints the Memorial. At its core, the Memorial is anchored deeply in the actual events it commemorates – connecting us to the towers' destruction, and more important, to all the lives lost that day.

In our descent to the level below the street, down into the outlines left by the lost towers, we find that absence is made palpable in the sight and sound of thin sheets of water falling into reflecting pools, each with a further void at its center. We view the sky, now sharply outlined by the perimeter of the voids, through this veil of falling water.

- World Trade Center Site Memorial Competition Jury Statement



Of course, we need a Museum at the epicenter of Ground Zero, a museum of the event, of memory and hope. The Museum becomes one of the entrances into Ground Zero, always accessible, leading us down into a space of reflection, of meditation, a space for the Memorial itself.

-- Daniel Libeskind, Statement for the World Trade Center Site Plan

PROCESS

To begin the process, we created guiding principles in partnership with the LMDC, the WTC Memorial Foundation (Foundation), the Port Authority of New York and New Jersey (Port Authority), and the Memorial, Memorial Museum, Visitor Orientation and Education Center (VOEC), and Master Plan designers:

- Adhere to the vision of *Reflecting Absence*
- Maintain the established \$500 million budget while considering operations costs and security implications
- Open the memorial by September 11, 2009

Working with Designers Michael Arad, Peter Walker, Max Bond, Daniel Libeskind, and Craig Dykers, along with the LMDC, the Foundation, the Port Authority and a team of established consultants and special advisors, we undertook the following process:

- Review of budgets and cost reconciliation reports prepared by the LMDC, the Foundation, and the Port Authority, along with the construction manager Bovis Lend Lease and consultants Faithful + Gould and URS Corporation
- Review of current design
- Reduction of costs through traditional value engineering methods
- Exploration of further cost-effective design refinements and options with the designers that remained in keeping with the *Reflecting Absence* vision
- Analysis of the impact of common infrastructure on the WTC Memorial and Museum
- Identification of most promising design refinement options
- Analysis, evaluation, modification, and prioritization of design refinement options
- Presentation of draft recommendations to the Governor and the Mayor

In addition to the consultants hired by the LMDC and Foundation, we assembled a high level team of special advisors, who graciously contributed their time on a pro bono basis, to assist us in the process including:

Business Relations	Bob Douglass, Chairman, Alliance for Downtown New York
Community Relations	Jack Rudin, Chairman, Rudin Management Company
Construction Consultants	Richard DeMatteis, President & Scott DeMatteis, Senior Executive Vice President and COO, The DeMatteis Organizations Chris Larsen, Principal, Halmar International
Legal	Anthony D'Auria, Partner, Winston and Strawn
Mechanical Engineer	Marvin Mass, Chairman, Cosentini Associates
Real Estate Consultant	Richard Kennedy, Senior Director, Cushman & Wakefield
Structural Engineer	Richard Tomasetti, Chairman, Thornton-Tomasetti Group
Vision Alignment Consultants	Thom Mayne, Principal, Morphosis Architects Rick Cook, Principal, Cook + Fox Architects Peter Claman, Principal, SLCE Architects Rick Bell, Executive Director, American Institute of Architects

OUTREACH

We consulted with many of the LMDC's advisory groups that have been instrumental in the selection and planning of the Memorial and Memorial Museum including: the Families Advisory Council, the Memorial Mission Statement Committee, the Memorial Program Committee, and the Memorial Center Advisory Committee. In addition, we consulted with many members of the Memorial Jury and residential and commercial community leaders, and held numerous individual meetings with family members and stakeholders, as well as consultants involved in various aspects of the Memorial design. We also drew on the critical and extensive work done by Roland Betts and Peter Lehrer, the Chairs of the LMDC and Foundation's Design Review Committee.

REVIEW OF BUDGETS, COST RECONCILIATION, VALUE ENGINEERING

Prior to this process, the most recent cost estimate for the Memorial and Memorial Museum totaled \$672 million, with an additional \$301 million identified in infrastructure or shared costs.

INFRASTRUCTURE COST ESTIMATE

A review of the \$301 million infrastructure estimate, through re-evaluation and traditional value engineering methods, yields a savings of \$74.1 million, resulting in a \$226.9 million estimate as the baseline cost estimate for the infrastructure costs. A refined figure for the slurry wall and the elimination of the cost of relocating the river water line brought the baseline figure down to \$177.9 million. The Port Authority contributed \$100 million toward that cost. \$27.8 million in costs were determined to be appropriately funded through grants for adjacent streets and sidewalks and contributions from other government agencies. The remaining infrastructure costs are for: site-wide coordination, slurry wall support, a sidewalk premium, a railroad premium, and site drainage. Costs can be further reduced – or may even be eliminated through efficiencies – if the Port Authority assumes responsibility for building the Memorial, Memorial Museum, and VOEC, as addressed later in this report.

MEMORIAL AND MEMORIAL MUSEUM COST ESTIMATE

In our review of the \$672 million project estimate, we reevaluated the various components of the estimate and also utilized traditional value engineering methods. In addition, various cost savings design options were considered and evaluated.

CONSIDERATION OF OPTIONS

We considered a wide range of options and analyzed each element of the designs individually, and then created several options that combined multiple design refinements.

Each option was evaluated against a series of criteria, including:

- Consistency with the *Reflecting Absence* vision
- Consistency with the WTC Site Master Plan
- Security implications
- Construction costs
- Operational Costs, including costs of security operations
- Impact to Schedule
- Practicality
- Visitor experience

An analysis was conducted for each permutation of the design.

Some options we analyzed were not considered consistent with the *Reflecting Absence* vision selected by the Memorial Jury, such as bringing the reflecting pools up to plaza level (making them shallow versions of the original). These kinds of revisions were deemed too severe a departure from inspiring elements of the original design.

We also considered eliminating the waterfalls, however many of those consulted felt that the waterfalls were an important aspect of the *Reflecting Absence* design. In addition, the sound of falling water was viewed as a necessary feature adding to the contemplative nature of the Memorial, removing visitors from the sounds of the City as they viewed the voids that are the empty footprints of the Twin Towers. Removing the waterfalls and retaining the galleries did not yield sufficient operational or capital cost savings, given these concerns, to merit adoption.

Options to reduce landscaping on the Memorial Plaza were also deemed inconsistent with the vision selected by the Memorial Jury, which noted in its statement the importance of the grove of trees surrounding the footprints as “traditional affirmations of life and rebirth.” Moreover, the removal of landscaping elements did not provide significant cost savings.

The elimination of the VOEC was also considered, however the inclusion of a building on the northeast corner of the WTC site has been an integral component of Daniel Libeskind’s Master Plan. Libeskind envisioned the building as a buffer between the Memorial and commercial activities beyond. The northeast corner of the site is viewed as the likely recipient of most pedestrian traffic, and therefore serves as a natural gateway and point of arrival for the Memorial quadrant. Funding for the VOEC has already been provided in the Governor’s 2006-07 budget.

We also thoroughly analyzed the option of relocating the Memorial Museum to the Freedom Tower from its current location below grade. If the Memorial Museum were to relocate, space would still need to be built below grade to provide access to the historic remnants of the site (such as the slurry wall and box-beam column remnants) as required under the Section 106 process. Given the cost of build-out of the museum in an office tower, which would include the need for double- and triple-height spaces and reinforcing support due to the weight of the WTC

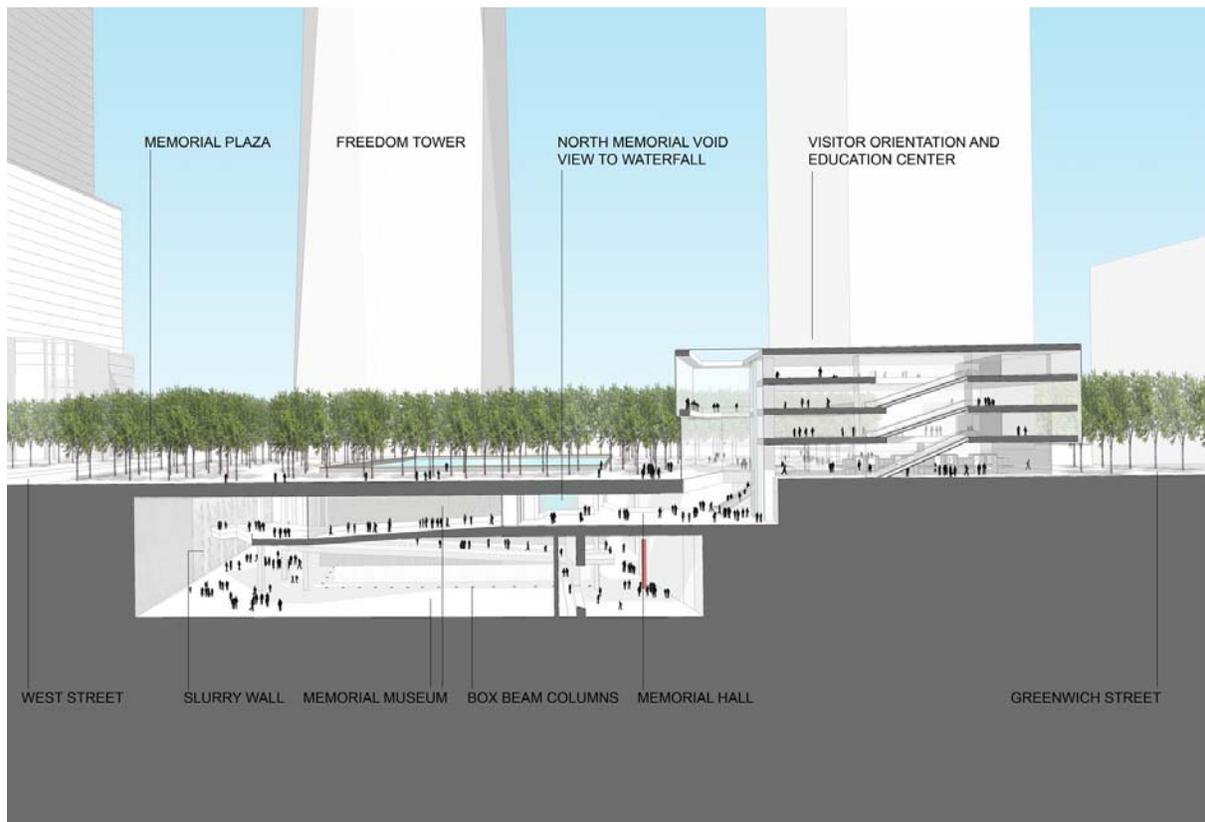
artifacts, as well as rent and additional access and security necessary, the analysis did not result in significant cost savings. The Freedom Tower's design also did not allow for the accommodation of additional elevators, escalators, and security for the Memorial Museum, and would have resulted in significant redesign and delays to both the Freedom Tower and Memorial Museum projects.

In summary, various options were not recommended because they were not considered in concert with the vision of *Reflecting Absence* or the WTC Master Site Plan, did not accomplish the budgetary goal, and/or did not maintain the schedule to open the Memorial in September of 2009.

DRAFT RECOMMENDATION



The draft recommended option was determined to have met all of the criteria outlined above. Under this option, consistent with the vision that the names ring the twin pools of water, the names will be moved to parapets surrounding the pools at grade, as shown above. This location for the names will allow for the greatest accessibility at any time of day, and will remove the need for visitors to process through security checkpoints in order to view the names below-grade (as would have been necessary for entry to the below-grade galleries). The waterfalls will be retained, as well as the landscaping features, both of which create the contemplative sense of separation from the City. As visitors read the names, they can look out over the waterfalls and view the reflecting pools and the voids that are the empty footprints of the Twin Towers. The recommended option removes portions of the below-grade galleries but preserves a below-grade view of the waterfalls and below-grade contemplative spaces through the VOEC, as discussed below.



As shown above, this option involves a consolidated entry point within the VOEC to the Memorial Hall and the Memorial Museum. This consolidation of entries will allow for a single security screening point for all elements of the Memorial quadrant, thereby improving the visitor experience and reducing operating costs. The consolidation also permits the elimination of the Pavilion entry to the Memorial Museum on West Street, resulting in significant cost savings.

The VOEC will serve as an iconic presence for the Memorial Museum upon arrival at the site. Visitors will enter the VOEC and choose a) to ascend to a site-wide orientation experience and education exhibits or b) to descend to the Memorial Hall (located between the two pools) and the Memorial Museum.

Here within the Memorial Hall, visitors will have the opportunity to view the waterfalls of both the north and south pools in a place for gathering and reflecting below grade.



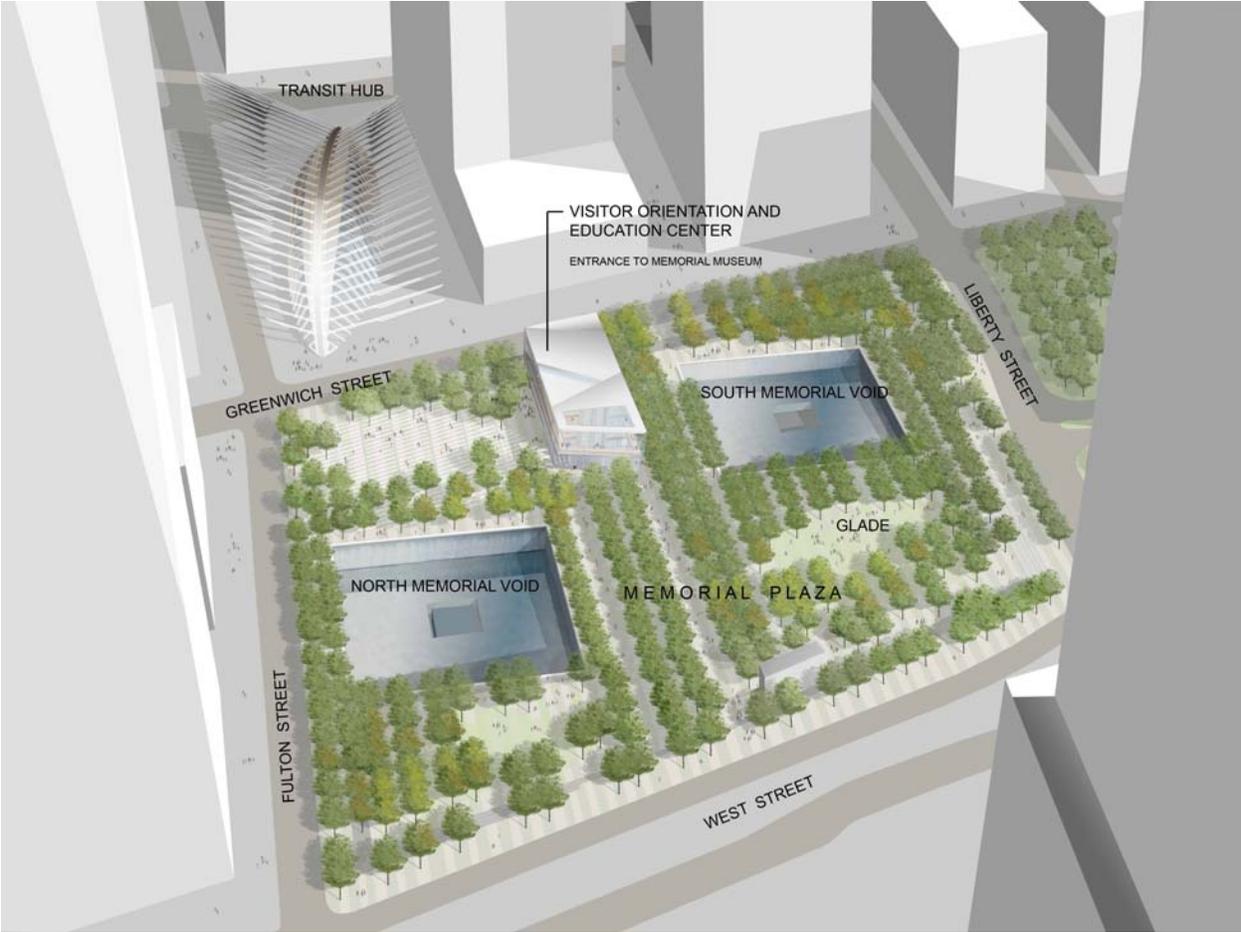
From the Memorial Hall, visitors will be able to enter the Memorial Museum. The museum experience will include an introductory exhibit followed by a descent to bedrock with views overlooking the box-beam column remnants and the slurry wall. The Memorial Museum experience will continue to include the requirements under the Section 106 process regarding historic preservation of the slurry wall and box-beam column remnants. The exhibit space has been modified to be consolidated primarily at bedrock level, instead of on multiple levels, providing for a more coherent visitor experience and achieving significant cost savings.

The Memorial-related mechanical equipment now located within the footprints at bedrock will be further minimized to the extent feasible. The Foundation, in concert with the LMDC and the architects, should make decisions as to the locations (at bedrock and relative to the footprints) of exhibits, the unidentified remains, the Contemplation Room, and the Family Room.



Back-of-house spaces will also be consolidated, allowing for operational efficiencies in functions such as loading docks and mechanical and administrative functions. The current projection for annual operating costs of the Memorial quadrant is \$60.9 million, with annual operating revenue at approximately \$53.1 million. Under this option, it is projected that there will be an annual operational savings of \$11.6 million.

This recommendation significantly reduces the project cost of the Memorial and Memorial Museum to \$510 million, while remaining true to the vision of the *Reflecting Absence* design and the Master Plan. It is anticipated that the recommended option will have no impact on the schedule to open the Memorial by September 11, 2009 and that work on the footing and foundation package could commence as early as next month.



FUNDING THE MEMORIAL QUADRANT

The capital costs for the Memorial and Memorial Museum, totaling \$510 million, will be provided through \$250 million from the LMDC and a fundraising campaign conducted by the WTC Memorial Foundation. The Foundation has raised \$131 million to date, and should continue its capital campaign to raise the balance, along with a fundraising campaign for the operational costs of the Memorial, Memorial Museum, and VOEC. Capital funding for the VOEC in the amount of \$80 million has been provided by the State of New York.

BUILDING THE MEMORIAL QUADRANT

As a result of our analysis, we recommend that the Port Authority assume responsibility for building the Memorial, with the WTC Memorial Foundation continuing to ensure the integrity of the design and planning and implementing the programming and operations. The Port Authority assuming responsibility would provide a single point of accountability, consolidation of management, consultants, and contractor staff, and eliminate project redundancies within the World Trade Center site. These factors will enhance project efficiencies and result in significant construction cost savings, and will also allow for expedition of the construction schedule.

Construction should be able to commence as early as next month, and the Memorial remains on schedule to open on September 11, 2009.

NEXT STEPS

The LMDC will be accepting public comments on the Draft Recommendations through June 27, 2006 by e-mail on www.RenewNYC.com or in writing to:

Lower Manhattan Development Corporation
Attn: Memorial Draft Recommendations and Analysis
One Liberty Plaza, 20th Floor
New York, NY 10006

Upon consideration of public input and consultation with the Governor, the Mayor, and the Foundation, the design refinements will be submitted to the LMDC Board for their consideration and adoption by the end of June.