

Signs
Environments
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The terrorist attacks of September 11, 2001 endure as indelible visions of chaos, destruction, and unimaginable loss. About 2 billion people—one-third of the world's population—watched the day's tragedies as they unfolded live on television and online.

While the world watched in the days and weeks afterward, two architects in New York City began to draw.

"It was my way of getting it out, what was seared in my memory," says Frederic Schwartz, principal of Frederic Schwartz Architects and longtime SoHo resident. He began by drawing the collapsing towers and over time, "I started to redraw the skyline. I started to draw what should happen," he says.

A couple of miles away in his home on the Lower East Side, Michael Arad, two years out of architecture school and employed at the New York City Housing Authority, began to sketch "a pair of twin voids tearing open the surface of the Hudson River. This inexplicable, enigmatic image seemed to capture a sense of rupture, loss, and persistent absence and stayed in my imagination."

A decade of consequences and contemplation have passed and those early drawings by Schwartz and Arad have transformed from paper musings into the two most profound memorials to the victims of September 11th: Arad's National September 11 Memorial at the World Trade Center and, across the Hudson River, Schwartz' New Jersey 9/11 Memorial in Liberty State Park. Both were dedicated and opened to the public on the 10th anniversary of 9/11.

The purpose of modern memorials is two-fold: to commemorate the grief of victims' families today and to convey the gravity of their loss to future generations. It is a daunting assignment to design for both of these intimate and immortal roles, and even more challenging to do so within the vortex of political, social, and cultural distress unleashed by these attacks.

Both Schwartz and Arad entered this vortex through public competitions. For the 2003 WTC site memorial competition sponsored by the Lower Manhattan Development Corporation, Arad submitted his concept for the twin voids, named *Reflecting Absence*. After six weeks of deliberations by the 13-member jury and some modifications to the concept, his design was chosen as the winner among the eight finalists.

In 2004, Frederic Schwartz Architects submitted a memorial design entitled *Empty Sky* to the New Jersey 9/11 Memorial Foundation public call for entries. The concept, a pair of steel walls framing the view of where the towers once stood, was unanimously selected by the foundation's Family & Survivor Committee.

REMEMBERING

9/11

Two architects, two visions, and two memorials commemorate loss and foster healing. BY LESLIE WOLKE

Leslie Wolke, SEGD (leslie.wolke@gmail.com) is a consultant who specializes in wayfinding technology and interactive donor recognition systems.

Intimacy and Immortality

Arad's vision honors individual loss and creates a "latticework of human meaning."



From his earliest sketch to the fully realized incarnation, Michael Arad envisioned *Reflecting Absence* as a plaza framing the two sunken pools that articulate the footprints of the towers. Streaming down the granite-clad walls from each side is a curtain of water, bathing the plaza with the constant sound of rushing water. From the bottom of the waterfalls, the water drifts toward the center, where it drops into what appears to be a bottomless chasm.

Outlining each tower's footprint is a bronze parapet, angled outward and bearing the names of the 2,983 victims—including those of the three attacks on 9/11 as well as those from the 1993 bombing of the World Trade Center. The organization of these names presented the most charged and complex challenge of the entire project. Arad remembers asking, "How could we arrange the names of the victims to reflect this terrible and enormous toll, while still honoring the individual and unique aspects of each and every loss?"

Early on, Arad and his design team dismissed common patterns of categorizing names on memorials; date of death, as in the Vietnam Veterans Memorial, did not apply in these tragic

circumstances. Another standby—alphabetical listings—would not honor the individuality and singularity of each person. Knowing that 40 percent of the victims' families had no remains to bury, Arad grasped that this memorial would be used as a gravesite for grieving and remembering. The act of scanning an alphabetized column, such as one that would include the three people named "Michael Lynch," would diminish that sense of intimate connection to a single person.

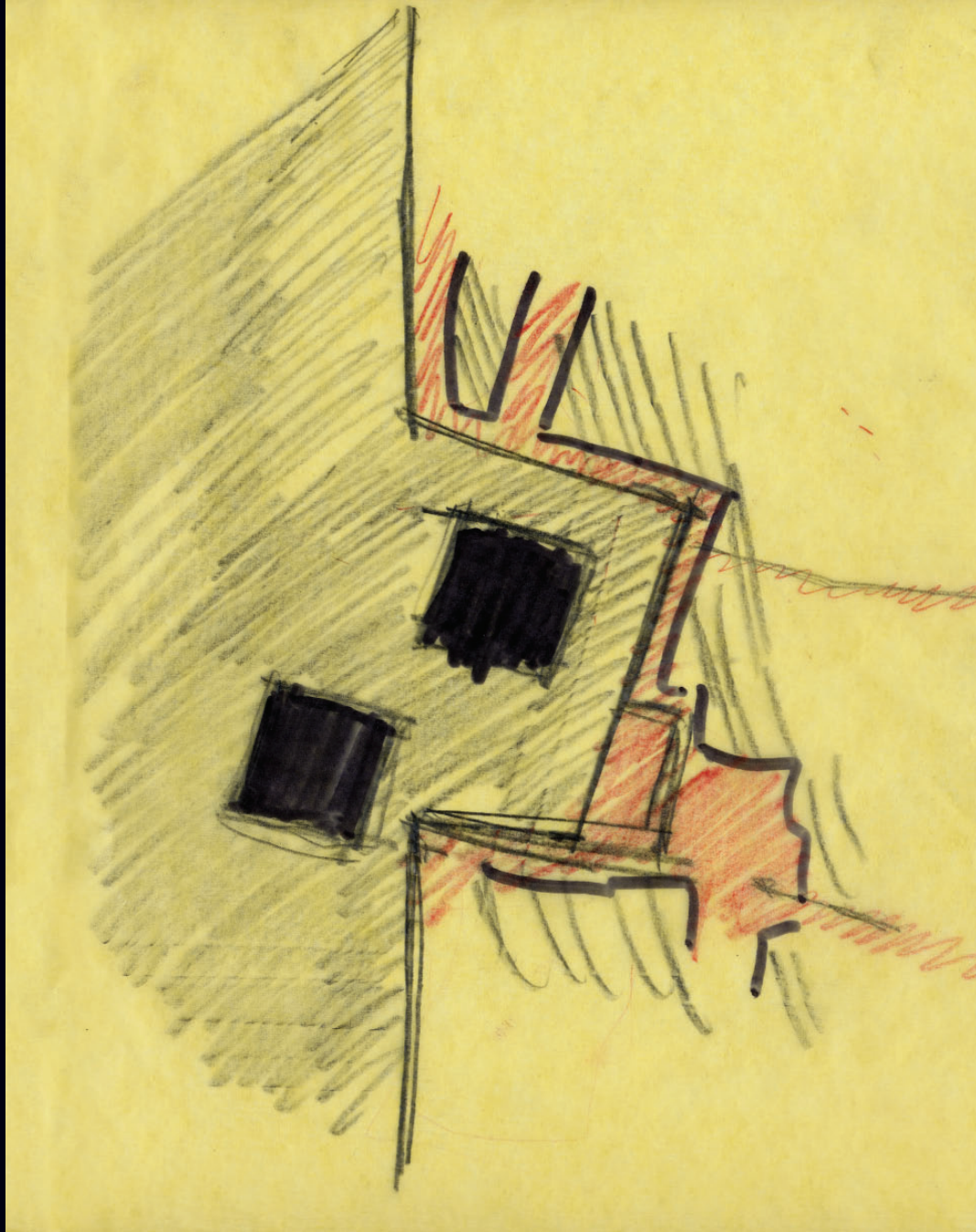
In his effort to achieve a "deep, personal, particular meaning in the arrangement" of names, Arad created the concept of "meaningful adjacencies." Following the wishes of the families, the names would be collected in nine groups: the two towers, the four flights, the Pentagon, the 1993 victims, and the first responders by department/division. Victims in the north tower would be recognized on the north pool panels, and victims in the south tower at the south pool. Within each group, names would appear to be randomly placed in staggered lines across five rows. The randomness paralleled the indiscriminate and arbitrary killing of these individuals.



Above: Streaming down the granite-clad walls of the reflecting pools are curtains of rushing water that drop into what appears to be a bottomless chasm. (Photo: Joe Woolhead)

Top left: Just two years out of architecture school on 9/11, Michael Arad drew this sketch of a pair of twin voids where the World Trade Center towers had been. For the memorial foundation, his concept captured the sense of rupture, loss, and absence the tragedy evoked. (Image: Handel Architects)

Left: An aerial rendering shows how closely the realized site resembles Arad's initial vision. The wedge-shaped building is Norwegian architect Snøhetta's Memorial Pavilion. Landscape architecture was by Peter Walker and Partners. (Image: Squared Design Lab)



Knowing that 40 percent of the victims' families had no remains to bury, Arad grasped that this memorial would be used as a gravesite for grieving and remembering.

A statistician hired by the memorial foundation concluded that there was zero chance of completing the puzzle to everyone's satisfaction.

Below: Outlining each tower's footprint is a bronze parapet, angled outward and bearing the names of the 2,983 victims. Arad chose Optima Medium Standard as the font for victims' names. The names are cut through 1/2-in. bronze panels illuminated from below. (Photo: Joe Woolhead)



But within this seemingly haphazard arrangement, Arad wanted to create a more intimate narrative for those who grieved the most. “I decided that we should reach out to family members of the deceased and ask if they wanted the names of their loved ones to be arranged adjacent to other victims that the deceased had known during their lives.”

“A latticework of human meaning”

In 2009, with Mayor Bloomberg’s help, the wishes of the families were collected; more than 1,600 requests poured in. Requests to connect brothers, fathers, and daughters, fiancés, friends, colleagues, and strangers who tried to help each other on September 11—hundreds of stories and personal relationships to be honored.

At the time, no one knew whether it was logistically possible to accommodate all the requests, especially within the nine groups as already defined. A statistician hired by the memorial foundation concluded that there was zero chance of completing the puzzle to everyone’s satisfaction.

That’s when Jake Barton, founder of Local Projects (New York), got a call from the foundation. His media design firm was

already working with Thinc Design (New York) on the exhibits for the National September 11 Memorial Museum that will open in 2012, directly beneath the memorial plazas (see sidebar). His expertise in storytelling, digital media, and complex content qualified his firm to address the name-adjacency challenge, and his team took on the project with conviction. It was their task to render an undifferentiated list of names into what Barton described as “a latticework of human meaning.”

Local Projects created a complex algorithm that sorted the victims’ names by affinity: police officers near other police officers, victims in the South Tower with their co-workers, passengers on the flights, etc. A drag-and-drop software tool tracked each request and maintained a tally of how close any composition came to fulfilling every adjacency request. Users of the tool could “pick up” a name, place it in a new location among the rows and panels, and see whether a given move improved or reduced the percentage of met requests.

With a deadline to complete the memorial by the 10th anniversary—and without knowing whether 100 percent of requests could indeed be fulfilled within the geographic and physical constraints of the design, Arad and Barton undertook

NATIONAL SEPTEMBER 11 MEMORIAL

PROJECT AREA 8 acres

PROJECT COST \$575 million

CLIENT National September 11 Memorial & Museum

LOCATION New York

DESIGN TEAM Handel Architects

LLP (design architect): Michael Arad (designer/partner in charge); Gary Handel (principal); Amanda Mangold-Sachs, David Margolis, Robert Jamieson, Cristobal Canas, Garrett Brignoli (design team)
Peter Walker and Partners (landscape architecture), Aedas (associate architect), Snøhetta (Pavilion architect)

CONSULTANTS Local Projects (names arrangement software, mobile app, Memorial Guide), DEW Inc. (fountain design), Fisher Marantz Stone (lighting designer), Lord Cultural Resources (museum planning)

parallel high-tech and low-tech sprints. “It was a tremendous gamble,” Arad remembers. Having expressed his intentions to the families, “we became engaged in months and months of hard work” to make it all happen.

On the high-tech route, foundation members and Arad’s team used Barton’s software tool to program the North Pool. At the same time, Amanda Mangold-Sachs, an associate at Arad’s firm Handel Architects, began to compose the South Pool by hand by herself. Using quarter-scale cards that included the person’s name, group, and adjacency requests, she spent months shifting and sorting the arrangements on 2-1/2 ft. racks. “It was a labor of love that took patience and perseverance,” Arad remembers.

Both the high-tech and low-tech efforts succeeded in fulfilling all the requests; the composition was as complete as what Arad called “an endless ribbon with a regular grain, or visual density.” The names are cut through 1/2-in. bronze panels illuminated from below at night. Arad selected the font Optima Medium Standard and his designers modified it into a stencil to accommodate the counters (the enclosed negative space within letters like “a” and “b”) with discrete pinned supports. Group names are CNC-milled as raised and attenuated prismatic letters.

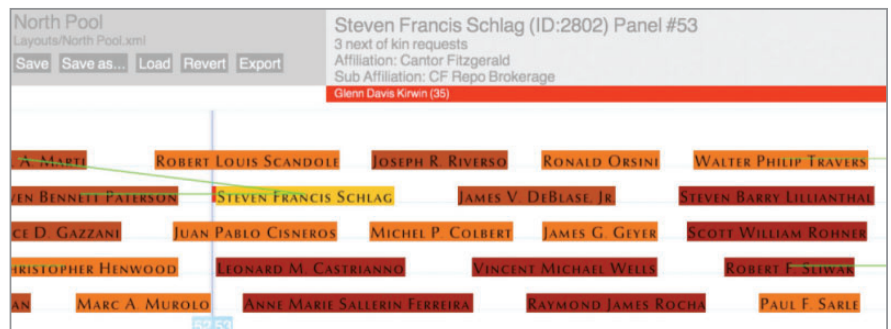
To find an individual’s name, visitors to the memorial can get directions from the Memorial Guide website and mobile app designed by Local Projects, as well as from several onsite kiosks that use Local Projects’ interface design.

Beyond their role in name arrangement and wayfinding for the memorial, Barton and his firm have taken on the role of storytellers and archivists of September 11. In partnership with StoryCorps, the nonprofit national oral history project, Local Projects has developed what Barton describes as “storytelling engines—participatory interfaces that are open and dynamic, that correspond to the fluid and interdependent nature of storytelling.” Their efforts to record, catalog, and publish stories about the events are to serve a universal mission: “tell the enormity and diversity of the tragedy—to dimensionalize each individual and their story.” People will interact with this living archive, and add to it, on websites, apps, and in the museum when it opens next year. [X]



In a project full of challenges, one of the most complex was finding a meaningful way to arrange the 2,983 victims’ names. Arad committed to a system of “meaningful adjacencies,” and he worked with victims’ families to ensure names appeared within affinity groups such as the 1993 WTC bombing, Flight 93, the North or South Towers, or first responders. (Photo: Joe Woolhead)

Local Projects created a complex algorithm that sorted victims’ names by affinity. A drag-and-drop tool tracked each request and maintained a tally of how close any composition came to fulfilling every adjacency request. (Image: Local Projects)



Local Projects’ mobile app allows users to search for victims’ names and listen to stories about some of the victims. (Image: Local Projects)

Empty Sky

Across the Hudson River, New Jersey poignantly remembers loss and refuge.

Empty Sky: New Jersey September 11th Memorial

On the morning of September 11, 2001, with the sky so clear that the Twin Towers across the river appeared to be within reach, the very essence of what our country stands for—freedom, tolerance, and the pursuit of happiness—was attacked. This memorial is dedicated to New Jersey's innocent loved ones who were violently and senselessly murdered that day at the World Trade Center, The Pentagon, and in Shanksville, PA.

Empty Sky: New Jersey September 11th Memorial

Let this memorial reflect the legacies of those whose lives were lost, that their unfulfilled dreams and hopes may result in a better future for society. Their unique qualities and characteristics enriched our lives immeasurably, and through this memorial their stories shall live on.

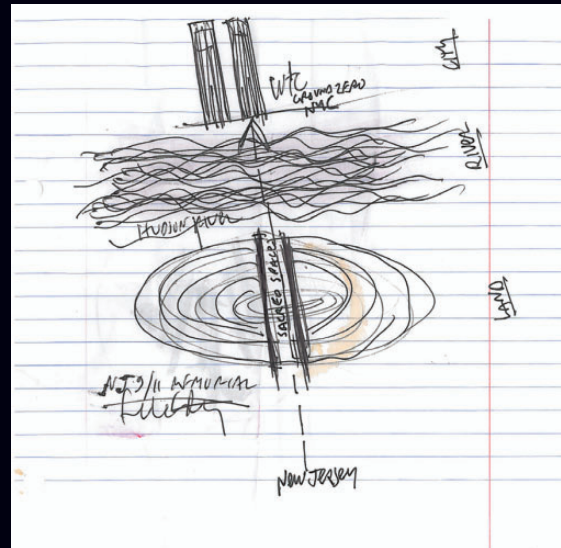
Just west of the tip of lower Manhattan and at the confluence of the Hudson River and the Atlantic Ocean, Liberty State Park played many roles in the events of September 11 and its aftermath. During the attacks, Jersey City residents and office workers gathered on the shore, witnessing the burning and collapse of the towers. Soon after, dozens of private, commercial, and Coast Guard boats shuttled evacuees from lower Manhattan to the docks at the park in the largest boatlift ever undertaken. In the following days and weeks, volunteers manned a family assistance center in the former railroad terminal on the grounds while spontaneous memorials sprung up at the waters' edge.

The families of the New Jersey victims of the attacks organized as the New Jersey 9/11 Memorial Foundation and chose this site to honor their dead. In June 2004, they selected Frederic Schwartz Architects' design, *Empty Sky*.

Two 210-ft.-long, 30-ft. high walls shelter and frame a 12-ft.-wide granite path. The board-formed concrete exteriors of the walls cut through a gently sloping hill planted with flowering cherry trees on axis with the memorial. Marine-grade stainless steel panels brushed to an ethereal matte finish make up the interior walls. Schwartz believes that stainless steel is the optimum material for modern memorials: "It reflects the light of the day and the finish is neither too shiny nor too flat."

Below: Frederic Schwartz' earliest sketches for the New Jersey 9/11 Memorial were of three distinct and interrelated elements: the land, the river, and the city. In the days following 9/11, dozens of private,

commercial, and Coast Guard boats shuttled evacuees from lower Manhattan to the docks at the park in the largest boatlift ever undertaken. (Image: Frederic Schwartz Architects)



Left: The corridor formed by the walls of the memorial draws the eye, like a diagrammatic one-point perspective, to the cavity in the Manhattan skyline where the twin towers once stood. (Photo: © David Sundberg/Esto)

Above: The site and its orientation toward the towers was the starting point for Schwartz' design. (Image: Frederic Schwartz Architects)

NEW JERSEY SEPTEMBER 11 MEMORIAL

PROJECT AREA 2 acres

PROJECT COST \$11.5 million

CLIENT State of New Jersey

LOCATION Liberty State Park, Jersey City, N.J.

DESIGN Frederic Schwartz Architects (architects and planners)

DESIGN TEAM Frederic Schwartz, FAIA (principal), Jessica Jamroz (associate)

CONSULTANTS Alexander Isley Inc. (graphic design), Ove Arup & Partners Consulting Engineers PC (structural engineers), Arnold Associates (landscape architects), Langan Engineering & Environmental Services (civil engineering and permitting), Fisher Marantz Stone (lighting), VJ Associates (cost consultant), Tender Creative LLC (computer programming)

FABRICATION Crystal Metalworks (stainless steel fabrication, finishing, installation), Great Lakes Etching & Finishing (etching)



To frame the *Empty Sky* of its title, the corridor shaped by these walls draws the eye, like a diagrammatic one-point perspective, to the cavity in the Manhattan skyline where the twin towers once stood. The site and its orientation toward the towers was the starting point for Schwartz' design.

"The empty space left by the towers is as significant as the towers themselves," he explains. With 1 World Trade Center (formerly the Freedom Tower) rising to the north, this area of the horizon is still void.

A single row of 4- by 8-ft. stainless steel panels at eye level bears the 476 names of the New Jersey victims in random order. Schwartz and his graphic design partner Alexander Isley (Alexander Isley Inc., Redding, Conn.), labored over the meticulous composition, starting with the intention to make the names as large as possible.

Left: Schwartz and Isley wanted to make the names as large as possible. At a cap height of 3.6 in., the names may be the largest found on a civilian memorial. Isley chose ITC Bodoni 12 for its powerful verticals and rounded serifs. (Photos: © David Sundberg/Esto)



At dusk and at dawn, an otherworldly halo effect touches the memorial. As the sun hits the parallel steel walls, it reflects radiant arcs that move ahead of visitors as they walk along the granite path. (Photo: Frederic Schwartz Architects)



Schwartz and Isley also knew victims' families and friends would want to make charcoal rubbings of the names. The ITC Bodoni also provides sufficient contrast to make rubbings legible. (Photo: Frederic Schwartz Architects)




“Presenting the inscriptions at a large size forces you to contemplate, to pay attention,” explains Isley. At a cap height of 3.6 in., the names may be the largest found on a civilian memorial. At design reviews with the foundation, Schwartz presented the full composition with every name in place. “I’m very proud that the names are so big—these are individuals and now they will never be lost.”

Isley chose ITC Bodoni 12 for its powerful verticals and rounded serifs. “It softens the expression of such a cool material [steel] with its curvature and nuance while providing the contrast required for readability and charcoal rubbings.”

Challenges and revelations

From concept to construction, Fred Schwartz faced a number of challenges: from opposition against the location of the memorial by a local park group to the spiraling costs of stainless steel during the worldwide building boom. “I felt like a commodities broker watching prices. They dropped during the crash in 2008 and we were lucky to come in under budget.”

While Schwartz captained every aspect of the project, he was caught by surprise by one remarkable phenomenon near the end of construction. At dusk and at dawn, he describes, “a miraculous and blinding halo of light touches each name.” When the sun is just right, the parallel steel walls reflect its light in radiant arcs that move ahead of the visitor as they walk along the path. “A lot of people lost their faith that day, but the way it touches every name,” Schwartz trailed off, “there’s a religious quality.” 

No Day Shall Erase

The National September 11 Memorial Museum will provide a first-person encounter with the events of 9/11, but won’t try to recreate the “there and then.”

On September 12, 2012, a year after the opening of the National September 11 Memorial, the National September 11 Memorial Museum will open in a 110,000-sq.-ft. space 70 ft. below ground, directly beneath the memorial plaza. Designing exhibits for the museum required a delicate balance of journalism and curation, immersion and avoidance. Tom Hennes, principal of lead exhibition design firm Thinc Design, spoke with segdDESIGN about the project.

Q *Your audience will range from people who knew a victim or escaped the towers, to those who simply have vivid memories of the day, to (in later years) people who weren’t even born when it happened. How did you balance that in your design?*

As exhibition designers we know that what people do in museums and what they learn and what they take away depends largely on their perspective going in—their entering narrative, if you will. So you always need to provide a variety of entry points into any subject. But with this museum, the challenges were magnified by the social trauma and the immediacy. You not only have to deal with the cognitive aspect of people’s interest, but also the emotional resonance of the day, which likewise includes a wide range.

From a design perspective, that means understanding that some of these positions and entry points are contradictory. The visitor who had no personal connection to the event may want a more immersive experience, while for someone who escaped from the rubble or lost a family member, the last thing they want to be exposed to is a re-experience.

This means both providing a range of experiences and giving

visitors the means to regulate their own experience. If there is difficult material, we can’t shy away from it, but we must be sensitive to its difficulty. And we need to give people choices to opt out of areas that might be painful or traumatic.

Q *Can you give us an example of this?*

A really basic example is the entrance to the museum. Most people will land at the main exhibit level near the East Chamber (Memorial Hall). It has a big quote on the wall—forged out of steel from the wreckage—that reads, “No day shall erase you from the memory of time” [from Virgil’s Aeneid]. And there is a sign that lets visitors know that behind the wall is a repository of unidentified remains from the attack. It’s a very emotionally laden place and, for some people, that may be as close as they want to get to confronting the victims. There are many other instances where the content quietly announces itself, or there is actual signage that lets visitors know they can choose to experience it or not.

Q *Media plays a big role in this museum, for obvious reasons. What was your media strategy?*

I asked Local Projects to join us on the team because we knew media would be monumentally important. This event was documented in a way that was unprecedented in history. It has a very palpable presence in digital form, with extensive oral histories, documentation of the sites, testimonials from families and survivors, and ongoing media attention. Media artifacts are on par with the physical artifacts in this case. The question is, what do you do with them?

NATIONAL SEPTEMBER 11 MEMORIAL MUSEUM
Opening September 11, 2012

LOCATION New York

CLIENT National September 11 Memorial & Museum

ARCHITECTURE Aedas (museum architects), Snøhetta (pavilion)

EXHIBITION DESIGN Thinc Design (lead exhibition designers), Local Projects (media)

CONSULTANTS Lord Cultural Resources (institutional planning)

IMAGES Thinc Design with Local Projects



One of our earliest breakthroughs was that the experience of the museum in the “here and now”—the visitors’ experience with this place—should not try to replicate the “there and then.” It should be completely distinct from the events of 9/11.

Our challenge was to use media to create a very personal, measured experience but not attempt to recreate the events of that day.

Q What is your basic palette for the exhibition design?

The palette is very simple. In the museum are the remains of the tower footprints, some of the original slab, the slurry wall, and other physical remains, visible and exposed and accessible.

From our perspective, it was very important that we didn’t try to embellish what’s there. We make it visible. We accord it as straightforward a presentation as possible, not putting a gloss on it. The two most common materials on the site are steel and concrete, so we’re using them too. We allow concrete to be concrete, usually in a relatively unfinished form. Reforged steel letters and hot-rolled steel provide a warmer aesthetic, the notion that a human hand was involved.

We wanted to create a simple formal language that would present the objects in the most unadorned, straightforward way possible, while retaining a sense of warmth, reassurance, and strength.

Q What were the physical challenges of designing in this underground space?

Aedas’ space design is very clever and highly textural. Spaces vary widely, from tall slender volumes up to 60 ft. high to relatively low ceiling heights of 9.5 ft., as well as more conventionally scaled galleries that are essentially found space under the memorial pools and between them. The stepped depressions created by the pools above form large volumetric shapes that are the exact size of the former tower, hovering about 12 ft. above the floor. We could think of this variety as a challenge or an opportunity, and we have found it to be the latter. X

Above left: In some cases, physical and media artifacts merge in the exhibition. Here, a huge chunk of steel from the World Trade Center is used as a projection surface.

Above: The foundations of the World Trade Center towers are prominent in the museum design by architects Aedas. Visitors will be able to see the original column bases and concrete footings that supported the towers.

Below: The In Memoriam exhibit features backlit portraits of the 2,983 victims. Inside, interactive tables allow visitors to learn more about the victims’ lives.

