ABSTRACT

Title of Thesis: AT THE WATER’S EDGE: A CULTURAL INSTITUTE OF THE CHARLES RIVER

Degree Candidate: Tracy Ann Marquis, Master of Architecture, 2004

Thesis directed by: Brooke Wertham, Lecturer
School of Architecture, Planning and Preservation

Rivers have provided reason for development throughout history. As a result, many of today’s major cities sit at the river’s edge. For those cities that span both sides of a river, treatment of the water’s edge is very important to the perception of the river in the city. This type of urban river can act as either a unifier or a divider of its city.

This thesis looks at urban rivers, and utilizing them as unifying spaces. In order to deal with the river as a space, people must be able to partake in that space. As such, they must be able to inhabit the land at the water’s edge. The thesis uses a site on the Charles River in Boston, Massachusetts, where the movement systems along the water’s edge start to break down, and thus so does the perception of the river as a space. The Master-plan, the site and the building, a cultural institute about the Charles River, are used to bring people to the rivers edge and into the space of the river.
AT THE WATER’S EDGE
A CULTURAL INSTITUTE OF THE CHARLES RIVER

By

Tracy Ann Marquis

Thesis submitted to the Faculty of the Graduate School of the University of Maryland, College Park in partial fulfillment of the requirements for the degree of Masters of Architecture 2004

Advisory Committee:
Brooke Wortham, Lecturer (Chair)
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INTRODUCTION

Figure 1: View of downtown Boston from Cambridge (near site).

CIVIC PRIDE...it is essential to the future of our cities. But what is it, where does it come from, and how can we use it to insure a bright future for urban America?

Currently, cities are enjoying a renaissance. After a mass departure from our cities to the suburbs in the later half of the twentieth century, people are moving back. Many American cities are enjoying a renewed cultural peak, much of it due to increased populations of artists and young professionals. Like smaller neighborhoods, cities go through cycles. They rise and fall in popularity, and these cycles often leave scars that take time to heal. With a rising interest in conservation of land and open space, therefore fostering urbanity and density, it is important to maintain the popularity of our cities. Civic pride is one tool that can be manipulated to do just so.
Pride can be defined as “a satisfied feeling experienced when having or achieving something special that others admire” (citation). Hence, a city with a rich history and a unique sense of place or genus loci causes its residents to have pride in it. Resident participation in the betterment of the city also induces pride. Studies have shown that residents are more likely to protect, maintain and support their home, neighborhood, or city, if it is something they can take pride in. As such, civic pride is a driving force behind historic preservation and city beautification programs.

Boston, Massachusetts is a city with a very rich history and strong sense of place. The genus loci comes from a long past, filled with the battles and struggles of Bostonians. These hard times range from the colonial fight for freedom to today’s struggling Red Sox.

Despite an already strong sense of civic pride, we must look out for the future of the city and look to programs that can maintain and foster pride. Many urban historic preservation programs already do this. The Boston Landmarks Commission, one such program, preserves the historic character of neighborhoods, as well as Boston’s monuments and treasures. The history exemplified by these structures is unique to the
city of Boston and thus contributes to its sense of place.

The Charles River Center explores the infusion of pride into the residents of Boston through preservation, education, protection, and composition. The center is dedicated to the Charles River, its history, science and protection. It houses the offices of the Department of Conservation and Recreation (formerly the Metropolitan District Commission or MDC), which was formed in 1893 to protect the Charles River Reservation, a swath of public green-space surrounding the Charles River. They recently lost their downtown home and are being moved out to the suburbs. A number of employees are losing their jobs because they are unable to get to the new location. This new center provides an urban location for the department in an appropriate site, adjacent to the lands they protect. The center also houses their archives, laboratory space, exhibition space, educational space and public facilities. The laboratory space is dedicated to researching the environment in the river’s waters and on its shores, and the exhibition space showcases works from the MDC archives, as well as a history of the river and its surrounding communities. The other functions help to educate the public on the river, with the theory that the more they learn about it, the more they will respect it, have pride in it, and want to preserve it for future generations.

The muddy waters of the Charles

Figure 4: Centerline at the Charles River
River contribute to the city and its sense of place. It, literally, defines
the boarder between the City of Boston and the City of Cambridge;
however, it also joins the two cities to form the eastern Massachusetts
urban area. As such, the Charles River is a major focal point and
centerline for “the city”. The Center is located on the Cambridge
side of the river, at the corner of Memorial Drive and the Boston
University Bridge. This site is located at the heart of the Charles River
Reservation. It sits at the west edge of the Lower Basin, the most
popular portion of the Charles River. The site allows for the structure
to interact with the river and reservation as a mediator between the
Lower Basin and Middle Basin. The structure also utilizes the Old
Junction Railroad Bridge (which crosses under the Boston University
Bridge), an existing landmark and element of civic pride, to make
cross-river connections for the pedestrian paths that run through the
reservation, and to act as an access point for the Center. The buildings
relationship with the reservation, the river and the bridge are just as
important as its relationship with the city.
SITE AND HISTORY

“Thus has nature placed and preserved at the very gates of Boston riches of scenery such as many another American city would give millions to create, if it were possible.” (Charles Eliot) (The Charles River Conservancy)

Boston is a city famous for its parks. Originally designed in 1875 by the famed landscape architect, Frederick Law Olmstead, the city’s park system, commonly known as the “Emerald Necklace”, incorporates portions along the Charles River, which then lead to a parkway inland, creating a necklace or green space that surrounds the city. (Parker) In 1893, Olmstead’s protégé, Charles Elliot, had a vision to convert the Boston Waterfront from a hazardous health issue to an amenity for the residents of Boston. He formed the Metropolitan Parks Commission (later known as the Metropolitan District Commission or MDC which was recently changed to the Departments of Conservation

Figure 6: The Emerald Necklace, as designed by Frederick Law Olmstead in 1887. (American Memory)

Figure 7: Olmstead and Elliot Plan for Memorial Drive (The Charles River Conservancy)
and Recreation) to protect the Charles River Reservation and support this vision. As part of this program, locks and a dam were installed at the base of the river in 1910, converting the saltwater estuaries of the Charles River into a freshwater lake. The pooling of water created the basins we are familiar with today.

![Diagram showing basin zones](image)

**Figure 8: Basin Zones (The Charles River Conservancy)**

The river is now divided into three separate basins, each with its own individual character. The Lower Basin runs from the dam to the Boston University Bridge and is defined as the widest portion of the river. The open basin is used in warmer weather for sailing, motor boating, and other water activities. This portion of the river, both the water and the surrounding parkland, is the most frequently used. The Middle Basin runs from the Boston University Bridge through Harvard University and close to the Arsenal Street Bridge. This portion of the river narrows from the Lower Basin and is curvilinear, weaving its way through the western portion of the city. Crew shells dominate this portion of the river, during the appropriate seasons. The Upper Basin runs from the Arsenal Street Bridge through Watertown to Newton, heading into the suburbs west of Boston. This portion of the river becomes very narrow and wooded, turning into a much more romantic
landscape. (The Charles River Conservancy) All three parts of the basin are flanked by pedestrian paths, and are widely used by residents for leisure activity.

*The Charles River Basin defines the center of Boston’s metropolitan area, giving residents and visitors alike an enduring sense of place and a refuge for recreation, contemplation, and renewal. The Basin comprises 19 miles of shore from the New Dam at the Charlestown Bridge to the dam near Watertown Square and includes over 20 parks and natural areas. (The Charles River Conservancy)*

The parkway on either side of the river was enhanced from Olmstead’s original plan, by the efforts of Elliot and the MDC, and then further by private donations from Mr. James Storrow. Storrow believed in Elliot’s vision for public park space surrounding the basin, and his funds helped create the original pedestrian paths and greenway west of the Esplanade. This generous greenway existed until 1951, when the state legislated that a road be installed along the riverbank. Ironically, the road was named Storrow Drive after Mr. James Storrow. The pedestrian way along the river was maintained, but diminished greatly in size. The construction of Storrow Drive separated the pedestrian path from Commonwealth Avenue, and subsequently from the pedestrian access to the Cottage Farm Bridge.
In order to construct the roadway, the state took land through eminent domain along the entire riverfront, pushing private property off of the river’s edge. Boston University was in the process of building a new campus near the Cottage Farm Bridge, and was pushed up onto Commonwealth Avenue, just like other private property owners. This action, by the state, reinforced a condition on the river that still exists, reserving the rivers edge as public. Through the efforts of Olmstead, Elliot, Storrow, and the State, both sides of the Charles River formed public space making up the Charles River Reservation. The reservation was bordered by major public roads, and then private property.

The character of the space and the roads on either side of the river contrast greatly. Storrow Drive, on the Boston side of the river (south) is a two to three lane highway with off and on ramps to access the city. The road travels at an elevation close to that of the river and
below the streets of the city at many points. The road is very difficult for pedestrians to cross, as a result of the highway nature of the road and the sectional differences between the road and the rest of the city. Pedestrian bridges have been constructed at a few points to attempt to remedy this situation. Boston was well developed by the time Storrow Drive was inserted into the city. When neighborhoods, such as Back Bay, were developed, the Charles River acted much more like an open sewer than an amenity, hence the residences were constructed with their backs facing the river. Storrow Drive was inserted between this existing urban fabric and the rivers edge, and therefore, it receives only the backs of buildings. As the greenway and pedestrian paths developed, they mainly stayed on the rivers edge, away from Storrow Drive. As the paths travel westward on the river, the generous green space of the Esplanade, downriver, narrows and the paths are forced up on a sidewalk of the road as it travels out to Brighton and the road changes from Storrow Drive to Soldiers Field Road.

Figure 13: Section at Storrow Drive

Memorial Drive, on the Cambridge side of the river (north), was developed in stages, most of which were designed and completed under Elliot's plan. As a result, the road is more integrated into the
fabric of the city. Instead of off and on ramps, there are stop-lights at intersections, which slows the traffic down, and allows pedestrians to cross the street. It receives the fronts of buildings, because the street was in place prior to development of the buildings. Therefore, the buildings front the river. Per Elliot’s plan, abutting the Lower Basin, the road splits to create a boulevard with a green space in the center. It also accommodates on-street parking in this portion of the road. The pedestrian paths are also very different from those on the Boston side. The paths generally remain on the street as a sidewalk, and off of the river. They occasionally split and cut down near the water. Contrasting the Boston Side of the river, the pedestrian paths and greenway are very narrow down-river and become more generous as they travel westward.

The Charles River Reservation has been infringed upon by buildings in specific circumstances, over the years. These circumstances include a few public structures, such as a public sailing shack, public outdoor performing space and shelter, and some utility structures. The city has also allowed the private universities of the city of Boston to inhabit segments of the waterfront for their boathouses.
These structures make up at least half of those in the public right of way in the Charles River Reservation.

The Boston University Bridge crosses the Charles River, connecting Commonwealth Avenue and Memorial Drive. The first structures on this site predate any plans for the park system. The Grand Junction Rail Bridge was built in 1850 concurrent with the 1850 Brookline Bridge on the same site. The Brookline Bridge crossed perpendicular to the river’s edge, and the rail bridge curved out diagonally across the river a bit further down. By 1867 the rail
bridge had yet to be used and was purchased by the Boston & Albany Railroad Company. (Bacon) In 1928, the Brookline Bridge was replaced with the Cottage Farm Bridge. The new Cottage Farm Bridge crossed the Charles perpendicular to the waters edge, directly above the old railroad bridge. During this construction, the Grand Junction Rail Bridge was also slightly rerouted, straightening its route. The design of the new Cottage Farm Bridge and the partial reconstruction of the Grand Junction Rail Bridge were completed together to accommodate each other. Architects Desmond and Lord designed the completed edition of the bridges, with consultation from Lewis Moore and John Rablin. (Hoing Online)

![Figure 17: Cottage Farm Bridge, 1938 (Massachusetts State Archives)](image)

Boston University had relocated to its current Commonwealth Avenue location and was growing westward through the old Cottage Farm and its bridge. In 1949 the bridge was legally renamed the Boston University Bridge, and since, both the auto bridge above and the Grand Junction Rail Bridge below, have conjunctively come to be known as the BU Bridge. Since the ownership of the rail bridge by the Boston & Albany Railroad, it has changed hands to Conrail and

![Figure 18: Proximity of Boston University to BU Bridge](image)
currently CSX. Of the two tracks that run on the BU rail bridge, one is completely abandoned, and the other is used only occasionally for slow moving cargo.

In more recent years, the students of Boston have laid claim to this artifact of the Charles River landscape. The rail bridge has become a billboard for university pride, covered with graffiti that promotes school spirit. The graffiti provides a heightened awareness of the bridge in the landscape of the city and the river, making it a landmark in the city of Boston.

Figure 19: Grand Junction Rail Bridge, 2004

Currently, the pedestrian and bike paths on either side of the river paths are used daily by thousands of Boston residents to walk, run, jog, bike and blade. The two parallel paths, one on the Boston side of the river and the other on the Cambridge side of the river, are connected at numerous points allowing users to loop around on the paths. The Lower Basin paths are the most actively used. This is a
result of their proximity to downtown, higher density areas, and an increase in green space at this portion of the river.

Figure 20: Charles River Bridges & Crossings

Figure 21: Dr. Paul Dudley White Charles River Bike Path (Mass.gov)

In 1960, Dr. Paul Dudley White had the paths on both sides of the river officially designated as a bike path. The visions and planning for the Charles River Reservation successfully created open space for the city of Boston. The Reservation and its paths have been highly used for leisure and recreation since their conception.
On the northern side of the bridge, southeast of the intersection with Memorial drive sits a vacant lot. This lot is part of the Charles River Reservation, however all pedestrian path by-pass the site leaving dead space. The lot is tucked between the Boston University Bridge and the Grand Junction Rail Bridge. It consists of a total of 1 acres.
and is bounded by the two bridges, Memorial Drive, and the Charles River and the flood zone. The Grand Junction Rail Bridge connects this site to the pedestrian zone on the southern side of the river. One of two tracks on the rail bridge is currently used infrequently for slow moving cargo. The rail bridge consists of two linear paths, each 14 feet wide, and has a clearance of 19 feet under the BU Bridge above. This site is connected to another site across Memorial Drive, via a rail underpass. These two sites allow for this public building to utilize the open space of the Reservation and bring life to this dead zone, as well as fit into the urban fabric and help define the edge along Memorial Drive.

Figure 24: Original Drawing for Rail Underpass

Figure 25: Existing Photo of Underpass

Figure 26: Original Drawing for Rail Underpass
SITE ANALYSIS

AT THE WATER’S EDGE:
A CULTURAL INSTITUTE OF THE CHARLES RIVER

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Figure 27:
Orthographic Photo
Showing location of site in greater context of Boston & Cambridge
Figure 28: Figure Ground
Shows the lack of definition at the river and road edge at the BU Bridge.
Figure 29: Use Diagram Boston & Cambridge, Massachusetts
Figure 30: Site Plan
Site possibilities: Site in the corner between the Rail Bridge and the Road bridge, and diagonally across the street, with connections under the road.
Figure 31: Figure Ground
Shows the small scale of residential Cambridge change into larger public, office and educational buildings at the rivers edge, reinforcing the idea that the river is public.

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Figure 33: Streets
Identifies the complexity of section with bridging and tunnelling streets, and also shows how traffic is brought to the rivers edge for the higher speed systems.
Figure 34: Charles River Reservation
The Reservation is a zone of public open space that boarders the river along the entire length of the basin.
Figure 35: Object Buildings in the Park
Buildings within the reservation are limited to public structures of both recreation and utility and to University structures. In all instances the building is treated like an object in the landscape, and not a part of the urban fabric.
Figure 36:
Circulation Patterns - Pedestrian & MBTA (Public Transit)
No connections available from Boston Pedestrian Path to Bridge Crossing.

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Figure 37: Circulation Patterns - Automobile
Shows street and traffic hierarchy
Figure 38: River Section
Figure 39: Orthographic Photo, Site Cambridge, Massachusetts
Figure 41: Site Identification
The identified site are two possibilities for the project.
Figure 42: Topography at 2’ intervals
Rivers edge is 20 feet below the street at the corner by the bridge.
Figure 43: Vegetation

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Figure 44:  
Section at Memorial Drive
Figure 45: Section at Storrow Drive
Figure 46: Pedestrian Site Access
Because of the topography and sectional differences, access to the site will be difficult. Pedestrian access can come from all directions, but auto will be limited.
Figure 47: Boston University Bridge and Grand Junction Railroad Bridge

Figure 48: View from site looking at downtown Boston

Site Photos
DESIGN PROBLEMS AND ISSUES

The preceding site analysis represents a number of issues that must be addressed at this site. Some are covered in the immediate scope of the project, while others are included in the master plan or soft boundaries of the project.

PEDESTRIAN CIRCULATIONS

The construction of Storrow Drive effectively separated the pedestrian paths along the river from Commonwealth Avenue, and thus access to a river crossing at this point. The road system and bike systems tie in together at each of the bridges, with the exception of the BU Bridge. As a result, bikers and pedestrians can occasionally be seen attempting to cross the four to six lane highway. The crossers identify the need for a cross river connection for pedestrians at this portion of the river. The BU Bridge is the boundary between the Lower Basin and the Middle
Basin, which represent both varying character zones, but also varying pedestrian circulation patterns. It is the only crossing for a long stretch of river.

EDGE DEFINITION

In addition to pedestrian circulation issues, the urban fabric is ill defined at either end of the Boston University Bridge. The southern portion of the bridge deposits traffic at a stop light onto Commonwealth Avenue. This is a very urban street on both sides, yet a vacant space and a parking lot border the entrance to the bridge. The vacant lot is due to the Massachusetts Turnpike, which runs diagonally below Commonwealth Avenue at that point. This gap in the fabric is very clear in the figure ground at 1”=800’.

The northern portion of the bridge deposits traffic at a stop-light that leads into a rotary. Through traffic on Memorial Drive bypasses the rotary by way of an overpass. At the northeast corner of this intersection sits the old Ford Motor Company. This historic building provides a very strong edge for the open space on the other side of the street. However, on the opposite corner sits a
park, even though Magazine Beach, a very large piece of open parkland is directly across the street. Further to the east of the Ford Motor Company (prior to the beginning of the MIT Campus), a few buildings set back with parking in front and treat Memorial Drive very much like a suburban strip. It is very important that the buildings to the north of Memorial drive hold the street edge, because they must define not only the street, but also the parkland on the other side of it.

ELEVATIONAL DIFFERENCES
The building or site plan must provide vertical connections between street, paths and parks. How can this connection be accommodated? ADA? Public or Private? Internal or External?

PARKING
Access to the site by automobile may be difficult. The building and site must accommodate some parking facilities. How? Parking may be accommodated on the northern site with only pedestrian access to the Reservation, consistent with the rest of the Reservation.

RAIL BRIDGE USE AND PRESERVATION
How is the bridge used? Does it become entirely pedestrian? Can it be built upon?

PUBLIC/SITE
How does the public get to the site? Is transit included in the masterplan, or does the project rely on existing transit?
URBAN FORM

What is the nature or character of the building and its urban form. Does it adhere or disregard the urban rules that are determined by the river? Is it a building in the landscape? Does it remain within the urban fabric? Or does it break all the rules and carry the fabric of the city into the Reservation?
PRIOR ARCHITECTURAL OR PLANNING STUDIES

Many of the problems and issues identified in the previous section have already been accounted for in a variety of planning studies. Boston University has plans for the areas within and/or adjacent to their campus, MIT has some hopes for segments of the existing rail tracks, the Department of Recreation and Conservation has completed a master plan for improvement to the Charles River Reservation, and the Boston Redevelopment Authority has completed guidelines for the development of air-rights over the Massachusetts Turnpike.

![Map of Charles River Basin Masterplan](image)

Figure 51: Charles River Basin Masterplan (Magazine Beach and BU Bridge) (Mass.gov)

The Commission of Conservation and Recreation recently completed a master plan for the Charles River Basin, including remedies for the crossing at the BU Bridge. This plan includes utilization of one half of the Grand Junction Rail Bridge as a
pedestrian path that would connect the existing Boston and Cambridge pedestrian paths. In addition it proposes new paths on the Cambridge side of the river, that run down by the water’s edge instead of up on the street. (BU Bridge Segment is attached in Appendix A)

The Master-plan for Boston University addresses the gaps in the urban fabric on the southern end of the BU Bridge. They plan to construct a new building on the northeastern lot of the intersection that will hold the edge at that corner better. They also plan to construct a new recreation center on the northwestern lot of the intersection.
This building would help tie the university into the park system. Development of the rail bridge as a pedestrian cross-river connection could relate to their BU recreation center. Given the site for this structure, it would adhere to the Air-Rights Guidelines set forth by the Boston Redevelopment Authority.

The Massachusetts Turnpike Air Rights Project has been in the planning phase for many years. The intention is to cover up the portion of the Massachusetts Turnpike that cuts through the city, at a submerged elevation. This would create newly developable urban
space, and could help to reconnect portions of the city that were divided by the construction of the highway system. Plans have been proposed ranging from new park systems, relocated ballparks, and conference centers, to smaller more individual projects.

![Figure 55: Plan for Proposed MIT Light Rail Line](image1)
(Boston Transportation Resources)

![Figure 56: Proposed MIT Light Rail Line Images](image2)
(Boston Transportation Resources)

Massachusetts Institute of Technology has been purchasing pieces of the land upon which the tracks sit with hopes to develop a light rail system in conjunction with the MBTA and Mass. Highway. The new rail line would run from Sommerville Yards to the BU Bridge.

These plans and studies are incorporated into the soft boundaries of this project to improve the site and to accommodate the plans for the individual universities and to benefit the larger context of the city. The light rail line has been dismissed, but connections to MIT will be established using the right of way from the old train tracks.
DESIGN GOALS AND APPROACH

Embedded in the concept of this thesis is the idea of connections. The idea of a pedestrian connection between the Boston and Cambridge pedestrian paths utilizing the Boston University Rail Bridge had driven this thesis from the beginning. The facility must provide a cross-river connection for pedestrians and bikers, as well as a connection back into the neighborhoods of Cambridge, including MIT, to the river’s edge, recreational pedestrian paths, and from Commonwealth Avenue to the river’s edge and recreational paths.

The landmark Grand Junction Rail Bridge is ideally situated in relation to the rivers edge and existing pedestrian paths to make the necessary connection for pedestrians to cross the river at this point. In addition to its ideal placement, the bridge has become a part of the cultural landscape of Boston, and deserves to be saved. It is infrastructure available for reuse. The preservation of this structure helps to maintain the character of the city and adds to the sense of place. The structure is covered with graffiti showing off the school spirit of the universities in Boston, and thus is a perfect segway to a building that is about the pride of the city.

In addition to the preservation of the bridge, the project addresses
deficiencies in the pedestrian circulation through the Reservation. By resolving some of these issues and activating dead space, the project provides pedestrians with more useful recreation space. Improvements to the amenities of the city, help the city by giving the residents something they can use and enjoy, as well as something they can be proud of. It is a unique and beautiful protected space in the middle of a bustling city.

Every element of the building, its image its site improvements and its program are meant to contribute to the city, provide learning opportunities for the residents and thus promote a sentimental feel for the city that cause residents to care for it and protect it.
PROGRAM

The Charles River Center is an institution that is focused on the river and its reservation. The center consists of office space for the Department of Recreation and Conservation, display space, research and laboratory space, a small library, archives, and educational spaces.

The Department of Recreation and Conservation was originally formed (as the Metropolitan District Commission) to care for and protect the Charles River Reservation. They have since grown to care for and protect many recreation and conservation areas for the City of Boston. They also recently lost their home in government center due to pulled funds. Given their mission, a site adjacent to the reservation is ideal; this site allows for their exterior space to be programmed both for their uses and as public reservation space. The building will accommodate the downtown offices of the Department.

In addition to the office space, the Department of Recreation and Conservation has archives for all the drawings relating to the parklands in Boston, including many of the original Olmstead and Elliot plans. Therefore, the building must accommodate the archives. They should be adjacent to both the library space and the display space. The library will be small and hold a small collection of books pertaining to the City of Boston, particularly the Charles River, including the communities that surround and affect the river’s evolution. The display space, will showcase some of the more precious archival objects as well as revolving exhibits that discuss the science and make up of the City of Boston, its land fill, the contamination of the river
and its clean up, and the surrounding communities. The display space should act as a space that can help to educate the public about the city and its history.

In addition to the display space, the center includes educational spaces including seminar rooms, lecture halls and activity rooms, both inside and out. These are to be used by the surrounding communities and visiting school groups. The educational facilities include laboratory space for scientific research regarding the river and reservation.

The center must provide public facilities including restrooms and a café for the users of the reservation. This portion of the program may be separated from the rest.
Program:

Lobby & Orientation
- Lounge Seating seating for 20 500 SF
- Information Counter Central Location 100 SF
- Shop/Bookstore On-Street 400 SF
- Circulation Space 900 SF
- Coat Check Area 40 Lockers 200 SF
- Mens Toilet 3wc, 3 lav, 3 u 300 SF
- Women’s Toilet 6 wc, 3 lav 350 SF

2,750 SF

Library
- Private Research Spaces 10 @ 100 SF each 1,000 SF
- Stacks 2,000 SF
- Reading Room 2,000 SF
- Administrative 600 SF

5,600 SF

Exhibition Spaces
- Storage Room 950 SF
- Community Galleries 2 @ 450 SF each 900 SF
- Main Exhibits 2,000 SF
- Administrative Space 300 SF

4,150 SF

Education
- Seminar Rooms 3 @ 300 SF 900 SF
- Activity Rooms 3 @ 600 SF 1,200 SF

2,100 SF

Cafe
- Waiting Area 150 SF
- Seating for 50 People 800 SF
- Serving Area 200 SF
- Kitchen 500 SF
- Mens Toilet 150 SF
- Womens Toilet 150 SF

950 SF

Public Restrooms
- Womens 300 SF
- Mens 300 SF

600 SF
## Outdoor Spaces

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### Building Services

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## Net Square Footage

- **38,350 SF**
- **7,670 SF**
- **46,010 SF**
PRECEDEENTS

Each of the examples that follow show one way of dealing with specific issues that have been identified in goals and problems. They include precedence’s for the building form and site.

SITE

Living Bridges

Throughout history, bridges have been inhabited with functional and programmable space, making the bridge not only a mode of connection and transportation, but an extended area for living. Some bridges are purely inhabitable space, while others perform the more common transportation functions as well as provide habitable space.

Figure 57: The Rialto Bridge, Venice Italy 1588, Architect: Antonio da Ponte
The Rialto provides a pedestrian crossing of the river, but supports retails space, continuing the activity of the surrounding streets over the span of the river.
Figure 58: Allahverdi Khan Bridge, Isfahan, Iraq, 1599

The Allahverdi Khan Bridge acts as an arcade that surrounds a building. The passage provides access to the rooms behind it, and is not as much a passage for travel beyond that of the building.

Figure 59: Battlefield Basin, London, England 1989 Proposal, Architect: Barfield and Marks

This living bridge accommodates additional housing for the city. It uses the space over the river as space that can be filled in with uses. This examples provides no means of connection or transportation at ground level, or otherwise.
Covered Bridges

The covered bridge provides shelter for the road and its’ travelers. It also combines the image of the bridge with the image of a building. They range from the traditional fully covered bridge, to bridges that provide only shelter from above, to bridges that are open, but provide an image of shelter through form. The following examples provide ways of dealing with the bridge as a structure.

Figure 60: Bridgeport Bridge
The Bridgeport Bridge is a traction covered bridge structure. The skin covering the bridge expresses the structural arch behind it, and there are few small openings allowing light to enter the interior passageway.

Figure 61: A Turkish Covered Bridge
This covered bridge, remains open to the sides, but by covering the passageway with a roof, it protects the people from rain and snow as they make the crossing.
Figure 62: Bollman Truss Bridge, Savage, MD - 1869, Engineer: Wendel Bollman

The Bollman Truss Bridge provides the image of a building. The framework of the truss provides a transparent structure through which trains may pass. The truss spans the top portion as well, giving an image of protection from the elements.
Leisure Bridges

These two examples show bridges that provide open space for leisure time and activities. They are places that act as destinations, where one can spend time relaxing.

Figure 63: Zig-Zag Bridge, Shanghai

The Zig-Zag Bridge brings people to the temple, but is also provides a place for people to relax and view the landscape. Note many people just standing and looking at the view.
Figure 64: Petrer Bridge, Petrer, Spain 1998, Architect: Carme Pinos and Miguell Llorens

The Petrer Bridge protects a small portion of the bridge, setting it aside specifically for leisure. The spot is protected from both the wind and the sun, making it an ideal place for people to come, sit and enjoy the outdoors.
Figure 65: Kapell Bridge, Lucerne
The Kapell Bridge provides a nice protected place for people to stand, out of the elements, and look at the Swiss view. This bridge is a destination, not just a means of access.
Connections

Some bridges not only provide connections across difficult terrain or inaccessible expanses, but connect vertical differences. This is a problem that has been identified on the BU site and will need to be addresses either within the building, or as part of the site design.

Figure 66: Solferino Bridge, Paris, France 1999, Architect: Marc Mimram
The Solferino Bridge provides connections across the river, but also vertically between the footpath along the rivers edge and the circulation of the rest of the city. This allows people to move back and forth between the two separate movement systems.
Rails to Trails

All over the country, abandoned train tracks are being converted into pedestrian paths and bike trails. The clean swath of land, left as residue of the once existing train tracks provides a nice continuous path to be reused. By utilizing the old rail bridge to connect existing pedestrian and bike paths, the bridge may want to be addressed in a manner similar to those used in the Rails to Trails program.
BUILDING

Although the Center is primarily office space, as a public building geared towards promoting civic pride, it should have some iconic value. Therefore, museum precedences are used for form.

Figure 68: Sainsbury Center, Norwich Connecticut, Architect: Norman Foster
This entrance to the Sainsbury Center shows how a major entry can be separated from the main structure, and exhibits possibilities for entry to the further portion of the site.

Figure 69: USS Arizona Memorial
The memorial built out over the water shows some possibilities for program on the bridge.
Figure 70: Ehime Museum of Science, Architect: Kisho Kurokawa, Plan
The Ehime Museum has many different building-water relationships.

Figure 71: Ehime Museum of Science, Architect: Kisho Kurokawa, Model
This image of the Museum shows an example of an object piece placed directly on the water, with reflections in the water.
Figure 72: Wakayama MOMO, Architect: Kisho Kurokawa, Plan
Kurokawa uses the water and brings the pool from exterior to interior in this project.

Figure 73: Wakayama MOMO, Architect: Kisho Kurokawa, Model
POSSIBLE SITE INTERVENTIONS

The following diagrams look at different ways of dealing with the approach to the site and the soft boundaries of the project.

All approaches include a cross-river connection utilizing the Grand Junction Rail Bridge and new pedestrian paths, which bring pedestrian traffic down to the water’s edge on the Cambridge side of the river.

Figure 74: Pedestrian & Green Space Connections. This Diagram shows the connection of pedestrian paths and green spaces from the Emerald necklace and how they would cross the river.

MINIMAL INTERVENTION

Figure 75: Minimal Intervention on site. This site strategy connects the pedestrian paths over the river and inserts two structures creating a relationship that spans the river.
This intervention maintains the basic road structure, but removes the over pass at the Memorial Drive intersection with the BU Bridge. The over pass is intrusive in the continuity and connection between the residential neighborhood and the recreational reservation. It investigates a parti that is an object within the reservation that may have some relations back to the oval of the rotary and to the residential neighborhood. This scheme raises the question whether a building should be constructed within the reservation or not, and how does the structure integrate with Boston University across the river.

REINFORCED RAIL PATH

![Image](Figure 76: Reinforced Rail Path. This site strategy fills in gaps along the old rail line, creating a stronger edge for the path that cuts through at this location.)

This scheme looks at bringing public transit directly to the site, per the MIT plans. A light rail line could use the existing train tracks to cross over and connect to the west part of the city. The structures reinforce this rail line. The problems of this scheme include the coexistence of a pedestrian path and a rail line on the Grand Junction Rail Bridge. It raises the question of necessity and future connection. Can it tie into the old abandoned A line (a branch of the Green Line)? Does a rail
line need to be reinforced, or should it remain the industrial backyard of the city?

Figure 77: Possible Metro Intervention. This diagram shows the existing Metro System with the yellow line highlighting a possible new metro extension, utilizing the existing rail

GATEWAYS AND BOOKENDS

Figure 78: Focus on Bridge. This intervention heightens the density surrounding the edges of the bridge on both sides of the river. It also brings the urban fabric closer to the river's edge, infringing on the landscape condition that currently exists there.

This scheme looks at reinforcing both ends of the BU Bridge. It provides a gateway to the bridge and the City of Boston on the Cambridge side, and reinforces the existing fabric on the Boston side (south). This scheme includes construction within the reservation and
again raises the question of whether or not that is appropriate.

REINFORCED EDGE

Figure 79: Reinforced Intersections. This intervention heightens the density at the intersections on either side of the BU Bridge. It fills in some gaps that currently exists, builds over the Massachusetts turnpike, a project that is in planning stages, and reorganizes the formation of the corner on the northern side of the bridge to create a true intersection instead of the rotary that currently exists there.

This scheme changes the existing traffic patterns in Cambridge, changing the rotary back into a traditional intersection. Most of the intersections with bridges on Memorial Drive result in stop lights, which allow pedestrians easier access to the reservation and river. At this location, the access has been sacrificed for higher speeds for automobile traffic. Removing the high speed overpass and reverting the intersection to a stop light would slow the speed of traffic and allow more use of the reservation by the residents coming from the north. Other parts of this scheme include filling in some gaps in the existing fabric and creating more solid edges for the streets and parkland. This scheme relies on using the reservation portion of the site as programmed outdoor space and possibly a very small structure that houses public facilities. This is the most promising approach, and all further explorations are based on this scheme.
CONCEPTUAL DESIGN APPROACHES

SCHEME A

This scheme combines the next two parti ideas. The parti puts a plaza at street level on the corner of the site, with some program below grade and offices across the street in the urban fabric. The building would utilize the rail underpass to make the physical connection between the two sites. It also sites some element above grade that can make a visual connection to the building across the street.

Figure 80: Cross Street Connection. The program is slit between the two sites, placing minimal program within the reservation.
Figure 81: Object in the Landscape. This parti looks at an object building that sits on the tracks with direct connections to the water and train bridge.

Figure 82: Site Plan
Figure 83: Street level has a plaza with a small vestibule with vertical circulation on the southern portion of the site, and a larger entry, and offices on the northern portion, with all floors above street level as office space.

Figure 84: The river level has programmable open space and display space, a café and public restrooms within the reservation.
SCHEME B

Scheme B looks at combining the next two ideas with a building that places all the program within the reservation, and attempts to have strong building/river and building/bridge relationships. It discards the idea of holding the street edge, because it is in the reservation, and attempt to create object buildings.

Figure 85: This Parti looks at a building that holds the street edge and opens up to the water.

Figure 86: This Parti looks at a courtyard building that holds the street edge and has close building/water and building/bridge relationships.
Figure 87: Site Plan

Figure 88: The street level again greates a plaza at the corner and then separates the public spaces from the office spaces

Figure 89: Below grade, the building buries some of the spaces that don’t need or want light and provides a cafe and public facilities fro the restervation.
SCHEME C

Scheme C places all the program on the north side of the street and programs the south side of the street as outdoor space.

Figure 90: Site Plan

Figure 91: Plan & Section
CONCLUSION

After a great deal of additional site exploration, I realized that this project was not just about the specific site, or the circulation at this point in the park system, but is had to look at the larger picture. Thus,
I stepped back with my site analysis and started looking at the park and river in the city as a whole. I realized that the park was primarily a recreational center for the city, and that this focus limited the audience and people that use the park system. Therefore, my project would fit into a greater vision for the park that would begin to diversify the nodes and events along its paths to encompass both recreation and culture. The Cultural Institute of the Charles River, therefore, is just one of many nodes.

Additionally, this thesis needed a greater goal, which was to use the river as a space that unifies Boston and Cambridge. In order
to do this, I needed to open up the waters edge and bring people into the space of the river. Therefore, the master-plan, site, and building are used to move people from the city into the park system, and to the water’s edge.

Figure 96: Unifying Space

Figure 97 & 98: River Space/Unifier

Figure 99: View from across the river. View from within space of river.
The urban intervention looks at the intersections on both sides of the Boston University Bridge. It fills in vacant spaces to clean up the edges to define a clear delineation between park and city. Additionally, the urban intervention increases the density on the Cambridge side of the bridge, forming a mixed-use center for the surrounding neighborhood. The overpass along Memorial Drive is removed and the rotary below is reverted to a true intersection. Street parking is also added to this portion of Memorial Drive. These changes help to slow the traffic at this portion of Memorial Drive and make the intersection more pedestrian friendly. Thus it is easier for people to move from the city to the park. The Light rail system, proposed by MIT is implemented in this scheme to facilitate the movement of people from the university and the city to the park system and the river’s edge. Within the park and river, the old train bridge is converted to a pedestrian bridge, allowing pedestrian to cross this river at this location. A new pedestrian path is also established along the water’s edge through Magazine Beach and under the Boston University Bridge, on the Cambridge side of the river.
The Institution is dealt with as a part of the park system. It terraces down to the river, mediating between the topography at street level, and the topography at the water’s edge. The site plan facilitates movement through the park system from all directions, bringing all travelers through a central space between the Institution and the water’s edge. Pedestrians and bikers can enter the site using the pedestrian Bridge (the Grand Junction Rail Bridge), the new path from the west the stairs and ramp from the street at the eastern edge of the site, the path from the corner intersection, and the city passage. The city passage maintains a connection between the park and the city (and Transit), utilizing the old train underpass under Memorial Drive. This passage slices through the building, leaving a memory of the old
train tracks. Movement from city to park requires the public to pass through the public portions of the building, thus the building is treated in a series of events for people to sit and enjoy the outdoors.

Figure 104: View of Passage from city to park.
The path from the intersection terminates in a lookout over the river.

Figure 105: View from Lookout, at end of corner path.

The pedestrian then moves either left or right to move down into the site and to the water's edge. At either end of the building sit these vertical circulation pieces. At the western end, the vertical circulation piece is both a grand stair, and an amphitheater. The tower terminates this space, acting as a backdrop for any events. It also houses a screen for viewing (movies, marathons, races, etc.)

At the eastern end, there is a grand stair and ramp for movement and sitting and viewing the river. This movement system is geared towards east/west travel along the park system.

The institution is treated as if it were part of the land, and is peeled away from the hillside. This allows for the lower terrace to slip under the building and reveal itself further back into the site. It also allows for an understanding of the different levels and how they work together. This movement creates private courtyards in the rear of the
Figure 106: View of Amphitheater and tower.

Figure 107: Upper Terrace Plan

Figure 108: Lower Terrace Plan
building for the staff and provides light and air to the service portion of the building. The building is entered from the lower terrace, so that people must enter the park system first, and can then filter into the building through a variety of entrances. At one end sits an educational center with lecture rooms and seminar rooms for community and institution courses. At the other end is the library and archives, which pops up above the land to create a presence for the institution. In the middle are the services spaces and the function hall. The café and library border the passage to provide a kind of street life for the gateway to the park system. In the middle sits the function hall, which opens up onto the lower terrace for parties. It also pops up above ground creating a glass lantern effect.

Along the front (river side) of the building, there is a unifying gallery. This gallery transitions from an exterior colonnade to an interior gallery within the function hall. The colonnade is a light steel frame component that sits on top of the land, and the rest of the terracing structure, just as the two adjacent bridges sit on top of the land. In
addition to the main program, a viewing tower is incorporated in the scheme. The tower acts as an icon for the city and draws people to the site. It then allows them to climb it and look back over the entire river and park system and understand it as a whole.
Figure 116: View of Colonade

The project is successful in the sense that it completes the space of the lower basin, and brings people to the river’s edge.

Figure 117: Main Hall Section

Figure 118: Passage Section
BIBLIOGRAPHY


BOSTON UNIVERSITY BRIDGE (3N, 3S)

Sorrow Drive between Charlestown and Boston University Bridge

KEY RESOURCES

- Boston University Bridge (1928)
- Sorrow Drive (1951, 1955)
- Boston University sailing pavilion
- Boston and Albany Railroad bridge

INTRODUCTION AND HISTORY

Built on the site of the 1850 Brookline Bridge, the Cottage Farm Bridge was completed in 1928 and renamed the Boston University Bridge in 1949. It rises high to clear the Grand Junction (Conrail) railroad tracks below. This bridge marks the transition from the broad expanse of the Lower Basin, where marshes once spread far beyond the present seawall, to the snaking course of the Upper Basin.

EXISTING CONDITIONS AND ISSUES

Given its strategic location, one would expect pedestrians to use the BU Bridge heavily, yet there is no direct link to the Basin pathways. On the south side the bridge soars high over the pathway. A set of stairs drops down on the wrong side of Sorrow Drive, tempting many pedestrians to cross illegally at this point. It is possible to head downriver a quarter of a mile to a pedestrian bridge that returns to the reservation, but this circuitous path is neither marked nor handicapped-accessible. This stretch of the pathway forces users to travel long distances to reach abutting neighborhoods.

The Boston University sailing pavilion, abutting the bridge, poses several problems. It creates blind corners on the path that have resulted in collisions between bicyclists and pedestrians, and it blocks full views of the path, creating a security problem. At this pinch point in the river, novice sailors using the dock conflict with passing rowers and are occasionally blown up against the railroad bridge. BU students must travel much further to reach the race course than do MIT or Harvard students sailing out of boathouses downstream and on the Cambridge side.

There are also access issues on the north bank. The MWRA’s Cottage Farm combined sewer outfall facility, the bridge, and the railroad all interrupt the riverside path, forcing it out to the intersection of the bridge and Memorial Drive. This intersection, despite signalization, can be hazardous for pedestrians. The pathways are narrow and uneven in this area. Automobiles turning east from the bridge onto Memorial Drive have limited visibility.

The Grand Junction Railroad Bridge, a double-barreled crossing with active tracks on one side and an abandoned roadbed on the other, is used rarely. The MBTA uses the tracks to shuttle trains each day at very slow
speeds. Conrail also uses them infrequently. This bridge links the two banks at a much lower elevation than the Boston University Bridge, presenting an opportunity for a new pedestrian link across the river.

**Goals**

- Improve the continuity and safety of movement along and across the river.

**Recommendations**

- Move the Boston University sailing pavilion from the pinch point at the Boston University Bridge to a location to be determined between the current site and the Charlestown (page 114).
- Use the abandoned half of the Grand Junction Railroad Bridge to provide pedestrian and bicycle access between the north and south banks of the reservation. A multiuse path for foot and wheeled traffic would occupy the unused side of the bridge bed, and the active rail line would be securely separated from this pathway. Build an earthen embankment ramping up to the railroad bridge from the upstream approach on the south side. If the roadbed can not be used, cantilever the pathway off the railroad bridge on the upstream side. Establish connections in four directions on the north bank (shown in diagram, above).
- Extend the upriver leg to cross on a boardwalk under the bridge and past the MWRA facility. Move the MWRA fences path would allow continuous waterfront access by connecting to a new shoreline path along Magazine Beach. Because the bridge is one of the worst pinch points for water traffic on the Charles, avoid further constrictions within the waterway. Consider cantilevering the walkway above the water surface.
- Cross the railroad tracks at grade with a new path past DeWolfe Boathouse. Several at-grade crossings already exist in Cambridge, one just fifteen hundred feet from the reservation. Should an at-grade crossing of the tracks prove infeasible, an alternative path alignment would climb the slope to the intersection of Memorial Drive and the Boston University Bridge.
- Extend a fourth pathway up the railroad alignment into East Cambridge, providing a direct link between BU and MIT and access to the river for Cambridgeport and East Cambridge residents.
- In the event that active use of the rail lines is discontinued, connect Boston University’s athletic fields and the Beacon rail yards directly to the Basin. Future development of the parcel fronting the approach to the Boston University Bridge also would provide an excellent opportunity for a direct connection to the river.
- Future rebuilding of the Boston University Bridge should provide pedestrian overburks to take full advantage of the views up and down the river.
- Eliminate the free right turn at the Boston University Bridge/Memorial Drive intersection and reduce the width of the Memorial Drive ramp inbound from the