CHARLESTON RIVERFRONT MASTER PLAN

Charleston, West Virginia

SASAKI January 2006

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Charleston, West Virginia

PREPARED FOR

The City of Charleston, West Virginia

PREPARED BY

SASAKI ASSOCIATES, INC.

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Vision and Strategy

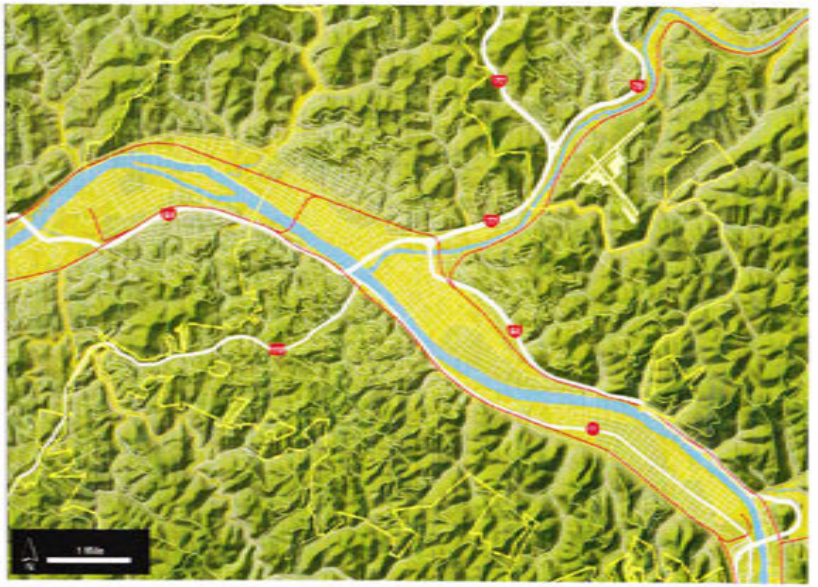
The city of Charleston is strategically located at the confluence of the Kanawha and Elk Rivers in southern West Virginia. Sitting atop a narrow plateau that stretches some four miles long, Charleston is the Capital of West Virginia, a major regional employment center, and home to 55,000 Charlestonians.

Defined by the West Side, Downtown, and East End neighborhoods, and anchored on the far east end by the Capitol complex, Charleston has always had a unique relationship to its rivers for commerce and recreation. That relationship and the physical environment along the Kanawha and Elk Rivers is now being carefully reconsidered:

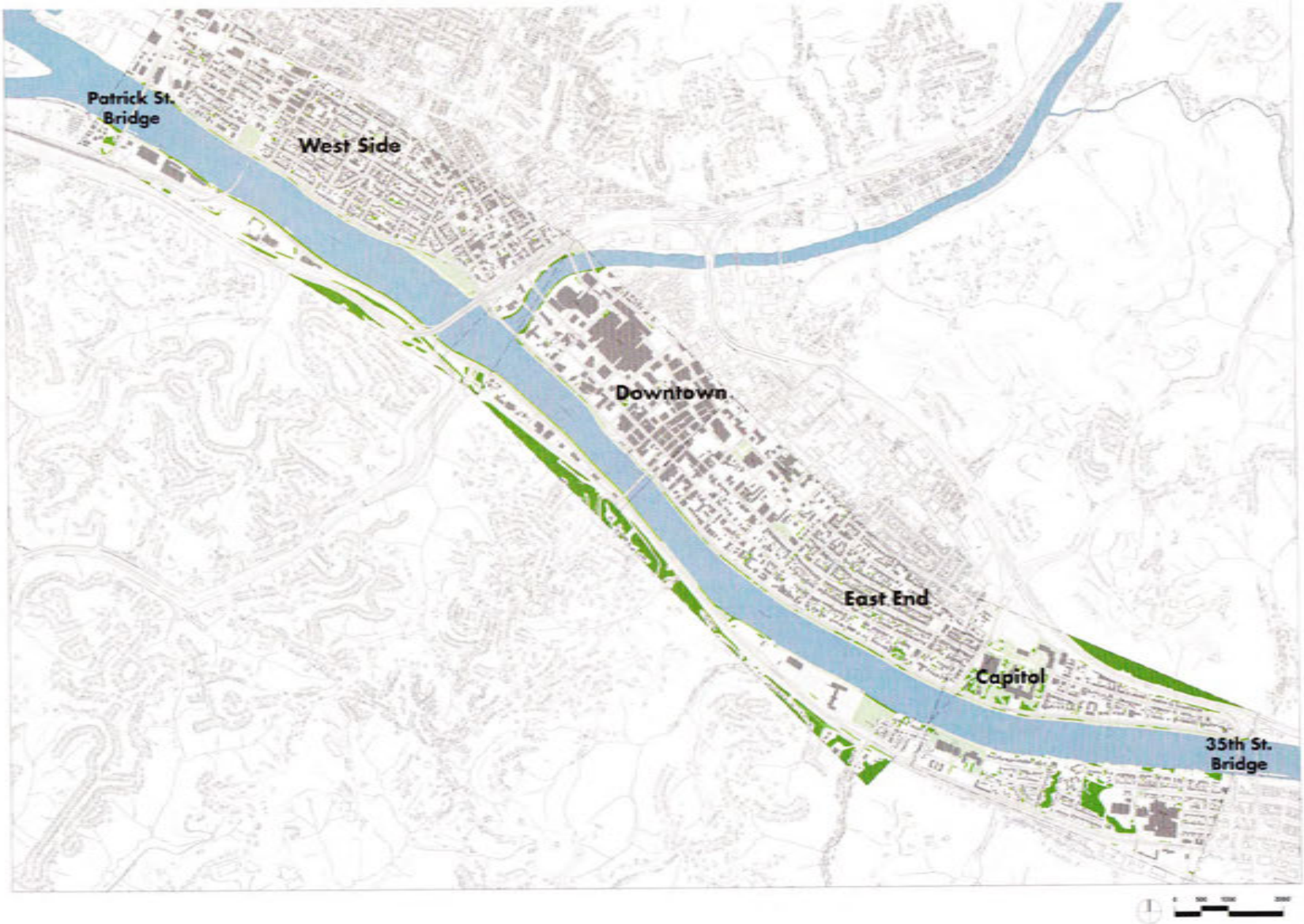
- *to position Charleston as a destination city and an attractive place to live and work*
- *to connect neighborhoods to each other and to the water*
- *to highlight and preserve Charleston's unique culture and history, and*
- *to capitalize on the considerable recreational and economic potential that the riverfront has to offer for the citizens of Charleston*

This study comes at a time when many other cities in West Virginia are improving their waterfronts to promote recreation and economic development. Cities such as Wheeling, Morgantown, Fairmont, Parkersburg and Point Pleasant are actively engaged in coordinated public, private, and non-profit efforts to upgrade their riverfronts. Charleston is similarly poised to implement fundamental and achievable changes to its own unique riverfront system. These changes, in both the short term (0 to 5 years) and long term (10 to 20 years), will contribute to Charleston's quality of life, catalyze private investment and contribute to the economic success and revitalization of the city.

▲ Map of Southern West Virginia and confluence of rivers.



▲ Topography and transportation network of Charleston.


Patrick St.
Bridge
West Side
Downtown
East End
Capitol
35th St.
Bridge

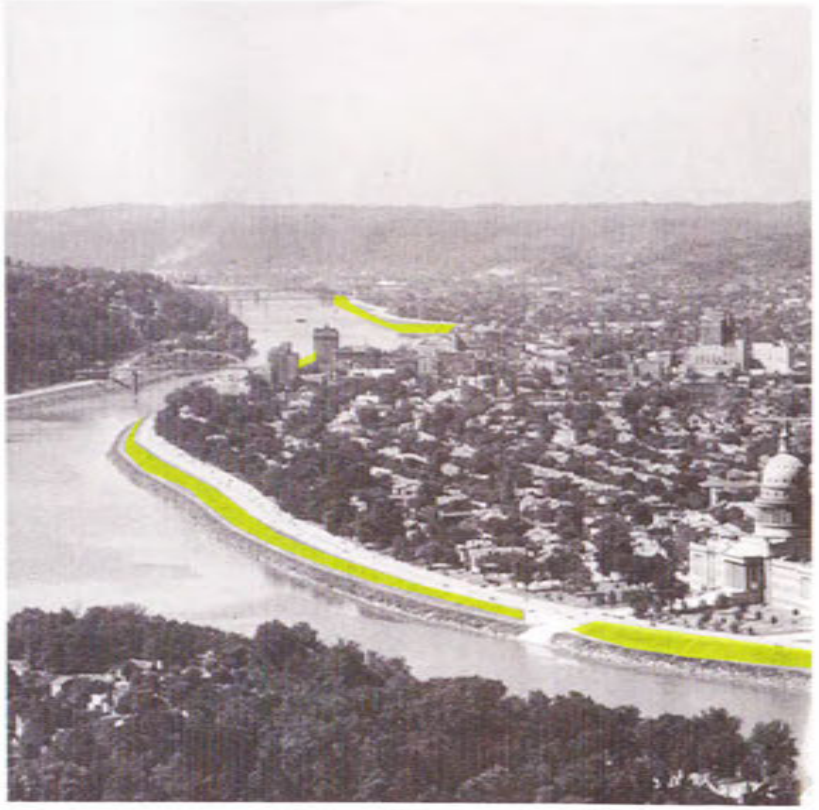
The riverfront area under consideration in this report stretches from the Patrick Street Bridge to the west, to the Kanawha City Bridges at 35th and 36th Streets to the east. This stretch of riverfront is characterized by the generous width of the Kanawha River as it flows through Charleston, almost 600' wide, and by the steep landscaped embankments that provide a setting for active and passive recreation and protects the city from periodic high water events.

At the top of the northern river embankment runs Kanawha Boulevard, a four-lane thoroughfare completed in 1940 by the Works Progress Administration. Single family homes in the historic West Side and East End neighborhoods line the Boulevard and face out onto the river, while office, commercial, and institutional buildings of various eras are seen in the downtown area. "Magic Island", a low lying park at the confluence of the rivers, and Haddad Riverfront Park between Court and Summers Streets in downtown Charleston, are the primary riverfront destinations. The Capitol building, designed by celebrated architect Cass Gilbert and completed in 1932, anchors the far east end of the riverfront.

This four mile stretch of waterfront can be considered Charleston's "Green Ribbon", tying together the city's unique qualities of environment, economy, culture, people, and history.

A fundamental philosophy behind this study is that key landscape improvements to both sides of the Kanawha River (the "Green Ribbon") will lead to private investment within the city itself, particularly along the northern edge of Kanawha Boulevard. Depending on market viability and timing, this investment could take many forms - a new "downtown riverfront district" with a mix of commercial and retail uses, adaptive re-use of historic buildings on the West Side and East End, loft apartments, art galleries, artist studios, riverfront restaurants, and other diverse new places to live, work, shop and eat. This model has been successfully achieved in recent decades in other riverfront cities such as Pittsburgh, Cincinnati, and Louisville to name but a few. Recent developments in Charleston have already initiated this trend, including the highly successful Clay Center, Appalachian Power ballpark, Farmer's Market, and Capitol Street projects.

A consensus vision for Charleston's riverfront, as outlined in this master plan report, in conjunction with public, private and non-profit partnerships built around the considerable potential of the Kanawha River, will be essential in achieving further positive and lasting change along the corridor.



▲ Charleston's "Green Ribbon," looking west

Process and Goals

Charleston's riverfront has long been a focus of improvement efforts. Beginning in the 1930s with the clearing of privately owned properties along the waterway to create public access and allow construction of Kanawha Boulevard, the waterfront has provided an important recreational asset to the city. Landscape improvements in the 1960s (plantings) and 1980s (Haddad Riverfront Park) further enhanced the perception and use of the riverfront land.

In the early 2000s, various proposals were submitted to the City of Charleston regarding developments and improvements to the riverfront in the form of offices, restaurants, and marinas. At the same time, forward thinking citizens and council members in Charleston began to look at the riverfront in a more comprehensive way, acknowledging that the Kanawha River was an underutilized asset that should be carefully planned and integrated into the city context. This effort in turn would leverage Charleston's competitive advantage as a riverfront city and encourage businesses and residents to remain or locate in Charleston.

To initiate this planning process and establish a vision and framework for the riverfront, Mayor Danny Jones and the Charleston City Council created the Charleston Riverfront Development Committee in early 2004. The vision and framework process is based on an open process of public participation and input. A key milestone occurred on November 9, 2004 when a public "Think Tank" meeting, conducted jointly by the Riverfront Committee and the Charleston Area Alliance, was held at the Charleston Civic Center. Approximately 130 Charleston citizens attended and voiced their support, among other things, for a riverfront plan that prioritized public green space, enhanced and added public amenities at the water, and carefully considered a mixed-use approach for any riverfront development (see Appendix A).

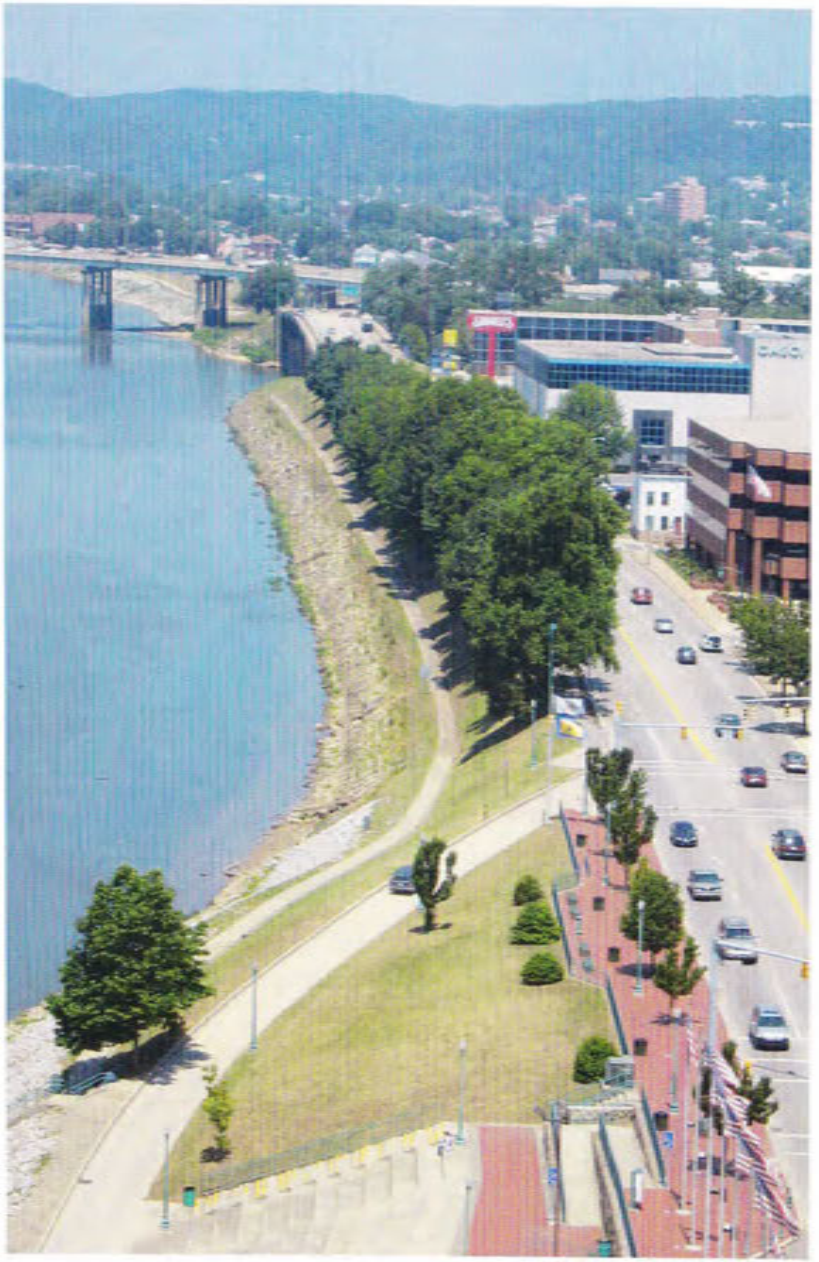
▲ Riverfront at Downtown, circa 1940 (from "Kanawhan Images," Vol. 2)

▲ Charleston Riverfront Committee with consultants.

In early 2005, the City selected Sasaki Associates as lead master planner for the riverfront plan, with Gannett Fleming as transportation and funding subconsultants, to lead a more involved riverfront master plan effort for the city and to further develop the ideas from the Think Tank session.

In order to make sound recommendations that reflected input from a broad range of constituents, the master plan process was based on a community outreach and engagement process that extended between June and November 2005. Through this process, the Sasaki and Gannett Fleming team met with citizens, neighborhood leaders and organizations, elected officials, municipal, county and state staff, regional organizations, and civic, institutional, and business leaders. These discussions, which included one-on-one interviews with key stakeholders and three well attended public meetings, generated local knowledge and understanding of the site and city, and uncovered a wide range of ideas for better access, improved uses, diverse activities, and landscape modifications to the riverfront.

The Sasaki and Gannett Fleming team was able to share their insights and experiences from other riverfronts, present an analysis of the Charleston riverfront conditions, suggest plan alternatives, and synthesize diverse ideas to develop a recommended vision and strategy.



Design Principles

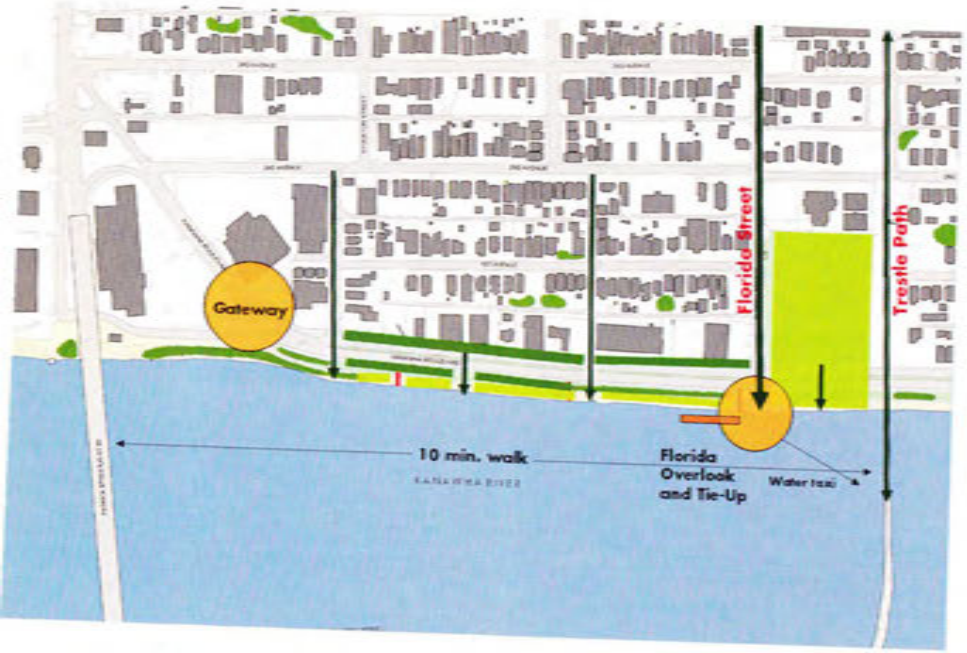
A number of initial design principles were established early on in the master plan process. These principles are meant to inform the plan over time, understanding that the riverfront plan will need to be implemented by the coordinated effort of many citizens and organizations over the course of many years.

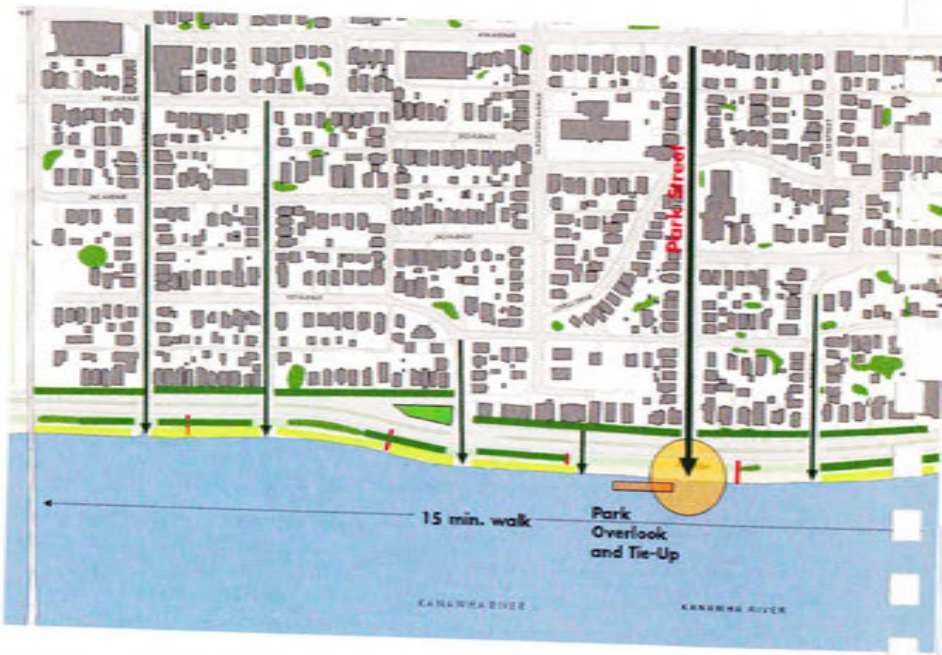
A. Create More Accessible and Usable Park Space along the Kanawha River

In order for the Charleston riverfront to become a completely functional, citywide recreational resource, it is critical to create more accessibility across Kanawha Boulevard and to provide more usable park space for people on the river side of the roadway. Crossing the Boulevard from the city to the riverfront is difficult due to the width of the roadway and continuous traffic flows from west to east in the southernmost lane. In places, there are no striped crosswalks from north/south connecting streets to the upper level park riverfront path, while there are a minimal number of curb cuts that allow pedestrians onto the path. Once across the Boulevard, pedestrians are required in some places to step over a 8" high concrete curb that separates the roadway from the path. The 6' wide upper path itself is too narrow to be a multi-purpose facility for both pedestrians and bicyclists at the same time.

In short, the Charleston riverfront has great potential for people who are seeking safe and usable recreational space. As public recreational space opportunities are somewhat limited in Charleston, it seems clear that the Kanawha riverfront should become Charleston's grand, linear "Green Ribbon".

▲ Existing site photos of Boulevard and riverfront.


Gateway
Florida Street
Trestle Path
10 min. walk
Florida
Overlook
and Tie-Up
Water taxi


Park Street
15 min. walk
Park
Overlook
and Tie-Up


Ruffner St.
(Ruffner Way)
Elizabeth St.
Ruffner Park
Water taxi
Ruffner
Overlook
and Tie-Up
15 min. walk
Elizabeth
Overlook

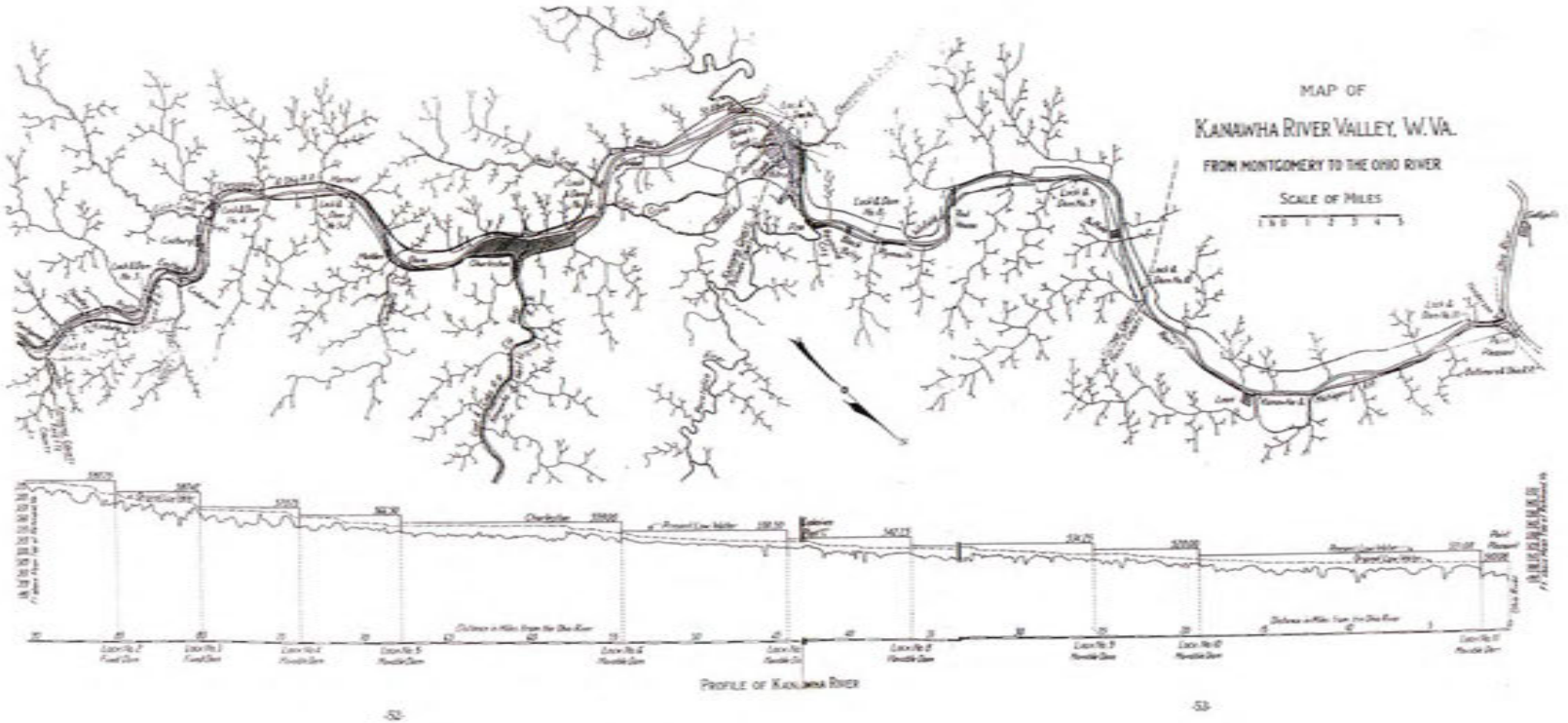

Chesapeake St.
East
Gateway
Chesapeake
Overlook and
Tie-Up
15 min. walk

B. Integrate Neighborhoods and Downtown Charleston with the River

The majority of the City's neighborhoods are within a half mile or a 10-minute walk to the riverfront. This half-mile distance is easily navigated through the city's very clear street grid which offers multiple north/south streets that lead from the city to the water, and vice versa. Key connections between the river and institutions such as the Clay Center for the Arts, the Charleston Area Medical Center, Capitol Street retail area, farmer's market and residential neighborhoods can be reinforced. Improved sidewalks, street trees, lighting, and in some cases banners and other forms of signage would greatly enhance the pedestrian experience.

Additionally, the normal pool elevation of the Kanawha River sits some 35 to 40' below the plateau of the city, making the river imperceptible as one approaches the water from the City. Key markers, statues, overlooks, tree openings, and other landscape elements should be developed at the ends of these streets within the riverfront park to signify the important connectivity between the urban (neighborhood) and natural (river) environments.

▲ Court Street, looking south to river.



▲ Plan and sectional drawing from 1918 of Kanawha River (from "Kanawha County Images").

C. Enhance the Recreational, Historic, and Cultural Qualities of the River

Since the late 19th century, the Kanawha River has been a major shipping route for coal barges originating from the southern coalfields of West Virginia to distribution points in the states of Ohio and Virginia. The river maintains that function to this day, where coal barges travel on the Kanawha on a daily basis between the Ohio River in the north and the New River to the south. Over time, the river has become a controlled system with a series of locks and dams that are used to manage river elevations and allow safe passage.

▲ Lock and dam construction (from "Kanawha Images," Vol. 2)

Because of this history, a 10 county area just to the south of Charleston has been designated a National Coal Heritage Area (NCHA). An opportunity exists in Charleston to highlight the Kanawha River's contribution to this nationally important commercial activity. In addition, Charleston is in close proximity to other regional destinations such as Daniel Boone Park to the east, Kanawha State Forest to the south, Coonskin Park to the north, and South Charleston to the west. A system of trails originating along the Kanawha River and the Elk River can connect with these destinations and provide spectacular recreational opportunities. An important study called the "Greater Charleston Greenway" is now being prepared by Terrell Ellis & Associates for the West Virginia Land Trust to analyze and design such important connections.

Finally, the Kanawha and Elk Rivers provide ample opportunities for recreational boating, fishing, regattas, concerts, festivals, arts events, movie nights, and other activities that have already been occurring in Charleston for some time. Activities such as these would benefit greatly from improved facilities at key locations.

▲ Charleston regatta.

▲ Movie night at Magic Island.

D. Enhance Areas for Special Events on the River

Magic Island and Haddad Riverfront Park are two key destinations on the Charleston Riverfront. A strong connection across the Elk River between these two parks is possible that would symbolize and strengthen the relationship of the West Side to the Downtown and East End. Magic Island could become Charleston's "Great Waterfront Park" and be designed with a new paved riverfront promenade for fishing and boat tie ups, as well as upper level gardens, spray fountains, small food kiosks, and improved paths and plantings.

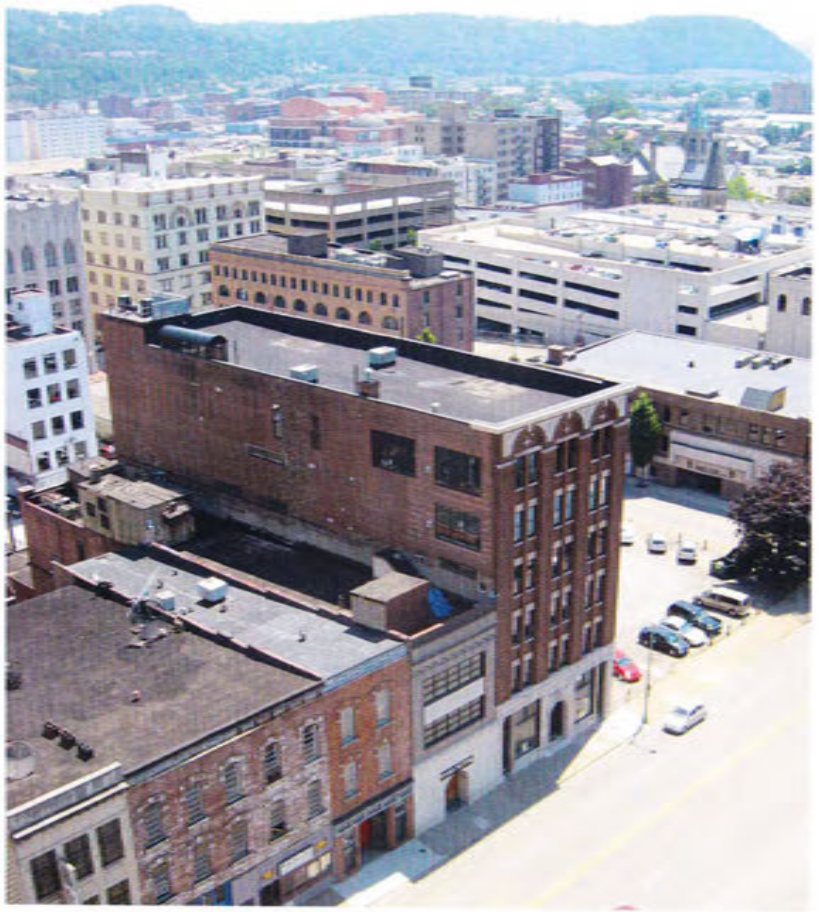
The Elk River Bridge is a special opportunity to celebrate the confluence of the two rivers, by adding lighting, banners, special sidewalks, benches, plantings. Built in the early 1980s, Haddad Riverfront Park is a popular destination that could be enhanced through a variety of carefully phased measures. An overhead canopy for the amphitheater would provide shade and protection during the hot summer months, while reconfigured kiosks and a new connection to the signature Union Building would enhance the park's function and quality.

Recent improvements in Charleston demonstrate that the public and private organizations, citizens, and funding mechanisms are in place in the city to "make things happen" from both a physical and operational standpoint. This spirit of achievement and focus on implementation should soon be brought to bear on short term improvements for Magic Island, the Elk River Bridge, and Haddad Riverfront Park.

E. Create Achievable Riverfront Plans that will Spur Adjacent Economic Development in the City

The Charleston riverfront is a tremendous resource that distinguishes the City from other urban settings and creates additional value for adjacent properties. Already, investor interest is high in developing areas near the riverfront, such as the former Elk Town Center Inn site and conversion to loft apartments of the building at 812 Kanawha Boulevard. With future development of commercial and residential parcels on the north side of Kanawha Boulevard, the riverfront park in turn will become an active and safe environment with "eyes on the park" during both daytime and nighttime hours. A mix of development uses will provide this sense of energy and activity, especially in the downtown area, and will ideally include residential uses arrayed along the riverfront between the Elk River and the South Side Bridge, with appropriately scaled retail, cultural, entertainment, and small business establishments. Ground floor retail uses with several floors of residential units in either rental or condominium configurations would be an excellent model to pursue fronting the river. Current zoning codes should be reviewed and modified
(if necessary) to reflect this intent.

Another important design element along the riverfront is that future or renovated building facades should be brought directly to the edge of the sidewalk and street and include numerous windows and entries to enliven the adjacent street life and pedestrian experience. In this way, the traditional relationship of City, riverfront boulevard, and river landscape can be reestablished and integrated. Surface parking lots and other outparcels that break this continuous street facade are not recommended, while parallel on-street parking spaces are encouraged to meet parking demand and protect pedestrians from street traffic.



▲ Conversion to loft apartments at 812 Kanawha Boulevard.

▲ View of City Boulevard, and Kanawha River, looking east.

F. Build Upon Previous/Ongoing Studies, Community Input and Recent Successes

Over the past 20 years, numerous planning and development studies have been completed for various areas of Charleston. Of particular relevance to the riverfront study are the current Combined Service Overflow (CSO) Initiative by the Charleston Sanitation Board and the Army Corps of Engineers Bank Stabilization Project. These two major infrastructure initiatives will greatly affect the Charleston riverfront and should therefore be engineered and designed in close coordination with an improved riverfront park. Both are considered in more detail in the Site Analysis section of this report.

In addition, the Charleston C.E.N.T.R.A.L. Area Redevelopment Plan (1997), the West Side Community Revitalization Plan (1998), the East End Revitalization Plan (1997), the Florida Street Revitalization Project (2002), the Kanawha Trestle Rail Trail project (2004), and the Greater Charleston Greenway Report (2005) speak to the importance of expanded parks and public open space opportunities for Charleston citizens. The Central Area plan by Odell Associates proposed a Greenway Loop system that would run through Charleston. This idea should be pursued in conjunction with the riverfront improvements.

Many of these reports are the result of community efforts and public input that should be incorporated into the evolving riverfront improvement process. During the schematic and design development phases of riverfront work, the reports should be consulted for their insights and ideas into important land use issues, connections, streets, and neighborhood nodes as they relate to the Kanawha and Elk Rivers.

▲ Recent Charleston developments and proposed city "Greenway Loop System."

▲ Kanawha River, north bank.

Site Analysis and Opportunities

Kanawha Riverfront - North Bank

The existing riverfront condition on the north slope of the Kanawha River is a steep embankment of stabilizing boulders (rip rap) at the water's edge, and a grass slope that leads up to Kanawha Boulevard. The grass slope includes groves of deciduous, evergreen, and flowering trees of varying age and condition, most of which were planted in the 1960s from plans by landscape architect Brooks Wiggington. Over time, a number of "memorial" trees have also been planted along the upper bank as part of a program managed by the Charleston Beautification Committee.

Two pathways run parallel through the riverfront park, a 6' wide upper pathway next to the Boulevard (separated from the road by an 18" grass strip and 8" high concrete curb) and a 4' wide mid-level pathway. The pathways are connected to each other and to the river through a series of narrow and steep concrete staircases that are in varying states of repair. Most do not have handrailings while handicapped access from the upper to lower level is essentially non-existent, with the exception of Haddad Riverfront Park. Further, the majority of these staircases have no apparent relationship to the north/south streets that feed into to the park from the neighborhoods, where most pedestrian activity leading into the park would be expected.

Access to the riverfront pathways from the City is made difficult by the fact that some crosswalks do not align with curb cuts next to the upper pathway. Additionally Kanawha Boulevard is a 60' wide roadway with continuous moving traffic in a "through-lane" immediately adjacent to the park. Pedestrian activated crosswalk signals are not installed at the key intersections along the Boulevard, and automobiles in the through-lane are not required to stop at these intersections. During the public participation phase of this study, many park users emphasized the challenges and opportunities of accessibility and safety in this regard.

The horizontal dimension of the bank in the study area is generally 60 to 70 feet wide, while the vertical dimension is approximately 35 to 40 feet, between normal river pool of +566.0 and a Boulevard elevation of +/-602.0 (variable). The slope condition therefore is generally in a 1:2 or 50% slope proportion, making it both difficult to maintain and to utilize for recreational purposes. Currently the grass slope is mown on a rotating schedule, while the lower rip-rap bank is cleared of invasive vegetation on a regular basis.

Periodic flooding of the river bank occurs from upstream dam releases, with water elevations at times reaching to the mid-level pathway. More significantly, Magic Island is often inundated with water during high water events as the island sits well within the flood plain and close to the +566 pool elevation. The City itself is well protected from flooding by the river embankment, although 50-year, 100-year, and 500-year floods would impact the City in places (see map).

Kanawha Riverfront - South Bank

The south bank of the Kanawha River falls under the jurisdiction of the State of West Virginia but provides an important visual backdrop for the riverfront as seen from Charleston. The south bank exhibits a shallower slope condition than the north bank and includes a combination of rip-rap stone and low lying invasive vegetation. This vegetation is periodically cut back in a similar fashion to that seen on the north bank. MacCorckle Highway is a regional transportation corridor that runs along the top of the south bank and feeds a variety of land uses, including light manufacturing, industrial, commercial, transportation, and institutional. Two prominent structures along the south bank of the Kanawha River are the historic 1905 "C&O" train depot at the terminus of the South Side Bridge, and the University of Charleston, situated across the river from the State Capitol. In time, these facilities and others should be connected to an integrated riverfront trail system on both the north and south sides of the river.

The marina at the 35th Street Bridge is surrounded by distinct and beautiful stands of mature deciduous and evergreen trees. Nearby residential parcels slope gently to the water's edge and exhibit a combination of lawn and landscape treatments. A small, informal boat launch is located at the Verizon building site.

An exciting opportunity exists to improve both the visual and functional quality of the south bank of the Kanawha River through landscape and trail enhancements. Improvements to the south bank should be considered at the same time as modifications to the north bank in order to improve the quality and attraction of the entire riverfront corridor. Making future connections to existing trails such as the historic Carriage Trail and the Kanawha City Bikeway are comprehensively discussed in the Greater Charleston Greenway study now being completed by the West Virginia Land Trust.

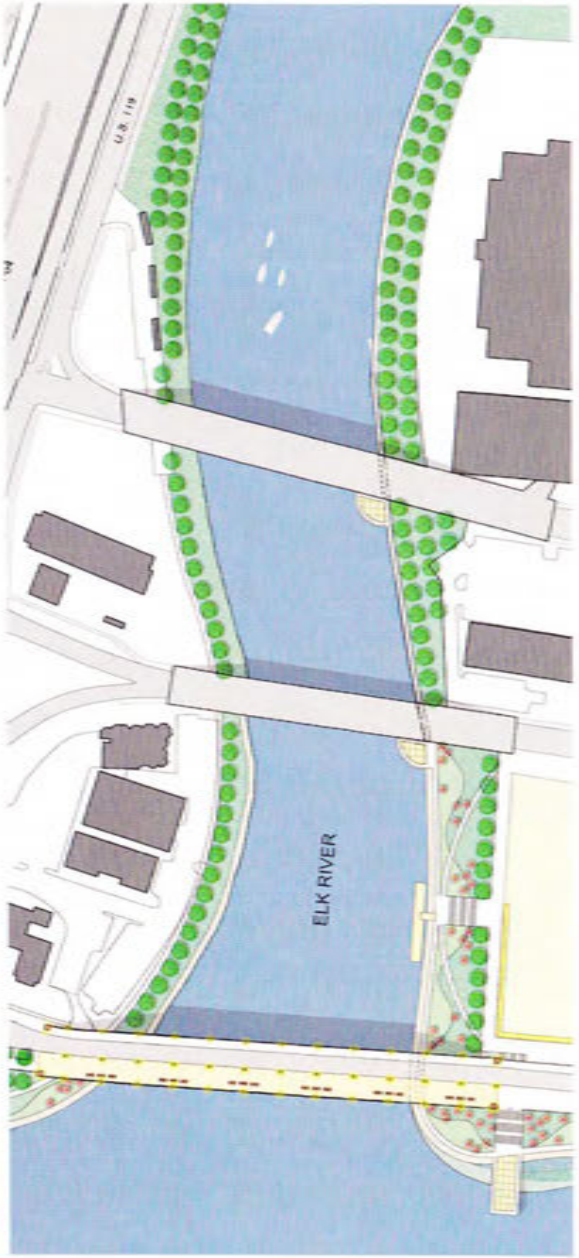
▲ Kanawha River, south bank (with 1905 railroad depot).

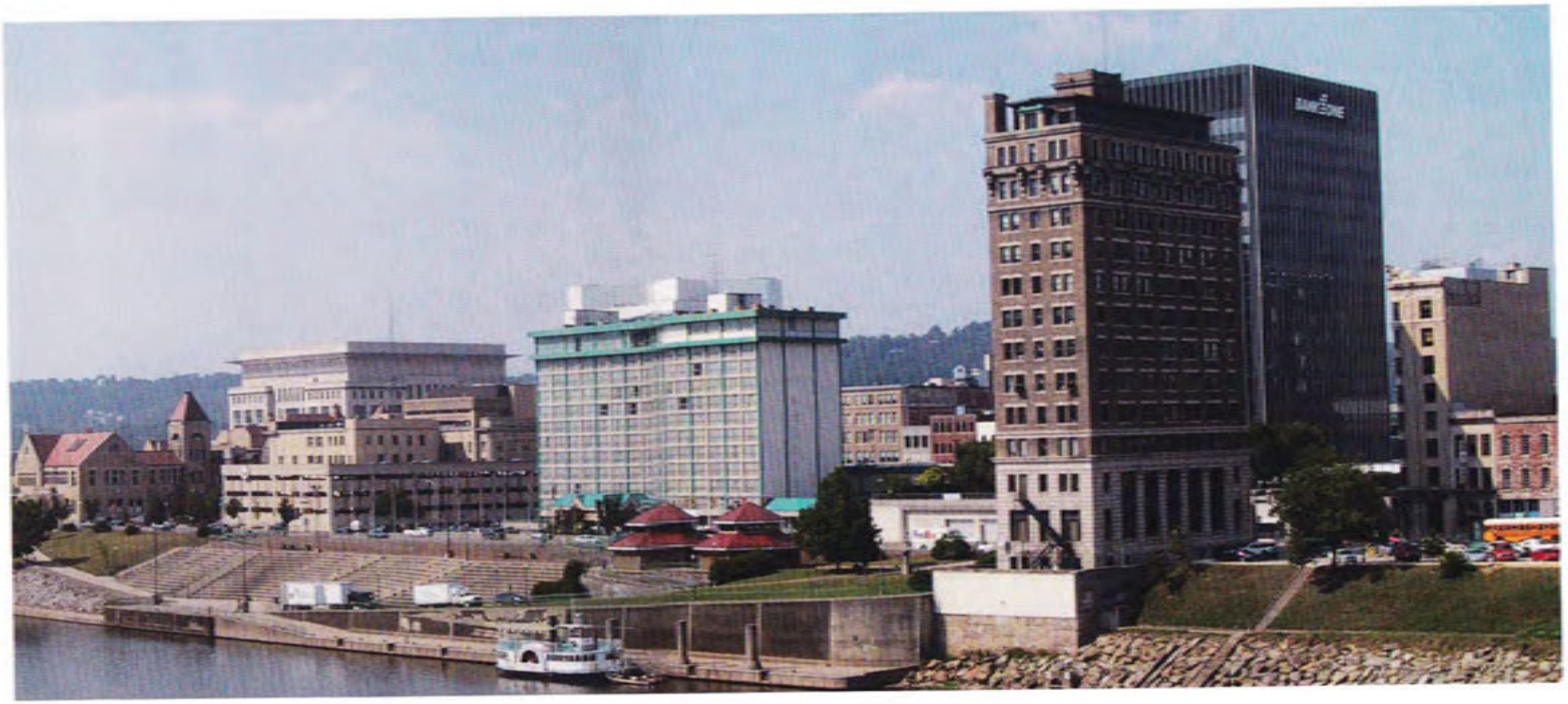
Elk River

The stretch of Elk River between the Kanawha confluence and the Washington St. Bridge is narrower and more "overgrown" in character than the Kanawha, and is characterized by mature growth trees and invasive shrub species with stabilized banks of stone and interspersed low lying vegetation. The river is crossed in numerous locations by beautiful steel bridge structures, including the historic "Whipple Bridge" which is the oldest such rail bridge in Kanawha County. Barges use the Elk to access industrial processing facilities upstream, while informal fishing takes place along the lower banks. The Elk River is a mostly hidden, natural waterway that runs between the West Side and Downtown Charleston, although recent measures have been taken to improve the Elk River as a recreational amenity for the City. A small park has been constructed along the west bank in the vicinity of the CAMC Women's and Children's Hospital and landscape and pedestrian improvements have been made underneath the I-64 highway overpass to accommodate parking during Magic Island events.

Several key parcels or structures are located adjacent to the Elk River, including the Elk Town Center Inn (now being demolished to make way for an office/commercial use), the Charleston Civic Center, the Clendenin Homes residential complex, the CAMC Hospital, and the Martin Luther King Community Center complex. Trail and public open space connections between the Elk River and these facilities hold great potential for improving public accessibility and enjoyment of this underutilized resource in Charleston. Further north along the Elk River lies Coonskin Park, a regional destination that should be tied into a larger river trail system through the conversion of existing rail right-of-ways (ROWs) to hiking and biking trails. This system should also link to the proposed Kanawha Trestle Rail Trail project, through an ongoing coordinated effort between the railway owners, citizens, and the City of Charleston.

In short, improved trails, fishing piers, and landscaping along the Elk River should be considered on both sides of the river to attract park users from all Charleston neighborhoods and to visually and physically reconnect the West Side and Downtown.




BANK ONE

Haddad Riverfront Park

Designed and constructed in 1983 by the Army Corps of Engineers, Haddad Riverfront Park replaced a simple switchback road that led from Kanawha Boulevard to the river's edge. For many years, this road and landscape were primarily used for automobile parking for the Union Building and for downtown employees. Intended as a permanent "levee" system and as a gathering place and civic amphitheater for festivals, regattas, and events, Haddad Park has served its purpose well for over 20 years. Today, recreational boats continue to tie up at the Haddad bulkhead, as do boats related to more commercial ventures such as the Delta Queen tour boat. These uses should be continued and enhanced.

Community input has noted that the amphitheater itself, which can seat upwards of 5,000 people per event, feels "exposed" and "hot" during summertime use. Additionally, the top of the amphitheater has an awkward relationship to Kanawha Boulevard in that the upper tier of seats is located below the road elevation, requiring a complicated ramp configuration and a sense that the amphitheater is disconnected from the street. Two kiosk buildings, for restrooms and concessions, reinforce this perception as they are also positioned below the roadway elevation and have an internal focus. The kiosks remain closed during non-event periods due to a lack of pedestrian traffic in the park.

Haddad Park also has no apparent connectivity with the historic, 12-story Union Building of 1911, a landmark Charleston structure that is currently leased for small office use. As the only building on the river side of Kanawha Boulevard, an opportunity exists to integrate the Union Building into Haddad Park. This integration could be achieved through a variety of terracing and plaza configurations, and possibly include different ground level uses in the Union Building such as restaurants and coffee shops. The floor plate dimensions of the Union Building (roughly 40" by 100") are also conducive to a residential layout in which two units per floor could potentially be accommodated. A residential use with ground floor commercial uses for the Union Building is highly recommended as part of the Charleston Riverfront master plan. At the same time, it is understood that ownership priorities and real estate market conditions will play an important role in determining any future renovation scenarios.

▲ Union Building, circa 1950s (from "Kanawha Images," Vol. 2)


Delaware Avenue
Ohio Avenue
Tennessee Avenue
Pennsylvania Avenue
MONONGALIA STREET
BERKELEY STREET
RALEIGH STREET
KANAWHA BOULEVARD
Magic Island Park
MAGIC ISLAND
Improve Pedestrian Connections
Delaware Overlook and Tie-Up
Water taxi
Water taxi
KANAWHA RIVER

Magic Island

Magic Island earns its nickname from the flooding condition which renders the island invisible during high water events. Originally an island created out of the deposition of suspended solid materials at the confluence of the Kanawha and Elk Rivers, Magic Island was later connected to the City in the early 1990's through the placement and stabilization of Elk River dredgings between the island and Kanawha Boulevard. As a result, Magic Island became a functional, recreational amenity for the West Side neighborhood and City and continues to serve that purpose to this day.

The park is edged by an upper level sidewalk that runs parallel to Kanawha Boulevard and which defines the upper level of a steep slope that falls away to a low, expansive lawn area. This lawn area is a popular destination for hundreds of people during the City's successful "Movie Nights" program. Concrete sidewalks wind their way through the park, which has little mature tree canopy and subsequently minimal shady areas. The edge of Magic Island is characterized by small rip-rap stone in a shallow profile as it meets the water. Looking southeast from Magic Island, one can experience spectacular views of the Kanawha River under the I-64 overpass. A paved promenade along the edge of Magic Island would enhance accessibility here and provide places for fishing and boat tie ups. Community input further suggests that fill material (dredge from the Elk River) should be considered for the north edge of Magic Island adjacent to Kanawha Boulevard. In this way, additional usable park space, raised out of the floodplain, could be created to accommodate gardens, playgrounds, fountains, and kiosks to activate the park.

In short, Magic Island offers a spectacular opportunity to build a great waterfront park in Charleston, one that will be a regional as well as local destination. This new park should be integrated with the Elk River and Haddad Riverfront Park to reinforce and symbolize the larger connectivity between the West Side and Downtown.

▲ Existing site photos of Magic Island, looking east and west.

Stone Toe Protection

A ridge of quarried rock or stream cobble placed at the toe of the streambank as an armor to deflect flow from the bank, stabilize the slope and promote sediment deposition.

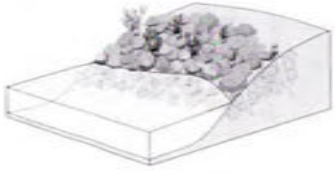
Applications and Effectiveness

- Should be used on streams where banks are being undermined by toe scour, and where vegetation cannot be used.
- Stone prevents removal of the failed streambank material that collects at the toe, allows revegetation and stabilizes the streambank.
- Should, where appropriate, be used with soil bioengineering systems and vegetative plantings to stabilize the upper bank and ensure a regenerated source of streamside vegetation.
- Can be placed with minimal disturbance to existing slope, habitat, and vegetation.

For More Information

- Consult the following references: Nos. 10, 21, 56, 67, 77, 81.

Joint Plantings



Live stakes tamped into joints or openings between rock which have previously been installed on a slope or while rock is being placed on the slope face.

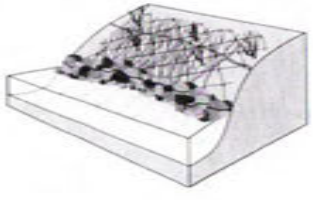
Applications and Effectiveness

- Appropriate where there is a lack of desired vegetative cover on the face of existing or required rock riprap.
- Root systems provide a mat upon which the rock riprap rests and prevents loss of fines from the underlying soil base.
- Root systems also improve drainage in the soil base.
- Will quickly establish riparian vegetation.
- Should, where appropriate, be used with other soil bioengineering systems and vegetative plantings to stabilize the upper bank and ensure a regenerative source of streambank vegetation.
- Have few limitations and can be installed from base flow levels to top of slope, if live stakes are installed to reach ground water.
- Survival rates can be low due to damage to the cambium or lack of soil/stake interface.
- Thick rock riprap layers may require special tools for establishing pilot holes.

For More Information

- Consult the following references: Nos. 21, 34, 65, 77, 81.

Brush Mattresses



Combination of live stakes, live fascines, and branch cuttings installed to cover and physically protect streambanks, eventually to sprout and establish numerous individual plants.

Applications and Effectiveness

- Form an immediate protective cover over the streambank.
- Capture sediment during flood flows.
- Provide opportunities for rooting of the cuttings over the streambank.
- Rapidly restores riparian vegetation and streamside habitat.
- Enhance conditions for colonization of native vegetation.
- Limited to the slope above base flow levels.
- Toe protection is required where toe scour is anticipated.
- Appropriate where exposed streambanks are threatened by high flows prior to vegetation establishment.
- Should not be used on slopes which are experiencing mass movement or other slope instability.

For More Information

- Consult the following references: Nos. 14, 21, 34, 56, 65, 77, 79, 81.

▲ Riverbank treatments (from the "National Engineering Handbook, USDA-Natural Resources Consortium Service," 1998.).

Infrastructure and River Ecology

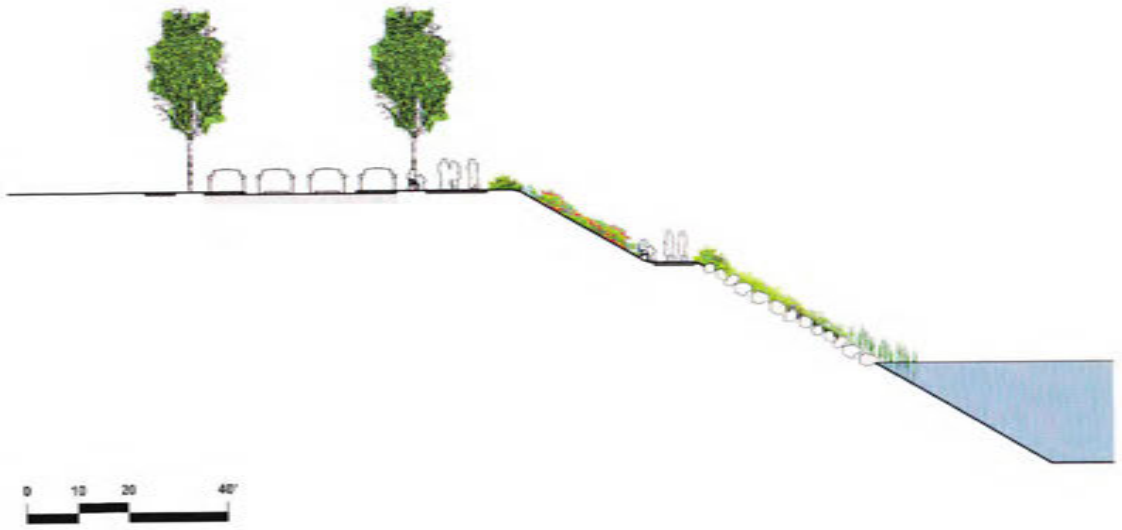
The Army Corps of Engineers (ACOE) is currently undertaking a comprehensive Bank Stabilization study for the Kanawha River in Charleston. Evidence of scouring and wash out of the rip-rap at the toe of the slope, and disruption of the lower level stairs, has led to this key project which will be critical for the long term viability of riverfront slope and its function as Charleston's primary flood control infrastructure. To date, the ACOE has identified several reaches within the 4-mile stretch of the Kanawha River in which bank stabilization would take place. Initial sketches show a straightforward layering approach in which a geotextile fabric is placed on top of the existing rock slope and then covered with layers of new stone protection. As of this report, supplemental riparian grass plantings are not considered to be part of these enhancements.

The Army Corps Bank Restabilization project provides an opportunity for the City to consider supplemental or complementary slope stabilization techniques that could work in concert with the ACOE approach. Procedures such as "joint planting" and "brush mattressing" are used to fill in the spaces between the rip-rap stone in order to encourage vegetative growth that will further bind the slope together through pervasive root growth. The policy of pruning back the vegetation within the rip-rap area should be reconsidered to allow for a more "natural" environment at the river's edge that would encourage bird habitat and act as an additional filter for water runoff from the upper slope. The height of this vegetation may be managed over time so that views to the river are not impeded.

In addition to these and other biotechnical slope protection measures, enhancements could also be made to the underwater condition at the toe of the slope, such as creating natural shelves for indigenous river plantings and fish habitat. This work could further be highlighted through partnerships with local schools and universities to create "living laboratories" along the river, emphasizing public education regarding the concepts and principles of an ecological river restoration. At the same time, the Kanawha River's commercial purpose - as a transportation corridor for coal and materials barges - could also be communicated such that an interactive and balanced understanding of the river is achieved. Experts in river morphology and river science could also be invited to participate in these future river restoration and bank stabilization efforts.

▲ Potential riverbank plantings.

In parallel with the federal effort of bank stabilization, the City of Charleston and the Charleston Sanitary Board are making preparations for a Combined Sewer Overflow (CSO) initiative that will manage stormwater and sewer outflows into the Kanawha River. At the present time, the existing sewer system becomes hydraulically overloaded during heavy rain events. EPA regulations require that release of untreated runoff into the river be managed and controlled. The most economical approach to this issue is the construction of a system of pumping stations and force mains that would intercept the runoff prior to entering the riverway; in the riverfront area, the force main network would most likely be placed underneath Kanawha Boulevard while the pumps stations would conceptually be located at Florida Street, Park Avenue, Ruffner Street, Elizabeth Street, and Greenbrier Street. The necessity of the pump stations, in addition to the idea of highlighting street ends and nodes in the park, creates an opportunity to integrate this critical infrastructure element into a new riverfront park system.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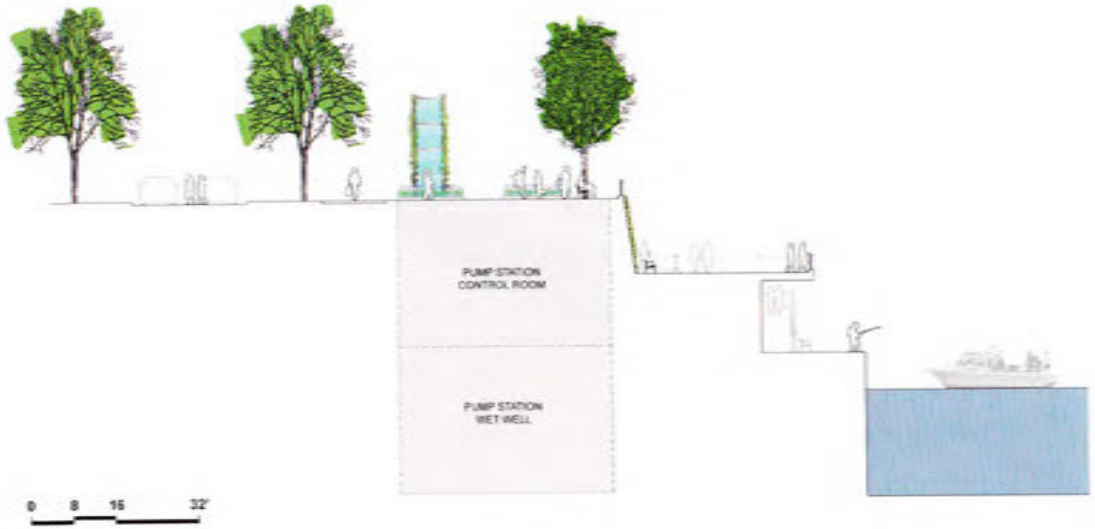
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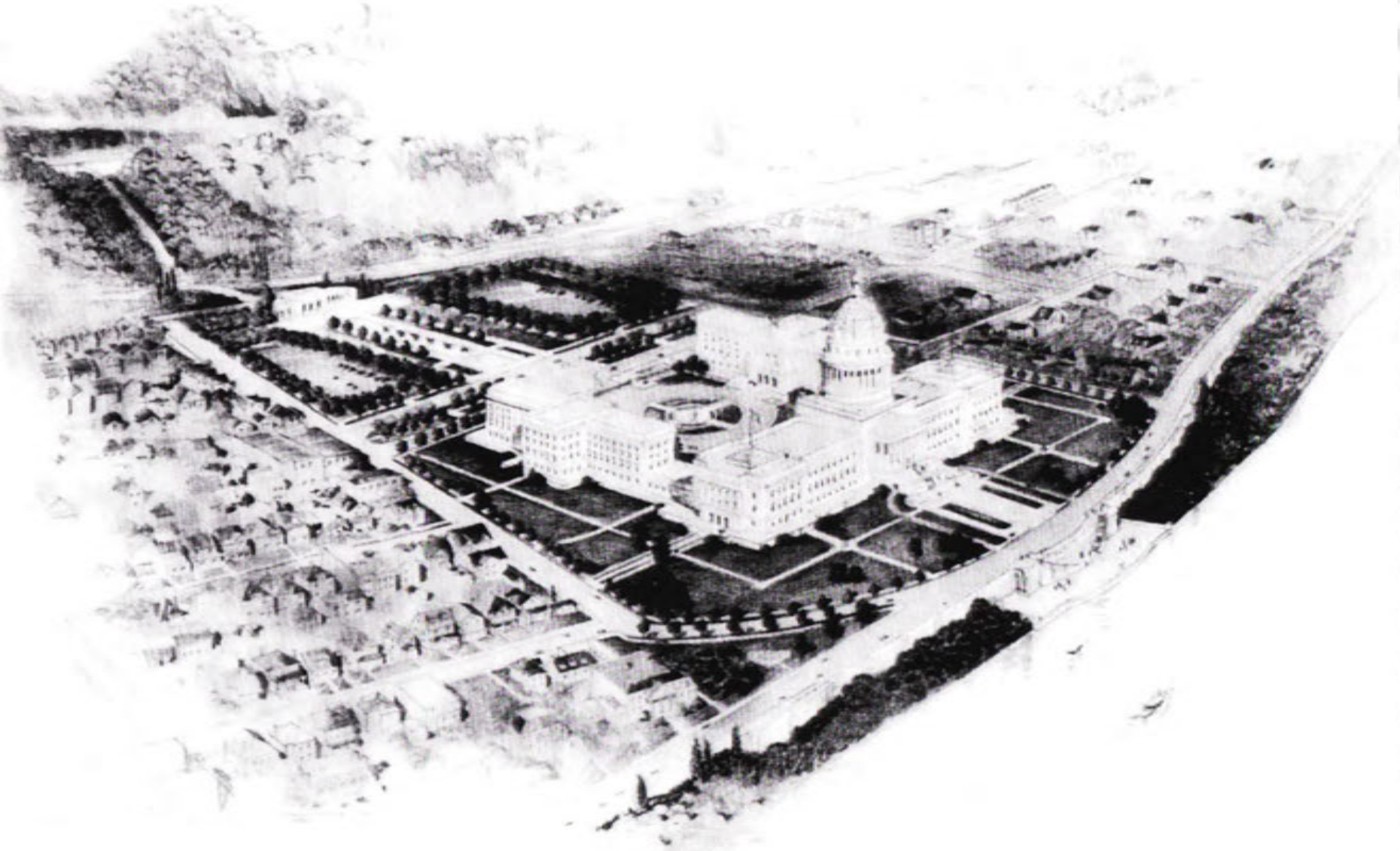
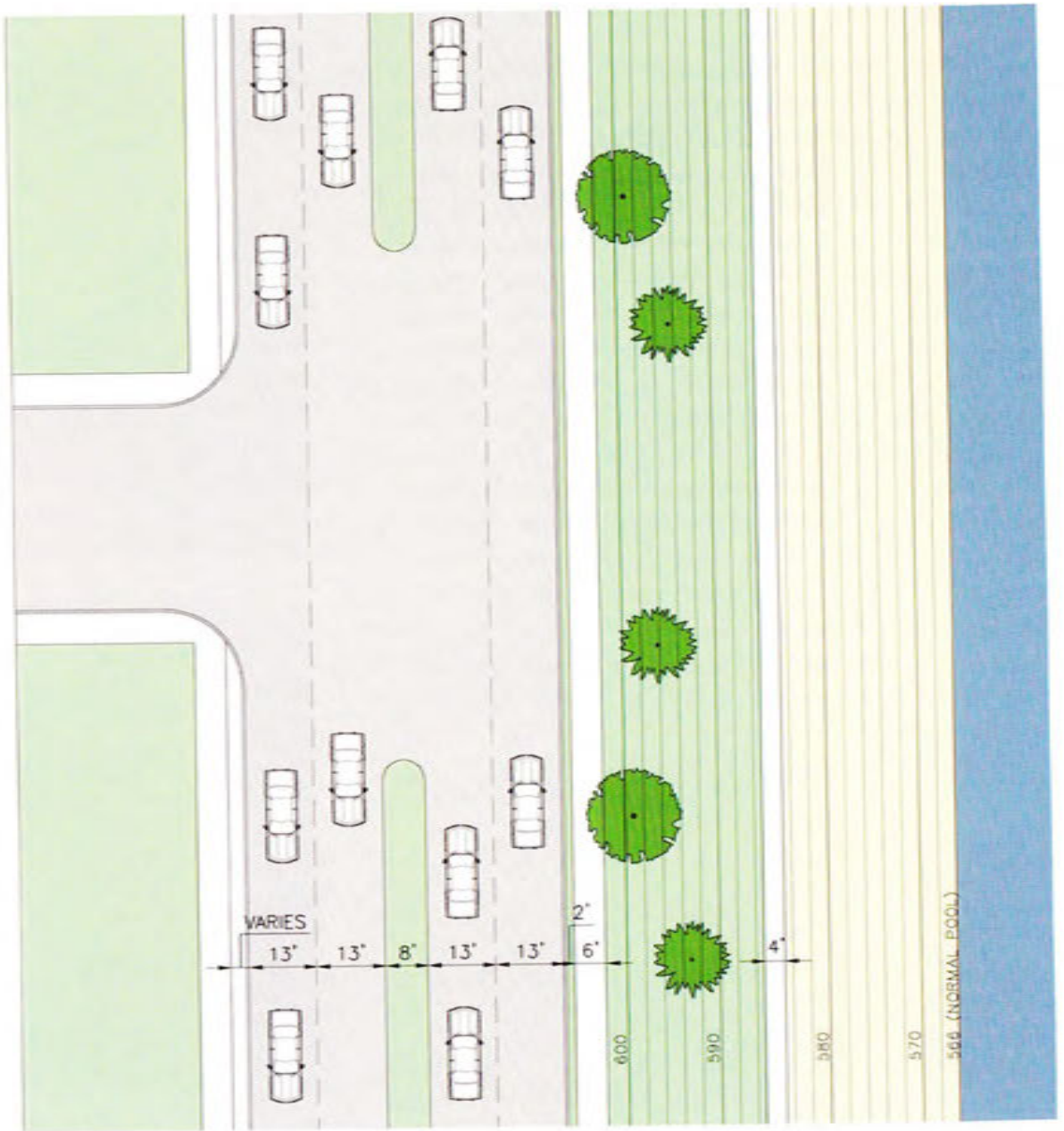


▲ Rendering from 1932 of Cass Gilbert Capital building. (from "Kanawha Image," Vol. 2)

The State Capitol

In early sketches for the State Capitol from the 1930s, architect Cass Gilbert envisioned a classical and ceremonial entrance to the Capitol along the banks of the Kanawha River, meant to reflect the classical grandeur of the building and its extension the landscape. Today, a series of staircases lead from the upper level of Kanawha Boulevard down to a river edge path. Although functional, the composition does not necessarily achieve the original intent of the architect and presents an opportunity for improvement. The Capitol complex includes numerous buildings, such as a visitor's center and cultural center with auditorium that plays host to, among other things, the popular Mountain Stage public radio program. As the complex is located at the intersection of Greenbrier Street and Kanawha Boulevard, the view of the Capitol and river is one of the first impressions of Charleston due to Greenbrier Street's direct connection to Yeager Airport. The end of Greenbrier Street at the river should be highlighted in this respect. The State of West Virginia owns the portion of Boulevard and riverfront between Greenbrier Street and California Street, such that any improvements would need to be coordinated between City and State. Regardless, the Capitol landscape zone should be closely integrated with improvements to the riverfront park. Parking along the Boulevard for in-session legislators must also be maintained.

▲ 1996 Landscape Master Plan for Capital complex.



▲ Plan of existing Boulevard condition

Kanawha Boulevard

The following list represents the study team's analysis of the current Boulevard and City vehicular circulation condition:

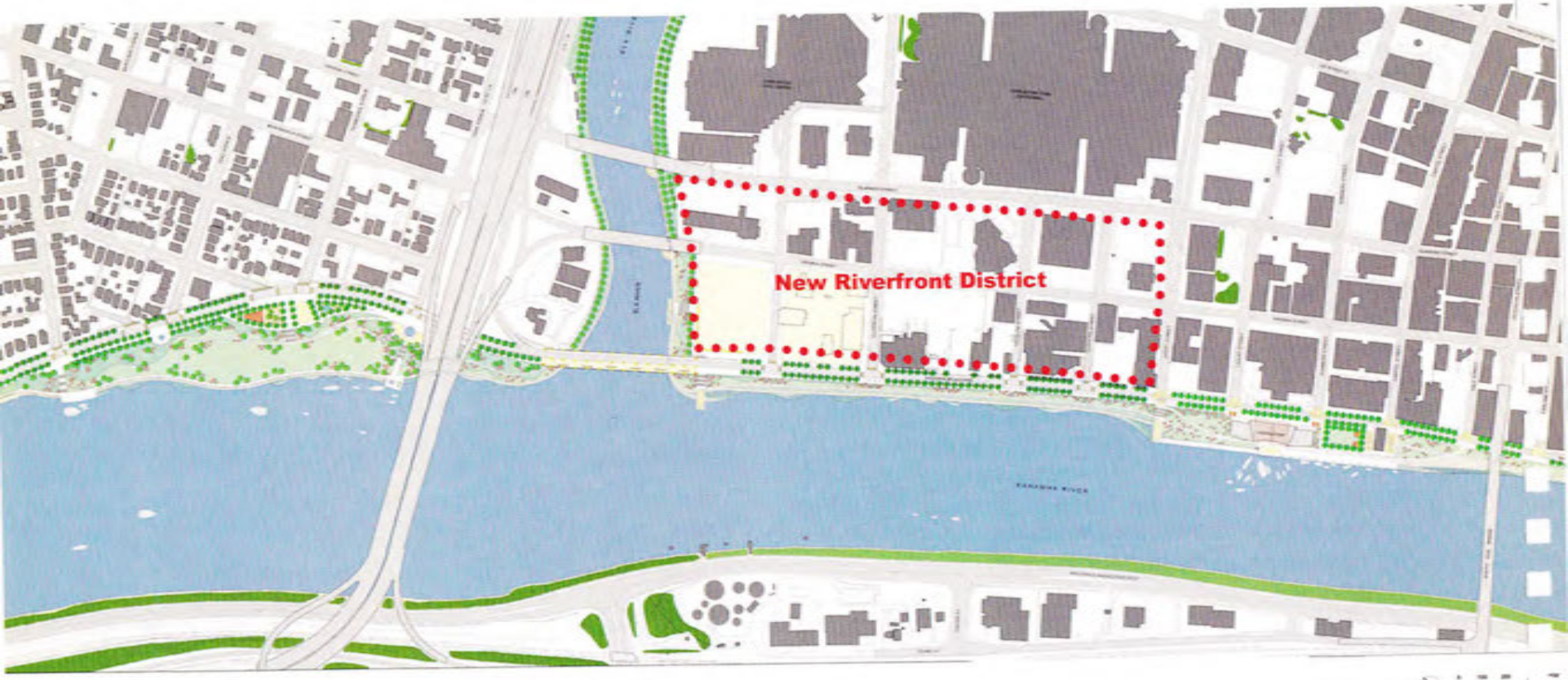
- *The Boulevard separates the River from the City*
- *Continuous traffic movement in the eastbound lane is a barrier.*
- *Lane widths are overly wide (13 feet).*
- *Traffic typically moves faster than the posted 35 mph speed limit.*
- *Parking is not clearly delineated.*
- *Daily traffic volumes are within capacity of the roadway.*
- *The interior street network of Charleston has excess capacity.*
- *Most left turn lanes on the Boulevard are underutilized.*
- *The Interstate system serving Charleston has adequate capacity.*
- *The Interstate system is adequate for evacuation purposes.*

Kanawha Boulevard has four 13' wide moving lanes of traffic with an 8' wide center grass median. Completed in 1940 by the Works Progress Administration, before the construction of the I-64 and I-77 Interstates around Charleston, the Boulevard was built as a riverfront drive with expansive views of the Kanawha River. The Boulevard carries traffic from points west and east through and into the City. In the downtown area, the Boulevard maintains a four-lane configuration. Oaks, White Ash, Tulip Poplar, Pine, Sugar Maple, Crabapple and Dogwood trees are planted in informal groupings on the river side of the Boulevard, while some large, mature specimen trees are found in the residential parcels to the north of the roadway.

Sidewalks to either side of the Boulevard are minimized and set close to the road. The existing street lamps are an attractive pole and teardrop fixture and should be maintained. The effect of the roadway width, sidewalks, and openness of landscape plantings creates the perception that the Boulevard is a high-speed thoroughfare, designed around the efficient movement of automobile traffic through the City. On weekends and during special events, the City has closed portions of Kanawha Boulevard to allow free pedestrian movement and bicycling. The popularity of these events, coupled with community input received over the course of the study, demonstrates that there is a desire within the community to consider potential improvements to the Kanawha Boulevard environment.

The study team therefore recommends that Kanawha Boulevard be strategically modified in order to accommodate the flow of park users as well as automobile traffic; to create a safe, accessible and friendly environment for recreational purposes; and to enhance the riverfront plantings and "Green Ribbon" that will become Charleston grand, linear park.

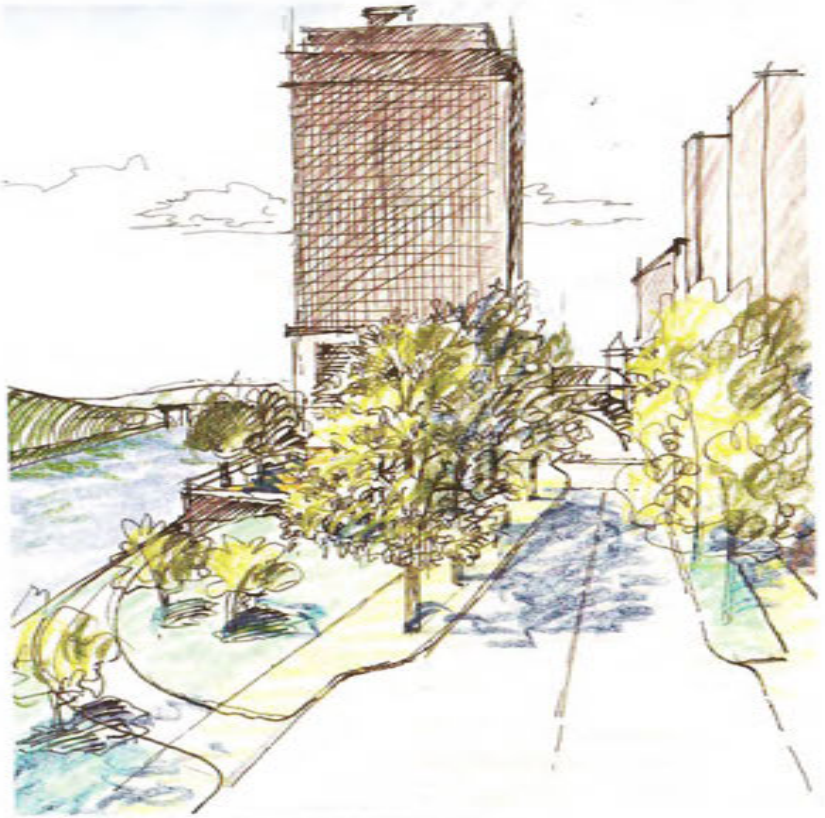
▲ View of Boulevard looking east


New Riverfront District

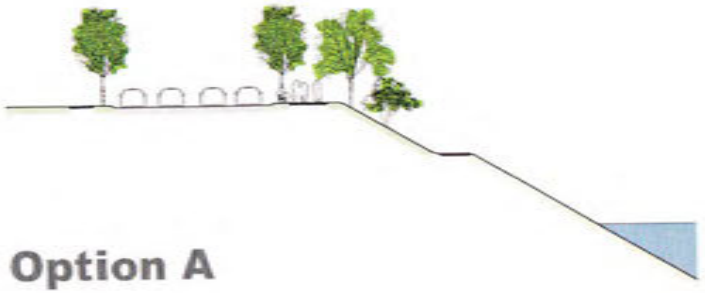
Riverfront Master Plan

The Charleston Riverfront Plan combines achievable short term efforts with longer term and more involved infrastructure enhancements. The primary elements to the plan are as follows:

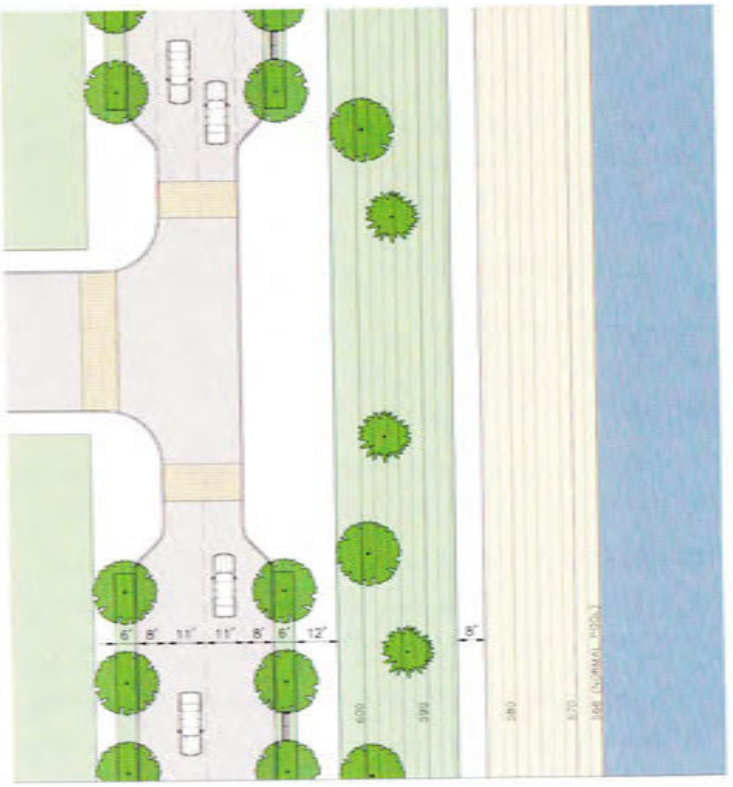
- *Modify Kanawha Boulevard by reducing lane widths and expanding the upper level park area*
- *Widen the upper level and lower level pathways so they become more accessible and multi-purpose*
- *Plant continuous rows of trees along Kanawha Boulevard to reinforce the power of the riverfront street*
- *Plant shade trees, flowering trees, flowering shrubs, ground cover, and native riparian plantings along both banks of the river to create a more rich and seasonal landscape environment*
- *Create overlooks with accessible ramps along the riverfront where north/south streets meet the park*
- *Coordinate the CSO pump stations as part of selected overlooks*
- *Design more boat tie up locations and accessible fishing platforms at the water*
- *Enhance the State Capitol landing area*
- *Redesign Magic Island and connect it to the Elk River Bridge and Haddad Riverfront Park*
- *Enhance the Elk River Bridge and the landscape along the Elk River*
- *Enhance Haddad Riverfront Park*

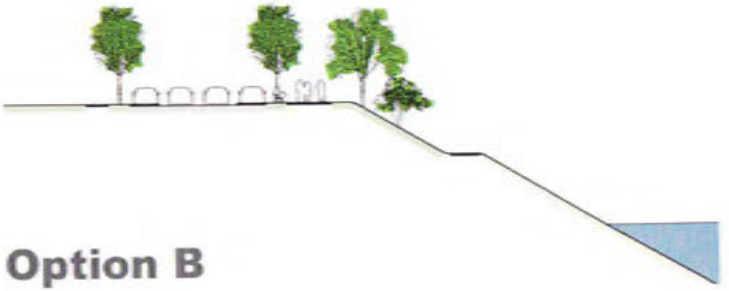


▲ Sketch of Boulevard and Union Building looking west.



Option A





Option B

Kanawha Boulevard and Upper Path

Two options are recommended for reconfiguring Kanawha Boulevard that will expand the riverfront park in the area of the upper path:

Option A - This option removes the 8' grass median strip from the Boulevard, provides two 11' lanes of moving traffic, and two additional 11' lanes that would be used for parking during off-peak hours, and used for moving traffic during high peak periods. In this way, 16 additional feet of park space is obtained which would be used for a 6' lawn or planted parkway for trees, and widening of the upper park path to 10' wide.

Option B - This option also removes the 8' grass median strip, and provides two moving lanes of traffic of 11' each. However, parking "bump outs" of 8' wide are included that would accommodate riverfront parking and allow an addition of 22' extra feet of park space, to be divided between a planted parkway with trees and a 12' wide multi-purpose path for bicyclists and pedestrians.

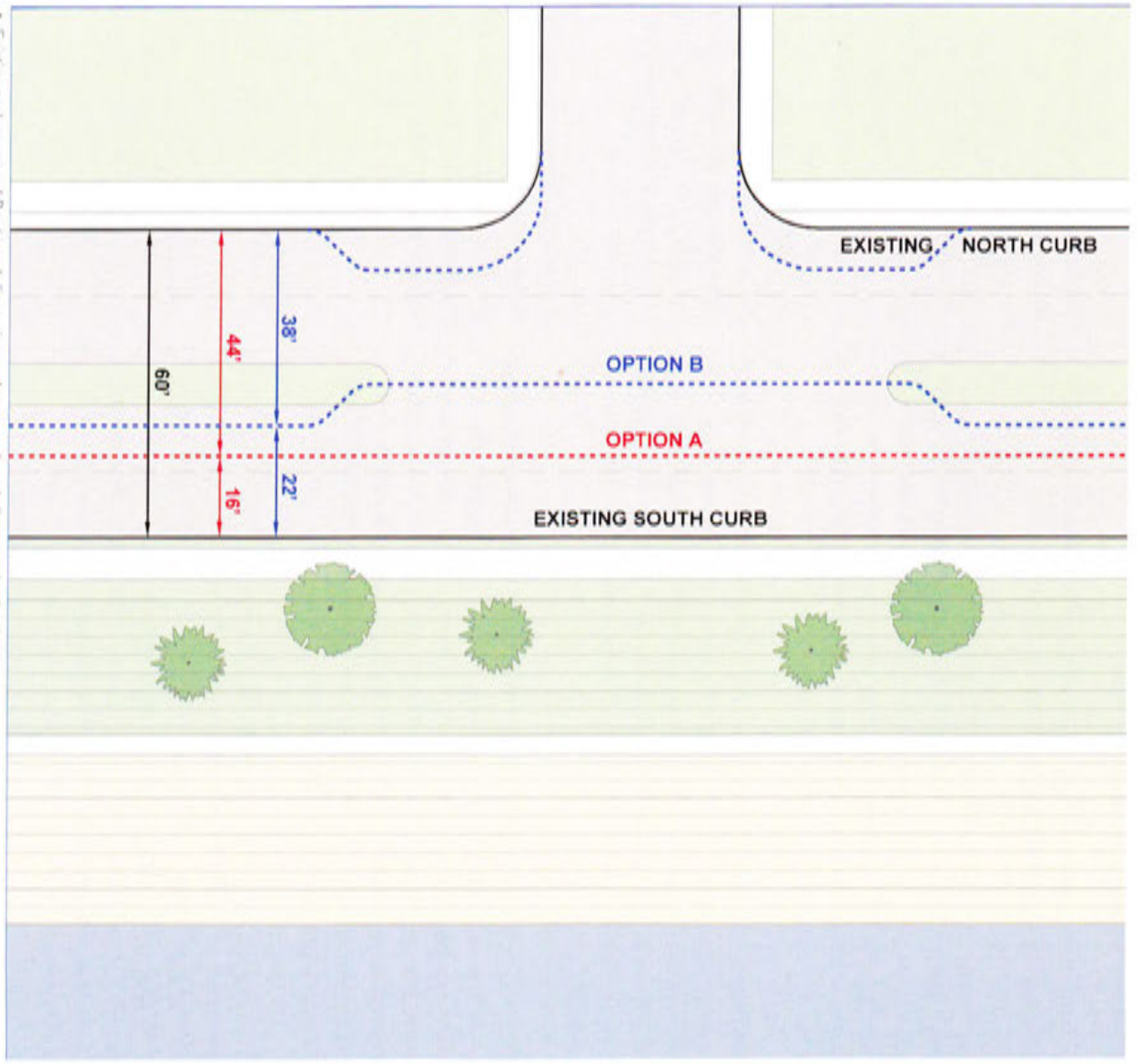
Note: With either Option A or B, reconstruction of the Boulevard could take place by leaving the north curb line in place and by moving the south curb line only. In this way, existing trees along the riverfront bank could be saved in place, although specific grading and drainage patterns for the new parkland and multi-purpose path would need to be studied closely. In addition, leaving the north curb in place may prevent demolition to existing drainage structures, lighting, or other elements within this side of the right of way.

For the entire four-mile stretch of waterfront, either Option A or Option B are suggested for the Boulevard between the Patrick Street Bridge and the Elk River, and between the South Side Bridge and the 35th Street Bridge. Only Option B is recommended for the downtown area: to immediately expand the park space in downtown, to slow traffic, and to allow more parallel parking opportunities. The street grid system and one-way paired streets through downtown appear more than adequate to handle the potential for increased traffic volume as a result of this change.

The following additional upgrades are also recommended for the Boulevard and upper path:

- *Add pedestrian striping and curb cuts with handicapped ramps at all intersections.*
- *Add pedestrian activated lights at all intersections.*
- *Install 12'-14' high pedestrian lights along the new multi-purpose path.*
- *Raise the grade of the park at the new curb line so that it is flush with the top of the curb.*
- *Add benches, trash cans and drinking fountains along the upper path.*
- *Plant large sweeps of ground cover and perennials where the slope falls away from the upper path for safety.*
- *Add garden gateways at either end of the Boulevard.*
- *If possible, connect riverfront path to Kanawha Trestle Rail trail at Cabell Field in future.*

Prior to implementing any changes, the feasibility of narrowing Kanawha Boulevard should be studied "in the field" through temporary lane closures and on-site traffic counts. These measures would determine the effect that modifications to the Boulevard would have on traffic flow as well as secondary vehicular impacts to surrounding streets and neighborhoods.



▲ Existing and proposed boulevard dimensions, where north curb line remains in place.

Boulevard and Slope Planting

Evenly spaced shade trees planted along a linear roadway are a traditional urban design element already seen in certain areas along Kanawha Boulevard, such as the large Pin Oaks that edge Ruffner Park. Trees in this configuration provide a beautiful and consistent canopy over a roadway and enhance the spatial experience of the road while driving, walking, or bicycling. Over time, trees planted in this way create a powerful landscape form. This form could become a signature element of Charleston's "Green Ribbon".

The master plan therefore recommends that a continuous row of shade trees at approximately 30' on-center be planted along the south side of the Boulevard, in the new 5'-6' green parkway that will be created by the narrowing of the road. Through this strategy, many of the large existing trees on the slope facing the river can be maintained in place. Where possible, shade trees should also be planted along the north curb of Kanawha Boulevard to create a double row or "allee" effect.

For the downtown area, trees should be planted in rows on both sides of the Boulevard. The trees should be limbed up so that views to the Kanawha River are maintained. Openings in the trees can be created at important zones and where north/south streets meet the water. The species of tree should be carefully selected, although different trees may be used to define different sections of the Boulevard. Oaks, Planetrees, Honeylocust and certain new Elm varieties are possible and should be carefully selected in the design development phase of work.

Planting on the slope itself could be enhanced through the use of large sweeps of low maintenance but colorful ground covers, grasses, shrubs, and flowering trees. These plantings would contribute to a spectacular seasonal display along the riverfront slope and reduce the need to cut the grass on the extremely steep slope condition. Soil conditions will need to be assessed to ensure a good growing medium and supplemental soil may need to be imported for this purpose.

▲ Ruffner Park, with existing Oak trees.

LOVELL DRIVE
PARK AVENUE
PARK DRIVE

Overlooks, Ramps and Stairs

A system of overlooks, ramps and stairs is included in the riverfront plan to improve accessibility to the riverfront park and to the river itself. Large overlooks are created at key streets along the Boulevard at the upper level of the park, and could become special areas for gardens, kiosks, fountains, or shade structures. The size of the large overlooks is partially dictated by the dimension of the Combined Sewer Overflow (CSO) pump structures that will be built into the slope underneath the overlooks. In this regard, ventilation of the pump structures, as well as accessibility through floor or wall panels to the pump rooms, will need to be coordinated in future phases of design and construction. Long handicapped accessible ramps at a 5% slope run along the outside edge of the overlooks and connect the upper and mid-level paths. Smaller overlooks are also proposed in the plan, although not all of them are necessarily coordinated with the CSO infrastructure.

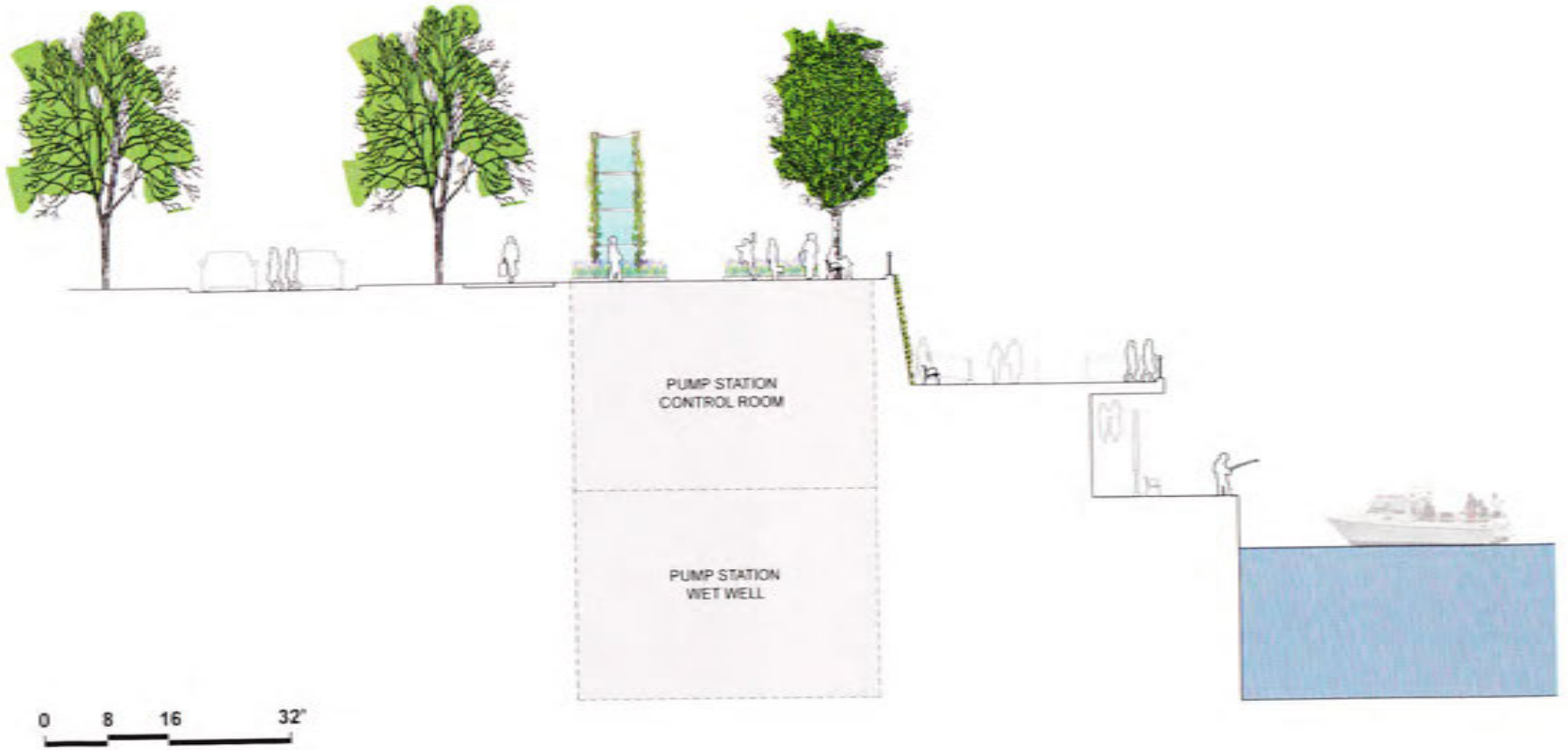
At the time of this report, overlooks with CSO pump structures are suggested at the following locations:

- *Florida Street*
- *Park Street*
- *Ruffner Street*
- *Elizabeth Street*
- *Greenbrier Street*

Planting at the overlooks is proposed as a rich combination of flowering trees, flowering shrubs, perennials and even vines that should be encouraged to cascade down the sides of the overlooks. Many variations of paving materials, railings, planting, lighting, and furnishings are possible within the overlooks, but a consistent design language should be established that ties the character of the Boulevard together. Art installations, either permanent or rotating, from local and regional artists could also be showcased at the overlooks, further strengthening the ties between river and City.

In addition to the overlooks, new wider stairways are proposed within the riverfront park that link directly back to north/south neighborhood streets and connect the upper path to the mid-level path, and to the water. The Charleston community emphasized the desire to maintain and improve this access to the water, but also expressed concern about safety issues being so far below the grade of the Boulevard. More and wider staircases with handrails at frequent intervals will improve the perception of safety at the lower elevations, as would the addition of pedestrian lights and a slight widening of the mid-level path. This work should be coordinated with the Army Corps of Engineers as part of their ongoing bank stabilization process.

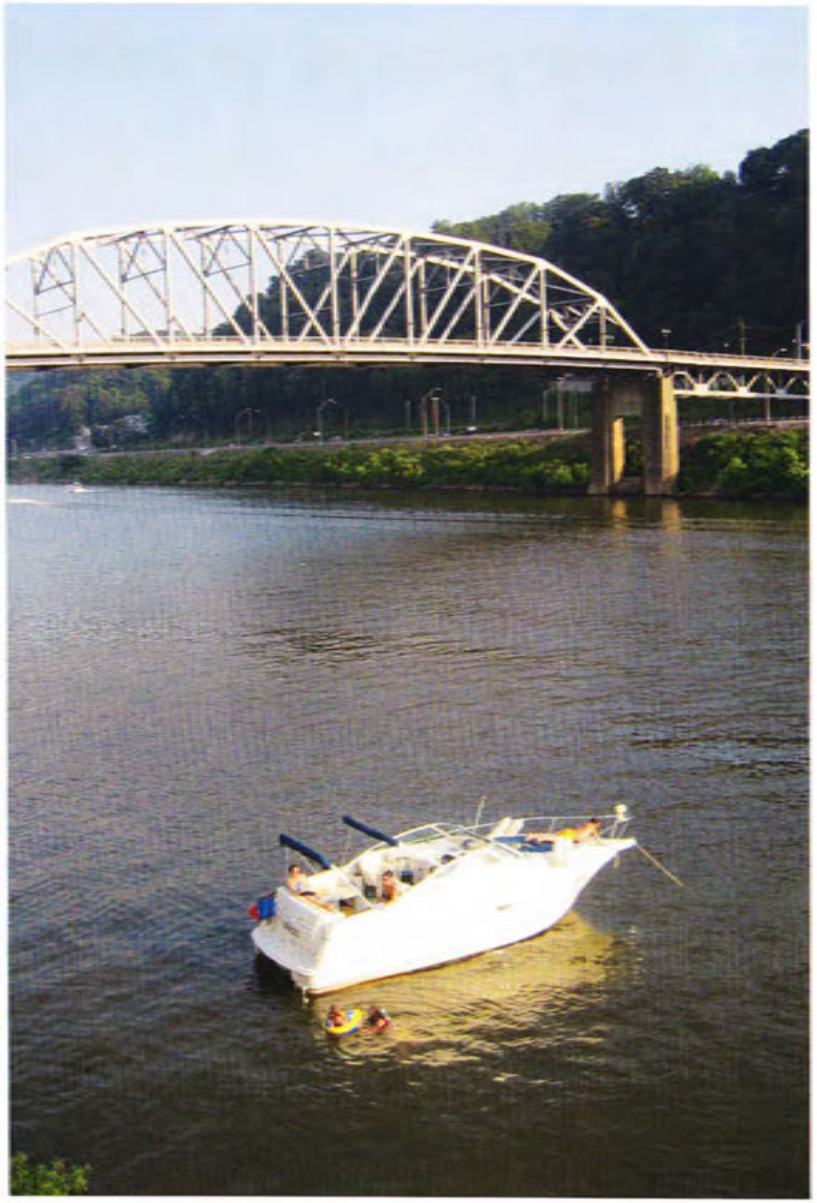
▲ Example of park overlook, Indianapolis riverfront.



▲ Typical overlook with CSO pump and well

Boat Tie-Ups and Fishing Platforms

Due to the navigable waterway dimensions (barge traffic) and desire on the part of the community to keep large scale development out of the riverfront parkland, no new marinas are proposed as part of the Riverfront Master Plan. However, numerous boat tie-ups and fishing platforms are recommended to increase recreational boat use of the river and to accommodate recreational fishing. The structures may be constructed out of timber and connected to large piles driven into the river bed; as river levels rise and fall, the floating structures can move up and down along the piles. Other structures may be constructed of more permanent materials and set in place through underwater cabling or other engineered solution. Key boat tie-ups and fishing platforms are suggested at Florida Street and Park Street overlooks, Magic Island, the Elk River and Elk River confluence, Haddad Park, the Ruffner Street, Elizabeth Street, Greenbrier Street overlooks, the Capitol Landing, and the Chesapeake Street overlook.



▲ Proposed Magic Island concept plan.

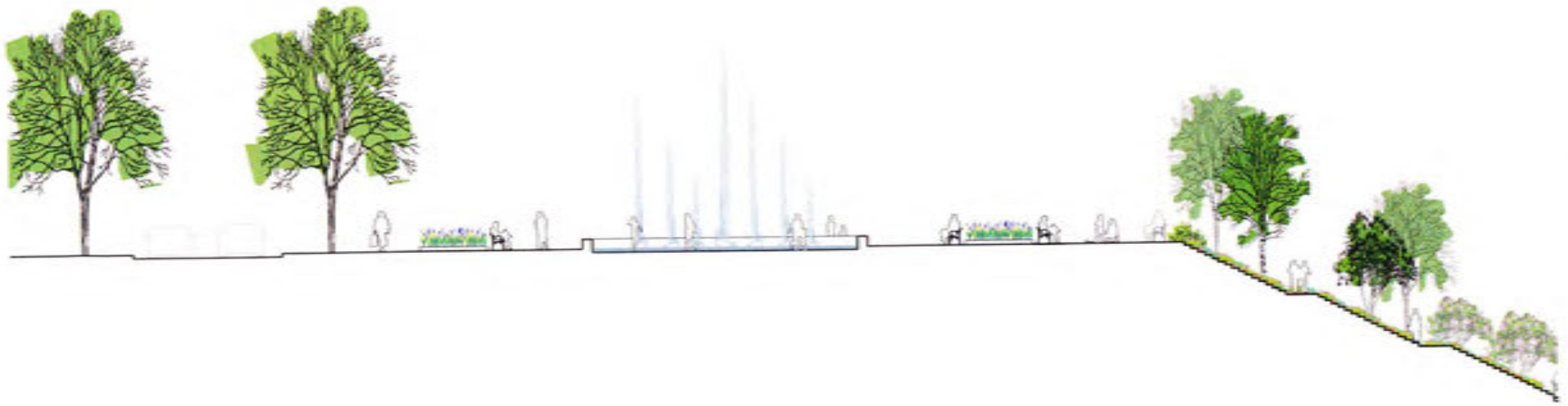
Magic Island

Magic Island is Charleston's unique opportunity to create a world class, 8 acre park at the confluence of the Elk and Kanawha Rivers. With improvements to the Elk River Bridge and Haddad Park, Magic Island will become the new "postcard" image for Charleston and a way to link the West Side neighborhood with the Downtown and East End.

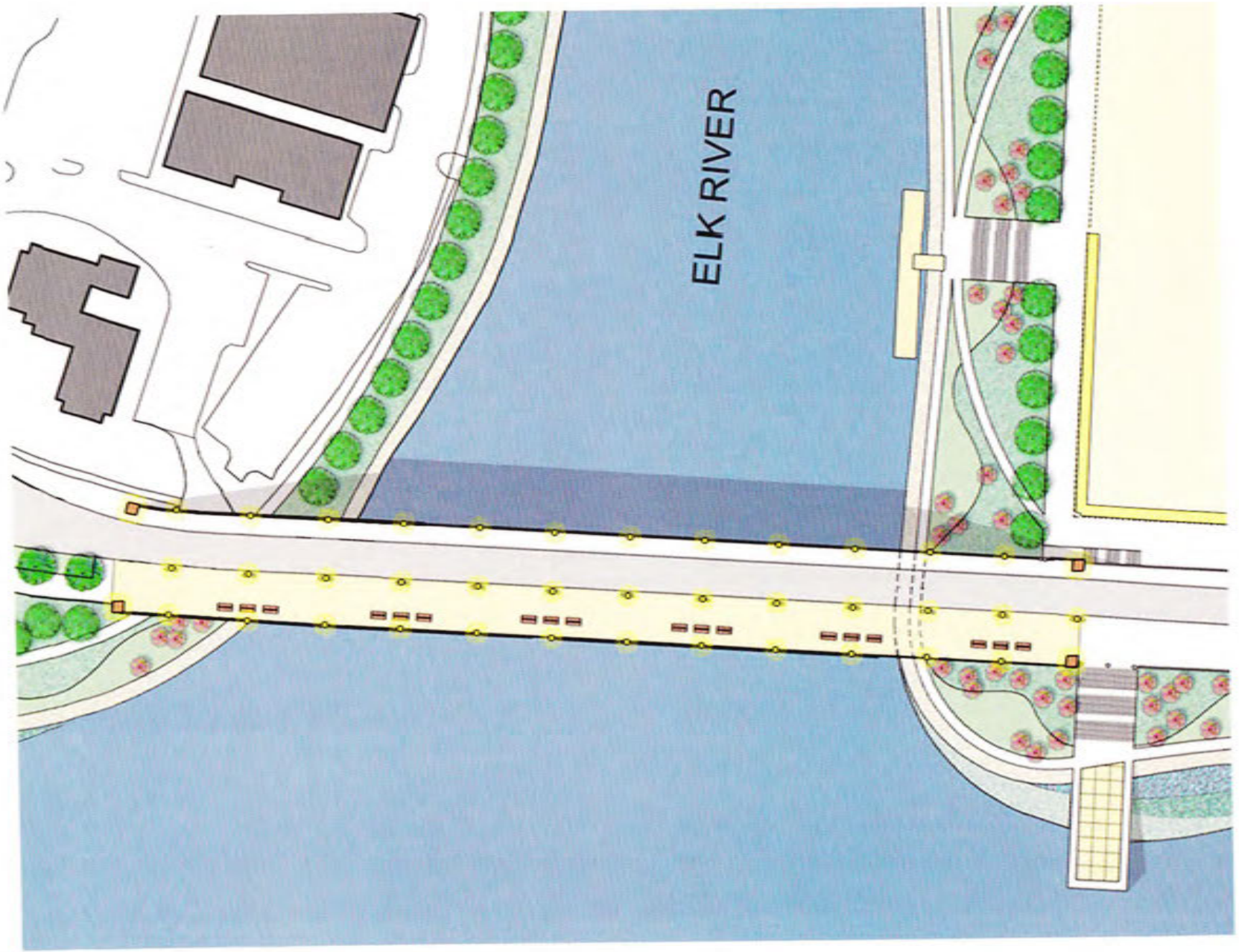
Additional usable park space, raised out of the floodplain, can be achieved by adding fill or dredge materials from the Elk River along the slope at Kanawha Boulevard. This upper elevation can then be programmed to more directly benefit the adjacent West Side residential neighborhood. The following elements are recommended as part of the new park at Magic Island:

- *Overlook, stairway, and ramps at the terminus of Delaware Avenue*
- *Overlook and sculpture feature at the terminus of Ohio Ave.*
- *Small restaurant/coffee bar with plaza for tables and chairs*
- *Main central plaza at terminus of Tennessee Avenue with interactive spray fountain*
- *Playground at terminus of Tennessee Avenue*
- *Large ceremonial fountain at the terminus of Pennsylvania Avenue that marks the entrance to the park from the Downtown area*
- *Overlook for fishing and boat tie-ups as a continuation of the Pennsylvania Street "axis"*
- *A "Great Promenade" along the edge of Magic Island to be used for strolling, jogging and river viewing*
- *An open lawn in the center of Magic Island for Movie Nights and other recreation*
- *Formal street tree and tree grove plantings at the new upper level of the park*
- *Informal groves of water-tolerant shade and flowering trees at the lower elevations*
- *Shelves of indigenous riparian plantings along the edges of the promenade*

▲ Example of waterfront promenade, Charleston, S.C.



▲ Magic Island proposed concept section, looking east.

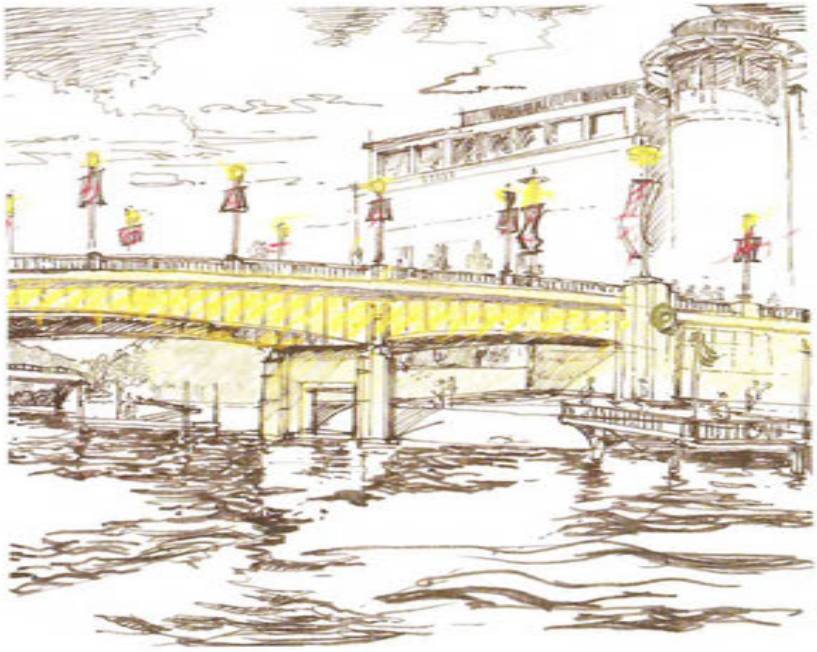


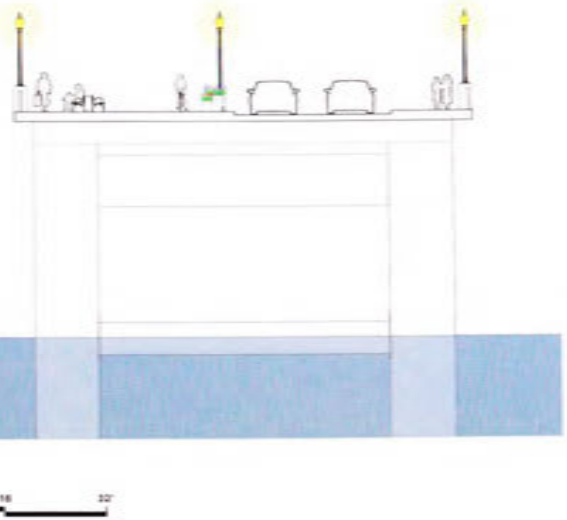
▲ Proposed concept for Elk River Bridge.

Elk River Bridge and Elk River

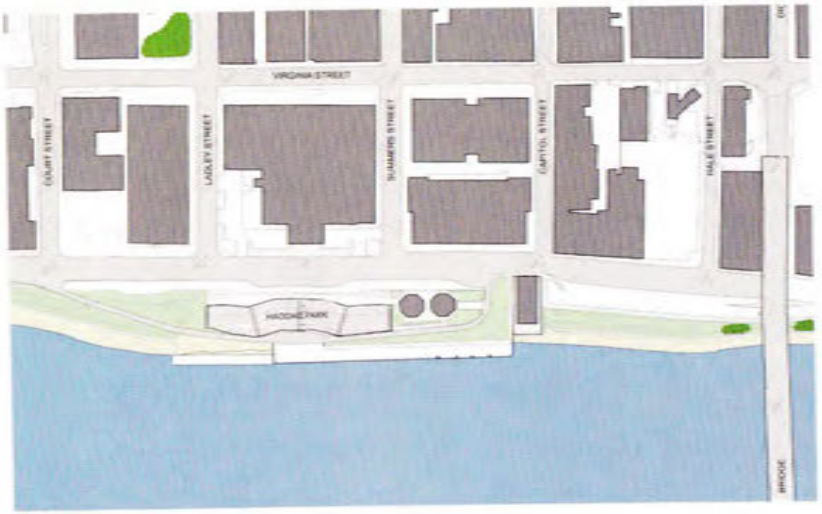
The Elk River Bridge currently carries five lanes of traffic along the Kanawha Boulevard into the Downtown area. The bridge is an excellent opportunity to improve pedestrian connectivity between Magic Island and Downtown and to celebrate the crossing of the Elk River where it meets the Kanawha. With the proposed improvements to Kanawha Boulevard, the bridge may also be reconfigured to provide more circulation space for pedestrians. Elements such as new pedestrian lighting, colored bridge lighting, specially paved sidewalks, benches, and planters should all be considered as part of the Elk River Bridge improvement project. The bridge itself would become an inviting destination during both the day and night, while also becoming a recognizable and memorable gateway into the City as seen from the river and the nearby I-64 highway corridor.

Beneath the Elk River Bridge, trail connections should be made on both sides of the Elk River, as well as to the "Whipple Bridge" if possible. A small boat tie-up at the Charleston Town Inn site can be made, linking up to a new path that will tie into the Clendenin Homes neighborhood and Martin Luther King Community Center. Along this paved promenade, fishing platforms could be extended into the water nearby to the existing bridge abutments. Trails along the west bank of the Elk River should also be implemented, to tie the West Side neighborhood into the recently constructed park, the Elk River Bridge, and Magic Island.





▲ Existing view of Elk River Bridge.



▲ Existing

▲ Phase 1

▲ Phase 2

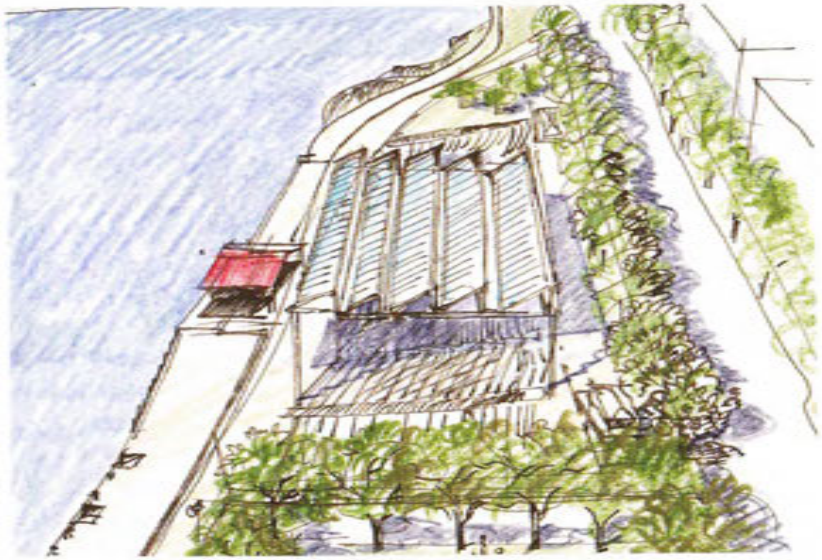
▲ Phase 3

Haddad Riverfront Park

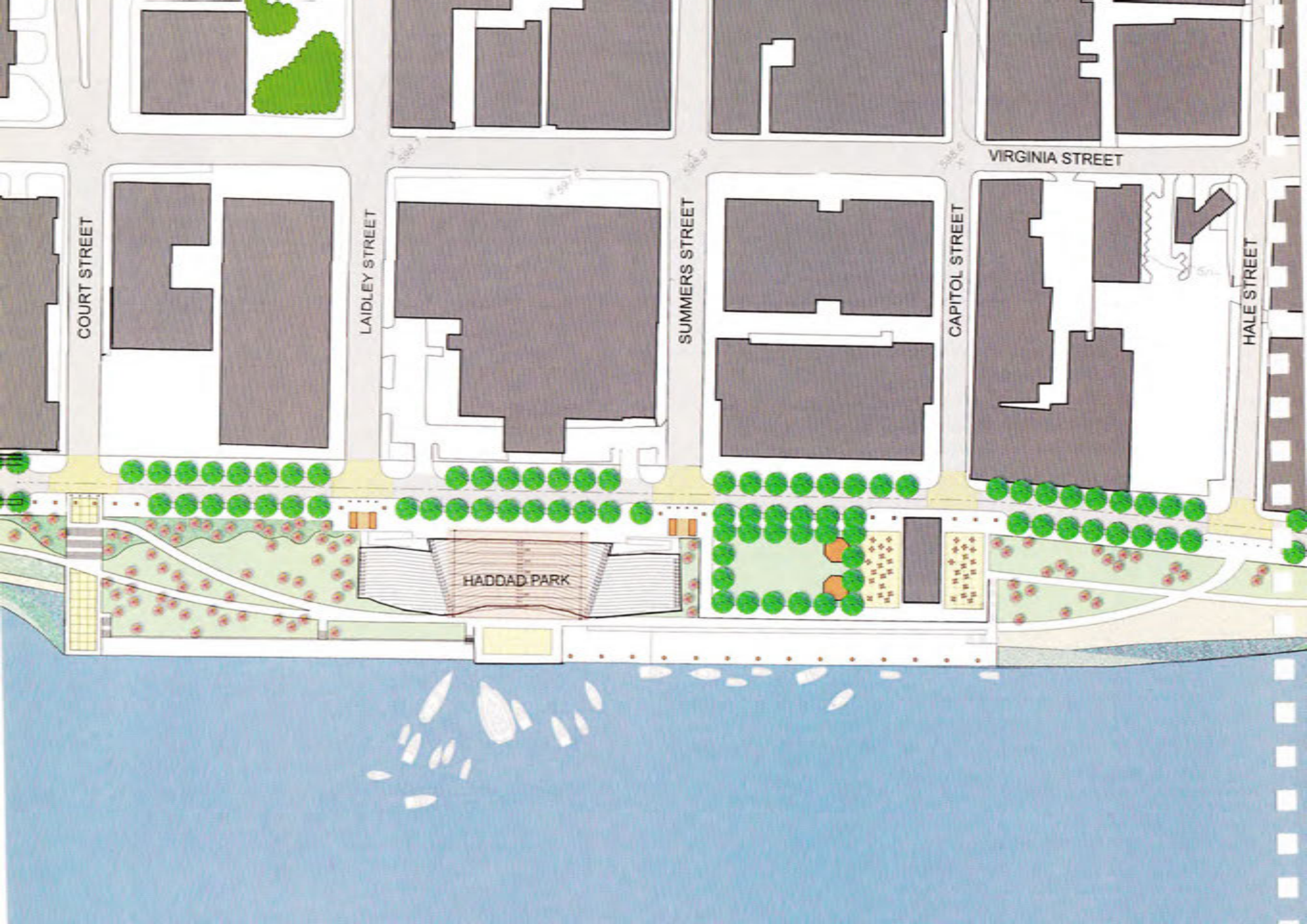
Haddad Riverfront Park is Charleston's premier downtown park and should be enhanced to attract even more local and regional visitors during non-event hours. Currently, a popular music and entertainment venue for Charleston's "Festivall" and regatta events, Haddad Park can become more closely integrated with the City and an even more attractive destination venue through the following modifications:

- *Build a canopy structure over the Haddad amphitheater*
- *Create a plaza, stairs, and overlook at the termination of Court Street*
- *Design attractive kiosks for small concessions at the terminus of Laidley and Summers Street and a the same elevation as Kanawha Boulevard*
- *Simplify the relationship between the top of the amphitheater and the Kanawha Boulevard sidewalk*
- *Raise the level of the park surrounding the Union Building to create a plaza space on both sides of the building*
- *Use the plazas for table and chairs as part of a ground floor commercial use (restaurant, coffee shop) at the Union Building*
- *By narrowing the Boulevard, create more space in front of the Union Building for safe pedestrian movement*
- *Create specially paved areas in the Boulevard where Court, Laidley, Summers, Capitol, and Hale Streets meet the park*
- *Reconfigure the equipment access road to pass behind the Union Building on the river side and connect with Hale Street at Kanawha Boulevard*
- *Complete the boat tie-up platform along the river to meet the Court Street overlook*
- *Enhance the soil conditions and plantings throughout the park, while maintaining the parks function as flood control device*
- *Add new lighting and furnishings within the park and along Kanawha Boulevard*

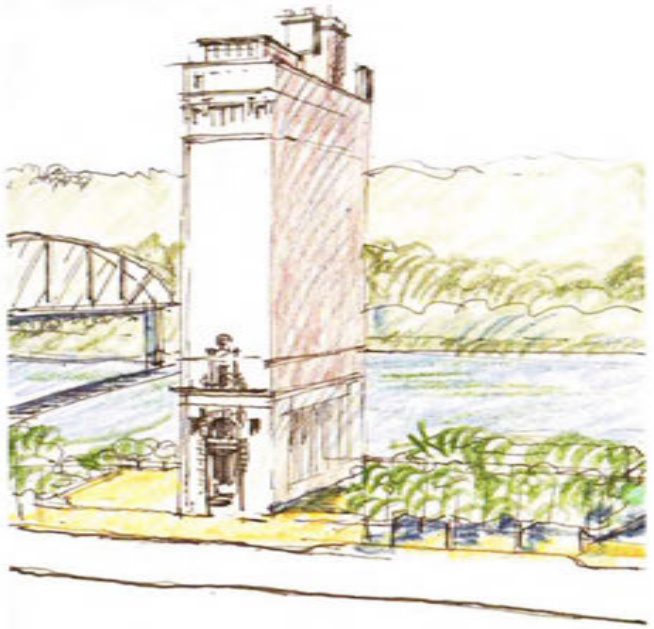
▲ Diagrammatic drawing of Union Building "choke point".

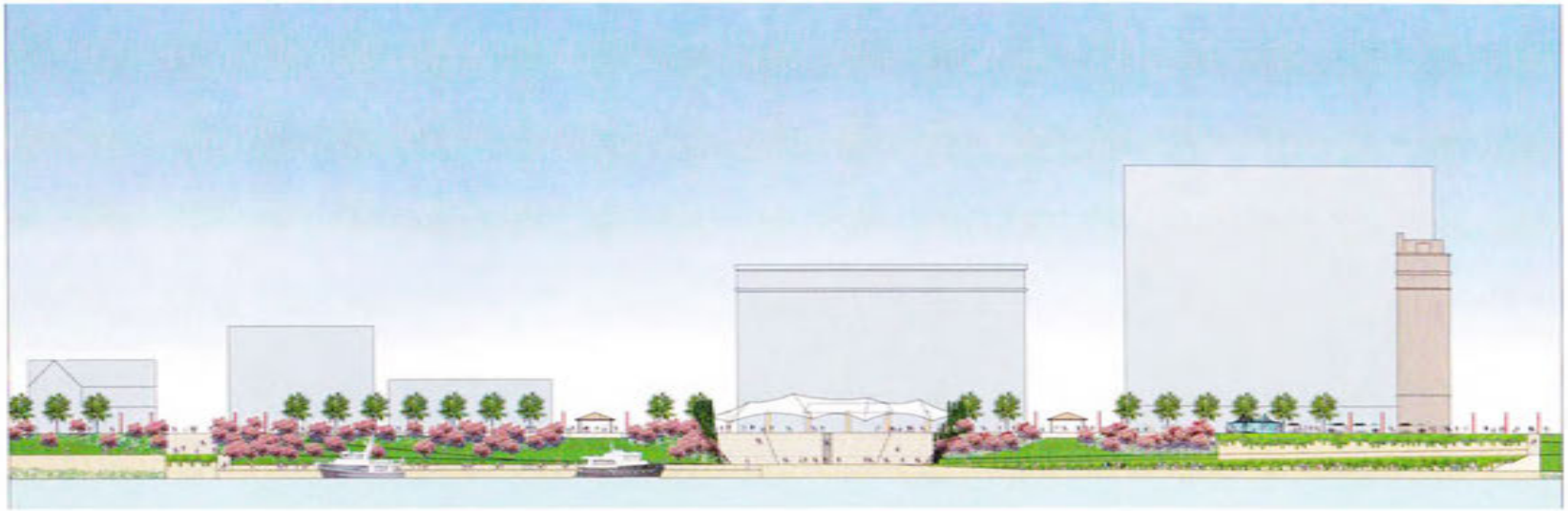


▲ Sketch of conceptual canopy over Haddad Park ampitheatre


VIRGINIA STREET
COURT STREET
LAIDLEY STREET
SUMMERS STREET
CAPITOL STREET
HALE STREET
HADDAD PARK

The riverfront area between Haddad Park and the Elk River should also be improved in order to complete the new downtown park composition. Flowering trees and other forms of low-maintenance ground cover should be planted along the slope, as well as riparian plantings at the river's edge. With the narrowing of the Boulevard, additional sidewalk and planting space will be created along the roadway. Special care should be given to several existing memorial trees in this zone, which include mature Pin Oak specimens. The mid-level path may also be slightly widened with lighting added to connect Haddad Park with a new fishing overlook at the Elk River.





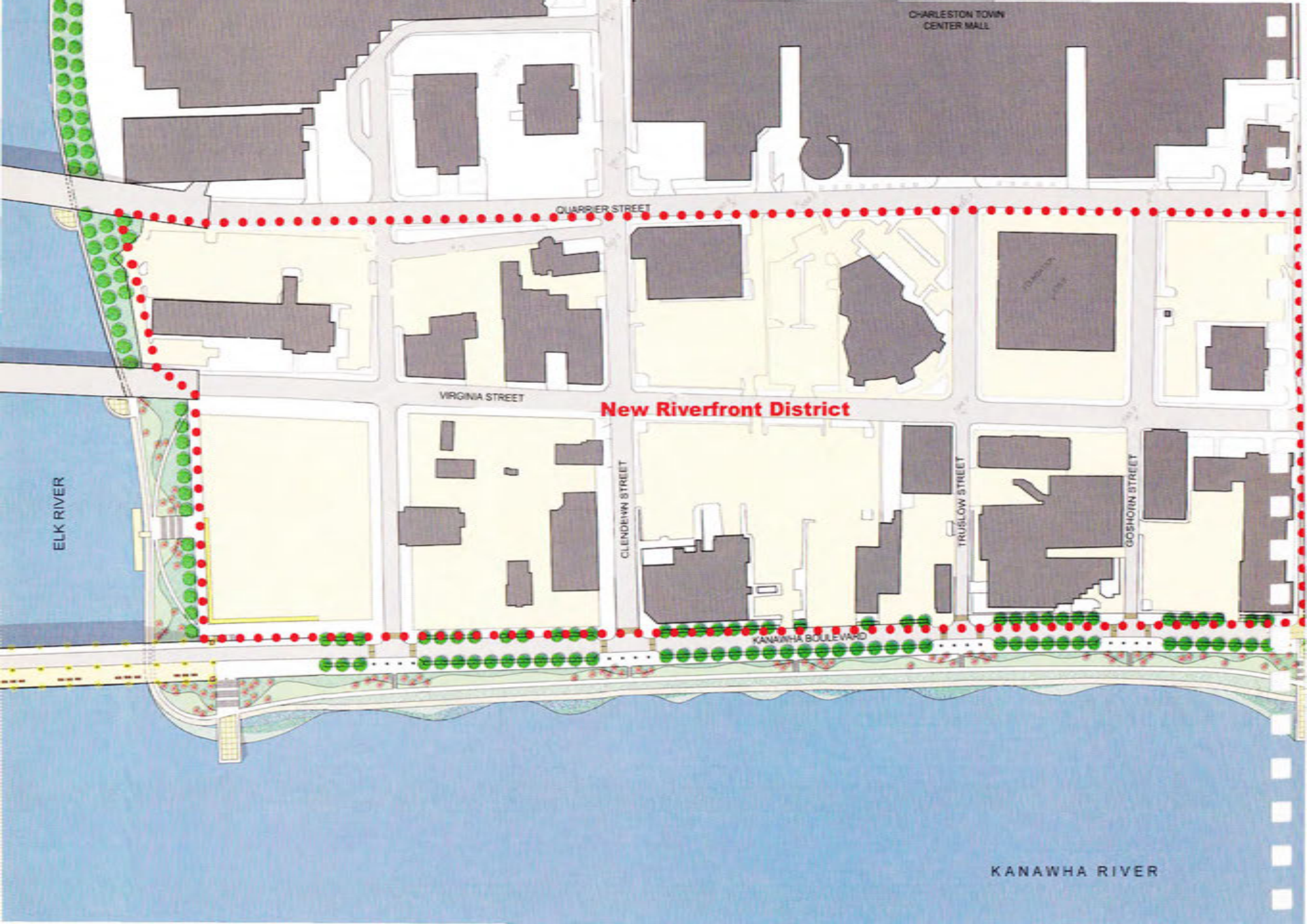
▲ Proposed concept elevation for Haddad Riverfront Park.


4TH AVENUE
3RD AVENUE
2ND AVENUE
1ST AVENUE
STOCKTON STREET
KANAWHA BOULEVARD
PATRICK STREET
US RT 60


MAIN AVENUE
4TH AVENUE
FLORIDA STREET
3RD AVENUE
FITZGERALD STREET
SUMMERS AVENUE
GLENWOOD AVENUE
2ND AVENUE
1ST AVENUE
LOVELL DRIVE
CABELL FIELD
KANAWHA BOULEVARD
0
100
200
400


MAIN AVENUE
GRANT STREET
ELM STREET
HALL STREET
LOVELL DRIVE
PARK AVENUE
PARK DRIVE
VINE STREET
DELAWARE AVENUE
MARYLAND AVENUE
RALEIGH STREET
BERKELEY ST


VIRGINIA STREET
MONONGALIA STREET
OHIO AVENUE
TENNESSEE AVENUE
BERKELEY STREET
RALEIGH STREET
PENNSYLVANIA AVENUE
KANAWHA BOULEVARD
US RT 119
I-64
ELK RIVER
0
100
200
400'


CHARLESTON TOWN CENTER MALL
QUARRIER STREET
VIRGINIA STREET
New Riverfront District
ELK RIVER
CLENDENIN STREET
TRUSLOW STREET
GOSHORN STREET
KANAWHA BOULEVARD
KANAWHA RIVER


QUARRIER STREET
VIRGINIA STREET
COURT STREET
LAIDLEY STREET
SUMMERS STREET
CAPITOL STREET
HALE STREET
DICKINSON STREET
McFARLAND STREET
DUNBAR STREET
HADDAD PARK
KANAWHA BOULEVARD
SOUTH SIDE BRIDGE
0
100
200
400


MASON ALLEY
ARLINGTON COURT
QUARRIER STREET
VIRGINIA STREET
LEON SULLIVAN WAY
BROOKS STREET
MORRIS STREET


FRANKLIN STREET
QUARRIER STREET
VIRGINIA STREET
ELIZABETH STREET
GREENBRIER STREET
STATE RT 114


QUARRIER STREET
VIRGINIA STREET
BRADFORD STREET
RUFFNER STREET
KANAWHA BOULEVARD
KANAWHA RIVER
0
100
200
400


PIEDMONT ROAD
US RT 60
WASHINGTON STREET EAST
JEFFERSON STREET
MICHIGAN AVENUE
VEAZY AVENUE
QUARRIER STREET
CALIFORNIA AVENUE
STATE CAPITOL
KANAWHA RIVER


WASHINGTON STREET EAST
US RT 60
GREENBRIER STREET
JEFFERSON STREET
MICHIGAN AVENUE
QUARRIER STREET
CALIFORNIA AVENUE
STATE RT 114
STATE CAPITOL
KANAWHA BOULEVARD
0
100
200
400'


I-77 AND I-64
I-77 AND I-64
WASHINGTON STREET EAST
CHESAPEAKE AVE
EAST AVENUE
KANAWHA BLVD/US RT 60
SEG RT 60/63
KANAWHA AVE SE
0
100
200
400'

Funding Strategy

The projects outlined in the Charleston Riverfront master plan fall into three primary categories: flood control, transportation and economic development. In order to achieve all of the projects, a strategy which maximizes the leveraging ability of local funds, most likely in the form of general obligation bonds, will need to be performed. This means that a major portion of the funding will need to come from federal funding, either from federal grant programs of from direct project appropriations. In order for Charleston to be most successful in obtaining its share of federal appropriations, its leadership representation must be diligent in providing the needed information and updates to its legislative representation. This information includes specific "cost-benefit" data which shows the "potential value captured," in the form of increased private investment, generation of additional tax revenues and positive effects on job creation, etc., as a result of the proposed projects. Succinct briefing sheets on the various components should be prepared and circulated. Finally, regular meetings should be held with the legislators and their key legislative aides. It is extremely important that quarterly meetings be held with the legislators and their key staff in their offices on Capitol Hill, in order to ensure that primacy of the City's projects and to re-enforce the critical need for funding.

The following is a brief description of some of the major sources of federal funding that should be considered for projects identified in the master plan.

The Water Resources Development Act (WRDA) authorizes new water resources related projects every two years. Administered by the Army Corps of Engineers' (ACOE) civil works program, it is the nation's largest water resources program and includes project for navigation, flood control, shoreline protection, hydropower, dam safety, water supply, recreation, environmental restoration and protection, and disaster response and recovery. This program represents one of the largest potential sources of funding for the City of Charleston. In order to receive funding the City will need to work with its legislators and the Huntington District of the Army Corps of Engineers, in order to ensure that the projects receive priority attention within their project program.

The first step in an ACOE water resources development project is a study of the project's feasibility. If the Corps has conducted a study in the area before, the new study can be authorized by a resolution (known commonly as a "survey resolution") of either the House Transportation and Infrastructure Committee or the Senate Committee on Environment and Public Works. If the Corps has not previously studied the area, then an Act of Congress is necessary to authorize the study. The majority of studies are authorized by Transportation Committee survey resolutions.

Once authorized, the study process consists of two parts. The Corps first performs a reconnaissance study at federal expense, usually taking 12-18 months to complete. This phase defines the water resources problems and opportunities, assesses the potential sponsor's level of interest and support for the identified potential solutions, evaluates federal interest, economic costs and benefits and environmental impacts of potential solutions.

If the reconnaissance study indicates that there may be a viable federal project and that a more detailed feasibility study should be undertaken, the Corps prepares a feasibility report, the cost of which is shared 50 percent by the federal government and 50 percent by the non-federal sponsor. The feasibility study examines project alternatives and recommends a project that is technically sound, environmentally acceptable, and economically justified. In accordance with cost-sharing formulas established by law, the study typically recommends a project that would be constructed on a cost-shared basis with a non-federal sponsor. After a full study is completed, the results and recommendations of the study are submitted to Congress in a final report of the Chief of Engineers.

Assuming the study recommendations are favorable, the next step is authorization. Project authorizations are traditionally contained in WRDAs. The typical prerequisite for including a project authorization in a biennial WRDA is a favorable report from the Chief of Engineers.

The Corps of Engineers also has authorities to construct certain small projects without specific authorization by Congress. These authorities,

known as the "continuing authorities program," include beach erosion, navigation, flood control, streambank and shoreline protection, snagging and clearing, modifications to existing projects for the benefit of the environment, and aquatic ecosystem restoration. Some of the projects within the Charleston Riverfront master plan may qualify under this authorization, if deemed a priority by the Corps.

The Transportation, Community, and System Preservation (TCSP) Program is a program administered by the Federal Highway Administration (FHWA) comprehensive initiative of research and grants to investigate the relationships between transportation, community, and system preservation plans. Cities are eligible for discretionary grants to carry out eligible projects to integrate transportation, community, and system preservation plans and practices that specifically reduce environmental impacts of transportation and examine community development patterns and identify strategies to encourage private sector development patterns and investments that support these goals.

The Federal Highway Administration has not solicited applications for the TCSP Program. To date the TCSP Program has solicited only those applications for projects specified by Congress in the Conference Reports accompanying the 2005 Omnibus Appropriations Act. The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFTEA-LU) authorized the TCSP Program through FY 2009. A total of $270 million is authorized for this Program in FY's 2005-2009.

Recreation Trails Fund (RTP) and the **Transportation Enhancement Program** (TEP) both funded under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFTEA-LU) and administered by the West Virginia Department of Transportation. These programs have relatively low caps on grant size ($100,000 per grant), but could be used to supplement other larger funding sources. Both programs have a 20 percent local matching funds requirement. Projects which can receive funding include the construction of new trails and other trail related facilities, water trails, parking, bridges, signage, etc.

Section 108 Loan Guarantee Program and the Economic Development Initiative (EDI) of the U.S. Department of Housing and Urban Development (HUD) is the loan guarantee provision of the Community Development Block Grant (CDBG) program. Section 108 provides communities with a source of financing for economic development, housing rehabilitation, public facilities, and large-scale physical development projects. This makes it one of the most potent and important public investment tools that HUD offers to local governments. It allows them to transform a small portion of their CDBG funds into federally guaranteed loans large enough to pursue physical and economic revitalization projects that can renew entire neighborhoods. Such public investment is often needed to inspire private economic activity, providing the initial resources or simply the confidence that private firms and individuals may need to invest in distressed areas. Section 108 loans are not risk-free, however; local governments borrowing funds guaranteed by Section 108 must pledge their current and future CDBG allocations to cover the loan amount as security for the loan. The City of Charleston has established a successful track record with HUD having developed numerous housing and economic development projects with this federal agency. Under the Section 108 Program the City could finance economic development activities eligible under CDBG, acquire real property, rehabilitate of publicly owned real property; construct, reconstruct, or install of public facilities (including street, sidewalk, and other site improvements); perform related relocation, clearance, and site improvements and utilize funds for the payment of interest on the guaranteed loan and issuance costs of public offerings.

HUD's EDI provides grants to local governments to enhance both the security of loans guaranteed through the Section 108 Loan Program and the feasibility of the economic development and revitalization projects they finance. EDI has been the catalyst in the expanded use of loans through the Section 108 Program. Because Section 108 loans represent a potential risk to local governments' Community Development Block Grant (CDBG) allocations which governments pledge against potential repayment shortfalls, the EDI program offers communities a way to decrease the level of risk

to their CDBG funds. HUD's Economic Development Initiative helps local governments manage and reduce this risk in at least two different ways. A local government may use an EDI grant to provide additional security for the Section 108 loan (as a loan-loss reserve or debt-service, for example), thereby reducing the exposure of its CDBG funds in the event of a default in loans made locally with the Section 108 funds. It may also use this flexible grant to simply make the project more feasible by paying some of the project costs with grant funds or by reducing the interest rate to be paid from a revolving loan fund.

Only amendments to previously approved grants are being made. No new grants are being awarded. Congressional earmarks are still possible however, so the City of Charleston would need to work directly with its federal legislators to obtain an appropriation.

The Appalachian Regional Commission (ARC) was established by Congress in 1965 to support economic and social development in the Appalachian Region. Appalachia is a 200,000-square-mile region from the spine of the Appalachian Mountains in Southern New York to Northern Mississippi. The ARC program's region includes parts of 13 states, including all of West Virginia. The ARC's program specifically focuses on improving infrastructure for community and economic development projects which increase the social and economic completeness of the region. Congressional appropriations vary from year to year, but generally West Virginia receives between $6 million and $7 million for its ARC projects.

The ARC does not have authority to write implementation grants directly. Therefore it grants moneys through other Federal agencies, such as HUD. These agencies act as an administering agency for Appalachian Regional Commission projects. On the average about $10 million dollars of ARC projects are assigned to HUD each year. The majority but not all are carried out under the State's CDBG Program (the balance are carried out under the CDBG Entitlement Program). In order for HUD to administer funding for an ARC project, the project must meet all CDBG program requirements.

Projects receiving ARC funding through HUD are initiated by the West Virginia Development Office; state-requested projects are approved for funding by ARC. The CDBG program serves as the vehicle to transfer funds to states or local government for approved projects, but HUD plays no role in the initiation or selection of projects for ARC funding. West Virginia Development Office staff reviews projects and recommendations are presented to the governor for approval. Projects are then forwarded to the ARC for final approval. ARC funding could be used as a match for other small grant programs which require match funds, such as the state administered transportation programs.

Conceptual Master Plan Cost Estimate

This cost estimate is for conceptual purposes only, to understand general orders of magnitude for projects within the master plan. Further schematic design, design development and cost estimating will be required. Quantities and costs are subject to change based on final design detail and project timing.

Item	Quantity	Unit	Unit Price	Construction Cost	Comments
Paths and Stairs					
Widen mid-level pathway	40,000	sf	$5.00	$200,000.00	
New staircases from Blvd. to water	16,800	ea	$28.00	$470,400.00	average 70' long x 8' wide = 560 sf each x 30 total new
Subtotal				***$670,400.00***	
Slope Plantings					
Mix of woody and herbacous plants	1,000,000	sf	$2.50	$2,500,000.00	
Flowering Trees	850	ea	$850.00	$722,500.00	
Subtotal				***$3,222,500.00***	
Magic Island - 340,000 sf total (8 acres)					
Demolition	200,000	sf	$0.50	$100,000.00	
Earthwork	100,000	cy	$15.00	$1,500,000.00	assume clean, dry fill from off site
Utilities	1	lump	$50,000	$50,000.00	water, sewer, gas, electric, phone
Paving - Plaza	15,000	sf	$8.00	$120,000.00	75% standard concrete; 25% special paving
Paving - Walks	12,000	sf	$4.00	$48,000.00	6' wide asphalt
Paving - Large staircase	5,000	sf	$28.00	$140,000.00	one staircase at Delaware Ave.
Paving - Small staircases	4,500	sf	$28.00	$126,000.00	two staircases at Pennsylvania Ave. plaza
Paving - Ramp	1,200	sf	$15.00	$18,000.00	6' wide concrete; handicapped accessible 5%
Paving - Children's Playground	2,500	sf	$5.00	$12,500.00	soft surface
Feature Fountain - passive	1	lump	$850,000.00	$850,000.00	entry fountain at Pennsylvania St. entrance
Feature Fountain - interactive	1	lump	$500,000.00	$500,000.00	jets in paving at upper plaza near pavilion building
Pavilion Building	1	lump	$500,000.00	$500,000.00	coffee shop, restrooms approx. 2,500 sf
Platforms for boat tie-ups	7,000	sf	$95.00	$665,000.00	one at Ohio; one at Pennsylvania
Lighting	75	ea	$3,500.00	$262,500.00	12' pedestrian standard
Shade Trees	150	ea	$850.00	$127,500.00	4" caliper minimum
Flowering Trees	100	ea	$850.00	$85,000.00	
Lawn/Plantings	250,000	sf	$1.00	$250,000.00	
Promenade with hard edge	1,300	lf	$550.00	$715,000.00	includes balustrade and lighting
Subtotal				***$6,069,500.00***	

Item	Quantity	Unit	Unit Price	Construction Cost	Comments
Boulevard Modification (Option A)					
Mobilization/Gen. Site Prep.	5	mi	$15,000.00	$75,000.00	
Demolition (curb, median, 16' of roadway)	25,000	lf	$30.50	$762,500.00	
New curb	25,000	lf	$18.00	$450,000.00	
Landscape treatment in new area	400,000	sf	$7.00	$2,800,000.00	6' parkway with trees 30' o.c.; 10' wide path w/ irrigation
Lighting/furnishings	1	lump	$400,000.00	$400,000.00	
Shade Trees	1,000	ea	$850.00	$850,000.00	4" caliper minimum
Subtotal				***$5,337,500.00***	
Overlooks - Large					**3 total: Florida St, Park Avenue, Ruffner St**
Earthwork	18,500	cy	$15.00	$277,500.00	
Retaining wall and ramps	600	lf	$425.00	$255,000.00	
Upper terrace and planting	12,000	sf	$17.00	$204,000.00	
Switchback ramp	100	lf	$425.00	$42,500.00	
Staircase	240	sf	$28.00	$6,720.00	
Platform over water	4,500	sf	$95.00	$427,500.00	
Lighting/furnishings	1	lump	$50,000.00	$50,000.00	
Subtotal				***$1,263,220.00***	
x 3				***$3,789,660.00***	
Overlooks - Small					**4 total: Brooks, Elizabeth, Greenbrier, and Chesapeake**
Retaining wall	125	lf	$425.00	$53,125.00	
Upper platform	2,500	sf	$17.00	$42,500.00	
Switchback ramp	125	lf	$425.00	$53,125.00	
Staircase	750	sf	$28.00	$21,000.00	
Platform over water	2,500	sf	$95.00	$237,500.00	
Lighting/furnishings	1	lump	$50,000.00	$50,000.00	
Subtotal				***$457,250.00***	
x 4				***$1,829,000.00***	

Item	Quantity	Unit	Unit Price	Construction Cost	Comments
Elk River Bridge					
Demo/paving/sidewalk/lighting/furnishings	35,000	sf	$100.00	$3,500,000.00	two 12' lanes x 500 lf
Subtotal				**$3,500,000.00**	
Haddad Riverfront Park					
Demolition/Earthwork/Site Prep	40,000	sf	$5.00	$200,000.00	
Utilities	1	lump	$50,000.00	$50,000.00	
Retaining Wall at Union Building	400	lf	$1,200.00	$480,000.00	
Paving - Plaza at Union Building	20,000	sf	$15.00	$300,000.00	special paving
Paving - New Access Road	750	lf	$9.00	$6,750.00	
Paving - Boat Platform	3,000	lf	$120.00	$360,000.00	
Stairs/ramps	2,000	sf	$28.00	$56,000.00	
Canopy	1	lump	$250,000.00	$250,000.00	over amphitheater
Concession Buildings	1,500	sf	$130.00	$195,000.00	750 sf each
Overlook at Court St	5,000	sf	$95.00	$475,000.00	
Landscape	1	lump	$200,000.00	$200,000.00	
Lighting/furnishings	1	lump	$100,000.00	$100,000.00	
Subtotal				**$2,672,750.00**	
CONCEPTUAL ESTIMATE TOTAL				**$27,091,310.00**	

Appendix A - Think Tank Minutes

Charleston Riverfront "Think Tank" Session

November 9, 2004

An open public meeting regarding Charleston's riverfront was held on November 9, 2004 in Parlor A of the Charleston Civic Center, beginning at 6:30 p.m. The purpose of the meeting was to solicit and receive public input, ideas, suggestions and concerns regarding possible future development of Charleston's riverfront. The meeting was conducted jointly by the Charleston Area Alliance and the Riverfront Development Committee of Charleston City Council.

Approximately 130 people attended the meeting. A copy of the list of attendees is attached to these meeting notes. Meeting participants appeared to represent a diverse cross-section of the community, and persons from neighborhoods throughout the city attended.

Mr. Joe Jones, Chairperson of the Charleston Area Alliance, opened the meeting by welcoming everyone present, and explaining the background to and purpose of the meeting.

Mr. Joe Jones introduced Mayor Danny Jones, who encouraged everyone to participate actively in helping shape Charleston's future, and to provide their thoughts, ideas and suggestions. Mr. Joe Jones noted the attendance of representatives of Environmental Design Group, who were present to provide consultation and artistic rendering services as people brainstormed ideas, and introduced Tom Heywood, who served as facilitator of the meeting.

Mr. Heywood briefly outlined the structure, purpose and agenda of the meeting. The meeting was structured as a public brainstorming process, to elicit ideas, thoughts, suggestions and concerns. Mr. Heywood encouraged attendees to be bold in their thinking and dreams, noting that there is no such thing as a right or wrong vision or dream. Through a public brainstorming process, the city's leaders hoped to better be able to determine whether there is public consensus regarding aspects of the possible re-development of Charleston's riverfront, and if so, what the essential elements of a common vision might be.

The attendees were seated in groups of roughly 10-12 persons each. Each group was encouraged to identify a scribe and a reporter, to capture thoughts and ideas, and report the group's work product at the end of the meeting. Numerous pictures, maps and photos of Charleston's riverfront areas were available to assist participants in their brainstorming activities. Facilitators were present to assist each group with discussion and brainstorming.

The brainstorming session lasted approximately one hour, followed by reports from each of the groups to all those in attendance.

People were enthusiastic and focused in their brainstorming activities. Presenters from the breakout groups were uniformly articulate and effective in summarizing and communicating the ideas from their groups. All persons in attendance were respectful of one another, and of the ideas presented by others.

Attached to this meeting summary is a copy of the meeting notes prepared by Susie Salisbury, who served as a reporter of the ideas presented at the meeting. These notes capture the specific thoughts, ideas, observations and suggestions of the various groups at the meeting. In addition to the notes appended to this meeting summary, copies of the flip chart notes of the working groups themselves are available for review and inspection at the offices of Charleston Area Alliance.

There was broad consensus, approaching unanimity, on many ideas and themes. There were many ideas offered which people present seemed to react positively to, even though that particular idea may not have been suggested within several of the groups. Following is a summary of several broad themes which emerged from the brainstorming session.

1. *Attendees Were Overwhelmingly Open to Change and Redevelopment of Charleston's Riverfront. Without exception, people in attendance voiced the belief that we can or should do something to better take advantage of Charleston's riverfront. The level of consensus on this fundamental issue – doing something versus doing nothing – was extremely high.*

2. *Any Redevelopment Activities Should be Thoughtfully Undertaken. There was broad consensus that any future redevelopment should be done thoughtfully, with due attention given to historic preservation, riparian, environmental, traffic and safety issues and considerations. A professional planning and development process is called for.*

3. *Creation of Green Space and Recreational Opportunities Should Be Priorities in the Redevelopment of Charleston's Riverfront. There was extremely broad consensus that the proper focus of any redevelopment effort should be to make the riverfront more accessible and user friendly for such activities as walking, biking, relaxing, enjoying the view, and possible water access. Possible use of boardwalks, viewing decks, benches and shade trees were mentioned by several groups.*

4. *The Viewshed on the South Bank of the River is an Asset and Should be Enhanced as Part of an Overall Plan. Several groups noted that the south bank of the river is the viewshed for all of downtown Charleston, and there was broad consensus that consideration should be given to enhancing this viewshed as part of an overall development effort.*

5. *There is Strong Public Support for Closing Down One or Two Lanes of the Boulevard as Part of an Overall Development Plan. Virtually every brainstorming group expressed support for, or openness to, closing down at least one or two lanes of the Boulevard as part of an overall riverfront redevelopment plan. The level of consensus on this point was extremely high, and was a striking aspect of the meeting. One group suggested possibly making Piedmont Road or another road the primary route of vehicular traffic from downtown to the East End, thereby permitting closure of the Boulevard altogether. Some groups suggested closing portions of Kanawha Boulevard*

6. *The Land at the Confluence of the Kanawha and Elk Rivers (currently occupied by the Elk River Town Center Inn) Should be Studied for Possible Public Acquisition and Use as Part of the Overall Riverfront Redevelopment Plan. Several groups suggested linking linear green space along the Kanawha and Elk Rivers, and using the Town Center Inn property as a public park with significant potential in connection with any redevelopment plans.*

7. *Restaurants and Shops, Rather than Office Buildings, Should be Considered for Possible Inclusion in the Redevelopment Plan. Participants were strong in their consensus that more office buildings should not be a part of the riverfront development plan. Several groups did suggest that restaurants and shops would be an appropriate part of a user-friendly redevelopment area, provided that such restaurants and shops were not heavily massed and did not impede public access to and use of recreational or green space.*

8. *Boat Slips and Possibly Other Waterfront Facilities Should be Considered as Part of An Overall Redevelopment Plan. Most groups noted that some sort of boat docking facilities should be included as part of an overall plan. Several groups also suggested that redevelopment plans should include water taxis, which would carry people from one side of the river to the other. Some groups and individuals suggested more substantial*

waterfront development, possibly including house boat docking facilities or development of a marina complex. While there seemed to be strong consensus regarding the addition of some additional boating facilities, the structure of the meeting did not permit exploration of the level of consensus regarding the development of more extensive waterfront amenities.

9. *Any Riverfront Redevelopment Should Include Attractions. There was strong consensus that any redevelopment effort should include elements of attraction. Several groups specifically mentioned construction of a lighted fountain, and suggested Magic Island as a good location for such a feature (to attract the attention of those traveling through Charleston on the Interstate Highway). Other suggestions for attractions that could be included as part of a riverfront redevelopment plan included an aquarium and an outdoor, riverfront movie screen.*

10. *Existing Riverfront Amenities Should be Improved, to Encourage Use. Several groups suggested that existing riverfront amenities could be improved to enhance use. Many groups suggested building some sort of canopy over Haddad Riverfront Park, to create shade and make the facility more usable on hot summer days. Groups suggested elevating Magic Island and/or planting more trees on Magic Island to make the park more usable. Some groups suggested installing decking or a boardwalk around the Union Building, and otherwise exploring means of creating access around or through the Union Building.*

There was broad consensus among persons in attendance as to the ideas noted above. Many, many other ideas were offered at the meeting. However, the structure of the meeting did not permit exploration of the level of consensus that may exist in the community for all ideas suggested. Many of the ideas offered and reflected in the attached notes fall within the broad elements of consensus noted above. All ideas suggested at the meeting are worthy of further consideration and review.

The level of excitement at the meeting for riverfront development was exceptionally high. At the conclusion of the meeting, attendees voiced appreciation for what they had heard and learned at the meeting, and expressed their desire to continue to participate in a public discussion of the future of Charleston's riverfront. People in attendance expressed their thanks to City Council and to the Charleston Area Alliance for facilitating a public discussion about riverfront development, and encouraged our city's leaders to continue the Charleston riverfront study and development process.

Respectfully submitted,

Tom Heywood, Facilitator

January 30, 2005

Appendix B
Transportation Memo

CHARLESTON RIVERFRONT MASTER PLAN

Transportation Circulation Plan – Evaluation Overview

Background

Charleston's traffic and circulation system is organized around a traditional rectangular grid of streets in which some of the principle streets act as one way pairs. Kanawha Boulevard is at the southern edge of that grid paralleling the river. In the early part of the nineteenth century Kanawha Boulevard had buildings fronting both sides, at least in the immediate downtown area, but in the late 1930's these buildings were demolished to make way for a four lane highway, built in part with WPA funding, that totally transformed the riverfront. The only building with river frontage to escape demolition was the Union building which today stands between the River and the Boulevard creating a choke point at Capitol Street.

From 1940 until I-77 was completed in the 1970's Kanawha Boulevard acted as a major through route to and from communities up and down the river. As such its cross section with two approximately 13-foot lanes in each direction and a small central median was appropriate for the function it served. However, with the opening of the Interstate much through traffic was eliminated and since that time Kanawha Boulevard has served as a quick way to get into and out of the downtown area for local users.

Existing Conditions

Kanawha Boulevard hugs the Kanawha riverbank for the entire length of the study area from the S.R.60 Bridge to the west and the I-77 twin bridges to the east. In general, the boulevard is a four lane road that provides easy access from east to west across Charleston because there is no cross traffic to impede east-west vehicular flow. The parkway-like character of the road is enhanced by the fact that trucks are banned from its use. For descriptive purposes the boulevard can be divided into three distinct sections each of which is slightly different in character and function.

A. South Side Bridge to I-77 Twin Bridges

The typical cross section on this stretch consists of four approximately 13-foot lanes with a small curbed central median, approximately six feet in width. To the north side there is a five-foot sidewalk and a parallel curbside parking lane. To the south, adjacent to the river, a five-foot paved trail, used by both pedestrians and cyclists, is situated behind a low barrier protecting users from moving traffic. On the river side there is no barrier or protection at the top of the steeply sloping grass riverbank. A second path of equal width parallels the first, halfway down the riverbank. Narrow flights of steps connect the two paths and continue down to the water's edge. Breaks in the barrier that separates traffic lanes from the foot/bicycle path do not align with these flights of steps or with cross walks across the Boulevard.

The major intersections along Kanawha Boulevard are signalized and control the capacity for traffic movement. However, the signals allow through traffic in the southernmost eastbound lane to move continuously. Southbound motorist turning left onto Kanawha Boulevard and proceeding east from side streets are restricted to turning into the lane adjacent to the median, which is separated from the through lane by a series of bollards. This arrangement allows eastbound vehicles to travel along Kanawha Boulevard without stopping and contributes to the impression that Kanawha Boulevard is the fastest way to travel across town. It is difficult for pedestrians to cross Kanawha Boulevard since this one lane of continuously moving traffic does not provide gaps in traffic flow that are typically provided by signalized intersections that stops to traffic in all directions. The Average Daily Traffic (ADT) volume in this segment was approximately 12,000 vehicles, well within the capacity of the roadway.

B. Elk River Bridge to South Side Bridge

This section is the heart of the downtown area. In this area events such as concerts and festivals are held on the waterfront and periodically attract large crowds of pedestrians. Even when events are not taking place, more pedestrians cross the boulevard to access the riverfront park than in the areas east and west of the downtown area.

The typical roadway cross section is four moving lanes with sidewalks on either side and no central median. Both the travel lanes and the sidewalk are reduced to minimal dimensions to skirt the Union Building. This building's entrance opens directly onto the sidewalk at its narrowest most constricted place, where it is only about four feet wide and where there is little room for pedestrians to stand while waiting to cross the street. Average Daily Traffic volume on Kanawha Boulevard between Capital and Court Streets was 14,400 vehicles in 2004. The highest vehicular volumes, along Kanawha Boulevard, are east of this section, between Broad and Dickinson Streets where ADT volume was 16,700 in 2004. All these volumes are well within the capacity of the roadway.

c. S.R. 60 to Elk River Bridge

This section, to the west of downtown Charleston, also provides four moving lanes with a small central median, a sidewalk on the south side and a walkway on the north adjacent to the edge of the riverbank. The travel lanes in this section are wider and there are few traffic signals than on the eastern section. Most of the side streets are controlled by stop signs allowing traffic on Kanawha Boulevard free movement east and west. Typical speeds are therefore somewhat higher, and crossing for pedestrians is more difficult than in the downtown or eastern sections. Average Daily Traffic volume was 15,000 vehicles in 2004, well within the capacity of the road.

Conclusions

Charleston is well planned with an Interstate network that carries through traffic and a traditional grid of streets providing adequate vehicular circulation within the town. There is adequate capacity within the street network to handle vehicular traffic demand. Kanawha Boulevard is a preferred local route into and out of the downtown area, but is functioning well within its theoretical ultimate capacity. However, the Boulevard, as currently configured creates a barrier for pedestrians and cyclists who wish to use the riverfront paths. In addition, these paths are themselves substandard in terms of width to accommodate both bicycle and pedestrian traffic. The location of the upper path, so close to the steep river bank, without a barrier is a safety concern especially considering the path is used by both cyclists and pedestrians.

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