CHICAGO RIVER DESIGN GUIDELINES

City of Chicago ✶ Department of Planning & Development ✶ January 24, 2019

"Our rivers are already tremendous assets, but they hold the potential for much more"

-Mayor Rahm Emanuel

DPD
CHICAGO DEPARTMENT OF PLANNING & DEVELOPMENT

US Army Corps of Engineers®
Chicago District

Adopted January 24, 2019

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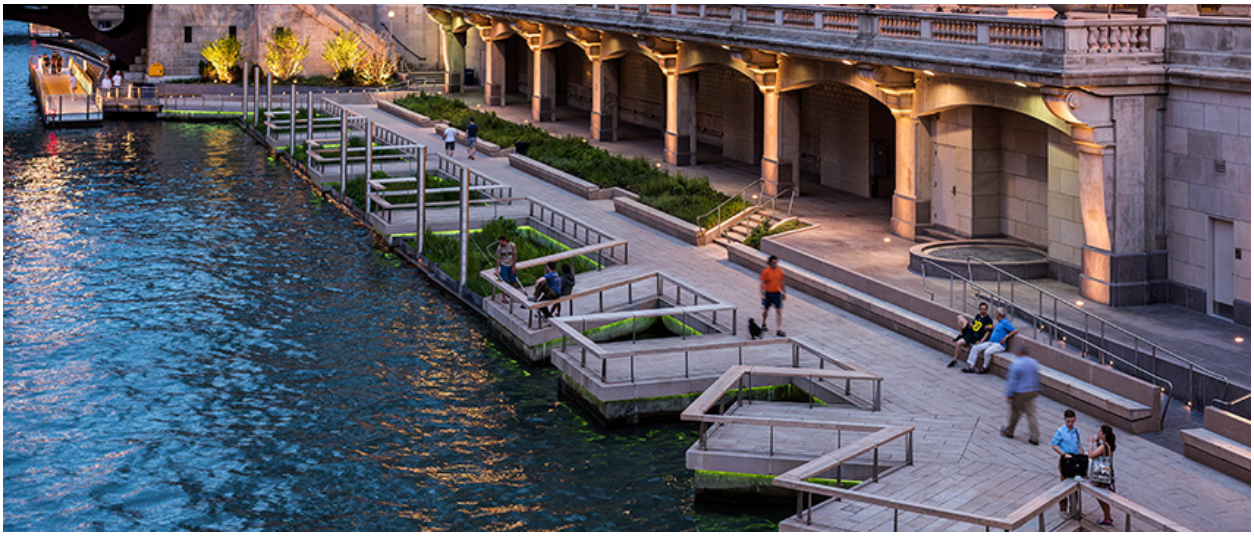
1 INTRODUCTION

WMS Boathouse at Clark Park

The Studio Gang-designed boathouse at Clark Park, completed in 2013, is one of the cornerstones of the Mayor's riverfront revitalization plan, anchoring future development.

1.0 INTRODUCTION



1.1 Purpose

The Chicago River is one of Chicago's most precious and recognized natural resources. Winding its way through the length of the city, it offers a peaceful, natural contrast to the urban environment. For most of Chicago's history, the river has been an essential working asset, serving as the city's harbor, supplying water for industry, and carrying away wastewater. In the process, the river was neglected and abused. Renewed development and changes in technology have made it possible to reclaim the river as an aesthetic and recreational resource to improve the quality of life for all Chicagoans.

The Chicago River Corridor Development Plan adopted by the Chicago Plan Commission in 1999 provides the framework for the revitalization of the Chicago River. The five goals outlined in this plan are to:

- Create a connected greenway along the river, with continuous multi-use paths along at least one side of the river.
- Increase public access to the river through the creation of overlooks and public parks.
- Restore and protect landscaping and natural habitats along the river, particularly fish habitat.
- Develop the river as a recreational amenity, attracting tourists and enhancing Chicago's image as a desirable place to live, work, and visit.
- Encourage economic development compatible with the river as an environmental and recreational amenity.

Since the implementation of the River Corridor Development Plan, there has been a significant amount of public and private investment that has transformed underutilized riverfront areas into new parks and paths, mixed-use and residential projects, and industry. New riverfront communities have emerged, land values have increased, water quality has improved, and the river has become a prime destination.

The role of the Design Guidelines is to outline the City's goals, expectations, and requirements for development along the Chicago River.

Building upon previous plans and guidelines, the Chicago River Design Guidelines outlines the guidelines for development along the Chicago River and its branches within the city limits. **The River Edge Ideas Lab renderings included in this document were created as part of a visioning exhibit prior to the development of these guidelines.** Planned development proposals will be expected to incorporate the guidelines outlined in this document.

1.2 Historical Context of the River

Chicago's growth into a major urban center is due, in large part, to its strategic location on the Chicago River and Lake Michigan. As early as the 1600s, the river and the lake were major trade routes. When the City was incorporated in 1836, the river was a desirable location for industrial development. The first meatpacking plant adjacent to the river opened in 1829 and the first lumber mill in 1833. These two industries were located just north of Wolf Point at the confluence of the North and South Branches of the Chicago River. The completion of the Illinois and Michigan Canal in 1848 linked Lake Michigan with the Mississippi River, dramatically increasing river traffic. By the 1860s, the river had become the focus of industrial development with an emphasis on meatpacking and lumber.

In the city's early history, the river was also used as a sewage outlet. Waste flowed east to Lake Michigan, the city's drinking water source, resulting in frequent outbreaks of water-borne diseases. In 1900, the Sanitary and Ship Canal was built both to protect the water supply and to provide greater shipping capacity. The construction of the Canal reversed the flow of the river, sending pollution away from Lake Michigan and into the Mississippi River system. The Sanitary and Ship Canal also became the main materials transportation artery, replacing the obsolete Illinois and Michigan Canal, which was eventually filled in.

Chicago's industrial legacy will likely remain a strong feature of development along the Chicago River, particularly along the South Branch and the Sanitary and Ship Canal. However, public demand for access and recreational amenities continues to grow, ensuring that future development will include a diverse mix of industrial, commercial, residential, and recreational uses.

1.3 Role of the Design Guidelines

The Chicago River Design Guidelines outline the expectations for development along the Chicago River and its branches within the city limits.

Appropriately developed, the river corridor will provide additional open space and recreational opportunities, increase property values, promote economic vitality, increase environmental awareness, and enhance Chicago's attractiveness as a tourist destination. These design guidelines address development expectations along the river, including but not restricted to architectural treatments, building design, fencing, lighting, landscape, materials, publicly-accessible amenities, and riverbank treatments. The guidelines encourage all new developments to embrace the river and activate the frontage along the river.

This document is an update to and replacement for the 2005 Chicago River Corridor Design Guidelines and Standards, which were based on earlier river design guidelines from 1999 and 1990.

1.4 Applicability

The Chicago Zoning Ordinance (Municipal Code of Chicago, Title 17 Section 8-0509-A) requires that **all new development within one hundred (100) feet of Chicago waterways be processed as Planned Developments.** These Planned Developments are subject to review and approval by the City of Chicago Department of Planning and Development (DPD), the Chicago Plan Commission, and the Chicago City Council. The ordinance further requires new developments to provide a thirty (30) foot setback from the river and comply with the general goals of the waterway design guidelines established by the Chicago Plan Commission.

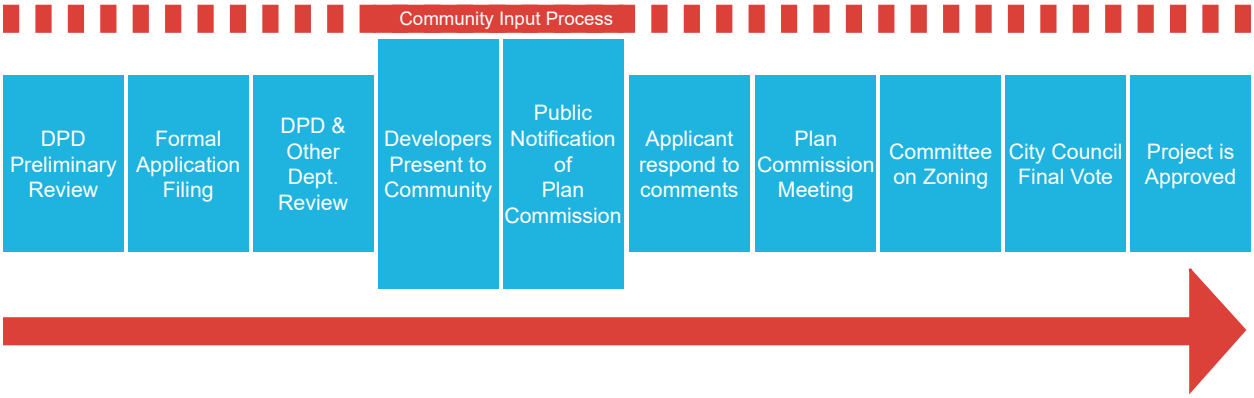
The Design Guidelines provide a basis for the review of riverfront Planned Development proposals by the DPD. Upon completion of DPD's review of an individial development proposal, a description of the applicant's obligations will be incorporated into the Planned Development ordinance. The ordinance is then subject to approval by the Chicago Plan Commission and the Chicago City Council, and, once approved, enforceable through the Zoning Administrator.

1.4.1 Exceptions

Per the City of Chicago Zoning Ordinance 17-8-0509-A.1 and A.2, exceptions to the Planned Development review process for properties adjacent to the river include:

- Repair or rehabilitation of any portion of an existing building, structure, or parking area;
- Residential buildings containing three or fewer dwelling units and structures that are accessory or additions thereto;
- Other buildings, structures, or parking areas that are accessory or an addition to an existing building, strucutre, or use, and are either 500 square feet or less in enclosed floor area or are set back a minimum of 30' from the top of the bank.

Figure 1.1: Planned Developments Review Process



1.5 Review Process

1.5.1 Planned Developments

The review process for Planned Developments (PD) follows a standard procedure, as outlined below:

1. The owner submits a draft development proposal to DPD for preliminary review.
2. DPD reviews the development proposal and responds via a Letter to Applicant.
3. The applicant files a formal application with City Council.
4. DPD and other city departments review the application for completeness.
5. The applicant presents the development proposal to the community.
6. Public notice of Plan Commission hearing is posted 15 days before the review.
7. Applicant responds to public comment and prepares for Plan Commission hearing.
8. Plan Commission conducts a hearing, followed by a Committee on Zoning Meeting.
9. Fifteen days following the City Council votes on PD approval.
10. The project is fully approved to seek permits.

Steps 2, 5, and 7 can take many meetings and/or require many iterations and the time frame to complete each step varies by project. Prior to Chicago Plan Commission review, projects are reviewed by the Chicago Department of Transportation (CDOT), Department of Buildings, Chicago Fire Department, and the Mayor's Office for People with Disabilities. As part of CDOT's review, certain large-scale projects are required to provide a traffic analysis.

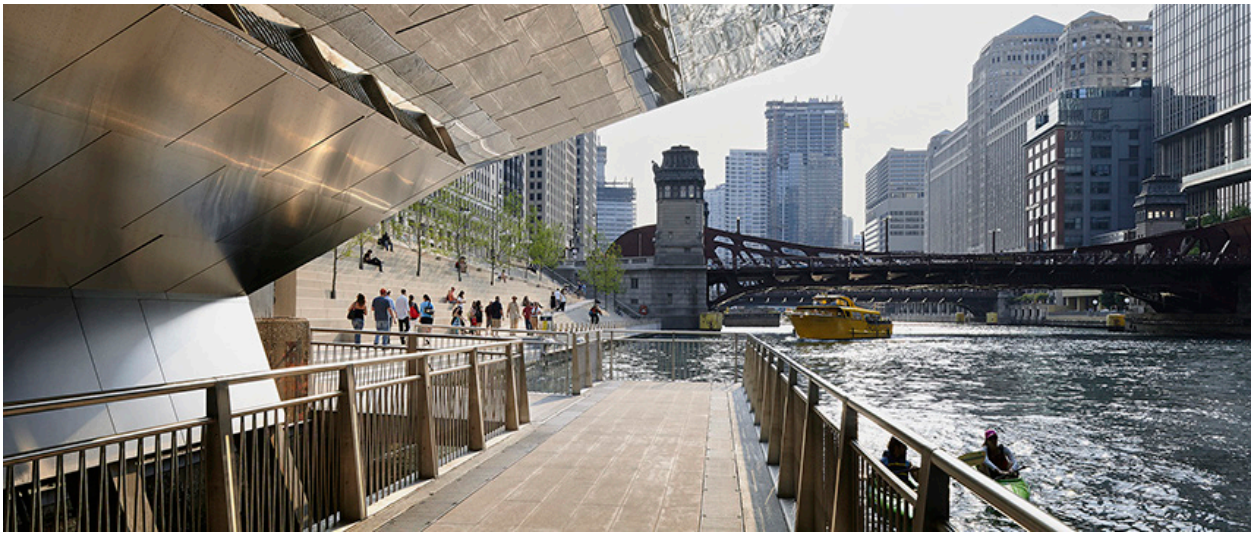
More details can be found in DPD's Development Manual for Chicago Plan Commission projects. A link to this document can be found in **Appendix 7.3: Additional Information and Websites on page 90**.

Throughout the PD review process, community feedback is encouraged and essential to successful projects. Community feedback is stronger when it is consistent with the City Zoning Code and Chicago River Design Guidelines. Providing comments in writing and quantifying how many of your neighbors share your idea is encouraged. Comments can be given through your local Alderman, community organizations, directly to the DPD, or through public comment at the Chicago Plan Commission.

1.5.2 Review by Other Public Agencies

Before conducting any project activity, all necessary federal, state, and local permits must be obtained.

A City Harbor Permit is required when any work in and within 40 feet of the Base Flood Elevation (BFE) of any City of Chicago waterway is being performed. CDOT will assist residential and business developments with the renovation of the City's shorelines. The City of Chicago encourages the appropriate treatment of riverbanks to preserve and enhance the attractiveness of this resource for the benefit of both people and wildlife. See **Appendix 7.3: Additional Information and Websites on page 90** for more details.



Projects that include activities within the 100-year floodway and in wetland or open water areas may require permits from the following regulatory agencies:

- U.S. Army Corps of Engineers Chicago District
- Illinois Environmental Protection Agency
- Illinois Department of Natural Resources – Office of Water Resources
- U.S. Coast Guard
- Metropolitan Water Reclamation District
- Chicago Department of Transportation

Additional review as required by the Department of Buildings in accordance with the City of Chicago Flood Control Ordinance for projects located in regulated floodpolains may be required.In addition to the City of Chicago Planned Development approval process, riverside projects that include modification of the riverbank may require permits from the following state and federal authorities:

U.S. Army Corps of Engineers - has jurisdiction under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act to issue regional permits, individual permits, or letters of permission for construction on waterways.

Reference **Appendix 7.2: Federal Navigation Channels and Army Corps Permit Process on page 83and Appendix 7.3: Additional Information and Websites on page 90** for more information.

Illinois Department Natural Resources / Office of Water Resources - requires permits for construction activity in waterways of the State of Illinois.

City of Chicago Department of Transportation Division of Engineering- issues harbor permits for construction within 40 feet of a waterway. Refer to **Appendix 7.3: Additional Information and Websites on page 90** for more information.

Metropolitan Water Reclamation District of Greater Chicago (MWRD)- requires approval for construction projects on the Chicago River that may impede its hydraulic flow. MWRD owns portions of the Chicago River and leases them to private parties; these leases may impose additional requirements.

U.S. Coast Guard - approval is required for any activity that may impinge on the navigation interests and safety of the Chicago River. The U.S. Coast Guard also has jurisdiction over bridge improvements.

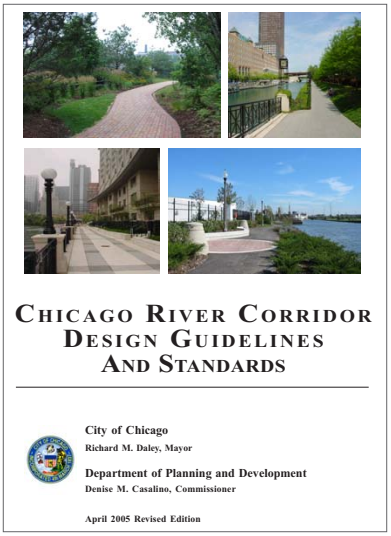
Illinois Environmental Protection Agency - issues permits under Section 404 of the Clean Water Act for projects that may have chemical, physical, or biological impacts on the waterway. The IEPA also issues National Pollutant Discharge Elimination System (NPDES) permits for industrial discharges, stormwater sewer point discharges, and earth moving construction projects, disturbing at least one acre of land that may discharge pollutants into water bodies. Reference **Appendix 7.3: Additional Information and Websites on page 90** for a link to the Stormwater BP and Pollution of Waters Ordinance.

1.6 Previous Plans

1.6.1 Previous Plans

Several plans and studies have been completed since the adoption of the 2005 Chicago River Corridor Design Guidelines and Standards that provide recommendations relevant to the Chicago River corridor and its surrounding areas. Referenced and relevant plans include:

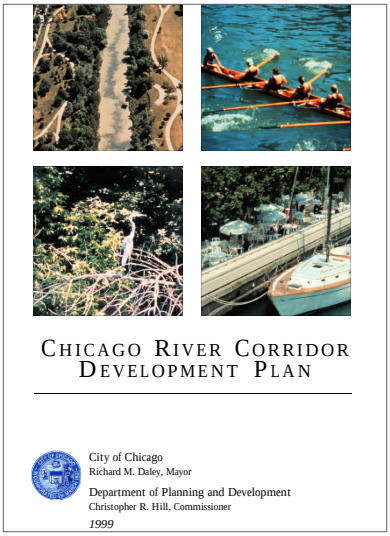
- 2005 Chicago River Guidelines
- Chicago River Corridor Development Plan
- Chicago Riverwalk Main Branch Framework Plan
- North Branch Industrial Corridor Framework Plan and Design Guidelines
- Our Great Rivers



Chicago River Guidelines (2005)

The Chicago River Corridor Design Guidelines and Standards outline the requirements for development in and adjacent to the setback area along the Chicago River and its branches within the city limits.

Appropriately developed, the river corridor will provide additional open space and recreational opportunities, increase property values, enhance economic vitality, increase environmental awareness, and enhance Chicago's attractiveness as a tourist destination. The 2005 Design Guidelines and Standards address development options along the river, including but not restricted to architectural treatments, building construction, parking, fencing, lighting, landscaping, and riverbank treatments.



Chicago River Corridor Development Plan (1999)

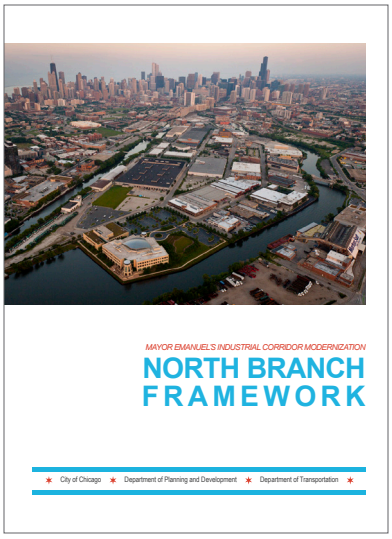
The Chicago River Corridor Development Plan provides the framework for the revitalization of the Chicago River. The five goals of the plan are to:

- Create a connected greenway along the river with continuous multi-use paths along at least one side.
- Increase public access to the river through the creation of overlooks and public parks.
- Restore and protect landscaping and natural habitats along the river, particularly fish habitat.
- Develop the river as a recreational amenity, attracting tourists and enhancing Chicago's image as a desirable place to live, work, and visit.
- Encourage economic development compatible with the river as an environmental and recreational amenity.

The plan was approved by the Chicago Plan Commission in 1999. It sets forth a shared vision for the river, outlines specific recommendations for public and private land, and presents strategies for preserving and enhancing the river's natural areas.

Chicago Riverwalk Main Branch Framework Plan (2009)

The Chicago Riverwalk Main Branch Framework Plan establishes guidelines for the construction of a continuous walkway from Lake Michigan to Lake Street along the water's edge. It also outlines ramp and elevator improvements to establish universal access between street and river levels, as well as loading and storage spaces to support river business operations. The plan also identifies landscape and hardscape improvements to attract people, plants, and animals to the river corridor. This plan also includes conceptual designs for the creation of two new destinations to anchor the east and west ends of the Main Branch Riverwalk.



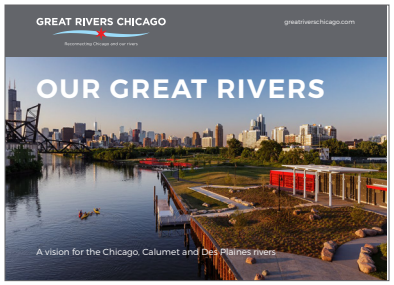
North Branch Industrial Corridor Framework Plan and Design Guidelines (2017)

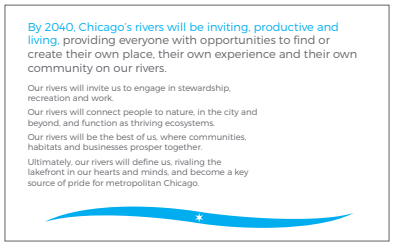
The North Branch Framework Plan and Design Guidelines is a land use plan for 760 acres along the Chicago River between Kinzie Street and Fullerton Avenue. It is the first framework developed as a part of Mayor Emanuel's Industrial Corridor Modernization Initiative, a multi-year effort to review Chicago's designated industrial corridors.

The plan, adopted by the Chicago Plan Commission in May 2017, includes modern land use parameters that will be used by the Chicago Plan Commission, City Council, and the public to assess future development proposals and land use transitions in the North Branch.

The framework's three main goals are to:

- Maintain the corridor as an economic engine and vital job center;
- Provide better access for all transportation modes; and,
- Enhance the area's unique natural and built environment.





Our Great Rivers (2016)

Our Great Rivers is the first unifying, forward-looking vision for all three of Chicago's rivers. This vision proposes that by 2040, Chicago's rivers will be inviting, productive, and living places where everyone can have their own experience. The vision was articulated by thousands of stakeholders through an intensive 18-month, citywide visioning process led by the City of Chicago, the Metropolitan Planning Council, Friends of the Chicago River, Chicago Metropolitan Agency for Planning, and more. Our Great Rivers lays out discrete goals for 2020, 2030, and 2040, to monitor progress toward achieving inviting, productive, and living rivers. It also articulates a need to determine new revenue streams and leadership collaborations for the rivers to ensure that this vision is realized and can endure.

1.7 Community Engagement Summary

The City's goal is to create a connected, publicly-accessible riverfront with a variety of natural and recreational amenities for all to enjoy. To accomplish this goal, a robust multi-year public engagement process was developed in an effort to include as many voices as possible. It includes:

- River Edge Ideas Lab
- North Branch Framework Plan
- Great Rivers Chicago
- CDOT South Branch Implementation Plan
- River Implementation Committee

A detailed summary of community survey results can be found in **Appendix 7.1: Community Engagement Summary on page 80.**

1.7.1 River Edge Ideas Lab

Sept 2017-Jan 2018

An initiative of DPD and MPC, the River Edge Ideas Lab engaged nine (9) leading architecture and landscape architecture firms to reinvent Chicago's riverfront for an exhibition as part of the Chicago Architecture Biennial. More than 11,500 people visited the main River Edge Ideas Lab exhibit in Expo 72. Nearly 300 attendees came to the Gallery Talks and panel. 500+ people gave feedback via the online survey and vision cards with their ideas for the river, and over 6,700 people visited the website. An estimated 24,000 people have passed by the traveling exhibit's eight (8) locations.

1.7.2 North Branch Industrial Corridor Framework Plan and Design Guidelines

2016-2017

As part of Mayor Rahm Emanuel's Industrial Corridor Modernization Initiative, the DPD initiated a public review process in spring 2016 to evaluate and refine land use policies for continued growth and private investment in the City's North Branch Industrial Corridor.

Between the summer of 2016 and the North Branch Industrial Corridor Framework Plan and Design Guidelines adoption in May 2017, DPD engaged with the community as part of the planning process, including:

- 12 public meetings (over 800 attendees)
- Five published meeting summaries
- Six neighborhood group meetings
- 366 emails and 49 letters from stakeholders
- 53 Maps created via sMap, an online community-based mapping program, with 192 original sMap comments

1.7.3 Great Rivers Chicago

2016

The Great Rivers Chicago initiative was led by the City of Chicago, Metropolitan Planning Council (MPC), Friends of the Chicago River, and Chicago Metropolitan Agency for Planning (CMAP) with the mission to shape the future of the Chicago, Calumet, and Des Plaines rivers through community engagement.

The Great Rivers Chicago public outreach was divided into six (6) areas throughout the city. Outreach was conducted from 2015 to 2016 for each area through three group interviews, public meetings/activities, and an online survey (3,800 respondents).

1.7.4 CDOT South Branch Implementation Plan

ongoing

In conjunction with the Chicago Riverwalk South Branch Expansion project, a series of 25 stakeholder interviews have been conducted to glean feedback from passenger, recreational, and industrial river users as well as government stakeholders, parks and recreation leaders, and developers.

1.7.5 River Implementation Committee

ongoing

The City of Chicago and MPC established a local advisory committee comprised of community leaders, elected officials, business owners, residents, and key stakeholders to provide ongoing input regarding development along the Chicago River. This committee represents the diverse users and stakeholders for the river, and will provide input and feedback on the proposed River Edge Guidelines.

1.7.6 Summary

Based on the above initiatives and outreach processes, community and stakeholder input was distilled down to three main topic areas: **Nature, Recreation, and Connectivity.** In general, the community desires a naturalistic and sustainable riverfront environment for a vibrant and memorable experience that provides social, physical, and visual connections.

From September to December 2018, additional stakeholder feedback was gathered during the development of the proposed updates to the Chicago River Design Guidelines. The stakeholders included property owners, community leaders, planning agencies, advocacy groups, and government agencies. A summary of the feedback gathered and DPD's responses are available for reference online at https://www.cityofchicago.org/city/en/depts/dcd/supp_info/chicago-river-design-guidelines-update.html

The three themes compiled from the River Edge Ideas Lab public feedback were:

The river's edge should have a natural aesthetic.

Recreation and public access should be central to any design.

Designs should be creative and utilize consistent elements to unify and connect the river to the surrounding neighborhoods.

2 CHARACTER ZONES + MINIMUM SETBACK

River Edge Idea Lab: Ping Tom Airline Trail

As part of their submission for the River Edge Ideas Lab, SOM proposed a new river park kayak trail islands and inlets, wetlands and quiet waters by Ping Tom Park.

2.0 CHARACTER ZONES + MINIMUM SETBACK

2.1 Character Zones

These guidelines apply to all branches of the Chicago River and connected waterways within the boundaries of the City of Chicago. Within the Chicago River system, five Character Zones have been defined based on existing context, scale, and character of the area, as well as changes anticipated by approved or proposed development projects. In many cases, the guidelines vary based on the context of these five Character Zones per below and **Figure 2.1**.

- Northwest Zone
  (City limits to Fullerton Avenue)
- North Branch Zone
  (Fullerton Avenue to Grand Avenue)
- Loop Zone
  (Between Harrison, Grand Avenue, and Lake Michigan)
- South Branch Zone
  (Harrison to Ping Tom Park)
- Southwest Zone
  (City limits to Ping Tom Park)
- Bubbly Creek Zone

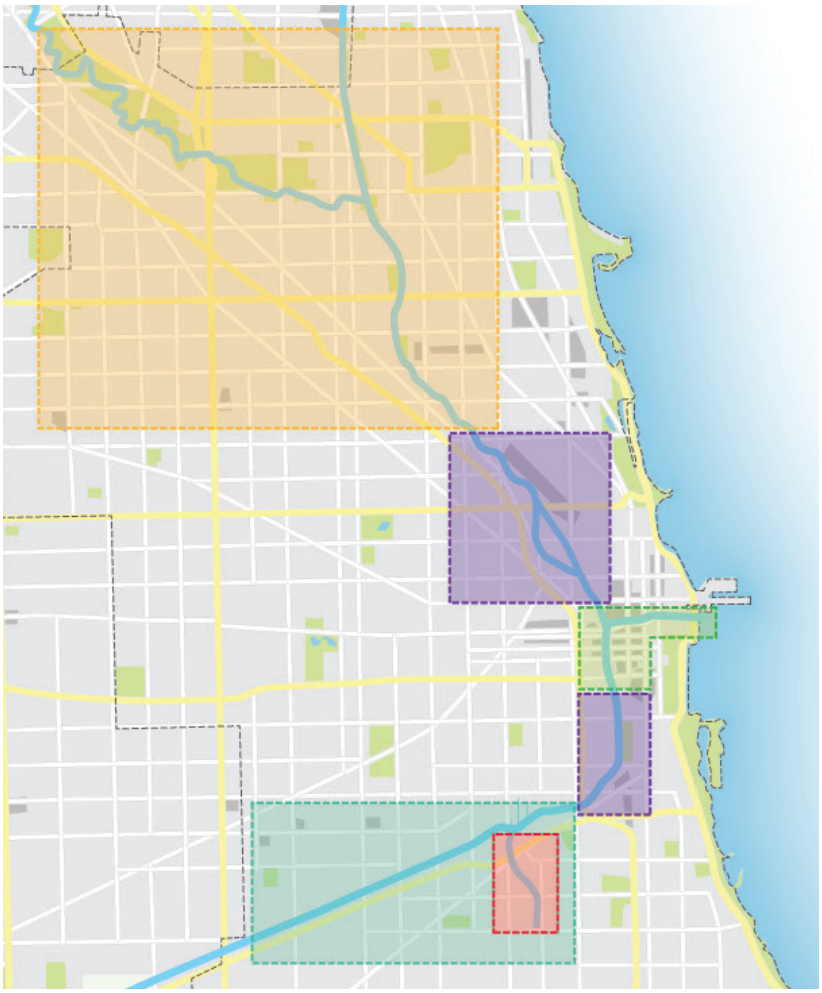


Figure 2.1: Character Zones

Map Key

City of Chicago Boundary
Major Roadways
Parks and Open Spaces
Water
Northwest Zone
North Branch Zone
Loop Zone
South Branch Zone
Southwest Zone
Bubbly Creek Zone

Figure 2.2: Setback and Top of Bank for Sloped Bank

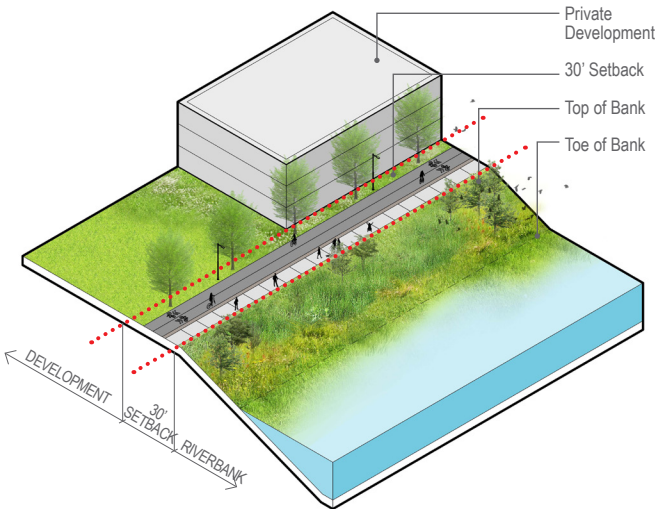
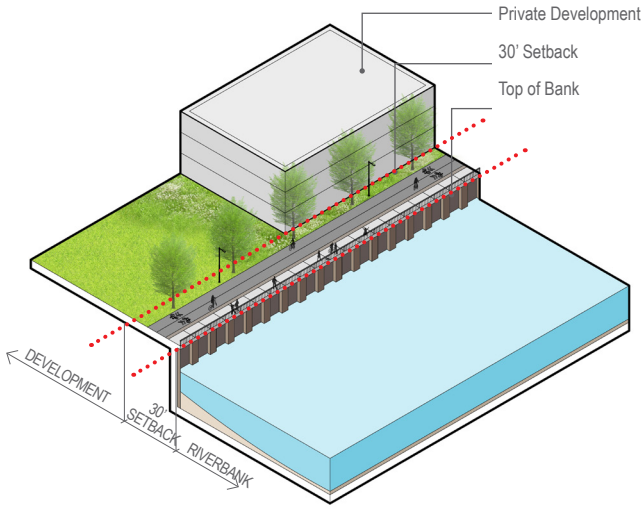


Figure 2.3: Setback and Top of Bank for Vertical Bulkhead



2.2 Required Minimum Setback (17-8-0912-A)

A setback, as it relates to the land along the Chicago River, defines the requirements for the minimum distance between new development and the river. Setbacks create consistency along the riverfront and provide the space for river access, a continuous multi-use path, and biodiversity.

A minimum setback is an important zoning tool used to regulate and direct Planned Development projects on individual parcels of land to preserve or achieve a public good or benefit. The most common example of zoning setbacks is the front yard, rear yard, and side yard setbacks, which bring order to the street façades of buildings and preserve open space around and between buildings.

It is important that new development is set back from the Chicago River to protect the natural, scenic, recreational, historic, and economic resources of the river. It is also key to preserve the potential for future development of greenway corridor improvements, and for the development of public access or multi-use paths.

2.2.1 Applicability

The minimum setback dimension should be measured horizontally from the top of the bank, rather than from the water's edge because the riverbank itself can be steep and may not be suitable or wide enough for landscaping or a multi-use path. The definition of the top of the bank varies depending on whether the existing riverbank is sloped or has a vertical bulkhead.

Top of bank (sloped bank): the point at the top of the slope at the water's edge where the steepness of the slope becomes less than ten (10) percent. See **Figure 2.2**.

Top of bank (vertical bulkhead): the point at the top of the bulkhead where a line between other analogous points is located continuously over land and does not cross over the water. See **Figure 2.3**.

The minimum setback requirement from the top of the bank to the development zone is thirty (30) linear feet for all Character Zones except Bubbly Creek. For Bubbly Creek, sixty (60) feet is required.

The minimum setback requirement is thirty (30) linear feet for all Character Zones except Bubbly Creek. For Bubbly Creek, sixty (60) feet is required.

2.2.2 Improvements or Structures Permitted in the Setback Area

Improvements or structures permitted in the setback area include:

- Paved or unpaved walkways;
- Projections from buildings in the private development zone, including but not limited to awnings and canopies, bay windows and balconies, and overhanging eaves and gutters, provided the projection does not extend three (3) or more feet into the setback zone, and has a minimum clearance of ten (10) vertical feet from setback grade;
- Stormwater best management practices (BMPs);
- Shade structures such as arbors, trellises, or pavilions;
- Fences and walls per zoning code requirements;
- Site furnishings including, but not limited to, benches, light fixtures, drinking fountains, and bike racks;
- Signage and wayfinding; and,
- Public gathering spaces and other riverfront amenities.

See **Section 3.4 Seating & Gathering Areas on page 26** and **Chapter 4 on page 40** .

2.2.3 Improvements or Structures Not Permitted in the Setback Area

Improvements or structures not permitted in the setback area include:

- Buildings or structures of any kind;
- Vehicular use areas including, but not limited to, parking lots, driveways, service drives, loading docks, vehicular staging, or vehicular storage areas;
- Overhead utilities; and,
- Private yards, patios, terraces, or decks.

2.2.4 Variances

In certain cases a setback less than the required 30 feet may be permitted to address constrained sites, small, irregularly shaped sites, and to allow flexibility for optimal site plans.

Maximum variance (depth): Structures and private yards may encroach into the 30-foot river setback a maximum of ten (10) feet so that the minimum setback is never less than twenty (20) feet from the top of the bank.

Maximum variance (length): Structures and private yards may encroach into the required river setback, provided that the encroachment, or the area with a reduced setback, occurs along a maximum of one-third (1/3) of the site's river frontage, measured in linear feet (LF), so that the required setback never occurs along less than two–thirds (2/3) of the site's river frontage.

2.2.5 Mitigation for Variances

Requirement for additional open space for mitigation of variances: Where structures and/or private yards encroach into the setback and riverfront, and the setback is therefore less than thirty (30) feet from the top of bank, additional land should be provided adjacent to the river setback and urban greenway zone to compensate for the loss of open space. This additional land should not be defined or developed as a private yard and should be free of structures.

Amount of additional open space for mitigation of variances: Additional land should be provided adjacent to, and contiguous with, the setback zone at a rate of 2.5 times the land or open space lost to the encroachment.

The proportion of additional open space for mitigation of variances: Additional open space design should avoid excessively long, deep, or narrow parcels of land that could be relatively or completely unusable and have little to no public benefit. Additional open space proportions should be no more than two (2) feet of open space per one (1) foot of frontage along the river setback line. Depth is measured perpendicular to the setback line.

2.3 River-Dependent & Critical Service Uses

In 2013, the Chicago Plan Commission adopted "Chicago Sustainable Industries," a comprehensive strategy to reinforce and expand the City's manufacturing base. This citywide strategy had four components, one of which was leveraging Chicago's local logistics infrastructure. Since before the incorporation of Chicago, the City's waterways have been used to transport raw materials for manufacturing, and barges are still the most efficient and cost-effective method for transporting heavy bulk cargo. Planners recommended further analysis of the dock infrastructure to protect nodes for industrial users requiring barge access, therefore DPD commissioned a 2015 study to analyze industrial use of the City's waterways.

As documented in the Industrial Usage of Chicago Area Waterway System report commissioned in 2015, researchers found that commerce on the waterway system is small when compared to Chicago's massive trucking and rail industries, and has been declining in recent years. Nonetheless, waterway access remains critical for certain industries that transport raw materials including sand and gravel, scrap metal, and certain minerals. The construction industry has an additional locational issue due to the fact that concrete and asphalt are time-sensitive materials that must be prepared and delivered within a short time-frame. In addition, several riverfront areas include utilities and waste facilities with defined service areas.

2.3.1 River-Dependent Uses

River-dependent uses are those uses or activities that can be carried out only on, in, or adjacent to a waterway because the use requires access to the waterway and therefore cannot be located inland. Although the river-dependent use may be located in or outside of the setback, such uses will necessarily impact the riverbank area. These uses include, but are not limited to:

- Bulk material operations that ship or receive materials by barge;
- Marinas;
- Recreational and commercial boating facilities;
- Waterfront dock and port facilities;
- Bridge abutments;
- Recreational parks and open spaces; and,
- Other uses that require waterborne transportation on the river as a source of water.

2.3.2 Critical Service Uses

Critical Services are those uses or activities associated with providing critical services to surrounding residents, including, but not limited to:

- Utility Service Providers (e.g., ComEd)
- Transportation-Related Services (e.g., CTA, Metra, Amtrak, etc.)
- Municipal Services (e.g., Fire Department, Police Department, etc.)
- Municipal Agencies (e.g., MWRD, etc.)

2.3.3 Guidelines for River-Dependent and Critical Service Uses

Existing uses. Existing river-dependent uses and critical services are appropriate uses that should remain.

New uses. New river-dependent uses and critical services are appropriate uses that should be accommodated.

Setback. Any associated buildings (i.e. bulk material piles, marina or park fieldhouse, office, etc..) should be set back 30' from the top of the riverbank.

Access/open spaces. Provide riverfront access and/or open spaces where possible in consultation with DPD and the community.

Multi-use path alignment. The alignment for a proposed or potential multi-use path should be located on the land side of river-dependent uses or critical services, rather than adjacent to the river, to avoid circulation, safety, and security conflicts or other unacceptable conditions.

Landscaping and screening. Landscaping and screening are required for portions of the river frontage, that are not in active use for loading or off-loading materials.

Case Study: Asphalt Operating Services of Chicago

As part of their Planned Development, Asphalt Operating Services of Chicago required riverfront barge access. They also incorporated a range of native prairie plantings, river setback, and stormwater infiltration basins.

3 CHICAGO RIVER EDGE DESIGN GUIDELINES

River Edge Ideas Lab: Shifting Fields

Sasaki's design of softer slopes and more expansive edges offers unique environmental restoration opportunities—where an ecologically productive landscape is fertile ground for new kinds of urban experience and programming. Productive landscapes and recreational amenities are interwoven, making a riverfront destination.

3.0 CHICAGO RIVER EDGE DESIGN GUIDELINES

3.1 Guidelines for Improvements within the Required Setback

The guidelines set forth in this Chapter apply to land within the required minimum setback area for Planned Development projects in all zones except for Bubbly Creek and river dependent and critical service uses. Bubbly Creek Zone design guidelines are identified in **Chapter 5 on page 64**. Design guidelines for River-Dependent and Critical Service Uses are identified in **Section 2.3 River-Dependent & Critical Service Uses on page 17**.

3.2 Multi-Use Path

One of the City's goals is to have a continuous multi-use path throughout the river corridor to accommodate walking, jogging, running, bicycling, roller-skating, in-line skating, and skateboarding. The multi-use path should be signed and striped as required to minimize use conflicts per American Association of State Highway and Transportation Officials (AASHTO) standards.

3.2.1 Design Criteria

The multi-use path should be designed to meet all relevant and current codes, standards, and regulations. These should include, but are not limited to, the Americans with Disabilities Act (ADA), AASHTO standards for multi-use paths, the Chicago Zoning Code, the Chicago Building Code, the Chicago Landscape Ordinance, and any other relevant codes, standards, and ordinances.

This path should minimize impacts to sensitive natural areas and habitats, such as wetlands and floodplain areas, through careful design and alignment. New sections of the path should seamlessly align with existing sections, though may do so through a variety of design configurations.

Design criteria for future multi-use paths along the river are based on multi-use paths located throughout the City of Chicago, recently adopted North Branch Industrial Corridor Framework Plan and Design Guidelines.

Table 3.1: Existing Multi-use Paths Along Chicago River

Path	Minimum Width
Forest Preserve North Branch Path	varies, 10' to 14' wide with 3' mowed shoulders
Eugene Field and River Parks	varies, 8' to 12'
312 River Run Trail / 606	varies, 14' to 16' wide with 2'; to 3' paved shoulders
Main Branch of the Riverwalk	10'
North Branch Framework Plan	Separated 12', bicycle, 8' pedestrian or Combined 16' multi-use

Figure 3.1: Public Access adjacent to River

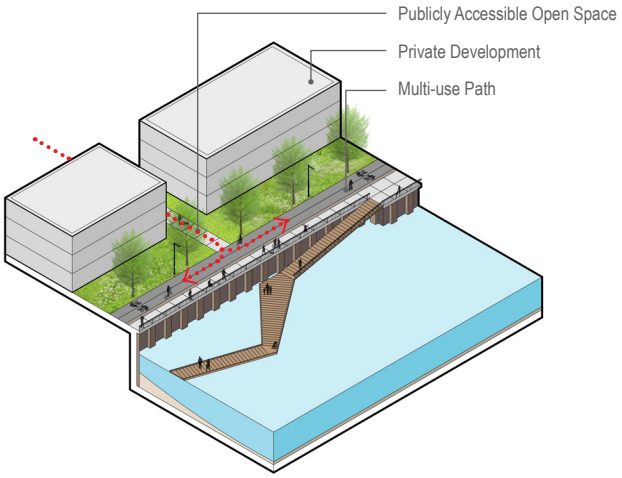
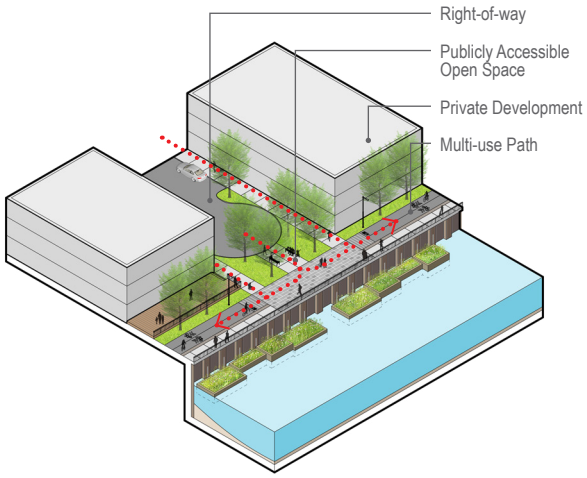


Figure 3.2: Public Access at Right-of-Way



3.2.2 Public Access

As part of Planned Development projects along the river, the property owner will need to provide un-gated and unobstructed public access to the minimum required setback area (except as noted in **Section 2.3 River-Dependent & Critical Service Uses on page 17**) and provide informational and wayfinding signage at all entries. Signage and wayfinding should state that the riverfront multi-use path is free and open to the public from at least 6:00 am to 11:00 pm every day of the year (subject to occasional partial closure for private use, provided that alternative access during such closures shall be maintained through the river setback). The property owner will also be responsible for maintaining and managing the river setback area, ensuring that the riverfront area is clean, well lit, litter free, and clear of snow (for hardscaped areas) and debris. The property owner will also need to provide sufficient liability insurance coverage for the riverfront's public use. Larger scale projects may require a separate maintenance and management agreement with the City. **Figure 3.1** and **Figure 3.2** above illustrate examples of successful public access points.

Access points to the multi-use path within the riverfront should be highly visible and strategically located adjacent to highly-trafficked, multi-modal areas.

3.2.3 Minimum Path Width

The City of Chicago recognizes that the aesthetic and character of the river changes as you move north or south through the city. As such, the path width guidelines are designed specifically for each of the Character Zones outlined in Section **Figure 2.1 on page 14**. Depending on which Character Zone it is located within, the multi-use path should be either separated or combined, and the width will adjust as necessary. **Figure 3.3** through **Figure 3.6 on page 25** illustrate path width guidelines for each Character Zone. The place-specific path width guidelines are outlined in **Table 3.2**.

Table 3.2: Minimum Path Width

Character Area	Type	Minimum Width
Figure 3.3, North Branch / South Branch	Separated	12' bicycle, 8' pedestrian
Figure 3.4, North Branch / South Branch	Combined	16' multi-use
Figure 3.5, Loop	Combined	10' multi-use
Figure 3.6, Northwest / Southwest	Combined	10' multi-use with 2' paved, gravel, or mowed shoulders

3.2.4 Paving and Masonry Material

Safe, functional, and maintainable paving is an important and integral part of the multi-use path. To minimize hazards, injuries, and liability, and to reduce capital expenditures and maintenance costs, the following paving materials suitable for bicycle, pedestrian, and shared-use paths, should be utilized. Whenever possible, paving materials should comply with green infrastructure and stormwater management objectives. Like the path width guidelines, the pavement palette adjusts based on the Character Zone within which the path is located. Paving materials should utilize neutral colors, primarily in gray or earth-tones. The image to the right illustrates an example of successful paving materials. The place-specific paving guidelines are outlined in **Table 3.3.**

Table 3.3: Paving and Masonry Material Guidelines

Character Area	Granite	Architectural Granite	Poured-in-Place Concrete	Concrete Pavers	Unit Pavers	Permeable Pavements	Asphalt	Decomposed Aggregate
North Branch / South Branch	●	●	●	●	●	●		
Loop	●	●	●	●	●	●		
Northwest			●	●	●	●	1	2
Southwest			●	●	●	●	1	2

1: Acceptable material for Primary Path

2: Acceptable material for Secondary Path(s)

Figure 3.3: Minimum Path Width, North Branch / South Branch, Separated

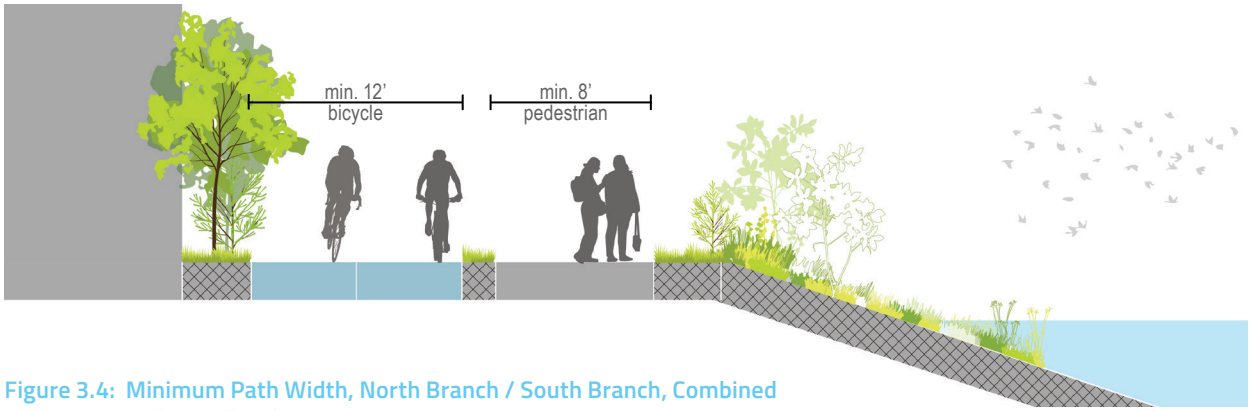


Figure 3.4: Minimum Path Width, North Branch / South Branch, Combined

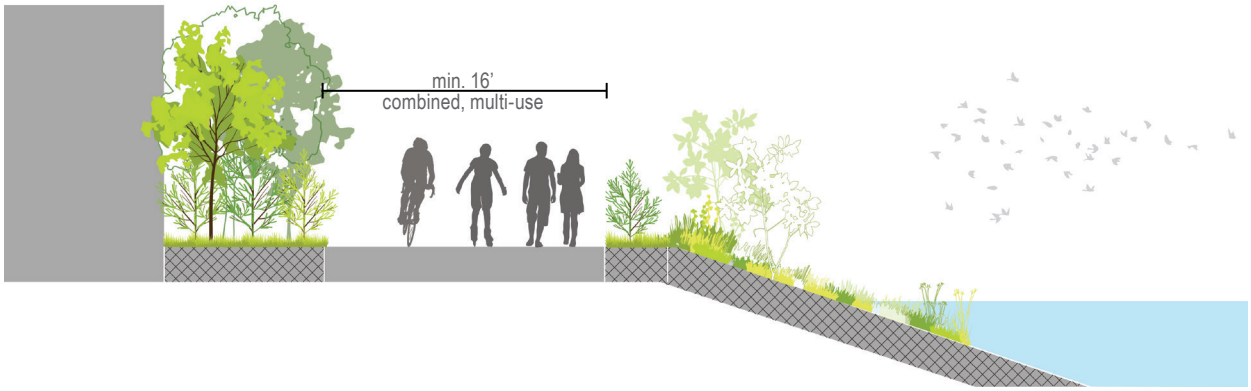


Figure 3.5: Minimum Path Width, Loop

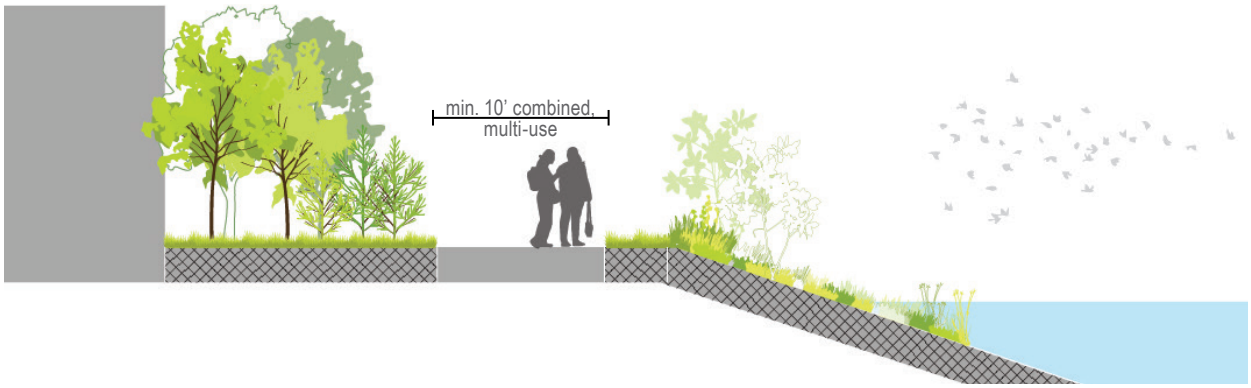


Figure 3.6: Minimum Path Width, Northwest and Southwest

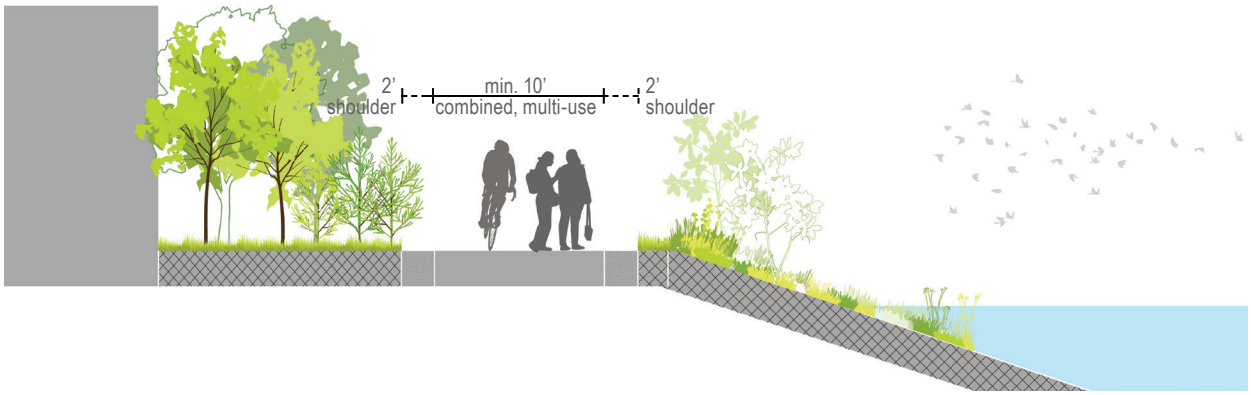


Table 3.4: Material Guidelines for Site Furnishings

Character Area	Stainless Steel	Galvanized Steel	Powder Coated Steel	Cor-ten Steel*	Hardwoods**	Recycled Plastic Lumber***
North Branch / South Branch	•			•	•	
Loop	•			•	•	
Northwest	•	•	•	•	•	•
Southwest	•	•	•	•	•	•

** Must be used in appropriate locations and applications to avoid staining*

***Hardwoods include, but are not limited to, teak, ipe, white oak, black locust, thermally-modified ash, and other hardwoods. Forest Stewardship Ccouncil (FSC) certification is encouraged, and woods should be sustainably sourced.*

**** Recycled plastic lumber should be in warm, neutral, wood-like tones.*

3.3 Furnishings

Appropriate furnishings and fixtures should be provided throughout the length of the multi-use path to make it attractive and functional for users. Site furnishings should prioritize environmentally and socially responsible choices that are easily maintained and fit within the context of the riverfront. Furnishings should be provided throughout to maximize functionality and create a welcoming, usable, and unified riverfront. Site furnishings should create a unified aesthetic for the riverfront and reflect the aesthetic and material choices demonstrated in this section. Site furnishings will be maintained by the property owner.

Note: DPD will consider alternate materials if they are integral to the creation of a high-quality design specific to the context of the development.

3.3.1 Site Furnishing Guidelines

Materials. Final furnishings and materials are subject to review and approval by the City. Refer to **Table 3.4** for more information.

Benches and Tables. Benches are to be placed along the multi-use path to encourage public access at points of scenic interest and opportunities for respite. Steel or concrete frame benches should be securely fastened to a concrete slab or footing. **At a minimum, one bench should be provided for every 250 linear feet of river frontage.**

Trash and Recycling Receptacles. In addition to trash and recycling receptacles at seating areas, **at least one metal trash receptacle and one metal recycling receptacle should be provided for every 250 linear feet of river frontage.**

Railings. Railings are not required along the perimeter of the multi-use path, but may be required per accessibility requirements along ramps and stairways. Additionally, they may be required by the City or other agencies if necessary to preserve the health, safety, and welfare of users. Railing materials should follow the guidelines outlined in **Table 3.4**.

3.3.2 Design Principles

General. Integrate seating with landscape design.

Furnishings Palette. Ensure the site furnishings palette is cohesive in material, color, and aesthetic. See **Figure 3.7 and Figure 3.8 on page 27.**

Brand and Identity. Consider ways to incorporate Chicago River brand and identity elements into site furnishings.

3.4 Seating & Gathering Areas

Where appropriate, seating areas are encouraged along the multi-use path, in addition to the individual benches and other site furnishings.

3.4.1 Seating Area Guidelines

Location. One seating area should be provided for every 500 linear feet of river frontage.

Furnishings. Each seating area should provide a minimum of two benches and one trash receptacle.

Seating Options. Provide a variety of seating options. Consider a mix of fixed, movable, bench, table/chair, and platform seating. Provide opportunities for individual and group seating.

Figure 3.7: Furnishing examples for all Character Zones



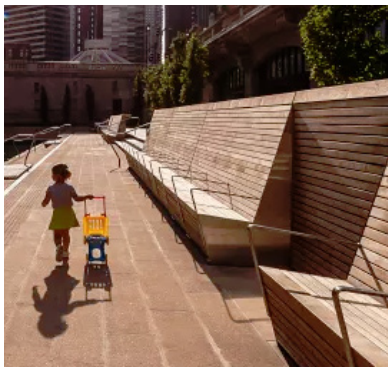



Figure 3.8: Additional furnishing examples for Northwest and Southwest Character Zones






3.5 Lighting

Lighting along the river should be adequate and appropriate for safety and security, as well as an attractive feature of the project site. Lighting should reduce light pollution and not be harmful to birds, bats, insects, and other wildlife.

Specifications and/or product data sheets, specifically highlighting the color temperature, light fixture height, and shield will be required for review and approval. See **Chapter "6" on page 70** for an example of an acceptable product data sheet that should be included for plan review and approval.

Note: DPD will consider alternate lighting solutions (such as lighting integrated with stairs, planters, or bollards) if they are integral to the creation of a high-quality placemaking design.

3.5.1 Lighting Guidelines

Fixture Height. Recommended light fixture height is between 14 and 30 feet tall.

Color Temperature. Fixtures should use LED bulbs that provide white light with a color temperature of 3000K or below. This color temperature emits less of the blue (cool) light that is more harmful to many animal species.

Light Levels. Provide energy efficient bulbs, such as LED lighting, with adequate light levels for project safety and security considering visibility, continuous illumination of vehicular use and other areas, and avoidance of dark or un-illuminated areas.

Light Pollution. Luminaires should be dark-sky compliant, and should be equipped with shields so that light does not shine into adjacent residential or institutional areas or negatively affect wildlife. Consider using Illuminating Engineering Society (IES) "full cut off" or "fully shielded" designated fixtures, which means that no light is visible above the lowest light emitting part of the fixture.

Additional Features. Timers and dimmer switches should be incorporated into fixtures, and when possible, lights should be turned off after publicly accessible hours.

Decorative Lighting. Decorative lighting that enhances the river front, highlights design features, and creates interest is encouraged. See **Section 4.5.7 Public Art & Specialty Lighting on page 63** for more information.

Security Lighting. Motion sensors should be utilized for any desired security lighting.

3.5.2 Design Principles

Scale. Light fixtures and luminares should be attractive, pedestrian scale fixtures with articulated bases, poles, pole tops, and luminares.

Style. Sleek, contemporary fixtures that complement the site's context are encouraged.

3.6 Wayfinding and Signage

Signage, identity, and wayfinding are essential components to enhance the functionality, beauty, and character of the river. These elements should be incorporated throughout the riverfront, and carefully designed based on context and unique site conditions.

Signage design standards, identifying elements, and aesthetics should contribute to a unified identity for the entire corridor while also conveying unique stories and attributes of distinct locations. Riverfront development projects will need to reference the Chicago River brand signage and graphics standards document. A site-wide wayfinding signage system utilizing the Chicago River brand standards should be implmeneted throughout the development. A signage and wayfinding program should be included with each PD submission for plan review and approval.

3.6.1 Signage Guidelines

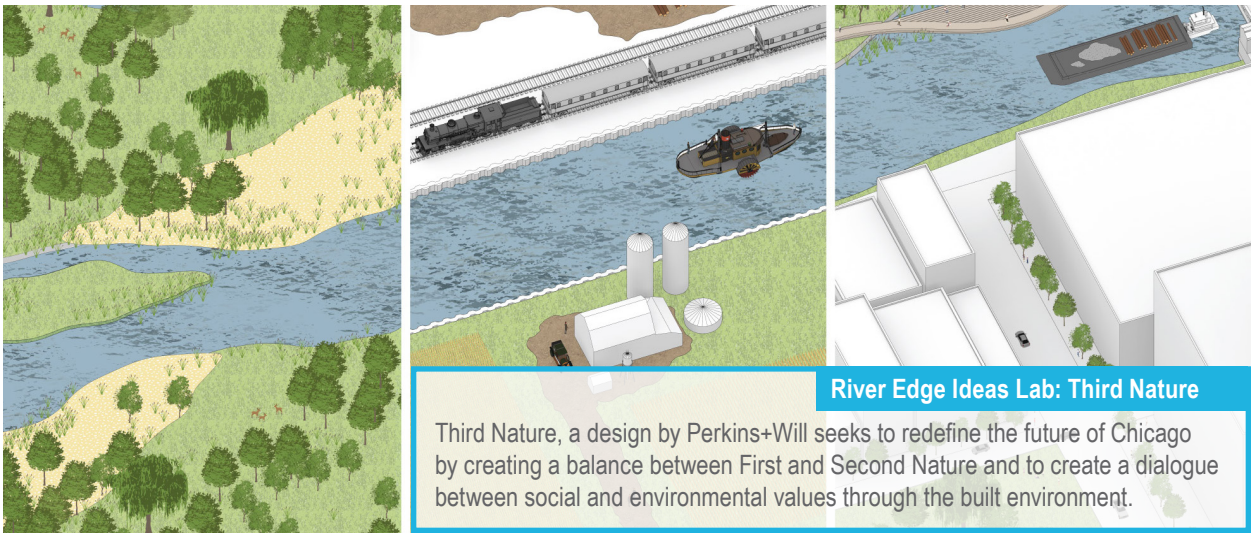
Brand and Identity. Projects should provide site-wide wayfinding signage system utilizing the Chicago River brand and sign standards, as outlined in a separate document to be published in early 2019.

Directional Signage. Directional signage is generally used to provide people with information about where a path or roadway goes and how far it is to a travel destination. Directional signage may include mile markers. Directional signage should be located strategically along the river, and identify the direction and distance to significant local destinations.

Mile Markers. Mile markers should be located along the multi-use path to identify how far the user is from Madison Street, which is where the north / south addresses start. Mile markers should be located every quarter-mile.

Regulatory Signage. Regulatory signage reinforces traffic laws, regulations, or requirements. Some common regulatory signs include stop, yield, do not enter, speed limit, and one-way signs. Regulatory signs maintain the desired flow of the path or roadway. Regulatory signage should be located at all public access points, as well as at large gathering spaces along the river.

Identity Signage. Identity signage should be provided where the multi-use path intersects with streets or other public access points. The signage should state the the multi-use path is open to the public during defined hours consistent with the City of Chicago Ordinance. This type of signage provides navigation help and reassurance for visitors along the path and at key destinations. Identity signage includes orientation and destination signage.



River Edge Ideas Lab: Third Nature

Third Nature, a design by Perkins+Will seeks to redefine the future of Chicago by creating a balance between First and Second Nature and to create a dialogue between social and environmental values through the built environment.

3.7 Landscaping

Vegetation is important to the urban landscape, providing contrast between the built environmental and natural forms, and can drastically enhance an area's sense of place.

3.7.1 Preservation and Restoration Guidelines

Preservation. Existing planting and habitat should be preserved to establish an environmentally-stable natural riverbank. Promote erosion control and stormwater management using appropriate best practices.

Disturbance. Minimize site disturbance and re-vegetate disturbed areas with native or adapted species per the Planting Guidelines.

Protection. Existing vegetation and habitats should be protected during construction by installing tree protection fencing at the top of the riverbank.

Tree Preservation & Removal. Mature, healthy, native shade and evergreen trees are to be preserved to the greatest extent possible. Standing dead tees are valuable habitat features and, where appropriate, should be preserved for terrestrial habitat creation. Dead, diseased, non-native/ invasive, or hazardous trees should be removed and are not subject to replacement.

3.7.2 Plant Selection Guidelines

The riverbank plays an important role in establishing the Chicago River as a healthy and functioning natural resource through the use of native and adapted vegetation. The landscape should create habitat, increase biodiversity, provide four-season interest, and establish a healthy river ecosystem. A list of recommended plant species can be found in **Appendix 7.4: Plant Palette on page 97**.

Plants should be selected based on the appropriateness to each unique ecological planting zone or community, including Submergent, Emergent, Riparian, and Upland. These zones are illustrated in **Figure 3.9 on page 31**.

Plant Selection. Native and adapted plants should be used in all instances, with an effort toward achieving plant species diversity that is reminiscent of natural communities in the region and supports a long-term, stable ecosystem. Native plans are those native to Illinois or, specifically,Zone 6a according to the 2012 USDA Hardiness Zone Map. Adapted, or naturalized plants, are non-native plants that reproduce and spread naturally in Illinois, or specifically Zone 6a, but are not invasive.

Exotic and invasive plant species are not permitted. Exotic plants are those plants not native to the United States. Invasive plants are both non-native and able to establish on many sites, grow quickly , and spread to the point of disrupting plant communities or ecosystems. (NRCS, USDA)

A variety of trees, shrubs, grasses, perennials, vines, and bulbs is encouraged. Select plant material paying attention to cultural requirements, growth habit, mature size, maintenance needs, pest resistance, function, and potential invasiveness. Be careful to select shade-tolerant and sun-tolerant species that will adjust in the understory as trees and shrubs mature. Select plants that will thrive in the climate and conditions of the site.

Seasonal Interest. Plant materials should be selected to create four-season interest.

Figure 3.9: Plant Communities

Table 3.5: Planting Guidelines

Planting Type	Non-vehicular Area Guidelines	Vehicular Area Guidelines
Fence	4' ornamental metal	4-6' ornamental metal
Tree	1 per 25' of river frontage	2 per 25 LF of river frontage
Hedge	not required	Continuous, planted on river-facing side of fence
Foundation Plantings	required	Continuous, planted on river-facing side of fence

Plant Sourcing. Use plants that are nursery-grown, legally harvested, or salvaged for reuse from on or off-site.

Aesthetics. Planting aesthetics should relate to the surrounding context. Naturalistic planting of the riverbank is encouraged wherever possible.

Trees. Locate canopy and ornamental trees suited to the river edge in informal groupings. Ensure plants do not block visibility of key recreational amenities and access points. For tree plantings, use the ANSI A300 Best Management Practices for Tree Planting as a guide.

Shrub, Groundcover, and Perennials. Plant shrubs, groundcovers, and perennials throughout the riverfront to provide landscape interest near the ground and alongside the multi-use path. Plant a diversity of native shrubs and wildflowers to provide year-round interest, wildlife habitat, and reduced maintenance responsibilities. Low mow grasses are encouraged as groundcovers.

Grasses, Sedges, Rushes, and Forbs. Plant grasses, sedges, rushes, and forbs throughout the riverfront. To the extent possible, native species are encouraged for year-round interest, wildlife habitat enhancement, and reduced maintenance responsibilities.

Vines. Plant vines at the base of all blank buildings walls, retaining walls, bridge abutments, or other structures that have little inherent architectural interest.

Turf. If turf grasses are to be used, select them to be regionally appropriate and minimize post-establishment requirements for irrigation, pesticide, fertilizer, and maintenance.

3.7.3 Planting Guidelines

Fences: 4-6' ornamental metal fence is required for vehicular use areas. Four foot (4') ornamental metal fence is required for non-vehicular areas.

Trees: Two (2) per 25 linear feet of river frontage for vehicular use areas. One (1) per 25 linear feet of river frontage for non-vehicular use areas. Trees may be placed in a natural layout.

Hedges: A continuous hedge on the river side of the fence is required for vehicular use areas, but is not required for non-vehicular use areas.

Foundation Plantings: Foundation plantings are a group of plants used in landscape design to blend a building with its setting and obscure any undesirable features of the foundation. Not applicable for vehicular use areas. Required for non-vehicular use areas.

Refer to **Table 3.5** above.

Figure 3.10: Sloped River Edge

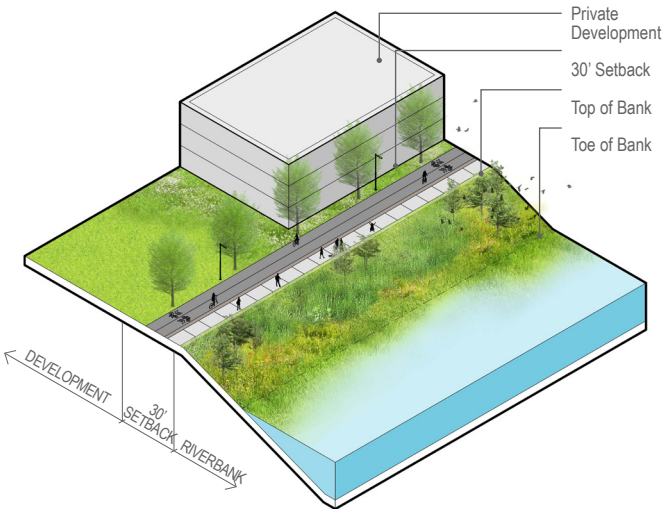
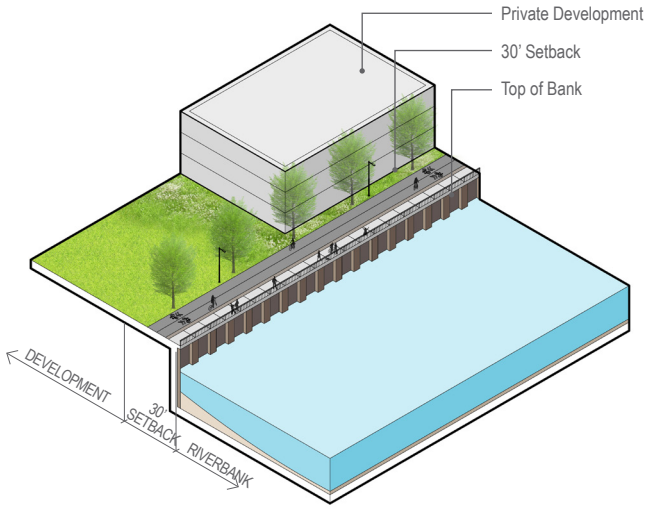


Figure 3.11: Vertical Bulkhead River Edge



3.8 Riverbank Treatments

The banks of the Chicago River experience two distinct types of erosion, one caused by flowing water and the other by surface runoff. The guidelines outlined in this section aim to address riverbank erosion at the river edge and along the slope. Degraded riverbanks will lead to higher erosion rates, habitat destruction, water quality impairment, and other threats to infrastructure. In contrast, a natural riverbank will become stronger over time as the native vegetation roots and anchors itself to the riverbank soils. New developments should create, restore, and protect riverbank buffers along the river to stabilize banks, control erosion, provide wildlife habitat, protect water quality, and provide an appealing natural environment.

These guidelines also aim to address basic health, safety, and welfare improvements along the river edge, regardless of the existing bank treatment.

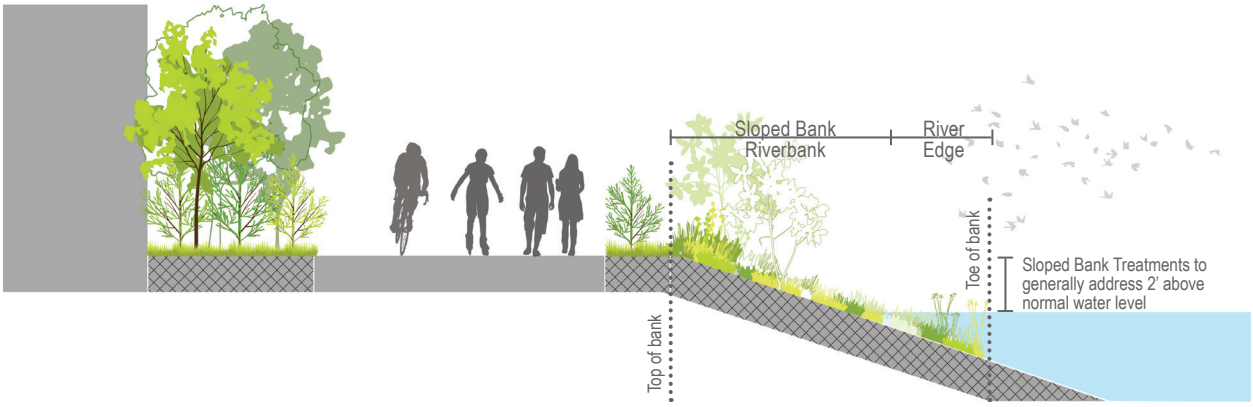
3.8.1 Riverbank Guidelines

Maintenance. The Chicago Municipal Code requires riverfront property owners to maintain the river edge, as well as the riverbank slopes, seawalls, and other attached structures on their property. The Municipal Code requires owners to protect the river edge from deterioration that may endanger the health or safety of individuals or impair river navigation. The riverbank should extend from the river edge to the edge of the multi-use path or a minimum of the first twenty (20) feet of the land adjacent to the top of the bank, whichever is less. The multi-use path or its shoulder shall not be located less than five (5) feet from the top of the bank.

Disturbance and Management. The riverbank should be managed as a natural area, utilizing native riparian and upland vegetation and avoiding incompatible structures. The riverbank should not be developed or disturbed except for environmental restoration, landscaping, and nature paths so that it serves as a buffer between the river and adjacent uses and enhance the natural aspects of the continuous greenway corridor. **If the existing conditions of a site include a sloped riverbank, the sloped riverbank is to be retained and improved per Chapter 4 on page 40 and Appendix 7.7: Naturalized Shoreline Applications on page 107.** Exceptions to this guideline include the development or construction required by river-dependent uses and existing buildings or structures.

The riverbank should extend from the river edge to the edge of the multi-use path or a minimum of the first 20 feet of the land adjacent to the top of the bank, whichever is less.

Figure 3.12: Delineation of the River Edge



3.9 River Edge Treatments

The goal of river edge treatments is to address riverbank or waterline erosion at the toe of the slope caused by flowing river water and wave action. Waterline erosion is the result of fluctuating water levels, and wakes contribute to the continued erosion and scouring of the bank. In these conditions, armoring the toe of the bank with rip rap or other material is required. The river edge treatments generally address the toe of the bank up to approximately two (2) feet above the normal water line.

Toe of the bank: the area where the sloped riverbank meets the normal water line.

The demarcation between river edge and sloped bank treatments will vary depending on the amount of water level fluctuation and wave height.

3.9.1 River Edge Guidelines

The river edge should be stabilized and enhanced per **Appendix 7.5: River Edge Treatments on page 95** which outlines and illustrates the suggested river edge treatments.

3.10 Sloped Bank Treatments

Figure 3.12 illustrates a sloped bank. The goal of the sloped bank treatments, where there is a sloped or "natural" bank, is to create an environmental buffer and to preserve, restore, or create a naturalistic appearance. Where the bank is sloped, the "top of the bank" is defined as the point at the top of the slope where the slope becomes less than 10 percent. Where there is a terrace or "bench" in the slope, the top of the bank is the point furthest from the water's edge where the slope becomes less than 10 percent. Slope treatments are generally intended to address the slope between approximately two (2) feet above the normal water level. For permitting, USACE Regulatory considers the Ordinary Mean High Water Mark, as opposed to the normal water level.

Appropriate slope treatments are outlined and illustrated in **Appendix 7.6: Sloped Bank Treatments on page 102.** In most cases, the slope treatment must be combined with toe protection or the river edge treatments listed in **Section 3.9** and **Appendix 7.5: River Edge Treatments on page 95.**

3.10.1 Sloped Bank Guidelines

Bank Steepness. Excessively steep slopes, especially those with soil erosion that are steeper than the angle of repose of the soil, should be re-graded to a minimum 3:1 (horizontal to vertical) slope and be planted and maintained with native or adapted vegetation. This treatment will minimize or eliminate soil erosion.

Bank Profile. The grading and profile of the re-graded bank should vary to be steeper in some places, gradual in others, and not be a single, consistent profile for the entire length.

Bank Stabilization. The sloped bank should be stabilized to meet the environmental and aesthetic objectives of the riverbank and may require the use of an erosion control blanket, geotextile reinforcement, and/or armoring of the toe of the bank. On steeper slopes, soil erosion control blankets or geotextile reinforcement will be necessary.

Vegetation. Where natural riverbanks exist, care should be taken to preserve the natural slope to the extent possible. Selective thinning and pruning of weedy and dead vegetation should be implemented. To minimize or eliminate soil erosion deposits and sedimentation in the water, sloped banks should be

planted such that there are no bare areas. Native vegetation adapted to the riparian zone should be used. A list of acceptable plant species can be found in **Appendix 7.4: Plant Palette on page 92**. If the steepness of the bank poses stability and environmental hazards, the bank should be re-contoured and replanted with native riparian vegetation.

Structures and Fixtures within the Riverbank Buffer. Structures should not be located within the riverbank, except those required by river-dependent uses. Fixtures associated with the multi-use path, that include ramps, steps, and fishing platforms are permitted within the buffer but should be located and designed to avoid impeding traffic or pedestrian circulation.

Clean-up. Garbage, litter, rubble, paving materials, construction materials, and any other unnatural, unattractive, or inappropriate materials shall be removed from the sloped banks by the owner.

Stormwater Discharge. Chicago's Water Agenda promotes efforts to protect, conserve, and manage the City's water wisely to improve the quality of life for residents and future Chicagoans. According to the Chicago Stormwater Ordinance, new developments along the Chicago River are required to remove 80% of total suspended solids, preferably through above-ground stormwater best management practices that include rain gardens, bioswales, infiltration areas, green roofs, and permeable pavements, before discharging into the river.

3.11 Vertical Bulkhead or Seawall Treatments

Where there is a vertical bulkhead or seawall or other engineered structure, the "top of the bank" is defined as the point at the top of the bulkhead on the riverside. Where the bulkhead is not in a straight line, the top of the bank is defined as the line between points on top of the bulkhead located continuously over land. Where there is a terrace or "bench" between two bulkhead walls, the top of the bank is the line furthest from the water's edge.

3.11.1 Vertical Bulkhead or Seawall Guidelines

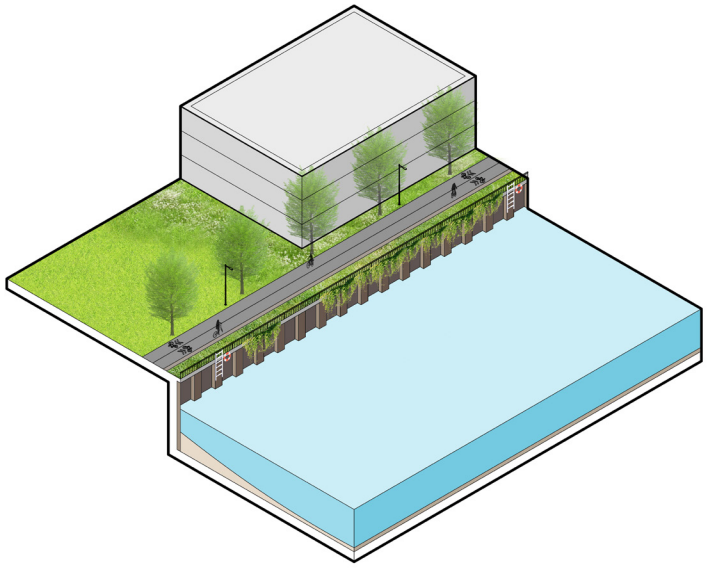
Ladders. Provide ladders no further than every 300 feet and/or at key locations, such as gathering spaces and overlooks. Attach ladders to the bulkhead face. Fabricate ladders of stainless steel. Ladders shall measure 24 inches wide with the length varying according to the distance from the top of the seawall to the low water point of the site. Ladder rungs are three-quarters (3/4) to one (1) inch in diameter, with a one (1) foot spacing between rungs. Rungs are welded onto a flat steel member that is three (3) inches wide by one-half (1/2) inch thick.

Life Rings. Provide life rings no further than every 300 feet and/or at key locations, such as gathering spaces, overlooks, and adjacent to ladder locations. Locate in tamper-resistant cabinets attached to railings near the bulkhead. All life rings shall be circular rings, 24 inches in diameter, and white. The rope attached to the life ring shall be white nylon rope, three-eights (3/8) inch in diameter and 100 feet in length. Life preserver rings may be purchased from a supplier of marine equipment and must be approved for use by the U.S. Coast Guard.

Vegetation. Vines and shrubs that spill over the top of the bulkhead should be planted at the top of the bulkhead, where space and function permit, to soften the hard appearance.

Seawall Height. The finished height of new seawalls or bulkheads should be the minimum necessary above the high water mark, and must not exceed the height of seawalls or bulkheads located on adjacent properties.

Figure 3.13: Delineation of Vertical Bulkhead or Seawall Treatments



3.12 Guidelines for Improvements Outside of the Required Setback

This section addresses design guidelines for the areas outside of the required setback, and that may be developed or redeveloped with new or existing structures. They can be privately or publicly owned and encompass the area where building or development occurs. Such development may be commercial, residential, institutional, or any other use permitted by the zoning for the site. This section guides building and open space design outside of the minimum setback area and aims to create a built riverfront edge that complements both the natural setting and neighborhood context.

3.12.1 Design, Orientation, and Massing of New Structures and Buildings

Placement. Buildings and vehicular use areas should be located outside of the river setback. Buildings should be located to create placemaking opportunities along the river.

River-facing façade. The river façade of buildings should be designed as a principal or major façade and should have at least the same design elements, articulation, relief, and other architectural considerations as the street-facing façades.

Massing and Articulation. Locate lower buildings with active frontage adjacent to the river setback area to create a pedestrian-friendly scale and increase solar access. Step back the massing of building frontages along the river to create a pedestrian-friendly scale, increase sunlight access, and create multiple levels with the activated ground, terrace, and rooftop. Locate taller buildings behind low buildings or a podium structure with active frontages facing the river.

Neighborhood Transitions. Step down the height of buildings to transition to the scale of adjacent neighborhoods.

First Floor. Active public uses are encouraged on the first floor of buildings with direct access to the river and multi-use path.

Wildlife. New development and retrofits of existing buildings are encouraged to implement bird-friendly design standards. The most hazardous areas of all buildings are the ground up to 50 feet, especially during the day. Here, birds are most likely to fly into glazed façades that reflect surrounding vegetation, sky, and other features that are naturally attractive to birds. Buildings taller than 50 feet also pose hazards as birds descend from migration heights in the early morning to rest and forage for food. Incorporate bird-friendly design features.

Sunlight. Solar modeling of the proposed development is required to ensure sunlight access to the river corridor (for approximately six (6) hours/day).

3.12.2 Screening Guidelines

Parking, Loading, and Mechanicals. Screen upper-level parking and loading with active uses as much as possible. If not possible, then parking areas and mechanical equipment should be screened with appropriate architectural treatments consistent with the overall façade design. Parking lots and vehicular use areas should be landscaped such that the view from the river is an attractive one. These areas should meet the landscape requirements of the City of Chicago Zoning Ordinance Chapter 17-11 Landscape and Screening Requirements and the City of Chicago's Guide to the Chicago Landscape Ordinance.

Outdoor Storage. Outdoor storage areas are discouraged along the river-side of the development. If storage areas are necessary, based on the use of the property, these areas should be located beyond the minimum 30' setback area and they should be screened from view.

Materials. Screen and buffer with high-quality, durable materials, architectural treatments, and landscaping. Acceptable materials include poured-in-place concrete, split face or ground face concrete masonry units, and heavy wood. Unacceptable materials for screening include chain-link fencing, plastic slat inserts, and lightweight lattice wood panels.

Walls and Fences. Screening walls and fences should be planted with vines at the base, and the vines should be trained up and over the walls and fences to soften their appearance and increase the amount of landscaping visible from the river.

Access. Wherever possible, fencing that separates the riverfront from the outside of the setback should be avoided to encourage a sense of community and public access to amenities and open space. In special circumstances if necessary for safety or security purposes, ornamental metal fencing may be utilized.

3.13 Transition Between Adjacent Developments

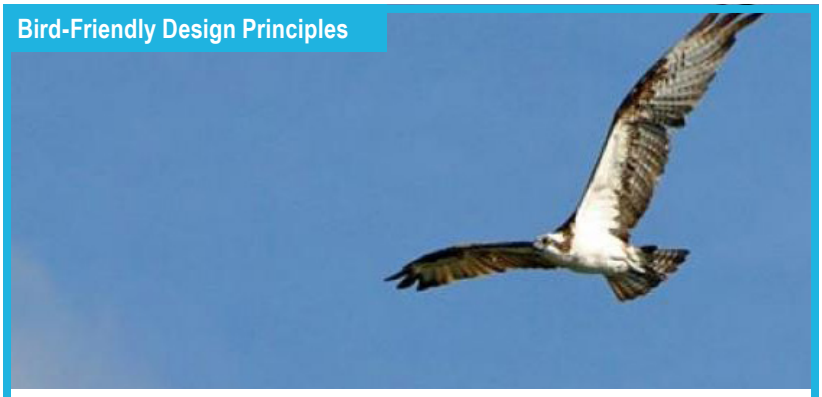
A successful riverfront not only depends on active, well-designed sites but also on the cohesiveness of all sites together. Developments should consider the following principles as new and existing sites are designed.

Multi-use Path. Paths connecting developments should be the same width and of similar materials. If material transitions are to occur, they should occur gradually between properties, not suddenly or immediately at the property line. If paths wider than adjacent properties are proposed for a new development, width transitions should also occur gradually, unless abrupt shifts are part of the overall design, and create a distinct, pleasant experience.

Lighting. Consider duplicating fixture spacing and color temperature of adjacent sites. Abrupt changes are discouraged.

Landscaping. Consider using a similar plant palette as adjacent developments if the existing plants are native and non-invasive species. Smooth transitions between shrub edges and planting beds are encouraged.

Bird-Friendly Design Principles



Design. Avoid design of transparent passageways, corners, atria, and courtyards. Design landscaping to keep birds away from building façades. Minimize rooftop obstacles to flight paths.

Glazing. Incorporate differentiations in material, texture, color, and opacity into glazing. Utilize low-reflectivity glass and low-e patterning. Utilize shading devices, screens, and other physical barriers to reduce glass access. Incorporate angled glass between 20 and 40 degrees from vertical to reflect ground instead of sky.

Light. Minimize the amount of night light visible through windows and turn lights off when possible. Shield and direct outside lighting to minimize attraction to night-migrating birds.

110 N Wacker

4 MENU OF IMPROVEMENTS

River Edge Ideas Lab: St. Charles Raceway

St Charles Raceway by Ross Barney Architects becomes a stadium for boating and swim races through a network of pivoting bridges that float along the South Branch.

4.0 MENU OF IMPROVEMENTS

4.1 Overview

In addition to the guidelines outlined in Section 3, each Planned Development (PD) project along the Chicago River will be expected to incorporate menu items as part of their project. Through the implementation of these menu items, the City aims to improve the river's water quality and create an active and engaging riverfront. The menu items are categorized into three main topic areas, based on the results of community feedback from the River Edge Ideas Lab exhibit. These topic areas are **Nature, Recreation,** and **Connectivity**. The applications and examples for each new improvement item are meant to serve as a starting point for planners and designers, but creative and innovative solutions are recommended and strongly encouraged.

4.1.1 Application

All property owners along the river's edge are encouraged to incorporate as many menu items as possible. The below table outlines the expectations that the Department of Planning and Development (DPD) will be using as a baseline for planned development projects. Please note that select amenities should be agreed upon in consultation with DPD and the community to determine priority improvements, and take into account the proposed uses and the specific context of the project. For river-dependent and critical service uses, new improvements will be evaluated on a case-by-case basis.

The City aims to improve the river's water quality and create an active and engaging riverfront.

Table 4.6: Menu Criteria per Planned Development Size

PD Project	Linear Feet of Riverfront*	Minimum Floor Area Ratio (FAR)**	Expected Minimum # of Menu Items	Required # of Priority Menu Items
Large PD	>1,980 LF	5	Most	All
Medium PD	660-1,980 LF	3	5-10	1
Others			3 or more	1

**600 linear feet is based on the typical length of a City of Chicago block.*

***Floor area ratio (FAR) is the ratio of a building's total floor area (gross floor area) to the size of the piece of land upon which it is built.*

4.2 Menu of Improvements

The menu of improvement items are aligned to implement the goals identified in Chapter 1 of this document, including providing additional open space and recreational opportunities, increasing property values, enhancing economic vitality, increasing environmental awareness, and enhancing Chicago's attractiveness as a tourist destination. The menu themes are structured within three over-arching categories of **Nature, Recreation**, and **Connectivity.**

Within each menu category are sub-categories, shown in the graphics to the right. These sub-categories include one or more specific improvements that can be implemented along the River.

4.2.1 Nature Menu

Items within the Nature Menu improve the natural environment, including both the river ecology and wildlife habitats. Priority items within the Nature Menu are new naturalized shoreline, stormwater management best practices, and aquatic wildlife habitats.

4.2.2 Recreation Menu

Items within the Recreation Menu enhance the river corridor as a recreational asset and destination. Improvements will be designed to attract a variety of user groups and promote both active and passive recreation.

4.2.3 Connectivity Menu

Items within the Connectivity Menu enhance the river corridor as a key component of the City's multi-modal system, and encourage the movement of people through the City. Improvements enhance connections between the river corridor and the surrounding neighborhoods, and promote a variety of transportation options along the river.

Nature

- New Naturalized Shoreline*
- Stormwater Management Best Practices*
- Aquatic Wildlife Habitats*
- Robust Upland Habitats
- Increased Setback
- Large Riverfront Park

Recreation

- Access to Water & Docking Facilities
- Expanded Seating Area(s)
- Riverfront Overlook
- Recreational Areas
- Support Amenities

Connectivity

- Underbridge Connections
- Enhanced Connections to Street and Transportation Network
- Elevator / Increased Accessibility
- Cantilevered & Floating Walkway
- Interpretive Signage
- Public Art & Lighting

** Priority items*

4.3 Nature

Preserving and restoring the Chicago River ecosystem ensures the long-term sustainability of wildlife, the health of the river, and the long-term use by Chicagoans. Ecologically, the ability to connect existing remnant landscapes and habitats with newly created and restored landscapes contributes to a healthy, functioning ecosystem that will lead to increased biodiversity, high-quality habitat for wildlife, and enhanced well-being for users and residents.

The natural environment, including riverbanks, the river edge, open space buffers, and wildlife habitats are critically important when planning a riverfront development project. This complex ecosystem includes geological, morphological, hydrological, and biological processes that each development project should aim to enhance for the public benefit. These guidelines identify best practice expectations related to integrating regenerative design, stormwater management, habitat restoration, public access, and stewardship.

4.3.1 Nature Design Principles

River Ecosystem. Connecting existing remnant landscapes and habitat with created landscapes and a restored riparian zone contributes to a healthy, functioning river ecosystem that will lead to improved water quality and enhanced well-being. Similarly, connecting the riparian zone to adjacent uses, residents, business owners, and nearby trail systems through the riverfront helps increase the use and sustainability of recreational amenities and raises awareness of the Chicago River, its ecology, and its function.

Increase Biodiversity. Increase the number of plant species to provide food and shelter for mammals, birds, fish, and insects. Biodiversity also helps with ecosystem resiliency and provides aesthetic benefits such as four-season interest.

Species Selection. Select species appropriate for the applications. For example, for birds and/or pollinators, include plants that attract both hosts (for eggs, larva) and nectar (adults). Orange, red, or yellow tubular flowering plants are the most successful. For aquatic habitats, plants such as American water-willow (*Justicia americana*) and Lizards tail (*Saururus cernuus*) can tolerate the river's consistent "flashing" or the rapid rise and fall of water levels. See **Appendix 7.4: Plant Palette on page 92** for recommended plan species.

Planting Design. Hierarchy, sun / shade tolerance, salt tolerance, and more should be considered when designing wildlife habitats and designing the landscape along the riverfront.

Placement. For the most successful terrestrial wildlife habitats, locate them away from busy pedestrian areas. Aquatic habitats, however, could be incorporated below pedestrian improvements such as boardwalks or overlooks.

Connectivity of Habitat Patches. When designing terrestrial habitat opportunities such as pollinator gardens and wooded areas, consider their connection to other landscape features on site. Connected, as opposed to fragmented landscapes, can protect and enhance animal movement, preserving the genetic viability of urban wildlife populations.

4.3.2 New Naturalized Shoreline (Priority)

Hard shorelines are not only less aesthetically appealing, but can also decrease fish populations, increase water velocity, and hasten erosion. Naturalizing the river's edge at the location of an existing bulkhead or seawall is encouraged. Advantages to naturalized shorelines include both ecological and economic benefits.

A naturalized edge can also be achieved without removing the sheet pile. Anchoring native plants and shrubs in strategic locations in and around the sheet pile can create the appearance of a natural edge without removing the sheet pile. Additionally, artificial wetlands can be attached to the sheet pile, concealing the sheet pile and providing additional benefits like water quality improvement and fish habitats.

Design Options

The following applications can be considered for naturalized shoreline improvements.

- Naturalized Edge with Seawall / Sheetpile
- Vegetated Terrace or Shelf
- Emergent Wetland Habitats
- Enhance Existing Sheetpile / Artificial Wetlands
- Dormant Woody Cuttings / Live Stakings
- Coir Logs
- Vegetated Geogrids

More information can be found in the **Appendix 7.7: Naturalized Shoreline Applications on page 107.**

Case Study: Horner Park

The Horner Park Restoration Project, completed by the Chicago Park District and U.S. Army Corps of Engineers with funding from the Great Lakes Restoration Initiative, removed invasive species, planted 128 native trees, and 282 native shrubs to combat riverbank erosion and improve wildlife habitats. Wood chip trails were incorporated with the re-graded naturalized shoreline to bring more people to the water's edge.

Illustrative Vision River Edge Ideas Lab, Airline Trail

The Airline Trail site, by Studio Gang, brings people, plants, and animals back to the river's edge. In an emergent zone where the river meets land, a constructed grid allows for a patchwork of different programs such as a fish hatchery and wetland habitat. Further upland, the grid is populated with prairie grasslands and denser woodlands. A former rail viaduct is re-purposed into a linear wildlife and cultural corridor connecting Pilsen and the river to the South Loop and the lake. A new soft, constructed edge creates underwater habitats for fish and emergent plants that filters rainwater as it returns to the river. These natural and constructed systems are made visible to the public by increasing access and educational opportunities at the river's edge.

4.3.3 Stormwater Management Best Practices (Priority)

Green infrastructure and on-site stormwater management throughout the corridor will help reduce runoff volume, control erosion, stabilize soil, and improve water quality. According to the USGBC, rain gardens cost 42% less than traditional engineered systems over their life cycle and reduce environmental impact by 62-98%. When done creatively, they can also enhance the aesthetics of a site. Finally, many stormwater management techniques can serve dual purposes – providing stormwater benefits while also creating and enhancing wildlife corridors.

Floodable landscapes with native plantings that encompass a large open space and a series of smaller spaces will be specifically suited to withstand periodic flooding during large rain events. Soils must be loose enough to allow water to percolate and roots to penetrate. Where these conditions do not exist naturally, soil amendments can be used to increase permeability.

Projects should adhere to the City of Chicago's Stormwater Ordinance.

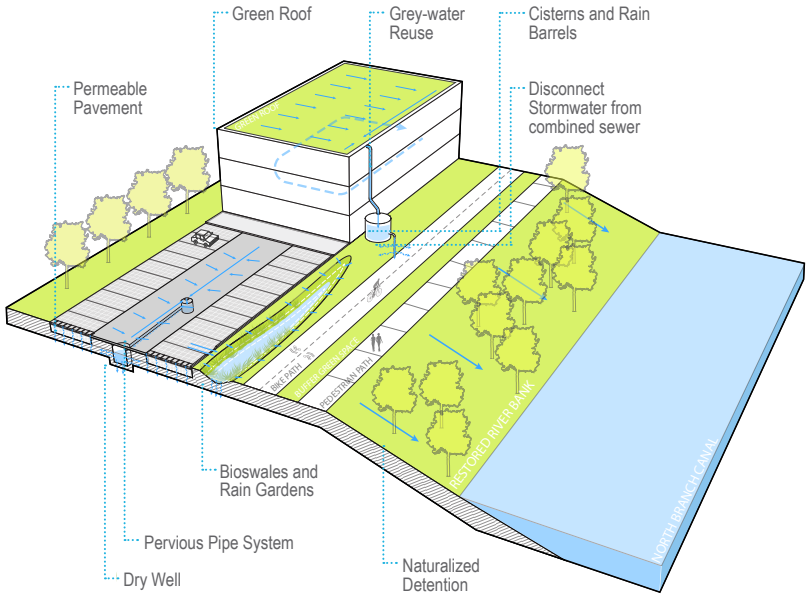
Design Options

Examples of stormwater management improvements are listed below.

- Stormwater Wetlands
- Filters Strips / Berms
- Bioretention (or bioinfiltration)/ Rain Gardens
- Bioswales
- Permeable Paving
- Tree Box
- Vegetated Roofs

More information can be found in **Appendix 7.9: Stormwater Management Best Practices on page 118.**

Figure 4.1: Example of Combined Stormwater Management Applications



Case Study: The Jetty Floating Wetlands

Constructed along the Jetty area of the Main Branch of the Chicago River are floating wetlands and water gardens. These floating wetlands use aquatic species to clean and improve the water, remove unwanted nutrients, and provide habitat for fish. These wetlands are constructed of a recycled plastic matrix on which aquatic and terrestrial vegetation is grown hydroponically.

4.3.4 Aquatic Wildlife Habitats (Priority)

Working in conjunction with riverbank improvements, in-stream aquatic improvements help create terrestrial wildlife and fish habitat, increase water quality, and improve the health and beauty of the Chicago River ecosystem. Based on the latest MWRD Fish Monitoring survey from 2016, there are 76 species of fish currently living the river. Current and future habitat considerations include those for fish, turtles, migratory and resident birds, crustaceans, worms, and aquatic insects.

In-stream improvements are primarily aimed at providing food, spawning areas, depressional areas for overwintering, and enclosed spaces for fish to hide. These habitats can be comprised of natural or fabricated elements, including vegetation, boulders, and fabricated systems, such as floating wetlands. Vegetated improvements also clean and filter river water and provide food and shelter for avian species, river mammals, reptiles and amphibians, and macroinvertebrates.

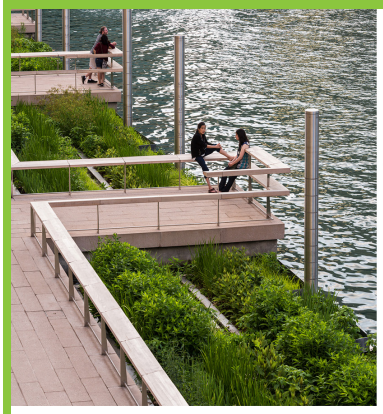
Design Options

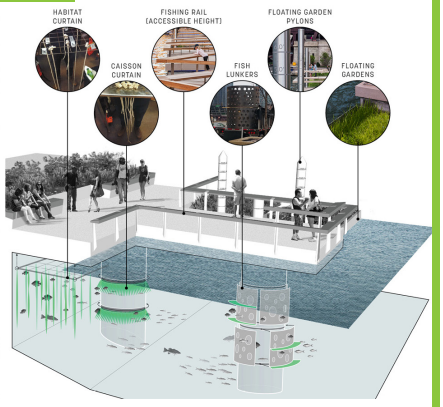
Examples of aquatic wildlife habitat improvements are listed below.

- Fish Cavities
- Boulder Placement / Boulder Clusters
- Revetments and Cover Logs
- Cribbing / Crib Wall
- Current Deflectors
- Floating Wetlands or Islands
- Pole Hulas
- Fish Lunkers
- Limnetic Curtain

See **Appendix 7.11: Aquatic Habitats Applications on page 111** for more information. In-stream improvements may require additional permit review with agencies to ensure the navigational channel remains unimpeded.

Case Study: Main Branch Fish Habitats





Used in the main branch of the Chicago River, pole hulas, fish lunkers, and limnetic curtains are innovative options to construct new fish habitats in areas underneath overlooks and cantilevered walkways. Pole hulas are constructed of nylon ropes attached to overhead structures, and dangle in the water. Lunkers are perforated steel cylinders that provide cover for fish to hide from predators. Limnetic curtains are steel frames with steel wire mesh where algae will form, providing food for the river's fish population.

Case Study: The Wild Mile

Floating wetlands are an effective habitat restoration solution, as noted in a recent Urban Rivers study where they found that the 50 square feet of wetlands at the Wild Mile on the northern tip of Goose Island led to a 100% increase in fish abundance. Floating wetlands are ideal for areas of the River where the slope is steep, unstable, or erodible. It is also a good choice for areas where the river has a hard edge, such as the Main Branch where the multi-use path lines the edge of the river itself or where there is a seawall, such as at the Wild Mile.

4.3.5 Robust Upland Habitats

The goal of this menu item is to minimize the loss and degradation of wildlife habitats, promote biodiversity, and restore habitats where possible. Vegetation in the riverbank should create and enhance wildlife habitat for the Chicago River's diverse avian species, river mammals, reptiles and amphibians, and macroinvertebrates. Vegetation plays a key role in the health and well-being of many of these species by providing subsistence-based resources, such as food and shelter.

Research shows that native trees reduce flooding, improve property values, reduce the heat island effect, promote safety, and provide a variety of social and health benefits for communities. Additionally, the maintenance of on-site trees plays a key role in successful riverbank restoration efforts.

Conservation and Restoration. Conserve and/or install appropriate native plants. Aim to restore most of the site's final vegetated area with native plant communities. On sites with existing native vegetation, design the site to preserve native plants, whenever possible.

Diversity. Plant diversity provides a number of benefits, including resistance to insects and diseases. Best practices for larger sites are to plant no more than 10 percent of any species, no more than 20 percent of any genus, and no more than 30 percent of any family. See **Appendix 7.4: Plant Palette on page 92** for more information.

Healthy Soils. Conserve existing healthy soils that are appropriate for the site conditions, climate, and design intent of the site.

Constructed Terrestrial Habitats. Terrestrial habitats promote bird, butterfly, amphibian, and insect biodiversity and provide habitats for other urban wildlife, including raccoons, mice, coyotes, and more.

Bat Boxes. Bats are a water-dependent species and bat boxes serve as summer homes for Midwestern bats. According to Bat Conservation International, bat boxes in the Chicagoland region should be painted a dark or medium shade of paint.

Butterfly / Pollinator Gardens. Pollinator gardens attract hummingbirds, bees, butterflies, moths, beetles, and other insects, and increase the productivity of wildlife, food, and landscape plants. Provide a mix of fruiting sedges, grasses, shrubs, and flowering perennials in sunny areas with well-drained soils.

Birdhouses / Nest Boxes. Birdhouses can be freestanding or attached to trees or other structures throughout a site to provide shelter for birds.

Illustrative Vision: River Edge Ideas Lab, Max F.A.R Forest Area Ratio

MAX F.A.R., by SWA Group, introduces a sensational natural environment in the middle of the City. A heavy tree canopy allows people to enjoy a serene forest within Chicago's concrete jungle. Folleys, pavilions, and look-out towers give perspective for users with spaces for contemplation and meditation. Passive eco-tech systems, meant to be viewed and appreciated, harbor flora and fauna, and educate people about their local ecosystems. The site will be further activated with bike stations, kayak launches, rock climbing, yoga, and games.

Case Study: Friends of the Chicago River Bat Condos

Friends of the Chicago River worked with the Forest Preserves of Cook County to install six 4x4 bat condo structures in open spaces near waterways throughout Cook County. These structures, which look like small doghouses on stilts, are maternity colonies that can hold up to 2,000 bats.

4.3.6 Increased Setback

Wider setback areas reinforce the natural, open character of the Chicago River. They also provide additional protection of surface waters from pollution, protect against flooding and erosion, and preserve riparian habitats. Setbacks from the river edge that are substantially larger than 30' will be expected on sites large enough to accommodate them. A larger setback provides room for additional vegetation and pedestrian areas including seating areas and recreational amenities, and also better accommodates separate bicycle and pedestrian paths. An increased setback also provides solar access and a pedestrian scale to riverfront.

Access. Identify and provide access to surrounding neighborhoods, trails, facilities, and attractions.

Connections. Physically and visually connect publicly-accessible open spaces to existing pedestrian, bicycle, and public transportation networks.

S**tormwater.** Stormwater requirements could be addressed within recreational fields, play spaces, or cultural areas being considered for large new developments.

Seating Options. Expanded seating areas that provide flexibility for different types of programming and a range of group sizes are encouraged. Provide a variety of seating options, for individuals and groups in shade and sunlight.

First Floor. Active public uses are encouraged on the first floor of buildings with direct access to the river and multi-use path.

Programming. Support active and passive activities and diverse programming opportunities that will attract a wide variety of users and recreation providers to serve surrounding residents, institutions, and business. Where possible, connect public uses to transit and provide required parking.

Case Study: The 78

The proposed development in the South Loop known as "The 78" proposes setbacks between 75-100' from the river's edge.

Case Study: 777 W. Chicago

Another proposed development, this one located at the former Chicago Tribune printing plant site, calls for a 70-80' setback for the first phase of work. This 30-acre site is located on the west bank of the Chicago River's North Branch between Grand and Chicago Avenues. Roughly 25% of the site is set aside for parks and open space.

4.3.7 Large Riverfront Park

Publicly accessible open spaces need to be incorporated, whenever possible, within Planned Developments. According to the USGBC, projects with trees and other green spaces increase property values by 3-15% and increase rental rates by 7%. In general, uses and design decisions along the river should encourage waterfront access and be inviting to workers, neighbors, and visitors.

Park spaces should be sized to accommodate both active and passive recreational amenities, in addition to the required multi-use and secondary paths. Amenity selection should pay attention to surrounding developments to ensure a balanced variety of recreational opportunities and avoid unnecessary duplication. Recreational amenities include, but are not limited to, sports fields and courts, playgrounds, pavilions or shade structures, and natural areas. The following design criteria should be considered for publicly accessible open space.

Placement. Locate open spaces along the river and provide publicly-accessible open spaces that facilitate access and use of the adjacent multi-use path via multi-modal connections from adjacent private developments.

Connections. Physically and visually connect publicly-accessible open spaces to existing pedestrian, bicycle, and public transportation networks.

Programming. Support active and passive activities and diverse programming opportunities that will attract a wide variety of users and recreation providers to serve surrounding residents, institutions, and business. Where possible, connect public uses to transit and provide required parking.

Framing. Buildings should frame public open spaces and add vitality to the public realm. Buildings fronting public streets should frame existing public spaces, create enclosure, and provide placemaking opportunities. Such buildings should contain ground floor public uses and contribute to the sidewalk and open space activation.

Scale. For Loop, North Branch, and South Branch Zone projects, the larger the open space, the taller the building may be to create a beneficial relationship in scale between the two. Increases in density associated with larger buildings also result in higher levels of open space utilization and increased public safety.

Orientation. Open space should be located to allow sunlight to reach the river corridor for at least six hours per day during non-winter months. Solar modeling of proposed development should be conducted to demonstrate performance as part of the design review and approval process.

S**tormwater.** Stormwater requirements could be addressed within recreational fields, play spaces, or cultural areas being considered for large new developments.

Case Study: 700 W Chicago

At this 37-acre development at 700 W. Chicago, more than 50% of the site will be developed as open space. The plan includes four buildings with 1.2 million square feet of loft-style office space, up to 310 residential units, and 4.5 acres of publicly-accessible waterfront open space.

Case Study: Proposed Riverline Park

The 14-acre Riverline Site, located along the South Branch is designed with 3.5 acres of open space that includes a playground, walking trail with floodable landscape and wetland, outdoor amphitheater, and dog park. These amenities provide public space for residents and area workers to enjoy.

River Edge Ideas Lab: pulse: conflux

PULSE: conflux, by site design group, encourages year- round use through river overlooks, fishing piers, a sledding hill, bike storage, and rental facilities for bikes, kayaks, and ice skates. Reinvigorating the riverfront throughout the winter months, the Adventure trail doubles as an ice skating rink.

4.4 Recreation

Creating diverse passive and active recreation opportunities is vital to the long-term use and enjoyment of the Chicago's River edge. The multi-use path is an important part of activating the Chicago River corridor, but additional opportunities exist within and outside of the minimum setback area to provide more diverse recreational amenities. These guidelines aim to serve as best practices for creating unique, diverse, and well-utilized recreation features.

4.4.1 Recreation Design Principles

Placement. Locate more active pedestrian and recreational areas away from sensitive natural areas and environments so as not to disrupt wildlife habitats.

User Groups. Improvements should accommodate a variety of user groups and be as inclusive as possible.

Variety. Providing a variety of recreational uses within an individual site and across multiple sites is key to creating a vibrant, active riverfront. Examine existing and planned recreational amenities on both a local and regional scale and balance active and passive opportunities. Consider spaces for mental restoration, physical activity, and social connection.

Design. Design recreational spaces using best practices and most current guidelines and standards, including AASHTO, CPSC, ASTM, ADA, and other federal, state, and local regulations. Improve the actual and perceived safety of site users by providing clear, defined spaces and access control, natural surveillance with adequate lighting levels, clear visibility and good sight lines, a variety of options for access, and site design elements that improve the effectiveness of policing and security efforts.

4.4.2 Access to Water & Docking Facilities

Access to and engagement with the Chicago River is encouraged through access points that provide direc, public access to the water's edge. Access points should not be located in areas of heavy river traffic or compromise bank stability, and should not impact the ecological integrity of existing landscapes, but rather, should encourage education and interpretation, as well as active and passive recreation. Physical access can be accomplished through built structures, such as docks and boardwalks, or more natural and informal pathways that lead to the water's edge.

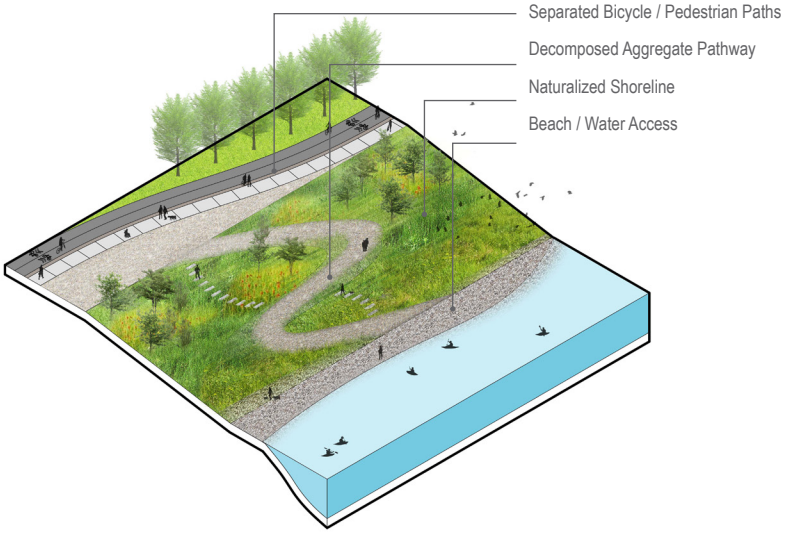
Direct Pedestrian Access. Provide pathways for direct river access as secondary routesg using loose fill materials such as decomposed granite or limestone screenings. ADA accessibility should be accommodated whenever possible for secondary paths to accommodate a variety of user groups.

Non-Motorized Docking Facilities. Docking facilities should be designed for non-motorized water crafts such as canoes and kayaks. Placement of docking facilities and launches should take into account existing currents, distance from other docks and boat traffic, physical barriers such as dams or weirs, and visibility from both the river and shore. Areas of moderate flow and deposition that form a natural, gradual slope or platform, like a "beach," are most suitable for launching.

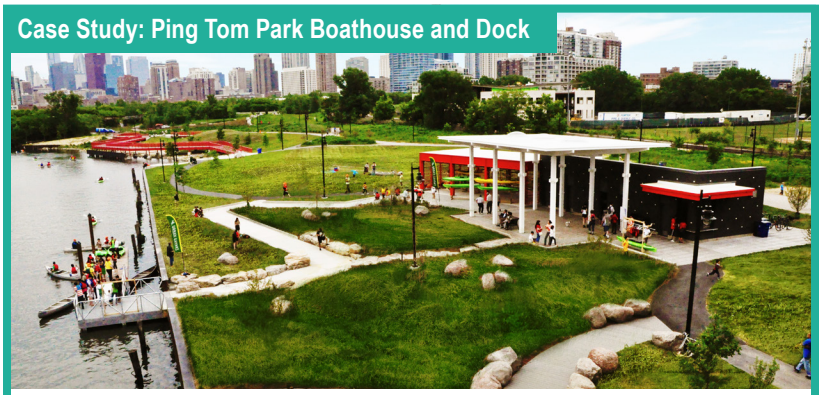
Kayak and canoe launches typically use natural launch surfaces while boats should be provided a dock.

Additionally, support amenities, such as secured craft storage, parking, seating, maps, navigation guides, water to rinse boats/gear, and restrooms are encouraged. Refer to the anticipated permit processes outlined in the links and documents provided in **Appendix 7.3: Additional Information and Websites on page 90** for more information.

Figure 4.2: Direct Pedestrian Access



Case Study: Ping Tom Park Boathouse and Dock



Located at Ping Tom Park, the Boathouse includes a storage shed for both kayaks and canoes; a comfort station and vending area; a porte-cochere resting ground; and a landscaped path with direct access to the river.

4.4.3 Expanded Seating Areas

Expanded seating areas are important elements along the Chicago River and are key to creating an active and engaging experience. Creating great public gathering spaces can enrich the lives of their users and contributes to the community's social, economic, cultural, and environmental health. Expanded seating areas may include plazas, amphitheaters, outdoor classrooms, multi-purpose event spaces, and more.

Placement. Expanded seating areas should be located in highly trafficked or programmed areas to benefit the surrounding uses. Seating areas should minimize impacts to habitats, such as remnant landscapes and floodplain zones.

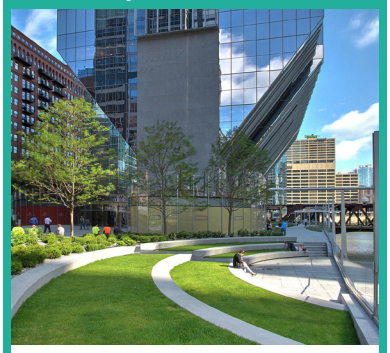
Seating Options. Expanded seating areas that provide flexibility for different types of programming and a range of group sizes are encouraged. Provide a variety of seating options, for individuals and groups in shade and sunlight.

Enclosure and Permeability. Define seating areas with features such as topography, walls, fences, or vegetation. Provide breaks in the enclosure to allow multiple access points to guide, deflect, and filter wind or sunlight.

Experience. Provide landscaping to enhance the aesthetic experience of the seating area. Consider overhead structures, groves of trees, water features, ornamental vegetation, tactile variation, and/or art.

River Cafes and Restaurants. Seating for riverside cafes and restaurants are encouraged outside of the minimum setback area. Seating should not block or restrict public access to the multi-use path or privatize use along the river.

Case Study: 150 North Riverside



Opened in 2017, this development is situated between Lake and Randolph Streets just west of the river. The two-acre site has 1.5 acres of open space, including a multi-use path and amphitheater.

Case Study: The Marina

Located on the Main Branch of the Chicago River, City Winery has an outdoor seating area located just south of the multi-use path. Large-backed, wooden benches serve as both a separation between the two spaces, seating for users, and bar seating for City Winery patron.

Illustrative Vision: River Edge Ideas Lab, Mbankment

An Open-Air Theater and Performance Venue by James Corner Field Operations celebrates the cultural vitality of the city. Two new symmetrical paths offer gentle access from the river to the upper level of the city. They frame a stepped amphitheater that extends into the water with new wetlands that promote improved water quality and new aquatic habitat.

4.4.4 Riverfront Overlooks

Riverfront overlooks should be placed in strategic locations along the riverfront and should function seamlessly with the multi-use path. Unlike docks and piers, overlooks promote visual, rather than physical, river access and viewsheds. Riverfront overlooks are constructed above or over the water's edge. These spaces facilitate passive recreation opportunities such as wildlife viewing platforms, fishing stations, and quiet seating areas. Additionally, overlooks may provide opportunities for public art, interpretive and cultural signage, and/or kiosks.

These areas should promote a diversity of uses and encourage users to linger and reflect along the river's edge.

Refer to **Appendix 7.3: Additional Information and Websites on page 90** for more information regarding the permit processes required to implement riverfront overlooks.

Figure 4.3: Overlook on Sloped Bank with Naturalized Treatment

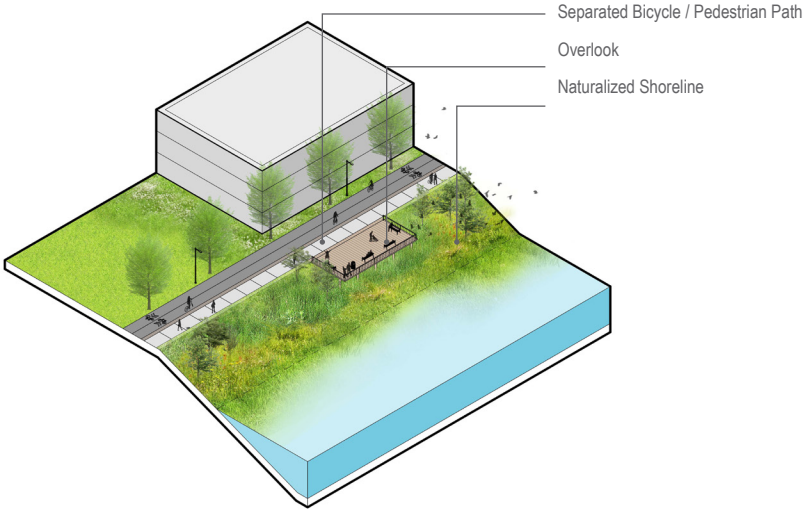
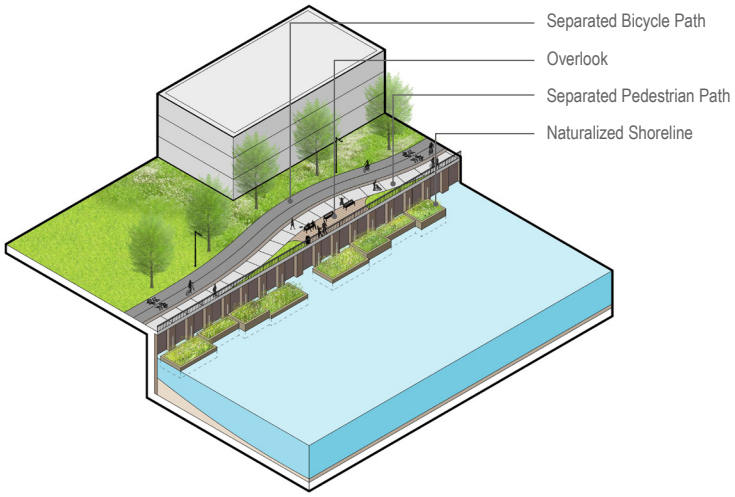


Figure 4.4: Overlook adjacent to Vertical Bulkhead



Illustrative Vision: River Edge Ideas Lab, Pier Promenade

The multi-use path connects back to the water edge at key moments, providing connections that would allow previously inaccessible land to foster new riverfront parks and ecologies. The Pier Promenade, by Adjaye Associates, also opens up to the river to provide a platform to activate the river with leisure activities such as boating and swimming.

4.4.5 Recreational Areas

Specialized recreational areas are important for creating diverse uses and for promoting a healthy, active lifestyle along the river. These amenities should be **located outside of the minimum 30' setback area** and relate or contribute to adjacent uses in the surrounding community.

Children's Play Areas. Children's play areas may range from traditional play environments to natural playscapes, from net climbers to interactive water features, and more. Children's play areas should be located in safe and secure locations that do not cross the multi-use path and minimize impacts to wildlife habitats. Play areas should offer a variety of activities and provide structures and experiences that support basic social, physical, and cognitive needs. Educational signage or programming may be complimentary to uses within these spaces. Additionally, play areas should consider all users, both children and those supervising them. Site furnishings such as seating, trash receptacles, and drinking fountains should be included with play areas.

Athletic Fields and Courts. Athletic fields and courts typically require more acreage than children's play areas. Court designs should take into account pavement materials, striping, and amenities such as seating and trash receptacles. Grid fields are best suited for east-west orientations and can be designed for both regulation and recreation play. Diamond fields are best suited for northeast or northwest orientations. Fields can be constructed with either natural or artificial turf. Maintenance, operations, and anticipated use characteristics should be considered when determining field characteristics. ASTM guidelines for construction and maintenance should be followed.

Dog Parks. Dog parks are another recreation amenity encouraged for the riverfront. According to the Trust for Public Land, dog parks have been the fastest growing new urban parks since 2007. Successful dog parks provide opportunities for socialization and physical activity. Both small and large dogs should be considered, and based on the available acreage, separate areas are encouraged.

Pet amenities include pet fountains, refresh stations, and waste stations / bags. Waste stations should provide compostable or biodegradable bags that meet the ASTM D6400 criteria.

Universally-Designed Recreation Facilities. Although the entire multi-use path will be designed to meet the ADA guidelines, creating additional recreational spaces that are universally accessible and encourage use by visitors of all backgrounds and abilities is an important consideration throughout the riverfront. Specialized recreation facilities may include accessible playgrounds, recreational fields, fitness areas, and more. These facilities can be designed for users of a wide range of ages.

Case Study: Focal Point

The 22-acre development site at 31st and Kedzie is planned to provide a two-acre recreation field available to area workers and residents to build connections within the community.

Illustrative Vision: River Edge Ideas Lab, Mbankment

Mbankment by James Corner Field Operations illustrates where a more extensively capped Congress Interchange Park meets the riverfront at a playscape that features climbing walls and slides, and places for lounging and swimming alongside a continuous pedestrian and bike trail.

4.4.6 Support Amenities

Amenities that support recreational activities along the Riverwalk are an important factor in the activation and use of these spaces. These spaces support activities along the riverfront, including biking, walking, play, and socialization.

Public Restrooms. Public restrooms should be considered adjacent to large gathering areas or active recreational facilities, such as boat launches and play spaces. Special consideration should be given in areas where restroom facilities are not readily available. This amenity should be located outside the minimum 30' setback area and can be within a development to provide an active and secure location. Restrooms need to be regularly maintained with provisions replenished daily, at a minimum. Restrooms will be privately-owned and maintained public restrooms.

Recreational Support Facilities. Consider providing facilities for rental of canoes, kayaks, bicycles, skates, and more to support nearby recreation. Locate these facilities outside the minimum 30' setback area. Recreational support facilities advance the overall goal of an active, vibrant riverfront. Consider indoor, multi-purpose recreational spaces to promote year-round activities.

Case Study: 1750 N Western

This development at Western Avenue and the 606 incorporates a public restroom facility shared with a new cafe space. The public restroom has direct access from the 606 for trail users.

4.5 Connectivity

One of the overall goals of improving the riverfront is to bring people to the Chicago River. Sidewalks, public streets, promenades, bike lanes, and transit connections facilitate safe and engaging passages, and reinforce the riverfront as a public amenities that connects the various neighborhoods together. The Chicago River is a valuable recreational asset, and key to increasing mobility across the city. The riverfront should also play an important part in the city's overall multi-modal transit system and identity. The following guidelines will ensure that all connections effectively relate both physically and visually to the surrounding context.

4.5.1 Connectivity Design Principles

Access. Identify and provide access to surrounding neighborhoods, trails, facilities, and attractions.

Permeability. The type and density of intersections in a network significantly impact how users move through a space. A highly permeable network with too many vehicular-pedestrian interactions may result in safety concerns, while a less permeable network may make it difficult to reach preferred destinations. Provide access and intersections in strategic locations and minimize dead ends.

User Needs. Consider the needs of all users when designing the pathway. Some users will be focused on leisure and recreation, while others will be focused on fitness and mobility.

Street Network. The multi-use path should provide strong connections to local roadway networks, specifically at key locations such as transit stops and bicycle paths.

Barriers. Consider creative ways to overcome barriers to connectivity such as steep topography, rail lines, or wetlands.

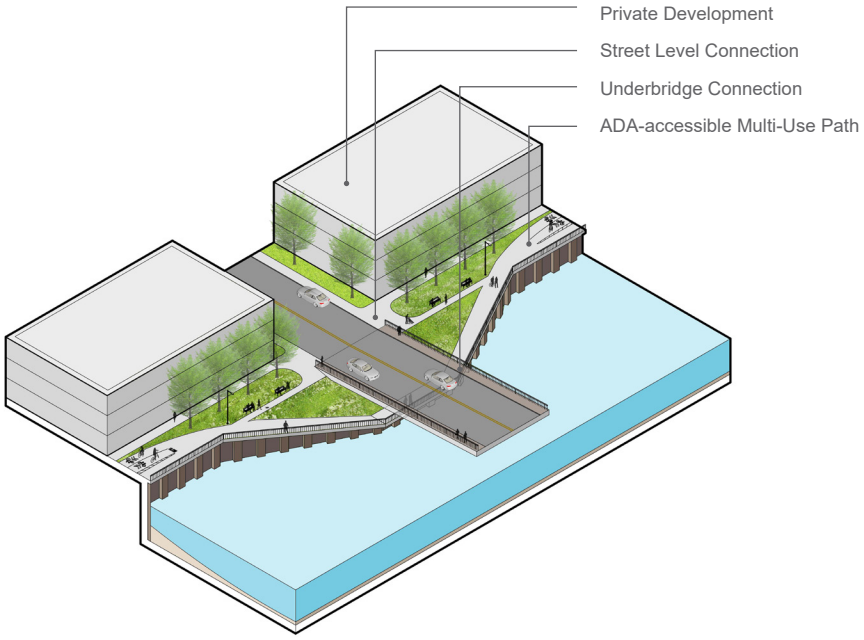
Hierarchy. Even within the riverfront, consider the hierarchy of pathways, and design each accordingly. Placement of amenities and connectivity features should consider the pathway hierarchy.

4.5.2 Underbridge Connections

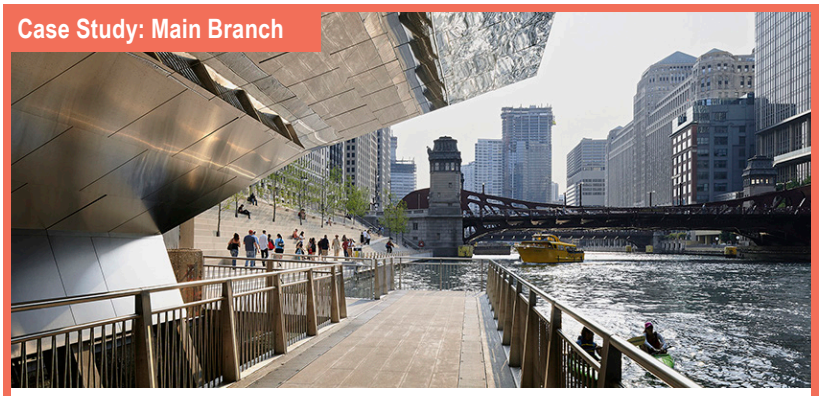
Bridges and abutments can be barriers to continuous multi-use path access along the river. Underbridge connections should be built with ample space beneath the bridge deck to allow the extension of a continuous trail and ensure the safety and security of users. The construction of underbridge connections will need to be coordinated with various city agencies and the adjacent property owners. The alignment of the multi-use path to and through the underbridge connection should avoid blind corners, sharp corners, or steep slopes that create safety and security issues.

The design of the underbridge connection should correspond to the Multi-use Path Guidelines in **Figure 3.2 on page 22** and adhere to AASHTO standards. Underbridge connections should be adequately illuminated with fixtures mounted to bridge abutments or piers at a minimum of 3.0 footcandles. The design should provide a continuous safety railing for a minimum of 20-feet on the approaches to the underbridge connection from the multi-use path. Railings should comply with all applicable building code and regulatory requirements. Underbridge connections require additional coordination with relevant agencies and may incur additional permit considerations. See **Appendix 7.3: Additional Information and Websites on page 90 and Appendix 7.2: Federal Navigation Channels and Army Corps Permit Process on page 83.**

Figure 4.5: Underbridge Connections



Case Study: Main Branch



The Main Branch of the Chicago River is successful because of the continuous pathway along the river's edge. Users do not need to go up to the street level to continue along the river, and can instead walk the continuous paths under bridges and abutments. In all, the multi-use path crosses underneath nine different bridges as it runs east-west in the Loop.

4.5.3 Enhanced Connections to Street & Transportation Network

Development along the Chicago River should enhance connections between all modes of transportation, from water taxi and transit systems to bike sharing and trails. By enhancing and connecting riverfront trails, water taxi service, adjacent bus and rail stations, bike lanes, and sidewalks, people will be able to more easily explore rivers and riverfront neighborhoods.

Water Taxi. Water taxis are a viable transportation option, and for some trips, a river route is the most direct. New water taxi stops at strategic locations will serve increasing demand and riverfront residential and commercial developments will be encouraged to add water taxi docking facilities, if feasible. Owners should coordinate with private water taxi companies.

Transit. To promote transit use, routes and stations should be displayed on regional transit maps on kiosks and signs at Riverwalk access points should point to and from commuter rail stations.

Bicycle Paths. Adding Divvy stations and bicycle stands near river trail access points, employment hubs, and major destinations would serve one-way commuters and last-mile transit needs, while increasing riverfront use. Divvy stations are an important component of the city's multi-modal transportation system. This system provides numerous Chicagoans access to thousands of bikes at nearly 600 stations across the city. As this system expands, the city will look to implement additional stations in under-served areas to create a more robust bike share network.

Bicycle Storage. Options for secure bike storage should be provided, either through traditional metal bicycle racks or enclosed public bike storage. Along the multi-use path, bicycle racks should be provided at points where the multi-use path intersects points of access to the street grid, as well as near plazas, seating areas, large gathering spaces, and recreational amenities.

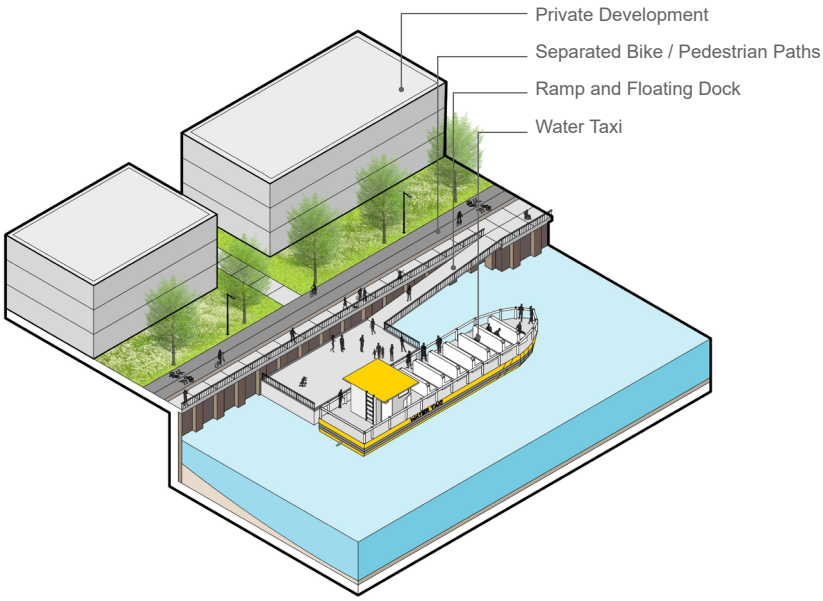
Bicycle Repair Stations. Bicycle repair stations should be strategically located along the multi-use path in areas where the trail intersects key access points and near large or small gathering spaces. Repair stations may encompass an air pump and gauge, repair stand, and standard toolset, and may be located in conjunction with other support amenities, such as drinking fountains.

Trails. For intersections with other multi-use trails, such as the 606 and the future El Paseo, provide connections to them whenever possible, and provide wayfinding signage.

Case Study: 606 Trail

Bikers on the 606 have access to three bike repair stations along the trail. These stations allow for minor bike repairs and include a tire pump. They were installed by the Trust for Public Land.

Figure 4.6: Water Taxi Stop



4.5.4 Elevator / Increased Accessibility

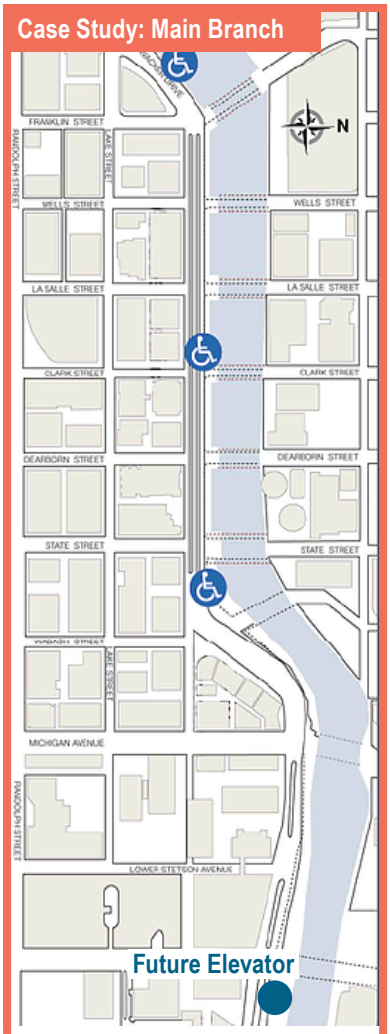
The Chicago River is an important public asset, and development projects will need to incorporate design features to provide access to all users. Applicants will need to coordinate with the Mayor's Office for People with Disabilities (MOPD) for riverfront improvements to ensure universal access will be provided per accessibility code requirements. Existing barriers to universal access along the riverfront should also be removed. Identifying such barriers should be done in coordination with MOPD, DPD, and CDOT. Increased accessibility reduces dependence on cars and provides increased independent mobility options for non-motorists. It leads to more active lifestyles, increased feelings of social inclusion, higher quality of life, and increased social capital.

Ramps. Ramps should be integrated with the overall landscape design using materials and lighting fixtures outlined in **Chapter 3 on page 20**.

Elevators. Publicly-accessible elevators should be provided with clear signage along the river identifying the elevator's location. The elevator should provide universal access to all grade levels that are programmed for public uses.

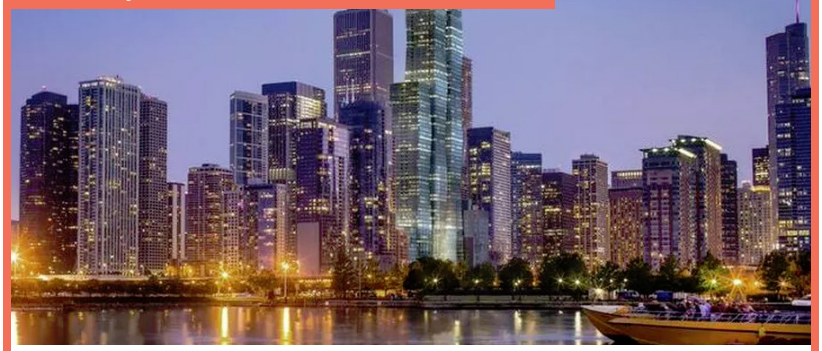
Accessible Paths and Recreation Areas. Secondary paths and additional recreational spaces that are universally accessible are encouraged throughout the riverfront.

Case Study: Main Branch



Currently, there are three (3) ADA compliant ramps that provide vertical connections between Upper Wacker Drive and the multi-use path.

Case Study: Vista Tower, Main Branch extension



At the proposed Columbus Drive Plaza, there will be improved landscaping and drainage, outdoor public seating, and a new elevator, a public amenity provided as part of the Wanda Vista development, located at 375 East Wacker.

4.5.5 Cantilevered & Floating Walkways

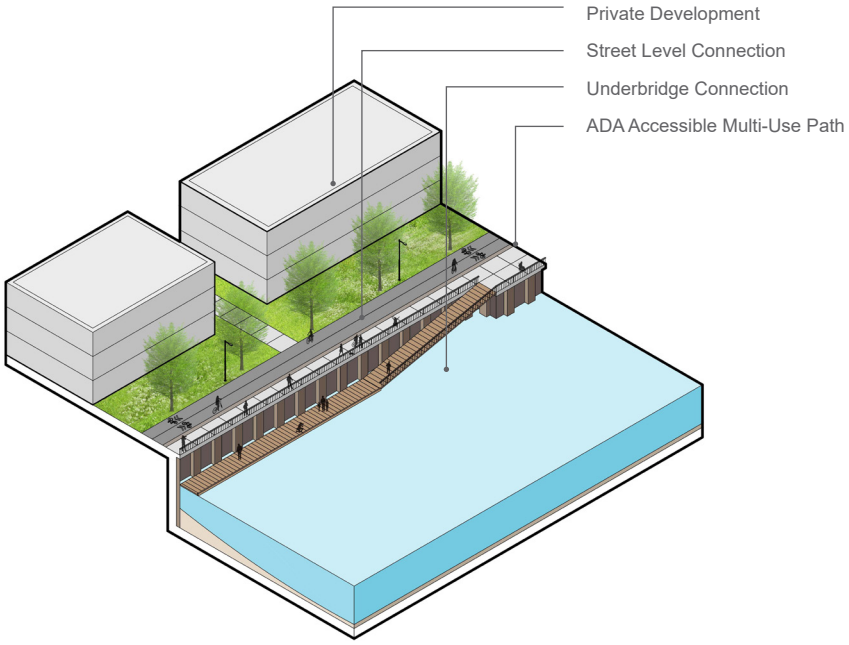
Existing buildings and structures, such as bridges and abutments, built along the river edge can create barriers to a continuous multi-use path. Where a detour around a building or structure would create a long or indirect route that would discourage use of the multi-use path or effectively interrupt it, construction of a cantilevered or floating walkway around the building or bridge should be considered to maintain a continuous trail along the river edge.

Cantilevered Walkways. Design specifications for cantilevered walkways should be consistent with the requirements for underbridge connections. Decking should be constructed of high-quality, durable materials suitable for an application approximate to a waterway. Consider poured-in-place concrete or treated heavy-duty timber decking, with joints aligned perpendicular to the direction of travel on the trail.

Floating Walkways. Floating walkways are post-mounted walkways constructed over the water, and should be designed by an experienced marina designer or engineer with urban waterfront expertise alongside a landscape architect and/or civil engineer to ensure that the design is safe, functional, and secure. Design specifications for floating walkways or boardwalks should be consistent with the requirements for cantilevered walkways.

Cantilevered and floating walkway connections require additional coordination with relevant agencies and may incur additional permit considerations. See **Appendix 7.3: Additional Information and Websites on page 90 and Appendix 7.2: Federal Navigation Channels and Army Corps Permit Process on page 83.**

Figure 4.7: Floating Dock along Vertical Bulkhead



Illustrative Vision: River Edge Ideas Lab, Rivertop Opera

The Rivertop Opera, by SWA Group, makes use of the space behind the Civic Opera Building, an architectural landmark well renowned for performative arts. Along the open stage over the river, seating and circulation extend out over the water. The stone façade of the historic structure is given a new life as a backdrop for a new kind of performance art. The multi-use stage transforms for each season, hosting ice skating, pop-up food fairs, and perhaps a political gathering.

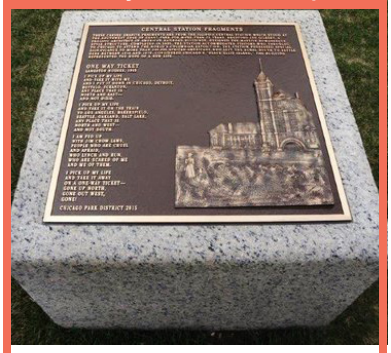
4.5.6 Interpretive Signage

The connectivity of the river – physically and visually – to the surrounding communities and immediate context is enhanced through key amenities, including informational kiosks, and interpretive and cultural signage.

Interpretive, Educational, and Cultural Signage. Interpretive, educational, and cultural signage should be located at points of historic, ecological, or educational relevance or interest throughout the river. Signage may occur along the multi-use path, gathering spaces, lookouts, and more. Signage standards should adhere to the Branding and Identity Plan, found in a separate document.

Informational Kiosks. Informational kiosks can play an important role in providing vital wayfinding, regulatory, and directional information for river visitors. Informational kiosks may be located in highly trafficked areas and at the intersection of adjacent pathways and circulation systems. Kiosks should provide flexibility in the information being displayed and adhere to the approved Branding and Identity Plan.

Case Study: Grant Park Plaque



Interpretive features can be implemented in a variety of ways. This example is a plaque commemorating the Central Stations Railroad Terminal and its significance to the African American history of Chicago.

Case Study: Lincoln Park Zoo Signage

The Lincoln Park Zoo displays educational signage related to the city's architecture, wildlife, and history throughout the park. This signage provides opportunities for visitors to learn about a variety of topics as they enjoy the park's natural features.

4.5.7 Public Art & Specialty Lighting

Public Art. Public art plays an important role in activating, enhancing, and building the character of public open spaces. Public art, including, but not limited to murals, sculpture, mosaic and tile installations, water features, and environmental artwork are encouraged within, or adjacent to the river. Art should reflect and complement the Chicago River context, and work seamlessly with the adjacent multi-use path, planting palette, and buildings. Community stakeholders should participate in all design and planning exercises when appropriate.

Specialty Lighting. In addition to safety and security lighting requirements found in **Section 3.5 Lighting on page 28**, specialty lighting provides an opportunity for creating attractive and engaging features that activate the river in the evening. Specialty lighting may include architectural lighting, public art features, interactive lighting, and more. All specialty lighting should be energy efficient, reduce light pollution, and not be harmful to birds, bats, and other wildlife.

Restore / Highlight Historic Features. Both the Chicago River and surrounding communities have strong historical value and historically-significant elements located throughout. Efforts should be made to highlight and restore those elements wherever possible, making them visible within the river and along the multi-use path. In addition, interpretive or cultural signage about each historic element may contribute to the educational value and significance of the space.

Case Study: Lightscape

Lightscape is a custom lighting installation that was designed as a modern interpretation of Chicago's native prairie. Located along State Street, the programmable LED lights are uniquely choreographed to seasonally themed songs.

Case Study: Art on theMART

To continue the tradition of celebrating iconic art on the Riverwalk, Art on theMART opened in September 2018. This installation, on display two hours a day, five days a week, projects the works of esteemed artists such as Diana Thater, Zheng Chongbin, Jason Salavon, and Jan Tichy onto the 2.5-acre river-facing side of the building across from the Main Branch Riverwalk.

5 BUBBLY CREEK DESIGN GUIDELINES

Bubbly Creek Framework Pan

The Framework Plan provides strategies to transform Bubbly Creek into a highlighted feature amenity to the rapidly-changing and historic Bridgeport community of Chicago. Rezoning concepts explore potential Transit Orientated Development practices, and stormwater strategies that connect to the Bridgeport community. Strategies include native plantings and sustainable stormwater practices, and elements such as overlooks, boardwalk connections over wetland restorations, open park space, and pierscapes connecting adjacent land uses to Bubbly Creek.

5.0 BUBBLY CREEK DESIGN GUIDELINES

5.1 Overview

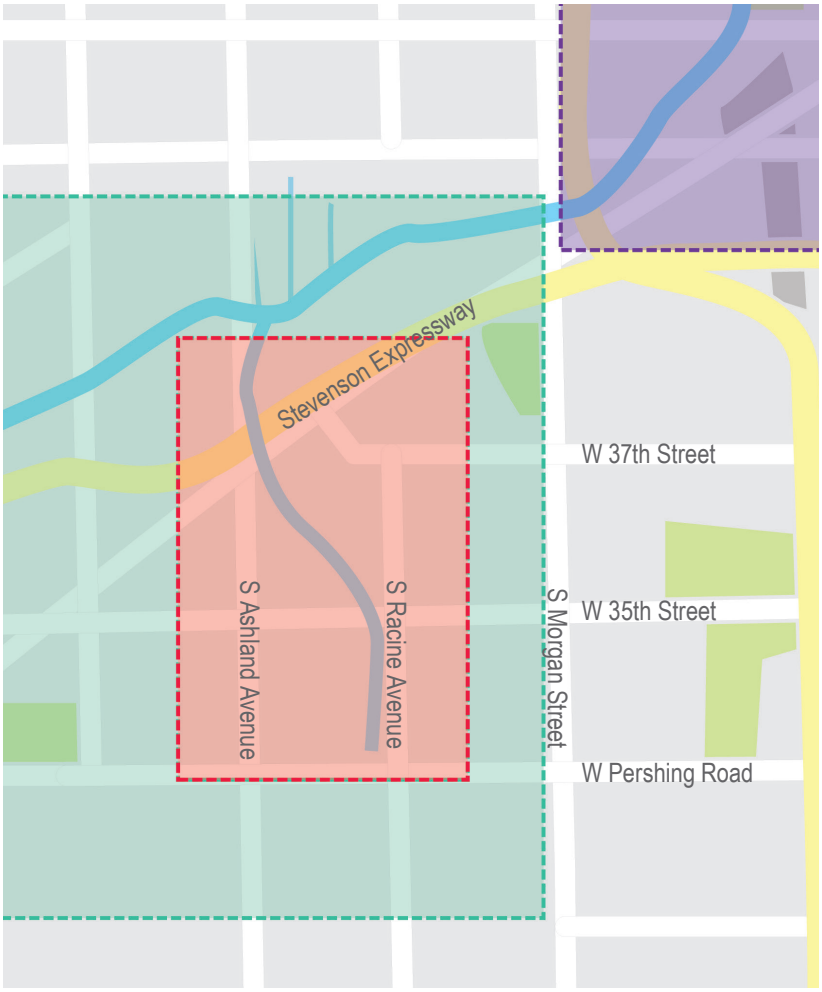
Bubbly Creek extends from the South Turning Basin of the South Branch of the Chicago River to its terminus at the MWRD Racine Avenue Pump Station. The boundaries of the Bubbly Creek zone are approximately 27th Street on the north to 39th Street on the south.

The development of the South Fork of the South Branch of the Chicago River traces back to the 1860s and the origins of the Chicago Union Stock Yards, which occupied the area bounded by Pershing Road, Halsted Street, 47th Street, and Ashland Avenue. Five hundred thousand (500,000) gallons of fresh water were pumped daily from the Chicago River into the yards, and vast quantities of untreated waste were dumped into the waterway. Bubbly Creek became a notorious open sewer, its name derived from the bubbles caused by decaying matter which filled the river bottom.

Upton Sinclair wrote about the deplorable conditions of the Chicago Union Stock Yards in his novel, "The Jungle" (1906). He described Bubbly Creek as if "grease and chemicals that are poured into it undergo all sorts of strange transformations, which are the cause of its name; it is constantly in motion as if huge fish were feeding in it, or great leviathans disporting themselves in its depths. Bubbles of carbonic acid gas will rise to the surface and burst, and make rings two or three feet wide. Here and there the grease and filth have caked solid, and the creek looks like a bed of lava; chickens walk about on it, feeding, and many times an unwary stranger has started to stroll across and vanished temporarily."

Bubbly Creek still effervesces today. At its southern terminus lies the MWRD Racine Avenue Pump Station, the largest facility of its kind in the United States. Fourteen pumps drain a 30 square mile area discharging stormwater into the river during heavy storm events. The remainder of the time Bubbly Creek is stagnant.

Over time, stormwater best management practices (BMPs) can significantly improve the water quality of Bubbly Creek. BMPs include new parks, open spaces, greenways, green roofs, cisterns, swales, wetlands, and other improvements in public and private developments. Within this sewershed, all new developments are responsible for reducing their stormwater contribution.



Chicago River Design Guidelines

Figure 5.1: Bubbly Creek

Map Key

- City of Chicago Boundary
- Major Roadways
- Parks and Open Spaces
- Water
- South Branch Zone *(Harrison to Ping Tom Park)*
- Southwest Zone *(City limits to Ping Tom Park)*
- Bubbly Creek Zone *(27th Street to 39th Street)*

5.2 Bubbly Creek Setback

5.2.1 Purpose of the Setback for Bubbly Creek

Special measures are necessary at Bubbly Creek to mitigate the degraded conditions of the waterway and its banks. A wider setback is needed to rebuild the riverbank in a manner that provides protection from sedimentation, erosion, and runoff.

Existing riverbanks along Bubbly Creek are fairly steep (steeper than 3H:1V), high (greater than 10ft), eroded, and unstable. In many cases, the original timber retaining wall has failed. These banks are susceptible to waterline erosion, sloughing, and gullying, particularly if there are heavyweight loads located near the top of the bank.

The expanded setback provides the physical space for rebuilding dilapidated banks in a sustainable manner for the purpose of stormwater management, stabilizing riverbanks, water quality improvements, and providing appropriate naturalistic landscaping and public access. Other benefits include improved wildlife and fish habitat, pollutant removal, runoff attenuation, and streamside aesthetics.

5.2.2 Setback Requirements

All new developments along Bubbly Creek are required to setback sixty (60) feet from the existing top of the bank as established by survey at the time of Planned Development application.

Top of bank (sloped bank): the point at the top of the slope at the water's edge where the steepness of the slope becomes less than ten (10) percent.

Top of bank (vertical bulkhead): the point at the top of the bulkhead where a line between other analogous points is located continuously over land and does not cross over the water.

5.2.3 Exceptions

Exceptions to the setback requirement include existing structures or buildings that are located within the setback zone and river-dependent industrial uses that require barge access.

Setbacks on Bubbly Creek shall accommodate;

- Riverbank improvements,
- Stormwater best management practices,
- Public riverwalk trail, and
- Landscape buffer/screening.

All new developments on Bubbly Creek are required to setback sixty (60) feet from the existing top of the bank as established by survey at the time of planned development application.

Image 5.2: Kayaking on Bubbly Creek

5.3 Guidelines for the Repair of Slopes

Excessively steep slopes are required to be repaired and re-contoured to a minimum 3H:1V slope. The slope shall be planted with native vegetation and stabilized with an erosion control fabric or geotextile reinforcement system. Terracing, soil wraps, and other bioengineered solutions are other options that can be used to treat steeper slopes.

Toe of Bank Stabilization. The toe of the bank is the point where the riverbank meets the water and may need to be reinforced with rip rap, coir logs, and live staking to control water line erosion and scour from fluctuating water levels.

Tree Survey. A tree inventory of all trees larger than eight (8) inches in diameter at breast height (DBH) will be required.

Removal of Trees. Re-contouring of the bank may entail the removal of a significant number of trees. Care should be taken to preserve the healthiest and largest trees, particularly trees located at the toe of the bank.

5.4 Guidelines for Repair or Modification of Seawalls

The construction of new seawalls or bulkheads is discouraged along Bubbly Creek. If a new seawall or bulkhead is necessary, the height of the new seawall shall be as low as possible, but above the high water mark, and no taller than the height of the seawall on adjacent properties.

Seawalls shall be lowered to the extent possible, but not below the existing tie back anchorage system, to accommodate a sloped natural vegetated embankment between the development site grade and the top of the modified seawall. The slope of this embankment shall not exceed 3H:1V

Additionally, the top of the seawall shall be covered with overhanging native vines or vegetation.

5.5 Stormwater Management Requirements

Central to improving the environmental quality of Bubbly Creek is the integration of above ground stormwater BMPs. To the extent possible, the river setback should manage as much of the stormwater from the development site before diverting stormwater into the sewer system or waterway.

Purpose. Stormwater BMPs, such as vegetated bioswales, infiltration strips, and level spreaders, will attenuate water flow and improve water quality.

Swales with native grass vegetation is nearly twice as effective as pavement in reducing velocity and flow. The slower the flow, the more effective the swale will be at assimilating nutrients before they reach the water body.

Design. The stormwater management plan extends beyond the river setback and should be integrated into the entire development site to include design elements such as parkway swales, grading, pumps, rain gardens, green roofs, permeable pavements, and ponding on roadways. Conveyance to the river setback is accomplished through a sewer pipe connection or

swale. Underdrains are recommended as a base for permeable pavements if the underlying soil is not sand.

Avoid designing linear swale systems characteristic along highways. The design should be more fluid, sinuous, and naturalistic, and does not necessarily have to be designed as one continuous swale, but a network of swales connected by culverts. The design should also provide an opportunity for public education and interpretation.

Size and Release Rate Requirements. Alternative sizing methodologies, in lieu of, or in addition to the ones below, may be specified by the Department of Water Management.

For volume-based BMPs (infiltration basins, rain gardens, permeable pavers), BMPs should be sized to capture and retain the first flush volume, defined as the first half-inch of precipitation.

For flow-based BMPs (swales, filter strips), BMPs should be sized to treat the first flush storm, defined as the two-year, one-hour storm based on the city's standard precipitation data used in stormwater calculations (Bulletin 70). First, flush flow velocity should be kept to less than one foot per second with a minimum BMP residence time of nine (9) minutes to allow for adequate settling of particulates. The 100-year flow velocity should also be evaluated to ensure it does not scour the riverbank.

For ponds and stormwater wetlands, Release rates should be no greater than 0.04 CFS/acre for the two-year, 24-hour storm event based on the city's TP-40 rain data.

Construction of a single BMP large enough to meet the water quality requirement may not always be possible. Therefore, a combination of BMPs in the series ("treatment train") may be used.

Landscaping. Stormwater bioswales shall be planted with native wet prairie mix, predominated by native grasses at least eight (8) inches in height. Prairie grasses with deep root systems are more effective at attenuating flow and capturing pollutants than turf grass.

Maintenance. Once the vegetation is established, stormwater BMPs require very little maintenance. Mowing or prescribed burning may be done once every two (2) to three (3) years to remove the accumulated dead organic material **Appendix 7.4: Plant Palette on page 92**.

Stormwater BMPs should be kept free of obstructions and debris which may impede flow.

5.6 Landscape Buffer and Riverwalk Multi-Use Path

Private uses outside the 60-foot river setback area need to be appropriately screened by landscaping. Apart from the specifications outlined in Chapter 5, the following apply:

Riverwalk trail. The placement of the riverwalk trail shall not be located on the riverbank nor on top of stormwater swales or infiltration areas as to impede the flow of water. Boardwalks are a solution to locate a path on top of a stormwater BMP without interfering with its function.

Landscape design. The intent is that the entire 60-foot setback area is planted with native vegetation. Trees and shrubs should be located in naturalistic layered groupings.

The placement of landscape screening should be sensitive to the placement of stormwater BMPs so as not to impede its capacity to convey or infiltrate stormwater.

Fencing. To create a naturalistic aesthetic, fencing is discouraged on the multi-use path, with an exception for safety purposes where the path approaches the riverbank.

5.7 Development Requirements

The development zone for Bubbly Creek is the area outside the 60-foot setback area, that may be developed or redeveloped with new or existing structures for residential, commercial, and manufacturing uses, as allowed by zoning. **3.12 Guidelines for Improvements Outside of the Required Setback on page 37** specifications apply.

6 IMPLEMENTATION

River Edge Idea Lab: Congress Water Steps

SOM created a new vision for the riverfront near Congress Parkway that aims to breathe life into the River through a Soundgarden of falling water.

6.0 IMPLEMENTATION

Project Information

Project Location		
Project Address	_____	
Type of Project (land use)		
Size of Project		
Is this a river dependent or critical service use?	□ Yes	□ No
Character Zone	□ Northwest Zone □ North Branch Zone □ Loop Zone	□ South Branch Zone' □ Southwest Zone □ Bubbly Creek Zone
30 ft. river setback (as verified by plat of survey)	□ Yes	□ No
Public Access	□ Yes	□ No

Chicago River Design Guidelines

3.2 Multi-Use Path		
3.2.1 Design Criteria	□ Yes	□ No
3.2.2 Public Access	□ Yes □ N/A, please describe	□ No
3.2.3 Minimum Path Width, select all that apply	□ Separated 12' bicycle, 8' pedestrian □ Combined, 16'	□ Combined, 10' □ Combined, 10' with 2' paved, gravel, or mowed shoulders □ Other, please describe below
3.2.4 Paving and Materials, select all that apply	□ Granite □ Architectural Granite □ Poured-in-Place Concrete □ Concrete Pavers □ Unit Pavers	□ Permeable Pavers □ Asphalt □ Decomposed Aggregate □ Other, please describe below

Comments, please not which section from the list above (e.g. 3.2.3) you're describing	

3.3 Furnishings

3.3.1 Site Furnishing Guidelines		
Materials, select all the apply	□ Stainless Steel □ Galvanized Steel □ Powder Coated Steel	□ Hardwoods, describe below □ Recycled Plastic Lumber, describe below □ Other, please describe below
Benches & Tables, on per 250 linear feet (LF) of river frontage.	LF of river frontage Total Benches Total Tables	_____ _____ _____
Trash and Recycling Receptacles, one metal trash and one metal recycling receptacles per 250 linear feet (LF) of river frontage	LF of river frontage Total Trash Receptacles Total Recycling Receptacles	_____ _____ _____
Railings	□ Yes	□ No

Comments, please note which section from the list above you're describing	

3.4 Seating and Gathering Areas

3.4.1 Seating Area Guidelines		
Location, one per 500 linear feet (LF) of river frontage.	LF of river frontage Total Seating Areas	_____ _____
Furnishings, Each seating area should provide a minimum of two benches and one trash receptacle.	Total Benches Total Trash Receptacles	_____ _____

3.5 Lighting

3.5.1 Lighting Guidelines, see follow pages for an example of an acceptable product data sheet.		
Fixture Height, recommended between 14-30 feet tall	□ Yes, between 14-30'	□ Other, please describe below
Color Temperature, LED bulbs that provide white light with a color temperature of 3000K or below.	□ 3000K or below	□ Other, please describe below
Light Pollution	□ Dark Sky Compliant	□ N/A
Additional Features	□ Yes, please describe below	□ No
Security Lighting	□ Yes	□ No

Comments, please note which section from the list above you're describing	

3.6 Wayfinding and Signage

3.5.1 Lighting Guidelines6.1 Signage Guidelines		
Brand and Identity	□ Yes □ N/A	□ No
Directional Signage, indicate total signs	□ Yes □ N/A	□ No
Mile Marker, locate every quarter mile	□ Yes □ N/A	□ No
Regulatory Signage, indicate total signs	□ Yes □ N/A	□ No
Identity Signage, indicate total signs	□ Yes □ N/A	□ No

Comments, please note which section from the list above you're describing	

3.7 Landscaping

3.7.1 Preservation and Restoration Guidelines		
Preservation, preserve existing habitat and plantings	□ Yes □ N/A	□ No
Disturbance, minimize site disturbance	□ Yes □ N/A	□ No
Protection, protect existing vegetation during construction by installing tree protection fence	□ Yes □ N/A	□ No
Tree Preservation and Removal, preserve mature, healthy, native shade and evergreen trees	□ Yes □ N/A	□ No
3.7.2 Plant Selection Guidelines		
Plant Selection, per Appendix 7.4. Identify total number of plants selected from Appendix list.	Submergent Emergent Riparian Upland	_____ _____ _____ _____
Fencing, 4-6' ornamental metal fence for vehicular use areas, 4' ornamental metal fence for non-vehicular use areas	□ Yes , height _____ □ N/A	□ No
Trees, 2 per 25 LF of river frontage for vehicular use areas, 1 per 25 LF for non-vehicular use areas	LF of river frontage Total Vehicular Area Trees Total Non-Vehicular Area Trees	_____ _____ _____
Hedges, continuous hedge on the river side of fence is required for vehicular use areas	□ Yes □ N/A	□ No
Foundation Plantings, required for non-vehicular use areas	□ Yes □ N/A	□ No

Comments, please note which section from the list above you're describing	

3.8 Riverbank Treatments

3.8.1 Riverbank Guidelines

Existing sloped riverbank is to be retained and improved	□ Yes	□ No

3.9 River Edge Treatments

3.9.1 River Edge Guidelines

Describe the proposed river edge stabilization and enhancement treatments.	

3.10 Sloped Bank Treatments

3.10.1 Sloped Bank Guidelines

Describe the proposed sloped bank treatments.	

3.11 Vertical Bulkhead or Seawall Treatments

3.11.1 Vertical Bulkhead or Seawall Guidelines

Describe the proposed vertical bulkhead and seawall guidelines treatments.	

3.12 Guidelines for Improvements Outside of the Required Setback

3.12.1 Design, Orientation, and Massing of New Structures and Buildings

Placement, locate buildings and vehicular areas outside of the river setback	□ Yes , height _____ □ N/A	□ No
River-facing façade, river-facing facade should be designed as a principal or major façade	□ Yes , height _____ □ N/A	□ No
Massing and Articulation, locate lower buildings with active frontage adjacent to river setback area. Step back massing along river. Locate taller buildings behind low buildings	□ Yes □ N/A	□ No
Neighborhood Transitions, step down height of buildings to transition to the scale of adjacent neighborhoods	□ Yes □ N/A	□ No
First Floor, activate first floors of buildings with direct access to river and multi-use path	□ Yes □ N/A	□ No
Wildlife, incorporate bird-friendly design standards into building designs	□ Yes □ N/A	□ No
Sunlight, river corridor should have sunlight for approximately six (6) hours per day	□ Yes □ N/A	□ No

	3.12.2 Screening Guidelines		
	Outdoor Storage, if necessary, storage areas should be locatede beyond the minimum 30' setback area	□ Yes , height _____ □ N/A	□ No
	Materials, select all that apply	□ Poured-in-Place Concrete □ Split Face Concrete Masonry Units □ Ground Face Concrete Masonry Units	□ Heavy Wood □ Other, please describe below
	Walls and Fences, screening walls and fences should be planted with vines at the base	□ Yes □ N/A	□ No
	Access, fencing that separates the riverfront from the outside of the setback area should be avoided	□ Yes □ N/A	□ No
3.13 Transition Between Adjacent Developments			
	Describe the proposed transitions and treatments between adjacent developments		

Menu of Improvements

4.1 Overview

4.1.1 Application

PD Project Size	□ Large, >1,980 LF of riverfront □ Medium, 660-1,980 LF of riverfront	□ Others
	Total Expected Menu Items	_____
	Required # of Priority Menu Items	_____

4.3 Nature

4.3.2 New Naturalized Shoreline (priority)

Describe the proposed new naturalized shoreline improvements

4.3.3 Stormwater Management Best Practices (priority)

Describe the proposed stormwater management best practices

4.3.4 Aquatic Wildlife Habitats (priority)

Describe the proposed aquatic wildlife habitats

4.3.5 Robust Urban Habitats

Describe the proposed robust urban habitats

4.3.6 Increased Setback

Describe the proposed increased setback

4.3.7 :Large Riverfront Park

Describe the proposed large riverfront park

4.4 Recreation

4.4.2 Access to Water and Docking Facilities

Describe the proposed access to water and docking facilities

4.4.3 Expanded Seating Areas

Describe the proposed expanded seating areas

4.4.4 Riverfront Overlooks

Describe the proposed riverfront overlooks

4.4.5 Recreational Areas

Describe the proposed recreational areas

4.4.6 Support Amenities

Describe the proposed support amenities

4.5 Connectivity

4.5.2 Underbridge Connections

Describe the proposed underbridge connections

4.5.3 Enhanced Connections to Street & Transportation Network

Describe the proposed enhanced connecttions to the street and transportation network

4.5.4 Elevator / Increased Accessibility

Describe the proposed elevator / increased accessibility

4.5.5 Cantilevered & Floating Walkways

Describe the proposed cantilevered and floating walkways

4.5.6 Interpretive Signage

Describe the proposed interpretive signage

4.5.7 Public Art & Specialty Lighting

Describe the proposed public art and specialty lighting

.hess

LINEA 450 LVC

Specification

The LINEA series features distinctly linear design qualities and exceptional versatility. Perceptively capturing today's minimal design philosophy, the reduced form is sure to retain its validity far into the future. It is available in three mounting heights in single or twin mounting configurations. The pedestrian-scale model is 15 feet, with intermediate and larger sizes at 20 and 26 feet, respectively, giving proper scale for a variety of applications. Units for bi-level mounting are available, where the street-side luminaire is mounted high and a second fixture is mounted on the sidewalk side at a lower height for pedestrian illumination. An LED illuminating bollard for low-level pathway illumination complements the family of products. CSA Listed for Wet Locations

For example only, use of this cut sheet does not imply approval of or preference for product shown. This sheet is for demonstration purposes only.

Model	LED Module	Color Temperature	Distribution	Volt	Mounting	Pole	Pole Mat	Finish	Option
LN450	2LVC - 2 modules	WW -3000K	T2 - Type II	UNV - 120-277V	A - Single Mount	15SR - 15' Straight Rectangular	A - Aluminum	SG - Silver Grey	DIM - 0-10vDC Dimming
		NW - 4000K	T3 - Type III		B - Twin Mount	X - Other (specify)	S - Steel	DG - Dark Grey	N - None
			T4 - Type IV					GG - Graphite Grey	
								BLK - Matte Black	
								BRZ - Dark Bronze	
								CC - Custom Color	

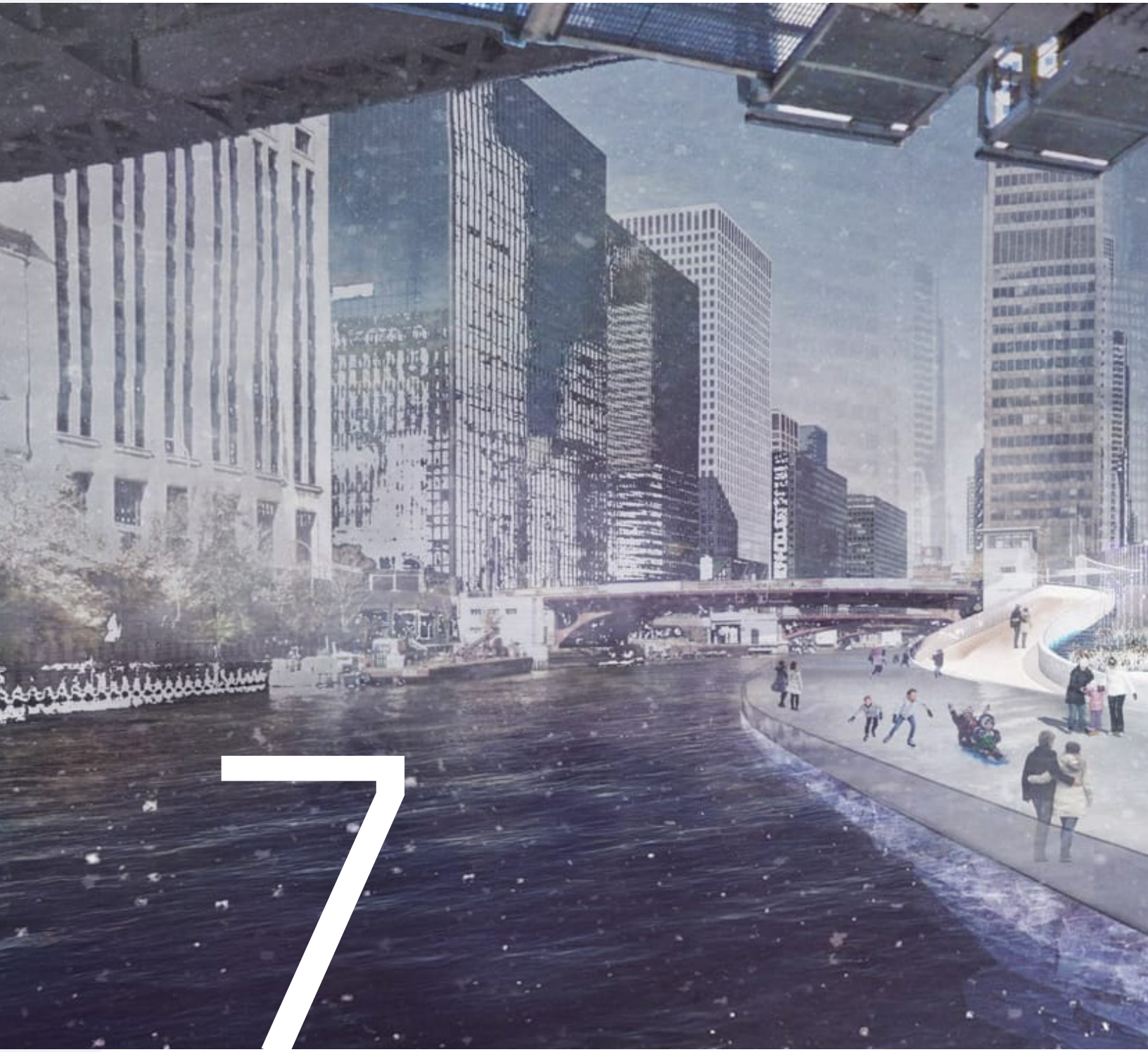
Ordering Information

Specifications are subject to change without notification

HessAmerica › Products › Lighting Products › Pole Mounted Luminaire › LINEA

https://www.hessamerica.com/Products/Lighting/Pole_Mounted_Luminaire/LINEA/

Page 1



7

APPENDIX

River Edge Ideas Lab: Tracking Wacker

Tracking Wacker, by SWA Group, combines ecology and spectacle to highlight the importance of the riverways in Chicago. Each wind-belt pole is topped with an LED light, powered by the wind harvesting technology. These lights come to life with the river's breeze, thus giving a real-time visualization of a natural energy resource.

7.0 APPENDIX

Appendix 7.1: Community Engagement Summary

River Edge Ideas Lab / Sept 2017-Jan 2018

In 2017, the City of Chicago Department of Planning and Development (DPD) and the Metropolitan Planning Council (MPC) initiated the River Edge Ideas Lab project.

The project is primarily a public participation effort to include as many voices as possible in the future of the Chicago River. Before any proposed revisions to the Chicago River Design Guidelines had been developed, DPD and MPC posed key questions and gathered input from the public as a starting point for the project.

The River Edge Ideas Lab engaged nine (9) leading architecture and landscape architecture firms to reinvent Chicago's second coast through innovative concepts for placemaking and ideas for creating a continuous and accessible pedestrian and bicycle path with integrated open spaces along the Chicago River.

More than 11,500 people visited the main River Lab exhibit in Expo 72. Nearly 300 attendees came to the Gallery Talks and panel. 500+ people gave feedback via the online survey and vision cards with their ideas for the river, and over 6,700 people visited the website. An estimated 24,000 people have passed by the eight (8) traveling exhibit locations.

- Public Exhibit/Gallery (11,500 visitors)
- Weekly Gallery Talks
- Exhibit Tours
- Traveling Exhibit (24,000 visitors)
- Multi-Media Website/Video
- Online Survey/Written Feedback (500 respondents)
- Public Panel Discussion

Feedback gathered from the River Edge Ideas Lab informed the updates to the Chicago River Design Guidelines regarding development constraints, river ecology, and typical edge conditions. The River Edge Ideas Lab presented 27 highly innovative design concepts for the public to react to, which catalyzed even more ideas.

DPD and MPC encouraged Chicagoans to examine the ideas and share their opinions about the best and most engaging concepts through a variety of public engagement strategies to maximize participation. Methods included:

Public Exhibit/Gallery: Open for four (4) months, the exhibit had educational and interactive components, including 3D video modeling, an online survey kiosk, a participatory vision wall, and design BINGO game.

Weekly Gallery Talks: Each of the design firms presented a public lunchtime talk that delved deeper into the design ideas.

Exhibit Tours: DPD and MPC staff provided guided tours of the exhibit upon request.

Traveling Exhibit: To reach a broader audience, a video satellite exhibit was installed at eight (8) locations across the city. Locations were selected for the proximity to the river and geographic diversity.

Multi-Media Website: High-quality viewing format, including videos, interviews, and simple feedback tools.

Online survey: A survey asked the public to respond to high-level questions regarding the presented design concepts and elements to be included in future development. The survey was primarily available online throughout the exhibit but was also presented at the gallery in paper form.

Public Panel Discussion: During the Chicago Architecture Biennial, a panel of notable developers and city planners discussed recent riverfront projects around the city.

Video: Several videos were developed throughout the River Edge Ideas Lab project, including an introductory video, a rotation of 3D models of each designers' vision, and a summary of public input through the myriad engagement tools. The three videos can be viewed online at www.chiriverlab.com

Key Themes

Three key themes emerged across the various public participation opportunities:

- The river edge should have a natural aesthetic.
- Designs shoud be creative and unique, while utilizing consistent elements to unify and connect the entire river edge.
- Recreation and public access should be central to any design.

Specific Feedback

Specific feedback related to each of these three key themes includes:

- Restoring wildlife habitat and improving water quality;
- Access and connectivity to adjacent communities;
- Opportunities for kayaking and canoeing;
- Continuous pedestrian and bicycle trails;
- Lighting and security;
- Flexible, multi-purpose gathering spaces;
- Opportunities for community events and activities;
- Four season programming;
- Historic preservation and education; and,
- Continued community involvement.

North Branch Industrial Corridor Framework Plan and Design Guidelines 2016-2017

Under Mayor Rahm Emanuel's direction, the DPD initiated a public review process in Spring 2016 to evaluate and refine land use policies for continued growth and private investment in the city's industrial corridor system.

For the North Branch Industrial Corridor (NBIC) Framework Plan and Design Guidelines, DPD engaged the community, resulting in a robust, transparent planning process, including:

- 12 public meetings (over 800 attendees)
- Five (5) published meeting summaries
- Six (6) neighborhood group meetings
- 366 emails and 49 letters from stakeholders
- 53 Maps created via sMap, with 192 original sMap comments

Stakeholders provided thoughtful insight on important community issues and offered meaningful input and feedback throughout the extensive community engagement process. Themes of input include:

Economic Development

- Allow the area to continue acting as an economic engine and job center;
- Establish an urban innovation district with good paying jobs;
- Explore the appropriate mix of land uses needed to ensure the area is sustainable while being mindful of the operational needs of businesses and their impact on adjacent areas;
- Provide effective buffers between incompatible land uses;
- Provide existing heavy-industrial businesses assistance to relocate within the city's other industrial corridors; and,
- Areas adjacent to the NBIC could provide retail and entertainment areas to support the future mix of uses within the NBIC.

Transportation

- Improve connections to existing transit stations;
- Enhance the multi-modal transportation network to accommodate all existing and future uses adequately;
- Extend the 606 eastward to the river and neighborhoods;
- Add new/widened streets, bridges, sidewalks, and bike lanes that connect and integrate into existing transportation framework to alleviate traffic congestion;
- Use a coordinated approach to parking and last-mile transit; and,
- Address aging infrastructure which is unsafe and inadequate to serve existing uses.

Open Space

- Maximize the value of the river to continue to provide transportation and recreational opportunities;
- Provide a continuous river trail;
- Provide a large regional park for active recreation;
- Provide guidelines to support ecological conditions and natural habitat/wildlife;
- Provide habitat in-stream and in the banks;
- Maximize open space for people, wildlife, and stormwater management;
- Include numerous dedicated river access points;
- Manage river traffic between industrial and new uses; and,
- Create new public open spaces in appropriate areas.

Urban Design

- Create urban design guidelines that promote the authentic character of the area;
- Utilize important character elements found within the area; and,
- Provide new coordinated wayfinding.

Great Rivers Chicago / 2016

The Great Rivers Chicago initiative was led by the City of Chicago, MPC, Friends of the Chicago River, and Chicago Metropolitan Agency for Planning (CMAP) with the mission of shaping the future of the Chicago, Calumet, and Des Plaines rivers through community engagement.

The Chicago River public outreach was divided into six (6) areas throughout the city. Outreach was conducted from 2015 to 2016 for each area through three primary methods:

- Group interviews
- Public meetings/activities
- Online survey (3,800 respondents)

Key feedback included:

- The river and riverfront should be a thriving habitat for animals and plants;
- The riverfront should be an active and vibrant place with a range of recreational opportunities, including spaces for events, performances, and gathering;
- The river/riverfront should be cleaner;
- Better access to the river is needed; and,
- There should be a balance between development and natural areas

CDOT South Branch Implementation Plan / ongoing

As part of CDOT's South Branch Implementation Plan, a series of 25 stakeholder interviews was conducted to glean feedback from the following stakeholders:

- Passenger river users
- Recreational river users
- Industrial river users
- Development
- Parks and recreation
- Government stakeholders (DPD and other City government organizations)

Key feedback from the completed interviews include:

- Riverfront development on the South Branch is desirable and will likely contribute to economic development;
- The riverwalk should be designed to function for a diversity of users; and,
- With an increase of the number and types of users, safety should be a key part of the planning process.

River Implementation Committee / ongoing

The City of Chicago, with help from the MPC, established a local advisory committee comprised of community leaders, elected officials, business owners, residents, and key stakeholders to serve the Chicago River development. This committee represents the diverse users and stakeholders for the river, and provides input and feedback on the River Edge Design Guidelines.

Summary

Generally, the public and stakeholders have welcomed the opportunity to learn about typical river edge conditions, contribute their input about future development, and provide feedback on the innovative Ideas Lab designs.

Conducting this public engagement effort early and in various formats ensures the maximum level of public influence over the future of the Chicago River.

The ideas and public input gleaned from this engagement, summarized in this report, informed the updated River Edge Design Guidelines.

Appendix 7.2: Federal Navigation Channels and Permit Processes

The Illinois Waterway Navigation Charts cover the Illinois Waterway from the confluence of the Illinois and Upper Mississippi Rivers to Lake Michigan at Chicago and Calumet Harbors. The charts were updated in 2013. They are available to purchase in hard copy format from the Illinois Waterway (at Starved Rock Lock & Dam) and Mississippi River (at Locks & Dam 15) Visitor Centers, and digital copies are freely available for download. See **Appendix 7.3: Additional Information and Websites on page 95.**

The following section outlines maps from the U.S. Army Corps of Engineers delineating the Federal Navigation Channel within the Chicago River Waterway (source: U.S. Army Corps of Engineers Illinois Waterway Charts).

Federal Navigation Channel

The federally authorized portion of the river open to commercial navigation includes the Main Branch, South Branch, a portion of Bubbly Creek north of 31st Street, the Sanitary and Ship Canal, and the portion of the North Branch south of Addison Street.

Army Corps Regulatory Overview

If a project involves work in, over, or under navigable waters of the United States (Section 10 of the Rivers and Harbors Act of 1899, "Section 10"), discharges of dredged or fill material (Section 404 of the Clean Water Act, "Section 404"), or construction that may affect a Federal civil works project and/or a Federal Navigation Channel (Section 14 of the Rivers and Harbors Act of 1899, "Section 408") require authorization (Section 10/Section 404) or permission (Section 408) from the US Army Corps of Engineers.

The Corps of Engineers, Regulatory Branch, reviews requests for authorization under Section 10 and Section 404. The federal regulations that implement the Section 10 and Section 404 authorities are found in Title 33, Code of Federal Regulations, Parts 320-332. Accordingly, Section 10 and/or Section 404 authorization may take the form of an individual (standard) permit, a (regional or nationwide) general permit, or a letter of permission. The Corps of Engineers typically encourages applicants to plan for at least one (1) year for review and approval of an individual permit, and approximately 60 days for general permits. The Corps of Engineers always endeavors to use the most expedient review process possible (i.e. consideration under a general permit before an individual permit), subject to the circumstances of any particular project.

The Corps of Engineers also reviews requests for permission to alter federal projects (which includes congressionally-authorized navigation channels) under Section 408. The Corps of Engineers implements its Section 408 authority under Engineering Circular 1165-2-220.

Many, if not all, Corps of Engineers Regulatory and Section 408 reviews require some degree of interaction with other federal laws and the associated regulatory agencies, which include Section 7 of the Endangered Species Act (US Fish and Wildlife Service), Section 106 of the National Historic Preservation Act (IL Dept. of Natural Resources, Native American Tribes), the Coastal Zone Management Act (IL Dept. of Natural Resources) and Section 401 of the Clean Water Act (IL Environmental Protection Agency). For some general permits, some of these coordination is already complete on a programmatic basis, saving time to project proponents.

The Corps of Engineers Regulatory Branch partners with several other agencies in making permit decisions. For example, soil erosion and sediment control plans are required, and the Corps often partners with local Soil and Water Conservation Districts for technical review and approval of these plans. The Corps also partners with the U.S. Coast Guard on issues of navigation and marine safety. These reviews often focus on whether the project is in accordance with the 2012 "Ports and Waterways Safety Assessment Workshop Report." These reviews occur during the overall timeframes for permit review and may affect the total time to reach a decision.

Because of the possible complexity of the review required for projects on the Chicago River, the Corps of Engineers recommends one or more pre-application meetings to discuss the applicant's proposed project. This gives the Corps a chance to understand the project and guide the applicant to ensure the smoothest possible permitting process, including coordination with other agencies.

Permit for Floodplain Development

A permit is required before construction or development begins within any Special Flood Hazard Area (SFHA). If FEMA has not defined the SFHA within a community, the community shall require permits for all proposed construction or other development in the community including the placement of manufactured homes, so that it may determine whether such construction or other development is proposed within flood-prone areas. Permits are required to ensure that proposed development projects meet the requirements of the NFIP and the community's floodplain management ordinance.

A community must also review all proposed developments to assure that all necessary permits have been received from those governmental

agencies from which approval is required by Federal or State law.

Illinois Department of Natural Resources

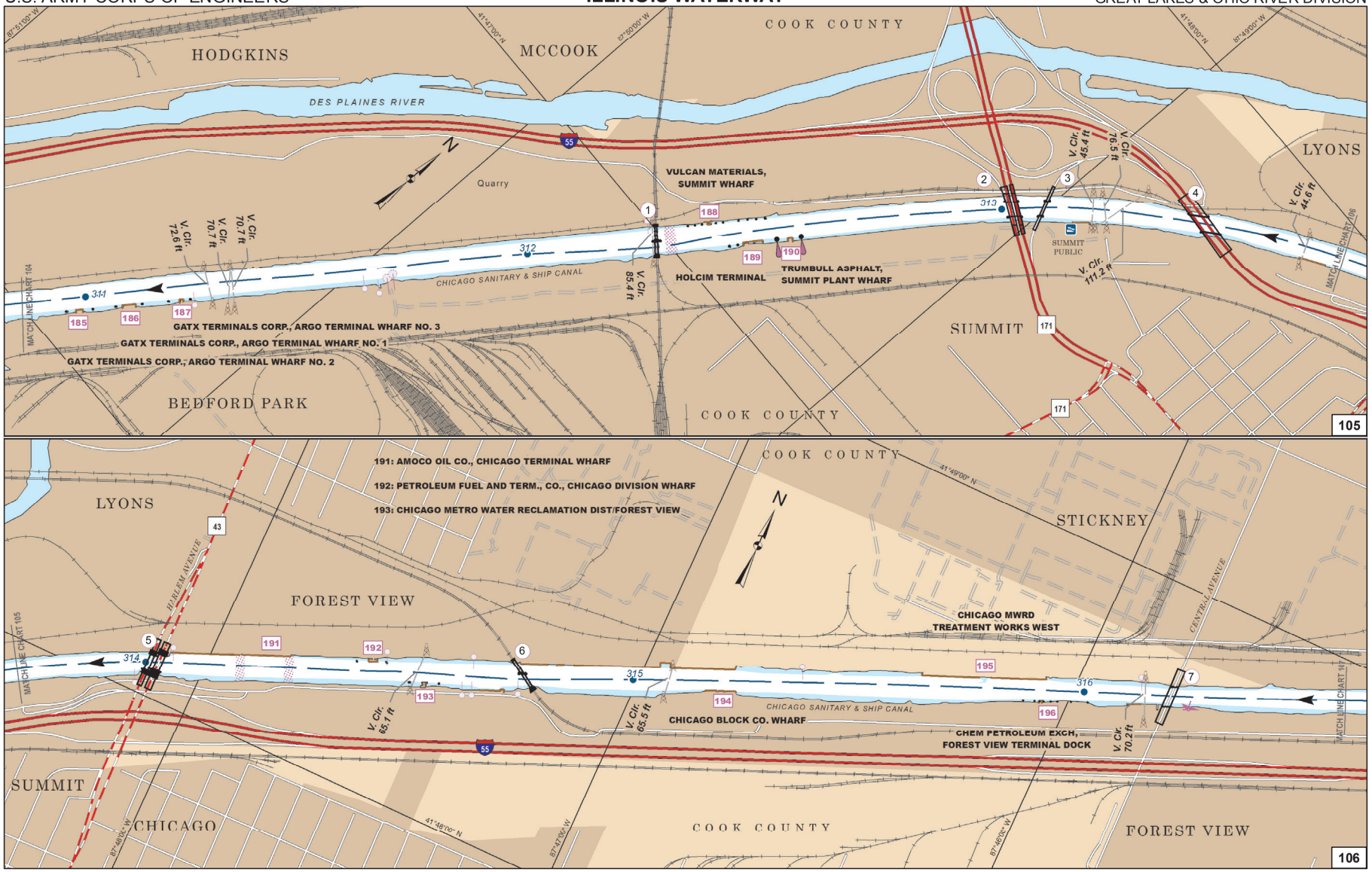
The Division of Water Resource Management (DWRM) issues permits for work in and along the rivers, lakes and streams of the state, for activities in and along the public waters, including Lake Michigan, and for the construction and maintenance of dams.

Generally, the Division issues an individual formal permit to the applicant to demonstrate compliance with the rules. In some cases, the Division has issued statewide, regional and general permits to reduce paperwork for the applicant. The statewide and regional permits describe a general project type and set limits on the scope of the work. If the proposed work meets all the specified limits, the project is approved under the statewide or regional permit.

U.S. ARMY CORPS OF ENGINEERS

ILLINOIS WATERWAY

MISSISSIPPI VALLEY DIVISION
GREAT LAKES & OHIO RIVER DIVISION



2013

BUOY POSITIONS ON CHART ARE APPROXIMATE, SEE NOTICE IN LEGEND

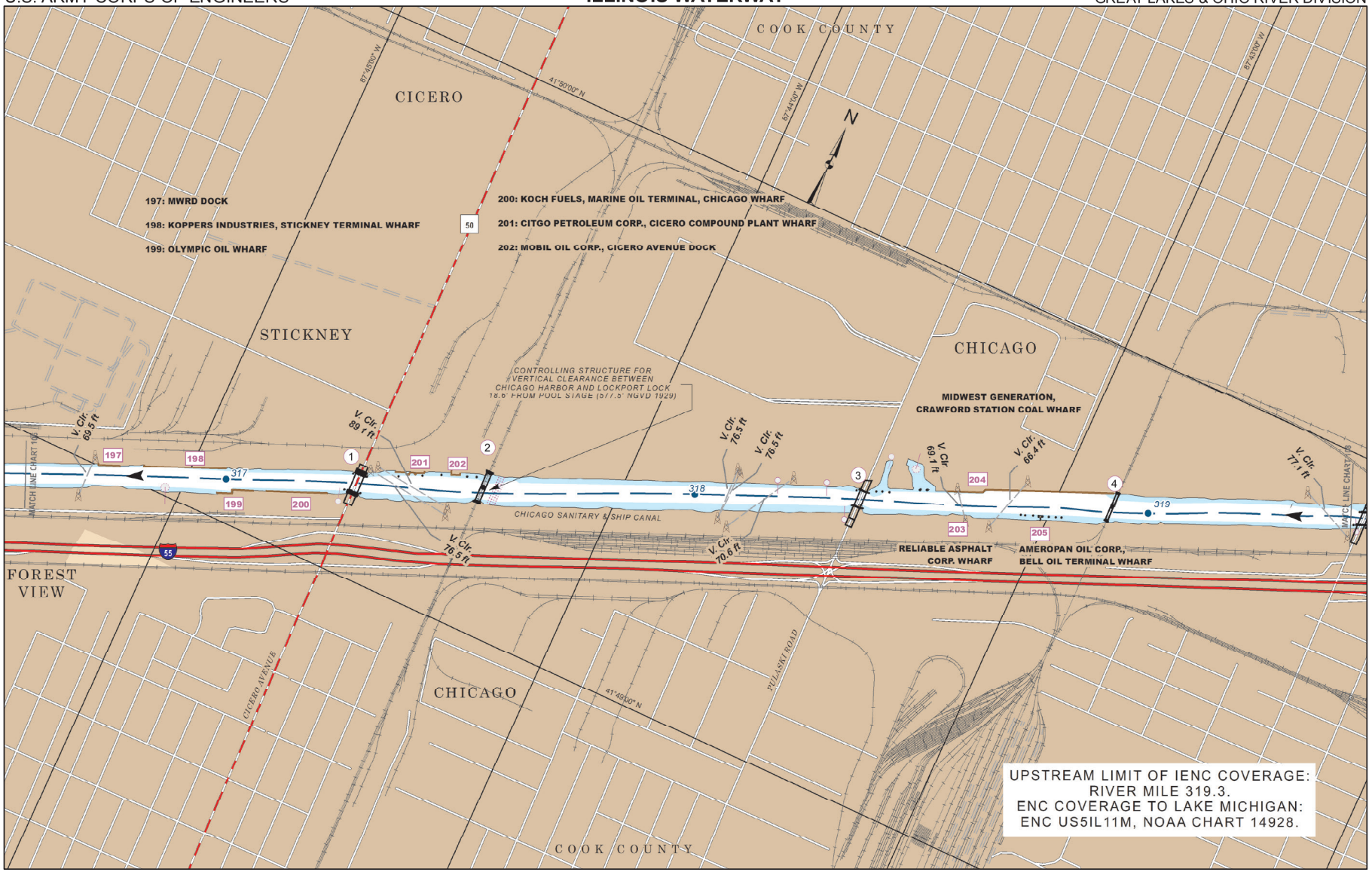
SCALE: 1 " = 1,000 '
0 1,000 2,000 3,000 Feet

CHART NO. 105 - 106
RIVER MILE 310.9 TO 316.6

U.S. ARMY CORPS OF ENGINEERS

ILLINOIS WATERWAY

MISSISSIPPI VALLEY DIVISION
GREAT LAKES & OHIO RIVER DIVISION



2013

BUOY POSITIONS ON CHART ARE APPROXIMATE, SEE NOTICE IN LEGEND

SCALE: 1 " = 1,000 '
0 1,000 2,000 3,000 Feet

CHART NO. 107
RIVER MILE 316.6 TO 319.4

U.S. ARMY CORPS OF ENGINEERS

ILLINOIS WATERWAY

MISSISSIPPI VALLEY DIVISION
GREAT LAKES & OHIO RIVER DIVISION

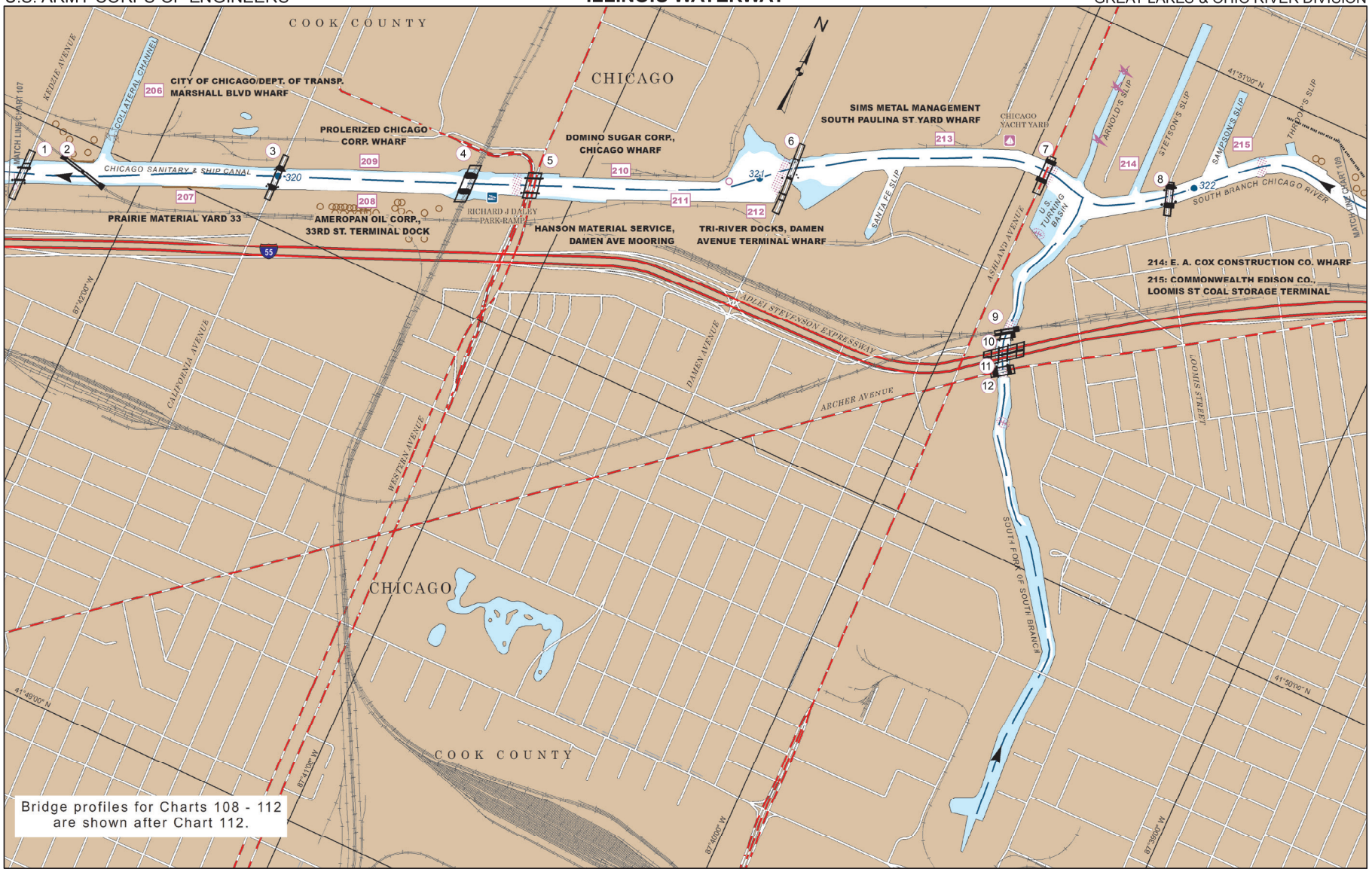


CHART NO. 108
RIVER MILE 319.5 TO 322.4

BUOY POSITIONS ON CHART ARE APPROXIMATE, SEE NOTICE IN LEGEND

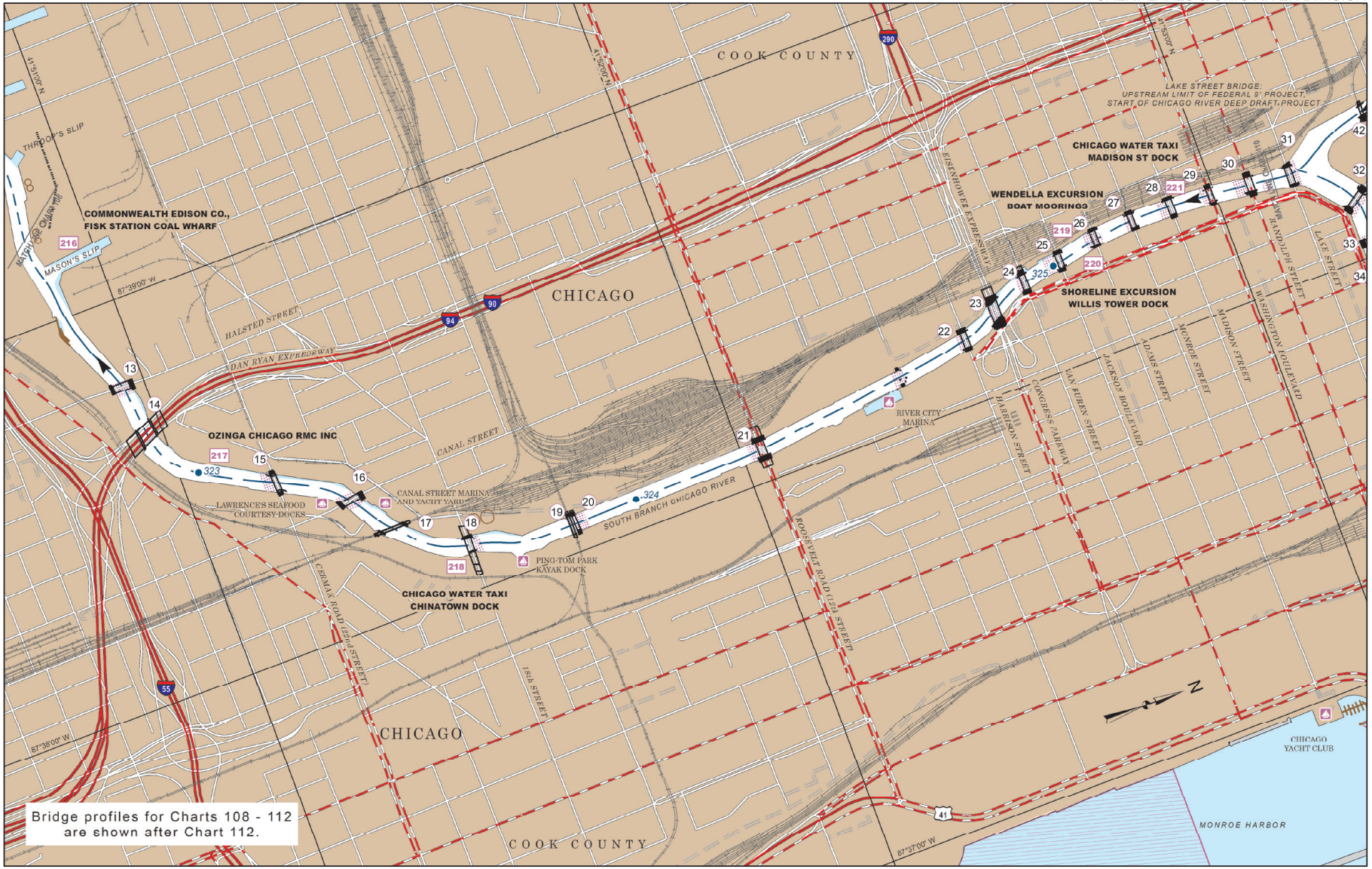
SCALE: 1 " = 1,000 '
0 1,000 2,000 3,000 Feet

2013

U.S. ARMY CORPS OF ENGINEERS

ILLINOIS WATERWAY

MISSISSIPPI VALLEY DIVISION
GREAT LAKES & OHIO RIVER DIVISION



2013

BUOY POSITIONS ON CHART ARE APPROXIMATE, SEE NOTICE IN LEGEND

SCALE: 1 " = 1,000 '

0 1,000 2,000 3,000 Feet

CHART NO. 109
RIVER MILE 322.3 TO 325.7

U.S. ARMY CORPS OF ENGINEERS

ILLINOIS WATERWAY

MISSISSIPPI VALLEY DIVISION
GREAT LAKES & OHIO RIVER DIVISION

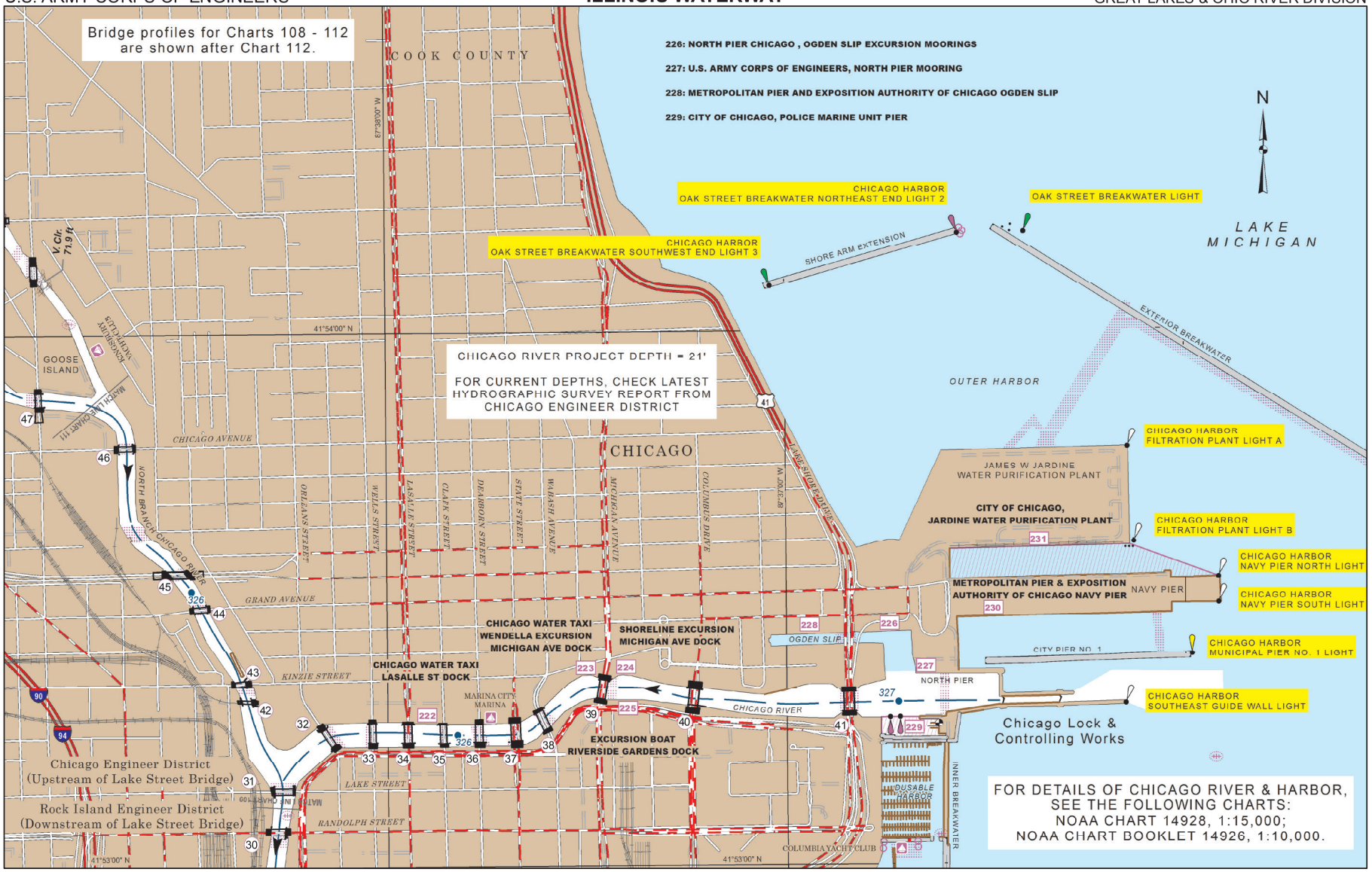


CHART NO. 110
RIVER MILE 325.4 TO 326.6

BUOY POSITIONS ON CHART ARE APPROXIMATE, SEE NOTICE IN LEGEND

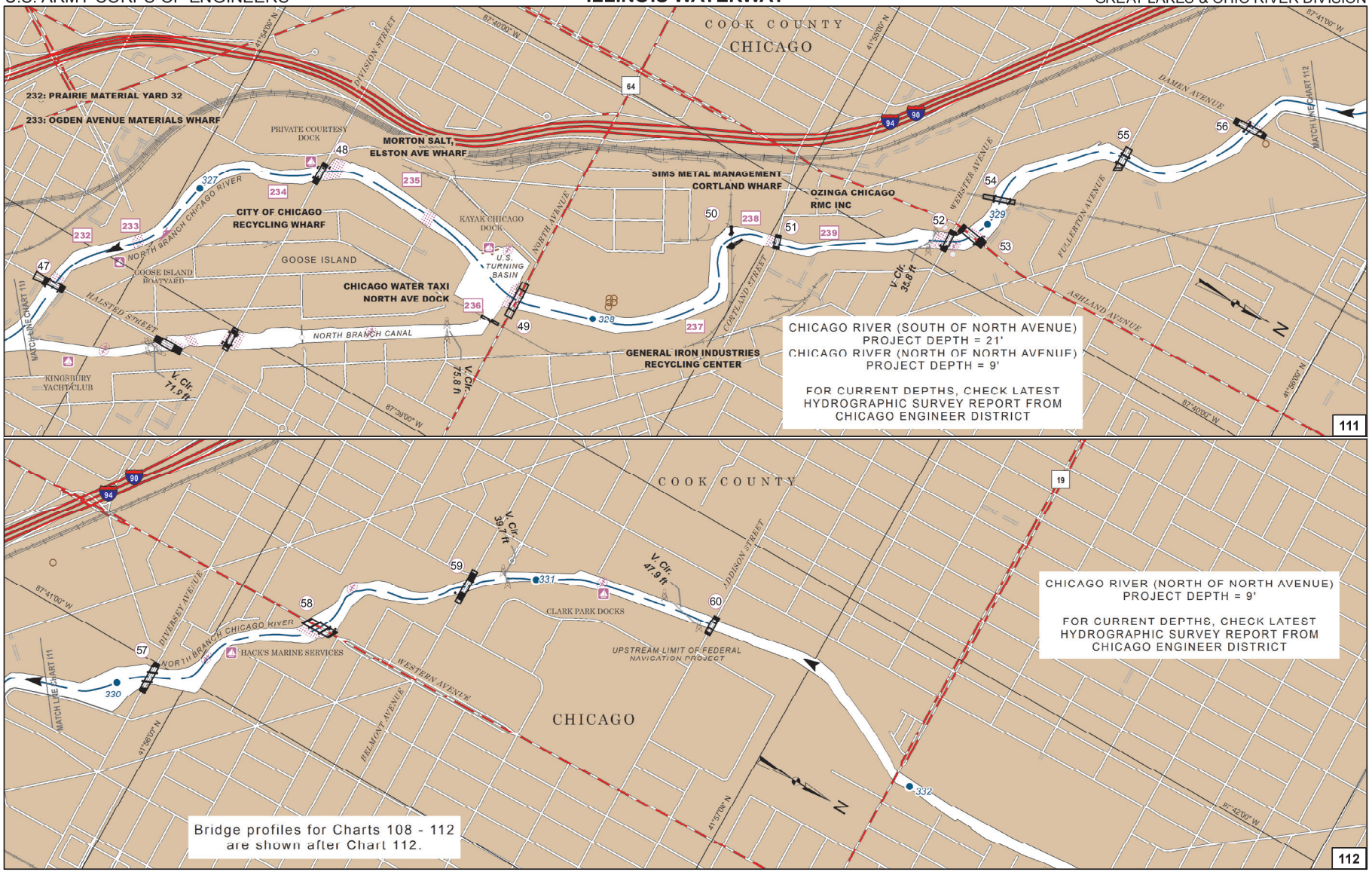
SCALE: 1 " = 1,000 '
0 1,000 2,000 3,000 Feet

2013

U.S. ARMY CORPS OF ENGINEERS

ILLINOIS WATERWAY

MISSISSIPPI VALLEY DIVISION
GREAT LAKES & OHIO RIVER DIVISION



2013

BUOY POSITIONS ON CHART ARE APPROXIMATE, SEE NOTICE IN LEGEND

SCALE: 1 " = 1,000 '
0 1,000 2,000 3,000 Feet

CHART NO. 111 - 112
RIVER MILE 326.5 TO 329.9

Appendix 7.3: Additional Information and Websites

Development Manual for Plan Commission Projects

https://www.cityofchicago.org/city/en/depts/dcd/supp_info/development_manualforplancommissionprojects.html

City of Chicago Stormwater Management Ordinance Manual

https://www.cityofchicago.org/content/dam/city/depts/water/general/Engineering/SewerConstStormReq/2016StormwaterManual.pdf

A Guide to Stormwater Best Management Practices, Chicago's Water Agenda

https://www.cityofchicago.org/dam/city/depts/doe/general/NaturalResourcesAndWaterConservation_PDFs/Water/guideToStormwaterBMP.pdf

Harbor Permit Review Process

Department of Buildings is responsible for the issuance of permits for construction projects in the City of Chicago, however, the Chicago Department of Transportation has the responsibility of approving City Harbor Permits. CDOT has the authority to regulate construction activity in and adjacent to the City of Chicago waterways and provides the City Harbor Permit Process information on their website at https://www.cityofchicago.org/city/en/depts/cdot/supp_info/harbor_permit_reviewprocess.html

A City Harbor Permit is needed to perform construction within 40 feet of the waterway (shoreline, riverbank, dockwall/ riverwall, beach, etc.). CDOT will assist residential and business developments with the renovation of the City's shores. The City of Chicago encourages the appropriate treatment of riverbanks to preserve and enhance the attractiveness of this great natural resource for both people and wildlife.

Army Corps of Engineers Regulatory Website

https://www.lrc.usace.army.mil/Missions/Regulatory/Illinois.aspx

- Application Checklist
- Application Instructions
- Table of Contents

Army Corps of Engineers Ports and Waterways Safety Assessment Workshop Report

https://www.navcen.uscg.gov/pdf/pawsa/WorkshopReports/Chicago_PAWSA_Workshop_Report.pdf

Permit for Floodplain Development

https://www.fema.gov/permit-floodplain-development

River Edge Ideas Lab

https://www.chiriverlab.com/

Great Rivers Chicago

http://greatriverschicago.com/index.html

Friends of the River

https://www.chicagoriver.org/

Harbor Permits

● Permit or Approval Require

● Operational Role

● Administrative / Regulatory Role

Activity	ACOE	Coast Guard	US EPA	IEPA	IDOC	IDOT/ DWR	NIPC	MWRD	CDOT	DOB	DPD	Police	Plan Commission	City Council	DWM
Bulkhead construction	●			●		●			●	●					
Dredging and Excavation	●	●		●		●			●	●					●
Bridge and underwater structure construction	●								●	●					
Filling, breakwater & dam construction	●			●		●			●	●					
Waterfront building construction									●	●	●		●	●	
Floodplain construction										●					
Wetland filling	●			●						●					
Navigable channel designation	●														
Navigable channel & harbor maintenance	●														
Removal of navigation hazards	●	●						●							
Maintenance of navigation aids		●													
Environmental impact review	●		●	●		●	●								
Water quality management			●	●	●	●		●							
Water quality monitoring				●	●	●		●							
Discharge Regulations				●				●		●					●
Overbank spillage & pollution control								●							
Clean-up of waterways & banks								●							
Protection of life & property		●										●			
Licensing of commercial vessels		●			●										
Licensing of recreational vessels					●										
Monitoring of commercial traffic	●														
Monitoring of hazardous natl. shipments		●		●											
Moveable bridge operation									●						
Lock and dam structure operation	●							●							
Water level and flood control	●							●							

Key

ACOE-Army Corps of Engineers; US EPA - United States Environmental Protection Agency; IEPA - Illinois Environmental Protection Agency; IDOC - Illinois Department of Conservation; IDOT / DWR - Illionis Department of Transportation / Department of Natural Resources/ Department of Water Resources; NIPC - Northeastern Illinois Planning Commission; MWRD - Metropolitan Water Reclamation District; CDOT - Chicago Department of Transportation; DOB - Department of Building; DPD - Department of Planning and Development; DWM - Department of Water Management

Appendix 7.4: Plant Palette

Plants listed are guidelines. Substitutions for alternate plant species will be reviewed and approved on a case-by-case basis.

Location Key:

- LO, Loop: Plants preferred for the Loop Zone. This character zone requires hardier species that can better tolerate poorer soils, stronger winds, and salt.
- UE, Urban Edge: Plants suitable for all character zones.
- RE, Restoration: Native plants preferred for ecological restoration and stormwater management. In many cases, these plants are also more tolerant of wet conditions.

Submergent

Scientific Name	Common Name	Location		
		LO	**UE**	**RE**
Nelumbo lutea	Lotus			X
Nuphar advena	Yellow Water Lily			X
Nymphaea odorata	White Water Lily			X
Potamogeton natans	Common Pondweed			X
Potamogeton nodosus	Long-leaved Pondweed			X
Vallisneria americana	Eel Grass			X

Emergent

Scientific Name	Common Name	Location		
		LO	**UE**	**RE**
Shrubs				
Cephalanthus occidentalis	Common Buttonbush			X
Grasses, Sedges, and Rushes				
Carex comosa	Bristly Sedge			X
Carex frankii	Frank's Sedge			X
Carex lacustris	Common Lake Sedge			X
Carex lurida	Bottlebrush Sedge			X
Carex stricta	Common Tussock Sedge			X
Carex vulpinoidea	Brown Fox Sedge			X
Glyceria striata	Fowl Manna Grass			X
Juncus effusus	Common Rush			X
Scirpus acutus	Hard-Stemmed Bulrush			X
Scirpus atrovirens	Dark Green Rush			X
Scirpus fluviatilis	River Bulrush			X
Spartina pectinata	Prairie Cord Grass			X
Sparganium eurycarpum	Great Bur Reed			X
Forbs and Others				
Acorus calamus	Sweet Flag			X
Alisma subcordatum	Common Water Plantain			X
Eleocharis acicularis	Creeping Spike Rush			X
Eleocharis obtusa	Blunt Spike Rush			X
Glyceria striata	Fowl Mana Grass			X
Iris virginica shrevei	Blue Flag Iris			X
Juncus effusus	Common Rush			X
Leersia oryzoides	Rice Cut Grass			X
Lobelia cardinalis	Cardinal Flower			X
Lobelia siphilitica	Great Blue Lobelia			X
Mimulus ringens	Monkey Flower			X
Pontederia cordata	Pickerel Weed			X
Sagittaria latifolia	Common Arrowhead			X
Scripus americanus	Chairmakers Rush			X

Riparian/Riverbank

Scientific Name	Common Name	Location		
		LO	UE	RE
Trees				
Alnus glutinosa	European Black Alder	X		
Betula nigra	River Birch		X	
Gymnocladus dioicus	Kentucky Coffeetree	X	X	X
Nyssa sylvatica	Blackgum			X
Platanus occidentalis	Sycamore		X	X
Quercus bicolor	Swamp White Oak	X	X	X
Quercus palustris	Pin Oak		X	X
Taxodium distichum	Bald Cypress	X	X	
Ornamental Trees				
Amelanchier laevis	Allegheny serviceberry		X	X
Amelanchier canadensis	Shadblow Serviceberry		X	X
Shrubs				
Amelanchier arborea	Juneberry		X	X
Amorpha fruticosa	False Indigo		X	X
Aronia arbutifolia	Red Chokeberry	X	X	X
Aronia melanocarpa	Black Chokeberry	X	X	X
Ceanothus americanus	New Jersey Tea		X	X
Cephalanthus occidentalis	Common Buttonbush			X
Chaenomeles japonica	Japanese Flowering Quince		X	
Cornus racemosa	Gray Dogwood	X	X	X
Cornus sericea cultivars	Redtwig Dogwood	X	X	X
Forthergilla gardenii	Drawf Bottlebrush, Drawf Fothergilla		X	
Hypericum kalmianum	St. John's wort	X	X	X
Ilex glabra	Inkberry	X	X	X
Ilex verticillata varieties	Common Winterberry	X	X	
Ilex x meserveae	Meserve Holly	X	X	
Kerria japonica	Japanese Kerria		X	
Potentilla friuticosa	Potentilla	X	X	X
Rhododendron hybrids	P.J.M. hybrid Rhododendrons		X	
Rhus glabra	Smooth Sumac	X	X	X
Rhus typhinia	Staghorn Sumac	X	X	X
Ribes alpinum	Alpine Currant	X	X	
Rosa rugosa	Rugosa Rose, Beach Plum	X	X	
Sambucus canadensis	Elderberry		X	X
Spirea japonica	Little Princess Japanese Spirea	X	X	
Spirea x bumalda	Bumald Spiraea	X	X	
Stephanandra incisa	Cutleaf Stephanandra	X	X	
Symphoricarpos x chenaultii	Chenault Coralberry		X	
Syringa spp.	Chinese Lilac, Meyer's Dwarf Lilac, Miss Kim Dwarf Lilac, and Purple Lilacs	X	X	

Riparian/Riverbank, continued

Scientific Name	Common Name	Location		
		LO	**UE**	**RE**
Taxus cuspidata varities	Japanese Yew varieties		X	
Taxus x media varieties	Yew varieties		X	
Viburnum x burkwoodii	Burkwood Viburnum	X	X	
Viburnum x carlcephalum	Carlcephalum Viburnum	X	X	
Viburnum carlesii	Koreanspice Viburnum	X	X	
Viburnum dentatum	Arrow-Wood Viburnum	X	X	X
Viburnum lentago	Nannyberry	X	X	X
Viburnum plicatum tomentosum	Doublefire Viburnum	X	X	
Viburnum prunifolium	Blackhaw Viburnum	X	X	
Viburnum sieboldii	Siebold Viburnum	X	X	
Viburnum trilobum	American Cranberrybush	X	X	
Viburnum x judii	Judd Viburnum	X	X	
Weigela florida	Weigela	X	X	
Elymus canadensis	Canada Wild Rye		X	X
Panicum virgatum	Switchgrass	X	X	X
Spartina pectinata	Prairie Cord Grass			X
Grasses, Sedges, and Rushes				
Carex muskingumensis	Palm Sedge			X
Carex stipita	Fox Sedge			X
Elymus canadensis	Nodding Wild Rye		X	X
Elymus virginicus	Virginia Wild Rye		X	X
Panicum virgatum	Switch Grass	X	X	X
Forbs and Others				
Allium cernuum	Nodding Wild Onion		X	X
Aquilegia canadensis	American Columbine		X	X
Arunus dioicus	Goat's Beard		X	X
Asclepias incarnata	Swamp Milkweed			X
Aster lanceolatus	Panicled Aster		X	X
Aster nova-angliae 'Purple Dome'	Purple Dome New England Aster	X	X	X
Aster novae-angliae	New England Aster	X	X	X
Bidens frondosa	Common Beggarsticks			X
Chasmanthium latifolium	Northern Sea Oats		X	X
Chelone glabra	Turtlehead			X
Dicentra spectabilis	Bleeding Heart		X	
Echinacea purpurea cultivars	Purple Coneflower	X	X	X
Eupatorium maculatum	Spotted Joe Pye Weed		X	X
Filipendula rubra	Queen of the Prairie		X	X
Glyceria striata	Fowl Mana Grass			X
Helenium autumnale	Common Sneezeweed		X	X
Hosta spp.	Hosta varieties	X	X	
Iris siberica cultivars	Siberian Iris varieties		X	
Juncus effusus	Common Rush			X

Riparian/Riverbank, continued

Scientific Name	Common Name	Location		
		LO	**UE**	**RE**
Pennisetum alopecuroides	Hamelin and Common Fountain Grass	X	X	
Perovskia atriplicifolia	Russian Sage	X	X	
Phlox paniculata cultivars	Phlox varieties		X	
Pycanthemum virginianum	Common Mountain Mint		X	X
Sporobolus heterolepsis	Prairie Dropseed	X	X	X
Verbena hastata	Blue Vervain			X
Veronia fasciculata	Common Ironweed			X
Veronicastrum virginicum	Culver's Root		X	X
Vines				
Celastrus scandens	Bittersweet		X	
Parthenocissus quinquefolia	Virginia Creeper	X	X	X
Groundcover				
Asarum canadensis	Wild Ginger		X	X

Upland

Scientific Name	Common Name	Location		
		LO	UE	RE
Trees				
Acer rubrum cultivars	October Glory and Red Sunset Maples	X	X	
Acer saccharum	Sugar Maple		X	X
Acer x freemanii 'Autumn Blaze'	Autumn Blaze Maple	X	X	
Alnus glutinosa	European Black Alder	X		
Alnus rugosa	Speckled Alder			X
Betula nigra	River Birch		X	
Celtis occidentalis	Hackberry	X	X	X
Gleditsia triacanthos inermis	Thornless Honeylocust	X	X	
Gymnocladus dioicus	Kentucky Coffeetree	X	X	X
Liriodendron tulipifera	Tulip Tree			X
Pinus strobus	White Pine		X	X
Pinus flexilis	Limber Pine		X	
Pinus mugo	Mugo Pine		X	
Quercus bicolor	Swamp White Oak	X	X	X
Quercus macrocarpa	Bur Oak		X	X
Taxodium distichum	Bald Cypress	X	X	
Tilia americana	American Linden		X	X
Tilia tomentosa 'Sterling Silver'	Sterling Silver Linden		X	
Tilia x euchlora	Crimean Linden		X	X
Tsuga canadensis	Canadian Hemlock			X

Upland, continued

Scientific Name	Common Name	Location		
		LO	UE	RE
Ornamental Trees				
Amelanchier laevis	Allegheny serviceberry		X	X
Amelanchier canadensis	Shadblow Serviceberry		X	X
Amelanchier x grandiflora	Apple Serviceberry		X	
Carpinus betulus	European Hornbeam		X	
Carpinus caroliniana	Blue Beech, Musclewood, American Hornbeam		X	X
Cercis canadensis	Redbud		X	X
Cornus alternifolia	Pagoda Dogwood		X	X
Cornus mas	Cornelian Cherry Dogwood		X	
Crataegus punctata	Dotted Hawthorn		X	
Crataegus crusgalli inermis	Thornless Cockspur Hawthron	X	X	
Crataegus mollis	Downy Hawthorn		X	X
Crataegus phaenopyrum	Washington Hawthorn		X	
Crataegus viridis	Winter King Hawthorn	X	X	
Hamamelis virginiana	American Witchhazel		X	X
Malus cultivars	Disease resistant cultivars such as Adams, Siberian, Jackii Siberian, Bob White,Beverly,Donald Wyman, Prairiefire, Profusion, Red Jewel, Sargent, Snowdrift, Red Zumi, and Yellow Zumi Crabapple	X	X	
Ostrya virginiana	Ironwood, Eastern Hophornbeam		X	X
Shrubs				
Aronia melanocarpa	Black Chokeberry	X	X	X
Buddleia davidii	Butterfly Bush		X	
Buxus micophylla varieties	Dwarf Korean Boxwood	X	X	
Ceanothus americanus	New Jersey Tea		X	X
Chaenomeles japonica	Japanese Flowering Quince		X	
Cornus racemosa	Gray Dogwood	X	X	X
Cornus sericea cultivars	Redtwig Dogwood	X	X	X
Corylus americana	American Hazelnut, Filbert		X	X
Cotoneaster horizontalis	Rock Spray Cotoneaster	X	X	
Forsythia viridissima	Bronx Forythia	X	X	
Forthergilla gardenii	Drawf Bottlebrush, Drawf Fothergilla		X	
Hydrangea arborescens	Smooth Hydrangea		X	
Hydrangea paniculata varieties	Peegee Improved and Tardiva Late, Panicle Hydrangea		X	
Hydrangea quercifolia	Oakleaf Hydrangea		X	X
Hypericum kalmianum	St. John's wort	X	X	X
Ilex glabra	Inkberry	X	X	X
Ilex verticillata varieties	Common Winterberry	X	X	
Ilex x meserveae	Meserve Holly	X	X	

Upland, continued

Scientific Name	Common Name	Location		
		LO	**UE**	**RE**
Juniperus chinensis pfitzeriana	Pfitzer Juniper	X	X	
Juniperus horizontalis var.	Spreading Juniper varieties	X	X	
Juniperus procumbens	Japanese Garden Juniper	X	X	
Juniperus sargentii	Sargent Juniper	X	X	
Juniperus virginiana var.	Eastern Red Cedar varieties	X	X	X
Junperus chinensis 'Sea Green'	Sea Green Juniper	X	X	X
Kerria japonica	Japanese Kerria		X	
Myrica pennsylvanica	Northern Bayberry	X	X	
Physocarpus opulifolius	Common Ninebark	X	X	X
Potentilla friuticosa	Potentilla	X	X	X
Rhododendron hybrids	P.J.M. hybrid Rhododendrons		X	
Rhus aromatica 'Gro-Low'	Gro-Low Sumac	X	X	X
Rhus glabra	Smooth Sumac	X	X	X
Rhus typhinia	Staghorn Sumac	X	X	X
Ribes alpinum	Alpine Currant	X	X	
Rosa rugosa	Rugosa Rose, Beach Plum	X	X	
Rosa hybrids	Mediland Roses	X	X	
Sambucus canadensis	Elderberry		X	X
Spirea japonica	Little Princess Japanese Spirea	X	X	
Spirea x bumalda	Bumald Spiraea	X	X	
Stephanandra incisa	Cutleaf Stephanandra	X	X	
Symphoricarpos albus	Common Snowberry			X
Symphoricarpos x chenaultii	Chenault Coralberry		X	
Syringa spp.	Chinese Lilac, Meyer's Dwarf Lilac, Miss Kim Dwarf Lilac, and Purple Lilacs	X	X	
Taxus cuspidata varities	Japanese Yew varieties		X	
Taxus x media varieties	Yew varieties		X	
Thuja occidentalis varieties	Arborvitae varieties	X	X	
Viburnum x burkwoodii	Burkwood Viburnum	X	X	
Viburnum x carlcephalum	Carlcephalum Viburnum	X	X	
Viburnum carlesii	Koreanspice Viburnum	X	X	
Viburnum dentatum	Arrow-Wood Viburnum	X	X	X
Viburnum lentago	Nannyberry	X	X	X
Viburnum plicatum tomentosum	Doublefire Viburnum	X	X	
Viburnum prunifolium	Blackhaw Viburnum	X	X	
Viburnum sieboldii	Siebold Viburnum	X	X	
Viburnum trilobum	American Cranberrybush	X	X	
Viburnum x judii	Judd Viburnum	X	X	
Weigela florida	Weigela	X	X	
Grasses, Sedges, and Rushes				
Andropogon gerardi	Big Bluestem		X	X
Elymus canadensis	Nodding Wild Rye		X	X
Elymus virginicus	Virginia Wild Rye		X	X

Upland, continued

Scientific Name	Common Name	Location		
		LO	**UE**	**RE**
Koeleria cristata	June Grass		X	X
Panicum virgatum	Switch Grass	X	X	X
Schizachyrium scoparium	Little Blue Stem	X	X	X
Sorgastrum nutans	Indian Grass		X	X
Forbs and Others				
Achillea 'Coronation Gold'	Coronation Gold Yarrow	X	X	
Anemone cylindrica	Thimbleweed			X
Aquilegia canadensis	American Columbine		X	X
Arunus dioicus	Goat's Beard		X	X
Asclepias tuberosa	Butterfly Weed		X	X
Aster azureus	Sky Blue Aster			X
Aster laevis	Smooth Blue Star		X	X
Aster nova-angliae 'Purple Dome'	Purple Dome New England Aster	X	X	X
Aster novae-angliae	New England Aster	X	X	X
Astilbe chinensis cultivars	Chinese Astilbe varieties		X	
Bouteloua curtipendula	Side-Oats Grama		X	X
Calamagrostis x acutiflora cultivars	Karl Foerster, Stricta Feather Reed Grass	X	X	
Chasmanthium latifolium	Northern Sea Oats		X	X
Chelone glabra	Turtlehead			X
Coreoposis verticillata 'Moonbeam'	Moonbeam Coreopsis		X	
Coreopsis tripteris	Tall Coreopsis		X	X
Dalea purpurea	Purple Prairie Clover			X
Desmodium illinoense	Illinois Tick Trefoil			X
Dicentra spectabilis	Bleeding Heart		X	
Echinacea purpurea cultivars	Purple Coneflower	X	X	X
Eupatorium maculatum	Spotted Joe Pye Weed		X	X
Filipendula rubra	Queen of the Prairie		X	X
Helenium autumnale	Common Sneezeweed		X	X
Hosta spp.	Hosta varieties	X	X	
Lespedeza capitata	Round-Headed Bush Clover			X
Liatris aspera	Rough Blazing Star		X	X
Liatris spicata	Blazing Star		X	X
Monarda didyma 'Cambridge Scarlet'	Cambridge Scarlet Bee Balm	X	X	
Monarda fistulosa	Wild Bergamot	X	X	X
Monarda punctata	Horse Mint			X
Pennisetum alopecuroides	Hamelin and Common Fountain Grass	X	X	
Perovskia atriplicifolia	Russian Sage	X	X	
Phlox paniculata cultivars	Phlox varieties		X	
Pycanthemum virginianum	Common Mountain Mint		X	X
Ratibida pinnata	Yellow Coneflower		X	X

Upland, continued

Scientific Name	Common Name	Location		
		LO	**UE**	**RE**
Rudbeckia hirta	Black Eyed Susan	X	X	X
Sedum spectabilis 'Autumn Joy'	Autumn Joy Sedum	X	X	
Silphium integrifolium	Rosin Weed			X
Silphium laciniatum	Compass Plant			X
Silphium terebinthinaceum	Prairie Dock			X
Solidago nemoralis	Old-Field Goldenrod		X	X
Solidago rigida	Stiff Goldenrod	X	X	X
Solidago speciosa	Showy Goldenrod	X	X	X
Sporobolus heterolepsis	Prairie Dropseed	X	X	X
Tradescantia ohioensis	Spiderwort		X	X
Verbena hastata	Blue Vervain			X
Veronia fasciculata	Common Ironweed			X
Vines				
Celastrus scandens	Bittersweet		X	
Hydrangea periolaris	Climbing Hydrangea		X	
Parthenocissus quinquefolia	Virginia Creeper	X	X	X
Parthenocissus tricuspidata	Boston Ivy	X	X	
Groundcovers				
Asarum canadensis	Wild Ginger		X	X
Pachysandra terminalis	Pachysandra, Japanese Spurge	X	X	

Appendix 7.5: River Edge Treatments

General Notes on Permitting

All projects altering the banks of the Chicago River navigable waterway are subject to the U.S. Army Corps of Engineers (USACE) permitting under:

- Section 10 of the Rivers and Harbors Act of 1899 for work in, over, or under navigable waters of the U.S.
- Section 404 of the Clean Water Act for discharges of dredged or fill material into waters of the U.S.

Any project altering the banks of the Chicago River in the area covered by these design guidelines (a navigable waterway under Section 10 of the Rivers and Harbors Act of 1899) will require a Section 10 Permit and most likely a Section 404 Permit as well (except for in rare cases where no fill is involved).

Corps regulatory staff will determine whether a Section 408 Permission (33 USC 408) to alter a federal project is required based on each individual application. 408 permissions would be required if a proposed design encroaches on an existing federally authorized navigation channel or alters a riverbank/structure that is part of a federal project. Any necessary 408 Permissions need to be gained prior to issuing Section 10 and Section 404 Permits. In this way Section 408 has the potential to drive the timeline. USACE recommends coordination with its regulatory staff as early as possible in the design process to determine the specific permit/permission requirements of a proposed project.

As noted in the USACE Regulatory Overview, there are generally three tiers of permits depending upon the nature of a specific project. A Letter of Permission is the lowest and fastest approval that USACE can issue for certain projects with minimal potential impacts to navigable waters of the U.S. More likely, however, a project will receive either a General Permit or a Standard/Individual Permit. For streambank stabilization projects that alter less than 500 linear feet of streambank on the Chicago River, it is likely that a General Permit would be required. For projects that alter greater than 500 linear feet of streambank, a more involved and time consuming Standard/Individual Permit will likely be required.

Development projects that propose alterations to the Chicago River should utilize the resources outlined in the USACE regulatory overview and reach out to USACE regulatory staff early in the process to determine required permitting actions on a case-by-case basis. Utilizing these resources early in the design process could reduce the time required to fulfill a proposed development's regulatory responsibilities down the road.

Also of note, all of the information included above is contingent upon the assumption that the proposed project is restricted to the streambank and does not include impacts to other protected resources like wetlands, floodplains, or streams.

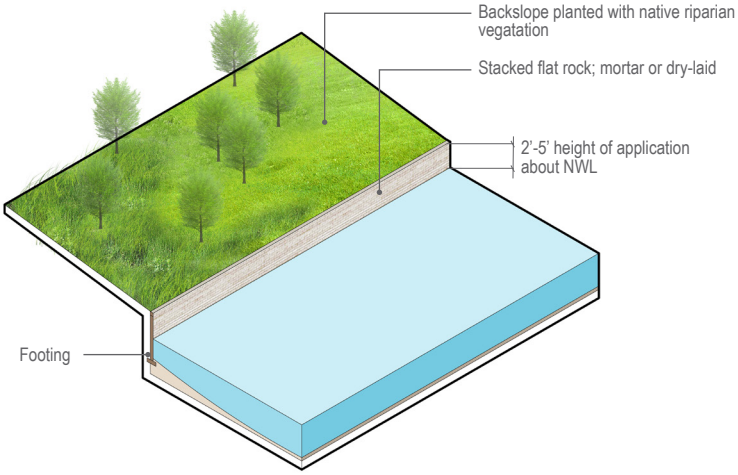
Stacked Flat Rock

Stacked flat rock such as limestone, granite, or broken concrete slabs provides a relatively aesthetic and functional alternative for shoreline treatments in urban settings. Stacked flat rock offers a seating and walking surface at the water's edge that accommodates walkers, anglers, and others. The reestablished slope should be seeded, covered with erosion control blankets, and planted with native plugs. If the stacked flat rock treatment is installed with stable, overhanging slabs adjacent to and within the water, it may also provide cover for aquatic organisms, as well as resting areas for waterfowl and other species.

Permitting Considerations

- Requires permit under Section 10 of the Rivers and Harbors Act of 1899 for work in, over, or under navigable waters of the U.S.
- Requires permit under Section 404 of the Clean Water Act for discharges of dredged or fill material into waters of the U.S.
- Corps regulatory staff will determine whether a Section 408 Permission (33 USC 408) to alter a federal project is required based on the application
- If < 500' in length, likely covered by a General Permit
- If > 500' in length, likely requires an Individual/Standard Permit
- Illinois Environmental protection Agency (IEPA) is responsible for issuing Section 401 Water Quality Certifications required in conjunction with a Section 404 Permit
- Chicago Department of Transportation (CDOT) is the party responsible for review of any potential Harbor Permits.

Figure 7.1: Treatment: Stacked Flat Rock



Advantages
Provides toe protection from the flow and wave energy and will absorb and resist wave action.
Can be mortared or stacked (gravity).
Visually-appealing.
Can provide access to the water's edge.
Opportunity for the use of recycled materials.
Cost may be relatively low in areas where existing wall can be rebuilt using existing materials.

Disadvantages
Subject to failure where there is a potential movement in the riverbed.
Tends to transmit flow and reflect wave energy.
Can be expensive, depending on height and material.
May be significant wetland and floodway permitting issues related to the use of retaining wall river edge treatments.

Maintenance
Provided that a proper foundation is constructed and trees are prevented from growing too close to the wall, little maintenance should be required.
Stacked stone is generally repairable if not mortared.

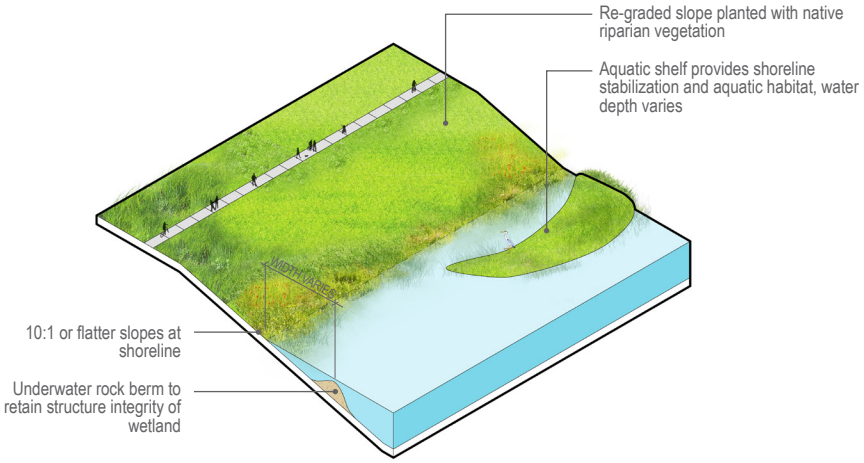
Floodplain Wetland / Aquatic Shelf

This treatment involves cutting back the existing bank to create a shallow aquatic shelf that would support native emergent and submergent vegetation. The newly created slope should be planted with native riparian vegetation per the plant list in **Appendix 7.4: Plant Palette on page 97**. Applicability of this treatment is limited to areas with sufficient space to allow grading the banks back a sufficient distance to create a shallow shelf. The width of the shelf could be as little as five (5) feet or as great as 50 or more to create a backwater slough. This treatment can significantly increase aquatic and riparian habitat. The establishment of different plant communities along the hydrologic gradient provides the chance for a diversity of vegetative species. This, in turn, provides the opportunity for diverse wildlife habitats. With adequate width and vegetation establishment, flow and wave erosion pressure at the water's edge can be substantially reduced. However, it may be necessary to provide some level of hardened stabilization at the edge of the channel (but below the normal water level). The reestablished slope should be seeded, covered with an erosion control blanket, and planted with native plugs.

Permitting Considerations

- Requires permit under Section 10 of the Rivers and Harbors Act of 1899 for work in, over, or under navigable waters of the U.S.
- Requires permit under Section 404 of the Clean Water Act for discharges of dredged or fill material into waters of the U.S.
- Corps regulatory staff will determine whether a Section 408 Permission (33 USC 408) to alter a federal project is required based on the application
- Likely falls under Habitat Restoration General Permit rather than Bank Stabilization.
- 500' threshold would not apply when triggering a likely Standard/Individual Permit.
- Habitat Restoration projects require post-implementation monitoring.
- Illinois Environmental protection Agency (IEPA) is responsible for issuing Section
- 401 Water Quality Certifications required in conjunction with a Section 404 Permit
- Chicago Department of Transportation (CDOT) is the party responsible for review of any potential Harbor Permits

Figure 7.2: Treatment: Floodplain Wetland / Aquatic Shelf



Advantages
If properly integrated into the river edge and adjacent landscape, floodplain wetlands / aquatic shelf can provide long-term stabilization of the shoreline.
Creates excellent wetland and aquatic habitat.
Elevation of the shelf relative to the normal water level and the degree of direct connection with the river can be varied to achieve different plant communities and habitat goals.
Provides additional opportunities for environmental interpretation and programming.

Disadvantages
Adequate landward space is required to create the shelf and the back slope.
Depending on the height of the bank, the amount of material to be removed may be very large, therefore costly.
Excessive silt deposition could limit plant communities that can be established.
Requires committee during vegetation establishment period.
Long-term committee for monitoring and management.

Maintenance
The interface between shelf and channel will need to be inspected for scouring.
Routine management of plant communities, typical of other created wetlands, including control of invasive vegetation and burn management.
Replacement of lost vegetation.

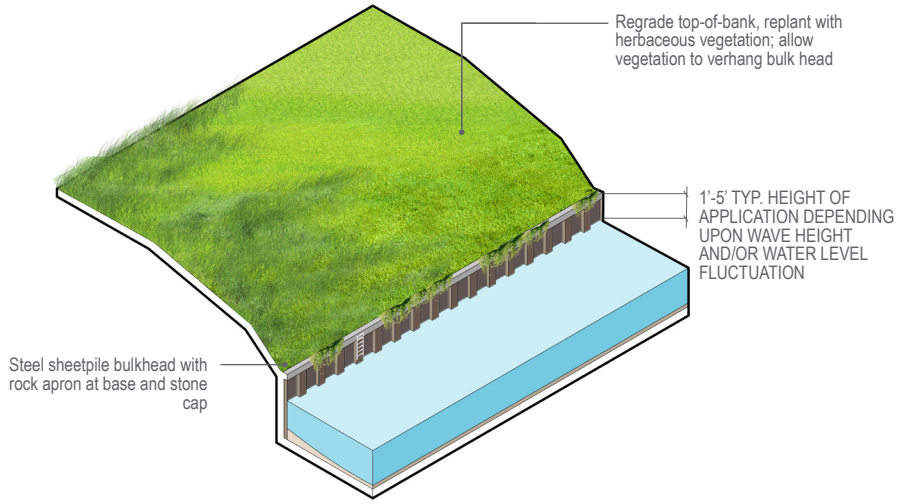
Sheetpile (low wall)

Often made from steel, sheetpile is an effective toe protection method, especially in deep-water situations. When used for river edge protection, only a low sheetpile wall is necessary to provide a foundation for the upper slope and protect against scouring. It can also be placed below water level so that it is not visually intrusive, but the protection from scouring may be lost. When capped, it offers a seating and walking surface at the water's edge that accommodates walkers, anglers, and others. Once the slope is stabilized, it should be seeded, covered with an erosion control blanket, and planted with native plugs.

Permitting Considerations

- Requires permit under Section 10 of the Rivers and Harbors Act of 1899 for work in, over, or under navigable waters of the U.S.
- May not require permit under Section 404 of the Clean Water Act for discharges of dredged or fill material into waters of the U.S. depending on methods of construction and removal of material.
- Corps regulatory staff will determine whether a Section 408 Permission (33 USC 408) to alter a federal project is required based on the application
- If < 500' in length, likely covered by a General Permit
- If > 500' in length, likely requires an Individual/Standard Permit
- Illinois Environmental protection Agency (IEPA) is responsible for issuing Section 401 Water Quality Certifications required in conjunction with a Section 404 Permit
- Chicago Department of Transportation (CDOT) is the party responsible for review of any potential Harbor Permits

Figure 7.3: Treatment: Sheetpile (low wall)



Advantages
Properly installed sheetpile is one of the most effective and long-term stabilization treatments.
Opportunity to provide public access to the water's edge when capped at an adequate for pedestrians.
Can be used for deepwater applications.
Can be used above or below normal water level.
When height is limited, and there is a vegetated slope above, sheetpile can be nearly invisible from the land side of the wall.

Disadvantages
Most expensive river edge treatment.
Difficult and expensive to repair.
Visually sterile.
Provides virtually no wildlife habitat.
Stone apron needed to prevent scour and undermining, particularly where there is significant wave energy.
Transmits or reflects flow and wave energy downstream.
There may be significant wetland and floodway permitting issues related to the use of sheetpile.

Maintenance
Very little maintenance is required.
Period inspection to evaluate and address scouring.

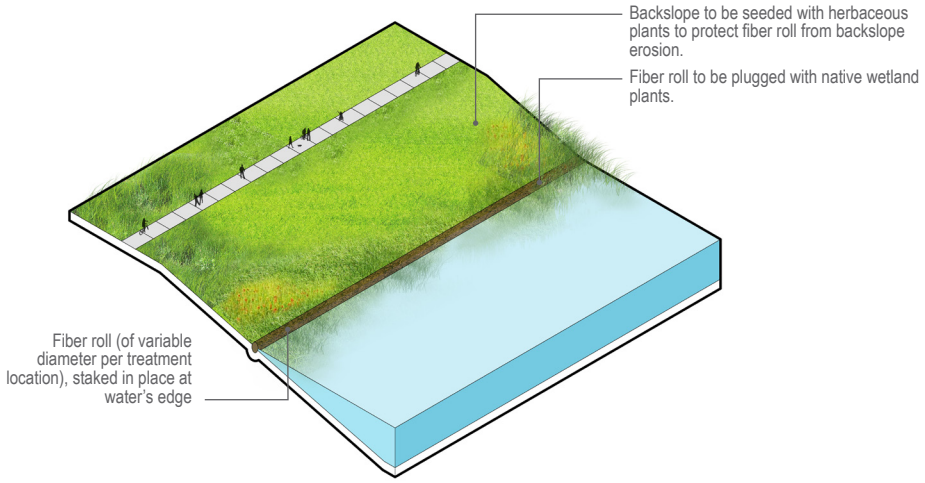
Fiber Roll

A fiber roll is a cylinder of non-woven fibers made from compacted coconut husk fiber and wrapped within a coir woven mesh rope or coconut fiber mesh. Fiber rolls are available in varying diameters and lengths. Installation occurs linearly along the toe of eroding stream banks to prevent erosive flows or wave energy from directly contacting the tow of the bank. The rolls are staked into place and planted with native wetland plants. Long-term stabilization is dependent upon the extensive establishment of the vegetation as the fiber roll slowly biodegrades. Site conditions that need to be considered include hydrology regime, expected sediment load, and substrate stability. Once the slope is reestablished, it should be seeded, covered with an erosion control blanket, and planted with native plugs.

Permitting Considerations

- Requires permit under Section 10 of the Rivers and Harbors Act of 1899 for work in, over, or under navigable waters of the U.S.
- Permit under Section 404 of the Clean Water Act for discharges of dredged or fill material into waters of the U.S. depends on the Ordinary High Water Mark (OHWM).
- Any grading below the OHWM requires a 404 Permit.
- Corps regulatory staff will determine whether a Section 408 Permission (33 USC 408) to alter a federal project is required based on the application
- May fall under Habitat Restoration General Permit rather than Bank Stabilization. If so, the 500' threshold would not apply when triggering a likely Standard/Individual Permit.
- Illinois Environmental protection Agency (IEPA) is responsible for issuing Section 401 Water Quality Certifications required in conjunction with a Section 404 Permit

Figure 7.4: Treatment: Fiber Roll



Advantages
Provides short-term stabilization (+/- 5 years) and a medium to establish desirable emergent and riparian vegetation that provides long-term stabilization.
Flexibility for molding to the existing curvature of the riverbank.
Provides toe protection where scour is not severe and vegetation is sufficient to provide long-term stabilization.
The established vegetation provides some water quality and aquatic habitat benefits and a natural-looking river edge.

Disadvantages
Limited effective life, biodegrades in 3-5 years. If vegetation is not sufficiently established in this time, the treatment may fail.
Requires maintenance to ensure the establishment of vegetation, including replanting during the establishment period.
Not appropriate for sites with severe scouring, high-velocity flows, or large ice build-up. One the river, applications may be limited to use within created backwater areas.
There must be sufficient sunlight available for colonizing plant growth.
Should only be installed in areas with low-flow velocities, relatively stable substrates, and where erosion pressure is low, and vegetation can be established.

Maintenance
Periodic inspection of the roll will need to occur to ensure stability as well as assess the establishment of vegetation, which is critical as the fiber degrades.
Plant maintenance will consist of invasive species removal, and other natural area management techniques as necessary to maintain appropriate emergent plantings.

- Chicago Department of Transportation (CDOT) is the party responsible for review of any potential Harbor Permits

Stone Toe Protection

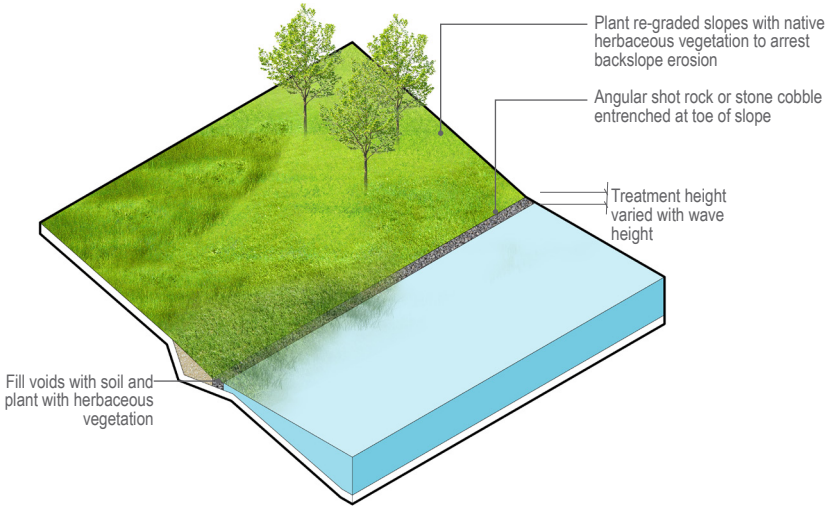
Stone or cobble, trenched or embedded into the tow of the riverbank, serves as a foundation for the slope above, as well as armor against erosion. The interstitial spaces between stones should be planted with emergent vegetation to soften the appearance and increase water quality and habitat benefits. The height of the stone should be sufficient to address wave energy where this is a significant concern. Once the slope is re-established, it should be seeded, covered with an erosion control blanket, and planted with plugs as necessary. This method may offer cover or habitat for aquatic organisms and small fry fish. It may also provide some foraging habitat opportunities for small fish and wading birds.

A variation on the stone toe protection concept is A-jacks or other similar pre-fabricated concrete structures. A-jacks are approximately two (2) feet square concrete structures with a similar appearance to a toy jack. They are nested together to form a flexible foundation to provide toe protection.

Permitting Considerations

- Requires permit under Section 10 of the Rivers and Harbors Act of 1899 for work in, over, or under navigable waters of the U.S.
- Requires permit under Section 404 of the Clean Water Act for discharges of dredged or fill material into waters of the U.S.
- Corps regulatory staff will determine whether a Section 408 Permission (33 USC 408) to alter a federal project is required based on the application
- If < 500' in length, likely covered by a General Permit
- If > 500' in length, likely requires an Individual/ Standard Permit

Figure 7.5: Treatment: Stone Toe Protection



Advantages
Effective method of toe stabilization where wave heights/water do not exceed the height of the stone. A-jacks are very stable and can resist high stream velocities and continuous wave action.
Can be placed with minimal disturbance to the upper slope but must be trenched into the bed of the stream to provide slope stability and improve longevity.
Can be aesthetically-pleasing with native plantings.
Provides a flexible structure that can withstand modest movement without failure.
A cost-effective method where hard toe stabilization is required.

Disadvantages
A-Jacks are more expensive than stone, and their installation is relatively specialized.
Stone may be subject to vandalism.
Aesthetic qualities of A-jacks may be more of a concern than for stone.

Maintenance
Little maintenance needed other than periodic inspection and repair. If rocks have been moved, repairs are relatively easy.
A-Jacks are less likely to require periodic repairs, but it is difficult to replace individual jacks due to the interlocking nature.

- Illinois Environmental protection Agency (IEPA) is responsible for issuing Section 401 Water Quality Certifications required in conjunction with a Section 404 Permit
- Chicago Department of Transportation (CDOT) is the party responsible for review of any potential Harbor Permits

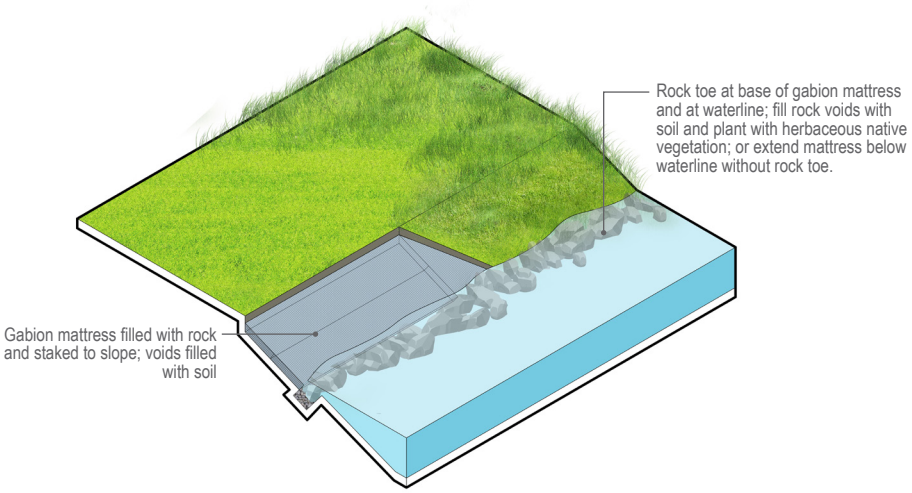
Gabion Basket or Mattress

Gabions are rectangular baskets or mattresses made from galvanized wire mesh that is filled with small to medium size stones. Gabions are tied together and placed at the bed/bank interface for immediate riverbank stabilizations. Soil can be used to fill the void space and planted with vegetation to soften their appearance and improve water quality and habitat. Once the slop is reestablished, it should be seeded, covered with an erosion control blanket, and planted with native plugs.

Permitting Considerations

- Requires permit under Section 10 of the Rivers and Harbors Act of 1899 for work in, over, or under navigable waters of the U.S.
- Requires permit under Section 404 of the Clean Water Act for discharges of dredged or fill material into waters of the U.S.
- Corps regulatory staff will determine whether a Section 408 Permission (33 USC 408) to alter a federal project is required based on the application
- If < 500' in length, likely covered by a General Permit
- If > 500' in length, likely requires an Individual/Standard Permit
- Illinois Environmental protection Agency (IEPA) is responsible for issuing Section 401 Water Quality Certifications required in conjunction with a Section 404 Permit
- Chicago Department of Transportation (CDOT) is the party responsible for review of any potential Harbor Permits

Figure 7.6: Treatment: Gabion Basket or Mattress



Advantages
Allows use of smaller stone than stone toe protection method for a given level of erosive pressure.
Cost-effective structural solution if required rock size is greater than what is locally available.
Can provide a significant foundation for the upper slope.
Because the baskets for a vertical wall, gabions can be used to fill a larger vertical cut.
Gabions are conducive to vegetative growth if they are filled with soil.
Gabion mattresses can be tailored to irregular shapes, e.g., transitions from one type of treatment to another, around drains, and other structural features.
Provides a semi-flexible structure that can withstand model movement without failure.

Disadvantages
Tends to transmit flow and reflect wave energy.
Expensive to install and replace.
Wire mesh subject to sediment, ice abrasion, and extremes in water pH that may lead to corrosion.
Slope stability protection can be lost when damaged.
Aesthetically unpleasing when not vegetated.
Requires a stable foundation.
Care must be taken during filling and complete lacing of the mattress components, which can be costly.
Less flexible than the stone toe.
There may be significant wetland and floodway permitting issues related to the use of gabion mattress treatment.

Maintenance
Wire mesh may need to be replaced.
Periodic inspection required to see if gabions have subsided.

Appendix 7.6: Sloped Bank Treatments

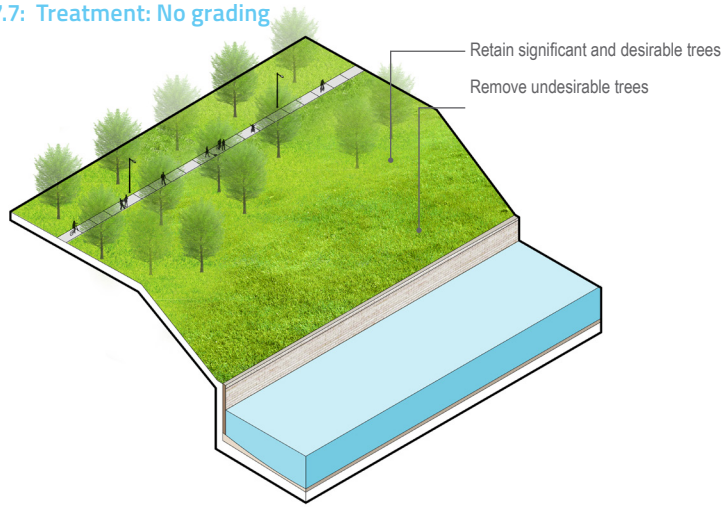
No grading

Where backfill is relatively stable, no re-grading of the slope is necessary. However, there are areas where dense growth of invasive trees and shrubs with insufficient groundcover is leading to surface erosion. Tree canopy should be selectively thinned to increase sunlight in the understory to establish native riparian cover to address surface erosion. The re-establishment of vegetative cover, which is primarily native grasses and forbs, will provide cover habitat and a food sources for small mammals and birds.

Permitting Considerations

- Likely no permit required with U.S. Army Corps of Engineers
- Chicago Department of Transportation (CDOT) is the party responsible for review of any potential Harbor Permits

Figure 7.7: Treatment: No grading



Advantages
No major site disturbance.
Allows for retention of desirable trees.
Vegetative management creates an environment for native plant growth and wildlife.

Disadvantages
Where slopes are relatively steep but stable, access down to the water may be limited.
Success of long-term slope stability may be dependent upon vegetative establishment.
Establishment of vegetation may be difficult on steep, shaded, and north-facing slopes.
Where slopes are steep and high, toe stabilization is critical to maintain slope stability.

Maintenance
Burn management is recommended for establishment of a native vegetative community.
Initial establishment period of one to three years would require more intense weed control via mowing or string trimmer, herbicide treatment, etc. for control of weedy and undesirable non-native species.

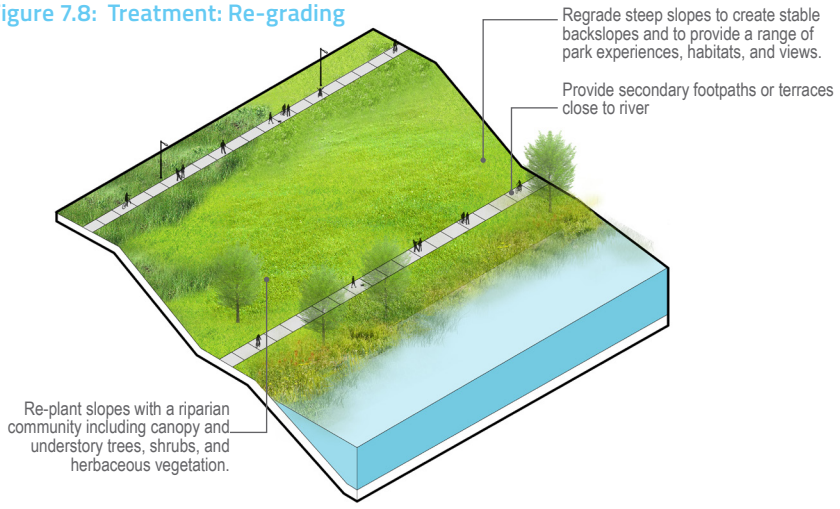
Re-grading

Where bank slopes are steep and unstable, re-grading may be required. In most cases, re-grading will require partial or complete removal of existing vegetation, which provides an opportunity to plant more desirable riparian tree species and native vegetation. The establishment of deep-rooted native herbaceous plant communities on the re-graded slopes is necessary to prevent soil erosion. Erosion blankets must be used to provide temporary protection against sheet and rill erosion and facilitate vegetative establishment.

Permitting Considerations

- Requires permit under Section 10 of the Rivers and Harbors Act of 1899 for work in, over, or under navigable waters of the U.S.
- May not require permit under Section 404 of the Clean Water Act for discharges of dredged or fill material into waters of the U.S. depending on methods of construction and removalof material.
- Corps regulatory staff will determine whether a Section 408 Permission (33 USC 408)to alter a federal project is required based on the application
- Likely falls under Habitat Restoration General Permit rather than Bank Stabilization.
- 500' threshold would not apply when triggering a likely Standard/Individual Permit.
- Habitat Restoration projects require post-implementation monitoring.
- Illinois Environmental protection Agency (IEPA) is responsible for issuing Section
- 401 Water Quality Certifications required in conjunction with a Section 404 Permit
- Chicago Department of Transportation (CDOT) is the party responsible for review of any potential Harbor Permits

Figure 7.8: Treatment: Re-grading



Advantages
Structures not needed to stabilize slopes, providing a natural appearance.
Immediate solution, creates "clean template" to establish desired plant communities and provide appropriate slopes minimizing erosions problems.
The establishment of native vegetation provides wildlife habitat.
Creates a pleasing aesthetic.

Disadvantages
Usually requires removal of many or all existing trees, shrubs, and other vegetation, which creates a temporary barren landscape.
Establishing trees and herbaceous vegetation is necessary.
Requires room to perform re-grading.

Maintenance
Routine inspection of new vegetation establishment.
Invasive species control including, but not limited to, prescribed burning, mowing, string trimmer, herbicide treatment, etc.
Replacing and reseeding as necessary.

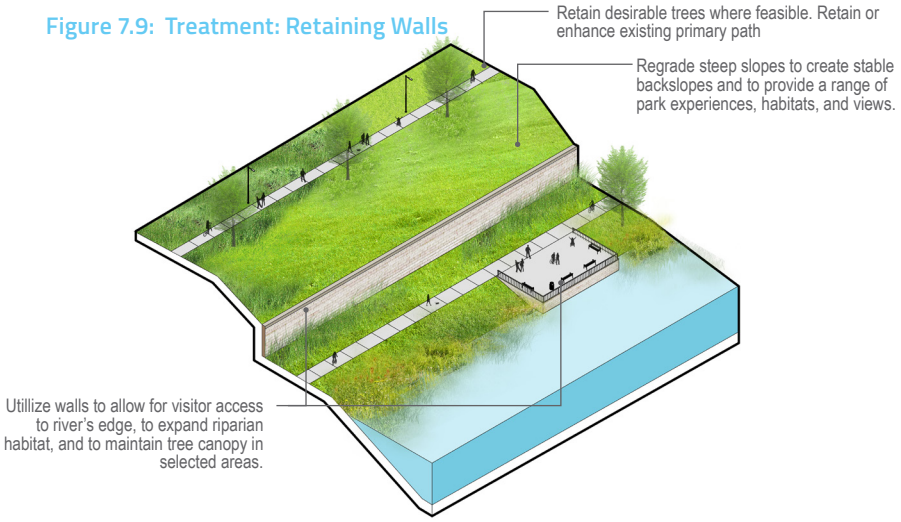
Retaining Walls

Retaining walls stabilize the slopes by retaining the soil behind them. The wall can be made from a variety of durable materials such as sheetpile, timbers, stacked rock, poured concrete, stone, or gabions. Retaining walls can be located at the river edge where they can be an extension of a wall or can be placed back from the river edge to allow for a trail or other uses between the edge and the back slope. Walls should be designed to avoid and alleviate groundwater accumulation behind them.

Permitting Considerations

- Requires permit under Section 10 of the Rivers and Harbors Act of 1899 for work in, over, or under navigable waters of the U.S.
- Most likely requires permit under Section 404 of the Clean Water Act for discharges of dredged or fill material into waters of the U.S.
- Corps regulatory staff will determine whether a Section 408 Permission (33 USC 408) to alter a federal project is required based on the application
- If < 500' in length, likely covered by a General Permit
- If > 500' in length, likely requires an Individual/Standard Permit
- Illinois Environmental protection Agency (IEPA) is responsible for issuing Section 401 Water Quality Certifications required in conjunction with a Section 404 Permit
- Chicago Department of Transportation (CDOT) is the party responsible for review of any potential Harbor Permits

Figure 7.9: Treatment: Retaining Walls



Advantages
Can be placed at the shoreline or further landward to accommodate trails and amenities.
Provides access to the water's edge.
Presents an opportunity to integrate overlooks, terraces to the river, and other amenities.

Disadvantages
There may be significant floodway permitting issues where the retaining wall is used to reduce the cross-section of the channel.
Retaining walls are generally the most expensive means of slope stabilization.
Retaining walls tend to isolate the river from its corridor and associated habitat.

Maintenance
Periodic inspection for tipping and bulging.
Possible vandalism where the wall is constructed of movable materials.

Compacted Soil Lifts

Soil lifts are typically used to reconstruct failed slopes and allow for the creation of steeper slopes than would normally be feasible with re-grading. In many applications, soil lifts are constructed where slumps have occured in order to replace lost bank material. This treatment consists of fabric reinforced soil lifts, seeded and planted with native vegetation. Compacted soil lifts are generally installed with a stone toe or A-jacks to provide a foundation and toe protection. The stone provides a drainage layer to reduce the duration of saturated bank conditions that can lead to bank slumping. The fabric provides temporary stability and protection from erosive forces before the native vegetation can become established for long-term stability. In many applications, the soil lifts constructed in the location form a slump to replace lost bank material and reestablish a continuous slope along the reach. In other applications, compacted soil lifts may be used where bank re-grading is not an option due to space constraints.

Permitting Considerations

- Requires permit under Section 10 of the Rivers and Harbors Act of 1899 for work in, over, or under navigable waters of the U.S.
- Requires permit under Section 404 of the Clean Water Act for discharges of dredged or fill material into waters of the U.S.
- Corps regulatory staff will determine whether a Section 408 Permission (33 USC 408) to alter a federal project is required based on the application
- If < 500' in length, likely covered by a General Permit
- If > 500' in length, likely requires an Individual/Standard Permit
- Illinois Environmental protection Agency (IEPA) is responsible for issuing Section 401 Water Quality Certifications required in conjunction with a Section 404 Permit
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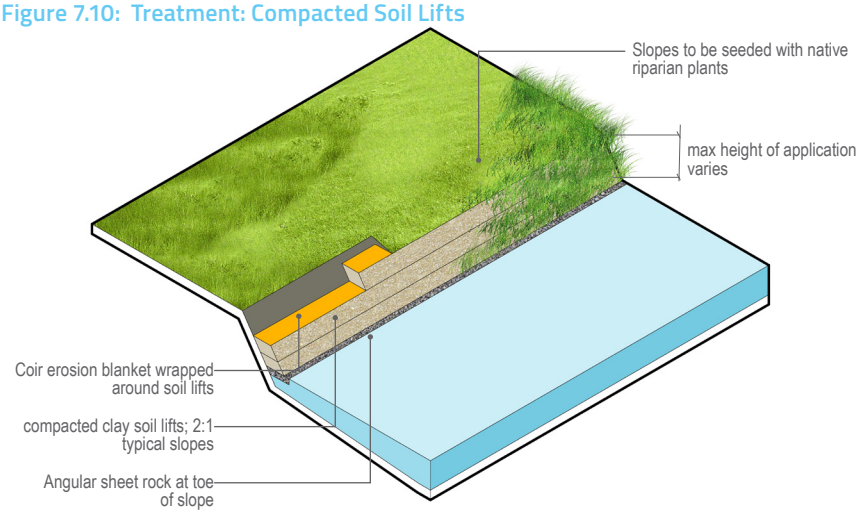
Figure 7.10: Treatment: Compacted Soil Lifts



Advantages
Can be used on steeper and higher banks than re-grading.
Can be used to rebuild bank slope where soil has slumped away.
Creates environment for native plant growth and wildlife habitat.

Disadvantages
More expensive than re-grading.
May require importing of suitable soils if existing material is unsuitable for bank stability.
For successful treatment, this technique must be combined with the stone toe or other hardened shoreline treatment.
System must be build during low-flow conditions.
Erosion blanket biodegrades in five to seven (5-7) years.

Maintenance
Vegetative management during the vegetation establishment period.
Periodic inspection to identify and address evidence of slope failure.

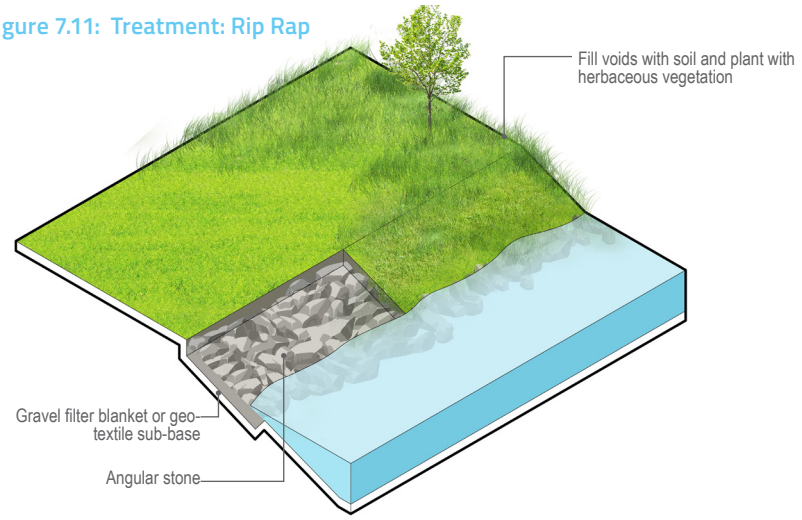
Rip Rap

This treatment involves layered angular stone that protects and stabilizes banks that are subject to erosion within areas of poor soils structure. The stone should be underlain by a filter blanket of gravel or synthetic material to prevent migration of soil through the rip rap. The voids may be planted with vegetation to soften the appearance, improve wildlife habitats, and provide water quality benefits. Although a portion of the soil may erode away over time, the rip rap prevents the bank from receding further and the vegetation will tend to mask the rock.

Permitting Considerations

- Requires permit under Section 10 of the Rivers and Harbors Act of 1899 for work in, over, or under navigable waters of the U.S.
- Most likely requires permit under Section 404 of the Clean Water Act for discharges of dredged or fill material into waters of the U.S.
- Corps regulatory staff will determine whether a Section 408 Permission (33 USC 408) to alter a federal project is required based on the application
- If < 500' in length, likely covered by a General Permit
- If > 500' in length, likely requires an Individual/Standard Permit
- Illinois Environmental protection Agency (IEPA) is responsible for issuing Section 401 Water Quality Certifications required in conjunction with a Section 404 Permit
- Chicago Department of Transportation (CDOT) is the party responsible for review of any potential Harbor Permits

Figure 7.11: Treatment: Rip Rap



Advantages
Well-suited for locations of high-flow or wave energy that impinges higher on the slope than toe protection measures. Examples include locations of large wave or large water level fluctuations.
Can be used to protect steeper slopes where re-grading to relieve flow or wave energy is not feasible.
Can appear quite natural when layered with soil and vegetation.

Disadvantages
May by considered unaesthetic in some locations, especially if unable to be planted with native vegetation.
Limited wildlife habitat when not layered with soil and vegetation.
Moderately expensive, although less so than retaining walls.
Potential for vandalism.

Maintenance
Little maintenance required.
Periodic inspection to assess if rocks have subsided.

Appendix 7.7: Naturalized Shoreline Applications

Naturalized Edge with Seawall / Sheet Pile

This application is useful for sites with limited setback distances and provides the opportunity to utilize the existing seawall. The seawall can be cut down or replaced by a shortened sheet pile. Once cut, the slope would need to be re-graded and / or backfilled to create a more natural slope and planted with native or adapted vegetation. **Figure 7.12** illustrates an approach to re-grading with the existing seawall / sheet pile, and **Figure 7.13** illustrates an approach to re-grading the shoreline with limestone slabs to anchor the edge. This application would require the planting of native forbs or grasses to strengthen and stabilize the edge and enhance the aesthetics of the application. Additionally, a cantilevered truss, constructed on top of the cut seawall or sheet pile, can be planted, creating a small artificial wetland.

Figure 7.12: Naturalized edge with existing seawall / sheet pile

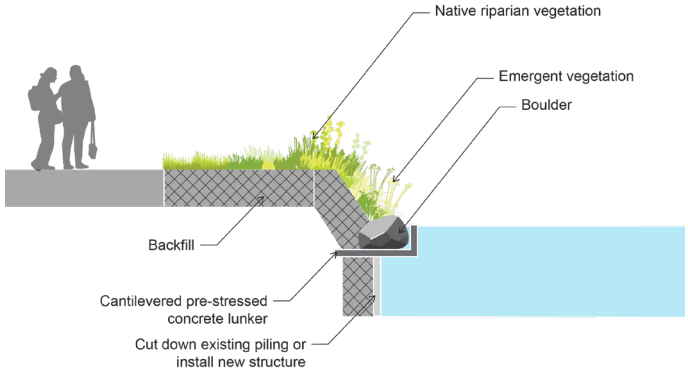
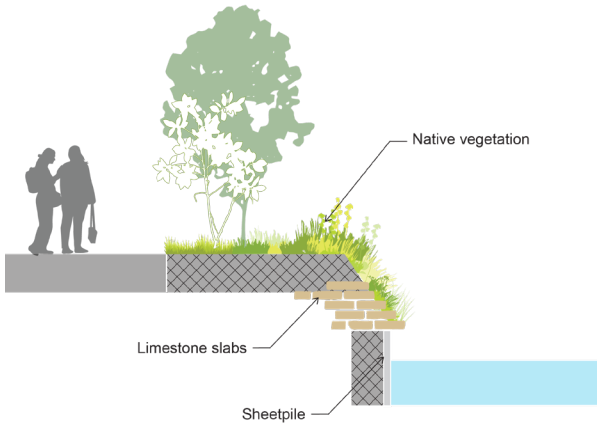


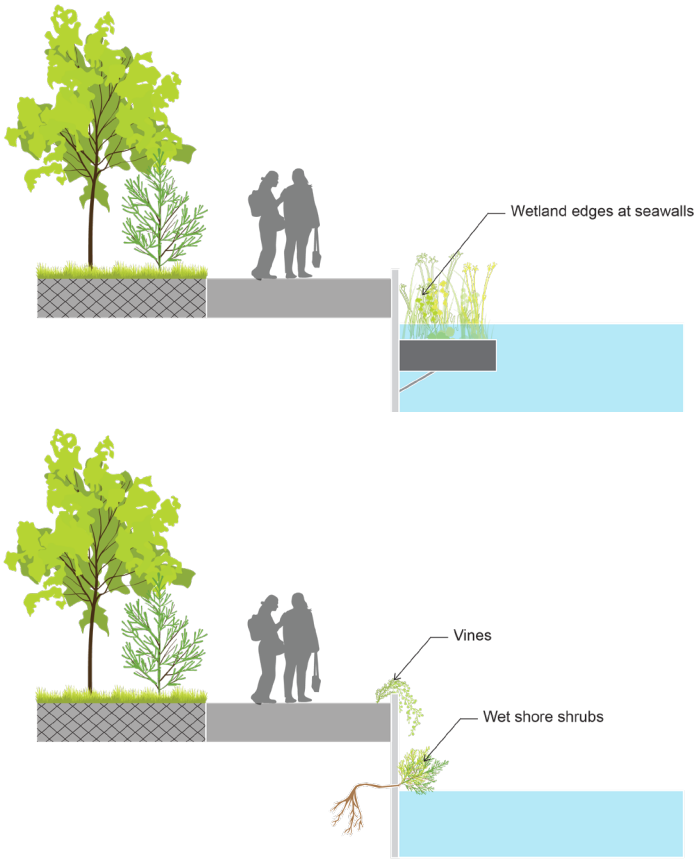
Figure 7.13: Naturalized edge with sheet pile and limestone slabs



Vegetated Terrace or Shelf

This terrace or shelf functions as a narrow riparian wetland, sustaining emergent wetland vegetation such as cattails, sedges, arrowhead, and irises. The new wetland habitat will attract wildlife, including insects, crayfish, snails, shorebirds, fish, and more. Anchored by a boulder, the reconstructed river bank above the waterline can be re-vegetated with native plants, gradually blending into the river edge . Overhanging vegetation at the river bank also serves to provide cover for wildlife adjacent to the water's edge. This type of riverbank restoration project can serve as an excellent interpretive river site to illustrate the natural and cultural aspects of the river.

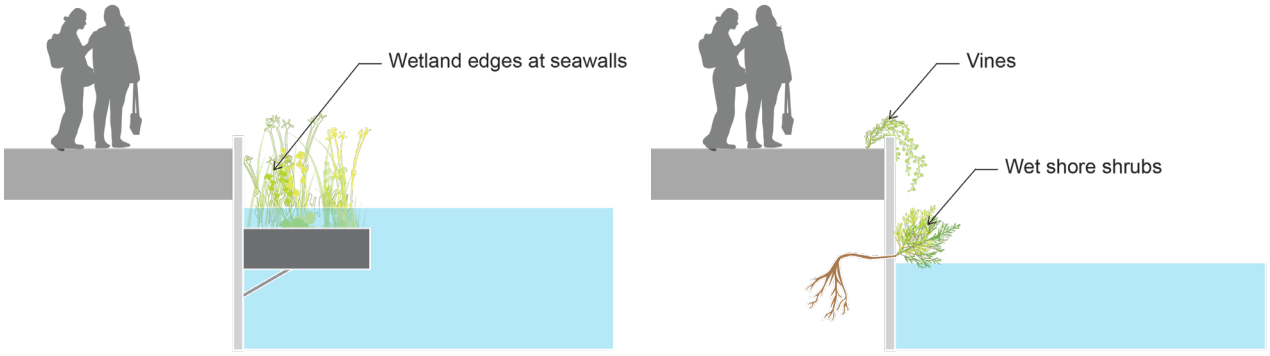
Figure 7.14: Vegetated Terrace or Shelf



Enhance Existing Sheetpile / Artificial Wetland

A naturalized edge can also be achieved without removing the sheet pile. Anchoring native plants and shrubs in strategic locations in and around the sheet piling, outside of the navigation channel, can create the appearance of a natural edge without removing the sheet piling. **Figure 7.15** illustrates this application. Additionally, artificial wetlands can be attached to the sheet pile, concealing the sheet pile and providing additional benefits like water quality improvement and fish habitats.

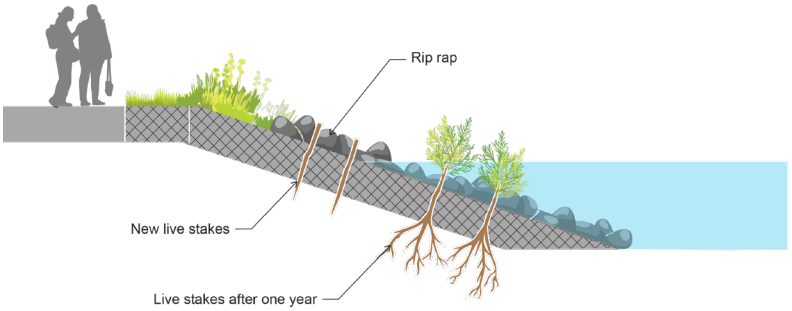
Figure 7.15: Enhance Existing Sheetpile / Artificial Wetland



Dormant Woody Cuttings and Live Staking

Some of the most common bioengineering techniques for naturalizing shorelines include live staking and planting dormant woody cuttings. This involves inserting dormant native tree cuttings into the existing riverbank. See **Figure 7.16** for an example of this application.

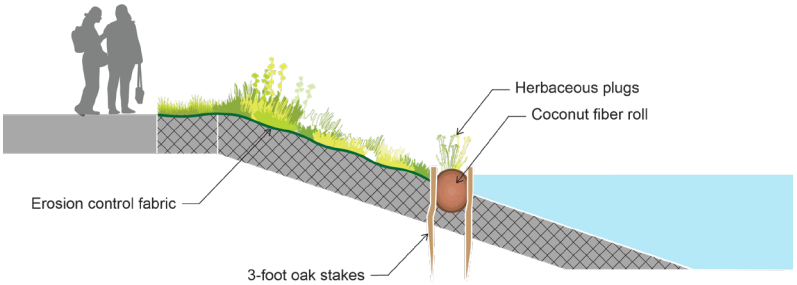
Figure 7.16: Woody Cuttings and Live Staking



Coir Logs

An application that helps to promote riverbank establishment and deter erosion is coir logs. These coconut fiber wrapped rolls are placed at various locations throughout the slope to serve as a buffering medium to contain and protect a degrading slope and serve as a growing medium for plants.

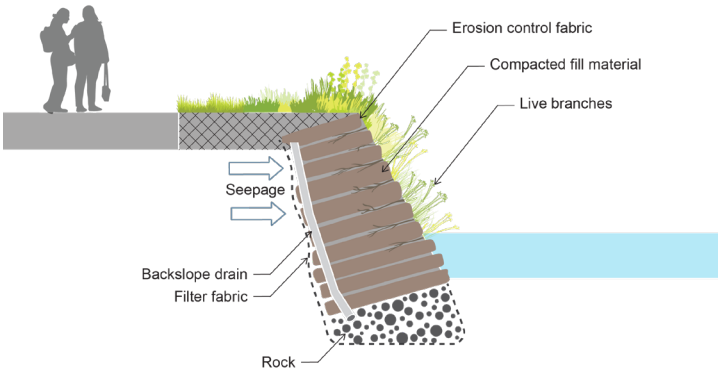
Figure 7.17: Coir Logs



Vegetated Geogrids

Vegetated geogrids involve installing dormant cuttings and native plantings layered between erosion control fabric and compacted fill materials. The toe of the geogrid is stabilized by lunkers, boulders, or rock fill while the top is planted with native plantings. This application not only provides bank stabilization but also serves as fish habitat and cover. See **Figure 7.18** for an illustration of this application.

Figure 7.18: Vegetated Geogrids



Treatment Matrix

Treatment	Application				Environmental Benefits						Cost Considerations		
	Tolerate large water level fluctuation	Tolerate high flow velocity	Tolerate high wave action	Ability to accommodate amenities (trails, etc.)	Fish habitat	Small fry fish habitat	Macro-invertebrate habitat	Soil stabilization	Improve water quality*	Dissipates flow/ wave energy	Installation cost	Longevity**	Maintenance
Stacked flat rock	X	X	X	X		X	X	X			$$-$$$	$$$	$
Stone toe protection	X	X	X	X		X	X	X			$	$$$	$$
Gabion basket or mattress	X	X	X	X		X	X	X			$$	$$	$$-$$$
Sheetpile	X	X	X	X				X			$$$	$$$	$
Fiber roll				X		X	X	X	X	X	$	$	$$$
Floodplain wetland / aquatic shelf		X	X	X	X	X	X	X	X	X	$-$$$	$$$	$$
No grading	X				-	-	-	1	1		$	$-$$$	$$-$$$
Re-grading	X			X	-	-	-	X	X	X	$$-$$$	$$-$$$	$$-$$$
Retaining wall	X	X	X	X	-	-	-	X			$$$	$$$	$
Compacted soil lift	X	X			-	-	-	X	X	X	$$	$$	$$
Rip rap	X	X	X		-	-	-	X		X	$$-$$$	$$$	$-$$

** Improvement in water quality due to filtering of runoff from adjacent areas and/or flow river water. Improvement due to the eduction in soil erosion of slope or toe addressed under "soil stabilization."*

*** Certain techniques longevity such as fiber roll, aquatic shelf, and compaced soil lift depend on continual maintenance.*

1. No grading treatment will only provide soil stabilization and water quality benefits if the existing slop is stable and vegetation is managed to achieve good herbaceous cover.

$ Low

$$ Medium

$$$ High

Appendix 7.8: Aquatic Habitats Applications

Fish Cavities

To enhance and promote fish habitat, a rock-filled cavity can be incorporated into the riverbank at and below the water level to create shallows. This cavity serves as a spawning area for fish, as well as habitat for insects which normally occur in gravel stream beds and are prey for fish. Wetland vegetation should be planted around the cavity, and is crucial to providing shelter and attracting fish.

Boulder Placement / Boulder Clusters

Groups of large rocks, placed in-stream can improve habitat, create scour holes, and slow water velocity. In-stream boulders create eddies or vortices in their wake, and diffuse sunlight, thus creating an overhead cover for fish. By generating scour, boulders can cause deeper pockets of water to develop, adding physical diversity to the stream. Boulders can be used in many stream habitats, but are most effective in wide, shallow areas with gravel or rubble beds. In deep streams, however, they can provide cover and improve substrate. This application should not be used near banks susceptible to erosion, or in streams with sandy substrate because the boulders could become buried.

Revetments and Cover Logs

This application uses brush and woody materials secured to the streambank to maximize surface area and provide structural diversity for both aquatic and terrestrial organism habitat. This application provides both cover and food opportunities and can provide limited stream bank protection. Materials must be securely fastened to be effective, and can be used in combination with other techniques, such as brush layering. This technique most effective in bends or meanders where open pools of water are already present.

Cribbing / Crib wall

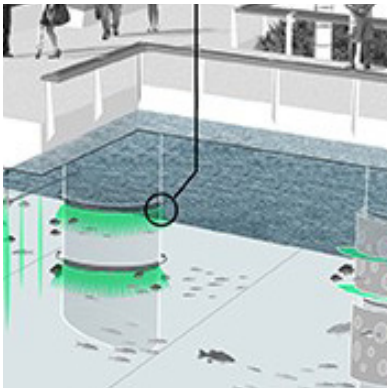
A crib wall is a live log wall, built like a crib, with interplanted vegetation that protects eroding stream banks. The interplanted vegetation is key to the crib wall's success, as the root structure strengthens the material within the crib. Vegetated crib walls reduce water velocities and provide cover for fish and other aquatic organisms. This technique is useful on steep slopes, where other stabilization techniques are not possible. It should be used for walls four feet (4) high or less and no longer than 20 linear feet. Cuttings planted in the crib wall should be dormant, not allowed to dry out, and installed soon after harvest. The crib wall itself should be installed during a low-water period.

Floating Wetlands or Islands (e.g., Fish Hotels)

Floating wetlands are an effective habitat restoration solution, as noted in a recent Urban Rivers study, where they found that the 50 square feet of wetlands at the Wild Mile led to a 100% increase in fish abundance. Floating wetlands are ideal for areas of the river where the slope is steep, unstable, or erodible. It is also a good choice for areas where there is a hard edge of the river due to the multi-use path, such as the Main Branch where the multi-use path lines the edge of the river itself or where there is a seawall, such as at the Wild Mile. Typically, floating wetlands are anchored to either the bottom of the riverbed or riverbank. They should be designed and constructed to occur outside of the navigation channel. The constructed, floating platforms act as a substrate medium for wetland plants. As the plants mature and fill in the platform, a wetland habitat forms and help improve water quality and provides habitats for aquatic organisms.

Small Dams and Channel Control Structures

This technique can be used to create scour pools in shallow sections of the streams. The upstream break can provide resting areas for fish and other aquatic organisms, and the quiet water above the structure acts as a trap for the organic material used as food by stream invertebrates. This technique requires an extensive design process to determine feasibility, and the impacts of proposed structures to upstream and downstream areas should be assessed clearly. There are a variety of construction methods to create small dams and channel control structures.



Pole Hulas

Used in the Main Branch of the river, pole hulas are constructed of nylon ropes attached to overhead structures, and dangle in the water. This application is useful for growing algae and serving as a breeding ground for amphibious insects, both primary fish food sources.

Fish Lunkers

Lunkers are perforated steel cylinders, also used on the Main Branch of the Chicago River, that provide cover for fish to hide from predators. The lunkers are installed approximately 10” away from the caisson (wall).

Limnetic Curtain

Limnetic curtains are steel frames with steel wire mesh that nylon rope strands hang from and function similarly to the caisson curtains. Algae will form on the nylon strands, providing food for the river’s fish population.

Appendix 7.9: Stormwater Management Best Practices

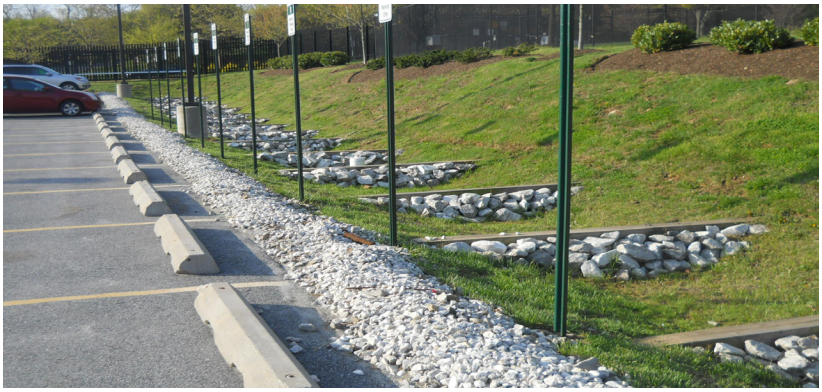
Stormwater Wetlands

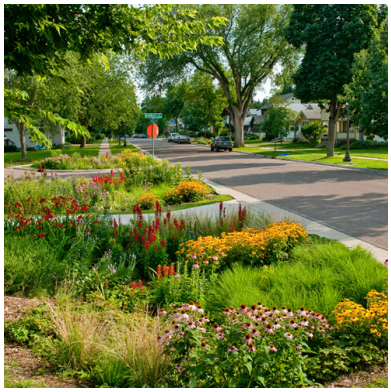
Stormwater wetlands are shallow, human-made vegetated systems designed to provide stormwater detention and pollutant removal. Stormwater wetlands are constructed in shallow marsh systems designed and placed to use the natural processes of wetland vegetation, soils, and their associated biological activity to provide treatment for stormwater runoff. As engineered facilities, stormwater wetlands have less biodiversity than natural wetlands but still require a base flow to support the aquatic vegetation present.

Pollutant removal in these systems occurs through the settling of larger solids and coarse organic material and also by uptake in vegetation. Wetlands can also be designed to remove nitrogen and phosphorus, which may be particularly useful in agricultural settings. It is typically appropriate to construct these wetlands in upland regions and outside of floodplains to avoid impacts to natural wetlands and aquatic systems. Stormwater wetlands can be used to enhance the aesthetics of a site and to increase the available habitat.

Benefits and Limitations

- Enhances site aesthetics
- Uses biological, chemical, and physical processes to remove a variety of pollutants
- Can be designed for enhanced nitrogen removal by creating aerobic and anaerobic zones
- Able to attenuate flow
- Reduces runoff temperature
- Creates habitat
- Can require larger parcels of land





Filter Strips / Berms

Filter strips are bands of dense, permanent vegetation with a uniform slope, primarily designed to provide water quality pretreatment between a runoff source (i.e., impervious area) and another best management practice. Filter strips are well-suited for treating runoff from roads, parking lots, and disconnected downspouts. They may also be used along streams to treat runoff and may be referred to as buffer strips. They are intended to treat sheet flow from adjacent areas and can be effective at removing sediments and other pollutants. Because of their ability to decrease sediment loads, filter strips often serve as pretreatment for other BMPs such as infiltration trenches or bioretention.

Filter strips provide water quality improvement primarily through vegetative filtering, infiltration, and sedimentation. Reductions in runoff volume from small storms can be achieved if the soils are sufficiently pervious, sheet flow is maintained along the entire length and width of the strip, and contact time is long enough for infiltration and sedimentation to occur.

Benefits and Limitations

- Uses vegetative filtering and infiltration to remove pollutants
- Able to attenuate flow and reduce volume if soils are sufficiently permeable
- Effectiveness governed by runoff contact time and density of vegetation
- A permeable berm may be installed on the downstream end to increase stormwater contact time

Bioretention/Rain Gardens

Bioretention describes a shallow stormwater basin or landscaped area that utilizes engineered soils and vegetation to capture and treat stormwater runoff. Bioretention areas are also referred to as rain gardens. There are numerous design applications for bioretention. These include use on single-family residential lots, on commercial/industrial sites, as off-line facilities adjacent to parking lots, and along highways and roads.

Benefits and Limitations

- Uses biological, chemical, and physical processes to remove a variety of pollutants
- Able to attenuate flow and reduce the volume of stormwater runoff
- Good retrofit capability
- Applicable to small drainage areas
- Good for highly impervious areas
- Relatively low maintenance requirements
- Can serve as a four-season landscape feature
- Can be a challenge for areas with steep slopes

Bioswales

A bioswale is a swale that uses bioretention media - engineered soils and vegetation - to improve water quality, reduce the runoff volume, and modulate the peak runoff rate while also providing conveyance of excess runoff through a linear system. Bioswales are well-suited for use within the rights-of-way of linear transportation corridors. They perform the same functions as grassed swales by serving as a conveyance structure and filtering and infiltrating runoff, but because bioretention media is used, they provide enhanced infiltration, water retention, and pollutant removal.

Runoff reduction is achieved by infiltration and retention in the soils and interception, uptake, and evapotranspiration by the plants. Removal of pollutants has been positively linked to the length of time that the stormwater remains in contact with the herbaceous materials and soils. Bioswales may be used in conjunction with filter strips, vegetated filters, or other sediment capturing devices to pre-treat stormwater and prevent sediment from accumulating in the swale. The enhanced properties of bioswales do not preclude the need for discharge to another BMP such as a bioretention cell or a detention basin for a large storm event.

Benefits and Limitations

- Uses biological, chemical, and physical processes to remove a variety of pollutants
- Able to attenuate flow, reduce the volume of stormwater runoff
- Good retrofit capability
- Provides stormwater treatment and conveyance
- Can be part of infrastructure within transportation rights-of-way
- Can serve as a four-season landscape feature
- Check dams, weirs, or stepped cells need to be used in areas with steep slopes

Vegetated Roofs

Vegetated roofs are used to introduce vegetation onto sections of the roof to reduce imperviousness and absorb and filter rainfall. Vegetated roofs consist of a layer of soil media and vegetation that filter, absorb, and retain/detain the rain that falls upon them. Rainfall that infiltrates into the vegetated roof is lost to evaporation or transpiration by plants, or percolates through to the drainage layer and is discharged through the roof downspouts. In unsaturated conditions, vegetated roofs provide high rates of rainfall retention for small storm events. Lower rates of retention are provided for larger storm events, but the runoff volume and peak flow rate is reduced because of temporary storage in the soil.

Vegetated roofs may cover large sections of a roof while maintaining access for utilities, maintenance, or recreation. Vegetated roofs are most often applied to buildings with flat roofs, but can be installed on roofs with slopes up to 30 degrees with the use of mesh, stabilization panels, or battens. Slopes greater than 30 degrees require special design considerations.

Benefits and Limitations

- Uses biological, chemical, and physical processes to remove a variety of pollutant
- Able to attenuate flow and reduce the volume of stormwater runoff
- Good retrofit capability as long as the existing roof is structurally able to support the vegetation and sub-layers
- Reduces impervious area
- Introduces vegetation which improves air quality and reduces the urban heat island effect
- Wood frame and unreinforced masonry buildings are generally unable to bear the additional load of a vegetated roof
- Design modifications are required to install vegetated roofs on sloped roofs

Permeable Paving

Permeable pavements allow stormwater to drain through the pavement to an aggregate reservoir through small voids in the pavement. Water then infiltrates into the soil. They may be modular paving systems (concrete pavers, grass-pave, or gravel-pave) or poured-in-place solutions (pervious concrete, pervious asphalt). Permeable pavement is typically used to replace traditional impervious pavement for most pedestrian and vehicular applications except high-volume/high-speed roadways. Permeable pavements have been used successfully in pedestrian walkways, sidewalks, driveways, parking lots, and low-volume roadways. Several design options are available for using permeable pavements to intercept, contain, filter, and infiltrate stormwater on site. Permeable pavements can be installed across an entire street width or an entire parking area.

Permeable pavements are used to reduce the volume of stormwater runoff by converting an impervious area to a treatment unit. The aggregate sub-base provides water quality improvements through filtering and chemical and biological processes. Permeable pavements are effective at reducing pollutant loads, reducing stormwater volume, and treating stormwater.

Benefits and Limitations

- Alternative to impervious hardscapes
- Reduces the impervious area of a site
- Uses biological, chemical, and physical processes to remove a variety of pollutants
- Able to attenuate flow and reduce the volume of stormwater runoff
- Pavement layer and aggregate sub-base provide rapid infiltration; total volume retention will be dependent upon properties of native soils
- Used to manage rain that falls on the surface rather than “run-on” from other areas

Tree Boxes

Tree boxes are urban applications of high-rate bioretention systems with vegetation and bioretention media contained in a precast concrete box designed to install like a standard curb inlet. Tree boxes are used to intercept and filter stormwater as it enters the conventional stormwater conveyance system. Installed upstream of a standard curb inlet, tree boxes appear to be a tree or other vegetation in a tree grate along a curb. The vegetation sits in a box of bioretention media through which street or parking lot runoff is filtered before entering the collection system.

For low to moderate flows, stormwater enters through the tree box inlet, filters through the soil, and exits through an underdrain into the storm drain. For high flows, stormwater will bypass the tree box if it is full and flow directly to the downstream curb inlet. Small trees and shrubs up to 15 or 20 feet that are tolerant of tree box conditions are suitable vegetation choices. Typically tree boxes are six (6) feet by six (6) feet and treat runoff from a quarter (¼) acre of impervious surface. Larger and smaller sized tree boxes are available, including double tree boxes that may accommodate canopy trees.

Benefits and Limitations

- Uses biological, chemical, and physical processes to remove a variety of pollutants
- Able to attenuate peak flow rates
- Good retrofit option to use with existing infrastructure
- Can be used in streetscape applications
- Primarily a water quality device with limited volume retention

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City of Chicago, Department of Planning & Development

David Reifman, *Commissioner*

Eleanor Gorski, *Bureau Chief*

Kathy Dickhut, *Deputy Commissioner*

Patrick Murphey, *Zoning Administrator*

Pete Strazzobosco, *Deputy Commissioner*

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Jeffrey Sriver

Kris Sorich

Department of Buildings

Andrew Billing

Fleet and Facility Management (2FM)

David Reynolds, *Commissioner*

Jennifer Muss, *Deputy Commissioner*

Michelle Woods

Law

Lisa Misher

Office of the Mayor

Chris Wheat, *Chief of Policy*

U.S. Army Corps of Engineers, Chicago District (Planning Assistance to States Program Grant)

COL Aaron Reisinger, *Commander, Chicago District*

Colin Smalley, *Regulatory Specialist/ Geographer*

Jason Zylka, *Ecologist/Botanist*

Frank Veraldi, *Ecosystem Restoration Regional Technical Specialist*

Alex Hoxsie, *Planner/Landscape Architect*

Chicago Park District

Michael P. Kelly, *Park District Superintendent*

Heather Gleason, *Director of Planning and Development*

Cathy Breitenbach

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River Implementation Committee

City of Chicago, Metropolitan Planning Council, Friends of the Chicago River, Active Transportation Alliance, Chicago Park District, Southeast Environmental Task Force, Prairie Rivers, Illinois International Port District, U.S Army Corps of Engineers, Gaylord and Dorothy Donnelley Foundation, Coalition for a Better Chinese American Community, YWCA of Metropolitan Chicago, Sierra Club, Trust for Public Land, Alliance for the Great Lakes, Little Village Environmental Justice Organization, Forest Preserve and Cook County Board, Village of Franklin Park, Wendella Boats, Chicago Community Trust, North Branch Works, Ozinga, Metropolitan Water Reclamation District

Chicago Waterways Committee

City of Chicago, Chicago Park District, US Coast Guard

River Edge Ideas Lab (initiative of DPD and MPC)

Particpating Firms: Adjaye Associates, James Corner Field Operations, Perkins+Will, ross barney architects, SOM, SWA, Sasaki, Studio Gang, *site design group*.

Funded By: the Driehaus Foundation, Comcast, Related Midwest, and The 601 W Companies.

Consultant Team

Invaluable consultant services were provided by *site design group, ltd.* with assistance from Blue Daring.