

The Benefits of Highway Cap Parks: A Report to Congress

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U.S. Department of Transportation
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Acronyms

CO ₂	Carbon Dioxide
CDOT	Colorado Department of Transportation
DOT	U.S. Department of Transportation
FHWA	Federal Highway Administration
MoDOT	Missouri Department of Transportation
SR	State Route
TIFIA	Transportation Infrastructure Finance and Innovation Act
TRID	Transportation Research International Documentation
TRB	Transportation Research Board
TxDOT	Texas Department of Transportation
WSDOT	Washington State Department of Transportation

Executive Summary

Purpose of Report

The Federal Highway Administration (FHWA) submits this report to the House and Senate Committees on Appropriations per House Report 116-452, which accompanied the Transportation, Housing and Urban Development, and Related Agencies Appropriations Act, 2021 (Public Law 116-260).¹ House Report 116-452 states:

The Committee notes the growing interest in communities across the country in developing cap parks (also called a city deck park) in which a park is placed over a highway. These parks connect neighborhoods that have long been divided by highways and from other opportunities, reduce traffic congestion, improve air quality, and bring green space to communities. The Committee directs FHWA to analyze the benefits of such parks and to report to the House and Senate Committees on Appropriations within one year of enactment of this Act.

This report presents FHWA's summary and analysis of the benefits of highway cap parks.

Definitions

This report uses the following definitions for highway caps and highway cap parks:

Highway Cap: Highway caps are structures built over highways that include elements other than streets, namely parks or buildings. Highway caps are technically very wide bridges or decks built over roadways and can vary in length from a few hundred feet to one or more city blocks.

Highway Cap Park: Highway cap parks are public parks that have been built above highways on top of highway caps. They are one approach to mitigating negative impacts that highways can have on communities. Highway cap parks can be built during the highway's construction, during highway reconstruction or expansion, or after the highway is completed.

Methodology

To conduct the research summarized in this report, FHWA formed an interdisciplinary team led by the FHWA Office of Planning, Environment, and Realty. The team also included representatives from the FHWA Office of Federal Lands Highway, FHWA Office of Infrastructure, FHWA Office of Safety, and the U.S. Department of Transportation (DOT) Volpe National Transportation Systems Center.

¹ H. Rept. 116-452 - DEPARTMENTS OF TRANSPORTATION, AND HOUSING AND URBAN DEVELOPMENT, AND RELATED AGENCIES APPROPRIATIONS BILL, 2021 | Congress.gov | Library of Congress.

The team conducted the following research tasks:

- **Literature Review:** The team reviewed 25 bodies of literature that discuss the benefits of highway cap parks, including academic articles, FHWA reports and publications, news articles, and practitioner reports.
- **Project Scan:** The team reviewed 60 highway cap projects in 22 States, including:
 - **45 Existing Highway Cap Parks**, or parks that have completed construction;
 - **4 Works in Progress**, or highway cap parks that are currently under construction; and
 - **11 Proposals**, which include projects in the planning, engineering, or environmental review stages of project development.
- **Interviews with Practitioners:** The team interviewed five agencies or organizations that have proposed, planned, constructed, or managed highway cap parks. The interviews provided insight into the origins of the highway cap park proposals, the successes and challenges of planning and designing the parks, and the anticipated or realized benefits of the parks.

Key Findings

Origins of and Motivations for Highway Cap Parks

Constructing a highway cap park is one approach to mitigating negative impacts of a highway on the surrounding community. Highway cap parks can be relatively expensive and complex projects with a range of costs and logistical challenges, but they can have a variety of benefits to surrounding communities. Highway cap parks may be a variety of sizes, shapes, and designs, based on costs, physical constraints, and community input.

Highway cap parks are built at different stages of a highway's lifecycle. Some early highway cap parks were built at the time of highway construction to mitigate the impacts of the highways on adjacent neighborhoods. Other highway cap parks are built as mitigation to accompany highway expansion. In other cases, project proponents develop highway cap parks after a highway is in place to reduce the highway's impacts on the community. Highway cap park proponents often have a common set of motivations for minimizing highway impacts to communities and achieving the localized benefits of highway cap parks. These include:

- Reconnect communities divided by highways;
- Improve quality of life for neighboring communities;
- Spur economic development; and
- Mitigate impacts to the natural and human environments.

Benefits of Highway Cap Parks

Highway cap parks can provide a range of benefits to local communities. This report categorizes

these benefits as:

- **Transportation Benefits:** Highway cap parks can enhance safety and connectivity for people traveling by foot, wheelchair, bicycle, or micromobility device, helping to improve mobility and reconnect communities. They can also benefit other modes by enhancing access to transit stations or reducing conflict between vehicle traffic and pedestrian and bicycle traffic.
- **Economic Benefits:** Highway cap parks can unlock land value by increasing the value of adjacent properties that had been depressed by proximity to a highway (though such property value increases may be offset by decreases elsewhere). Highway cap parks can also create business opportunities within the parks, such as park vendors, events, programmed activities, and maintenance and operations (though such activity may be offset by reductions in similar activities elsewhere). However, the potential economic benefits of highway cap parks can also lead to concerns about gentrification and displacement. A few proponents of new highway cap parks consider investments (e.g., Black enterprise districts, affordable housing, community-based nonprofits) to mitigate these concerns.
- **Social Benefits:** Social benefits of highway cap parks include improved social cohesion, community connections, and sense of place; improved access to parks and green space; active recreation and public health benefits; aesthetic benefits; and opportunities to learn about a neighborhood's culture and history.
- **Environmental Benefits:** Natural environment and human environment benefits of highway cap parks include noise reduction; localized air quality improvements; stormwater filtration and management; reduced urban heat island effects; and carbon sequestration from park landscaping.

Highway Cap Parks Implementation, Management, and Evaluation

- **Funding and Financing:** Highway cap parks are often complex projects that combine funding and financing sources from a variety of Federal, State, local, and nonprofit partners.
- **Right of Way Considerations:** Highway cap park project sponsors should consider the need to acquire the rights to access the airspace over the highway and any future transportation needs.
- **Construction Costs:** Although it can be difficult to estimate the cost of highway cap parks due to the wide range of park designs and the fact that they are often constructed as part of larger transportation projects, a scan of existing highway cap parks across the U.S. shows an estimated range of \$18-\$21 million per acre.²
- **Maintenance and Operations:** Long-term maintenance and operations are another important consideration for highway cap parks. It is important to have a dedicated

² Bonjukian, Scott. 2015. Let's Bury I-5: An Urban Design Framework for Freeway Lids in Downtown Seattle. Unpublished master's thesis. University of Washington, Seattle, Washington.
<https://digital.lib.washington.edu/researchworks/handle/1773/34213>.

funding source and maintenance plan for a highway cap park. In many cases, State departments of transportation (State DOT) maintain the highway deck structure, while city parks departments or nonprofits manage the surface park.

- **Monitoring and Evaluation:** Evaluation is an important part of any transportation project to understand how well it aligns with its initial goals. In the case of highway cap parks, it is important to measure how well projects achieve a variety of transportation, economic, social, and environmental benefits. Transportation agencies might consider developing a performance monitoring and evaluation plan for their projects.
- **Lessons Learned from Practitioners:**
 - Engage with community members early and often to generate buy-in and reflect the culture and needs of the community.
 - Identify and estimate the benefits and community impacts – and who experiences those benefits and impacts – early in the planning process.
 - Determine the appropriate size, cost, and design for the cap park to meet community needs.
 - Explore innovative finance opportunities and value capture techniques, such as public-private partnerships, business improvement districts, and tax increment financing.
 - Establish long-term maintenance agreements that document each entity's responsibilities for maintaining both the cap structure and the park above it.

Introduction

Purpose of Report

The FHWA submits this report to the House and Senate Committees on Appropriations per House Report 116-452, which accompanied the Transportation, Housing and Urban Development, and Related Agencies Appropriations Act, 2021 (Public Law 116-260).³ House Report 116-452 states:

The Committee notes the growing interest in communities across the country in developing cap parks (also called a city deck park) in which a park is placed over a highway. These parks connect neighborhoods that have long been divided by highways and from other opportunities, reduce traffic congestion, improve air quality, and bring green space to communities. The Committee directs FHWA to analyze the benefits of such parks and to report to the House and Senate Committees on Appropriations within one year of enactment of this Act.

This report presents FHWA's summary and analysis of the benefits of highway cap parks.

Definitions

Highway Cap

Highway caps, which are also referred to as highway or freeway lids, are structures built over highways. Highway caps are technically very wide bridges or decks built over roadways (typically limited-access highways) that include elements other than streets, namely parks or buildings. They can vary in length from a few hundred feet to one or more city blocks. The construction of a highway cap park creates a tunnel through which highway traffic travels. Many highway caps create short highway tunnels that may not require special ventilation (though longer highway caps may require it). However, they do require ongoing maintenance and eventual structural replacement.⁴

Highway Cap Park

Highway cap parks are public parks that have been built above highways on top of highway caps. They are one approach to mitigating negative impacts that highways can have on communities. Highway cap parks can be built during the highway's construction, during highway reconstruction or expansion, or after the highway is completed.

Facilities that can have characteristics similar to highway cap parks, but are not considered highway cap parks, include highway caps that do not include public parks (e.g., those that are for real estate development), highway tunnels with existing parks or other developments over them, bridges that do not have parks on them, and wildlife overpasses that are not considered public

³ H. Rept. 116-452 - DEPARTMENTS OF TRANSPORTATION, AND HOUSING AND URBAN DEVELOPMENT, AND RELATED AGENCIES APPROPRIATIONS BILL, 2021 | Congress.gov | Library of Congress

⁴ PBIC. 2019. *The Emerging Language of Highway Removals*.

https://www.pedbikeinfo.org/cms/downloads/PBIC_HighwayRemoval.pdf.

parks. Highway cap parks are also distinct from highway removal projects, such as the removal of a highway and the construction of a surface-level park, arterial street, or real estate development in its place.⁵

This report specifically addresses the benefits of highway cap parks, not the benefits of other highway cap uses, tunnels, bridges, wildlife overpasses, or highway removal projects.

Report Development Team

FHWA formed an interdisciplinary team, led by the FHWA Office of Planning, Environment, and Realty, to conduct the research summarized in this report. The team includes representatives from the following offices and agencies:

- FHWA Office of Planning, Environment, and Realty,
- FHWA Office of Federal Lands Highway,
- FHWA Office of Infrastructure,
- FHWA Office of Safety, and
- DOT Volpe National Transportation Systems Center.

Report Organization

This report addresses House Report 116-452 by presenting FHWA's summary and analysis of the benefits of highway cap parks. It is organized into the following sections:

- **Introduction:** This section presents the purpose of the report, a definition of highway cap parks, and the report development team.
- **Methodology:** This section summarizes the research activities to develop this report. These include a review of highway cap park literature; a scan of 60 known highway cap park projects across the U.S. (including existing parks, works in progress, and proposals); and interviews with 5 agencies or organizations that have proposed, planned, constructed, or managed highway cap parks.
- **Key Findings:** This section presents the key findings of this research. These include the origins of and motivations for highway cap parks; anticipated or observed transportation, economic, social, and environmental benefits of highway cap parks; considerations for highway cap park implementation and management; and post-implementation evaluations and lessons learned.
- **Project Examples:** This section provides summaries of 5 example highway cap parks around the U.S. Each example provides information about project status, park size, cost, and the primary benefit of the park, as well as narratives providing information on unique park planning, design, construction, or management practices. These examples also provide information on observed or proposed project impacts.

⁵ PBIC, 2019.

Methodology

The team conducted this research by reviewing published literature on highway cap parks; studying information on existing and proposed highway cap parks throughout the U.S.; and interviewing practitioners with experience in planning, building, or maintaining highway cap parks.

To conduct the literature review, the team searched online databases such as the Transportation Research Board Transportation Research International Documentation database and urban and transportation planning professional websites for articles or other literature on highway cap parks. The team also reviewed FHWA reports and publications that feature highway cap park projects. The team reviewed a total of 25 bodies of literature that discuss the benefits of highway cap parks. Appendix A: Bibliography provides the resources cited in this report.

The team coordinated with FHWA staff in the 52 FHWA Federal-aid division offices to identify current and future highway cap parks across the country. The team also reviewed FHWA documents to identify highway cap parks in the proposal, construction, and completion stages. The team identified and reviewed 60 highway cap projects in 22 States,⁶ including:

- **45 Existing Highway Cap Parks**, or parks that have completed construction;
- **4 Works in Progress**, or highway cap parks that are currently under construction; and
- **11 Proposals**, which include projects in the planning, engineering, or environmental review stages of project development.

Appendix B: Highway Cap Park List provides a list of highway cap parks reviewed for this report by State and includes information about their locations, the names of the parks, and the highways or roadways below the parks (or park proposals). Appendix B also provides latitude/longitude coordinates and links to the project locations.

⁶ This list of highway cap parks does not include parks that were not built on highway caps (e.g., tunnels built under existing parks). The team aimed to develop as comprehensive an inventory of highway cap parks or proposals in the U.S. as possible. There may be additional highway cap parks or proposals that are not included in this report. The presence or absence of a highway cap park or proposal in this report does not have any bearing on funding decisions.



Figure 1: Locations of identified highway cap park projects in the U.S. Source: FHWA

The team also interviewed five agencies or organizations that have proposed, planned, constructed, or managed highway cap parks. The interviews provided insight into the origins of the highway cap park proposals, the successes and challenges of planning and designing the parks, and the anticipated or realized benefits of the parks. The interviewed agencies and organizations are listed in Table 1.

Table 1: Agencies or organizations interviewed for this report

Agency/ Organization	Park Name	Location	Highway/Roadway Below Park	Park Status
Central Atlanta Progress	The Stitch	Atlanta, GA	I-75/I-85	Proposal
Colorado Department of Transportation	I-70 Cap Park (tentative name)	Denver, CO	I-70	Work in Progress
Minnesota Department of Transportation	Gichi-Ode' Akiing (Lake Place Park), Jay Cooke Plaza, and Leif Erikson Park/Duluth Rose Garden	Duluth, MN	I-35	Existing
Woodall Rodgers Park Foundation	Klyde Warren Park	Dallas, TX	Texas State Highway Spur 366 (Woodall Rodgers Freeway)	Existing
Washington State Department of Transportation	Montlake Lid and Roanoke Lid (tentative names)	Seattle, WA	Washington State Route 520	Proposal

Key Findings

Highway cap parks typically are the products of successful partnerships between a wide variety of agencies and stakeholders: Federal, State, and local transportation agencies; cities; nonprofit organizations and foundations; neighborhood organizations; and private partners. The original concept and impetus for highway cap parks often begins within communities impacted by proposed or existing highways. It requires substantial visioning and organizing among all partners involved in a project, including State DOT, cities, and community organizations. In most cases, project proponents assemble a combination of funding and financing sources for the planning, design, construction, maintenance, and operations of highway cap parks. These funds include Federal transportation funds, State DOT funds, city funds, and donations from private

foundations. Typically, nonprofit foundations manage the long-term park programming, operations, and maintenance, although in some cases city parks departments manage the parks.

Origins of and Motivations for Highway Cap Parks

Constructing a highway cap park is one approach to mitigating the impacts of a highway on the surrounding community. Highway cap parks can be relatively expensive and complex projects with a range of costs and logistical challenges, but they can have a variety of benefits to surrounding communities.

Highway cap parks are built at different stages of a highway's lifecycle. Some early highway cap parks were built at the time of highway construction to mitigate the impacts of the highways on adjacent neighborhoods. Examples of these cap parks include Lytle Park in Cincinnati, Ohio (completed 1970); Freeway Park in Seattle, Washington (completed 1976); and Charlotte M. Rothstein Park and Victoria Park in Oak Park, Michigan (completed 1989). Other highway cap parks are built as mitigation to accompany highway expansion, such as the Central 70 Project in Denver, Colorado (work in progress). In other cases, project proponents develop highway cap parks long after a highway is in place to reduce the highway's impacts on the community. Examples of these parks include Klyde Warren Park in Dallas, Texas (completed 2012); and the Reconnect Rondo project in St. Paul, Minnesota (proposed).



Figure 2: 1981 photograph of Freeway Park over I-5 in Seattle, Washington. Source: The Cultural Landscape Foundation; Photo by Richard Longstreth, 1981

Highway cap parks may be a variety of sizes, shapes, and designs, based on costs, physical constraints, and community input. For example, the Washington State Department of Transportation (WSDOT) designed the Montlake Lid Project over State Route 520 (work in progress) as a shorter highway cap park and a separate bike and pedestrian bridge nearby to meet

community connectivity needs while right-sizing the cap park to avoid the need for a ventilation building.

There are three primary types of stakeholders that propose or champion highway cap park projects:

- Community members or organizations;
- Businesses and business associations; and
- Transportation agencies (e.g., State DOTs).

These stakeholders typically propose highway cap parks to:

- **Reconnect communities divided by highways.** By providing enhanced, safe, and comfortable access across highways, cap park proponents aim to preserve or restore community connectivity and access to employment opportunities, social opportunities, and community services for local residents.
- **Improve quality of life for neighboring communities.** Highway cap park proponents aim to improve local quality of life by providing new parks and green space; opportunities for active recreation; places to celebrate neighborhood cultures, traditions, and histories; and enhanced sense of place and community cohesion.
- **Spur economic development.** Highway cap park proponents aim to support economic development by improving access to jobs and commercial destinations; increasing local real estate values; and creating new opportunities for economic activities within the parks, such as vendors, programming, and maintenance.
- **Mitigate impacts to the natural and human environments.** Highway cap park proponents aim to reduce the local environmental impacts of an existing or proposed highway project by incorporating green infrastructure and other design features that improve local air quality, stormwater management, noise, and other highway impacts. By enhancing pedestrian, bicycle, and transit connectivity, they can also support sustainable transportation modes.

The motivations for building highway cap parks are discussed in more detail in the Benefits of Highway Cap Parks section below.

Benefits of Highway Cap Parks

Highway cap parks can provide a range of benefits to local communities. As a type of highway mitigation, highway cap parks can help address the local effects of highways. These micro effects include localized air pollution, divided neighborhoods, noise pollution, unsightly structures, and longer trip lengths for pedestrians and bicyclists. However, the highway cap parks are less effective at addressing highways' macro effects, such as regional air pollution, suburban sprawl, and health impacts.⁷

⁷ PBIC, 2019.

Benefits from highway cap parks can be categorized as transportation benefits, economic benefits, social benefits, and environmental benefits. In many cases, these benefits are interrelated. For example, reconnecting communities that were divided by construction of a highway can help address the impacts and expand local transportation options and improve residents' quality of life.

Many highway cap parks have non-park components of the projects – such as commercial development or transit improvements. The mix of park and other commercial, residential, or transportation developments over a highway cap can also create synergistic benefits among all elements of a highway cap project. It can be difficult to disaggregate the benefits of the park from the benefits of the overall project.



Figure 3: Rendering of the cap park being built as part of the Central 70 Project over I-70 in Denver, Colorado. Source: Colorado Department of Transportation

Transportation Benefits

One of the most common transportation benefits of highway cap parks is enhanced safety and connectivity for people traveling by foot, wheelchair, bicycle, or micromobility device. Highway cap parks can provide opportunities for safe, comfortable nonmotorized travel across highways, increasing local mobility. For example, Charlotte M. Rothstein Park and Victoria Park in Oak Park, Michigan (completed in 1989) were built during the construction of I-696. The Orthodox Jewish community of Oak Park organized and led the push for the highway caps

to maintain safe and adequate pedestrian access across I-696 and enhance connections to community facilities.⁸ To realize the transportation benefits to pedestrian and bicycle safety and connectivity, projects should also consider improvements to pedestrian and bicycle facilities on adjacent roadways to ensure that pedestrians and bicyclists can safely access the highway cap parks. In some cases, highway cap parks can also improve transportation facilities for vehicular traffic. This is particularly true if a highway cap park removes conflicts between vehicular traffic and other modes, such as pedestrians and bicycles at at-grade crossings. For example, the City Arch River Project in St. Louis, Missouri, included a new highway cap park connecting downtown St. Louis to the Gateway Arch, a major national tourist destination managed by the National Park Service. As part of the project, the Missouri DOT reconfigured adjacent surface roads and on-off-ramps to remove at-grade crossings that created safety issues and traffic congestion.



Figure 4: An aerial view of the Charlotte M. Rothstein Park and Victoria Park over I-696 in Oak Park, Michigan. Source: FHWA, 1998

Highway cap parks can also enhance access to transit. For example, as part of the State Route (SR) 520 – Montlake Project (work in progress), WSDOT will incorporate design elements to enhance access to transit and pedestrian and bicycle transportation. The project includes a lid with open space and a transit hub to facilitate access to transit-only lanes on SR 520. Similar to other recently constructed lids over SR 520, the Montlake Lid will also include pedestrian and bicycle trails designed to link to the cities’ active transportation networks and a major regional multiuse trail. After construction of Klyde Warren Park in 2012, the city of Dallas, Texas, reported that the presence of the park contributed to a 61 percent increase in transit ridership on the M-Line trolley, which had been rerouted to include three stops near the park.⁹

8 FHWA. 1998. “Community Cohesion: Oak Park, Michigan.” In *Community Impact Mitigation: Case Studies*. Pp. 2-1 to 2-13. Washington, D.C.

9 Ozdil, Taner R., Sameepa Modi, and Dylan Stewart. 2013. “Klyde Warren Park.” Landscape Performance Series, Landscape Architecture Foundation. <https://doi.org/10.31353/cs0590>.



Figure 5: Before photo (left) of I-44 running in front of the Gateway Arch grounds in St. Louis, Missouri, and after illustration (right) showing the City Arch River Park in front of the Gateway Arch grounds. Source: FHWA, 2017

Economic Benefits

Highway cap parks have several potential economic benefits. In general, they can unlock land value by creating newly usable parcels of land and by increasing the value of adjacent properties that had been depressed by proximity to a highway (though such property value increases may be offset by decreases elsewhere). Highway cap parks can also spur development in adjacent neighborhoods.

For example, Klyde Warren Park in Dallas has contributed to the revitalization of downtown and North Dallas. The Landscape Architecture Foundation projected that the park will provide an estimated \$312.7 million in economic benefit to the city, \$12.7 million in direct tax revenue, and a 32 percent increase in nearby commercial rents. The park was also projected to contribute to an 8.8 percent increase in the residential population of the two adjacent Census Block Groups by 2017, 5 years after the park's completion.¹⁰

Many highway cap parks also include commercial or residential development as part of the project, or they provide space for commercial uses, such as food truck parking, fitness classes, concerts, and other programming. Klyde Warren Park includes a restaurant tenant, a performance stage, space for outdoor fitness classes and other activities, and space for park visitors, local residents, and nearby office workers to access food trucks. Each of these

¹⁰ FHWA, 2019. "Case Study: Klyde Warren Park, Dallas, Texas: Texas Department of Transportation and Klyde Warren Park." Community Connections.

https://www.fhwa.dot.gov/planning/community_connections/case_studies/dallas/.

commercial uses of the park provides business opportunities and employment for local residents (though such activity may be offset by reductions in similar activities elsewhere).

In addition to the jobs created by private businesses operating on Klyde Warren Park, the project created 170 temporary jobs during park construction and 8 full-time and 5 part-time jobs for operations and maintenance.¹¹

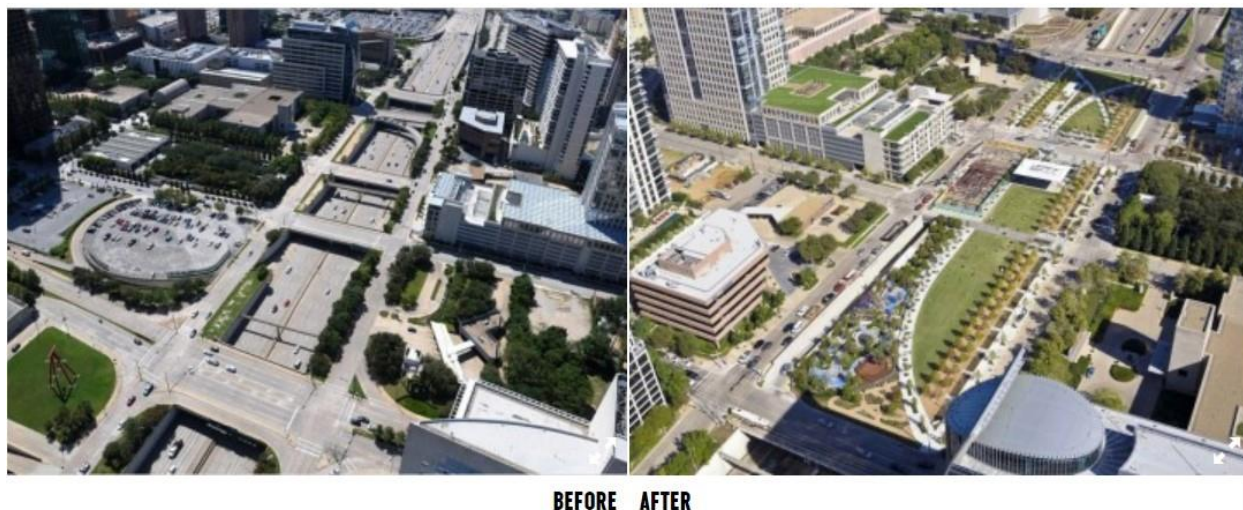


Figure 6: Before (left) and after (right) photos of the Woodall Rogers Freeway in Dallas, Texas, with Klyde Warren Park completed in 2012 in the right image. Source: Landscape Architecture Foundation.

Although economic benefits are a compelling motivation for many highway cap park proponents, some communities express concerns about the potential for gentrification and displacement. Some recent highway cap park proposals have an equity focus, as the agencies and stakeholders planning the parks consider how to mitigate these concerns and ensure that the benefits of highway cap parks improve the lives and livelihoods of current residents and reduce the threat of displacement. For example, the proposed ReConnect Rondo Project in St. Paul, Minnesota, includes proposals to support a Black enterprise district near the highway cap, which is located in a historically Black neighborhood impacted by I-94.¹² However, not all highway cap park project proponents have considered how these projects may cause or accelerate gentrification.

Another project that incorporates equity concerns into its design is the Central 70 Cap Park¹³ in Denver, Colorado. This park is currently being constructed over I-70 in Denver as one part of

¹¹ Ozdil, et al, 2013.

¹² Cho, Aileen. 2021. "The Roads to Justice: Building New Bridges." Engineering News-Record. <https://www.enr.com/articles/52091-the-roads-to-justice-building-new-bridges>.

¹³ This is a tentative name for the park. A new name will be identified through a community engagement process after the park opens.

the Central 70 Project¹⁴ to improve safety, access, and mobility and address congestion in the project area. The cap park will be located in the Globeville-Elyria-Swansea neighborhood, which is a predominantly Spanish-speaking, low-income community. The Colorado Department of Transportation (CDOT) designed this cap park through an extensive community involvement process, and the park is designed to address community concerns, such as noise, traffic, air quality, and the division of the neighborhood caused by the elevated highway. The park is adjacent to the Swansea Elementary School and is designed to provide direct benefit to the school, including a dedicated soccer field. The project also includes mitigation measures to address environmental justice and concerns of gentrification. These include donated funding to a local food nonprofit to improve residents' access to healthy foods; donated funding to a community organization to improve residents' access to transportation, such as improved shuttle service, carpool incentives, and bus passes; and \$200 million in contributions to an affordable housing nonprofit grant program to help residents stay in the community.

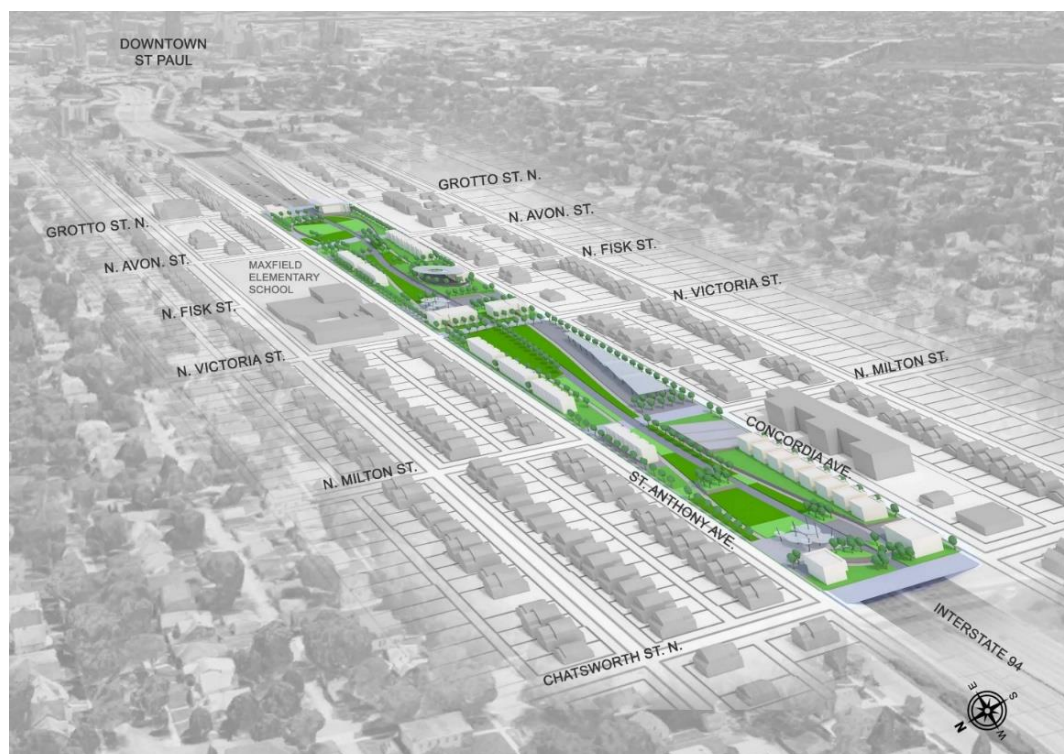


Figure 7: Rendering of the ReConnect Rondo highway cap proposal over I-94 in St. Paul, Minnesota. Source: ReConnect Rondo.

Social Benefits

There are several social benefits of highway cap parks. Reconnecting neighborhoods benefits social cohesion, community connections, and sense of place. For example, in Oak Park, Michigan, the Orthodox Jewish community was particularly concerned about maintaining pedestrian access, because Orthodox Jewish custom prohibits driving on the Sabbath (observed

¹⁴ The Central 70 Project involves the reconstruction of a 10-mile stretch of I-70, adding new express lanes, removing the aging viaduct, lowering the highway between Brighton and Colorado boulevards, and placing a 4-acre park over part of the lowered highway.

every week beginning at sunset on Friday evening and ending after dark on Saturday evening) and other Jewish holidays. For this reason, maintaining pedestrian access between residents and synagogues, social gatherings, and other community amenities was a key social benefit of the highway cap parks there.¹⁵ Similarly, highway cap parks can enhance access to parks, historic sites, and other iconic community destinations, both for residents and tourists. Example projects include:

- City Arch River Project in St. Louis, Missouri, which provided safer and more convenient access from downtown St. Louis to Gateway Arch National Park;
- City Square Park in Boston, Massachusetts, which restored access to a historic site and is part of the Boston Freedom Trail;
- Margaret T. Hance Park in Phoenix, Arizona, which provides access to historic sites such as the Kenilworth School and which is now home to cultural institutions such as the Burton Barr Central Library, Irish Cultural Center and Library, and Japanese Friendship Garden;
- Historic Fort Snelling cap park in Minneapolis, Minnesota, which preserved the historic fort above State Highway 5; and
- Penn's Landing Park in Philadelphia, Pennsylvania, which is a proposal to build a new 12-acre park over I-95 that will reconnect the city center with the Penn's Landing historical site on the Delaware River waterfront.



Figure 8: City Square Park over U.S. Route 1 in Boston, Massachusetts. Source: American Society of Landscape Architects.

¹⁵ FHWA, 1998.

Highway cap parks provide a rare opportunity to increase park lands in dense urban areas and low-income neighborhoods with limited access to parks and open space. They can increase recreational opportunities for local residents and improve park equity in cities. Park sizes, designs, and uses vary widely depending on context, community desires, and other factors (e.g., cost, design constraints). Some cap parks are small and primarily provide community open space, while other parks provide space for active uses and programming. Many cap parks are designed with a variety of uses (e.g., pedestrian and bicycle paths, children's play areas, performance venues, open space) and programmed activities (e.g., concerts, children's reading time, outdoor exercise classes). Whether through community open space or more programmed parks, cap parks can provide valuable opportunities for people to recreate outdoors. Increased park access can also benefit local health by providing more opportunities for physical fitness activities.

Highway cap parks also have aesthetic benefits, such as improved views. In some cases, highway cap parks also provide opportunities for learning and communicating about a neighborhood's history and culture. In many cities, the construction of highways caused the demolition of historic neighborhood homes, businesses, and thoroughfares, and some highway cap park proponents see an opportunity to incorporate educational and interpretive information about the neighborhood's history.¹⁶

Environmental Benefits

There is less information available about the environmental benefits of highway cap parks than the other types of benefits. This may be partly because project proponents' motivations for developing highway cap parks were more focused on the transportation, social, and economic benefits of the parks as environmental benefits of highway cap parks are mainly localized to the adjacent areas or neighborhoods. Environmental benefits from highway cap parks can include noise reduction, localized air quality improvements, stormwater filtration and management, reduced urban heat island effects, and carbon sequestration from highway cap park landscaping. Many of these benefits depend on the design of the highway cap park; projects that incorporate design elements to meet environmental goals or include sound mitigation will have greater benefits to the environment. Some of these benefits, such as improved air quality, are also difficult to measure and attribute to highway cap parks, but some projects estimate the benefits based on the incorporated design features. In the case of air quality, for example, some project sponsors document the number of trees and vegetated features in the park and estimate the anticipated benefits related to carbon sequestration and air filtration.

One project that has been evaluated to quantify benefits is Klyde Warren Park in Dallas, Texas. The Landscape Architecture Foundation and researchers from the University of Texas at Arlington have modeled or measured the following environmental benefits after completion of the park:¹⁷

16 Dottle, Rachel, Laura Bliss, and Pablo Robles. 2021. "What It Looks Like to Reconnect Black Communities Torn Apart by Highways." Bloomberg CityLab, July 28, 2021: <https://www.bloomberg.com/graphics/2021-urban-highways-infrastructure-racism/?sref=qneqM2kv?srnd=citylab>.

17 Odzil, et al, 2013.

- Sequestration of 18,500 pounds of carbon dioxide (CO₂) annually through newly planted trees, equivalent to the CO₂ emitted from driving approximately 22,636 miles in a single passenger vehicle;
- Landscaping that intercepts 64,124 gallons of stormwater runoff annually; and
- Reduced summer temperatures in the park by 1-9°F compared to average temperatures for the park's zip code.

The Woodall Rodgers Park Foundation also measured the park's impact on noise pollution, with approximately 70 decibels in the park compared to 90 decibels on a nearby bridge over the highway.

Although it is still under construction, the Central 70 Project in Denver, Colorado, has the potential to provide a valuable opportunity to evaluate a highway cap park's benefits after construction compared to pre-construction data. As part of its Final Environmental Impact Statement,¹⁸ CDOT collected extensive pre-project data on air quality and noise in the Globeville-Elyria-Swansea neighborhood and modeled the projected impacts of each proposed alternative, including the selected alternative that includes a highway cap park.

SITE IMPROVEMENTS PLAN - RENDERING



Figure 9: Rendering of highway cap park under construction over I-579 in Pittsburgh, Pennsylvania. Source: Pittsburgh Sports and Exhibit Authority.

18 Colorado Department of Transportation. 2016. *I-70 East Final Environmental Impact Statement and Section 4(f) Evaluation*. <https://i-70east.com/reports.html#feis>.

Another project example with environmental benefits is a highway cap park over I-579 in Pittsburgh, Pennsylvania, which is currently under construction. This project includes stormwater retention and diversion features, including a permeable lawn and a series of trench drains and rain gardens, to encourage water to evaporate, be absorbed by plants, or slowly filter back into the public drainage system. The cap park will reduce stormwater discharge to the public storm sewer system and contribute to the city's urban tree cover, which will provide additional air and water filtration and lessen the urban heat island effect.¹⁹

In addition to the environmental benefits listed above, highway cap parks can achieve environmental benefits by increasing pedestrian and bicycle connectivity. To the extent that highway cap parks can achieve a mode shift from vehicle trips to nonmotorized trips, they can improve air quality and reduce greenhouse gas emissions. Although these benefits could be modeled or observed for an individual project, it is difficult to create general estimates for these benefits given the unique nature of each park design and local context, and the overall difficulty in measuring and estimating walking and bicycling trip volumes.

Highway Cap Park Implementation and Management

The team reviewed the available information about project costs, financing, and management in the published literature. This section summarizes the available information on highway cap park funding and financing, construction costs, and maintenance and operations.

Funding and Financing for Planning, Design, and Construction

Agencies leading the development of highway cap parks typically combine funding and financing sources from a variety of Federal, State, local, and nonprofit partners for planning, design, and construction. For example, Klyde Warren Park in Dallas, Texas, had a total project cost of \$110 million. This included approximately \$16.7 million in Federal American Recovery and Reinvestment Act funds, \$20 million from the Texas Department of Transportation, \$20 million in bond funds from the city of Dallas, and \$54 million in private donations from the Woodall Rogers Foundation.²⁰

Highway cap parks that are built as part of highway construction or expansion often include financing strategies due to the scale and large costs of the projects. For example, Colorado Department of Transportation's Central 70 Project, which is estimated to cost over \$1.2 billion, employs over \$961 million in financing, including a \$416 million Transportation Infrastructure Finance and Innovation Act loan and over \$120 million in private activity bonds. Of the total \$1.2 billion project cost, the Central 70 Cap Park is estimated to cost approximately \$70 million: \$40 million for the deck structure over I-70 and \$30 million to construct the landscaped park above it.

Some highway cap park proponents have used various value capture techniques to partially fund capital construction costs or the ongoing maintenance of the park. Value capture refers to a set

19 Sports & Exhibition Authority of Pittsburgh and Allegheny County (SEA). 2019. "I-579 CAP Urban Connector Project." <http://www.pgh-sea.com/index.php?path=i5-ucp>.

20 McGraw, Daniel. 2019. "Putting Parks over Pavement." Reasons to be Cheerful. August 21, 2019. <https://reasonstobecheerful.world/tearing-down-the-walls/>.

of techniques that take advantage of increases in property values, economic activity, and growth linked to infrastructure investments to help fund current or future improvements. Value capture also presents an opportunity to meet public policy objectives. With value capture, those who benefit from a new transportation investment pay for some of its costs, which results in the funding burden being shared more equitably. Because communities like sharing the costs along with the benefits, projects funded by value capture may more likely meet community goals and advance equity, sustainability, and quality-of-life objectives. The value capture techniques that highway cap park project sponsors have used include right-of-way use agreements and special assessment districts, often referred to as community improvement districts, business improvement districts, or sales tax districts. These techniques are also featured in FHWA's recently published Active Funding and Finance Toolkit that provides information on how value capture was used to fund large scale bicycle and pedestrian projects to improve network connectivity.

Right-of-Way Considerations

Highway cap park project sponsors should consider the need to acquire the rights to access the airspace over the highway and any future transportation needs. If the cap is in the airspace of a Federal-aid highway, FHWA must approve the use and a Right-of-Way Use Agreement is required.²¹ The use of highway airspace must consider the safety and integrity of the highway facility and will only be approved if it is in the public interest and it does not interfere with the free flow of traffic or safety on the highway. In most States, State DOTs have the authority to approve the use of highway airspace for off-Interstate highway rights of way.

To accommodate a highway cap park project over Federal-aid right-of-way, Fair Market Value must be charged for the use of the property interests. There are exceptions to the requirement for charging fair market value when the use is shown to be in the overall public interest based on social, environmental, or economic benefits or for nonproprietary governmental uses. FHWA may approve requests for uses at less than Fair Market Value when the public will receive the benefit used to justify the less than Fair Market Value determination.

Construction Costs

It is difficult to estimate the cost of constructing highway cap parks. Existing project costs range dramatically based on local context and the scale of projects. In addition, available information about highway cap park costs often report total project costs without separating the cost of the highway cap park from other elements of the project. This is especially challenging when highway cap parks are part of larger transportation projects. However, a 2015 review of existing and proposed highway cap parks throughout the U.S. found an average cost, adjusted for inflation, of \$21 million per acre and provided an estimated range of \$18-\$21 million per acre for

21 See 23 CFR 1.23(c): "Subject to 23 U.S.C. 111, the temporary or permanent occupancy or use of right-of-way, including air space, for nonhighway purposes and the reservation of subsurface mineral rights within the boundaries of the rights-of-way of Federal-aid highways, may be approved by the Administrator, if he determines that such occupancy, use or reservation is in the public interest and will not impair the highway or interfere with the free and safe flow of traffic thereon."

typical highway cap parks.²² Freeway Park and the Mercer Island Lid in the Seattle region each cost approximately \$18 million per acre, and Klyde Warren Park in Dallas cost \$21.1 million per acre. The Central 70 Cap Park's estimated cost is approximately \$17.5 million per acre.

Maintenance and Operations

Long-term maintenance and operations costs are another important consideration for highway cap parks. It is important to have a dedicated funding source and maintenance plan for a highway cap park. Most of the literature reviewed does not discuss maintenance costs in depth, but many highway cap parks are managed by nonprofit partners through long-term leases or other agreements.

In conversations with highway cap park practitioners, the project team learned that State DOTs often enter into maintenance agreements with the entities that maintain and operate the parks. These entities may be city or county parks departments or nonprofit partners who manage the parks. The State DOT typically retains maintenance responsibilities for the highway deck structure, while the entity maintaining the park maintains the park above the deck. Typically, the boundary separating the State DOT's structural maintenance from the surface park maintenance is a waterproofing membrane that protects the deck structure.

Highway cap park maintenance above the waterproofing membrane includes landscaping and vegetation management, drainage, maintenance of recreational facilities and other amenities, trash disposal, and other surface-level maintenance. Below the waterproofing membrane, cap parks require structural maintenance of the deck. Since cap parks are essentially large bridge decks with parks on top, the decks require regular inspection and maintenance as well as planning for long-term repair and eventual replacement. State DOTs typically manage the highway below the cap park and are responsible for additional maintenance, operations, and safety impacts that the deck structure has on the highway.

Klyde Warren Park in Dallas is one example of a park managed by a private foundation. The Woodall Rogers Foundation manages Klyde Warren Park in Dallas through a 50-year lease and has an annual budget of \$5 million to operate and maintain the park.²³ In addition to donations from private donors, the park's programmed uses and commercial vendors contribute revenue to the park's operations and maintenance. For example, the food truck parking fees at the park generate about \$100,000 per year.²⁴

In some cases, highway cap parks are managed by city parks departments like Seattle's Freeway Park which is managed by Seattle Parks and Recreation. Freeway Park provides an example of why it is important to establish a dedicated maintenance fund and plan for a cap park: although the park opened in 1976 to great fanfare and popularity, by the 1980s it became overgrown, had limited sight lines and lighting, and it saw an increase in crime rates. In 1993, the Freeway Park

²² Bonjukian, 2015.

²³ Axelrod, Jason. 2019. "From freeway to walkway: Freeway cap parks address multiple issues in urban cores by covering highways with walkable greenspace." American City & County: <https://www.americancityandcounty.com/2019/08/07/from-freeway-to-walkway/>.

²⁴ Bonjukian, 2015.

Association formed to organize programming and implement improvement projects. In 2004-2005, the city of Seattle rehabilitated the park, implementing several design improvements to improve visibility, accessibility, and wayfinding. In 2014, the city established a dedicated fund for park maintenance.²⁵ In 2017, Seattle Parks and Recreation and the Freeway Park Association began planning for a new Freeway Park Improvement Project, which will be funded by \$10 million from a public benefit package for the Washington State Convention Center Expansion Project. This project includes infrastructure upgrades, lighting, wayfinding, and possibly a new restroom. As of fall 2021, the city has completed design development and expects to complete construction documents in late 2022.

Post-Implementation Evaluation and Lessons Learned

Examples of Monitoring and Evaluation

Evaluation is an important part of any transportation project to understand how well it aligns with its initial goals and objectives. In the case of highway cap parks, it is important to measure how well projects achieve a variety of transportation, economic, social, and environmental benefits. Transportation agencies should consider developing a performance monitoring and evaluation plan. This could include the collection of baseline data or other methods for evaluating the impacts of cap parks after project completion. Monitoring and evaluation can help communicate the benefits of highway cap parks and make the case for future projects. It can also help transportation agencies and their partners build better projects in the future or address unexpected issues with a park's design or operations.

The team identified the following examples of post-implementation evaluation that can provide a model for other projects:

- **Charlotte M. Rothstein Park and Victoria Park in Oak Park, Michigan:** These highway cap parks were completed in 1989. In 1998, FHWA developed a case study about the project in a research publication entitled *Community Impact Mitigation*.²⁶ In this case study, FHWA reported on metrics of project success, including the social benefits from maintaining community cohesion, transportation benefits in terms of improved pedestrian conditions and reduced vehicle congestion on local streets, and an analysis of the local housing market to document increased real estate values.
- **Klyde Warren Park, Dallas, Texas:** In 2013, researchers at the University of Texas at Arlington evaluated the impacts of Klyde Warren Park, one year after the park opened.²⁷ This evaluation measured the environmental, social, and economic benefits of the project for adjacent neighborhoods and the city of Dallas. Researchers analyzed real estate values, city tax receipts, and environmental benefits such as a reduction to the urban heat island effect by measuring temperatures in the park compared to averages in adjacent neighborhoods. The researchers monitored visitation trends and conducted a survey of park visitors to measure its social benefits, and over 90 percent of survey respondents

²⁵ Bonjukian, 2015.

²⁶ FHWA, 1998.

²⁷ Ozdil, et al, 2013.

said that the park improves their quality of life.

Lessons Learned from Practitioners

During the team's discussions with agencies and organizations with experience with highway cap parks, practitioners shared the following lessons learned:

- **Engage with the community.** It is important to have early, robust, and ongoing public engagement when planning projects that may include highway cap parks. Highway cap parks should have strong buy-in from community members and reflect the culture and needs of the communities in which they are located.
- **Estimate the anticipated benefits and community impacts and adjust as needed.** Forecasting the transportation, economic, social, and environmental benefits of highway cap parks and the potential impacts to the community (e.g., gentrification, displacement, increased cost of living), are critical to generating public support for highway cap parks. Identifying the benefits and community impacts – and who experiences those benefits and impacts – early in the planning process enables proponents to adjust the project or add mitigations to address community concerns.
- **Determine the appropriate size, cost, and design for the cap park.** The length of the cap may determine the need for specialized ventilation equipment; the longer the cap, the greater the ventilation need. Consider reducing the length of the cap or breaking it into smaller pieces to naturally ventilate the highway under the cap to reduce construction costs. In addition, the size of the park correlates to the expected cost. Proponents should consider developing highway cap parks in phases or segments to align with available funding options.
- **Explore innovative finance opportunities and value capture opportunities.** Private entities located near a cap park can realize benefits, including increased property values. Communities can capitalize on the increased value by employing value capture techniques, including business improvement districts and tax increment financing. They can generate revenue to support the operations and maintenance of the park and other neighborhood improvements. In addition, private organizations such as business associations sometimes propose highway cap projects in anticipation of the economic benefits of the park. Public-private partnerships between governments and private organizations can assist in the development or maintenance of highway cap parks.
- **Establish long-term maintenance agreements.** While State DOTs are commonly the entities that construct highway cap parks, municipal parks and recreation departments or private organizations often are responsible for maintaining the parks. The partners should establish long-term maintenance agreements to document each entity's responsibilities for maintaining both the cap structure and the park above it.

Project Examples

The interviews with select highway cap park practitioners yielded additional information on eight highway cap parks and cap park projects. These cap parks and cap park projects are described in the project examples in this section.

Gichi-Ode' Akiing (Lake Place Park), Jay Cooke Plaza, and Leif Erikson Park/Duluth Rose Garden

Duluth, Minnesota

Existing

Overview

Gichi-ode' Akiing (formerly known as Lake Place Park), Jay Cooke Plaza, and Leif Erikson Park/Duluth Rose Garden are highway cap parks over I-35 in downtown Duluth, Minnesota. Each park is built on a separate highway cap that connects downtown Duluth to the Lake Superior waterfront. Opened in 1992, the parks and the development of the highway spurred the cleanup and redevelopment of the waterfront, reconnecting Duluth residents to Lake Superior.



Figure 10: Left: Public art in Gichi-ode' Akiing (Lake Place Park); Right: the Duluth Rose Garden. Source: Duluth Parks & Recreation

In 1958, the Minnesota Highway Department (now the Minnesota Department of Transportation) planned an elevated extension of I-35 through downtown Duluth. In 1970, during the height of the “highway revolt” that was taking place across the country, an organization called Citizens for Integration of Highways and Environment asserted that the Lake Superior waterfront was Duluth’s biggest asset and argued that an elevated highway would divide Duluth from the waterfront. Another group called Stop the Freeway also mobilized to fight the project.

Through the environmental review process, highway officials agreed to construct the highway below grade with three highway caps containing public parks. This plan preserved the views of Lake Superior from hilly Duluth and improved access to the waterfront. Today, the Minnesota Department of Transportation (MnDOT) is responsible for maintaining the cap structures, and the city of Duluth manages the public parks.

Benefits

The primary benefit of the three cap parks over I-35 in Duluth is vastly improved access to the Lake Superior waterfront, which had been separated by railroads prior to the highway project. Sidewalks and bridges provide pedestrian access over I-35 and adjacent railroad tracks connect

residents, visitors, and workers to the lake. The Duluth Rose Garden's original location was to be impacted by the highway, so MnDOT relocated the garden and its famed rose bushes to a new location atop the highway.

The highway access and public parks catalyzed the cleanup and development of the waterfront area. Gichi-Ode' Akiing (Lake Place Park) also provides pedestrian access to Canal Park, which hosts a vibrant dining, commercial, and entertainment district that may not have been built without the transportation improvements provided by the highway extension and cap parks.

Name: Gichi-Ode' Akiing (Lake Place Park), Jay Cooke Plaza, and Leif Erikson Park/Duluth Rose Garden

Location: Duluth, MN

Status: Existing

Cap Lengths: 725 feet, 570 feet, and 1,480 feet, respectively

Costs: \$7.9 million, \$44.3 million, and \$26.6 million (1992 dollars), respectively

Primary Benefit: Lakefront Access



Figure 11: Satellite photo of Leif Erikson Park (lower left) and the Duluth Rose Garden (upper right). Source: Google Maps

Klyde Warren Park

Dallas, Texas

Existing

Overview

Klyde Warren Park is an existing highway cap park over Woodall Rodgers Freeway (Texas State Highway Spur 366) in between North Pearl Street and North St. Paul Street in Dallas, Texas. Completed in 2012, the five-acre park provides a variety of recreational, social, and culinary attractions to residents, visitors, and workers. It connects Dallas's Uptown neighborhood and art district to the north with the downtown business center to the south. A planned expansion will add 1.7 acres to the park in the next few years.

The Woodall Rodgers Park Foundation led the design and development of the park in the early 2000s and operates and maintains the park today. The Foundation spends approximately \$5 million annually to operate and maintain the park. About 25 percent of the operating and maintenance costs are funded by the public improvement district (a type of special assessment district, which is a value capture technique) that was created to capitalize on the economic development benefits of the park. Other operating and maintenance funding comes from food truck revenues, event rentals, sponsorships, and other sources. The Foundation manages a \$13 million capital fund and uses some of the funds for park improvements.



Figure 12: Promenade and Great Lawn at Klyde Warren Park. Source: Landscape Architecture Foundation

Benefits

The Woodall Rodgers Foundation has evaluated the benefits of Klyde Warren Park since its opening in 2012:

- Environmental:** The park's trees sequester 18,500 pounds of CO₂ annually and divert nearly 65,000 gallons of stormwater from the sewer system. The Foundation also observed that noise levels in the park are approximately 20 decibels lower than a location on a nearby bridge over the freeway.
- Economic:** The park has helped to dramatically increase property values in the area. The park is expected to generate \$312.7 million in economic development, resulting in \$12.7 million in tax revenue. Property values in the vicinity have increased; one building saw its property value increase by 65 percent in 2013 as compared to 2008. The park spurred the creation of a public improvement district that funds the park and other neighborhood improvements.
- Social:** While park visitation is difficult to estimate due to the park having multiple open access points, the Foundation estimates that over 750,000 people visit the park annually. According to a survey of 224 park users, 91 percent of respondents indicated that the park improves their quality of life, reducing stress, providing desirable outdoor space, and improving the neighborhood's sense of place. The various activities, recreational opportunities, and programs offered attract visitors that reflect the diverse demographics of the city and region.

Name: Klyde Warren Park
Location: Dallas, TX
Status: Existing
Park Size: 5 Acres
Cost: \$110 Million (est.)
Primary Benefit: Economic Development



Figure 13: Seating area and food trucks at Klyde Warren Park. Source: Landscape Architecture Foundation

Central 70 Cap Park

Denver, Colorado

Work in Progress

Overview

The Central 70 Cap Park²⁸ is a highway cap park that is currently being constructed over I-70 in Denver, Colorado as one part of the \$1.2 billion Central 70 Project. The cap park will be located between Columbine Street and Clayton Street in the Globeville-Elyria-Swansea neighborhood. This neighborhood is predominantly Spanish-speaking and low-income. Scheduled to open in 2023, the four-acre park will reconnect the community and be integrated into the Swansea Elementary School, which is adjacent to the cap park.



Figure 14: Rendering of the soccer fields on the Central 70 Cap Park in Denver, Colorado.
Source: CDOT

The cap park is the result of a 15-year study process where CDOT worked to meet the needs and address the concerns of the community about the planned reconstruction and expansion of I-70. Community members raised concerns including noise, traffic, air quality, and the division that the elevated highway caused. The CDOT considered over 90 alternatives for the project; reconstructing the highway below grade and adding a cap park became the selected alternative to mitigate the community's concerns.

²⁸ This is a tentative name for the park. A new name will be identified after the park opens.

Benefits

CDOT has evaluated the anticipated environmental benefits of the cap park in terms of noise reduction and air quality improvement. While much of the noise reduction will be a result of the replacement of the elevated highway with a below-grade highway, the cap park will further reduce traffic noise in the community. Similarly, many of the air quality benefits of the project relate to the below-grade nature of the highway, but the cap will reduce vehicle emissions near the park, particularly at Swansea Elementary School. The addition of trees on the park will further improve air quality.

Name: Central 70 Cap Park
Location: Denver, CO
Status: Work in Progress
Park Size: 4 Acres
Cost: \$70 Million (est.)
Primary Benefit:
Environmental Mitigation

CDOT is partnering with local nonprofits and community organizations to provide additional support to the community. The Globeville-Elyria-Swansea community is considered a “food desert,” so CDOT donated funding to a local food nonprofit to improve residents’ access to healthy foods. The agency also donated funding to a community organization to make transportation demand management improvements, such as improved shuttle service, carpool incentives, and bus passes to further improve transportation in the community. CDOT also contributed \$200 million to an affordable housing grant program to help residents stay in the community and avoid displacement.



Figure 15: Rendering of a section of the Central 70 Cap Park. Source: CDOT

Montlake Lid and Roanoke Lid

Seattle, Washington

Work in Progress and Proposal, respectively

Overview

SR 520 is a highway that connects I-5 in Seattle to SR 202 in Redmond, Washington. WSDOT has embarked on multiple phases of projects to reconstruct SR 520. Several of the project phases include highway caps (referred to as lids): three have already been constructed over SR 520 in Medina, Hunts Point, and Clyde Hill. The Montlake Lid in Seattle is currently under construction and the Roanoke Lid is currently in design.

The Montlake Lid will be located above SR 520 between Montlake Boulevard East and 24th Avenue East. The lid will add open space that will connect two sides of the affluent Montlake neighborhood that were divided by the below-grade highway. The lid will improve access to the SR 520 trail and other trails in the region. It will also include a regional transit hub to provide improved transit access for the community. As part of the project, an additional land bridge (wide bridge with landscaping on either side) will be constructed to carry the SR 520 trail on a new alignment over SR 520. Construction on the overall project, including the lid, is scheduled to be completed in 2024.



Figure 16: Rendering of the Montlake Lid. Source: WSDOT

The Roanoke Lid will be located above SR 520 between 10th Avenue East and Delmar Drive East. The lid and the open space it will provide will connect the affluent North Broadway neighborhood to other Seattle neighborhoods to the south. Similar to the Montlake Lid, the Roanoke Lid will provide connections to the SR 520 trail and other trails in the region. The lid will provide additional open space for the community with desirable views to other parts of Seattle. Construction on the overall project, including the lid, is scheduled to begin in 2024 and be completed in 2030.

Benefits

Both the Montlake Lid and Roanoke Lid projects will significantly improve access to Seattle's extensive network of trails, expanding opportunities for active transportation while reducing the potential for conflicts among vehicles, bicyclists, and pedestrians. By including a transit hub, the Montlake Lid will expand transit access for community residents. The new open spaces will provide opportunities for active and passive recreation for residents and visitors.

Name: Montlake Lid and Roanoke Lid
Location: Seattle, WA
Status: Work in Progress and Proposal, respectively
Lid Size: 3.1 Acres and 2.7 Acres, respectively
Cost: \$60-75 million (est.) and \$75-90 million (est.), respectively
Primary Benefits: Community Connectivity and Trail Access



Figure 17: Rendering of the Roanoke Lid. Source: WSDOT

The Stitch

Atlanta, Georgia

Proposal

Overview

The Stitch is a proposal for a highway cap park over the I-75/I-85 Downtown Connector between West Peachtree Street and Piedmont Avenue in Atlanta, Georgia. If built, the project would cover a $\frac{3}{4}$ -mile stretch of the Downtown Connector with a highway cap with parks totaling 14 acres on top.

The proposal for The Stitch originated in the early 2000s when Mayor's Park, a small plot of greenspace adjacent to the below-grade Downtown Connector, was built. While the benefits of the park were small, community and business leaders saw an opportunity to connect a series of parks using the air rights above the Downtown Connector and exponentially increase the benefits to the community.



Figure 18: Conceptual map of proposed parks for The Stitch in Atlanta, Georgia. Source: Central Atlanta Progress

Central Atlanta Progress, a private nonprofit community development organization, is the main organization championing The Stitch and leading its development. Over the years since Mayor's

Park opened, the proposal for The Stitch was included in the Imagine Downtown Plan, an Urban Land Institute analysis, and the I-75/I-85 Connector Transformation vision plan. In 2015, Central Atlanta Progress funded the development of The Stitch Vision Plan and later conducted a feasibility analysis. Central Atlanta Progress is currently developing partnerships and seeking funding to make the proposal a reality. The current estimated cost to build The Stitch is \$450 million, though it may be built in phases to facilitate funding, financing, and construction timelines.

Benefits

Central Atlanta Progress anticipates that The Stitch would lead to an economic development boom in this area of Atlanta, bridging the “value gap” as compared to other downtown locations. The organization estimates that, once fully built, The Stitch could result in \$1.1-3.1 billion in value creation by increasing existing property values and stimulating the development of underutilized parcels in the area. This could generate \$21-58 million in annual revenues to benefit the neighborhood and the rest of Atlanta.

Name: The Stitch
Location: Atlanta, GA
Status: Proposal
Park Size: 14 Acres
Cost: \$450 Million (est.)
Primary Benefit: Economic Development, Community Connectivity, Equity

The Stitch would knit back together the neighborhood which was fragmented by the construction of the Downtown Connector, which runs below grade diagonally through this portion of downtown Atlanta. New street segments would reconnect the urban grid, which would be improved to increase safety for all roadway users. The new greenspace would improve the quality of life for current and future residents, visitors, and workers in the area. The Stitch may also lead to improvements to the Civic Center transit station, including a new off-street bus facility and opportunities for transit-oriented development.



Figure 19: Rendering of possible future park uses for The Stitch. Source: Central Atlanta Progress

Conclusion

Highway cap parks are one approach to mitigating the impacts of highways on surrounding communities. Highway cap parks can be relatively expensive and complex projects with a range of costs and logistical challenges, but they can have a variety of benefits to surrounding communities, including transportation, economic, social, and environmental benefits. The 45 existing highway cap parks and 15 proposed and in-progress highway cap parks in the U.S. aim to reconnect communities divided by highways, improve quality of life for neighboring communities, spur economic development, and mitigate the impacts that highways have on their adjacent communities. Agencies and communities interested in implementing highway cap parks should consider the costs of highway cap parks along with the benefits to help ensure future policy and project decisions are well-informed.

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Appendix B: Highway Cap Park List

Status	State	City or County	Coordinates	Park Name	Highway/Roadway Below Park
Existing	AZ	Phoenix	33.461774298702835, -112.07621402493686	Margaret T. Hance Park/The Japanese Friendship Garden of Phoenix	Interstate 10
Existing	CA	La Canada Flintridge	34.20719532832371, -118.205357267684	Memorial Park	Interstate 210
Existing	CA	Monterey	36.60319243142857, -121.89388118096619	Monterey State Historic Park	Lighthouse Avenue
Existing	CA	San Diego	32.752274922764975, -117.10855881282913	Teralta Park	Interstate 15
Work in Progress	CA	San Francisco	37.80299735452046, -122.45621169505294	Presidio Tunnel Tops	U.S. Route 101 (Presidio Parkway)
Work in Progress	CO	Denver	39.780442427344425, -104.9555507037127	Central 70 Cap Park	Interstate 70
Existing	CT	Hartford	41.769796465736896, -72.6740525688466	Heaven Skateboard Park	Interstate 84
Existing	CT	Hartford	41.76530673199541, -72.66756339101762	William H Mortensen Riverfront Park/Mortensen Riverfront Plaza	Interstate 91
Existing	DC	Washington	38.9000961, -77.0139961	Cobb Park	Interstate 395
Proposal	DC	Washington	38.91114664576494, -77.04431535618087	(unnamed)	Connecticut Ave NW

Status	State	City or County	Coordinates	Park Name	Highway/Roadway Below Park
Existing	GA	Atlanta	33.77690338554941,-84.39085592429396	Fifth Street Plaza	Interstates 75/85
Proposal	GA	Atlanta	33.763286793276166,-84.38319286755598	The Stitch	Interstates 75/85
Existing	KY	Louisville	38.24321343337741,-85.69581852819614	Cherokee Park	Interstate 64
Existing	KY	Louisville	38.25887722739034,-85.7575891475666	Riverfront Plaza/Belvedere	Interstate 64
Existing	MA	Boston	42.35741194099827,-71.05140882029852	Rose Fitzgerald Kennedy Greenway	Interstate 93
Existing	MA	Boston	42.37169956874308,-71.0618481204014	City Square Park	U.S. Route 1
Existing	MA	Milton	42.258461730711765,-71.04174229381994	Manning Community Park	Interstate 93
Existing	MD	Montgomery County	39.137886952208454,-77.13408930110008	(unnamed)	MD Route 200 (Intercounty Connector)
Existing	MI	Oak Park	42.47737625728216,-83.19564511429247	Charlotte M. Rothstein Park	Interstate 696
Existing	MI	Oak Park	42.4766245511235,-83.19243985916117	Victoria Park	Interstate 696
Existing	MI	Southfield	42.47968985175461,-83.20625934208157	Freeway Park / Lincoln Woods Nature Preserve	Interstate 696
Existing	MN	Duluth	46.788681902774336,-92.09429125049881	Gichi-Ode' Akiing (Lake Place Park)	Interstate 35

Status	State	City or County	Coordinates	Park Name	Highway/Roadway Below Park
Existing	MN	Duluth	46.7948972935458,-92.08761049120336	Jay Cooke Plaza	Interstate 35
Existing	MN	Duluth	46.7978253936506,-92.0813404110286	Leif Erikson Park/Duluth Rose Garden	Interstate 35
Existing	MN	Minneapolis	44.91583812262477,-93.21426542759333	Longfellow Gardens	Minnesota State Route 55/ Hiawatha Avenue/Trunk Highway 55
Existing	MN	Minneapolis	44.89315914867521,-93.18275675484391	Historic Fort Snelling	Minnesota State Route 5/Trunk Highway 5
Proposal	MN	St. Paul	44.9517597499391,-93.13649032571628	ReConnect Rondo	Interstate 94
Existing	MO	St. Louis	38.62539063468287,-90.1880291985829	Luther Ely Smith Park/Gateway Arch National Park	Interstate 44
Proposal	MO	Kansas City	39.0960621389471,-94.58261359011144	(unnamed)	Interstate 670
Existing	NJ	Trenton	40.20036645724442,-74.75885531349637	South Riverwalk Park	New Jersey State Route 29
Existing	NJ	Atlantic City	39.37267209649027,-74.44414696703019	Horace Bryant Park	Atlantic City-Brigantine Connector
Existing	NY	New York	40.75687357307979,-73.96002962718146	Sutton Place Parks	Franklin D. Roosevelt East River Drive (FDR Drive)
Existing	NY	New York	40.77518429451977,-73.94365019712797	Carl Schurz Park	Franklin D. Roosevelt East River Drive (FDR Drive)
Existing	OH	Cincinnati	39.10108419288682,-84.5039041530602	Lytle Park	Interstate 71

Status	State	City or County	Coordinates	Park Name	Highway/Roadway Below Park
Proposal	OH	Cincinnati	39.097790, -84.515465	(unnamed)	Interstate 71 (Fort Washington Way)
Existing	OK	Tulsa	36.120851708922025, -95.98549028689439	The Gathering Place	Riverside Drive
Proposal	OR	Portland	45.536506063755205, -122.66790315045169	(unnamed)	Interstate 5
Existing	PA	Danville	40.96065836622695, -76.6201335316789	(unnamed)	Pennsylvania State Route 54
Existing	PA	Philadelphia	39.95900501879292, -75.17117803942799	Shakespeare Park	Interstate 676 (Vine Street Expressway)
Existing	PA	Philadelphia	39.94776132932569, -75.14205151811754	I-95 Park	Interstate 95
Existing	PA	Philadelphia	39.9448098481553, -75.1431273498615	Foglietta Plaza	Interstate 95
Existing	PA	Philadelphia	39.94390841564528, -75.14276996323008	Philadelphia Vietnam Veterans Memorial	Interstate 95
Proposal	PA	Philadelphia	39.94691600003549, -75.14211842464242	Penn's Landing Park	Interstate 95
Work in Progress	PA	Pittsburgh	40.44087134385731, -79.99280250333774	(unnamed)	Interstate 579
Proposal	TN	Nashville	36.17047784448118, -86.80536774918967	(unnamed)	Interstate 40
Proposal	TX	El Paso	31.762499, -106.490987	Downtown Deck Plaza	Interstate 10

Status	State	City or County	Coordinates	Park Name	Highway/Roadway Below Park
Existing	TX	Dallas	32.789512194036455, -96.80162133188315	Klyde Warren Park	Texas State Highway Spur 366 (Woodall Rodgers Freeway)
Proposal	TX	Dallas	32.744687217737855, -96.81395797640319	Southern Gateway Park	Interstate 35 (R.L. Thornton Freeway)
Existing	VA	Arlington County	38.898945123227236, -77.07259849859867	Gateway Park	Interstate 66
Existing	VA	Richmond	37.536749800263664, -77.43934998528452	Kanawha Plaza	Downtown Expressway
Existing	WA	Medina	47.63743316641768, -122.23859321359316	520 Bridge View Park	Washington State Route 520
Existing	WA	Hunts Point	47.63613413706294, -122.22678681789813	520 Trail	Washington State Route 520
Existing	WA	Clyde Hill	47.64075928394371, -122.21677856822272	Points Loop Trail	Washington State Route 520
Existing	WA	Mercer Island	47.592139441632796, -122.24454448893891	Aubrey Davis Park	Interstate 90
Existing	WA	Mercer Island	47.585754842378506, -122.22734618848219	I-90 Trail	Interstate 90
Existing	WA	Seattle	47.609445409660665, -122.33087081591964	Freeway Park	Interstate 5
Existing	WA	Seattle	47.5900471205633, -122.29781493065856	Sam Smith Park (Mount Baker Lid)	Interstate 90
Existing	WA	Tacoma	47.25618452422277, -122.43750987331303	Fireman's Park	Interstate 705

Status	State	City or County	Coordinates	Park Name	Highway/Roadway Below Park
Proposal	WA	Seattle	47.642694122372205, -122.3192270433688	Roanoke Lid	Washington State Route 520
Work in Progress	WA	Seattle	47.6446234629951, -122.30286489967055	Montlake Lid	Washington State Route 520