I-5 Decking Research Study

INVENTORY OF COMPARATIVE DECKING PROJECTS

Prepared May 15, 2001

Prepared for:

City of Sacramento
Economic Development Department and Public Works Department
INVENTORY OF COMPARATIVE DECKING PROJECTS

Summary Report

This document was prepared in support of the

I-5 DECKING RESEARCH STUDY

for the

CITY OF SACRAMENTO
Economic Development Department
Public Works Department

by

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(Note: Projects indicted in **bold** are most applicable to Sacramento’s I-5 Decking Research Study)

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OVERVIEW

“Decking” is the process of constructing a usable structural space above a new or existing roadway, rail line, water body or other transportation system. A “deck” is also often referred to as a lid, cap, platform, cut and cover tunnel, cantilever, or bridge widening.

The idea of decking is a very old concept. Communities have been doing it over roadways, railways, and water bodies for centuries, mostly as an effort to maintain or reconnect neighborhoods that would otherwise be cut off from each other or from a major civic resource. It is through the realized efforts and commitment of cities around the world that the city of Sacramento can glean valuable lessons learned. The city can use these past experiences to better understand ways in which it can reconnect its own downtown with the Sacramento riverfront.

Successful decking efforts are as diverse in scope as they are widespread in location. Exemplary projects exist in notable locations like the Capital Mall in Washington, D.C. Some are as close by as Monterey, California; others as far away as Barcelona, Spain. And some are located in places as unexpected as Duluth, Minnesota. Decking projects range greatly in construction cost and time-frame, depending in part on the scale of the project and on the amount of political and public support they garnered.

The following projects provide a sampling of some of the unique benefits that can be achieved through the decking process. It is intended as a resource to learn about how other urban areas reclaimed their communities and solved tough connectivity issues. This inventory is not intended to be an exhaustive report on all the decking projects throughout the world, nor a comprehensive case study, but rather a guide to some of the projects built to date or currently under construction.

INVENTORY OF FREEWAY DECKING PROJECTS

This inventory highlights a sampling of twenty decking projects across the United States. The projects range from passive parks to active sports and recreation centers and from small-scale residential housing to high-rise office complexes. Also included in this inventory are another 15 or so projects that have been proposed, but not yet funded, as well as a few examples that are located in Europe and South America. The following map shows the distribution of decking projects that have been researched to date throughout the United States.
Projects Completed or In-Progress, in the United States

- Phoenix, AZ: I-10 Papago Freeway
- Monterey, CA: Monterey Tunnel Project
- San Diego, CA: Mid-City I-15
- Hartford, CN: I-91/I-84 Interchange: Riverfront Plaza & Founders Bridge
- Boston, MA: I-93: Central Artery/Tunnel, Copley Place, and Prudential Center
- Charlestown, MA: CANA Project: City Square Park and Tunnel
- Duluth, MN: I-35 Extension: Lake Place & Leif Erickson Park
- Reno, Nevada: I-80 Platform
- Atlantic City, NJ: Brigantine Connector
- New York City, NY: Park Avenue and Trans-Manhattan Expressway
- Brooklyn, NY: Brooklyn/Queens Expressway Promenade
- Cincinnati, OH: Fort Washington Way and Lytle Park
- Philadelphia, PA: Commerce Square
- Mercer Island, WA: I-90 Completion Project
- Seattle, WA: Freeway Park and Convention Center
- Washington DC: The Portals
Projects Proposed, But Not Yet Funded or Approved

- Bakersfield, CA: SR-178 Extension
- La Canada Flintridge, CA: Liberty Project
- Pasadena, CA: I-710 Extension
- Glenwood Springs, CO: Freeway Decking Project
- Vail, CO: Freeway Decking Project
- New Haven, CT: I-95 - Haven Harbor Access Feasibility Study
- Brooklyn, NY: Gowanus I-278 Expressway Tunnel
- Manhattan, NY: Miller Highway Project
- Gresham, OR: Mount Hood Parkway
- Portland, OR: Bridge the Divide & Cap I-405
- Medina, WA: Freeway Decking Project
- Washington, D.C: I-395 Third Street Tunnel

Projects Completed or In-Progress, Outside of the United States

- London, England: Bishopsgate
- Paris, France: Pont Au Change
- Florence, Italy: Ponte Vecchio
- Amadora, Portugal: Amadora Central Station
- Barcelona, Spain: Moll De La Fusta
- Barcelona, Spain: Ronda De Dalt
- Berne, Switzerland: N6 Motorway
- Sao Paolo, Brazil: Anhangabau Valley Park

LESSONS LEARNED

Many lessons can be learned from the decking projects summarized in this inventory. Following is a list of the top ten.

1. The public involvement process can have major impact on the final design and community benefit of a decking project.
2. Variable tunnel lighting controls provide adequate levels of illumination, saves money, and is safe.
3. Timing the construction of a decking project with needed highway reconstruction can help create an opportunity to build high a quality park and major civic improvements by leveraging the reconstruction/rehabilitation of the existing freeway.
4. Air rights leases can be difficult to assess for fair market value. It’s a good idea to talk with people who have negotiated the process before.
5. It’s best to plan for a maximum weight on top of a deck so there’s more flexibility with what can be put on top. This eliminates the need to add or re-do supports/reinforcements later.
6. Use the word “mitigation” as often as possible when applying for grants and funding (the word has “legal pregnancy”).
7. Brainstorm what to do in the interim, in between time when the foundation is complete and when the design is actually built.
8. Determine what the potential range of costs is first.
9. Good interdepartmental communication system is key.
10. Cut and cover construction can easily accommodate multi-story buildings over deck, with a potential for leveraging costs of freeway construction as well.
Description:

The final section of Interstate 10, the Papago Freeway in Phoenix, was constructed in 1990. Part of it was built as a depressed freeway, covered by 19 side-by-side bridges that form the foundation for a 29-acre urban park. Constructed in the heart of downtown Phoenix, the ½-mile long cut and cover tunnel allows the freeway to disappear beneath the Margaret T. Hance Park, which was built on top of the deck to establish a connection between the neighborhoods bisected by the freeway. The tunnel is monitored 24-hours per day by video camera and off-site staff.

The park spans several blocks and is divided by Central Avenue into two distinct areas. On one side is an open play area, playground, and picnic area with grills and sand volleyball. On the other side is a brick entryway and fountain at the base of the Phoenix Public Library and a partially completed Japanese Friendship Garden. When completed, the Gardens will be located on 3 acres of the park and will include a Tea House, a koi fishpond, and a strolling walkway.

Considered the heart of Phoenix’s downtown cultural center, Deck Park is the city’s second-largest downtown park. The park has spurred recent efforts to revitalize the surrounding downtown area, including the construction of a new library, new market rate and affordable housing projects, and the expansion or renovation of nearly all the area's museums.

Proposals to build a downtown freeway in Phoenix had been debated for decades – the original 1966 design called for a roadway elevated more than 100 feet above ground. However, because of public support for the current design, the Papago Freeway overcame obstacles that would kill most highway projects. The highway was built through some of the oldest and most historic neighborhoods in Phoenix; it also ran through two ancient archaeological sites, which were salvaged before construction.

Today, the Papago Freeway is an aesthetic, economic, and cultural success. The project, particularly the park deck area, is thought of as a showcase for Phoenix; not just a highway project, but also an essential element of the fabric of the City of Phoenix.
Deck Details:
• ½-mile long cut and cover tunnel, consisting of 19 side-by-side bridges that form the foundation for a 29-acre urban park. Deck pad is 6 to 8 feet deep.

Key Results/Lessons Learned:
• Public support for park deck enabled freeway to be built through heart of city
• Deck Park has been catalyst for commercial and residential revitalization in surrounding area
• Waterproofing is a huge concern; deck has experienced some minor leakage from pond on top
• Good interdepartmental communication system is key. Special events must be monitored very closely, considering weight of special vehicles on deck, assemblage of temporary structures, etc. Any event planned or anything that will penetrate ground more than 3 feet must be approved by ADOT
• Lighting can be a potential problem when entering/exiting the tunnel
• Exit ramps are too sharp/too quick; accidents occur frequently
• Trees must be carefully and appropriately selected. On Deck Park, the trees have not grown to full height, possibly because there was not enough dirt for the type of tree (soil only 3-5 feet deep). Due to weight limitations, special fills are required; can’t have solid soil.

Project Completion Status:
• Freeway completed 1990; Park deck completed 1992
• Japanese Tea House & Gardens – 30% complete by 2000; Phase II currently underway

Project Costs:
• $100 million for decking structures; $5 million for park
• City pays $300/year for a 50-year air rights lease from the State; City maintains all park facilities

Funding Sources:
• Deck structure – 92% FHWA (additional discretionary funds and 8% State funds
• Hance Deck Park – City funds
• Japanese Friendship Garden - partial funding through a voter-approved Cultural Bond Election, in 1988. Bond funds available in 1998 covered only partial cost of building the Gardens. A volunteer committee is currently raising additional $1 million in donations to complete the project.

Contacts:
• Bill Hayden, Arizona Dept of Transportation - Community Relations
  Phoenix, Arizona - (602) 712-7524, e-mail: whaden@dot.state.az.us
• Mark Lamm, City of Phoenix Parks and Recreation Dept - Special Facilities
  Phoenix, Arizona - (602) 262-4541

Additional Information:
http://www.thenewi64.org/1c1_az.htm
http://www.arizonaroads.com/urban/papago.htm
http://www.fhwa.dot.gov/byday/fbhd0810.htm
http://www.tfhrc.gov/pubrds/summer96/p96su28.htm
http://www.jgarden.org/gardens.asp?ID=426
Lighthouse Avenue Tunnel: Lower Plaza and Custom House
Monterey, California

Description:

Planning for Monterey’s Lighthouse Avenue traffic tunnel began in 1962. The project was originally designed to keep through traffic out of the downtown area. Now complete, the decked structure supports several buildings, such as the Monterey Maritime Museum, Heritage Harbor Center, Customs House Plaza, and a two-story complex made up of offices and retail shops.

Completed in 1969, this is one of the first examples of a decking project on the West Coast. It was funded primarily by federal funds dedicated for urban renewal efforts. The biggest obstacles to completing the project were related to easements and property ownership issues. The land was owned by a combination of city, state, and private parties.

The tunnel/decking project has an extensive pumping and collection system for stormwater drainage and a network of ventilation fans.
Deck Details:
• 1,000-foot cut and cover tunnel

Key Results/Lessons Learned:
• Tunnel diverts traffic away from downtown and provides seamless connection to Fisherman’s Wharf
• Major tourist attractions and revenue generating businesses are built on top of the deck
• Drainage is a significant issue. The Monterey tunnel is below sea level, the lowest part of the city. A major portion of downtown stormwater drains directly into the tunnel. If anything were to ever happen with the pumping system, the tunnel would flood. The City is currently considering modifications to the tunnel to mitigate this impact.
• Speeding through the tunnel can also be a big problem. Should identify ways ahead of time to mitigate it.
• Best to plan for maximum weight on the deck, so that there’s more flexibility with what can be put on top. This will eliminate the need to have to go back and add additional supports/reinforcement later.

Project Completion Status:
• Completed 1969

Project Costs:
• Not available

Funding Sources:
• 100% Federal funds

Contacts:
• Tom Reeves, City Engineer
  Monterey, California
  (831) 646-3920

• Cathy Smith, Public Works Department
  Monterey, California
  (831) 646-3920

• Jeff Krebs, Public Works – Operations and Maintenance
  Monterey, California
  (831) 646-3927

Additional Information:
• Not available
I-15: Mid-City Bridge Widening and Park Deck
San Diego, California

Description:

When construction of Interstate 15 was first planned in the 1960s, a typing error on a federal form resulted in a funding deficit that halted the completion of the freeway through the inner city neighborhood of Mid-City. As a result, high traffic volumes increased on the community’s surface arterials, causing significant damage to the neighborhood’s cohesion and quality of life.

When funds were finally appropriated to complete the 2-mile segment of freeway, the proposed below grade freeway created a new problem of dividing the neighborhood from east from west with a deep canyon. The initial design went through a number of iterations (from a cut and cover tunnel to an 8-block deck to a single park deck). The process was highly politicized and included a major community involvement effort.

In order to mitigate the impacts of the freeway, the community wanted the whole segment decked (approximately 8 blocks). But, due to funding limits, only one block was decked and a 4-acre park has been built on top. Mitigating efforts also included the widening of two bridges on either side, with 40 feet of buildable space. The bridges are designed to carry up to 2-story, light-frame structures.

The community is now trying to figure out how to use the buildable area on the two mini decks to help keep a continuous streetscape over the bridges so that the community is knitted together by the freeway instead of further divided. Future plans include transit-oriented development in support of the dedicated transit facilities already earmarked for this area, which would help to transform this area into the center of the community. Some concepts have included an elevator from the at grade transit platform in the center lane of the freeway or sky walks to the corners adjacent the freeway roadbed.
Deck Details:
• 4-acre passive community park deck
• 40-foot mini decks on either side of two bridge overpasses designed to carry up to 2-story light frame structures

Key Results/Lessons Learned:
• Build to full weight capacity. Even though planning and design had not been completed, mini decks were built with intent of putting structures on top to avoid having to redo anything later.
• Use the word mitigation as often as possible. Getting the park deck built was a mitigating factor to the freeway construction. The word mitigation has “legal pregnancy”; the more you can label the work you’re doing as mitigation, the better. For this project it meant that Caltrans was obligated to do the work, and they already accepted that something would be built there to mitigate the impact of the freeway.
• Carefully assess air lease rates. The City’s redevelopment agency in conjunction with the El Cajon Business Association signed a master lease agreement for the rights to lease and develop the deck. This way, the Caltrans won’t have to continually be involved with leasing issues. The bad news is it still has to go through FHWA, which will be a 6-month review process.
• A difficult task is determining what to do in the interim, between when the foundation is complete and when the design is actually built. Caltrans spent $1 million to landscape the mini-decks, although this work may have to be torn up once the planning and design is complete. Might be best to leave it unfinished and save any interim funds for the real deal.
• Need to determine what the potential range of costs is first. In other words, determine what can really be built on top of the mini-decks.

Project Completion Status:
• Park deck and mini-decks completed by 2000
• First community workshop to plan design of mini decks scheduled for June 2001

Project Costs:
• $5 million for bridge widening

Funding Sources:
• $5 million in Federal demonstration funds for bridge widening
• $4.1M TEA-21 grant through SANDAG to do planning and design for bridge mini decks
• State funded technical mitigation of park deck (amount not available)

Contacts:
• Gary Weber, El Cajon Business Improvement Association
  San Diego, California
  619-282-1270

Additional Information:
www.theboulevard.org
www.midtowncenter.org
I-91/I-84 Interchange Improvement: Riverfront Plaza and Founders Bridge
Hartford, Connecticut

Description:

The I-84/I-91 Interchange Improvement project, also known as the Riverfront Plaza and Founders Bridge Reconstruction project, was part of an ambitious plan to revitalize Hartford's CBD. The 1981 plan to reconnect the community with the river enabled riverfront development to serve as a catalyst for urban rebirth. Improved pedestrian access to the riverfront and to East Hartford across the Connecticut River was considered essential to this revitalization effort.

Restoration of pedestrian access to the riverfront required lowering the 1-91 southbound viaduct to grade while maintaining traffic flow. This permitted the construction of the elevated 1.5-acre landscaped deck (Riverfront Plaza) that spans I-91, the railroad, and the flood control walls, and includes a landscaped, platform-supported, terraced structure that steps down to the riverfront. A pedestrian and bicycle pathway over the river was incorporated into the Founders Bridge reconstruction.

Widening the 1,100-foot long Founders Bridge by encapsulating the existing piers facilitated the maintenance of traffic and minimized costly and environmentally disruptive foundation work in the Connecticut River. To widen the bridge, the two existing column pier bents were modified using post-tensioned cantilevered "wings" and the frame was restyled to an arched configuration to provide visual compatibility.

This project has resulted in the transformation of Hartford's riverfront into a national model for urban park systems and has created one of the region's most impressive recreational assets. This project exemplifies the benefits that can accrue to urban communities through the cooperative efforts of multi parties on major transportation related projects. This project restored riverfront access and the historic connection between Connecticut River and Hartford – Connecticut’s capital city.
Deck Details:
- 1.5-acre landscaped lid
- Cantilevered bridge extension – 1,100 feet long

Key Results/Lessons Learned:
- Timing the construction of the park deck with needed highway reconstruction created opportunity to build a high quality park and major civic improvements
- The non-profit group Riverfront Recapture, Inc., championed the riverfront revitalization effort since 1981. They learned how to harness power of public/private partnerships to serve as a catalyst for investment and redevelopment.
  - More than $16M in economic activity from events and attractions
  - More than $700M planned development projects adjacent to Plaza, including a convention center, hotel, retail and entertainment center, Science Center, and 400 housing units

Project Completion Status:
- Last of seven structures completed 2000

Project Costs:
- $115 million for the entire I-91/I-84 Interchange Project, including $24.6 million for Riverfront Plaza (decking, terraced lawn, and dock)

Funding Sources
- 22% State of Connecticut Department of Transportation ($5,502,300)
- 62% Federal Highway Administration ($11,349,500, plus $4,000,000 Federal ISTEA Grants)
- 12% US HUD funds ($2,900,000)
- 4% Private money through non-profit Riverfront Recapture, Inc. ($850,000)

Contacts:
- Marc Nicol, Director of Parks Planning and Development
  Hartford, Connecticut
  (860) 713-3131

- Jim Connery
  Connecticut Department of Transportation
  (860) 594-2666

Additional Information:
http://www.acec.org/eea/eeaimages/Ecah12.jpg
http://www.acec.org/aceonline/Articles/eeaexcell6.htm
http://www.pps.org/urbanparks/Reprint_CP_text.html
http://www.riverfront.org/
http://www.fwdodge.com/dcp/NYCN/NYbestprojects/NYtopprj-007.html
http://www.dot.state.ct.us/BUREAU/eh/ehcn/road/63-376.htm
I-93: Central Artery/Tunnel
Boston, Massachusetts

Description:

The Central Artery/Tunnel (CA/T) Project, or “Big Dig”, provides a solution to Boston’s traffic problems and an opportunity to reconnect neighborhoods that were severed by the construction of the Central Artery through downtown Boston.

Currently under construction, the CA/T Project will remove the 1950’s elevated, six-lane Central Artery viaduct (I-93) through Boston's CBD, as well as its double-decked Charles River Bridge and a portion of its elevated approaches. It will be replaced with an 8-10 lane underground highway beneath approximately 30 acres of linear park along the Artery corridor. Three quarters of the new corridor space will be designated as open space, with the rest planned for modest buildings. A total of 250 acres in all will be reserved for parks and open space throughout the project area. The CA/T project will also extend the I-90 (Massachusetts Turnpike) from its current terminus south of downtown Boston through Third Harbor Tunnel beneath South Boston and Boston Harbor to Logan Airport. The entire CA/T project spans 7.5 miles of highway.

Planning for the CA/T project began in 1986 and has been under construction since late 1991. The project is anticipated to be finished in 2013, including demolition of the elevated highway and restoration of the surface. The project’s primary goals are to mitigate the barrier created by the old elevated highway, reconnect the neighborhoods that were severed by it, and improve the quality of life in the city beyond the confines of the new highway.

The project has created unprecedented opportunities for city building and rebuilding. Four types of development parcels will be available when the project is complete: air rights land, land under viaducts, residual
land adjacent to the highway, and the parcels set aside for tunnel ventilation structures. All of the land
is publicly owned, but the city and state have committed to public-private partnerships where
appropriate. The 30 acres of developable land in the air rights parcels above the new downtown
tunnel are part of a joint development opportunity with state, city, and various private groups to join
the downtown with the waterfront, both physically and visually. Proposals for up to six-story
buildings, all with ground floor commercial uses are being considered during the planning process.
Site preparation of the parcels will be the responsibility of the public sector, although real estate
revenues and sales generated by the development could offset a good portion of the cost.

Deck Details:
• 2,900 foot long park covered tunnels

Key Results/Lessons Learned:
• Reconnected neighborhoods and improved accessibility in/out of downtown CBD
• Enhanced scenic aesthetic by providing more than 250 acres of parks and open space
• Provided access to the river by connecting downtown financial district and East Bay with river
  front
• Improved air quality through reduced traffic congestion

Project Completion Status:
• Completion estimated in 2013

Project Costs:
• $14 billion as of October 2000 (costs for decking project alone not available)

Funding Sources:
• Multiple federal and state agencies – TBD

Contact:
• John Romano
  CA/T
  (617) 951-6531

• Allan Hodges, AICP
  Parsons Brinckerhoff
  (617) 960-4890

Additional Information:
http://www.bigdig.com
http://www.mccormack.umb.edu/Publications/IssueBook/caTunnel.html
http://libraries.mit.edu/rotch/artery/
http://www.transdyn.com/HTML/App_Bul/Transportation/BostonCAT/index.htm
http://www.massturnpike.com/links_info.html
http://www.ctps.org/bostonmpo/resources/tip_01_06.pdf
Copley Place and Prudential Center
Boston, Massachusetts

Description:

**Prudential Center**
This was the first commercial project to reclaim old rail yards and seed the revival of Boston’s Back Bay. Located on a 23 acre site between Boylston Street and Huntington Avenue in the heart of Back Bay, Prudential Center is adjacent to Hynes Convention Center, major hotels, shopping and residential areas, and a 2.2 million square foot office and retail complex. The Prudential Center is the largest mixed-use development in New England. Prudential tower has 52 stories and shares a multi-level retail complex of 486,428 square feet, and 2,680 underground parking spaces with the other buildings in the Prudential Center.

**Copley Place**
Completed in 1984, this office and retail project helped reconnect Boston’s oldest neighborhoods in the Back Bay. The entire project comprises 9.5 acres, a portion of which is built on the air rights above the Massachusetts Turnpike, the Copley Square exit, and the railroad tracks. The mall totals 3.7 million square feet. At the time it was built, it was the largest single-phase private development in New England history. It is bound by the Westin Hotel, the Marriott Hotel, and Neiman-Marcus. Passages within connect the hotels with the multi-use complex associated with the Prudential Tower.

Copley Place is the result of a long and carefully executed public process. Tunney Lee, a professor of architecture at MIT, headed a Citizens Review Committee composed of lawyers from the Back Bay, activists from the South End, citywide architects and planners, and concerned local citizens. Questions of circulation, height, density, housing, land use, and design criteria were considered. Thus the developers were legally committed to incorporating the goals of the community in their final design.
The Copley/Prudential complex includes three hotels and a convention center along with office, retail, and residential uses. Along with four other adjacent hotels, one third of the city's hotel rooms are located here. Although it’s physically set off from the street on super blocks, the complex does not segregate tourist activity from the city. It is surrounded by attractive neighborhoods and spectacular public spaces that bring visitors out into the streets. It is also heavily used by locals for shopping, eating, and entertainment.

**Deck Details:**
- A portion of the mixed-use complex at Copley Place is built on top of I-90 (Massachusetts Turnpike) and the rail yards.

**Key Results/Lessons Learned:**
- Reclaimed old rail yards, reconnected neighborhoods, and spurred revitalization of Boston’s Back Bay
- Project is one of the largest mixed use developments in New England
- Public process will have major impact on the design and community benefit of any decking project

**Project Completion Status:**
- Completed 1984

**Project Costs:**
- Not available

**Funding Sources:**
- Not available

**Contact:**
- Randy Goldstein, Leasor
  Boston Properties
  (617) 236-3301

- Claude Hoops, Leasor
  Prudential Center
  (617) 236-3304

**Additional Information:**
http://www.iboston.org/buildings/building_index.html
**Description:**

The Central Artery/North Area (CA/NA) Project included the construction of new tunnels under Charlestown’s City Square and demolition of the existing elevated highway structure that connected the Tobin Bridge to the Central Artery (interchange of Route 93 and 1).

The community participation process for this project concluded with the decision to utilize the newly cleared area for a public park. The 1-acre City Square Park was constructed partly over the tunnels and now provides clear, unobstructed views that have not been enjoyed since the overhead MBTA Orange Line was constructed in the 1950s.

City Square Park is thought of as the promise of the Central Artery/Tunnel Project. By opening the tunnels under City Square Park to traffic that formerly used the elevated ramps between the Tobin Bridge and Route 1/93, Charlestown's link to the waterfront was restored. The park features a sculptured fountain, an open lawn area, seating, a wide variety of trees, shrubs, and seasonal flowers, and an exhibit on the history of City Square. Boston landscape architectural firm, The Halvorson Company, in collaboration with sculptor David Phillips of Somerville, designed the park.

City Square Park is now a landmark that once was overshadowed (literally) by elevated train tracks and highways. The citizen-led group Friends of City Square Park and other residents of Charlestown succeeded in having them removed and replaced with a beautiful public park, which has since played a key role in the area’s urban revitalization and residential resurgence. Property assessments, for example, rose by as much as 22% in one year since the completion of the park.
Deck Details:
• 1-acre park deck built over tunnels – part of CA/T Project

Key Results/Lessons Learned:
• Completion of the park reclaimed City Square as Charlestown’s civic center and restored its link to the waterfront and its gateway to Boston
• City Square Park has served as catalyst for neighborhood gentrification and has sparked ongoing urban revitalization in the surrounding area

Project Completion Status:
• Completed 1998

Project Costs:
• $2 million for construction of the 1-acre park deck ONLY
• $110 million for construction of tunnel and ramp demolition

Funding Sources:
• 60% State of Massachusetts Highway Department (Engineering and Construction Services) and Department of Environmental Management (Design and Project Management)
• 30% Federal funds

Contacts:
• Fred Yalouris
  Director of Surface Restoration for Project
  (617) 951-6400

• David Kruh
  Massachusetts Highway Administration
  (617) 951-6013

Additional Information:
http://www.tiac.net/users/kat/CAT/CITY_SQUARE_PARK_GROUNDBR.html
http://www.justrentals.com/relocating/charlestown.html
I-35 Extension: Lake Place and Leif Erickson Park
Duluth, Minnesota

Description:

The I-35 Extension project used decking to bring about a variety of waterfront linkages and community amenities that reconnected downtown Duluth to Lake Superior. It also preserved the city’s historic district, integrated the 2.3-mile freeway segment into the rest of the city, improved pedestrian access to the Lake Superior waterfront, and ultimately spawned the revitalization of downtown Duluth.

In 1992, the city completed the construction of four cut and cover tunnels, which added 13 city blocks to Duluth’s downtown. The effort saved historic buildings, added the 2-1/2 acre Lake Place Park, restored the Rose Garden at Leif Erickson Park, and created new urban green spaces such as Lakewalk.

The public input process was a key component of the project from the beginning. When the Interstate 35 Extension through downtown Duluth was proposed 30 years ago, local residents feared that it would result in a detrimental separation between the city and its waterfront. As a result, the community organized and through a long public process, ultimately influenced the redesign of the highway. The project is now met with immense local pride.

Lake Place Park and the rose garden at Leif Erickson Park are good examples of green spaces set aside for public use to enhance the connection between the city and its lakeshore. The design also provided a catalyst for restructuring the Duluth-area economy from an industrial to a tourism base. The Leif Erikson Tunnel, which opened in October 1992, has been honored by the Federal Highway Administration and others for its use of cut and cover tunnels, architectural design treatments, and extensive landscaping to integrate the freeway into the surrounding urban environment and create a pleasing driving experience.
A 580 ft. long ceramic tile Image Wall mural on the outside highway wall faces lake level use areas. Consistent with community waterfront themes, it depicts historic marine images and provides additional highlight for lakefront trail visitors. Lake Place continues to accomplish its goals with new adjacent improvements, development, and attractions. More than a dozen adjacent downtown blocks have been revitalized as direct result of this multiple-use highway improvement.

**Deck Details:**
- Four cut and cover tunnels; total length of all four tunnels is about ¾ mile

**Key Results/Lessons Learned:**
- Community leadership is extremely important. In this case, the community organized against the initial design of I-35 and ultimately turned a major transportation investment into city renaissance. Millions have been invested in the old warehouse Brewery District since completion of the project. Duluth is now a tourist destination, attracting thousands from the Twin City area during the summer months.
- Freeway and park deck design reconnected downtown with the lakefront, providing access to Lake Superior
- Air quality was ultimately improved, since the tunnels allowed for through traffic through the downtown, reducing the amount of start/stop traffic congestion

**Project Completion Status:**
- Leif Erickson Tunnel (last of four) completed 1992

**Project Costs:**
- Costs: $220 million for decks and greenspace
  - Example costs:
    - $45 million - rail relocation
    - $3.8 million - Leif Erickson Park, including park restoration, bike/ped path and landscaping
    - $23 million - Leif Erickson Park tunnel (1,480’ long)
    - $10 million - Lake Place Park (3 acres)

**Funding Sources:**
- 90% - Federal funds, primarily from federal and state motor fuel tax (user fees). $74 million came from interstate substitution (I-Sub) funds
- 10% - State funds

**Contacts:**
- John Bray, District Public Affairs Director
  Minnesota Dept of Transportation
  (218) 723-4802

**Additional Information:**
http://www.landscapedirect.com/articles/kw/kw1.html
http://www.duluthnews.com/docs/mill/freeway.htm
Description:

The freeway deck was built in 1973 concurrent with construction of Interstate 80 through Reno’s northern central business district. Since completion, the platform has been unused except for a brief period when it was used for parking. The deck is approximately 76,773 square feet (1.7 acres), including a 66,652 square foot concrete and steel platform and 10,121 square feet of land on either side of the platform that contains the necessary abutments, supports, and access for the platform.

The air rights were initially sold to a private party who built the pad in 1972, with the intention of constructing a platform that would provide the foundation (super-structure) for a multi-story building. Subsequent to the platform’s construction, the development plans for the super-structure were terminated and the platform was foreclosed upon. A single-ply membrane roofing was applied to the surface of the concrete deck.

Ownership subsequently went through a number of bankruptcies over the next couple of decades. In 2000, a new owner bought interest in the deck from the previous lessee for $440K and has proposed a 14,976 square foot single-story commercial building to be leased to Walgreen’s Drugs. Construction is currently in progress. Because the deck had been left to deteriorate for so many years, substantial repairs had to be made in order to begin construction of the building. The current estimated cost to rehabilitate the pad structure is $1,021,688. While difficult to assess, the initial lease rate of $31K per year has remained through to 2065, when the lease expires. Whereas previously it had been assessed every 5 years.
 Deck Details:
• 66,652 square foot concrete and steel platform and 10,121 square feet of land on either side of the platform containing the necessary abutments, supports, and access for the platform.

Key Results/Lessons Learned:
• If they knew now what they didn’t now then, they may not have agreed to build the deck. It hasn’t received much income, nor has it’s potential been realized until now (nearly 30 years later).
• Air rights leases can be difficult to assess for fair market value. Good idea to talk with people who have negotiated the process before.

Project Completion Status:
• Deck foundation built in 1972; actual utilization of deck anticipated in 2001

Project Costs:
• Cost of deck – not available; deck rehabilitation of deck $1,021,688
• Current annual airspace lease is $31K

Funding Sources:
• Not available

Contacts:
• George W. Sloss, MAI, Chief Review Appraiser  
  Nevada Department of Transportation  
  (775) 888-7219

• Paul Saucedo  
  Nevada Department of Transportation  
  (775) 888-7390

Additional Information:
• Not available
Atlantic City/Brigantine Connector
Atlantic City, New Jersey

Description:

Currently under construction, the 2.2-mile-long Atlantic City/Brigantine Connector will increase the capacity of the transportation network for anticipated casino development in the Marina District and improve ingress and egress for the Atlantic City Convention Center. The project includes a 2,200-foot long cut and cover tunnel including a boat section at either end with pedestrian bridges and a landscaped park on top.

Plans for a connection between the Atlantic City Expressway and the island community of Brigantine have been discussed since the expressway opened in the mid-1960's. Previously, only one link provided access between Brigantine and mainland New Jersey. With the legalization of casino gambling in the late 1970's, heavy traffic has clogged the Brigantine Bridge. A new connection to the Atlantic City Expressway will allow motorists to avoid the congestion in Atlantic City.

The tunnel parallels a canal where the excavation ranged between 10 and 35 feet deep and extended into loose silty sands, 30 feet below the water table. The work included the design of the sheeting, high capacity tiebacks, and a jet grout wale and strut system to support the sheeting at subgrade. Design of the excavation support includes a 45-foot deep pump station.

The project has received the New York Construction News’ Best of 2000 Award as the Heavy Construction Project of the Year.
Deck Details:
- 2,200-foot long cut and cover tunnel with park on top

Key Results/Lessons Learned:
- Not available

Project Completion Status:
- Construction began November 1998
- Completion of connector anticipated in Fall 2001

Project Costs:
- $330 Million for entire project (cost of deck alone not available), including $10 Million for park

Funding Sources:
- 2/3 State of New Jersey
- 1/3 Private Funds

Contacts:
- Randy Merrill
  Parsons Brinckerhoff
  Atlantic City, New Jersey
  (609) 348-6600

Additional Information:
http://www.shorecast.com/html/Features/ScFeatures/AcRedevelop.html
Park Avenue
New York, New York

Description:

Built above the rail yards in the 1930s, this deck changed a grimy 4th Avenue into a posh boulevard, which is now lined with housing, retail, and office space. Moreover, the entire New York Subway system was basically a cut and cover project, and the immeasurable benefits speak for itself.

Deck Details:
• Deck above rail yards

Key Results/Lessons Learned:
• Not available

Project Completion Status:
• Completed 1930s

Project Costs:
• Not available

Funding Sources:
• Not available

Contacts:
• Not available

Additional Information:
• Not available
Trans-Manhattan Expressway & George Washington Bridge
New York, New York

Description:

The Trans-Manhattan Expressway, which passes through the Washington Heights section of upper Manhattan, connects the Cross Bronx Expressway with the George Washington Bridge. It was the first expressway to be built across Manhattan.

Originally planned in 1955 as an open-cut design, the Trans-Manhattan Expressway is one of the few examples in New York City, and one of the earliest in the United States, where air rights over major highways are used. Upon completion of the expressway in 1962, the Port Authority Bridge Plaza bus terminal (which serves North Jersey communities via the George Washington Bridge) and apartment buildings opened above the expressway.

Originally constructed as a two-lane bypass, the expressway now carries more than 250,000 vehicles per day on its 12 lanes of roadway. The original 178th Street and 179th Street tunnels were designed in traditional Moses-style, utilizing stone-faced arch portals and "Whitestone" lightposts. Viaducts with single circular supports that connected the tunnels with the Washington (Heights) Bridge are still in use today.
Deck Details:
• Cut and cover expressway, with apartments and bus terminal built on top

Key Results/Lessons Learned:
• Cut and cover construction can easily accommodate multi-story buildings over the tunnel, with the potential for leveraging the costs of freeway construction

Project Completion Status:
• Expressway completed 1962

Project Costs:
• Not available

Funding Sources:
• Not available

Contacts:
• Not available

Additional Information:
http://www.duke.edu/%7emjt7/gwb.html
http://www.nycroads.com/roads/trans-manhattan/
Description:

The Brooklyn-Queens Expressway (BQE) is located parallel to the waterfront of the East River, immediately south of the Brooklyn Bridge. It was built in 1947-48, and was later designated as the I-278.

The initial plan was proposed as a 6-lane, open cut freeway directly bisecting Brooklyn Heights. But the plan was not popular with the public. Instead, the local community developed their own Citizen Alternative Plan, which included a 6-lane, 2 to 3 deck cantilevered structure that hugs the edge of the ridge along the edge of the Brooklyn Heights neighborhood, with a park deck built on top. The community’s plan was forced upon Robert Moses, who accepted the community alternative design upon the condition that the park on the promenade deck that was proposed by the neighborhood groups for private gardens, would be open to the public.

Dramatically cantilevered over the BQE, the eight-block-long promenade parallels the East River and has an unimpeded view of the skyscrapers of Manhattan. At night, when the skyline is ablaze with light, the view is truly spectacular.

Between 2001 and 2004, studies will be undertaken for rehabilitation alternatives on the cantilevered section of the BQE through Brooklyn Heights. $11.6 million has been allocated for this work.
Deck Details:
• 8-block-long cantilevered deck with public promenade

Key Results/Lessons Learned:
• Through public pressure, communities can impact the design or redesign of freeways, and ultimately improve their quality of life through the public funds invested for improved transportation infrastructure

Project Completion Status:
• Completed in 1948

Project Costs:
• Not available for construction of cantilevered deck and promenade
• $11.6 million allocated to study rehabilitation alternatives for the deck

Funding Sources:
• Not available

Contacts:
• Not available

Additional Information:
http://www.nycroads.com/roads/brooklyn-queens/
Description:

Built between 1959 and 1963, Fort Washington Way (FWW) was originally constructed as a downtown distributor, linking the Central Business District (CBD) via I-71 to the Brent Spence Bridge (I-75) Ohio River crossing. By the 1990s, the urban expressway had become functionally obsolete carrying almost twice the original traffic volume it was initially designed for, resulting in heavy congestion, traffic safety hazards, and physical deterioration. It also created a major barrier from the downtown to the riverfront.

Reconstruction of the FWW began in 1998. Some of the project’s key goals were to: improve traffic flow, safety, and access on I-71; accommodate future construction of mass transit; reclaim roadway for future riverfront development; improve CBD access to the riverfront; and improve connections to new cultural facilities such as the new Paul Brown Stadium through better use of existing bridges.

The objective was to narrow the expressway from two 400’ wide lanes in either direction to four 180’ wide lanes each way. City and community groups realized that to maximize the economic potential of the Riverfront Redevelopment (including two new stadiums), connecting the CBD to the banks was critical to its success. Timing of the I-71 reconstruction played a key role in making the deck construction possible. The Riverfront Advisors spearheaded the effort, as their vision for the “Banks” would not be fulfilled without better connections and access to the riverfront. Foundation was laid for two half and two full decks across FWW, spanning 400 feet wide and 185 feet long.

The City now has plans to build two mini decks and two full decks, over the newly reconstructed FWW as part of an effort to increase pedestrian connectivity from the CBD to the Riverfront. Three rows of pilings spanning 5 city blocks were installed in February – August 2000, while major reconstruction of the expressway was still underway. The City is now gathering ideas from the public about what should be built on top of the decks (i.e., pedestrian plazas, parks, open space). Air rights will only become an issue if and when private development is considered. The decks will be built in-between five newly (re)constructed overpass bridges, with 25-foot gaps separating each structure for air intake. An exhaust system will be required to mitigate emissions from inside the decks.
Deck Details:
• Two full and 2 mini decks, when completed

Key Results/Lessons Learned:
• The idea of decking the freeway had been kicked around for years prior to the reconstruction of FWW. While initially left out of the final design due to lack of funding, the concept was resurrected during the construction phase, since much of the costs could be absorbed by the construction and traffic mitigation measures already underway. Building in tandem with the FWW Reconstruction project saved major costs, such as traffic control, etc.
• Having a project champion was key to getting the pilings installed for the deck foundation. The Riverfront Advisors worked with the City to raise $10 million to lay the foundation for the decks.
• Ventilation costs may be avoided depending on the design. In this case two half decks and two full decks are proposed to be built in between the five existing bridges, with 25 foot gaps between the landscaped buffer of the bridges and the edge of the decks to allow for air intake.

Project Completion Status:
• Construction of pilings (foundation) 1999. Completion of decks estimated in 2005 when development south of the expressway is complete.

Project Costs:
• $10 million for deck foundation (pilings only). Costs associated with the reconstruction of FWW are not included. An estimated $39 - 46 million is required to complete the decks (total tunnel length of about 1,200ft) and another $12 million for landscaping. An estimated $14 million was saved by driving the piles before reconstruction of FWW was complete.

Funding Sources:
• 60% ($6M) - City of Cincinnati, general fund
• 20% ($2M) - Hamilton County
• 20% ($2M) - Private (Cincinnati Business Committee), including $250K from the Bangles

Contacts:
• Jeff Wallace, Construction Services Division
  Parsons Brinckerhoff – Ohio
  513-639-2100
• Mark McPhillips
  Ohio Dept of Transportation
  514-352-5270

Additional Information:
http://www.riverfrontplanning.org
http://www.rcc.org/news-parkplaza-20010123.html
http://web.utk.edu/~snake1/tunnels
http://www.cinci-parks.org/parks/pdf/lytle_park.pdf
Description:

The 2.31-acre Lytle Park sits on top of a cut-and-cover tunnel, which was built in 1970 to link I-71 with FWW. Features of the park include a statue of Abraham Lincoln and a monument dedicated to the U.S. Marine Corp.

The tunnel is approximately 1,100 feet long. Its ventilation system is limited to a single set of ceiling intakes in the middle of the tunnel. Exhaust is removed with fans made of simple grates in the sidewalks above.
Deck Details:
• 2.31 acre park on top of a cut and cover tunnel

Key Results/Lessons Learned:
• Innovative freeway design solutions can minimize the negative impacts of construction and provide valuable and long lasting civic amenities

Project Completion Status:
• Completed in 1970

Project Costs:
• Not available

Funding Sources:
• Primarily (90%) private funds

Contacts:
• Dave Prather, City Parks Dept.
  City of Cincinnati
  513-421-4085

Additional Information:
http://www.cinci-parks.org/parks/text/lytle.html
http://www.rcc.org/cplanning/guidelines/lytleprk.htm
http://web.utk.edu/~snake1/tunnels/lytle.html
http://www.downtowncincinnati.com/pedestrian.html
http://www.cincinnati-transit.net/lytle.htm
Commerce Square  
Philadelphia, Pennsylvania

Description:

Though not technically a decking project, the central courtyard at Commerce Square creates a unique gathering place in Center City Philadelphia, on top of an underground parking garage. An arched entrance leads pedestrians through an open facade and into the landscaped courtyard between twin towers. Setbacks on the towers allow sunlight to come into the courtyard in all seasons, and honey locust trees form a pattern of light over cafe seating adjacent to the buildings. In the center of the courtyard, two large planters with shrubs and flowering plants surround a fountain. At night, a dramatic column of light rises from the center of the fountain, while indirect lighting illuminates the planting, the walkways and the office towers.

Extensive planning was required to create a continuous tree planter of soil averaging more than six feet in depth above the garage. Appropriate irrigation, underdrainage, and support structures were developed to accommodate not only the planters and fountain, but also the granite paving, which were carefully designed not to inhibit tree growth. Innovative construction details were developed to provide optimum growing conditions for the plant material and close coordination between the landscape architects, architects, engineers, and other consultants was required.
Deck Details:
- Park deck and plaza built on top of a parking garage

Key Results/Lessons Learned:
- Restoring the connection between and throughout neighborhoods can be achieved through good, conscientious, and innovative design ideas that maximize bike and pedestrian connectivity.

Project Completion Status:
- 1992

Project Costs/Funding:
- Not available

Contacts:
- Not available

Additional Information:
- Not available
I-66 Extension: Gateway Park
Rosslyn, Virginia

Description:

The 9.6-mile extension of I-66 from the I-495 Capital Beltway to the Theodore Roosevelt Bridge (Potomac River) includes a 900-foot cut-and-cover tunnel that was built beneath a new 3.7-acre park in the city of Rosslyn, Virginia.

The Virginia Highway Department's original 1956 plan for this freeway called for an at-grade highway with an ivy-covered chain link fence to separate the neighborhoods from the Interstate. One location of the proposed plan was wide enough to accommodate 14 lanes for interchanges and highway ramps.

Opponents of the proposed 8-lane highway succeeded in having the project redesigned into a Multi-modal Transportation Corridor consisting of a 4-lane highway with 6 miles of rapid rail transit line in the median. More than half of the corridor was built below grade, in order to minimize community impacts. Bicycle and pedestrian trails follow most of the highway's right-of-way, and thousands of feet of sound barriers were constructed to alleviate noise impacts to the community.

This project demonstrates the power of public involvement. The Virginia Highway Department wanted an 8-lane expressway, while residents along the proposed route did not want a highway at all. The result was a compromise and one of the most innovative highways in American History.
Deck Details:
• 900-foot cut and cover tunnel with a park deck on top

Key Results/Lessons Learned:
• Through public pressure, communities can impact the design or redesign of freeways, and ultimately improve their quality of life through the public funds invested for improved transportation infrastructure. In this case, the city of Rosslyn got nearly 4 more acres of park space added to the system.

Project Completion Status:
• Completed 1982

Project Costs/Funding Sources:
• $280 million for entire project ($28.6 million/mile) – funds for park deck only not available

Contacts:
• Not available

Additional Information:
http://www.richmond.infi.net/~kozelsm/Int66_MetroViennaRte.html
http://www.angelfire.com/va2/Route66/Background.html
I-90 Completion Project
Mercer Island, Washington

Description:

The Interstate 90 Completion Project includes two landscaped lids on either end of a 7-mile stretch of freeway from Seattle to Mercer Island. The lids cover about 20 percent of the project’s length and account for 28 acres of park land that help reunite the neighborhoods that had been torn apart by freeway construction decades ago.

Both park decks are distinctly linear and are organized around pedestrian/bike trails. The park created on top of the Seattle deck has a ventilation smokestack that looks like a modernist Mayan-like sculpture. Access to the park is easy - residents can enter at many places. An elementary school now exists on a large, adjacent deck, and when standing at grade, the freeway is nearly invisible. The Seattle deck reunited a neighborhood that began to be revitalized as WashDOT resold condemned houses and renovated some into affordable housing.

The Mercer Island deck features a 12-mile bike path lined by grass fields, which connects several sports fields and play meadows. A concrete wall that rises as high as 40 feet at the freeway’s edge provides a noise barrier to the freeway traffic, yet some consider it a compromise to the island’s rural character. The ventilation tunnel stacks are architecturally integrated into the design of the park, and the retaining walls are sculpted and painted neutral beige. The lid includes 13 9-foot-diameter exhaust fans and 3,800 lights.

The decking design is not only one of form, but of functionality. As a major interstate highway, I-90 had to allow a wide variety of trucking activity, including HAZMAT. Therefore, the I-90 Mercer Island Tunnels were designed and constructed with a state of the art ventilation and fire suppression system. Mobilized citizen concern made it politically impossible for highway planning authorities to shorten or delete the park-covered cut and cover tunnel sections or replace them with uncovered, up-encased highway.
Deck Details:
- Two landscaped decks with approximately 28 acre of park on top

Key Results/Lessons Learned:
- Not available

Project Completion Status:
- 1971-1985

Project Costs:
- $1.6 billion for entire project (about $225 million per mile)
- $300 million for parks ($300/sqft)

Funding Sources:
- 90% - Federal funds
- 10% - Other

Contacts:
- Pete Mayer, Director
  Mercer Island City Parks Dept.
  206-236-3545

Additional Information:
http://www.donnaonat.com/mercerisland.htm
http://www.wilsa.org/driving.htm
I-5: Freeway Park
Seattle, Washington

Description:

Built on one of the freeway overpasses of Interstate 5 between 6th and 9th Avenues, Freeway Park is a 5-acre oasis in the center of downtown Seattle. Its waterfalls and fountains mute the roar of the eight-lane freeway below and its landscaping provides a green respite and pedestrian connection between neighborhoods that were cut off from each other when I-5 was built in the 1960s.

Plans to deck the below-grade portion of I-5 that separated First Hill from downtown Seattle were first discussed by citizens and city, county, and state officials as early as 1966, when the freeway was completed. Air and noise pollution along the freeway had caused adjacent property values to plummet and new development ceased. Concerned citizens considered covering I-5 with a bridge to restore vitality to Seattle's downtown.

Freeway Park grew out of overlapping objectives - the city’s need for a municipal parking garage and a developer’s interest to construct a 21-story building. The completed complex includes two bridges covering more than 400 feet of freeway, a 630-car public parking garage, the park itself, and the 21-story Park Place building. Construction of the project began in February of 1974 and was completed in 1976. It was the first of its kind in which a mutual interest among diverse parties brought together a sizeable investment of capital. The project was a cooperative effort between the City of Seattle, the Federal Highway Commission, the State Highway Department, and public-spirited citizenry. The joint partnership produced benefits for all parties at minimal costs. Blighted land along the corridor and airspace above the freeway later became available for future park development, including the Pigott Memorial Corridor (1984) and the Washington State Convention and Trade Center (1992).
Deck Details:
• 5-acre park deck covering I-5

Key Results/Lessons Learned:
• Park provides a passive space for residents, shoppers, downtown office workers, and visitors to enjoy while adding value to the Park Place building, which ultimately increases property tax revenues.
• The municipal parking garage benefits from its link with the park as well as to the re-establishment of pedestrian access between First Hill and downtown.

Project Completion Status:
• Completed 1976

Project Costs:
• $23 million

Funding Sources (total public investment = $13.8 million):
• 25% ($5.5 million for decks) - Federal Highway Administration and State Funds (Washington DOT)
• 18% ($4.2 million for municipal parking garage) – City of Seattle (Councilmanic Bonds and Bond Interest)
• 18% ($4.1 million for parks) – King County-Approved Forward Thrust Park Bonds ($2.8 million), CBDG funds ($340K), municipal and interstate highway funds ($240K), Metro ($19K), HUD Open Space ($209K), Interagency Outdoor Recreation ($424K), and American Legion ($35K)
• 39% ($9 million for Park Place building) – Private developers

Contacts:
• City of Seattle Parks & Recreation Dept.
  206-684-4075

Additional Information:
http://www.dkassociates.com/plan/3.html
http://www.greatbuildings.com/buildings/Freeway_Park.html
http://members.cruzio.com/~cmssc/main.htm
Description:

In the 1960's, Seattle was severed by a twelve lane depressed freeway with on/off ramps and overpasses built through its center. Important urban transportation corridors - Seventh and Eighth Avenues, and University and Union Streets -- were severed by the construction of Interstate-5, disrupting the city's pedestrian links between the residential community and downtown. The Washington State Convention and Trade Center project is one of three lids that span across I-5, serving to reconnect the neighborhoods on either side of the freeway.

The tunnel under the convention center has variable lighting controlled by photocells, which adjusts to match the surrounding conditions. The cells control circuits that activate more lights on brighter days to reduce the contrast for drivers when entering the tunnel. Studies were done to determine the proper levels of illumination required during certain times of day, and minimum lengths for the transition zones. Washington's tunnel-lighting policy of using transitional zones at tunnel entrances, and less than full light farther inside, provides adequate illumination levels and is safe.

Plans to expand the Convention Center are currently underway, including the doubling of its exhibition space to 207,000 square feet by building across Pike Street. A connecting ninety-foot wide glass exhibition bridge will be a unique feature that frames views to Elliot Bay and the historic Pike-Pine neighborhood. Two loading docks, escalator banks, and pre-function areas will allow the space to serve two independent 100,000 sqft trade shows.

To fund the expansion and activate the new district, the project includes development partners that are constructing the 450 room Elliott Hotel, a public parking garage with 990 spaces and the 18 story One Convention Place office tower. The new 120,000 SF Museum of History and Industry will join the district's celebrated performing arts theaters: Paramount, ACT and 5th Avenue.
Deck Details:
- Using variable lighting controls in the tunnel will save thousands of dollars as opposed to having them lit at full intensity.

Key Results/Lessons Learned:
- Using variable lighting controls in the tunnel will save thousands of dollars as opposed to having them lit at full intensity.
- The 665-space Freeway Park Parking Garage is operated by the Convention Center, which provides much needed parking during events as well as a source of revenue for the City.
- Expansion of the Convention Center will add to the City's 24-hour a day urban activity, and the block-long glass canopy on Pike Street will create a new district with artworks, outdoor seating, cafes, restaurants and entertainment.

Project Completion Status:
- Freeway lid and original facility completed 1992; expansion of Convention Center scheduled for Summer 2001

Project Costs:
- $191 million for original deck

Funding Sources:
- Not available

Contacts:
- Washington State Convention and Trade Center
  206-694-5000

Additional Information:
http://www.wsctc.com/
http://seattlep-i.nwsource.com/local/get312.shtml
The Portals  
*Washington D.C.*

**Description:**

The Portals is a mixed-use development project built over a rail line in Washington D.C., just blocks from the Capital. The goal of the project was to extend Maryland Avenue and build an urban park and central plaza on top of the deck. While it was designed to help spawn development in the surrounding area, it was not (at least primarily) part of a greater neighborhood strategy plan.

The deck covers several blocks of railway and is approximately 160 feet wide (width of the avenue’s right of way). It is open on both sides, allowing for ventilation of the rail line below, and is constructed to absorb the vibration and noise of the trains. When on top of the deck, both are unnoticeable.

The deck was built to support significant soil depths in certain areas. Landscaping included 4 to 7 foot trees, shrubs under 3 feet, and 18-inch vegetation in lawn areas.

Planning for the Portals began in 1988, and construction of the public improvement portions was completed by 1990. The project was funded almost entirely by the developer, Republic Properties, although land was provided by the City at a reduced cost. Planning for this project did not include a community involvement process.
Deck Details:
• 160 feet wide

Key Results/Lessons Learned:
• The most significant problems encountered during the project involved running into utilities during construction and safety issues for the contractors working over the rail line. Rail maintenance and air rights over the line were also a challenge.

Project Completion Status:
• Completed in 1990

Project Costs:
• $20 million for the public space improvements
• $1 billion for construction of adjacent buildings

Funding Sources:
• 100% private funding from developer

Contacts:
• Not available

Additional Information:
• Not available
OTHER SAMPLE DECKING PROJECTS

The following project descriptions represent examples of decking projects outside of the United States where communities have found ways to connect or reconnect neighborhoods that would otherwise be split apart by a freeway, water body, rail line, etc. Examples date back as early as 1639, when the Pont Au Change was built across the Seine to connect the Right Bank to the Ile de la Cite in France.
Bishopsgate
London, England

Description:

The Bishopsgate project is a prominent commercial/urban development in London’s financial district. Located adjacent to the Liverpool Street Rail Station above rail yards and adjacent to the Broadgate development, the Bishopsgate creates a series of interconnected yet distinct exterior public spaces related to the buildings and reflecting the rich historic context of the site.

Significant elements of the project included a large, richly planted public square, a fountain, kiosks, artwork, and a handsome stone amphitheater for events and performances. The Bishopsgate roadway is a major regional bus stop and was transformed into a large public room, furnished with stone benches and shelters for commuters, obelisks, railings, and new pavements.

Additional Information:
• Not available
Canary Wharf – London Dockyards

London, England

Description:

This mixed use development project revitalized 71 acres at the site of the West India Maritime Shipping Facilities docks. Over 10,000,000 square feet of office space designed specifically for the expansion of the financial services sector were set within a strongly articulated public realm. A sequence of public spaces were developed that were integral with the project architecture and infrastructure. Urban squares, courtyards, boulevards, and esplanades are located over occupied space, which required the development of innovative construction and planting technologies for the creation of “established” landscapes with semi-mature plant materials. Growth support systems were designed to promote longevity of the trees in a stressful environment caused by limited root space, restricted water and drainage, high winds, and prolonged shade created by adjacent buildings.

Additional Information:

- Not available
Pont Au Change
Paris, France

Description:
In 1639, the Pont Au Change was built across the Seine from the Right Bank to the Ile de la Cite to replace the Grand Pont. It featured houses that had shops at ground level opening onto a central street with balconies on the river facades, kitchens above the shops, three upper floors and an attic on the fourth. An edict of 1786 ordered the houses to be demolished.

Additional Information:
• Not available
Ponte Vecchio
Florence, Italy

Description:
Built on the River Arno in Florence, Italy, the Ponte Vecchio is one of the oldest examples of a connection between two neighborhoods. The bridge has supported churches, homes, vegetable markets, and shops for more than four centuries.

Additional Information:
http://library.thinkquest.org/2838/flnc2000.htm
Amadora Central Station
Amadora, Portugal

Description:

This project proposes the restructuring of the central train station in Amadora, Portugal, by capping over a section of the railroad, whereby augmenting the commercial and service industries facilities of the city. The central idea of the project is to create three large urban spaces, which are highly integrated within the city itself.

The city of Amadora lacks a defined urban center because of the barrier created by the railroad line itself, which divides the city into two parts. The design proposes the construction of a platform above the rail line, which would provide pedestrian access through a system of ramps and escalators. On the cap would be a series of landscaped and paved public spaces for important public functions.

The plan includes a shopping center that includes an arcade of shops, and a multi-level parking facility that is easily accessed from the bordering streets. A hanging garden becomes an integral part of the entire urban system.

Additional Information:

• Not available
**Moll De La Fusta**

*Barcelona, Spain*

**Description:**

The Moll De La Fusta is located at the edge of Barcelona’s historic city where it meets the sea. The Moll is a one-kilometer long garden platform used for recreation, festivals, and celebrations. The purpose of the project was to combine open space and transportation. The project reconfigures traffic patterns, converts obsolete wharf operations to open space, and provides the city with views to the sea.

The scope of the project involved the partial depression of one of the central quays stretching from Montjuic to the Barceloneta. This allowed for large traffic volumes to pass through the corridor, which is one of the densest urban seafronts on the Mediterranean. The decked platform (about 140 meters in length) is organized in three distinct units, which are visually and functionally interrelated:

1. **The Salon de Colon** is a 35-meter wide waiting and crossing zone that connects to city buildings.
2. **The balcony above the harbor** is a 25-meter wide place for rest and observation zone. The balconies were planned high enough to provide views of the water above traffic on the coastal street. Open, sunny rest areas along the balconies are dotted with cafes and music stands. From the balcony, three pedestrian bridges cross the avenue leading to the Moll. An underground parking garage is located below the balcony.
3. **The Moll platform** is a 65-meter wide platform used for festivals and celebrations, which also provide direct access to the water and ships. Heavy transport traffic uses the below grade freeway, leaving only light vehicles and public transportation on the surface street.

The project started in 1981 and was completed in 1987. Between 1987 and 1992, other spin-off street and open space connections were developed at both ends of the project. It was largely built exactly as designed and has been considered a huge success. The project cost about $900 million pesetas to build ($6 million in 1998 U.S. dollars), and those costs were shared among the local and regional authorities. Uses on the cap include open spaces, ramblas, cafes, promenades, and music stands, and other shelters.

**Additional Information:**

Description:

The Ronda De Dalt in Barcelona is an approximately 31 kilometer ring road that connects neighborhoods along its route with structural coverings that provide parks, play spaces, parking and pedestrian linkages over the depressed freeway. Built in response to the, at that time, forthcoming 1992 Summer Olympics, the Ronda De Dalt embodied the latest Spanish engineering, architecture and urban design. It is similar in width, depth and context to I-405.

Additional Information:
• Not available
N6 Motorway
Berne, Switzerland

Description:

The City of Berne, Switzerland, used the decking concept to comply with a 1987 noise abatement regulation. The deck covers 250 meters of the N6 Motorway in Berne. Funds for building a park on the deck were approved in 1991.

Additional Information:
• Not available
Anhangabau Valley Park
Sao Paolo, Brazil

Description:

Completed in 1991, this project was designed to mitigate traffic problems ease conflicts between cars and pedestrians, and restore the original character of the area. The project involved the construction of a 490-meter underground tunnel for traffic, so that the area above could be better for pedestrians in the area. The station descends down a steep hillside, with the entrance in a small park. The actual subway line is underneath a highway tunnel.

Additional Information:

- Not available
LIST OF PROPOSED FREEWAY DECKING PROJECTS IN THE UNITED STATES

The following list of freeway decking projects have been proposed but are not yet built, either because the projects are still being hotly debated (i.e., Pasadena I-710 Extension) or are still in the design phase (i.e., Vail, Colorado). Yet, even projects that have not yet been built can provide us with “lessons to learn from” in that their proposals for freeway decking may offer creative solutions to tough pedestrian connectivity issues. For further information about these projects, see web links below (when available).

SR-178 Extension from M Street to SR-99
Bakersfield, California
• This proposal includes a decking structure and is being promoted to provide a freeway facility in an environmentally sensitive manner in an existing built up area.

Liberty Project
La Canada Flintridge, California
• This proposal would provide approximately 65 acres of park and recreational land in the heart of the City, above the freeway.

I-710 Extension
Pasadena, California
• The latest version of this controversial project includes a number of covered decks, featuring areas where the existing historic houses will be moved and replaced on top the decks.

Freeway Decking Project
Glenwood Springs, Colorado
• This project is already in design stage and includes a park deck over the freeway.

Freeway Decking Project
Vail, Colorado
• This decking project has been designed and funded, but not yet built.
• http://www.clr.utoronto.ca/ARCHIVES/HMAIL/larch94/0158.html

I-95: Haven Harbor Access Feasibility Study
New Haven, Connecticut
• This project proposed a 350-foot and a 500-foot deck to improve pedestrian access to waterfront.
• www.state.ct.us/dot/bureau/pp/docs/envir/nhh/nhhesview.htm

Uptown Transit Study
Cincinnati, Ohio
• This study included the option of light rail transit and a deck above the roadway. Contact:
• http://www.cincylightrail.org/process.html
Gowanus I-278 Expressway Tunnel
Brooklyn, New York
• This project proposes a tunnel replacement for the existing, primarily elevated Gowanus Expressway.

Miller Highway Project
Manhattan, New York
• This project proposal features a park-covered highway, with a sloping (6% grade) promenade on top of a highway, adjacent to a tunnel portal.
• www.pb4d.com/projects/highways/miller/maerials/maerials.htm

Mt. Hood Parkway
Gresham, Oregon
• The Oregon Department of Transportation evaluated alternatives to cap portions of the Mt. Hood Parkway in response to concerns about the parkway’s noise, visual, economic, and environmental impacts. The proposed construction of six lids would cost approximately $290 million, with an additional $10 million in maintenance fees.

I-405 Capping Project
Portland, Oregon
• The "Bridge the Divide and Cap I-405 Vision Study" details concepts of how to recapture some of the 38 blocks bulldozed in 1965 for the construction of the open cut 6 lane I-405 freeway. The project would reclaim 26 downtown blocks in what is currently vacant air space over the I-405 freeway.
• http://www.aslaoregon.org/centennial/405.html
• http://www.asla.org/centennial/OR_I405C.htm
• http://www.oregonlive.com/todaysnews/9807/st070309.html
• http://www.ci.portland.or.us/mayor/press/I405rpt.htm
• http://local.portland.citysearch.com/story/990405katz.html

Freeway Decking Project
Medina, Washington
• Decking project proposed; no information available.

I-395 Third Street Tunnel (originally named the I-95 Center Leg)
Washington, D.C.
• Decking project proposed; no information available.