



Table of Contents

I.	Introduction	2
II.	Review of Previous Plans for LSP	3
III.	Review of Similarly Situated State and National Parks with Rail Components	5
IV.	Review of Environmental Considerations within Liberty State Park	11
٧.	Proposed Rail Alignments for Liberty State Park	13
VI.	Projected Ridership	16
VII.	Projected Costs	18
VIII.	Potential Funding Sources	21
APP	PENDIX A	30
	ACT OF EXISTING CONDITIONS AND HABITAT RESTORATION PLANS ON POTENTIAL TRANSIT	
ALIC	GNMENTS IN LIBERTY STATE PARK	
APP	PENDIX B	40
REV	IEW OF VISITATION DATA TO LIBERTY STATE PARK	
APP	PENDIX C	45
РОТ	ENTIAL VOLUNTEER OPPORTUNITIES	
APP	PENDIX D	48
BRI	DGE OVER THE GLIMMER GLASS AT MANASQUAN BORO	
List	of Correspondence	51
Woı	rks Cited	53
Sug	gested Readings	55



I. Introduction

For the 2008 fall semester, students at the Edward J. Bloustein School of Planning and Public Policy completed a studio project regarding possible creation of a rail component to Liberty State Park (LSP) in northern New Jersey. The three advisors and thirteen students have produced the report presented here.

The park contains the former terminal for the Central Railroad of New Jersey (CRRNJ) and was the next destination for hundreds of thousands of immigrants after they passed through nearby Ellis Island. Trains took the immigrants from the terminal to their final destinations, either in New Jersey or beyond. Over time, the tracks were removed and the train shed fell into disrepair. Fortunately, the terminal building survived and has been rehabilitated to serve the park's needs.

But what of the trains? There are currently three railcars on display near the train shed, but they were not historically used at that terminal and were merely repainted to give that impression. Over the years, many of the actual cars have been lost or reduced to scrap, but a significant number have been preserved and restored through the efforts of the Friends of the New Jersey Transportation Heritage Center and the United Railroad Historical Society. The group also has three Presidents Conference Committee (PCC) trolley cars in its collection. The purpose of the studio was to determine if there is potential for reusing these historic railcars in the area they were originally intended for.

What follows is the conclusion of research, site visits, and conversations with officials from the park and its neighbors. The results presented are only a suggestion, and are meant to be supplemented by contributions from administrators, contractors, and the park's neighbors.

The students wish to thank their advisors Martin Robins, Bill Vigrass, and Bill McKelvey for their dedication to and support of this unique project.

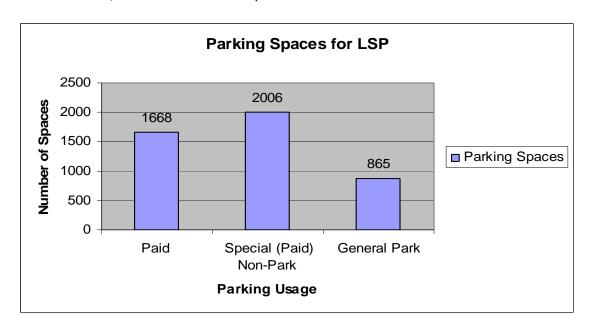


II. Review of Previous Plans for LSP Elizabeth Thompson and Peter Cutera

Jersey City Liberty Access Study Alternative Projects 2005

Prepared by: Urbitran Associates

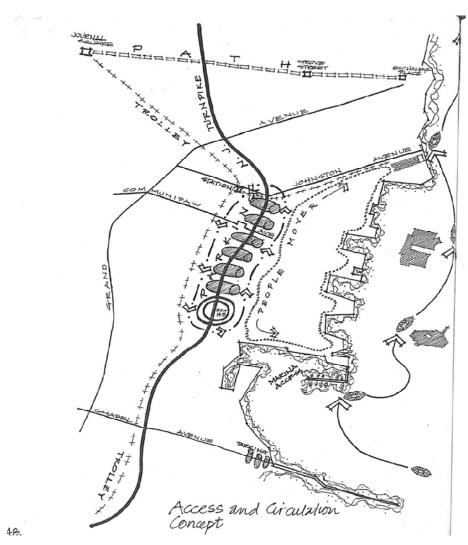
Halting the growth of parking construction is a major concern for the future preservation of the park. The <u>Jersey City Liberty Access Study Alternative Projects</u> of 2005 highlights the need for rail accessibility within Liberty State Park. Only 19% of parking spaces in relation to the park are dedicated for general park use. Upwards of 1,000 additional spaces could be used in the foreseeable future. And recreational demand is generally expected to increase on the order of 3% per year in the near future. To accommodate this growth and avoid construction of additional parking spaces as a result of park visitor increases, internal rail accessibility is essential.



Liberty State Park R/UDAT 1977

Prepared by: Urban Regional Deign Assistance Team

In looking at previous plans and reports regarding Liberty State Park, transportation accessibility within the park has been vital in accommodating the surrounding urban population. Plans that promote rail access within the park have been proposed since the latter half of the 20th Century. <u>Liberty State Park R/UDAT</u> 1977 highlights internal rail service around the perimeter of the park and is an early concept of intra-park transit.

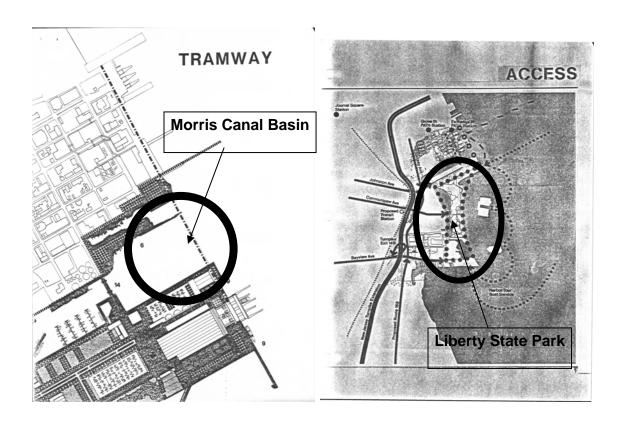


A Park for Exchange Place 1980

Prepared for: Jersey City Office of Planning

The 1980 report A Park for Exchange Place proposed both external and internal accessibility improvements at Liberty State Park. This plan proposed two systems within their preliminary route. The two systems consisted of a tramway from Exchange Place to the Central Railroad of NJ 9 (CNJ) historic terminal building over the Morris Canal basin mouth, and a proposed automated guide-way transit (AGT) system loop circulating within Liberty State Park. The plan recommended a direct link with the tramway station at CNJ historic terminal building.





III. Review of Similarly Situated State and National Parks with Rail Components Chris Sandiford and Kimberly El-Sadek

Background

Bringing historic rail to Liberty State Park (LSP) is not a radical or untried notion. Precedent has been set both domestically and abroad that demonstrates the value and attraction of historic rail. Though proposed options for LSP are less comprehensive than other applications, such an arrangement may be beneficial to the park, especially since the goal here is not to create a massive attraction, but rather to complement the existing features of the park, as well as proposed plans, while improving visitor circulation within the park. LSP is a former transportation hub of great significance and recognition of this heritage is important. As it stands, the current condition of LSP makes it difficult to envision the remaining facilities in terms of their former grandeur as an important and functional railway facility. Even though the Central Railroad of New Jersey's (CNJ) terminal is survived by its sister facility, the very active Lackawanna Terminal in Hoboken, picturing the Jersey City terminal in an active state, especially sans tracks and trains anywhere within close proximity is very difficult. The presence of some relevant rail equipment in conjunction with an historically complementary trolley circulator would augment the park's end goals for blending history and environmental concerns and help in spurring an effort to repair the derelict train sheds that serve as an eyesore of a monument to our nation's industrial past.



A number of parks, both in the United States and overseas have adopted historic rail and trolley service as both an attraction in and of themselves, as well a practical method of moving visitors through neighborhoods and different parts of parks with many other points of interest. Historic rail and trolley operations tend to garner attention due to their uniqueness and tend to spark greater voluntary use when given the option of their use. Museums and excursions dedicated to rail preservation can be found from coast to coast. However, what is proposed for LSP is more of a two-pronged, complementary historic emphasis on rail. The first goal is not to create a new attraction, but rather to help in offering historic perspective on the importance of rail in the history and development of LSP. The second goal is to provide visitors with an improved method of transport within the park from existing attraction to existing attraction and to connect to the world beyond the park where local visitors and those from out of town can park off-site and enjoy easy, historically complementary transport to and within the park. Some of the examples that follow highlight similar operations that meet the above mentioned goals, either in large part or wholly.

A Depiction of Historic Rail Operators in Liberty State Park

Part of the first goal of the project is to construct a spur from the nation-wide rail system into the terminal in order move historic rolling stock into and out of tracks located beneath restored train shed space or immediately adjacent to the terminal, should initial costs to repair the portion of the shed needed be too high. The United Railroad Historical Society (URHS), Friends of the NJ Transportation Heritage Center and North Jersey Electric Railway Historical Society are all in possession of historic rail equipment relevant for display at the terminal. Locomotives, passenger and freight cars from the Central Railroad of New Jersey, Reading Company (RDG), Baltimore and Ohio (B&O), Lehigh Valley (LV), New York Central (NYC), Chessie System (CSX) and Conrail would all be appropriate pieces for display in the terminal as they operated trains into and out of facilities that once existed within the confines of what is now LSP. Equipment belonging to many of these historic roads is contained in the collections of the aforementioned historical societies and is in varying states of repair. Pieces that have already been restored, such as the URHS's CNJ, and LV locomotives and cars would be immediate display items at the terminal. A side factor that benefits these organizations would be the fact that equipment kept in the park would likely be protected from possible vandalism that storage on active rail lines does not afford.

Evidence that the presence of such equipment would be well received by the general public can be viewed through the successes of Steamtown National Historic Site, a park that embraces the history of the heyday of American Railroading and showcases its labor-intensive nature as well as its more "romantic" side. A display at the CNJ Terminal trainshed, though significantly smaller in scale, could evoke images of luxurious long distance travel, the gritty commutes lived out daily by New Jersey commuters in open window coaches right on up through the early 1980's and the wonder and apprehension felt by our immigrant ancestors as they began their journeys in the new land. Equipment representing all of these aspects of the terminal's storied existence and purpose are on hand for eventual display as well as historic and rare freight cars that once carried the goods produced and shipped throughout the nation. These cars were once sorted, loaded, unloaded and serviced in the yards that now comprise LSP.



Historic Transit Use in Parks

The second goal of the project is to provide park visitors with a better way of getting around within LSP, preferably taking advantage of the tracks laid down to service the historic equipment positioned within the park. What follows are examples of State and National Parks that have embraced trolley and/or rail as both an attraction and a practical means of moving people through urban and environmentally sensitive facilities.

Lowell National Historic Park, Lowell, MA

Lowell, Massachusetts is a classic New England mill town, once home to many textile industry-related facilities. As post industrial revolution fortunes declined for the city, it became a rundown shell of its former self with many classic industrial mill facilities remaining throughout the city's downtown. By the late 1970's efforts were underway to showcase Lowell's industrial history in the form of a park. Lowell National Historic Park was founded in 1978 and thirty years later, it continues to preserve this city and region's rich industrial history. In 1984, an historic trolley line, operating on two miles of former Boston and Maine Railroad branch line tracks was established to connect various park sites throughout town and to connect the park itself with the town. The service is operated free of charge, though park fees charged to visit museums and historic mill buildings offset the cost of operation. The service operates from March through November and plans are underway to expand the trolley line within the city's growing downtown. The line operates three full-scale replica cars, reminiscent of those that operated in the region prior to discontinuance in the 1930's. All cars operate on environmentally friendly electric power fed through a visibly unobtrusive 600-volt direct current single trolley wire system.

A more recent joint venture with the Seashore Trolley Museum of Kennebunkport, Maine has led to the creation of the National Streetcar Museum at Lowell, which speaks to the history of the development, importance and ultimate decline of the nation's once vast network of trolleys. As part of this joint venture, an historic former New Orleans streetcar now augments regular service. A service of this nature in LSP would operate within the historic context of the region, as Hudson, Essex, Union, Bergen and Passaic counties were developed in part by the expansion of the streetcar network. In much the same fashion, a service operating in LSP would connect key locations in the park with the larger statewide transportation network, and thus surrounding neighborhoods.

Trolley and Rail in Scranton, PA

Scranton, Pennsylvania, much like Lowell, is a Northeastern city that has felt the harsh and unpleasant effects of deindustrialization. Once a major manufacturing site, Scranton and its environs are also known for their key role in the anthracite coal mining business of Eastern Pennsylvania. As a manufacturing and mining hub, Scranton also played host to numerous railroads, all tapping into the traffic generated by these industries. Like many cities nationwide, trolley and interurban lines connected the downtown with surrounding residential neighborhoods and other communities. As with trolley lines elsewhere, service was eventually discontinued in favor of the more flexible bus. By the end of the 1960s, mining and manufacturing had largely declined in Scranton and surrounding Eastern Pennsylvania. The railroads, burdened by declining freight revenue, expensive mandated passenger



service and increasing taxes slowly declared bankruptcy and merged with one another in order to stay afloat. Eventually, many of the existing roads were merged into the government-instigated conglomeration known as Conrail. With duplicative facilities and routes and decreasing on-line business, many routes were dropped from the Conrail system. Many of the lines in and around Scranton were downgraded and the city was left with substantial moribund rail facilities.

Steamtown National Historic Site was founded in 1986 to preserve and interpret the legacy of steam-era railroading. Prior to the formation of the National Park in Scranton, a smaller "Steamtown" museum, featuring much of the collection presently housed in the Delaware, Lackawanna and Western Railroad yard was once displayed in Vermont. The Scranton site, under the auspices of the National Park Service, has proved very successful; and, aside from displaying both rolling stock and artifacts aimed at preserving the "romantic" aspects of railroading, offers steam-powered excursions through the rural winding grades of the Poconos on the former Lackawanna Railroad mainline. These excursions, scheduled during most of the fair-weather months, are operated by the Park Service using vintage steam locomotives and commuter coaches, though park documentation indicates that diesel equipment, usually of historic nature, can be substituted. Trips vary in duration and length, and fares are charged on this basis. The park grounds and museums are also subject to admission fees, all of which go to offset both the operation of the Park and the excursions, but also the continued preservation of rolling stock and artifacts in the Park's collection. The success of Steamtown bodes well for a proposed display at LSP, as the presence of historic rail rolling stock combined with some interpretive historical information or displays should give park visitors an added perspective on the importance of the grounds upon which they tread.

Separate from but complementary to Steamtown National Historic Site is the Electric City Trolley Museum, located on the National Park site and operated by Lackawanna County, in conjunction with the Lackawanna Heritage Valley Authority. The museum features interactive exhibits and interpretative displays similar to those found in Lowell that demonstrate the importance of trolleys in the nation's transportation development. Vintage trolleys are displayed at the facility as well. The museum offers trolley rides over tracks owned by both Steamtown and the Lackawanna County Rail Authority, including a portion of the historic Lackawanna & Wyoming Valley "Laurel Line" third-rail powered interurban right-of-way. The line is now powered through a 500 Kilowatt rectifier unit that converts high potential three-phase alternating current supplied from Pennsylvania Power & Light (PP&L) to nominal 600 Volts direct current to power the trolley cars. Distribution is via a lightly constructed overhead trolley wire system. The original third rail power supply has been removed.

Staff operating the trolleys are paid and the county budget, in part, underwrites the operation. The museum and the excursion both require separate fees and fares that help to underwrite museum and excursion costs. The scenic route follows a portion of the former Lackawanna & Wyoming Valley (Laurel Line) Railroad right-of-way as it parallels Roaring Brook, and makes stops at the Historic Iron Furnaces, then continues through the Crown Avenue Tunnel – at 4747 feet long, one of the longest interurban tunnels ever built. An additional extension to the Lackawanna County Stadium at Montage was completed July 14, 2006. A line of this context also fits the bill for service provided in LSP, as it complements the existing park features as well as any new rail exhibit that might be available. It also



centralizes visitors around a central parking and visitors' facility and allows them to use these historic transportation means as way of experiencing said means in action while discovering new aspects of the park and surrounding region.

Precedent Set: Other Historic Rail Applications and Circulators

Combining the twin goals of providing circulation within a park with historic rail and trolley operation has been explored in a number of other cases as well. Cuyahoga Valley National Park was founded in 1974 to protect lands in the Lake Erie watershed and to thwart the effects of pollution, development and soil erosion. Historically, a rail line followed the path of the Cuyahoga River, operated by the Baltimore and Ohio Railroad. Over time, the line became redundant and it began to serve the purpose of shuttling visitors through the park, which is largely accessible only on foot or bike. Presently, the Cuyahoga Valley Scenic Railroad operates historic coaches and locomotives through the entire length of the park and links the cities of Canton and Akron with various destinations throughout the park. The railroad operates as a non-profit and uses fares to cover the cost of operations.

Stone Mountain Park in suburban Atlanta is the site of the historic Confederate War Memorial and serves as a recreation area for concerts, hiking, amusements and picnicking. Visitors to this state park, managed by a private firm, pay an \$8.00 fee to park in lots on the perimeter of the park. Fees are then charged to ride the train or the cable car, which traverses the face of the mountain, or to enter into any of the other attractions within the park. The train, which utilizes historic rail equipment, traverses a five-mile loop of track, a portion of which affords a spectacular view of the Confederate War Memorial, which is carved into the dome-like mountain's side. In addition to the above, there are many other excellent and outstanding examples of rail transit service in parks: Ft. Edmonton Park, Alberta, Canada; The Black Country Museum, near Birmingham, UK; Heritage Park Calgary (Canada); Beamish, The North of England Open Air Museum, County Durham, UK; Rusk & Palestine Depot Campgrounds, Rusk & Palestine, Texas; Washington Park & Zoo Railway, Portland, Oregon; and Grand Canyon National Park; Arizona. Though not everyone of the above mentioned rail or trolley applications mirrors the needs of LSP or the scope and size of any proposed operation within LSP, these examples do prove out a necessary precedent that rail and trolley transport, especially of an historic nature, will attract visitor attention while serving a desired purpose. The purpose of which in the case of LSP is to better expedite the movement of visitors throughout the park.

Observations

A powerful reason why rail circulator systems have made a substantial appearance in our nation's parks is the notion of their being a victim of their own success. The overabundance of visitors at some of the nation's most popular parks threatened to disturb the historic and/or natural sites that spurred their creation in the first place. Parks such as Zion National Park and Bryce Canyon National Park have outright bans on automobile traffic and parking within the park during peak seasons. These parks rely on frequent, modern bus circulators to transport visitors from remote parking facilities to the key locations within the park. These operations rely on admission fees to cover all or some of their operating costs. Harpers Ferry National Historical Park and Colonial Williamsburg do not have outright



bans on vehicular traffic through historic sites, but have established shuttles and remote parking as a way of keeping the historic downtown areas from being choked with cars. Again, this frequent service is built into the cost of admission as a way of offsetting operating expenses. The relevance of these circulators to LSP is the notion of keeping parking within the park at present levels, while handling increasing visitation. Service from the Hudson Bergen Light Rail (HBLR) station with its remote Park and Ride lot draws a close parallel to the latter examples in particular since it affords visitors the opportunity to park remotely at the HBLR station or at other outlying transit facilities and enjoy a leisurely ride to LSP and its connections and attractions via mass transit.

Historic Rail and Trolley applications in other parks have proven to be quite the success. Similarly, historic rail and trolley displays and museums that thoughtfully depict the importance of their existence in the development of this Nation and more importantly on the specific area and the larger region they once served as a whole both draw significant positive attention from the public. Successful parks such as those Lowell and Scranton demonstrate the attachment to the nostalgia that rail brings, and what better place to tap that nostalgia but in Liberty State Park, where not only could an historic rail or trolley circulator serve a practical role in moving visitors within the confines of an environmentally sensitive urban oasis, but it could also serve as a way to revive the best and most important aspects of the past. Any plan would have to be carefully planned to fit seamlessly within the context of the park. However, the examples put forth combined with the importance of both addressing an historic void and anticipating future visitor growth should justify bringing rail back to the confines of Liberty State Park.



IV. Review of Environmental Considerations within Liberty State Park Nicholas Minderman

The existing and proposed conditions in Liberty State Park must be considered when selecting the optimal route for a circulator transitway.

The primary concerns with respect to the park's habitat and natural conditions are encroachment on wetlands and soil conditions that may require remediation before a rail right-of-way can be constructed. The former has the potential to be a project roadblock if alternatives are not adequately vetted. Therefore, discussion of the potential environmental impacts for each of the initial route options resulted in elimination of routes that penetrated into the park's interior—with the exception of locations where a large radius necessitated that the right of way enter the interior for a short stretch. The two options chosen either minimize overall encroachment or use tracks that are constructed within the interior for a minimal number of railroad vehicle movements.

The latter concern, subgrade conditions, has the potential to increase cost for certain alignments. Alternative B does traverse an area where undesirable soil conditions have been identified. However, the preliminary analysis performed in Appendix A shows that further investigation is necessary to determine whether subgrade improvements will be necessary for construction of a rail transitway within Liberty State Park.

Conclusions from Envt Report (for use in final report)

This report is intended to summarize the primary impacts of the existing ecological and physical characteristics of Liberty State Park on any potential transit right of way within the park. An important consideration, as mentioned in Appendix A is an overall minimization of the impacts on natural and built environment within the park. A notable concept is that the preferred option will not necessarily have the minimal direct impacts. When weighing alternatives, direct impacts (such as wetland disturbance) must be compared to indirect impacts (increased automobile traffic). With this in mind, it is likely that the most significant challenge will be avoiding existing wetlands that are currently planned for enhancement. Since wetlands are already protected by Federal and State Statutes, it can be anticipated that attaining approval for any disturbance of these areas than the other habitats in the park. In addition, the FR/EIS details plans that are expected to result in overall improvements to the Hudson-Raritan Estuary as well as the parkland that is immediately surrounding these restoration areas. Therefore, the negative indirect impacts of wetland disturbance can be significant.

Plan for the freshwater wetlands could be constricting, since this phase is expected to be constructed very soon. For this reason, construction in these areas may be difficult, though less so than the existing wetlands. It seems unlikely that state and federal regulatory agencies would be willing to compromise large portions of this restoration plan, due to the benefits listed within this report. Proposed transit rights of way could potentially impact the function of existing, restored, and constructed wetlands if changes to physical characteristics of the wetlands are made. Water quality, available habitat, and



storm protection impacts should be considered if the construction of a transit system requires alterations to the wetlands at Liberty State Park.

The tidal wetland plans might be more flexible since LSP staff expects this construction to be completed significantly later than the freshwater project. Similarly, the anthropogenic influence on the warm weather grassland and urban successional forest (these would not exist without human intervention) make these aspects of the rehabilitation easier to adapt to transportation needs.

Consideration for historic fill is minimal in the scope of this project because it seems unlikely that it will include large amounts of excavation. The only area where unsuitable solid strength is likely to be a consideration is the western edge of the site (along Phillip Drive), and there are many established, accepted, and low-cost mitigation practices for these conditions.

Overall, transitway routing along the edges of the habitat restoration area will most likely avoid the majority of conflicts by reducing encroachment on the rehabilitated area and staying within locations where the historic fill has already been encapsulated.



V. Proposed Rail Alignments for Liberty State Park Katie White

After much discussion, the group settled on two rail alignments that it deemed to be reasonable, efficient, and in line with the goals of display and transportation purposes. The alternatives were chosen due to their connections with main points of interest within and throughout the park. These alternatives, A and B, are displayed below. Both intend to use landscape design principles to mask the mechanical nature of the train cars and their related equipment, similar to techniques used in New Orleans with their streetcar line on St. Charles Avenue.

Alternative A

Alternative A is represented by a solid orange line. This option indirectly connects the HBLR station to the south side of the rail terminal along the north side of Audrey Zapp Drive, and is intended for regular daily use by park visitors. It includes a station stop at the marina, in addition to the stations at each end of the route. This part of the line is entirely intended for trolley/PCC cars to serve a people-moving purpose. This fulfills the goal of reducing the demand for parking, due to the prediction of more visitors to the park, and the park's intention not to build any more parking spaces. Loops on each end allow the vehicles to move forwards at all times.

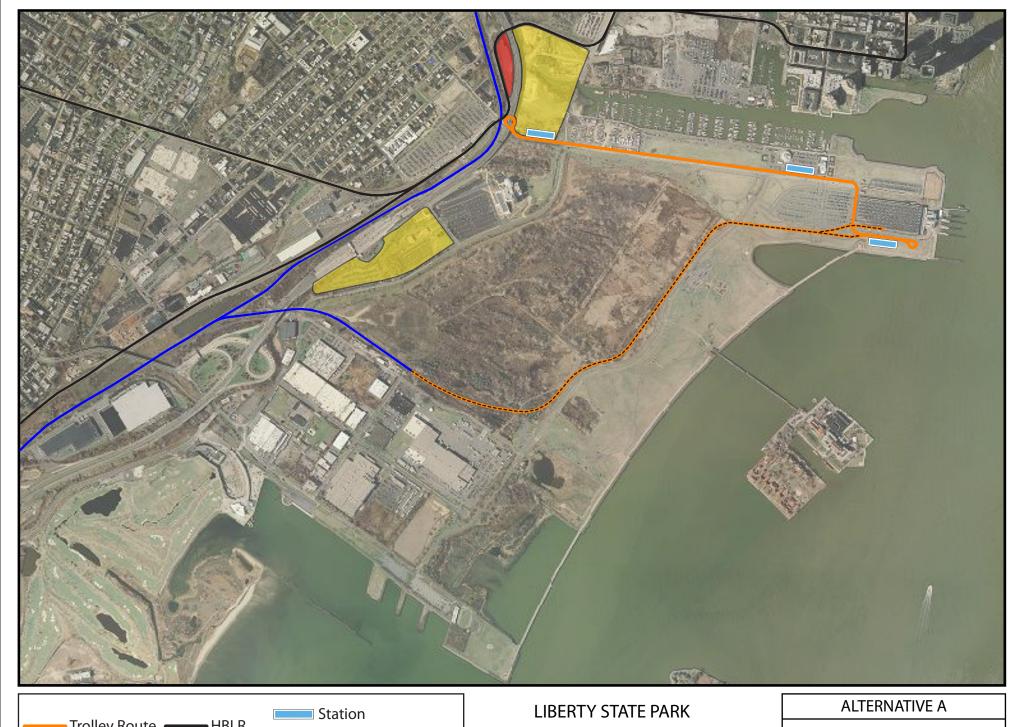
Alternative A also includes an orange line with black dashes. This represents the route that must be built to accommodate the movement of railway cars. These cars would be moved to the south side of the train shed for historic and interpretive purposes (until the point where the shed is repaired or replaced, in which case the railway cars may be stored underneath it). At the west end, this line connects with the ConRail tracks that already exist and are in use. The tracks then follow Freedom Way before terminating at the train shed. Initially, the intent is for this section to only be used very occasionally to rotate out exhibits and equipment. Future phases of development may call for continuous service along this set of tracks.

A maintenance shed will need to be constructed for storage and periodic repair work to the PCC cars that will be in continuous use. This is identified with the color red.

Alternative B

Alternative B is represented by a solid green line. This option also connects the HBLR station to the terminal along Audrey Zapp Drive through the use of PCC cars. However, this version terminates along the north side of the terminal. This enables the passengers to get closer to the waterfront area.

Railway cars will be brought near the train shed via Philip Drive, on the western section of the park and near the proposed developments (as represented by the green line with black dashes). It will curve northbound in order to avoid the environmental protection area and will briefly share the tracks of the trolley line. This makes it difficult to propose the option of adding continuous service to this route. Maintenance sheds may be constructed at one of two locations, also represented in red.



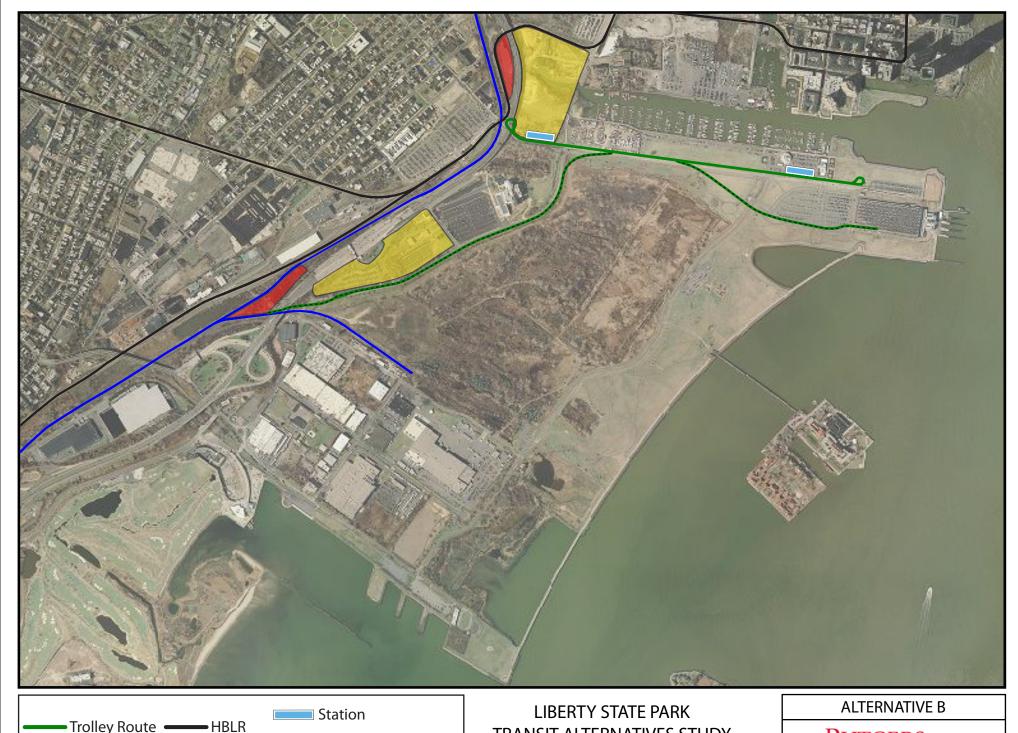
Trolley Route ——HBLR ☐ Future Development Display Route —— Conrail ■ Maintenance Shed

TRANSIT ALTERNATIVES STUDY JERSEY CITY, NJ

DEC - 2008



Edward J. Bloustein School of Planning and Public Policy



Trolley Route ——HBLR ☐ Future Development Display Route —— Conrail Maintenance Shed

TRANSIT ALTERNATIVES STUDY

JERSEY CITY, NJ DEC - 2008



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VI. Projected Ridership Vincent Riscica

Forecast future trips in LSP are based on existing levels of visitation to the park as well as the projected trips to be generated by the potential new developments in the area (the convention center and hotel and proposed residential development). Trip generation rates, modal splits, and vehicle occupancy rates for these future land uses were obtained from the previously approved Hudson Rail Yards Environment Impact Statement (EIS). These rates are relevant because the Hudson Rail Yards redevelopment area is in close proximity to the Javits Convention Center and Hudson River Park in New York City. Both of these land uses are similar to existing uses and those proposed for the LSP vicinity. While Manhattan is certainly denser than Jersey City, the rates are relevant due to the high level of anticipated growth and development. Differences do, however, exist in the level of walkability and availability of public transit. For this reason, some of the modal splits were adjusted based on professional judgment. Lastly, these rates were used because the alternative, the Institute of Transportation Engineers (ITE) Trip Generation Manual, uses data compiled primarily from suburban areas; which are not comparable to the Jersey City area of this study.

The limitations of our estimate lie in the uncertainty of the future. Provided this study is adopted, and transit is made available, lower rates of vehicle travel are expected. In this situation the parking demand would be lower and supply would be limited. If, however, parking is continuously provided at current rates, levels of transit ridership in our projection will be less accurate. It is recommended, then, that this plan be embraced with a comprehensive approach to sustainable transportation, which would encourage limiting future parking supply.

Based on our projections there is sufficient demand to support a trolley line through LSP. Our demand estimate is based on average weekday and weekend visitations, figures and projected trips from new developments. On an average weekday, roughly 9,000 person trips could be expected to use the proposed trolley line. On the average weekend day, this number is close to 12,000 person trips. In order to support higher demand time periods, such as the summer months and special events, more than one trolley line would be necessary. The provision for this type of service should be incorporated in the future phases of a transit plan for LSP.



Ridership Forecast for Liberty State Park Trolley

Existing

Visitation	
LSC Visits (2008)	5,094,262

Daily Trips	
LSC Visits (Wkday)	4,606
LSC Visits (Wkend)	9,351

Modal Split %:	Auto		Ferry	Walk	LSC	Peninsula
LSC Visits		74.8%	2.6%	3.6%	12.8%	2.6%
Existing Modal Splits:	Auto		Ferry	Walk	LSC	Peninsula
Existing Modal Splits: Wkday LSC Visits	Auto	3,445	- /	_		

Existing + New Developments:	
Daily Trips	
Wkday	10,478
Wkend	14,013

Modal Split %:	Auto	Bus	Ferry	Walk	Trolley	
Existing + New Devs:	42.6%	4.0%	3.6%	7.2%	42.6%	100.0%

Vehicle Occupancy:	Auto
	1.5

Existing + New Modal Splits:	Auto		Bus	Ferry	Walk	Trolley
Future Weekday Trips*	2,	976	419	377	754	4,463
Future Weekend Trips	3,	980	561	504	1,009	5,970

Sources and Notes:

Professional Judgement
Rates from Hudson Rail Yards EIS

Obtained from LSC

* Roughly 30% of these trips can be expected to take place during the AM, Midday and PM peak hours

Proposed

New Developments	Stories	Acres	DUA	Conference (sq ft)	Hotel (rm)	Residential (rm)	Est. Completion
Convention Center	12			80,000	350	150	2011
Residential (assumption)		8.2	15			123	

Daily Trip Generation Rates:	Wkday	Wkend
Convention Center	4.75	4.2
Hotel	9.4	6.8
Residential	8.075	7.138

New Trips:	Wkday Wkend
Convention Center	380 336
Hotel	3,290 2,380
Residential	2,202 1,946
Total:	5,872 4,662

Modal Split %:	Auto	Taxi	Bus	Trolley	Walk	
Convention Center	20.0%	15.0%	5.0%	52.4%	7.2%	100%
Hotel	9.1%	17.5%	1.0%	65.3%	7.2%	100%
Residential	6.6%	6.5%	5.8%	73.9%	7.2%	100%

Vehicle Occupancy:	Auto	Taxi
Convention Center	1.5	1.5
Hotel	1.4	1.8
Residential	1.65	1.4

New Trips, Wkday:	Auto	Taxi	Bus	Trolley	Walk
Convention Center	51	34	19	199	27
Hotel	214	231	33	2,148	237
Residential	88	90	128	1,627	159
Total:	353	355	180	3,975	423



VII. Projected Costs Jim Van Schoick

For each of our current options two different cost projections were calculated to obtain an estimate of what each line would cost. This price is heavily dependent on the length of each route, which is nearly identical in both situations. Alternative A is 3.93 miles long, while Alternative B is 3.83 miles long. Each cost sheet has identified each cost, which is expected to be incurred by any typical rail project. Costs were estimated using information obtained from several different sources within the Metropolitan area, and have attempted to account for the cost of labor (based on NY rates) as well a significant margin of error.

Costs for materials were obtained from Hill International's estimating department as is being applied to NYMTA New Haven Line, New Haven yard and shop rehabilitation by Bill Vigrass. Additional price quotations were provided from Atlantic Track and Turnout Co. for the purchase of the two #8 turnouts required at the end of each line, which were also obtained by Mr. Vigrass. Rehabilitation of the PCC cars formerly used in the Newark City Subway was obtained from the Brookville Equipment Co, for each car will have to be overhauled to accommodate current ADA specifications for a transit line.

All of the costs seen in the data sheet provide a general idea of the costs associated with a project of this type, and are not to be considered final costs for this project. It should also be mentioned that these costs assume only one track; plans to construct a 2-track line have been proposed for the future.

As seen below, each alternative would come to approximately \$15,500,000, which accounts for a 30% contingency.



Alternative A

	Track Lengths (in ft)	
1	Track 1	17,664
2	Track 2	3,072

Total Mileage 3.9

Material (per lineal ft.)	Cost	#	Sub-Totals		Totals
3 Track	\$194.00				
4 Labor	\$29.00				
5 Equipment	\$65.00				
6 Switches	\$20,000.00	5	\$100,000.00		
7 Cost Error	\$12.00	•		Rail 1	\$5,299,200
Total	\$300.00			Rail 2	\$921,600
					\$6,320,800

Turnouts	Cost	Quantity	Totals
Refurbished #8 Turnouts w/ 8 necessary parts and fittings.	\$14,900.00	2	\$29,800
			\$29,800

	Catenary	Cost		# of Poles			Totals
9	Labor	\$2.00	per lineal ft.		_		
Ī,	Poles	¢1 710 00	nor nolo	Rail 1 141	F	Rail 1	\$276,972
10		\$1,710.00	per pole	Rail 2 25	F	Rail 2	\$48,169
,							\$325,140

Addtl Materials	Cost	Cost 2		Totals
11 Material	\$21.00 per cu.yd.	\$7.00 per cubic ft.		
12 Labor	\$2.25	\$0.75		
13 Equipment	\$4.00	\$1.33	Rail 1	\$1,604,480
Total	\$27.25	\$9.08	Rail 2	\$279,040
		·	•	\$1.883.520

Additional Costs	Cost	# of cars	Totals
14 Rehab of Rail Cars	\$1,100,000	3	\$3,300,000
'			\$3,300,000

Approx Cost:	\$11,859,260
Contingonay @ 20%	¢1E /17 020



Alternative B

	Track Lengths (in ft)	
1	Track 1	14,712
2	Track 2	5,484

Total Mileage	3.83
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Material (per lineal ft.)	Cost	#	Sub-Totals		Totals
3 Track	\$194.00				
4 Labor	\$29.00				
5 Equipment	\$65.00				
Switches	\$20,000.00	5	\$100,000.00		
7 Cost Error	\$12.00		•	Rail 1	\$4,413,600
Total	\$300.00			Rail 2	\$1,645,200
				•	\$6 158 800

Turnouts	Cost	Quantity	Totals
Refurbished #8 Turnouts w/ 8 necessary parts and fittings.	\$14,900.00	2	\$29,800
•			\$29,800

	Catenary	Cost		#	of Poles			Totals
9	Labor	\$2.00	per lineal ft.			_		
	Poles \$1,710.00 per	ć1 710 00	nor nolo	Rail 1	118	R	tail 1	\$230,684
10		R:	Rail 2	44	R	tail 2	\$85,989	
								\$316,673

Addtl Materials	Cost	Cost 2		Totals
11 Material	\$21.00 per cu.yd.	\$7.00 per cubic ft.		
12 Labor	\$2.25	\$0.75		
13 Equipment	\$4.00	\$1.33	Rail 1	\$1,336,340
Total	\$27.25	\$9.08	Rail 2	\$498,130
				\$1.834.470

Additional Costs	Cost	# of cars	Totals
14 Rehab of Rail Cars	\$1,100,000	3	\$3,300,000
			\$3,300,000

Approx Cost:	\$11,639,743	
Contingency @ 30%	\$15,131,666	

715,151)



VIII. Potential Funding Sources Doug McQueen and Graydon Newman

The diverse uses of LSP, both existing and potential, open up several funding resources for the LSP Rail Access Feasibility Study project. The major funding sources can be divided into categories by the source's funding type: transportation or historic preservation.

Transportation-related Funding:

One of this project's two major facets is the development of an historic transportation system that improves access to LSP and its surrounding destinations. Likewise, as long as this project is characterized as a transit project, significant state and federal transportation funding is available.

Transportation funding sources include federal and state grants, user fees, and private contributions.

Most federal and state programs for transportation funding are discretionary, meaning that projects are funded according to a rating system that accounts for qualities such as necessity, viability, and public benefit. Thus, project characteristics and funding availability are extremely codependent. For example, decisions regarding track layouts and trolley stops will affect the project's eligibility score for the Federal Transit Administration's Small Starts funding program. In general, decisions that limit this project's ability to move people from Point A to Point B will negatively affect available transportation funding.

Federal "Small Starts" funding

Major funding for a transportation enhancement in LSP could come from the Federal Transit Administration's "Small Starts" program.

The Federal Transit Administration (FTA) is an agency within the U.S. Department of Transportation that provides financial and technical support to a wide range of transportation projects. FTA funds, usually in the form of grants, are used by state, regional, and local transit providers to develop, improve, and maintain systems. Funding appropriations are governed through periodic spending bills passed by Congress and enacted by the President.

The current bill for transportation funding is the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). SAFETEA-LU was signed into law by President Bush in August 2005, and expires in September 2009.

One of the transit funding programs authorized by SAFETEA-LU is FTA's "New Starts" program. New Starts is a discretionary project funding source for transit projects. All projects funded through New Starts are rated according to a set of guidelines and competitive criteria, and the top projects are recommended for funding. If a project meets FTA's eligibility guidelines, it will be rated by FTA. In 2007, FTA rated 20 projects and recommended 12 of those projects for funding.



Because the size and scope of transit projects varies greatly, and because smaller projects should not require the same degree of planning analysis as large ones, FTA created a sub-category of New Starts for smaller projects called "Small Starts". Small Starts allows a streamlined planning, analysis, and application process for transit projects requesting less than \$75 million in federal funds and costing less than \$250 million in total.

"Small Starts" is a discretionary fund created by the SAFETEA-LU legislation in order to simplify the evaluation process of the more comprehensive New Starts program. The capital investment funds under section 5309 of SAFETEA-LU are limited to \$75 million and total project costs are limited to \$250 million. Eligibility requirements include:

A "substantial portion" of the project must operate on a separate right-of-way dedicated for public transit during peak hours, or

The project must represent a "substantial investment" as demonstrated by such features as park-and-ride lots, stations, signage, signal priority, off-board fare collection, technology, and other features supporting a long term corridor investment.¹

Additionally, the project's eligibility must be justified by local economic development impact, cost effectiveness, supportive land use policies and other factors. The Rail Feasibility Study, through its planned connection of NJ Transit's Hudson-Bergen Light Rail to the Liberty Landing Marina ferry service to lower Manhattan, demonstrably justifies fulfillment of the first criteria. An equally powerful justification is the economic development impact of the rail line on future event attraction, such as the extremely successful All Points West music festival, to LSP. Cost effectiveness is greatly helped by the utilization of existing rail stock provided by the United Railroad Historical Society of New Jersey.

A fixed-guideway transportation project, such as that contemplated by this study for LSP would qualify for Small Starts funding. Small Starts guidelines allow up to 80 percent of total project cost to be federally-funded. It should be noted, however, that projects with a higher proportion of federal funding (generally over 60 percent) are rated lower by FTA.

Federal Surface Transportation Program funds

Under Title 23, Sec. 133 of the US Code, federal funds apportioned to the State of New Jersey may be used to fund capital costs of transit projects.² The funding is discretionary and requires state financial backing for its provision. With the focus currently on the state's *Access to the Region's Core/Trans Hudson Express Tunnel Project*, it is unclear as to the future availability of funds.

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¹ TCRP QUICK RESPONSE PROJECT J-06/TASK 66, Small Starts Justification Criteria.

http://www.apta.com/government_affairs/safetea_lu/documents/small_starts_quick_response_0124061_final.pdf

² 23 USC, Sec. 133. http://uscode.house.gov/uscode-page-133.

cgi/fastweb.exe?getdoc+uscview+t21t25+4008+1++()%20%20AND%20((23)%20ADJ%20USC)%3ACITE%20AND%20(USC%20w%2F10%20(133))%3ACITE>



Federal Lands Highway Program

The Federal Lands Highway Program is a funding possibility contingent on the project's inclusion as an access component to the Statue of Liberty National Monument. It is not clear whether this component is feasible or desirable to either party involved. In order to qualify for Federal Lands Highway Funds, National Park Service would need to qualify LSP as primary access corridor for Ellis Island and the Statue of Liberty. If this avenue is pursued, cooperation would be needed between National Park Service and the State of New Jersey.

Historic Preservation Funding:

The other major facet of this project is historic preservation of the CNJ train shed. This project presents an opportunity to restore the historic train shed of the CNJ by re-introducing rail transportation to an automobile-dominated park. By renovating the train shed, displaying historic equipment, and using historic equipment to move people through the park, Liberty State Park will again acknowledge the industry upon which our region and nation prospered. A renovated train shed will also serve as a platform for expanding our understanding of historic and cultural events that shaped our nations history, including immigration through Ellis Island and westward migration of immigrants on railroads.

An historic preservation project of this magnitude would be eligible for significant funding, albeit less than that available for transportation. Funding sources include federal and state historic preservation and museum funding, user fees, and private contributions.

A large amount of historic preservation funding comes from the federal government through grants administered by the National Park Service, including large grants to states who may subsequently allocate funds according to their own criteria. Grants and their funding sources may be researched through the Catalog of Federal Domestic Assistance (CFDA) by using a CFDA reference number specific to that funding source. Federal funds administered through the National Park Service include:

Historic Preservation Fund Grants-in-Aid

CFDA 15.904

Grants-in-Aid are potentially large grants made directly to states so that the state can administer historic preservation funds as it sees fit. Eligible recipients include state and local governments, public and private non-profit organizations, and individuals. Funds may range from \$200,000 to \$2,000,000 and must be matched by equivalent funds, which may be state, private, or other public (non-federal) funds.

Save America's Treasures Grant

CFDA 15.929

Save America's Treasures grants are available for preservation and/or conservation work on nationally significant intellectual and cultural artifacts and collections and on nationally significant historic properties. Grants are awarded through a competitive process and require a dollar-for-dollar, non-



Federal match, which can be cash, donated services, or use of equipment. The grant and the non-Federal match must be expended during the grant period, generally 2 to 3 years, to execute the project. The minimum grant request for collections projects is \$25,000 Federal share; the minimum grant request for historic property projects is \$125,000 Federal share. The maximum grant request for all projects is \$700,000 Federal share. Applications received are scored on the following criteria: critical preservation need; well-planned objectives, tasks, and schedules; qualifications and coordination of partner organization(s); and realistic budget and matching resources.

Preserve America Grant

Preserve America Grants are smaller grants for historic preservation planning which are awarded to individual communities or state historic preservation offices. Grants range from \$20,000 to \$250,000 and must have a non-federal match.

Museums for America Grant:

CFDA 45.301

All types of museums, large and small, are eligible for funding. Eligible museums include general museums, historic houses and sites, history museums, science and technology centers, and specialized museums. Federally operated and for-profit museums may not apply for funds.

An eligible applicant must be:

- either a unit of state or local government or a private nonprofit organization that has taxexempt status under the Internal Revenue Code;
- located in one of the 50 states of the United States; and
- a museum that, using a professional staff,
- is organized on a permanent basis for essentially educational or aesthetic purposes,
- owns or uses tangible objects, either animate or inanimate,
- cares for these objects, and
- exhibits these objects to the general public on a regular basis through facilities which it owns or operates.

(An organization uses a professional staff if it employs at least one professional staff member, or the full-time equivalent, whether paid or unpaid, primarily engaged in the acquisition, care, or exhibition to the public of objects owned or used by the institution. An organization "exhibits objects to the general public" if such exhibition is a primary purpose of the institution.)

Museums for America grants range from \$5,000 to \$150,000 and must be matched by non-federal funds.



Other Funding Sources:

User Fees:

LSP does not charge a fee for entry into the park, nor is it planning to do so in the future. However, fees for specific services provided within the park could be collected from users of the service. For example, paid parking is provided in certain park lots. Likewise, museum fees and transportation fees could be charged in a variety of ways:

Ticket sales from the transportation system itself.

A small transportation fee could be added to the ticket price of large events such as the "All Points West" music festival. Fees could also be collected from events that utilize this historic transportation system or restored rail equipment.

Revenue streams that are enhanced from the provision of improved park transportation could be used to offset the cost of the transportation. Examples of enhanced revenue streams would be HBLR parking fees and ticket revenue, ferry revenue, and other park fees.

<u>Private Donations, Local Contributions, In-kind Contribution:</u>

Private contributions represent a significant opportunity for initial and ongoing funding. Donations and contributions often compromise a substantial portion of the matching funds required for many federal and state funding programs.

Despite the current economic crisis, profitable corporations seek to minimize tax consequences through tax-deductible donations to non-profit entities. Funding amounts can be significant, and can include visible sponsorship, if desired. Corporations seeking visibility in the community may vie for "lead sponsor" status in this project through sizeable donations.

Potential corporate sponsors could be those who have a large local presence, such as Goldman Sachs. Additionally, railroads could be interested in the historic rail preservation aspect of the project. Further, local businesses that benefit from improved park transportation, such as the hotel/conference center and golf course, could be approached for potential contributions.

Last, contributions from local governments (Jersey City, Bayonne, Hudson County) are unlikely, but should not go without investigation.

Direct contributions:

Many transportation projects receive funding from private groups who have an interest in provision and operation of those systems. One example is L.L. Bean's operational support of Acadia National Park's Island Explorer bus service. L.L. Bean provides \$200,000 per year to the Island Explorer service through donations to the Friends of Acadia support group.



Museum and historic preservation funding often comes from private and corporate donations. As a non-profit entity, an historic preservation and transportation agency could receive direct contributions such as cash, stock certificates, and testamentary gifts. These donations can either be contributed one time or pledged at regular or future intervals. One example of significant private funding for historic preservation is the California Railroad Museum in Sacramento. The museum maintains an extensive list of corporate and private donors who have donated in substantial monetary amounts, including almost a dozen gifts valued at over one million dollars.

In-kind donations of Materials / Equipment / Artifacts / Labor / Expertise:

This project already has the pledged support of the New Jersey Transportation Heritage Center and the United Railroad Historical Society, who have offered to donate a significant amount of historic railroad equipment, construction equipment, materials, labor, and expertise. Other in-kind donors of artifacts, services, and materials could also readily be found.

In-kind contributions are significant for both transportation and historic preservation funding, in that the fair market value of such contributions usually count towards the 'matching funds' requirement of most government funding sources.

A Note about current economic conditions and the political climate:

The current economic downturn may result in a significant reduction of free-market capacity to undertake significant capital projects. However, in challenging economic times, governments often undertake major capital and infrastructure projects as a means of stimulating economic activity. Further, president-elect Obama has proposed a commitment to investment in urban infrastructure and alternatives to automobile transportation. We feel that this project represents an opportunity to improve both urban infrastructure and alternative transportation. In light of the above factors, this project may have excellent potential for completion due to current economic and political considerations.

Department of Transportation Rules Regarding Transportation Projects That Affect Public Lands:

Summary:

Transportation projects that affect or infringe on public lands, including parks, must minimize the encroachment on those lands whenever possible. The Department of Transportation (DOT) promulgates rules designed to protect public lands and recreation areas, and special consideration must be given to transportation projects that infringe on these lands. The DOT has fashioned a "deminimis impact" test to determine whether projects that affect public lands should require additional scrutiny. If a transportation project has more than a "deminimis impact" on designated protected lands, a complex alternatives analysis must be undertaken to mitigate these impacts.

Although this project affects a public park, the project will be in full compliance with DOT rules regarding public lands. Because the nature of this proposal is a transportation enhancement within a park, and is, in fact, a proposal to provide a transportation solution that is integral to the park, we feel that this



project's proposals would meet a "deminimis impact" finding. In the alternative, the project would meet the standards set forth in the DOT alternatives analysis because the project is an integral part of the park, not an intrusion on it.

Explanation:

Recent DOT rule changes amended the alternatives analysis that applies to transportation projects that affect parks, historic sites, and other publicly owned land. Projects with only a "deminimis impact" impact on these areas may forgo the otherwise strict alternatives analysis typically required under Rule 4(f). That analysis requires that no less-intrusive alternative is feasible, and that the harm will be mitigated as much as possible.

This is a tough hurdle that would affect many of our alignment decisions, but would not be insurmountable. (Remember that this alternative to our project is a "no build" option, which contemplates paving over portions of the park in order to accommodate more parking, while allowing the train shed to continue to deteriorate.)

Also, the very heart of our project is to provide a transportation solution within a park, so a total avoidance analysis is a moot point.

The general requirements for a deminimis impact finding are: the project must have no adverse effect on the use of the site, and the coordinating authority (historic officer and park officials) must concur. Additionally, regarding a park, public hearings must be held and comments received.

DOT Rule 4(f) and the "deminimis impact" waiver of alternatives analysis:

The Department of Transportation Act (DOT Act) of 1966 included a special provision - Section 4(f) - which stipulated that the Federal Highway Administration (FHWA) and other DOT agencies cannot approve the use of land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless the following conditions apply:

There is no feasible and prudent alternative to the use of land, and

The action includes all possible planning to minimize harm to the property resulting from use.

Section 4(f) of the Department of Transportation (DOT) Act of 1966 was set forth in Title 49 United States Code (U.S.C.), Section 1653(f).

In August 2005, Section 6009(a) of the <u>Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users</u> (SAFETEA-LU), made the first substantive revision to Section 4(f) since the 1966 US Department of Transportation Act. Section 6009, which amended existing Section 4(f) legislation at both Title 49 U.S.C Section 303 and Title 23 U.S.C. Section 138, simplified the process and approval of projects that have only de minimis impacts on lands impacted by Section 4(f).

<u>Under the new provisions, once the US DOT determines that a transportation use of Section 4(f)</u>
<u>property results in a deminimis impact, analysis of avoidance alternatives is not required and the Section</u>



4(f) evaluation process is complete. Section 6009 also required the US DOT to issue regulations that clarify the factors to be considered and the standards to be applied when determining if an alternative for avoiding the use of a section 4(f) property is feasible and prudent. On March 12, 2008 FHWA issued a Final Rule on Section 4(f), which clarifies the 4(f) approval process and simplifies its regulatory requirements. In addition, the Final Rule moves the Section 4(f) regulation to 23 CFR 774.

So what are "deminimis" impacts (that do not require avoidance alternatives)?

Deminimis Impacts.--

- (1) Requirements.--
- (A) Requirements for historic sites.--The requirements of this section shall be considered to be satisfied with respect to an area described in paragraph (2) if the Secretary determines, in accordance with this subsection, that a transportation program or project will have a deminimis impact on the area.
- (B) Requirements for parks, recreation areas, and wildlife or waterfowl refuges.
- --The requirements of subsection (1) shall be considered to be satisfied with respect to an area described in paragraph (3) a park or historic site, if the Secretary determines, in accordance with this subsection, that a transportation program or project will have a deminimis impact on the area. The requirements of subsection (c)(2) with respect to an area described in paragraph (3) shall not include an alternatives analysis.

(C) Criteria.—

In making any determination under this subsection, the Secretary shall consider to be part of a transportation program or project any avoidance, minimization, mitigation, or enhancement measures that are required to be implemented as a condition of approval of the transportation program or project.

- (2) <u>Historic sites</u>.--With respect to historic sites, the Secretary may make a finding of deminimis impact only if--
- (A) the Secretary has determined, in accordance with the consultation process required under section 106 of the National Historic Preservation Act (16 U.S.C. 470f), that--
- (i) the transportation program or project will have no adverse effect on the historic site; or
- (ii) there will be no historic properties affected by the transportation program or project;
- (B) the finding of the Secretary has received <u>written concurrence from the applicable State historic preservation officer</u> or tribal historic preservation officer (and from the Advisory Council on Historic Preservation if the Council is participating in the consultation process); and
- (C) the finding of the Secretary has been developed in consultation with parties consulting as part of the process referred to in subparagraph (A).



- (3) <u>Parks</u>, recreation areas, and wildlife or waterfowl refuges.--With respect to <u>parks</u>, recreation areas, or wildlife or waterfowl refuges, the Secretary may make a finding of deminimis impact only if--
- (A) the Secretary has determined, after <u>public notice</u> and <u>opportunity for public review and comment</u>, that the transportation program or <u>project will not adversely affect the activities, features, and attributes of the park</u>, recreation area, or wildlife or waterfowl refuge eligible for protection under this section; and
- (B) the finding of the Secretary has received <u>concurrence from the officials with jurisdiction over the</u> park, recreation area, or wildlife or waterfowl refuge.

Summary and Application to This Project:

To summarize, the general requirements for a "deminimis impact" finding are: the project must have no adverse effect on the use of the site, and the coordinating authority (historic officer or park officials, as applicable) must concur. Additionally, with a park, public hearings must be held and comments received.

Currently, Dr. Gallagher would be the coordinating authority for addressing the environmental impact issues. We have considered these impacts in our planning, and continue on the assumption that a "deminimis impact" finding will be received. Additionally, if an alternatives analysis were necessary, our pros/cons analyses have considered whether each option would adversely affect the activities, features, or attributes of the park and we factored these considerations into the project layouts and system attributes.

Sources:

http://www.environment.fhwa.dot.gov/projdev/PD5sec4f.asp

http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=browse usc&docid=Cite:+49USC303



APPENDIX A

IMPACT OF EXISTING CONDITIONS AND HABITAT RESTORATION PLANS
ON POTENTIAL TRANSIT ALIGNMENTS IN LIBERTY STATE PARK



Impact of Existing Conditions and Habitat Restoration Plans on Potential transit Alignments in Liberty State Park

Nicholas Minderman

Introduction

This document summarizes some of the goals and significant findings of the environmental restoration project proposed for Liberty State Park in Jersey City, New Jersey. The restoration project is part of a broader, federally coordinated effort to rehabilitate water bodies influencing the Hudson-Raritan Estuary in New Jersey, New York, and Connecticut. The report primarily referenced throughout this summary is the Integrated Feasibility Report/Environmental Impact Statement (FR/EIS) issued by the New York District of the U.S. Army Corps of Engineers (USACE) in July, 2004. In addition to the main report, two appendices to the report, the Environmental Resources Inventory (ERI, USACE 2005) and the Site Investigation (USACE 2004b) have also been referenced.

This summary is a supplement to the report performed by The Edward J. Bloustein School of Planning and Public Policy in December, 2008. Due to the nature of the report that this summary document accompanies, only aspects of the FR/EIS and its appendices relevant to the feasibility of a rail transit system in Liberty State Park have been included. For further information regarding the full habitat restoration, please see the appropriate reference documents, available from the USACE's website.

An assessment of the plan has shown that there are three primary considerations: wetlands, both existing and proposed; habitat restoration areas, and; soil conditions that underlay potential rail alignments.

In addition to these topics, it has also been requested that the feasibility of solar power be included in the report, since it serves as a potential revenue source for a future-phase rehabilitation of the Central Railroad of New Jersey (CRRNJ) train shed located in the northeastern corner of the site. Since no part of the Minimum Operating Segment (MOS) in the report is dependent on solar power revenue, it will only be discussed within this appendix.

History of Site

The history of Liberty State Park starts as shallow tidal marsh at the beginning of the 18th century. Oyster beds were the dominant resource until pollution rendered the shellfish unfit for consumption. At the same time, the need provide resources to the booming city of New York across the harbor and introduction of the railroad to New Jersey resulted in gradual construction of ferry docks, canal quays, and railyards along the Hudson River and Upper New York Bay. The original shoreline in the vicinity of Liberty State park is roughly along the current alignment of the New Jersey Turnpike Extension (I-78) on the west and along the northern edge of the Morris Canal big basin to the north. Filling progressed to reach the current conditions around 1930. Cinders, ash, household refuse, and construction debris were used to extend the shoreline further east, enabling the land's original owner, the Central Railroad of



New Jersey (CRRNJ), to construct a large switching yard, car float and maintenance facilities, and a passenger terminal. (USACE, 2004a)

With the decline of railroads in the Northeastern United States, the CRRNJ eventually collapsed and its shorefront facilities in Jersey City came into state possession. Local advocates were able to establish a state park with close proximity to Ellis Island, the Statue of Liberty, and with excellent views over the New York skyline. However, the site's genesis as filled land has resulted in contamination hotspots that are below federal action levels. Current plans to rehabilitate the interior of the park will open this land that has been fenced off, nearly doubling the space available to users. According to New Jersey Department of Environmental Protection (NJDEP) employees, the freshwater wetlands rehabilitation phase is funded and about to move into construction, while later phases must still secure financing. The park's history continues to change as proposals for residential, lodging, and convention center developments on its margins spring up—how the park will adapt to these new uses will likely depend on key choices in new amenities provided. The landscape plan (WRT, date unknown) is just one example.

Existing and Proposed Wetlands

The USACE reports (2004a, 2005) indicate that tidal wetlands existed in the area where Liberty State Park is currently located. These were filled during the 19th century in order to construct the CRRNJ railyards that existed until the middle of the 20th century. After abandonment of the CRRNJ yards, linear wetlands formed in the ditches between former roadbeds, comprising a disconnected group of shallow, elongated wetlands.

The wetlands projects at Liberty State Park aim to enhance and, in some cases connect wetlands on the site and reconstruct some of the ecosystem that was lost over a century ago. The habitat restoration project will reduce the effects of the deteriorated environment by improving aspects of both the natural and built environment.

Benefits to Natural Environment

The wetlands will provide ecological services to the natural environment, including flood buffering and storm surge mitigation, improving quality of runoff, and providing habitat for species that have established themselves in the successional forest or low-quality wetlands that currently exist in the park. Potential negative impacts on the natural environment by a transit service in the park should be mitigated whenever possible to ensure the optimal function of the existing, restored, and constructed wetlands.

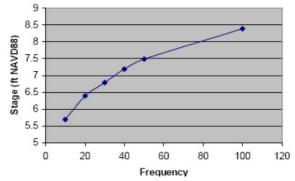


Figure 1: Storm Surge at the Battery, New York City New York City (USACE, 2004a)



Storm Surge Protection

The roads surrounding the proposed habitat restoration area currently serve as a levee; though the project will create breaks in this levee system, additional fill around the saltwater wetland will maintain protection for the other habitat areas while allowing the wetland to be flooded (naturally) as an undisturbed tidal wetland would. Figure 1 shows the anticipated storm sure height and frequency in Upper New York Bay (USACE, 2004a).

Water Quality

The habitat restoration plan selected was chosen partially for the potential to improve water quality in the nearby Morris Canal basin and the North Cove. These water bodies currently suffer from little circulation and/or excessive contamination loading due to runoff. By diverting runoff from some roadways and parking areas in the northwestern corner of the site to a Biofilter wetland, water quality is expected to improve overall. The chain of freshwater and saltwater wetlands will result in sufficiently lengthy retention times to reduce turbidity in the water discharged to North Cove, as well as limiting the sediment deposition in the cove. The Morris Canal Basin could benefit from this proposal due to the diversion of runoff toward the Biofilter.

Habitat Improvement

Both the FR/EIS and the ERI note that numerous species have established themselves in Liberty State Park as the environment has transitioned from an active industrial site to urban forest and grassland. Birds currently dominate the wildlife on the site, with previous studies showing some mammals within the center of the park and few amphibians and reptiles. The FR/EIS concludes that the low population, despite ample habitat, is due to the lack of connectivity with existing, higher-quality habitat.

The establishment of new wetlands, as well as enhancement those already found in the park, will increase the ecosystem's ability to support both aquatic and terrestrial species. This includes amphibians, waterfowl, reptiles, and fish that have not been observed in the park, despite typically being found in freshwater and saltwater wetlands in eastern New Jersey. Habitat restoration will be further discussed in Section 0: Habitat Restoration.

Benefits to Community

In addition to these ecological qualities, wetland benefits to local communities include protection of infrastructure (flood and storm protection as mentioned above), passive recreational space, and an opportunity for experimental and educational "outdoor classroom" facilities easily within reach of the Liberty Science Center and schools in Bayonne, Jersey City, and Hoboken.

Again, any potential negative impacts to users caused by a proposed transportation system should be mitigated to the maximum extent appropriate. It should be noted that such a plan will likely have significant positive impacts on the ability of local community members to access the park's amenities.



Storm Protection

As mentioned in 0, the existing roads surrounding the proposed habitat restoration area serve as a buffer from storm surges in the Upper New York Bay. The breach of the levee created by Freedom Way, along the eastern side of Liberty State Park, will be mitigated by the creation of a berm surrounding the proposed tidal wetland. In addition to protecting the successional forest habitat from extensive flooding, this levee system also protects built infrastructure such as Liberty Science Center, various industrial sites adjacent to the park, and the existing water treatment facility (to be replaced by a convention center and hotel). This natural shelter will benefit future residential developments adjacent to the park as well.

Passive Recreation Space

While a number of active recreation spaces currently exist along the margins of Liberty State Park, the proposed wetlands improvements will provide space for hiking, birdwatching, and other lower-intensity activities. Lying in the center of a densely populated urban area, the revitalized habitat in the center of Liberty State Park will offer local residents an amenity they would otherwise require travelling to suburban communities. The restoration will nearly double the amount of terrestrial space available to users, doubling the capacity of the park without creating excessive risk for overstressing existing facilities at Liberty State Park.

Outdoor Education Space

The park's proximity to an urban area and the Liberty Science Center make it a natural location for outdoor education opportunities. For example, projects for urban youth could expose them to the natural environment and promote understanding of the relationship between humans and ecosystems in densely populated areas. The Liberty Science Center's wetland will be integrated into the freshwater wetland system in the park, which will in turn flow into the tidal wetland area. The creation of this dynamic ecosystem in the park could serve as a living laboratory for the Science Center's visitors, as well as researchers associated with local and regional higher educational institutions. In fact, a comparison between current studies and future investigations could help better understand the resiliency of constructed wetlands when exposed to stressors in an urban setting.

Habitat Restoration

The wetlands discussed in Section 0 are just components of a broader proposal to improve the overall habitat at Liberty State Park. The entire transportation system in the park should provide visitors access to this restored habitat while minimizing overall encroachment due to automobile and public transportation on wildlife in the restored areas of Liberty State Park.

Six threatened and endangered species have been observed in the park, one grass and five birds. Of these, only the Northern Harrier is called out specifically as a valuable asset to the park because it has used the urban successional forest at Liberty State Park as a nesting site. With consideration for the presence of threatened and endangered (T&E) species in the park impact of each alternative on these



species was one of the three scoring categories used for weighing the options in the FR/EIS. The other categories were water quality and biodiversity; while the former is more relevant to wetlands (see Section 0 above), biodiversity and T&E species are linked by the need to create a sensitive and adaptive habitat.

Construction of Restored Habitat



Figure 2: Wetland Reconstruction in Progress (Photo from Microsoft/Navteq/Pictometry, 2006)

The habitat restoration will, similar to previous projects at Liberty State Park, involve extensive earthwork to create the necessary channels and elevations for certain parts of the plan. Despite the significant disturbance of the habitat (see Figure 2), end benefits are determined to outweigh detrimental impacts. For example, future water levels will be consistent enough to support wetland vegetation, drainage in areas intended to be dry will be improved, and invasive species are typically eliminated by large scale earthwork operations (when appropriate follow-up management is implemented). Without such invasive measures, the habitat would continue to deteriorate, as

outlined in the "no build" option in the FR/EIS. The urban successional forest portion of the habitat rehabilitation plan is expected to remain largely intact throughout construction, ensuring that vegetation requiring longer time periods for establishment (trees) are retained to the greatest extent possible. Here the primary goal of the habitat restoration is to ensure a healthy forest, controlling the understory and limiting the spread of invasive species. In the grassland and wetland sections of the plan, establishment of vegetation is anticipated to occur over a shorter time span. This will result in a high-quality habitat for species that currently are found in Liberty State Park and those that could be successfully introduced at the conclusion of the rehabilitation. Concern for the Northern Harrier, despite nearly complete destruction of its habitat according to the ERI, was minimal because the net benefit of improved habitat will bolster its population (as well as numerous other species), rather than depleting it. ³ Thus the FR/EIS generally lists no significant impacts to T&E species as a result of the proposed habitat restoration.

Habitat Description

Tidal Wetland

The tidal wetland will be composed of approximately 46 acres on the eastern edge of the restoration area. The majority of this area will be excavated to a few feet above mean low water level (MLW), and a channel connected to the North Cove will then be constructed, with an invert below or at MLW to ensure that water can penetrate into or drain out of the restored habitat in normal high/low tide

³Liberty State Park employees have noted that the Northern Harrier has not nested at the site listed in the ERI in the past two years, which should remove any remaining concern regarding destruction of its habitat.



conditions. The channel will have four to five bends to increase the perimeter of the channel and the unique ecosystem that thrives along its margin. Spoils from the excavation of the tidal wetland will be used for construction of the warm weather grassland in the southwestern corner of the site.

Freshwater Wetland

The freshwater wetland component of the plan will include enhancement of existing wetlands and

creation of a new Biofilter wetland and deep emergent wetland, both of which will compliment the shallow emergent wetlands currently scattered around the site (Figure 3). The total wetlands either constructed or enhanced will be 26 acres, all within the interior of the park.

The deep emergent wetland and Biofilter will require excavation and comprehensive replanting, while

improvements to the shallow emergent wetlands will involve selective grading and replanting when needed to improve drainage or eliminate invasive species.



Figure 3: Regulated Wetlands at LSP (USACE, 2004a)

Warm Weather Grassland

The warm weather grassland will include approximately 50 acres, planted on top of the berm created with the excavation spoils resulting from the wetlands projects. The USACE and New Jersey Department of Environmental Protection (NJDEP) have established that keeping the historic fill (see Section 0: Site Investigation Report) on site- is the desirable mitigation method for potentially contaminated soil. The combination of elevation and solar exposure will maintain this part of the rehabilitation area in a drier condition than the remaining parts of the park's interior. This part of the rehabilitation plan replicates a habitat not originally found along the New Jersey coast, but does duplicate and ecosystem once found inland and now rare due to urban development.

Urban Successional Forest

The urban successional forest portion of the habitat rehabilitation plan will include about 100 acres of existing hardwoods and maritime shrubs that will have been enhanced through a growth management and invasive species eradication program. The majority of a proposed trail system (Figure 4) will be routed through the successional forest, dramatically



Figure 4: Oblique View of Proposed Trails

(WRT, date unknown)



increasing the amount of recreational space available to park visitors.

Site Investigation Report

The Site Investigation (USACE 2004b) describes the conditions of soil found at Liberty State Park. The two concerns for the Transit Alternatives Study are the mitigation of contamination and the presence of soil with inadequate strength for the proposed railroad bed.

Historic Fill

The state of New Jersey's soil remediation codes have included a special classification called "Historic Fill" for sites that have a legacy of filling that would result in prohibitively expensive remediation. The official definition is found in NJAC 7:26E Subchapter 1.8 (NJDEP, 2008), and includes fill placed to raise the topography of a site contaminated before placement, "and is in no way connected to the operations at the location of emplacement". NJDEP typically expects that historic fill will be treated using encapsulation (NJDEP, 2007) in order to reduce the general population's potential for exposure. In-situ encapsulation requires the placement of a layer of clean fill over any soil designated as historic fill. When historic fill is excavated, it may still be encapsulated, but must either be done so on-site or transported to an approved disposal facility. Testing was performed across the site (Figure 5), and no areas of contamination requiring more action than encapsulation were found. (USACE, 2004a)

Soil Strength

A review of the soil borings found in the Site Investigation (Figure 5) shows that there are some areas of



Figure 5: 2003 Subsurface Investigation Locations (USACE 2004a)

Liberty State Park where uncontrolled fill placement practices may have resulted in low soil strength. (USACE, 2004b)
Remediation of these conditions may be as simple as additional ballast layers, ballast pre-loading, or geogrid placement under the proposed roadbed. It is encouraged that any alignment traversing the northwestern corner of the site (across Phillip Drive from Liberty Science Center) perform a more in-depth analysis, as this is the area shown to have the greatest risk for unsuitable soil conditions. ⁴

Solar Potential

The existing climate conditions of the site govern the potential for solar power as a financing mechanism for the proposed project or any future project that would rehabilitate the CRRNJ railroad terminal's train shed. The U.S. Department of Energy (USDOE, 2008) broadly categorizes solar potential according to the

⁴ Unsuitable soil conditions are defined as either N<4 at the surface and penetrating at least 2 feet or N<0 in the first 5 feet of a boring log.



contour map shown in Figure 6. The load factor for solar energy is reported as 12-15% in Massachusetts, which lies in the same contour as northern New Jersey (RERL, 2006). Thus, one would only expect to capture 420 to 600 watts per square meter of flat plate collector installed. However, the large are of the train shed would allow for a large enough number of photovoltaic cells to generate a significant amount of

energy. More in-depth study should precede any plan to install solar production on the site, including an analysis of the current electricity price and Solar Renewable Energy Credit (SREC) redemption values in New Jersey.



Figure 6: Solar Potential (USDOE, 2008)

Conclusions

This report is intended to summarize the primary impacts of the existing ecological and physical characteristics of Liberty State Park on any potential transit right of way within the park. An important consideration, as mentioned in section 0, is an overall minimization of the impacts on natural and built environment within the park. A notable concept is that the preferred option will not necessarily have the minimal direct impacts. When weighing alternatives, direct impacts (such as wetland disturbance) must be compared to indirect impacts (increased automobile traffic). With this in mind, it is likely that the most significant challenge will be avoiding existing wetlands that are currently planned for enhancement. Since wetlands are already protected by Federal and State Statutes, it can be anticipated that attaining approval for any disturbance of these areas than the other habitats in the park. In addition, the FR/EIS details plans that are expected to result in overall improvements to the Hudson-Raritan Estuary as well as the parkland that is immediately surrounding these restoration areas. Therefore, the negative indirect impacts of wetland disturbance can be significant.

Plan for the freshwater wetlands could be constricting, since this phase is expected to be constructed very soon. For this reason, construction in these areas may be difficult, though less so than the existing wetlands. It seems unlikely that state and federal regulatory agencies would be willing to compromise large portions of this restoration plan, due to the benefits listed within this report. Proposed transit rights of way could potentially impact the function of existing, restored, and constructed wetlands if changes to physical characteristics of the wetlands are made. Water quality, available habitat, and storm protection impacts should be considered if the construction of a transit system requires alterations to the wetlands at Liberty State Park.

The tidal wetland plans might be more flexible since LSP staff expects this construction to be completed significantly later than the freshwater project. Similarly, the anthropogenic influence on the warm weather grassland and urban successional forest (these would not exist without human intervention) make these aspects of the rehabilitation easier to adapt to transportation needs.

Consideration for historic fill is minimal in the scope of this project because it seems unlikely that it will include large amounts of excavation. The only area where unsuitable solid strength is likely to be a



consideration is the western edge of the site (along Phillip Drive), and there are many established, accepted, and low-cost mitigation practices for these conditions.

Overall, transitway routing along the edges of the habitat restoration area will most likely avoid the majority of conflicts by reducing encroachment on the rehabilitated area and staying within locations where the historic fill has already been encapsulated.

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APPENDIX B

REVIEW OF VISITATION DATA TO LIBERTY STATE PARK



Review of Visitation Data to Liberty State Park

ArefehNasri, Austin Lee

Liberty State Park is a convenient option for those looking for a wonderful place for recreation and family fun. Many developments have been planned in the vicinity of LSP and will likely translate into increased patronage for the park. Of these, several high rise condominiums have been planned within the surrounding neighborhoods within Jersey City. Specifically, the Liberty Harbor project on the opposite side of the Morris Canal Big Basin will contain approximately 6,000 dwelling units. A new hotel and convention center is also being planned just south of the Liberty Science Center (LSC) and will also promote the use of the park.

Since a large amount of data was unavailable to provide accurate future visitation numbers, it was decided that we would estimate these statistics by mirroring population growth in Jersey City. The population of Jersey City has increased since 1990, and from the period between 1990 and 2000 had grown by an additional 3%. Assuming this to stay constant we can see in Figure 1 that significant growth will be seen throughout the park. Unfortunately, these numbers will not reflect the economic conditions at present, but with the increases in development surrounding the park, visitation is sure to increase. Visitation numbers were based on the daily attendance numbers from FY '08-'09 obtained through Liberty State Park, and then projected at a 4% increase over the next 7 years to account for the growth being in such close proximity to the park. Please note, however, that this is only a general trend line.

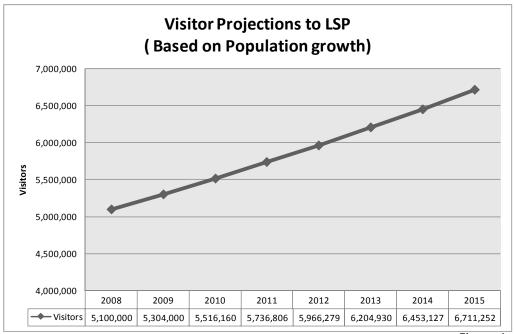


Figure 1

The total number of visitors to LSP in fiscal year 2007-2008 was approximately 5.1 million visitors. Seasonal variations in visitation are seen in Figure 2, with the summer season having the highest number



of visitors, and the most of these coming in the months of July and August. Attendance drops 44% at the end of the summer between August and September, although some increases are seen in subsequent months on the weekend. These rates do not start to rise significantly until the spring months, which is to be expected.

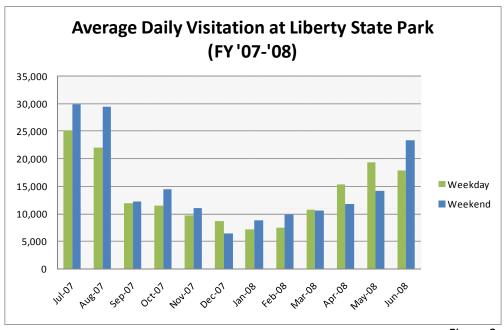
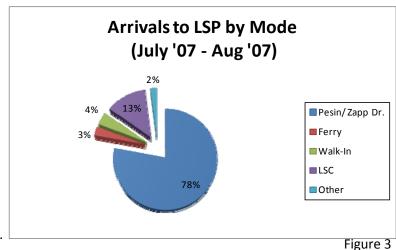


Figure 2

Visitors have several different options for getting to Liberty State Park. Unfortunately, a large majority of them arrive to the park via car by way of the parks two major entrances. Only a small portion arrives by other means such as ferry or other public transit options (Figure 3). Data for the Hudson Bergen Light Rail Station was obtained but could not be used, for it is unclear whether riders were arriving for use of Liberty State Park, Liberty Science Center, or the commuter lot adjacent to the station. Additional surveys could be performed during peak and off-peak times in order to establish more accurate destinations of the riders at this station





Ferry ticket sales to Ellis Island and the Statue of Liberty were available from 2001 to 2005, at which time, contracted operators had changed. According to the National Park Service, approximately 20% of total tickets are sold from the LSP terminal. Thus, in 2005, 637,756 people are estimated to have boarded from LSP (Figure 4). This number is roughly 13% of all total visitors in FY '08 to LSP. Whether these people stayed at the park to visit or only passed through on their way to the Statue of Liberty is unknown.

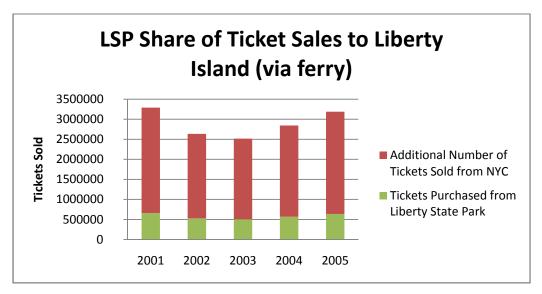


Figure 4

NJ TRANSIT 305 LSP Shuttle Ridership Data

No manor 303 Est shattle Maciship Data		
Month/Year	Passenger Trips	Passenger trips per day
Jul-07	11,615	375
Aug-07	12,544	405
Sep-07	5,991	200
Oct-07	3,988	129
Nov-07	3,152	109
Dec-07	4,900	163
Jan-08	891	111
Feb-08	611	76
Mar-08	1,274	142
Apr-08	4,076	136
May-08	5,451	176
Jun-08	7,755	259
Total FY08	62,248	

Figure 5

Also available is ridership data for the LSP 305 shuttle, currently operated by Coach USA for NJ Transit (Figure 5). Total passenger trips and daily passenger trips for each month of fiscal year 2008-2009 are shown. From this data, we see that the total ridership for this period of time is only 62,248 and represents only 1.2% of the 5.1 million total visitors that came to the park in FY08. It can be concluded that most visitors to LSP travel by private cars in order to reach their destinations or are simply not aware that the service exists within the park.



After being closed for 2 ½ years, the Liberty Science Center reopened in the summer of 2007. The total number of visitors in this past fiscal year was 731,821 persons. Like LSP, Liberty Science Center also saw its highest share of visitors come in August with a large drop in visitors at the end of summer in September (Figure 6).

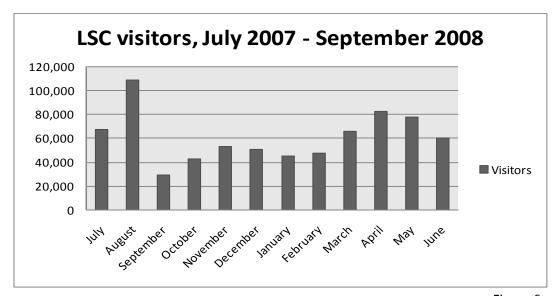
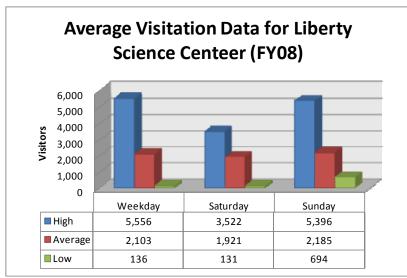


Figure 6 Once again, this is most likely due to summer holidays ending and the school year resuming. The visitation numbers increase on a relatively consistent basis from that point until the warmer months, where visitation begins to rise again.



When looking at daily statistics, the average number of visitors to the Liberty Science Center for a weekday was 2,103 persons while Saturdays averaged 1,921, mirroring similar trends for weekday vs. weekend travel to LSP (Figure 7). These averages, as well as the high visitation values show that a large number of visitors do come to the Liberty Science Center; but it is unknown whether these visitors actually enter Liberty State Park. Under ideal circumstances, it

Figure 7

is hoped that those who would be interested in visiting Liberty Science Center, could then enter the park, and make for a full day's worth of activities. Currently provided through the Liberty Science Center's website is the "Give Me Liberty!" pass, which encourages visitors to enter the park, and visit Liberty and Ellis Islands, via the ferry located at the CRRNJ Terminal.



APPENDIX C

POTENTIAL VOLUNTEER OPPORTUNITIES



Potential Volunteer Opportunities

Andrew Besold

The New Jersey Division of Parks Forestry has a long tradition of working with volunteer organizations to help develop, build and maintain facilities that are located on park grounds. Most notable are recreational trail interest groups. Organizations that represent equestrians, mountain bikers, off-road vehicle users and hikers have assisted the New Jersey Division of Parks and Forestry to build and maintain trails and other related facilities. Most notable of these organizations is the New York-New Jersey Trail Conference (Trail Conference) founded in 1920. Today the Trail Conference is an invaluable partner to the park services in both states and oversees 1600 miles of hiking trail.

Friends of the New Jersey Transportation Heritage Center, Inc. is a fully insured volunteer 501(c)(3) organization of over 500 members and was founded in 1989. Like the Trail Conference, the Friends of NJTHC have the potential to offer services unique to their realm of expertise free of charge to the Park Service. The Friends of NJTHC are dedicated to supporting the creation, development, and operation of a Transportation Heritage Center in New Jersey. Many of the members of the Friends of NJTHC are highly trained, experienced professionals and technicians that have professional experience with NJ Transit, PATH, NY Susquehanna and Western Railroad, the Railroad Construction Company and the Conti Company. Some of the skills the members of the Friends of NJTHC are willing to volunteer include:

- Architecture
- On-site field engineering
- Qualified heavy equipment operations
- Welding
- Carpentry
- Fabrication
- Skilled labor related to railroad operations
- Heavy manual labor

Besides skills, many members of the Friends of NJTHC own heavy equipment which they are willing to volunteer. This includes, but is not limited to:

- Trucks (cabs, flatbed trailers, box trailers, etc.)
- Grading equipment (bulldozers, backhoes, etc.)
- Cranes
- Forklifts
- Specialized railroad maintenance vehicles



The Friends of NJTHC have all the rolling stock needed to operate the trolley service as proposed. This includes the three Presidents' Conference Committee (PCC) Trolley Cars from the Newark Subway and Public Service Car 2651 (double ended trolley car).⁵

Finally the Friends of NJTHC also have in their possession much of the equipment and materials needed to build the main trolley line along Audrey Zapp Drive. This includes:

- 35 trolley poles
- All rail track
- Four miles of 2/0 trolley wire, with fittings
- All railroad ties (not in possession but easily acquired)
- In the process of acquiring 600v DC transformers & rectifiers for trolley power
- An historic platform shelter from the Newark Broad Street Station
- 45 ton trolley bridge
- Signals, tie plates, track bolts and joint bars
- Truckloads of cobblestones, Belgian Block, and historic pavers
- Countless miscellaneous items critical to rail operations
- Numerous miscellaneous architectural elements original to historic rail operations

As one can see the Friends of NJTHC along with fellow heritage rail organizations located in New Jersey have much to offer New Jersey and LSP. It should be noted however that at this time the Friends of NJTHC is not an "Officially Recognized Friends Organization" (ORFO) of the New Jersey Division of Parks and Forestry.

behalf the Friends of NJTHC. NJERHS is an active member of United Railroad Historical Society.

⁵ The Public Service Coordinated Transport trolley car #2651 is owned by the North Jersey Electric Railway Historical Society (NJERHS), which is in the process of restoring it for operation in a future Heritage Center on



APPENDIX D

BRIDGE OVER THE GLIMMER GLASS AT MANASQUAN BORO



Bridge Over the Glimmer Glass at Manasquan Borough

William Vigrass

Class members reviewed the 1990 study by EBASCO and noted that EBASCO proposed a two leaf bascule ("Chicago type") bridge to connect LSP near the Terminal Building to the north shore of the basin. This would provide a pedestrian and bicycle way to connect with existing streets which in turn provide access to PATH's Exchange Place Station. The distance via the bridge would be about 0.75 miles rather than the approximately two miles of circuitry following the route of the Hudson-Bergen Light Rail transit line of NJT.

Several class members stayed after the class period and we discussed various types of bridges that might be used. One class member reported that there was an existing historic bridge with rolling counterweights up on the North Jersey Coast. Further research indicated that this was the Glimmer Glass Bridge. Peter Imperiale, P.E., Assistant County Engineer for Monmouth County sent an announcement (via e-mail) that the bridge was available to others if it were preserved. Additional information was requested, and a package of such information arrived several weeks later.

If the project is to make use of this bridge, it will have to be redesigned to fit the needs of Liberty State Park. In reading the material in the package, it is evident that this sort of bridge was occasionally moved and more often modified as needs changed. Its basic design and historic nature can be retained with the changes proposed, but someone is needed to do the work. The proposed work would have to be reviewed by the historic preservation agency.

It is that Rutgers Engineering Department use this bridge as a class project in Spring 2009. The following tasks are envisaged.

- Scout the site; obtain measurements of the waterway to be spanned. It is estimated to be
 about 200 feet. Determine the width of the necessary channel to clear small craft as well as NY
 Waterways ferries and NY Water Taxi ferries. Sixty feet ought to suffice. NY Waterways ferry
 boats are 78 feet long overall by 26 feet wide (beam). The NY Water Taxi catamaran boats are
 smaller. Water Taxi dock ought to be relocated on the river side of the bridge.
- 2. Obtain working drawings of the bridge, as is. These ought to be available from Monmouth County.
- 3. The present bascule (draw) span is 20 feet wide and 34 feet long (20' x 34'), and when raised provides a 31 foot channel. It has a posted three (3) ton load limit. While adequate for its present use, this is much too small for the Liberty State Park marina and ferry docks. It is suggested that the lift span be cut in half lengthways and reassembled to become ten feet wide by sixty four feet long (10' x 64'.) It would have about the same square footage area. This ought to be just right for pedestrian and bicycle use well within its three ton load limit.
- 4. The draw span should be covered with timber or plastic-appearing timber to replace the present metal grid deck which was a recent addition (recent in terms of the age of the bridge).
- 5. Prepare working drawings of the narrowed and lengthened bridge as will be needed for a contractor to fabricate a new draw span and rehabilitate the rest of the bridge. The Assistant



- County Engineer recommended that all new timbers be used as the present ones are near the end of their useful life.
- 6. Determine which components can be repaired, rehabilitated or should be replaced. The sheaves have grooves in them but it is not known if these were original, to guide the cables, or from wear as the Asst. Engineer described.
- 7. Research and find one or more marine machine and welding shops that could do the work intended. Research and find one or more barge and rigging operators who would disassemble the bridge where it is, under Monmouth County supervision, and transport the pieces to the marine shop. Arrange to have the redesigned and rebuilt bridge parts barged to the Liberty State Park basin and be erected there.
- 8. Concurrent with the above work, design appropriate abutments and approaches for the LSP site for a pedestrian and bicycle-way Lift Bridge. The proposed location has what appear to be abutments but the earth around them is greatly eroded. A bridge operator's cabin may be appropriate, or a Yacht Club facility might be used. Appropriate electrical controls should be designed.
- 9. Contract documents for the above work should be prepared. This may become a real project, so such documents should contain all the usual "boilerplate", terms and conditions as well as technical engineering data and drawings. Terms and conditions required for NJ State Parks can probably be supplied by Liberty State Park management.
- 10. Have the US Coast Guard and Army Corps of Engineers review the drawings before a contract is awarded. It may be beneficial to contact these two agencies early in the process so that their requirements and recommendations can be incorporated in the design process. Both agencies must approve any bridge over a navigable waterway.
- 11. Add any additional work as may be appropriate.



List of Correspondence

All correspondence occurred between August-December, 2008.

Barth, Robert. Past President, Canal Society of New Jersey

Beekman, John. Reference Librarian, Jersey City Public Library-Local History Room

Carpenito, Paul. President Phillipsburg Railroad Historians

Cucurello, Nancy. Assistant to President, Metrovest Equities, Inc.

Dakelman, Mitchell. Film& Media Librarian, National Railway Historical Society

Filopoulos, George. President, Metrovest Equities, Inc.

Fitzsimmons, Neal. Director Light Rail Service Planning, NJ Transit

Gallagher, Frank PhD. Administrator, Office of the Director, New Jersey Department of Environmental Protection-Division of Parks and Forestry.

Hoeft, Bob. Past President, Central Railroad of New Jersey Veteran Employees Association

Imperiale, Peter F. P. E., Assistant County Engineer, Monmouth County

Klemchalk, Matt. PE, Engineer-Track Division, Railroad Construction Company, Inc.

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McKelvey, Bill. Advisor to Studio

North, Joseph. General Manager, Light Rail, NJ Transit

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Storey, Fred. Service Planner, NJ Transit

Tadurian, Butch. Map Technician, City of Jersey City

Taylor, Richard. Railroad Historian and Photographic Documentarian

Timpanaro, Michael. Resource Interpretive Specialist, Liberty State Park, New Jersey Department of Environmental Protection-Division of Parks and Forestry

Vigrass, Bill. Part Time Lecturer, Rutgers University, Edward J. Bloustein School of Planning and Public Policy.

Warren, Allen. Manager, New York Waterway

Wright, Marie F. Photo Archivist, North Jersey Chapter, National Railway Historical Society



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