Prepared for:

City of Long Beach
Traffic and Transportation Bureau
333 West Ocean Boulevard
Long Beach, California 90802

FINAL REPORT
Limited Streetcar Feasibility Study

August 7, 2009

Prepared by:

HDR ONE COMPANY Many Solutions
100 Oceangate Suite 1120
Long Beach, California 90802-4314

TABLE OF CONTENTS

PAGE

TABLE OF CONTENTS

TABLE OF CONTENTS

PAGE

LIST OF APPENDICES

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION AND BACKGROUND

In October 2008, the City of Long Beach initiated a Limited Streetcar Feasibility Study through the consultant team of HDR Engineering, Inc.

1.1 STUDY GOALS AND OBJECTIVES

The intent of this study is to provide the City of Long Beach, its decision-makers, residents, and business community with information on potential streetcar alignments, and how well (or poorly) they could address community needs. The study will discuss the purpose and need of a streetcar project. The study will also help the City decide whether to continue to consider its technical, financial and physical feasibility at a more-detailed level through additional studies or to halt further consideration of a streetcar in Long Beach.

1.2 ORGANIZATION OF THE STUDY

The study was conducted under the direction of the Long Beach Public Works Bureau and the City's Project Manager was Sumire Gant, Traffic Programs Officer.

Providing input to the City's Project Manager and the Consultant team was an internal Project Study Committee comprised of representatives from each of the City Council member's and from:

- California State University Long Beach
- City of Long Beach Public Works Department
- City of Long Beach Redevelopment Agency
- Long Beach Transit
- City of Long Beach Development Services
- City of Long Beach Planning Department

The Project Study Committee met three times; on:

- November 25, 2008,
- January 21, 2009, and
- March 9, 2009.

The Consultants, HDR Engineering, received a Notice to Proceed in October 2008 and were asked to complete the work by February 27, 2009. The Consultant team's key staff (and their project roles) were:

- Stan Feinsod – Project Manager
- Jim Hecht, P.E. – Engineering
- Richard Dial, AICP – Project Planner
- Charlie Hales – Financing and Implementation Review
- Alicia Rice, EIT – Transportation Planning

The HDR team also included administrative and GIS/graphics support staff.

1.3 WHAT ARE STREETCARS?

Streetcars are lighter than the light rail cars that are on the Blue Line in Long Beach. They are smaller and tend to be less expansive to install. The running track is installed in the street and is usually on a narrower concrete slab with embedded rail in a lane used by other vehicles and not reserved.

1.3.1 Physical Characteristics

The scale of the tram-style Streetcar and the location of its guideway – track that is flush with the street surface in a shared travel lane – make it possible to add high-capacity transit to an urban arterial and downtown without overwhelming its character or radically altering its design. Additional benefits of the tram-style Streetcar include:

- Track systems and a single overhead wire that can be constructed quickly, with minimal impact on surrounding businesses and streets,
- Clean and quiet electric propulsion, which is especially pedestrian- and environmentally friendly,
- Smooth and comfortable rides, particularly in comparison to buses, and
- In-street operation, which means no travel lanes are lost and street parking is impacted only minimally.

Specifications for tram-style Streetcars may be summarized as follows:

Travel function:	Local, with connectivity and distribution to other systems
Market:	In-town/urban core
Construction disruption:	Minimal/moderate
Potential for economic development:	Significant
Passenger capacity per vehicle (projected):	95-110 (standing and seated)
Typical maximum speed:	25-40 mph
Typical average speed:	15-to-20 mph
Power system:	Overhead electric/on board electric motors
Guideway:	Shared with other traffic on street lanes
Capital costs per mile:	$18 million (single-track alignment) to $25 million (double track alignment)
Operating costs per service hour	$105.00-$140.00

A streetcar can be designed to be street running, sharing the street with all of the other vehicles and not requiring a dedicated space along the roadway. In this way, streetcars can have little or no street traffic impact in the flow of traffic. The exception requires careful design of streetcar stops so that they also have little traffic flow impact and can be seen as similar to a bus stop.

1.3.2 Examples and Pictures

Please review the Appendix A, City of Long Beach Case Studies to see pictures of vehicles, station stops and streetscapes from cities which have streetcars.

1.4 STOPS

Stops two-to-four blocks apart would be situated so as to ensure “local circulation”, permitting many riders to arrive much closer to their destinations, overcoming a significant problem which currently deters many commuters from leaving their automobiles behind, at home or at their workplace within any Corridor. Stops are simple including a bus type shelter and a boarding area which provided ADA compliance with a low-floor vehicle.

1.5 VEHICLES

Three types of streetcars have been used recently in the United States:

- Vintage streetcars – rehabilitated historic vehicles based on retired streetcars used decades ago refitted to be true to their original design
- Replica streetcars – vehicles built from scratch and all new, but designed to resemble older historic streetcars
- Modern streetcars – new vehicles available in the marketplace based on modern designs and used in large numbers in European cities

Vintage Trolley – Dallas, Texas

The cost of these different vehicle types differs dramatically. Modern streetcars purchased for use in Portland, Seattle (South Lake Union Streetcar) and Washington, DC (Anacostia Streetcar) has been approximately $3 million each. Modern streetcars are available from two Czech manufacturers Inekon and Skoda, an American licensee of Skoda, United Streetcar (Oregon Iron Works), or from Italian manufacturer Ansaldo and French manufacturer Alstom.

Replica street cars available from an Iowa manufacturer, Gomaco Trolley Company, can be purchased for approximately $1 million.

The cost of rebuilding (by hand) historic streetcars varies with the state of the vehicle being rebuilt and the decisions about fitting it with modern equipment and can be between $800,000 and $2 million.


Replica Trolley – Portland

A nearby example of the use of historic streetcars is the San Francisco Muni "F" Line which is a successful revenue producer for Muni.

The decision between modern and replica is driven by price, ease of meeting ADA accessibility requirements, the "look and feel" of the product and the desire of the local community. The ADA access requirements for replicas can only be met with lifts at the right front door, while the modern vehicle can be configured for level boarding from a raised platform at mid-car.

Modern Streetcar by Inekon/Skoda – Portland

A choice among the options would depend on local considerations and the overall approach decided for a project. This decision would need to be made in the context of financing considerations and local preferences.

1.6 PROPULSION

Streetcars are primarily installed with electric motors deriving their power from a simple overhead contact system (catenary systems) strung above the tracks. The catenary system is hung from existing street poles, buildings or, when required, on poles set up solely to carry the electric traction wire. Note that there have been a wide variety of catenary designs with differing visual impacts. In Portland, for instance, street art was used for poles. A decorated totem-pole design was applied to the two adjacent streets on Jamieson Square in the Pearl District. Where catenary systems have been installed, the visual impact has been lessened by treescapes and the normal clutter above the streets.

The design alternatives for overhead electric traction systems offer the possibility of unobtrusive poles that can be fit into the urban streetscape, however, the impact of the electric lines must be taken into account.

There are alternative propulsion systems in various stages of testing, development and deployment that substitute for an overhead wire based distribution system. These include battery powered vehicles, and an electric distribution system which delivers power on the ground only under the vehicle. Although these alternatives may be available, they should be considered with an understanding they may still be in the development stage, and that they may be more expensive to purchase and install and more expensive to maintain. There are no instances in the US at this time of new streetcar projects applying any of these technologies. There are, however, a number of manufacturers claiming their systems are ready for installation and use.

2.0 PURPOSE AND NEED

2.1 PURPOSE

In considering the potential re-introduction of streetcar service in Long Beach, one of the most fundamental tasks was developing a statement explaining the purpose that such a project would serve, as well as articulating the needs and problems that could be addressed by provision of streetcar service.

Streetcars would not be new to Long Beach. As early as 1902, the Pacific Electric Railway provided service between the emerging city of Long Beach and downtown Los Angeles. Today, this linkage remains in the form of Metro's (LACMTA) Blue Line, one of the most heavily-used light rail services in the United States.

Smaller spur lines within Long Beach had provided both passenger and freight services for many years, before eventually being displaced by automobiles and buses in 1940.

A new streetcar investment in Long Beach may offer significant benefits and solutions to issues facing Long Beach, its residents and visitors. Streetcars feature sustainable, neighborhood –connecting, quality of life benefits. The following subsections will articulate how the benefits and issues could be addressed through a streetcar project.

Streetcar service should be anchored by a major activity center. Streetcars promote economic activity and serve relatively short trips. Streetcar projects currently under consideration or recently opened in the United States currently are not focused on commuting or work trip service, but, connecting activity centers, promoting urban vitality and improving pedestrian access. For these reasons, downtown Long Beach should be served by any streetcar project.

The purposes for a streetcar service connecting downtown Long Beach with one or more adjoining neighborhoods is to:

- Provide convenient access and local circulation between major civic, commercial, recreational, and cultural activities.
- Expand and integrate the residential presence in the Downtown area,
- Provide an attractive means of transportation, as an adjunct to walking or bicycling, for residents, workers, and visitors (as a "pedestrian accelerator"),
- Support existing and planned economic development and redevelopment within the area around the streetcar corridor(s), while limiting adverse impacts,
- Support and shape the urban form within downtown and surrounding neighborhoods, taking advantage of the unique "placemaking" effect of a streetcar investment,
- Reduce the need for additional investment in parking, while freeing up valuable and scarce available real estate to support existing and new investment in commercial, retail, residential, civic and recreational land uses,
- Integrate the potential streetcar line(s) through linkages to the Metro Blue Line, the large number of bus routes operated by Long Beach Transit throughout the

City and transit services by other providers, and to facilitate transfers to encourage ridership by minimizing travel delays, and to
- Initiate a context-sensitive transportation solution to advance efforts toward a sustainable urban environment.

The need for a streetcar system in Long Beach is driven by a desire for solutions to address the following constraints and issues:

- Limited parking within the downtown area and its immediate environs which dissuades people from traveling to the area, with accompanying economic impacts to local businesses (particularly during evening and weekend periods),
- Environmental considerations, such as reducing the need to travel by automobile, in favor of travel by walking or bicycling,
- A desire for greater connectivity (both real and perceived) between Downtown Long Beach and its surrounding neighborhoods,
- Policies and projects to sustain and support existing commercial and retail businesses within the downtown and surrounding neighborhoods, as well as to encourage a vibrant economic climate that attracts new, quality business investment, and
- Creation of a “signature” project to increase the attractiveness of Long Beach to visitors.

2.2 NEED – STREETCARS RETURN TO LONG BEACH

The concept of bringing back streetcars to Long Beach is focused on the potential benefits and impacts of a new transportation link that would connect downtown Long Beach with one or more of its surrounding neighborhoods and districts, at least in the initial phase. This is in contrast to the Blue Line, whose purpose is more regional, providing linkages between the City, neighboring cities, and Los Angeles.

Like Long Beach, many cities in the United States are considering (or reconsidering) streetcar investments to reinvigorate downtowns and neighborhoods, to link major activity centers, to support sustainable economic activity, and to promote more-compact development patterns. Representative case studies of six cities that have developed streetcars can be found in Appendix A.

HDR is pleased to have played a role in so many of these Cities’ project planning and engineering. Figure 2-1 provides a map showing those US cities that are either considering or have implemented streetcar systems. Unlike light rail services such as the Blue Line, streetcars are more-easily implementable, as they do not require an exclusive lane, and co-operate in a mixed-flow lane with other traffic (auto, truck and bus). They act differently from conventional transit, as they are frequently used as “pedestrian accelerators”, carrying people just a few blocks further or faster than they might otherwise walk. They feature simple curb stops, and provide for patterns of use that have are supportive of a pedestrian and bicyclist-based environment.

Figure 2-1. US cities that are either considering or have implemented streetcar systems.

3.0 RELATED STUDIES AND PLANNING EFFORTS

A Potential Streetcar is supportive of Other Long Beach Studies and Planning Efforts.

Many of the issues and objectives noted that could be addressed through a streetcar system have been identified as a result of past studies and current planning efforts within the City, including the "Strategic Action Plan for Downtown Long Beach" (2000), "Strategy for Development – Greater Downtown Long Beach" (2000), and the Long Beach 2030 General Plan update (2008, on-going). In order to show how well a streetcar option fits with these planning documents, appropriate highlights from each document are provided here:

3.1 STRATEGIC ACTION PLAN FOR DOWNTOWN LONG BEACH (2000)

In its "Vision for Downtown Long Beach", the Strategic Action Plan articulates the following characteristics as being desirable for the City's future:

- "A dynamic, vibrant multi-use activity center with a unique urban experience for residents and visitors",
- Downtown will be "Pedestrian-friendly, with attractive streetscapes that connect (Long Beach's) distinct neighborhoods", and
- "Efficient and effective mass transit also links the various neighborhoods to each other and to regional destinations."

A primary "Priority Action" to support the goals of the Strategic Action Plan is #9, "Develop strong linkages to improve connections and access between neighborhoods in Downtown." This is listed as a Short/Medium goal, requiring between one and five years, with the City identified as the agency having primary responsibility for accomplishing this action.

3.2 STRATEGY FOR DEVELOPMENT – GREATER DOWNTOWN LONG BEACH (2000)

This plan, developed on behalf of the Long Beach Redevelopment Agency, provides a vision for the future development of the City, principally from a land use planning perspective.

In terms of transportation, the Strategy calls for "Pedestrian-Oriented Development." This would include:

- Pedestrian accessibility,
- "Park Once and Ride",
- Parking Management, including new parking areas, and
- Provision of new shuttle buses, buses, and light rail trains.

While many of the recommendations have been accepted and are reflected in today's building stock and land uses, increased accessibility could enhance those efforts through provision of a streetcar.

3.3 STRATEGIC PARKING PLAN SUMMARY (UNDATED)

This plan, developed by the Long Beach Redevelopment Agency, articulates how managing parking resources in the downtown area can have a dramatic impact on a variety of fronts: economic and social. One element is in the area of Economic Development, Action Item 8.5 (Reinvestment of Parking Revenues) states:

> *"Dedicating a portion of parking revenues to be invested back into the districts in which they are generated can help change the way people think about paying for parking. If parking revenues are used for projects that make the downtown more attractive and enjoyable, the increased visitation generates additional parking revenues for reinvestment as well as additional sales tax revenues where applicable."*

Other cities have used increased parking charges as a funding source to support streetcar investment, both on the capital and operating sides. The possibility of increased sales tax revenues, combined with the idea that passengers traveling by streetcar would free up parking for visitors from further outside the downtown area, could be an attractive, cost-effective means by which investment in a streetcar service would ultimately provide a return to the community larger than the amount invested.

3.4 LONG BEACH 2030 (GENERAL PLAN UPDATE) – EMERGING THEMES (2008)

The City of Long Beach is in the process of updating their General Plan, and this Emerging Themes document is a compilation of comments and trends developing through a series of public meetings and surveys.

Key themes and ideas from these meetings that are in keeping with the potential introduction of a streetcar service include:

- "A City at the Water's Edge"
  - Protecting and improving connections, both physical and visual, to the bay and beaches.
  - Creating more usable public spaces in waterfront areas and beaches.
- "A Clean Environment Everywhere"
  - Implementing "green" technologies in new and existing buildings and development, drainage systems, and infrastructure systems.
  - Creating and prioritizing primary walking streets and transit corridors, improving the landscape and making streets more walkable.
- "Healthy and Active Neighborhoods"
  - Designing neighborhoods that are friendly and inviting for pedestrians, and streets that safely accommodate bicyclists.
- "Expanded Transportation Choices"
  - Creating environments where people can enjoy walking to transit, shopping, school, and work, as well as open spaces such as parks, beaches, the bay, and natural areas.
  - Encouraging new housing and employment centers near transit.
  - Accommodating vehicle use with an efficient city street system without compromising opportunities for safe transit use, walking, and bicycling.

- "Community Connections and Culture"
  - Reinforcing physical connections between neighborhoods and activity centers to make sure that all places are accessible to all people.
- "Safe and Secure Environment"
  - Ensuring that public facilities in all neighborhoods are regularly maintained and have sufficient capacity to meet local needs.
  - Creating positive activities in street corridors, parks and other places to thwart crime.

As seen from the relevant points and ideas taken from previous and on-going studies, there are a wide variety of benefits and solutions that a potential streetcar system connecting Downtown Long Beach and its surrounding neighborhoods could provide, and these have been condensed to form the Purpose and Need for such a system.

4.0 DISCUSSION OF FEASIBILITY

Although the analysis in this Limited Feasibility Study is not detailed enough to make a Feasibility Determination (as defined under Federal Transit Administration (FTA) standards), it is helpful in providing the City of Long Beach and its leaders with an indicator and sufficient decision-making information to determine whether to advance or to discontinue further consideration of a Streetcar investment.

Feasibility in the dictionary means "the degree to which something can be achieved or put in effect". Synonyms with similar meanings are viability, possibility, probability, likelihood, practicality and achievability. These meanings are subjective; in other words, there is no quantitative measure that makes a project either feasible or infeasible.

For a Long Beach Streetcar project, a feasibility determination would conclude that it is:

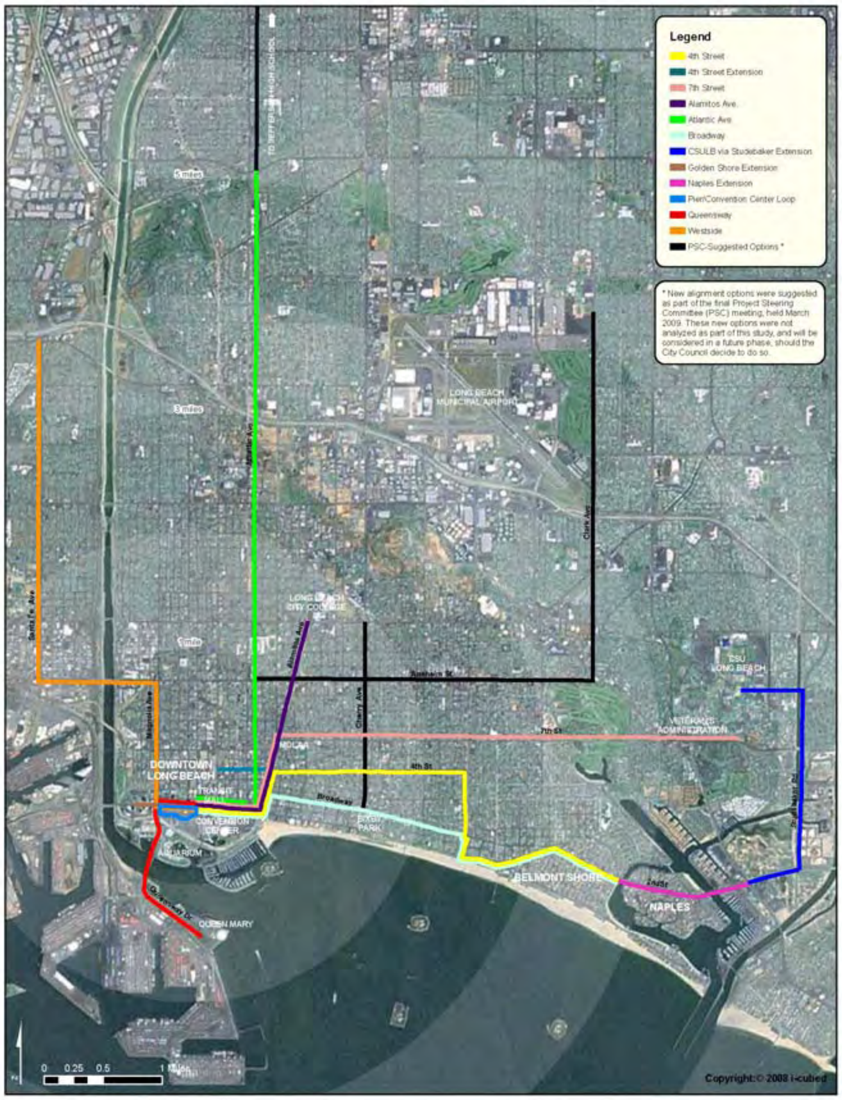
- Reasonably priced, within the context of City public investments, and offers good value to the community,
- Can be afforded within a defined financing scheme that secures the necessary city approvals,
- Does not harm other investments being pursued by the City for transportation or other types of publicly funded projects,
- Able to gain the support of the residents and businesses of the area(s) in which the streetcar system would be located, through a clear identification of its potential benefits and impacts,
- Potentially able to redirect existing transportation resources to other areas, expanding the City's transit network to serve new neighborhoods,
- Physically able to be placed in the City without impossible or too-costly obstacles,
- Able to meet a reasonable Purpose and Need acceptable to the City,
- Located on an alignment that is consistent with the Purpose and Need statement, resulting in positive impacts to the City's transportation network,
- Supports a cleaner, greener Long Beach by encouraging modal shifts including walking and bicycling, with corresponding benefits including individual VMT reduction, reductions in greenhouse gas levels, etc., and
- Able to enhance the City's attractive quality of life for its residents, employers, and visitors

5.0 POTENTIAL STREETCAR CORRIDORS IDENTIFIED

5.1 ALIGNMENT ALTERNATIVES

The following potential alignments were identified after a series of field reviews and discussions with the Project Study Committee. Consensus was that the alignments needed to be anchored downtown to serve: the Long Beach Convention and Entertainment Center, the Pike dining, shopping and entertainment district, the Aquarium of the Pacific, Pine Avenue, the Long Beach Cruise Terminal, the major hotels (Westin, Hyatt Regency, Renaissance, etc.), the high-rise office buildings, and City Hall. This would also provide a good connection to the Long Beach Transit Mall, the LA Metro Blue Line to downtown Los Angeles, and the Long Beach Commuter Bike Station. To allow for a comparative analysis of all the alignment alternatives, and to ease the connection from the attractions near the harbor to the higher elevations of Ocean Boulevard while staying off the route of the Long Beach Grand Prix, it was assumed that all seven major alignment options would originate from Pine Avenue and Seaside Way. Figure 5-1 shows all the alignment alternatives analyzed within this study, as well as additional routes/route extensions suggested by the Project Steering Committee at its final

Figure 5-1. Alignment Alternatives



meeting on March 9, 2009. These added routes and segments included:

- An extension of the Atlantic corridor further north to connect with Jefferson High,
- A new route that would run between downtown and Long Beach International Airport, via Anaheim Street and either Cherry Avenue or Clark Avenue, and
- A new route that would run between downtown and California State University, Long Beach via Anaheim Street.

No technical analysis was conducted on the three PSC-suggested additional alignments. Further assessment of each of these would be included in future project phases, should the City Council decide to do so.

There are a variety of downtown routing options, and no decisions have been made at this point as to a streetcar's alignment within the down town area. Beginning all alignment alternatives at Pine Avenue and Seaview Way provides a means by which to directly compare each alternative. Therefore, routing options shown in each of the following descriptions of potential alignments should not be viewed as final. They will be subject to review and potential revision in a future project phase.

Please note in all alignment options, a stub-end terminal might be incorporated at the end of a particular route. This terminal could be located either in a center median or on either side of the street, and would allow the operator to switch from one end of the streetcar to the other, depending on the direction of travel.

5.1.1 Alignment Alternative 1 – Atlantic Avenue

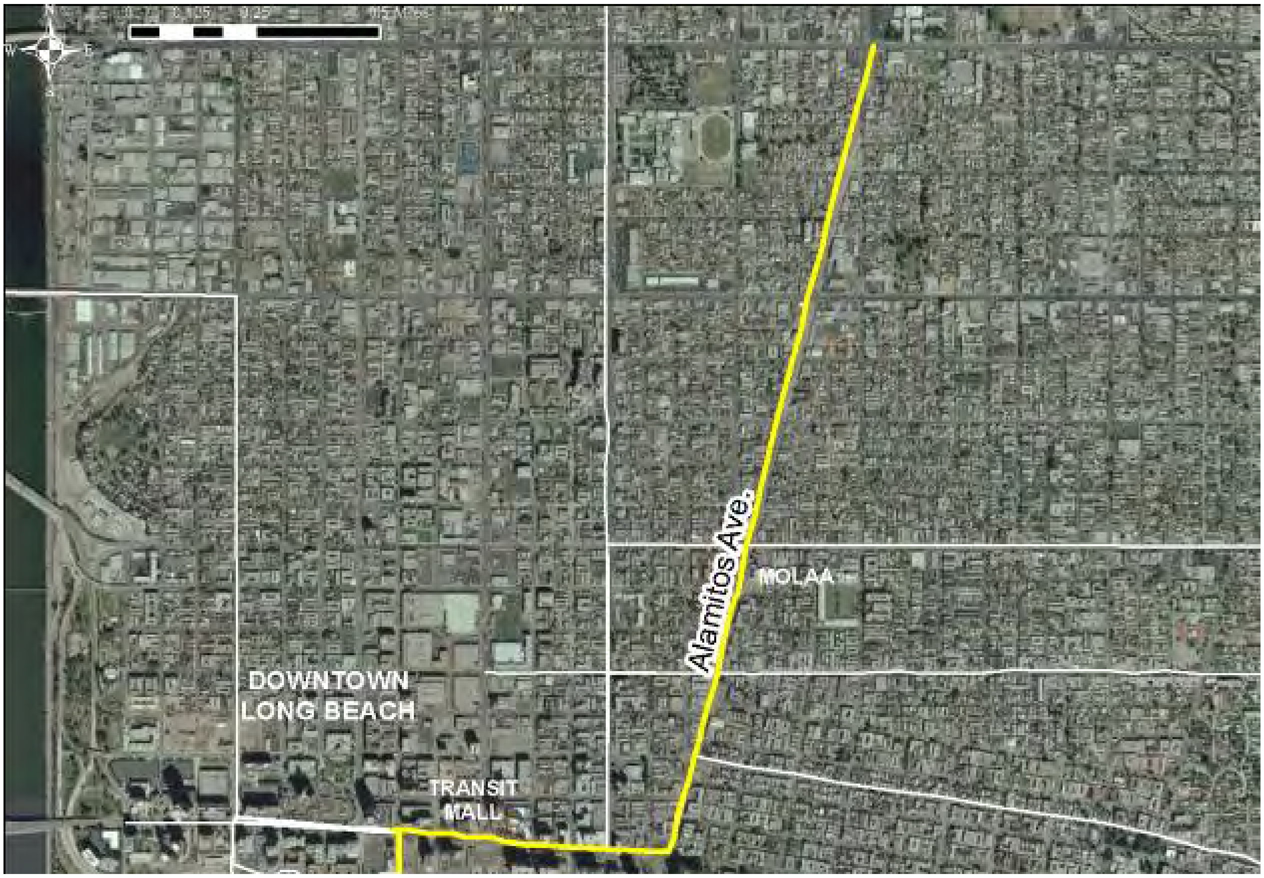
This route would begin on Pine Avenue at Seaside Way, proceed north, turn east on Ocean Boulevard, and turn north on Atlantic Avenue to Del Amo Boulevard, a distance of 5.97 miles. The route passes through the East Village Arts District, two major medical centers (St. Mary and Long Beach Memorial), primary and secondary schools, and some redevelopment before crossing over Interstate 405 and entering the Bixby Knolls shopping district. The majority of the alignment is on 4-lane streets with speeds and traffic volumes appropriate for a streetcar. The route runs parallel and four blocks to the east of the Blue Line. As a streetcar, it would have more frequently spaced stations, and would serve different trips.

Figure 5-2. Alignment Alternative 1 – Atlantic Avenue

5.1.2 Alignment Alternative 2 – Alamitos Avenue

This route would begin on Pine Avenue at Seaside Way, proceed north, turn east on Ocean Boulevard, and turn northeast on Alamitos Avenue to Pacific Coast Highway, a distance of 2.32 miles. The route passes through the East Village Arts District, past the Museum of Latin American Art (MOLAA), and terminates at Long Beach City College. Redevelopment is not evident on the corridor. The majority of the alignment is on 4-lane streets with speeds and traffic volumes appropriate for a streetcar.

Figure 5-3. Alignment Alternative 2 – Alamitos Avenue



5.1.3 Alignment Alternative 3 – 7th Street

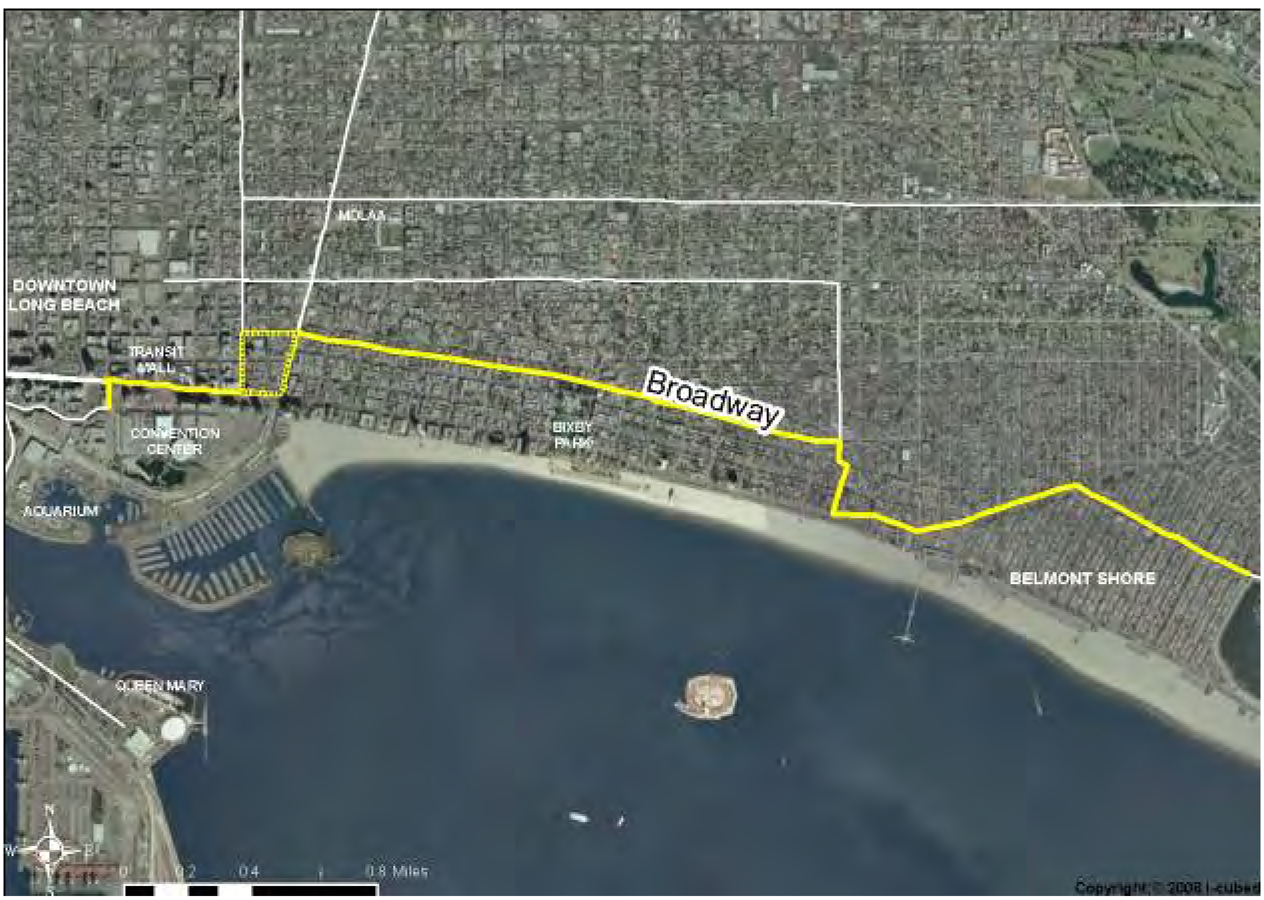
This route would begin on Pine Avenue at Seaside Way, proceed north, turn east on Ocean Boulevard, turn north on Atlantic Avenue, and turn east on 7th Street to East Campus Drive, a distance of 5.20 miles. An alternative would be to replace Alamitos Avenue with Atlantic Avenue. The route passes through the East Village Arts District, past the Museum of Latin American Art, primary and secondary schools, the Veterans Administration Medical Center and terminates at the California State University at Long Beach. The corridor is primarily auto-oriented commercial without much evidence of redevelopment. The average daily traffic of 7th Street increases from 30,000 to 90,000 cars per day as the street widens from 4-lanes to 6-lanes and the speeds increase as 7th Street becomes State Route 22 and a direct connection to Interstate 405.

Figure 5-4. Alignment Alternative 3 – 7th Street

5.1.4 Alignment Alternative 4 – Belmont Shore via Broadway

This route would begin on Pine Avenue at Seaside Way, proceed north, turn east on Ocean Boulevard, turn northeast on Alamitos Avenue, turn east on Broadway, turn south on Redondo Avenue, turn southeast on Ocean Boulevard, turn northeast on Livingston Drive, and turn southeast on 2nd Street through Belmont Shore to Bay Shore Avenue, a distance of 4.26 miles. An alternative would be to replace Alamitos Avenue with Atlantic Avenue. The route passes through the East Village Arts District, traverses the Broadway corridor, a consistent mix of pedestrian-friendly neighborhood shops, restaurants, bars, and apartment buildings with potential for new investment, and terminates in the Belmont Shore commercial district with 250 shops, businesses, and restaurants and challenging parking in a 15-block-long area. The majority of the alignment is on 4-lane streets with speeds and traffic volumes appropriate for a streetcar. Broadway is a four-lane street, with two traffic lanes in each direction. The majority of the route runs parallel and a quarter-mile north of Ocean Boulevard. A quarter-mile is the distance that most people are willing to walk to transit, so this route would benefit the highly developed Long Beach waterfront.

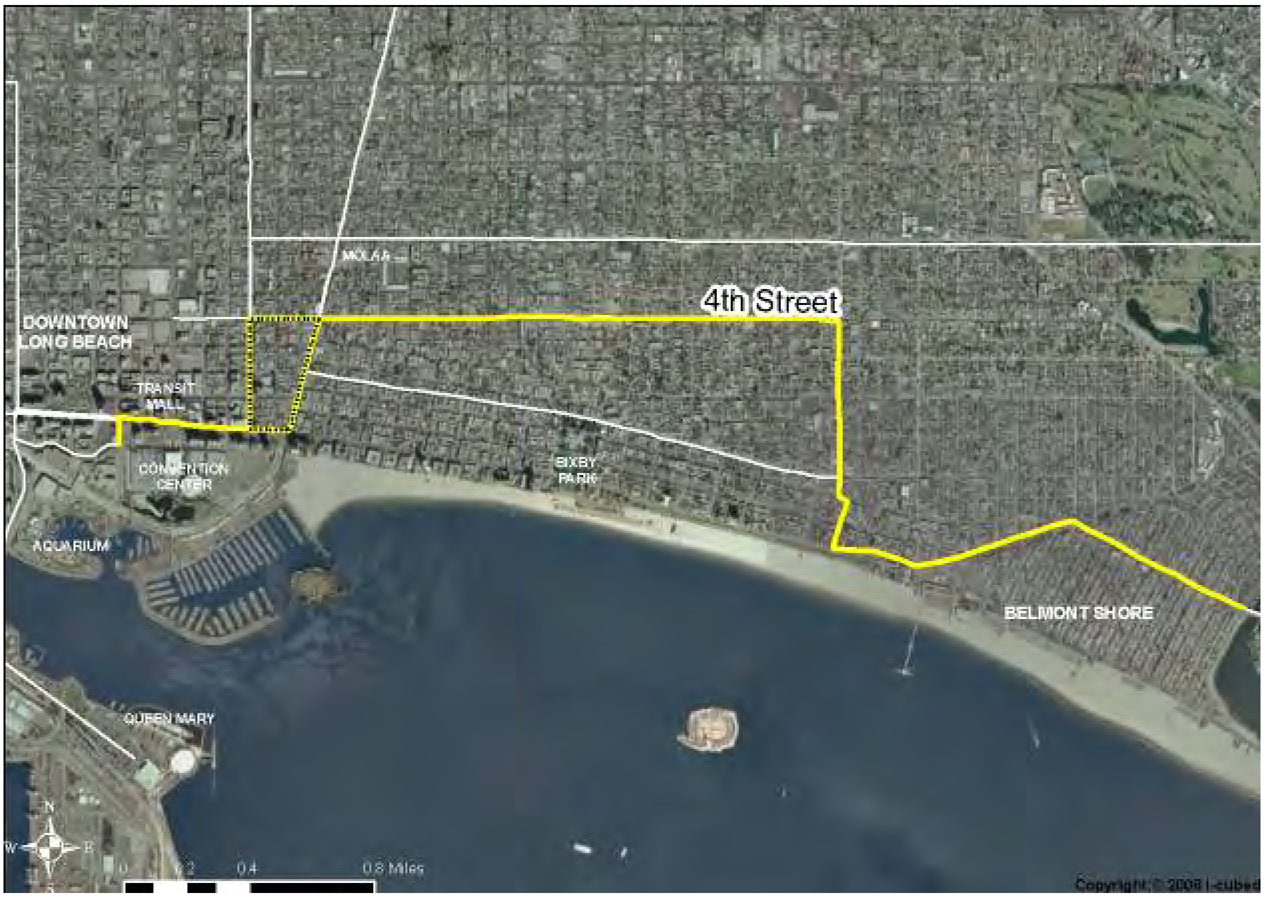
Figure 5-5. Alignment Alternative 4 – Belmont Shore via Broadway



5.1.5 Alignment Alternative 5 – Belmont Shore via 4th Street

This route would begin on Pine Avenue at Seaside Way, proceed north, turn east on Ocean Boulevard, turn northeast on Alamitos Avenue, turn east on 4th Street, turn south on Redondo Avenue, turn southeast on Ocean Boulevard, turn northeast on Livingston Drive, and turn southeast on 2nd Street through Belmont Shore to Bay Shore Avenue, a distance of 4.84 miles. An alternative would be to replace Alamitos Avenue with Atlantic Avenue. The route passes through the East Village Arts District, traverses the 4th Street corridor, a bit quieter but perhaps better-kept mix of pedestrian-friendly neighborhood shops, restaurants, bars, and apartment buildings than Broadway, and terminates in the Belmont Shore commercial district. 4th Street is a 2-lane street (a single travel lane in each direction) with speeds and traffic volumes appropriate for a streetcar. A route on a 2-lane street has the disadvantage of temporarily blocking traffic at each streetcar stop.

Figure 5-6. Alignment Alternative 5 – Belmont Shore via 4th Street



5.1.6 Alignment Alternative 6 – Queen Mary

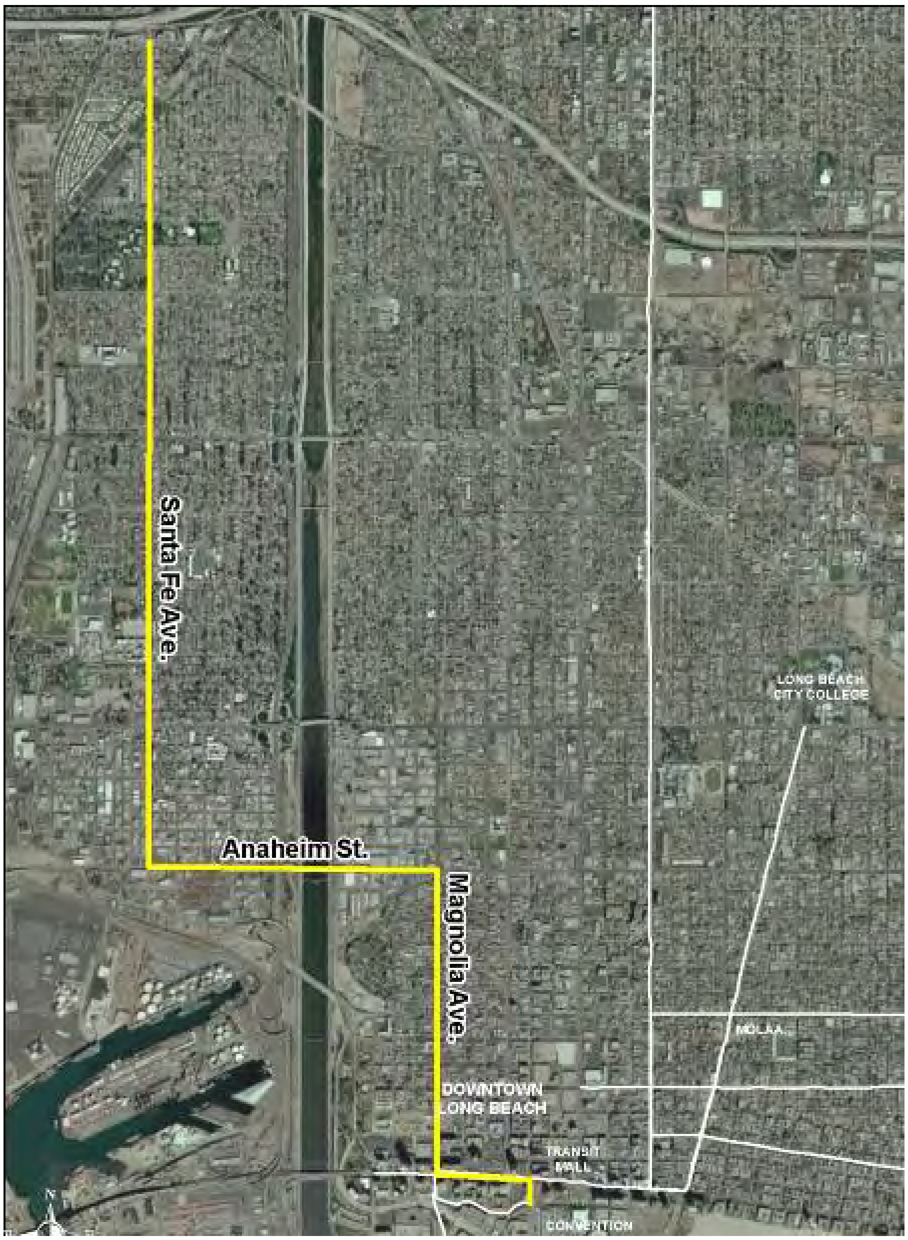
This route would begin on Pine Avenue at Seaside Way, proceed north, turn west on Ocean Boulevard, turn south on Queens Way Drive, to the Queen Mary and the development site surrounding it, a distance of 1.47 miles. Until reaching the development site, there are no land uses along Queens Way Drive that can be served by the streetcar. The streetcar would run on a series of bridges and "expressway-style" ramps which may not be compatible with streetcar operations.

Figure 5-7. Alignment Alternative 6 – Queen Mary

5.1.7 Alignment Alternative 7 – Westside

This route would begin on Pine Avenue at Seaside Way, proceed north, turn west on Ocean Boulevard, turn north on Magnolia Avenue, turn west on Anaheim Street over the Los Angeles River and Interstate 710, and turn north on Santa Fe Avenue to Wardlow Road, a distance of 5.10 miles. An alternative to Anaheim Street would be Pacific Coast Highway. The corridor is primarily auto-oriented commercial without much evidence of redevelopment. Traffic volumes and high truck volumes on Anaheim Street and Pacific Coast Highway would be problematic.

Figure 5-8. Alignment Alternative 7 – Westside



5.2 ADD-ONS OR VARIATIONS

The following add-ons or variations were also identified for consideration.

5.2.1 Add-On 1 – Pike Loop

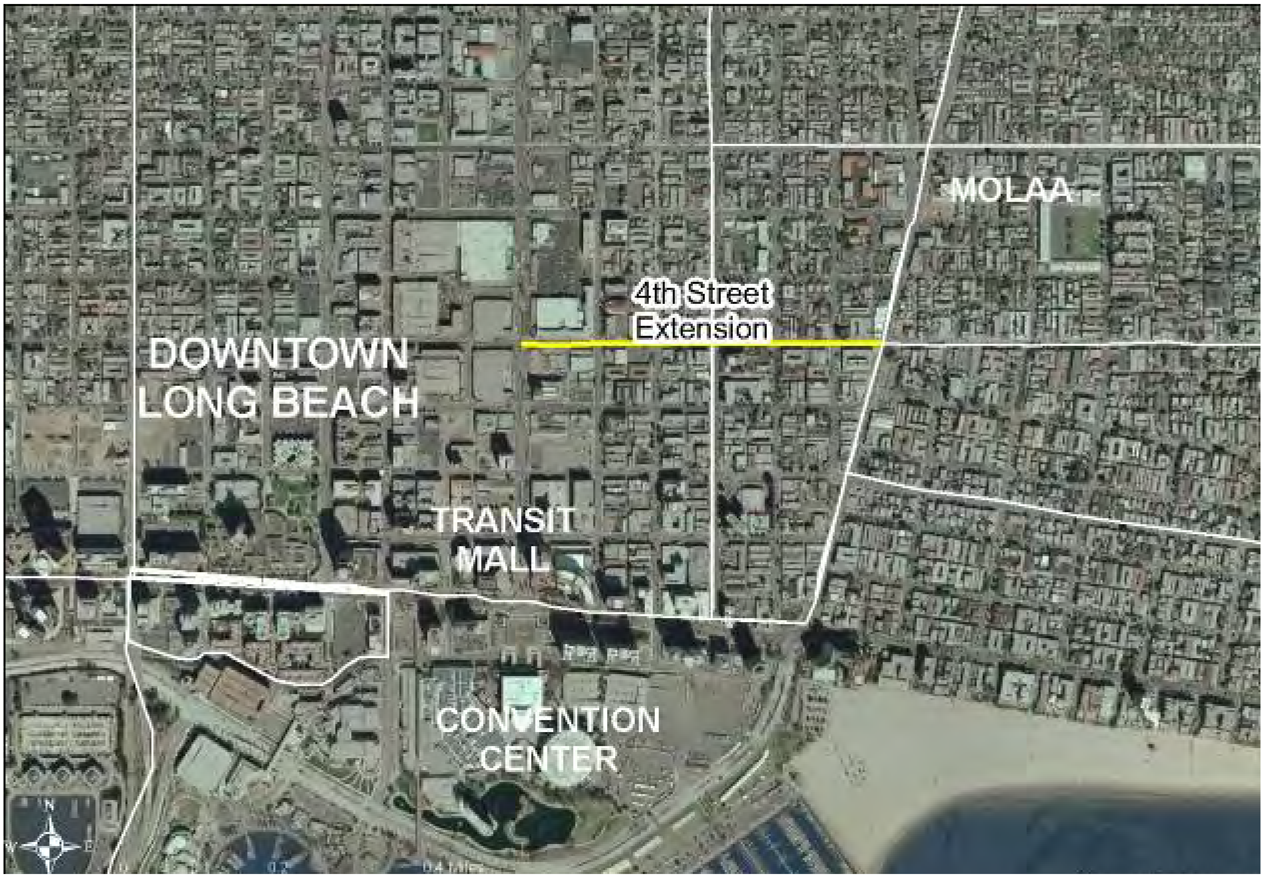
A 0.60-mile long loop could be added to any of the 7 major alignment options beginning on Pine Avenue at Seaside Way, proceeding west on Seaside Way, turning north on Chestnut Place, and turning east on Ocean Boulevard. This loop would serve more office, residential, and hotel development in the Waterfront district, and bring the alignment closer to a potential maintenance facility site on City-owned property on Seaside Way at Queens Way.

Figure 5-9. Add-On 1 – Pike Loop

5.2.2 Add-On 2 – City Place Termination

0.66-miles could be saved from the first 5 alignment options by beginning at 4th Street at Long Beach Boulevard rather than Pine Avenue at Seaside Way. This would provide direct service to the City Place mixed-use development, but would not serve the Long Beach Convention and Entertainment Center, the Pike, the Aquarium of the Pacific, Pine Avenue, the Long Beach Cruise Terminal, the major hotels, City Hall, the Long Beach Transit Mall, and the Long Beach Commuter Bike Station.

Figure 5-10. Add-On 2 – City Place Termination



5.2.3 Add-On 3 – Golden Shore

0.44-miles could be added to the first five alignment options by beginning at Ocean Boulevard at Golden Shore rather than Pine Avenue at Seaside Way. This variation would serve more high-rise office buildings and the Hilton Hotel, but it would not drop down to directly serve the Waterfront District.

Figure 5-11. Add-On 3 – Golden Shore

5.2.4 Add-On 4 – 2nd Street to Pacific Coast Highway

1.13 miles could be added to the 7th Street option to extend the route on 2nd Street to Pacific Coast Highway to serve Naples and the Marina Pacifica Mall on Pacific Coast Highway. The route would require crossing two bridges spanning Alamitos Bay and would require further study.

Figure 5-12. Add-On 4 – 2nd Street to Pacific Coast Highway

5.2.5 Add-On 5 – CSULB via Westminster, Studebaker, and Anaheim

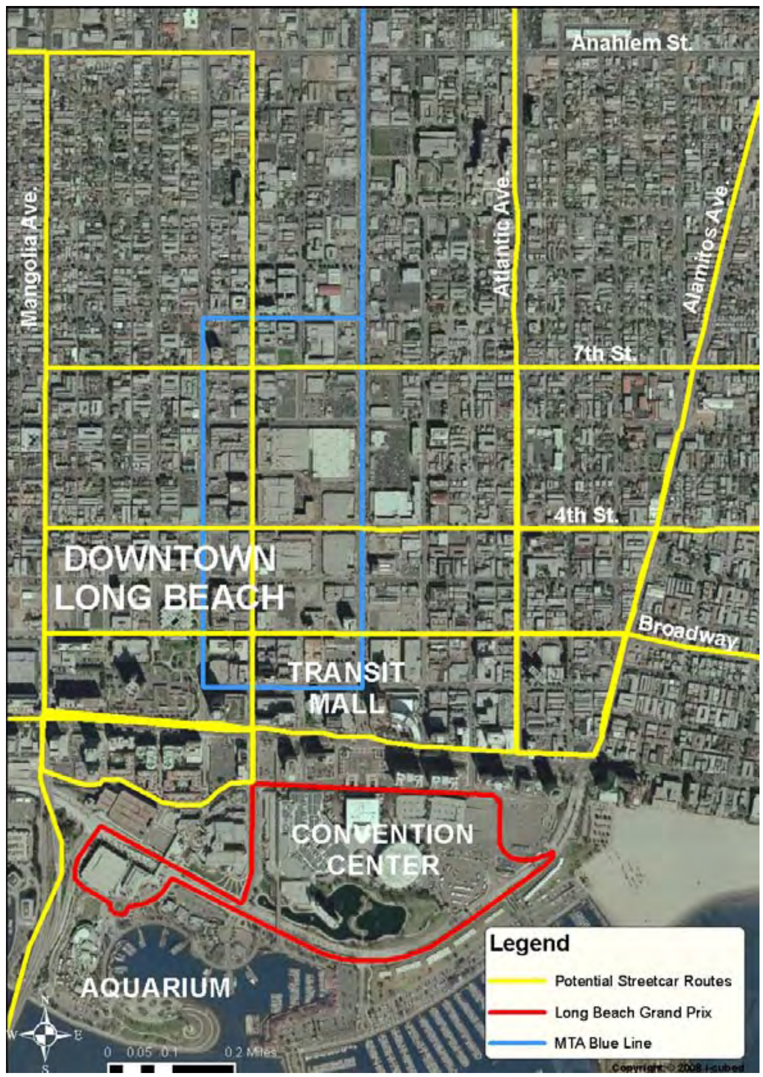
2.50 miles could be added to the addition above by continuing east on 2nd Street/Westminster Avenue, turning north on Studebaker Road, and turning west on Anaheim Road to East Campus Road to serve California State University at Long Beach. From Shopkeeper Road until reaching the Anaheim Road, there are no land uses along this route extension that could be served by the streetcar. This results in a 7.89-mile total streetcar route from downtown Long Beach. Traffic speeds and volumes on this route extension may not be compatible with a streetcar and would require further study.

Figure 5-13. Add-On 5 – CSULB via Westminster, Studebaker, and Anaheim

5.2.6 There Are Many Potential Routes within Downtown Long Beach

The preceding alignment alternatives, add-ons and variations are by no means the only possible streetcar routes. There are many streets within Long Beach that would lend themselves to a successful streetcar operation, and in the future phases of the work, the City of Long Beach may wish to explore and evaluate several other routing options. Most downtown streets would be compatible with streetcar, and there are many exchangeable route options to consider. The preceding alignment options did not make use of Pine Avenue north of 1st Street, due to concerns that the streetcar might interfere with frequent light rail trains on the Blue Line and might require expensive modifications to the Blue Line signaling system. Pine Avenue's activity level and pedestrian focus would certainly make it an attractive streetcar route, but being a two-lane street, it may be difficult to add a streetcar without impeding traffic and delivery trucks. If the City of Long Beach wants to consider a route on Pine Avenue within the Blue Line loop, the next phase of work should include coordination with LA Metro on the two at-grade crossings that would be required with the Blue Line.

Figure 5-14. Potential Routes within Downtown Long Beach



5.3 CAPITAL COSTS

The capital costs for each of the potential streetcar corridors described above can be found in Section 8.

5.4 COMPARISON OF THE ALIGNMENT OPTIONS

Applying the evaluation criteria to the alignment options is a highly subjective process. The attached spreadsheet is an attempt to explain the ways that the options meet the criteria and explain the differences. A copy of the evaluation matrix used at the January 21 Project Study Committee meeting is also attached.

The most important points in summary are:

- Going over existing bridges is challenging, could add significant costs, and would require further study.
- The length of the alignment drives its cost and it may be prudent to define an initial investment in the 2-4 mile length to test its feasibility for financing.
- Achieving service to the CSULB campus may not be possible at the outset of the program due to the length of the alignment. The two potential alignments that would serve the campus are each challenging the Studebaker alignment because of its length and the long stretches that have no compatible land use at all, and the 7th Street alignment because 7th street is a high capacity, high speed, arterial which serves as an extended freeway on-ramp. Fortunately bus access is excellent and is being done with special express services.

5.5 MAINTENANCE FACILITY

In order to implement a Streetcar project, a site for a small maintenance facility is required. Because Long Beach is very built-out and there is little or no vacant land, the search for a site needs to be opportunistic in that any possible site which can serve the most likely alignment must be considered.

In a second phase of the feasibility analysis, a detailed investigation of potential sites needs to be undertaken with a specific defined requirement of land for a small building and storage yard. We believe, at this point that a site of about 2-3 acres is necessary.

The City owns property on Seaside Way under Queensway adjacent to the Pike and this site may be an ideal location. If City Council decides to continue with a full feasibility study, it is recommended that this site be reserved as a potential streetcar maintenance facility site, while other alternatives are considered in a next phase of the project.

6.0 EVALUATION CRITERIA

Because this was a limited feasibility study, it did not address neighborhood impacts and priorities; however those impacts and priorities would be one of the primary considerations in the next phase of this study if the city determines to move forward with a further investment. If the City Council approves additional streetcar study, the next phase would go into greater detail in order to reach consensus on the specifics of a viable streetcar project for Long Beach. Public input would be sought in this phase, and to advise the City Council in reaching a consensus on a locally preferred alternative for the Streetcar Project.

Each selected corridor was evaluated against a set of criteria, which included:

- Access to major destinations
- Capital costs
- Ongoing operations and maintenance costs
- Compatibility with existing and planned land uses, as well as consideration of redevelopment plans;
- Potential financing options (some alignments will better be able to access potential funding sources than others)
- Relative ease of construction (the nature of some alignments may result in greater construction impacts)
- Traffic impacts (set streetcar alignment to minimize impacts in critical locations);
- Transportation and mobility benefits;
- Streetcar operation impacts on pedestrians and bicyclists
- The ability to address goals and objectives of current and past planning studies.

The following paragraphs describe in more detail each evaluation criterion and how it would be applied to the corridor analysis.

6.1 ACCESS TO MAJOR DESTINATIONS

How many major Long Beach destinations/activity centers does this alignment serve (within walking distance)? Potential major destinations could include:

- Civic Center
- Convention Center
- The Pike/Aquarium area
- The Queen Mary/Queensway Bay area
- East Village Arts District
- Museum of Latin American Art (MOLAA)
- 4th Street Retro Row
- Pine Avenue Entertainment District
- CityPlace
- California State University, Long Beach (CSULB)
- Long Beach City College
- Belmont Shore shopping district
- Bixby Knolls shopping district

Using this criterion, alignments were rated “Low” if they served between 0-2 destinations, “Medium” if they serve more than 3 but less than 5, and “High” if they served 5 or more activity centers.

6.2 POTENTIAL RIDERSHIP

This was an initial, qualitative assessment, based upon transit usage, activity centers, commercial and retail uses, as well as residential uses along and near the corridor. Potential ridership was characterized as either “Low”, “Medium” or High.

6.3 CAPITAL COSTS

This quantitative criterion compared each alignment’s estimated capital costs based on the corridor’s length, the possible number of streetcar vehicles required to provide adequate service schedules, maintenance and layover facilities,, and any “special “ costs caused by physical conditions (such as required structural modifications.)

6.4 COMPATIBILITY WITH REDEVELOPMENT PLANS

This qualitative criterion indicated whether an alignment lies within any existing or planned redevelopment agency areas, and supports redevelopment objectives, sites or any other criteria suggested by the Long Beach Redevelopment Agency.

6.5 COMPATIBILITY WITH EXISTING AND PLANNED LAND USES

This qualitative criterion indicated if the alignment is consistent with current land uses along the right-of-way, or would provide support for compatible new or planned projects which might change the current land use and/or provide the highest and best use.

6.6 FINANCING OPTIONS

This qualitative criterion noted potential local funding sources (Parking and Business Improvement Districts/Associations) that lie along a corridor, which could provide a local match for capital costs and/or help offset operating costs in order to attract/qualify for local, state or federal funding.

This criterion noted potential opportunities to provide a local funding match (or on-going operational funds) through increased parking meter revenues, expansion of an existing Business Improvement District/Business Improvement Association assessment, or through the development of a Tax Increment Financing scenario.

This criterion showed the presence of a parking meter zone, and to identify the BIDs/BIAs along the corridor.

6.7 EASE OF CONSTRUCTION

Comparing the alignment alternatives on the basis of their constructability and any special right-of-way or cost challenges posed by a particular alignment.

A rating of “High” indicated that there were few impediments to constructing a streetcar line on a corridor; “Medium” indicated that there were some impediments that might result in higher construction costs, delays or complications; “Low” indicated that there would be significant constructability issues – these could include a need for structures, or changes to existing structures (bridges, particularly) that would result from the introduction of a streetcar.

6.8 TRAFFIC IMPACTS

Evaluation of the alignment’s impact on current traffic operations including the impact on parking on street, queuing at traffic lights, impacts on existing bus or light rail (Blue Line) services, increased/reduced traffic delays and congestion, or access problems to adjacent property caused by the alignment.

A rating of “Low” means those impacts from the introduction of a streetcar line would be minimal; “Medium” means that impacts from a streetcar would be moderate; “High” means that traffic impacts on a corridor from a streetcar would be significant.

Average Daily Traffic Volumes will also be a consideration. On streets where the daily volumes are comparatively low, streetcar operations might have a low impact. On streets with higher volumes, a streetcar stopping in a traffic lane could have more significant impacts (higher than a bus, which would pull to the curb, for example.)

6.9 TRANSPORTATION AND MOBILITY BENEFITS

A generalized assessment of the potential for increased public transit ridership, travel time savings, diversion from automobile trips and VMT reduction, increased access to activity centers, and reduced parking demand.

Most of the corridors already feature bus service, primarily by Long Beach Transit (thought LA Metro, Orange County Transportation Authority (OCTA), and other transit agencies also have routes that serve Long Beach.) This criterion noted existing bus routes.

6.10 STREETCAR OPERATIONS IMPACTS ON PEDESTRIANS AND BICYCLISTS

Evaluation of the impact of the alignment on existing identified formal and informal bike routes, and pedestrian pathways, including the impact of enhancing the bike and/or pedestrian experience by being an accelerator.

6.11 ECONOMIC DEVELOPMENT IMPACTS

The project team considered development or redevelopment potential along corridor or adjacent parcels that are vacant, poorly used, or identified by the redevelopment agency as sites of interest. Additionally, this criterion addresses the potential to sustain existing businesses through provision of increased access via streetcar, without a corresponding need for new parking.

6.12 MEETING THE GOALS AND OBJECTIVES OF CURRENT AND PAST PLANNING STUDIES

The project team compared the alignment's consistency with City of Long Beach plans and planning studies and official goals and objectives as evidenced by adopted or approved planning for the City of Long Beach.

7.0 RESULTS OF CORRIDOR EVALUATIONS

The following table provides an overview of how each potential streetcar corridor met (or did not meet) the evaluation criteria established by the Project Steering Committee. Below is a discussion of each alternative.

7.1 ATLANTIC AVENUE CORRIDOR

This north-south corridor is one of the most productive Long Beach transit bus corridors in the City. It connects two medical centers, a large high school and ends on the Northern end in a lively shopping district of Bixby Knolls. In order to get to the North end, the line must traverse nearly six miles, and much of the route parallels the MTA Blue Line.

7.2 ALAMITOS CORRIDOR

This north-south corridor is anchored at its north end by the campus of Long Beach City College. It is short, about 2.3 miles and relatively inexpensive. The corridor serves the East Village Arts District and the Museum of Latin American Art (MOLAA) well.

7.3 SEVENTH STREET CORRIDOR

This east-west corridor is anchored by the 35,000 student CSU Long Beach campus on the eastern end and a Veterans Administration Medical Center just before the campus. Linking to the campus may help encourage the development of a large satellite campus in downtown Long Beach. To get to the CSU campus requires 5.2 miles. And its eastern end is a fast, high capacity automobile corridor serving as a direct access ramp to the regional freeway system. The high traffic volumes and speeds may prove challenging for a streetcar operation. Currently Long Beach Transit and the University are using a special student pass to link to the campus with relatively fast express bus service.

7.4 BROADWAY CORRIDOR

This east-west corridor is anchored on the eastern end by the large and active Belmont Shore shopping, dining and commercial district. This area is one of Long Beach's primary retail areas attracting a large number of national and regional stores, and a constant throng of customers. Parking in the area can be a challenge. The Broadway Corridor had been a streetcar route and shows some continued signs of that with fairly active pedestrian and retail opportunities. This corridor may be appropriate for small scale in-fill redevelopment projects that could transform it into a showcase for urban life. This corridor is also well positioned to serve the high level of development that has occurred along the Long Beach waterfront. The corridor is 4.26 miles. If a bike route is added to Broadway, the streetcar would have to be designed to minimize conflicts.

7.5 4TH STREET CORRIDOR

This east-west corridor is also anchored on the eastern end by Belmont Shore. The Fourth Street Corridor is nearly 0.6 miles longer than the Broadway Corridor. It only has two (2) lanes, versus four (4) on Broadway, so traffic would backup behind the streetcar at every stop. 4th Street is more residential than Broadway, and does not appear to have as many properties that could be redeveloped. This corridor's link to Belmont Shore could be considered a productive alternative to Broadway.

7.6 QUEENSWAY CORRIDOR

This north-south alignment links to the Queen Mary and the development zone surrounding it. It is relatively short; 1.47 miles. It needs to traverse a series of elevated structures which may have to be reconstructed, and, between downtown and the end of the line at the Queen Mary there is no pedestrian activity and little activity of any kind. The streetcar mode may be a poor choice to connect this development site to downtown.

7.7 WESTSIDE CORRIDOR

This north-south corridor is designed to link with the Westside of Long Beach across the 710 freeway and the Los Angeles River. The planned major reconstruction of some of these facilities makes accommodating a streetcar line possible. Further consideration of this corridor will take into account the high volumes of truck traffic to the Port of Long Beach and the Port of Los Angeles.

7.8 NAPLES EXTENSION

This would extend from Belmont Shore across one bridge into Naples, and another bridge to serve the Marina Pacifica Mall on Pacific Coast Highway. Although the extension is just 1.13 miles, because it goes over structures it may be challenging. It may make sense for consideration as an extension of an initial investment.

7.9 STUDEBAKER TO CSULB EXTENSION

This would extend an alignment from Pacific Coast Highway to the CSULB campus through the "back way". This alternative link to the campus has poor characteristics for a streetcar. There is no activity along most of this 2.5 mile long extension between the Pacific Coast Highway and the Campus, and traffic speeds and volumes are not compatible with a streetcar. The 7.89 mile total route length from downtown combined with the slow speed of a streetcar operation would serve the campus poorly.

7.10 PIKE/CONVENTION CENTER LOOP

This 0.6 mile "add-on" from downtown would bring people closer to some of the destinations within the Pike retail and entertainment complex and the waterfront. It also brings the alignment closer to a city-owned parcel on Seaside Way under Queens Way that could be used as a maintenance facility site.

7.11 GOLDEN SHORES-OCEAN BOULEVARD EXTENSION

This 0.44 mile add-on would extend the western section of the alignment further along Ocean Boulevard accessing the high-rise residential and office buildings in this area and enhancing the utility of the streetcar line in connecting people to the places they want to go.

Table 7-1 EVALUATION MATRIX											
Evaluation Criterion	**Atlantic Avenue Corridor**	**Alamitos Avenue Corridor**	**7th Street Corridor**	**Broadway Corridor**	**4th Street Corridor**	**Queensway Corridor**	**Westside Corridor**	**Naples Extension**	**Studebaker to CSULB Extension**	**Pike/Convention Center Loop Add-On**	**Golden Shore and Ocean Blvd Add-On**
Corridor Route	Atlantic Ave from Pine Ave and Ocean Blvd to Del Amo Blvd	Alamitos Ave from Pine Ave and Ocean Blvd to Pacific Coast	7th St from Pine Ave and Ocean Blvd to Alamitos Ave to 7th St to East Campus Dr	Belmont Shores via Broadway from Pine Ave and Ocean Blvd to Alamitos Ave to Broadway to Redondo to Ocean to Livingston to 2nd St and Bay Shore Ave	Belmont Shores via 4th St from Pine Ave and Ocean Blvd to Alamitos Ave to 4th St to Redondo to Ocean to Livingston to 2nd St and Bayshore Ave	Queen Mary from Pine Ave and Ocean Blvd to Queensway Dr	Westside from Pine Ave and Ocean Blvd to Magnolia Ave to Anaheim St to Santa Fe Ave to Wardlow Rd	Continuation from Belmont Shores from 2nd St to Pacific Coast Hwy	CSULB from 2nd Street and Pacific Coast Hwy via Westminster, Studebaker and Anaheim	Pike Loop from Pine Ave via West Seaside Way, Chestnut Place and Ocean Blvd	Continues downtown portion of any corridor from current termination at Pine Ave and Ocean Blvd to Golden Shore and Ocean Blvd
Access to Major Destinations	Medium	High	Low	High	High	Low	Low	Low	Low	High	High
Potential Ridership	Medium	Low	Medium	High	High	Low	Low	Medium	Low	Medium	High
Capital Costs	5.97 miles - $153M	2.32 miles - $66M	5.2 miles - $132M	4.26 miles - $111M	4.84 miles - $120M (City Place termination would reduce corridor by .66 miles and reduce cost by $14M)	1.47 miles - $69M	5.10 miles - $140M	1.13 miles - $35M	2.5 miles - $66M	0.6 miles - $14M	0.44 miles - $10M
Compatibility with Development Plans	Lies within Downtown, Central Redevelopment Areas	Lies within Downtown, Central Redevelopment Areas	Portions lie within Downtown, Central Redevelopment Areas	Portions lie within Downtown, Central Redevelopment Areas	Portions lie within Downtown, Central Redevelopment Areas	Lies within Downtown Redevelopment Area	Lies within Downtown Redevelopment Area; Might lie within West Industrial Redevelopment Area	N/A	N/A	Lies within Downtown Redevelopment Area	Lies within Downtown Redevelopment Area
Compatibility with Existing and Planned Land Uses	Yes	Yes	Yes	Yes	Yes	TBD	TBD	N/A	TBD	Yes	Yes
Financing Options	Medium - Corridor transits Downtown PBIA/PBID, Bixby Knolls PBIA areas	Low	Medium	High - Corridor transits Downtown PBIA/PBID, Belmont Shores PBIA - Parking meter zones 1, 8	High - Corridor transits Downtown PBIA/PBID, 4th Street PBIA, Belmont Shores PBIA - Parking meter zones 1, 4,	Medium	Low	Low	Low	High - Corridor transits Downtown PBIA/PBID areas	High - Corridor transits Downtown PBIA/PBID areas
Ease of Construction	High	High	Medium	High		Low	Low	Low	Low	High	High
Traffic Impacts	High	Medium	High	Low	Low	Low	TBD			Low	Low
Transportation and Mobility Benefits	Low - Served by LBT routes 61, 62, 63 (and 102, 103 for a portion)	Low	Low - Served by LBT routes 91, 92, 93, 94 (and 81 for a portion)	LBT routes 111, 112, A, D, 131	LBT routes 181, 182, A, D, 131	LBT route C	Potentially LBT routes 45, 191, 192, 193			LBT route C	LBT route C
Streetcar Operations Impacts on Pedestrians and Bicyclists	Neutral	Positive	Negative	Positive - Potential bike route on Broadway	Positive	Class 1 bike route for a portion of corridor	Potential bike route on Santa Fe Avenue	Positive	Potential bike route on Studebaker (From 2nd Avenue to State University Drive)	Class 1 bike route for a portion of add-on	Positive
Economic Development Impacts	Medium	Low	Medium	Low/Medium	Low/Medium	Medium	TBD	Low/Medium	Low	Medium/High	Medium/High
Meets City Goals and Objectives	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes

8.0 CAPITAL COSTS

The costs of each of the options described in Section 5 have been estimated using an approximate cost-model derived from the actual costs from recently completed streetcar projects in the United States. Although this educated estimate creates a very practical comparison among the alternatives, it is not based on projects that have been “engineered” at the conceptual, preliminary, or final design level. The engineering process of putting the project on paper typically identifies additional levels of detail and exposes conflicts that must be resolved. These items translate into more construction work to be performed that adds to the cost of the project. At the level of knowledge that we have for the project alternatives that have been identified, we capture the cost components that we do know about and use unit costs that should cover all of the associated items of work, and then apply healthy contingencies (25% in this case) to cover the work items that have not been identified yet.

The most important thing at this stage of the process is to arrive at cost estimates that are reasonable and within the order-of-magnitude so there aren’t misconceptions regarding the funding that will need to be identified to pursue these projects. We verify that we are within the ballpark by checking the cost per mile and be sure that we are falling within the ranges for the projects that have recently been built. The cost model also needs to calculate the cost differences between different alternatives.

There are a few key parameters or inputs to the cost model (see Figure X-XX). The first is the length of the track. Obviously this drives the cost of the track work, but it also directly relates to the amount of roadway modifications (curb, gutter and sidewalk work, and street re-planning and overlays), utility relocations, and traffic control. Other significant cost items are the number of turnouts, crossovers, and diamond crossings, etc. (special track work). The cost of the overhead contract system (the electric wires that supply power to the trains) depends on opportunities to use shared center poles because much of the cost relates to the number of foundations and poles that are needed, so the length of OCS was recalculated to account for this. Traction power substations will be needed approximately every half-mile. Station platforms on a streetcar system are typically spaced every quarter-mile, but some thought was given for each alternative of where it would make sense to locate stops. If there were no land uses adjacent to the route, then no stations were assumed. Assuming a 6.5 mile/hour average speed for a streetcar that assumes station stops and no traffic signal priority, and assuming that trains would run every 15 minutes, it is possible to determine the number of vehicles that would need to be purchased for the project. The size of the maintenance facility would vary depending on the size of the vehicle fleet, so the approximate budget for the maintenance facility reflects the different sizes.

The biggest variable in the cost estimate, and the one we know the least about, is that several of the alignment variations include several crossings over roadway bridges. None of these bridges appears to have sufficient surplus width that would allow the streetcar to operate in an exclusive lane. In order for the streetcar to share a lane with traffic, the rails would have to be recessed approximately 6-inches into the bridge deck, or the drive surface of the bridge deck would have to be raised 6-inches with a second concrete pour. It is not known whether or not either of these solutions would be feasible. We've included large order-of-magnitude budget numbers into the cost estimates to account for these bridge modifications.

In addition to contingency, the cost estimates include costs for administration, mobilization, environmental, preliminary engineering, final design, and construction management, calculated as a percentage of the estimated construction cost.

Figure 8-1 provides a summary of Capital Cost estimates for each corridor. The number of miles (length) rounded estimated cost and cost per mile for each option is included. Figure 8.2 provides additional detail to show how the estimates were developed.

Table 8-1. Capital Cost Estimates (by Alignment Alternative)

		Alternative	Length (miles)	Cost (Millions)	Cost/Mile
Alternatives	1	Atlantic Ave from Pine Ave and Ocean Blvd to Del Amo Blvd	5.97	$ 153	$ 26
	2	Alamitos Ave from Pine Ave and Ocean Blvd to Pacific Coast Highway	2.32	$ 66	$ 28
	3	7th Street from Pine Ave and Ocean Blvd to Alamitos Ave to 7th Street to East Campus Drive	5.20	$ 132	$ 25
	4	Belmont Shore via Broadway from Pine Ave and Ocean Blvd to Alamitos Ave to Broadway to Redondo to Ocean to Livingston to 2nd St and Bay Shore Ave	4.26	$ 111	$ 26
	5	Belmont Shore via 4th St from Pine Ave and Ocean Blvd to Alamitos Ave to 4th St to Redondo to Ocean to Livingston to 2nd St and Bay Shore Ave	4.84	$ 120	$ 25
	6	Queen Mary from Pine Ave and Ocean Blvd to Queensway Dr	1.47	$ 69	$ 47
	7	Westside from Pine Ave and Ocean Blvd to Magnolia Ave to Anaheim St to Santa Fe Ave to Wardlow Rd	5.10	$ 140	$ 27
Add-Ons	1	Pike Loop from Pine Ave via West Seaside Way, Chestnut Place, and Ocean Blvd	0.60	$ 14	$ 23
	2	City Place Termination, 4th St and Long Beach Blvd	-0.66	$ (14)	$ 21
	3	Golden Shore and Ocean Blvd	0.44	$ 10	$ 23
	4	2nd Street and Pacific Coast Highway	1.13	$ 35	$ 31
	5	CSULB via Westminster, Studebaker, and Anaheim	2.50	$ 66	$ 26

Table 8-2 – Detailed Breakdown of Cost by Alignment Alternative

	Base Alternatives							Add-Ons				
	1	2	3	4	5	6	7	1	2	3	4	5
	Atlantic Ave from Pine Ave and Ocean Blvd to Del Amo Blvd	Alamitos Ave from Pine Ave and Ocean Blvd to Pacific Coast Highway	7th Street from Pine Ave and Ocean Blvd to Alamitos Ave to 7th Street to East Campus Drive	Belmont Shores via Broadway from Pine Ave and Ocean Blvd to Alamitos Ave to Broadway to Redondo to Ocean to Livingston to 2nd St and Bay Shore Ave	Belmont Shores via 4th St from Pine Ave and Ocean Blvd to Alamitos Ave to 4th St to Redondo to Ocean to Livingston to 2nd St and Bay Shore Ave	Queen Mary from Pine Ave and Ocean Blvd to Queensway Dr	Westside from Pine Ave and Ocean Blvd to Magnolia Ave to Anaheim St to Santa Fe Ave to Wardlow Rd	Pike Loop from Pine Ave via West Seaside Way, Chesnut Place, and Ocean Blvd	City Place Termination, 4th St and Long Beach Blvd	Golden Shore and Ocean Blvd	2nd Street and Pacific Coast Highway	CSULB via Westminster, Studebaker, and Anaheim
Length from one end to the other (miles)	5.97	2.32	5.2	4.26	4.84	1.47	5.1	0.6	-0.66	0.44	1.13	2.5
Length of Single Track	63,043.2	24,499.2	54,912.0	44,985.6	51,110.4	15,523.2	53,856.0	6,336.0	(6,969.6)	4,646.4	11,932.8	26,400.0
Number of Turnouts and Crossings	10	10	10	10	10	10	10	-4	0	0	0	0
Number of Substations (0.5 mile spacing)	13	6	11	10	11	4	11	2	-2	1	3	6
Length of OCS (single and double)	60,403.2	21,014.4	51,427.2	36,220.8	42,345.6	11,642.4	51,744.0	6,336.0	(3,484.8)	2,323.2	5,966.4	26,400.0
Number of Individual Platforms (1/4 mile spacing)	44	16	42	24	28	5	34	3	-2	1	3	7
Round Trip Run Time (min--assuming 6.5mph)	110.22	42.83	96.00	78.65	89.35	27.14	94.15	11.08	-12.18	8.12	20.86	46.15
Number of Vehicles (assuming 15 min headway)	8	3	7	6	6	2	7	1	-1	1	2	4
Number of Vehicles with spares	10	4	9	8	8	3	9	1	-1	1	2	5
Other Cost Considerations Description	About a 400-foot-long bridge over I-405	None	None	None	None	1200 foot bridge over channel, 400 over shoreline, 300 foot n/b over chestnut, 400 foot harbor scenic drive	800 foot bridge over river, 200 foot bridge over 710	None	None	None	350 foot bridge and 800 foot long bridge	150, 100, 200, and 175 foot long bridges
Other Cost Number	$ 2,000,000	$ -	$ -	$ -	$ -	$ 12,000,000	$ 5,000,000	$ -	$ -	$ -	$ 6,000,000	$ 3,000,000
Total Cost	$ 153,115,036	$ 68,343,631	$ 132,727,101	$ 111,511,254	$ 121,186,948	$ 71,227,802	$ 140,083,193	$ 13,464,447	$ (13,563,432)	$ 9,675,204	$ 34,323,224	$ 63,865,925
Call	$ 153,000,000	$ 68,000,000	$ 133,000,000	$ 112,000,000	$ 121,000,000	$ 71,000,000	$ 140,000,000	$ 13,000,000	$ (14,000,000)	$ 10,000,000	$ 34,000,000	$ 64,000,000
Cost per Mile	$ 25.65	$ 29.46	$ 25.52	$ 26.18	$ 25.04	$ 48.45	$ 27.47	$ 22.44	$ 20.55	$ 21.99	$ 30.37	$ 25.55

9.0 OPERATING COSTS

Operating costs were estimated for each corridor to show their relative difference. The estimate is fairly general and assumes that the streetcar would run 365 days a year for 19 hours a day at a headway of 15 minutes. These operating cost estimates are not definitive and adjustments could be made based on the number of vehicles in operation and the daily hours that they are in use on a given day as the estimates are based on the total vehicle hours in a given year. Thus, reducing the service hours on certain days or reducing the vehicles in service would reduce the overall operating costs. The estimates are based on the number of vehicles hours per year which are multiplied by an hourly cost to get the annual operating cost. The hourly cost used in the estimates was determined by comparison of this potential streetcar project to another, similar project in Sacramento, CA, in order to determine a reasonable hourly operation cost.

The operating costs range from a low of about $1.8 million to a high of $7.1 million. The difference in cost for the corridors is due to the number of vehicles in operation for that particular corridor. A longer corridor requires more vehicles at the peak and as a result has more vehicle hours per year.

These estimates give a general ballpark of the operating costs; however a more definitive cost estimate would be required as the project progresses. The estimates include maintenance costs, which are a variable based on the length of the corridor alignment.

Operating costs would in part be covered through farebox revenues., The full extent to which anticipated revenues would be sufficient to cover these costs will be further studied in future project phases, should the City Council decide to do so.

Table 9-1 Annual Operating Cost for Daily Service

Annual Operating Cost for Daily Service

Corridor	Length in Miles	Headway	Cycle Time (rounded)	Peak veh	Number of hours per day	Daily Veh Hours	Days per Year	Annual Vehicle Hours	Hourly Fully Allocated Cost	Annual Operating Cost (hours x cost)
Atlantic Avenue Corridor	5.97	15	110	8	19	152.0	365	55480	$128	$7,102,000
Alamitos Avenue Corridor	2.32	15	43	3	19	57.0	365	20805	$128	$2,664,000
7th Street Corridor	5.2	15	96	7	19	133.0	365	48545	$128	$6,214,000
Broadway Corridor	4.26	15	79	6	19	114.0	365	41610	$128	$5,327,000
4th Street Corridor	4.84	15	89	6	19	114.0	365	41610	$128	$5,327,000
Queensway Corridor	1.47	15	27	2	19	38.0	365	13870	$128	$1,776,000
Westside Corridor	5.1	15	94	7	19	133.0	365	48545	$128	$6,214,000
Pike/Convetion Center Loop Add-on	0.6	15	11	1	19	19.0	365	6935	$128	$888,000
City Place Termination	-0.66	15	-12	-1	19	-19.0	365	-6935	$128	($888,000)
Golden Shore and Ocean Blvd Add-on	0.44	15	8.12	1	19	19.0	365	6935	$128	$888,000
2nd Street and and Pacific Coast Highway Extension	1.13	15	21	2	19	38.0	365	13870	$128	$1,776,000
Studebaker to CSULB Extension	2.5	15	46	4	19	76.0	365	27740	$128	$3,551,000

10.0 FINANCING TOOLS

One of the primary tasks of the study was to identify potential sources of funding for a streetcar in Long Beach. As with streetcar systems in other cities, the Long Beach Streetcar is intended to be both a transportation circulator and a catalyst for real estate development and revitalization. Thus, the sources of funding will range widely, reflecting the Streetcar's diverse purposes. Indeed, there are multiple local, regional, state, and national sources that can be combined to build and operate streetcar systems. A summary table of such resources is attached. A more in-depth analysis of financial resources would be considered in the next phase of the study, if approved. Around the country, streetcar systems have been funded through a diverse combination of tools, ranging from public sources at all levels of government to private sources such as developer fees and local improvement districts. Partly because traditional federal funding sources were not involved in the first arrivals of the new generation of streetcar lines, and partly because streetcars have been viewed as a real estate development tool, cities seeking to build and operate streetcars have sought flexible and unconventional financial solutions. Not only is the package of tools likely to be diverse, but the package of tools may also be different for different segments of the streetcar line. Indeed, this may be quite likely as the streetcar will pass through different neighborhoods with widely varying site conditions, development opportunities, and land uses.

10.1 CITY-WIDE ECONOMIC BENEFITS

The presence of an operating streetcar in Long Beach would benefit not just its riders and the immediate business and property owners along the corridor, but would have economic impacts that could benefit the entire City, as increased economic activity would enhance the City's general fund revenues. Streetcars would make Long Beach more economically-competitive within Southern California, attracting new residential, commercial/retail investment, and shopping/tourism.

This attractiveness could also sustain and support current residents, business owners, shops and restaurants within the City of Long Beach. Streetcars could help the City to attract and retain the talented professionals who drive much of the "new economy's" economic activity and wealth creation by creating an urban lifestyle that is attractive to the young "creative class". By sustaining and increasing the overall level of economic activity, income and other forms of tax receipts may also increase.

In the long term, a streetcar system in Long Beach could increase connectivity, reinforce a transit culture among choice riders within the districts served by a streetcar, and provide a major tool for the City to more-effectively respond to some of the environmental and sustainability challenges of today: air pollution, traffic congestion, global warming, reduced oil supplies and escalating gas prices. In the long run, the streetcars could replace redundant local bus routes and become a significant addition to the overall transit system. Streetcars would also provide connections to regional rail and bus services and local circulation.

All of these considerations suggest that as the City-at-large would receive indirect benefits, it could bear some portion of the investment in the streetcar system, even if many citizens of the larger region never ride the streetcar or own property or a business near a streetcar line. Therefore, it could be reasonable to seek some portion of the funding of the investment from local resources beyond the immediate zone of more direct benefit.

10.2 ACCESSING FEDERAL FUNDS

The Federal Transit Administration controls the traditional process for federal grant funding to transit projects through the “New Starts” and “Small Starts” programs. Of the 25 or 30 streetcar projects that are in active planning or design across the country, only three – Tucson, Ft. Lauderdale, and an extension of the existing Portland system are attempting to qualify for FTA funding.

10.3 LOCAL FINANCING SOURCES

There are several potential sources of funding that have been successfully used in other cities to provide a means by which to implement a streetcar system. These sources include:

- Parking/parking meter revenues (used in San Francisco and Los Angeles, planned in Sacramento),
- Business Improvement District/Association Assessments (used in Minneapolis, Seattle, Portland and planned in Sacramento),
- Local transit operating funds (used in Portland, saved funds planned in Sacramento) – which may or may not be available in Long Beach,
- Establishment of a Tax-Increment Financing (TIF) plan (used in Portland, planned in Sacramento)

10.4 PARKING/PARKING METER REVENUES (CAPITAL AND OPERATING)

On-street metered parking and both public and private off-street parking hold the potential for contributing substantial revenue flows that could be directed to constructing and/or operating a streetcar line. There is a sound policy basis for considering the use of these revenues because the land uses supported by this parking inventory will benefit from the streetcar’s presence and, in fact, the parking itself will become more valuable in a streetcar-supported urban district, since the higher-intensity urban environment catalyzed by the presence of the streetcar generally increases housing density and retail activity. Even if the streetcar carries a large share of local trips, the livelier urban environment generates a large number of trips, some of which will still be by automobile and will require parking. A frequent and convenient streetcar system can further the strategy of “park once and stay all day”, using the streetcar to get from an existing parking space to other locations. This can increase the demand for, and occupancy of, more remote off-street parking facilities, and the revenues derived from them. (Impacts to, and sufficiency of existing parking along any particular proposed alignment were not considered in this study. A more-detailed parking assessment would be conducted in a future phase of this project, should the City Council decide to do so.

Revenues from on-street parking resources can be increased by increasing the meter rate, increasing the number of meters, and/or changing the meter rate structure. Revenues from off-street parking resources can be increased by increasing the fees (public parking), adding a surcharge or annual fee to existing revenues (public and private for-fee parking), and/or adding a surcharge or annual fee per off-street parking space. Parking surcharges are widely used in other states for a variety of transportation projects, and have been used to fund streetcars in San Francisco.

For on-street parking, many cities are considering an increase in their parking meter rates. For example, in January 2009, Phoenix, Arizona raised its parking-meter rates to $1.50 per hour, up from 60 cents and Los Angeles, after a 17-year period without an increase, raised their rates from 25 or 50 cents an hour in most areas to $1.00 per hour, with the $4.00 rate being applied to its downtown and Civic Center area.

Parking meters are currently in operation in the Downtown and Belmont Shores areas, and are being considered in Bixby Knolls. In other areas of the City where streetcar corridors are proposed, including the Westside, 7th Street corridor, or Queensway areas, parking meter revenues are either more limited or non-existent.

10.5 PROPERTY-RELATED SOURCES (CAPITAL AND OPERATING)

Real estate-related revenues have been a key funding component of other streetcar projects. This is natural in that such revenues are often under the control of city governments, typically the project sponsor for streetcar projects. There is also a strong policy nexus at work here: rail transit projects, especially streetcar projects, have been demonstrated to have positive effect on property values and on development "yield" in terms of pace and density for properties located in the project's area of influence. This area typically is configured as a node around light rail or heavy rail stops extending out approximately ¼ mile and in a continuous band along streetcar alignments (due to frequent stop spacing), also extending out about ¼ mile. A now-extensive body of research documents this trend, revealing value premiums based on the impact of transit access on residential and commercial property. Table 10.1 outlines property value premiums observed in other cities.

Table 10-1 – Rail Transit Premiums Observed in Other Cities

System	Year	Property Type	Property Value Premium	Distance Measured (feet)
Washington Metrorail	1981	Commercial	11.5%	300
San Diego Trolley	1992	Commercial	16.70%	200
Atlanta MARTA	1993	Commercial	13.1%	300
BART	1970	Residential	8.0%	800
Toronto Streetcar	1976	Residential	18.0%	1,750
BART	1979	Residential	5.00%	1,500
Philadelphia-NJ	1986	Residential	7.80%	10,000

System	Year	Property Type	Property Value Premium	Distance Measured (feet)
San Diego Trolley	1992	All	2.00%	200
Portland MAX	1993	All	10.60%	1,500
Sacramento Light Rail	1995	Residential	6.20%	900
Santa Clara Light Rail	2002	Residential	45.00%	1,320
BART	1991	R-Rental	5.00%	1,320
San Diego Trolley	1992	R-Rental	5.00%	200

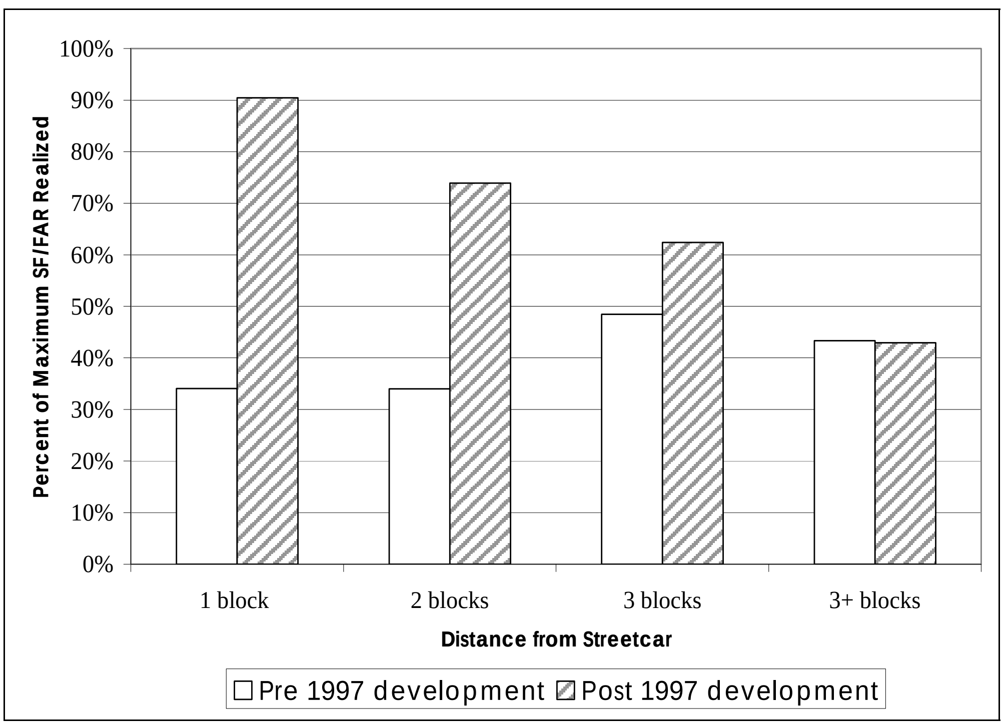
Source: Transit Cooperative Research Program

Similarly, research is now beginning to document what planners have come to call the "streetcar effect," the tendency of streetcar projects to act as a development catalyst. This catalytic affect has appeared in three ways:

- Greater development intensity (as measured by density or Floor Area Ratio) of projects located closer to the streetcar line
- Concentration of development market share in this same area, and
- Increased pace of new development in the market area

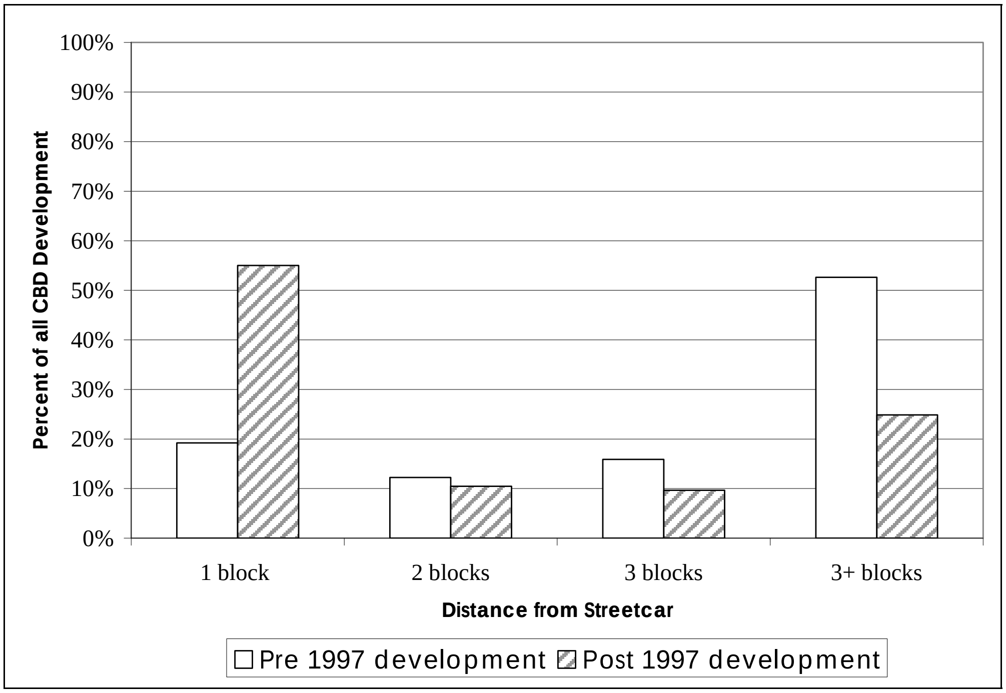
Figures 10-1 and 10-2 below, derived from development data along the Portland Streetcar project, are clear demonstrations of these effects.

Figure 10-1. Development Intensity (as measured by percentage of buildable square footage)



Source: Portland Streetcar, Inc. and E. D. Hovee and Associates

Figure 10-2 – Development Locational Market Share (as measured by new square footage)



Source: Portland Streetcar, Inc. and E. D. Hovee and Associates

These effects are being seen in all streetcar projects opened during the past decade in the U.S., with variations produced by the date of opening, the size of the city and local economic conditions. As a result, the amount of new development "induced" in the associated "streetcar zones" following announcement and construction of the line, is substantial, as shown in Table 10-3.

Table 10-3. Redevelopment Along Streetcar Alignments in Other Cities

City	Year Opened	New Investment in Project Area
Portland	2001	$2,800,000,000
Tampa	2003	$1,100,000,000
Little Rock	2004	$700,000,000
Tacoma	2003	$680,000,000
Kenosha	2000	$175,000,000
Seattle	2007	$285,000,000

10.6 LOCAL IMPROVEMENT DISTRICT (CAPITAL AND OPERATING)

A local improvement district (LID) or Mello-Roos community facilities district (CFD) is based upon the benefit district concept, which allows for an assessment on property within a geographically defined area. Revenues from this assessment are directed back to the defined area to finance a myriad of enhanced services or improvements. The approval of a two-thirds majority of property owners within the LID or CFD is usually required in order to form the district and initiate the assessment.

Proposition 13 limits property tax growth, thus an LID or CFD must base assessments on property attributes other than simple property value, as was done in Portland. For example, an assessment can be based on the amount of street frontage adjacent to a rail line, a building's total floor area, proximity to rail line, or other attributes. However, assessments must be shown to be in reasonable proportion to the benefits derived by property owners, sometimes through a benefits study.

A special assessment district paid by property owners will generate $35 million for construction and operation of Seattle's South Lake Union Streetcar, which is capitalizing on the streetcar-land development connection. A similar district is planned in Sacramento.

For LID's funding is generated by the property owners and developers who will directly benefit from the streetcar. The assessment formula and total amount can be varied significantly to meet the needs of the project.

In considering a potential streetcar corridor, consider the likelihood of approval of a Tax-Increment Financing plan, and how much it might generate, and let that be a determining factor in the identification of a preferred corridor.

10.7 BUSINESS IMPROVEMENT DISTRICTS (BID) (CAPITAL AND OPERATING)

A business improvement district (BID) is a variation on the LID concept, but where businesses are assessed instead of property owners. As with an LID or CFD, a BID is flexible and different businesses can be assessed different fees, depending on how much they will benefit their location, or other factors. A BID is typically formed through a business association and can be used for capital improvements, but is usually focused on services and maintenance.

There are three existing Business Improvement organizations in Long Beach. Each is potentially capable of increasing its revenues to support a streetcar investment.

The City's Business Improvement Associations/Districts generally provide localized services within their respective areas. These services support both the local businesses and provide for the well-being and quality of life of the neighborhoods.

Examples of activities covered and services provided by the BIA/BID include:

- Street cleaning
- Local festivals/street fairs/special events
- Lighting
- Streetscape
- Marketing
- Economic development support

BIAs derive their income primarily through member assessments. Typical member categories include:

- Employers (of various types and sizes)
- Financial institutions
- Hotels, restaurants and bars
- Individual community members/residents

The annual assessments are often adjusted to reflect the number of employees of a particular business.

The City of Long Beach has sought to partner with the BIAs within the community, sharing locally-derived revenues from parking, as well as from the General Fund, recognizing the organizations' value and the important role they play in promoting Long Beach and its individual neighborhoods.

Depending on the potential streetcar corridor selected for further consideration, an important component would be the support of the local BIA through which a streetcar might pass. This will be explored in the next step of this study if it is approved.

10.8 REDEVELOPMENT DISTRICT (TAX INCREMENT FINANCING) (CAPITAL AND OPERATING)

A redevelopment district and its corollary, tax increment financing (TIF), are mechanisms where public projects are financed by debt borrowed against the future growth of property taxes in a district. The assessed value of all properties within the district is set at the time the district is first established (the base). As public and private projects enhance property values within the district, the increase in property taxes over the base (the increment) is set aside. Debt is issued, up to a set maximum amount, to carry out a redevelopment plan and is repaid through the incremental taxes generated within the district. Redevelopment districts usually are in effect for 15 to 20 years. When the district is retired, the base is removed and all property taxes in the district return to normal distribution.

If a Long Beach project is implemented along a corridor that could lend itself to a series of modest redevelopment and real estate investment projects, the use of this method could be considered. It may also have an application in downtown Long Beach.

In considering a potential streetcar corridor alignment for more-detailed consideration, we would seek the active involvement of any BIA through which a system might pass. Willingness to contribute to the capital and operating costs of the system could be a key factor in identifying a preferred corridor.

10.9 DEVELOPMENT IMPACT FEES (SDCS) (CAPITAL AND OPERATING)

System development charges (SDCs) or development impact fees are one-time fees assessed to new development and changes in use. The fees cover the capital cost of the infrastructure needed to serve new development and the people who occupy or use the new development.

SDCs often pay for a wide range of improvements, including roads, schools, fire and police stations, sewer, water, stormwater, utilities, and other costs. An assessment for the part of the streetcar capital construction could be included with other SDCs already being assessed, specifically the existing traffic impact fee.

Because compact urban development usually requires less public infrastructure investment to serve than suburban development (for example, fewer road miles and utility extensions are required), it is possible that fees generated by development along a proposed streetcar alignment could be retained for streetcar purposes.

10.10 PROPOSITION 1B BOND REVENUE (CAPITAL)

Proposition 1B which was passed by California voters in November 2006 created $19.9 billion in bonded debt for state-approved transportation projects. The bond will finance everything from building new roads and bridges, seismic retrofit of existing infrastructure, and mass transit capital projects.

The use of these funds is currently complicated by the State's fiscal crisis; however, it may be reasonable to develop a Proposition 1B strategy for the Long Beach Streetcar project.

10.11 SALES TAX REVENUES (CAPITAL AND OPERATING)

In November 2008 Los Angeles County voters approved Measure R, to impose an additional ½ cent sales tax for transportation investments. The City of Long Beach can utilize funding from this new resource as well as the existing Proposition A ½ cent sales tax approved by voters in 1990.

10.12 FARES AND PASSES (OPERATING)

All of the potential streetcar alignments identified in this study begin in downtown Long Beach. There is existing, free transit service (the Passport), whose routes cover many of the same routes a streetcar might serve. While there are attractive reasons to provide a free service, we believe a streetcar fare should be assumed in the analysis of financing tools. A good starting point is $1.00 per ride. It can also be assumed that a portion of riders would use discounted multi-ride tickets or weekly or monthly passes and another portion of riders would utilize pre-paid tickets by showing convention passes, ticket stubs or other similar media related to "bulk user" agreements, described below. A farebox revenue mix would be structured for an operations revenue analysis once some initial ridership estimates are made (as part of the more-detailed financing planning in the next phases of the streetcar's study, if approved.)

10.13 BULK USER AGREEMENTS (OPERATING)

Streetcar access between the Long Beach Convention Center, various downtown hotels, restaurants, shopping districts, and the museum and entertainment venues could demonstrate a strong marketing benefit for attracting convention business to the Long Beach Convention Center and provide a convenience to conventioneers. Convention authorities in other cities have negotiated deals with transit service providers whereby, in return for guaranteed annual pre-payments to the operating entity (to help underwrite its costs), the convention center obtains the right to have its convention attendees ride for “free” (e.g. by showing their convention pass or badge). Availability of a streetcar could be used as a key component in convention marketing, recovering the cost of these bulk user contributions out of the general revenue stream from convention center rentals, exhibitors’ fees, etc.

Analysis of the potential for bulk purchases would need to be made in consultation with the Convention Center.

Similar approaches could be applied to operators/owners of the Pike, Aquarium, and other Attractions with a presence along the various proposed streetcar routes. The same could also apply to institutions of higher education. Further analysis of these potential sources would be made in the next phase of work.

10.14 LONG BEACH TRANSIT OPERATING FUNDS (OPERATING)

Long Beach Transit currently provides extensive public transportation services to the residents and visitors of the Long Beach community. The following services are currently provided by Long Beach Transit:

- Fixed Route bus service
- Shuttle services
- Demand responsive paratransit services
- Water taxi services
- Charter and community special services.

Long Beach Transit could be the choice as the operator of the proposed Long Beach Streetcar. Several other cities that have implemented streetcar projects have utilized the local transit agency as the operating agency. However, it is necessary to recognize the financial constraints of the Long Beach Transit system and encourage separate sources of funding for the operations and maintenance of the streetcar system.

According to the Long Beach Transit Annual 2007 Comprehensive Financial Report, the total operating revenues for these services was $15 million in 2007. Non-operating revenues including subsidies and interest accounted for 73% of total revenue in 2007. These subsidies came from a variety of sources including, Proposition A Funds from the City of Long Beach and Los Angeles County. In addition, Proposition C Funds from Los Angeles County, State Assistance and Federal Preventative Maintenance Program funds were contributed. In 2007, Long Beach Transit also received almost $8 million in federal grants.

As a result of the current economic downturn, transit agencies across the country are faced with increasing operating losses as a result of reduced state and local tax revenues and other factors. These losses come in a period where ridership is actually increasing, as patrons are trying to reduce their individual travel costs and deal with fluctuations in the price of gasoline.

At the present time, there are no available monies Long Beach Transit could tap to provide either capital or operational funding for a streetcar, however, to the extent that the Streetcar would be a substitute for a Long Beach Transit route or route segment, the operating cost reduction could be made available to the Streetcar operating budget.

10.15 FEDERAL FORMULA OPERATING FUNDS (OPERATING)

Additional Federal FTA operating funds could flow to the region as a result of the operation of any streetcar lines in Long Beach based on formula allocations. These are generally determined as a function of the number of incremental vehicle hours and miles of operational capacity that the streetcar line adds to the region's transit overall service. The incremental benefit of these funds should be made available to streetcar operating costs. This amount needs to be analyzed but is not expected to be significant.

10.16 REGIONAL ECONOMIC DEVELOPMENT RESOURCES (CAPITAL)

Some streetcar systems have been successful in obtaining grants from federal Economic Development Administration sources, Community Development Block Grant funds, state economic development funds and related programs based on the ability of streetcars to act as a catalyst for high intensity development in urban areas.

10.17 ADVERTISING (OPERATING)

Advertising is similar to sponsorship, but usually more limited in scope—for example, to poster advertisements in train cars or in stations—and for this reason, funds operations. This category refers to routine short-term advertising at streetcar stops and advertising spaces marketed on the outside and inside of vehicles. It does not refer to naming or "sponsorship" rights which are described separately below. Advertising revenue is generated from advertisements for shows and events, local businesses and products, etc. that advertisers can buy on weekly, monthly or quarterly terms. Based on experience in other cities, lines of length and ridership comparable to those under consideration here this source of revenue could be expected to be useful in paying for some operating costs.

10.18 INSTITUTIONAL TRANSIT PASS PURCHASES (OPERATING)

Bulk transit pass purchases by large institutions (for example, universities, hospitals, government agencies, and businesses) typically provide additional support for operations beyond the passes purchased by individual transit users. If there is enough established demand from such large institutions, a significant portion of the streetcar's operating annual costs can be projected in advance.

10.19 LEASE REVENUE (OPERATING)

Buildings or land owned by the city of Long Beach and adjacent to streetcar stations can be leased to private businesses. This could include everything from small coffee shops, dry cleaners, and florists to larger retail, office, or apartment establishments. Leasing logistics can be simplified by arranging for a single brokerage to operate as master lessor. Given that streetcar stops are often similar to bus stops in size, there may be limited opportunities for leasing.

10.20 MUSEUM REVENUES/AFFILIATION (OPERATING)

Rail transit, from long haul to streetcars, has an established tourism appeal and a cadre of dedicated rail buffs to help staff historic streetcar lines and museums. The Long Beach Streetcar line could take advantage of local museums and enthusiasts by generating additional revenues for a streetcar museum and using available labor for maintenance and operations.

10.21 NAMING RIGHTS OR CORPORATE SPONSORSHIPS (OPERATING)

Other streetcar systems have successfully sold sponsorships and naming rights to regionally based corporations and/or obtained grants from corporations and/or non-profit organizations.

Table 10-4 SUMMARY OF FUNDING OPTIONS									
Brief Description		**Estimated Annual Revenues (High, Medium or Low)**	**Estimated Annual Revenue**	**Capital or O&M**	**Reliability as a Funding Source**	**Legislative Change Required? (Yes, No, Possibly)**	**Notes**	**Best Practices/ Examples**
Federal								
Federal Earmarks/ Demonstration Projects	Funding from direct earmark of federal funds procured by congressional delegation.	Low	Highly variable	Capital only	Low	No	Difficult to obtain	Little Rock
Federal Transit Act - Formula Funds	Federal program to fund region's capital improvement program.	Low-Medium		Vehicle purchases	High	No	Limited funds cover extensive regional needs – not likely to be available for streetcar in short-term	Little Rock
Federal Transit Administration - New Starts Program	Grants are for capital costs associated with new fixed guideway systems, extensions, and bus corridor improvements	Low	Varies tremendously	Capital only	High	No	20% local match requirement; FTA encourages higher local match – currently not available for streetcar	Memphis (earlier version of regulations)
Federal Transit Act - Small Starts Program	Grants are for capital costs associated with new fixed guideway systems, extensions, and bus corridor improvements	Low	In 2007, up to $75 million from feds per project	Capital only	High	No	Total project costs must be under $200 million – no funds yet awarded for streetcar projects	None to date
Congestion Mitigation and Air Quality (CMAQ)	Funding for surface transportation and other related projects that contribute to air quality improvements and reduce congestion	Low	Between $500 K - $7 M per project	Capital only	Moderate	No	One-time, three-year grants; requires 20% local match – significant competition for funds – not likely available for streetcar	Tampa

Table 10-4 SUMMARY OF FUNDING OPTIONS								
Brief Description		Estimated Annual Revenues (High, Medium or Low)	Estimated Annual Revenue	Capital or O&M	Reliability as a Funding Source	Legislative Change Required? (Yes, No, Possibly)	Notes	Best Practices/ Examples
Housing and Urban Development Grants	Non-traditional Federal source, but have been know to earmark funds for streetcar projects	Low	Up to $500,000	Capital only	Moderate	No	20% local match requirement – limited resources may be available if related to development	Portland
State and Local								
Taxes								
Convention Center Taxes	Revenues generated from the Minneapolis Convention Center Tax. Rate is 1/2 of 1% and is restricted to convention center related use legislatively; sources include food, liquor, hotels and sales tax.	Medium	Dependant on rate set	Capital only	High	Yes	Currently used for debt service on convention center	Charlotte
Local Sales Tax	Revenues generated from general sales tax imposed by local unit of government.	Medium	Dependant on rate set	Capital only	High	Yes	Would require an increase as current taxes are already pledged.	Tacoma Seattle (upcoming project)
LA County Sales Tax	Revenues generated from Measure R general sales tax	Medium	$25-28 million annually (ballpark estimate).	Capital and O & M	High	Yes	Counties recently authorized to assess sales tax for transit – priority for funds is for LRT – not likely available for streetcar in short term	
Hotel Guest Tax	Revenues generated from tax on hotel guests (tourists).	Low		Capital	Moderate	Possibly	Recently increased to 3%; ties into convention center tax; city will not want to be non-competitive	New Orleans

Table 10-4 SUMMARY OF FUNDING OPTIONS								
Brief Description		**Estimated Annual Revenues (High, Medium or Low)**	**Estimated Annual Revenue**	**Capital or O&M**	**Reliability as a Funding Source**	**Legislative Change Required? (Yes, No, Possibly)**	**Notes**	**Best Practices/ Examples**
Transit Utility Tax	A fee for public transit added to sewer/garbage bill (indirect tax).	Low-Medium		Capital and O&M	Moderate to High	Yes	Benefit study would probably be needed.	
Land Gains Tax	Tax is paid when land is sold or exchanged and is calculated based upon the pre-streetcar appraisal as compared to the sales price following completion of the streetcar. Data would indicate that increase in value can be attributed to the benefit of the streetcar if property is within 3 blocks distance of line (about ¼ mile).	Low	Amount may be initially somewhat speculative	O&M	Moderate	Yes	New; will require some speculation	Vermont (not due to transit benefit)
Motor Vehicle Sales Tax	Sales tax on motor vehicles, all of which is dedicated to transportation. Transit is guaranteed 40% of these funds.	Medium	$120 M annually (only 50% for Metro)	Capital and O&M	High	No	Viewed as insufficient for regional transit needs – not likely to be available for streetcar in the short term	
Tax Abatement	Revenues from a tax collected by the City, county and school district and held for a designated purpose.	Medium	Maximum of $200,000/year or 10% of current levy, whichever is greater	Capital	High	No	Not available on property within TIF district; city, county, school approval required unless limited to city share	

Table 10-4 SUMMARY OF FUNDING OPTIONS									
Brief Description		Estimated Annual Revenues (High, Medium or Low)	Estimated Annual Revenue	Capital or O&M	Reliability as a Funding Source	Legislative Change Required? (Yes, No, Possibly)	Notes	Best Practices/ Examples
Wheelage Tax	Revenues generated from tax on motor vehicles using public streets or highways.	Medium	Annual for City residents $15 for trucks, $10 for other motor vehicles	Capital and O&M	High	Special Election Vote	Requires a general referendum	Dakota County, Minnesota has collected and used for Cedar Avenue Transitway; Tacoma
Parking Tax	A tax on parking similar to a use tax.	Medium		Capital and O & M	Moderate	Yes	Would not generate revenue where parking is free; State would receive and return a portion to the City.	San Francisco and Los Angeles
Fees								
Parking Impact Fee	An annual fee charged based upon the number of spaces available to property owners.	Medium		Capital and O&M	Moderate	Yes	Annual amount, Impact fee; free parking does not avoid the need to pay	Sydney
Transit Impact Development Fee	One time fee (typically) on new property based upon projected usage of transit and benefit created by proximity of tenant.	Low		Capital only	High	Yes	Requires developer support	

Table 10-4 SUMMARY OF FUNDING OPTIONS								
Brief Description		**Estimated Annual Revenues (High, Medium or Low)**	**Estimated Annual Revenue**	**Capital or O&M**	**Reliability as a Funding Source**	**Legislative Change Required? (Yes, No, Possibly)**	**Notes**	**Best Practices/ Examples**
In Lieu of Parking Fee, Density Bonus, Development Fee (TOD)	One time payment from developers. [Example: City negotiates one time payment for increased density, or one time payment for relief from parking requirements within certain distance of streetcar (found in transit oriented developments), or payment by developer for density increase over what is allowable by zoning.]	Low-Medium	One time fee	Capital only	High	Zoning code amendment	Requires developer support	Lynn Lake, Minnesota model; buy credits; annual assessment or consider downtown where zoning code does not require parking and a fee in lieu to all buildings

Table 10-4 SUMMARY OF FUNDING OPTIONS								
Brief Description		Estimated Annual Revenues (High, Medium or Low)	Estimated Annual Revenue	Capital or O&M	Reliability as a Funding Source	Legislative Change Required? (Yes, No, Possibly)	Notes	Best Practices/ Examples
Benefit Districts								
Local Improvement District (Special Services District)	District where special services are rendered and the costs of such services are paid from service charges collected; typically used for advertising, lighting, parking; may NOT be for services typically paid for through general funds.	Low		Capital and O&M	Moderate	Yes if wish to include residential properties	If route largely serves residential this would present a challenge; would require local business/developer support	Minneapolis, Seattle, Portland; similar to special service district on Nicollet Mall
Special Assessment District	Revenues generated from a district established for improvements paid by special assessment.	Medium		Capital only	High	Yes	Must satisfy the law that benefit is received; change needed to apply to residential; developer/business support needed	
Housing Service District	Similar to special assessment district but would apply to residential and not just commercial and industrial.	Low-Medium		Capital and O&M	Moderate	Yes		
Tax Increment Financing (TIF) District	Tax increment financing for improvements: water, sewer, roads and parking facilities, etc.	Medium - High		Capital	High	Possibly	Very competitive; restricted uses; 15% of total market value currently in TIF	Austin; Portland
Recycled Matured TIF	Dedicated portion of previous TIF stream when TIF districts sunsets.	Medium - High	Some portion of current districts that are expiring in 2009	Capital and O&M	High	Possibly	Very competitive; restricted uses; 15% of total market value currently tied up in TIF in Minneapolis	

Table 10-4 SUMMARY OF FUNDING OPTIONS									
Brief Description		Estimated Annual Revenues (High, Medium or Low)	Estimated Annual Revenue	Capital or O&M	Reliability as a Funding Source	Legislative Change Required? (Yes, No, Possibly)	Notes	Best Practices/ Examples
State Aid; California 1B Funds	Statewide Transportation Capital funds	Low	TBD		Low	Yes	Very competitive;	
Parking								
Parking Meter Revenues	Revenues received from use of parking meters.	Medium	Downtown or throughout city	Capital and O&M	Moderate	No	Already funding other priorities; ordinance may be required	Portland
Parking Ramp Revenue	Revenues received from use of parking ramps.	Medium		Capital and O&M	Moderate	No	Already funding other priorities; ordinance may be required	Portland
Operating Funds								
Streetcar Farebox Revenues	Revenues generated directly from rider fares.	Low		O&M only	Moderate	No		
Streetcar Advertising Revenue	Monthly revenue from interior/exterior ads, ads on vehicles, benches and stations/stops.	Low	Annual amount	O&M only	Moderate to High	No	Will need to be negotiated with entity owning or operating streetcar; may compete with Coordinated Street Furniture Program	Many examples. Galveston generates $100,000 month for interior and exterior ads.
Streetcar Naming Rights	Naming the system, individual cars or stations for a fee; can be a one time or annual sponsorship	Low		Capital or O & M	Moderate			Tampa
Other								
Air Rights	Revenues generated by selling of air rights over part of a corridor or maintenance building, etc.	Low		Capital only	Moderate	No		Seattle

Table 10-4 SUMMARY OF FUNDING OPTIONS								
Brief Description		Estimated Annual Revenues (High, Medium or Low)	Estimated Annual Revenue	Capital or O&M	Reliability as a Funding Source	Legislative Change Required? (Yes, No, Possibly)	Notes	Best Practices/ Examples
Non-Profit Contributions	Streetcar established as a non-profit entity; contributions and/or endowment similar to non-profits, hold events to fund streetcar service.	Low		Capital and O&M	Low	Possibly	Legal input needed	Tucson
Operating Endorsements	Foundations with Program Related Invest (PRI) program can provide endowment; distinguish from corporate grants, grants for livability improvements to community.	Low		Capital and O&M	Moderate	Yes	Competition for non profit and foundation support for affordable housing, social welfare, etc	Tampa

[1]Table updated from Appendix A - *Minneapolis Streetcar Finance Plan, HDR, 2008*.

11.0 RECOMMENDATIONS AND NEXT STEPS

The Consultant team believes that further studies may be warranted to continue the feasibility analysis and to choose a single "starter-line" if it proves feasible. The feasibility of a first streetcar segment serving the downtown Long Beach and linking it to an activity center along a corridor that can sustain multiple redevelopment sites will require more detailed engineering and design considerations, preliminary screening of environmental impacts and potential mitigations, a detailed study of financing options and a conclusion that a financing package is feasible. An initial corridor can potentially create Streetcar access to the Civic Center, the Convention Center, the Pike, City Place, the LOMAA, and the East Village Arts District and generally support many of the stated future goals and objectives of the City of Long Beach. In consideration of the financing options available, the Consultant team believes that the City of Long Beach may be able to develop a financial plan sufficient to provide the needed capital and operating funds necessary for an initial streetcar line. Although a Streetcar segment may be costly, we believe existing financial mechanisms are in place that may be able to support and sustain the development of a project in the range of $100 -$150 million.

Plainly speaking, we believe there is a high probability of a feasible project among the options we have studied.

The conclusion of this Limited Streetcar Feasibility Study is that there is sufficient potential to warrant further consideration and a more definitive analysis.

If the City believes further analysis is warranted by the results of this Limited Streetcar Feasibility Study, the next steps must pin down and select an initial alignment for consideration while also describing potential extensions. These next steps would include:

- A significant public outreach process involving community groups, citizens, stakeholders and the development community,
- Selection of an alignment to serve as an Initial Operating Segment (recognizing that additional corridor segments may be added later),
- Engineering and construction considerations(preliminary design) including structural assessments,
- More detailed traffic study,
- Economic development analysis,
- Maintenance facility site selection,
- More-detailed capital cost estimates,
- Operations analysis including fares and service criteria and refined operating cost estimates,
- Demand analysis and ridership estimates,
- Vehicle analysis and vehicle selection,
- Preliminary environmental impact assessment (screening) to make sure there are no fatal flaws,

- Further refinement of the financial analysis to develop a potential and feasible financing plan sufficient to support bonding or other long-term investment,
- Decisions on whether to apply NEPA or CEQA requirements (depending on the source of funding),
- Development of a purpose and need statement, and
- Analysis of management, ownership and operations options.

In deciding to move to a next step, the City may want to develop a work program that includes two phases (as a means to limit the procurement process): a final feasibility analysis leading to an alignment selection; followed by (if warranted by the conclusion of the first phase) a preliminary engineering and environmental documentation task. This last phase would include:

- Continued outreach,
- Preliminary engineering (systems and infrastructure),
- Environmental documentation (CEQU or NEPA),
- Project delivery process decisions,
- Final financial plan, and
- Development of a management strategy.

An estimate of the cost of the first phase, to make a final feasibility and project selection decision is $550,000. The estimate for the second phase to do preliminary engineering, environmental documentation and develop a financial plan is $1,635,000. A preliminary budget for these activities is below.

The estimate for these two phases combined is approximately $2,200,000.

Table 11-1 Estimated Tasks and Costs for Next Steps – Limited Long Beach Streetcar Feasibility Study

Step 1: Feasibility Determination and Alignment Selection		
Public Involvement and Outreach		$70,000
Purpose and Need Statement		$20,000
Alignment Selection		$40,000
Development Analysis		$30,000
Conceptual Design and Capital Cost Estimates		$100,000
Maintenance Facility Site Selection		$20,000
Demand Analysis		$100,000
Vehicle Selection		$20,000
Environmental Screening		$75,000
Financial Planning		$50,000
Management Options		$25,000
	Subtotal:	$550,000
Step 2: Preliminary Engineering and Environmental Documentation		
Public Involvement and Outreach		$50,000
Right-of-Way and Structures		$500,000
Survey		$150,000
Systems		$130,000
Refined Cost Estimates		$40,000
Environmental Analysis and Preparation of CEQA or NEPA Documents		$500,000
Traffic Engineering and Impact Analysis		$125,000
Project Delivery Decisions		$40,000
Development of Final Financial Plan		$50,000
Management Strategy		$50,000
	Subtotal:	$1,635,000
	Overall Next Steps Total:	$2,185,000

APPENDIX A

City of Long Beach Case Studies

City of Long Beach
Limited Streetcar Feasibility Study






HDR | ONE COMPANY
Many Solutions℠

CITY OF LONG BEACH
LIMITED STREETCAR FEASIBILITY STUDY

CASE STUDY: SEATTLE STREETCAR

Start of Service:	2007
Miles of Track:	2.6 miles
Stops:	11
Initial Cost:	$52.1 Million
Cost per Track Mile:	
Planned Expansion:	Yes
Peak Headway:	10 minutes
Type:	Modern
Operator:	King County Metro

Passenger service on Seattle Streetcar's South Lake Union (SLU) Line began late in 2007. Its anticipated first-year ridership was reached three months ahead of schedule, and was surpassed on October 1, 2008.

The SLU Line was designed to increase transit opportunities between the Seattle's downtown retail core, Deny Triangle and the South Lake Union area. This area is one of the fastest growing residential and employment centers in Seattle. As the area continues to grow, the city is committed to providing a transit system to increase transportation choices other than driving personal automobiles for those who live and work there.

The SLU Line runs for 2.6 miles and has 11 stops, connecting the downtown area with the South Lake Union district neighborhood.

The inaugural ride of the Seattle Streetcar.

The SLU Line also provides direct connections to and from Seattle's other public transit systems, including local and commuter buses, trains and light rail, and the famous downtown monorail.

About half of the cost of construction of the SLU Line was funded from a local improvement district. The Local Improvement District was a fund created by a special property tax levy on local property owners, reflecting the benefits that they would receive from the streetcar service through increased property valuations. A combination of state and federal monies formed the rest of the funding.

Similar to Tampa Streetcar line, Seatle is selling the Streetcar's naming rights and features painted advertising on the cars to generate operating revenues.

In additon to the SLU line opened this past year, Seattle also has a heritage Waterfront Streetcar line. Though service is currently suspended while a new maintenance facility is being constructed, the line runs from the International District to Pier 70 and carries approximately 400,000 riders per year.

Future mobility needs are under study, with three additional streetcar corridors being examined. The first corridor is the South Jackson Streetcar, which would link Pioneer Square and the Stadium District. A second line would link the existing SLU line to the Eastlake neighborhood and the University of Washington. The third streetcar line would provide connections to the First Hill Urban Center.

A map of the South Lake Union Line.

CITY OF LONG BEACH
LIMITED STREETCAR FEASIBILITY STUDY

CASE STUDY: PORTLAND STREETCAR

The Portland Streetcar project is an example of a tremendously successful urban streetcar project which generated a significant amount of local area development and helped transform an old warehouse district into a thriving mixed use urban area.

Initially opening in 2001 as a 4.8 mile loop, the Portland Streetcar was the first modern streetcar project in the United States. The project stimulated an interest in the streetcar nationally due to success of the redevelopment of the downtown area.

Start of Service: 2001
Miles of Track: 8 mile loop
Stops: 46
Initial Cost: $57 Million (2000)
Cost per Track Mile: $12 million (2000)
Planned Expansion: Yes
Peak Headway: 12 minutes
Type: modern and vintage
Operator: City of Portland

The streetcar was introduced in Portland with the goal of linking neighborhoods with convenient and alternative forms of transportation, thus reducing short inter-city automobile trips and also encouraging the development of more housing and business growth in the central portion of the city.

The initial segment of single track was constructed in 2001 and runs from the campus of Portland State University through the Pearl District west to northwest 23rd Avenue to the Legacy Good Samaritan Hospital and then back to Portland State University on adjacent streets. An additional 0.6 miles of track was added in 2005 as part of an ongoing extension plan for the South Waterfront redevelopment area which includes a new location of the Oregon Health and Science University. A 0.6 mile extension to the lower terminus of the Portland aerial tram at SW Gibbs Street was completed in 2006. Within four years of the streetcars initial opening, $2.3 billion had been invested within two blocks of the streetcar line. The streetcar line could be considered a catalyst for the redevelopment of the Pearl District, which when combined with public-private investment, planning and development created a perfect opportunity to revitalize the area.

The streetcar line intersects with the MAX Light Rail Train at four intersections in downtown Portland.

The modern Czech streetcars running through a residential area.

Currently, there are a total of 46 stops (every three to four blocks) and riders can check for arrival times at stops and on the internet, thanks to a GPS tracking system that was installed in 2002.

A slight raised platform extends from the curb to the rails at a streetcar stop.

The streetcar vehicles are a modern, low-floor design produced in the Czech Republic. They are narrower and shorter than the MAX Light Rail Trains that run through the Portland Metropolitan area because they must run along city streets and alongside parked automobiles. The low floor layout eases passenger boardings and alightings and reduces dwell time at stops.

Overall, the streetcar in Portland has been a success. Initially project ridership was immediately exceeded when the line first opened in 2001 and ridership has been increasing steadily ever since.

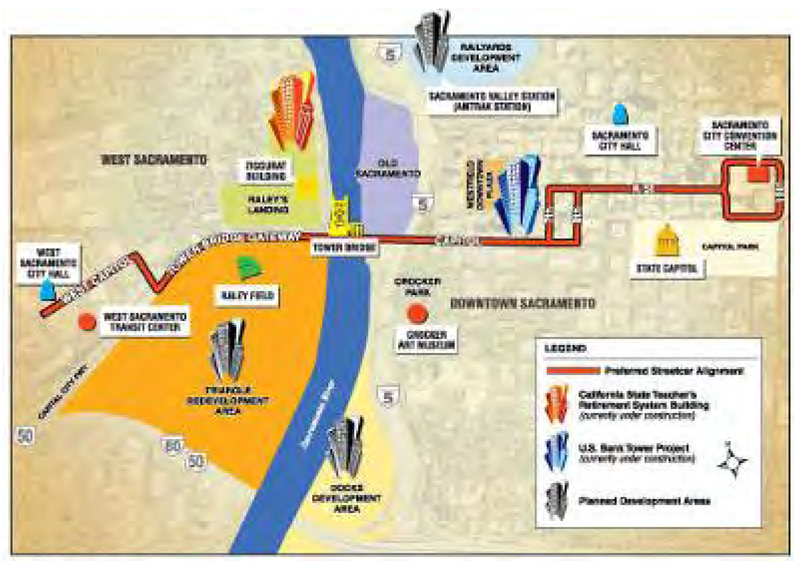
CITY OF LONG BEACH
LIMITED STREETCAR FEASIBILITY STUDY

CASE STUDY: SACRAMENTO STREETCAR

The Sacramento Modern Streetcar Project is joint venture between the cities of Sacramento and West Sacramento and other regional agencies to connect the two downtown regions along the adjacent Riverfront area. HDR is providing Environmental Analysis and Preliminary Engineering for this project. It is expected to begin construction in 2010.

> Start of Service:
> Miles of Track: 2.2
> Stops: 18
> Initial Cost: $53-70 Million
> Cost per Track Mile:
> Planned Expansion: Yes
> Peak Headway: 10
> Type: Replica/Modern
> Operator:

The proposed route is a 2.2 mile route connecting Sacramento's midtown and the Capitol Mall area on the east side with the West Sacramento Civic Center on the west side. Approximately 0.5 mile of this route will be existing track that will be shared with the existing light rail service. The alignment will run across the Tower Bridge which connects the two cities and through the Industrial Triangle Area, a redevelopment area near Raley Field in West Sacramento. It is expected that the streetcar line will serve as an additional catalyst for redevelopment of the Industrial Triangle Area creating a vibrant downtown area along the waterfront with offices, commercial and residential uses. The streetcar would be used as an urban pedestrian circulator in the area, encouraging a pedestrian-friendly environment and stimulating the growth of an area that no longer needs to rely on automobiles. The streetcar has shown to be a magnet for this kind of development and the cities of Sacramento and West Sacramento are optimistic for the success of this redevelopment plan.



Map of the proposed streetcar line.

Due to anticipated success of the proposed line, extensions are already under study, including one that runs north into the Sacramento Rail Yard area. This is planned to be a pedestrian and transit-oriented village linking the streetcar with a light rail line which would provide service to Sacramento International Airport. Another extension line in West Sacramento would add service south along the Sacramento River waterfront.

The anticipated cost of the project varies due to the type of streetcar selected. A project with a fleet of modern type streetcar could add approximately $16 million to the overall project cost. However, the modern cars may have operational advantages over the replica style cars. The modern streetcar has a greater passenger capacity and also features low-floors which facilitates boarding and decreases dwell time at each station.

2010 ridership is estimated to be approximately 9,900 riders per day. The average rider is expected to travel 4 to 6 blocks or 1 to 2 stops.

CITY OF LONG BEACH
LIMITED STREETCAR FEASIBILITY STUDY

CASE STUDY: SAN FRANCISCO STREETCAR

The San Francisco Heritage Streetcar is the most successful new streetcar line ever opened. The F-line runs down Market Street to Fisherman's Wharf and attracts over 20,000 riders a day. However, San Francisco is a unique environment for the streetcar because of its high density of urban population, large numbers of tourists, and transit rich environment. The only other city which is comparable in these areas would be New York City.

Start of Service: 1995
Miles of Track: 11.6
Stops: 33
Initial Cost: $150 Million
Cost per Track Mile: $13 Million
Planned Expansion: Yes
Peak Headway: 6 minutes
Type: Heritage reinstated
Operator: Municipal Transit Agency (MUNI)

A streetcar stopped in front of Fisherman's Wharf.

The F-line was originally reinstated as part of a historic Trolley Festival that ran while the cable car was out of service for maintenance. The success of the festival provided the motivation to repeat the event for several summers in a row and ultimately establishing a permanent F-line. The initial 4 mile stretch of the F-line opened in 1995 at a cost of $55 million. The new line traveled from the Castro District into downtown near the Convention Center. The line runs within two blocks of Union Square and then travels into the Financial District. The line was incredibly popular and the Municipal Transit Agency (Muni) added additional vintage refurbished cars to the fleet.

In 2000, an extension to Fisherman's Wharf was completed which added service to the Ferry Building, traveled along the Embarcadero to Pier 39, the Alcatraz tour pier, The Cannery and Ghirardelli Square. A future E-Line will add even more service

A heritage trolley stops in front of the Ferry Building.

connecting Fisherman's Wharf and the Caltrain Depot at 4th and King Street.

A refurbished European trolley stops downtown.

A nonprofit preservation group called the Market Street Railway encourages the growth of the streetcar within San Francisco. The group is championing an extension of the E-line to the Mission Bay area and north to Fort Mason. The Mission Bay area is a 303 acre redevelopment area in the vicinity of the Giants' stadium.

Although the cars are heritage restored cars, the line is much more than a tourist attraction and is a vital part of the urban transportation network of the city. It links residential, commercial and leisure-oriented areas of the city.

CITY OF LONG BEACH
LIMITED STREETCAR FEASIBILITY STUDY

CASE STUDY: TUCSON STREETCAR

Start of Service:	2011
Miles of Track:	4
Stops:	19
Initial Cost:	$140 Million
Cost per Track Mile:	$25million/ Mile
Planned Expansion:	Yes
Peak Headway:	10
Type:	Modern
Operator:	Regional Transportation Authority

Expected to open in 2011, HDR is planning and designing Tucson's Modern Streetcar Project. Its initial operating segment will be a four mile route from the University Medical Center to downtown into the area known as Rio Nuevo. Rio Nuevo is a redevelopment district where the University of Arizona plans to construct the new Flandrau Science Center. The new Flandrau Center will straddle Interstate 10, which bisects the City and incorporate a unique bridge span over the river and the freeway. In addition, a visitors' center would be constructed in the area and the new streetcar line would terminate there. The Rio Nuevo area's redevelopment construction is estimated at $700 million and would include enhancement of the convention center area with visitor attractions, commercial, office and residential development.

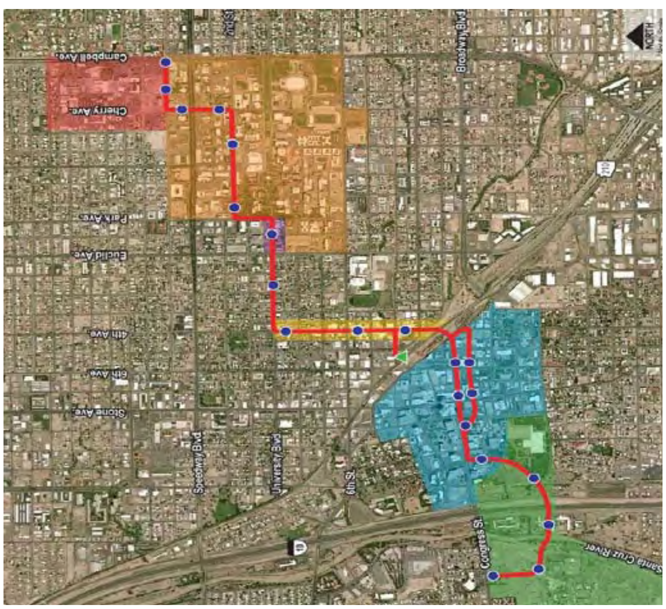
The other end of the streetcar line would extend into the University Main Campus and link up with the Old Pueblo Trolley (OPT) heritage line. The existing OPT line runs for approximately 10 blocks with 9 stops through the Fourth Avenue business district to University Boulevard to the main gate of the University. The OPT heritage line is run by an all volunteer staff on Friday, Saturday and Sunday to connect the University of Arizona with the Central Business District of Tucson. The modern streetcar project will be a full time operating transit system separate from the OPT. Also, unlike the heritage vehicles used on the OPT line, the modern streetcar system would use modern vehicles that have a low floor and air-conditioning systems.

A sketch of the streetcar line, scheduled for debut in late 2011.

The Tucson Regional Transportation Authority has begun a Transit-Oriented Development (TOD) Program which incorporates the new streetcar line with redevelopment to encourage compact, mixed-use urban areas that are vibrant and inviting. The ultimate goal of TOD is to create livable communities that decrease use of automobiles in these areas, instead encouraging transit, walking, and bicycling.

The overall project is expected to cost $140 with the funding split between federal and local funds. In addition, the modern streetcar project will operate through the new 4th Avenue underpass under the Union Pacific Railroad tracks and on Santa Cruz River Bridge, but these projects will be funded separately.

Tucson's Modern Streetcar line is initially expected to carry 4,200 passengers per day. The streetcar alignment was designed to traverse through the areas of Tucson with the highest population and employment density. Approximately 10% of the city's population lives or works within walking distance of the streetcar alignment. This area is also considered one of the most congested areas of Tucson. The resulting streetcar line was the Locally Preferred Alternative from a Major Transit Investment Study completed by the city in 2007. The streetcar line will be integrated with the SunTran bus system and will replace 259 bus runs per day from the downtown area.



Proposed route for the Tucson Streetcar line.

In a cooperative effort to clear the way for restoration of a streetcar network in Tuscon, Arizona, the City Council is set to approve a site swap to lease Old Pueblo Trolley space at the Tuscon Transportation Department's maintenance facility, offering in exchange a city-owned property leased by the historic trolley group, at a price of $1 per year. Tuscon voters in May 2006 approved a measure to build a four-mile streetcar route.

One proposal for possible future extension includes continuing the tracks north a few more miles from the University Medical Center to the Tucson Mall, the largest shopping center in the region.

CASE STUDY: TAMPA STREETCAR

In the mid-1990's, the City of Tampa decided to add a streetcar line to connect seemingly isolated attractions in its downtown area. Heavily visited by tourist and convention attendees, Tampa's many attractions were not easily accessible to those visitors without a car. While the City had a new convention center and aquarium, in addition to an existing hockey arena, cruise ship terminal and the historic Ybor City area, these attractions were within close proximity of one another but seemed isolated without transportation between the areas.

Start of Service: 2002
Miles of Track: 2.4
Stops: 12
Initial Cost: $48.3 Million
Cost per Track Mile: $20 million/mile
Planned Expansion: Yes
Peak Headway: 15
Type: Heritage New
Operator: Regional Transit Agency


New residential development along the streetcar line near the harbor.

In response, the City designed a crescent-shaped street car route along the waterfront that connects southern edge of downtown Tampa with the cruise ship terminal and the Ybor City historic district. The City, together with the regional transit agency, worked to construct a streetcar line in Tampa from a combination of federal, state, and local funds. The line was built to light rail standards with the hopes of eventually building a more extensive light rail transit facility in Tampa. One of the biggest challenges to opening the line was to negotiate the rights to cross a track belonging to CSX. The right to cross the CSX tracks was granted and the streetcar line was opened in 2002 with new heritage streetcars. These are replica cars that are built new and include air conditioning.


The station stop in front of the new Centro Ybor commercial development.

As a direct result of Tampa's investment in a streetcar service, by 2006, nearly $1 billion had been invested within 3 blocks of the line, mostly in the waterfront area. This waterfront area, known as Channelside under went a

The station stop at the current southern terminus at the hockey arena.

transformation from shipping to residential and commercial uses.

It is estimated that two-thirds of the passengers on the streetcar are tourists. The streetcar line primarily serves as access to the convention center and other tourist attractions. It does not go through the central business district of Tampa, but it is an appealing attraction to convention organizers.

The streetcar's day-to-day operations are run by a non-profit group called Tampa Historic Streetcar. The City owns two-thirds of the systems' assets and Hillsborough Area Regional Transit (HART) owns the cars and maintenance facility. Part of the operational funding comes from payment for naming rights to the line, station, and the cars. For example, Tampa Electric Company has bought the naming rights for the line and it is called the TECO Line Streetcar System.

Ridership has been consistently greater than projections and a second phase of the streetcar line that would connect to downtown Tampa is in the planning stages.

REFERENCES

American Public Transportation Association (APTA) Streetcar and Heritage Trolley Site. Seashore Trolley Museum. Website: http://www.heritagetrolley.org

Havens, Edward B. Tucson: Light Rail Transit Trying for a Comeback with a Streetcar Plan. February 2006. http://www.lightrailnow.org/news/n_tuc_2006-2a.htm

Laubscher, Rick. "How the F-Line Came to Be." July 21, 2008. Market Street Railway.

Lind, William and Paul Weyrich. "Bring Back the Streetcars!" The Free Congress Foundation. June 2002. Website: http://www.apta.com/research/info/online/weyrich.cfm#po

Market Street Railway. Website: http://www.streetcar.org/

Ohland, Gloria and Shelley Poticha. Street Smart: Streetcars and Cities in the 21st Century. Oakland: Reconnecting America

Old Pueblo Trolley (OPT). An Operating Transit Museum - Trolley, Buses, and Railroads. Website: http://www.oldpueblotrolley.org

Portland Streetcar. Website: http://www.portlandstreetcar.org

San Francisco Municipal Transportation Agency (SFMTA). Website: http://www.sfmta.com/

Seattle Streetcar: South Lake Union Line. Website: http://www.seattlestreetcar.org/

Seattle.Gov. Seattle Department of Transporation. Website: http://www.seattle.gov/transportation/streetcarnetwork.htm

Taunton, Mathew. "Tucson Planning Modern Street Car." Transitline; February 2008. HDR, Inc.

TECO Line Streetcar System. Website: http://www.tecolinestreetcar.org

Tucson Department of Transportation. Regional Transportation Authority (RTA). Transit on the Move. A Major Transit Investment Study for Tucson. Website: http://www.tucsontransitstudy.com/

APPENDIX B

Capital Cost Details to Summary

City of Long Beach

Streetcar Feasibility Study

8/7/2009

	No	Alternative	Length (miles)	Cost (Millions)
Alternatives	1	Atlantic Ave from Pine Ave and Ocean Blvd to Del Amo Blvd	5.97	$ 153
	2	Alamitos Ave from Pine Ave and Ocean Blvd to Pacific Coast Highway	2.32	$ 68
	3	7th Street from Pine Ave and Ocean Blvd to Alamitos Ave to 7th Street to East Campus Drive	5.20	$ 133
	4	Belmont Shores via Broadway from Pine Ave and Ocean Blvd to Alamitos Ave to Broadway to Redondo to Ocean to Livingston to 2nd St and Bay Shore Ave	4.26	$ 112
	5	Belmont Shores via 4th St from Pine Ave and Ocean Blvd to Alamitos Ave to 4th St to Redondo to Ocean to Livingston to 2nd St and Bay Shore Ave	4.84	$ 121
	6	Queen Mary from Pine Ave and Ocean Blvd to Queensway Dr	1.47	$ 71
	7	Westside from Pine Ave and Ocean Blvd to Magnolia Ave to Anaheim St to Santa Fe Ave to Wardlow Rd	5.10	$ 140
Add-Ons	1	Pike Loop from Pine Ave via West Seaside Way, Chesnut Place, and Ocean Blvd	0.60	$ 13
	2	City Place Termination, 4th St and Long Beach Blvd	-0.66	$ (14)
	3	Golden Shore and Ocean Blvd	0.44	$ 10
	4	2nd Street and Pacific Coast Highway	1.13	$ 34
	5	CSULB via Westminster, Studebaker, and Anaheim	2.50	$ 64

Atlantic Ave from Pine Ave and Ocean Blvd to Del Amo Blvd

Item	Unit	Unit Cost	Quantity	Total
Track, Utilities, Roadway Modifications, Traffic Control (sawcut, excavate, gauge ties, rail in boot, street planing, curb and gutter)	SNG TF	$ 525	63,043	$ 33,097,680
Turnouts/Special Trackwork	EA	$ 100,000	10	$ 1,000,000
Substations	EA	$ 650,000	13	$ 8,450,000
OCS per foot single or double track (including foundation, pole, hardware, wire)	SNG or DBL TF	$ 220	60,403	$ 13,288,704
Platforms (Shelter, paving, tactile strip, trash can, bench, lean rail, changeable message sign)	EA	$ 50,000	44	$ 2,200,000
Maintenance Facility	EA	$ 8,000,000	1	$ 8,000,000
Other	LS		$ 2,000,000	$ 2,000,000
Subtotal				$ 68,036,384
Mobilization (10% of Construction)				$ 6,803,638
Contingency (25% of Construction)				$ 18,710,006
Construction with Mobilization and Contingency				$ 93,550,028
Environmental/PE (5%)				$ 4,677,501
Final Design (10%)				$ 9,355,003
Construction Management (10%)				$ 9,355,003
Vehicles	EA	$ 3,000,000	10	$ 30,000,000
Administration (5%)				$ 6,177,501
Total				$ 153,115,036
Call				$ 153,000,000
Cost per Mile			5.97	$ 25.6

Alamitos Ave from Pine Ave and Ocean Blvd to Pacific Coast Highway				
Item	**Unit**	**Unit Cost**	**Quantity**	**Total**
Track, Utilities, Roadway Modifications, Traffic Control (sawcut, excavate, gauge ties, rail in boot, street planing, curb and gutter)	SNG TF	$ 525	24,499	$ 12,862,080
Turnouts/Special Trackwork	EA	$ 100,000	10	$ 1,000,000
Substations	EA	$ 650,000	6	$ 3,900,000
OCS per foot single or double track (including foundation, pole, hardware, wire)	SNG or DBL TF	$ 220	21,014	$ 4,623,168
Platforms (Shelter, paving, tactile strip, trash can, bench, lean rail, changeable message sign)	EA	$ 50,000	16	$ 800,000
Maintenance Facility	EA	$ 8,000,000	1	$ 8,000,000
Other	LS		$ -	$ -
Subtotal				$ 31,185,248
Mobilization (10% of Construction)				$ 3,118,525
Contingency (25% of Construction)				$ 8,575,943
Construction with Mobilization and Contingency				$ 42,879,716
Environmental/PE (5%)				$ 2,143,986
Final Design (10%)				$ 4,287,972
Construction Management (10%)				$ 4,287,972
Vehicles	EA	$ 3,000,000	4	$ 12,000,000
Administration (5%)				$ 2,743,986
Total				$ 68,343,631
Call				$ 68,000,000
Cost per Mile			2.32	$ 29.5

7th Street from Pine Ave and Ocean Blvd to Alamitos Ave to 7th Street to East Campus Drive

Item	Unit	Unit Cost	Quantity	Total
Track, Utilities, Roadway Modifications, Traffic Control (sawcut, excavate, gauge ties, rail in boot, street planing, curb and gutter)	SNG TF	$ 525	54,912	$ 28,828,800
Turnouts/Special Trackwork	EA	$ 100,000	10	$ 1,000,000
Substations	EA	$ 650,000	11	$ 7,150,000
OCS per foot single or double track (including foundation, pole, hardware, wire)	SNG or DBL TF	$ 220	51,427	$ 11,313,984
Platforms (Shelter, paving, tactile strip, trash can, bench, lean rail, changeable message sign)	EA	$ 50,000	42	$ 2,100,000
Maintenance Facility	EA	$ 8,000,000	1	$ 8,000,000
Other	LS		$ -	$ -
Subtotal				$ 58,392,784
Mobilization (10% of Construction)				$ 5,839,278
Contingency (25% of Construction)				$ 16,058,016
Construction with Mobilization and Contingency				$ 80,290,078
Environmental/PE (5%)				$ 4,014,504
Final Design (10%)				$ 8,029,008
Construction Management (10%)				$ 8,029,008
Vehicles	EA	$ 3,000,000	9	$ 27,000,000
Administration (5%)				$ 5,364,504
Total				$ 132,727,101
Call				$ 133,000,000
Cost per Mile			5.2	$ 25.5

Belmont Shores via Broadway from Pine Ave and Ocean Blvd to Alamitos Ave to Broadway to Redondo to Ocean to Livingston to 2nd St and Bay Shore Ave

Item	Unit	Unit Cost	Quantity	Total
Track, Utilities, Roadway Modifications, Traffic Control (sawcut, excavate, gauge ties, rail in boot, street planing, curb and gutter)	SNG TF	$ 525	44,986	$ 23,617,440
Turnouts/Special Trackwork	EA	$ 100,000	10	$ 1,000,000
Substations	EA	$ 650,000	10	$ 6,500,000
OCS per foot single or double track (including foundation, pole, hardware, wire)	SNG or DBL TF	$ 220	36,221	$ 7,968,576
Platforms (Shelter, paving, tactile strip, trash can, bench, lean rail, changeable message sign)	EA	$ 50,000	24	$ 1,200,000
Maintenance Facility	EA	$ 8,000,000	1	$ 8,000,000
Other	LS		$ -	$ -
Subtotal				$ 48,286,016
Mobilization (10% of Construction)				$ 4,828,602
Contingency (25% of Construction)				$ 13,278,654
Construction with Mobilization and Contingency				$ 66,393,272
Environmental/PE (5%)				$ 3,319,664
Final Design (10%)				$ 6,639,327
Construction Management (10%)				$ 6,639,327
Vehicles	EA	$ 3,000,000	8	$ 24,000,000
Administration (5%)				$ 4,519,664
Total				$ 111,511,254
Call				$ 112,000,000
Cost per Mile			4.26	$ 26.2

Belmont Shores via 4th St from Pine Ave and Ocean Blvd to Alamitos Ave to 4th St to Redondo to Ocean to Livingston to 2nd St and Bay Shore Ave

Item	Unit	Unit Cost	Quantity	Total
Track, Utilities, Roadway Modifications, Traffic Control (sawcut, excavate, gauge ties, rail in boot, street planing, curb and gutter)	SNG TF	$ 525	51,110	$ 26,832,960
Turnouts/Special Trackwork	EA	$ 100,000	10	$ 1,000,000
Substations	EA	$ 650,000	11	$ 7,150,000
OCS per foot single or double track (including foundation, pole, hardware, wire)	SNG or DBL TF	$ 220	42,346	$ 9,316,032
Platforms (Shelter, paving, tactile strip, trash can, bench, lean rail, changeable message sign)	EA	$ 50,000	28	$ 1,400,000
Maintenance Facility	EA	$ 8,000,000	1	$ 8,000,000
Other	LS		$ -	$ -
Subtotal				$ 53,698,992
Mobilization (10% of Construction)				$ 5,369,899
Contingency (25% of Construction)				$ 14,767,223
Construction with Mobilization and Contingency				$ 73,836,114
Environmental/PE (5%)				$ 3,691,806
Final Design (10%)				$ 7,383,611
Construction Management (10%)				$ 7,383,611
Vehicles	EA	$ 3,000,000	8	$ 24,000,000
Administration (5%)				$ 4,891,806
Total				$ 121,186,948
Call				$ 121,000,000
Cost per Mile			4.84	$ 25.0

Queen Mary from Pine Ave and Ocean Blvd to Queensway Dr				
Item	**Unit**	**Unit Cost**	**Quantity**	**Total**
Track, Utilities, Roadway Modifications, Traffic Control (sawcut, excavate, gauge ties, rail in boot, street planing, curb and gutter)	SNG TF	$ 525	15,523	$ 8,149,680
Turnouts/Special Trackwork	EA	$ 100,000	10	$ 1,000,000
Substations	EA	$ 650,000	4	$ 2,600,000
OCS per foot single or double track (including foundation, pole, hardware, wire)	SNG or DBL TF	$ 220	11,642	$ 2,561,328
Platforms (Shelter, paving, tactile strip, trash can, bench, lean rail, changeable message sign)	EA	$ 50,000	5	$ 250,000
Maintenance Facility	EA	$ 8,000,000	1	$ 8,000,000
Other	LS		$ 12,000,000	$ 12,000,000
Subtotal				$ 34,561,008
Mobilization (10% of Construction)				$ 3,456,101
Contingency (25% of Construction)				$ 9,504,277
Construction with Mobilization and Contingency				$ 47,521,386
Environmental/PE (5%)				$ 2,376,069
Final Design (10%)				$ 4,752,139
Construction Management (10%)				$ 4,752,139
Vehicles	EA	$ 3,000,000	3	$ 9,000,000
Administration (5%)				$ 2,826,069
Total				$ 71,227,802
Call				$ 71,000,000
Cost per Mile			1.47	$ 48.5

Westside from Pine Ave and Ocean Blvd to Magnolia Ave to Anaheim St to Santa Fe Ave to Wardlow Rd

Item	Unit	Unit Cost	Quantity	Total
Track, Utilities, Roadway Modifications, Traffic Control (sawcut, excavate, gauge ties, rail in boot, street planing, curb and gutter)	SNG TF	$ 525	53,856	$ 28,274,400
Turnouts/Special Trackwork	EA	$ 100,000	10	$ 1,000,000
Substations	EA	$ 650,000	11	$ 7,150,000
OCS per foot single or double track (including foundation, pole, hardware, wire)	SNG or DBL TF	$ 220	51,744	$ 11,383,680
Platforms (Shelter, paving, tactile strip, trash can, bench, lean rail, changeable message sign)	EA	$ 50,000	34	$ 1,700,000
Maintenance Facility	EA	$ 8,000,000	1	$ 8,000,000
Other	LS		$ 5,000,000	$ 5,000,000
Subtotal				$ 62,508,080
Mobilization (10% of Construction)				$ 6,250,808
Contingency (25% of Construction)				$ 17,189,722
Construction with Mobilization and Contingency				$ 85,948,610
Environmental/PE (5%)				$ 4,297,431
Final Design (10%)				$ 8,594,861
Construction Management (10%)				$ 8,594,861
Vehicles	EA	$ 3,000,000	9	$ 27,000,000
Administration (5%)				$ 5,647,431
Total				$ 140,083,193
Call				$ 140,000,000
Cost per Mile			5.1	$ 27.5

Pike Loop from Pine Ave via West Seaside Way, Chesnut Place, and Ocean Blvd

Item	Unit	Unit Cost	Quantity	Total
Track, Utilities, Roadway Modifications, Traffic Control (sawcut, excavate, gauge ties, rail in boot, street planing, curb and gutter)	SNG TF	$ 525	6,336	$ 3,326,400
Turnouts/Special Trackwork	EA	$ 100,000	(4)	$ (400,000)
Substations	EA	$ 650,000	2	$ 1,300,000
OCS per foot single or double track (including foundation, pole, hardware, wire)	SNG or DBL TF	$ 220	6,336	$ 1,393,920
Platforms (Shelter, paving, tactile strip, trash can, bench, lean rail, changeable message sign)	EA	$ 50,000	3	$ 150,000
Maintenance Facility	EA	$ 8,000,000	0	$ -
Other	LS		$ -	$ -
Subtotal				$ 5,770,320
Mobilization (10% of Construction)				$ 577,032
Contingency (25% of Construction)				$ 1,586,838
Construction with Mobilization and Contingency				$ 7,934,190
Environmental/PE (5%)				$ 396,710
Final Design (10%)				$ 793,419
Construction Management (10%)				$ 793,419
Vehicles	EA	$ 3,000,000	1	$ 3,000,000
Administration (5%)				$ 546,710
Total				$ 13,464,447
Call				$ 13,000,000
Cost per Mile			0.6	$ 22.4

City Place Termination, 4th St and Long Beach Blvd

Item	Unit	Unit Cost	Quantity	Total
Track, Utilities, Roadway Modifications, Traffic Control (sawcut, excavate, gauge ties, rail in boot, street planing, curb and gutter)	SNG TF	$ 525	(6,970)	$ (3,659,040)
Turnouts/Special Trackwork	EA	$ 100,000	-	$ -
Substations	EA	$ 650,000	(2)	$ (1,300,000)
OCS per foot single or double track (including foundation, pole, hardware, wire)	SNG or DBL TF	$ 220	(3,485)	$ (766,656)
Platforms (Shelter, paving, tactile strip, trash can, bench, lean rail, changeable message sign)	EA	$ 50,000	(2)	$ (100,000)
Maintenance Facility	EA	$ 8,000,000	0	$ -
Other	LS		$ -	$ -
Subtotal				$ (5,825,696)
Mobilization (10% of Construction)				$ (582,570)
Contingency (25% of Construction)				$ (1,602,066)
Construction with Mobilization and Contingency				$ (8,010,332)
Environmental/PE (5%)				$ (400,517)
Final Design (10%)				$ (801,033)
Construction Management (10%)				$ (801,033)
Vehicles	EA	$ 3,000,000	-1	$ (3,000,000)
Administration (5%)				$ (550,517)
Total				$ (13,563,432)
Call				$ (14,000,000)
Cost per Mile			-0.66	$ 20.6

Golden Shore and Ocean Blvd

Item	Unit	Unit Cost	Quantity	Total
Track, Utilities, Roadway Modifications, Traffic Control (sawcut, excavate, gauge ties, rail in boot, street planing, curb and gutter)	SNG TF	$ 525	4,646	$ 2,439,360
Turnouts/Special Trackwork	EA	$ 100,000	-	$ -
Substations	EA	$ 650,000	1	$ 650,000
OCS per foot single or double track (including foundation, pole, hardware, wire)	SNG or DBL TF	$ 220	2,323	$ 511,104
Platforms (Shelter, paving, tactile strip, trash can, bench, lean rail, changeable message sign)	EA	$ 50,000	1	$ 50,000
Maintenance Facility	EA	$ 8,000,000	0	$ -
Other	LS		$ -	$ -
Subtotal				$ 3,650,464
Mobilization (10% of Construction)				$ 365,046
Contingency (25% of Construction)				$ 1,003,878
Construction with Mobilization and Contingency				$ 5,019,388
Environmental/PE (5%)				$ 250,969
Final Design (10%)				$ 501,939
Construction Management (10%)				$ 501,939
Vehicles	EA	$ 3,000,000	1	$ 3,000,000
Administration (5%)				$ 400,969
Total				$ 9,675,204
Call				$ 10,000,000
Cost per Mile			0.44	$ 22.0

2nd Street and Pacific Coast Highway

Item	Unit	Unit Cost	Quantity	Total
Track, Utilities, Roadway Modifications, Traffic Control (sawcut, excavate, gauge ties, rail in boot, street planing, curb and gutter)	SNG TF	$ 525	11,933	$ 6,264,720
Turnouts/Special Trackwork	EA	$ 100,000	-	$ -
Substations	EA	$ 650,000	3	$ 1,950,000
OCS per foot single or double track (including foundation, pole, hardware, wire)	SNG or DBL TF	$ 220	5,966	$ 1,312,608
Platforms (Shelter, paving, tactile strip, trash can, bench, lean rail, changeable message sign)	EA	$ 50,000	3	$ 150,000
Maintenance Facility	EA	$ 8,000,000	0	$ -
Other	LS		$ 6,000,000	$ 6,000,000
Subtotal				$ 15,677,328
Mobilization (10% of Construction)				$ 1,567,733
Contingency (25% of Construction)				$ 4,311,265
Construction with Mobilization and Contingency				$ 21,556,326
Environmental/PE (5%)				$ 1,077,816
Final Design (10%)				$ 2,155,633
Construction Management (10%)				$ 2,155,633
Vehicles	EA	$ 3,000,000	2	$ 6,000,000
Administration (5%)				$ 1,377,816
Total				$ 34,323,224
Call				$ 34,000,000
Cost per Mile			1.13	$ 30.4

CSULB via Westminster, Studebaker, and Anaheim

Item	Unit	Unit Cost	Quantity	Total
Track, Utilities, Roadway Modifications, Traffic Control (sawcut, excavate, gauge ties, rail in boot, street planing, curb and gutter)	SNG TF	$ 525	26,400	$ 13,860,000
Turnouts/Special Trackwork	EA	$ 100,000	-	$ -
Substations	EA	$ 650,000	6	$ 3,900,000
OCS per foot single or double track (including foundation, pole, hardware, wire)	SNG or DBL TF	$ 220	26,400	$ 5,808,000
Platforms (Shelter, paving, tactile strip, trash can, bench, lean rail, changeable message sign)	EA	$ 50,000	7	$ 350,000
Maintenance Facility	EA	$ 8,000,000	0	$ -
Other	LS		$ 3,000,000	$ 3,000,000
Subtotal				$ 26,918,000
Mobilization (10% of Construction)				$ 2,691,800
Contingency (25% of Construction)				$ 7,402,450
Construction with Mobilization and Contingency				$ 37,012,250
Environmental/PE (5%)				$ 1,850,613
Final Design (10%)				$ 3,701,225
Construction Management (10%)				$ 3,701,225
Vehicles	EA	$ 3,000,000	5	$ 15,000,000
Administration (5%)				$ 2,600,613
Total				$ 63,865,925
Call				$ 64,000,000
Cost per Mile			2.5	$ 25.5

City	Year	Miles	Cost	2010 Cost	Stops	Miles/Stop	Headway	Vehicle	Cost/Mile	2010 Cost/Mile
Little Rock	2004	2.5	19.6	24.8	11	0.23	15	Replica	$ 7.84	$ 9.92
Portland	2001	4.8	55.2	78.6	38	0.13	13	Modern	$ 11.50	$ 16.37
SLU	2007	2.6	51	57.4	13	0.20	15	Modern	$ 19.62	$ 22.06
Tampa	2003	2.3	48.3	63.6	12	0.19	15	Replica	$ 21.00	$ 27.63
Tacoma	2003	3.2	80.4	105.8	10	0.32	10	Modern	$ 25.13	$ 33.06

Assumed construction cost inflation rate 4%

Notes:
1. Miles are total track miles (i.e. round trip).
2. Tacoma's numbers are high because it was built to LRT standards.

2005	66.2
2006	68.8
2007	71.6
2008	74.5
2009	77.4
2010	80.5

	Base Alternatives							Add-Ons				
	1	2	3	4	5	6	7	1	2	3	4	5
	Atlantic Ave from Pine Ave and Ocean Blvd to Del Amo Blvd	Alamitos Ave from Pine Ave and Ocean Blvd to Pacific Coast Highway	7th Street from Pine Ave and Ocean Blvd to Alamitos Ave to 7th Street to East Campus Drive	Belmont Shores via Broadway from Pine Ave and Ocean Blvd to Alamitos Ave to Broadway to Redondo to Ocean to Livingston to 2nd St and Bay Shore Ave	Belmont Shores via 4th St from Pine Ave and Ocean Blvd to Alamitos Ave to 4th St to Redondo to Ocean to Livingston to 2nd St and Bay Shore Ave	Queen Mary from Pine Ave and Ocean Blvd to Queensway Dr	Westside from Pine Ave and Ocean Blvd to Magnolia Ave to Anaheim St to Santa Fe Ave to Wardlow Rd	Pike Loop from Pine Ave via West Seaside Way, Chesnut Place, and Ocean Blvd	City Place Termination, 4th St and Long Beach Blvd	Golden Shore and Ocean Blvd	2nd Street and Pacific Coast Highway	CSULB via Westminster, Studebaker, and Anaheim
Length from one end to the other (miles)	5.97	2.32	5.2	4.26	4.84	1.47	5.1	0.6	-0.66	0.44	1.13	2.5
Length of Single Track	63,043.2	24,499.2	54,912.0	44,985.6	51,110.4	15,523.2	53,856.0	6,336.0	(6,969.6)	4,646.4	11,932.8	26,400.0
Number of Turnouts and Crossings	10	10	10	10	10	10	10	-4	0	0	0	0
Number of Substations (0.5 mile spacing)	13	6	11	10	11	4	11	2	-2	1	3	6
Length of OCS (single and double)	60,403.2	21,014.4	51,427.2	36,220.8	42,345.6	11,642.4	51,744.0	6,336.0	(3,484.8)	2,323.2	5,966.4	26,400.0
Number of Individual Platforms (1/4 mile spacing)	44	16	42	24	28	5	34	3	-2	1	3	7
Round Trip Run Time (min--assuming 6.5mph)	110.22	42.83	96.00	78.65	89.35	27.14	94.15	11.08	-12.18	8.12	20.86	46.15
Number of Vehicles (assuming 15 min headway)	8	3	7	6	6	2	7	1	-1	1	2	4
Number of Vehicles with spares	10	4	9	8	8	3	9	1	-1	1	2	5
Other Cost Considerations Description	About a 400-foot-long bridge over I-405	None	None	None	None	1200 foot bridge over channel, 400 over shoreline, 300 foot n/b over chestnut, 400 foot harbor scenic drive	800 foot bridge over river, 200 foot bridge over 710	None	None	None	350 foot bridge and 800 foot long bridge	150, 100, 200, and 175 foot long bridges
Other Cost Number	$ 2,000,000	$ -	$ -	$ -	$ -	$ 12,000,000	$ 5,000,000	$ -	$ -	$ -	$ 6,000,000	$ 3,000,000
Total Cost	$ 153,115,036	$ 68,343,631	$ 132,727,101	$ 111,511,254	$ 121,186,948	$ 71,227,802	$ 140,083,193	$ 13,464,447	$ (13,563,432)	$ 9,675,204	$ 34,323,224	$ 63,865,925
Call	$ 153,000,000	$ 68,000,000	$ 133,000,000	$ 112,000,000	$ 121,000,000	$ 71,000,000	$ 140,000,000	$ 13,000,000	$ (14,000,000)	$ 10,000,000	$ 34,000,000	$ 64,000,000
Cost per Mile	$ 25.65	$ 29.46	$ 25.52	$ 26.18	$ 25.04	$ 48.45	$ 27.47	$ 22.44	$ 20.55	$ 21.99	$ 30.37	$ 25.55