Metropolitan Transportation Authority
One Gateway Plaza
Los Angeles, CA 90012-2952
213.922.2000 Tel
metro.net

Metro

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PLANNING AND PROGRAMMING COMITTEE
JANUARY 17, 2007

SUBJECT: HARBOR SUBDIVISION TECHNICAL FEASIBILITY ANALYSIS

ACTION: RECEIVE REPORT/AUTHORIZE PROCEEDING WITH NEXT PHASE

RECOMMENDATION

A. Receive and file the Harbor Subdivision Technical Feasibility Analysis Final Report. Attachment A contains the Report's Executive Summary. The full report will be available upon request; and

B. Authorize the Chief Executive Officer to proceed with the Alternatives Analysis phase of the environmental process as indicated in the 2007 Metro Supplemental Budget Board action.

ISSUE

The Harbor Subdivision is an approximately 26-mile rail right-of-way Metro purchased in 1992 from the Atchison, Topeka and Santa Fe Railroad, now Burlington Northern Santa Fe Railroad (BNSF). It extends from just south of downtown Los Angeles to Wilmington. Figure ES-1 in the Executive Summary is a map of the Harbor Subdivision. Under the purchase agreement, BNSF retained freight rail operating rights in perpetuity. Requests, and in particular from Supervisor Burke, have been made as to how this asset could be put into a productive passenger transit operating use. This resulted with the Metro Board through the adoption of the FY 2006 budget, authorizing the completion of a technical feasibility analysis focusing on the transit options that could be operated in the rail corridor both with and without BNSF service. The technical feasibility analysis has been completed. This feasibility analysis examined the viability and issues affiliated with each potential transit mode, without conducting any in-depth environmental review or community outreach and only rough order of magnitude costing and ridership forecasting.

POLICY IMPLICATIONS

The results of the feasibility analysis show that there are no fatal flaws to implementing certain types of passenger transit service. However, depending upon the service selected, right-of way may need to be acquired and restrictions on operating hours may need to be negotiated with BNSF. The 2001 adopted Long Range Transportation Plan (LRTP) does not include a project using this rail right-of-way in either the constrained or strategic element. The Harbor Subdivision provides direct access from just south of Downtown Los Angles to

the Los Angeles World Airports (LAWA) and points to the south including the South Bay cities and terminates in close proximity to the Port of Los Angeles. It could provide high speed passenger transit service to an area that is currently under-served. Now that the technical feasibility analysis has been completed, starting an Alternatives Analysis report would position this project for future funding opportunities should they arise. This corridor as well as others will be considered by the Metro Board as part of the LRTP update.

OPTIONS

The Metro Board could receive the Technical Feasibility Analysis and not proceed into the next phase of the work. This is not recommended as this is one of the few Metro-owned rights-of-way that have no passenger services planned and would serve an area that currently is without high speed transit options.

FINANCIAL IMPACT

The FY 2007 Metro adopted budget contains $100,000 in Cost Center 4330 under Project # 400229, Task #01.02 to initiate work on the Alternatives Analysis. It will be the Chief Planning Officer and Area Team Director's responsibility to budget sufficient funds in future years to complete this effort.

DISCUSSION

The Harbor Subdivision was purchased in 1992 from the former ATSF Railroad, now BNSF. With the purchase, BNSF retained operating rights in perpetuity. Currently, differing levels of freight activity occur along various segments of the corridor.

In March 2006, Wilbur Smith Associates initiated work on this high-level technical feasibility analysis of passenger service options that could be operated with or without BNSF. The options included: both heavy and light rail; both Federal Railroad Administration (FRA) Compliant and non-FRA compliant Diesel Multiple Unit (DMU), a self propelled diesel powered rail car; Bus Rapid Transit (BRT) and Metro Rapid. The consultant was directed to: (1) identify the feasibility and viability of the service; (2) develop rough order of magnitude cost of all alternatives/technologies for implementing and operating passenger services; (3) identify the most appropriate operator; and, (4) recognize areas where community concern and areas where the community would need further consultation. The scope did not include any community outreach, detailed environmental assessment, costing or modeling of ridership projections. However, during the analysis development, key stakeholders including the City of Los Angeles, Torrance, South Bay Council of Governments and BNSF were contacted to determine their concerns and issues.

Analysis Findings

The Analysis found that all modes, except heavy rail could operate in this rail right-of-way under certain conditions. Depending upon the mode, these conditions could include shifting rail freight traffic to late night/early morning window, the need to acquire right-of-way, etc. It should be noted that the Metro Rapid alternative had similar operating traits in

the rail right-of-way as the BRT. Therefore, it was consolidated under that scenario and not analyzed separately. Additionally, the DMU options served as a substitute for Metrolink. All types of rail service including the DMU options would require that the tracks, signal system and grade crossings be upgraded to accommodate passenger service.

As shown on the matrix on page ES-5 of the Executive Summary, the LRT alternative had the highest capital cost and ridership. The higher capital cost could be attributed to the need to double track the alignment, a trench along Aviation Boulevard adjacent to Los Angeles International Airport (LAX) runways and the need for elevated structures through Alcoa Yard in Torrance to name a few. The high ridership could be attributed to its greater frequency. The BRT had the lowest capital costs due in large part to the assumption of using city streets for almost half of the route where the Harbor Subdivision narrows and doesn't connect directly to Downtown Los Angeles. The BRT ridership figures could also be attributed to its frequency. The non-FRA Compliant DMUs have a shorter route and higher frequencies resulting in lower capital cost and more ridership than the FRA Compliant DMUs.

All alternatives would generate environmental impacts. FRA compliant DMUs and the BRT, however, would generate fewer of them.

NEXT STEPS

Upon Metro Board approval, a scope of work will be developed to procure consultant services to complete the Alternative Analysis for this corridor. This will address the recommendations of the technical feasibility analysis. Metro Board authorization will be sought in either late FY 07 or early FY 08 to award the consultant contract.

ATTACHMENT(S)

A. Harbor Subdivision Technical Feasibility Analysis Executive Summary

Prepared by: Alan Patashnick, Transportation Planning Manager, South Bay
Renee Berlin, Director, South Bay

Carol Inge
Chief Planning Officer

Roger Snoble
Chief Executive Officer

Executive Summary
HARBOR SUBDIVISION TRANSIT ANALYSIS

ANALYSIS BACKGROUND AND PURPOSE

In 1992, the former Los Angeles County Transportation Commission (LACTC) purchased the majority of the Harbor Subdivision, the mainline of the former Atchison Topeka & Santa Fe Railway (ATSF or Santa Fe) between downtown Los Angeles and the Ports of Los Angeles and Long Beach. As part of that agreement, ATSF retained the right to provide freight rail service on the portion of the line owned by the LACTC, and LACTC retained the right to operate passenger service on the line. Today, the Burlington Northern Santa Fe Railway (BNSF), the successor railroad to the ATSF, still operates freight trains on the line, although the total is a small fraction of what it was at the time of the purchase. Neither LACTC nor its successor agency, the Los Angeles County Metropolitan Transportation Authority (Metro), ran any passenger service on the line. The line studied appears as Figure ES-1 on the following page.

With this analysis, Metro has attempted to investigate the feasibility of the potential deployment of various transit modes on its portion of the Harbor Subdivision. The attempt has been to make use of as much of the 26.36-mile right-of-way as may be practical, realizing that some sections of the line run through primarily industrial land uses. In all, six different transit service alternatives were investigated. The potential environmental constraints for the alternatives were identified and rough order-of-magnitude ridership and costs were estimated. Thirteen potential station locations along the Harbor Subdivision also were preliminarily assessed. Should Metro decide to pursue transit operations on the Harbor Subdivision, a more detailed costing, ridership modeling and environmental analysis would be necessary. Discussions also would need to take place with the BNSF.

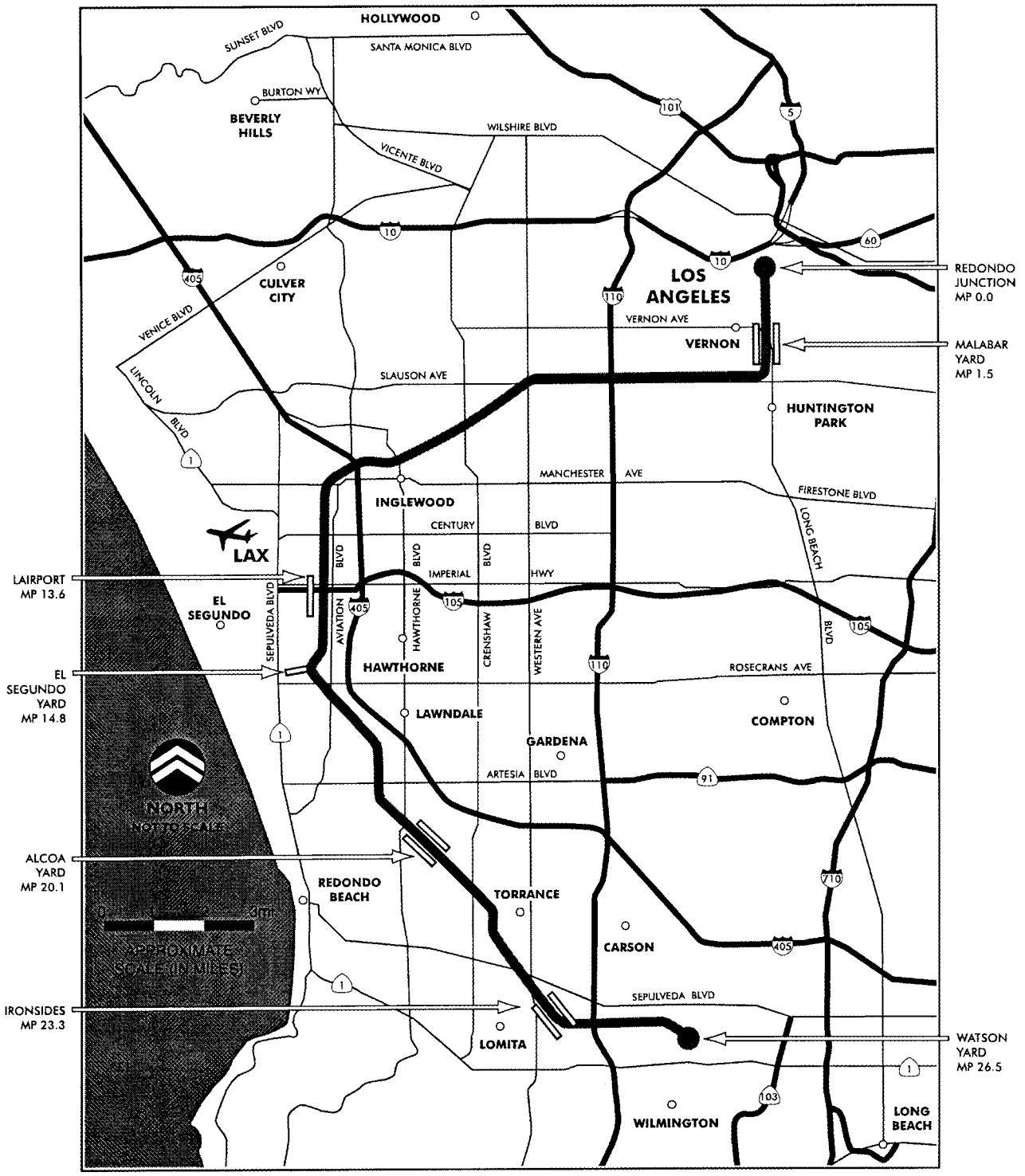
During the course of this analysis, there were some discussions of the analysis's purpose with selected stakeholders. However, no formal public outreach was conducted. Further detailed investigation of the transit service alternatives should include such an effort as well.

TRANSIT SERVICE ALTERNATIVES

The following transit service alternatives were considered in this analysis for deployment on the Harbor Subdivision:

- ***FRA Compliant DMU's 30".*** Diesel multiple units (DMUs) are self-propelled diesel-powered rail cars that comply with the crashworthiness standards for operation on tracks shared with freight trains and conventional passenger trains, as specified by the Federal Railroad Administration (FRA), the federal agency having the responsibility for oversight of safety issues for the national railroad system. The DMUs would operate between Los Angeles Union Station (LAUS) and Torrance, accessing the Harbor Subdivision via a new flyover of the Alameda Corridor, the BNSF Transcon mainline, and Washington Boulevard. This alternative assumed 30-minute peak period, bi-directional headways. Off-peak and weekend headways would be hourly.

- ***FRA Compliant DMU's 15".*** This alternative was a variant of the first, and assumed 15-minute peak period, bi-directional headways. Off-peak and weekend headways would be hourly.



ENGINEERS
PLANNERS
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Figure ES-1
HARBOR SUBDIVISION
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- ***Non-FRA Compliant DMU's 30".*** These are DMUs which do not comply with FRA crashworthiness standards. They can only operate on track shared with freight and other passenger trains on a time-separated basis (temporal separation). The DMUs would operate between the Metro Blue Line crossing of the Subdivision at Long Beach and Slauson Avenues and Torrance. This alternative assumed 30-minute peak period, bi-directional headways. Off-peak headways would be half hourly, and weekend headways would be hourly.
- ***Non-FRA Compliant DMU's 15".*** This alternative was a variant of the non-FRA Compliant DMU's 30" alternative, and assumed 15-minute peak period, bi-directional headways. Off-peak headways would be half hourly, and weekend headways would be hourly.
- ***Light Rail Transit (LRT) 15".*** This analysis assumed that an extension of the Metro Blue Line LRT service could be deployed on the Harbor Subdivision. LRT service would operate between the 7th Street/Metro Center station in Downtown Los Angeles and Torrance, accessing the Harbor Subdivision via a new connection between the Metro Blue Line and the Subdivision at Long Beach and Slauson Avenues. This alternative assumed 15-minute, bi-directional headways all-day (6 AM to 12 AM) on weekdays. Weekend headways would be half hourly.
- ***Bus Rapid Transit (BRT) 15".*** This analysis assumed that buses could operate on portions of the Harbor Subdivision in a two-lane busway, in the same way that the Metro Orange Line BRT service operates today on an abandoned railroad right-of-way in the San Fernando Valley. BRT would operate between the Metro Blue Line crossing and Torrance. This alternative assumed 15-minute, bi-directional headways all-day on weekdays. Weekend headways would be half hourly.

The alternatives for the non-FRA Compliant DMU's, LRT, and BRT assumed that BNSF train operations between the Metro Blue Line crossing and the Metro Green Line crossing at Imperial Highway could be confined to a late/night early morning window, when the transit operations would not be running. This assumption was necessary, given the narrowness of the Harbor Subdivision in much of this segment and the fact that these modes can only share a right-of-way with freight trains given the provision of either temporal or spatial separation. Such a shift of freight train operations would require discussion and/or negotiation with the BNSF. The DMU alternatives assumed headways, consistent with the higher levels of service offered by commuter rail services, such as the Southern California Regional Rail Authority's (SCRRA) Metrolink commuter rail service.

The purpose in investigating such a range of transit alternatives was to identify the potential benefits and costs of transit improvements on the Harbor Subdivision. Heavy Rail, like the Metro Red Line, was initially identified as a potential transit mode for deployment on the Harbor Subdivision. However, Heavy Rail would be grade separated, triggering the greatest number of potential surface environmental constraints of all options studied. Accordingly, Heavy Rail was dropped from further analysis.

POTENTIAL SURFACE ENVIRONMENTAL CONSTRAINTS

The analysis looked at the potential environmental constraints inherent in implementation of DMU, LRT, BRT and Heavy Rail alternatives. Major constraints included noise and vibration impacts that would likely occur as a result of the shifting of freight train traffic between the Metro Blue Line crossing and the Metro Green Line crossing to a late night/early morning operating window. Doing so could increase train noise during a time when nearby residents would be trying to sleep. Other major constraints could be potential visual and safety impacts resulting from transit services near homes in the South Bay Area, as well as right-of-way acquisitions.

POTENTIAL STATION LOCATIONS

The analysis looked at 13 potential station locations along the Harbor Subdivision. These included:

- Slauson Avenue and Long Beach Avenue
- Slauson Avenue at Broadway
- Slauson Avenue at Figueroa Street
- Slauson Avenue and Normandie Avenue
- Slauson Avenue and Western Avenue
- Crenshaw Boulevard and 67th Street
- La Brea Avenue and Florence Avenue
- Century Boulevard and Aviation Boulevard
- Imperial Highway and Aviation Boulevard
- Douglas Street
- Marine Avenue
- The Galleria at South Bay
- Sepulveda Boulevard

A station at Slauson and Long Beach Avenues would provide a connection with the Metro Blue Line. Stations at Imperial Highway and Aviation Boulevard, Douglas Street, and Marine Avenue would provide connections to the Metro Green Line. A station at Crenshaw Boulevard would provide a connection to any future transit improvements proposed for the Crenshaw Corridor. A station at Sepulveda Boulevard was chosen as a southern terminus for costing purposes. The analysis found that all station locations have characteristics that would justify their consideration as possible station stops. Stations were assumed to consist of platforms with minimal shelter and ticket vending machines, rather than park-and-ride locations. No specific station plans were analyzed.

The LRT alternative assumed a northern terminus at the Downtown Los Angeles 7th Street/Metro Center station, used by the Metro Blue Line today. The FRA Compliant DMU alternative assumed access to LAUS. The capacity of either location to accommodate additional transit was not analyzed.

The 13 station locations above are conceptual only, and represent a universe of potential sites for this analysis. Each of the individual transit alternatives assumed a subset of these locations for costing purposes. Other station locations are certainly possible. Any decision on potential station locations beyond this analysis would require a detailed environmental assessment and a formal public outreach effort.

SUMMARY OF FINDINGS

This investigation found that implementation of all six transit service alternatives would be feasible. The major findings are summarized in Table ES-1. The analysis's ridership estimates were based on what Los Angeles area transit services, operating with similar service levels through similar land uses and having similar origins and destinations, are able to attain. These preliminary ridership estimates were sensitive to the length of headways and the convenience of access to Downtown Los Angeles. That is, the shorter the headways and the more direct the access to downtown, the higher the ridership estimate. LRT, with 15-minute frequencies all-day on weekdays and direct access to Downtown Los Angeles, would likely gain the highest average weekday ridership. BRT would have the same service level as LRT, but would not access Downtown Los Angeles directly. Rather, it would connect with the Metro Blue Line at Long Beach and Slauson Avenues. Accordingly, its ridership would likely be lower. Three of the four DMU alternatives would have lesser ridership, a result of lower service levels relative to both LRT and BRT.

Table ES-1: Harbor Subdivision Transit Service Alternatives Matrix

	FRA Compliant DMU 30"	*FRA Complaint DMU 15"*	*Non FRA Compl. DMU 30"*	*Non FRA Compl. DMU 15"*	*LRT 15"*	*BRT 15"*
Total Route Miles	26.7	26.7	20.0	20.0	25.2	20.0[1]
Miles on Harbor Sub.	23.0	23.0	20.0	20.0	20.0	11.3
Total Capital Cost (2006$)	$306.2 million	$376.9 million	$326.9 million	$353.8 million	$667.8 million $1.4 billion[2]	$260.9 million
Operator	Metrolink	Metrolink	Metro	Metro	Metro	Metro
Annual Operating Cost (2006$)	$14.5 million	$18.5 million	$12.4 million	$15.2 million	$14.5 million	$10.9 million
Avg. Weekday Boardings[3]	4,000	5,000	10,000	12,000	40,000	15,000
Headways Peak	30 minutes	15 minutes	30 minutes	15 minutes	15 minutes	15 minutes
Headways Off-peak	1 hour	1 hour	30 minutes	30 minutes	15 minutes	15 minutes
Headways Weekends	1 hour	1 hour	1 hour	1 hour	30 minutes	30 minutes
Travel Time	Approx. 57"	Approx. 58"	Approx. 42"	Approx. 42"	Approx. 57"	Approx. 40-45"[4]
Major Surface Environmental Constraints	Safety impact in Torrance	Safety impact in Torrance	Noise from nighttime freight rail operation on northern portion; visual/safety impact in Torrance	Noise from nighttime freight rail operation on northern portion; visual/safety impact in Torrance	Noise from nighttime freight rail operation on northern portion; visual/safety impact in Torrance	Noise from nighttime freight rail operation on northern portion
Pros - Total Capital Cost - Operating Cost - Ridership - Environmental Impacts	Lower capital cost; moderate operating costs; fewer environmental impacts	Moderate capital cost; fewer environmental impacts	Lower capital cost; moderate operating cost; higher ridership	Moderate capital cost; higher ridership	Highest ridership	Lowest capital and operating costs; higher ridership; fewer environmental impacts
Cons - Total Capital Cost - Operating Cost - Ridership - Environmental Impacts	Lower ridership	Lower ridership; highest operating cost	More environmental impacts	Higher operating cost; more environmental impacts	Highest total capital cost; higher operating cost; more environmental impacts	Variability in travel time due to the use of city streets for almost half of the route

[1] Overall route mileage depends on the assumption of a loop at Hawthorne and Sepulveda; the Metro Orange Line has such a loop.
[2] The range of costs shows the difference between the consultant's cost estimate and typical Metro costs.
[3] Ridership was not modeled; figures based upon services with similar operating characteristics and density/demographics.
[4] Variance depends on traffic conditions on Aviation Blvd. and Hawthorne Blvd.

The order-of-magnitude capital costs include estimates for new track and structures, including stations; new grade crossing protection devices replacing existing systems; and rolling stock. The non-FRA Compliant DMU alternatives assumed a new maintenance facility along the Subdivision at Alcoa Yard in Torrance. All other alternatives assumed maintenance of equipment would be performed at existing facilities. No major acquisitions for right-of-way were assumed. FRA Compatible DMUs can share track with freight rail trains, albeit with significant track reconfigurations. The Non FRA Compliant, LRT and BRT alternatives assumed that freight operations between the Metro Blue Line crossing and the Metro Green Line crossing could be pushed to a late night/early morning window, when transit would not be operating. Aside from the flyover of the Alameda Corridor/BNSF Transcon/Washington Boulevard for the FRA Compliant DMU alternatives, no new grade separations or closures of existing crossings were assumed. LRT's cost of construction would be the highest, more than twice that of most of the other alternatives. The high cost was triggered by the need for a double track alignment, a trench along Aviation Boulevard to the east of the Los Angeles International Airport runways[4], and elevated structures through Alcoa Yard in Torrance[5], among other things.

Annual operating costs include the costs of running and maintaining the transit alternatives. The analysis relied on figures developed by the SCRRA, operator of the Metrolink commuter rail service, to calculate the FRA Complaint DMU estimate; and on the North County Transit District, operator of the future Escondido-Oceanside Sprinter DMU service, to calculate the Non FRA Compliant DMU estimates. Cost estimates for LRT and BRT were based on LRT and bus cost figures developed for Metro's 2007 budget. BRT would be the least expensive alternative to implement, since it would make use of city streets on a little under half of its route to and from Torrance. The comparatively high FRA Compliant DMU operating cost estimates were driven by longer routes and higher service-mile costs.

All options have the potential for triggering environmental impacts. These are primarily:

- For the non-FRA Compliant DMU, LRT and BRT alternatives, potential noise impacts in Los Angeles may result from the shift of BNSF freight train operations to a late night/early morning window between the Metro Blue Line crossing and the Metro Green Line crossing; the freight train shift could generate noise impacts just when residents would be trying to sleep. FRA Compliant DMUs, on the other hand, would not require shifting freight traffic to a late night/early morning window, and thus would not be likely to generate additional noise impacts at that time. Nor would freight traffic have to be shifted south of the Metro Green Line crossing, as the Non FRA Compliant DMU, LRT and BRT alternatives would operate on separate facilities (apart from the freight tracks) built on the right-of-way. Thus, none of these alternatives would trigger potential late night/early morning noise impacts in the South Bay Area.
- For the Non FRA Compliant DMU, LRT and BRT alternatives, potential visual impacts to some South Bay residents may result from new track near homes.
- For all DMU alternatives and the LRT alternative, potential safety impacts to some South Bay residents may result from either new trains or new track near homes. Residents there today cross the Harbor Subdivision on foot at a designated pedestrian crossing.

[4] A trench there likely would be a requirement to prevent the LRT electrified overhead contact system from interfering with airplane navigational systems.

[5] These structures would provide for total separation of LRT from freight train activities in Alcoa Yard.

NEXT STEPS

Deployment of any of the six transit service alternatives appears feasible between Los Angeles and Torrance on the Harbor Subdivision. However, given the narrow right-of-way width restrictions in various segments, deployment of only one alternative is practical, assuming continuing freight rail use of the corridor. No one alternative stands out as clearly superior through the length of corridor. Each has advantages and disadvantages relative to the others. To further refine which alternative makes the most sense for the corridor, further analysis is recommended.

Elements of further analysis should include a traditional travel demand forecast for each alternative. The ridership forecasts appearing in this analysis were based on what Metro and the SCRRA's Metrolink commuter rail service are generating on services running with comparable headways though comparable land uses.

Another element may include phasing of a transit alternative as well as costing, environmental analysis and a public participation component. For example, it might make sense to implement an alternative in just one segment of the route, where the ridership potential is high and implementation costs are low. If the service proves itself by steadily gaining substantial numbers of riders, the service could be expanded as funding becomes available. Such phasing would maximize the benefits while minimizing the costs.

Other elements to be included in additional analysis would be:

- A formal environmental assessment with public participation component, inclusive of community and local concerns relative to potential noise, visual and safety impacts that may be triggered by the transit alternatives.
- Additional discussions with the BNSF for implementation of alternatives which may require temporal separation of freight and certain transit modes on a shared Harbor Subdivision right-of-way.
- More detailed assessments of station locations, including development of conceptual station plans with parking and/or connecting transit access. Included would be an assessment of capacity at the Downtown 7th Street/Metro Center station, which would service as a northern terminus for the LRT alternative, as well as at LAUS, the northern terminus for the FRA Compliant DMU alternatives.
- Detailed assessments of maintenance facility options. Specifically assessed would be Metrolink's ability to maintain FRA Compliant DMUs at Taylor Yard; Metro's ability to accommodate additional rolling stock at its Carson LRT maintenance facility; and potential construction of a Non FRA Compliant maintenance facility west of Alcoa Yard.
- More detailed capital cost estimates.