

Community and Systems Planning for Muni's Third Street Light Rail Project

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San Francisco's Municipal Railway (Muni) is one of the seven "first generation" light rail operations in the United States to survive until the streetcar's rebirth as light rail transit (LRT) in the 1970s. Currently under construction is its two-phase Third Street Light Rail Project, projected to open in fall 2005, the most significant expansion of any of these systems since 1959. The planning history of this project is traced, with particular emphasis on how the project was developed as an integral component of Muni's network, not as a line onto itself. The twists and turns of community planning and politics are described to show how such issues can be resolved and lead to a strengthened project which furthers various objectives. The paper describes how a simple surface LRT proposal evolved into a two-phase project, including a 5.4-mi Phase 1 Initial Operating Segment (IOS) and a Phase 2 New Central Subway (NCS) extending 1.7 mi into San Francisco's Chinatown. With 92,000 daily projected riders, a project which could have dissolved in bickering and divisiveness is instead on track to become one of the most densely ridden LRT projects in the nation.

OVERVIEW: MUNI IN THE REGION

San Francisco's Municipal Railway (Muni) is the largest transit operator in the San Francisco Bay Area, and the seventh largest in the nation, with approximately 750,000 boardings per weekday. Muni operates a multimodal urban core transit system, characterized by a dense network of lines, frequent services, high ridership, and high load factors. Muni's operation is diverse, with service provided by five modes—light rail (both subway and surface operations), historic streetcars, electric trolley coaches, motor coaches, and cable cars. San Francisco is a city with a strong urban tradition, and Muni is used by San Franciscans, Bay Area residents, and visitors for all types of trips.

The San Francisco Bay Area is a region of approximately 7 million residents, composed of nine counties, with three central cities (San Francisco, Oakland, and San Jose). The region is served by four regional rail systems [Bay Area Rapid Transit (BART), Caltrain, Altamont Commuter Express, and Amtrak's Capitol Corridor], and a multitude of operators that provide service from San Francisco to outlying counties, as well as services within the other counties. Though San Francisco's population is only slightly more than 1/10th of the region's population, Muni carries almost half of the transit riders in the region.

Muni began operation in 1912 as one of the first publicly owned transit systems in the United States. Muni constructed a network of rail lines prior to World War II in competition with privately owned operators; it then absorbed the larger privately owned system in 1944. Since

then, Muni has experienced many of the same forces as other transit systems in the nation, including retrenchment of much of the rail network in the 1940s and 1950s, and replacement of much of that network by diesel buses and electric trolley coaches. Muni managed to retain a core five-line streetcar system into the 1970s, largely due to significant tunnel and reserved right-of-way running, and Muni maintained the largest electric trolley coach network in the nation. Muni's streetcar system was modernized with a downtown subway and new light rail vehicles (LRVs) in the late 1970s, and was extended several times in the 1980s and 1990s.

In contrast to most other large city transit systems, Muni remains a department of the city and county of San Francisco. Some governance changes resulting from the passage of Proposition E in 1999 have given Muni some measure of independence in administrative matters, and the proposition established performance measures for Muni to meet in a variety of areas.

SYSTEM AND NETWORK

Properly, one does not set out to plan for light rail; one designs a transit network and the needs of the network will identify the need for higher capacity services, which might appropriately be served by light rail. Carried further, it is as important to consider the design of the bus portions of the network as the rail line itself; success or failure will be determined by the functioning of the transit system as a whole, not by a light rail line in isolation.

In the case of San Francisco, transit service was restructured in the 1980s along multidestinalional principals to form a modified radial grid system of routes. The nature of San Francisco's geography, with a downtown skewed to the northeast corner of a peninsula, and the absence of a single rectilinear grid precluded consideration of a pure grid system of routes. Instead, the restructured system of the 1980s consists of a reduced number of radial trunk lines, and an expanded system of circumferential (usually L-shaped) and, usually further from downtown, north-south and east-west cross-town lines. [Figure 1](#) gives a schematic representation of San Francisco's radial grid transit network.

A number of rail lines served the middle southwest-to-northeast "slice" of the network: in counterclockwise order, (1) the N-Judah Sunset District light rail line, (2) the K, L, and M Twin Peaks corridor light rail lines, and (3) the BART Mission Street corridor rapid transit line. Two additional principal corridors existed which served concentrated volumes of demand, reinforced by the nature of the radial grid, but served entirely by buses: (1) the east-west Richmond corridor in the city's northern area centered on Geary Street, and (2) the north-south Bayshore-Third Street corridor along the eastern portion of the city, naturally intersecting Market Street and connecting to the also heavily traveled Chinatown-North Beach corridor north of the central business district (CBD).

PROPOSITION B AND SYSTEMS PLANNING

In the 1980s, state law in California encouraged several metropolitan areas to turn to a county-wide sales tax as a way to finance transit system improvements. In San Francisco, such a sales tax measure appeared on the ballot as Proposition B in 1989. The package of projects to be funded from Proposition B was assembled by a citizens' task force, and stressed systems planning and what was then about \$900 million in capital funding for major corridor projects,

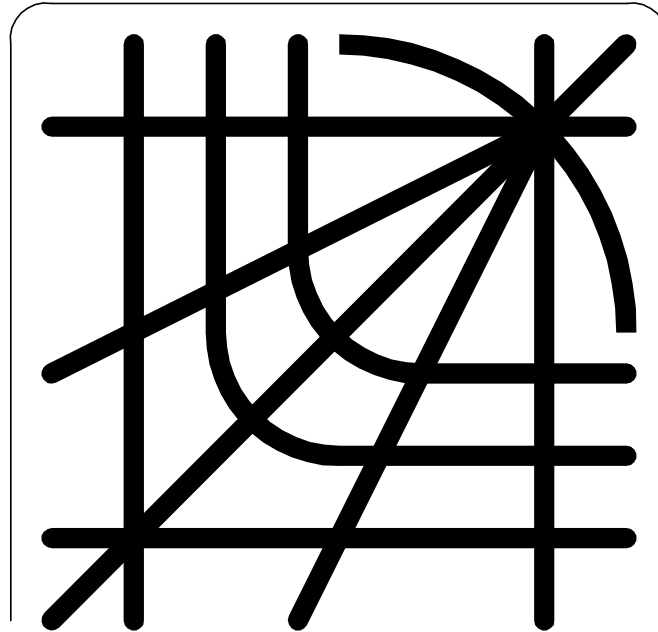


FIGURE 1 Conceptual framework for San Francisco's multidestination modified radial grid route network.

specifically for the Geary and Bayshore corridors, with Chinatown–North Beach a secondary priority.

Systems planning studies in the early 1990s confirmed the appropriateness of light rail to either corridor, but community support was far stronger in the city's southeastern communities, and ensured that first priority be given to a Bayshore–Third Street corridor project.

Systems planning was intended to first confirm the viability of each corridor for further project development, and to identify what alternatives should be carried forth. The Bayshore Systems Study examined three classes of project for this corridor (*1*):

- Bus-only alignments,
- Light rail surface projects on a Third Street alignment, and
- Light rail rapid transit projects on a shared Caltrain alignment.

Bus rapid transit (BRT) had not yet been invented, at least not in the United States, so there was no full BRT alternative studied. The bus alternatives included both diesel and trolley bus variants, and were retained as a TSM (Transportation Systems Management) alternative to be carried through the final environmental impact study (EIS) and environmental impact review (EIR). However, there was no enthusiasm in the very involved Bayshore neighborhoods for a long-term, bus solution.

Third Street is, however, paralleled by the Caltrain commuter rail service between San Francisco and San Jose (now extended to Gilroy), and the fact that this was a four-track alignment in the city with only two tracks in use made it a very attractive alignment for a high speed light rail or true rapid transit type alignment. However, there are four tunnels in the city, only one of which was ever bored through for more than two tracks.

Various factors led to the eventual dropping of the Caltrain alternatives in favor of a Third Street surface line, one with relatively close station spacing at that:

- Shared use of Caltrain tunnels proved hopelessly complex to the point of infeasibility, primarily because of FRA and California Public Utilities Commission issues concerning train compatibility from a safety perspective.
- Constructing new bores for Muni was fiscally infeasible using available funds, which was necessary for near-term implementation (as explained below).
- Access to stations would neutralize any benefits of rapid transit speeds and result in longer travel times for residents than current bus service and the surface light rail transit (LRT) options.
- San Francisco is a physically small, compact area. Frequent stops—or a residual bus service—were necessary to retain transit service viability in this dense corridor relatively close to downtown San Francisco.
- Community pride wanted a service which would be close and accessible to all (and still, of course, unobtrusive).

At the end of systems planning, alternatives to be carried forward were the no-build alternative, a TSM bus alternative, and variations of a Third Street surface alignment, with a median right-of-way throughout the corridor.

GEARY STREET AND FOUR CORRIDORS PLAN

Systems planning for the Bayshore–Third Street corridor in mid-1993 was immediately followed by systems planning for Geary Street, the other first priority corridor included in Proposition B. While a full description of this process is beyond the scope of this paper, it is significant that two alternatives identified were (1) a surface alignment feeding onto Muni’s surface Market Street tracks downtown, those intended for the F-Market Street and Wharves vintage line, and (2) a subway–surface line that would run in a subway east of Laguna Street and serve downtown in a subway that would thread it’s way down Geary, cross over the two-level Market Street subway in a shallow tunnel at Third and Kearny Streets, and continue south of Market (2).

But Proposition B contained only enough local funds to build one corridor, so both Geary and Third Street could not proceed. On Geary, community opinion had never coalesced sufficiently around any alternative to generate political momentum to move a project forward. Though there was strong support for the light rail alternative among transit advocates, neither the residential nor the business community in the neighborhoods had gotten together strongly behind the project.

In the Third Street corridor, community support was building for light rail, partially due the transportation improvements that would be realized, and partially as a community development strategy for a neighborhood that had traditionally felt bypassed by much of the city’s development boom and rising incomes. Political and community support for Third Street ultimately caused the Third Street project to be moved forward as the corridor that would be built first.

In this same period, the San Francisco County Transportation Authority initiated a “Four Corridors” planning effort to tie together the Bayshore, Geary, and eventual Chinatown and

possible Van Ness corridors in spring 1994, paralleling the Geary study. The eventual recommendation endorsed a concept put forth by Muni that the Geary subway–surface concept could connect to a north–south trunk at Geary and Stockton Streets, which would eventually serve Chinatown, and after crossing Market could surface and connect to the proposed Third Street line (3).

COMMUNITY ISSUES

Project planning in any American city in the last decades of the 20th century or the start of the 21st is a partnership between the agencies of government, including the transit agencies, and the communities served. Local community activism is probably more highly developed in San Francisco neighborhoods than in many jurisdictions, and planning for the Third Street project inevitably took place in this turbulent fishbowl environment. Transportation goals were perhaps most obvious, but hardly the only expectation placed on the project.

Jobs, Jobs, Jobs

The central community served by the Third Street Light Rail Project is Bay View–Hunter’s Point, a politically astute community, yet one plagued by high unemployment, gang activity, and physical deterioration. If there was an economic boom underway, it had bypassed Bay View. While Third Street forms the axis of the community, numerous storefronts are vacant or marginal, community services such as groceries and supermarkets are few, and general retail is almost nonexistent. Activists saw the light rail project as a catalyst for the community, and one that would not only bring a brief influx of jobs during construction, but one that could provide job training to make residents more competitive in the open job market long after the line was built, as well as bring economic revitalization—and jobs—to the community as a whole. Transportation improvements were not enough; the goal was transit-oriented development along Third Street (but without residential displacement)—and jobs.

Make Bay View Part of the City

Through the 1970s, the economic, social, and racial isolation of Bay View–Hunter’s Point (after the city’s other major African American community was obliterated by the bulldozer of 1950s style “redevelopment”) was mirrored by the structure of transit service. The 15-Third served the corridor, but most “cross-town” services were only interrupted feeders and failed to connect the eastern portion of the city with other areas. Restructuring in the early 1980s remedied much of this isolation, but travel times remained long and the perception of isolation remained. A strong community goal was for a Third Street LRT to physically interconnect the community’s trunkline with the rail fabric which interwove San Francisco’s other neighborhoods, with the strong belief that this would bring customers and pedestrians to a revitalized Bay View core.

The Push of Politics

The hope, or rather the expectation, that the light rail project could precipitate an economic transformation naturally found its champions on the local political scene. Given that the San

Francisco County Transportation Authority, as administrator of San Francisco's half-cent sales tax, was the principal local funding source, it was only natural that the city and county Board of Supervisors, sitting as the Authority's board, would respond. This took the form of substantial pressure, both internally on the Authority board and externally on Muni as the implementing agency, to use the local sales tax money as 100% financing for a quickly implemented, locally funded project. Skip the EIS, no cumbersome federal process—let's build the thing!

The Municipal Railway, as well as Authority staff, found this alarming and foolish in the long term, as planners naturally wanted to leverage local funds against federal and state monies to stretch the Authority's \$900 million resource into as much as a \$4.5 billion dollar program, under the 80-20 match program still available in theory.

Visitacion Valley and Chinatown

Lest this sound like a project with universal support and the only dialogue being whether to build it quickly or deliberately, dissent started to emerge from the Visitacion Valley community just south of Bay View–Hunter's Point. Bay View, as noted, was home to a large African American community, largely born of the jobs of World War II's Naval Shipyard and reinforced by the redevelopment of the Western Addition cited above. Visitacion Valley harbors another strong ethnic community, this one of several Asian communities in San Francisco that evolved as satellites of crowded Chinatown. With shops and family ties to Chinatown itself, community leaders in Visitacion Valley started to note that the proposed Third Street LRT line running south along Bayshore Boulevard would both fail to serve the heart of Visitacion Valley to the west, but would also sever the 24-h, 7-day-a-week connection between the two parts of the Asian community afforded by the 15-line bus. As systems-level planning evolved toward preliminary design, these voices became increasingly shrill. Third Street Light Rail was not yet a done deal.

What About Geary?

A last lingering concern, if only for the planners, concerned the Geary corridor. As mentioned, enthusiasm for the Bayshore Third Street project eclipsed interest in a Geary project as systems planning wound down, but from a planner's perspective, the 80,000 riders of a Geary project ensured the desirability of an eventual Geary project's still being achieved. Was there any way to advance a Geary agenda from within the parameters of a Third Street project?

NEW CENTRAL SUBWAY STRATEGY

The largest public meeting held until that point was the meeting at which over 200 residents of the Visitacion Valley community had been gathered in opposition to the project, but out of this Muni developed the strategy that has led to implementation of the project.

As described, Visitacion Valley residents protested that while Third Street would receive a shiny new light rail line, they would be deprived of their direct access via Muni's 15-line between their community and Chinatown. The solution was in the refinement of the Bayshore Light Rail Project into a two-phase project, as shown in [Figure 2](#).

Phase 1 would consist of the project as it had been defined to date: a "Third Street Light Rail Project Initial Operating Segment" between the Bayshore Caltrain Station and King Street,



FIGURE 2 The Third Street light rail project.
 (Solid line indicates Phase 1 IOS; dashed line indicates Phase 2 NCS.)

where it would connect to Muni's existing light rail Muni Metro System. During this phase, another bus route, the 9X San Bruno Express, which shared the 15-line's Visitacion Valley routing, would be expanded from part-time (weekday-daytime) to daily, 20-h service, to address the immediate concerns of Visitacion Valley's Asian community. Extensions at each end would further maintain coverage to San Francisco City College at the south end, and Fisherman's Wharf at the north.

But the project would be proposed to include a Phase 2 which would extend from King Street northwest into a "New Central Subway" under Third Street, passing the Moscone Convention Center, crossing Market Street, serving the Union Square retail and hotel district, and continuing into Chinatown.

In fact, this would be the downtown portion of the Four Corridors plan. It would construct the keystone portion of an eventual Geary corridor project, and as much of the Chinatown subway as funds and politics would permit. (Since "Chinatown" was a lower priority than "Bayshore" and "Geary" under Proposition B, the Transportation Authority insisted only a one-station link as far as Clay Street could be considered as part of an initial "Bayshore" project.). This would not only mesh with the city's grid route system, but would offer the Visitacion Valley community the restoration in the mid-term of their Chinatown connections as an extension of the nearby rail service.

It would furthermore bring a new community, Chinatown itself, into the constellation of support for the emerging Third Street project. So rather than trying to advance a project primarily supported by one established community (Bay View–Hunters Point) and the developer of Mission Bay, that initial Third Street surface line had the potential to be supported by a series of constituencies lined up along the entire eastern half of the city: Visitacion Valley, Little Hollywood, Bay View–Hunters Point, Mission Bay, various downtown interests (convention, retail, and hotel businesses), Chinatown, and even supporters of the Geary subway-surface proposal.

It would further allow Muni to pursue a funding strategy under which the Third Street Initial Operating Segment (IOS) would be built as quickly as possible using 100% local Proposition B funds, but a federal "Letter of No Prejudice" would be sought under which federal funds could subsequently be awarded to construct the more costly New Central Subway (NCS) project, leveraged by the full \$584 million cost of the IOS.

Muni began a process to move the Third Street line into implementation. A major investment study, EIS, and EIR process was undertaken, which resulted in a draft EIS/EIR in 1998. A Locally-Preferred Alternative was selected in June 1998. In March 1999, FTA issued a Record of Decision (ROD) for Phase 1 of the Third Street project, the IOS. FTA did not issue a ROD for Phase 2 of the Third Street project at that time.

While the two phases of the Third Street project had been intended to follow in rapid succession, funding issues within the region about the use of FTA Section 5309 New Starts funds pushed the phases further apart. Muni originally planned to build the entire Third Street corridor project using a mix of local and New Starts funds. At this time, however, BART had a commitment from FTA for New Starts funds through 2007, and FTA would not approve two New Starts projects for funding at the same time within the region. Therefore, a regional agreement was reached which split Muni's Third Street project more formally into two elements, and allowed the first component, the Phase 1 IOS, to proceed with local funds. The Phase 2 NCS would proceed later with New Starts funds after BART's extension to San Francisco International Airport was completed. This decision has continued to have ramifications for

Muni's project to this day. The main issue is that FTA has not allowed local funds spent on Phase 1 to be credited as match to the New Starts funds in Phase 2 as originally intended. This has become more of an issue as FTA has increased the match requirement incrementally. Muni is currently seeking legislation that would instruct FTA to credit the local funds in Phase 1 to match the New Starts funds in Phase 2, in much the same way that Las Vegas has done.

REFINING THE PROJECT

Jobs, Jobs, Jobs

From the beginning of the project, a focus of the community in the Third Street corridor has always been on the creation of jobs for local and minority businesses and individuals. Muni took this concern seriously, and has worked throughout the project to develop appropriate methods for ensuring that project work is done, as much as possible within federal regulations, by local and minority business enterprises, and that project contractors consider hiring local workers to fill vacancies. Muni initiated three programs to assist local businesses and individuals:

1. Community Employment, Recruitment, and Training program to identify Third Street construction-related job opportunities. The program, administered by the San Francisco Private Industry Council with the assistance of local community-based organizations, helps local residents prepare and become placed in these positions.
2. Small Enterprise, Recruiting, and Subcontracting program to assist local businesses in obtaining surety bonding, and to support subcontractor lines of credit.
3. Community Outreach Program to provide information and outreach throughout the community about the project, as well as maintain a Plan Room, to allow local contractors to obtain assistance in preparing bid documents.

In addition, Muni decided to use an alternative method of contracting for the construction of the Metro East Maintenance Facility, which would increase local subcontractor opportunities. Muni is using a construction manager/general contractor process for Metro East facility construction, which will increase the number of opportunities for smaller contractors to competitively bid on smaller packaged project components throughout the term of the contract.

Mission Bay

Mission Bay is a project of the Catellus Development Corporation (formerly Santa Fe Southern Pacific Real Estate Company) primarily on the site of the Southern Pacific Railroad's former San Francisco terminal rail yards. The development spans approximately 300 acres, about 1 mi south of the San Francisco CBD. Plans include mixed use development with about 1.5 million gross square feet of retail, 6000 residential units, a 43-acre University of California at San Francisco medical campus, and 5.65 million gross square feet of research and development, light industrial and office space (4).

Initial planning for the Third Street corridor envisioned a line which continued along alignment of King Street, swinging east adjacent to Owens Street parallel to the Caltrain, formerly Southern Pacific, commuter-rail tracks. One advantage was averting crossing bridges over Mission Creek channel, which remained a navigable waterway with just enough traffic to

require lifting bridges and raise concern about the resultant schedule interruptions. Secondly, this alignment facilitated connection to the Caltrain right-of-way to provide the Bayshore rapid transit service described earlier.

But as development plans for the Mission Bay project progressed, it became apparent that this alignment would miss the relatively high density development along this portion of Third Street, in favor of low-density research and perhaps even industrial facilities along the King-Owens alignment. And when the Caltrain right-of-way alignments were discarded in favor of Third Street itself, this benefit too became moot. When finally Catellus began to covet the rail yard site adjacent to the King-Owens alignment, the shorter route along Third Street had too many obvious benefits despite the bridge interruptions, and even the frequency of those occasions had abated over the intervening years. The switch to a Third Street alignment through Mission Bay was a win-win situation. (A jog at the north end over the Fourth Street bridge, not the bridge over Third Street itself, would serve the Caltrain terminal and better avoid traffic congestion at the San Francisco Giants' Pac Bell Park.)

Ridership and Travel Times

San Francisco is a largely developed city with high transit ridership and a congested core. The Third Street Light Rail Project will serve an existing market drawn largely from 25,000 present riders of line 15-Third, plus increasing volumes of trips generated largely by Mission Bay. By the time of the IOS line's opening, Mission Bay is expected to generate approximately 20,000 additional daily transit trips, which will largely be served by the Third Street rail line (4).

As was stressed earlier, the Third Street line does not stand in isolation, but will function and attract the ridership expected in part because it is still but one line in Muni's network, connected to a rich fabric of cross-town services at almost every stop. This connecting network for the most part is already in place as part of the current bus system, and will only require minor modifications to integrate with light rail. [Figure 3](#) illustrates the bus network, which is an inseparable component of the project.

Including connecting trips, corridor ridership of 66,000 in 1996 was projected to increase to 136,000 on the IOS by 2015, or 143,000 with the NCS, though the economic downturn has slowed the Mission Bay project and suggests 2015 volumes may fall about 10,000 short of those figures. Light rail ridership on IOS was projected as reaching 71,000 by 2015 and 92,000 with the NCS, though again a slowed pace of Mission Bay development will defer the attainment of those projections. Ridership is summarized in [Table 1](#) (5).

[Table 2](#) summarizes transit trip times and shows significant reductions over future no project conditions, as well as over current travel times. Future conditions project deterioration of surface traffic conditions. Thus current comparisons show time savings in the 10% to 20% range, while future time savings are in the 20% to 30% range. (These are for total trip times, not just in-vehicle times.)

Trip time reductions have been estimated at various stages of the planning process, but unfortunately do not exist as one fully consistent set at this juncture. Initial work for environmental documentation estimated average trip time savings of 4.0 min for the IOS and 6.9 min for the NCS phase. Subsequent refinements for FTA reporting derived the following net user time savings for the IOS relative to the TSM alternative, and for the NCS relative to the

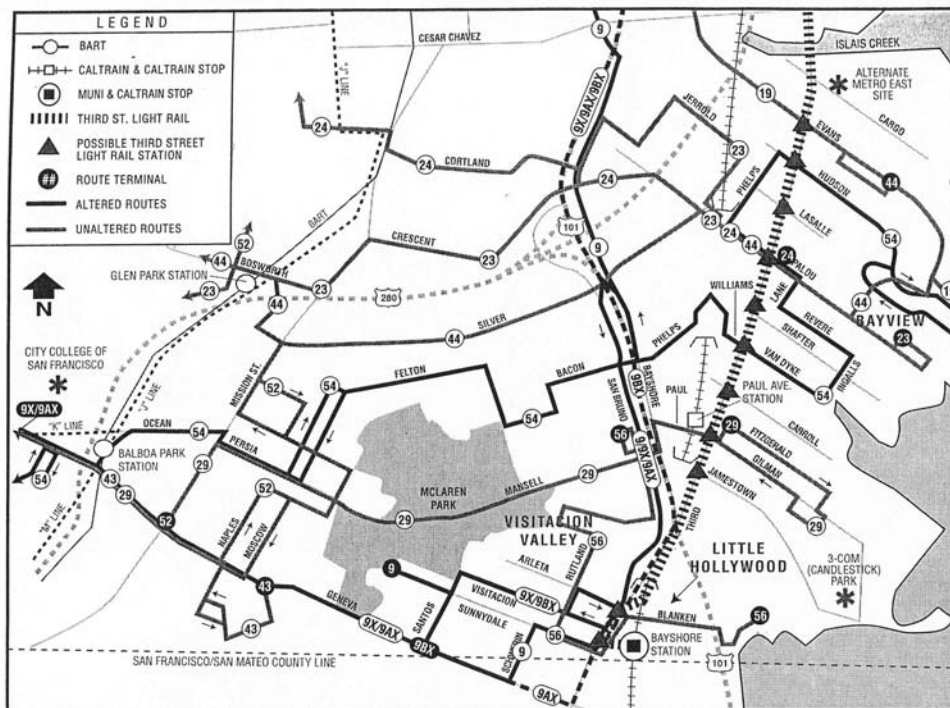


FIGURE 3 IOS bus service plan.

TABLE 1 Estimated Weekday Transit Ridership

LRT/BUS LINE	EXISTING (1996)	2007 IOS	2020 IOS	2020 NCS
Light Rail Lines in Corridor:				
Embarcadero Ext. (1998)	n/a	7,238	9,050	2,020
Third Street LRT	n/a	39,834	71,010	92,110
Subtotal	n/a	47,072	80,060	94,130
Bus Lines in Corridor:				
Line 15-Third	25,050	n/a	n/a	n/a
Lines 9X, 9AX, 9BX	14,330	14,330	21,780	18,200
Lines 30, 45	26,640	26,640	31,770	25,880
Shifts from 15 to other lines	n/a	1,500	4,480	4,480
Subtotal	66,020	42,470	58,030	48,560
TOTAL IN CORRIDOR	66,020	89,542	138,090	142,690
Increase over existing:	n/a	23,522	72,070	76,670

Notes: "2007" figures were initially projected as 2003; this adjustment represents a 2002 estimate of delayed Mission Bay development. Similarly, "2020" figures were presented in the EIS as 2015. Table adapted from *Third Street Light Rail Project FEIS/FEIR*. Data are drawn from *Third Street Light Rail Project FEIS/FEIR*; *Travel Demand Forecasting Results Working Paper*, and *Mission Bay Muni Service Extension Strategies* reports. Projections for "2007" for bus lines other than line 15 were not prepared; estimates in table are inferences drawn from other entries.

TABLE 2 In-Vehicle and Total Transit Travel Times for Selected Third Street Corridor Transit Trips (Times in Minutes)

ORIGIN–DESTINATION	EXISTING (1996)	2020 NO BUILD/TSM ALTERNATIVE	2020 Phase 1 (IOS)	2020 Phase 2 (NCS)
Arleta/Bayshore–Third/Market	36/45	42/51	31/44	27/40
Third/Palou–Montgomery/Market (IOS) Third/Market (NCS)	30/44	30/44	24/38	19/33
Arleta/Bayshore–Stockton/Clay	49/61	49/61	n/a	30/44
Third/Palou–Stockton/Clay	36/50	36/50	n/a	22/37
Arleta/Bayshore–Montgomery/Market (IOS) Main/Market (NCS)	42/54	42/54	29/42	n/a
Third/Palou–Main/Market	30/47	30/47	22/36	n/a

Notes: First number represents in-vehicle travel times; second number represents total point-to-point travel times. “2020” figures were initially projected as 2015 in EIS; this adjustment represents a 2002 estimate of delayed Mission Bay development. Table adapted from *Third Street Light Rail Project FEIS/FEIR*. Data are drawn from *Third Street Light Rail Project FEIS/FEIR*; *Travel Demand Forecasting Results Working Paper*, and *Mission Bay Muni Service Extension Strategies* reports.

IOS. (Again, the reader is warned that the numerical bases of these two estimates are unfortunately not entirely consistent with one another, the NCS estimate incorporating later refinements.)

IOS	4,293 daily hours	1,343,709 annual hours (over TSM)
NCS	13,320 daily hours	4,169,160 annual hours (over IOS)

Costed at a user travel time value of \$11.70, as recommended by FTA when environmental documentation was prepared, the annualized value of these savings to users is estimated as:

IOS	1,343,709 annual hours	\$15.7 million per year (over TSM)
NCS	4,169,160 annual hours	\$48.8 million per year (over IOS)

Signal Priority and Semi-Exclusive Right-of-Way

Visitors to San Francisco since the 1970s have puzzled over the one 10-block stretch of semi-exclusive median treatment (i.e., a transit-only exclusive median, but one still interrupted by cross streets) on a portion of the N-Judah line, not repeated elsewhere in the system. At the time, community opposition, primarily concerned with driveway access and on-street parking, prevented expansion of this approach. Community support for transit-priority applications has since become far more (but, no, not universally) acceptable, and hence transit rights-of-way have

become generally accepted for rail expansion programs on city streets, and are likely to characterize future bus rapid transit projects on city streets, too.

Thus the community accepted the concept of a transit median for the Third Street project (illustrated in [Figure 4](#)), even recognizing the traffic impacts this would have by reducing three traffic lanes to two on a busy truck corridor. Many residents even viewed this as positive in that it might force reduction of traffic volumes.

The only exception came in the Bay View commercial core, a nine-block stretch in which the community sought widened sidewalks with pedestrian amenities. The compromise was to accept shared traffic operation in these nine blocks, light rail operating in one of the two traffic lanes, with the remaining street width given to the widened sidewalks (see [Figure 5](#)).

Similarly, all signals along Third Street will be signalized (many are now two-way arterial stop signs for cross-traffic) specifically so that transit can be given pre-emptive control over the length of the project. Muni's LRVs are outfitted with Vetag controllers and the Vetag technology is being utilized for signal pre-emption.

Stops and Stations

It is undeniable that Muni remains in many ways a "streetcar" system, and this will remain true of the Third Street line. Muni's service standards for its bus system call for stops every 800 to 1000 feet. This stop spacing was expanded somewhat for light rail, but the project's 19 surface stations remain a pedestrian-friendly four blocks and 1,000-1,200 ft apart on average. All are



FIGURE 4 Third Street trackway design, with side platform station.



FIGURE 5 Bay View commercial core treatment at Palou–Oakdale Station.

high-level, with ramp entry at one or both ends wherever feasible. Most stations are center island platforms, but a number of stops in the Bay View district are paired side platforms. While this obviously results in slower operation, less frequent stops would require retention of a local bus service, a financial and physical impossibility. Being a pedestrian-scaled city has its price.

Proof of Payment Fare Collection

Muni initiated Proof-of-Payment (POP) fare collection incrementally in the 1990s on the existing LRT system. Muni has developed a hybrid approach to POP that incorporates Paid Areas within subway stations with barrier fare collection, and POP surface operation in which passengers can still pay fares onboard the first car of each train of LRVs at surface stops, or board any door if they already have POP. Roving inspectors enforce the regulations. The Third Street line was designed from the start to incorporate Muni's hybrid features, which means that high-volume stations will have ticket vending machines (TVMs) available for fare prepayment, but at low-volume stations, passengers needing to pay a fare will be able to pay onboard the cars. Surface station platforms are not considered Paid Areas, and passengers are not subject to inspection on these platforms.

High-Floor Versus Low-Floor

When Muni's initial Market Street subway was designed in the late 1960s and early 1970s, it was laid out as a high-floor platform facility, to facilitate boarding from a level floor. Similarly, the vehicles eventually designed to serve it used a surprisingly successful and reliable high-low step design to serve either the high-level subway platforms or street level surface stops. At the time, today's low-floor light rail car had not yet been invented.

But when planning commenced for the Third Street project, low-floor cars now existed and offered some very attractive features. Community members along Third Street were very concerned that massive, high-platform stations could form a barrier between the two sides of the future revitalized neighborhood commercial street they foresaw. Less intrusive low-level platforms, served by low-level cars were a very attractive alternative. From a planning perspective, low-level cars and platforms also simplified wheelchair accessibility from platforms in blocks too short to accommodate ramps at each end.

A concept was developed to through-route Third Street service with the N-Judah line. Lowering a portion of the platform at the downtown subway stations was shown by an engineering feasibility study to be less problematic than it might seem, and providing accessibility at all N-line stops offered an obvious attraction to disabled transit users over the occasional high-block mini-platforms provided only at major stops.

While this low-floor concept was given serious consideration, a decision was eventually made, however, to stick with a uniform fleet of high-floor LRVs. Principal concerns were to simplify maintenance requirements, as well as to retain a fleet of vehicles which could serve all lines, and certainly simplify the capital construction program for the IOS.

Metro East Light Rail Maintenance Facility

Muni's current LRV maintenance facility, Green Division, is overcrowded and sorely in need of relief in order to function effectively. Muni could not even consider building a new light rail line without increasing maintenance and storage capability, and given that Green Division is hemmed in on all sides by development, Muni had to find a location for a new maintenance facility. After several alternative locations had been considered and rejected, Muni settled on a site for the new Metro East Light Rail Vehicle Maintenance and Operations Facility along the Third Street project corridor, in the vicinity of Illinois and 25th Streets. This new facility is currently under construction, and will be able to store, maintain, and operate up to 100 LRVs.

CONSTRUCTION STATUS AND OPENING DAY: FALL 2005

After years of planning, it is always exciting to move into actual project construction and implementation. All segments of the Surface Rail Alignment for Third Street are under construction as of this writing (July 2003), and the 15 LRVs needed to operate the IOS have been purchased and delivered. The Metro East facility is scheduled to begin construction in Fall 2003, and opening day for revenue operation on the line is scheduled for Fall 2005.

LESSONS LEARNED

The lessons learned by Muni in planning and building the Third Street line are fairly universal transit lessons that are applicable to other situations.

1. Build the network, not the line. The truth is that not all rail projects (and not all light rail projects) that get built are successes. The probability of success will be greatly enhanced when your project makes sense as part of your overall transit network. Your network should be telling you where to consider light rail.

2. Community planning can be a win-win. If you establish credibility with your constituencies—yes, your community comes first, your agency comes second—working with neighborhood activists and other stakeholders does not require you to abandon your transportation principles to reach consensus. Know what’s important to you, and know what’s important to community members. A win for all (or at least most) is not always, but usually, achievable.

3. Consider the longer-term implications of phasing and funding early. With FTA’s new practices regarding phasing of projects, and the reduced ability to match New Starts funds across phases, you should seriously consider the implications of how your project funding is assigned between the phases. It has become much more difficult to build a Minimum Operable Segment or IOS with your local funds, and then use those local funds to match New Starts funds on extensions and future phases. The politics may dictate that you proceed with a locally funded project anyway, but be mindful of the potential future consequences of that.

REFERENCES

1. Wilbur Smith Associates. Bayshore Transit Study. San Francisco Municipal Railway, Dec. 1993.
2. Merrill Associates. Geary Corridor System Planning Study Final Report. San Francisco Municipal Railway, April 1995.
3. San Francisco County Transportation Authority. The Four Corridors Plan. San Francisco, June 1995.
4. Wilbur Smith Associates. Mission Bay Muni Service Extension Strategies. Catellus Urban Development Corporation, March 2002.
5. FTA, U.S. Department of Transportation, and City and County of San Francisco Planning Department. Third Street Light Rail Project: Final Environmental Impact Statement/Final Environmental Impact Statement/Final Environmental Impact Report. Prepared by ICF Kaiser in association with The Duffey Company, et al., November 1998.