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### NO LITTLE PLANS: ENVISIONING THE BAY AREA RAPID TRANSIT SYSTEM AND THE RENEWAL OF RAPID TRANSIT IN THE UNITED STATES

A Thesis

Presented to

The Faculty of the Department of Geography

San José State University

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

by

Jake Coolidge

May 2011

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The Designated Thesis Committee Approves the Thesis Titled

### NO LITTLE PLANS: ENVISIONING THE BAY AREA RAPID TRANSIT SYSTEM AND THE RENEWAL OF RAPID TRANSIT IN THE UNITED STATES

by

# Jake Coolidge

## APPROVED FOR THE DEPARTMENT OF GEOGRAPHY

# SAN JOSÉ STATE UNIVERSITY

# May 2011

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#### ABSTRACT

### NO LITTLE PLANS: ENVISIONING THE BAY AREA RAPID TRANSIT SYSTEM AND THE RENEWAL OF RAPID TRANSIT IN THE UNITED STATES

#### by Jake Coolidge

Cities across the United States and Canada in the years following the Second World War witnessed reinvigorated efforts to construct rapid transit systems despite a decades-long decline in transit patronage, and central to these efforts was the visionary plan for the San Francisco Bay Area Rapid Transit (BART) District. The proponents of these new systems used their initial plans and feasibility studies to articulate a new vision for rapid transit, one that imagined rapid transit not merely as a practical transportation solution, but as a technologically advanced tool for reshaping urban regions. This evolving vision emerges in an examination of the cartography, visual design, and textual arguments of the original BART plan of 1956 and nine additional rapid transit plans produced from 1925 to 1968. Placing the BART plan in the broader context of rapid transit planning illuminates both the innovations of its authors and the concepts those authors inherited from earlier designs. These plans exhibit increasingly sophisticated presentations and nuanced arguments for rapid transit intended to win approval from a public that increasingly preferred private automobiles for transportation. With rapid transit recast as a tool for positively shaping urban areas, this thesis reveals shifting visions for the future development of North American cities.

#### ACKNOWLEDGEMENTS

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#### Introduction

In one of the more famous quotes in urban planning history, Daniel Burnham exhorted us to "Make no little plans. They have no magic to stir men's blood and probably themselves will not be realized" (Hall, 1996, p. 174). Burnham provided a sterling example of such a plan with the now-famous *Plan of Chicago* of 1909. It seems Burnham realized that the grander the vision and the more dramatic its proposed changes to the urban environment, the more a cautious public needed to be assured of its merits. Though the *Plan of Chicago* did not materialize as envisioned, Burnham's ideology found a new application nearly half a century later in an unlikely document: the original plan for the San Francisco Bay Area Rapid Transit (BART) system.

The ambition underpinning this plan finds a voice in a statement by BART's first Board President, Adrien Falk, to the BART Board of Directors:

I think we can take great pride in the plan we have sent on its way today. Without question, it embodies the most modern metropolitan transportation system ever conceived–a system that has captured the imagination and admiration of transportation engineers throughout the world. Represented in these reports before us is a system that almost beggars superlatives because of its bigness. It is big in concept...big in size...big in benefits...and, unfortunately but inevitably, big in cost. (Falk, 1961)

The development of BART has been characterized as a pivotal moment in the history of rapid transit planning (Conway, 1965; Webber, 1976; Cervero & Landis, 1997). First formally conceptualized with the 1956 publication of the plan *Regional Rapid Transit,* constructed during the 1960s and opened to the public in 1972, it was the first rapid transit project of its scale and scope to be built from the ground up in the United States since the venerable systems of Boston, Chicago, Philadelphia, and New York half a

century earlier (Whitt, 1982; Cervero & Landis, 1997). It was an audacious effort to reverse an era of long decline in public transit patronage, an era littered with rapid transit proposals that never materialized while existing systems struggled.

At first glance, BART seems a complete anomaly: high-tech public transportation on the west coast of the United States, a land where the car is king. And yet, perhaps even more remarkably, several metropolitan areas in the US followed the Bay Area's example and produced their own rapid transit proposals during the 1960s. The existence today of Washington's Metro, Atlanta's MARTA, and Baltimore's Metro, among others, runs counter to a more familiar narrative of twentieth century urban development shaped by the mass-produced private automobile.

Significant odds were stacked against rapid transit development in the US as WWII drew to a close. An engineer involved in BART's design noted, "As the automobile came into popular usage, growth of rapid transit systems slowed. From 1935 to 1955 there was actually a net decrease of nine miles in reported subway and elevated trackage" (Quinby, 1961, pp. 352-353). Increasing numbers of automobiles quickly overwhelmed city streets and the urban stretches of nascent highways, causing unprecedented traffic congestion and changing the urban fabric within a generation. While the public in general embraced the shift from public transit to the automobile, the changes wrought upon the city were intolerable to others, as Lewis Mumford's quote demonstrates, "Forget the damned motorcars; design cities for friends and lovers" (Griffin Jr., 1962, p. 58).

Rapid transit proponents, in particular, envisioned a less automobile-oriented future was possible for US cities:

At the time BART's designs were being drawn, the postwar auto boom was a major factor in metropolitan growth, and freeways were accorded high priority. At the same time, public transit systems were falling into disrepair or being abandoned, and patronage was declining everywhere, projecting the prospect of a virtually all-auto transportation system. BART was seen as a lower-cost alternative to freeways and as a means for both reversing the trend and preserving the option of public transit. (Webber, 1976, p. 30)

The planners behind BART and similar systems believed rapid transit could recapture those transit riders who had abandoned traditional streetcar transit systems mired in the traffic. With some amount of zeal, they imagined swift trains running over and under congested thoroughfares, comfortably and conveniently delivering passengers downtown.

Rapid transit advocates needed to speak with firm conviction for their proposals, and the rapid transit plan provided an ample opportunity to express big, sweeping visions for the future and rally support from a public wary of public transit expansion. As a result, rapid transit plans produced in the mid-twentieth century encapsulated the mindset of their authors and express their desires and aspirations for the city. Southworth (1989) writes, "Certainly, plans are only a part of the planning process...But plans are key documents which record the values, intentions, and methods for managing an environment; without a graphic and written plan available for public scrutiny large-scale planning cannot take place" (p. 370). The planners develop a document, comprised of text, images, and maps in support of an idea but do not work in a vacuum. Buisseret (1998) states, "No matter what technical means of representation is adopted, the actual envisioning of the city owes everything to the motives of its patrons, as reflected in the technique of the plan-makers" (p. xiii). The BART plan and the rapid transit plans of other cities are no exception. Their designers chose to include some images and not others. Their maps express variables in support of their arguments and suppress elements that do not. The process of inclusion and exclusion is essential to any act of design and assures that the resulting works are never neutral documents; they will always contain the intentions of the authors and their patrons.

This work will trace the seemingly unlikely resurgence in rapid transit development though the lens of rapid transit plans produced shortly before and during the time period in question. Central to this exploration is the ambitious plan for the BART system, which led, in part, to the construction of "the most publicized transit project in recent decades" (Black, 1995, p. 126). Situating the BART plan in the broader context of rapid transit planning in North America, the work will seek to shed light on how rapid transit proponents appealed to their audiences, examining the graphic techniques and arguments employed. Through alternate readings of these plans, evolving conceptions of the problems facing the city of the twentieth century, challenges to public transportation, and the role of rapid transit in curing those problems are revealed. This exploration begins with a review of the historical developments that changed rapid transit systems from somewhat profitable private ventures at the turn of the twentieth century to increasingly insolvent publicly-owned services by the end of the Second World War.

#### The Context for Rapid Transit Planning at Mid-Century

#### **Rapid Transit Development in North America**, 1890–1950

The torpid state of rapid transit inherited by rapid transit planners in the 1950s resulted from both developments in transportation technology, primarily the popular adoption of the private automobile, and financial strains incurred by public transit providers during WWI, the Great Depression, and WWII. During this time, the transit business shifted from privately owned and operated, for-profit transit providers to public transit franchises, operated like public utilities (Cheape, 1980). Whereas the first rapid transit systems in the US were the fruits of capitalist ambition and investment, funding for subsequent systems faced the scrutiny of the ballot box, increasingly in the face of mounting competition from the private automobile. A review of these developments follows.

Rapid transit has acquired several names in the English-speaking world in the past century, including rapid rail, subway, elevated (railway), and metropolitan railway, or metro. The American Public Transportation Association (APTA) and the Federal Transit Administration (FTA) currently use the term "Heavy Rail" to distinguish this transit technology from other passenger rail systems, like light rail, commuter rail, and highspeed (inter-city) rail. APTA's glossary definition for heavy rail is tinged with exciting evocations of electric speed and sophistication: "An electric railway with the capacity for a "heavy volume" of traffic and characterized by exclusive rights-of-way, multi-car trains, high speed and high acceleration, sophisticated signaling and high platform loading" (Glenn & American Public Transportation Association, 1994, p. 23). The key

feature of rapid transit is the exclusive rights-of-way. This allows a rapid transit system to run on a tight schedule, moving large numbers of people without any other traffic, pedestrian or vehicular, interfering. Cars individually powered with electric current allow for rapid acceleration and deceleration, and can run through tunnels without emitting exhaust. The best rapid transit systems are now famous around the world. They allow residents and visitors of all ages and abilities to use and experience the city collectively, without the burdens and expense of operating a private automobile. Their ability to tie their city's numerous districts and localities together help to organize and strengthen the mental image of the city as an organic whole (Vertesi, 2008). London's Underground, the Paris Metro, and the heavily patronized systems in Moscow, New York, and Tokyo are indispensable components of the built environment and leave an impression on residents and visitors alike.

Rapid transit's key feature, the exclusive right-of-way, assures another intrinsic feature of these systems: great cost of implementation. To be truly "rapid," the system must run above the streets on elevated structures, as the famous "L" trains in Chicago, under the streets in subway tunnels, or along freeway medians. Underground or aboveground stations must be built to provide access. Systems may vary in cost, but all are expensive, and can take years to build. Higher costs imply higher stakes. Rapid transit's promise as a mass transportation solution comes with a high risk of failure, and it may take years for a transit system to "mature" and capture the high number of passengers it was designed to carry. This is particularly true in the United States, where high levels of car ownership, combined with federal home financing policies, rising post-

war incomes, and decentralized employment, have facilitated a dispersed settlement pattern outside of traditional urban centers (Meyer, Kain, & Wohl 1965, p. 110).

Indeed, high population densities demanded the development of rapid transit. The world's first rapid transit system was built in London, one of the most densely populated cities of the Industrial Revolution. As early as the 1860s a steam-powered locomotive pulled Londoners along a route part open trench, part tunnel; the tunnel sections filled with smoke and fumes, leaving riders with headaches and stinging eyes. By the 1880s, New York's Lower East Side had become one of the most densely populated places on earth, while all over the city, pedestrians, horse-drawn railcars, and a perfusion of wagons and buggies clotted into traffic jams on an epic scale (Heller & New York Transit Museum, 2004).

Such intolerable conditions in New York led to a search for solutions, and initially presented a business opportunity. At the end of the nineteenth century in the United States, transit services were provided exclusively by private operators, running horsecars along public rights-of-way on charters granted by the city. These transit systems were completely uncoordinated, as the various operators competed with each other, typically by providing redundant routes adjacent to competitors' routes. New York's first rapid transit system actually went over, versus under, the streets with elevated steam trains. However the noise and fire hazard posed to adjacent buildings by steam locomotives, not to mention slow acceleration and limited passenger capacities, made this system unpopular from the beginning. Still, transit remained a lucrative business, if one could amass the capital for city charters, tracks, and rolling stock. The development of superior

electric-powered train technology only strengthened the positions of those operators who had established themselves. In New York, August Belmont financed the construction of the Interborough Rapid Transit (IRT) system with wealth inherited from his father, a representative of the Rothschild interests (Brooks, 1997). Belmont's autonomy allowed his engineer, William Barclay Parsons, to execute his innovative design. Belmont profited handsomely from it through WWI (Heller & New York Transit Museum, 2004).

The only options for the urban dweller in the older eastern cities were to walk or subject oneself to the whims of the transit corporations, who could determine routes, fares, and changes to service without public input and consent.

Urban riders realized the potentials of (electric traction) innovation, but they perceived that the private corporations were not serving the public in the fullest measure. Those who led the fight for better service believed that a new franchise relationship had to be instituted between the city and the carrying corporations. (Holt, 1970, p. 81)

General resentment led elected officials to renegotiate terms with transit operators. For example, the City of New York had secured ownership of their subway rights-of-way, leasing the use of those facilities to Belmont's IRT. By 1912, "a monopoly in each city operated a system, or a coordinated network...and in some cases the commissions even built and administered high speed rights of way" (Cheape, 1980, p. 1).

As the public began to wrest control of their transit networks from private corporations, a spate of new challenges began to erode the economic vitality of these systems. Most famously, perhaps, the private automobile entered the scene and within a generation radically altered the built environment. Ford introduced the Model A in 1908.

Beginning with a trickle, the small autos were soon flooding the streets...from 1914 to the beginning of 1919, the number of persons per auto dropped from

sixty-two to nineteen, and the number of families per car fell from sixteen to five. The electric railways had a real competitor for the first time in their existence. (Holt, 1970, p. 85)

The onset of WWI led to inflation and a scarcity of materials and labor, causing the costs of rapid transit projects to skyrocket. The combination of these factors created a hostile environment for rapid transit proposals, and a reversal of these trends did not appear at all imminent. Cincinnati's plan for a rapid transit system was approved in 1917 and construction began just before the onset of the war, and was effectively caught in the vice-grip of war-time inflation and a war-time suspension of capital projects imposed by the federal government. Now known as Cincinnati's "White Elephant," construction of the 16-mile system sputtered on for a number of years after WWI, until finally the project ran out of money and was eventually buried under an expressway (Black, 1995).

The rising flood of private automobiles soon outpaced roadway construction and created new challenges in cities throughout the US. In 1925, the city and county of Los Angeles contemplated the undertaking of a massive rapid transit system, encapsulated in a 202-page, hardbound tome prepared by Kelker, De Leuw & Co. of Chicago. In its synopsis of the plan, the Los Angeles Traffic Commission (1925) wrote:

Phenomenal growth in population and industrial activity, together with the tremendous increase in street traffic, makes the construction of rapid transit lines not only necessary but imperative if an adequate, quick, and convenient means of public transportation is to be provided...both local and interurban lines are experiencing more and more difficulty in getting into and out of the central business district because of traffic congestion. (p. 3)

The local and interurban lines referred to here are the streetcar lines that once girded much of metropolitan Los Angeles, until their continued operation was viewed as a nuisance by motorists and cost-prohibitive by the transit operators; their tracks pulled out in favor of bus transit from the 1930s to the 1950s. Ridership on Los Angeles's streetcars peaked in the decade the plan was put to the voters for approval; in later years, more and more commuters would chose the private automobile, and the streetcar lines became increasingly insolvent (Post, 2003).

The plan of 1925 sought to stem this coming decline of public transportation by getting the rails off the streets and onto exclusive rights-of-way, particularly in the central business district. In some ways the plan foreshadows the BART plan of 1956: a boom in economic activity leads to crippling traffic congestion; rail rapid transit is heralded as a key to facilitating the movement of workers into and out of the central business district; and a massive technical document well-stocked with multi-color plates expresses the rationality of a rapid transit solution with imperative authority. Unlike the BART plan, however, the plan did not carry the day at the ballot box, as Angelenos responded skeptically to the fantastic plan and its hefty price-tag. The time for a resurgence in rapid transit schemes. But there was more talk than action, as the realities of inflated construction costs, the long period of time before completion, and political differences among the various units of the balkanized metropolis all hampered building efforts" (Holt, 1970, p. 91).

Lack of initiative in rapid transit development coincided closely with deteriorating conditions for mass transit generally. Up to the Great Depression, surface transit operators had managed to maintain a share of commuters traveling to work downtown, but this crucial revenue source evaporated after 1929, as unemployment soared and fewer

workers made fewer trips. Falling revenues deepened a vicious cycle; as revenue from fares decreased, operators had less funding for staff and vehicle maintenance, resulting in a reduced number routes and vehicles. Additionally, this worsening insolvency made transit companies unattractive to investors and creditors. This in turn led to a declining level of service that made automobiles all the more attractive option for those who could still afford them (Foster, 1981; Cudahy, 1990).

After a nearly two-decades long decline in transit patronage, a hobbled mass transit industry scrambled to handle a spike in transit patronage induced by the entrance of the United States into WWII. US mobilization required the transportation of large numbers of enlisted servicemen, many of them via mass transit, and greatly curtailed the fuel and parts available to operate private automobiles, further increasing the reliance on mass transit amongst domestic workers. The number of those domestic workers on the home front swelled to record highs to satisfy the demand for war-related supplies and machinery. The relatively rapid spike in transit patronage did not accompany a similarly rapid reinvestment and upgrade of transit facilities, however. Though the federal government, recognizing transit's importance in the domestic war effort, allowed the continued manufacture of transit vehicles while automobile production halted, transit infrastructure deteriorated with increased usage. "(T)he volume of patronage and the demands of the war effort literally wore out the industry's track and rolling stock. With the streetcar companies' physical assets credit both exhausted, wholesale abandonment of trackage and service followed from 1945 to 1955" (Jones, 2008, p. 95). The years immediately after WWII were most dire for streetcar operators, but buses and rapid

transit systems also suffered losses in transit riders as the production and consumption of private automobiles resumed (Cudahy, 1990; Jones, 2008).

#### The San Francisco Bay Area and the Development of BART

The San Francisco Bay Area was greatly affected by the US war effort, becoming one of the key regions for shipbuilding and military staging. The period from 1941 to 1945 saw a major influx of federal investment in industry and a remarkable growth in population, as immigrants from all over the country arrived seeking work in the factories. Many communities, especially in the East Bay, grew so quickly that infrastructure improvements lagged far behind, including transportation. The popular streetcar systems were increasingly unable to handle the spiking passenger loads, while the roadways and bridges clotted with grinding traffic. The situation became so dire that productivity threatened to plateau, and lucrative defense contracts might be directed elsewhere (Whitt, 1982; Scott, 1959). An alarm sounded amongst the region's industrial and financial elite-a solution to traffic congestion needed to be found. In turn-of-the-century New York, a wealthy financier had masterminded a rapid transit monopoly, but those days were long gone, and rapid transit development had stagnated. In the Bay Area at midcentury, the business elite spearheaded the effort to overcome that stagnation, only this time, the effort would move through the state legislature, and ultimately depend on voter approval of a bond measure for financing.

The Bay Area, like other cities in the US and its rival to the south, Los Angeles, had considered a rapid transit system in the interwar period, but it had failed to win voter support (Zwerling, 1974). The idea might have remained dormant indefinitely, but in

1943, a joint Army-Navy review board concluded that a regional rapid transit system, crossing the bay in a subaqueous tube, provided the best solution to Bay Area traffic congestion (Whitt, 1982; Scott, 1985). One organization in particular stood poised to take the military's recommendation and run with it–the Bay Area Council (BAC), a private non-profit organization comprised of the region's biggest corporations (R. Walker, 2007). From its establishment in 1944, the group sought solutions to development problems of regional significance, reasoning that continued economic vitality benefited not only industry but the Bay Area as a whole (Dyble, 2008; Zwerling, 1974).

This business-led support of rapid transit stemmed from two important motivators. On the one hand, industrial giants like United States Steel Corporation, Kaiser Steel, and Bechtel stood to gain from lucrative contracts such a project would provide. On the other hand, Bank of America and like-minded businesses in downtown San Francisco and Oakland had significant real estate holdings; they viewed rapid transit as the best means of preserving the vitality of the central business district, and stood to benefit from increased land values adjacent to new stations (Whitt, 1982, Zwerling, 1974). Additionally, the BAC enjoyed the support of a broad coalition of governments, labor unions, and newspapers (R. Walker, 2007; Dyble, 2008). The BAC harnessed this popular support in Sacramento, encouraging the state legislature to establish the San Francisco Bay Area Rapid Transit Commission in 1951.

All the pieces were set, but no one knew for certain if the Commission could get the project off the ground. The hefty support of the Bay Area business elite and the

coalition it had assembled proved crucial. BART's abilities to overcome the odds stacked against it and win the 1962 bond election seems, to several observers, due in part to an appealing presentation by its supporters to the public. Hall (1982) writes, "...as soon as the legislature...committed to the idea of exploring the need for rapid transit and then presenting the case to the public...the exercise from then on was one of public relations" (p. 136). Webber (1976) concurs, stating, "If BART has achieved any sort of unquestionable success, it is as a public relations enterprise" (p. 37). Most blatantly suggesting a selling of rapid transit with a winning plan, Zwerling (1974) writes, "It would almost appear as if the consulting experts were intended more for the purpose of merchandising a particular type of transit system than for the purpose of discovering what type of system was best suited for the Bay Area" (pp. 29-30). BART had many means of projecting a superb image to the public, but the original plan itself is certainly an important early component in that process. "The Parsons, Brinckerhoff report thus gave technical endorsement to the proposal, making it seem credible and even respectable; thus it was a vital first stage in winning political support" (Hall, 1982, p. 112). By marshaling their considerable resources, BART's supporters hoped to reverse half a century of rapid transit apathy.

#### **Alternate Readings of Rapid Transit Plans**

Though the preferred reading of a rapid transit plan produced at mid-century would be that of an impassive document produced by engineers–a straight presentation of technological facts–a review of the plan's packaging, choice of imagery, and sequence of imagery suggests an alternate reading is possible. Such a reading of the BART plan reveals a vision for the future of the Bay Area captured at mid-century, a vision championed by some of its most influential citizens. Opening up that reading to the plans produced before and after the BART plan in other North American cities suggests how previous planning efforts influenced the BART planners' efforts, illuminates the specific plan-making techniques BART planners inherited to articulate their vision and make it appealing to their intended audience, and suggests how the BART plan, in turn, influenced the ideas and techniques of subsequent plans. Taken together, the plans tell a story of renewed efforts to revive rapid transit development across the continent.

The packaging of a plan and the object, the book, that results, marks an initial point of contact for the viewer. In a sense, it provides a frame, to borrow a term from cultural studies, within which the actual content of the plan–the text and imagery–will be viewed. Emmison and Smith (2000) provide an example in which the art gallery provides a frame for the artworks presented within that is institutional in nature and invokes authority (pp. 67, 121). Maps and printed media, particularly those published by governments or reputable institutions, similarly exude authority (Harley, 1990). A hand-drawn map on a disposable medium, like a napkin, will be easily disregarded, and its accuracy strongly doubted. On the other hand, as more money is spent on the production

of a map, book, or atlas, the more seemingly impressive the document becomes and the more credible the conveyed message contained therein. The dimensions, the number of illustrations, fold-out plates, even the choice of paper–all are deliberate choices on the part of the plans' designers. For each plan reviewed, the study will consider the frame the printed and bound object provides for the plan's content, and how this contributes to the plan's persuasive quality.

The impressiveness of the plan as an object provides merely an introduction to the plan itself-the contents of each plan warrant close review and provide another basis of comparison with other plans. In each plan, individual elements are included or excluded to muster support for the project. In a review of over a hundred town and urban design plans produced in the United States from 1972-1989, Southworth (1989) creates a broad matrix of plan elements in order to gauge how the planners went about producing their studies, and point to how the planning process has perhaps changed over time. Southworth is particularly interested in how the presence or absence of elements, like a traffic circulation and parking analysis or a pedestrian circulation and access analysis, denotes changing priorities and values within the urban planning profession. Danzer (1998), in his review of Burnham's 1909 Plan of Chicago, focuses on how individual elements of a plan, including maps, images, and text, convey important ideas about the plan's subject and the authors' visions for its future. Additionally, individual plan elements are arranged in a specific sequence to form a cohesive message in support of the proposal. Danzer detects a narrative in a sequence that, taken together, takes the reader of the plan on a visual journey from a broad and contemplative setting upon the shores of

Lake Michigan, to the stunning perspective views of the proposed civic center complex, and finally, to a sober discussion of costs and necessary next steps, "a path to civic commitment" (p. 168). Danzer seems unabashedly smitten with an urban plan whose images have since become iconic, although never realized in built form, and this underscores the power of design to inspire, regardless of how outlandish the prospect of a "future Chicago in Parisian dress" (p. 148).

A rapid transit system for the Bay Area may have seemed similarly outlandish at mid-century. To better gauge how visionary the BART plan may have seemed at the time of its publication and note how rapid transit planning changed over time, this study selects five plans that precede it and four plans published after for comparison and exploration. The plan produced for Los Angeles in 1925 represents an early plan mired in a bleak period for rapid transit, and serves as a starting point. Subsequent plan selections can be drawn from early BART-related materials and documents themselves. As the BART designers set to work in 1953, they would look to newer systems in the US, of which there were few. Chicago had managed to augment their elevated system with a new subway despite US involvement in World War II, and was the only US city to do so at that time. The subway began carrying passengers in 1951; its plan originally circulated in 1939. Cleveland's new system was close to completion. In their 1957 report to the state legislature, the BART Commission included a glowing review of Cleveland's new "modern rapid transit line...(that) has attracted considerable new patronage. Smooth fast new cars, attractively designed, with large windows, make commuting a pleasure" (San Francisco Bay Area Rapid Transit Commission [SFBARTC], 1957, p. 14). Ultimately

Cleveland's system would not provide a suitable model for the Bay Area's ambition. BART planners would have to look to Toronto and Montreal for additional inspiration on the continent. A 1955 report by the Toronto Transit Commission cited land value increases and a building boom associated with the Yonge Street Subway, a rallying point for BART's backers (Parsons Brickerhoff Hall & MacDonald, 1956; Whitt, 1982). Montreal had a plan by 1953 that featured the expertise of Charles De Leuw, who had worked on the Los Angeles plan of 1925, the Chicago subway from 1941-1944, and the new Cleveland system (Montreal Transit Commission, 1953). In contrast to the Cleveland system, George (1968) commented that Montreal's Metro was "the first real indication that subways could be anything but gruesome" (p. 11). George's remarks for the Cleveland system are less flattering: "Cleveland has shattered space-age illusions by coming forth with a car for its new airport-to-downtown link that looks as grim and uncommodious [sic] as anything General Grant ever had to contend with" (p. 3). Indeed, BART board member Arnold C. Anderson's marginalia in his copy of the 1957 San Francisco Bay Area Rapid Transit Commission report provides a telling artifact. Adjacent to the photographs of the interiors of Cleveland's cars, he penned in all capitals, "But-look what we've designed! -11/18/68" (SFBARTC, 1957). It's evidence of a measure of pride those involved in BART's creation felt, and suggests a breaking away from the systems and plans of the past. Another long-time board member, George Silliman, later remarked in an interview,

We had to come up with a politically acceptable program. We had to come up with a design system acceptable to people and our biggest problem actually was coming up with a system that was advanced enough to be pleasing to people. In other words, when we talked about transit, for instance, we were fighting what

was happening in New York, Philadelphia...the dirty, noisy, bad system, the problems with muggings. We were in a space age, so we had to come up with something that was really a space age system. (Anderson, Perrucci, Schendel, & Trachtman, 1980, p. 29)

The original plan of 1956, Regional Rapid Transit, attempts to capture this design mentality, as does a subsequent document circulated prior to the 1962 election, The Composite Report (Parsons Brinckerhoff Quade & Douglas, 1962). With the engineering and construction of the new BART system underway after narrowly winning the bond measure, BART became standard-bearers for newly invigorated rapid transit advocates. A sub-headline for an article entitled "Blueprint for Survival" in the magazine *Railway* Age Weekly (1963) reads, "San Francisco is giving rapid transit its greatest boost. Here's the Bay Area's story-and, on succeeding pages, the stories of other major cities now planning for transit" (p. 2). Among the cities listed are Washington, Atlanta, Los Angeles, and Baltimore. Washington's Metro would open in 1976, just four years after BART. Its plan went to President Kennedy and the US Congress for approval in 1962, the same year that Atlanta's was published by the same firm that worked on BART, Parsons Brinckerhoff. Rail advocates in Los Angeles resuscitated their own rapid transit dreams. Construction of the BART system provoked fears that Los Angeles would lose a competitive edge to its rival to the north, and spurred the Southern California Rapid Transit District to retain the firm Daniel, Mann, Johnson & Mendenhall for the production of a new rapid transit plan in 1968 (Whitt, 1982). That same year, the same firm would produce a rapid transit plan for Baltimore. All the cities involved in rapid transit planning from 1960 onwards would benefit from increased federal spending made available for transit, particularly for the capital costs of new construction (Black, 1995).

A sample of plans representative of this changing era of rapid transit begins to form, and are listed chronologically in the table below. Rapid transit planning, like any large project subject to public input and approval, is necessarily iterative. As a result, none of the plans selected stand alone as the sole rapid transit planning document for those cities; subsequent plans capture inevitable revisions and alterations. Each plan selected for review includes engineering work that produces estimates of cost and describes some technical specifications, all with the intent of providing the public with the information necessary to decide on financing and constructing the system. Where possible, the selected plans are the first to finalize preliminary design for an ostensibly feasible rapid transit system. In many cases the system that finally gets built varies substantially from the proposals. These plans will form the basis of the exploration to follow.

# Table 1. List of plans reviewed.

Date	Plan Title, Primary Author
1925	Report and Recommendations on a Comprehensive Rapid Transit Plan for the City and County of Los Angeles, to the City Council of the city of Los Angeles and the Board of Supervisors of Los Angeles County. Kelker, De Leuw & Co.
1939	A comprehensive plan for the extension of the subway system of the city of Chicago : including provision for the widening of E. and W. Congress Street / Department of Subways and Traction ; submitted to the Mayor and the City Council of the City of Chicago, October 30, 1939. Chicago Department of Subways and Traction.
1945	Report on Cleveland transit modernization to the Advisory committee to the Cleveland transit system, October, 1945. De Leuw, Cather & Co.
1945	Rapid Transit for Toronto. Toronto Transportation Commission.
1953	Report of the Montreal Transportation Commission for the establishment of a system of rapid mass transportation. Montreal Transportation Commission.
1956	Regional rapid transit : a report to the San Francisco Bay Area Rapid Transit Commission, 1953-1955. Parsons, Brinckerhoff, Hall & MacDonald.
1962	Transportation in the National Capital region: finance and organization; a report to the President for transmittal to Congress. National Capital Transportation Agency.
1962	A Plan and program of rapid transit for the Atlanta metropolitan region. Parsons, Brinckerhoff, Quade & Douglas.
1968	Baltimore region rapid transit system; feasibility and preliminary engineering. Prepared for the Mass Transit Steering Committee, Regional Planning Council, Baltimore, Md. Daniel, Mann, Johnson & Mendenhall.
1968	A final report : to the people of the Los Angeles metropolitan area regarding a first-stage system of rapid transit / prepared in accordance with the provisions of the Southern California Rapid Transit District law, (Statutes of 1964, as amended) by the Directors and staff of: Southern California Rapid Transit District. Southern California Rapid Transit District.

#### Shifting Visions: A Journey through Ten Plans

Good transportation is essential and vital to a great community. Every city is the guardian of its future. Plan broadly for tomorrow, build wisely for today! (Kelker, De Leuw & Co., 1925, p. ii)

#### Los Angeles, 1925

The earliest plan considered in this study provides an exhaustive appraisal of the transportation situation of its chosen subject, with 202 letter-sized pages to sift through including numerous charts, diagrams, maps, drawings, and photographs. The Chicagobased firm Kelker, De Leuw & Co. was merely six years old at this time and perhaps wanted to establish a reputation for itself as capable of taking on complex and ambitious designs (Bulldozer, 1969). And since metropolitan Los Angeles, even at this time, was rapidly spreading from the Basin down the coast and spilling over to the adjacent valleys, it provided an ample opportunity to make no little plan. The plan has the weight of a book, not a pamphlet. Embedded in the wide-spaced type are 62 figures, none of which include color, likely owing to the limits of printing technology at the time. Perhaps most impressive from an initial, cursory visual appraisal of the plan is the inclusion of 24 foldout plates, placed at the end of the book, of which 18 fold out to 18.75 in. tall and 12.5 in. wide, and 6 are even larger, spanning 21 by 17.5 in. Most are printed in more than one color; some are printed with four. The services of Neuner Corporation, Printers and Lithographers, Los Angeles, were retained for this massive undertaking.

The plan's chapters are arranged in a sequence that, after a summary provided for impatient or harried readers, first elaborates on the existing conditions in Los Angeles that create a need for a transportation solution, then reviews the rapid transit solutions

implemented in other cities, outlines coordinating a rapid transit system with local transit services, exhibits the proposed system in detail, discusses the design of facilities and structures, and finally, weighs in on costs and financing schemes. The figures embedded within the text follow these themes closely.

In describing current conditions in Los Angeles, the authors are struck by notable and inter-related upward trends: a greatly increasing population and growth in industrial activity, a spike in private automobile registration exceeding the growth of population, and an increase in traffic congestion, particularly in the downtown area. Graphs and a few thematic maps are provided to aid the reader's grasp of the import of these trends on the urban fabric. The graphic conventions employed remain familiar to a modern reader. Simple graphs depicting the exponential growth of Los Angeles's population and its forecasted continued growth predominate at the onset. An exception is Figure 8, which uses drawings of pyramids to underscore a 1,278% increase in aggregate cargo tonnage handled at San Pedro Harbor from 1910 to 1924. The authors continue with an analysis of street traffic, employing thematic maps to express traffic densities in the downtown area by varying the thickness of the line: the thicker the line, the higher the volume of vehicles on the roadway. The Parking Survey Board and Boy Scouts performed the vehicle counts. The maps reinforce the conclusion that the central business district, at this time, remained the focal point for the metropolitan area, and the clotting of streetcars as they converged here effectively dragged their operating speeds downward. But the maps are actually somewhat small on the page and do not attract especial attention. 18 of the 62 figures are photographs, and these do not appear until the later chapters on the

design of rapid transit structures and methods of financing. The reader is invited to imagine the elevated railway structures and station interiors proposed for Los Angeles by examining modest photographs of similar structures in Philadelphia, Boston, and Chicago. Near the end of the plan appears the sole instance of photographs used in a more persuasive fashion. The authors use before and after photos of a few sites in their local Chicago to underscore the economic benefits rapid transit facilities provide. In one pair of photographs, the location changes from a truck farm to a bustling suburban commercial district within a few years of elevated railway development. Another mostly vacant area later boasts a towering apartment complex. Throughout the plan, however, long stretches of text are left undisturbed by much in the way of imagery, leaving the plates at the back, and the additional space their formats provide, to do the heavy lifting.

First amongst the foldout plates, and perhaps the most important to the designers, is the complete plan for the metropolitan district, a larger format plate that demonstrates the cumulative grandness of the project, and a visual analog to summarize the 201 pages of text that precedes it (Figure 1). A web of proposed rapid transit lines radiates as much as 25 miles from downtown in all directions. The reader finds these distances easily, as the cartographer has provided concentric circles indicating mileages. The pattern of the lines themselves, coupled with the concentric circles, place a keen focus on the downtown area, and the concentric circles are not employed once, but in nearly all the subsequent maps. It provides a unifying motif, and repeatedly reminds the viewer of the subordination of outlying districts to the center. The importance of the center drives the design of the overall network. Subsequent maps express the clustering of population



Figure 1. Kelker, De Leuw & Co. (1925) The Complete Plan for the Metropolitan District [map]. From *Report and Recommendations on a Comprehensive Rapid Transit Plan for the City and County of Los Angeles* (plate no. 1) by Kelker, DeLeuw & Co. (1925).

around the downtown area (Plate 6, a dot-distribution map) and where, at this time, most people worked. Plate 13, "Inbound Passenger Movement on Los Angeles Railway and Local Lines of Pacific Electric Railway," assigns a pie graph to each district encircling the central business district, and according to the authors' numbers, at least half of the workers in each of these districts commuted downtown (Figure 2). Additionally featured are maps of the residential distributions of workers in three industrial districts adjacent to downtown. In each map, graduated circles are assigned to residential districts indicating



Figure 2. Kelker, De Leuw & Co. (1925) Inbound Passenger Movement on Los Angeles Railway and Local Lines of Pacific Electric Railway [map]. From *Report and Recommendations on a Comprehensive Rapid Transit Plan for the City and County of Los Angeles* (plate no. 13) by Kelker, DeLeuw & Co., (1925).
the relative number of workers that live there; connecting these circles to the destination industrial district creates desire lines of relative magnitude in the mind of the map-reader.

Population distribution and travel behavior aside, the radically dispersed pattern of urban development in Los Angeles remained an underlying rebuke to any rapid transit proposal. The authors acknowledge that, at the time, the downtown area was less than half as dense as the Chicago metropolitan area, the most readily comparable due to its more recent development (Kelker, De Leuw & Co., 1925). A set of four plates draws an overt comparison of the downtown area with rapid transit systems successfully operating in other cities by superimposing the lines of those systems over a map of downtown, as if to assure the reader that indeed, rapid transit has been implemented in the United States, and it can be done in Los Angeles as well (Figure 3).

The maps are large, fairly visually dense, and make a firm case for the importance of Los Angeles's downtown, based on a moment in the city's history when the supremacy of downtown was, as yet, unchallenged. The authors hint at the use of transportation planning to influence the "future orderly development" (Kelker, De Leuw & Co., 1925, p. 6) of the metropolis, which would appear to require maintaining that supremacy, in accordance with the example set by the eastern cities the authors so eagerly compared their plan to. The more than 80 years since the plan's creation has borne out a different reality that the planners did not anticipate—the galactic decentralization of industry and bedroom communities facilitated by a robust, if chronically congested, freeway grid. The focus on downtown, and rapid transit's role in promoting that focus, will re-appear thirty years later in the plan for the San Francisco

Bay Area, though by this time, the ascendancy of the suburbs will be impossible to ignore. In the intervening years, the plan for a comprehensive subway system for Chicago demonstrates the increasing influence of that technology facilitating the outward spread of urban populations: the private automobile.



Figure 3. Kelker, De Leuw & Co. (1925) Rapid Transit System of Chicago Superimposed Upon Map of Los Angeles [map]. From *Report and Recommendations on a Comprehensive Rapid Transit Plan for the City and County of Los Angeles* (plate no. 20) by Kelker, DeLeuw & Co. (1925).

## Chicago, 1939

The engineers behind the Los Angeles plan lent their expertise 14 years later to a report created by the City of Chicago in compliance with a federal grant to augment, and in some cases, supplant the existing elevated rapid transit system with subways. First-stage subways beneath State and Dearborn Streets were under construction at the time, under the auspices of the Public Works Administration. The plan's full title, "A Comprehensive Plan for the Extension of the Subway System of the City of Chicago, Including Provision for the Widening of E. and W. Congress Street," places an emphasis on these subways. The typesetting on the cover and title page bolsters the emphasis; "Extension of the Subway System" is set in the second-largest letters (after City of Chicago), while the Congress Street portion of the title is comparatively quite small. Remarkably, the concept of widening Congress Street into a multi-lane superhighway consumes the bulk of the report, and marks a major concession to automobile traffic and its increasing impact on the city.

When held, the heft of the plan is similar to its Los Angeles predecessor; the page format is identical and the thickness is comparable. A review of the contents reveals a shorter written report (131 pages), completely devoid of images, followed by 31 figures (plates) and 44 plans. 12 of the figures and all of the plans unfold out to dimensions of up to 23 in. wide. A considerable amount of the plan's size results from the inclusion of these plans. Most of the plates are printed solely with black ink, with the exception of five small maps, printed with black and red. The City of Chicago retained Fred Klein Co. for printing.

A summary begins the report, followed by two principle sections, one detailing subway extension, and a second concerning the widening of Congress Street into a superhighway. Appendix I discusses the estimated initial use and capacity of the proposed superhighway. Costs for both the superhighway and the subways are itemized in Appendix II, but a method of financing is not agonized over, since the federal government has assured its support for both elements of the project. This lessens the overall persuasive character of the document. In their overview of the Chicago's recent development, however, the authors defend the merits of the rapid transit element of the plan.

Much has been said thoughtlessly of the gradual disappearance of the streetcar, bus and rapid transit train...it may be concluded that, while superhighways are needed and will be built, the need for subway extensions and modernization of all local transit facilities is fully as urgent. (Chicago Department of Subways and Traction [CDST], 1939, p. 24)

The best cartography in the plan is rendered in service to the rapid transit system. Figure 1 is an 8 by 11 in. dot-distribution map of the population of Chicago projected for the year 1950, printed in black, with the rapid transit system overlaid in red ink (Figure 4). Drawing attention to the map, the authors assert that it "provides a visual exhibit through which the necessity for certain of the proposed subway extensions becomes evident" (CDST, 1939, p. 23). The principle foldout map of the rapid transit system, placed in the plan twice (once at the beginning, and again at the beginning of the figure section), includes a shaded area denoting a one-mile buffer around the system, which "embraces 78% of the total city area and 93% of population" (Figure 5). Another figure, "Relation of Rapid Transit Lines as Proposed to Centers of Industry, Commerce, Recreation and

Residence in the City of Chicago" maps these phenomena with graduated circles to indicate relative importance of each center, and demonstrates how the current rapid transit system serves many of these centers, while the proposed extensions will serve still more once built. The small map is dense with information, straining the limited space available and the limited palate of the two inks.

Despite the arguments presented favoring the subway system, much of the plan is given over to the exploration of the superhighway, which in 1939 was still a new term, and perhaps, as a result, represented uncharted territory. A seemingly exhaustive number of plans devoted to the subject express the feasibility of making the idea reality from an engineering perspective. But what might it look like once constructed? All six of the striking illustrations by Miles Sater visualize an eight-lane thoroughfare, driven boltstraight through the urban fabric, sprinkled with sleek automobiles and bordered by greenery as it stretches to the distant Midwestern horizon (Figure 6). The evocation of space, and the sense of scale, links these more humble visualizations with the classic work of Jules Guerin completed 30 years prior for the *Plan of Chicago*. The inclusion of these illustrations place importance on functional and aesthetic benefits the superhighway will bring the city as designed in the plans.

Taken as a whole, the plan presents certitude in Chicago's capacity to expand and modernize its existing rapid transit network, while simultaneously acknowledging the need to accommodate the private automobile. Chicago Dept. of Subways and Traction Commissioner Philip Harrington, in his letter of transmittal introducing the plan, sums up the challenge stating:

It is this problem of making adequate provision for large volumes of private traffic as well as for users of common carrier service, that makes "superhighways" as necessary for the segregation of fast moving automotive traffic as subways are needed for the rapid transportation of the public car rider. Nor can we dispense with either, in the hope that the other will provide all the relief we need. (CDST, 1939, pp. 4-5)

The plan also strikes a contrast with the Los Angeles plan, in that key support for rapid

transit development was already in place as the designers set to work. This scenario

would be seldom repeated as the twentieth century progressed.



Figure 4. Chicago Department of Subways and Traction. (1939). Comprehensive Plan for Extension of the Subway System and Forecast of Population Distribution [map] From *A Comprehensive Plan for the Extension of the Subway System of the City of Chicago: Including Provision for the Widening of E. and W. Congress Street.* (Fig. 1) by Chicago Department of Subways and Traction. (1939).



Figure 5. Chicago Department of Subways and Traction. (1939). Proposed Pattern of City Wide Rapid Transit Facilities [map] From *A Comprehensive Plan for the Extension of the Subway System of the City of Chicago: Including Provision for the Widening of E. and W. Congress Street.* (Fig. A) by Chicago: Department of Subways and Traction. (1939).



Figure 6. Sater, Miles. (1939). Perspective of West Side Superhighway Between Garfield Park and Columbus Park [drawing] From *A Comprehensive Plan for the Extension of the Subway System of the City of Chicago: Including Provision for the Widening of E. and W. Congress Street.* (Fig. A) by Chicago Department of Subways and Traction. (1939).

#### Cleveland, 1945

Circumstances amenable to rapid transit development aligned in Cleveland as WWII drew to a close. The same firm that worked on the Los Angeles and Chicago plans, now operating under the name De Leuw, Cather & Co., was retained by the Cleveland Transit Authority to build upon a study for transit modernization done by the Authority the previous year. In their opening comments, they cite the "unusually favorable financial condition" (De Leuw, Cather & Co., 1945, p. ii) of the city's transit system and the "availability of substantial mileage of railroad rights-of-way" (De Leuw, Cather & Co., 1945, p. 1) as factors facilitating rapid transit development, while assuring readers that the process of modernization put forward in the plan does not involve any sort of "untried or novel schemes not previously tested and found practicable" (De Leuw, Cather & Co. 1945, ii). The tone at the onset of the plan underscores a decidedly unadventurous approach to rapid transit development.

The plan's 52 letter-sized pages are typewritten and printed single-sided, marking a departure from the lithographically printed earlier plans. As with the Chicago plan, the plates, referred to as "exhibits" in this plan, are placed at the end of the volume. 19 of 28 plates fold out to 19 in. wide. Over half of the plates are printed with two colors, and one plate has three. The maps, plans, and conceptual sketches comprising the exhibits required printing superior to that found in the textual portion of the plan, and yet oddly enough, a number of the maps in the copy reviewed demonstrated numerous printing flaws and errors, principally under-inking, over-inking, and poor registration. The exhibit number is crudely stamped on the upper-right hand corner of each plate. Budget

constraints may have been a decisive factor in the compromised visual appearance of the plan.

The main contribution of the plan, particularly in augmenting the Cleveland Transit Authority's 1944 report, is its origin and destination study, designed and analyzed by De Leuw Cather & Co. and conducted by the CTA, utilizing, as had been done in Los Angeles, a small army of Boy Scouts for data collection. A description of the survey begins the report, followed by an inventory of existing transit facilities, a brief discussion of Cleveland's development, and the author's recommendations for rapid transit development based on the transit-riding behavior observed in the study.

First amongst the exhibits is a map showing passenger volumes observed on Cleveland transit lines in 1941, using line thickness to indicate relative volumes. The importance of the central business district in drawing commuters is immediately apparent. Exhibits 2-11 are maps in which the authors attempt to graphically convey the findings of the recently completed origin and destination survey (Figure 7). The city is divided into ten zones, and a separate map is produced for each zone. On each map, a pie chart represents a zone's residential population, with larger circles representing larger populations. Individual slices of the pie chart represent the proportion of commuters destined for each zone in the city. Similar maps were prepared for the Los Angeles plan, and in those maps, the reader had to create the connections between origin zone and destination zone in his or her mind. In the Cleveland maps, the designers have added arrows stylized with a drop-shadow effect, even twisting in some cases as they arc across the map to connect the origin zone to the destination zones. The end result adds

considerable unnecessary visual clutter, but the reader is able to decipher, with the aid of an accompanying table of figures, the relative importance of the individual zones as centers of employment. The central business district drew at least a quarter of all commuters from each zone, but the study also reveals the importance of zones adjacent to downtown, both immediately to the east and the west. Additionally, Exhibit 12 is a graduated circle map showing the destinations, block by block, of commuters arriving in the central business district.



Figure 7. De Leuw, Cather & Co. (1945). Distribution of Transit Passengers Originating in East Inner Area – 400 Zone [map] From *Report on Cleveland transit modernization to the Advisory Committee to the Cleveland transit system, October, 1945* (Ex. 6) by De Leuw, Cather & Co. (1945)

The map of the proposed route does not appear until after the maps of the survey results, in contrast to previously noted plans, which place the proposed system map near

the beginning. In doing so the authors emphasize that the route chosen is driven by the survey results. Not surprisingly, the route tracks generally west to east, curving toward the lakeshore to intersect the downtown area. Exhibit 15 maps all commercial and industrial employment centers in the city with graduated circles to indicate magnitude; the proposed system is overlaid to demonstrate coverage (Figure 8). Accompanying text boasts, "The recommended rapid transit system with its feeder lines serves all major concentrations of industrial and commercial employment in the Cleveland metropolitan area" (De Leuw, Cather & Co., 1945, ex. 15) The map appears to contradict this statement, though the poor registration of the printing plates makes a final determination difficult.

The feeder lines referred to above are local and express bus routes designed to augment the proposed rapid rail route. Whereas the Los Angeles plan relies solely on grade-separated rail for the bulk of its proposed system, and the Chicago plan incorporates a significant concession to automobiles with the inclusion of the Congress Expressway, the Cleveland plan relies heavily on a network of motorbuses to carry passengers into its rail stations. The buses initially travel over local streets and thence over expressways. Five drawings provided amongst the last of the exhibits underscore the importance of buses to the overall scheme (Figure 9). Each visualizes a key proposed rapid transit station situated on wide streets sparsely dotted with tiny private cars (proper proportions are not carefully executed in all but one of these drawings, saddling them with an unfortunately amateur appearance). At each station, at least one bus is parked adjacent to the station's entrance. Implicit in the drawings is the seamless integration of

bus and rail modes that will make Cleveland's otherwise limited system comprehensive, and an acknowledgement of the impracticability of implementing an exclusively railbased system.



Figure 8. De Leuw, Cather & Co. (1945). Relation of Recommended Rapid Transit System to Industrial and Commercial Employment [map] From *Report on Cleveland transit modernization to the Advisory Committee to the Cleveland transit system, October, 1945* (Ex. 15) by De Leuw, Cather & Co. (1945)



Figure 9. De Leuw, Cather & Co. (1945). Delineation of Cedar Station [drawing] From *Report on Cleveland transit modernization to the Advisory Committee to the Cleveland transit system, October, 1945* (Ex. 23) by De Leuw, Cather & Co. (1945)

# Toronto, 1945

As Cleveland's plan took shape, Toronto also looked to its post-war future with a proposal for a rapid transit system. The plan, *Rapid Transit for Toronto*, marks a departure from the previously reviewed plans, as authorship belongs to the Toronto Transportation Commission, and not a private firm hired for the task (though the Commission did retain engineering consultants to aid their work, including the ubiquitous De Leuw, Cather & Co.). It is also a much more slender document, with 32 letter-sized

pages, printed on both sides, bound with a small-gauge spiral. The document is handsomely printed on semi-glossy stock, and the images are integrated with the text, not inserted as plates at the end of the document. The tone carried throughout exudes a sense of certainty in the plan's merits and the need for action.

Despite its brevity, the plan includes some of the basic elements found in previous plans. After a summary, it describes development trends in Toronto from 1900 onward, chiefly the rising population and increasing automobile traffic in the downtown area creating a now-familiar scenario of compounding congestion problems. A description of the rapid transit route designed to relieve the congestion follows. The authors explicitly call attention to the merits of the plan with the next section entitled "Benefits" before concluding with a discussion of financing and transit fares.



Subways will produce a startling improvement in such conditions as illustrated here—Yonge Street at Front Street, during the evening rush hour.

Figure 10. Toronto Transportation Commission. (1945). [photograph] From *Rapid Transit for Toronto* (p. 1) by Toronto Transportation Commission. (1945) From the onset the authors present a stark congestion problem that threatens to undermine Toronto's position of importance in Canada and North America. A photograph on pg. 1 (Figure 10) provides visual evidence of deteriorating conditions at the downtown intersection of Yonge and Front Streets: pedestrians, trucks, streetcars, even a horse-drawn cart ply the slush-ridden streets in seemingly chaotic fashion. The next three pages each have a well-chosen photograph for added emphasis: private automobiles and streetcars alike locked side-by-side and bumper-to-bumper in rush-hour gridlock; a streetcar stopped in its tracks while police officers work to extricate an ambulance stuck in the snow. A caption under the third photograph reads, "It is easy to imagine how greatly such conditions will be improved by the adoption of the Commission's rapid transit proposals" (Toronto Transportation Commission, 1945, p. 3).

Having quickly laid out a case for a grade-separated transit solution, the plan follows with proposed routes. A map of passenger flows as observed in 1943 draws thick lines over east-west arterials of Bloor, Danforth, and King Streets, but especially over the north-south arterial of Yonge Street and the east-west arterial Queen Street. These latter streets form the basic components of the proposed system, drawn on a map placed on the page opposite the map of passenger flows. Attractive, precisely rendered cutaway drawings of key transit stations in the system follow, emphasizing the convenient and orderly distribution of passengers from the streets to the subway platforms (Figure 11). Integration with the surface transit system is emphasized as previously observed in the Cleveland proposal. Plans and sections of stations at Bloor St. and St. Clair Ave. detail street-level platforms for streetcar passengers that provide protection from the elements

and transfers to the subway below without the need of a transfer slip. The document provides few technical drawings, however, and ink-wash drawings of stations and trackways predominate. In one instance, a photograph of the "beautifully finished mezzanine" (Toronto Transportation Commission, 1945, p. 24) in a new Chicago subway station provides a means of conceptualizing Toronto's proposed facilities. On a facing page, an artist's visualization populates a "well lighted and attractively finished" (Toronto Transportation Commission, 1945, p. 25) platform area with stylish women in heels and men in three-piece suits; one even leans jauntily on a cane.



Cutaway drawing of King Street Station showing subway tracks, platforms and mezzanine. Note that subway entrances will be located back from the congested sidewalk corners.

Figure 11. Toronto Transportation Commission. (1945). [drawing] From *Rapid Transit* for *Toronto* (p. 9) by Toronto Transportation Commission. (1945)

The section of the plan expounding the benefits of the system provides the one instance of persuasive cartography. On facing pages are two maps, printed in color, that portray travel times to the downtown area with the existing surface streetcar system and the proposed rapid transit system (Figure 12). They are, in fact, the only items in the document printed in color, and their appearance late in the plan comes as a bit of a surprise. In both maps, the core zone, representing travel times of 5 minutes or less, is a saturated red, ringed by a bright yellow (5-10 min), and saturated turquoise (10-15 min); subsequent zones are printed with a half-tone pattern that reduces their intensity. The message is clear when comparing the side-by-side maps: the bright, red-yellow-turquoise core of reduced travel times spreads like a flame through the map when the transit system is in place; travel times at the northern terminus at Eglinton Street drop from 25-30 min via streetcar to 10-15 min with the subway.



The times required to traced on the present surface transit system between downtown Toronto and other sections of the city are shown in the coloured time zones.

Figure 12. Toronto Transportation Commission. (1945). Time Zones with Existing and Proposed Systems [maps] From *Rapid Transit for Toronto* (pp. 28-29) by Toronto Transportation Commission. (1945)

Given the limited size of the document, the authors must state their case quickly. They concede that private automobiles will only become more popular in the coming post-war era, and to respond to this the Commission must develop a transit service that can compete with the private automobile, compelling commuters to choose riding transit over driving. As a result, the plan's contents present a vision of a system that is convenient, attractive, and necessary, if current, intolerable conditions are to be ameliorated. Much like the plan considered for Cleveland, coordination with surface transit is stressed as vital to the rapid transit system's success.

#### Montreal, 1953

The physical location of Montreal's central district between the St. Lawrence River and Mont Royal constrained the city's ability to construct thoroughfares and surface transit lines connecting it to its outlying residential districts; the worsening traffic situation caused the city to strongly consider a subway solution since at least the mid-1940s (Montreal Transportation Commission, 1953). With a mandate for rapid transit building, the Montreal Transportation Commission developed a highly detailed plan to supplant earlier, roughly sketched ideas. Like its counterpart in Toronto, the Commission authored its own report, adding in its opening letter of submittal:

Work of this kind is of a very specialized character, and systems of underground rapid mass transportation exist only in some large cities of the world. It was necessary, in order to direct our studies, to retain the services of an engineer of the highest competence and of wide experience in this kind of undertaking. (Montreal Transportation Commission, 1953, p. v)

That engineer was none other than Charles De Leuw.

With the involvement of Mr. De Leuw, one might anticipate some similarities with the plans previously reviewed. It is a much larger report than Toronto's: 113 lettersized pages with 26 fold-out plates at the back, spiral-bound between rigid cardboard covers. The front cover has a silver sheen, with map of the proposed initial subway system printed on it. Black and white images are embedded in the text, and color plates are inserted. The report is generally well printed and the foldout plates at the back are particularly well printed, typically with multiple colors, including warm background grays that allow plan features to stand out. The pacing of the document and the placement of large plates at the end of the plan is reminiscent of the Los Angeles and Cleveland plans.

An opening letter to the city's Executive Committee serves as an introduction to the report. The first chapter immediately delves into Montreal's recent development history and the resulting causes for traffic congestion. The second chapter then provides a statement of purpose for rapid transit development, noting the studies on the subject made in the 1940s. The next chapters carry out what those earlier studies were unable to do: a detailed system plan complete with initial and subsequent routes, station plans, a discussion on equipment, and financing schemes.

The authors clearly spell out the strengths of their proposal and seek to alleviate potential resistance caused by its high cost. In addition to Chapter 8, "Advantages of Proposed Subways and Modernization of Surface System," Chapter 9, "Factors to be Considered in the Distribution of Subway Costs" argues that the costs cannot be shouldered by transit operators alone, and that the benefits of rapid transit experienced by all citizens behooves costs to be distributed amongst citizens generally. To bolster this argument, Chapter 9 includes a seven-paragraph quote from a letter written earlier that year "by one of Toronto's outstanding real estate experts, Mr. Murray Bosley" (Montreal

Transportation Commission, 1953, p. 93). Bosley provides numerous examples where development of the Yonge Street subway had a positive affect on real estate values adjacent to the line. These benefits provide justification for the initial high cost of the system with the added commercial activity and tax revenues collected by the city; the argument foreshadows similar conclusions made by the Toronto Transportation Commission two years later that were ultimately cited in the San Francisco Bay Area plan.

As with earlier plans, the seemingly most important maps and plans are to be found after the conclusion of the written report. There are some notable exceptions. Similar to the Toronto plan, the Montreal plan documents traffic congestion with a selection of photographs; one depicts traffic in snowy conditions, a frequent concern in Montreal. Also employed are photographs of station platforms and train cars currently in use in Toronto and Chicago. Crisply drawn charts express increasingly familiar themes: of an increasing rate of population growth in the metropolitan area projected for the near future, and of great increases in private vehicle registration and a near doubling of automobiles and taxis leaving the central business district during the evening commute. The authors allow themselves a few flourishes as well with the amount of space provided them: the frontispiece bears a full-page aerial photograph of downtown Montreal with Mont Royal in the middle ground and the northwestern skyline receding behind; peppered throughout are line drawings printed in half-tone of scenes and notable buildings in Montreal. A measure of civic pride accompanies the customary rapid transit plan graphics.

Most of the foldout plates at the back of the plan depict floor plans, sections, and profiles of planned stations throughout the route, but three maps in particular warrant closer examination. Exhibit 2 shows the population distribution in 1951 with blue dots and projected additional population distribution in 1971 with red dots (Figure 13). Superimposed on these distributions are existing surface transit routes drawn with thin black lines. With few exceptions, the red dots can be found on the periphery, outside of the central area best served by the existing transit network.



Figure 13. Montreal Transportation Commission. (1953). Population Distribution and Existing Transit System [map] From *Report of the Montreal Transportation Commission for the establishment of a system of rapid mass transportation* (Ex. 2) by Montreal Transportation Commission. (1953)

Exhibit 3 draws the population distribution for 1971 in one color (blue), with the two stages of the subway and revised surface routes superimposed on it (Figure 14). In contrast to the previous map, the proposed system purports to bring comprehensive service through a combination of surface and rapid transit routes. The bold red lines of the subway, drawn with a line much thicker than the surface lines, grasp the mapped area with four branching lines and command the viewer's attention.



Figure 14. Montreal Transportation Commission. (1953). Comprehensive Plan of Proposed Subway System [map] From *Report of the Montreal Transportation Commission for the establishment of a system of rapid mass transportation* (Ex. 3) by Montreal Transportation Commission. (1953)

The last exhibit in the plan, "Regions Benefited by the Initial Subway in Conjunction with Revised Surface Routes," draws regions with two shades of yellow where travel times to downtown are reduced by 15-30% and 30-45% (Figure 15). The data classification, percent reduction in travel time, is less definite than the time-zone maps used in previous plans, expressed in concentric bands of minutes, and is generally coarser, employing only two broad categories, but the net effect portrays a widely distributed benefit from the proposed subway, with yellow sprawling across half of the extent. This last map subtly reinforces the claim of broad benefit, which the authors argue should be financed by the broad base of the general public:

It is futile to think that the passengers of the transportation system alone could absorb the considerable capital costs which the construction and equipping of a subway would require... To encourage and assure the progress of Greater Montreal, a subway is of primary importance. The advantages are widespread, not only to the users of the transportation system, but to all citizens as well as commercial and industrial enterprises (Montreal Transportation Commission, 1953, p. 99).

The maps and text combined present the citizens of Montreal with an opportunity to

positively affect the city through collective action.



Figure 15. Montreal Transportation Commission. (1953). Regions Benefited by the Initial Subway [map] From *Report of the Montreal Transportation Commission for the establishment of a system of rapid mass transportation* (Ex. 3) by Montreal Transportation Commission. (1953)

### San Francisco Bay Area, 1956

Thus far, the plans reviewed have been a normal book size, though some have included plates that fold out to larger formats, and the firm of Charles De Leuw has been involved in their creation. Their arguments have borne witness to the rise of the private automobiles and an increased emphasis on the integration of surface transit networks to augment more modest rapid transit proposals. They establish, in pragmatic terms, a means of moving passengers comfortably and efficiently in and out of downtown. Where they visualize their proposed rapid transit facilities, they blend tastefully and innocuously into the established urban fabric, using time-tested technologies. The San Francisco Bay Area's plan, *Regional Rapid Transit*, contains most of the elements now common to the 20<sup>th</sup> century rapid transit plan: a summary, an overview of the development of the Bay Area, a description of existing transit facilities and traffic congestion problems, a review of options available for a rapid transit solution, a physical plan, and a means to raise funds for construction and operation. But its ambition is much larger: it presents itself as an authority on the subject of transportation; it imagines a spectacularly large rapid transit system serving a nine-county urban region; for the first time, it clearly spells out a link between land use policy and transportation; and it offers a fresh, adventurous vision for rapid transit. Though time has proven the impracticability of building the proposed system in its entirety, the document must have made an impression on many of those who encountered it.

The viewer is immediately struck by the document's size. With a page size of 22 in. wide by 17 in. tall, spiral bound in hard cover, it is unwieldy to handle, requiring a good-sized table and careful page-turning. The engineering firm established over 50 years earlier by New York's first accomplished subway designer, W. B. Parsons, spent two years developing the plan in offices in both New York and San Francisco, aided by consultants and a staff comprised of regional planners, transportation analysts, civil engineers, and graphic designers. The page layouts are elegant and the color choices are understated. Most of the 106 pages are printed in several colors and benefit from the skilled work of H. S. Crocker Co., a San Francisco-based lithographer.

In summarizing their findings, the authors propose that:

(T)he dominant question for the Bay Area is whether to accept the stagnation and decline of interurban transit and to prepare for drastic decentralization and

repatterning [*sic*] of its urban centers to meet the avalanche of automobiles that will result—or whether to reinvigorate interurban transit so as to sustain the daily flow of workers, shoppers, and visitors on which the vitality of these urban centers depends. (Parsons, Brinckerhoff, Hall & MacDonald [PBHM] 1956, p. 1)

Traffic in the post-war Bay Area strained the capacity of the roadways, and existing transit facilities—the buses, the old Key System streetcars—seemed only to exacerbate the situation. In calling attention to this and proposing a rapid transit solution, the authors follow the example provided by recent rapid transit projects undertaken in other cities. Only now, instead of maintaining the supremacy of a single urban center, the system proposed in *Regional Rapid Transit* stitches together a diverse distribution of regional and local centers, with San Francisco and Oakland together forming the regional core. A rapid transit system focused solely on San Francisco would not satisfy the Bay Area's needs—the region had, by the mid 1950s, already developed in a decidedly multicentered fashion. The plan ties together this vast region—measuring 88 miles from north to south and 46 miles from east to west, in straight-line distances—with a network of fast, technologically advanced trains designed to compete with the automobile by providing a comfortable seat for each passenger, average speeds of 45 mph, and convenient station locations and amenities.

The plan's opening chapters are designed to ease the reader into accepting the plausibility of this audacious concept by exuding a calm and measured knowledge and authority. A glossary of terms like "Headway" and "Grade-Separated Right-of-Way," a feature not observed in previous plans, is provided on page vii, not in the back. Immediately after the opening summary and a page enumerating four overarching project objectives is a short chapter entitled "Basic Concepts." The authors explicitly aim their

primer on the nature of urban transportation, and the modes available for providing it, to the non-expert, introducing the section as follows:

Upon completion of this survey we are more than ever aware that the recommendations which result can not be entirely based on engineering analysis. In making a choice between alternate possibilities, public sentiment alone is often the most decisive factor. Wherever possible, then, it has been our purpose not to confine but to expand our responsibilities to insure that the alternatives are clearly defined and presented so that no feasible one is eliminated from the public's consideration. (PBHM, 1956, p. 6).

The authors imply that if only the public was educated in how reasonable rapid transit development is in comparison to the alternatives, their fickle support would become unwavering, and as a result, the authors have "expanded" their plan to achieve that goal. A selection of photographs bolsters the arguments made. Discussing the "Basic Types of Travel," a photograph of bumper-to-bumper automobile traffic en route to San Francisco via the west span of the San Francisco-Oakland Bay Bridge accompanies "Home to Work Trips," emphasizing the rush-hour spikes in traffic that rapid transit can most effectively alleviate. The next section discusses "Transportation Facility Types," breaking them into three categories: "The Private Automobiles on the Highway," "Mass Transit on the Highway," and "Mass Rapid Transit on Grade-Separated Right-of-Way." Much like the photographs of busses and streetcars stranded in congested city streets used in the Toronto plan, a photograph of busses lumbering out of the San Francisco Greyhound terminal and into a street flooded with cars supports the authors' criticism of this mode: "Like its speed, the capacity of this facility type is limited by the degree of traffic congestion along or across its route of travel" (PBHM, 1956, p. 7). Finally, to begin a section entitled "Travel and Transportation Related to Metropolitan Development," the

authors declare, "Transportation is undoubtedly the most significant single influence on the shape of a metropolitan region" (PBHM, 1956, p. 7). A photograph shows suburban tract home development near San Lorenzo adjacent to one side of a freeway, with open, perhaps agricultural, parcels still intact on the other. Speaking to this increasingly frequent pattern of development, the authors muse:

It seems, with the passing of each day, that the places which we must, or want to, visit become more numerous, more distant, and more widely scattered...we are experiencing at the same time a more concentrated use of space in some areas, and entirely new development in areas once only pasture or marsh. (PBHM, 1956, p. 7)

This depiction carries a note of chaotic, disorderly development, and a new and somewhat unfamiliar scenario. The authors follow by concluding that a transportation system properly designed in concert with the urban fabric it serves can provide for the orderly development of both the present and future region. The properly designed transportation system is, of course, theirs. In ostensibly providing a primer on the basic concepts of transportation planning, the authors have provided themselves an additional opportunity to bolster their argument in favor of rapid transit development.

Numerous maps provide a visual means to express both the authors' knowledge of current and future Bay Area transportation problems and their skillful rapid transit design solution. The whole of page viii depicts the comprehensive plan in initial, secondary, and subsequent stages (Figure 16). The rapid transit routes, printed in quiet ochre on a white and gray background, form a partial grid to embrace the notable urban areas of all nine counties. A first glance may not register the size of the system, or its more decentralized nature. Two cartograms on page 2 underscore the multi-nodal nature of the proposed



Figure 16. Parsons Brinckerhoff Hall & MacDonald. (1956). Comprehensive Plan for Regional Rapid Transit [map] From *Regional Rapid Transit* (p. viii) by Parsons, Brinckerhoff, Hall & MacDonald. (1956).



Figure 17. Parsons Brinckerhoff Hall & MacDonald. (1956). Peak Hour Travel Times Between Adjacent Urban Centers [map] From *Regional Rapid Transit* (p. 2) by Parsons, Brinckerhoff, Hall & MacDonald. (1956).

network while expressing the travel timesavings it will provide once implemented (Figure 17). Rather than lines radiating out from a central downtown, the network encompassed by the plan includes three parallel north-south corridors and numerous east-west connections. The shortest possible peak-hour travel times possible in 1954 are depicted in the larger of the two cartograms; the length of the lines between the nodes indicate relative travel times, not mileage. The 1 hr 33 min commute from San Francisco to Walnut Creek begins to indicate the size of the region; continuing out to the eastern suburb of Brentwood adds an additional hour. The peak-hour travel times possible with rapid transit, depicted in the smaller cartogram, effectively reduce the "size" of the Bay Area, in terms of travel times, by more than one-half: the commute from San Francisco to Brentwood is now 1 hr 7 min. Maps and diagrams depicting the benefits of rapid transit in terms of reduced travel times are certainly not unique to *Regional Rapid Transit,* however.

More unique is the plan's map of the region's urban activities. Whereas the Los Angeles plan of 1925 emphasizes the primacy of its downtown and identify important industrial zones in its immediate vicinity, and similar maps appear in the Chicago, Cleveland, and Montreal plans, the authors of *Regional Rapid Transit* provide a map, "Organization of Urban Activities, 1954" featuring the "orbits," or zones of influence of the major urban centers San Francisco and Oakland in a small inset map. The main map depicts "Orbits of Subcenters," in which fine red lines, radiating outward in concentric circles, represent residential areas tributary to a wide array of local downtowns (Figure 18). The density of the concentric circles indicates magnitude of population, and



Figure 18. Parsons Brinckerhoff Hall & MacDonald. (1956). Organization of Urban Activities, 1954[map and detail] From *Regional Rapid Transit* (p. 10) by Parsons, Brinckerhoff, Hall & MacDonald. (1956).

in this sense, the traditional centers of San Francisco and Oakland continue to stand out. In addition, clusters of small point symbols, one for manufacturing employment, and one for commercial employment, map the density of these activities throughout the region. The layering of these multiple, finely drawn features over the full-page map is visually dynamic and bustling. This effect only intensifies in a later map on page 19 that uses the same symbolization scheme to depict forecasted increases in urban activities, entitled "Regional Outline Plan—1990." Notably, the inset map of major centers includes not only orbits for San Francisco and Oakland, but adds the orbits of San Jose, Concord, and Petaluma. Finally, a map on page 39 overlays the comprehensive rapid transit system over the concentric orbits of subcenters as forecast in 1990, emphasizing the rapid transit system's ability to connect the diverse economy of a future Bay Area comprehensively.

The forecasts of the Bay Area's future distribution of housing and economic activities derive from county population projections and a detailed study of its land characteristics, land resources, and land development policy. The maps provided to illustrate this study are perhaps the most impressive in the plan, compiling fine-grained information from a variety of agencies into a comprehensive, region-wide extent. In this too, *Regional Rapid Transit* exceeds the scope of work observed in previous plans, and explicitly links land use and transit development. Where previous plans refer to the benefits of increased property values adjacent to stations or encouraging orderly development through rapid transit development, the authors of *Regional Rapid Transit* provide two land-use classification maps for the entire Bay Area, each one spanning both pages to a width, not including the legend, of 35 in. The first depicts existing land use in
1954, and the second proposes a land use and circulation plan for 1970, with an anticipated regional population of 4.8 million (Figure 19). These massive maps, with their fine-grained detail, provide a commanding view. The authors have passed on an opportunity to draw their proposed rapid transit system on the 1970 map with a bold line; instead they use a difficult to discern, fine dotted line. The main objective is to promote a vision for regional development that focuses economic development on traditional commercial cores, a pattern that at once could be aided by rapid transit development, and also simultaneously could secure the long-term success of the rapid transit system. Permeating all this is a desire to peer into a future Bay Area positively shaped by a rapid transit system to suit "the newly developing needs and desires of an automobile- and airplane-age population and the evolving requirements of a national and regional economy geared to unprecedented national and personal wealth" (PBHM, 1956, p. 20).

Having established a sweeping vision of the future development of the Bay Area and the benefits of rapid transit on economic growth and "orderly" urbanization, the authors close the plan with design concepts for the rapid transit trains at the heart of the scheme. Transportation engineers are perhaps best equipped to shape the future and make tomorrow's wonders a reality by building technologically advanced transportation facilities, and in this spirit, they take great care to illustrate the sleek, modern trains they have selected to carry the Bay Area transit rider into the future. Illustrations produced by the Budd Corporation, a maker of rolling stock, are perhaps the best-executed, using ink wash to add depth and realism to an interior view of its of train car and a view of a train arcing on an elevated structure over Valencia Street in San Francisco's Mission District



Figure 19. Parsons, Brinckerhoff, Hall & MacDonald. (1956). Land Use and Circulation Plan: 1970 [map and detail] From *Regional Rapid Transit* (pp. 32-33) by Parsons, Brinckerhoff, Hall & MacDonald. (1956).

(Figure 20). These trains promised speed and comfort in a dawning space age, and a fresh, adventurous vision of rapid transit. Perhaps by placing these train designs at the plan's conclusion, the authors hoped to invoke a longing in their readers for a brighter future, and appeal to a faith in the powers of technology to help create the ideal city of tomorrow. Taken in its entirety, *Regional Rapid Transit* sets a high standard for the plans to follow with its imagination and audacity.



VIEW OF A SUPPORTED TRAIN ON AN ELEVATED STRUCTURE IN THE CENTER OF A CITY STREET

Figure 20. Budd Corp. (1956). View of a Supported Train on an Elevated Structure in the Center of a City Street [drawing] From *Regional Rapid Transit* (p. 99) by Parsons, Brinckerhoff, Hall & MacDonald. (1956).

# Washington, 1962

The plan that envisioned a rapid transit system for the nation's capital took on noticeably different dimensions from the plans that preceded it. This is attributable to the plan's author, the National Capital Transportation Agency (NCTA), and its intended audience, the US Congress and the President. Only in Washington would the final decision to approve construction of an ambitious new rapid transit system lie squarely with a Congressional vote. The document prepared to make a case for such a system is tailored to these circumstances.

Recommendations for Transportation in the National Capital Region is a modestly sized booklet measuring 6 in. wide by 9 in. tall with 92 pages. It was printed, appropriately, by the US Government Printing Office, and bound in a soft cover bearing the Presidential insignia. At the time of printing, copies could be purchased for \$1.50. Diminutive when placed side by side with *Regional Rapid Transit*, the document somewhat obscures the ambitious nature of its proposed rapid transit system, though its stately layout and printing makes it worthy of a President's desk.

The arguments presented for this ambitious system follow a familiar sequence. Washington in the post-war era was not immune to the side-effects of increased automobile use by its downtown employees, and mounting traffic congestion provided cause for alarm. The authors quickly describe the region's traffic woes, discuss alternative solutions (including increased highway construction), and present a rapid transit solution, finishing with a discussion of costs and revenues. A closer look at these arguments reveals a desire on the part of the plan's authors to vanquish rivals both at home and abroad.

The plan reads as a response to, or even a rebuttal of, the 1959 Mass Transportation Survey Plan documents, which called for an immense freeway-building campaign with public transit improvements consisting of augmented bus service only. Though the authors concede that the existing freeway network in the D.C. area will need

to be augmented to an extent, including a highway element in their plan, they are convinced that freeways and buses alone cannot properly address the problem, and as a result they fulfill their mandate stipulated in the National Capital Transportation Act of 1960, in which Congress directed the NCTA to look specifically into a subway solution linked to Union Station, the capital's traditional rail terminal (National Capital Transportation Agency [NCTA], 1962, p. vi). Among the NCTA's criticisms of the Mass Transportation Survey Plan are its high cost and its call to displace 33,000 persons in the District; these sentiments and instances in other US cities where plans for urban freeway projects proved unpopular comprise the section entitled "Concern Over Urban Highway Construction."

Contrasting this emerging concern, the authors provide a section entitled "The Growing Interest in Rapid Transit." They begin by stating, "The Agency's conclusion as to the need for a rapid transit solution reflects a growing awareness in urban areas throughout the world that public transportation is a key element in solving the problem of moving people to and through downtown" (NCTA, 1962, p. 9). Where earlier plans made note of systems developed in fellow cities in North America, Washington's plan has more global concerns. A footnote reads: "There are subway systems in 23 cities in other countries, including the following national capitals: Buenos Aires, London, Paris, Berlin, Vienna, Rome, Lisbon, Athens, Budapest, Madrid, Stockholm, Oslo, Moscow and Tokyo" (NCTA, 1962, p. 9). Washington immediately comes up short in terms of modern transportation facilities. Perhaps it is not surprising that arch-rival Moscow and the only-recently defeated former foe Tokyo are placed at the end of a list of world

capitals, like an exclamation point. A montage of five photographs opposite page 1 depicts rapid transit facilities in what appear to be European cities (a caption is not provided); in the photo on the lower left, Cyrillic characters grace the directional signs of an underground station platform situated in a striking vaulted interior adorned with brightly lit glass chandeliers (Figure 21). The nerve center of a deepening Cold War could read this document and find yet another example of Soviet advancement.



Figure 21. National Capital Transportation Agency. (1962). [photographs] From *Transportation for the National Capital Region* (p. xxii) by National Capital Transportation Agency. (1962).

The montage provides the only photographs used in the plan. Charts and graphs comprise the bulk of the visual support for the arguments made, in addition to a few maps essential for portraying characteristics of proposed transportation networks. In many instances the authors eschew conventional titles for their charts and graphs, favoring declarative statements that read like headlines or proclamations, set in bold, all-capital lettering. Examples include, "The Population of the National Capital Region is Increasing Rapidly," "Rapid Transit Draws People to Public Transportation," "In Chicago More and More People Are Using Rapid Transit," and "Fewer People Will Be Displaced in D.C. By Transportation Improvements." This last example is similar to several charts provided in that it is comprised simply of two bars, side by side, the bar on the left representing the 33,000 persons displaced by the 1959 plan, and the bar on the right representing the 5,400 persons displaced by the recommended plan. The authors seem pressed to make their case quickly and unequivocally, as if fearful of a Congress-person's limited attention span.

In comparison to the bombast of the graphs, the few sketches visualizing proposed facilities seem almost an afterthought. A frontispiece bears a sketch of a subway platform placed directly underneath the Capitol; a sketch on page 32 depicts a woman gazing at a mannequin in a shop window adjacent to a subway entrance while another woman accompanied by a man in a hat passes by. This illustration supplements a section entitled "The Downtown Subway;" opposite page 32 is one of two fold-out maps included in the plan. This map shows the routing of the proposed subway in the downtown area and the locations of stations. It folds out to 18 in. wide and 12 in. tall,

and is handsomely printed in four colors. Like many of the maps provided, its sole purpose is to describe locations of proposed facilities and lacks rhetorical punch.

The plan does include some persuasive cartography, however, including a map on page 35 with a headline-like title similar to the graphs, "Subway System Blankets 1980 Downtown Employment Centers" (Figure 22). Buffers representing 5 and 8 minute walking times encircle downtown station locations; to underscore the comprehensive coverage of these buffers, a second map, immediately below the first entitled "Density of Employment" shows five classes ranging from, presumably, none to most dense, drawn with symbols ranging from no symbol (blank) through levels of cross-hatching to solid color. A legend is not provided, so the reader can only determine that certain areas have more employees than others. Glancing between the two maps, the areas with many employees appear plausibly served by the locations of the subway stations. Two maps, placed side by side, provide an opportunity to demonstrate the superiority of the plan's transportation network over the 1959 plan (Figure 23). Identical line symbols representing freeways and parkways, rail rapid transit, commuter railroad, and buses on freeways are used in both maps; the 1959 plan is placed on the left, and the "NCTA Total Transportation System" is placed on the right. By providing this one-to-one comparison, the authors can point to the jumbled, almost chaotic appearance of the 1959 plan, with its noticeable density of freeways and parkways. The NCTA plan, in contrast, appears elegant in its simplicity. The maps add weight to the numbers presented in the accompanying graphs that argue forcefully for the NCTA plan over its predecessor.



Figure 22. National Capital Transportation Agency. (1962). Subway System Blankets 1980 Downtown Employment Centers and Density of Employment [maps] From *Transportation for the National Capital Region* (p. 35) by National Capital Transportation Agency. (1962).



Figure 23. National Capital Transportation Agency. (1962). 1959 Recommended Plan and NCTA Total Transportation System [maps] From *Transportation for the National Capital Region* (pp. 20-21) by National Capital Transportation Agency. (1962).

Washington's position at the dawn of the 1960s as "the capital of the free world" places its rapid transit plan in a unique context. Though the system eventually built would somewhat resemble, in terms of train equipment and facilities, the BART system built shortly before, the plan that proposed it sought to win support from the US Congress, setting it apart from the plans that both preceded and followed it. The circumstances for rapid transit were optimal. Fittingly, the seat of the federal government, where legislation had, less than two years earlier, authorized greater federal investment in urban mass transportation, would pursue its own rapid transit system. The

election of President Kennedy ushered in an administration with a sympathetic ear for urban issues like mass transportation. Washington's plan takes square aim at the 1959 highway-oriented plan (and its supporters in Congress) produced at the end of Eisenhower's tenure, and articulates an enthusiasm at the federal level for rapid transit development, an enthusiasm that would soon ripple out to other cities as well.

# Atlanta, 1962

The report produced for Atlanta and distributed in December 1962 marked a culmination of interest on the part of several agencies to bring rapid transit to the Atlanta region. By 1959, the Atlanta Region Metropolitan Planning Commission (ARMPC) began studying the transportation situation in greater detail, and a rapid transit solution appeared foremost in their minds. The Atlanta Transit System, Inc., the local bus service provider, followed in 1960 with Rapid-Atlanta, which laid out that agency's call for a rapid transit system. The ARMPC answered with a follow-up report in 1960, What You Should Know About Rapid Transit, meant to generate awareness and interest amongst local citizens. It featured an artist's rendering of a futuristic-looking concept train on its cover, and a list of "Questions for Discussion" inside the back cover. Having received responses to such questions as, "Would you ride rapid transit if it were available, fast, safe, comfortable, and convenient?" the ARMPC assembled, in June 1961, their Atlanta Region Comprehensive Plan: Rapid Transit. Indicative of the federal government's emerging interest in rapid transit development, this document includes, on its title page, a quote from President Kennedy's Special Message to Congress delivered to Congress just a month prior, in which he calls for greatly improved mass transportation alternatives to

urban freeways and a greater coordination of land use and transportation planning. This link between land use and transportation, articulated in 1956 in the Bay Area's rapid transit plan, had now entered the speech-making of the nation's top elected officials. The ARMPC would dutifully sketch out a rapid transit concept with projected land use patterns, though their plan would not serve, ultimately, as a proper feasibility study. Its authors recommend, "expert consultants with national experience and reputations in modern rapid transit should be retained" (Atlanta Region Metropolitan Planning Commission, 1961, p. 32). The firm selected by the newly formed Metropolitan Atlanta Transit Study Commission was Parsons, Brinckerhoff, Quade & Douglas (PBQD), a firm capable of applying recent experience in the Bay Area to Atlanta's plan.

With the involvement of PBQD, the dimensions of Atlanta's plan, *A Plan and Program of Rapid Transit for the Atlanta Metropolitan Region*, more resemble the Bay Area's plan: the pages are landscape-oriented, measuring 17 in. wide by 11 in. tall. With 117 pages, the resulting book is fairly large, though the Bay Area plan dwarfs even this plan. The book is comb bound in printed soft covers. That it is less lavish than *Regional Rapid Transit* is understandable, if only based on the relatively quick turnaround: whereas nearly three years were spent preparing *Regional Rapid Transit, A Plan and Program*...came to fruition in less than a year. Despite this the plan features full-color maps and diagrams, sharp graphic design, and stylistic embellishments, including a decorative typeface, used for titles and headings, that invokes the city's westwardlooking railroad heritage. Atlanta-based printers Victor & Carter handled the presswork.

The plan's content and chapter sequence also generally follows the example provided by its predecessor, though it is more lean, devoting merely a page to the discussion of the role of regional rapid transit within a metropolitan transportation system, and to basic rapid transit concepts. Like most all of the plans thus far reviewed, the plan opens with a discussion of the region's development, documenting a need for the rapid transit system explained in great detail in subsequent sections.

A description of the Atlanta region's development provides an opportunity to celebrate its stunning post-war economic growth. Accompanying large aerial photographs of downtown and land-based photographs of the city's burgeoning skyline are multiple graphs of economic indices-population, commercial employment, retail sales, bank deposits—all rapidly escalating, and above the national average. The authors explicitly portray Atlanta as the undisputed capital of the Southeast, providing a map of the Southeastern states in which the five-county Atlanta Metropolitan Region, printed in solid black, stands out from background, revealing its central location in the portion of the US extending from Louisiana to Virginia. This coincides with an account of Atlanta's role as the center for federal activities in the Southeast, as the headquarters of the Third Army, and as the convergence point of six interstate freeways, in addition to its role as the capital of Georgia. At the center of this regional hub lies "the highly developed complex known as Central Atlanta" (Parsons, Brinckerhoff, Quade & Douglas [PBQD], 1962, p. 8), drawn as a small blue polygon in the center of a map of the Atlanta Metropolitan Region. A detailed map of Central Atlanta indicates commercial areas in red, with graduated circles indicating the great numbers of employees that commute daily

to the area. A subsequent map draws region-wide travel patterns as red, graduated line symbols, and not surprisingly, thicker and thicker lines coalesce and converge upon Central Atlanta (Figure 24). Not only is Atlanta an ascending economic juggernaut in the Southeast, its downtown is of crucial importance to the region.

Having firmly established Atlanta's recent economic successes and Central Atlanta as its employment center, the authors look to the region's future, noting, "The Atlanta Metropolitan Region is one of the few metropolitan areas that has no major topographic barriers to growth. Development is physically possible in all directions" (PBQD, 1962, p. 23). Two sets of maps portray a rapid outward spread of population and urbanization from the city center. The first set is comprised of dot distribution maps showing regional population in 1961, plus projected distributions in 1975 and 1990. The density of the core changes little, while the number of dots in outlying areas increases markedly. Outward urban expansion is even more strikingly depicted in the second set of maps of regional land development, which employs solid colors to map residential, public and semi-public lands, industrial, and commercial land uses (Figure 25). Using the same time points as the population distribution maps, the urbanized area appears to triple in size by 1990. Whereas the authors of the Bay Area plan questioned the desirability of unchecked sprawl, in the Atlanta plan such criticism is not committed to paper. Instead, fervor for Atlanta's continued economic rise is palpable, in the assertion placed in the summary, "population will more than double by 1990, and economic growth will be even faster" (PBQD, 1962, p. 9).



Figure 24. Parsons, Brinckerhoff, Quade & Douglas. (1962). Desire Lines—1961 [map] From *A Plan and Program of Rapid Transit for the Atlanta Metropolitan Region* (p. 26) by Parsons, Brinckerhoff, Quade & Douglas. (1962).



Figure 25. Parsons, Brinckerhoff, Quade & Douglas. (1962). Regional Land Development—1961, 1975, and 1990 [maps] From *A Plan and Program of Rapid Transit for the Atlanta Metropolitan Region* (pp. 22-23) by Parsons, Brinckerhoff, Quade & Douglas. (1962).

With such a different vision for the future development of a metropolitan region, what role would a rapid transit system play within it? This plan argues that the proposed rapid transit system, with six suburban branches converging on Central Atlanta, can contribute directly to the continued economic growth of the region. It presents traffic congestion on local roads and freeways alike as the only side effect of Atlanta's economic boom, and capable of interfering with continued economic expansion. The reader finds several photographs of traffic jams to document the problem; in one, a driver has stepped out from behind the wheel to lean forlornly on his car door and stare at halted vehicles. Another shows a bus—the transit vehicle perpetually subject to the whims of traffic congestion—stopped in traffic on a freeway onramp. The plan offers rapid transit as a means of bringing more workers downtown, thereby strengthening the vitality of the employment center, while simultaneously freeing up more capacity on the freeways and increasing the returns on that major investment. The plan enumerates savings to the rapid transit patron, in terms of insurance premiums, maintenance, parking fees, and even cites the benefits of the reduced number of accidents caused by drivers switching to rapid transit. Every argument for rapid transit is framed in economic terms. In their summary the authors urge:

The greatest single question for (Metropolitan Atlanta's) citizens to consider is whether the region is to grow with a strong, conveniently accessible central city complex, linked by rapid transit to outlying centers that will grow in importance around rapid transit stations...or whether, without rapid transit, it is to grow in expanding rings of solid urbanization with congestion in each new ring raising a barrier to accessibility to the old. (PBQD, 1962, p. 12)

Ultimately Atlanta would join the ranks of US cities with a modern rapid transit system, bolstered by a persistent business-led initiative to foster an image of Atlanta as world-class New South city (Bullard, Johnson & Torres, 2004, p. 52). The system this plan proposed in 1962 did not find sufficient support to move forward, however. Atlanta's MARTA system represents only a portion of the system originally proposed.

#### Baltimore, 1968

Six years after the unveiling of a rapid transit plan in the Sun Belt city of Atlanta, an older mid-Atlantic port considered its own rapid transit scheme. Baltimore's plan exhibits an emphasis not observed in earlier plans: on the purported social benefits of rapid transit development in addition to economic benefits. In their discussion of the Baltimore region, the authors acknowledge the increasing suburbanization of middleclass whites and the simultaneous in-migration of low-income African Americans to the deteriorating central city. Describing the plight of the latter group, they write:

A substantial portion of the inner city population occupies old and substandard housing, and in the blighted areas, much of the housing is seriously overcrowded. Many of the residents are tenants who, because of their low income, must spend a disproportionate amount of their earnings on rent. (Daniel, Mann, Johnson & Mendenhall [DMJM], 1968, p. 14)

The rapid transit plan promises to serve both suburban and inner city populations while inducing regenerative urban development adjacent to stations.

The plan's 116 pages measure 17 in. wide by 11 in. tall, and are printed in a variety of earth-toned inks, in addition to black. The graphic design exudes a contemporary look; text blocks are set in Helvetica whereas earlier plans employed serif typefaces, and the page layouts make ample room for aerial photographs of downtown Baltimore and the large number of striking concept sketches. Of the plans thus reviewed, this is the first produced by the firm Daniel, Mann, Johnson & Mendenhall (DMJM), in partnership with Kaiser Engineers. In their letter of transmittal, DMJM bills itself as a firm of architects as well as engineers, and an architecturally oriented design mindset permeates the plan. If engineering documents can be characterized as detached from human experience and unfeeling, if technically sound, in contrast architecture can express a concern for human experience. Early in the plan summary the authors assert, "The fixed facilities of a rapid transit system must designed with particular care and sensitivity because of stringent functional requirements and the desirability to provide attractive structures; the strong influence they have on the attraction of riders; and the major impact they exert on the communities through which they are constructed" (DMJM, 1968, p. 4). This assertion is complimented by the goal expressed near the end of the plan, in a chapter titled "Impact Studies:" "the goal of planning should be the creation of an environment satisfying to human needs" (DMJM, 1968, p. 82). Indeed, the textual and

visual arguments made in between these two statements seek to provide a vision of the built environment of Baltimore transformed by a cutting-edge rapid transit system.

A full-page black and white aerial photograph of the downtown and adjacent areas welcomes the viewer, printed just inside the front cover. The next image is found opposite page 1, the first page of the plan summary, and is a drawing of an imagined aerial view of the Baltimore region, stretching to a horizon of distant hills accompanied by clouds; overlaid in the middle and foreground are the complete network of rapid transit lines and station locations (Figure 26). The exquisite attention to detail paid to the stylized depiction invites an extended gaze. This full-page illustration marks the first of many concept sketches to follow, sketches that visualize station interiors; station exteriors and adjacent parking and surface transportation facilities; and the integration of elevated rapid transit structures into their urban surroundings. A full-page illustration on page 9 visualizes an elevated rapid transit structure snaking across the Middle Branch of the Patapsco River alongside a proposed freeway; flourishes indicate aloft shore birds and recreational watercraft in the harbor, while the downtown skyline looms in the background. An ochre tone is applied to all but the rapid transit structure, allowing it to stand out. A few photographs are also used, especially in the introductory chapters. In the introduction, the authors provide accompanying photographs of John Hopkins Hospital, City Hall, the Dundalk Marine Terminal, and activity inside a Bethlehem Steel factory. Presented with these photographs is another sketch of a rapid transit train speeding over coastal wetlands on an elevated track, suggesting a close association between what Baltimore is, and what the authors imagine it could be. The next page

features an aerial photograph of downtown Baltimore, focused on the recently constructed Charles Center, the hub of the proposed rapid transit system. Photographs of Memorial Stadium and the Maryland State building complex accompany a discussion of the Baltimore Region and its transportation needs.

After this initial set of photographs, the views of Baltimore provided come solely from the drafting table. Concepts are thoroughly sketched out for a variety of station types, including the bustling downtown hub, a futuristic-looking station positioned in a



Figure 26. Daniel, Mann, Johnson & Mendenhall. (1968). Baltimore Rapid Transit System Routes [drawing] From *Baltimore Region Rapid Transit System* (p. x) by Daniel, Mann, Johnson & Mendenhall. (1968).

freeway median and connected to surface streets by an enclosed pedestrian bridge, and

open-cut stations located in outlying areas (Figure 27). The sketches teem with transit

patrons, buses and automobiles, and generous landscaping. In a study of neighborhoods adjacent to Pennsylvania Avenue, the authors note:

Certain aspects of this area indicate serious trouble. There exists widespread dilapidation and overcrowding of available housing. Retail stores are generally in poor condition. Recreational and institutional needs are not met. The median income of families in the immediate vicinity of Pennsylvania Avenue is below \$3,500 per year, land the unemployment rate exceeds 10 percent of the labor force. (DMJM, 1968, p. 88)

This is contrasted by the accompanying rendering of an attractive station entrance plaza

under leafy trees, populated by men in suits and women in skirts; one man carries a

briefcase as he approaches the station; and an angular, contemporary building juts over

the sidewalk on the opposite side of the street.



Figure 27. Daniel, Mann, Johnson & Mendenhall. (1968). Open-cut station showing landscaped and vehicular plaza and a portion of the parking area [drawing] From *Baltimore Region Rapid Transit System* (p. 51) by Daniel, Mann, Johnson & Mendenhall. (1968).

When compared to earlier plans, this plan includes remarkably few maps. Those that are included mainly serve to describe the location of the proposed rapid transit system, or to delineate the dimensions of the City of Baltimore and the Baltimore Region. Three maps, whose dimensions are dwarfed by numerous concept sketches, express the proposed rapid transit system's comprehensive coverage of the region. The first, Figure 1-4, draws buffers around the network based on feeder bus trips of ten minutes or less; the other two, Figures 11-1 and 11-2, map the relationship of the proposed system to a population dot-distribution map and to major employment centers, respectively. The spare presentation and diminutive size of these maps lessen their impact, leaving the concept sketches and other graphic elements to make a visual case for rapid transit.

A full-page illustration of the design concept of the rapid transit vehicle seeks to garner excitement for the technology tasked with transforming Baltimore (Figure 28). An indistinct background of ink washes contrasts a precise and polished rendering of the angular, streamlined train. Artistic touches provide the illusion of reflective surfaces, especially in the windows, in which the reflection of a rolling skyline dotted with trees is discernable. An imagined logo for the Baltimore Transit System graces the train's side and completes the visualization. A similar attention to detail pervades a visualization of the vehicle's interior (Figure 28). Metallic doors reflect the wood-grain of an adjacent panel; texture adds realism to the seat upholstery; and out the windows, a group of lights appear to rush by, indicating movement. The artist even places a map of the complete transit system as proposed adjacent to the doors.



Figure 7-2. Interior of proposed rapid transit vehicle.

Figure 28. Daniel, Mann, Johnson & Mendenhall. (1968). (above) Design Concept for Baltimore Region rapid transit vehicle; (below) Interior of proposed rapid transit vehicle [drawings] From *Baltimore Region Rapid Transit System* (pp. 41-42) by Daniel, Mann, Johnson & Mendenhall. (1968).

The authors close with a benefit-cost analysis, providing an opportunity to make one last overt bid to win over their audience. Table 11-1 weighs the costs of construction and operating expenses against a host of benefits for transit users and non-transit users, regional benefits, including "improved productivity," and increased property tax revenues. By their estimate, total benefits would have exceeded costs by over \$800 million. An assortment of somewhat simplistic graphics aid in spelling out the portents expressed in the table. To the right of Table 11-1, a graphic reads, "A Rapid Transit System Results In: Transportation benefits, Regional benefits, Local benefits" (DMJM, 1968, p. 95). A pedestrian, car, truck, and bus illustrate the transportation benefits, a diagram of the rapid transit system illustrates the region, and a city block diagram expresses the local. Transportation benefits are further illustrated on the following page, with illustrations of a tollbooth, gas pump, and a stack of oilcans representing expenses familiar to drivers. The authors provide a sign with daily parking rates; the rates have been crossed out, as has one of two cars in a garage, indicating the benefit of reduced vehicle ownership. Hourglasses represent timesavings. Early in the plan, the authors state their desire to serve not only white-collar commuters traveling to the central business district from suburbs, but also blue-collar workers commuting to outlying industrial districts from the central city. In a graphic titled "Transportation-Derived Benefits" on pg. 99, a drawing of a factory worker in overalls and a hard hat is placed in two equations, meant to be read as "factory worker, minus private automobile, equals restricted employment opportunities" and "factory worker, plus rapid transit system, equals greater employment opportunities."

As an older city based on shipping and manufacturing industries, Baltimore faced increasing uncertainty and mounting challenges as the twentieth century wore on. The rapid transit plan presented to the city in 1968 represents a bid to recast rapid transit as more than a transportation system; rather, the authors argue that its construction will serve as a catalyst to reshape the city. Coupled with this vision is an acknowledgement that any transportation system constructed in Baltimore cannot be oriented strictly towards suburban commuters who work in the CBD. It is the first plan thus reviewed that attempts to serve blue-collar workers. Contemporary observers can only wonder if this scheme could have worked as intended. A mere fraction of the system, a single line connecting downtown to a suburban shopping center, opened for service fifteen years later.

### Los Angeles, 1968

Across the continent, a new plan commissioned by the Southern California Rapid Transit District marked the latest of an ongoing series of attempts to link the Los Angeles metropolis with swift trains. In the forty-three years since Kelker, De Leuw & Co. prepared their ill-fated plan, the Los Angeles metropolitan area had become the second largest in the US, although spread over hundreds of square miles and linked by a robust grid of freeways. Remarkably, rail advocates in Los Angeles kept their dreams of building rapid transit alive in a city that appeared to lead the nation in championing "autopia." The vision of Los Angeles linked by high-tech public transportation ran counter to the prevailing trend of auto-based development, and carried with it a nostalgia for the departed streetcar era. The plan prepared to deliver a victory for rail advocates

expresses this vision in a striking package and with an occasionally defiant tone, and suggests that its authors did not take the task of presenting a rapid transit proposal to the Los Angeles public lightly.

The firms retained to produce the Baltimore plan, a joint venture of Daniel, Mann, Johnson & Mendenhall and Kaiser Engineers, also led a coalition of collaborating firms on the Los Angeles plan. The kinship between these plans is detectable upon close review, though the physical dimensions of each plan vary considerably. The Los Angeles plan, *A Final Report*, is split into four volumes; the first two are landscape oriented with pages measuring 12 in. wide and 9 in. tall, and the second two are standard letter-sized and portrait oriented. The main portion of the plan, including the introduction, preliminary engineering, estimates of patronage and revenue, financing, and a benefit-cost analysis, is housed in volume 1. The subsequent three volumes house the four appendices that provide technical material to support the first volume, and are generally less lavishly produced than volume 1. Volume 1, comprised of 116 pages, is distinguished by its high quality printing in rich inks on thick, textured paper.

At the onset, the authors emphasize the mandate granted by the California legislature to complete a plan for "adequate and effective public transportation in the Los Angeles Metropolitan Area" (Southern California Rapid Transit District [SCRTD], 1968, p. RTD-9) and the incorporation of public feedback to the final product as evidence of popular support for rapid transit. Elaborating on this the authors boast:

This project is perhaps unique in that the public has been a continuing an integral part of the design team. In drafting the District Law, the State Legislature insured that any mass rapid transit program for Southern California would be one of the

most thoroughly reviewed and discussed proposals ever to be submitted to any electorate. (SCRTD, 1968, p. RTD-28)

Throughout the plan, the authors note when particular design elements have been modified based on public feedback. Lack of consensus had stymied rapid transit development in Los Angeles in the past, and this plan takes great care to present an alternate image of a broad coalition of support.

The historic lack of consensus on solving traffic-related issues in the Los Angeles region forms the basis of the plan's historical overview of transportation in the region. Additionally, the chapter provides an opportunity to both celebrate the region's glory days of public transportation and cast scorn on the post-war boom in freeway building. A section titled "The Big Red Cars" begins with a glowing, if not hyperbolic sentiment, "Seldom if ever in history has an area been so crisscrossed with speedy transportation prior to the advent of populated cities as was the Southland" (SCRTD, 1968, p. RTD-12). A description of the Pacific Electric Railway line's eastward service lists community names separated by ellipses, a flourish invoking the movement of a train making stops along a route: "Inland it extended to Whittier...Fullerton...Bellflower...Santa Ana...Torrance...Gardena" (SCRTD, 1968, pp. RTD 12-13). A favorable description extends to the Los Angeles Railway Company as well: "Although based in the central city, the Los Angeles Railway Company's streetcar system also ventured far afield-to such neighboring communities as Highland Park...Eagle Rock...Vernon...Huntington Park...Inglewood" (SCRTD, 1968, p. RTD 13). The following page features a large, hand-drawn illustration printed in a warm red ink of a Red Car, circa 1930, destined for Redondo Beach (Figure 29). A number of patrons approach the car to board, including

several children (one, a young boy in a sailor costume), women in skirts and hats, and an elderly, white-bearded man with a picnic basket, presumably taking his pony-tailed granddaughter to the beach. Smiles abound as the care-worn car waits peacefully to resume its route. The culprit responsible for undoing this terrific system is soon revealed: "Then came the automobile-glamorous solution to California mobility" (SCRTD, 1968, p. RTD-13). The use of sarcasm in the opening paragraphs of a highly produced rapid transit plan is jarring. Where other rapid transit plans suggest merely that the problem is not the automobile per se, but the fact that too many automobiles fill the roadways during peak commute-hours, the authors here choose a more antagonistic tone. They also take aim at the political dimensions of the problem: "The strong trend in urban growth and increasing commercial development caused responsible officials to have serious concern for the threats to mobility and continued economic health posed by future demands on the street systems" (SCRTD, 1968, p. RTD-17). The authors appear to imply that only an irresponsible official would fail to support a rapid transit proposal that promised to cure such threats.

The proposed system, the "Master Plan Concept," includes five corridors radiating out from downtown Los Angeles, to be constructed as a first stage of development. A suggested second stage of interlocking corridors partially resembles the grid-like structure of the freeway network. A small three-color map on page RTD-20 provides a basic overview of the system (Figure 30). An additional leaf inserted between



Figure 29. Southern California Rapid Transit District. (1968). "Red Car" Circa 1930. [drawing] From *A Final Report* (p. RTD-14) by Southern California Rapid Transit District. (1968).



Figure 30. Southern California Rapid Transit District. (1968). Master Plan Concept [map] From *A Final Report* (p. RTD-20) by Southern California Rapid Transit District. (1968).

pages RTD-20 and 21 roughly suggests further extensions from the second-stage corridors that would extend beyond the District's boundaries into adjacent Ventura, Orange, and San Bernardino Counties. Following a long-established precedent, the system links feeder bus routes to the rapid transit stations to guarantee comprehensive coverage throughout the region, and suburban stations provide ample parking facilities. The trains themselves are fast, comfortable, and reliable. Few maps are used to convey these ideas visually; instead, the plan includes a great number of illustrations exquisitely rendered with a blend of sharply delineated masses and soft ink washes. Illustrations on pages RTD-27 and JV-34 provide aerial viewpoints that embrace wide urban expanses and make the rapid transit facilities featured to seem almost diminutive in comparison (Figure 31). Station designs exude a futuristic orientation. Aboveground platforms feature cylindrical glass canopies. A sectional illustration of a proposed downtown Metroport station on page JV-41 integrates the rapid transit train and platform on the lowest level, an elegant ticketing area above it, a parking garage, and on the roof, sleek helicopters await passengers (Figure 32). One of these helicopters even sports a pair of wings, suggesting anticipated technological advances in the near future.

The rapid transit system proposed, in sum, makes a great departure from the elevated train network proposed for Los Angeles over forty years earlier, owing to technological advances and the extraordinary development of the region in that time. Despite this, however, the newer work carries echoes of its predecessor, in its focus on bringing commuters to downtown Los Angeles, and its refusal to accept the private automobile as the region's sole source for mobility. The authors behind the 1968 plan do

not intend their rapid transit system to greatly alter future growth in the region to the extent that planners in the Bay Area, Washington DC, Atlanta, and especially Baltimore do. Instead, their vision weaves a rapid transit system into an urban region still viewed, at that time, as one of the best places to live in the US. The authors trace the region's desirability to that earlier shaper of cities, the streetcar, which permitted "the formation of a number of independent communities" and "made a pattern of low-density development feasible" (SCRTD, 1968, p. RTD-13). Increasingly congested freeways and thoroughfares had sullied the region's sterling image, and the proposed rapid transit system promises to lavish a number of benefits upon the region's citizens, among them, increases in productivity, reductions in employment, improved air quality, even improvements in "Life Style" valued at \$25 million annually (SCRTD, 1968, pp. SRI-11). The plan presents a possibility to reclaim the public transit option of the fondly remembered streetcar era from an automobile-oriented future, using the latest technology. These efforts would only be partially realized 22 years later, when the first line of the Los Angeles Metro Rail opened for service. To this day, learning that Los Angeles has a subway comes as a surprise to many.



Figure 31. Southern California Rapid Transit District. (1968). Preliminary Design— Pacific Coast Highway Station [drawing] From *A Final Report* (p. RTD-27) by Southern California Rapid Transit District. (1968).



Figure 32. Southern California Rapid Transit District. (1968). Metroport Station [drawing] From *A Final Report* (p. JV-41) by Southern California Rapid Transit District. (1968).

### Conclusion

The necessity, and the difficulty, of securing support for big, ambitious plans has shadowed rapid transit from its inception. In 1917, a historian named J.B. Walker completed a detailed account of the development of New York's rapid transit system up to that point. Walker chronicles the numerous proposals that failed to materialize prior to the construction of Belmont's Manhattan-Bronx line in 1904. Among these is an early design by an engineer named A. P. Robinson. Walker describes Robinson's plan in particularly glowing terms, calling attention to the quality of the design's presentation, and even noting of the printer of the pamphlet. Particularly telling, however, is Walker's observation: "It is written in an argumentative style, the author evidently feeling that he was proposing a daring innovation and needed to justify it" (J.B. Walker, 1918, pp. 16-17).

The original plan for the BART system prompts similar observations. Not only was the utmost care taken in presenting the system with a document of extraordinary size and exemplary visual design—its vision for rapid transit is daring and innovative, and its authors argue forcefully for it. This appraisal is tempered when the BART plan is situated within the broader context of rapid transit planning in the US and Canada. Recovering these plans from library shelves and storage facilities reveals numerous proposals adapted to changing circumstances in the twentieth century, whose arguments helped make a broader resurgence in rapid transit development possible.

Early plans rely heavily on maps to reinforce ideas expressed in the text. Tasked with representing the virtues of the proposed systems, the resulting maps are visually

dense and detailed, and in cases where larger formats are used, they envelope the viewer's gaze and provide commanding viewpoints. The BART plan, amongst the rapid transit plans reviewed, perhaps carries this cartographical orientation to its most fully realized extent, providing numerous large maps packed with an array of data culled from governments and institutions lining the Bay Area. But the BART plan also makes use of well chosen photographs to convey the magnitude of the challenges to urban transportation BART was designed to address. This too follows a precedent established in earlier plans, especially the Toronto plan. The last two plans reviewed, produced by the firm Daniel, Mann, Johnson & Mendenhall, break with their predecessors by providing a large number of striking architectural sketches and visualizations that re-imagine a near future with rapid transit woven into the urban fabric. As rapid transit development gradually claimed a precarious foothold in US cities, the plans produced to articulate them grew in size and graphic complexity and sophistication.

One theme remains constant across all the reviewed plans. Their authors maintain that increasing rush-hour automobile traffic posed the greatest threat to the proper functioning of an urban region. Coupled with this is the common assessment that existing surface transit systems were unable to ameliorate traffic problems on their own. The BART plan is not exceptional in presenting rail rapid transit as a cost-effective solution to these problems.

Perhaps more striking in comparing the BART plan to those plans that came before and after is the emergence in the BART plan of a re-imagined role of rapid transit in shaping urban areas. Where earlier plans focus on moving people comfortably and

efficiently and make limited references to the positive effects of rapid transit on local real-estate development, the BART plan specifically articulates a connection between land use and transportation, providing a land-use plan for the entire region that both strengthens and is strengthened by the rapid transit system. The plans produced after the BART plan follow suit in enumerating the ways that rapid transit could positively shape the urban environment, though in each case, the message is tailored to the specific city. In Washington DC, rapid transit could ease congestion and provide an orderly pattern of urban development necessary to maintain the prestige of a world capital. Atlanta's rapid transit proponents sought support for their system by extolling possible benefits to economic growth. In Baltimore, rapid transit could provide a powerful tool for urban renewal. Finally, the Los Angeles plan of 1968 perhaps points to the limits of using rapid transit as a tool to shape the future development of the city. This last proposal maintains a focus on downtown Los Angeles reminiscent of the streetcar era but otherwise stops short of imagining broad transformations. Perhaps Los Angeles, as a last frontier for rapid transit, provides such a challenge that the mere construction of a rapid transit system amounts to a significant transformation in its own right.

The developments depicted here provide a richer context in which to situate the BART plan. Though it did not reinvent the practice of rapid transit planning, its wide-ranging vision helped to usher in a new era in which rapid transit was repurposed for the post-war city. The ability or inability of the systems that were constructed to shape the city as promised in the plans is another matter entirely; on the whole, rapid transit technology failed to assert itself as a predominant urban transportation mode in the US,

and the car remains king. There is a value, however, in revisiting the dreams and aspirations encapsulated in the plans of the past and consider how their visions stirred action or failed to be realized. In the case of the Bay Area, its rapid transit system has joined the ranks of the notable transit systems of the world—an indispensable feature of the built environment. This legacy is owed, in part, to the vision set forth in its plan.
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