planning process. When the Harrisburg rail transit study began, it was viewed by elected officials, local planners, and the general public as strictly an engineering exercise of fitting new railroad tracks within an existing right-of-way, turning the power on, and beginning transit service. Through the feasibility test approach, TAMS was able to identify other important factors influencing the construction of new rail transit service, some of which required community action and some of which (particularly institutional issues) were outside the community’s control. The attraction of the feasibility-test approach is not that it offers a methodology for resolving planning issues but rather that it leads to their formal or explicit identification.

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REFERENCE


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Joint-Development Potential for Light-Rail Systems

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In recent years, many cities have begun to question the universal application of conventional rapid transit (CRT) systems but have indicated a need for a fixed-guideway solution to their transit problems. During this period of technological reexamination, light-rail transit (LRT) systems are being evaluated in greater detail to determine their capacity to meet operational specifications. This paper isolates for discussion the potential of LRT systems to inspire joint-development opportunities like those that have been attributed to CRT systems. Current incentives are evaluated in terms of the similarities that exist between the development of CRT and LRT systems. LRT’s operational flexibility is widely recognized. This flexibility also provides new dimensions for station-area development; the small scale (compared with CRT stations) provides opportunities for initiating development within areas that normally would not be considered to have development potential. The barriers to joint development for LRT systems are essentially the same as those for CRT systems. The most significant barrier to a full realization of joint-development potential is the lack of adequate private capital to realize the full opportunity of the public investment. Under the new policy directives for urban revitalization, several new financial assistance programs have been developed. The urban design action grants appear to have a significant potential for use in expanding the joint-development potential of LRT systems. Value-capture options for stimulating private investment in joint development are currently being given considerable attention in demonstrations of LRT and downtown people movers. Each rapid transit system currently under consideration must conduct an assessment of the value-capture potential as part of the requirements for federal funding. Implementation techniques are discussed in terms of development incentives and the control mechanisms that are necessary to guide development along the lines of community objectives.

Since there is a general professional consensus regarding the physical and economic merits of joint development, one wonders why so few valid examples exist today. Federal agencies have invested millions of dollars in joint-development research, yet the private development community’s reaction remains tepid at the hour of implementation. While the number of examples of joint development increases with each kilometer of transit, freeway, or waterway development, there remains a gap between the public and private entrepreneur.

In recent years our nation has refocused on light-rail transit (LRT) as a valuable transportation resource, the infrastructure for which already exists in many urban and suburban environments. Since the cost of conventional rapid transit (CRT) sometimes exceeds $30 million/km ($50 million/mile), both the federal and local governments are looking at existing LRT rights-of-way and considering adding to them for new or expanded systems. No one is suggesting that LRT is a panacea for solving transportation and urban development problems, but LRT is considerably less expensive to construct and operate than CRT and has greater functional flexibility. This presentation attempts to analyze the joint-development potential that LRT systems offer in a variety of patterns of urban density and land use. The same rationale that has encouraged cities to look more closely at LRT for urban transportation systems is applicable to the joint-development opportunities. Several components of the planning process for LRT and joint development will be isolated for analysis, including (a) current incentives for joint development, (b) current liabilities affecting joint-development potential, (c) federal assistance for joint development, (d) value-capture financing options, and (e) implementation opportunities.

Since very few examples exist in the United States to illustrate the joint-development potential of LRT systems, the case studies presented here will generally be taken from CRT systems. Most of the developmental and financial techniques are transferable and the effects may be quite similar.

INCENTIVES FOR JOINT DEVELOPMENT

A turning point in the recognition of joint-development planning as a workable component in the transportation planning process came in a memorandum on the role and responsibilities of the federal highway system in Baltimore written by the late Charles Abrams in 1967 (1).
The interdisciplinary concept team formed in Baltimore at that time was one of the earliest examples of a planning team set up to integrate the transportation engineering and civic design process.

In 1969 the U.S. Department of Transportation (DOT) commissioned a technical study to develop guidelines for the promulgation of transportation and joint-development planning activities (2). Case studies of five cities were analyzed. At the same time, the National Enviropolicy Act of 1969 emerged as the most powerful piece of environmental legislation of the decade. The act required the preparation of environmental impact statements that covered the analysis of social, economic, and physical impacts of publicly funded projects. This served to further encourage the use of multidisciplinary teams in the evaluation of project impacts.

Other notable joint-development studies followed, including the Boston transportation planning review (begun in 1970) and the 1975 program of the National League of Cities and U.S. Conference of Mayors to set up prototypes for providing financial assistance for joint development. However, most of these studies emphasized the planning rather than the implementation process. Not until the Young amendment to the National Mass Transportation Assistance Act of 1974 was passed were joint-development planning activities directly linked to an implementation process.

The Young amendment permits section 3 funds to be used to assist the establishment and funding of local public or private corporations operating in designated corridors and districts. The Young amendment inspired the reconsideration of tax-increment financing as a workable tool for local governments to use in implementing joint-development projects related to public investments. In addition, "brick-and-mortar" funds are now available through community development block grants from the U.S. Department of Housing and Urban Development (HUD). Other public funds have also been committed to the encouragement of such projects. However, the previous lack of coordination between federal and local agencies and the delayed initiation of joint-development planning in advance of system construction have stymied local project development.

Aside from the fact that joint development tends to make the best use of land and converging activities, joint development is a proven method of obtaining additional financial benefits from the creation of transportation improvements in conjunction with community or urban-area improvements. Therefore, the incentives for developing integrated transportation and urban improvement programs are economic as well as conservational in nature. By using joint-development financing options, which will be examined below, it is possible to recover as much as 20 to 40 percent of the capital cost of transit improvements. This quantifiable incentive, coupled with the better use of land and the concentration of activities, can be a significant factor in the integration of the transportation and urban development planning and implementation processes.

Do these economic, physical, and social incentives apply to LRT systems? They certainly apply to the consideration of new or extended LRT systems, and they have limited application to improvements in existing systems. Beyond lower capital and operating costs, one of the most significant advantages of LRT systems is functional flexibility. This advantage is magnified when joint-development opportunities are explored.

An early misconception about the feasibility of joint development concerned the physical size of the development site. Recent LRT joint-development projects in Toronto have illustrated that, even if station size and the development site are restricted, there can be successful integration of land use and economic activity. There is a tendency to consider joint-development solutions only in conjunction with high-rise air rights development, commercial centers, or high-density residential developments. While the potential economic return from joint-development activities such as these is greater, it should only reflect the proportional public investment in the transit station at these sites.

Since the intensity of use of LRT stations is lower than that for CRT systems, the scale of development can also reflect a lesser impact. This is not to imply that LRT stations do not have the same joint-development potential as CRT stations; it simply accepts that the density patterns that dictate the need for CRT rather than LRT systems will probably prevail in measuring the impact of joint development.

CURRENT LIABILITIES AFFECTING JOINT-DEVELOPMENT POTENTIAL

Several factors may exist in an area that act as disincentives for meeting joint-development objectives. These local liabilities are usually attitudinal rather than functional in nature but are, nonetheless, real barriers to realizing the full potential that can accrue to integrated development. In certain environments, there are institutional barriers to implementation opportunities, but rarely are there barriers to the integration of planning activities. The effort for change must be consistently directed toward the institutional barriers but have an equal focus on the financial disincentives that foster within outdated institutional frameworks.

Several institutional barriers exercise financial, legal, or planning constraints that prevent the full recognition of joint-development potential. A local government must be able to separate those barriers that are entrenched in legal restrictions from those that are attitudes developed over years of using a single-purpose planning and implementation process. The construction of any fixed-guideway system is a large enough financial venture to require a comprehensive approach to planning and implementation activities. It therefore represents an appropriate opportunity to scrutinize existing institutional structures for possible improvements and to direct any creative impulses toward refinement of the process.

Planning Barriers

Several impediments to joint development appear in the early phases of the planning process. One major barrier is the absence of an organizational sponsor or catalyst at any level of local government. Often several agencies, groups, or organizations are suitable and capable of being prime sponsors, but the institutional framework or attitudes of a community may prevent one from emerging. This condition or attitude can produce an approach to transportation and land-use planning that addresses these elements separately rather than in an integrated process. Key decisions are often settled by default rather than through an open decision-making process. The result is that public and private interests—the merger of which is essential to the success of joint development—are in conflict.

In many communities the analytical techniques necessary for defining the level and intensity of interaction between land use and transportation are not developed. The value of perishable data sources is often not defined in a manner that facilitates before-and-after impact monitoring. Similarly, nonperishable data sources are organized for single-purpose use (e.g., analysis of housing supply and demand) rather than accumulated in a
comprehensive fashion, thereby facilitating early analysis of the potential benefits of joint development. The impetus for joint development is sometimes lost in the time-consuming feasibility-analysis stage of transit and joint development planning. A comprehensive data base reduces the delays that often erode local interest.

**Financial Barriers**

The financial constraints on the public and private sectors form the greatest barrier to the potential success of joint development projects. One simple but major constraint is that the economic advantages of joint development are either unknown to or not accepted by local government officials. This is especially true in cities that are considering fixed-guideway systems for the first time. Since the Center City transportation project study on joint development was completed in 1970 (2), considerably more research and development funds have been devoted to providing joint development data to local governments for specialized use. In addition, new funding programs of DOT, HUD, and the Economic Development Administration (EDA) have provided information and encouragement to local governments that are considering joint development activities. HUD's urban development action grants offer still more potential for implementation funds.

Given the growing role of various federal agencies in joint development, the private sector should be more receptive to risking venture capital. To date, this has been the greatest shortcoming of joint development proposals, since real or imagined barriers have discouraged the investment of seed capital by private entrepreneurs. Traditionally, the private market seizes on land development opportunities that are created by the convergence of favorable economic, social, and political conditions. Except for the need to obtain building permits, environmental certifications, or zoning approvals or to fulfill other government-imposed requirements, the private market is virtually free to select the best use of a property.

In joint development all of these factors apply, but the initiating market stimulus is a public decision to invest tax revenues in a capital-improvement project, regardless of the best use of the property. The private market must then adjust to this government-sponsored activity and reestablish the profitability of a transit station in relation to other surrounding land uses. For this reason, joint development often relies on the government to assume a leadership role in initiating the condition for private investment, and the ultimate success of joint development is dependent on the adoption of consistent goals for public and private economic investment.

**Legal Barriers**

Many states and localities do not have an existing legislative base that encourages joint-development planning or implementation programs. For example, laws governing the exercise of eminent domain are not uniform for all transportation modes in all states. The result is that each joint-development project must be considered as a special legal case, which hinders the transfer of experience between projects. This barrier is gradually being removed as more court decisions have upheld the rights of localities to acquire property in excess of construction rights-of-way to implement projects for the public good.

Many states do not have laws that allow tax-increment financing for public-private joint ventures. Without this financing tool, a valuable catalyst for joint development is lost. The public, generally speaking, remains largely uninformed or uninterested in this financing option; a local bond issue suffered defeat in Dade County in late 1976.

The creation of public development corporations requires state legislative action, which often limits the nature and extent of the charter. Overcoming this barrier can require a substantial commitment by local governments, which are often only marginally convinced of the need at all. The passing of the Young amendment to the National Mass Transportation Assistance Act of 1974 has helped to alleviate some local concerns by providing a financial avenue for establishing public development corporations. Public corporations are not unique in the United States; housing and development authorities have used these concepts for years. However, their use in the past has predominantly been for single-purpose developments rather than for an integrated multidirectional scope, as is required in joint transportation and urban development proposals.

Many of the current liabilities that affect the feasibility of joint development exist because the apparent barriers have never been challenged. Local government officials often walk a tightrope in dealing with acceptance of a transit improvement program by a local community or neighborhood and therefore develop opposition to more creative approaches that may require amending existing laws or ordinances. LRT and CRT systems face similar constraints in relation to such liabilities. Since station locations for LRT systems are much closer together than for CRT systems, the need for a comprehensive public development charter is greater. Unless a comprehensive joint-development program is adopted, a strategy for joint development may become diffused and ineffective.

**FEDERAL ASSISTANCE FOR JOINT DEVELOPMENT**

Various incentives for joint development have been discussed. The most significant incentives are financial, and in recent years there has been evidence that the federal government, through several agencies and funding vehicles, is willing to accept a larger role in providing the initial financial incentives. Capsule descriptions of these programs follow.

**U.S. Department of Transportation**

The Young amendment provided the inducement for establishing public development corporations by allowing the use of section 3 funds to defray operating and administrative costs. To qualify for these funds, a public sponsor must prepare a grant application that illustrates the objectives, feasibility, and operating intent of the corporation. Support data concerning the quantity of land assembled, the anticipated costs and benefits and the scope of the corporation must also be provided. The local-participation share in the funding is 20 percent.

The Urban Mass Transit Administration (UMTA) recently began a 2-year demonstration program to provide technical and financial assistance to a select group of cities to evaluate the potential for joint development by using value-capture financing options. Capital grants for site acquisition and station modification will be provided in addition to potential loan guarantees for related infrastructure costs. The cities are asked to include value-capture options. The intended result of this requirement is that joint development will at least be considered as a contributing factor in the reduction of capital costs by returning to the public coffers a portion of the benefits derived from public investments. It
requires that joint-development feasibility be explored in a comprehensive manner during the planning of LRT or CRT systems that use section 3 capital funds. Another new UMTA program involves a demonstration effort oriented toward the testing and evaluation of personal rapid transit (PRT) systems in an urban environment. The downtown people-mover demonstration program will focus on less costly solutions to needs for mobility in major activity sectors of three demonstration cities-St. Paul, Houston, and Los Angeles. These cities are encouraged to use the demonstration funds to define the specific role of joint development in the planning and implementation processes. Since some aspects of PRT systems closely resemble those of LRT systems, an increased resource base should be available and transferable from this demonstration program.

U.S. Department of Housing and Urban Development

In 1973 HUD and DOT jointly financed a study by the National League of Cities and U.S. Conference of Mayors to recommend prototypes for financial assistance in planning joint development projects within a 760-m (2500-ft) radius of a transit station. This study (3) established the criteria for the use of community development block grants to assist in setting up and supporting development corporations. The funds continue to be available for joint-development projects, including the improvement of sidewalks and utility systems at stations in low-income neighborhoods.

The Housing and Community Development Act of 1977 (PL 95–128) adds a new component to the community development block grant program—the urban development action grants. The intent of these grants is to "alleviate physical and economic deterioration through reclamation of neighborhoods having excessive housing abandonment and deterioration [and] through community revitalization in areas with population out-migration or a stagnating or declining tax base." The program is designed to stimulate economic development and revitalization of residential neighborhoods through joint efforts of public and private investments. Approximately $400 million/year has been authorized for expenditure. Guidelines for the grant program have been developed; the Transit and Urban Development Committee of TRB served as a review group. This program represents an important breakthrough for funding transit–station development in neighborhoods that are experiencing economic decline. The funds can provide important seed money for encouraging other public and private financial commitments.

EDA funding has traditionally been used to promote predominantly rural development, tourism, or industrial development activities. However, EDA has recently taken a number of steps to begin developing an urban strategy that includes cooperative agreements between HUD and EDA on urban development action grants. A recently initiated national demonstration program will support the administrative costs of hiring experienced professional staff and managing central-city economic development programs aimed at inducing greater public and private investment in urban settings. Districts in cities that have high levels of unemployment will be given first priority for funds. Joint development projects in such environments should qualify for EDA assistance for areawide revitalization.

Other federal funding programs, such as those under the Bureau of Outdoor Recreation, are suitable for use in joint development projects. The successful projects will use these programs to accumulate the basic functional infrastructure capital and technical assistance funds. However, the success of joint development will depend on the enthusiastic support of private investment. The major issue is whether adequate private capital can be attracted to a project to ensure its financial feasibility.

PRIVATE INVESTMENT INCENTIVES FOR JOINT DEVELOPMENT

Although federal programs can provide the initial incentive for joint development, these funds are not essential for integrated transportation-related urban development activities. Direct access has been provided from a number of transit stations into office buildings (such as the Pan Am building in New York) or department stores without federal assistance. The private market has consistently responded to investment opportunities created through public investment in capital improvements. However, in recent years a concept has emerged that encourages public subsidization of private development, yet returns to the public coffers a share of the financial benefits that accrue to the private developer. This concept, value capture, warrants closer examination.

Value-Capture Financing Options

Value capture has been defined as "a means whereby land adjacent to transportation facilities (in this case, transit stops) is purchased, managed, or controlled in order for the public to share in potential financial and community development benefits from the facilities that are not otherwise possible" (4). Research work completed by the Rice Center for Community Design and Research team has demonstrated that 20 to 40 percent of the capital costs of transit improvements may be saved by using the value-capture technique in joint development.

At the heart of value capture is a defensible legal basis. Recent court cases have upheld the right of cities to sell property in excess of the necessary construction right-of-way for private development. A history of court cases upholds the ability of a public body to acquire more land than is required for a project to accommodate future expansion needs. However, recent cases have allowed the acquisition of additional land for the purpose of development to ensure its financial success. These cases have established a legal precedent for financing joint development on surplus lands and returning to the public a share of the profits to defray the transit system's capital costs.

Special-benefit districts have been used as a means of sharing in the cost of transit improvements; this is also a form of value capture. This concept, frequently used to finance pedestrian malls, has numerous applications for transit–station development and is particularly appropriate for LRT systems, where the smaller scale of development is more easily defined than for CRT station areas. Legislation exists in many states (Minnesota's joint powers, Wisconsin's benefit district, and South Carolina's special assessment district) to allow an increase in property taxes to be used for financing the cost of improvements. In California this concept has been used by defining concentric districts around certain San Francisco Bay Area Rapid Transit stations and levying different tax rates on private land according to its proximity to the station. Revenues from this differential taxation are then used to defray a portion of the system costs.

Although the influence zones surrounding LRT stations are not generally as broad as those around CRT stations—perhaps 300 m (1000 ft)—the use of benefit districts or
joint-power districts remains an economically valid technique to encourage LRT joint development. The same potential for air or subsurface rights development that exists for CRT systems is available for LRT systems. LRT has a slight functional disadvantage if an overhead power source is used, but this need not preclude air rights development. The shorter and lower platform of LRT systems can also be a significant feature in air rights development.

Several techniques for applying value capture to station-area joint-development projects were developed by Carl Sharpe and the Rice Center team (5). These techniques are designed to assist a public agency or development corporation in capturing both financial and community design benefits from integrated station-area development programs. These techniques are defined below.

1. Ad valorem taxation: The transit or development entity taxes the assessed market value of land and improvements within the entity’s taxing jurisdiction or the city served by the transit system.

2. Special district taxation: An ad valorem tax would be levied by the entity on a district in the city adjacent to a transit station. The district’s boundaries are set to include the area that receives special benefits from the facility. The transit or development entity would, through the separate tax on the assessed valuation of the market value of the land and its improvements, receive some of the financial benefits created by its facilities.

3. Incremental value taxation: This instrument also sets up special districts, but no new taxes are introduced. The entity receives by agreement all or part of the ad valorem tax revenues on the incremental difference between the assessed valuation of the land at some future date and the assessed valuation at a point prior to the construction of the transit improvements.

4. Develop and hold real property: The entity constructs transit-related facilities around the transit stop and leases or rents them. Public participation in the development of the facilities enhances the potential for community influence over the design, while generating revenue through lease and rental agreements.

5. Develop and sell real property: The entity acquires land fee simple and develops transit-related improvements and facilities thereon. At completion, the land and facilities are sold. As in the preceding technique, the public participates in the community development process, which yields potential benefits unique to this and the above or last techniques.

6. Hold and sell real property: Fee-simple interest and other development rights (air or subsurface) of transit-related land parcels are acquired by the entity. In the future, when the development of these parcels meets appropriate public purposes, the rights or land is sold subject to specific-use conditions.

7. Lease of real property: After acquiring land related to the transit facility, the entity enters into long-term leases for the ground or air and subsurface rights to the land or related development rights, subject to the terms of specific development programs in regard to community design and public finance benefits.

8. Participation in holding real property: Interest in transit-related land parcels or development rights is ceded to other private or public parties for development around stop locations. Under some circumstances, the transit or development entity may receive a portion of the income thus produced.

To illustrate the application of these techniques and define the financial incentive that value capture can have in reducing the burden of capital development, the Rice Center team applied the value-capture financing approach to several different transit-station situations. Each station has two or three different land-development projects associated with it. Table 1 provides a comparative view of the transit development costs, returns from the value-capture application, and an estimate of the transit development costs that can be defrayed through value capture. The cash flow is accumulated over a 25-year development period and also illustrates the impact of discounting the returns at a rate of 8 percent/year to determine net present value. Although the transit systems are assumed to be CRT, a similar impact might be expected from LRT systems. The scale of the economic development and thus the potential returns might be reduced simply because there would be smaller influence zones surrounding CRT stations; however, the joint-development opportunities remain valid.

The last column in Table 1 illustrates the importance of considering value capture as a financing tool in the development of a comprehensive station-area development plan. In the four examples shown, as much as 450 percent of the development costs of a particular segment or station can be defrayed by use of the value-capture method of financing station-area development. Obviously, in some instances the land use, density pattern, and concomitant market land values may be so well established and the development costs so high that there will be very little value to capture for defraying develop-
Integrating Implementation Techniques in the Planning Process

It should not be assumed that joint development, even on a small scale, will automatically occur because a transit station has been absorbed into an area. Earlier research evaluating the impact of development along the Philadelphia-Lindenwold high-speed rail line illustrated that minimal land-use conversions occurred as a result of the implementation of the two new systems. In addition, not every transit stop is a candidate for private capital beyond the actual investment in the station itself. The joint-development projects that have the best potential in an overall system plan should be the result of a comprehensive urban design and economic development program that links planning goals to implementation strategy. Although development can occur after a station has been constructed, the maximum joint-development potential can be gained if the urban and transit development planning processes are conducted simultaneously. Consequently, joint-development activities do not necessarily have to occur, although important functional linkages should be accommodated during the construction of the station.

A major consideration in the joint-development planning process is gaining an understanding of the cycle of impacts that will follow the development activities. The impact zone for LRT systems is generally smaller than that for CRT stations, but a definable ripple effect can be expected to begin in the immediate station environment and extend to related developments within an estimated 300-m (1000-ft) radius of the station. The planning process for the station area must identify a coordinated development program for the entire influence zone, but implementation phasing must consider the likely cycle of economic impacts. The planners must also consider the effects phased implementation will have on traffic circulation, pedestrian movement, extreme changes in density patterns, and the inducement of strip developments between stations. Anticipating these impacts is possible only if the planning and implementation processes have common development goals.

One potential problem in urban design related to joint development of LRT stations that has economic implications is that stops on an LRT system are more closely spaced than those on a CRT system. Zones may overlap, and a diffusion of joint-development activities can occur. This makes financing techniques such as value capture more difficult, since development sites may overlap to the point of making it impossible to identify boundaries for the purpose of establishing assessment districts or other jurisdictional limits. A coordinated program of corridor development goals and station-area development plans can eliminate this potential erosion of the LRT joint-development opportunities.

The planning process for LRT joint development must include (a) a recognition of the need for a coordinated station-planning framework; (b) a resource base that allows the measurement of the potential ripple effect that station development can have on other functions within the urban setting; (c) a full grasp of the tools available to induce development, such as bonus zoning, transfer rights, and special districts, that will encourage and coordinate joint development; and (d) a complete awareness of the aesthetic impact a joint development project can have on community revitalization.

The final important ingredient in a comprehensive joint-development planning process is the vital linkage between station-area planning and implementation procedures. Without this well-defined linkage, examination of joint development will remain a paper exercise to satisfy federal grant application requirements that consistently falls short of actually achieving the commitment of private investment. To achieve this linkage requires a very detailed understanding of the unique design aspects of CRT and LRT systems, especially in relation to accommodation of power source, platform size and height, and the definition of influence zones.

At the present time, a variety of development incentives and controls are being tested in various transit construction programs. The downtown people-mover demonstration programs are also providing a valuable opportunity to evaluate public and private joint-development activities. During the next 2 years, our resource base for identifying successful development incentives and control models will expand, primarily because of the downtown people-mover demonstrations and the Miami and Baltimore transit programs. In addition to these larger examples, many medium-sized cities are evaluating the benefits of forming public development corporations and using tax increment financing as an incentive to encourage the public-private joint-venture approach. All of these efforts will substantially improve the data base for evaluating the joint-development potential of LRT systems.

CONCLUSIONS

The following general conclusions have been drawn concerning the potential that LRT systems have for joint development opportunities.

1. The same basic urban design opportunities that exist for CRT systems are available in the development of LRT systems.
2. Functional differences between LRT and CRT systems that affect joint-development opportunities will generally involve reduced volumes of riders at LRT stations and the smaller platform size and lower platform height of LRT systems.
3. The functional feasibility of LRT systems presents an important joint-development potential. Caution should be exercised in locating joint-development programs between stations since LRT stations tend to be closer together than CRT stations; the impact of a station may be lost if it overlaps with an adjacent station.
4. The financial incentives that apply to joint-development solutions for CRT are transferable to LRT systems.
REFERENCES


Fort Worth’s Privately Owned Subway System

P. D. Scott, Tandy Corporation, Fort Worth, Texas

For the past 14 years a small subway system has been quietly and steadily carrying passengers into and out of the central business district (CBD) of Fort Worth, Texas. It has two unique features: It is privately owned, and passengers ride it for free. In the early 1960s, two merchants in Fort Worth hit on the idea of providing subway service to their downtown department store from a large parking lot on the banks of the nearby Trinity River. They bought second-hand electric trolley cars from Capitol Transit Company of Washington, D.C., modified them extensively, dug a tunnel from the edge of the parking lot to the lower level of their store, and began operating the subway in February 1963. Tandy Corporation bought the department store in 1967 and continued to operate the subway, which carried nearly 15,000 passengers/day. Tandy is now rebuilding the subway cars to give them a squared-off configuration and many refinements. Introduction of these refurbished cars will coincide with the opening of Tandy Center—an eight-block complex of office buildings and shopping malls in downtown Fort Worth that the subway system will serve. There has been some preliminary exploration of the feasibility of extending the subway system several blocks south through the CBD. This short-haul do-it-yourself subway system has proved that shoppers and downtown workers can be induced to leave their automobiles in a fringe parking lot and ride into the heart of the city by light-rail transit.

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The first phase of Tandy Center, which is now near-completion, consists of a 19-story office tower, which will house Tandy Corporation's international headquarters; a three-level shopping gallery surrounding an ice-skating rink; and a three-level parking garage. The second phase of construction, now well under way, includes a 20-story office tower and a new Dillard Department Store—the first new department store to be built in the CBD in 40 years. The third phase of Tandy Center, which is still on the drawing boards, calls for a 500-room hotel or a 45-story office tower or, perhaps, both. The subway cars that will begin carrying passengers into the new Tandy Center will bear little resemblance to the old trolley cars purchased from Capitol Transit Company of Washington, D.C., in 1962.

BACKGROUND

The subway is now and always has been a small-scale operation. What makes it interesting to transportation engineers and planners is that it represents a low-cost, do-it-yourself approach to public transit. The Fort Worth subway system contrasts markedly with transit operations in many urban areas throughout the world, some of which are characterized by high costs, high deficits, and high subsidies. Fort Worth's trolley subway system was constructed by a department store and for most of its life has been operated by department store personnel without financial assistance from any level of government—local, state, or federal.

In the early 1960s, Marvin and Obie Leonard, pioneer merchants in Fort Worth, hit on the idea of providing subway service to their downtown store from a large parking lot on the banks of the nearby Trinity River. They figured that free subway service and free parking for automobiles would keep customers coming into their store rather than making their purchases in the suburban shopping malls that were being built around Fort Worth and throughout the nation. The Leonard brothers bought five electric trolley cars from Capitol Transit Company of Washington, D.C., where the public transit system had just switched over to buses. Since the demand for second-hand trolley cars was limited, the Leonards acquired their small fleet for a total of only $10,000. These were Presidents' Conference Committee (PCC) streetcars, manufactured by the St. Louis Car Company. They were extremely mod-