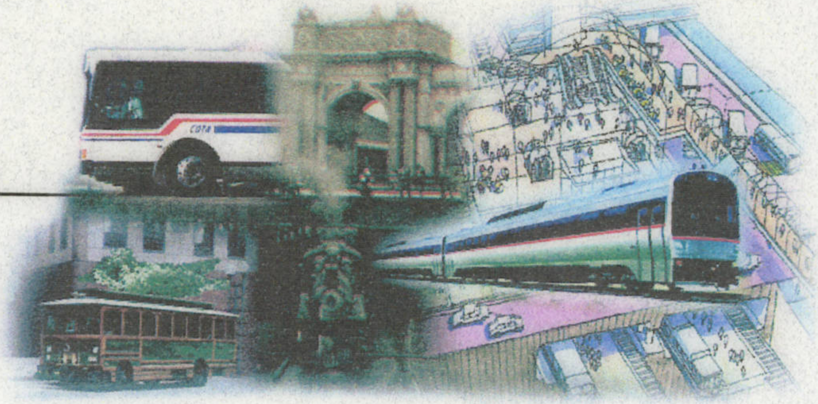
VISION 2020: Transportation for a Great Community

Downtown Mobility Study



Central Ohio Transit Authority

Mid-Ohio Regional Planning Commission

in association with:

Burgess & Niple, Limited

Lea + Elliott, Inc.

Manuel Padron and Associates

February 16, 1999

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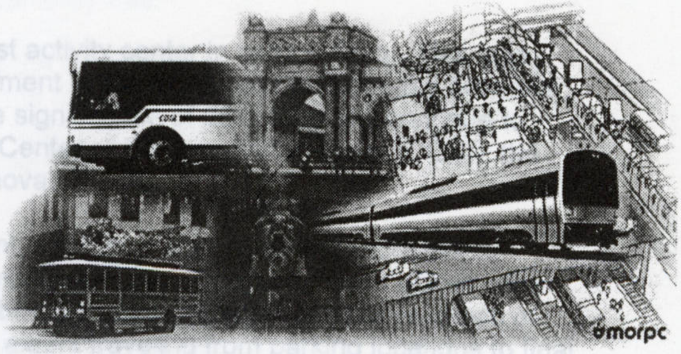


EXECUTIVE SUMMARY

COTA /MORPC DOWNTOWN MOBILITY STUDY

EXECUTIVE SUMMARY

Downtown Columbus represents the largest activity center in central Ohio. This area encompasses the largest concentration of employment in the region and includes the broadest collection of cultural and recreational venues. The significance of downtown will continue to grow with completion of new projects such as the Center of Science and Industry (COSI), the Nationwide Arena/entertainment district and Miranova.

While the number of downtown employment, shopping, education and recreational opportunities presents an attractive downtown environment, the dispersed nature undermines any synergism that could be fostered by their combined impact. In fact, the inconvenience of moving between the various venues, and to some extent traveling from parking locations to final destinations, may potentially undermine the attractiveness of the individual locations.

In order to address this issue, the Downtown Mobility Work Group was formed by the Central Ohio Transit Authority (COTA) and the Mid-Ohio Regional Planning Commission (MORPC) to identify downtown transportation issues and potential solutions. This work group, consisting of representatives of major employers, shopping, cultural and entertainment, and education facilities, formed a set of transportation goals, developed transportation options, and recommended two long-term approaches to addressing mobility needs in the downtown area.

Each of the two long-term approaches builds upon an expanded local bus system in downtown Columbus. This enhanced service would include more frequent buses on existing local and express routes. In addition, several new routes that circulate solely within the downtown area would enhance mobility between downtown locations.

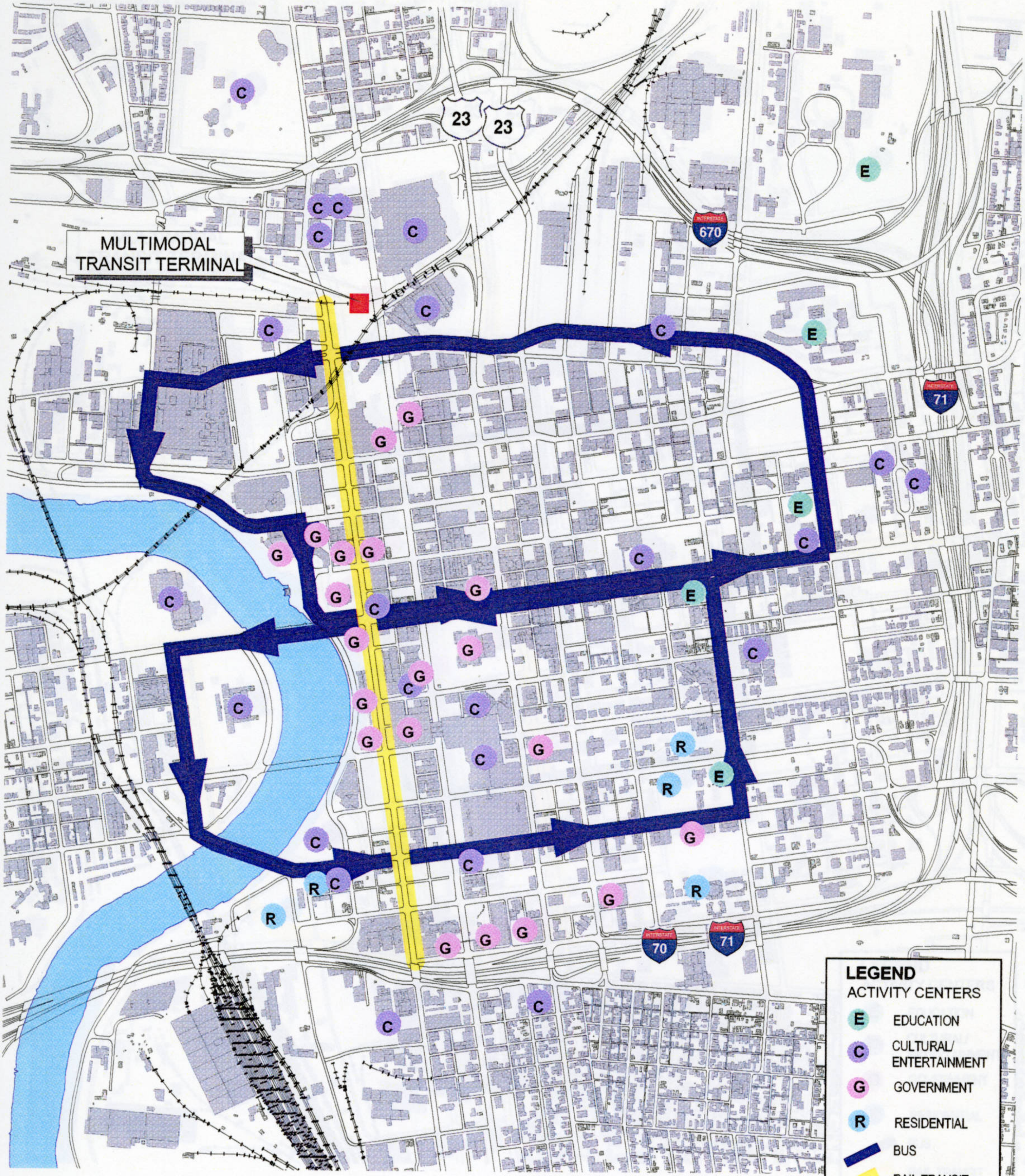
Each of the two options would also provide access to the Multimodal Transportation Terminal planned at North High Street across from the Convention Center. This terminal may eventually include commuter rail service from Columbus suburbs, as well as inter-city rail service from Cleveland and Cincinnati. It will be the focal point for transit service in central Ohio.

The first long-term option, the At-Grade Shuttle shown in Figure ES1, would provide high-quality transit service on a north-south street such as High or Front. Although the rail service in this alternative operates in the street, the vehicles would travel in dedicated transit lanes and would have some influence on the traffic signals to reduce transit delay at intersections. As indicated above, this new service would be augmented by and integrated with new downtown circulator buses.

A more ambitious plan, the Elevated Loop Cross shown in Figure ES2, would provide an expanded transit guideway network operating above street level throughout much of downtown. The main advantage of this option is the total avoidance of traffic conflicts at the street level. The travel speeds for the elevated vehicles would be substantially faster than those experienced by street-level buses or the rail shuttle outlined in the prior option. The main disadvantage associated with this alternative is its high construction cost.

The work group was almost equally divided in its preference for these two options. Lacking a clear-cut preference, the main message from the group was the need for an enhanced transit system that would look beyond expanded bus service. Implementation of the elevated alternative would require both increased local funding and significant financial participation on the part of the private sector. Overall implementation of either alternative will require a stronger local funding base than COTA currently has.

The next step in the planning process is for the COTA Board of Trustees to review the recommendations of the Mobility Work Group and the feedback provided through its public outreach campaign and select a preferred path for downtown transit improvements. The eventual implementation of that path will be dependent upon the overall public and private support for that path.



AT-GRADE SHUTTLE
Figure ES1

morpc
Mid-Ohio Regional Planning Commission
January 1999
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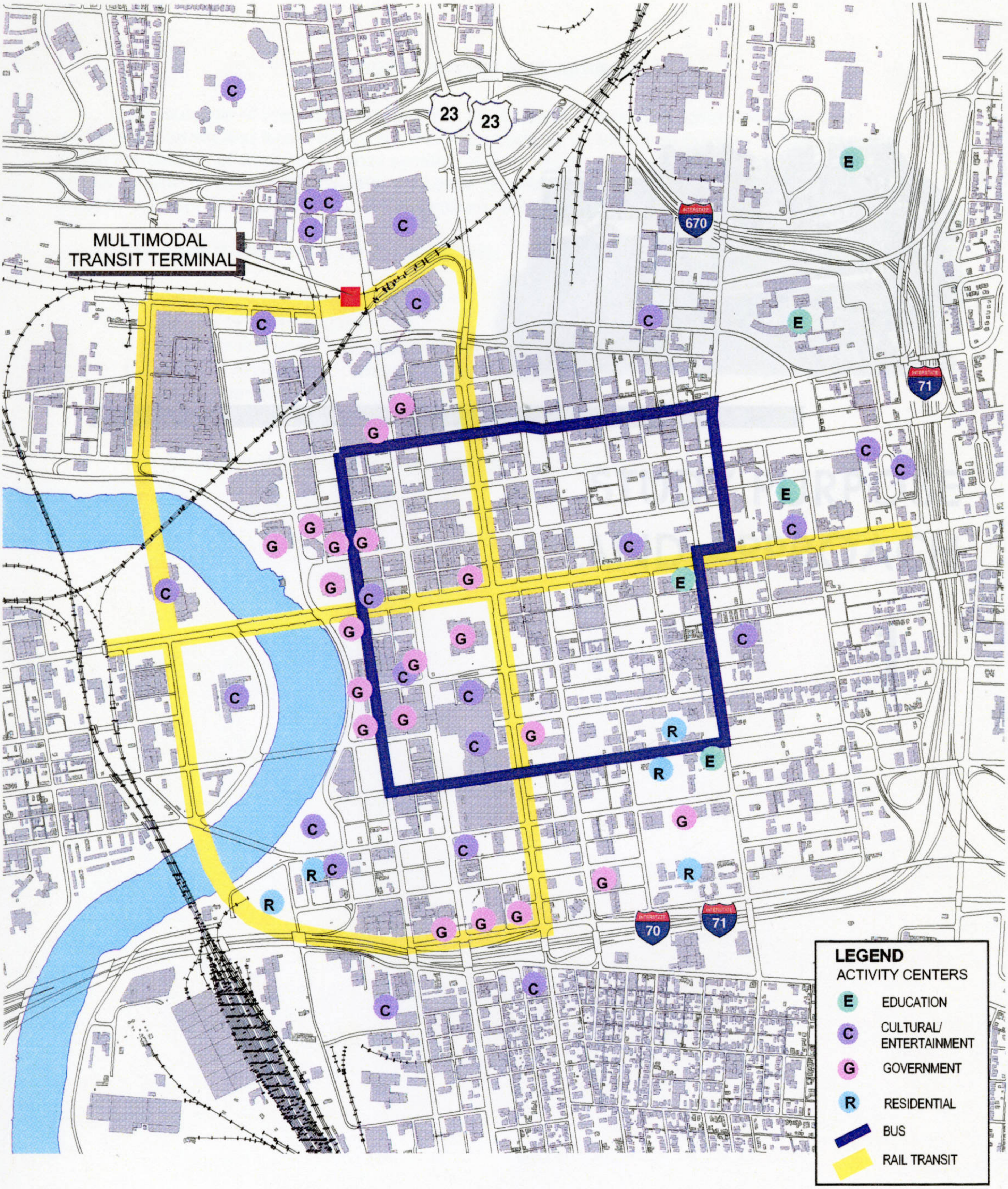

ELEVATED LOOP CROSS
Figure ES2

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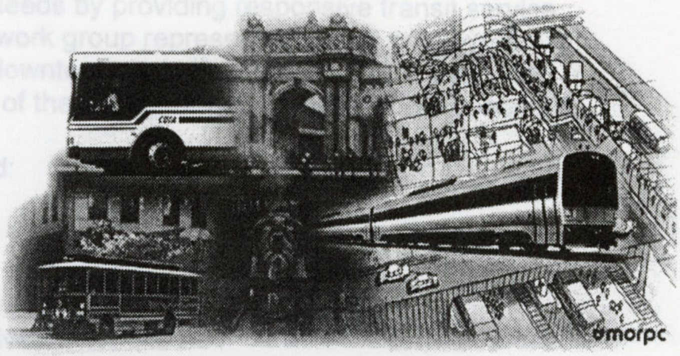
N

0 500 1000 1500 Feet



STUDY PURPOSE AND APPROACH

1

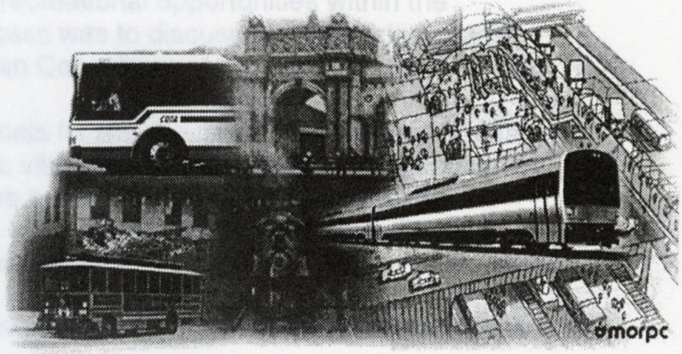
1.0 STUDY PURPOSE AND APPROACH

The purpose of the Downtown Mobility Study was to develop a community plan that addresses current and future downtown mobility needs by providing responsive transit service within the context of a regional transit system. A work group representing major employers, property owners, cultural arts facilities and other downtown stakeholders provided community input throughout the planning process. Members of the work group are identified in Appendix A.

The steps in the planning process included:

- Identification of Service Goals
- Review of Technologies
- Development and Evaluation of System Concepts
- Detailed Analysis of Preferred Alternatives
- Recommendation to COTA
- Potential Procurement Methods

The remainder of this report summarizes these activities.



IDENTIFICATION OF SERVICE GOALS

2

2.0 IDENTIFICATION OF SERVICE GOALS

The work group brought a broad range of perspectives to the study with respect to working, shopping, living, and visiting cultural and recreational opportunities within the downtown area. The first step in the planning process was to discuss the role(s) that transit could play in supporting these activities in downtown Columbus.

The committee identified a diverse set of goals for the downtown transit system. Many of the goals focused upon enhancing the economic vitality of the downtown by creating an innovative transportation system and enhancing the ease of movement between various downtown areas without the use of an automobile. A number of comments were directed towards serving specific market segments in the downtown.

The general themes established by the work group are summarized below by market segment/subject area.

Downtown Visitors

- Extend period of stay for downtown visitors
- Connect activity centers/population pockets
- Attract more convention business

Downtown Workers

- Connect activity centers/population pockets

Downtown Residents

- Connect activity centers/population pockets
- Support residential development
- Link adjacent neighborhoods to downtown

Downtown Parking

- Reduce need for parking
- Increase service area for existing parking

Transportation Facility Characteristics

- Create national "signature" facility
- Design for reasonable return on investment
- Provide easy access
- Provide service suitable for various markets
- Serve east/west movement

Miscellaneous

- Encourage appropriate development patterns
- Anticipate future development
- Reinforce downtown as the regional center

- Reduce perceived size of downtown (travel time)
- Improve air quality
- Riverfront access (special events)

Although these different issues were not formally incorporated into specific goal statements, the committee discussion provided a foundation for identification of service needs, and development and evaluation of alternatives. With respect to service needs, the work group emphasized two critical themes:

1. Improve the connection of work places to other work places, shopping, cultural/entertainment, and parking facilities, and

2. Enhance access to cultural/entertainment venues from other cultural/entertainment, work, residential, and parking facilities, and major downtown access points

These themes became the basis for development and evaluation of a preliminary range of downtown transit options, as summarized in Chapter 4.

REVIEW OF TECHNOLOGIES

3

3.0 REVIEW OF TECHNOLOGIES

Prior to development of alternative systems, a summary of potential transit technologies was presented to the work group. The different technologies are described in this section in terms of general technical characteristics, suppliers and applications. System capacities, which are configuration dependent, are provided as typical ranges. The technologies include electric buses, conventional buses, cable-propelled systems, monorails, automated guideway transit (AGT), light rail (LRT), commuter rail and personal rapid transit (PRT). Information on the technologies is summarized in Table 3.1.

Electric Buses

All Battery and Electric Hybrid (batteries provide primary power) – are manually operated, battery-powered; 22- to 32-passenger buses are prototype buses which have exhaust-free operation, reduced noise emissions and regenerative braking (Figure 3.1). The length ranges from 22 to 35 feet. Service route flexibility is optimal with this technology although route length and span of service may be a constraint. Capacity along a single route can range from 150 to 300 passengers per hour. Vendors and applications include:

- Advanced Vehicle Systems Manufacturing (U.S.) – Chattanooga (1992), Chatham, Charlotte and Atlanta
- APS Systems, Inc. (U.S.) – Santa Barbara (1991) and Santa Monica
- US Electricar (U.S.) – Berkeley
- Bus Manufacturing USA (U.S.) – Denver
- Specialty (Inactive – now Electric Vehicles International) (U.S.) – Grand Canyon (1996) and Massachusetts (1996)

Hybrid-Electric (batteries provide secondary power)

These manually operated buses combine a combustion engine with an electric motor and batteries. They carry 29 to 61 passengers and are prototype buses that have reduced noise emissions and regenerative braking. The length ranges from 22 to 40 feet. Service route flexibility is optimal with this technology although route length and span of service may be a constraint. Route capacity can range from 300 to 600 passengers per hour.

- Orion – NJ Transit (1997)
- APS – AC Transit (1998)

Table 3.1 Technology Summary

Physical, Performance and Operational Characteristics

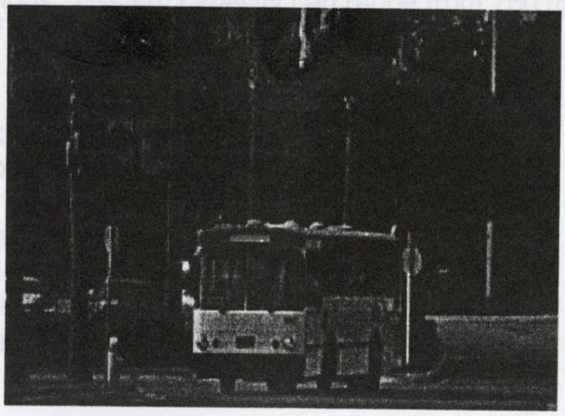
Physical Characteristic	Conventional Bus	Electric Bus	PRT	Cable Propelled	Monorail	AGT/APM	LRT
Length (Vehicle)	40'	22'-30'	11'-12'	7'-32'	20'-40'	40-45'	80'-85'
Width	8'6"	8'-9'	5'-6'	9'-10'	7'-9'	9'-10'	9'
Height	10'9"	8'	6'	12'-14'	10'	11'	11'
Weight-empty (lbs)	35,000	20,000	2,500	30,000	25,000	26,000	67,000
Capacity (passengers/ car)	45	25	4	30-100	15-50	65-85	150-180
Station Requirements	N/A	N/A	off-line	on-line	on-line	on-line	on-line
Propulsion System	Diesel	HV Elec.	AC induction	DC Geared Motor	Traction	Traction	Traction
Acceleration (0-30 mph)	5-6 sec	<20 sec	5-6 sec	10-14 sec	8-9 sec	4-5 sec	9-10 sec
Maximum Speed	65 mph	40 mph	25-30 mph	18-50 mph	25-40 mph	30-50 mph	50-55 mph
Operating Configurations	Single	single	Single	1+ cars	1-10 cars	1-4 cars	1-3 cars
Branching Capabilities	Yes	yes	Yes	limited	yes	yes	yes
Capital Costs (Systems & civil)	$180-230K per bus	$300-400K per bus	$30-40M per single-lane mile	$40-80M per dual-lane mile	$50-90M per dual-lane mile	$50-90M per dual-lane mile	$30-50M per dual-lane mile
Representative Applications	many Urban	some Urban	1 demonstration	Airport/Resort	Urban/Airport	Urban/Airport	Urban

Trolleybus

These manually operated buses take power from overhead wires. They carry 85 to 176 passengers and are prototype buses that have reduced noise emissions and are nonpolluting. The length ranges from 37 to 60 feet. Service route flexibility is limited with this technology due to overhead wire constraints. Route capacity can range from 750 to 1,500 passengers per hour.

- Skoda (Czech Republic) – Dayton MVRTA (1995) and San Francisco MUNI (on order)
- NovaBus/Kaman (U.S.) – Dayton MVRTA (1996)
- New Flyer (Canada) – San Francisco MUNI (1972), Dayton MVRTA (1976), and Boston MBTA (1976)
- Breda (Italy) – Seattle METRO (1988)
- AM General (U.S.) – Philadelphia SEPTA (1979) and Seattle METRO
- MAN (Germany) – Seattle METRO

Figure 3.1 Electric Bus Examples

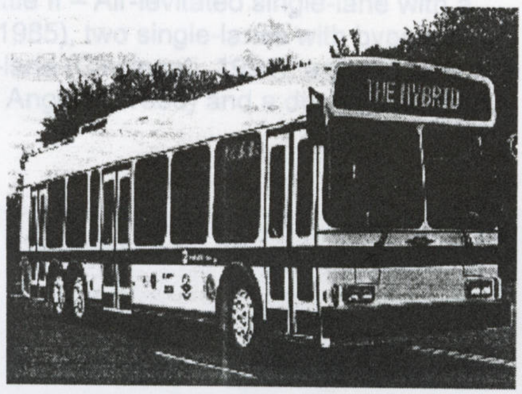


AVS Battery

- Limited Technology Maturity
- Light-Duty Durability
- Manually Operated
- Limited Service Capabilities
- 20-30 Passengers/Bus

APS Electric

- Limited Technology Maturity
- Light-Duty Durability
- Manually Operated
- Moderate Service Capabilities
- 20-30 Passengers/Bus



Trolley Bus

- Technically Mature
- Heavy-Duty Durability
- Manually Operated
- Limited Service Capabilities
- 40-45 Passengers/Bus
- Overhead Trolley Wires

Orion Hybrid-Electric

- Limited Technology Maturity
- Medium-Duty Durability
- Manually Operated
- Extended Operating Range
- Very Low Noise/Pollution Emissions
- 40 Passengers/Bus

Conventional Buses

They are manually operated, diesel-powered, 40- to 100-passenger buses. Service route flexibility is optimal with this technology. System capacity can range from 750 to 1,500 passengers per hour. Suppliers of this type of technology include:

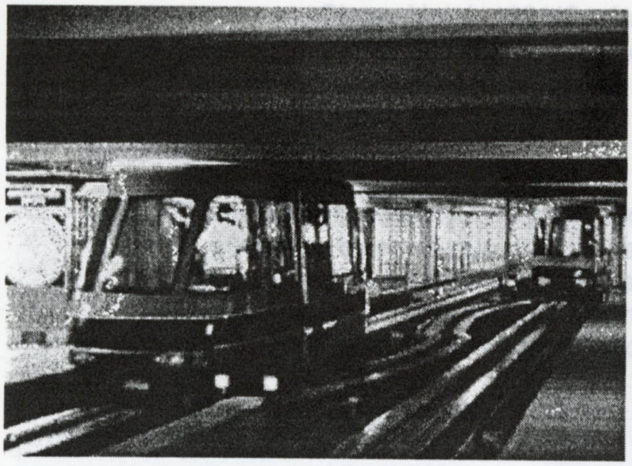
- New Flyer (U.S.) – Numerous applications
- Neoplan (Germany) – Numerous applications
- Van Hool (Belgium) – Numerous applications
- El Dorado (U.S.) – Numerous applications
- Blue Bird (U.S.) – Numerous applications
- Gillig (U.S.) – Numerous applications
- Orion (U.S.) – Numerous applications
- NovaBus (U.S.) – Numerous applications

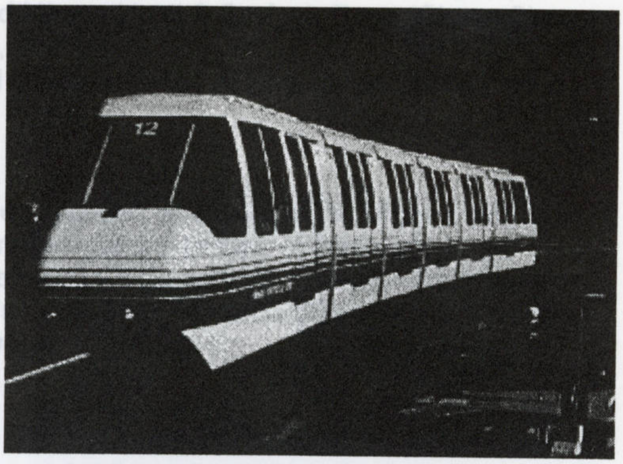
Cable-Propelled

Medium-capacity vehicles or trains that use cable propulsion with various suspension systems (Figure 3.2). System line capacity ranges from 1,000 to 5,000 passengers per hour per track with speeds of 25 to 30 miles per hour (mph). This technology is best suited for two-station shuttle applications with relatively straight guideway alignments of one mile or less. Suppliers of this type of technology include:

- Otis Transit Systems (U.S.) – Shuttle I – Steel-wheel on steel-rail dual-lane, relatively inexpensive; system installed to connect commercial centers with rapid rail transit (Boston, 1997).
- Otis Transit Systems (U.S.) – Shuttle II – Air-levitated single-lane with a bypass at Harbor Island (Tampa, 1985), two single-lanes with bypasses at Narita Airport (Tokyo, 1992), dual-lane (Cincinnati, 1994), a single lane with a bypass at the Getty Museum (Los Angeles, 1996) and a dual-lane airport shuttle (Zurich, 2001).

Figure 3.2 Monorail and Cable-Propelled Examples





Bombardier UM III

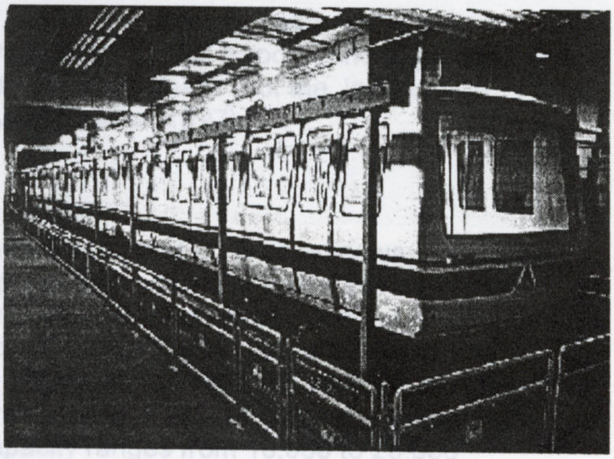
Adtranz Monorail

- Electrically Self-Propelled
- Rubber Tires
- Fully Automated - Driverless
- Technically Mature

- Concrete or Steel Guideway
- Less Obtrusive Guideway
- 15-150 Passengers/Train

Cable Propelled

- Wayside Cables Propulsion
- Rubber Tires or Air Levitated
- Fully Automated - Driverless
- Technically Mature
- Superior Grade Capability
- Limited Curve Capability
- Simple Shuttle Alignments
- Top or Bottom Suspension



- VSL (Swiss/U.S.) – Cable-pulled, rubber-tired, suspended shuttle at Mud Island (Memphis, TN, 1982); bottom-supported shuttles in Las Vegas (Circus-Circus Hotel, 1981/Casino and Mirage Hotel & Casino), Reno (Circus-Circus, 1985), and Nevada (Stateline, 1990).
- Soule – Cable-propelled, dual shuttle installed at Charles de Gaulle Airport (Paris, 1998).

<u>Monorail</u>

These self-propelled vehicles or trains are supported on or suspended from a single rail or guideway beam (Figure 3.2). There are two general groups of monorails, large capacity and small capacity, which are defined by both cabin/vehicle size and speed. System line capacities for small monorails range from 500 to 3,000 passengers per hour with speeds ranging between 20 and 30 mph.

Large-Capacity Monorails include:

- Hitachi (Japan) – Straddle-beam, flat-floor monorail located in Haneda (Tokyo), Kitakyushu, and Japan (Osaka, 1990).
- Mitsubishi (Japan) – Suspended monorail, located in Ofuna (Yokahama) and Japan (Chiba, 1988).
- Bombardier (TGI) (Canada/V.S.) M-VI – Straddle-beam, separate-car monorail located at Disney World and Epcot Center.
- Alweg – Straddle-beam, separate-car monorail, temporary transit system located at Seattle World's Fair.

Small-Capacity Monorails

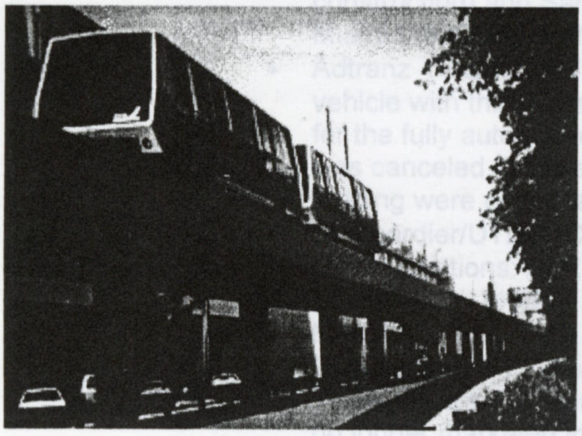
- Adtranz/Von Roll (German/Swiss/U.S.). Type III – straddle-beam, separate-car, small vehicle at Newark International Airport (Newark, 1996), Australia (Sydney, 1988), England (Birmingham) and the Jurong Bird Park (Singapore). Also have had temporary systems at the Vancouver Expo-86 and the Seville (Spain) Expo-92.
- Bombardier/TGI (Canada/U.S.). UM III – straddle-beam, separate-car, small-vehicle loop system at the Tampa International Airport parking garage. This technology will be enhanced and used in Phase 2 of the Jacksonville Automated Skyway Express (Jacksonville, 1997).

<u>Automated People Mover (APM)</u>

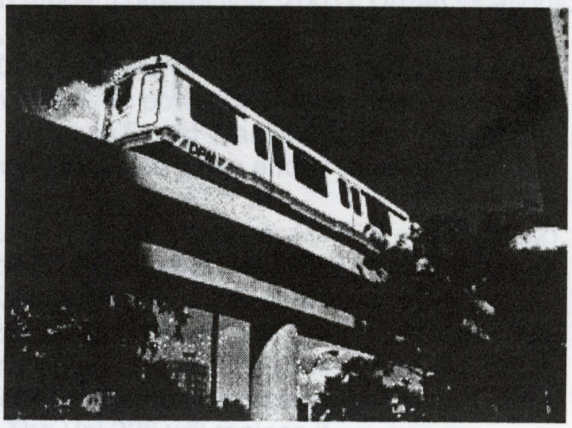
APMs are fully automated, driverless vehicles operating on fixed guideways along an exclusive right-of-way (Figure 3.3). Self-propelled vehicles or trains use a two-rail guideway system with rubber tires on concrete or steel guideway or steel wheels on steel rail. System line capacity ranges from 5,000 to 20,000 passengers per hour. Cruise speeds range from 30 to 40 mph. Higher-speed vehicles, sometimes referred to as ALRT, are self-propelled vehicles or trains using a two-rail guideway system with steel wheels on steel rail. System line capacity ranges from 10,000 to 25,000 passengers per hour with speeds of 50 to 55 mph. Suppliers, each with different proprietary designs, include:

Figure 3.3 Automated People Mover Examples

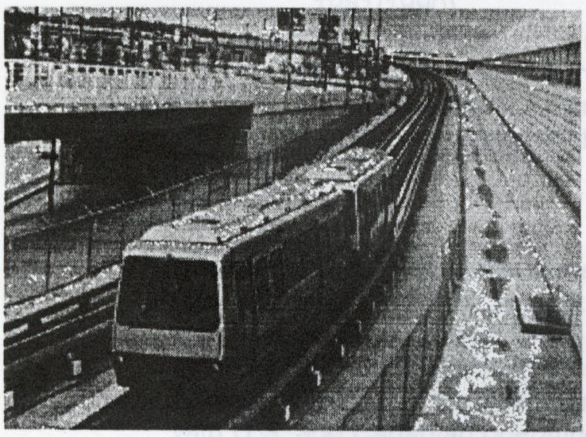
- Electrically Self-Propelled
- Rubber Tires, Steel Wheels
- Fully Automated - Driverless
- Technically Mature
- 40-320 Passengers/Train
- Proprietary Design



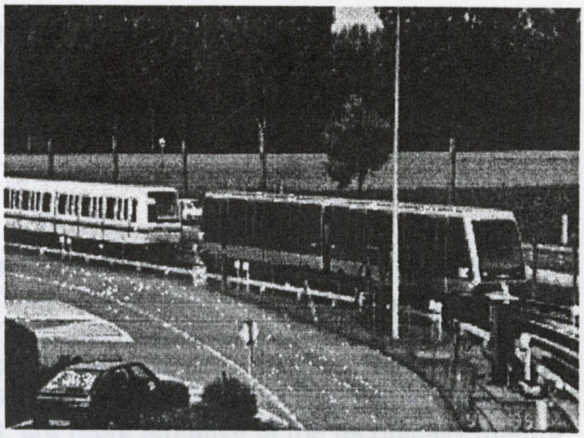
Adtranz CX-100



Bombardier MK I



Matra Val 256



Matra 206 208

- Adtranz (Germany/U.S.). C-10 – Urban location: Honolulu (Pearl Ridge, 1978)
- Adtranz (Germany/U.S.) C-45 – Urban location: Las Colinas, Texas (1989)
- Adtranz (Germany/U.S.). C-100 – Airport locations: Tampa (1971), Seattle-Tacoma (1973), Miami (1980), Atlanta (1980), Orlando (1981), McCarran (Las Vegas, 1985), Pittsburgh (1992), Denver (1993), London (Gatwick and Stansted), Singapore-Changi, Frankfurt, Kuala Lumpur, Rome (under construction) and San Francisco (under construction, 2001). Urban locations: Miami (1986) and Williamsburg, Virginia.
- Adtranz (Germany/U.S.). C-200 – Hybrid APM – An automated light-rail vehicle with third rail rather than overhead power collection. It was selected for the fully automated, turnkey Honolulu Rapid Transit System. This project was canceled at the end of the design phase when efforts to secure local funding were unsuccessful.
- Bombardier/UTDC (Canada) ALRT. Airport locations: ALRT II – JFK (2002). Urban locations: ALRT I – Detroit (1987), Vancouver (1986), and Toronto-Scarborough (1986); ALRT II: Kuala Lumpur (under construction).
- MATRA (France) Val 256 and 206 – Airport locations: Chicago O'Hare (256), Orly-Paris (206). Urban locations: Lille (206) and Toulouse (206) in France, Taipei, Taiwan (256) and Jacksonville (256, being replaced). The Val 256 is no longer marketed in the U.S. The Val 208 will replace it.
- Niigata (Japan) – Urban locations: Osaka Newtram (1981), Seaside line (Yokohama, 1989) and Ina line system (Omiya, 1983). These systems have a driver with a full Automatic Train Operation.
- Kawasaki (Japan) – Urban locations: Portliner Line and Rokko Line (Kobe, 1981/1990).
- Otis Transit Systems (U.S.) LIM 303 – Under development, it uses a vehicle body and air-levitation suspension design similar to the Otis cable-propelled vehicle at Narita International Airport, Japan, and linear-induction-motor propulsion similar to the Otis system at the Duke University Medical Center.

Light Rail

Driver-operated, electrically powered railcars operating as a single car or trains of up to four cars over fixed two-rail tracks (Figure 3.4). System capacity (exclusive right-of-way) for the technology ranges from 5,000 to 22,000 passengers per hour. Many recent U.S. systems have articulated vehicles. It is the only technology under consideration that can operate in mixed traffic (streetcar) as well as grade-separated. The following suppliers, with U.S. and Canadian operating systems, are representative of the technically mature industry:

- Siemens – DUEWAG (Germany) – Los Angeles (LACMTA Green Line), Denver, Pittsburgh, St. Louis, San Diego, and Sacramento
- Bombardier (Canada) – Portland, Santa Clara County, and Toronto
- Breda (Italy) – Cleveland and San Francisco
- Sumitomo (Japan) – Dallas and Boston
- Kinki Sharyo (Japan) – Philadelphia
- Kawasaki (Japan) – Philadelphia

Commuter Rail

Self-Propelled Diesel or Electric Multiple Units (DMUs or EMUs) – With systems that range from 1,000 to 8,000 passengers per hour for a train consisting of up to four vehicles (Figure 3.5). They are often operated by railroad agencies on their own or leased rights-of-way, which are typically grade-separated or exclusive right-of-way. Commuter rail has relatively longer acceleration and stopping times and therefore lends itself to longer-distance trips and stations spaced at several miles. A commuter rail application in Columbus could potentially include suburban service following railroad rights-of-way in suburban areas and travelling along a city street in the downtown area. These individually powered vehicles could also be used to provide street-level rail service exclusively in downtown. Examples of self-propelled commuter rail in the U.S. include:

- New Jersey Transit – Southern New Jersey line (35 miles) from Trenton to Camden (under development).
- Pennsylvania DOT – Amtrak replacement between Philadelphia and Harrisburg. The state department of transportation is currently in negotiation with a supplier for this project.

Non-powered Units are non-powered passenger cars that are pulled or pushed by diesel or electrically powered locomotives. This technology would not be applicable in downtown because of its dependence upon locomotive propulsion.

Personal Rapid Transit (PRT)

This technology has two- to six-passenger vehicles that operate under total automatic control (Figure 3.6). The key characteristic of PRT that differentiates it from other modes is that it offers point-to-point service for individuals. Alignments are interconnected networks, with each vehicle capable of traveling to and from any station within the network without stopping or transferring. System line capacity has been estimated in conceptual studies to range from 500 to 2,500 passengers per hour, but this is configuration dependent. All stations are off line. *This technology has no systems in operation in a "real world" city or airport environment.* Several prospective suppliers have recently shown interest in this technology:

- Raytheon Company (U.S.) – PRT 2000-Acquired the Taxi 2000 technology and currently, as part of a joint development with the Northeastern Illinois Regional Transportation Authority, is planning to demonstrate a full-function PRT system in Rosemont, Illinois (near Chicago). A test track in Marlborough, Massachusetts was built and became operational in 1996.

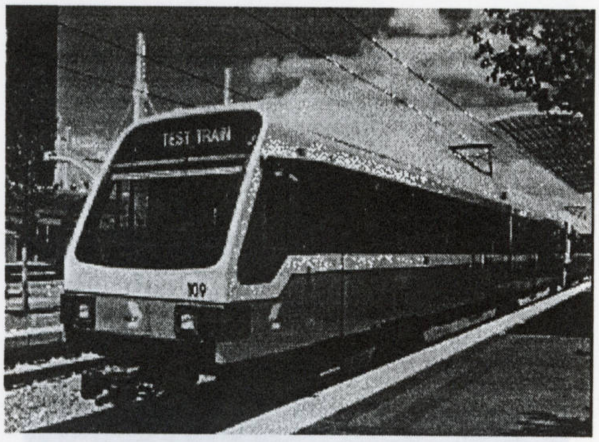
- Intamin Company (Swiss) – Monorail-like vehicle, proposed for Rosemont, Illinois project but not selected for implementation.

- Boeing (U.S.) – Implemented a demand-responsive APM system for urban use. It is referred to as the Morgantown PRT (Morgantown, West Virginia, 1975). Vehicles are large enough to hold groups of passengers.

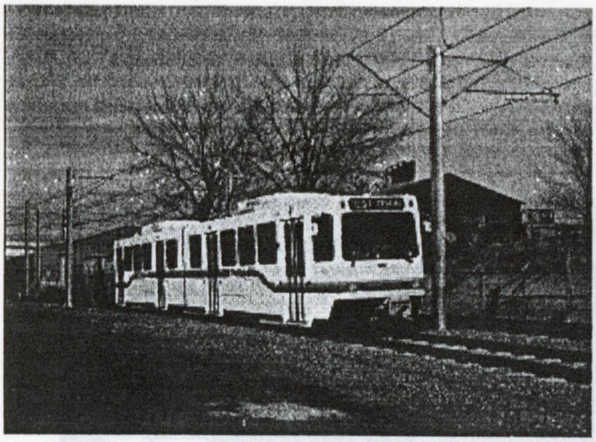
Figure 3.4 Light Rail Transit (LRT) Examples

- Electrically Propelled
- Steel Wheels
- Manually Operated
- Technically Mature
- 175-700 Passengers/Train
- Standard Design

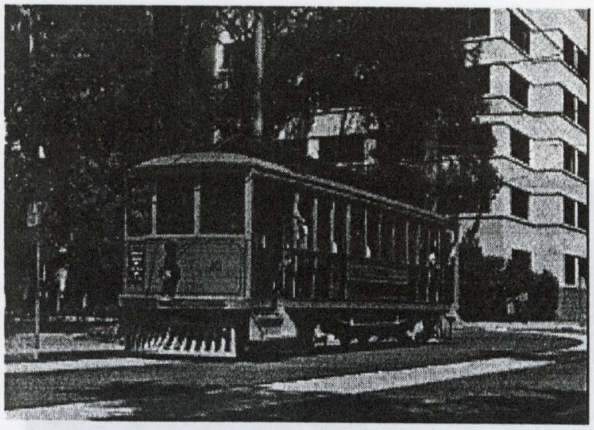
Sacramento LRT



Dallas LRT



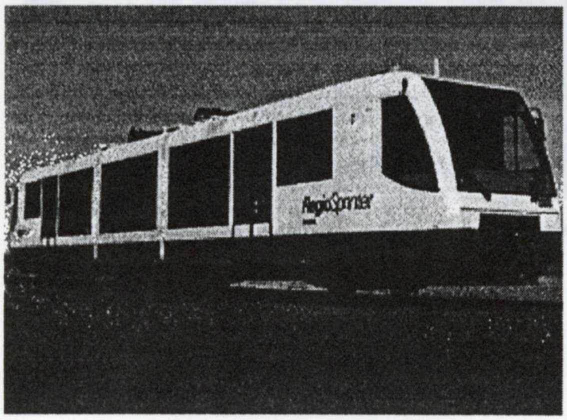
Denver LRT



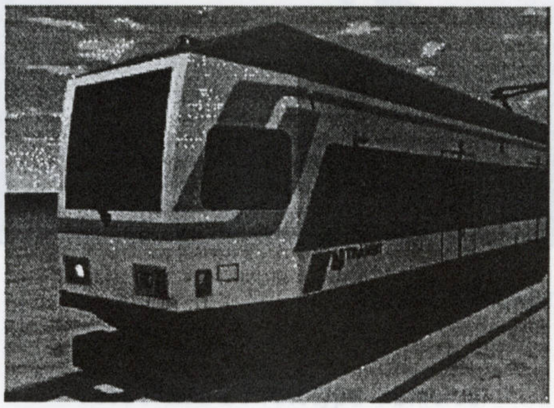
San Jose Historic Trolley

Figure 3.5 Diesel Multiple Units (DMU) Examples

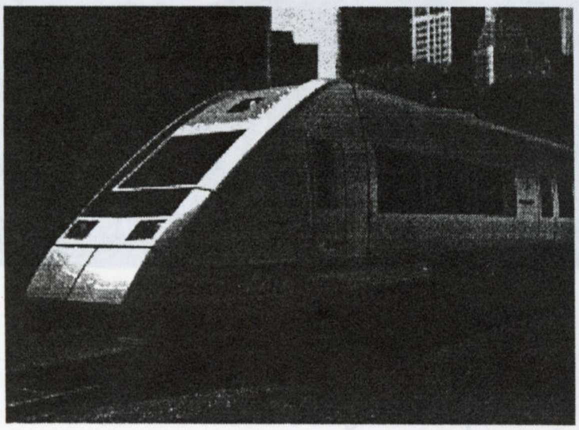
- Diesel or Electric
- Steel Wheels
- Manually Operated
- Limited Technical Maturity
- 175-525 Passengers/Train
- New or Existing Track



Siemens RegioSprinter
Non-FRA Compliant



KinkiSharyo (USA)
Non-FRA Compliant



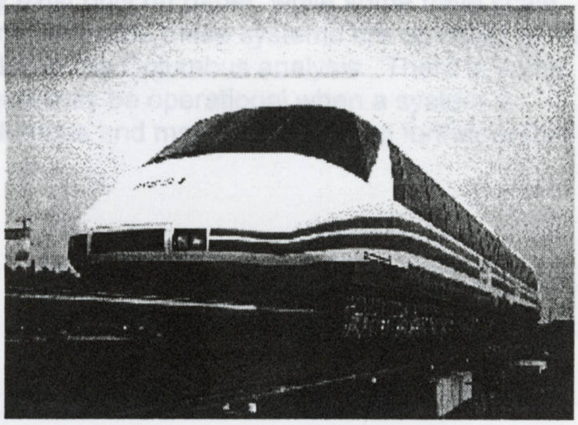
Bombardier/Alsthom
FRA Compliant

Nippon Sharyo
FRA Compliant

Figure 3.6 Emerging Technology Examples

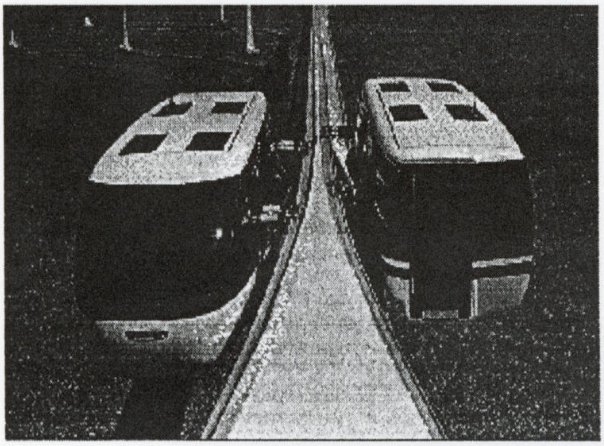
Raytheon

- Test Track & Prototype Vehicles
- Demonstration System Underway
- Unique Point-to-Point Service



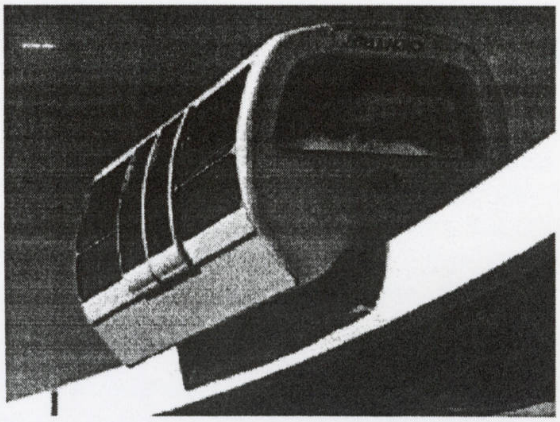
HSST Maglev

- Test Track & Prototype Vehicles
- No Demonstration System
- Very High Speed (150 mph)



Futrex

- Scale Model & Design Concept
- No Full Size Test Track
- Minimal Guideway Requirements

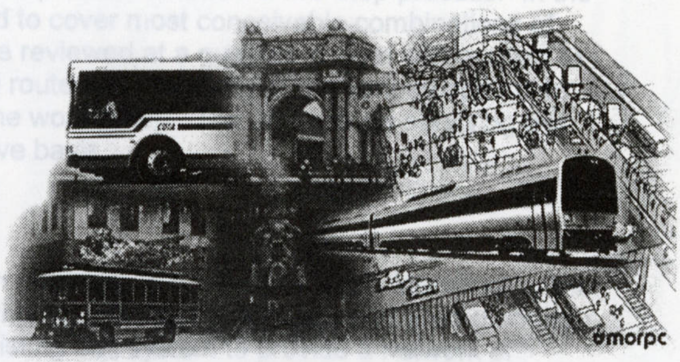


Yantrak

- Third Generation
- Based on a 2nd Generation
  - Test Track & Prototype
  - System Implementation

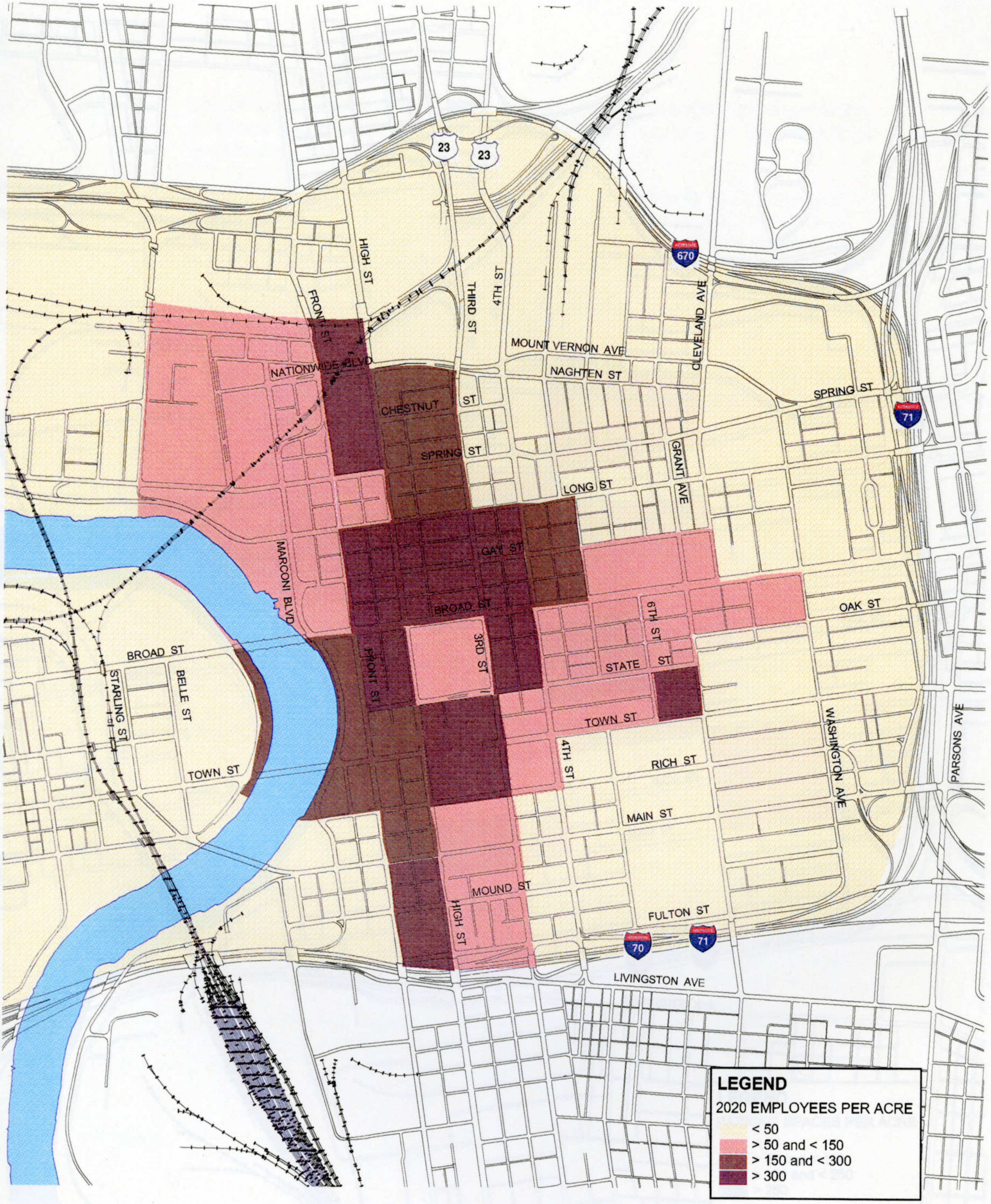
Other Evolving Technologies

A number of additional technologies have been proposed for urban application and are at different stages of development. Many exist only on paper, while some have scale models in operation or under development. Because these systems are untested even as full-scale models, they were not included in the Columbus analysis. There is some potential that one or more new technologies may be operational when a system is advancing towards implementation in Columbus and may be considered further at that time.



DEVELOPMENT AND EVALUATION OF SYSTEM CONCEPTS

4



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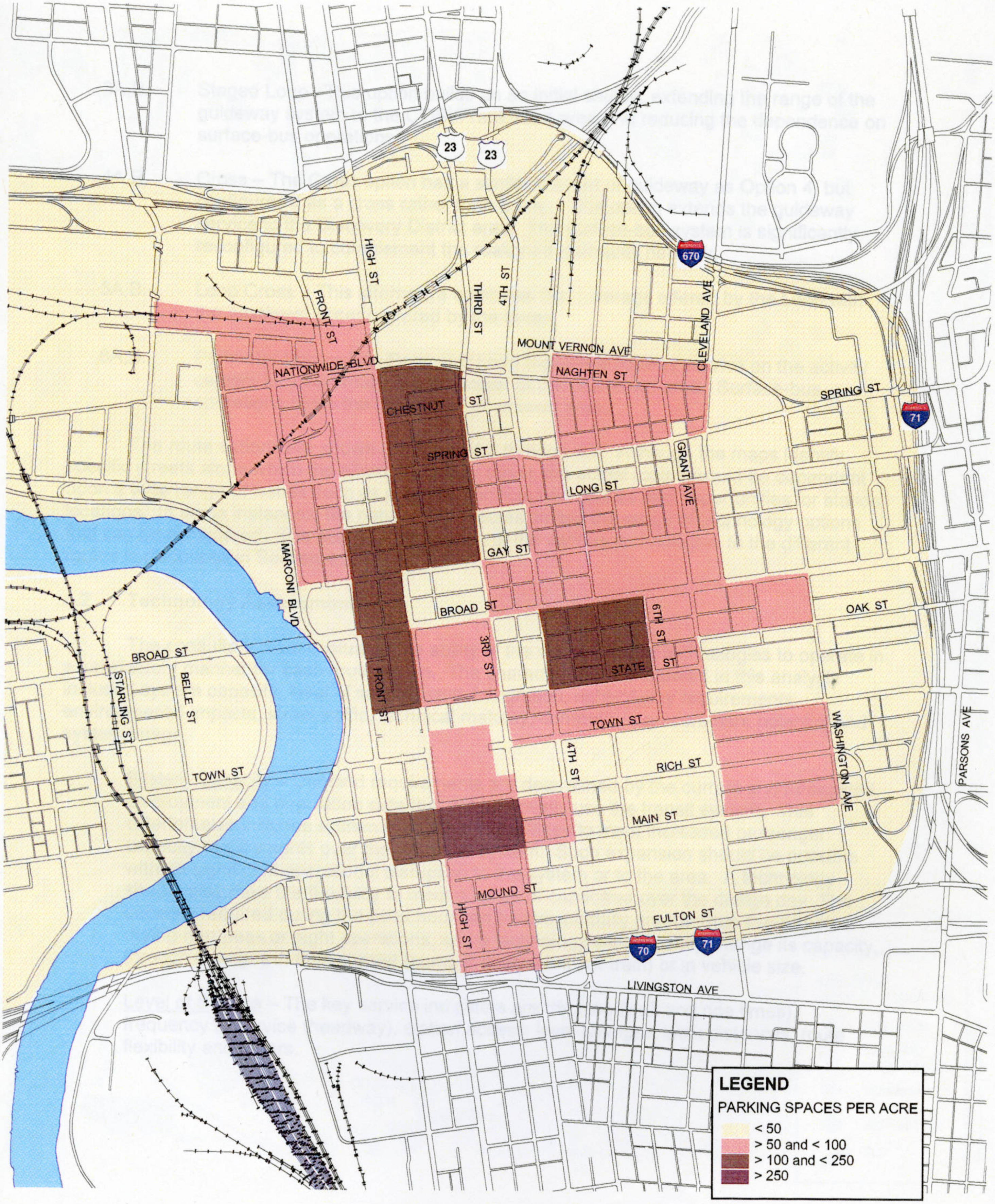
FUTURE DOWNTOWN
EMPLOYMENT DENSITY
Figure 4.1

N

0 500 1000 1500 Feet



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DOWNTOWN PARKING DENSITY:
1994 DATA
Figure 4.2

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0 500 1000 1500 Feet

3A,B. Staged Loop –This option builds on an initial shuttle, extending the range of the guideway system to the COSI/Franklinton area and reducing the dependence on surface-bus operations.

4A,B. Cross – The Cross option has a similar amount of guideway as Option 4, but configures it as a cross rather than a loop. This option extends the guideway service to the Discovery District area. The surface-bus system is significantly reconfigured to complement the realigned guideway network.

5A,B. Loop Cross – This alternative combines the coverage offered by the Loop with the east/west access offered by the Cross.

6A,B. Perimeter Loop – The Perimeter Loop focuses guideway service on the activity centers located around the perimeter of the downtown area. Surface-bus operations serve the core of the downtown area.

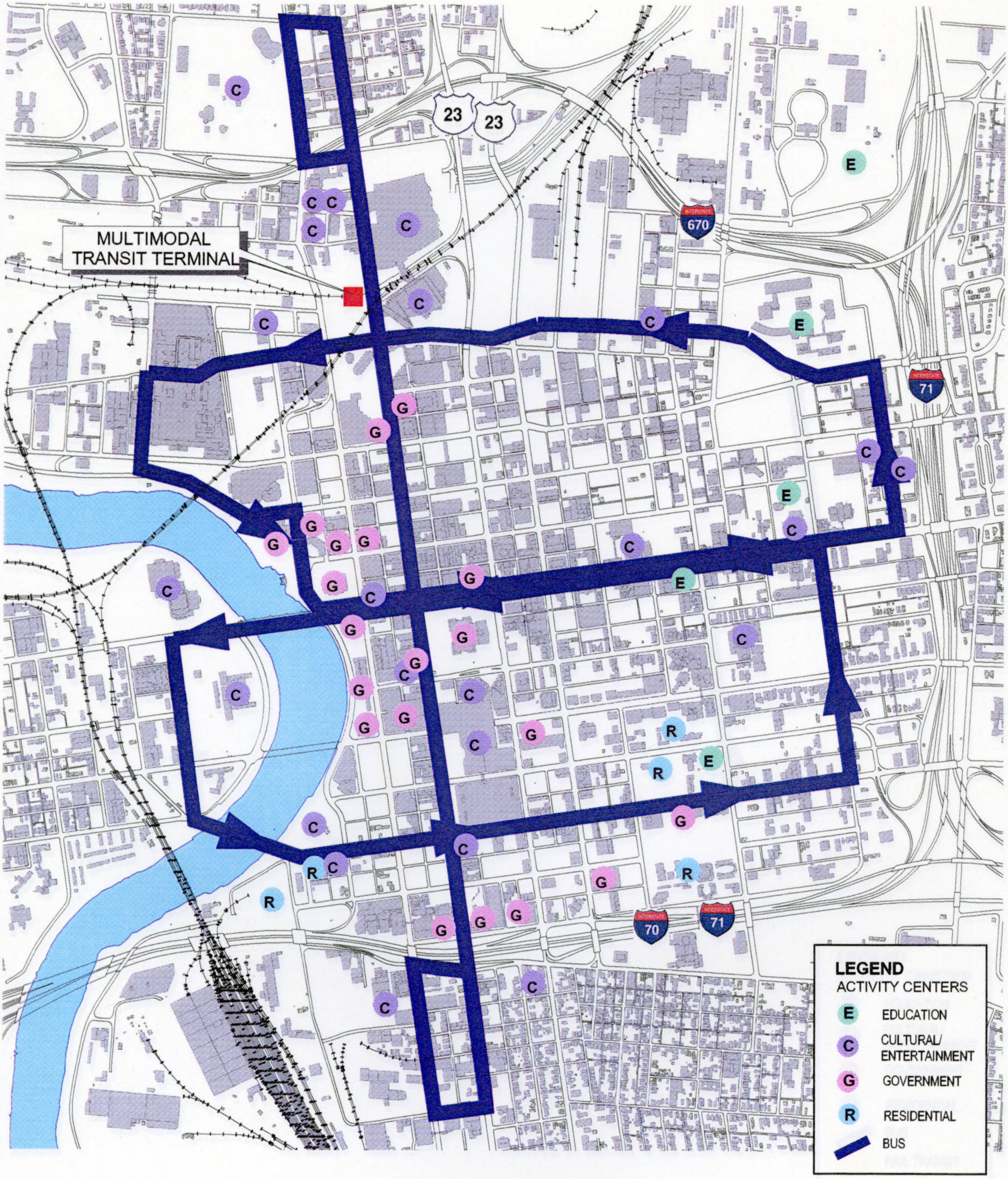
The route options are shown in Figures 4.3 through 4.8. Although the maps identify specific streets along which the alternatives may travel, the actual routes would be dependent upon a wide range of issues such as potential conflicts with utilities and opportunities for station locations. In some instances, the nature of the routes limited the range of technology options that can be considered. The potential application of the various technologies to the different routes is discussed in Section 4.2.

4.2 Technology Assessment

The consultant team evaluated the ability of the various transit technologies to operate in a satisfactory manner for each route option. The characteristics considered in this analysis included system capacity, level of service, cost, integration, right-of-way requirements, environmental impacts, street traffic, technical maturity, competitive procurement potential and system image.

System Capacity – Demand requirements are determined by the current and forecasted employment and population data that will potentially use the transit system. This criterion also includes system expansion capabilities to meet increased passenger capacity requirements over the life of the system. Such expansion should be possible without significant operational disruption to the system or to the area. A technology should also have the flexibility to meet a range of capacities over the design day. The capacity required during the peak hour can be substantially greater than that required during non-peak or night operations, and a technology should easily change its capacity, through changes in train consist (number of vehicles per train) or in vehicle size.

Level of Service – The key service indicators are trip time (wait and ride times), frequency of service (headway), station access, level changes, walk distances, route flexibility and others.



SURFACE BUS OPTION
Figure 4.3

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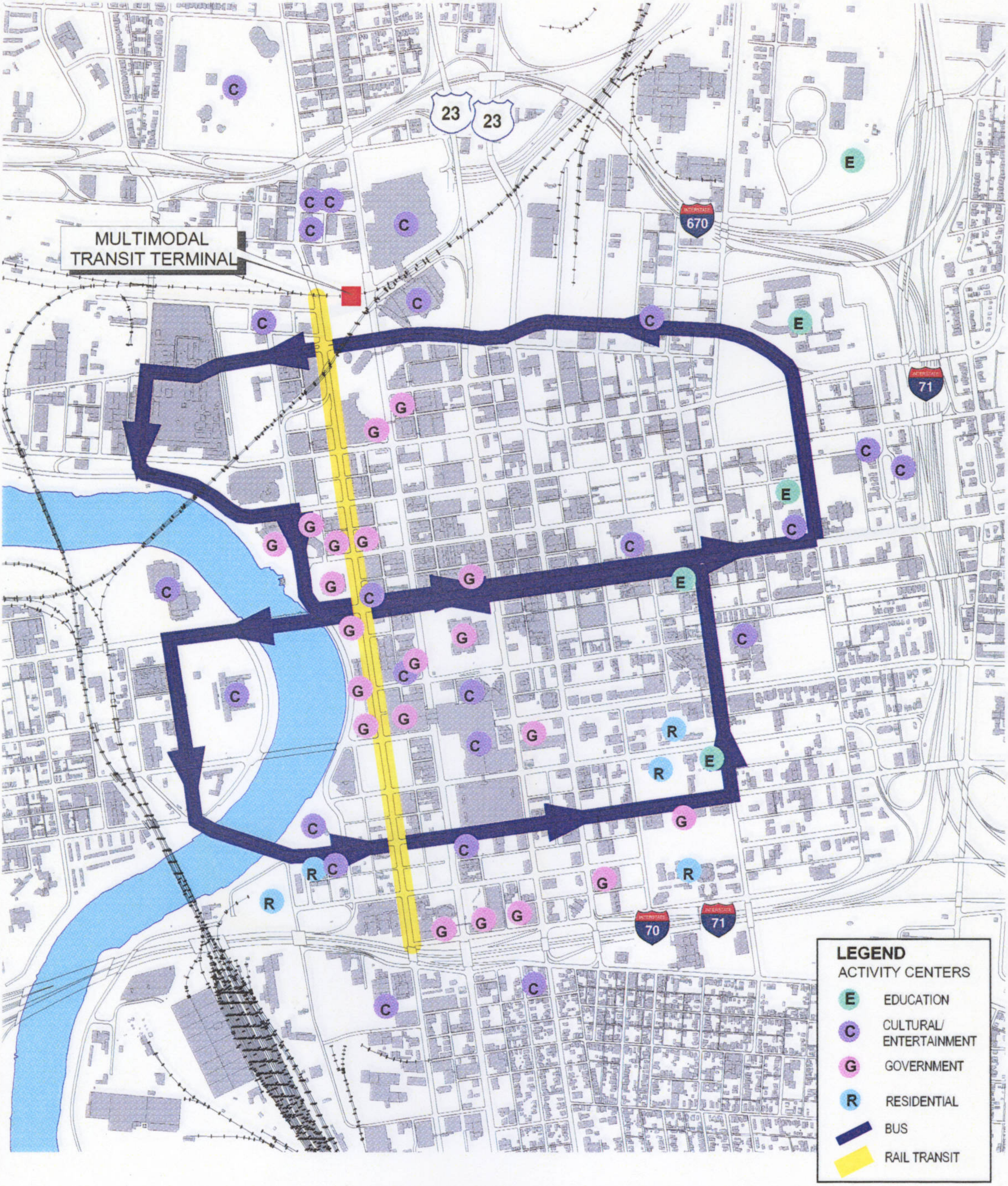

SHUTTLE OPTION AT-GRADE OR ELEVATED
Figure 4.4

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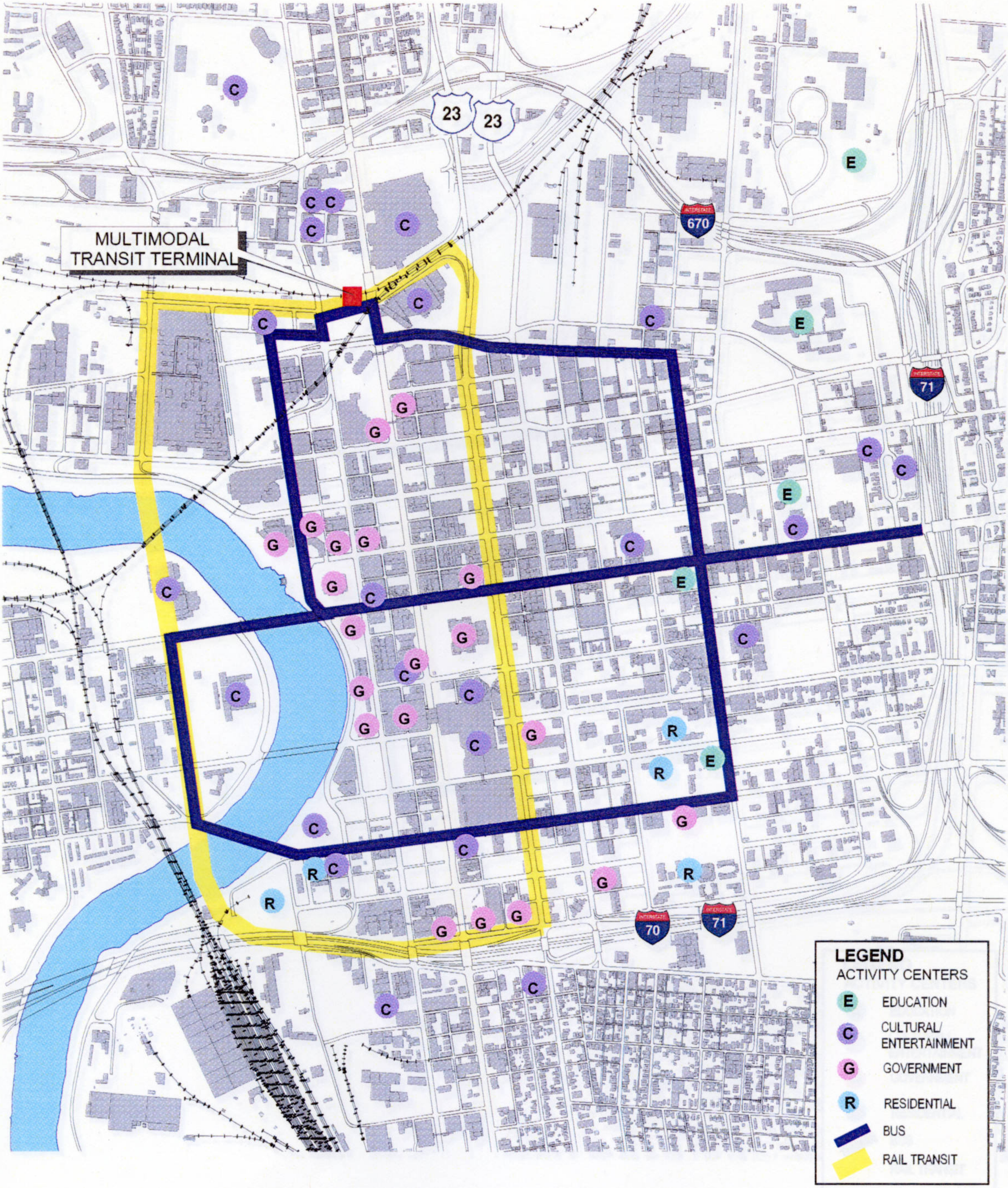

STAGED LOOP OPTION AT-GRADE OR ELEVATED
Figure 4.5

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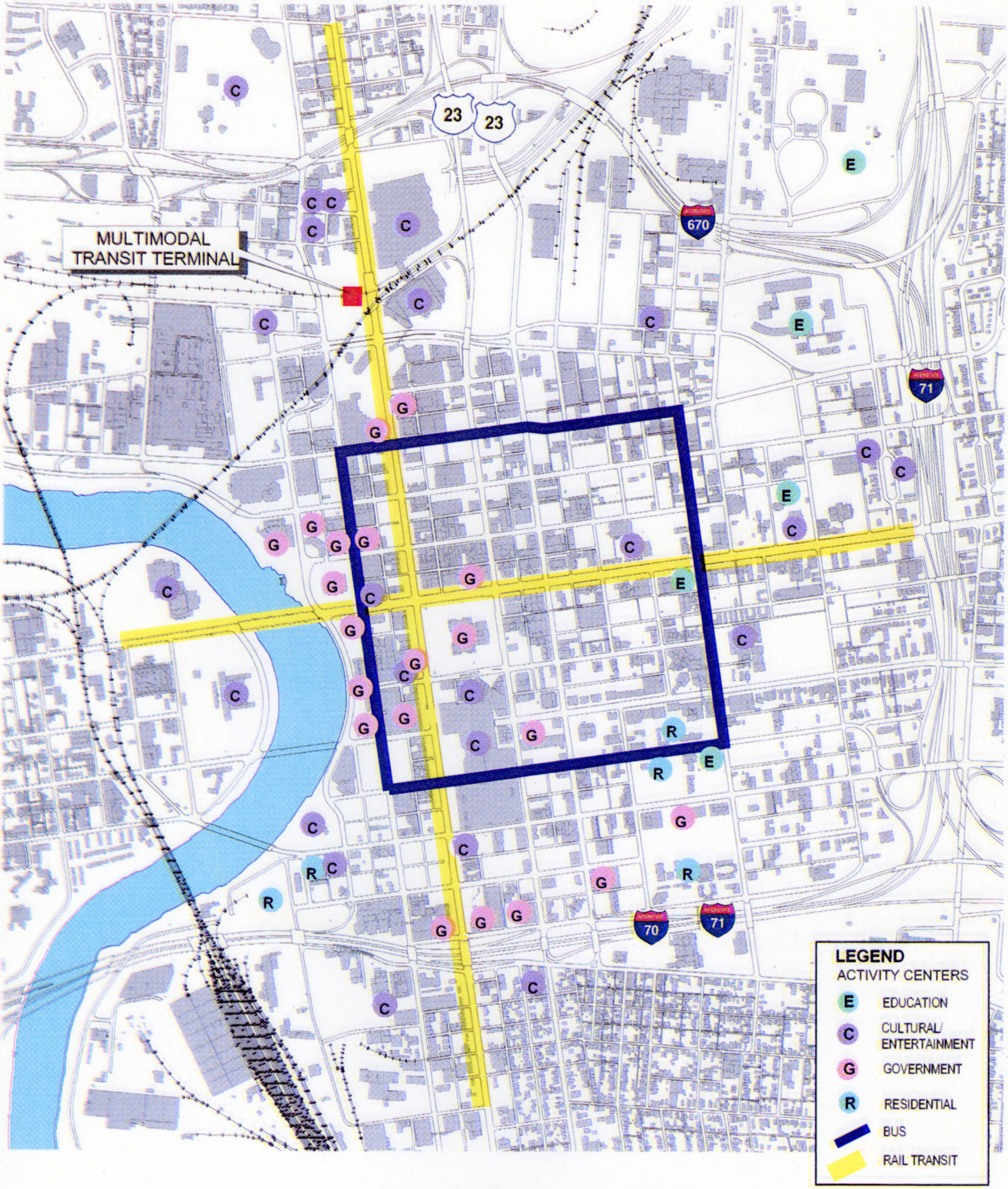

CROSS OPTION AT-GRADE OR ELEVATED
Figure 4.6

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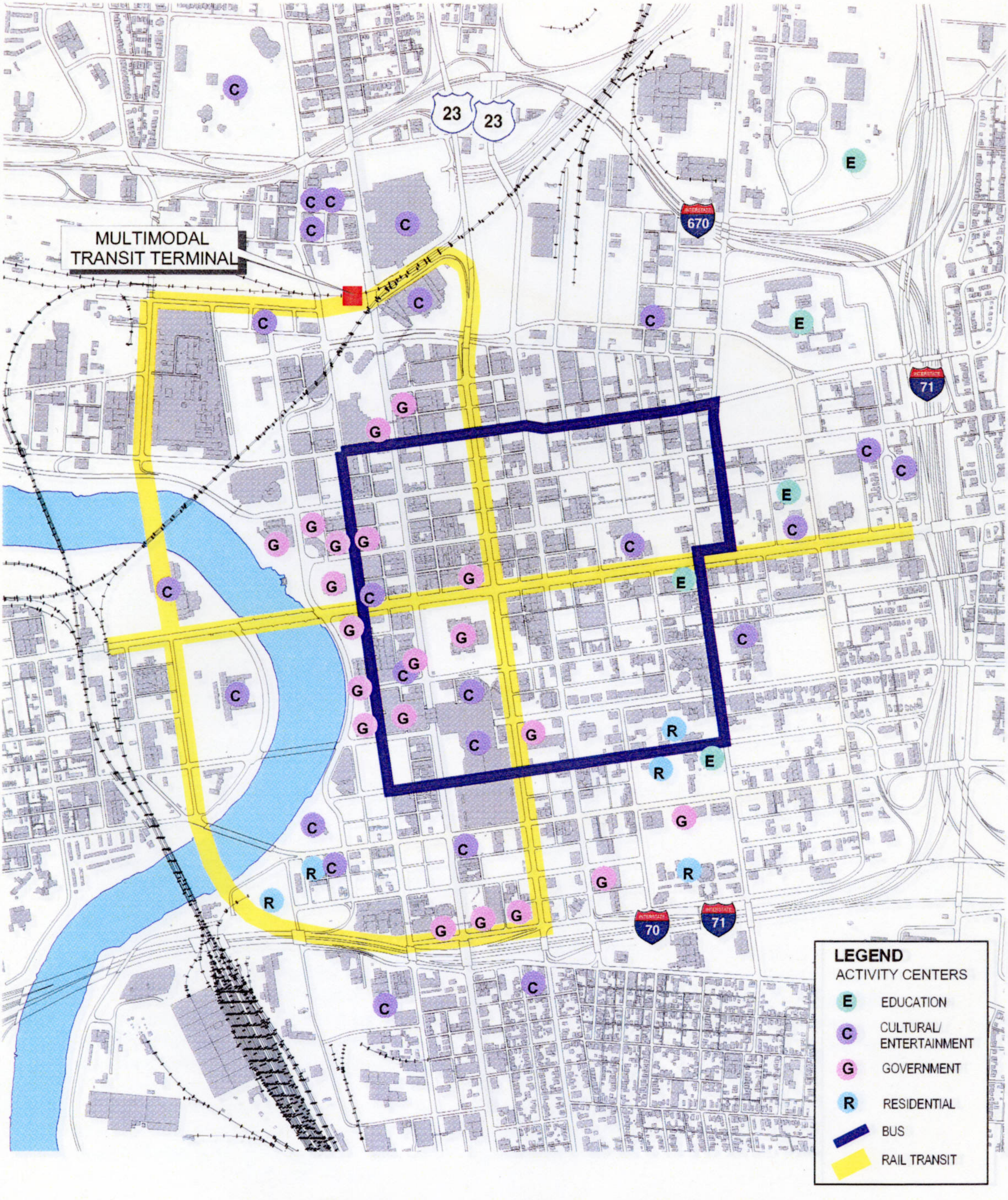

LOOP CROSS OPTION AT-GRADE OR ELEVATED
Figure 4.7

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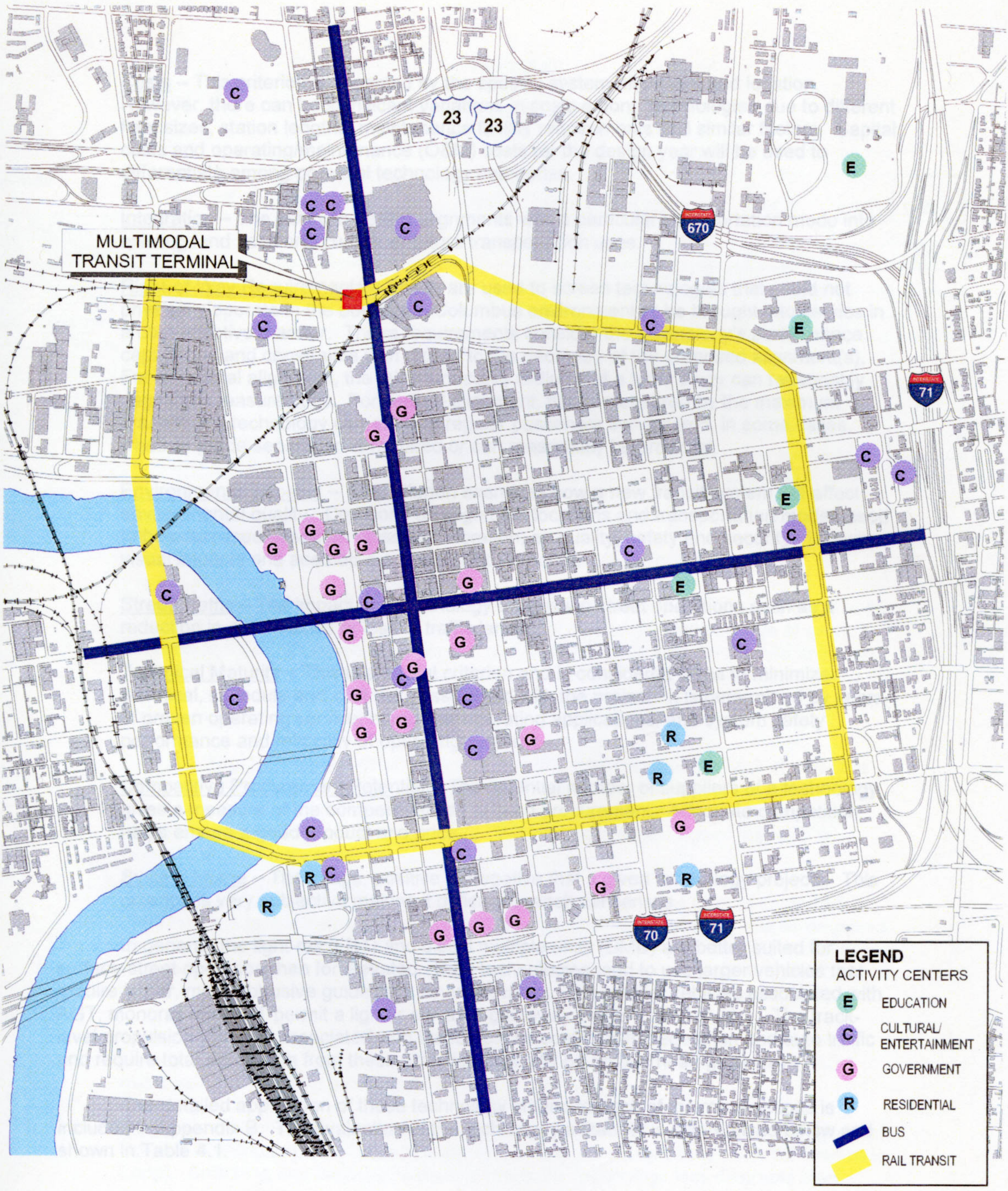

PERIMETER OPTION AT-GRADE OR ELEVATED

Figure 4.8

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Costs – This criterion is impacted by the specific system alignment and location. However, there can be significant variations in costs among technologies due to different fleet sizes, station lengths, maintenance facility requirements and similar factors. Capital costs and operating/maintenance (O&M) costs for the design year will be used to differentiate among potential technology categories.

Integration – The ability to design alignments with a particular transportation mode into existing land uses and current or future transportation uses.

Right-of-Way Requirements – These are used to screen technologies that could not physically operate in the downtown Columbus environment or be brought into service in a cost-effective manner. These requirements consider the technology's performance capabilities and constraints with regard to the geometry of the proposed alignment(s). For horizontal alignment, the minimum curve radius that a technology can reasonably negotiate measures this. For vertical alignment, this is measured by the maximum grade that a technology can attain in regular passenger service and, in some cases, whether grade separation is required or can reasonably be provided.

Environmental Impacts – This criterion examines how a new transit system will affect environmental quality. Decisions on alignment locations and transportation modes need to be addressed based on noise and vibration, air quality, safety and security. Likewise, visual impacts and aesthetics are taken into account.

Street Traffic – The impact of a technology on existing street operations such as a reduction in automobiles or loss of traffic lanes.

Technical Maturity – This is a critical criterion and is considered so as to minimize technical, schedule and cost risks associated with the project. It is determined by years of proven operating service, number of operating applications, and system safety performance and reliability of operating systems.

Competitive Procurement Potential – The potential number of suppliers of a technology gives a measure of the competitiveness of such procurement. Adequate competition helps ensure a good product and price.

System Image – The image, positive or negative that a given technology projects. This criterion is very subjective making it difficult to reach consensus.

In general, the light-rail (LRT) and diesel multiple units (DMU) are better suited for surface-street operation than for elevated. Both technologies tend to use larger vehicles that require larger, more obtrusive guideways when elevated. The smaller vehicles associated with AGT, monorail and PRT permit a lighter elevated guideway that is less obtrusive. The track-level propulsion systems associated with these options conflict with pedestrian and auto traffic and require total separation from these activities, typically on an overhead guideway.

The detailed application of these technology criteria to each of the route options is included in Appendix B. The evaluation of the technology suitability is summarized below and shown in Table 4.1.

Table 4.1

Technology Assessment

Route	Potential Technology							
	Diesel Bus	**Electric Bus**	**PRT**	**Cable**	**Monorail**	**AGT**	**LRT**	**DMU**
1. Surface Bus	✓							
2A. At Grade Shuttle							✓	✓
2B. Elevated Shuttle				✓	✓	✓		
3A. At-Grade Staged Loop								
3B. Elevated Staged Loop				✓	✓			
4A. At-Grade Cross		✓						
4B. Elevated Cross		✓		✓	✓	✓		
5A. At-Grade Loop Cross		✓						
5B. Elevated Loop Cross		✓	✓		✓	✓		
6A. At-Grade Perimeter Loop								
6B. Elevated Perimeter Loop					✓	✓		

Conventional Bus on Street – This technology essentially represents baseline conditions and is included in all of the systems under consideration. This technology was evaluated as being most suitable for Option 1 (Surface Bus Routes).

Electric Bus on Street – The "on-board" power supply used by electric buses is still in the developmental stage. The current technology supports only a limited range of service between charges. Because of the limited range, electric bus was determined to be best suited for the bus component of the at-grade and elevated Alignment Options 4A and 4B (Cross) and 5A and 5B (Loop Cross). These alternatives tend to have shorter circulators that are more tolerant of battery limitations.

Personal Rapid Transit – Limited technical maturity, capacity, and the lack of grid-type alignment alternatives that take advantage of this technology's strength made PRT unsuitable under all of the alignment options, except the Elevated Loop Cross (Alternative 5B) which provides some opportunity to take advantage of the routing flexibility of this technology.

Cable-Propelled – Geometric constraints of this technology in the form of curve radius limitations made the technology unsuitable for a number of alignments. Cable-propelled technologies were determined to be best suited for the elevated Options 2B (Shuttle) and 4B which operate in a straight line. The cable technology generally requires that stations be spaced at equal distances, severely limiting flexibility in system design.

Automated People Mover – This technology was determined to be best suited for the elevated Alignment Options 2B, 3B, 4B, 5B, and 6B. Figure 4.9 shows what an AGT might look like traveling along Front Street.

Monorail – This technology was determined to be best suited for the elevated Alignment Options 2B (Shuttle), 3B (Staged Loop), 4B (Cross), 5B (Loop Cross), and 6B (Perimeter Loop). Switching and capacity limitations made the technology less desirable than

Automated People Movers, however, for these options. Figure 4.10 depicts a Monorail operating along High Street. This graphic was developed for a prior study.

Light-Rail Transit (LRT) – This technology was determined to be best suited for the at-grade Alignment Option 2A. Impacts on street traffic made this technology unsuitable for the more extensive at-grade alternatives. This technology could support direct service from the suburbs to downtown destinations if it were also implemented in suburban commuter corridors.

Diesel Multiple Units (DMUs) – These vehicles, originally designed for commuter rail service, could have similar application as an LRT in the downtown. Because of the comparable impacts on auto traffic, this technology is also best suited for Option 2A. This technology could also support direct service from the suburbs to downtown destinations if it were also implemented in suburban commuter corridors.

4.3 Work Group Evaluation of Preliminary Options

The work group members reviewed each of the transit options with respect to its ability to serve the critical travel connections that had been identified by the work group at the beginning of the study. The performance of the alternatives was scored on a scale of 1 to 5, with 1 representing poor and 5 representing excellent service. The service considerations in evaluating each of the travel connections included:

1. Directness of service between points (is the route direct or circuitous?)

2. Travel time (at-grade rail is slightly faster than bus; elevated is 2 to 2.5 times faster)

3. Transfer requirements (consider both bus-to-guideway and guideway-to-guideway transfers)

4. Simplicity to the user.

In addition to scoring the level of performance for each travel movement, members of the work group were also given the opportunity to weight the different connections to reflect their relative importance. In most cases, no weights were assigned, indicating all of the travel movements were equally important.

Figure 4.9 AGT on Front Street

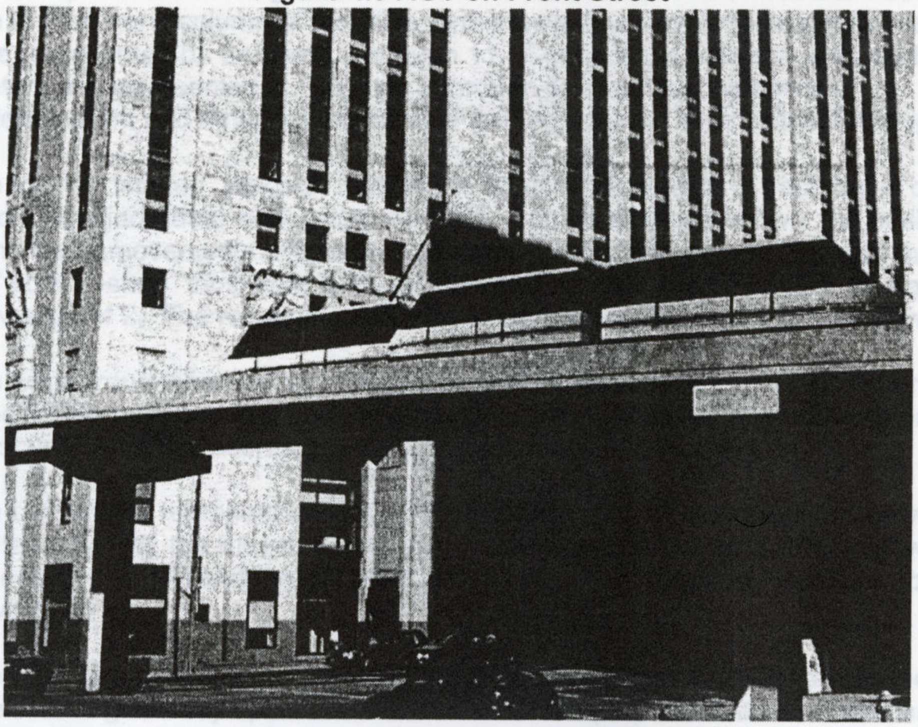
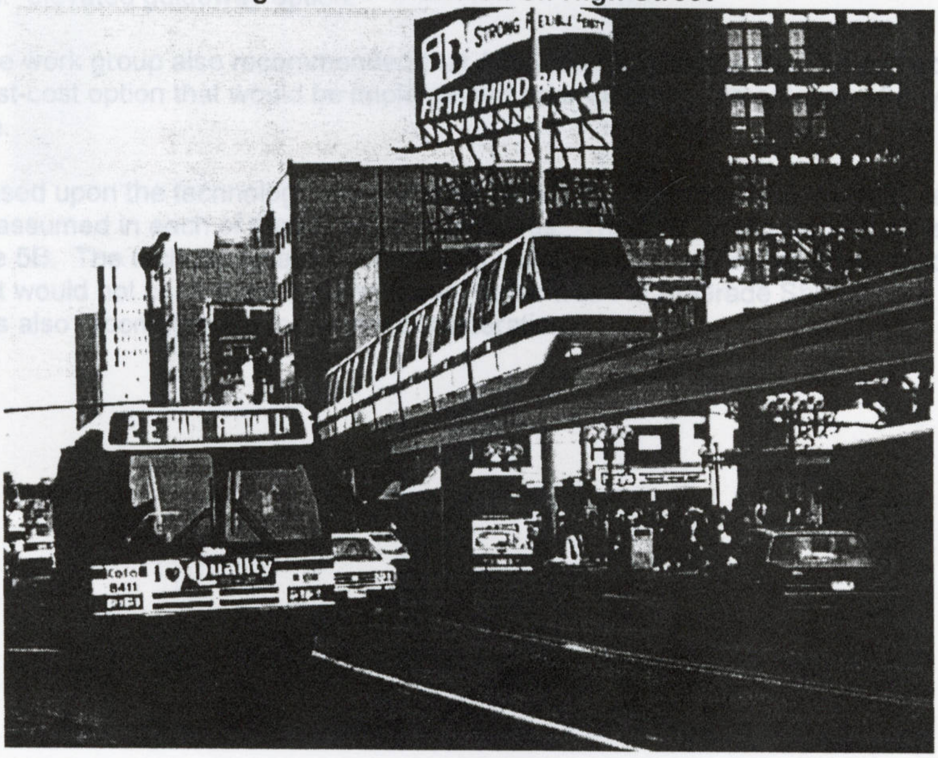


Figure 4.10 Monorail on High Street



An example of the scoring matrix is shown in Table 4.2. The transit alternatives are listed down the left-hand column of the table, and the various travel markets they are designed to serve are represented by Columns 2 through 11. Connections between work and other activity centers are represented in Columns 2 through 6. Connections between cultural/entertainment and other activity centers are represented in Columns 7 through 11.

The top row labeled "weights" reflects the relative importance of each travel connection, as assigned by the individual work group member. For the example shown, the evaluator weighted the travel movements differently. This work group member decided that the "work-to-work" and "work-to-shop" trips were twice as important as all of the other trips, and gave these columns a weight of 2. The remaining columns were given a weight of 1 by this individual.

The work group members submitted a total of 12 evaluation forms. The alternatives were ranked for each respondent and the rankings were summed by alternative to provide a composite score. The total scores are shown by alternative on Figure 4.11.

The bar heights represent the general preference by the work group for the various options. Alternative 5B, the Elevated Loop Cross, received the highest score, followed by the At-Grade Loop Cross (5A) and the Elevated Cross (4B). The At-Grade Perimeter Loop (6A) had the lowest rating.

The work group decided to carry the Elevated Loop Cross (5B) forward as the most extensive elevated guideway option. The Elevated Cross (4B) was recommended as an "intermediate cost" elevated guideway and the Elevated Shuttle (2B) was selected to represent a "low-cost" elevated guideway option.

The work group also recommended that Alternative 1, Surface Bus, be carried forward as the least-cost option that would be implemented prior to the implementation of any guideway alternative.

Based upon the technology assessments described in Section 4.2, the AGT technology would be assumed in each of the elevated alternatives. The PRT would also be considered for Alternative 5B. The technology assessment also indicated that the only at-grade guideway option that would not conflict severely with auto traffic was the At-Grade Shuttle (2A). This option was also recommended for further consideration.

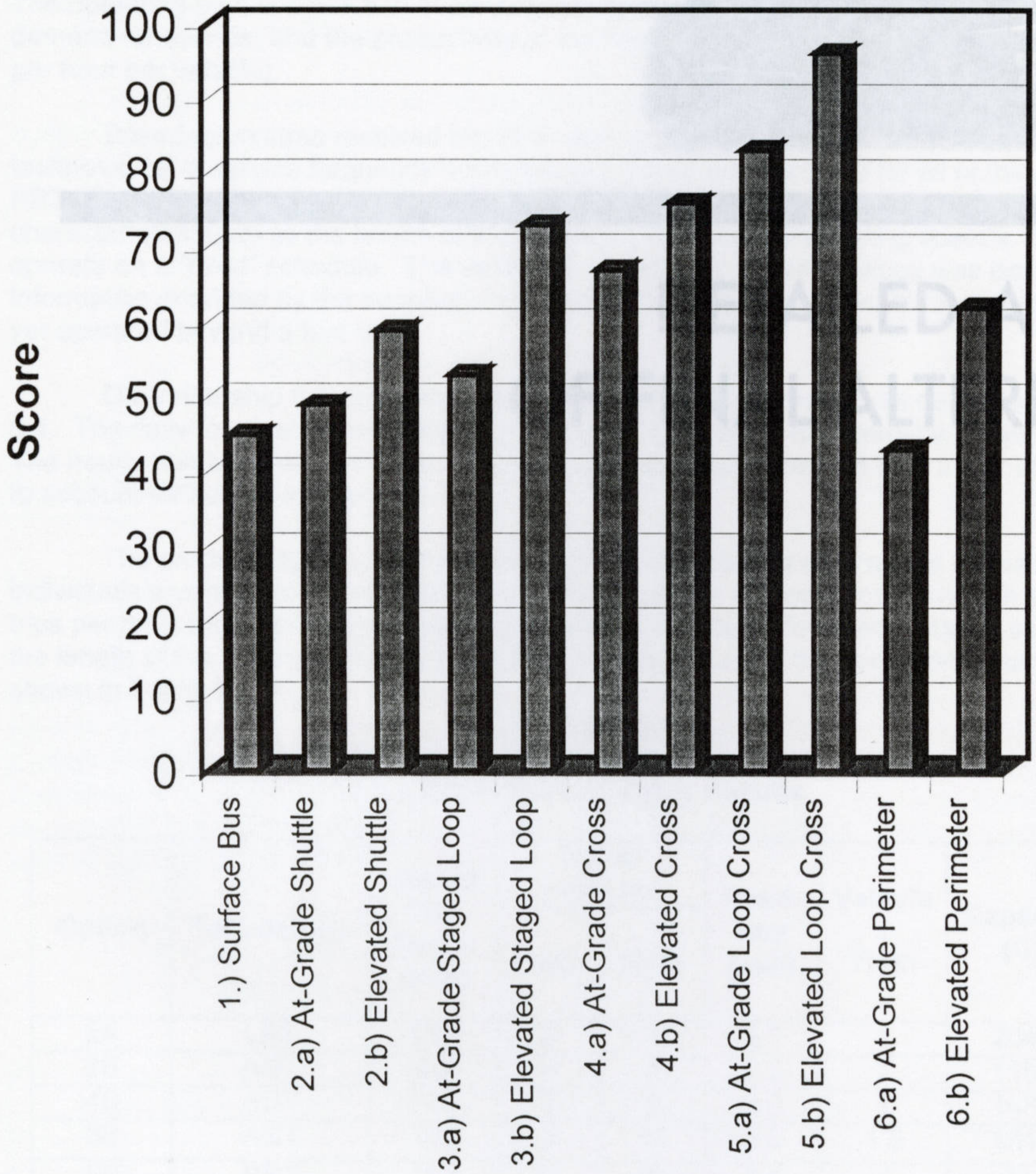
Table 4.2

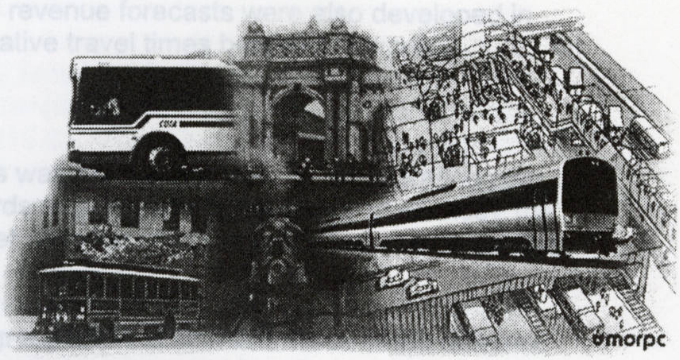
Sample Evaluation Matrix

Comparison Of Alternatives: Quality Of Service

NUMBER	COLUMN	2	3	4	5	6		7	8	9	10	11	
		TRIP CONNECTIONS											
	FROM:	Cultural/Entertainment (C/E)					FROM:	Work					Total
	TO:	C/E	Work	Parking	Res	Reg. Entry	TO:	Work	Shop	C/E	Parking	Educ.	Score
ALTERNATIVE \ Weight		1	1	1	1	1		2	1	2	1	1	
1.) Surface Bus		3	3	3	3	3		3	3	3	3	3	33
2.a) At-Grade Shuttle		2	2	2	2	2		2	2	2	2	2	22
2.b) Elevated Shuttle		2	1	2	2	2		2	2	2	2	2	21
3.a) At-Grade Staged Loop		1	1	1	1	1		1	1	1	1	1	11
3.b) Elevated Staged Loop		1	1	1	1	1		1	1	1	1	1	11
4.a) At-Grade Cross		2	2	2	2	2		2	2	2	2	2	22
4.b) Elevated Cross		3	3	3	3	3		3	3	3	3	3	33
5.a) At-Grade Loop Cross		3	3	3	2	3		3	3	2	3	3	30
5.b) Elevated Loop Cross		3	3	3	3	3		3	3	1	3	3	29
6.a) At-Grade Perimeter		1	1	1	1	1		1	1	1	1	1	11
6.b) Elevated Perimeter		1	1	1	1	1		1	1	1	2	1	12

Figure 4.11
Work Group Rating of Downtown Alternatives





DETAILED ANALYSIS OF FINAL ALTERNATIVES

5

5.0 DETAILED ANALYSIS OF FINAL ALTERNATIVES

The final range of options was developed in greater detail in order to provide capital, operating, and maintenance costs. Ridership and revenue forecasts were also developed in order to evaluate the options along with representative travel times between key points.

5.1 Operating Costs

The first step in forecasting operating costs was the development of an operating plan. The operating plan is a function of service standards (e.g., minimum frequency of service), the demand for service, and the productivity of the fleet (number of passengers that can be carried per hour per vehicle).

Based upon input received from the work group and the characteristics of the different technologies, a service frequency not to exceed 6 minutes was used for all of the options except PRT. The actual frequency varied slightly by alternative due to differences in service characteristics such as the length of the guideway and overall operating speeds. PRT does not operate on a "fixed" schedule. The vehicle availability for this technology was based upon information provided by the supplier and professional judgment since this technology has not yet operated beyond a test track.

Daily ridership forecasts were developed for each alternative, as described in Section 5.4. The daily forecasts were converted to peak hour in order to determine a transit fleet size. The hourly number was split in two directions (60/40), and increased by a factor of 150 percent to account for surges in ridership.

The productivity or capacity of the different options was determined by the number of individuals a vehicle could hold each trip and the number of trips it could make in an hour. The trips per hour were determined based upon typical vehicle performance, station spacing, and the length of the guideway for each alternative. The results of the operations analysis are shown in Table 5.1.

Table 5.1

Operations Analysis Results

Option	Technology	Round Trip Times (min)	No. of Vehicles		Head-way (min)	Vehicle / Train	Capacity (C)	Riders (D)	Load Factor (D/C)
			Peak	Total					
2A	LRT	15.4	3	4	5.1	1	2045	365	18%
2B	AGT	9.9	2	4	5.0	1	1184	365	31%
4B	AGT	14.2	7	9	3.0	1	1464	1080	74%
5B	AGT	13.6	9	11	3.0	1.5	1915	1580	83%
5B	PRT	15.4	80	92	0.4	1	623	1580	257%

As shown in the last column of the Table, most of the systems have significant unused capacity when operated at a minimum frequency of 6 minutes (i.e., load factor less than 100 percent). The PRT is the exception, in which the ridership exceeds capacity by a factor of about

2.5. In order to carry the projected ridership, the PRT system would need to be developed as a larger, grid-like network.

The cost to run the various transit guideway systems includes labor, fuel, parts, and maintenance. With a driverless system, there are no labor costs for operators. According to the Top Hourly Wage Rate Summary published by the American Public Transit Association, the top full-time rate for a rail maintenance employee in Cleveland, Ohio is $19.20. Laborers for this system have a wage rate that is calculated to be $16.62. The supervisor/clerk has a combined calculated wage rate of $22.07. The number of employees is based on the size of the fleet. These statistics were used to develop a general wage scale that was then applied to a staffing plan developed for each of the alternatives.

The non-labor element of the operating and maintenance costs includes material and supply costs, renewal parts, fuel, and maintenance supplies. These costs were estimated for each option based on guideway length and power consumption. Table 5.2 summarizes the total operation and maintenance costs for each of the alternatives, based upon the operating characteristics identified in Table 5.1.

Table 5.2

Operations and Maintenance Cost Estimate (1998 $M)

	Option 2A	Option 2B	Option 4B	Option 5B
Total O&M Annual Cost	$1.5M	$1.8 M	$3.7 M	$4.8 M

5.2 Capital Costs

Capital costs were estimated for the five alternatives that were evaluated in the operations analysis. Capital costs include system and civil costs. While most cost items are usually developed through the unit cost approach, a number of items are better handled on a system-wide basis. Typically, these include vehicle requirements, initial parts purchases, and maintenance facilities. Add-on items are allowances for contingencies (unforeseen costs), engineering, construction management, and construction insurance. Table 5.3 summarizes the capital costs for each of the alternatives.

Table 5.3

Capital Cost Estimate (1998 $M)

Description	Option 2A	Option 2B	Option 4B	Option 5B AGT	Option 5B PRT
Operating System Fixed Facilities	$17-18 $23-26	$57-60 $43-50	$125-130 $ 95-110	$170-177 $120-143	$160-210 $120-170
TOTAL COST	**$40-44**	**$100-110**	**$220-240**	**$290-320**	**$280-380**

The following is a brief description of the fixed facility cost items and assumptions used in estimating their costs.

Guideway Construction – The guideway consists of typical sections including grading, subgrade and drainage. Additional items based on the particular alignment include bridges, lighting, and special surface treatments. Costs accommodate a guideway at a nominal elevation of 20 feet above grade and include an emergency walkway.

Station Construction – Stations are priced on a typical station basis. The system equipment costs related to stations and guideway construction costs within the stations are not included in station costs. The street-level DMU stations are 300 feet long and the elevated AGT stations are 200 feet long (150 feet of which is the platform). The DMU platforms are 10 feet wide and the AGT platforms are 20 feet wide.

Maintenance Construction – Maintenance shops include the cost of an enclosed maintenance facility for daily inspection and cleaning, maintenance, and repair of vehicles. Space is also provided for maintenance employee and operator facilities as well as offices for system administration and control. The facility is assumed to be of a simple design with a relatively low level of finishes. The building would be sized to accommodate the basic fleet with expansion capabilities.

The following is a description of the operating system/technology cost items.

Central and Control System (Signals) – The cost of signal and control systems is included as distributed costs for each segment. The parameters used are guideway feet, number of stations, vehicle headway, and characteristics of the vehicle. The cost includes automatic controls and audio and video equipment.

Traction/Electrification System – This includes costs for substations, cabling, and miscellaneous equipment.

Vehicles – The at-grade options are based upon current industry estimates for DMU vehicles. The elevated systems are assumed to use a typical bottom-supported AGT vehicle or Raytheon PRT vehicle.

Contingencies – These are included to address uncertainties in costs and generally range from 10 to 15 percent.

Project Management (Engineering and Management of Construction) - Costs include general engineering services, construction management services, project management oversight, project administration, insurance, and special programs.

Power Distribution System – The cost of the power distribution system includes power equipment, distribution equipment, and guideway heating.

Maintenance Equipment and Tools – This cost includes tool fixtures and spare parts.

Other Systems Equipment – This cost includes a system demonstration period of parts and supplies.

The capital costs are in 1998 dollars and include no cost escalation. Other costs may include right-of-way, environmental-related costs (i.e., unique soil conditions), owner's administrative program and legal costs, engineering and related costs prior to final design, financing and interest during construction, and other costs incurred which are not expected. No yard and shop facilities were included in the at-grade alternative (2A). Given the small fleet, it was assumed that maintenance would be contracted out to the freight railroads, particularly if a DMU technology were selected.

The cost for the street-level DMU (2A) was based upon the downtown portion of the light-rail system developed for Columbus in 1994. The costs were modified to use the diesel-powered rail rather than the electric light-rail vehicle. The total cost was then inflated to 1998 dollars.

Capital costs for the elevated AGT options (2B, 4B, and 5B) were developed using unit cost data from actual AGT applications. The examples used included airport facilities at JFK, O'Hare, San Francisco International, and Newark. The urban systems operating in downtown Detroit and Miami were also included. This provided a wide range of system and vehicle types for the composite unit costs. Adjustments were made for time and location of construction, as well as unique local conditions before the data were averaged for application in Columbus.

Since there is no operating PRT system, capital costs for application of this technology to alternative 5B were based upon information provided by the prospective system provider. These costs were modified somewhat based upon the professional judgment of the consultant team. The lower level of competition associated with this technology led to the use of a higher contingency than was used for the other alternatives. This resulted in a larger range in the cost estimates for this option, as shown earlier in Table 5.3.

5.3 Travel Time Comparison

The most comprehensive method to compare the level of service offered by the various alternatives is to examine the total travel time between representative trip origins and destinations. The total travel time includes:

- the initial walk to the bus stop or transit station
- the waiting time to board the service (one-half the service frequency)
- access time to reach an elevated station, if applicable
- in-vehicle travel time
- transfer time for trips using more than one route (one-half of the service frequency)
- access time from the elevated station to the street, if applicable
- walk time from the bus stop or transit station to the final destination.

Since this approach to calculating travel time includes all components of the trip, it fully considers each aspect of the level of service provided, including system coverage, ease of station access, service frequency, directness of service, and vehicle travel speeds.

The travel time for representative trips is shown by alternative in Table 5.4. Loop Cross AGT and PRT represent identical guideway systems, with the exception that one uses conventional AGT vehicles which stop at each station, and the other uses the PRT technology currently under development which permits riders to travel directly between the origin and destination stations without making intermediate stops.

The combined travel time for each of the trips is shown graphically in Figure 5.1. In general, the total travel time for the different alternatives decreases with expansion of the fixed-guideway system. This is logical since the guideways operate at higher speeds than the bus traveling in mixed traffic with automobiles. The elevated guideways travel faster than the at-grade guideway because they can totally avoid delays at traffic signals.

The increase in total travel time from the Cross to Loop Cross AGT is primarily a function of the additional station required to connect the Loop and Cross elements. While this additional station permits an important movement in the guideway system, it also increases the overall travel time for the trips that must stop at that station. This trade-off will be an important consideration for any system that may be built in downtown Columbus. Adding stations will improve the access to the system, but each station will also increase the travel time for all "through" passengers that are now required to make an additional stop.

The unique operating characteristics of the PRT provide the opportunity to avoid this access vs. travel-time trade-off. As shown in Table 5.4, Loop Cross PRT has a substantial travel time advantage over all of the other options. This results from its operational flexibility, permitting travel past intermediate stations to the final destination. The use of this technology would be at some risk, however, since it is still in the development phase and has not been applied in an urban setting. This aspect is discussed further in Section 6.

Table 5.4

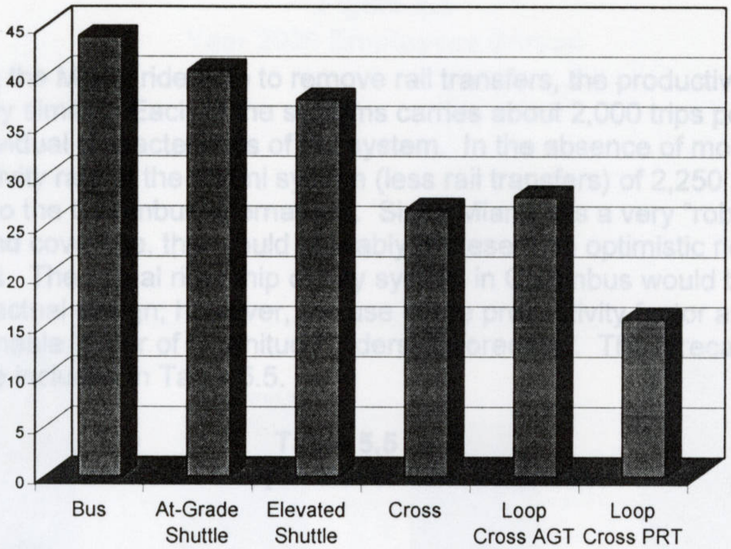
Travel Time Comparison

Trip	Bus	At-Grade Shuttle	Elevated Shuttle	Cross	Loop Cross AGT	Loop Cross PRT
Convention Center to City Center	9.1	8	6.2	5.8	6.9	4.5
Convention Center to COSI	12.8	10.7	9.3	7.8	6.5	4.1
COSI to Grant/Broad	10	10	10	5.9	6.9	3.9
City Center to Grant/Broad	12	11.8	12.1	7.1	7.6	3.2
Total	43.9	40.5	37.6	26.6	27.9	15.7

5.4 Ridership Forecast

Ridership forecasting for transit projects is typically conducted using mathematical computer models that are developed based upon observed local data or observed data for similar systems operating in other cities. Since there is no "people mover system" operating in downtown Columbus, or in most other downtowns, there is little data from which to structure a ridership model for this study.

Figure 5.1 Total Travel Time
(Minutes)



The three cities that currently have people mover systems include Jacksonville, Detroit, and Miami. The Jacksonville system is a two-way short shuttle, similar to the Columbus Shuttle option. It is currently being expanded to provide several branches. The Detroit system is a larger one-way loop that could be compared to the Columbus Loop Alternative. Miami has an expansive system that is based upon a loop with branches. This would be somewhat comparable to the Columbus Loop Cross.

There is no detailed travel information on any of the existing systems with respect to the characteristics of the traveler (income, age, and gender) or the trip purpose (work, shop, and recreation). The only statistics available for these systems include the length of the system and the daily ridership. These characteristics are shown in Table 5.5, Downtown People Mover Characteristics.

It is important to note that the Miami people mover also acts as a distribution system for a rail passenger system that brings commuters to the edge of downtown and effectively forces the riders on to the people mover to complete the trips. This is reflected in the relatively high ridership per mile shown in the table. According to the operator of the Miami system, approximately 25 percent of its ridership results from the forced transfer from the rail passenger service. If these trips were removed, the productivity of the system would be about 2,250 trips per mile.

After reducing the Miami ridership to remove rail transfers, the productivity of the existing systems is surprisingly similar. Each of the systems carries about 2,000 trips per day per mile regardless of the individual characteristics of the system. In the absence of more detailed statistics, the productivity rate of the Miami system (less rail transfers) of 2,250 riders per mile per day was applied to the Columbus alternatives. Since Miami has a very "robust" system in terms of frequency and coverage, this would probably represent an optimistic ridership level for the Columbus options. The actual ridership of any system in Columbus would be highly dependent upon the actual design; however, the use of the productivity factor as outlined above should provide reasonable "order of magnitude" ridership forecasts. The forecasts for the Columbus options are included in Table 5.5.

Table 5.5
Downtown People Mover Characteristics

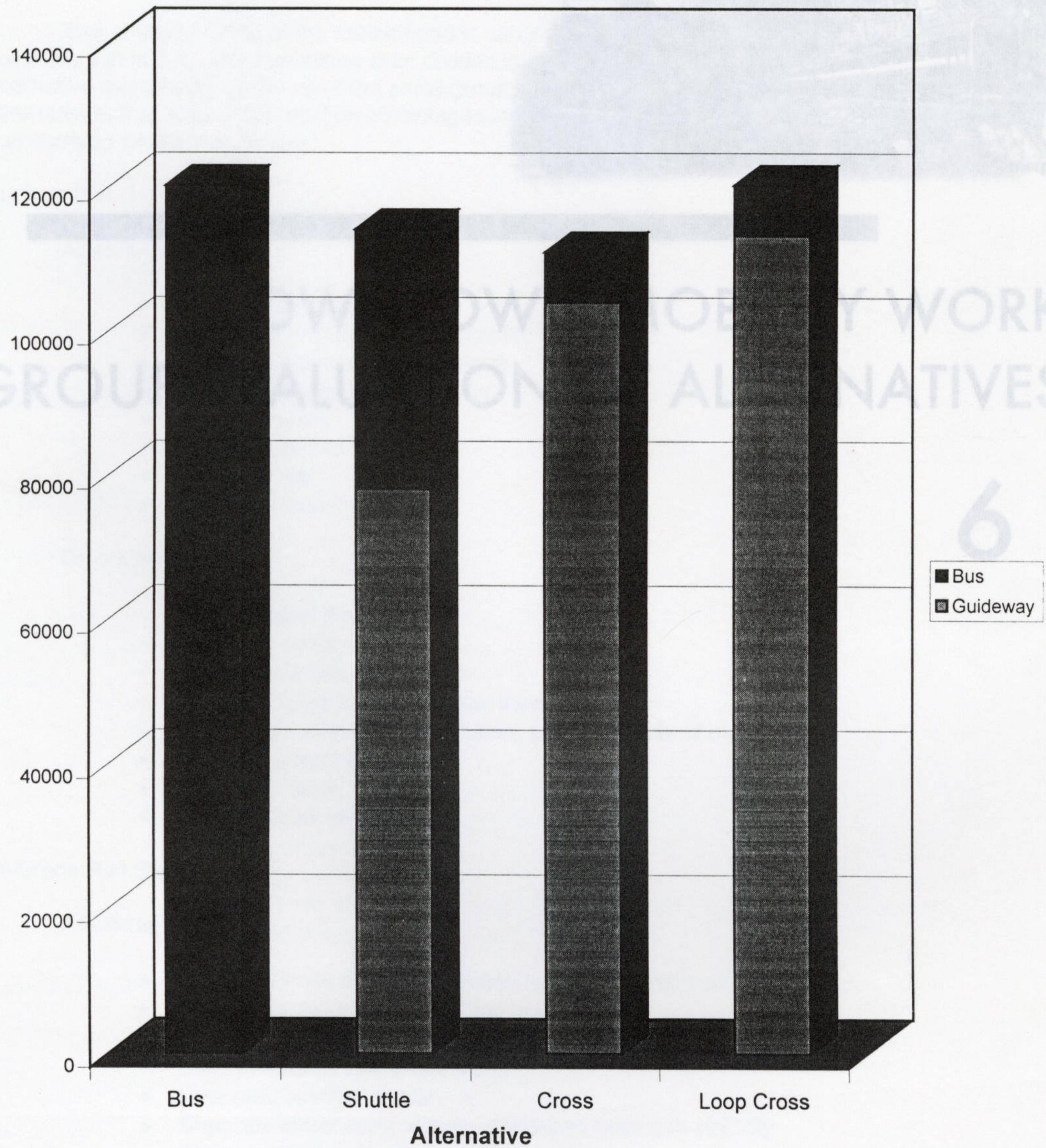
System	Vendor	Length	Daily Riders	Riders/Mile	Fare	Farebox Recovery
Detroit	Bombardier	2.8 mi	5,000	1,800	$0.50	13%
Miami	Adtranz	4.6 mi	14,000	3,000	$0.25	5%
Jacksonville	MATRA	.7 mi	1,300	1,900	$0.35	26%
PROPOSED						
Elevated Shuttle		1.2 mi	2,700	2,250	$0.50	20%
Cross		3.5 mi	8,000	2,250	$0.50	30%
Loop Cross		5.2 mi	11,700	2,259	$0.50	36%

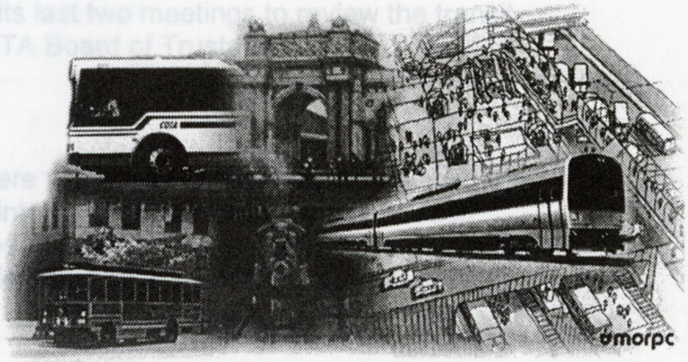
An alternative method of comparing ridership potential was developed based upon the number of downtown employees within walking distance of the proposed transit options. This comparison is shown on Figure 5.2. The total bar height reflects the total number of employees within a reasonable walking distance of the service. The bar is broken into segments that reflect the number of employees served by bus and those served by the guideway component of the downtown service options. Those employees who were served by both bus and guideway in a particular option were allocated to the guideway to avoid double counting.

As shown on the Figure, all of the alternatives serve a similar number of downtown employees. This indicates that all the options provide effective coverage throughout the downtown area. As would be expected, the proportion of employees with access to the guideway increases as the guideway system is expanded.

Although the alternatives provide comparable coverage, it is anticipated that transit ridership would increase along with the extent of the guideway. This is consistent with the improved travel times characteristic of the larger guideway systems discussed above and the experience in other cities.

Figure 5.2
Year 2020 Employees Served





DOWNTOWN MOBILITY WORK GROUP EVALUATION OF ALTERNATIVES

6

6.0 DOWNTOWN MOBILITY WORK GROUP EVALUATION OF ALTERNATIVES

The Downtown Mobility Work Group used its last two meetings to review the transit options and develop a recommendation to the COTA Board of Trustees.

6.1 Review of Alternatives

The characteristics of the transit options were presented to the work group using the summary Table 6.1. The committee then divided into small groups that discussed each alternative individually. After all of the small groups had recorded their comments on all of the alternatives, the advantages and disadvantages identified by the various groups were summarized as outlined below.

Surface Bus

Advantages

- Lowest costs
- Greatest flexibility and geographic coverage
- Frequent service, multiple stops
- Reinforces street-level activity
- Easy transfers
- Quick implementation
- Creates jobs
- Supports tourism

Disadvantages

- Longer travel times
- Poor ride quality
- Subject to traffic congestion
- Less attractive to visitors, new transit riders
- Increased noise and air pollution, visual impacts of more buses
- Not a long-term solution
- Labor intensive
- Limited street amenities

At-Grade Rail Shuttle

Advantages

- Opportunity for direct connection to suburbs/regional connectivity
- Low construction and operating costs
- Less risk, higher voter acceptance
- Easy to access and understand
- Reasonable initial phase
- Supports street-level activity, enhances business visibility
- Reduces auto capacity

- High rider safety

Table 6.1
Analysis of Alternatives

	Surface Bus	At-Grade Shuttle	Elevated Shuttle	Elevated Cross	Elevated Loop Cross	Elevated Loop Cross
Technology	Bus	DMU	AGT	AGT	AGT	PRT
Criteria						
Rail Capital Cost*	$0.0	$40-44	$100-110	$220-240	$290-320	$280-380
Bus Capital Cost*	$6.2	$3.9	$3.9	$1.6	$1.6	$1.6
TOTAL Capital Cost*	$6	$44-48	$104-114	$222-242	$292-322	$282-382
Rail Operating Cost*	$0.0	$1.4-1.6	$2.1-2.4	$3.9-4.3	$4.8-5.3	$3.4-4.7
Bus Operating	$3.3	$2.0	$2.0	$1.8	$1.6	$1.6
TOTAL Operating	$3.3	$3.4-3.6	$4.1-4.4	$5.7-6.1	$6.4-6.9	$5.0-6.3
Traffic Impacts	Lose 2 Traffic Lanes	Lose 2 Traffic Lanes	Lose 1 Traffic Lane	Lose 1 Traffic Lane, 2 Streets	Lose 1 Traffic Lane, 2+ Streets	Lose 1 Traffic Lane, 2+ Streets
Visual Impacts	None	None	Moderate, Major at Stations	Major at Stations Crossing	Major at Stations, Crossings	Major at Stations, Crossings
Technical Maturity	Mature	Extensive Testing	Mature	Mature	Mature	Prototype
Proprietary Issues	Multiple Vendors	Potentially Multiple Suppliers	Limited Suppliers	Limited Suppliers	Limited Suppliers	Single Supplier

*** Cost in Millions based on 1998 Dollars**

Disadvantages

- Diesel noise and air pollution for non-electric option
- Visual impact of overhead wire for electric option
- Reduces street capacity
- Slower than elevated
- Perceived barrier for street crossings – less visual recognition than elevated
- Less geographic coverage than elevated.

Elevated AGT/PRT

Advantages

- High-speed/high-quality service
- More flexibility
- High-tech image, attractive to new riders

- Recognizable
- Convenient service between major destinations
- Reinforces development along High Street corridor
- Encourages residential development downtown
- Provides "signature" downtown feature

Disadvantages

- Highest cost
- Difficult to extend to suburbs
- Elevated stations less convenient to access, inconvenient transfers
- Least flexibility
- Reduces street-level activity between stations, pulls downtown further apart
- Perceived class differential (bus vs. elevated)
- Safety concerns
- Highest risk to voters.

The discussion of these advantages and disadvantages provided the opportunity for the work group members to exchange viewpoints. This exchange was important as the group members prepared to make their recommendation in the following meeting.

6.2 Work Group Recommendation

During the last meeting, the work group followed a two-step selection process leading to recommendation of a preferred option. In the first step, the committee voted on the preferred Elevated Guideway option that would be carried forward for consideration with the Surface Bus and At-Grade Shuttle alternatives. The committee selected the most expansive system, known as the "Loop Cross." Although this was the most extensive option, many committee members noted that an implementation process would probably require staged construction possibly using the "small" and "medium" alternatives as construction segments.

Each committee member was then given two votes to apply to his/her preferred transit option. The individual committee members had the option of voting for two of the three alternatives, or applying both votes to a single option. The results of the voting are summarized below by option:

• Surface Bus	4 Votes
• At-Grade Shuttle	22 Votes
• Elevated Guideway (Loop Cross)	20 Votes

The vote distribution reflects a strong preference for a rail/fixed guideway component in the downtown transit system. Given the similar levels of support for the At-Grade and Elevated alternatives, there was no clear consensus on the type of rail component to be added. The advantages and disadvantages of these two options will be presented to the COTA Board along with comments received from the general public. The Board will then adopt a downtown element for inclusion in the COTA Vision Regional Transit Plan, and develop a financial plan for the entire system.

ADDITIONAL PLANNING REQUIREMENTS

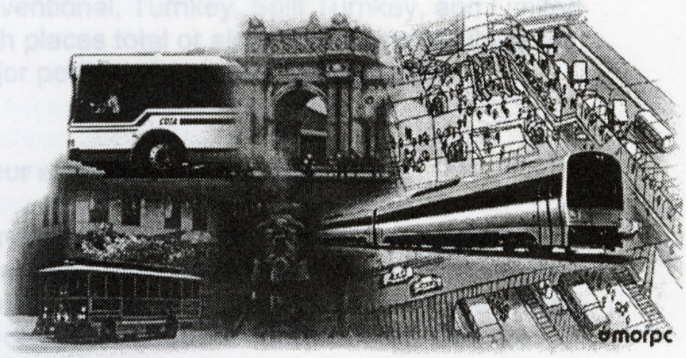
7

7.0 **ADDITIONAL PLANNING REQUIREMENTS**

Either of the transit options recommended by the work group is beyond the existing or potential local funding levels of COTA. Both options would require federal funding assistance, such as that being provided for rail projects under way in Cincinnati and Cleveland. The higher cost for the Elevated Guideway would probably require private-sector participation in addition to any federal contribution.

Federal funding requirements include a rigorous analysis of alternatives that significantly exceeds the general feasibility study represented by this report. The next step in the process is the completion of a Major Investment Study that includes conceptual engineering and detailed analysis of capital and operating costs and ridership. This effort typically takes about 1 year to complete. Subsequent steps in the implementation process include Preliminary Engineering, Final Design, Construction, and Testing. Each must follow federal guidelines in order to ensure eligibility for federal funding. The overall process takes 4 to 7 years, assuming that funding is in place for the project.

Local planning activities would also be incorporated into the transit development program. This could include a public initiative such as implementation of a downtown parking program that would coordinate parking facility locations with a potential transit alignment, or potentially provide supplemental transit funding and/or create another implementing entity that could take responsibility for the project construction or operation. Private sector coordination could range from building/site design to accommodate future stations or guideways, to development of assessment districts to help fund the transit improvement.



POTENTIAL PROCUREMENT STRATEGIES

8

8.0 POTENTIAL PROCUREMENT STRATEGIES

If COTA were to pursue any of the fixed-guideway options, there are several different procurement methods that could be followed: Conventional, Turnkey, Split Turnkey, and Limited Turnkey. Turnkey is a method of contracting which places total or almost total responsibility for the design and implementation of a project, or major portion of a project, with a single contractor.

The following is a brief description of the four strategies for procurement.

Conventional – This is the traditional way in which transit systems were procured by public agencies until approximately 20 years ago. In a conventional project, the owner takes responsibility for managing the planning, design, and implementation of the project including the integration of all the project's components into a final product. The conventional approach is not conducive to the operating system portion of an automated technology because all automated suppliers furnish complete products (at least equipment) based on proprietary, unique designs. Under the conventional strategy the owner and its consultants assume much of the technical and all of the integration risks for the fixed facilities and the operating system.

Turnkey – With this relatively new approach to transit system procurement, the owner enters into one contract for the delivery of a complete, functioning system. The owner must develop the concept, then create a contract with a well-defined work scope, performance specifications, and schedule. The single contractor is responsible to optimize interrelationships between the operating system hardware and the facilities. Turnkey contracts are most appropriate for projects with few or limited well-defined external interfaces when complete work scope and performance criteria can be established, and when the owner's interest in technology is limited to performance. The owner may relinquish significant control over facility and system design. Competition could be limited based on the scale of the single contract.

Joint ventures usually form to pool expertise and aggregate sufficient financial resources. The joint-venture partners could include equipment suppliers, designers, specialty consultants, construction managers, and construction contractors. Each joint-venture partner will engage the services of specialty suppliers and subcontractors. Thus, a complex organization can result. Often, a construction contractor will lead the joint venture for commercial reasons, to include the strength of financial resources and bonding capability. Under this strategy, the owner shifts almost all risks to the joint-venture contractor but retains little control over the details of the project. Risks and potential profits are shared among the joint-venture partners based on a formal, joint-venture agreement.

Split Turnkey – Under the Split Turnkey strategy, the transit operating system and the facilities are separated into two or more turnkey contracts. There could be two contracts: one for the operating system and one for all facilities. A more disaggregated approach could be used, resulting in, for example, separate turnkey contracts for vehicles, train signalization and control, guideway sections, elevated structures, tunnels, stations, and support facilities. Possible scenarios are numerous. The owner is responsible for interface coordination and management of all contracts it awards. This strategy approaches that of the conventional contracting process as the project is split into more contracts, reducing the potential benefits of the turnkey process, particularly with respect to owner-assumed risk. In theory, more competition could result than under

Turnkey. This is because of the disaggregation of the component parts into smaller, more specialized elements with lower individual monetary values.

Limited Turnkey – The Limited Turnkey approach has been used to procure the preponderance of AGTs at airports in the United States. A single turnkey contract is employed for the complete operating system, while the conventional approach is retained for facilities. Because automated systems involve proprietary designs, a turnkey contract with performance specifications is the only effective procurement method. However, the owner uses its engineering staff, design consultants, and construction contractors for the facilities elements of the project. Usually one or more project management consultants is engaged to coordinate the work of the designers, the operating system supplier, and the facilities constructors.

Although the owner assumes integration and coordination risks, the Limited Turnkey approach works well because of the many external interfaces. For example, stations can be located within buildings, the guideway must be closely coordinated with roads and parking garages, and numerous utility lines must be avoided or relocated.

The limited turnkey approach is recommended as the best-suited strategy from the procurement of any elevated downtown Columbus system. The advantages of maintaining close control of the project and furthering commercial policies outweigh the integration risks and added management effort. Implementation of the lower-cost surface-rail option could use either a conventional or limited turnkey approach.

APPENDIX A

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Mobile (614) - Home: (614) -

APPENDIX B
TECHNOLOGY ASSESSMENTS

+ Positive; Expected to meet criterion
0 Neutral; Should meet criterion but may have problems
- Negative; Not expected to meet criterion and/or cause significant problems
NA Not Applicable

ALIGNMENT OPTION #1 -- SURFACE BUS ROUTES

EVALUATION ISSUES		MODES						
		Conventional Bus on Street	Electric Bus on Street	PRT	Cable-Propelled	Monorail	APM	Light Rail
Capacity	2,500 pph*	+	+	NA	NA	NA	NA	NA
	5,000 pph	-	-	NA	NA	NA	NA	NA
	10,000 pph	-	-	NA	NA	NA	NA	NA
	Flexibility	+	+	NA	NA	NA	NA	NA
	Off-Peak Use	+	+	NA	NA	NA	NA	NA
Level-of-Service	Frequency	0	-	NA	NA	NA	NA	NA
	Speed	0	0	NA	NA	NA	NA	NA
Cost	Capital	+	0	NA	NA	NA	NA	NA
	O & M	0	-	NA	NA	NA	NA	NA
Integration		+	+	NA	NA	NA	NA	NA
Right-of-Way Requirements		+	+	NA	NA	NA	NA	NA
Environmental Impacts		-	+	NA	NA	NA	NA	NA
Street Traffic		-	-	NA	NA	NA	NA	NA
Technical Maturity		+	-	NA	NA	NA	NA	NA
Competitive Procurement		+	-	NA	NA	NA	NA	NA
System Image		-	0	NA	NA	NA	NA	NA
INITIAL FINDINGS		keep	drop	drop	drop	drop	drop	drop
COMMENTS								

*Passengers per hour (pph)

+ Positive; Expected to meet criterion
0 Neutral; Should meet criterion but may have problems
- Negative; Not expected to meet criterion and/or cause significant problems
NA Not Applicable

ALIGNMENT OPTION #2 – FRONT ST. SHUTTLE (AT-GRADE)

EVALUATION ISSUES		MODES						
		Conventional Bus on Street	Electric Bus on Street	PRT	Cable-Propelled	Monorail	APM	Light Rail
Capacity	2,500 pph*	+	+	NA	NA	NA	NA	+
	5,000 pph	-	-	NA	NA	NA	NA	+
	10,000 pph	-	-	NA	NA	NA	NA	-
	Flexibility	+	+	NA	NA	NA	NA	+
	Off-Peak Use	+	+	NA	NA	NA	NA	+
Level-of-Service	Frequency	0	-	NA	NA	NA	NA	+
	Speed	0	0	NA	NA	NA	NA	-
Cost	Capital	+	0	NA	NA	NA	NA	0
	O & M	0	-	NA	NA	NA	NA	-
Integration		+	+	NA	NA	NA	NA	+
Right-of-Way Requirements		+	+	NA	NA	NA	NA	+
Environmental Impacts		-	+	NA	NA	NA	NA	+
Street Traffic		-	-	NA	NA	NA	NA	0
Technical Maturity		+	-	NA	NA	NA	NA	+
Competitive Procurement		+	-	NA	NA	NA	NA	0
System Image		-	0	NA	NA	NA	NA	+
INITIAL FINDINGS		keep	drop	drop	drop	drop	drop	keep
COMMENTS								

*Passengers per hour (pph)

+ Positive; Expected to meet criterion
0 Neutral; Should meet criterion but may have problems
- Negative; Not expected to meet criterion and/or cause significant problems
NA Not Applicable

ALIGNMENT OPTION #2 – FRONT ST. SHUTTLE (ELEVATED)

EVALUATION ISSUES		MODES						
		Conventional Bus on Street	Electric Bus on Street	PRT	Cable-Propelled	Monorail	APM	Light Rail
Capacity	2,500 pph*	+	+	NA	+	+	+	+
	5,000 pph	-	-	NA	+	0	+	+
	10,000 pph	-	-	NA	0	-	+	-
	Flexibility	+	+	NA	-	+	+	+
	Off-Peak Use	+	+	NA	0	-	0	+
Level-of-Service	Frequency	0	-	NA	-	0	+	+
	Speed	0	0	NA	0	+	+	-
Cost	Capital	+	0	NA	0	+	+	-
	O & M	0	-	NA	+	+	+	-
Integration		+	+	NA	+	-	+	+
Right-of-Way Requirements		+	+	NA	+	-	+	+
Environmental Impacts		-	+	NA	+	+	+	-
Street Traffic		-	-	NA	+	+	+	0
Technical Maturity		+	-	NA	+	+	+	+
Competitive Procurement		+	+	NA	-	+	+	0
System Image		-	0	NA	+	+	+	-
INITIAL FINDINGS		keep	drop	drop	keep	drop	keep	drop
COMMENTS								

*Passengers per hour (pph)

+ Positive; Expected to meet criterion
0 Neutral; Should meet criterion but may have problems
- Negative; Not expected to meet criterion and/or cause significant problems
NA Not Applicable

ALIGNMENT OPTION #3 – STAGED LOOP (AT-GRADE)

EVALUATION ISSUES		MODES						
		Conventional Bus on Street	Electric Bus on Street	PRT	Cable-Propelled	Monorail	APM	Light Rail
Capacity	2,500 pph*	+	+	NA	NA	NA	NA	+
	5,000 pph	-	-	NA	NA	NA	NA	+
	10,000 pph	-	-	NA	NA	NA	NA	-
	Flexibility	+	+	NA	NA	NA	NA	+
	Off-Peak Use	+	+	NA	NA	NA	NA	+
Level-of-Service	Frequency	0	-	NA	NA	NA	NA	+
	Speed	0	0	NA	NA	NA	NA	-
Cost	Capital	+	0	NA	NA	NA	NA	0
	O & M	0	-	NA	NA	NA	NA	-
Integration		+	+	NA	NA	NA	NA	+
Right-of-Way Requirements		+	+	NA	NA	NA	NA	+
Environmental Impacts		-	+	NA	NA	NA	NA	+
Street Traffic		-	-	NA	NA	NA	NA	-
Technical Maturity		+	-	NA	NA	NA	NA	+
Competitive Procurement		+	+	NA	NA	NA	NA	0
System Image		-	0	NA	NA	NA	NA	+
INITIAL FINDINGS		keep	drop	drop	drop	drop	drop	drop
COMMENTS								

*Passengers per hour (pph)

\+ Positive; Expected to meet criterion
0 Neutral; Should meet criterion but may have problems
\- Negative; Not expected to meet criterion and/or cause significant problems
NA Not Applicable

ALIGNMENT OPTION #3 – STAGED LOOP (ELEVATED)

EVALUATION ISSUES		MODES						
		Conventional Bus on Street	Electric Bus on Street	PRT	Cable-Propelled	Monorail	APM	Light Rail
Capacity	2,500 pph*	+	+	0	+	+	+	+
	5,000 pph	-	-	-	+	0	+	+
	10,000 pph	-	-	-	0	-	+	-
	Flexibility	+	+	-	-	+	+	+
	Off-Peak Use	+	+	-	0	-	-	+
Level-of-Service	Frequency	0	-	0	-	0	+	+
	Speed	0	0	+	0	+	+	-
Cost	Capital	+	0	-	0	+	+	-
	O & M	0	-	-	+	+	+	-
Integration		+	+	+	-	+	+	+
Right-of-Way Requirements		+	+	+	-	+	+	+
Environmental Impacts		-	+	+	+	+	+	-
Street Traffic		-	-	+	+	+	+	0
Technical Maturity		+	-	-	+	+	+	+
Competitive Procurement		+	+	+	-	+	+	0
System Image		-	0	+	+	+	+	-
INITIAL FINDINGS		keep	drop	drop	drop	keep	keep	drop
COMMENTS								

*Passengers per hour (pph)

+ Positive; Expected to meet criterion
0 Neutral; Should meet criterion but may have problems
- Negative; Not expected to meet criterion and/or cause significant problems
NA Not Applicable

ALIGNMENT OPTION #4 – RAIL CROSS WITH BUS LOOP (AT-GRADE)

EVALUATION ISSUES		MODES						
		Conventional Bus on Street	Electric Bus on Street	PRT	Cable-Propelled	Monorail	APM	Light Rail
Capacity	2,500 pph*	+	+	NA	NA	NA	NA	+
	5,000 pph	-	-	NA	NA	NA	NA	+
	10,000 pph	-	-	NA	NA	NA	NA	-
	Flexibility	+	+	NA	NA	NA	NA	+
	Off-Peak Use	+	+	NA	NA	NA	NA	+
Level-of-Service	Frequency	0	-	NA	NA	NA	NA	+
	Speed	0	0	NA	NA	NA	NA	-
Cost	Capital	+	0	NA	NA	NA	NA	0
	O & M	0	-	NA	NA	NA	NA	-
Integration		+	+	NA	NA	NA	NA	+
Right-of-Way Requirements		+	+	NA	NA	NA	NA	+
Environmental Impacts		-	+	NA	NA	NA	NA	+
Street Traffic		-	-	NA	NA	NA	NA	-
Technical Maturity		+	-	NA	NA	NA	NA	+
Competitive Procurement		+	+	NA	NA	NA	NA	0
System Image		-	0	NA	NA	NA	NA	+
INITIAL FINDINGS		keep	keep	drop	drop	drop	drop	drop
COMMENTS								

*Passengers per hour (pph)

+ Positive; Expected to meet criterion
0 Neutral; Should meet criterion but may have problems
- Negative; Not expected to meet criterion and/or cause significant problems
NA Not Applicable

ALIGNMENT OPTION #4 – RAIL CROSS WITH BUS LOOP (ELEVATED)

EVALUATION ISSUES		MODES						
		Conventional Bus on Street	Electric Bus on Street	PRT	Cable-Propelled	Monorail	APM	Light Rail
Capacity	2,500 pph*	+	+	0	+	+	+	+
	5,000 pph	-	-	-	+	0	+	+
	10,000 pph	-	-	-	0	-	+	-
	Flexibility	+	+	-	-	+	+	+
	Off-Peak Use	+	+	-	0	-	-	+
Level-of-Service	Frequency	0	-	0	-	0	+	+
	Speed	0	0	+	0	+	+	-
Cost	Capital	+	0	-	0	+	+	-
	O & M	0	-	-	+	+	+	-
Integration		+	+	+	+	+	+	+
Right-of-Way Requirements		+	+	+	+	+	+	+
Environmental Impacts		-	+	+	+	+	+	-
Street Traffic		-	-	+	+	+	+	0
Technical Maturity		+	-	-	+	+	+	+
Competitive Procurement		+	+	+	-	+	+	0
System Image		-	-	+	+	+	+	-
INITIAL FINDINGS		keep	keep	drop	keep	keep	keep	drop
COMMENTS								

*Passengers per hour (pph)

+ Positive; Expected to meet criterion
0 Neutral; Should meet criterion but may have problems
- Negative; Not expected to meet criterion and/or cause significant problems
NA Not Applicable

ALIGNMENT OPTION #5 – RAIL LOOP CROSS WITH BUS (AT-GRADE)

EVALUATION ISSUES		MODES						
		Conventional Bus on Street	Electric Bus on Street	PRT	Cable-Propelled	Monorail	APM	Light Rail
Capacity	2,500 pph*	+	+	NA	NA	NA	NA	+
	5,000 pph	-	-	NA	NA	NA	NA	+
	10,000 pph	-	-	NA	NA	NA	NA	-
	Flexibility	+	+	NA	NA	NA	NA	+
	Off-Peak Use	+	+	NA	NA	NA	NA	+
Level-of-Service	Frequency	0	-	NA	NA	NA	NA	+
	Speed	0	0	NA	NA	NA	NA	-
Cost	Capital	+	0	NA	NA	NA	NA	0
	O & M	0	-	NA	NA	NA	NA	-
Integration		+	+	NA	NA	NA	NA	+
Right-of-Way Requirements		+	+	NA	NA	NA	NA	+
Environmental Impacts		-	+	NA	NA	NA	NA	+
Street Traffic		-	-	NA	NA	NA	NA	-
Technical Maturity		+	-	NA	NA	NA	NA	+
Competitive Procurement		+	+	NA	NA	NA	NA	0
System Image		-	0	NA	NA	NA	NA	+
INITIAL FINDINGS		keep	keep	drop	drop	drop	drop	drop
COMMENTS								

*Passengers per hour (pph)

+ Positive; Expected to meet criterion
0 Neutral; Should meet criterion but may have problems
- Negative; Not expected to meet criterion and/or cause significant problems
NA Not Applicable

ALIGNMENT OPTION #5 – RAIL LOOP CROSS WITH BUS (ELEVATED)

EVALUATION ISSUES		MODES						
		Conventional Bus on Street	Electric Bus on Street	PRT	Cable-Propelled	Monorail	APM	Light Rail
Capacity	2,500 pph*	+	+	0	+	+	+	+
	5,000 pph	-	-	-	+	0	+	+
	10,000 pph	-	-	-	0	-	+	-
	Flexibility	+	+	-	-	+	+	+
	Off-Peak Use	+	+	-	0	-	-	+
Level-of-Service	Frequency	0	-	0	-	0	+	+
	Speed	0	0	+	0	+	+	-
Cost	Capital	+	0	-	0	+	+	-
	O & M	0	-	-	+	+	+	-
Integration		+	+	-	+	-	+	+
Right-of-Way Requirements		+	+	-	-	+	+	+
Environmental Impacts		-	+	+	+	+	+	-
Street Traffic		-	-	+	+	+	+	0
Technical Maturity		+	-	-	+	+	+	+
Competitive Procurement		+	+	-	-	+	+	0
System Image		-	0	+	+	+	+	-
INITIAL FINDINGS		keep	keep	drop	drop	keep	keep	drop
COMMENTS								

*Passengers per hour (pph)

\+ Positive; Expected to meet criterion
0 Neutral; Should meet criterion but may have problems
\- Negative; Not expected to meet criterion and/or cause significant problems
NA Not Applicable

ALIGNMENT OPTION #6 – PERIMETER RAIL LOOP WITH BUS (AT-GRADE)

EVALUATION ISSUES		MODES						
		Conventional Bus on Street	Electric Bus on Street	PRT	Cable-Propelled	Monorail	APM	Light Rail
Capacity	2,500 pph*	+	+	NA	NA	NA	NA	+
	5,000 pph	-	-	NA	NA	NA	NA	+
	10,000 pph	-	-	NA	NA	NA	NA	-
	Flexibility	+	+	NA	NA	NA	NA	+
	Off-Peak Use	+	+	NA	NA	NA	NA	-
Level-of-Service	Frequency	0	-	NA	NA	NA	NA	0
	Speed	0	0	NA	NA	NA	NA	-
Cost	Capital	+	0	NA	NA	NA	NA	-
	O & M	0	-	NA	NA	NA	NA	-
Integration		+	+	NA	NA	NA	NA	0
Right-of-Way Requirements		+	+	NA	NA	NA	NA	0
Environmental Impacts		-	+	NA	NA	NA	NA	0
Street Traffic		-	-	NA	NA	NA	NA	-
Technical Maturity		+	-	NA	NA	NA	NA	+
Competitive Procurement		+	+	NA	NA	NA	NA	+
System Image		-	0	NA	NA	NA	NA	0
INITIAL FINDINGS		keep	drop	drop	drop	drop	drop	drop
COMMENTS								

*Passengers per hour (pph)

+ Positive; Expected to meet criterion
0 Neutral; Should meet criterion but may have problems
- Negative; Not expected to meet criterion and/or cause significant problems
NA Not Applicable

ALIGNMENT OPTION #6 – PERIMETER RAIL LOOP WITH BUS (ELEVATED)

EVALUATION ISSUES		MODES						
		Conventional Bus on Street	Electric Bus on Street	PRT	Cable-Propelled	Monorail	APM	Light Rail
Capacity	2,500 pph*	+	+	0	+	+	+	+
	5,000 pph	-	-	-	+	0	+	+
	10,000 pph	-	-	-	0	-	+	-
	Flexibility	+	+	-	-	+	+	+
	Off-Peak Use	+	+	-	0	-	-	+
Level-of-Service	Frequency	0	-	0	-	0	+	+
	Speed	0	0	+	0	+	+	-
Cost	Capital	+	0	-	0	+	+	-
	O & M	0	-	-	+	+	+	-
Integration		+	+	-	-	+	+	+
Right-of-Way Requirements		+	+	-	-	+	+	+
Environmental Impacts		-	+	+	+	+	+	-
Street Traffic		-	-	+	+	+	+	0
Technical Maturity		+	-	-	+	+	+	+
Competitive Procurement		+	+	-	-	+	+	0
System Image		-	-	+	+	+	+	-
INITIAL FINDINGS		keep	drop	drop	drop	keep	keep	drop
COMMENTS								

*Passengers per hour (pph)

APPENDIX C

FEEDBACK ON THE PROCESS AND SERVICE OPTIONS

COSI Columbus
280 East Broad Street
Columbus, Ohio 43215-3773

(614) 228.COSI
(614) 228.6363 Fax

RECEIVED
DEC 0 2 1998
GENERAL MANAGERS OFFICE

TRANSPORTATION
DEC 0 8 1998
DEPARTMENT

COSI
Science, Learning and Fun!

November 30, 1998

Mr. William C. Habig
Executive Director
Mid-Ohio Regional Planning Commission (MORPC)
285 East Main Street
Columbus, Ohio 43215-5272

Mr. Ronald L. Barnes
CEO/General Manager
Central Ohio Transit Authority (COTA)
1600 McKinley Avenue
Columbus, Ohio 43222

Dear Bill and Ron:

We have been pleased to be part of the Downtown Peoplemover Mobility Work Group, and COSI Vice Presidents Lynn Wallace and Chuck O'Connor have been working hard to attend as much of the discussion as is possible given our very hectic construction schedule.

COSI and our visitors will clearly benefit from the good planning work you are doing. I wanted to be sure to pass along a couple of key COSI needs and values so you felt sure you had heard directly from us in considering key issues.

Our leadership team believes that in order to truly impact ridership and transportation patterns among our public we must establish new systems that enable people to easily change their old behaviors. We believe we must have a "peoplemover" plan that is: 1) tremendously easy to access and use throughout the day; 2) provides high levels of comfort and safety; 3) offers very high frequency to travelers so it is not hard to remember how and when it can be used throughout the day; and, 4) links the working downtown to the nearest neighborhoods (Short North, Brewery District, German Village) residential and entertainment.

We believe a low cost, high frequency option will best serve our community, and visitors traveling to COSI in the next decade. A large investment of capital is not necessary until new patterns can be catalyzed and begin to emerge in downtown people flows.

We will continue to participate in all of the meetings as best we can. Please feel free to be in touch if we can provide any additional input or support.

Sincerely,

Kathryn D. Sullivan, Ph.D.
President & CEO

KDS:jmr

RECEIVED

DEC 0 8 1998

GENERAL MANAGERS OFFICE

December 7, 1998

Mr. Ron Barnes
General Manager
COTA
1600 McKinley Ave.
Columbus, Ohio 43222

Dear Ron:

I first want to thank you again for allowing me to participate in the recently concluded Downtown Mobility Work Group. I found it to be a worth while and productive dialogue on the future of downtown transit. Attached you will find my thoughts concerning the future of public transportation downtown. I also sent a copy to Kent Carson.

Ron, the future of downtown public transportation in my opinion holds the key not only to the long term economic vitality and cultural excitement of the city's civic center, but will be fundamentally strategic to the future of the entire metropolitan area. I look forward to assisting you in any way I can to make the best possible public transit future for Columbus become a reality.

Sincerely,

Steve Soble

Reasons for supporting the development of an elevated downtown/riverfront circulator over that of an at grade system.

The operative word in the mission statement for the Downtown Mobility Work Group revolved around the term 'mobility'. The future of public transportation in metropolitan central Ohio as outlined in COTA's Vision 2020 Plan envisions some form of regional commuter or light rail technology interacting with an expanded bus system. Radiating throughout the community the various commuter rail corridors will all converge downtown at a Multi Modal Transportation Terminal. The centerpiece of the region's entire public transportation network should be the downtown/riverfront circulator.

The transit technology ultimately chosen for the regional system's downtown component should be worthy of the 'spirit' of Vision 2020. The circulator should become a national and international public transit icon. The technology that best exemplifies a transit circulator of the 21st century is the automated elevated fixed guide way people mover. An elevated fixed guide way system will indeed be more expensive then other technologies. The range of capital costs associated with constructing such a system is open to further discussion. However to borrow and modify an old phase, when it comes to the future of public transportation in central Ohio, our community will get what it pays for, or in this instance, invests in.

The civic center of the capitol city of Ohio is deserving of the best that the future of public transit has to offer, nothing less. Over the last 20 years, somewhere between 3 and 4 billion dollars of public and private capital has gone into development downtown. For the cost of a civic arena or a science center, downtown Columbus can distinguish itself with a modern transit circulator few cities anywhere in the world will possess. In relation to the capital that has already been committed to the downtown, let alone what is yet to come, the cost of constructing an elevated transit circulator will appear over time by comparison a moderate community investment.

In evaluating the most appropriate elevated technology for our city's skyline several issues will need critical examination. The elevated technology chosen should possess as minimal a guide way infrastructure as possible. Attention to the guide way's esthetics must also be given particular attention. The family of elevated people mover which most readily addresses these issues is the straddle beam monorail. Examples of such monorails are the AdTranz/Von Roll and Bombardier UM3 straddle beam systems.

The two principal operational characteristics favoring an elevated fixed guide way system over one at grade are the elements of 'speed' and 'frequency' of service. These two factors were rated by the working group as critically important to the overall success of any downtown circulator. An elevated system is 2 to 2.5 times faster than an at grade system. During the next century as Columbus' downtown matures and becomes more densely developed, the speed and frequency of its transit circulator service will become critical to the core district's long term economic vitality, particularly as downtown competes over time with the emerging edge cities of Easton, Polaris, and Tuttle Crossing. Head ways between trains at elevated stations can be as short as two minutes. The elevated technology

technology mentioned here is automated as well as demand sensitive giving it greater operational flexibility than systems running at grade.

Downtown is currently and will continue to be the metro area's premiere cultural, economic and entertainment engine. And with any economic engine, time is money! Riders of an elevated circulator, be they workers, tourists, sports fans, convention visitors or residents will be able to set their watches by the regularity of the system's service. Because of its speed, passengers will minimize their travel time getting around downtown and its riverfront.

The issue most debated by the working group as it pertained to elevated versus at grade systems was the issue of the pedestrian street scape. Columbus' core business district is peculiar in one particular aspect of its urban topography. It is an anomaly not shared by downtowns of other cities our size in the United States. Possessing development opportunities as well as challenges, this unique element of our urban core's landscape has had and will continue to have a major impact on the future development of our city's civic center. Half the surface area of downtown Columbus is currently a surface parking lot.

The reality of downtown today is that except for High Street there is relatively little if any continuous pedestrian street scape environment. Following the urban renewal programs of the 1960's and 1970's which leveled much of old downtown what has emerged in its place over the last two decades are activity 'districts'. These pods of public activity, the Convention Center/Short North District, the Arena/Pen West District, the Brewery District, the Capital Square/City Center District and the COSI Peninsula District are like oasis in a vast desert of block after city block of surface parking lots. It may well take 30 years or more to develop those vacant spaces between the districts.

An elevated circulator linking together parking garages with currently existing and emerging core district and riverfront activity centers be they places of work, entertainment or recreation would become a catalyst for development along the system's beamway alignment filling in the existing economic dead space of surface parking. Not unlike freeway interchanges, wherever you strategically place stations, development will occur. Even with an elevated transit system people will still have to traverse the sidewalk to and from station locations which will avail the pedestrian plenty of opportunity to partake of street level retail opportunities. Do the subway stations of New York, or the stations along Chicago's El limit or prohibit street level commerce? No.

In addition to its ability to move people quickly around as well as being an economic development tool, there is one other element associated with an elevated people mover which is hard to quantify yet fundamentally important to our emerging national and international image as a city of the 21st century. In choosing the right elevated technology and having paid attention to its guide way esthetics, a ride on a monorail would be a 'unique' transit experience few if any city in North America could provide its passengers, availing those who ride it a sensation of flight as well as a visual perspective of downtown one could never get with any at grade transit system. The circulator would become an attraction unto itself giving the core district and its riverfront a uniquely distinctive identity.

For all intents and purposes a downtown at grade transit circulator is merely a contemporary adaptation of a public transit system of the 19th rather than the 21st century. When contemplating the downtown component of COTA's Vision 2020, Columbus needs to look forward into the future not back toward the past. Once in a generation does a community have the opportunity to undertake an endeavor that will benefit its citizenry for succeeding generations. The future of public transportation in central Ohio is just such an endevour. The construction of a downtown elevated two way straddle beam monorail circulator for Columbus' central business district and riverfront may well prove to be the single piece of urban infrastructure capable of insuring and sustaining the economic and cultural vitality essential to the 'long term' health of our city's center.

In the life of a city, Columbus has at the end of the 20th century finally come of age. During the next hundred years it is possible Columbus will mature into one of the great American cities of the 21st century. As central Ohio addresses the challenges of public transportation, this community should seek out the best solutions befitting our city's own future. We should not necessarily implement transit solutions of the past nor for that matter simply adapt what has worked in other cities. In looking at the downtown component of our community's future regional transit system, Columbus should dream its own dream.

cc: Bill

DEC 9 1998

Bill

December 6, 1998

MORPC
Attn: Mr. William Habig, Director
285 E. Main Street
Columbus OH 43215

Subject: Monorail People Mover

Dear Mr. Habig:

After reading Michael Racey's December 2, 1998 article which appeared in the "This Week" newspaper, regarding our options with the Downtown People Mover, light rail vs an elevated monorail system, I became worried Columbus is once again ready to shoot it self in the foot rather than become a world class city.

We need to review the basic fundamentals of street level light rail vs. an elevated monorail. Columbus removed steel rails and interurban tracks over forty years ago. Street level rail transit will add noise, clutter, danger, vehicle accidents and congestion to our downtown streets, something our previous, very wise, city planners saw fit to remove. At least two lanes of right-of-way will have to be forfeited to the operation of the rail cars, thus eliminating two lanes already dedicated to automobile, truck and COTA traffic. Light rail on the street level will not improve our already crowded and congested downtown traffic conditions. Diesel powered light rail cars will increase downtown air and noise pollution.

Columbus needs an elevated people mover. A transit system for the new millennium, reducing street level congestion, a Disney World type Monorail system to express people through out the downtown loop. An express Monorail loop serving the Convention Center, Short North, Nationwide complex, Arena, COSI, Miranova, Brewery District, County Court House, State House/City Center. The Monorail would not replace COTA as door to door downtown service but supplement COTA, creating an important world class "express" transit system for the down town and river front loop, serving business, tourism and entertainment. An airport to downtown connector along the I-670 corridor may also be a consideration.

There are several established, time tested, world recognized US and European manufacturers able to provide a dependable elevated monorail system at an affordable cost to tax payers or private investors. Unfortunately there are many over-inflated cost figures floating around for public consumption. These inflated cost figures arrived from a very expensive New Jersey airport system that was plagued with "political" and "local" cost overhead problems, and of course government red tape, considering an airport environment. Neither of these issues should effect Columbus.

A monorail will add a trademark river front image for Columbus, easy for tourists to visit and circulate from shopping and entertainment areas such as COSI and the Arena. Great for business executives to by-pass street level congestion and arrive at other Downtown meeting centers on time.

An elevated, electric powered, computer controlled , monorail will operate with much less noise and pollution free. Consider an elevated monorail riding on smooth , quiet rubber tires, not a noisy steel on steel of a rail system.

Columbus needs to plan for the future with realistic foresight and imagination, not by resurrecting 19th century rail technology. Columbus has the opportunity with an elevated monorail System to set itself apart from Indianapolis and Pittsburgh. Columbus is a wonderful business, research and education center that needs to become a leader, not a follower.

Thank you

Larry Kohar

178 Sarwil Drive North
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CC: Mr. Ron Barnes, COTA Gen. Mgr.

Brian Martin

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DEPARTMENT

Nov. 25, 1998

Mr. Ron Barnes
General Manager
COTA
1600 McKinley Ave.,
Columbus, OH 43222

Dear Ron:

I was unable to attend the last meeting of the Downtown Mobility Work Group due to pressing business and was thus brought up to date by Steve Soble and the article in today's Dispatch.

Had I been there, would have cast both votes for the elevated loop and I also speak for Saul Seigel who missed the meeting due to surgery. I understand Arlene Shoemaker was also absent and I'm sure she, as a long time proponent for a downtown elevated system, would also have voted for the extensive downtown elevated loop.

In retrospect, I was extremely disappointed that the consultants did not devote more time to graphically presenting the various technologies that are available. Both Steve and I made repeated offers to loan them video footage along with color photos of the technologies that are in operation today around the world to enlighten members of the study group but obviously our resources were not tapped.

As has been stated at the meetings and reemphasized here, Columbus finally has an opportunity to gain national attention and stature with a bold move to become a truly world class city by building an elevated downtown people mover system. Mass transit in Columbus has a golden opportunity to attain new heights of respect by building a futuristic downtown people mover coupled with a light rail system.

As you know, I have long favored the automated straddle beam monorail because of its simplicity, aesthetics, and low maintenance and operating costs. The two-way beam system also presents the least amount of guideway over the streets when compared to the other four-wheeled, rubber tired technologies. (Detroit and Miami).

The elevated people mover system, if built, would actually decongest street traffic by not requiring dedicated ground level lanes of right of way for strictly surface rail operations and would also eliminate the need to construct an overhead wiring system to run the cars.

Even from a noise factor, the elevated rubber tired people mover would generate far less audible sounds than the steel wheel on steel rail street system.

And, Ron, as you well know, people today are in a hurry. They want fast, clean, efficient and on time performance when using public transit. It's obvious the elevated system would not have to contend with red lights, parades, downtown street fairs and festivals, normal traffic congestion such as buses now do. (There were many times when I was at COTA, that a convention in town would stage a downtown parade which shut down some of the streets temporarily and no one bothered to tell us so we could react). Obviously, an elevated system would operate on time and not be impacted whatsoever by street conditions.

I was extremely heartened by your comment in the Dispatch that the study group's final vote was not binding on the COTA board.

Over the years, Steve, Saul and I have made many presentations to individuals for a downtown monorail--including the editorial board of the Dispatch. We never talked to anyone who voiced opposition to the idea. "Connectivity" is the buzz word downtown and in my estimation, the only way to tie the north and south ends of downtown with the West bank is with an elevated system.

From a cost standpoint, yes, an elevated system is going to cost more initially but its lower O/M costs once it's in operation should also be considered. And if it can somehow be operated as a separate entity--there's no doubt in my mind that it could break even or operate at a profit.

At some of the meetings, a couple of members indicated the elevated system would reduce pedestrian traffic. Buses tend to reduce pedestrian traffic simply because of the frequency of bus stops. People wanting to ride the elevated system would probably walk at least two blocks to access a station which means in effect, they are walking farther on the sidewalk to get to the station. I've never read where merchants in Chicago or New York decry the El or subway for taking away pedestrian traffic.

As I mentioned to you in our meeting, I personally would only give consideration to proven technologies--no prototypes. Columbus is still paying out millions of dollars annually for the prototypical trash burning power plant. I personally don't want to see us buy into an unproven system that has no operating history. For this reason I'd exclude Futrex and Raytheon's PRT system. Otis, AdTranz, Bombardier, Severn Lamb and Intamin are among system that should be presented to the board.

Steve and I would be delighted to loan you our graphic resources. For instance, the Sydney video shows how the vertical support piers are designed to actually not only be attractive but also be a focal point for mini plazas with benches and small kiosks. The board should see that there doesn't have to be unattractive support columns along the street.

As you and the COTA Board plan for the transit Vision 20-20 plan, a golden opportunity now exists for COTA to make a bold, strong statement for the future of Downtown and this community so sorely in need of a national image. In my opinion, a short rail system running up and down High Street or Front Street is not going to improve mobility around the downtown nor will it offer any compelling reason for visitors and shoppers to want to come downtown to use it. The Seattle monorail, as old as it is, is making a profit and draws 2 1/2 million riders a year and it only goes one mile from downtown to the old space needle.

Ron, you have the opportunity to forge a dramatic turnaround for mass transit in the Central Ohio area. Do you see the story in Tuesday's Dispatch to wit: "City Image Still Draws Blanks, Survey Finds." Think what image Columbus would have to be the first major North American city to build a downtown two-way elevated people mover.

It would heighten convention business (especially in the winter months), create added incentive for downtown residential development, facilitate mobility for downtown shoppers and workers and become a magnet for general ridership from people who just want to ride it for the novelty of the system.

Page 3, Ron Barnes

Having this system connected to major parking garages plus future ones in the downtown area and connecting major activity centers, City Center, the Arena, Vets Memorial, COSI, the Convention Center, Short North, Brewery District, and the major residential developments, will foster tremendous economic benefits to the downtown as it answers the challenges of Tuttle Crossing, Polaris and Easton for the retail and entertainment dollar.

This should be in your Vision 20-20 and nothing less.

Sincerely,

Jim Ahlstrom

JAMES E. AHLSTROM
President

cc: Steve Soble
Arlene Shoemaker
Saul Seigel
Bill Habig, MORPC

Metro

SECTION **D**

An 'El' suggested for riverfront

Metro P. D-1
Fri., 3/27/98

By Doug Caruso
Dispatch City Hall Reporter

A plan for developing the Scioto and Olentangy riverfront should include a mass-transit loop around Downtown and should not limit development on the Whittier Peninsula to low-rise buildings, the Columbus Downtown Commission said yesterday.

Cleve Ricksecker, Riverfront Commons executive director, presented the plan to the commission yesterday — the first in a series of presentations to area commissions

The Downtown Commission unanimously recommended that the City Council approve the plan.

and groups before the plan goes to the Columbus City Council on April 27.

The Downtown Commission unanimously recommended that the City Council approve the plan but urged the addition of the transit loop and removal of building restrictions on the Whittier Peninsula.

Harrison Smith, chairman of the commission, described something akin to the elevated rail systems, or "Els," found in other major cities. He suggested that it start at Ohio State University Medical Center, heading through Downtown on High Street, crossing the Whittier Peninsula and the Scioto River to the new COSI building, then heading north again past Veterans Memorial and the Nationwide Arena and back to OSU.

Please see DOWNTOWN Page 2D

DOWNTOWN from **1D**

"We have an opportunity here, but we have to start thinking about it," Smith said. He pointed out that Columbus has many vital neighborhoods near Downtown but it is difficult to travel among them.

"You're still not looking at it as linked," he told Ricksecker. "You've got to link it."

Smith's comments came a day after the Central Ohio Transit Authority announced plans to buy land across from the Convention Center for a terminal that could be capable of light-rail service.

Smith and commission member Stephen Wittmann also questioned plans for a development on the Whittier Peninsula, a 150-acre area south of Downtown.

Riverfront Commons' plan for the peninsula includes 75 acres of parkland in an arc along the Scioto River and 75 acres holding 1,000 to 1,300 units of apartments and houses. The plan envisions a dense, urban development similar to German Village, with buildings no taller than four or five stories.

But there should be no limit on the type of buildings, Wittmann said.

Ricksecker replied: "The judgment here is that people want a neighborhood that has the feel of Victorian Gate in the Short North; that has the feel of Mohawk Street in German Village."

Smith called limiting the peninsula to low-rise buildings a "hideous mistake."

"We're really discouraging the marketplace from functioning," he said. More high-rise apartment buildings and good transportation would bring the population necessary for a 24-hour Downtown, he said.

The Riverfront Commons plan calls for at least $230 million in public and private money for park pathways, footbridges, roads and other improvements.

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THIS WEEK - GRANDVIEW
WORTHINGTON, OH.
W CIRC. 8,723

JUL-29-98

People-mover system may go on 1999 ballot

By MICHAEL RACEY (391)
ThisWeek Staff Writer

The Central Ohio Transit Authority is leading a group of downtown businesses and the Mid-Ohio Regional Planning Commission in studying a people-mover system for the city.

On July 31, the first in a series of meetings will be held to study what kind of system could be put to the voters in Nov. 1999, if any at all.

COTA and the Mid-Ohio Regional Planning Commission will host three meetings over the next three months. The group will study everything from an electric monorail system to simply adding downtown bus shuttle routes.

"There has been a lot of interest in downtown circulation," said Brian Martin, COTA's liaison with MORPC.

The study is part of COTA's desire to get a regional rail system in Franklin County.

The downtown people-mover system could simply add downtown bus routes to augment COTA's mid-day trolley service, which runs along High Street, Martin said.

However, COTA and MORPC are hoping for something more ambitious, such as a monorail or fixed-guideway system.

"Basically, something you would see at most major airports," Martin said, adding that MORPC is looking at city systems in Miami, Seattle, Tampa and Newark.

The idea is to have the downtown system follow Third and Front Streets north to the Franklin County Convention Center, and south to the Franklin County Courthouse.

"There's always the option of extending it south to the Brewery District," Martin said.

One of the group's main decisions will be who should pay for it, Martin said, adding that private help would be likely.

There are several different variations on the same concept of monorails or fixed-guideway systems. Some systems use electric cars with rubber tires on concrete. Some systems run at ground level while others run on raised platforms.

"There's so many varieties of this technology," Martin said.

A downtown system would most likely run on a raised platform, he said, adding that the three meetings will give COTA a better ide: of just what the city needs and will support.

"That's yet to be determined," Martin said. "We have to try to find what the service frequency will be...."

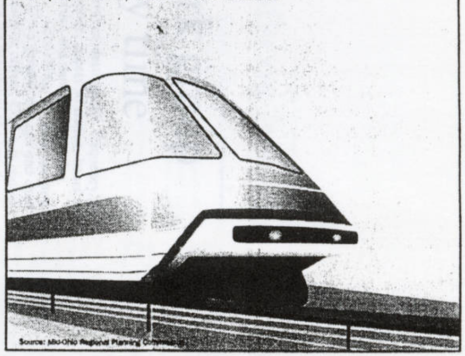
A similar study was done in the 1980s but did not produce anything more than a preliminary look at what could be done. Former Columbus Mayor Dana Rinehart was a proponent of a downtown people-mover system.

"There has been nothing formally done by COT. and MORPC since then until now," Mrtin said.

The local design firm of Burgess & Niple Ltd. is conducting the $75,000 study, and it will include the feasibility of a regional rail system.

People-movers

The Central Ohio Transit Authority is leading a group of downtown businesses and the Mid-Ohio Regional Planning Commission in studying a people-mover system for Columbus. Other metropolitan areas which have people-mover systems include Seattle, Newark, Tampa, Miami, Detroit and Dallas.



By Erin Holl/*ThisWeek*

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THE DAILY REPORTER
COLUMBUS, OH.
E CIRC. (NO SAT) 4,500

AUG-26-98

Mobility work group extends study time

By LAURA NEWPOFF
Daily Reporter Staff Writer

The planning for a future downtown transportation system is racing ahead.

The Downtown Mobility Work Group met Tuesday to further its efforts toward determining the best approach for creating a transportation plan suitable for an up-and-coming city.

The group has been formed as a project between the Central Ohio Transit Authority and the Mid-Ohio Regional Planning Commission.

A final meeting was to be held in September before a report about the transportation system was to be issued. However, MORPC announced Tuesday that two additional meetings will be held — Oct. 23 and Nov. 24.

"Our mission is the downtown circulator," said Michael R. Rankin of the law firm Bricker & Eckler and the group's chair. "How do we connect key points downtown? We need a seamless web connecting busses with light rail or trains and we need to be able to use a circulator without having to go from one parking lot to another."

The group's mission statement is to develop a community plan that addresses current and future downtown mobility needs by providing responsive transit service within the context of a regional transit system.

At Tuesday's meeting, audience members — made up of stakeholders representing major traffic generators, neighborhood and business associations, and other special interest groups from downtown — broke into groups to provide input about the dynamics of a new system.

Those members answered questions about ideal travel time between destinations, frequency of service, access to transit, hours of service and number of transfers.

According to Ron Barnes, COTA's general manager and chief executive officer, COTA is considering the possibility of a new downtown system as part of its current long-range plan update.

"In updating our long-range plan of 1993, we are taking three approaches," he said. "First, we're looking at travel patterns. Second, we're looking at taking transportation to a new level by looking at technology. Third, we're looking at a downtown rail component."

Barnes wants COTA to be a transit system "befitting a great community." He said COTA hopes to have the update ready by Oct. 28 to submit to its board. Then it plans to hold a one-day transit summit. Afterward, the plan will be taken to the community for feedback and, by the end of April, COTA hopes to submit it to MORPC.

While COTA's exact role in future downtown transportation is yet to be determined, the transit authority definitely will have its say on the final plan.

The work group will recommend to COTA and MORPC the important characteristics of the proposed system as well as the type of necessary technology. COTA, in cooperation with MORPC, various consultants and the work group, will determine the financial feasibility of building and operating the system. COTA's board will then determine how, when, or whether to pursue the recommended system to serve downtown's circulation needs.

Whatever those needs may be, the previously mentioned downtown monorail was not discussed Tuesday. A monorail or an elevated rail system could run approximately $50 million a mile, according to MORPC.

According to Rankin, 90,000 people flow into the downtown area each day for work. He also said 6.7 million visitors make their way into Columbus each year.

Those numbers are expected to grow because of the outpouring of downtown development, existing and proposed — the Nationwide Arena, COSI's new facility and expansion of the convention center, to name a few.

BUSINESS FIRST
COLUMBUS, OH.
CIRC. 15,521

SEPT-18-98

Transit agency fills in details on bus-rail service plan

By Peggy Frank Freeland (39)
BUSINESS FIRST CORRESPONDENT

Commuters in Central Ohio can look forward to futuristic mass transit if they buy into an expansive new vision document being unveiled this month by COTA.

The document represents the first phase of an overall mass transit master plan master-minded by the Central Ohio Transit Authority.

The plan is being developed in collaboration with several task forces and committees of community, civic and city leaders. It addresses:

- Addition of commuter and light-rail services in the suburbs and downtown areas.
- Expansion of bus routes into economically depressed neighborhoods and enterprise zones.
- Financial and environmental accountability.

COTA spokesman Kent Carson said increased development activity in downtown Columbus around the new arena site, the Center of Science and Industry, and the Greater Columbus Convention Center, have heightened interest in rail services.

"We are definitely looking at rail issues. There are plans underway that are going to bring people downtown, plus there's the whole notion that the state is going to put in a commuter rail to bring people into the city. We've got to be able to give them mobility when they get here," Carson said.

The COTA spokesman described his agency as "very much interested in pursuing rail services, but there's nothing concrete yet."

There may be something more concrete, Carson hopes, by November, when a second draft of the vision is to be unveiled. Community input will then be sought before a final blueprint, to include funding options, comes out around April of next year.

Meanwhile, at the Mid-Ohio Regional Planning Commission, assistant director for transportation Brian Martin is working with the downtown mobility task force to study the technologies of railroad transportation. "We're looking at a complete system, not just downtown, and rail is certainly one of the technologies we're looking at," Martin said.

"Whatever we do downtown, we're going to have to start with the surface bus, but we're looking at a couple of different options for rail service," he said.

One of the options under consideration is a "three-car grade" rail line which would use a dedicated traffic lane of downtown roadways for service. An elevated system which would connect to major office and work sites is also being considered.

"The downtown transit terminal is important too," Martin said. "You need a station, a transit point, where you can pick up the train."

"We're looking at a complete system, not just downtown, and rail is certainly one of the technologies we're looking at."

BRIAN MARTIN,
MORPC

COTA is hoping to acquire a tract of about 50,000 square feet on North High Street, across from the Greater Columbus Convention Center for its transit terminal. The property is part of a larger parcel being purchased by the Convention Facilities Authority from Conrail.

Funding is a factor for the land as well as for financing COTA's new vision. COTA general manager Ronald Barnes said about $66 million should be available from a $217 billion transportation bill signed by President Clinton last June. There's also a combination of public-private partnerships, social programs and taxes to complete the financing package, he said.

"It's one thing to talk about a vision, but then you have to put together the commitment. You have to be willing to ante up," Barnes said.

COTA depends on a 0.25 percent sales tax for two-thirds of its operating money and has no permanent funding. That not only limits the authority's ability to plan long term, Barnes said, but also its ability to tap federal money, which often requires a demonstration of long-range system management.

COTA's 10-year sales tax expires at the end of next year. Barnes said some form of tax proposal will be on the ballot by then. "In the long run, we have to create that permanent tax on our sales so that we can leverage opportunities for the future," he said.

In November 1995, Franklin County voters defeated a 10-year, 0.5 percent sales tax that would have replaced the current levy, but did not include money for light-rail service.

A December 1997 poll conducted for Business First by Worthington-based Partners in Marketing Inc. indicated that a majority favors taxpayer support for a light-rail system.

Of 727 Franklin County heads of households surveyed, 51 percent favored taxpayer support for such a system, while 42.1 percent were against taxes for it, and 6.9 percent had no response.

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THIS WEEK - WORTHINGTON NEWS
COLUMBUS, OH.
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SEPT-30-98

Peoplemover group expected to debate options

(39)

By MICHAEL RACEY
ThisWeek Staff Writer

The group in charge of choosing a downtown peoplemover has narrowed its options, and the debate is expected to come down to bus vs. monorail or fixed-guideway service.

In July, the Mid-Ohio Regional Planning Commission and the Central Ohio Transit Authority put together a group of civic and business leaders to study the issue of a downtown peoplemover.

At its last meeting, on Sept. 25, the group agreed to choose from five systems, four of which offer some sort of monorail or fixed-guideway service.

Burgess & Niple Ltd., chief consultant on this project, will come up with operating and capital costs for each option as well as ridership estimates.

"I'd say you're looking for a Mercedes-Benz or Lexus system," said Doug Moore, of Burgess & Niple, after studying a series of questionnaires group members filled out at an August meeting.

The group indicated in the survey that it wants service that is fast, makes many stops and runs 24 hours a day. "A lot of people want a system right outside their door," Moore said.

But while the group agreed on which systems should be studied, several members debated whether the final system should use just buses, or a combination of bus and monorail or fixed-guideway service.

After David Little, of Lea+Elliott, explained what bus and fixed-guideway systems could be used with each option, several members questioned the need for anything more than bus service downtown.

"You drop all of the other things (monorail or light-rail systems) from one list or another except for buses," said Ray Hanley, the city's art czar.

Moore said he wasn't advocating any type of system, but that the group should look at several options varying in cost and service.

Another debate that arose at the meeting was where service should be focused. Two of the options have monorail loops extending up to the future Nationwide Arena, across the Scioto River to the future Center of Science and Industry and down to the future Miranova residential and office high rises.

A few members wondered if these options would inadvertently take development away from the core of downtown, which is east of the river.

The group will meet again on Friday, October 23, at 9:30 a.m at MORPC headquarters. The group's last meeting is scheduled for November.

Peoplemover options

A group of citizens known as The Downtown Peoplemover Work Group is in the midst of choosing a downtown circulator system for recommendation to the board of directors for the Central Ohio Transit Authority.

The group will meet in October and November to decide among five options it selected at its last meeting on Friday, Sept. 25.

These are the options the group is considering, listed from cheapest to most expensive.

1 —Downtown bus service

This option would simply expand downtown bus service. Two loops extending north and south from Broad Street would circulate downtown, extending to the future Nationwide Arena, the future home of the Center of Science and Industry and the Miranova development. Another north-south route along High Street would serve the Short North, downtown and the Brewery District.

2 — Front Street shuttle with bus service

In this option, two downtown bus service loops extending north and south from Broad Street would be augmented by light rail service on Front Street from the future Nationwide Arena to the Franklin County Courthouse.

3 — Loop monorail shuttle with bus service

This option is similar to the second option except that it would add a monorail loop that would serve High Street from the Nationwide Arena to the Brewery District and across the Scioto River to the future Center of Science and Industry and Miranova development.

4 — Crosstown fixed-guideway shuttle with bus service

This option would have one bus service loop around the downtown core with crosstown monorail or light-rail service on High and Broad Streets.

5 — Crosstown and loop fixed-guideway shuttle with bus service

This option would combine the features of options three and four.

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COLUMBUS DISPATCH
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NOV-25-98

Panel suggests street-level rail Downtown

COTA will use committee's study of city's transit needs

By Phil Porter
Dispatch Staff Reporter

Ground-level rail service along High Street and a pair of bus loops won support from a committee that has been studying Downtown transit for the past four months.

A committee representing government agencies and Downtown employers and gathering places yesterday recommended a street-level rail system that would run 1.2 miles along High Street from just north of Nationwide Boulevard to I-70.

The recommendation also calls for a circulator bus loop covering Downtown north of Broad Street and a similar loop south of Broad Street.

The recommendation will be forwarded to the Central Ohio Transit Authority for possible inclusion in its long-range regional plan, being compiled over the next several months.

The committee was organized by the Mid-Ohio Regional Planning Commission to help COTA in its planning.

Committee members narrowly rejected the option of an overhead monorail or other elevated rail system. Expanding existing bus service into two Downtown loops was strongly rejected and was viewed by many members as not being innovative enough.

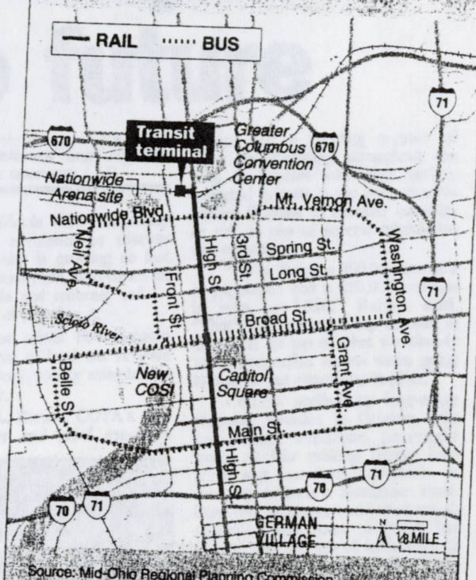
The vote was 22 votes for a ground-level rail system with two circulator bus routes, 20 votes for an elevated loop around Downtown with bus support, and four votes for a bus-only option. Each member was given two votes to split or cast together.

Ron Barnes, COTA's general manager, said the group's recommendation is not binding for COTA.

"We wanted to get a sense of what the community had to say," he said.

Choice route

A committee studying Downtown transit has recommended this plan to circulate people there in the next century. The option includes a 1.2-mile rail shuttle up and down High Street coupled with two counter-clockwise bus routes that would run north and south of Broad Street.



Source: Mid-Ohio Regional Planning Commission
Tom Baker / Dispatch

The ground-level rail system is estimated to cost $44 million to $48 million to build, compared with more than $300 million for the most extensive of three elevated-train options. That option includes 5.2 miles of track.

Startup costs for the bus loops would be about $6 million.

Michael Rankin, a lawyer who served as chairman of the Downtown Mobility Work Group, said the close vote between the surface-rail option and the elevated-rail option reflected the desire of many members to phase in an increasing level of Downtown rail service over several years. COTA officials have said that even if Downtown

Please see **RAIL** Page **2B**

RAIL from **1B**

rail ultimately is approved, COTA probably will begin expanded service with the circulator buses.

Rankin said street-level rail probably could be built in five to seven years.

The committee includes representatives of Nationwide Insurance, Huntington Banks, City Council, the Greater Columbus Chamber of Commerce, the Central Ohio Restaurant Association, Columbus City Center and the Columbus Parks and Recreation Department.

Several members were impressed with the most extensive of three elevated-rail options but were concerned it would be a tough sell to residents who might eventually vote on a sales tax to help pay for COTA's plans. Elevated railroads could move people more quickly than street-level railroads, which are subject to street traffic, but they are more expensive.

"I'm trying to be realistic," said Jane Butler, owner of Graystone Winery and Restaurant. "This elevated system is a Cadillac, but we need something that is feasible that we can sell to the community right now."

COTA: Rail system is key to future

By Phil Porter
Dispatch Staff Reporter

1/10/99

■ Debate continues over whether rail system is necessary / 1B

With crucial decisions right in its path, COTA finds itself at a crossroads.

Will the Central Ohio Transit Authority remain a bus system or expand to something more — encompassing commuter rail, Downtown streetcars or a monorail and enhanced bus service?

As the 21st century approaches, what transit system does the Columbus region need and what can it afford?

COTA officials want community leaders and residents to discuss whether the city is growing so fast that it must turn from its reliance on the automobile and embrace rail — after decades of rejecting it.

The issue arises now because COTA's source of local tax revenue — a 0.25 percent county sales tax — ends this year.

Ronald L. Barnes, COTA's general manager and chief executive officer, and a growing number of allies are traveling throughout the area to explain why they believe expected growth in the area requires central Ohioans to consider commuter rail as one of several transportation options.

"We're facing a 400,000 increase in population and a 225,000 increase in jobs by 2020," Barnes said. "That's like putting a city the size of Cleveland on top of what we already have. Congestion means we're going to have to put something in place."

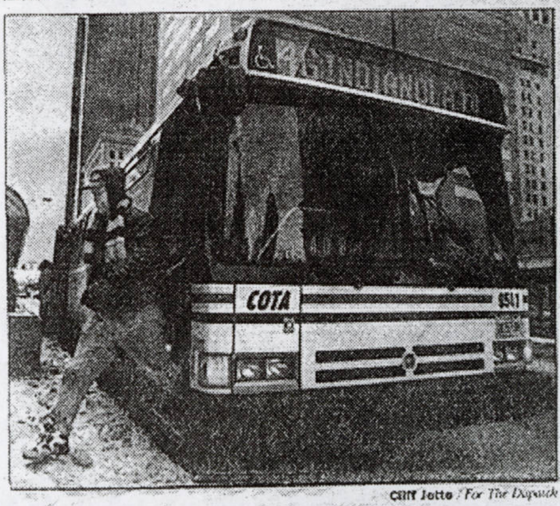
COTA's preliminary long-range proposal, unveiled in October, calls for adding suburban passenger trains on four existing freight lines north and east from Downtown. It also recommends a Downtown circulater rail, at street level or elevated; expanded and more frequent bus service; and the use of technology to allow buses to control traffic lights and operate more efficiently.

On Tuesday, COTA will hold the last of eight community meetings to gain feedback on the proposal, developed by the Mid-Ohio Regional Planning Commission. The meeting will start at 7 p.m. at Whetstone High School, 4405 Scenic Dr., on the North Side.

The authority's board may vote on the plan — or an amended version — Feb. 24.

At the same time, the board also may decide whether to ask voters to approve a permanent sales tax of 0.5 percent in November to replace the existing 10-year tax.

Barnes, a former top rail manager with the Greater Cleveland Regional Transit Authority, is working 12- to 16-hour days, presenting the



Cliff Jette / *For The Dispatch*

A passenger exits a COTA bus Downtown near Broad and High.