CROSS-COUNTY MetroLink Extension

Segment 1
Conceptual Design

Cross-County
MetroLink
Extension

Forest Park Circulator
Final Technical Report

Prepared for the
East-West Gateway Coordinating Council
in association with the
Bi-State Development Agency
Missouri Department of Transportation

By Parsons Transportation Group
and Associated Consultants

August 1999

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1
Purpose

As part of the Cross-County MetroLink Extension Segment I concept design study, a plan for a transit circulator serving Forest Park and environs is being developed. This technical paper presents a preliminary plan for this circulator. This document should be considered in conjunction with the Definition of Alternatives Report, January 1999, prepared for the Cross-County MetroLink Extension, which presents conceptual design alternatives for a new light rail transit line extending west and south from the Forest Park MetroLink station.

Considerations for the Circulator are based on the Forest Park Master Plan recently completed by the St. Louis Development Commission. Circulator concepts have also been guided by two prior studies:

- Forest Park Alternative Transportation Plan, prepared for the East-West Gateway Coordinating Council, 1995 by Claybour Architects, prime consultant.

- Proposal for a Transit System for Forest Park, prepared for the Missouri Historical Society, 1997, by Sverdrup Civil, Inc..

It should be noted that the Circulator plan has been devised to respond to anticipated needs. The resulting plan would be a substantial upgrade and expansion in transit service for the park area. As such the plan represents a “master plan” for long range implementation, with improvements coordinated with park improvement projects and the growth of the travel demand market by user groups.

Capital and operating costs for this plan will be developed later. The preliminary plan will be evaluated in light of these costs. The costs, compared to possible financial resources, may require revision to or staging of the Circulator improvements discussed in this preliminary plan.

2
Planning Framework

Forest Park is a major park within the City of St. Louis. The park contains a number of major institutions, that attract visitors and patrons from the region and other states, and substantial open space with a major reserve of natural resources. As the site of the 1904 St. Louis World's Fair, Forest Park is also an important historic place.

Adjacent to the park boundary are other significant land-uses along the Oakland Avenue, Kingshighway/Euclid Avenue, and Skinker Boulevard corridors. These include educational, health care, public service, and cultural activities; and are part of the potential service area for an improved or new Circulator.

All of these activities, within and adjacent to the park, generate significant transportation demand. The park area is served by regional highways, arterial streets, and public transit. Transit service includes MetroLink and BSDA bus service.

MetroLink serves the park area with two stations: at DeBaliviere/Forest Park and at Euclid Avenue (Central West End) in the Washington University/Barnes-Jewish Hospital Medical Center. BSDA bus routes extend along the park edges on Skinker Boulevard (Route 16) Oakland Avenue (Routes 52 and 18), Kingshighway (Route 95), and Lindell (Route 93). BSDA bus route No. 90 travels through the park along the Hampton/DeBaliviere corridor. BSDA bus route No. 2, the Forest Park shuttlebug, provides local service through the park between the Forest Park MetroLink station and the Central West End. BSDA bus route no. 14, the Garden Express, provides shuttle service between the Central West End MetroLink station and the Missouri Botanical Garden.

While these existing transportation services are substantial, the vision contained in the Forest Park Master Plan features improvements, including a better transit Circulator. Both the quality and the form of the service would be changed to achieve more value as both an attractive and an efficient form of transportation. An improved Circulator would include its linkage to MetroLink, especially recognizing the implementation of the Cross-County MetroLink Extension with an expanded Forest Park station and a new station at Skinker Boulevard/Forest Park Parkway. The improved Circulator would also include a larger service area than the existing shuttlebug to access significant land-uses in the Oakland Avenue and Skinker Boulevard corridors.

Land Use Organization

Figure 1 illustrates the overall layout of Forest Park and adjoining area. The park, itself, is an attraction. Within it and in areas adjacent, specific land uses can categorize as follows:

1. Institutions (cultural, natural, scientific) that have employees and attract visitors on a daily basis throughout the year:

   - History Museum (Missouri Historical Society)
   - Art Museum
   - Science Center
   - St. Louis Zoo
   - Jewel Box (horticultural)
   - Missouri Historical Society Collections Center

2. Institutions (educational, health care, public service) that entail significant employment, students, patrons, and visitors on a daily basis throughout the year.

   - St. Louis Community College
   - Washington University (Hilltop Campus)
   - Washington University Barnes-Jewish Hospital Medical Center)
   - Deaconess Hospital
   - Compton-Drew Magnet School
   - Humane Society of MO
   - St. Louis University High School

3. Institutions (cultural, entertainment) that attract patrons on a seasonal basis, with evening/ weekend events:

   - Muny (Municipal Theater/Opera)
   - World's Fair Pavilion

4. Active athletic facilities attracting users on a seasonal basis:
   - Three golf courses
   - Davis Tennis Center
   - Aviation Field
   - Baseball/Soccer Fields
   - Steinberg Skating Rink
   - Post-Dispatch Lake Boathouse
   - Central Field

5. Other open space, bike paths, trails, and pedestrian paths.

Beyond the immediate park area, other significant land uses include:

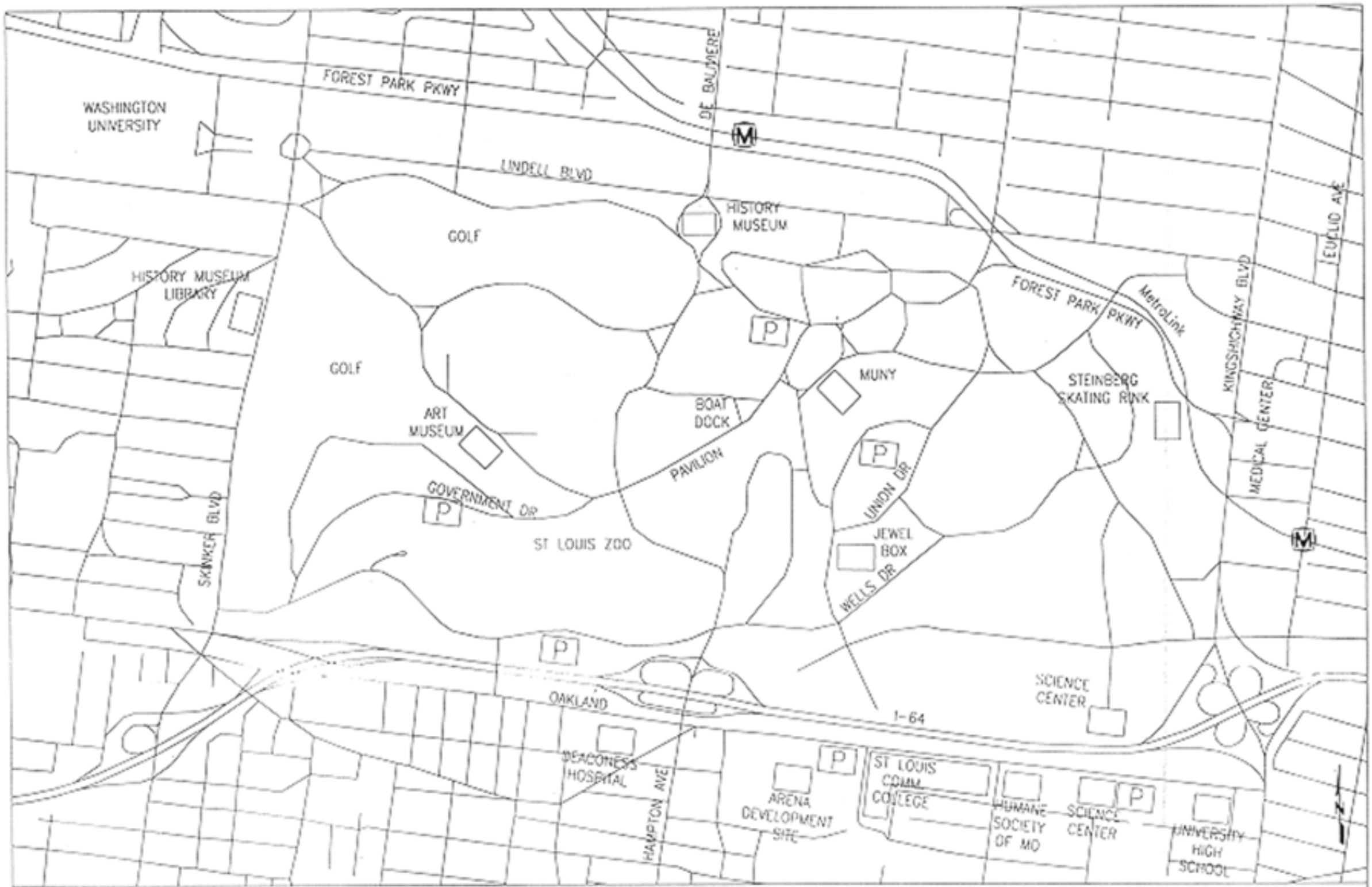
- Central West End commercial district along the Euclid Avenue corridor from Forest Park Parkway to McPherson (restaurants and specialty shops).
- St. Louis Cathedral east on Lindell at Newstead.
- Missouri Botanical Gardens southeast at Shaw Boulevard and Tower Grove Avenue.
- The Loop commercial area along Delmar Boulevard in University City and City of St. Louis.

As shown in Figure 1, the major institutions are located within the park, generally in the south and west edge corridors. It is to these locations that improved Circulator service should be oriented.

Existing Transit Services

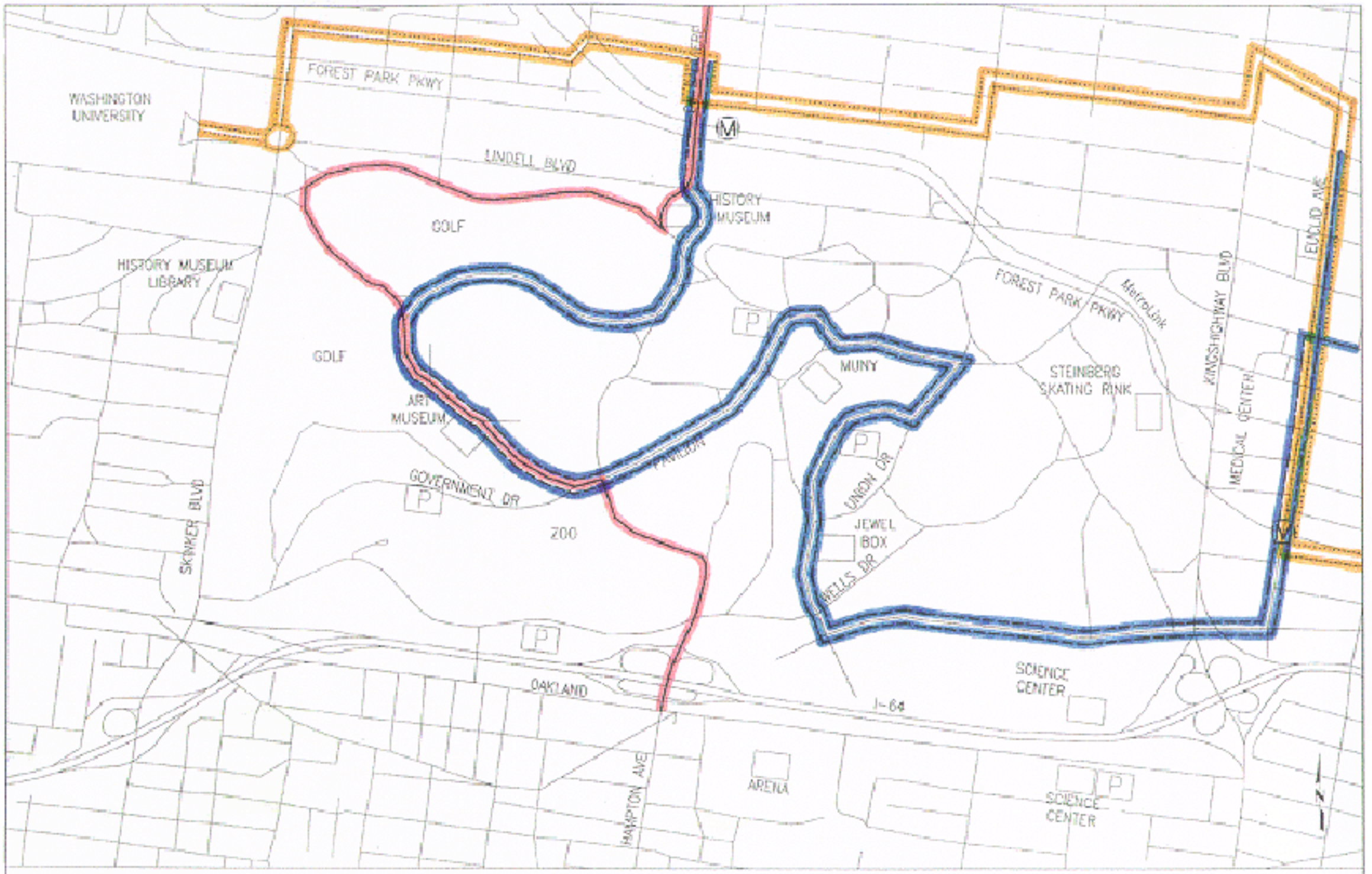
As noted above, there are existing transit services, including city-wide bus routes and shuttle services, operating in and around Forest Park. These are operated by BSDA and Washington University. Figure 2 illustrates route locations.

The various bus routes (BSDA and Washington University) provide a pattern of accessibility between MetroLink stations and major land-use and between land-use. Table 1 provides a summary of transit accessibility in terms of the point-to-point linkages that are now possible (i.e., without transferring between bus routes and with minimum walking distance) considering both BSDA and Washington University service.



FOREST PARK
STUDY AREA

STUDY AREA
FIGURE 1



FOREST PARK
STUDY AREA

FIGURE 2

Table 1
TRANSIT ACCESSIBILITY

	Trip End															
Trip End	MetroLink at Forest Park	MetroLink at Central West End	History Museum	Art Museum	St. Louis Zoo	Science Center	St. Louis Community College	St. Louis University High School	MHS Collections Center	Washington University (Hilltop)	Deaconess Hospital	Humane Society	Washington U/BJC Medical Center	Muny	Steinberg Rink	Jewel Box
MetroLink at Forest Park			✓	✓	✓					✓	✓		✓	✓		✓
MetroLink at Central West End			✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓
History Museum				✓	✓								✓	✓		✓
Art Museum					✓								✓	✓		✓
St. Louis Zoo													✓	✓		✓
Science Center							✓	✓			✓	✓	✓			
St. Louis Community College								✓			✓	✓	✓			
St. Louis University High School											✓	✓	✓			
MHS Collections Center										✓						
Washington University (Hilltop)													✓			
Deaconess Hospital												✓	✓			
Humane Society													✓			
Washington U/BJC Medical Center																
Muny																
Steinberg Rink																
Jewel Box																

The MetroLink Central West End station is accessible to the most major land-uses - both those inside and outside the park. The MetroLink Forest Park station has linkages to internal park land-uses, but not to the Oakland Avenue area, except for the immediate vicinity of Oakland/Hampton Avenues. There is little transit linkage between internal park land-uses and the Oakland Avenue and Skinker Boulevard corridors. Some land-use locations in the park, (i.e., Steinberg Rink) do not have direct transit access.

The headways (i.e., time between buses) vary for these existing routes from 10 to 40 minutes, depending on route and time of day. The Shuttlebug has 15 minute service. Hampton Avenue has 10 to 15 minute service in the peak hour. For midday periods, BSDA routes typically provide service in the 20 to 30 minute range.

The Cross-County MetroLink Extension-Segment I will add a new station to the area (at Skinker/Forest Park Parkway) and enlarge the Forest Park Station. With the increased regional transit access to these locations, more areas in the Forest Park vicinity should be accessible with reasonably direct collector service.

Washington University (WU) provides service[1] along the north edge of Forest Park that is principally designed to link the Hilltop campus to the W. U. Medical Center, MetroLink stations, nearby neighborhoods (student and faculty housing), and the Central West End. WU transit does not serve the park institutions.

Circulator Service Improvement Needs

Based upon this review, Circulator service should be modified/expanded to include the following:

- Oakland Avenue corridor.
- Science Center (Observatory)
- Steinberg Skating Rink—building includes various public services that are available all year (not just during the winter).
- Missouri Historical Society-Library and Collections Center on Skinker Boulevard.

[1]Not a public transit service

Besides issues of accessibility, there are also improvement needs associated with the operational aspects of existing transit service:

- Quality of the ride experience.
- Appearance of vehicles, e.g., desire to have a “vintage trolley” look.
- Continued availability of bus operators trained to be park tour guides.
- Reliability of the equipment, i.e., breakdown of special vehicles and frequent use of regular BSDA buses which may be larger and do not look like the shuttlebug vehicle.

3
Transportation Principles and Goals

A set of principles and service goals defines the qualities and functions to be achieved via Circulator the service plan.

Principles

A set of Circulator planning principles has been identified via a review of the Forest Park Master Plan. These describe the role of the Circulator and significant attributes of the service plan.

1. The intent is to promote multi-modal (transit and auto) travel to and from Forest Park. The linkage to MetroLink is to be high quality and highly convenient. Circulator service should be coordinated with BSDA bus service to maximize patron convenience and minimize service duplication.

2. The relationship of the Forest Park parking system to the Circulator is an essential consideration as follows:

    a. Each institution will have an appropriate parking supply within reasonable walking distance. The quantity of parking should be capable of serving individual institutional parking demands 90 percent of the time.

    b. Some institutions may generate peak parking demand that will exceed the parking supply; other parking should be available as a reserve via shuttle service.

c. Because of the occurrence of multi-institution trips (and these would be encouraged) by visitors and patrons, motorists should park in one location and be transported to other sites rather than creating the need for multiple parking spaces for the same vehicle.

3. The technology used for a circulator must be park- environment and user-friendly. It should also be flexible in order to respond to changing conditions in terms of the volume of travel demand or the pattern of trip-making. For these reasons, rubber-tired, not fixed guideway, vehicles will be used. The Circulator should be comfortable during all seasons and have performance characteristics consistent with the park environment including maneuverability, quiet operation, minimum negative air quality impact, and efficient operation.

Goals

The overall purpose for the Circulator has a dual nature. It should provide the desired transportation function, but at the same time it should be an attractive ride. The latter represents an experiential quality in which patrons would use the circulator as a form of recreation.

As such, the following goals will be used to guide planning and design:

1. Function as a distributor mode that would connect to regional transit to bring park visitors, employees, students, patients, and patrons to specific institutional destinations; this function needs to be reasonably direct and swift.

2. Function as a circulator mode that would link intra-park area destinations; this function needs to be comprehensive and understandable, with speed being important for commuter-type trips generated by area land-uses.

3. Function as a distributor for park land-uses that would link major parking facilities, allowing them to be operated as a system to serve high-attendance activities in the park.

To achieve the above goals, the Circulator should be planned with a market orientation. This means developing transit service to fit specific user market groups defined by trip purpose and origin-destination patterns. The significant user market groups anticipated within the Forest Park area are:

- Institutions generating daily employee and student trips
- Institutions attracting daily visitors with full day schedules
- Institutions attracting visitors for events with primarily evening/weekend sessions
- Medical centers generating daily patient, visitor and staff trips

- Central West End restaurants and shops attracting daily park visitors and staff

Table 2 identifies user market groups in relation to the land-use linkages important for circulator planning.

TABLE 2: USER MARKET GROUP TRANSPORTATION LINKAGES

	User Group					
User Group	Daily Cultural Institutions	Event Institutions	Educational Institutions	Medical Centers	Central West End	MetroLink
Daily Cultural Institutions	Yes	Yes			Yes	Yes
Event Institutions	Yes				Yes	Yes
Educational Institutions			Possible	Yes	Yes	Yes
Medical Centers			Yes	Possible	Yes	Yes
Central West End	Yes	Yes	Yes	Yes	Yes	Yes
MetroLink	Yes	Yes	Yes	Yes	Yes	

4
Alternative Circulator Concepts

Based upon the review of existing transit service and the planning goals, a set of alternative circulator concepts have been developed. These include proposals developed in previous studies and new alternatives.

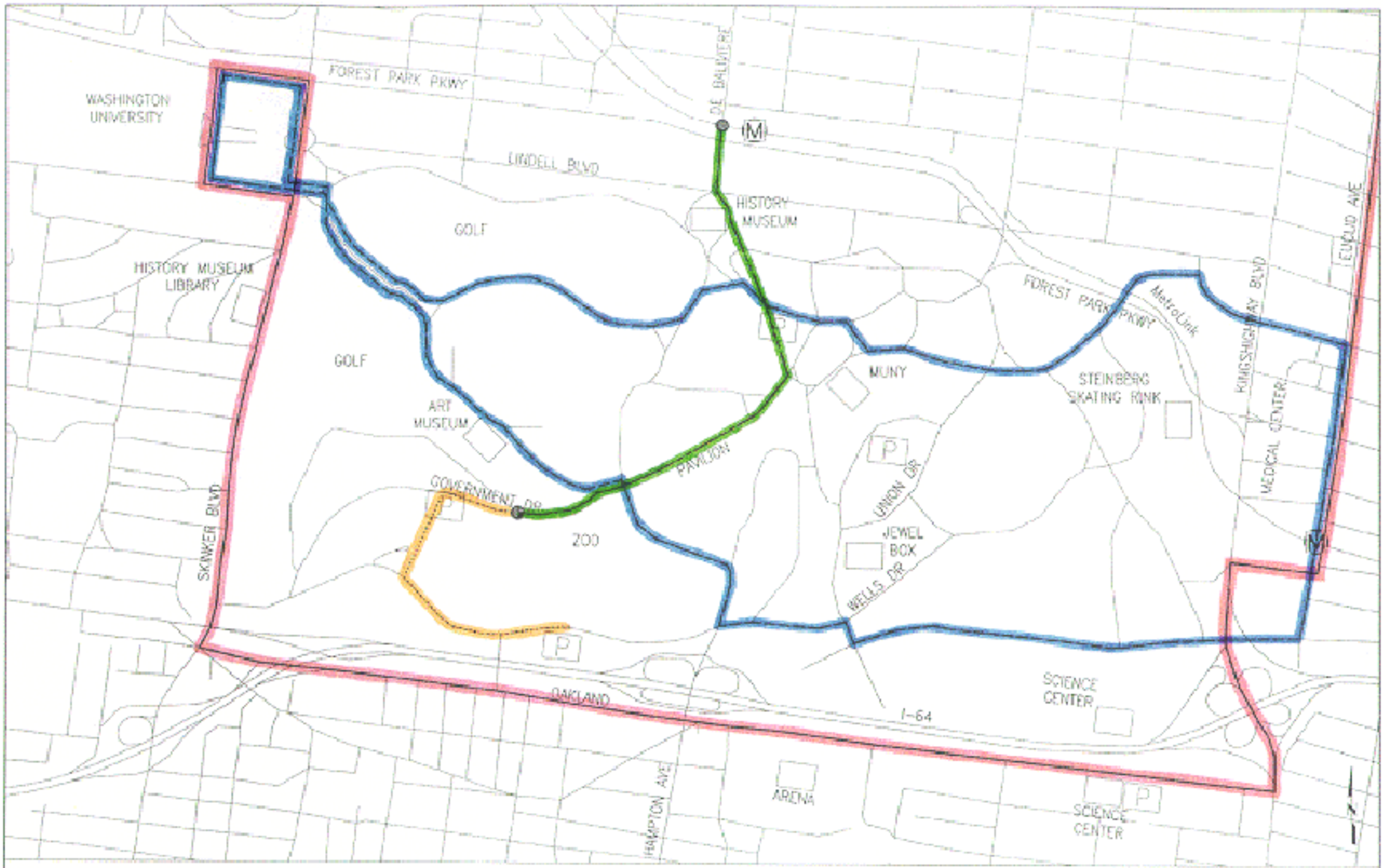
Previous Concepts

Figure 3 identifies two prior proposals for the Circulator. One was proposed in an unpublished 1995 study for East-West Gateway Coordinating Council and entailed construction of a single-track trolley line between the Forest Park MetroLink station and the Zoo, with a possible extension to a new MetroLink station[2] in the Oakland Avenue corridor associated with a MetroLink extension along the south side of Forest Park. The trolley would directly access the History Museum, Muny, and the Zoo. In combination with the trolley, bus shuttle service would be provided to achieve a broader area of transit coverage in the park area.

The bus shuttle service would be operated on two routes. One route would be located at the edge of Forest Park along Skinker, Oakland, and Euclid Avenues. It would link the Washington University Campus, the Arena site, the Science Center, the W. U. Medical Center and the Central West End district. The second route would be more of an intra-park shuttle connecting all park institutions.

The shuttle bus routes would be short to immediate range improvements. The trolley, as a more capital intensive project, would a longer range project.

[2] No longer possible, given the decision to locate the Segment I line north of Forest Park.

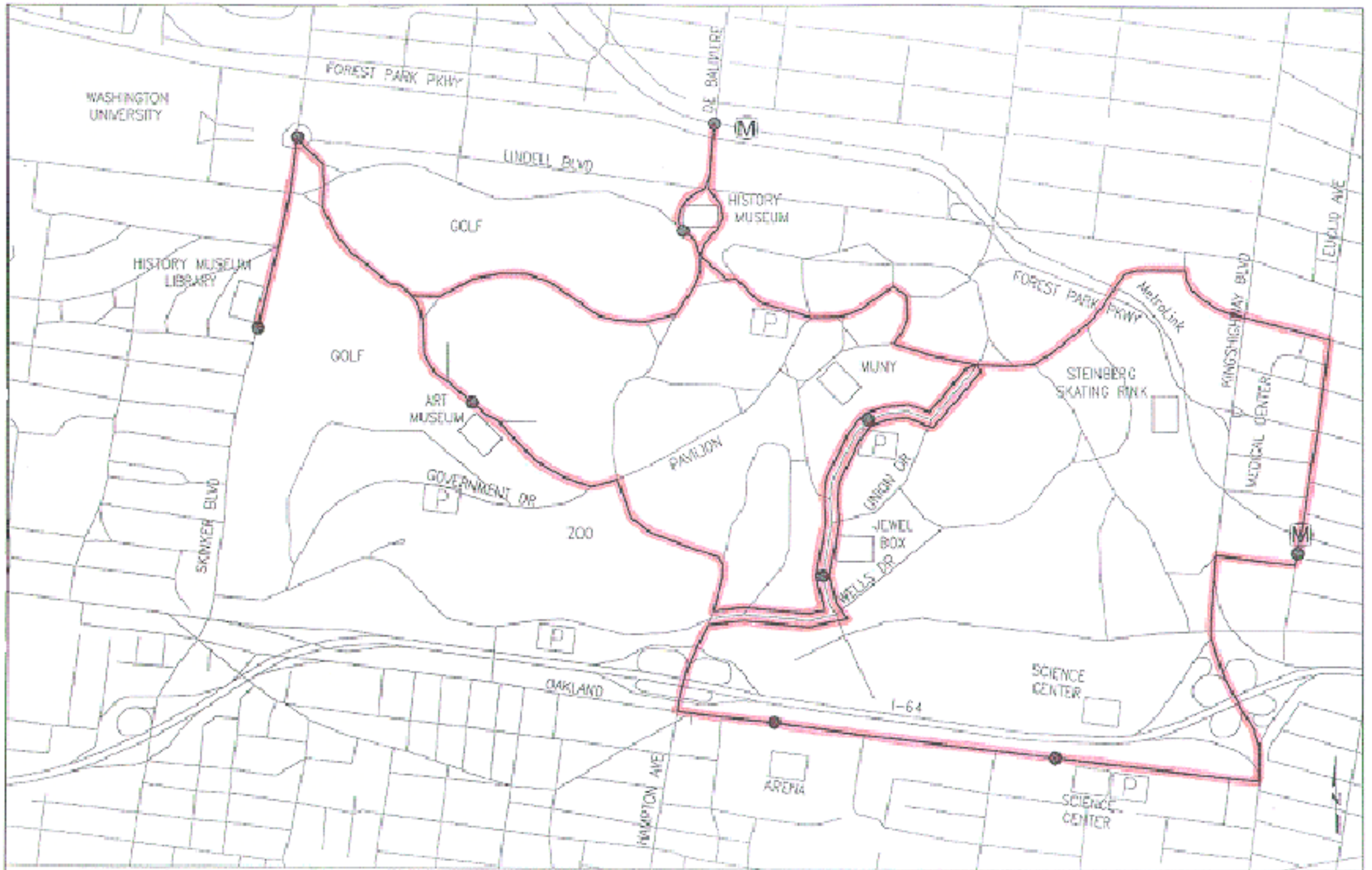


CIRCULATOR PLAN
1995 STUDY

FIGURE 3

The other proposal was developed in the 1997 study for the Missouri Historic Society (See Figure 4). This plan featured rubber-tired vintage trolleys. The route plan would have the shape of a figure eight. One loop would link the MetroLink station at Forest Park, Washington University, History Museum Library, History Museum, Art Museum, Zoo, and Muny. The other loop would link Muny, Zoo, Science Center, Central West End MetroLink station, and the Central West End. The common point would be Government Drive between the Muny and the Zoo. As shown in Figure 4, this would be a single route on which riders could access all destinations without changing vehicles.

Each of these previous concepts (1995 and 1997 plans) have been included as alternatives examined in this project.



CIRCULATOR PLAN
1997 STUDY

FIGURE 4

New Alternative Concepts

From a broad conceptual perspective, alternatives could consider a single-route or a multiple-route circulator. The latter could be viewed as a means to serve the various user markets during the normal day (i.e., multiple routes operating simultaneously) or to serve user markets at different times of the day or week (i.e., routes change from daytime to evening periods or on weekends but do not maintain simultaneous operation).

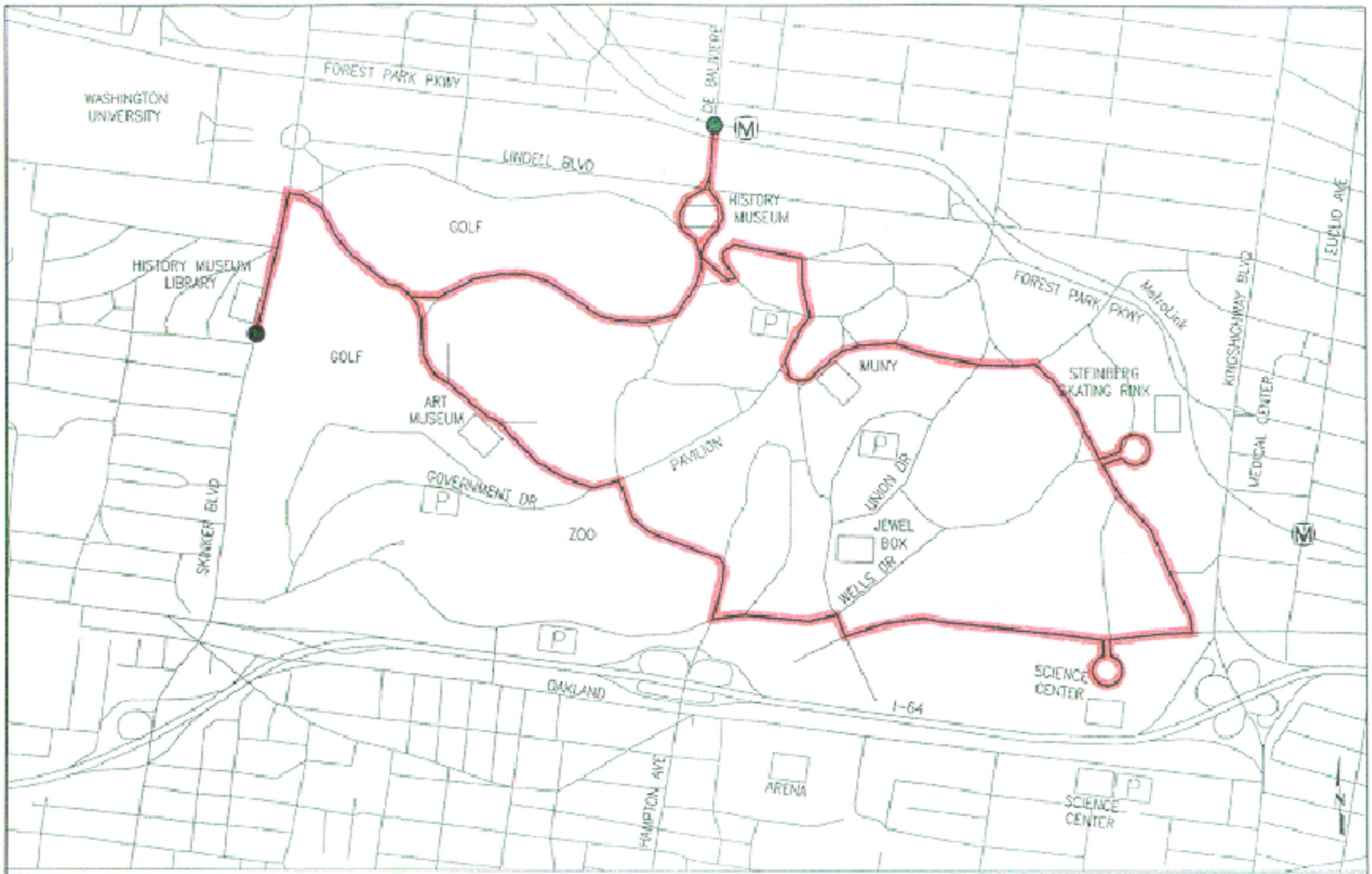
Using the above perspective, possible alternative concepts would be as follows:

No. 1	Single route with maximum direct access to all major institutions	(Figure 5)
No. 2	Single route as a comprehensive tour (broader coverage) of the park with institution access	(Figure 6)
No. 3	Multiple route system including an internal route (within Forest Park) and external route (outside of Forest Park)	(Figure 7)
No. 4	Multiple route system using an internal north-south corridor route and east-west corridor route intersecting at a transit visitor center	(Figure 8)
No. 5	Multiple route system including a daytime internal route to all institutions, but with a different evening route for event access	(Figure 9)

For each basic route configuration, service could be extended to include the St. Louis Cathedral the Missouri Botanical Gardens, and, possibly, the Loop commercial district in University City. The extension to the Cathedral could simply be an extension of the routes for new alternatives 1, 2 and 4. This extension is already included in alternatives 3 and 5.

Access to the Missouri Botanical Garden is currently provided by Bi-State via Route #14, Garden Express. This service operates with 20 minute headways seven days per week (9:30 A.M. to 7:30 P.M., weekdays and 7:30 A.M. to 5:00 P.M. on weekends). This route loops through the W. U. Medical Center via Euclid Avenue, Forest Park Parkway, and Kingshighway and connects to the Missouri Botanical Garden via Clayton Avenue, Taylor Avenue, Chouteau Avenue and Tower Grove Avenue. The route extends to the east along Tower Grove Park via Magnolia Avenue to Thurman Avenue. Overall travel time from Missouri Botanical Garden to the Central West End MetroLink station is 10 minutes.

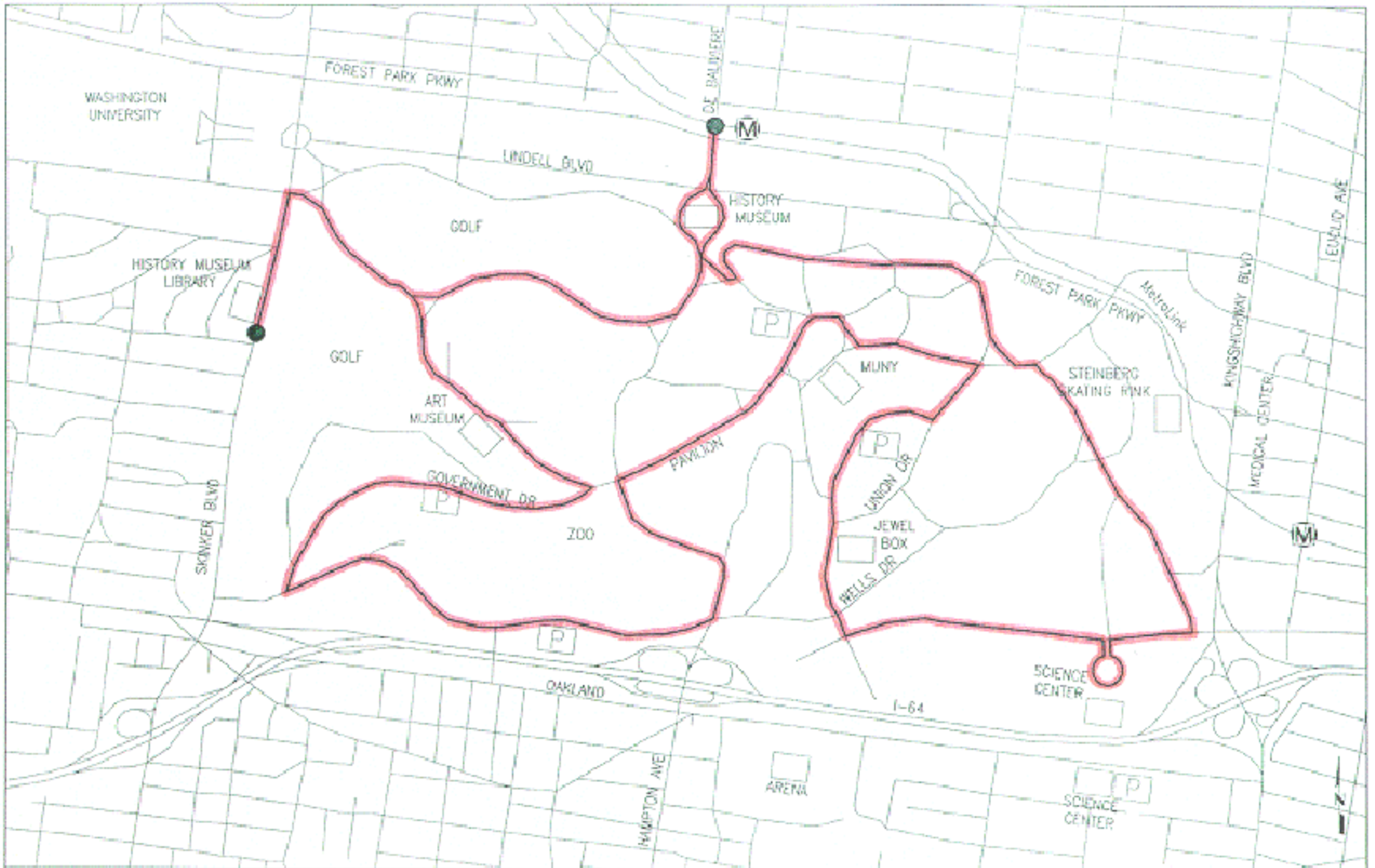
The presence of the existing service would suggest that the Circulator routes should not be extended to the Botanical Garden. There should be facilities to provide excellent mode transfer in the Central West End, probably at the MetroLink station. This could also include coordination of operating schedules.



ALTERNATIVE #1 - SINGLE ROUTE
FIGURE 5

FOREST PARK
STUDY AREA

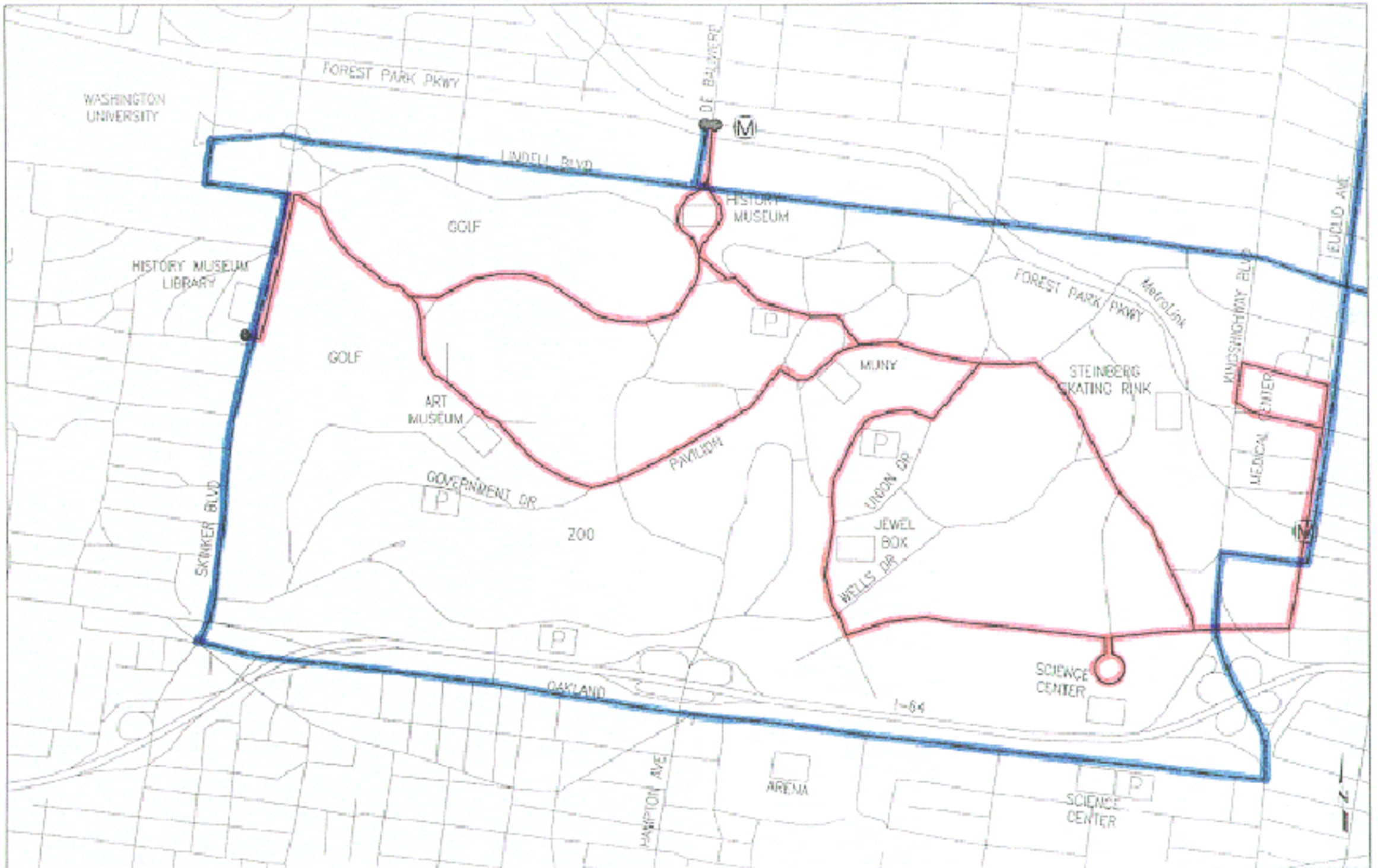
FIGURE 5



ALTERNATIVE #2- SINGLE ROUTE (TOUR) **FIGURE 6**

FOREST PARK STUDY AREA

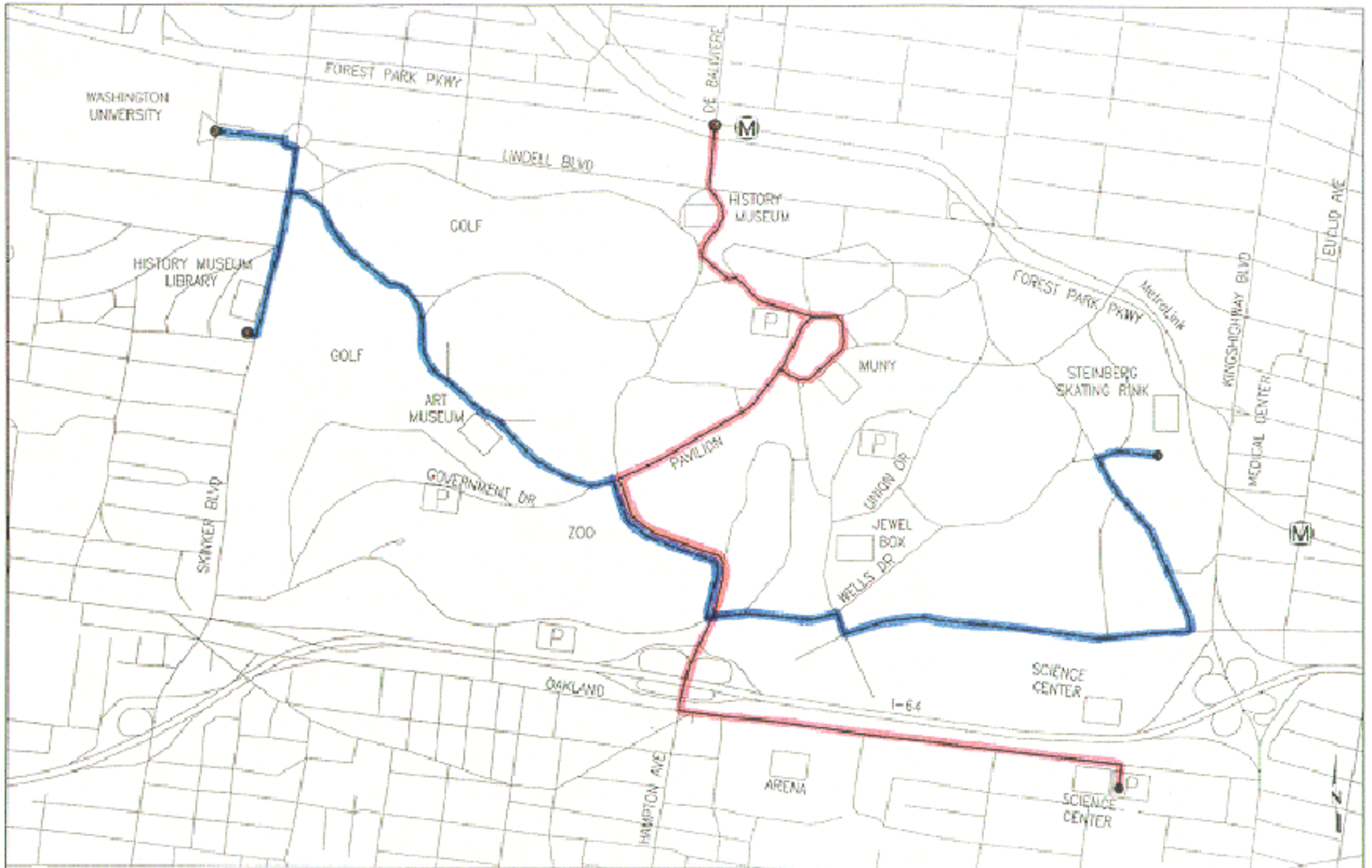
FIGURE 6



ALTERNATIVE #3 - MULTIPLE ROUTE
FIGURE 7

FOREST PARK
STUDY AREA

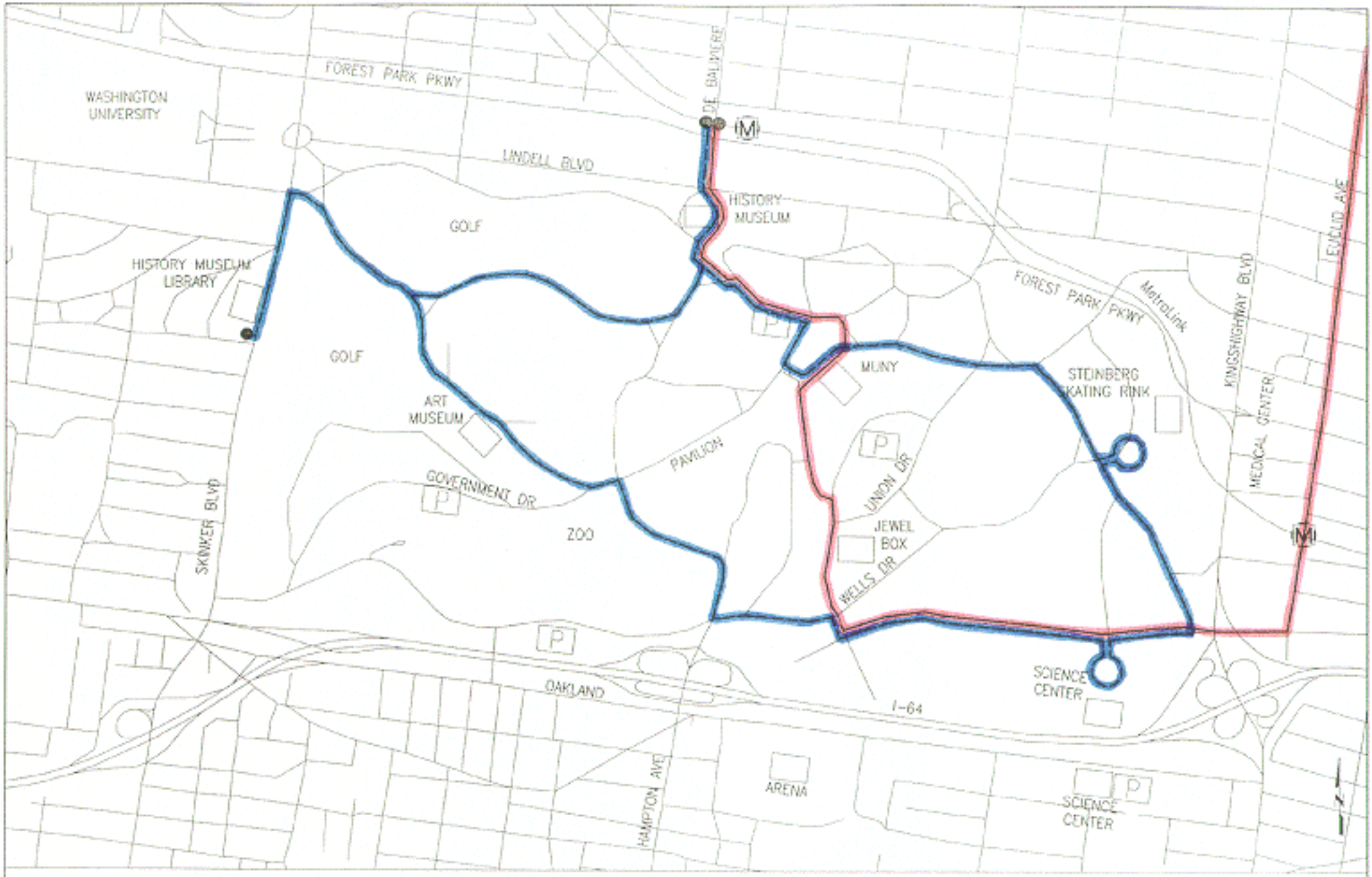
FIGURE 7



ALTERNATIVE #4 - MULTIPLE ROUTE (CORRIDOR) **FIGURE 8**

FOREST PARK STUDY AREA

FIGURE 8



ALTERNATIVE #5 - MULTIPLE ROUTE (EVENT)

FIGURE 9

FIGURE 9

Access to the Delmar Loop would entail a route extension north along Skinker Boulevard to Delmar Boulevard. This route could be linked to a vintage trolley on Delmar Boulevard, as envisioned by the loop trolley study[3]. However, BSDA bus route #62 is already located on Skinker Boulevard from Forsyth to Delmar (and beyond). Circulator service linkage to the Loop would duplicate this service.

In addition to the Missouri Botanical Garden and Delmar Loop comments about BSDA bus service coordination, each of the alternatives, that have extensions to areas outside of Forest Park, may result in duplication with service provided or being planned by BSDA. This situation would affect BSDA routes #18 and #52. Each of these routes provide a connection from the Oakland Avenue to the Central West End MetroLink station. Route #18 focuses on the St. Louis Community College. It is routed to the south along Manchester Avenue to Kingshighway and then north to the Central West End MetroLink station. To minimize Circulator duplication, this route could be shortened to eliminate the St. Louis Community College segment, i.e., route to begin along Manchester Avenue. Route #52 is a long, east-west city-wide route located along the Clayton Avenue/Dale Avenue/Oakland Avenue corridor extending from the Cross-County corridor into the center of St. Louis. As such, the route has broad city transit service purposes beyond being available to serve Oakland Avenue to Central West End (MetroLink) travel demand. This route would need to remain intact.

BSDA routes #16 and #95 along Skinker Boulevard and Kingshighway would be potentially duplicated by some of the alternatives. However, these routes are essentially north-south in configuration and do not serve the park trip patterns directly. To serve the park area trip patterns, the use of these routes would require transferring to an east-west route. In concept, the Circulator alternatives would not require such transfers. Routes #16 and #95 are long-distance city-wide routes with broader service purposes than just for the Forest Park area. It would not be anticipated that these routes (#16 and 95) would be changed due to Circulator service.

BSDA routes #2 and #90 penetrate Forest Park, #2 being the existing shuttlebug. Most of the alternative concepts represent modification or replacement of Route #2. Route #90, Hampton Avenue, is a highly used city-wide route. It provides regional transit access to the Forest Park area. Interfaces with this route and new Circulator routes would be important for extending transit accessibility. Route #90 would remain intact.

The BSDA routes, described above, offer service that accommodates a portion of the trip patterns generated by the park and adjoining land-uses. The question must be asked - why depart from this BSDA service concept now available in and around Forest Park?

---

[3]Concept Paper, Delmar Wabash Trolley Restoration Project, 12/97 - Bi-State Development Agency and Arts in Transit.

The appeal for introducing new Circulator service can be found in the following conditions that exist or will develop:

1. New Circulator routes can be identified as being directly related to the new MetroLink line, i.e., marketed as an extension of a high quality, highly popular regional transit service.

2. A significant portion of the Forest Park area visitors will be auto-users without much understanding or appreciation of the BSDA bus system; for these people, a dedicated Circulator is simpler to understand and is not burdened by possible perceptions of urban bus service.

3. Dedicated service for the Forest Park community (park institutions and edge institutions) provides the likelihood that "local ownership" of the Circulator will develop; this will be important for possible financing support, being active advocates for using the circulator, and caring about the on-going quality and performance of the service.

4. The Forest Park area travel market is diverse; successful transportation service needs to be focussed on smaller user market groups; a smaller transit system, such as the Circulator, has more flexibility to adapt to such conditions as compared to a region wide transit system.

Design Concepts

In all concepts, the Circulator would operate at grade. No elevated or below-ground alignments would be anticipated. The route would be located on public streets or public drives within Forest Park or areas adjacent to the park.

Within Forest Park, the Circulator could be designed to operate either in mixed-traffic (shared use of roadways) or in reserved or separate lanes. Because of the current width of most park drives, and the need to maintain on-street parking, it is likely that mixed traffic operation would prevail. There may be some drives that will be closed to general vehicle traffic (per the Master Plan). The Circulator could still be permitted in some of these locations. Further, for major events, the Circulator could have preferential use of some drives to maintain efficient travel time in the presence of high event-generated traffic.

At stop locations, the Circulator could have reserved curbside facilities or even special access drives or off-street stopping berths. Some of these stops could be augmented with special shelters, kiosks, and signing.

For the alternatives with routes outside of Forest Park, the Circulator would operate in mixed traffic. This would occur along Skinker Boulevard, Oakland Avenue, Clayton Avenue, Euclid Avenue, McPherson Avenue, Taylor Avenue, Newstead Avenue, and Lindell Boulevard. Along these streets, curb space would be reserved for Circulator bus stops.

5
Circulator Plan

The alternative concepts, described in the previous chapter, have been reviewed and discussed with representatives of the Forest Park area institutions. Their comments provided the basis for evaluating the alternatives leading to a preliminary Circulator plan.

Evaluation

In order to compare the alternatives, a set of six evaluation criteria were identified. These reflect the goals set forth in the Forest Park Master Plan and circulator service goals articulated by institutions and organizations located outside of the park.

A. Coverage - the Circulator needs to provide direct service to all major land-uses internal and external (along edge) to Forest Park.

B. Convenient - the service configuration and service level need to be convenient in terms of reasonable travel time (generally in the 5 to 30 minute ranges).

C. Understandable - the service system should be simple and understandable to perspective riders.

D. Right-of-Way - the service and facilities should be accommodated within existing rights-of-way and should consider the changing network of circulation drives within Forest Park (as included in the Master Plan).

E. Flexibility - the service must have operating flexibility to respond to unique needs and priorities of user market groups as they may change over time.

F. Modal Interchange - the service must connect to MetroLink and interface with BSDA bus

service in comprehensive fashion.

Applying these criteria to the six identified alternative concepts yields evaluation results as summarized by Table 3.

TABLE 3: CONCEPT EVALUATION

Alternative Concept	Criteria Rating[4]						
	Coverage	Convenience	Understandable	R.O.W.	Flexible	Inter-modal	Ranking
1995 Concept	5	5	4	3	4	5	2
1997 Concept	4	4	4	5	3	4	3
#1 Single Access	3	4	4	5	3	4	4
#2 Single Tour Route	3	3	4	5	3	4	6
#3 Multiple Routes	5	4	4	5	4	5	1
#4 North-South Corridor Routes	2	2	3	5	3	4	5

These evaluation results make clear two primary differences between concepts, i.e., coverage which includes Oakland Avenue and flexibility to respond to multiple user market groups. Concepts #1, 2 and 4 would not rank high because they would not provide appropriate coverage and service flexibility.

The 1995 concept provides coverage. The rail trolley would require right-of-way (outside of roadways) within the park. As a fixed guideway, it would not be flexible to changing needs to user market groups. The 1997 concept would extend coverage, but may also not have sufficient flexibility to serve various market groups.

The multiple route, with an internal (to the park) and external configuration would be considered the best and most promising concept for the Circulator. It would measure high for all criteria.

[4]Uses a rating scheme of 1-5, with 5 being the best performance.

Preliminary Plan

On this basis of the evaluation results, a preliminary Circulator Plan has been developed. The Circulator plan would entail creating a multi-route service system deploying a mix of vehicle types. The transportation needs of Forest Park, institutions located in the park, and the adjoining land uses are varied, with very distinct service requirements. Further, the character of the service ranges from highly functional transportation (e.g., direct route with minimum travel time) to visitor-oriented transportation with a "tour" aspect.

Routes

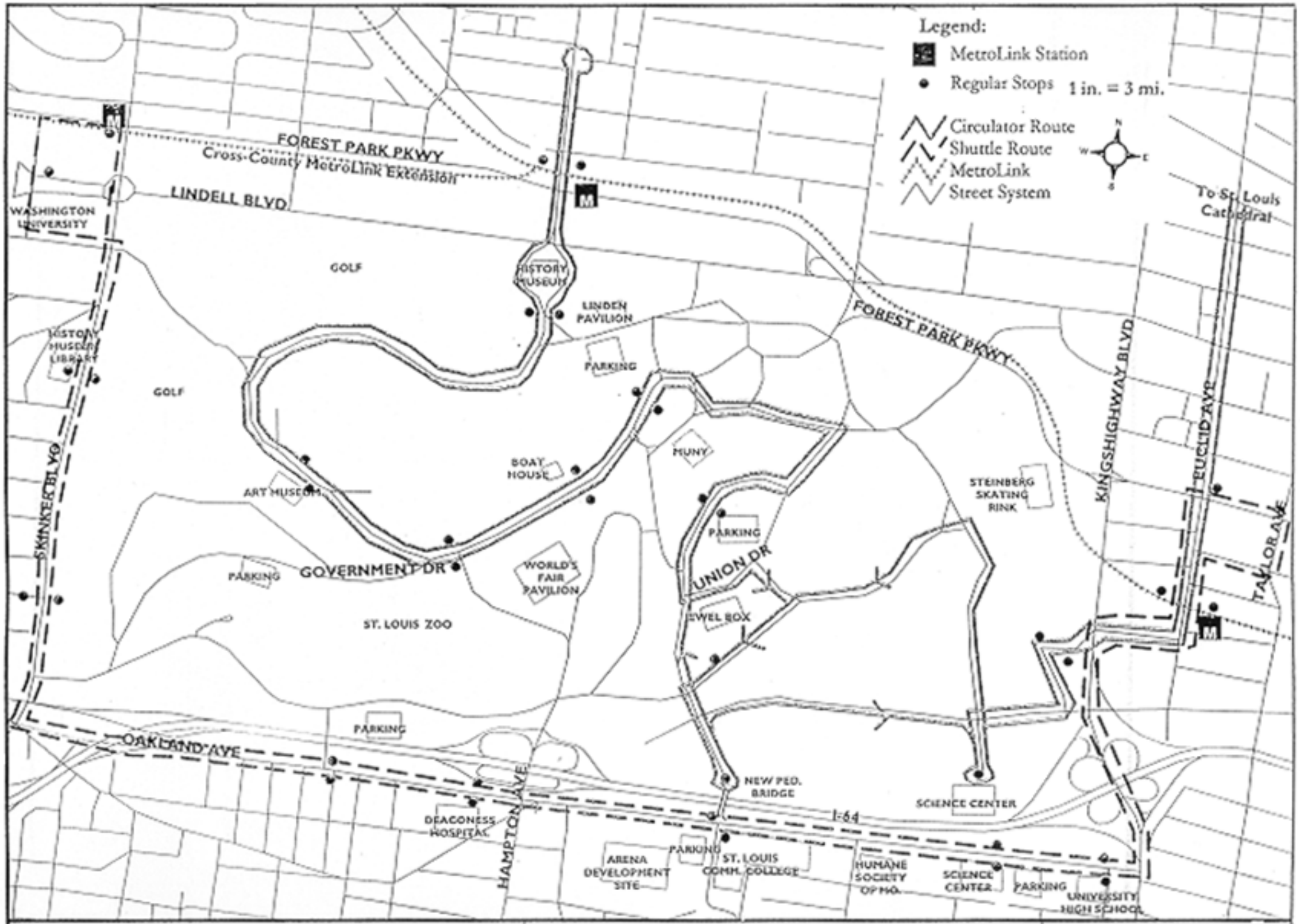
From a service perspective, the plan would include:

A. ***Circulator Route*** (see Figure 10). This would be the basic route to access destinations within the park, plus connections to two MetroLink stations and the Central West End/St. Louis Cathedral area.

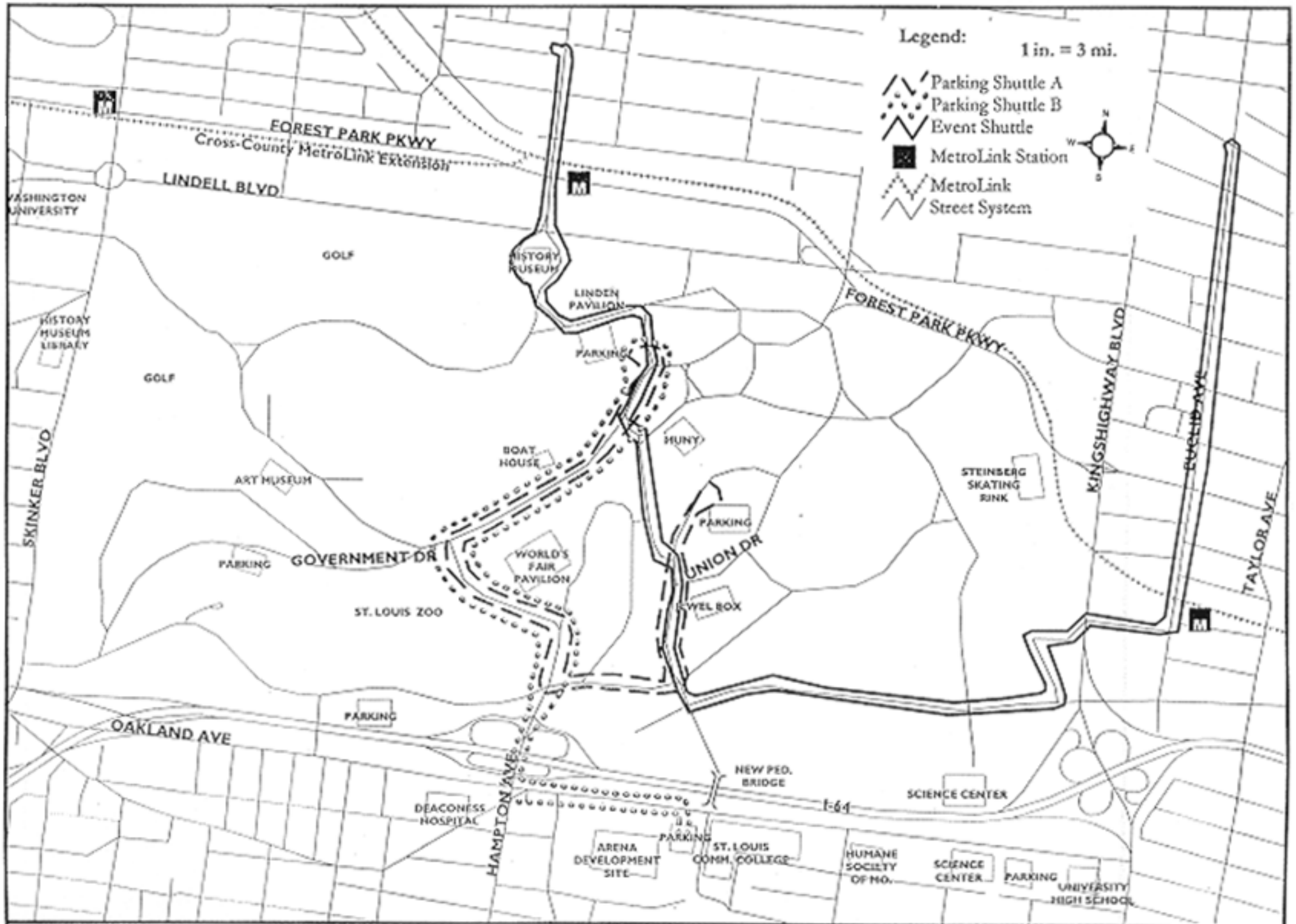
B. ***Shuttle Route*** (see Figure 10). This would be a route located at the east, south and west edges of the park linking a series of external land uses (institutional and residential) along the Oakland Avenue, Euclid Avenue, and Skinker Boulevard corridors, plus connections to two MetroLink stations (existing Central West End station and the proposed Skinker Boulevard station).

C. ***Event Shuttle Route*** (see Figure 11). This would be a route operated to serve special events (primarily at the Muny) providing linkage with two MetroLink stations and the Central West End.

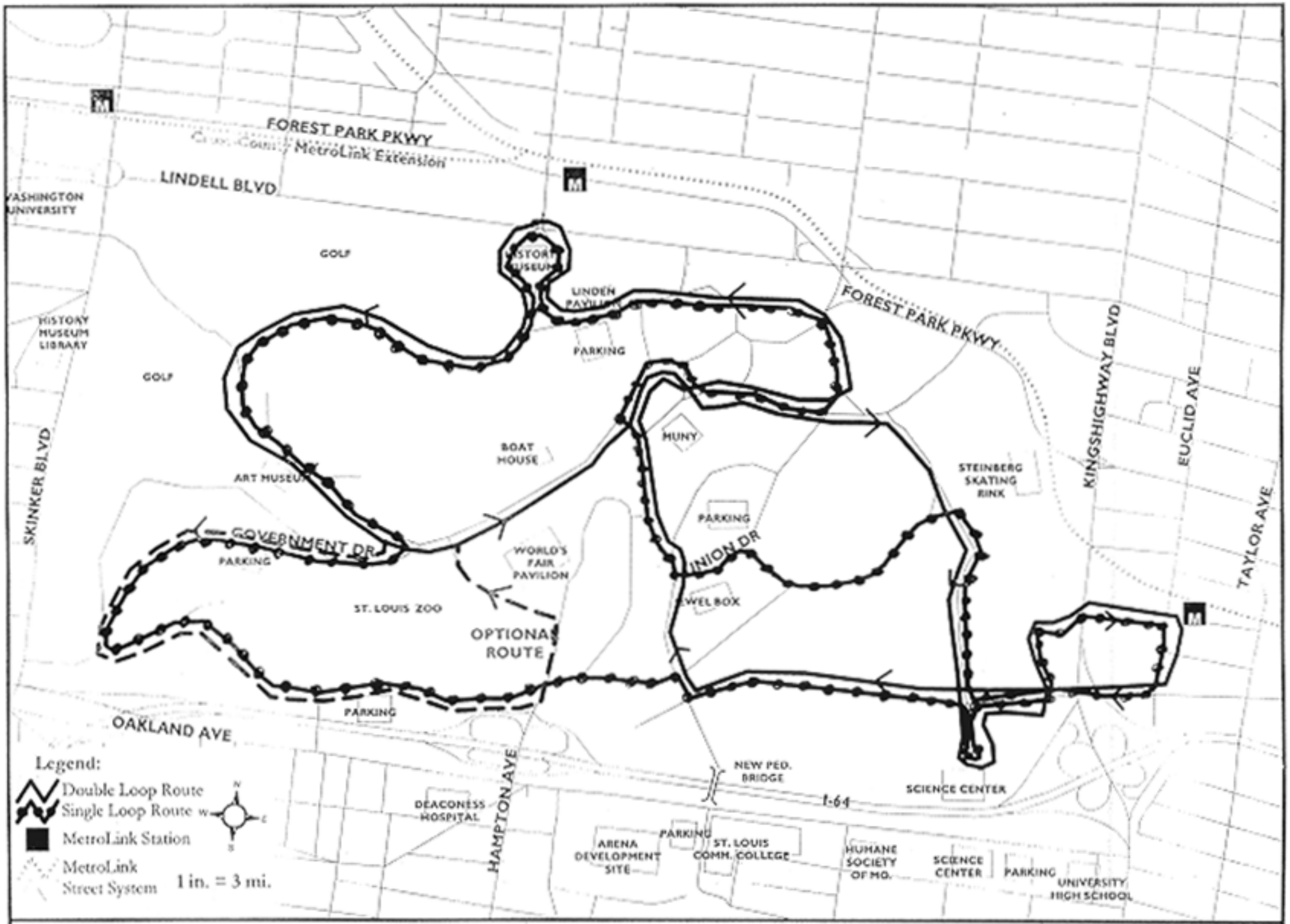
D. ***Parking Shuttle Route*** (see Figure 11). This would be a supplemental shuttle route used during summer periods when the park population increases (especially at the Zoo) and there is a need to link major in-park parking lots and possible arena-site parking to park destinations (mostly the Zoo). Parking lots to be accessed would be the Twin lot, upper Muny lot, and possible arena-site parking on Oakland Avenue.



Forest Park Study Area	Basic Circulator System	Figure 10



Forest Park Study Area	Special Purpose Service	Figure 11



Forest Park Study Area | Summertime Tram | Figure 12

E. ***Summertime Tram Ride*** (see Figure 12). This would be a special transit service designed specifically as a "ride" or attraction. The ride would be included as an optional element in the plan. Its route would be contained within the park. As an attraction, the ride would be supported by programmed tour messages or even a tour guide. It would be a form of recreation traveling through all sections of the park using special vehicles.

Intermodal Linkages

Because the basic circulator and shuttle routes need to operate as a system including interfaces with regional transit service, there will be two transfer/interface locations where patrons could transfer between routes, as listed below:

1. ***Central West End MetroLink Station.*** Routes will stop on Euclid Avenue at the MetroLink station. There will be the potential for interface with the Garden shuttle (Bi-State Route No. 14), which provides access to the Missouri Botanical Garden and other shuttle buses. Route schedule coordination will be undertaken to facilitate transfers.

2. ***Oakland Avenue.*** Routes would interface via a pedestrian bridge over I-64 near the south end of McKinley Drive. The circulator route would stop at the north end of the bridge (inside the park) and the shuttle route would stop at the south end of the bridge along Oakland Avenue. (The latter position would serve St. Louis Community College and the arena site).

In addition, there will be interfaces with regional transit at the Forest Park and proposed Skinker Boulevard/Forest Park Parkway MetroLink stations. The former will involve the Circulator route and BSDA route #90 (Hampton Avenue); the latter will involve the shuttle route and BSDA routes #16 and #62.

Operations

From an operational perspective, the above routes would function as follows:

1. Circulator Route (Figure 10):
   a. Round trip distance = 13 to 14 miles
   b. Number of stops (round trip) = 21
   c. Estimated overall trip time (round trip) = 72 minutes (includes 10 minute layover time)
   d. Vehicle requirements:[5]
      - 5-minute headway = 15 vehicles
      - 10-minute headway = 10 vehicles
      - 15-minute headway = 5 vehicles

[5]Exclusive of spare vehicles. Spares would be added equivalent to 15% of the basic fleet requirement.

e. Operate daily for 12 hours (7:00 A.M. to 7:00 P.M.), plus evening extension when institutions are open later.

2. Shuttle Route (Figure 10):
   a. Round trip distance = 9 to 10 miles
   b. Number of stops (round trip) = 19
   c. Estimated overall trip time (round trip) = 40 minutes (including 10 minute layover time)
   d. Vehicle requirements:
      - 5-minute headway = 8 vehicles per direction
      - 10-minute headway = 4 vehicles per direction
      - 15-minute headway = 3 vehicles per direction
   e. Operate daily for 12 hours (7:00 A.M. to 7:00 P.M.).

3. Event Shuttle (Figure 11):
   a. Round trip distance =7 to 8 miles
   b. Number of stops = 9
   c. Estimated overall trip time (round trip) = 38 minutes (includes 5 minute layover time)
   d. Vehicle requirements:
      - 5-minute headway = 8 vehicles
   e. Operate from two hours before to two hours after an event.

4. Parking Shuttle (Figure 11):
   - Route A (Twin Lot - Zoo - Upper Muny Lot)
     a. Round trip distance = 3 or 4 miles
     b. Number of stops = 5
     c. Estimated trip time = 10 minutes
     d. Vehicle requirements:
        - 5-minute headway = 2 vehicles
     e. Operate on peak summer days for 12 hours (10:00 A.M. to 10:00 P.M.).
   - Route B (Twin Lot - Zoo - Arena Site)
     a. Round trip distance = 3 to 4 miles
     b. Number of stops = 5
     c. Estimated trip time = 10 minutes
     d. Vehicle requirements:
        - 5-minute headway = 2 vehicles
     e. Operate on peak summer days for 12 hours (10:00 A.M. to 10:00 P.M.).

5. Summertime Tram Ride (Figure 12):
   - Optional Route (Single Loop)
     a. Round trip distance = 8 to 9 miles
     b. Number of stops = 7
     c. Estimated trip time = 50 minutes (includes 10 minute layover)
     d. Vehicle requirements:
        - 15 minute headway = 4 vehicles
     e. Operate (Memorial Day to Labor Day) for 12 hours (10:00 A.M. to 10:00 P.M.).
   - Optional Route (Double Loop)
     a. Round trip distance = 7 to 10 miles
     b. Number of stops = 7
     c. Estimated trip time = 46 to 54 minutes (includes 10 minute layover)
     d. Vehicle requirements:
        - 15-minute headway = 4 vehicles
     e. Operate (Memorial Day to Labor Day) for 12 hours (10:00 A.M. to 10:00 P.M.).

Because the services would be operated at different times, there would be an opportunity to share vehicles between routes and reduce overall fleet requirements for the system. Moreover, the significant increase in park population (summer versus winter) will create the need to expand service capacity on a seasonal basis.

The fleet size and potential assignment of vehicles would be as follows:

- Summer period (certain spring and fall days included):
  10 buses for circulator route (5 of these vehicles would be used for event shuttles)
  3 buses for shuttle (these vehicles would be used for event shuttles)
  4 buses for parking shuttles
  4 trams for summertime ride (optional service)
- Winter period
  5 buses for circulator routes
  3 buses for shuttle
  4 buses available for events.

Vehicles

The overall fleet would consist of:

- 17 shuttle buses, plus two spares.
- 4 trams[6], each power unit with two trailers, plus one spare power unit and trailer.

The vehicles would have the following characteristics:

- Circulator: seating capacity of 30 to 35; all weather[7]; audio/public address for tour messages.
- Shuttles: seating capacity of 30 to 35; all weather[7].
- Tram: seating capacity of 20 to 30 per unit (depends on specific equipment) - power vehicle unit plus trailers; audio/public address features for tour program.

All vehicles need to be ADA-compliant and should reflect a unique design theme appropriate for a Forest Park system.

Reviews of manufacturers equipment[8] identify a variety of possible vehicles that would meet the above requirements. In concept, a basic shuttle bus could be used for most of the services. Such vehicles could be designed as vintage trolleys or some other design theme. A tram vehicle would be used for summertime ride. Such vehicles have a "tour" appearance with entertainment facilities and personnel.

Facilities

Since the Circulator service would operate on existing public streets, no special facilities would be required except as follows:

1. At all designated Circulator stops, there would be all-weather pavement for standing/waiting plus special signage to identify the stop; graphics concepts would be coordinated with Forest Park Master Plan standards and activities.

2. At certain high volume stops (excluding the MetroLink stations) such as the History Museum, Art Museum, Deaconess Hospital, Washington University, St. Louis Zoo, and Science Center, a special stop kiosk and waiting space would be developed using a concept as suggested by Figure 13.

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[6] Optional part of fleet.

[7] Vehicles equipped with heating and air conditioning.

[8] See Appendix for supplemental information

Project: FOREST PARK TRANSIT SYSTEM
Topic: TROLLEYBUS STATION - CONCEPT

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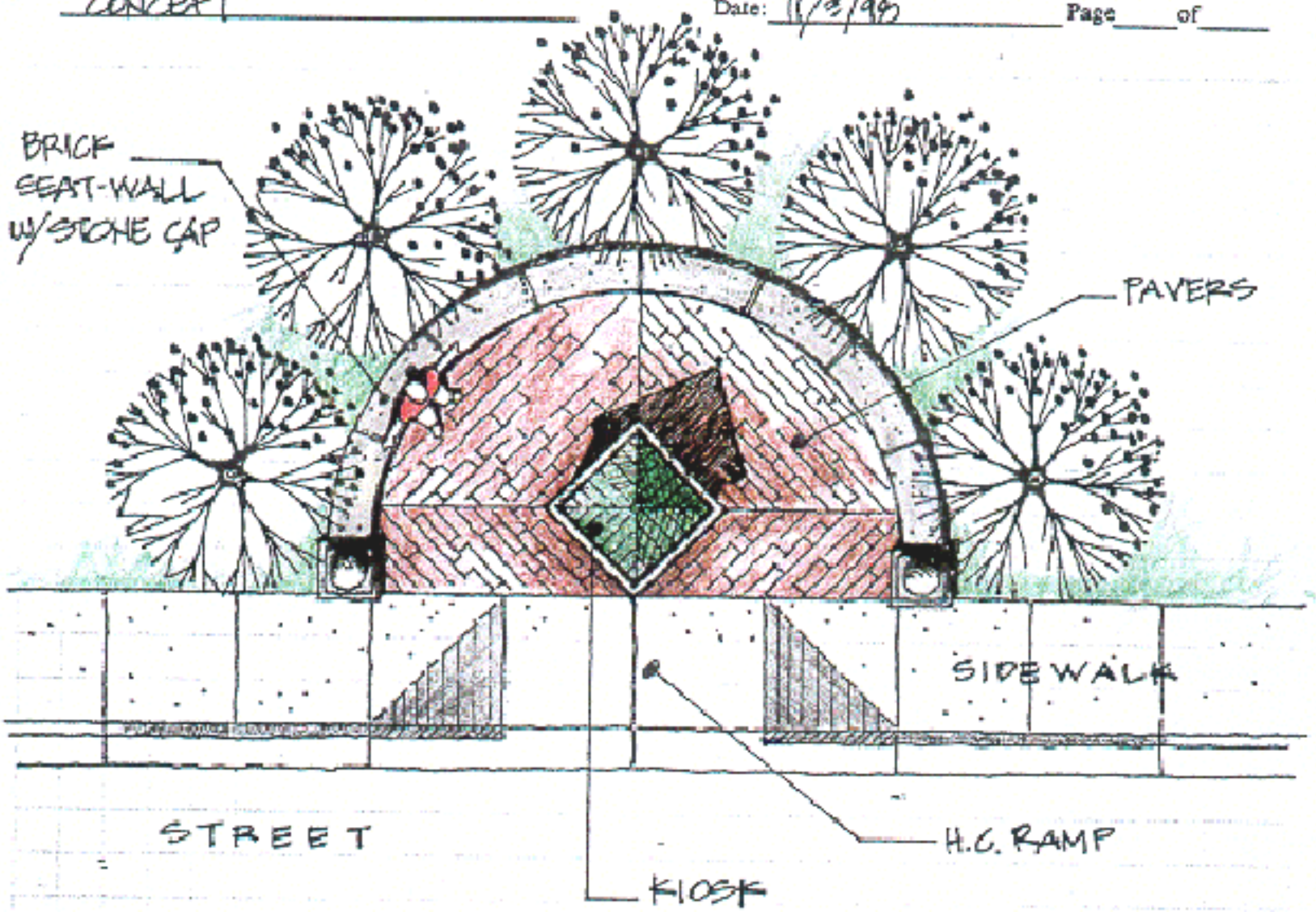
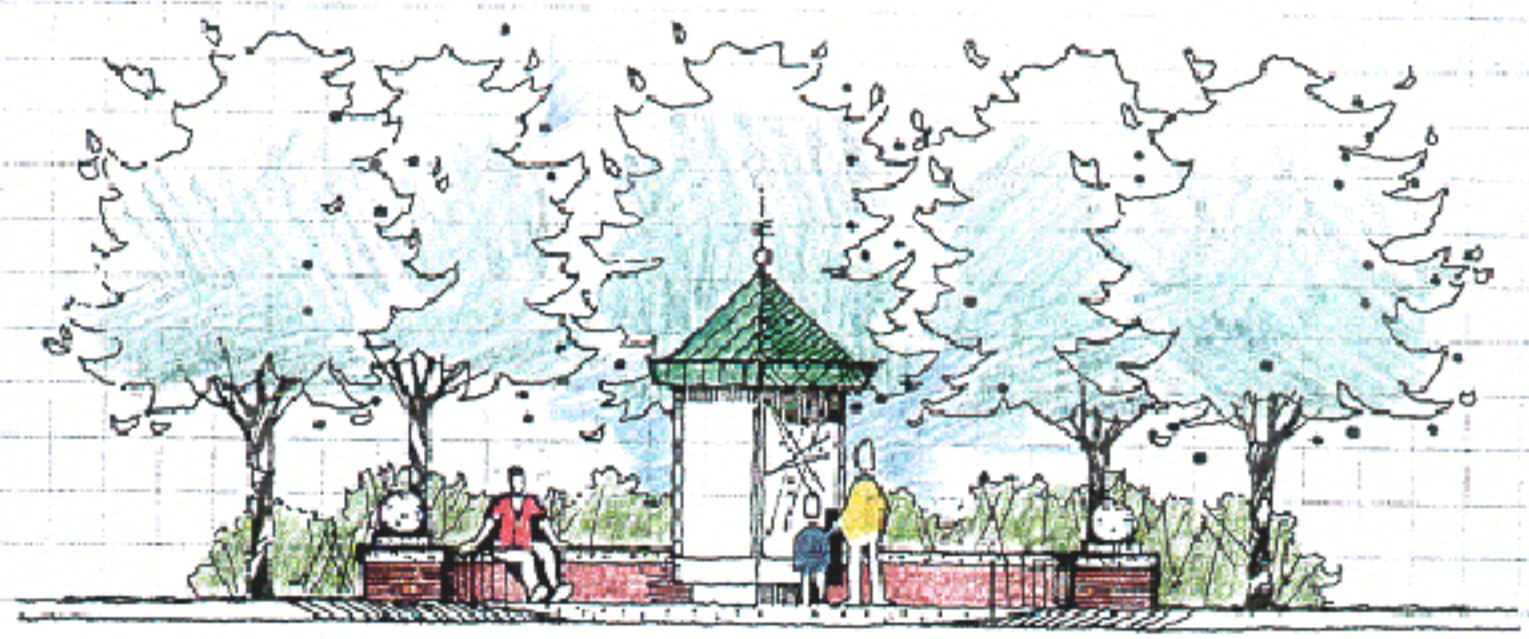
Date: 11/3/95 Page ___ of ___





ELEVATION VIEW

3. To facilitate the linkage between routes, a new pedestrian bridge would be constructed over I-64 in the vicinity of McKinley Drive connected to Oakland Avenue. This bridge would satisfy ADA requirements.

4. Circulator/shuttle buses and trams would be housed/maintained at the BSDA facility on DeBaliviere Avenue near Delmar Boulevard.