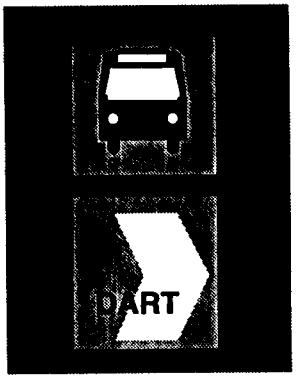

DART FIXED-ROUTE SERVICE REVIEW STUDY EXECUTIVE SUMMARY

prepared for the

NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS
and DALLAS AREA RAPID TRANSIT

prepared by

Booz·Allen & Hamilton Inc.

in association with

Mundle & Associates, Inc.

February 1995

ACKNOWLEDGMENTS

Prepared in cooperation with the Texas Department of Transportation and the United States Department of Transportation, Federal Highway Administration and the Federal Transit Administration.

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1.0 STUDY OVERVIEW

DART HAS A NUMBER OF MAJOR CAPITAL PROJECTS UNDERWAY THAT WILL AFFECT THE FUTURE DELIVERY OF FIXED-ROUTE SERVICES.

- Light rail transit (LRT) starter system
- Commuter rail system
- Transfer center facilities in the Central Business District (CBD)
- High Occupancy Vehicle (HOV) lanes
- Additional transit centers outside of the CBD.

AT THE START OF THIS STUDY, DART PLANNERS HAD ALREADY BEGUN A NUMBER OF SERVICE PLANNING INITIATIVES TO ADDRESS THESE CHANGES, INCLUDING:

- Preparation of the September 1994 bus/rail interface plan for the Oak Cliff and North Central LRT starter system;

- Preliminary plans for Hop-A-Bus CBD services to complement new LRT and commuter rail service;

- Development of a number of "Sector Plans" to improve service to communities and productivity; and

- Preliminary design of potential new crosstown bus routes to further develop a grid network serving areas outside of the CBD.

BOOZ·ALLEN WAS RETAINED TO PROVIDE TECHNICAL ASSISTANCE TO SUPPORT DART PLANNING EFFORTS IN THE FOLLOWING AREAS:

- Conduct an assessment of overall bus system performance. In restructuring services, it is important to keep those routes that work well and improve those services that do not.

- Refine the bus/LRT feeder plan prepared by DART staff and develop a bus interface plan for new commuter rail service, including estimation of cost impacts.

- Assess the need for additional crosstown routes to meet changing population and employment patterns, as well as fill-in any gaps in the existing grid network.

- Develop a CBD Transfer Center Plan, including assignment of bus routes to either the East or West Transfer Center, routing changes, and berthing assignments.

- Examine DART's privatization strategy, including evaluation of potential operating cost savings from DART provision of a facility for contract operations and by additional contracting of existing routes.

BOOZ·ALLEN WAS RETAINED TO...

- Design and analyze a rider "Tell Us Where To Go" survey, Bus Operator survey, and Supervisor workshops. Results were used in identifying improvement opportunities and service needs.

- Develop analytical support tools used in this study and available to DART planners in the future, including:

  — route level cost allocation model
  — route ridership sketch planning methodology
  — route fare revenue allocation model.

THIS EXECUTIVE SUMMARY PRESENTS FINDINGS AND RECOMMENDATIONS CONTAINED IN STUDY DELIVERABLES PROVIDED UNDER SEPARATE COVER.

2.0 EXISTING SERVICE

Existing Service...

BETWEEN FY91 AND FY94, RIDERSHIP HAS DECLINED BY FIVE PERCENT, PRIMARILY AS A RESULT OF A DECREASE IN TRAVEL TO THE CBD. SERVICE OUTSIDE THE CBD, HOWEVER, HAS EXPERIENCED SIGNIFICANT GROWTH, AS SHOWN BELOW.

FY91-FY94 RIDERSHIP TRENDS

Weekday, Saturday & Sunday Service Combined

SERVICE	FY91	FY92	FY93	FY94*	Percent Change FY91-FY94
Circulator/Connector	2,203,100	2,315,870	2,572,424	2,561,285	16.3%
Regional Crosstown	1,871,376	1,992,196	2,015,541	2,079,192	11.1%
Regional Express	2,891,769	2,919,423	2,743,184	2,859,651	-1.1%
Radial Local	24,242,449	25,053,328	23,449,782	22,571,536	-6.9%
Urban Crosstown	3,513,975	3,871,569	4,133,419	4,437,248	26.3%
Radial Limited Stop	10,484,874	9,799,731	9,239,357	8,442,539	-19.5%
Systemwide	**45,207,543**	**45,952,117**	**44,153,707**	**42,951,451**	**-5.0%**

** Estimated Actuals based on 9 months.*

DART HAS ADJUSTED SERVICE HOURS CONSISTENT WITH TRAVEL DEMAND. THE RESULT IS THAT SYSTEMWIDE PRODUCTIVITY HAS REMAINED STABLE AND IMPROVED FOR ALL SERVICE TYPES BUT ONE.

FY91-FY94 SERVICE PRODUCTIVITY TRENDS
Weekday, Saturday & Sunday Service Combined

SERVICE	Passengers Per Vehicle Service Hour				Percent Change
	FY91	FY92	FY93	FY94*	FY91-FY94
Circulator/Connector	12.8	13.3	14.3	15.7	22.7%
Regional Crosstown	13.4	14.7	15.8	16.6	23.9%
Regional Express	22.3	22.4	22.3	24.2	8.5%
Radial Local	29.2	33.6	31.5	31.1	6.5%
Urban Crosstown	20.5	22.7	24.1	24.5	19.5%
Radial Limited Stop	34.8	30.9	29.4	26.9	-22.7%
Systemwide	**26.4**	**27.6**	**26.7**	**26.4**	**0.0%**

** Estimated Actuals based on 9 months.*

WITHIN THE DART SYSTEM, INDIVIDUAL ROUTE PERFORMANCE VARIES BY TYPE OF ROUTE.

- Routes in more densely populated urban cores generally have better productivity than services in less dense areas.

  — DART currently evaluates routes relative to other services of the same type.

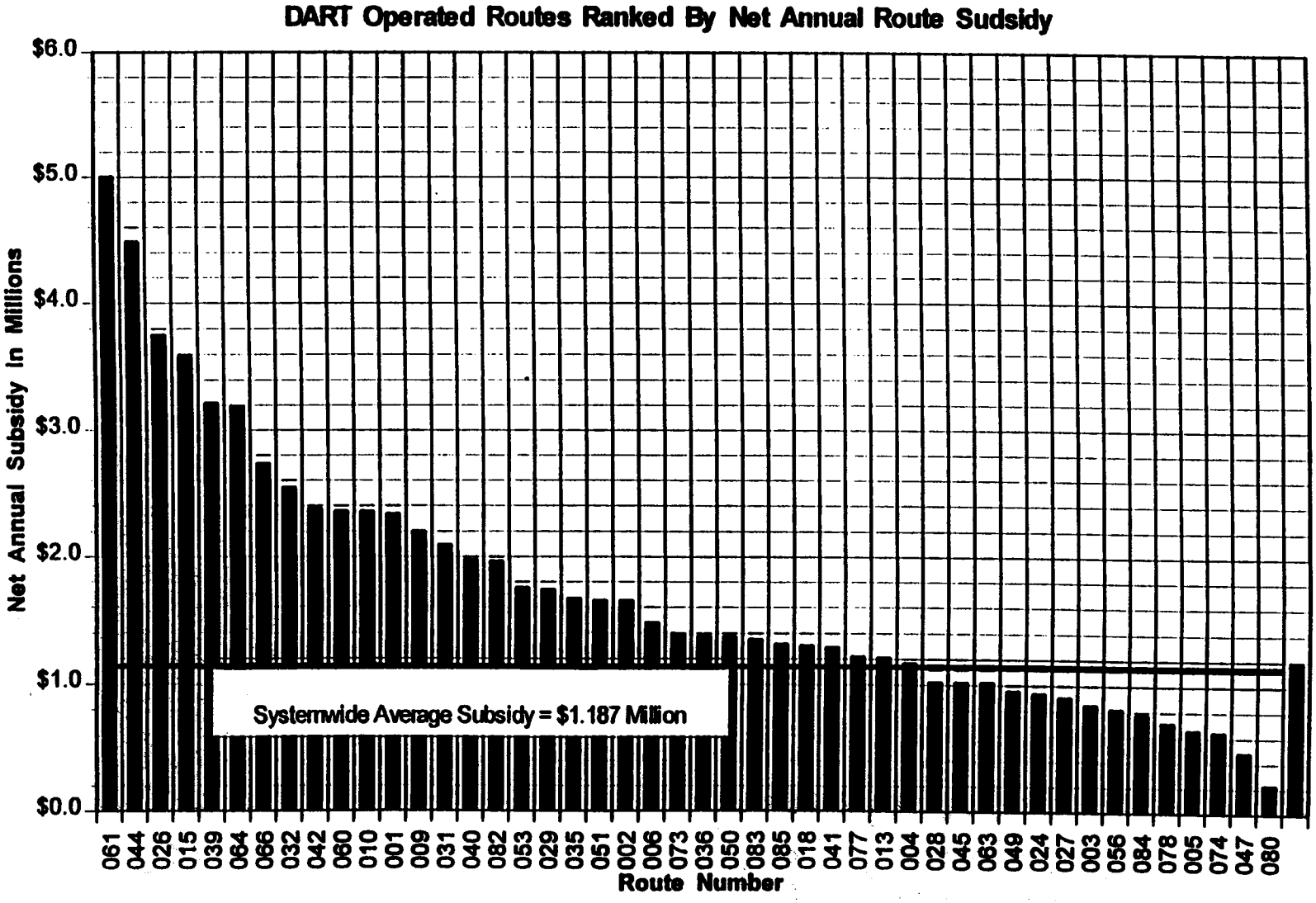
  — Average performance by route type is shown below.

TOTAL SYSTEM PERFORMANCE
WEEKDAY, SATURDAY AND SUNDAY SERVICE COMBINED

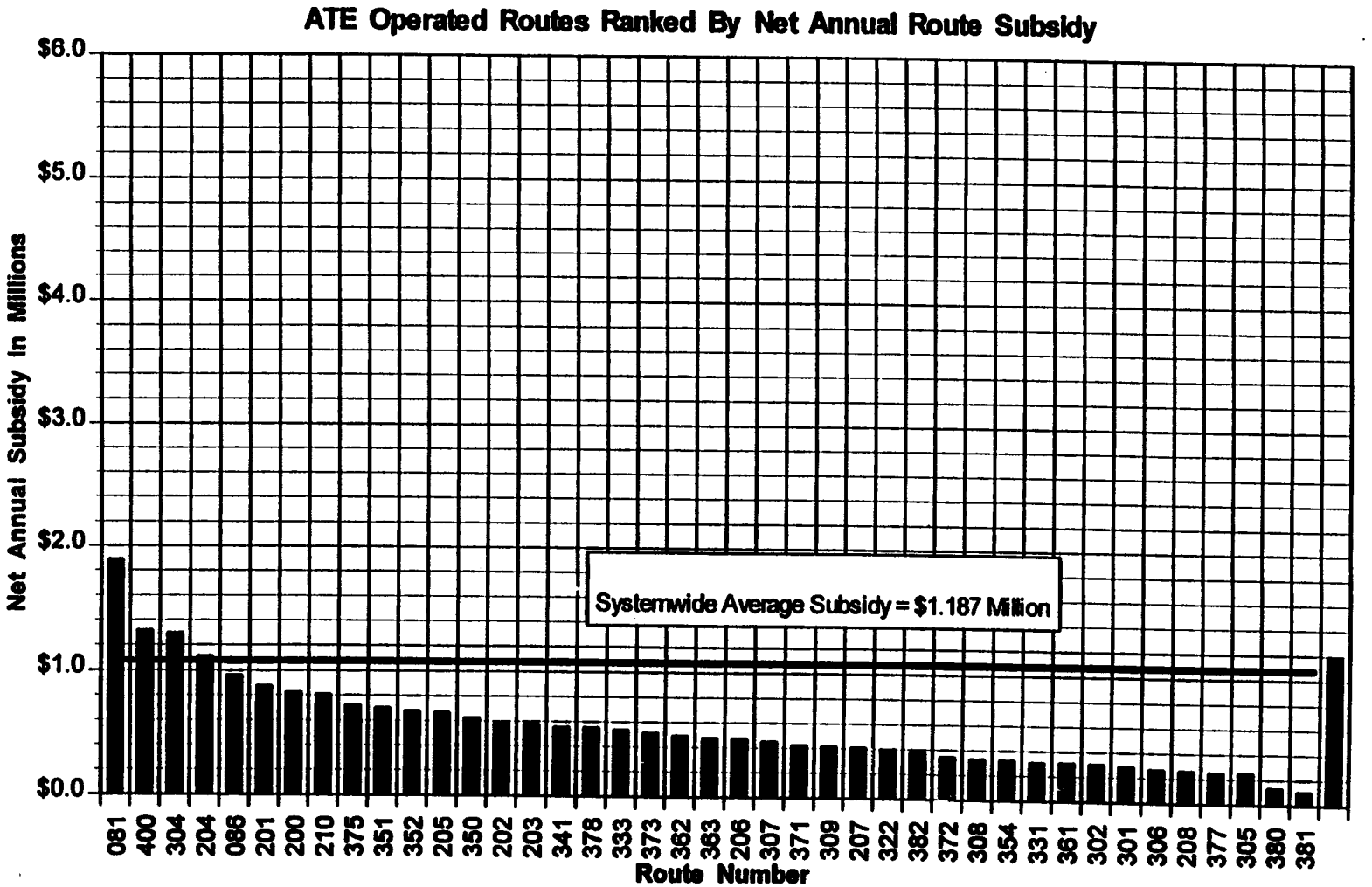
Route Type	Passengers Per Mile	Passengers Per Hour	Cost Per Passenger	Farebox Recovery Ratio	Net Subsidy Per Passenger
Circulator/Connector	0.97	15.66	$4.03	10.0%	$3.63
Regional Crosstown	1.01	16.63	$3.77	11.7%	$3.33
Regional Express	1.00	24.15	$4.75	28.3%	$3.41
Radial Local	2.42	31.12	$2.36	17.8%	$1.94
Urban Crosstown	1.59	24.48	$2.89	15.7%	$2.44
Radial Limited Stop	1.57	26.94	$3.61	11.7%	$3.19
SYSTEM AVERAGE	**1.71**	**26.40**	**$2.99**	**16.2%**	**$2.50**

Existing Service...

THERE ARE NO ROUTES IN THE DART SYSTEM WHICH ARE "PROFITABLE." THERE ARE, HOWEVER, A NUMBER OF ROUTES WHOSE SUBSIDY IS FAR ABOVE AVERAGE INDICATING THE NEED TO EITHER INCREASE REVENUE AND RIDERS, OR REDUCE COSTS.



Existing Service...

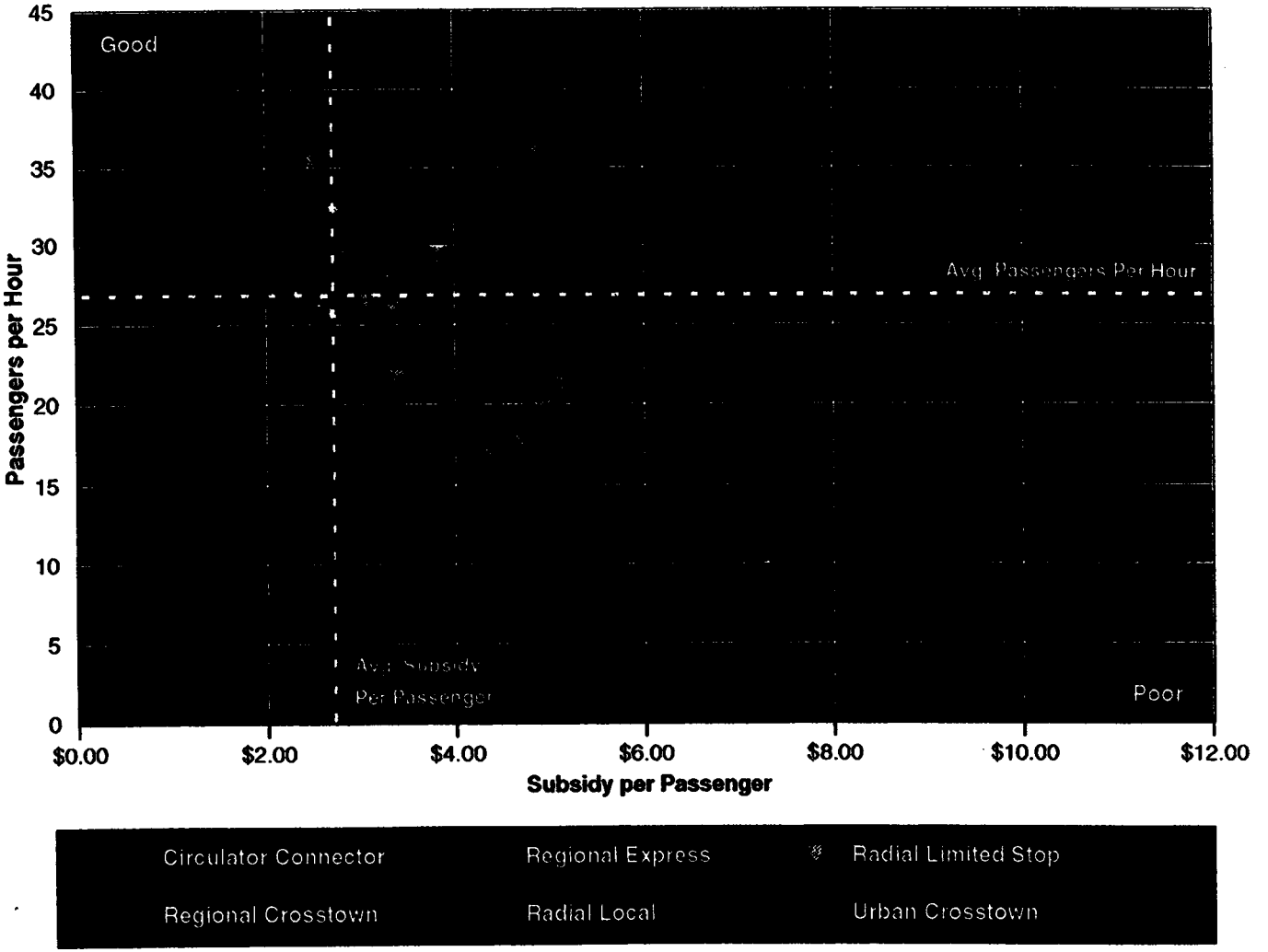


RESTRUCTURING BUS SERVICE IN RESPONSE TO RAIL IMPLEMENTATION PRESENTS AN EXCELLENT OPPORTUNITY TO ALSO ADDRESS ROUTES WITH BELOW AVERAGE PERFORMANCE.

3.0 BUS/LIGHT RAIL INTERFACE

CIRCULATOR ROUTES (SERVING SUBURBAN AREAS) GENERALLY HAVE POOR PERFORMANCE, WHILE RADIAL LOCAL (URBAN) ROUTES HAVE GOOD PERFORMANCE.

FY94 SYSTEMWIDE ROUTE PROFILES
Weekday, Saturday and Sunday Service Combined



RECOMMENDED CHANGES ARE DISCUSSED IN THE FOLLOWING FIVE SECTIONS AND INCLUDE AN ESTIMATED ANNUAL COST SAVINGS OF $4.4 MILLION. ADDITIONAL COST SAVINGS ARE ALSO POSSIBLE WITH PRIVATIZATION STRATEGIES.

SUMMARY OF RECOMMENDATION IMPACTS BY SECTION

SECTION	ESTIMATED ANNUAL COST IMPACTS ($ in thousands)			CHANGES IN PEAK BUS REQUIREMENTS
	Variable Costs	Fixed Costs	Total Costs	
3.0 Bus/Light Rail Interface Plan	($5,609.1)	$425.3	($5,183.8)	(54)
4.0 Bus/Commuter Rail Interface Plan	($9.5)	$18.5	$9.0	(4)
5.0 Grid Network Plan	$688.5	$43.7	$732.2	3
6.0 CBD Transfer Center Plan	[Impacts included in other sections]			
TOTAL RECOMMENDED BUS SERVICE CHANGES	**($4,930.1)**	**$487.5**	**($4,442.6)**	**(55)**
7.0 Route Privatization Strategies	($2,800)	($1,200-$2,236)	($4,000-$5,036)	NA

DART STAFF DID AN EXCELLENT JOB OF BUS/LRT INTERFACE PLANNING. CONSULTANT EFFORTS TO FINE-TUNE THIS PLAN INCLUDED:

- Specification of a new route numbering system, as shown below;

PROPOSED BUS ROUTE DESIGNATION SYSTEM

Route Numbers	Type	Description
1-99	R	Radial - Local (to Downtown Dallas)
100-199	LS	Limited-Stop Service
200-299	EXP	Express Service
300-399	CF	Circulator/Feeder Service (Suburban)
400-499	C	Crosstown Service
500-599	F	Rail Feeder Service

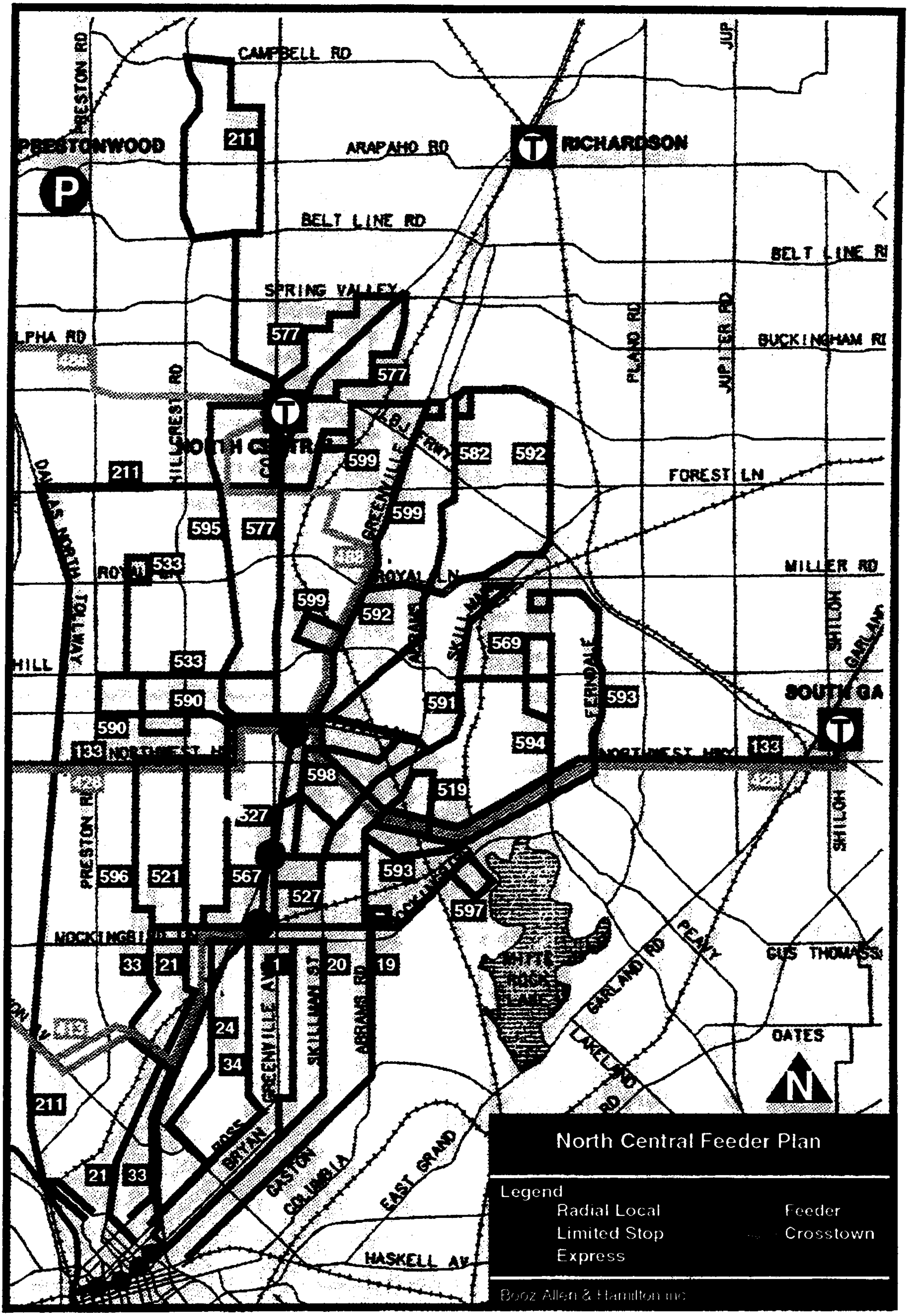
- Modification of "Station Connector" routes - - rather than operating separate bus routes that would essentially duplicate the LRT alignment, elements of the "Station Connector" routes were incorporated into other services that would be less duplicative and serve more wide-ranging travel needs; and

- Increased short-turning of routes to reduce bus volumes in the CBD.

RECOMMENDED CHANGES TO THE BUS NETWORK ARE SUBSTANTIAL AND AIMED AT INCORPORATING LRT AS AN INTEGRAL PART OF THE DART SYSTEM WITHOUT INCONVENIENCE TO EXISTING BUS RIDERS. THE FOLLOWING FOUR PAGES SUMMARIZE RECOMMENDED CHANGES IN THE NORTH CENTRAL AND OAK CLIFF AREAS.

BUS/LIGHT RAIL INTERFACE PLAN SUMMARY - NORTH CENTRAL AREA

CURRENT ROUTE			PROPOSED ROUTE			NORTH CENTRAL LRT STATIONS		
NO.	TYPE	SERVICE	NO.	TYPE	SERVICE	SERVED	CHANGES FROM CURRENT	NOTES
1	RL	7-day	1	R	7-day	Mockingbird	Retain only CBD-Mockingbird trunk	Outer segments covered by new feeder routes
6	RLS	7-day	--	--	--	---	Eliminate route	Outer portion covered by new #598,599
13	UC	6-day	413	C	6-day	Mockingbird	Short-turn at Mockingbird Station	Improve route productivity
19	RL	7-day	19	R	7-day	---	Retain only CBD-Mockingbird trunk	To Abrams, not LRT; Outer segments - new #519,597
20	RL	7-day	20	R	7-day	Mockingbird	Extend to LRT	
21	RL	7-day	21	R	7-day	Mockingbird	Retain only CBD-Mockingbird segment	Fewer trips; Outer segment covered by new #521
24	RL	7-day	24	R	7-day	Mockingbird	Extend to LRT	
27	RLS	Peak	527	F	Peak	Lovers La,Mockingbird	Cut back/revise to feed LRT	Connect the stations, via Skillman
28	RC	7-day	428	C	7-day	Park La	Divert to serve LRT	
33	RL	5-day	33	R	5-day	Mockingbird	Retain only CBD-Mockingbird segment	Outer segments covered by new #533,590,596
34	RL	7-day	34	R	7-day	Mockingbird	Extend to LRT	
67	RLS	5-day	--	--	--	---	Eliminate route	Outer portion covered by new #567,595
69	RLS	5-day	--	--	--	---	Eliminate route	Outer portion covered by new #519,569,593,594
73	RLS	5-day	211	EXP	5-day	---	Reroute to Tollway, not LRT	Travel time/service reliability considerations
77	RLS	Peak/Sat	577	F	6-day	Park La	Cut back to feed LRT	Add M-F midday service (compensate for #73 reroute)
82	RLS	6-day	--	--	--	---	Eliminate route	Outer portions covered by new #582,591,592
88	RC	5-day	488	C	5-day	Park La	Extend to LRT	
133	RLS	Peak	133	LS	Peak	Park La	Divert to serve LRT	
200	RE	5-day	200	EXP	5-day	Park La	Eliminate mid-day CBD Segment	AM outbound stop at LRT station; reverse in evening
201	RE	5-day	201	EXP	5-day	Park La	Eliminate mid-day CBD Segment	AM outbound stop at LRT station; reverse in evening
--	--	--	519	F	5-day	Mockingbird	New Route "19A"	Replace outer #19N
--	--	--	521	F	7-day	Park La,Mockingbird	New Route "21"	Connect the stations, replacing outer #21
--	--	--	533	F	5-day	Park La	New Route "33A"	Replace n. end of #33R (maybe also #33F);new Walnut Hill svc
--	--	--	567	F	5-day	Park La,Mockingbird	New Route "67A"	Connect the stations, replacing part of outer #67
--	--	--	569	F	5-day	Park La	New Route "69A"	Replace outer #69W
--	--	--	582	F	5-day	Park La	New Route "82A"	Replace outer #82W
--	--	--	590	F	7-day	Park La	New Route "A"	New service on Park Lane, Walnut Hill
--	--	--	591	F	6-day	Lovers La	New Route "82C"	Replace part of #82
--	--	--	592	F	6-day	Park La	New Route "82B"	Replace outer #82E
--	--	--	593	F	5-day	Lovers La	New Route "69C"	Replace outer #69E
--	--	--	594	F	5-day	Lovers La	New Route "69B"	Replace part of #69W
--	--	--	595	F	5-day	Park La	New Route "67B"	Replace north end of #67
--	--	--	596	F	5-day	Park La,Mockingbird	New Route "33B"	Connect the stations, replacing part of outer #33
--	--	--	597	F	Peak	Mockingbird	New Route "19B"	Replace outer #19M
--	--	--	598	F	7-day	Park La,Lovers La	New Route "6A"	Connect the stations; via Shady Brook/Eastridge (#6)
--	--	--	599	F	7-day	Park La	New Route - combined "1/6" & "1F"	N. Greenville corridor; M-F to Hamilton Pk/N.C. TC


CAMPBELL RD
PRESTON RD
PRESTONWOOD
ARAPAHO RD
RICHARDSON
BELT LINE RD
BELT LINE RD
SPRING VALLEY
BUCKINGHAM RD
PLANO RD
JUPITER RD
HILLCREST RD
NORTH CENTRAL
FOREST LN
LBJ FRWY
GREENVILLE
ROYAL LN
MILLER RD
SKILLMAN
ABRAMS
FERNDALE
SHILOH
GARLAND
SOUTH GARLAND
NORTHWEST HWY
DALLAS NORTH TOLLWAY
PRESTON RD
MOCKINGBIRD
GREENVILLE AV
SKILLMAN ST
ABRAMS RD
WHITE ROCK LAKE
GARLAND RD
PEAVY
GUS THOMASSON
LAKELAND
OATES
ROSS
BRYAN
GASTON
COLUMBIA
EAST GRAND
HASKELL AV
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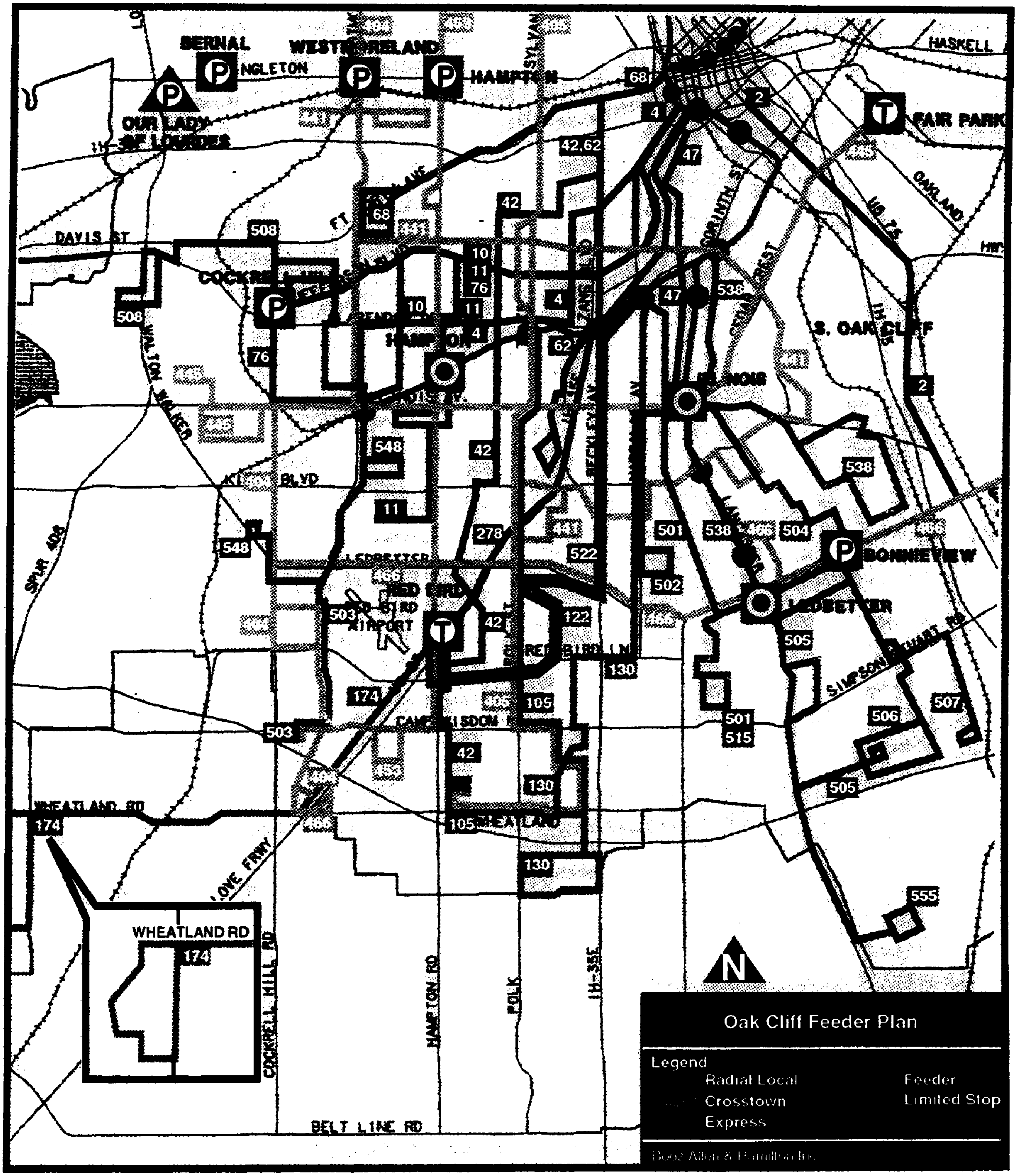
34
North Central Feeder Plan
Legend
Radial Local
Limited Stop
Express
Feeder
Crosstown
Booz Allen & Hamilton Inc

BUS/LIGHT RAIL INTERFACE PLAN SUMMARY - OAK CLIFF AREA

CURRENT ROUTE			PROPOSED ROUTE			OAK CLIFF AREA LRT STATIONS		
NO.	TYPE	SERVICE	NO.	TYPE	SERVICE	SERVED	CHANGES FROM CURRENT	NOTES
2	RL	7-day	2	R	7-day	Lamar	Divert via LRT	
4	RL	7-day	4	R	7-day	Tyler,Westmoreland	Extend w. on Clarendon	Subst for #11; new service corridor
5	RL	Peak	--	--	--	---	Eliminate route	Covered primarily by #405
10	RL	7-day	10	R	7-day	Westmoreland	Extend to LRT; add trips	Subst for #11
11	RL	7-day	11	R	7-day	Hampton	Eliminate Montreal Segment	Covered by extended #453 diversion
15	RL	7-day	501	F	7-day	Zoo	Cut back to feed LRT	Suppl. with peak #515
16	RL	Peak	--	--	--	---	Eliminate route	Route #453 to deviate two trips per peak
22	RL	7-day	522	F	7-day	Zoo	Extend to Red Bird TC; terminate at zoo station	New service corridor; Suppl. with peak #122
30	RL	7-day	502	F	7-day	Zoo	Cut back (LRT); s. to Ann Arbor only	Suppl. with peak #630
38	RL	7-day	504,538	F	7-day	Illinois, Corinth	Cut back to feed LRT	Divide into two routes
41	UC	6-day	441	C	6-day	Keist,Corinth	S. loop via Kiest/Polk (not US 67)	Replace #56, better transfers
42	RLS	5-day	42	R	6-day	Tyler-Vernon	Extend to Wheatland	Replace #56; also divert via Red Bird TC
45	UC	7-day	445	C	7-day	Westmoreland,Illinois	Extend w. to loop via Larue	Replace outer #68
47	RL	7-day	47	R	7-day	Illinois-Ledbetter, Morrell	Extend along Lancaster	Subst for #55
48	RL	7-day	548	F	7-day	Westmoreland	Cut back to feed LRT	Suppl. with new #503
53	UC	7-day	453	C	7-day	Hampton	Some trips via Montreal loop (from #11)	
54	RL	7-day	--	--	--	---	Eliminate route	Covered by new #70,508
55	RLS	7-day	505,506,507	F	7-day	Ledbetter	Cut back to feed LRT	Divide into three routes
55X	RLS	Peak	--	--	--	---	Eliminate route	Covered by LRT,feeders
56	RLS	6-day	--	--	--	Tyler-Vernon	Eliminate route	Covered by #42
61	RLS	7-day	--	--	--	Tyler-Vernon	Eliminate route	Covered by #405,605
62	RL	7-day	62	R	7-day	Zoo	Cut back (LRT); Extend to Wheatland	---
66	UC	7-day	466	C	7-day	Ledbetter,VA Hosp	[No change]	
68	RL	7-day	68	--	--	---	Eliminate route	Covered by #76,445,508, and new #68
74	RLS	Peak	174	LS	Peak	---	Service to Red Bird TC	Interline with #122 or #278
76	RL	7-day	76	R	7-day	Westmoreland	West only to LRT; subst. Marsalis for Ewing	"Complements" #10,404,508
78	RE	5-day	278	EXP	5-day	---	Add stop at Red Bird TC	Coordinate schedule with #205 in CBD
304	RC	6-day	404	C	6-day	Westmoreland	Via Westmoreland,Illinois - to serve LRT	Eliminated section served by #76
405	RC	7-day	405	C	7-day	Tyler	S. to Wheatland (not Illinois TC)	Covers #61; Suppl. with peak #605
515	CF	Peak	515	F	Peak	Ledbetter	Cut back to feed LRT	
530	CF	Peak	130	LS	Peak	Illinois	Extend south of I-20	Replace #30P; Ltd stops along Marsalis
555	CF	5-day	555	F	5-day	Ledbetter	Cut back to feed LRT	
--	--	--	68	R	7-day	Westmoreland	New Route "C" - Ft Worth Ave	Replace #16,48,54,68 trunk; re-use #68 route designation
--	--	--	503	F	7-day	Westmoreland	New Route "48B" - s. Westmoreland	To Red Bird Mall
--	--	--	508	F	7-day	Westmoreland	New Route "B" - Mt Creek,Cockrell	Replace outer #54,68,76
--	--	--	105	LS	Peak	Tyler	New Route "561"	Ltd Stops along southern #405 alignment
--	--	--	122	LS	Peak	Zoo	New Route	Ltd Stops along southern #522 alignment


BERNAL
WESTMORELAND
HAMPTON
OUR LADY OF LOURDES
HASKELL
FAIR PARK
DAVIS ST
OAKLAND
S. OAK CLIFF
ILLINOIS
WALTON WALKER
KIEST BLVD
SPUR 408
LEDBETTER
RED BIRD AIRPORT
BONNIEVIEW
SIMPSON STUART RD
REDBIRD LN
WHEATLAND RD
LOVE FRWY
COCKRELL HILL RD
HAMPTON RD
POLK
IH-35E
BELT LINE RD
68
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42,62
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508
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76
538
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548
441
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278
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466
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174
105
506
507
515
555
Oak Cliff Feeder Plan
Legend
Radial Local
Crosstown
Express
Feeder
Limited Stop
Booz Allen & Hamilton Inc.

LIGHT RAIL SERVICE PROVIDES AN IMPORTANT LINK IN THE DART SERVICE NETWORK AND ALLOWS FOR BUS SERVICE REDUCTIONS TO BE MADE WITHOUT NEGATIVE IMPACT TO THE RIDING PUBLIC.

- The exhibit on the following page summarizes changes in trips, revenue miles, revenue hours and peak vehicles, by day, for the North Central and Oak Cliff areas.

- Trips in the North Central area will increase, while service hours and miles will decrease. This increase in trips with fewer resources is possible because bus routes are short-turned at LRT stations.

- LRT, with two branches serving neighborhoods in the Oak Cliff area , provides substantial transit service coverage.

  — Bus trips, service miles, and service hours in the Oak Cliff area decrease as a result.

  — The exception is the number of bus trips on Sunday, which increase by 14 percent.

COMBINED BUS/LIGHT RAIL INTERFACE PLAN IMPACTS

	WEEKDAY				SATURDAY				SUNDAY			
	One-Way Trips	Revenue Miles	Revenue Hours	Peak Vehicles	One-Way Trips	Revenue Miles	Revenue Hours	Peak Vehicles	One-Way Trips	Revenue Miles	Revenue Hours	Peak Vehicles
CURRENT												
North Central Plan	1,227	14,460.1	924.8	130	446	5,134.6	337.3	21	223	2,062.7	156.5	10
Oak Cliff Plan	2,269	24,357.7	1,653.6	202	1,283	14,664.2	1,020.5	63	698	7,382.1	536.3	32
Total LRT Feeder Plans	**3,496**	**38,817.8**	**2,578.4**	**332**	**1,729**	**19,798.8**	**1,357.8**	**84**	**921**	**9,444.8**	**692.8**	**42**
PROPOSED (FOR 1996)												
North Central Plan	1,862	14,221.5	901.5	130	616	4,463.0	312.8	32	314	1,973.2	142.4	19
Oak Cliff Plan	2,017	19,276.3	1,307.2	148	1,235	12,795.3	884.3	62	796	6,984.3	490.7	37
Total LRT Feeder Plans	**3,879**	**33,497.8**	**2,208.7**	**278**	**1,851**	**17,258.3**	**1,197.1**	**94**	**1,110**	**8,957.5**	**633.1**	**56**
CHANGE												
North Central Plan	635	(238.6)	(23.3)	0	170	(671.6)	(24.5)	11	91	(89.5)	(14.1)	9
Oak Cliff Plan	(252)	(5,081.4)	(346.4)	(54)	(48)	(1,868.9)	(136.2)	(1)	98	(397.8)	(45.6)	5
Total LRT Feeder Plans	**383**	**(5,320.0)**	**(369.7)**	**(54)**	**122**	**(2,540.5)**	**(160.7)**	**10**	**189**	**(487.3)**	**(59.7)**	**14**
PERCENT CHANGE												
North Central Plan	51.8%	-1.7%	-2.5%	0.0%	38.1%	-13.1%	-7.3%	52.4%	40.8%	-4.3%	-9.0%	90.0%
Oak Cliff Plan	-11.1%	-20.9%	-20.9%	-26.7%	-3.7%	-12.7%	-13.3%	-1.6%	14.0%	-5.4%	-8.5%	15.6%
Total LRT Feeder Plans	**11.0%**	**-13.7%**	**-14.3%**	**-16.3%**	**7.1%**	**-12.8%**	**-11.8%**	**11.9%**	**20.5%**	**-5.2%**	**-8.6%**	**33.3%**

AN ANNUAL $5.2 MILLION IN OPERATING COST SAVINGS IS ESTIMATED TO RESULT FROM IMPLEMENTATION OF RECOMMENDED BUS SERVICE CHANGES, AS SHOWN BELOW.

COMBINED BUS/LIGHT RAIL INTERFACE PLAN OPERATING COST IMPACTS

(annualized FY94 budget dollars)

	Variable Costs	Fixed Costs	Total Annual Costs
North Central Plan	($394,516)	$198,900	($195,616)
Oak Cliff Plan	($5,214,601)	$226,440	($4,988,161)
Total Combine Plans	($5,609,117)	$425,340	($5,183,777)

- Variable costs are reduced by an estimated $5.6 million. This is offset by a $0.4 million change in the allocation of fixed costs to individual routes.

- Fixed costs are allocated to routes based on peak vehicles. The bus/LRT interface plan calls for a peak vehicle reduction of 54. Therefore, fixed costs are spread over a smaller base.

  — The total dollar amount of fixed costs does not change, but the amount allocated to individual routes is increased (i.e., $1,530 per peak vehicle).

4.0 BUS/COMMUTER RAIL INTERFACE

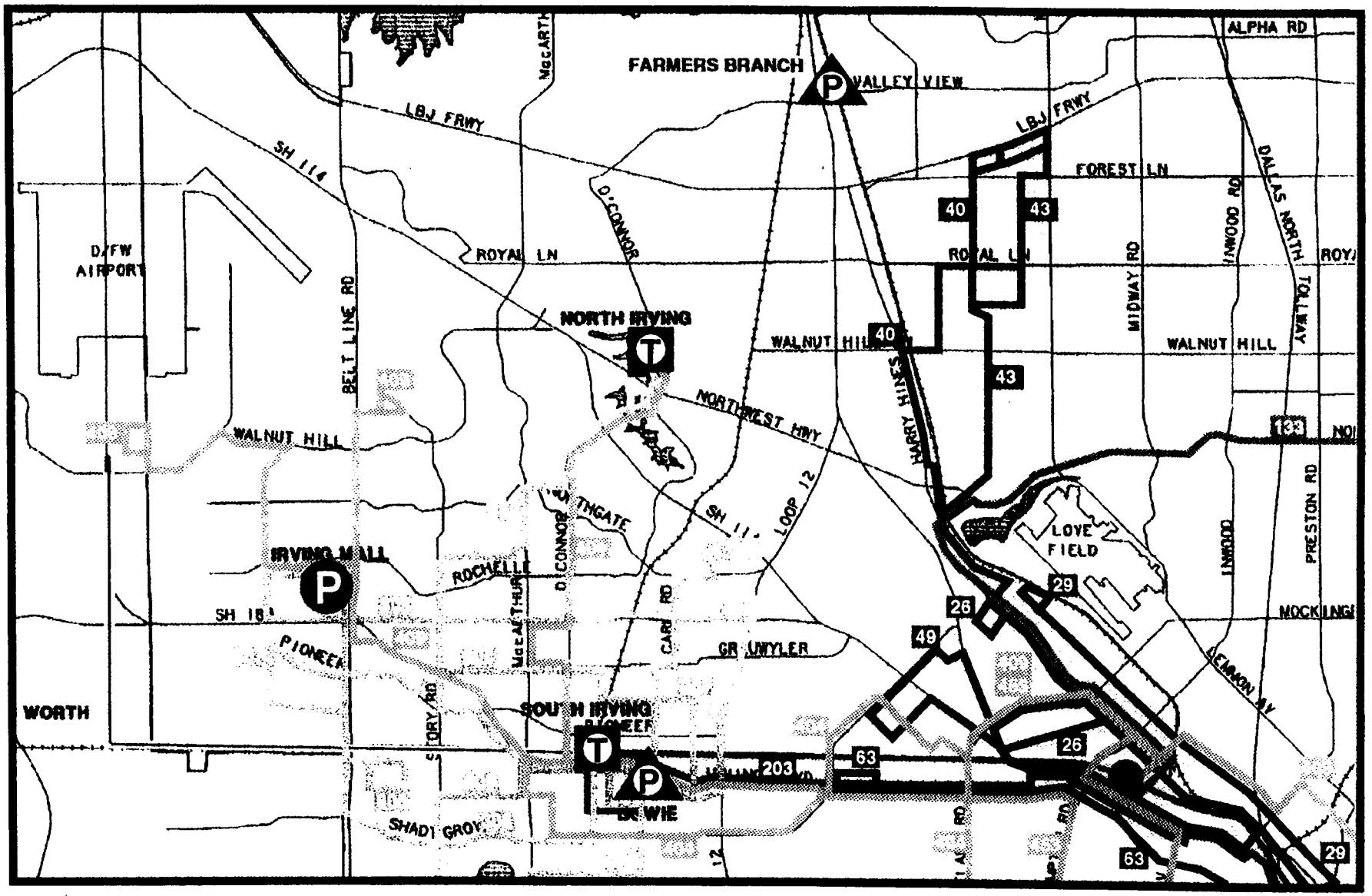
COMMUTER RAIL SERVICE BETWEEN SOUTH IRVING AND THE CBD IS PLANNED FOR PEAK PERIODS BEGINNING IN 1996. RECOMMENDED CHANGES IN THE BUS NETWORK ARE SUMMARIZED BELOW AND SHOWN GRAPHICALLY ON THE FOLLOWING PAGE.

Current Route No.	Type	Service	Proposed Route No.	Type	Service	Stations to be Served	Changes from Current (Railtran-Related)	Notes/Comments
9	C	7-day	409	C	7-day	Med. Center, Irving	None except designation	Connection on Harry Hines
13	C	6-day	413	C	6-day	---	None except designation	Possibly change as part of Crosstown Plan
26	R	7-day	26	R	7-day	Med. Center	None	Connection on Harry Hines
29	R	7-day	29	R	7-day	Med. Center (a)	None	Serves parallel corridor; Time penalty to divert
40	R	7-day	40	R	7-day	Med. Center	None	Connection on Harry Hines
40	RL	Peak	740	RLS	Peak	Med. Center	None except designation	Connection on Harry Hines
43	R	6-day	43	R	6-day	Med. Center	None	Connection on Harry Hines
43	RL	Peak	743	RLS	Peak	Med. Center	None except designation	Connection on Harry Hines
49	R	5-day	49	R	5-day	Med. Center (a)	None	Serves parallel corridor; Time penalty to divert
53	C	7-day	453	C	7-day	Med. Center	Short extension to station	Terminal location and good feeder potential
63	R	5-day	63	R	5-day	Med. Center (a)	None	Serves parallel corridor; Time penalty to divert
85	RLS	5-day	785	RLS	5-day	---	None except designation	Serves different market; Time penalty to divert
133	CLS	Peak	133	CLS	Peak	Med. Center	Short extension to terminate at station	More for terminal location than feeder potential
203	EXP	5-day	203	EXP	5-day	Irving	Eliminate in peak; no change off-peak	Competes with Railtran during the peak periods

INCLUDED IN THE CHANGES ABOVE ARE THOSE RECOMMENDED BY DART STAFF AS PART OF THE IRVING SECTOR STUDY.

RECOMMENDED CHANGES IN THE BUS NETWORK (CONTINUED)

Current Route No.	Type	Service	Proposed Route No.	Type	Service	Stations to be Served	Changes from Current (Railtran-Related)	Notes/Comments
300	C	7-day	409	C	7-day	Med. Center, Irving	None	Connections available at both stations
301	CF	6-day	301	CF	5-day	---	None	Assumes 1/95 changes (revised Sat. route - see #311)
302	CF	5-day	302	CF	5-day	Irving	None	Existing connection at Transit Center
304	C	6-day	404	C	6-day	Irving	Reroute via Shady Grove	Based on pending DART proposal
305	CF	5-day	305	CF	5-day	---	None	Assumes 1/95 changes (Univ. of Dallas diversion)
306	CF	Peak	306	CF	5-day	Irving	Improve peak headway to 25 minutes	Assumes 1/95 changes (elim. north end; add off-peak)
307	CF	5-day	307	CF	5-day	Irving	To sta. (not Brook Hollow); Replace #308 Esters loop	Based on pending DART proposal
308	CF	5-day	308	CF	5-day	Irving	Replace Esters loop with #307; Divert via Tudor	Based on pending DART proposal
309	CF	5-day	309	CF	5-day	Irving	None	Existing connection at Transit Center
405	C	7-day	405	C	7-day	Med. Center	Short extension to station	Terminal location and good feeder potential
--	--	--	303	CF	6-day	Irving	New Route: station to Hwy 183 corridor	25 min. peak headways; based on DART proposal
--	--	--	311	CF	Sat	Irving (b)	New Route: Walnut Hill/South Irving	Included for completeness (Sat. only); 1/95 change
--	--	--	318	CF	Sat	Irving (b)	New Route: Oakdale/Irving Mall	Included for completeness (Sat. only); DART proposal



N

Commuter Rail Feeder Plan

Legend

- Radial Local
- Limited Stop
- Express
- Connector/ Feeder
- Crosstown

Booz Allen & Hamilton Inc

THERE ARE FOUR ISSUES THAT NEED TO BE ADDRESSED AS PART OF THE BUS/COMMUTER RAIL INTERFACE PLANNING PROCESS.

- Schedule Coordination. A 20 or 30-minute headway for commuter service would improve schedule coordination.

  — Phase 1 Railtran service calls for 25-minute peak period headways. Bus service is currently on 30-minute headways. As a result, only one in five trips will be coordinated.

  — Changing bus service to a 25-minute headway will disrupt transit center schedule coordination throughout the system and have a high cost.

- Route 203 Peak Period Service. Route 203 peak period service is recommended for elimination.

  — Route 203 currently provides service between South Irving and the CBD; the approximate same alignment as Railtran.

  — Route 203 provides service more frequently than that planned for Phase 1 Railtran service (i.e., 8 minutes compared to 25).

  — Travel time between the two modes is essentially the same, although bus service is subject to traffic delays.

  — Downtown train access may be less convenient for many riders.

THERE ARE FOUR ISSUES THAT NEED TO BE ADDRESSED (CONTINUED)

- South Irving Parking. Additional parking is needed at the South Irving Transit Center.

  — Many patrons of Route 203 park at the Bowie Park-N-Ride lot which has 440 spaces of which about 95 are used. The proposed plan calls for eliminating Route 203 peak period service. Those people who park at Bowie would begin to park at South Irving.

  — The South Irving Transit Center has 157 parking spaces with approximately 130 currently in use.

- Medical/Market Center Employer Shuttle. Rather than changing all bus routes that operate in this area, it is recommended that DART explore opportunities to expand existing privately-operated shuttle service.

  — A significant amount of transit service exists near and around the Medical Center Railtran station site. These routes are primarily CBD bound; route deviations to serve the Railtran station would inconvenience a majority of riders.

  — A privately-operated shuttle service currently exists in the Medical Center area. Options to expand this service to include the Railtran station and other sites in the Medical/Market Center area should be explored.

THE BUS INTERFACE PLAN FOR PHASE 1 RAILTRAN SERVICE IS ESTIMATED TO COST ABOUT $10 THOUSAND ANNUALLY, AS SUMMARIZED BELOW.

COMBINED BUS/LIGHT RAIL INTERFACE PLAN OPERATING COST IMPACTS

(annualized FY94 budget dollars - $ in thousands)

	Variable Costs	Fixed Costs	Total Annual Costs	Peak Vehicles
Bus Routes	($193.5)	$18.5	($175.0)	(7)
New Shuttle	$184.0	NA	$184.0	3
Total	$9.5	$18.5	$9.0	(4)

- Estimated cost savings for bus routes are primarily a result of eliminating Route 203 peak-period service.

- New van shuttle service between the Medical Center Railtran station and major employment sites is estimated to cost $30 to $45 per hour, for an annual cost of $184,000.

5.0 GRID NETWORK

Grid Network...

IN 1992, DART CONDUCTED A GRID SYSTEM STUDY. DART PLANNERS HAVE SINCE CONTINUED TO WORK ON DEVELOPMENT OF A GRID NETWORK, INCLUDING IDENTIFICATION OF POTENTIAL NEW ROUTES, AS SHOWN BELOW.

ESTIMATED PERFORMANCE FOR PROPOSED NEW GRID NETWORK ROUTES

Route Name	Route Miles	Daily Rev. Miles	Daily Rev. Hrs.	Peak Vehicles	Est. Annual Costs ($000)	Est. Annual Riders (000)	Riders Per Hour	Cost Per Rider
Legacy Park/Plano/S. Garland	22.9	1,374.0	65.4	5	$832	88.3	5.3	$9.42
Carrollton/Richardson	14.3	858.0	40.9	3	$532	162.1	15.6	$3.28
Oak Cliff/North Irving	16.2	972.0	46.3	4	$594	254.6	21.6	$2.33
Oak Cliff/Richardson	20.4	1,224.0	58.3	5	$738	398.0	26.8	$1.85
Richardson/North Irving	17.2	1,032.0	49.1	4	$628	159.7	12.7	$3.93
Pleasant Grove/South Garland	15.4	924.0	44.0	4	$567	320.3	28.6	$1.77
Rowlett/Richardson	14.6	876.0	41.7	4	$541	152.4	14.3	$3.55
Carrollton/Medical Center	15.5	930.0	44.3	4	$570	107.2	9.5	$5.32
Red Bird/Prestonwood	21.3	1,278.0	60.9	5	$777	437.6	28.2	$1.77
Prestonwood/Garland	12.8	768.0	51.2	4	$648	311.7	23.9	$2.08
Inwood Crosstown	12.5	750.0	50.0	4	$631	227.4	17.8	$2.78
Illinois/Sylvan	11.5	690.0	46.0	4	$581	215.0	18.3	$2.70
Ledbetter/Medical Center	14	840.0	56.0	4	$702	271.0	19.0	$2.59
Illinois/Hampton	12.6	756.0	50.4	4	$633	253.9	19.8	$2.49
Clarendon Crosstown	9.7	582.0	38.8	3	$499	287.6	29.1	$1.73
Baylor/Medical Center	7.8	468.0	31.2	3	$405	245.2	30.8	$1.65
Walnut Hill Crosstown	14	840.0	56.0	4	$696	205.0	14.4	$3.40
TOTAL	**252.7**	**15,162.0**	**830.5**	**68**	**$10,574**	**4,097.1**	**19.3**	**$2.58**

ASSUMPTIONS USED IN ESTIMATING ROUTE PERFORMANCE INCLUDE:

- Service frequencies of 30-minutes for a 15-hour span of service; weekdays only;
- Average of 21 mph for express/limited stop services; 15 mph for crosstown services;
- Operation of all candidate routes by private provider, although for some of the routes, deadhead mileage could be reduced by DART operation; and
- Ridership estimates based on a sketch plan ridership model (developed as part of this study) which uses factors such as population, employment and cars per household.

ELEVEN OF THE PROPOSED NEW ROUTES WERE ESTIMATED TO HAVE A COST PER PASSENGER BELOW THE SYSTEMWIDE AVERAGE OF $2.99, INDICATING STRONG POTENTIAL FOR IMPLEMENTATION. RECOMMENDATIONS FOLLOW.

- Two of the candidate routes are recommended for early implementation (i.e., Pleasant Grove/South Garland and Baylor/Medical Center) at an estimated annual cost of $732,200. Cost savings from changes in bus service upon LRT implementation could be used to offset this cost.

- Changes in Route 4 are recommended upon implementation of the LRT starter system and Fair Park Transit Center. These changes address the travel needs of the Clarendon Crosstown candidate route with little cost impact.

- Two of the candidate routes are recommended for implementation concurrent with the new Addison Transit Center (i.e., Prestonwood/Garland and the Inwood Crosstown) at an estimated annual cost of $1.3 million annually.

  — The cost of these candidate routes will need to be considered relative to other service needs at the time of transit center completion.

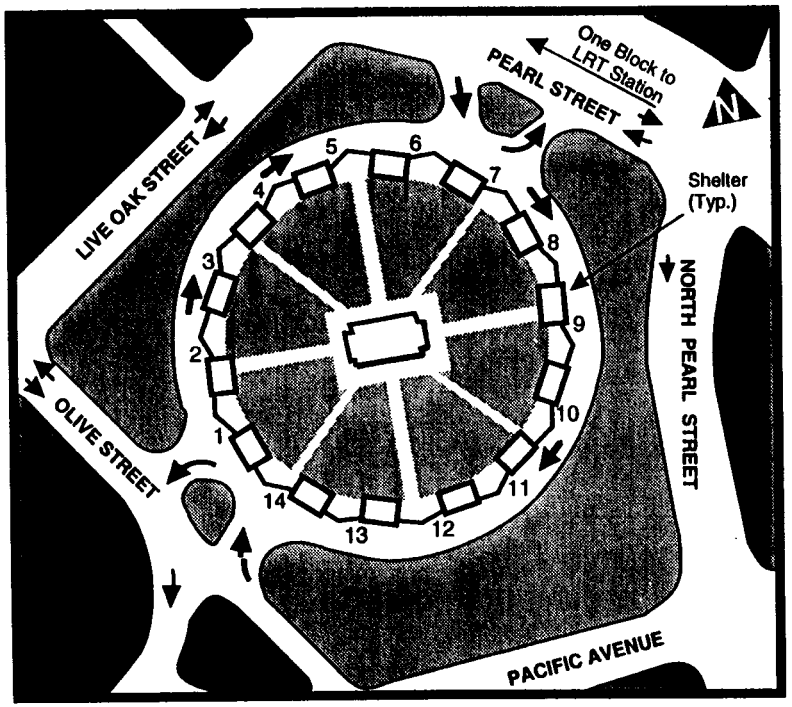
- The remaining six candidate routes are addressed to a great degree by proposed LRT-bus feeder service and CBD transfer center and routing recommendations. Associated costs with these changes are included in other sections.

6.0 CBD TRANSFER CENTERS

DART PLANS CALL FOR DEVELOPMENT OF TWO TRANSFER CENTERS IN THE CBD, AS SHOWN BELOW.

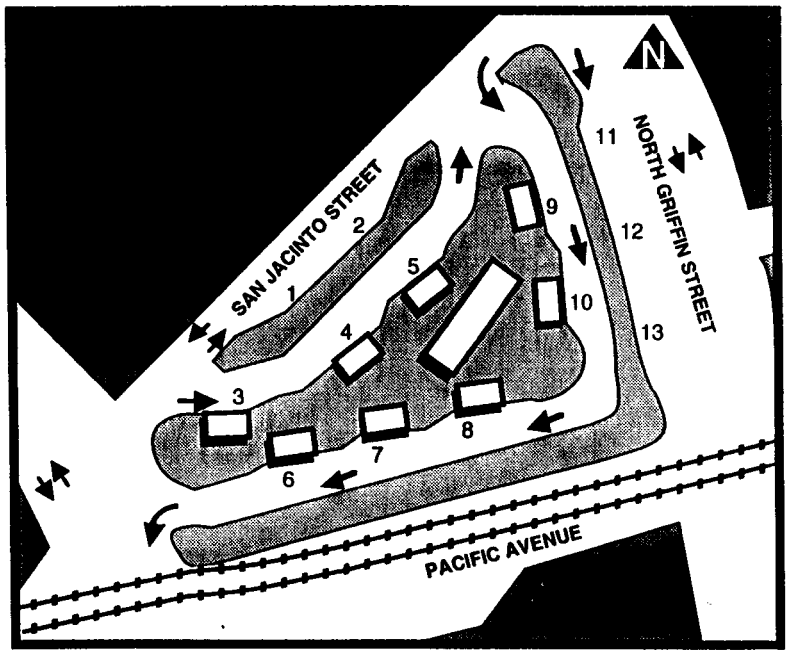
CBD TRANSFER CENTER - PRELIMINARY SITE PLANS
As of February 1995

East Side Transfer Center



Maximum Buses = 14

West Side Transfer Center



Maximum Buses = 13

AN OPERATIONS PLAN FOR THESE TWO CENTERS WAS DEVELOPED BASED ON THE ASSUMPTION THAT APPROXIMATELY 125 PEAK PERIOD TRIPS WOULD NO LONGER SERVE THE CBD UPON RAIL SERVICE START-UP. PLAN OBJECTIVES INCLUDE:

- Minimize the added time inconvenience to non-transferring passengers.

  — CBD routing of individual bus services were developed with this concept in mind. The majority of routes stop only at one center just prior to departing the CBD.

- Maximize the number of downtown transfers that can be diverted to these two centers.

  — With rail start-up and the proposed CBD operations plan, 61 percent of passenger transfer activity in the CBD will be accommodated at the Transfer Centers.

- Balance peak period bus trips between the two Transfer Centers.

  — This has been accomplished as shown below.

NUMBER OF PEAK PERIOD BUS TRIPS BY CBD TERMINAL WITH RAIL START-UP

		A.M. Peak
Number of Peak Hour Bus Trips	East	135
	West	130
	Both	22
Number of Berths	East	14
	West	13
Minutes per Berth Trip	East	5.0
	West	5.1

PROPOSED TERMINAL AND BERTHING ASSIGNMENTS ARE SHOWN BELOW AND ON THE FOLLOWING PAGES.

East CBD Transfer Center

Berth No.*	Route Number	Route Name	Peak Hr. Buses
1	68	New route replacing 16 and 22	6
	280	Pleasant Grove Express	2
2	40	Brockbank	--
	43	Park Forest	--
	44	Oakland	14
3	31	Midway	4
	58	Canada/Bernal	2
	59	Ledbetter/Singleton	2
	35	West Commerce	2
	76	Cockrell/Mt. Creek	2
4	29	Maple	4
	37	Urbandale	4
	50	Piedmont	4
5	19	Abrams	2
	23	Lakewood	2
	25	Westshore	2
	201	Richardson Express	6
6	278	Red Bird Express	6
	200	East Plano Express	5
	203	South Irving Express	off-peak
7	205	Addison Express	4
	208	Valley Ranch Express	2
	210	West Plano Express	6
8	206	Glenn Heights Express	4
	207	Rowlett Express	2

PROPOSED TERMINAL AND BERTHING ASSIGNMENTS (CONTINUED)

East CBD Transfer Center

Berth No.*	Route Number	Route Name	Peak Hr. Buses
9	17	Hop-A-Bus (Red and Green)	12
10	33	Baltimore	3
	36	Preston Hollow	3
	73	Spring Creek	4
11	4	Bishop	3
	21	SMU	3
	24	Capitol	3
	34	Vickery	3
12	1	Belmont	--
	20	Skillman	--
	62	Wynnewood	9
	84	Preston Hollow/Frankford	3
13	2	Ervay	6
	8	Oak Lawn	6
14	3	Junius	3
	7	Harwood	3
	63	Industrial	6

PROPOSED TERMINAL AND BERTHING ASSIGNMENTS (CONTINUED)

West CBD Transfer Center

Berth No.*	Route Number	Route Name	Peak Hr. Buses
1	18	Parkview	4
	83	Prestonwood	5
	85	Shady Trail	2
2	204	Carrollton Express	11
3	17	Hop-A-Bus (Blue, Green, Red)	12
4	33	Baltimore	3
	51	Walnut Hill	2
	52	Bickers	2
	73	Spring Creek	4
5	42	Elmwood	5
	202	North Irving Express	6
6	10	Sunset	3
	11	Hampton	3
	12	Second	3
	14	Lagow	3
7	26	Hines	10
	49	Brookhollow	2
8	65	Pleasant Grove	12
9	46	Meadow	2
	47	Moore	2
	60	White Rock	8
10	36	Preston Hollow	3
	39	Love Field	6
	75	Murdock	3
11	64	Ferguson	12
12	81	Garland Express	12
13	64, 81	Share Space	6+6

7.0 ROUTE PRIVATIZATION

DART IS AMONG THE LEADERS IN THE PRIVATIZATION OF TRANSIT SERVICE IN THE NATION. THE LEVEL OF PRIVATIZATION IS A FUNCTION OF RAPID SERVICE GROWTH IN THE MID-80'S. THE PROCESS OUTLINED BELOW WAS DEVELOPED FOR DART TO USE IN ASSESSING CURRENT ROUTE PRIVATIZATION OPPORTUNITIES.

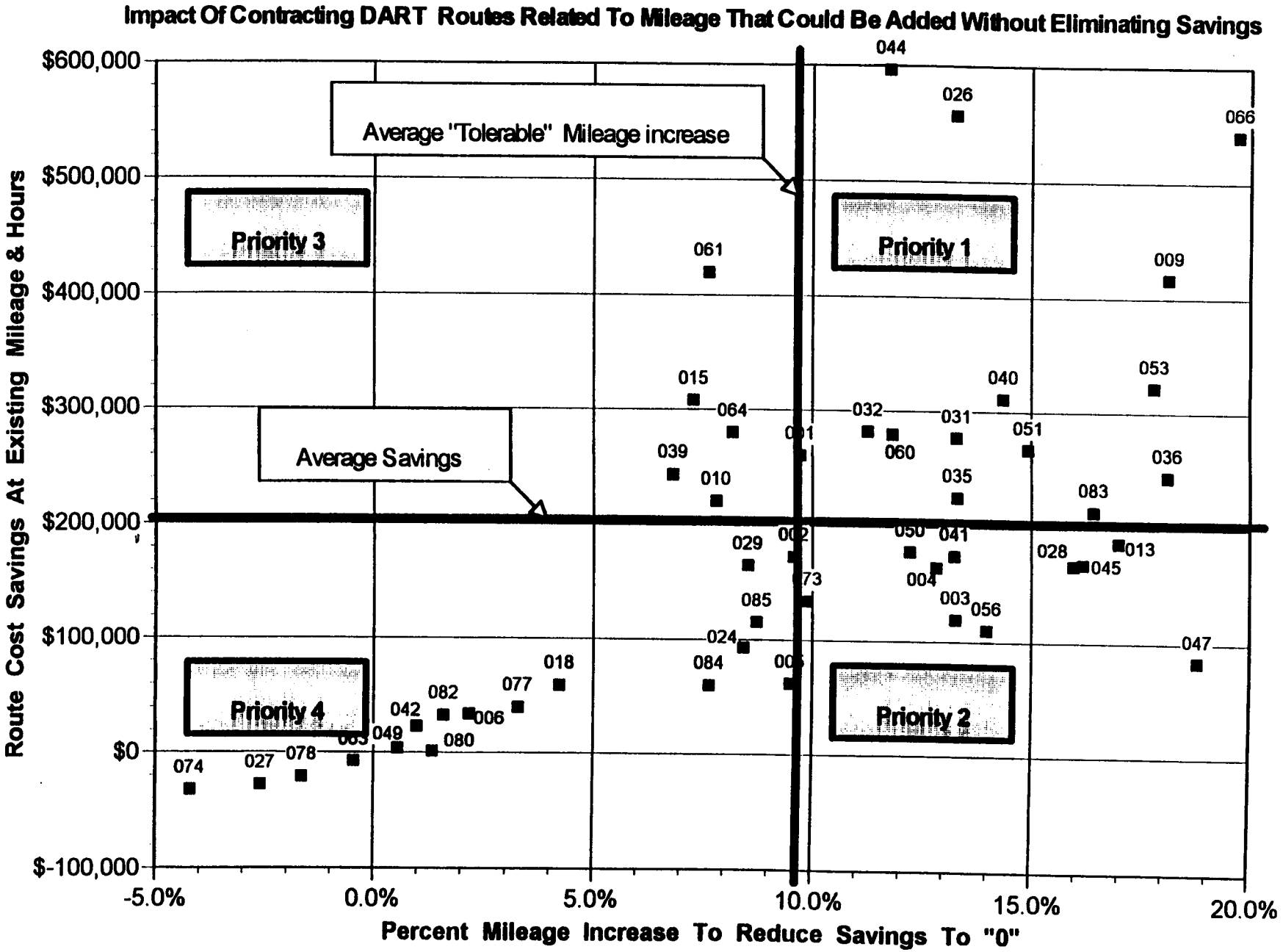
- Estimate the cost of each DART operated route using the cost allocation methodology developed as part of this study.

- Calculate the savings for every route assuming contractor operation and no change in miles or hours.

- Calculate the additional miles that could be "tolerated" before savings were eliminated.

- Develop a privatization prioritization system based on the magnitude of potential savings and mileage increase "tolerance".

THE EXHIBIT SHOWN ON THE FOLLOWING PAGE ILLUSTRATES POTENTIAL COST SAVINGS FROM ROUTE PRIVATIZATION RELATIVE TO "TOLERABLE" MILEAGE INCREASES.


Impact Of Contracting DART Routes Related To Mileage That Could Be Added Without Eliminating Savings
Route Cost Savings At Existing Mileage & Hours
$600,000
$500,000
$400,000
$300,000
$200,000
$100,000
$0
$-100,000
-5.0%
0.0%
5.0%
10.0%
15.0%
20.0%
Percent Mileage Increase To Reduce Savings To "0"
Average "Tolerable" Mileage increase
Average Savings
Priority 1
Priority 2
Priority 3
Priority 4
044
026
066
061
009
015
040
053
064
032
031
051
039
060
036
010
035
083
029
050
041
028
013
004
045
085
003
056
024
047
084
018
077
082
042
006
049
080
074
027
078

SHOWN BELOW IS AN EXAMPLE OF THIS ANALYTICAL APPROACH FOR TEN ROUTES. CONTRACT OPERATION OF THESE TEN ROUTES WOULD RESULT IN A COST SAVINGS OF APPROXIMATELY $2.8 MILLION.

FINANCIAL IMPACT OF CONTRACT OPERATION OF SELECTED DART ROUTES

Route Number	Route Type	Priority Category	Peak Veh.	Total Annual Vehicle Miles	Total Annual Vehicle Hours	Contract Deadhead Miles Change	Contract Deadhead Hours Change	Contract Total Annual Miles	Contract Total Annual Hours	Current Total Route Cost	Contract Cost With Miles Change	Contract Savings With Miles Change
083	RLS	1	6	450,016	22,532	(1,436)	(213)	448,580	22,319	$1,537,552	$1,314,956	$222,596
066	UC	1	11	947,646	53,313	3,644	372	951,290	53,685	$3,296,027	$2,761,754	$534,273
013	UC	1	5	367,616	20,103	(10,879)	(1,312)	356,738	18,791	$1,306,578	$1,082,558	$224,020
053	UC	1	8	564,893	35,424	(12,273)	(1,158)	552,620	34,266	$2,145,957	$1,788,575	$357,382
009	UC	1	10	729,557	44,968	(15,373)	(1,428)	714,185	43,540	$2,731,296	$2,271,013	$460,283
073	RLS	2	8	367,787	21,458	(24,098)	(8,626)	343,690	14,832	$1,519,464	$1,241,863	$277,601
041	UC	2	7	358,131	24,010	8,757	439	366,888	24,449	$1,515,134	$1,353,646	$161,488
045	UC	2	5	295,246	20,712	13,852	1,636	309,098	22,348	$1,227,833	$1,098,970	$128,863
064	RLS	3	21	878,166	50,936	(4,965)	(1,222)	873,202	49,714	$3,732,097	$3,422,064	$310,033
085	RLS	4	8	389,793	18,482	3,825	848	393,618	19,330	$1,469,815	$1,369,931	$99,884
Total / Average			89	5,348,851	311,938	(38,945)	(8,665)	5,309,907	303,273	$20,481,753	$17,705,330	$2,776,423

ADDITIONAL COST SAVINGS COULD BE ACHIEVED BY DART PROVIDING A FACILITY FOR CONTRACTOR USE IN SERVICE PROVISION.

- The current ATE contract includes $7,452,112 in domicile costs. DART estimates that 30 percent (i.e., $2.2 million) is for buildings and land, as shown on the following page. These costs are annual operating costs to DART.

- The capital cost for DART to build a new facility is estimated at $30.0 million. Assuming federal funding participation, the cost of this new facility to DART would be $6.0 million.

- If DART were to build a new facility for contractor use, annual operating costs could be reduced. This reduction would most likely be considerably less than the $2.2 million for buildings and land due to expenses associated with facility operation and maintenance (e.g., utilities).

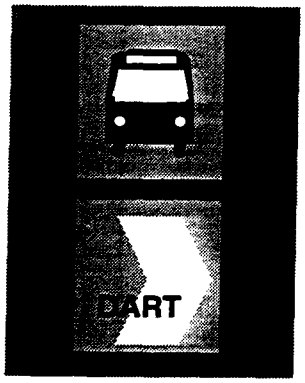
- A capital investment by DART of $6.0 million (i.e., local share for $30.0 million new facility) would pay for itself in operating cost savings over a three to five year period. If shop tools were capitalized, the payoff time would be slightly less.

GIVEN THE POTENTIAL PAYOFF PERIOD OF THREE TO FIVE YEARS FOR DART PARTICIPATION, IT IS RECOMMENDED THAT DART PURSUE THIS OPTION FURTHER.

ESTIMATED BREAKDOWN OF ATE DOMICILE COST VIS-A-VIS DART PROVIDED FACILITY

1994 BUDGET TOTAL = $7,452,112	
30% = Buildings and Land =	$2,235,634
30% = Administration =	$2,235,634
20% = Shop Overhead (Fringes/Supplies/etc.) =	$1,490,422
5% = Miscellaneous Overhead =	$372,606
5% = Tools =	$372,606
10% = Profit =	$745,211
	$7,452,112
Local Share of $30 million facility =	**$6,000,000**
Payoff Time Period (buildings & land charge) = Assuming other costs don't go up as a result of switch to new facility (e.g., shop overhead)	**2.7-5(a) Years**
Payoff Time Period (if tools were capitalized) =	**2.3-3.8(a) Years**

(a) Extended payoff period assumes that some portion of buildings and land $2.2 million annual cost is for facility maintenance and operations.



DART FIXED-ROUTE SERVICE REVIEW STUDY

NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS
and DALLAS AREA RAPID TRANSIT

prepared by

Booz·Allen & Hamilton Inc.

in association with

Mundle & Associates, Inc.

February 1995

ACKNOWLEDGMENTS

Prepared in cooperation with the Texas Department of Transportation and the United States Department of Transportation, Federal Highway Administration and the Federal Transit Administration.

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1.0 INTRODUCTION

1.0 INTRODUCTION

Booz·Allen & Hamilton Inc. was retained by the North Central Texas Council of Governments (NCTCOG) to assist Dallas Area Rapid Transit (DART) conduct a review of fixed-route services. This report summarizes analyses and recommendations in a number of service planning areas, including:

- bus/rail interface planning
- grid network development
- CBD transfer center operations
- service contracting strategy.

This section contains an overview of study objectives and scope, as well as report organization.

OVERVIEW OF STUDY OBJECTIVES AND SCOPE

DART has a number of major capital projects underway that will affect the future delivery of fixed-route services, including:

- light rail transit (LRT) starter system
- commuter rail system
- transfer center facilities in the Central Business District (CBD)
- completion of proposed high occupancy vehicle (HOV) lanes
- completion of additional transit centers outside the CBD.

Each of these projects will affect the configuration of the bus route network and the type of service provided by that network.

At the start of this study, DART service planners had already begun a number of service planning initiatives to address future needs given major capital investments in the transportation network and changes in travel patterns, demographics, and employment within the region. The status of these efforts prior to this study follow.

- Planning efforts for bus feeder services to new LRT and commuter rail stations outside the CBD were well underway. Many of the service changes implemented on July 25, 1994 were a result of these planning efforts and the opening of the Illinois Transit Center/LRT Station. A draft bus/rail interface plan was distributed by DART staff in September 1994.

- Efforts to develop revised routing patterns in the CBD were in the formative stage with only preliminary work having been done. The CBD strategy depends, to a large degree, upon changes made elsewhere in the bus network.

- Varying levels of effort have been expended on projects to improve the utility of DART's bus system given changes in employment patterns. A grid routing study had been completed, but additional work in translating

its results into specific route recommendations remained. Several of the new routes introduced in the July 25, 1994 service change were a result of DART planning efforts in this area.

Booz·Allen was retained to provide technical expertise and assistance to support DART service planning efforts in the form of:

- collection, aggregation, analysis and interpretation of data
- developing a framework for final service implementation planning.

This effort was designed to complement the work of DART staff and to provide assistance in developing specific plan concepts for:

- bus feeder service to the LRT starter and commuter rail systems
- routing and operating changes associated with CBD transfer centers
- a grid network to improve non-CBD travel.

Changes in the fixed-route network likely to result from this service review have the potential to impact DART's existing privatization strategy. DART is among the leaders in the privatization of transit service operation in the nation. The level of privatization is a function of the rapid growth of DART's bus system during the mid-80's. An additional objective of this study has been to examine several aspects of DART's privatization strategy, including:

- cost of contracting service compared to direct operation and framework for cost analysis

- potential for operating cost savings if DART provided a facility for contractor use.

REPORT ORGANIZATION

Sections contained in this report are as follows:

- **Existing Fixed Route Services** presents an overview of the amount and type of service provided by DART. Included in this overview is a summary of historical performance trends, as well as FY94 route performance. Service changes likely to impact performance are highlighted. This includes changes recommended in this report, as well as other service changes recommended in Sector Plans prepared by DART planning staff.

- **Emerging Trends And Future Plans** presents a summary of projected changes in population and employment likely to impact the need for and performance of DART's fixed route bus system. Included in this section is a summary of DART's Draft Transit System Plan Year 2010 and rail starter system.

- **Bus/Light Rail Interface Plan** expands upon DART's draft bus/rail interface plan of September 1994. Recommendations include identification of additional opportunities to short-turn and combine routes to improve overall bus system performance, and provide for additional bus/rail interface opportunities. Recommendations focus on near-term start-up of the light rail system, with an estimated $5.2 million annual operating cost savings resulting from bus service changes.

- **Bus/Commuter Rail Interface Plan** combines Irving Sector Study recommendations, prepared by DART staff, with considerations for 1996 Railtran start-up. Recommended changes are estimated to cost less than $10,000 annually.

- **Grid Network Plan** is a result of reviewing and evaluating previous DART planning efforts in light of the overall transit system plan and projected population and employment trends for 2010. Several new routes proposed by DART staff are evaluated. Opportunities to improve crosstown travel through schedule coordination, CBD Transfer Centers, and rail implementation are considered in conjunction with the need for new crosstown routes. New routes are estimated to cost $732,200 annually.

- **CBD Transfer Center Operations Plan** identifies routes to serve the East and West CBD Transfer Centers. Included in this section are maps showing recommended CBD routing and berthing assignments. The CBD Operations Plan focuses on the 1996 rail starter system implementation.

- **Assessing Opportunities For Route Privatization** outlines an approach and cost allocation methodology for analyzing privatization opportunities for fixed route services. Included in this section are examples of a number of routes with privatization potential to reduce total annual operating costs by approximately $2.8 million. The potential to reduce contract service domicile costs, through provision by DART of a maintenance facility, was also evaluated. A capital investment of $6 million in local match capital funding would pay for itself with operating cost savings in a three to five year period.

In total, service changes recommended herein are estimated to result in annual operating costs being reduced by approximately $4.4 million. Operating cost savings could be increased by an additional amount with privatization and facility strategies.

Accompanying this report, under separate cover, are a number of technical appendices which include information and service planning tools developed and used in this study. Technical appendices include:

- Appendix A: "Tell Us To Go" Rider Survey Results
- Appendix B: Bus Operator Survey and Supervisor Workshop Results
- Appendix C: Route Cost Allocation Model

- Appendix D: Route Ridership Sketch Planning Model
- Appendix E: Route Fare Revenue Allocation Model
- Appendix F: FY94 Route Performance Profile Data.

These technical appendices have additional value in that they may prove useful to DART service planning staff long after this study has been completed.

2.0 EXISTING FIXED ROUTE SERVICES

2.0 EXISTING FIXED ROUTE SERVICES

Dallas Area Rapid Transit Authority provides mass transit service to residents in a service area of 698 square miles with a total population of 1.7 million. Jurisdictions served by DART include: Addison, Buckingham, Farmers Branch, Highland Park, Carrollton, Cockrell Hill, Dallas, Garland, Glenn Heights, Irving, Plano, Richardson, Rowlett, and University Park. Exhibit 2-1 is a map of existing DART fixed route services.

This section presents an overview of historical performance by route type, as well as FY94 performance for individual routes by route type and day of week. Information presented herein identifies routes with good, marginal, and poor performance.

At the start of FY94, DART classifies its routes into six categories, including:

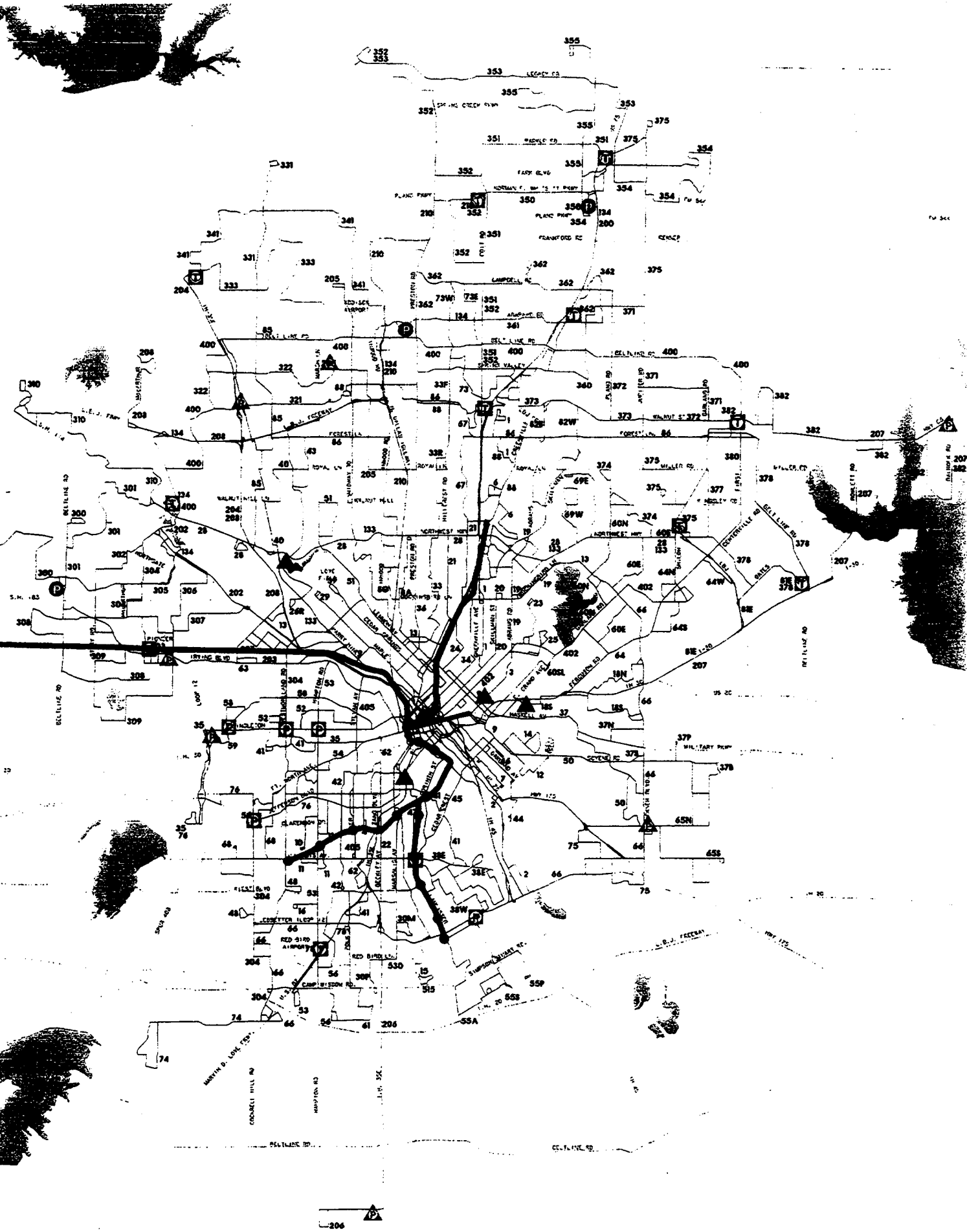
- Circulator/Connector routes that stop frequently and offer transfer opportunities to/from other routes and park-n-ride locations -- no downtown service
- Regional Crosstown routes stop frequently and link suburban areas primarily outside of the I-635 loop as well as provide service to transit centers where transfers to downtown Express service are available
- Regional Express routes provide weekday service to and from the downtown
- Radial Local routes stop frequently and serve the downtown and neighboring areas
- Urban Crosstown routes stop frequently and link areas and routes inside of the I-635 loop -- no downtown service
- Radial Limited Stop routes provide express-like service to downtown with a few stops along the route.

On July 25, 1994, DART implemented rail feeder routes and non-radial limited stop services. As a result, two new route classifications have been added. These services, as well as the downtown circulator system "Hop-A-Bus," have not been included in the performance profiles which follow.

HISTORICAL PERFORMANCE TRENDS

Between FY91 and FY94, DART fixed-route ridership has declined by about five percent from 45.2 million annually to 42.9 million, as shown in Exhibit 2-2. A decrease in the amount of travel to the CBD is the primary factor in this ridership decrease. Ridership losses have been heaviest on weekday services to the CBD, including: radial limited stop decrease of 19.5 percent; regional express to downtown decrease of one percent; and radial local services in the CBD decrease of 6.9 percent.

Exhibit 2-1
DART FIXED ROUTE BUS SERVICE



Service outside of the CBD, however, has been experiencing significant growth, including: urban crosstown and regional crosstown increases of 26.3 and 11.1 percent, respectively; and a suburban circulator service ridership increase of 16.3 percent.

Exhibit 2-2
FY91-FY94 RIDERSHIP TRENDS
Weekday, Saturday & Sunday Service Combined

SERVICE	FY91	FY92	FY93	FY94*	Percent Change FY91-FY94
Circulator/Connector	2,203,100	2,315,870	2,572,424	2,561,285	16.3%
Regional Crosstown	1,871,376	1,992,196	2,015,541	2,079,192	11.1%
Regional Express	2,891,769	2,919,423	2,743,184	2,859,651	-1.1%
Radial Local	24,242,449	25,053,328	23,449,782	22,571,536	-6.9%
Urban Crosstown	3,513,975	3,871,569	4,133,419	4,437,248	26.3%
Radial Limited Stop	10,484,874	9,799,731	9,239,357	8,442,539	-19.5%
Systemwide	**45,207,543**	**45,952,117**	**44,153,707**	**42,951,451**	**-5.0%**

** Estimated Actuals based on 9 months.*

Despite a decrease in overall ridership, service productivity, measured by passengers per hour, has remained stable on a systemwide basis, as shown in Exhibit 2-3.

Exhibit 2-3
FY91-FY94 SERVICE PRODUCTIVITY TRENDS
Weekday, Saturday & Sunday Service Combined

SERVICE	Passengers Per Vehicle Service Hour				Percent Change
	FY91	**FY92**	**FY93**	**FY94***	FY91-FY94
Circulator/Connector	12.8	13.3	14.3	15.7	22.7%
Regional Crosstown	13.4	14.7	15.8	16.6	23.9%
Regional Express	22.3	22.4	22.3	24.2	8.5%
Radial Local	29.2	33.6	31.5	31.1	6.5%
Urban Crosstown	20.5	22.7	24.1	24.5	19.5%
Radial Limited Stop	34.8	30.9	29.4	26.9	-22.7%
Systemwide	**26.4**	**27.6**	**26.7**	**26.4**	**0.0%**

** Estimated Actuals based on 9 months.*

Hours of service have been adjusted consistent with changes in travel demand. Services exclusive to the suburban areas (i.e., circulator and crosstown) have experienced productivity improvements of more than 20 percent. Urban crosstown service productivity has also improved by about 20 percent. Radial local and regional express services have experienced modest productivity improvements of 6.5 and 8.5 percent, respectively. Radial limited stop service to the CBD has experienced a 23 percent decline in productivity since FY91 and is therefore a candidate for improvement.

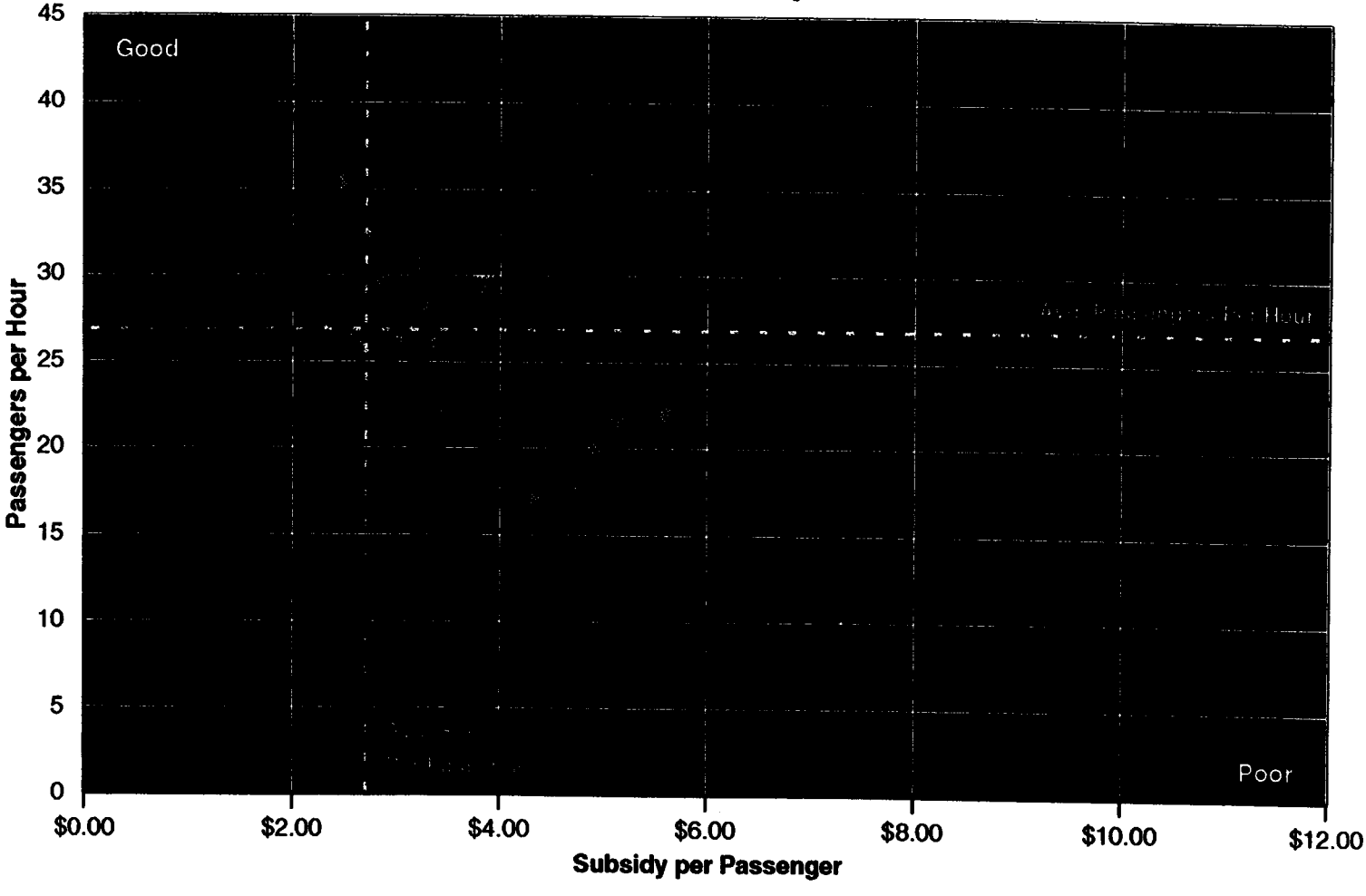
CURRENT ROUTE PERFORMANCE

While the focus of this review is on bus feeder, crosstown, and CBD transfer center routing, service changes cannot be developed in a void. Overall system performance in terms of "mobility delivered per dollar expended" is important. Exhibit 2-4, on the following page, illustrates overall system performance in terms of cost effectiveness (i.e., subsidy per passenger) and productivity (i.e., passengers per hour) for FY94.

Within a system, individual route performance is likely to vary by type of route. Routes in more densely populated urban cores generally have better productivity than services in less dense suburban areas. Productivity is also likely to vary significantly between weekday, Saturday, and Sunday service. The discussion which follows presents a comparison of individual routes by service type. Averages by service type are used to establish the baseline for determining good, marginal, and poor performance.

In restructuring services, it is important to keep what works and improve those services that do not. The exhibits which follow have been structured to facilitate this analysis. Statistics shown graphically in this section, as well as other commonly used industry performance indicators, are provided in a separate technical appendix document.

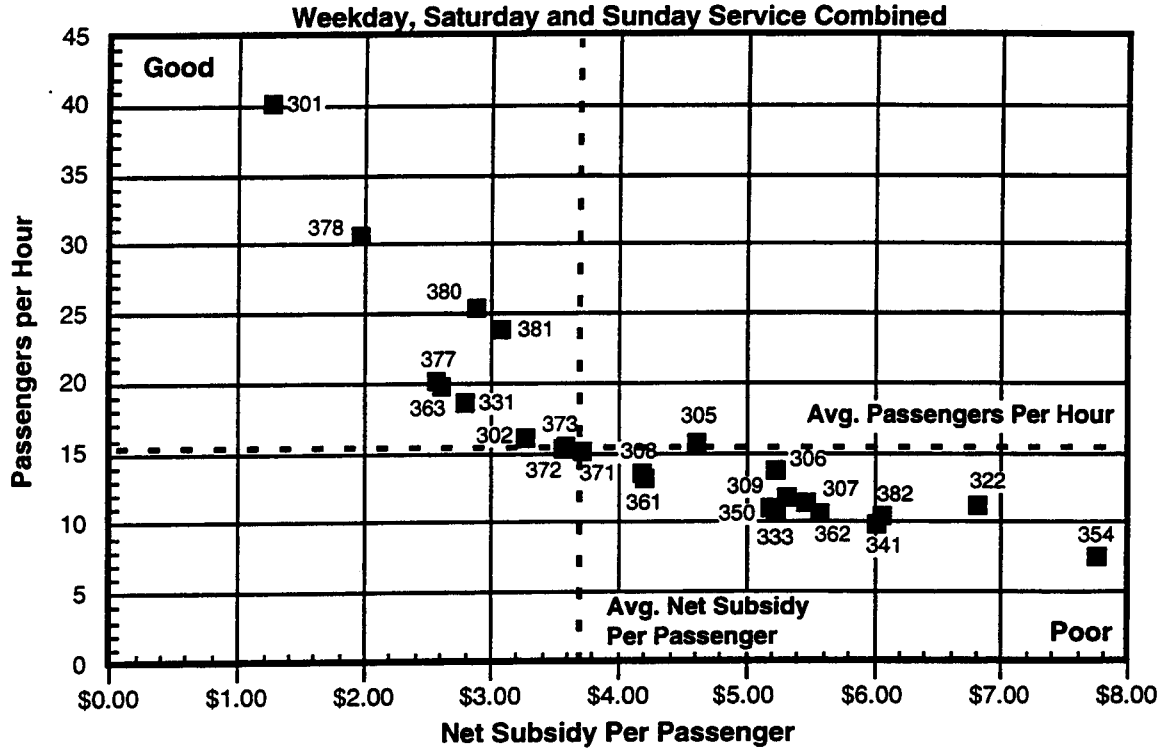
Exhibit 2-4
FY94 SYSTEMWIDE ROUTE PROFILES
Weekday, Saturday and Sunday Service Combined



Circulator/Connector Routes

Exhibit 2-5 profiles circulator/connector routes in terms of cost effectiveness and productivity. These routes generally operate in less dense suburban areas. While the performance on some routes such as 301 Walnut Hill is quite good, other routes (e.g., 354 East Plano and 382 Country Club) warrant attention. Services in this category are provided under contract.

Exhibit 2-5
FY94 CIRCULATOR/CONNECTOR ROUTE PROFILES
Weekday, Saturday and Sunday Service Combined



DART Sector Plans include a number of recommendations for service improvement, including:

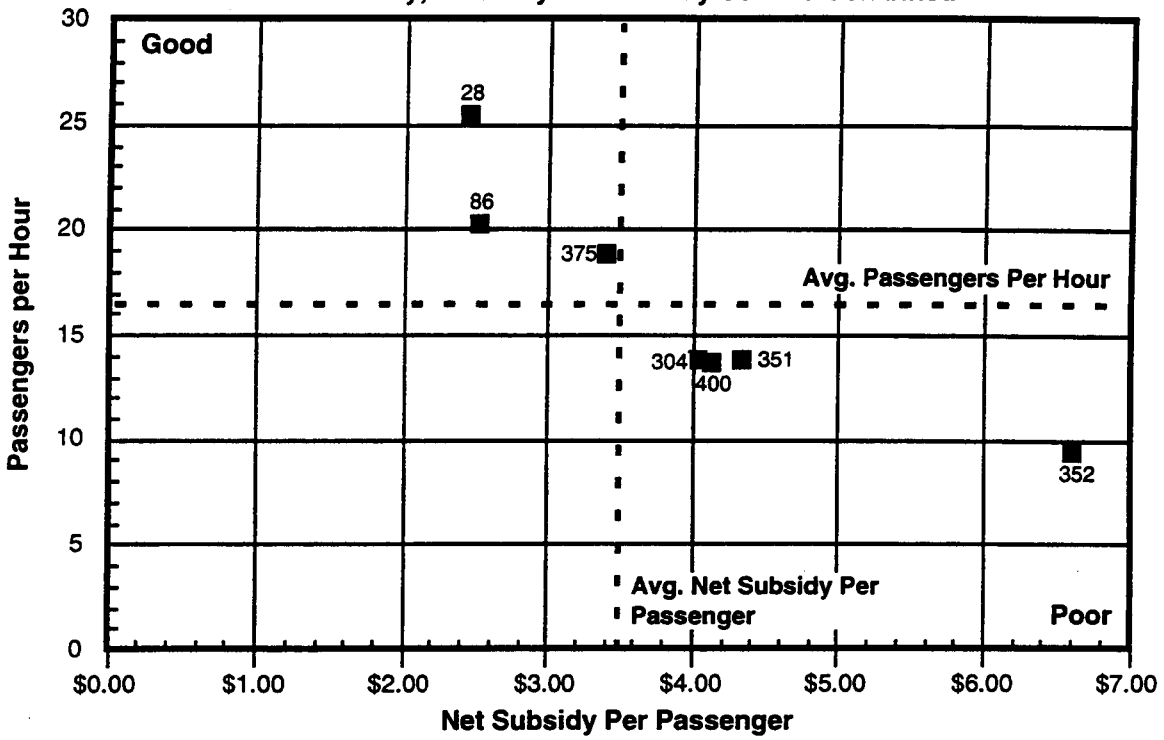
- Route 305 and 306 -- Irving Sector Plan
- Route 354 -- Plano Sector Plan
- Routes 362 and 371 -- Richardson Sector Plan.

In the longer term (i.e., by 2010), population and employment in many suburban areas will continue to grow. Such changes in demographics will contribute to improved performance for suburban routes.

Regional Crosstown Routes

Exhibit 2-6 presents a performance profile for regional crosstown routes linking suburban areas outside of the CBD and providing for transfer opportunities with express buses to downtown. Routes 28, 86, and 375 have good performance.

Exhibit 2-6
FY94 REGIONAL CROSSTOWN ROUTE PROFILES
Weekday, Saturday and Sunday Service Combined



Routes 304, 351, and 400 are marginal in terms of productivity and cost effectiveness. Route 304 may be impacted by commuter rail service. Route 351 connects three transit centers: North Central; West Plano; and East Plano. Route 400 is the longest of DART's routes.

Route 352 Coit/Legacy serves major employers (e.g., EDS) and is a candidate for improvement. Bus stops are located outside the entrance of major employers which require passengers to walk a greater than average distance. This may be a factor in lower than average ridership. The option of using smaller vehicles and bringing stops closer to business sites is one option to explore.

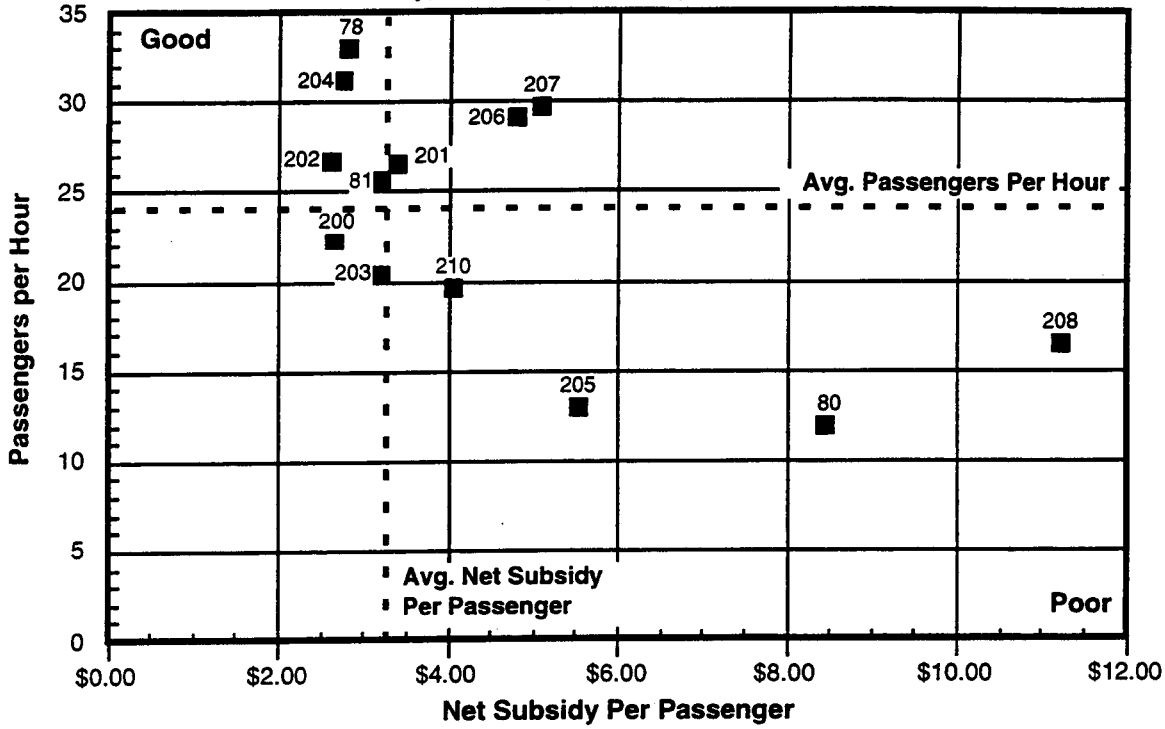
Population and employment forecasts for the year 2010 were used to estimate potential ridership on marginal and poorly performing regional crosstown routes. Productivity for these four routes can be expected to reach 14 to 15 passengers per hour by the year 2010. Performance on these routes will continue to fall below the average for regional crosstown routes. Analysis of route ridership by segment should be examined in an effort to identify non-productive segments for restructuring or

elimination. Options such as limited stop service should also be considered to reduce travel time and improve the attractiveness of these routes relative to the automobile.

Regional Express Routes

Exhibit 2-7 shows performance for regional express routes. Route 80 Pleasant Grove, Route 205 Addison/Farmers Branch, and Route 208 Valley Ranch are candidates for improvement.

Exhibit 2-7
FY94 REGIONAL EXPRESS ROUTE PROFILES
Weekday, Saturday & Sunday Service Combined



Load factors by trip on Route 80, operated by DART, require examination as a smaller vehicle or changes in the number of trips may be appropriate for this line given the low level of ridership per hour. A similar analysis of Route 208, as well as ridership by route segment, is also warranted. Options to combine Route 208 with Route 202 or Route 204 should be investigated. The option to combine Routes 205 and 210 would be facilitated by the new Addison Transit Center location. The time penalty of an intermediate stop may be unacceptable in peak periods, but acceptable mid-day. If ridership on Routes 80, 208, and 205 does not improve, one option is to reduce or eliminate service.

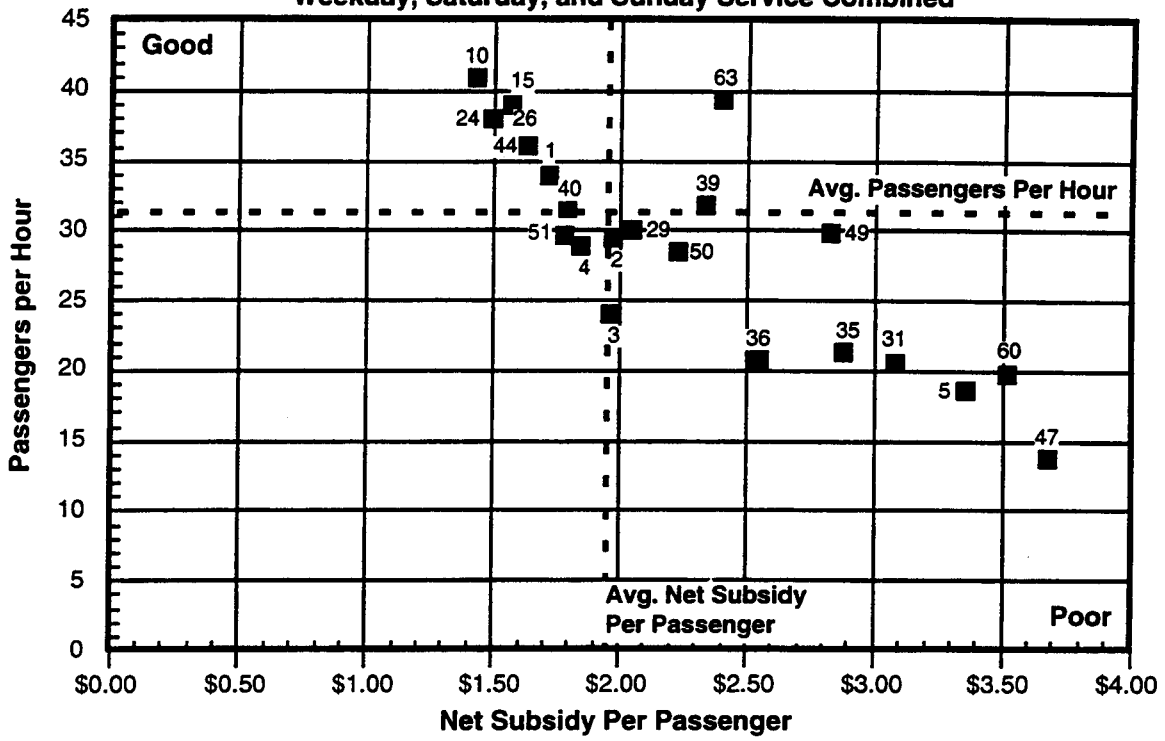
In the longer-term, Routes 80, 208, and 204 may not be necessary due to planned rail system improvements. Routes 207 and 206 will most likely be positively impacted by implementation of HOV facility improvements in their respective operating corridors. Such improvements should increase average speeds resulting in a reduction of service hours and/or an increase in the attractiveness of this service.

In the more immediate future, Route 203 South Irving will be impacted by implementation of Railtran service. Section 5 of this report includes recommendations related to this route. Route 78, with very good performance, will not be altered as a result of light rail service to Oak Cliff.

Radial Local Routes

Radial local routes are the backbone of DART's system in terms of ridership. Even the poorest performing routes in this category have 15 passengers per hour or more, as shown in Exhibit 2-8.

Exhibit 2-8
FY94 RADIAL LOCAL ROUTE PROFILES
Weekday, Saturday, and Sunday Service Combined

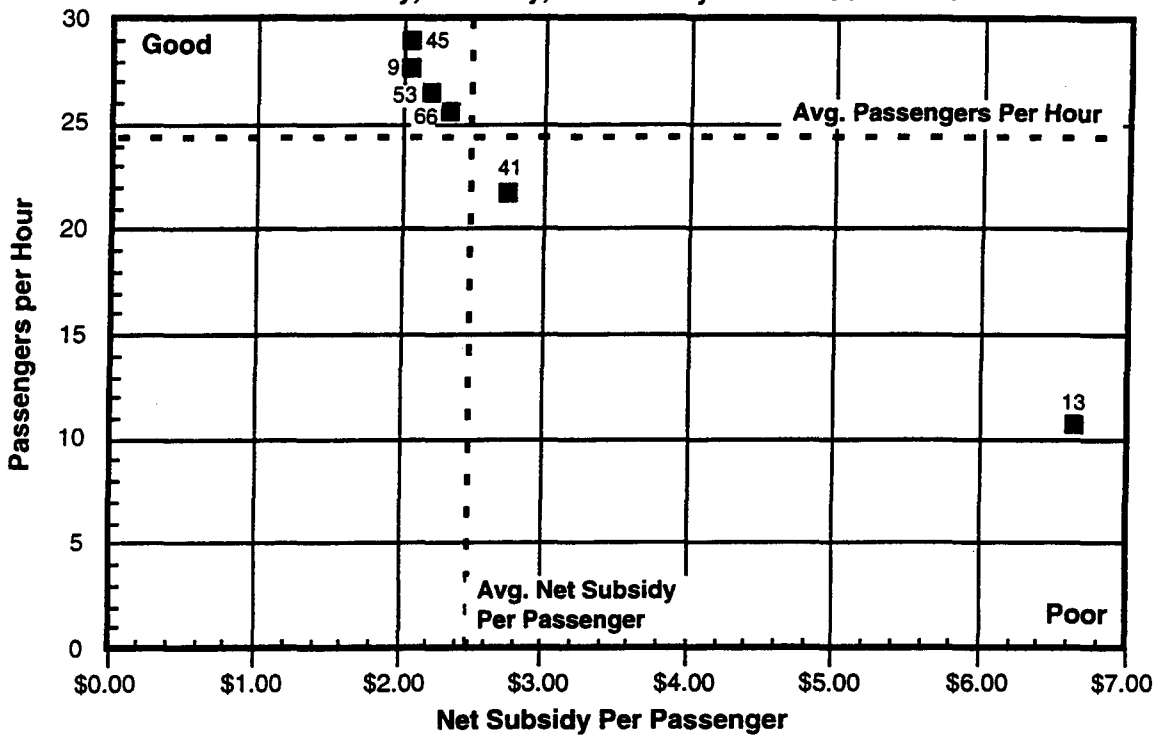


Routes 5 and 47 are both candidates for improvement, with changes recommended in Section 4 relating to bus/light rail interface. Routes 31, 35, 36 and 60 require analysis of ridership by route segment to determine the appropriate performance improvement strategy.

Urban Crosstown Routes

Urban crosstown routes link areas outside of the CBD and make frequent stops. Exhibit 2-9 provides a performance profile of urban crosstown routes. Performance for this group of routes is likely to be impacted by introduction of rail service. An opportunity to restructure Route 13 relative to the North Central LRT Mockingbird station is proposed in Section 4. Route 41 Davis/Kiest is proposed for restructuring as a result of the Oak Cliff LRT service.

Exhibit 2-9
FY94 URBAN CROSSTOWN ROUTE PROFILES
Weekday, Saturday, and Sunday Service Combined

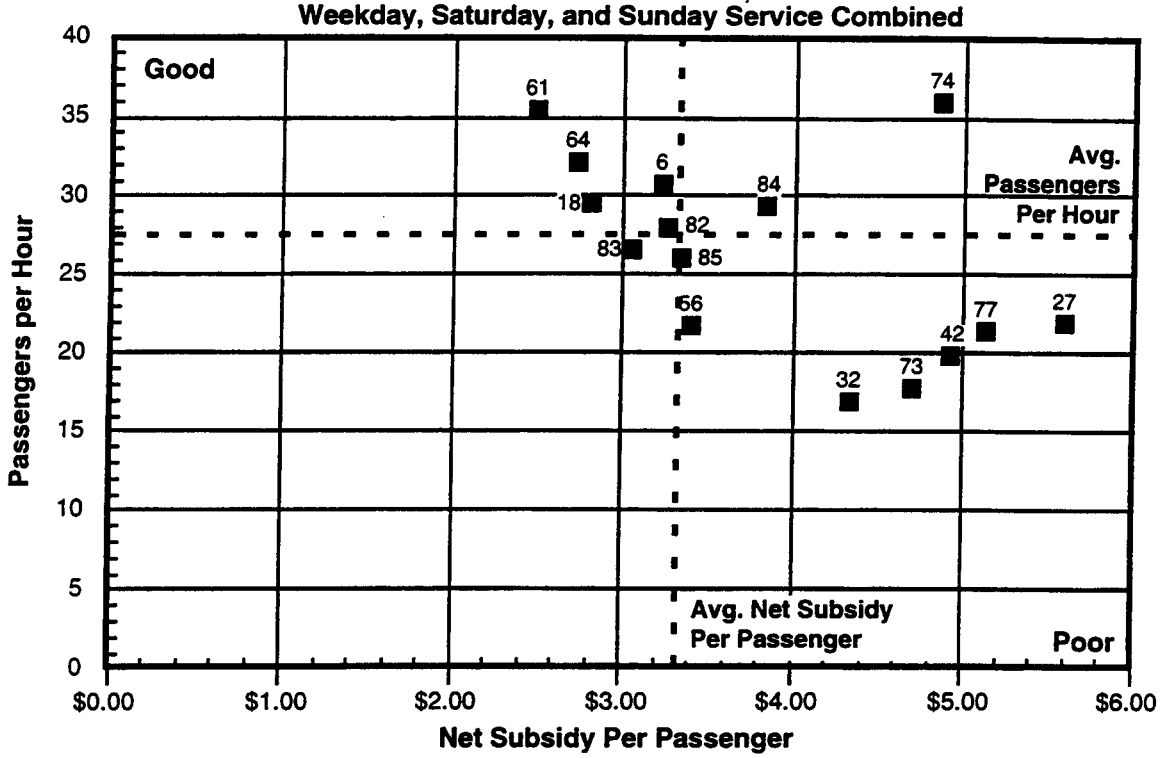


Radial Limited Stop Routes

Exhibit 2-10 provides a performance profile of radial limited stop service to the CBD. Several of the routes in the marginal or need improvement categories present good opportunities relative to rail station feeder service. These routes include 73, 77, and 42. Route 74, with good ridership but high costs, is proposed to be combined with Route 78 for a significant reduction in costs. Details are provided in Section 4.

Analysis of ridership by route segment is required to determine the appropriate strategies for improving ridership and/or lowering costs on Routes 32 and 27.

EXHIBIT 2-10
FY94 RADIAL LIMITED STOP ROUTE PROFILES
Weekday, Saturday, and Sunday Service Combined



3.0 EMERGING TRENDS & FUTURE PLANS

3.0 EMERGING TRENDS AND FUTURE PLANS

Demographic information for existing routes was compared to forecasts of population and employment. Forecasts of population and employment are for the year 2010 and were developed by NCTCOG. DART's GIS was used to obtain information at the route level. The relationship between existing route performance and future forecasts serves as the basis for estimating future ridership. Information on emerging trends (population and employment) was reviewed to identify areas of high future travel demand. This review of emerging trends provides the background for understanding the strategic thrust of DART's Draft Transit System Plan Year 2010.

CURRENT ROUTE DEMOGRAPHICS AND GROWTH POTENTIAL

An interim deliverable for this study included a comparison of 1990 population and employment to forecasts for the year 2010 by route and route type. Summary findings based on this earlier review include the following:

- The alignment for Route 210 Plano West Express serves what is forecast to be an area of significant population growth. High population growth is expected along three other routes as well:

  — Route 341 Rosemeade
  — Route 352 Coit-Legacy
  — Route 208 Valley Ranch Express.

  Some of these routes are currently experiencing relatively low ridership.

- Areas within 1/2 mile of circulator and regional express routes are forecast to increase population the most compared to growth along other route alignments.

- Routes 134, 310, and 353 have alignments which are forecast to increase in population more than other routes with the possible exception of the West Plano Express.

- Areas within 1/2 mile of Routes 133, 134 and 88 (implemented July 25, 1994) are expected to increase in terms of employment.

- Other routes serving locations outside the CBD which should experience increased employment along existing alignments include:

  — Route 362 Campbell
  — Route 9/300 King Center/Irving Blvd.
  — Route 28 Northwest Highway
  — Route 304 West Side
  — Route 352 Coit-Legacy
  — All urban crosstown routes with the exception of Route 45.

PROJECTED CHANGES IN POPULATION AND EMPLOYMENT

Exhibit 3-1 presents year 2010 population density forecasts. Areas where population densities are forecast to be 4,000+ persons per square mile include: Plano; Carrollton; Addison; Farmers Branch; North Dallas; Richardson; Garland; Irving; North East Dallas; University Park; Cockrell Hill; and Oak Cliff/South Dallas.

Exhibit 3-2 presents employment densities in the year 2010. Employment growth will occur in a number of areas, many of which DART already has plans for or capital investments in place to facilitate transit services. Areas of high employment growth and employment densities, include:

- Spring Creek Parkway/Preston Road area (e.g., EDS and other major employers are already located in this area). Route 352 from the West Plano Transit Center currently serves this area.

- North Central US 75 corridor. Light rail service is planned for this corridor. Connections from the North Central and Richardson Transit Centers are also possible. Westward travel from the Garland Transit Center is another option.

- The Renner Rd./Campbell/Jupiter area and Arapaho Rd./Plano Rd. areas are also projected to grow and may be served from the Richardson Transit Center.

- Preston/Frankford and Legacy/Independence areas could be served from the East and West Plano Transit Centers.

- Love Field, and the Medical/Market Center, will continue to be areas of high employment density. The Railtran Medical/Market Center Station is located in this area.

- Los Colinas, and Walnut Hill are expected to be high employment density areas as well. The North Irving Transit Center is located in this area.

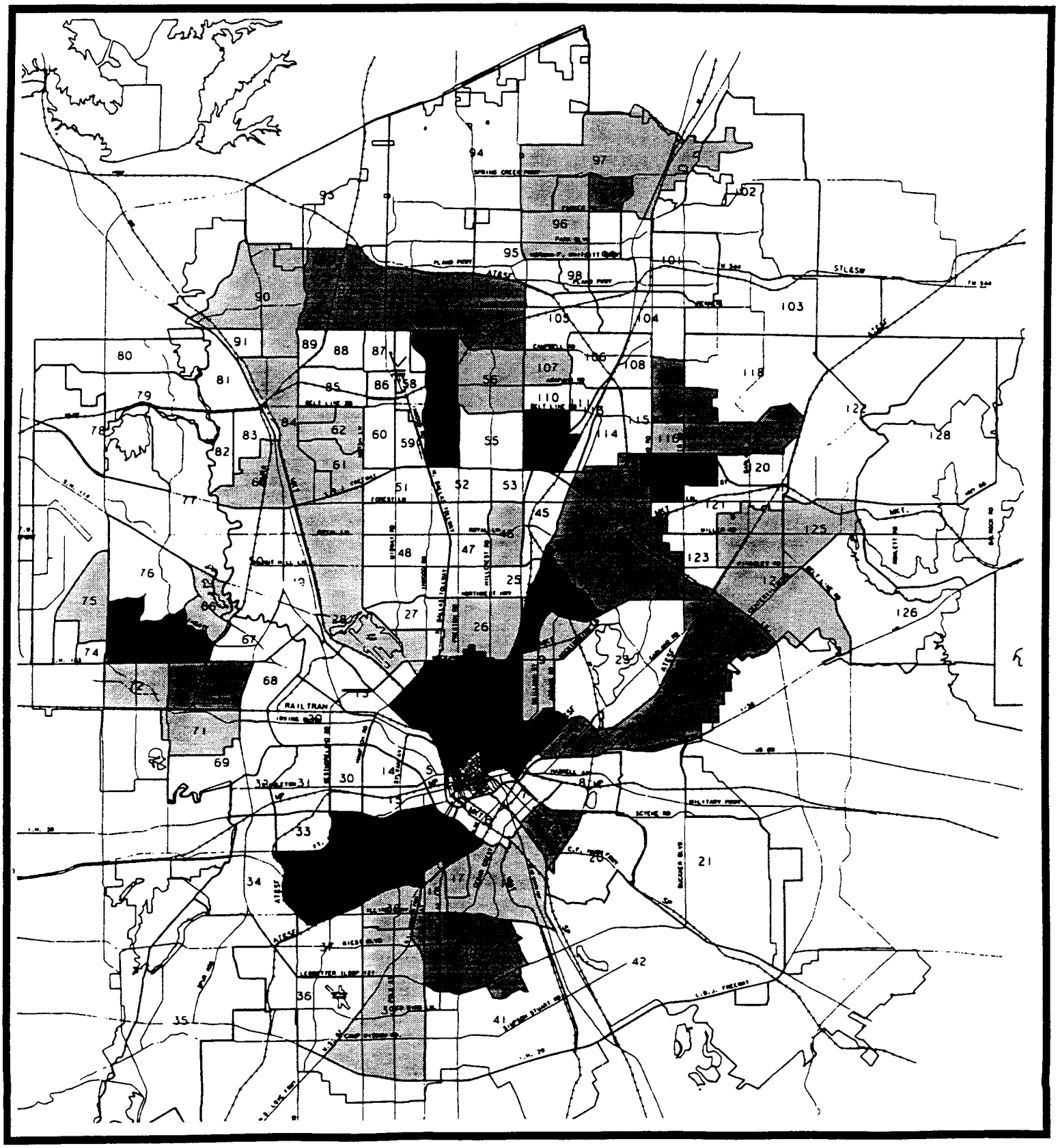
- The North Dallas Tollway and LBJ Freeway will become a key employment center in DART's service area. The Prestonwood transfer point and North Central Transit Center could serve as focal points for providing service to this area.

- The Claredon/Jefferson/Westmoreland area will be served by the West Oak Cliff LRT segment with feeder bus service.

Existing DART facilities or plans call for capital investments in or near most areas of projected population and employment growth.

EXHIBIT 3-1
2010 POPULATION DENSITIES
(population per square mile)

- < 4000
- 4000 – 5000
- 5000 – 6000
- ≥ 6000



CURRENT ACTIVITY CENTERS OUTSIDE THE CBD

At the Traffic Analysis Zone Level, key traffic generators outside the CBD include:

- Medical Center Area
- Las Colinas
- Greenville and Northwest Highway
- Forest Lane and Greenville
- Preston Road and Belt Line
- Forest Lane and Audelia Road
- Ferguson and Loop 12
- Fort Worth and Sylvan Avenue
- MLK and Oakland Avenue
- Lovers Lane and US 75
- Lake June Road and C.F. Hawn Freeway
- Kiest and Beckley area.

Many of these areas already have high levels of bus service.

PLANNED TRANSPORTATION SYSTEM IMPROVEMENTS

Understanding the current and projected population and employment trends in DART's service area makes it easier to understand the importance of planned improvements recommended in DART's Draft Transit System Plan Year 2010, shown in Exhibit 3-3. Transportation improvements on a corridor basis are summarized in Exhibit 3-4.

It is within the context of DART's overall transit system plan that improvements to DART's fixed route bus system must be considered. Recommended fixed route service changes should support and move DART towards its vision for a 2010 transit system.

In the shorter-term, the need to provide for an integrated bus/rail feeder system is the first component to support achievement of DART's transit system plan. The light rail starter system and Phase 1 Railtran commuter service lines are shown in Exhibit 3-5. Sections 4 and 5 provide detailed recommendations for bus/rail interface planning.

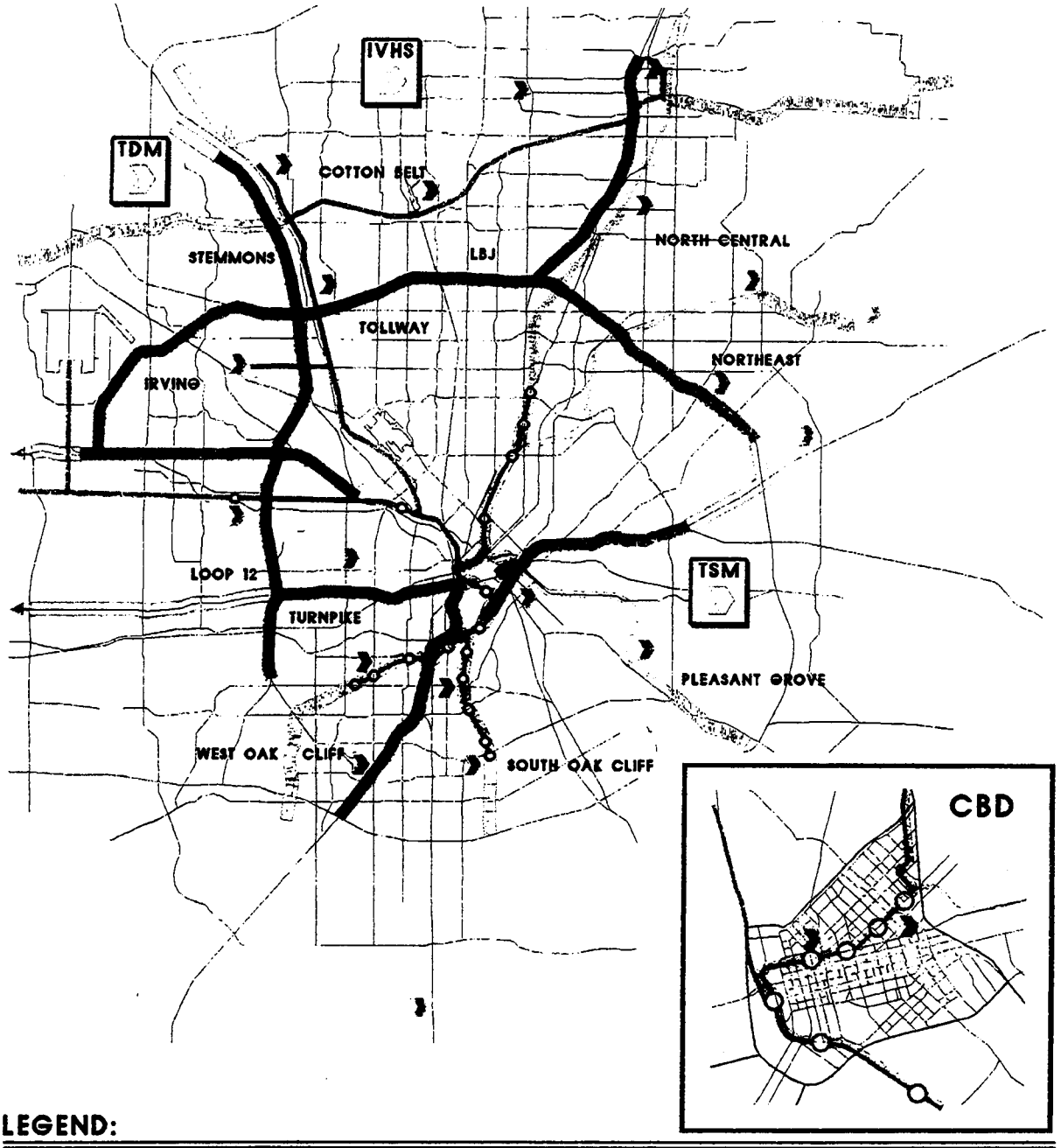
While much attention has been given to emerging trends, DART has also been conducting a number of Sector Studies, as shown in Exhibit 3-6. Sector studies are generally concerned with existing community transit needs, and fixed route performance.

Recommendations contained in the following sections are offered in support of emerging trends, and long and short term transit plans and initiatives.

Exhibit 3-3

DART DRAFT TRANSIT SYSTEM PLAN YEAR 2010

JUNE 1994



LEGEND:

RAIL

- STARTER SYSTEM & STATIONS
- LIGHT RAIL (FULL CAPACITY)
- LIGHT RAIL (INTERMEDIATE CAPACITY)
- COMMUTER RAIL
- R-O-W PRESERVATION

HOV LANES

- DART PARTICIPATION
- NO DART PARTICIPATION

BUS

- TRANSIT CENTER
- BUS CORRIDORS

GENERAL MOBILITY

- TSM — TRANSPORTATION SYSTEM MANAGEMENT
- IVHS — INTELLIGENT VEHICLE-HIGHWAY SYSTEMS
- TDM — TRAVEL DEMAND MANAGEMENT

6/27/94

Exhibit 3-4
(Page 1 of 2)
SUMMARY OF DRAFT TRANSIT SYSTEM PLAN-CORRIDOR RECOMMENDATIONS

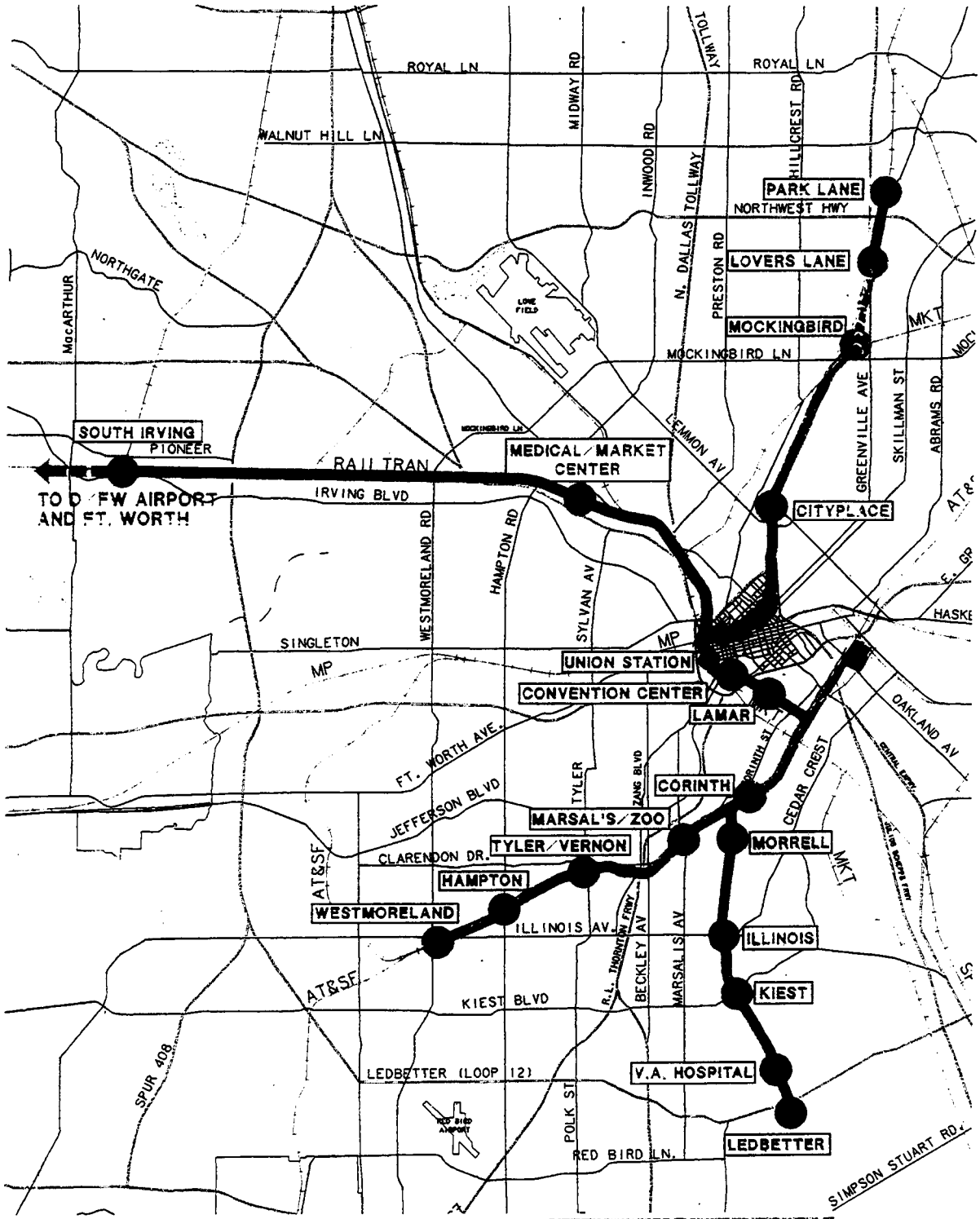
CORRIDOR	RAIL IMPROVEMENTS	HOV IMPROVEMENTS	GENERAL MOBILITY IMPROVEMENTS	BUS IMPROVEMENTS
North Central Corridor	12-mile Extension of North Central LRT -- Park Lane to Plano	7-mile HOV facility on North Central Expressway -- North of LBJ to Parker Rd.	TDM Program with major employers along the new HOV facility	Tollway Bus Corridor to respond to radial travel demand not met by LRT; develop N/S crosstown routes to interface with rail feeder and E/W crosstown routes
Northeast Corridor	11-mile LRT line -- Mockingbird station to the Central Garland Transit Center	9-mile HOV facility on I-30 -- downtown Dallas to Buckner (regional plan to LBJ - other agencies)	TDM program with major employer along the new HOV facility	East Dallas (White Rock) Radial to take advantage of new HOV facility; feeder bus to Northeast LRT; improve route interface at South Garland Transit Center
Pleasant Grove Corridor	10-mile LRT line -- downtown Dallas to Buckner Rd; ROW Preservation	No Recommendations	No Recommendations	No Recommendations
South Oak Cliff Corridor	ROW Preservation	No Recommendations	No Recommendations	No Recommendations
West Oak Cliff Corridor	ROW Preservation	9-mile HOV facility on I-35E and US67 -- downtown Dallas to I-20	TDM program with major employers along the new HOV facility	West Oak Cliff Bus Corridor to respond to E/W crosstown travel demand; radial routings to take advantage of new HOV facility
Turnpike Corridor	No Recommendations	8-mile HOV facility on I-30 -- downtown Dallas to Loop 12 (regional plan to Arlington -- other agencies)	TDM program with major employers along the new HOV facility	West Dallas Bus Corridor to enhance radial service to CBD; improve inter and intra-community circulation; weekend routing to respond to travel needs
Stemmons Corridor	19-mile CR line -- Union Station to North Carrollton Transit Center; branch to North Irving Transit Center	10-mile HOV facility on the Stemmons Fwy -- Loop 12 to SH190	TDM program with major employers along the new HOV facility	No Recommendations

Exhibit 3-4
(Page 2 of 2)
SUMMARY OF DRAFT TRANSIT SYSTEM PLAN-CORRIDOR RECOMMENDATIONS

CORRIDOR	RAIL IMPROVEMENTS	HOV IMPROVEMENTS	GENERAL MOBILITY IMPROVEMENTS	BUS IMPROVEMENTS
Irving Corridor	No Recommendations	10-mile HOV facility on SH183 -- I-35E to SH161; 9-mile HOV facility on SH161 -- I-635 to SH183	TDM program with major employers along the new HOV facility	No Recommendations
Cotton Belt Corridor	13-mile CR line along Cotton Belt -- North Central LRT to Stemmons Corridor CR	No Recommendations	No Recommendations	North Suburban Bus Corridor to respond to E/W crosstown and non-radial travel demand; improve local route interface at transit centers; enhance collector/distributer service to major suburban employment centers
LBJ Corridor	No Recommendations	23-mile HOV facility on LBJ Fwy. -- La Prada to SH161 (regional plan I-30 to La Prada -- other agencies)	TDM program with major employers along the new HOV facility	North Dallas Bus Corridor to increase E/W crosstown service; integrate E/W crosstown with LRT feeder bus routes
Loop 12 Corridor	No Recommendations	10-mile HOV facility on Loop 12 -- Spur 408 to I-35	TDM program with major employers along the new HOV facility	No Recommendations

Exhibit 3-5

LIGHT RAIL STARTER SYSTEM AND COMMUTER RAIL



LEGEND:

- LIGHT RAIL STATION
- LIGHT RAIL LINE
- COMMUTER RAIL STATION
- COMMUTER RAIL LINE

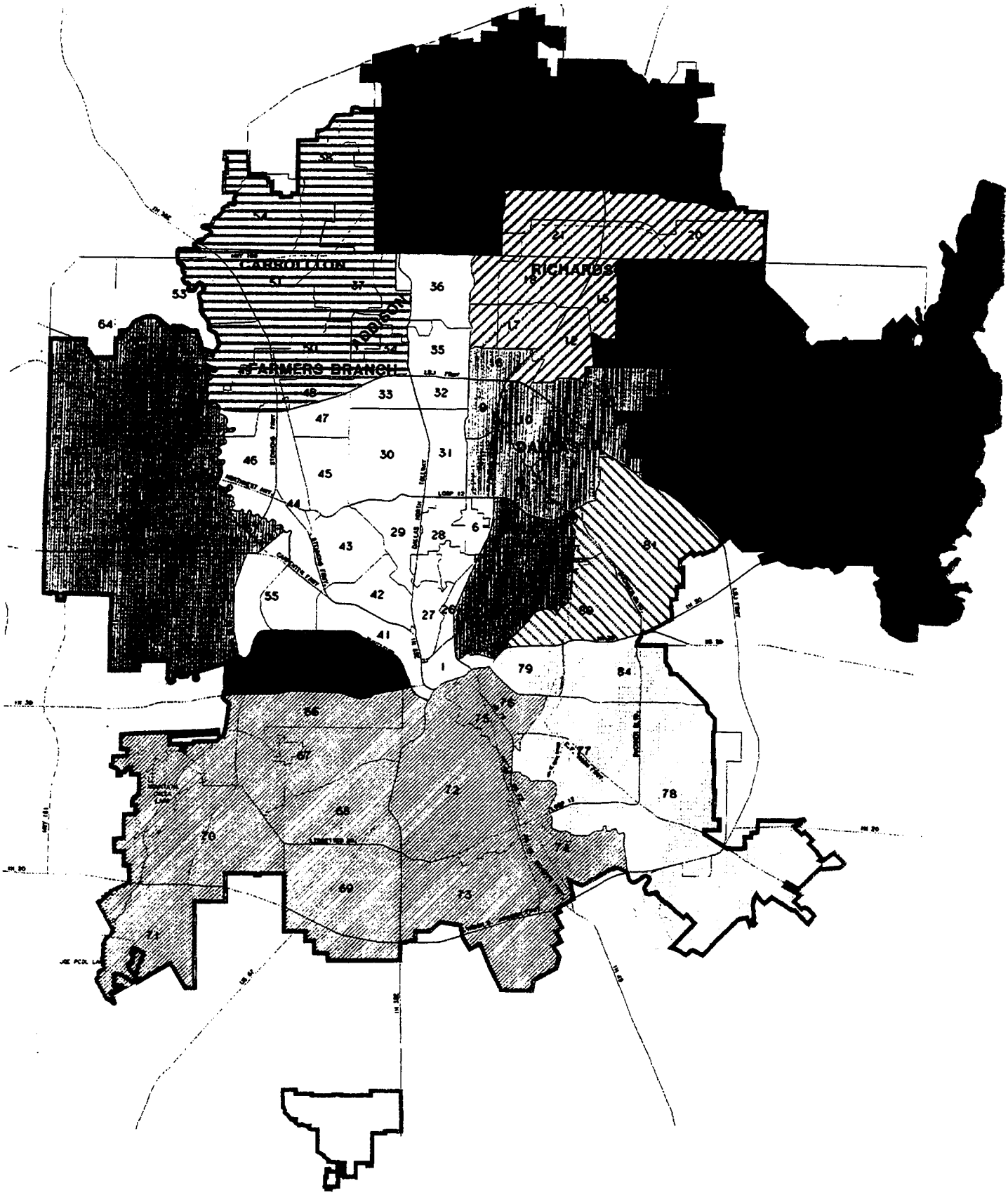
DRAWN BY DART CADD DEPARTMENT

CAES

DART

EXHIBIT 3-3

SECTOR STUDIES



4.0 BUS/LIGHT RAIL INTERFACE PLAN

4.0 BUS/LIGHT RAIL INTERFACE PLAN

This section contains recommended service changes to DART's bus system to complement the LRT starter system. It has been assumed for this analysis that the entire LRT starter system will be in service. The North Central through Oak Cliff trunk line, as well as the West Oak Cliff and South Oak Cliff branches, are scheduled to begin operation in 1996. The underground City Place station will open several years later. It is anticipated that the plan can be implemented in phases that correspond with interim LRT starter-system and station openings, and could be adapted as necessary to complement future LRT extensions.

The changes are substantial. They combine to form a comprehensive transit network that reflects a departure from DART's traditional service output, incorporating LRT as an integral component and focus. Each bus route operating in the defined study area has been examined individually and in the context of the overall provision of service. Proposed changes range from minor alignment adjustments to total route elimination. Several new routes have also been devised where appropriate. Certain changes emphasize simplifying route designations over altering operations.

The end result of this plan is a transit network designed to improve service to the majority of DART's current passengers and attract new riders in the light rail corridors and beyond, within the confines of a "subsidy-neutral" financial environment.

PLAN ORGANIZATION

This section presents some general comments on "system connectors", route identification nomenclature, and inputs reviewed as part of this study task. To correspond with the approach utilized by DART staff, the plan presented in this section is divided into two segments; one for the North Central LRT and one for Oak Cliff. However, each sub-plan is presented on a route-by-route basis, rather than according to LRT station. Bus routes serving the LRT area north of downtown Dallas (i.e., vicinity of Park Lane, Lovers Lane or Mockingbird Lane stations) comprise the *North Central Plan.* Bus routes serving the LRT areas south of downtown (i.e., Lamar to Westmoreland or Ledbetter stations) comprise the *Oak Cliff Plan.* The six stations in downtown Dallas are not addressed as part of the feeder plan.

Operating impacts are summarized at the end of this section along with some general comments regarding opportunities for bus resource redeployment as LRT services are expanded in future years.

SOURCES REVIEWED

Recommendations contained herein were developed after review of DART's Draft Bus/Rail Interface Plan for Light Rail Starter System (August 1994) and are consistent with DART's bus service modification objective to maximize the bus/light rail interface without inconveniencing the majority of current passengers. As such, it incorporates many of the criteria and guidelines used by DART planners (e.g., acceptable time-penalty parameters for alignment diversion). No existing transit corridors have been eliminated entirely, and several new segments are proposed.

Other inputs received and utilized to support this analysis include:

- Suggestions received from DART personnel at various levels of the organization, including planners, road supervisors and bus operators;
- Results of previous analyses, particularly the various Sector Studies;
- Field observations of the demographics, activity centers and ridership throughout the affected areas;
- Route performance data and comparisons prepared as part of this study; and
- Available ridership data by route segment.

SYSTEM CONNECTORS

In light of the comprehensive nature of DART's own draft plan, the network proposed has been basically retained. One exception is that the "Station Connector" concept was modified. Rather than operating separate bus routes that would essentially duplicate the light rail alignments, elements of these routes would be incorporated into other services that would be less duplicative and serve more wide-ranging functions.

In the event of a light rail service disruption, a contingency plan should be ready for implementation as needed. Successful examples of this policy can be seen in several other cities that have recently opened rail systems. It also appears that the Station Connectors could siphon riders from LRT, establishing a competing market and reducing LRT's ability to meet its objectives. The resources necessary to serve this additional market could be more effectively deployed elsewhere in the system.

ROUTE IDENTIFICATION

A significant departure from DART's earlier efforts is that several revisions are proposed in route identification nomenclature. The primary intent is to provide a route identification system that includes provisions for new service types, some of which were implemented with the July 25, 1994 service change (i.e., rail feeder, non-radial limited stop services). As shown in Exhibit 4-1, the revised route numbers would be loosely reminiscent of the existing system.

New designations could apply system-wide, not only for bus routes included in the LRT feeder plan. However, the major bus service changes associated with the LRT opening could provide an opportunity for implementing these changes as well.

Exhibit 4-1
PROPOSED BUS ROUTE DESIGNATION SYSTEM

Route Numbers	Type	Description
1-99	R	Radial - Local (to Downtown Dallas)
100-199	LS	Limited-Stop Service
200-299	EXP	Express Service
300-399	CF	Circulator/Feeder Service (Suburban)
400-499	C	Crosstown Service
500-599	F	Rail Feeder Service

NORTH CENTRAL PLAN

A summary of the North Central Plan bus routes and changes is presented in Exhibit 4-2. Route numbers shown in quotes on the exhibit are those used by DART staff in their plans. A detailed route-level discussion follows. The discussion is arranged according to route number, with existing and proposed new routes listed together in numerical order. A geographical representation of the plan is shown in Exhibit 4-3.

Almost 20 bus routes currently operate within the North Central LRT service area with service changes suggested for all. Included in the North Central plan are a number of proposed routes that are not clearly associated with any existing service; they are treated as entirely new routes. They primarily offer revised service patterns along existing transit corridors, although certain new transit corridors are introduced as well. All are LRT-feeders; most are scaled back from radial services that currently continue to downtown Dallas. In addition, many of the recommendations from DART's North Central Sector Study have been included in this plan, as appropriate.

For this analysis, new or substantially changed routes have been assigned new numbers -- generally reflecting the service types and primary route numbers from which they were developed (e.g., new Route 519 replaces part of existing Route 19). In the case of several North Central LRT-feeder routes where the most appropriate number was not free, the 590-599 series has arbitrarily been used.

- Route 1 - Belmont: This route currently operates as a radial local service from downtown Dallas, primarily along Live Oak Street, Matilda Street, and Greenville Avenue. Service is provided seven days a week. Base service operates as far as Mockingbird Lane (1B), with extended service to Walnut Hill Lane (1P), and selected peak period trips continuing to north of Forest Lane (1F). Most evening and Sunday trips are combined with Route 20.

Exhibit 4-2
BUS/LIGHT RAIL INTERFACE PLAN SUMMARY - NORTH CENTRAL AREA

CURRENT ROUTE			PROPOSED ROUTE			NORTH CENTRAL LRT STATIONS		
NO.	TYPE	SERVICE	NO.	TYPE	SERVICE	SERVED	CHANGES FROM CURRENT	NOTES
1	RL	7-day	1	R	7-day	Mockingbird	Retain only CBD-Mockingbird trunk	Outer segments covered by new feeder routes
6	RLS	7-day	--	--	--	---	Eliminate route	Outer portion covered by new #598,599
13	UC	6-day	413	C	6-day	Mockingbird	Short-turn at Mockingbird Station	Improve route productivity
19	RL	7-day	19	R	7-day	---	Retain only CBD-Mockingbird trunk	To Abrams, not LRT; Outer segments - new #519,597
20	RL	7-day	20	R	7-day	Mockingbird	Extend to LRT	
21	RL	7-day	21	R	7-day	Mockingbird	Retain only CBD-Mockingbird segment	Fewer trips; Outer segment covered by new #521
24	RL	7-day	24	R	7-day	Mockingbird	Extend to LRT	
27	RLS	Peak	527	F	Peak	Lovers La,Mockingbird	Cut back/revise to feed LRT	Connect the stations, via Skillman
28	RC	7-day	428	C	7-day	Park La	Divert to serve LRT	
33	RL	5-day	33	R	5-day	Mockingbird	Retain only CBD-Mockingbird segment	Outer segments covered by new #533,590,596
34	RL	7-day	34	R	7-day	Mockingbird	Extend to LRT	
67	RLS	5-day	--	--	--	---	Eliminate route	Outer portion covered by new #567,595
69	RLS	5-day	--	--	--	---	Eliminate route	Outer portion covered by new #519,569,593,594
73	RLS	5-day	211	EXP	5-day	---	Reroute to Tollway, not LRT	Travel time/service reliability considerations
77	RLS	Peak/Sat	577	F	6-day	Park La	Cut back to feed LRT	Add M-F midday service (compensate for #73 reroute)
82	RLS	6-day	--	--	--	---	Eliminate route	Outer portions covered by new #582,591,592
88	RC	5-day	488	C	5-day	Park La	Extend to LRT	
133	RLS	Peak	133	LS	Peak	Park La	Divert to serve LRT	
200	RE	5-day	200	EXP	5-day	Park La	Eliminate mid-day CBD Segment	AM outbound stop at LRT station; reverse in evening
201	RE	5-day	201	EXP	5-day	Park La	Eliminate mid-day CBD Segment	AM outbound stop at LRT station; reverse in evening
--	--	--	519	F	5-day	Mockingbird	New Route "19A"	Replace outer #19N
--	--	--	521	F	7-day	Park La,Mockingbird	New Route "21"	Connect the stations, replacing outer #21
--	--	--	533	F	5-day	Park La	New Route "33A"	Replace n. end of #33R (maybe also #33F);new Walnut Hill svc
--	--	--	567	F	5-day	Park La,Mockingbird	New Route "67A"	Connect the stations, replacing part of outer #67
--	--	--	569	F	5-day	Park La	New Route "69A"	Replace outer #69W
--	--	--	582	F	5-day	Park La	New Route "82A"	Replace outer #82W
--	--	--	590	F	7-day	Park La	New Route "A"	New service on Park Lane, Walnut Hill
--	--	--	591	F	6-day	Lovers La	New Route "82C"	Replace part of #82
--	--	--	592	F	6-day	Park La	New Route "82B"	Replace outer #82E
--	--	--	593	F	5-day	Lovers La	New Route "69C"	Replace outer #69E
--	--	--	594	F	5-day	Lovers La	New Route "69B"	Replace part of #69W
--	--	--	595	F	5-day	Park La	New Route "67B"	Replace north end of #67
--	--	--	596	F	5-day	Park La,Mockingbird	New Route "33B"	Connect the stations, replacing part of outer #33
--	--	--	597	F	Peak	Mockingbird	New Route "19B"	Replace outer #19M
--	--	--	598	F	7-day	Park La,Lovers La	New Route "6A"	Connect the stations; via Shady Brook/Eastridge (#6)
--	--	--	599	F	7-day	Park La	New Route - combined "1/6" & "1F"	N. Greenville corridor; M-F to Hamilton Pk/N.C. TC

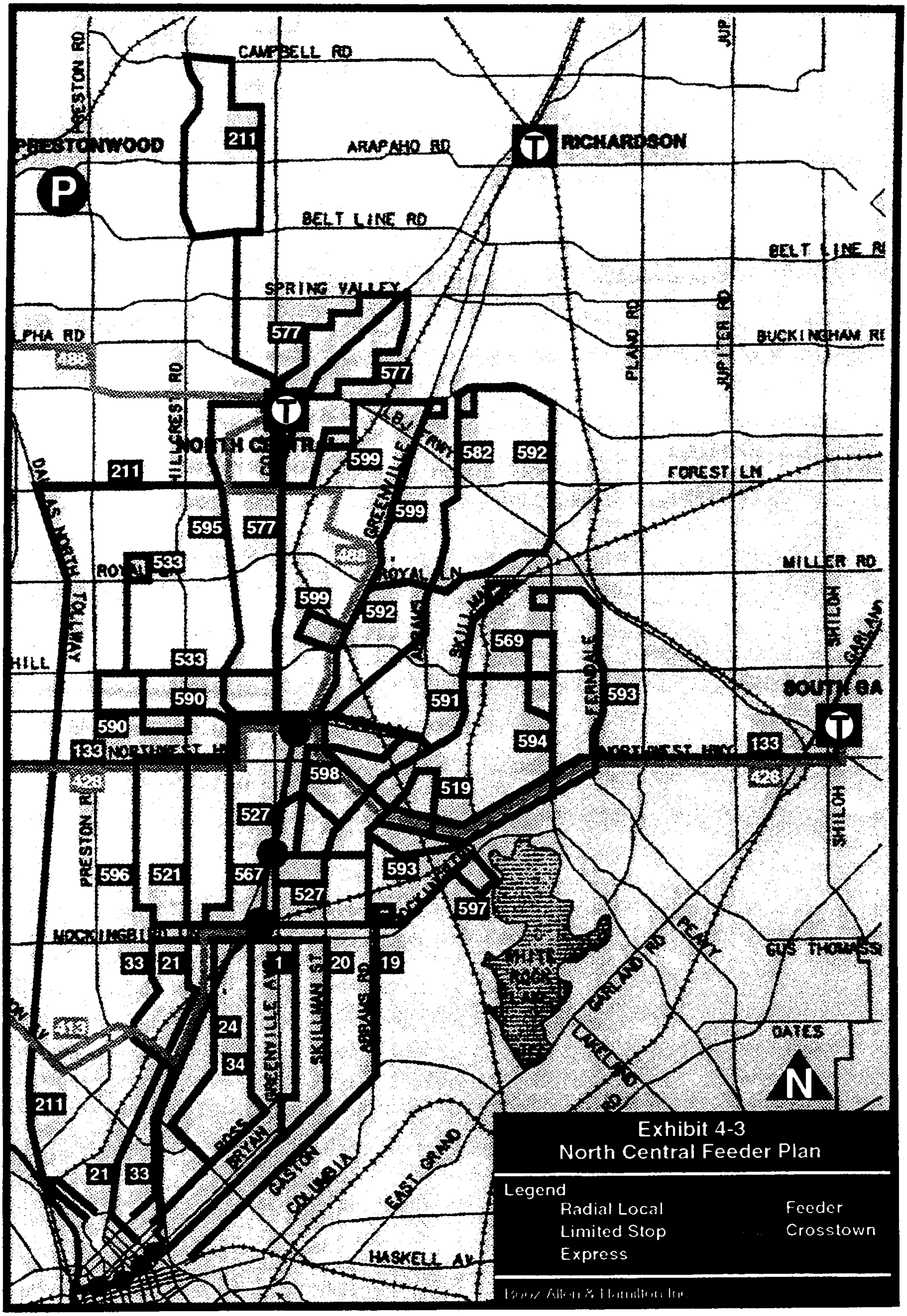


Exhibit 4-3
North Central Feeder Plan

Booz Allen & Hamilton Inc.

Only the downtown-Mockingbird Lane trunk line would be retained as Route 1. This segment is comparatively close to downtown and distant from LRT access. The northern terminal would be the Mockingbird Lane station, to provide convenient transfers with LRT and several other routes. Outer segments of the current route would be served by LRT, crosstown Route 488, and LRT-feeder Routes 527, 592, 598, and 599. Most of current Route 1 would have similar or improved service levels.

- Route 6 - Fair Oaks: This route currently operates as a radial limited-stop service from downtown Dallas, utilizing the Central Expressway non-stop to Caruth Haven Lane, and then making local stops in the Shady Brook/Fair Oaks Drive corridor north to Walnut Hill Lane. Service is provided seven days a week.

  Route 6 would be eliminated. New LRT-feeder Routes 598 and 599 would cover the local-stop portion. Service levels similar to current Route 6 would be offered. The light rail line would provide the link to downtown.

- Route 13 - Mockingbird: This route currently operates as a crosstown service in the Mockingbird Lane corridor, connecting the Brook Hollow and Casa Linda areas. Service is provided Monday through Saturday.

  Reflecting the proposed standardized route designation policy, this service would be known as Route 413. Existing Route 13 has a generally poor performance record. New LRT-feeder Route 597 would supplement the portion east of Mockingbird station. Thus, the opportunity of truncating the Route 13 segment east of the Mockingbird LRT station.

- Route 19 - Abrams: This route currently operates as a radial local service from downtown Dallas, primarily along Gaston Avenue and Abrams Road. Service is provided seven days a week. Base service operates as far as Mockingbird Lane (19A), with extended weekday service past Northwest Highway (19N), and selected peak period trips to Mockingbird Hills (19M). Evening and Sunday trips are combined with Routes 23 and 25.

  Only the downtown-Mockingbird Lane trunk line would be retained as Route 19. This segment is comparatively close to downtown and distant from LRT access. The northern terminal would be Mockingbird Lane and Abrams Road. No direct LRT connection would be made except in downtown Dallas, since rerouting the line to the Mockingbird station would result in a somewhat lengthy segment of duplicative service along Mockingbird Lane. The outlying 19N and 19M segments would be served by new LRT-feeder Routes 519 and 597, respectively. Most of current Route 19 would have similar service levels.

- Route 20 - Skillman: This route currently operates as a radial local service from downtown Dallas, primarily along Live Oak and Skillman Streets. Service is provided seven days a week; all trips operate as far as Mockingbird Lane. Evening and Sunday trips are combined with Route 1.

  A short extension is proposed to access the Mockingbird Lane LRT station, which would become the northern terminal, and would enable convenient transfers with LRT and several other routes. Since this route is comparatively close to downtown and distant from LRT access, no other changes are suggested.

- Route 21 - S.M.U.: This route currently operates as a radial local service from downtown Dallas, primarily along Cole/McKinney Avenues and Hillcrest Avenue. The outer terminus is at the North Park Shopping Center (abutting the Central Expressway between Park Lane and Northwest Highway). Service is provided seven days a week.

  Only the downtown-Mockingbird Lane portion would be retained as Route 21. This segment is comparatively close to downtown and distant from LRT access. The northern terminal would be the Mockingbird Lane station, to provide convenient transfers with LRT and several other routes. The outer segment of the current route would be served by new LRT-feeder Route 521. Revised Route 21 would operate fewer trips than the current route, since it would operate somewhat parallel to LRT. However, new Route 521 would retain service similar to current levels.

- Route 24 - Capitol: This route currently operates as a radial local service from downtown Dallas, primarily along Ross Avenue, Capitol and Homer Streets. Most trips terminate at Monticello West or McCommas Boulevard (several blocks south of Mockingbird Lane). Service is provided seven days a week. Evening and Sunday trips are combined with Route 34.

  A short extension is proposed to access the Mockingbird Lane LRT station, which would become the northern terminal, and would enable convenient transfers with LRT and several other routes. Since this route is comparatively close to downtown and distant from LRT access, no other changes are suggested.

- Route 27 - Village: This route currently operates as a radial limited-stop service from downtown Dallas, utilizing the Central Expressway non-stop to University Boulevard, and then making local stops in the vicinity of the Village Apartment Complex and Medallion Shopping Center (principally along Skillman Street, Southwestern Boulevard and Amesbury Drive). Service is provided only during peak hours, Monday through Friday.

  Route 27 would be truncated, revised and redesignated as LRT-feeder Route 527. The new route would connect the Lovers Lane and

Mockingbird LRT stations. From the Lovers Lane station, service would be north on Greenville Avenue to the Mockingbird station. The reverse direction would be the Mockingbird station to the Lovers Lane station via Greenville Avenue. The reverse loop would continue from the Lovers Lane station to University Boulevard, Skillman Street, Caruth Haven Lane, and South on Greenville Avenue to the Lovers Lane Station. Service would continue to be offered only during peak periods. The light rail line would provide the link to downtown.

- Route 28 - Northwest Highway: This route currently operates as a crosstown service along Northwest Highway, connecting the North Irving Transit Center with the South Garland Transit Center. Service is provided seven days a week.

  Reflecting the proposed standardized route designation policy, this service would be known as Route 428. The alignment would be adjusted slightly to access the Park Lane LRT terminal, enabling convenient transfers with LRT and several other routes. The revised route would divert from Northwest Highway via Boedeker Drive, Blackwell Street, Park Lane, and Shady Brook Lane. No other LRT-based changes are suggested.

- Route 33 - Baltimore: This route currently operates as a radial local service from downtown Dallas, along Baltimore Drive, Edgemere Road, and other thoroughfares in this general corridor. Service is provided during daytime hours Monday through Friday as far as Royal Lane (33R), with selected peak period trips continuing north on Hillcrest Road to Belt Line Road (33F).

  Only the downtown-Mockingbird Lane trunk line would be retained as Route 33. This segment is comparatively close to downtown and distant from LRT access. The northern terminal would be the Mockingbird Lane station, to provide convenient transfers with LRT and several other routes. Service levels would be similar to those currently offered. Most of the remainder of the existing route would be served by new LRT-feeder Routes 533, 590, and 596, with comparable or better service levels.

- Route 34 - Vickery: This route currently operates as a radial local service from downtown Dallas, primarily utilizing Ross Avenue and McMillan Street. Most trips terminate at Martel Street (several blocks south of Mockingbird Lane). The route operates seven days a week. Evening and Sunday trips are combined with Route 24.

  A short extension is proposed to access the Mockingbird Lane LRT station, which would become the northern terminal, and would enable convenient transfers with LRT and several other routes. Since this route is comparatively close to downtown and distant from LRT access, no other changes are suggested.

- Route 67 - Boedeker: This route currently operates as a radial limited-stop service from downtown Dallas, utilizing the Central Expressway (mostly non-stop) to Mockingbird Lane, and then making local stops principally along Boedeker Drive to the North Central Transit Center. Service is provided on weekdays.

  Route 67 would be eliminated. New LRT-feeder Routes 567 and 595 would cover the local-stop portion. Service levels similar to current Route 67 would be offered. The light rail line would provide the link to downtown.

- Route 69 - Lake Ridge: This route currently operates as a radial limited-stop service from downtown Dallas, utilizing the Central Expressway (mostly non-stop) to Mockingbird Lane, and then making local stops along three branches. Daytime service is provided on weekdays in the Northwest Highway/Ferndale Road corridor (69E), and in the Northwest Highway/Audelia Road corridor (69W). Some off-peak trips combine both branches. Additional peak period short trips operate to Larmanda Court, just past Northwest Highway, via Abrams Road (69SL).

  Route 69 would be eliminated. New LRT-feeder Routes 569, 593 and 594 would cover the bulk of the local-stop portion, while Route 519 would serve the 69SL Larmanda Court loop. Service levels at least equivalent to current Route 69 would be offered. The light rail line would provide the link to downtown.

- Route 73 - Spring Creek: This route currently operates as a radial limited-stop service from downtown Dallas, utilizing the Central Expressway (generally non-stop) to Park Lane or Forest Lane. Local stops are then made along the Meandering Way/Spring Creek corridor (73E), or the Meandering Way/Hillcrest Road corridor (73W), both to the vicinity of Campbell Road. Service is provided on weekdays.

  Route 73 would continue to travel downtown, but would be reconfigured, upgraded and designated as express Route 211. It was determined that a forced transfer to LRT at Park Lane station would have a significant adverse travel-time impact on the majority of Route 73 riders. In addition, rerouting the buses from the Central Expressway to the less congested Dallas North Tollway is recommended to improve service reliability (and substantiate the new premium fare). Buses would use the Tollway north to Forest Lane, and then would proceed east on Forest Lane to join with the current route. Service levels would be similar to those currently offered.

- Route 77 - North Central Park & Ride: This route currently operates as a radial limited-stop service from downtown Dallas, utilizing the Central Expressway and/or its service roads to Forest Lane or beyond. Most trips continue to the North Central Transit Center, with several local and

non-stop alignment variations to serve employment centers in the area. Weekday service is provided only during peak periods. A modified route operates on Saturdays, making local stops from Lovers Lane north, and terminating at the Transit Center.

Route 77 would be truncated at the Park Lane station and redesignated as LRT-feeder Route 577. The light rail line would provide the link to downtown. Midday trips would be added on weekdays. This would compensate for Route 73 trips which currently provide supplemental service for Route 77, but would bypass much of the corridor (operating express via the Tollway) with this plan. Peak period and Saturday service levels would remain essentially unchanged.

- Route 82 - Richland: This route currently operates as a radial limited-stop service from downtown Dallas, utilizing the Central Expressway non-stop to Northwest Highway (peak periods) or Southwestern Boulevard (off-peak). Then, local stops are made to Richland College, via either the Skillman Street/Audelia Road corridor (82E) or the Skillman Street/Abrams Road corridor (82W). Weekday and Saturday service is offered. On Saturdays, however, all service is provided along an extended 82E alignment which covers a portion the 82W as well (from Richland College to Forest Lane).

  Route 82 would be eliminated. New LRT-feeder Routes 582, 591 and 592 would cover the bulk of the local-stop portion. Service levels would be similar to those currently operated. The light rail line would provide the link to downtown.

- Route 88 - Galleria/Presbyterian: This route currently operates as a crosstown service, connecting several major retail and medical centers in the Alpha Road/LBJ Freeway and Forest Lane/Greenville Avenue corridors. Service is provided Monday through Friday.

  Reflecting the proposed standardized route designation policy, this service would be known as Route 488. The alignment would be extended slightly from the current southern terminus at Presbyterian Hospital to access the Park Lane LRT station. This would enable convenient transfers with LRT and several other routes. No other LRT-based changes are suggested.

- Route 133 - Northwest Highway-Parkland: This route currently operates as a limited-stop crosstown service, principally along Northwest Highway and Harry Hines Boulevard. It connects the South Garland Transit Center with the Medical Center/Market Center complex. Service is provided only during peak periods (from South Garland in the morning and returning in the evening).

  The alignment would be adjusted slightly to access the Park Lane LRT terminal, enabling convenient transfers with LRT and several other

routes. The revised route would divert from Northwest Highway via Boedeker Drive, Blackwell Street, Park Lane, and Shady Brook Lane. No other LRT-based changes are suggested.

- Route 200 - Plano East Express: A minor change is proposed for this route whereby outbound peak period trips would make an additional stop (prior to entering the CBD in the evening, and after leaving the CBD in the morning) at the Park Lane LRT station. Mid-day service would be between Plano and the Park Lane station, only.

- Route 201 - Richardson Express: A minor change is proposed for this route whereby outbound peak period trips would make an additional stop (prior to entering the CBD in the evening, and after leaving the CBD in the morning) at the Park Lane LRT station. Mid-day service would be between Richardson and the Park Lane station only.

- Route 211 - Spring Creek: This would be the new designation for existing Route 73, which would be reconfigured as a premium express service. The changes are detailed in the Route 73 discussion.

- Route 413 - Mockingbird: Reflecting the proposed standardized route designation policy, this would be the new designation for existing Route 13. As noted in the Route 13 discussion, the route segment east of the Mockingbird LRT station is proposed for elimination to improve productivity. Service along part of this segment would be replaced by Route 597.

- Route 428 - Northwest Highway: Reflecting the proposed standardized route designation policy, this would be the new designation for existing Route 28. Other changes are detailed in the Route 28 discussion.

- Route 488 - Galleria/Presbyterian: Reflecting the proposed standardized route designation policy, this would be the new designation for existing Route 88. Other changes are detailed in the Route 88 discussion.

- Route 519 - Abrams/Larmanda: This new LRT-feeder route would replace the outer end of the current 19N branch. Beginning at the Mockingbird LRT station, buses would proceed east on Mockingbird Lane and north on Abrams Road to terminate in the Northwest Highway/Larmanda Court area. Service would be offered on weekdays, at levels similar to the 19N.

- Route 521 - S.M.U./North Park: This new LRT-feeder route would replace the outer end of the current Route 21. Beginning at the Mockingbird LRT station, buses would proceed west on Mockingbird Lane and north on Hillcrest Avenue to Northwest Highway, and then access the Park Lane LRT station via Boedeker Drive and Park Lane. Connections to LRT and several other bus routes will be available at

both ends of the line. Service would be offered seven days a week, at levels similar to existing Route 21.

- Route 527 - Village: This would be the new designation for existing Route 27, which would be revised to become an LRT-feeder service. The changes are detailed in the Route 27 discussion.

- Route 533 - Walnut Hill/Edgemere: This new LRT-feeder route would replace the outer end of the current 33R. Beginning at the Park Lane LRT station, buses would proceed north via the Central Expressway service road, west along Walnut Hill Lane, and north on Edgemere Road to Royal Lane. The segment along Walnut Hill Lane represents a new transit corridor. Service would be offered on weekdays, at levels similar to the 33R. The selected peak period 33F trips continuing north on Hillcrest Road to Belt Line Road could be retained as part of this route as well, although they are not currently in the plan.

- Route 567 - Boedeker/Mockingbird: This new LRT-feeder route would replace part of outer Route 67. Beginning at the Mockingbird LRT station, buses would proceed west on Mockingbird Lane, and then via Dublin Street, Yale Boulevard, Boedeker Drive, and then access the Park Lane LRT station via Park Lane. Connections to LRT and several other bus routes will be available at both ends of the line. Service would be offered Monday through Friday. Peak period service levels would be similar to existing Route 67; base service would be increased.

- Route 569 - Lake Ridge/Kingsley: This new LRT-feeder route would serve the outer end of the current 69W branch, utilizing an alignment that offers new service along a segment of Kingsley Road. Beginning at the Park Lane LRT station, buses would travel east on Park Lane, then utilize Eastridge Drive, Skillman Street and Kingsley Road, to loop via Fieldcrest Drive, Church Road and Audelia Road. Weekday service would be offered, at improved levels compared with the 69W.

- Route 577 - North Central: This would be the new designation for existing Route 77, which would be cut back to become an LRT-feeder service. The changes are detailed in the Route 77 discussion.

- Route 582 - Richland/Abrams: This new LRT-feeder route would serve the outer end of the current 82W branch, utilizing an alignment that offers new service along a segment of Fair Oaks Drive. Beginning at the Park Lane LRT station, buses would proceed east on Park Lane, then utilize Fair Oaks Drive and Abrams Road as far north as the Richland College vicinity (Walnut Street). Weekday service would be offered, at similar levels as the 82W.

- Route 590 - Park Lane/Preston Hollow: This new LRT-feeder route would provide service along an east-west corridor essentially unserved by transit at present. Beginning at the Park Lane LRT station, buses would proceed west on Park Lane and north on Preston Road. At Walnut Hill Lane, the alignment would turn east, passing a large housing complex via Thackery Street, Bandera Avenue and Hillcrest Road. Buses would then return to the station along Park Lane. Route 590 would operate seven days a week, with 20 minute headways in peak periods and hourly headways at other times.

- Route 591 - Skillman North: This new LRT-feeder route would replace portions of the current Route 82 (primarily along the 82E branch). Beginning at the Lovers Lane LRT station, buses would proceed east on Lovers Lane and north on Skillman Street to the Royal Lane/Fair Oaks Drive area. The route would operate Monday through Saturday, with service levels based on those of existing Route 82.

- Route 592 - Richland/Audelia: This new LRT-feeder route would serve the outer end of the current 82E branch, utilizing an alignment that offers new service along a segment of Royal Lane. Beginning at the Park Lane LRT station, buses would proceed east on Park Lane, then utilize Greenville Avenue, Royal Lane, Fair Oaks Drive, Skillman Street, Audelia Road and Walnut Street to the Richland College vicinity (Abrams Road). The route would operate six days a week, with service levels based on those of existing Route 82.

- Route 593 - Lake Ridge/Ferndale: This new LRT-feeder route would serve the outer end of the current 69E branch. Beginning at the Lovers Lane LRT station, buses would proceed east on Lovers Lane, then utilize Skillman Street, Fisher Road, Trammel Drive, Northwest Highway, and Ferndale Road to terminate at White Rock Trail. Weekday service would be offered, at improved levels compared with the 69E.

- Route 594 - Lake Ridge/Audelia: This new LRT-feeder route would replace part of the current 69W branch. Beginning at the Lovers Lane LRT station, buses would proceed east on Lovers Lane, then utilize Abrams Road, Northwest Highway, and Audelia Road to Kingsley Road. Part of the Audelia Road segment has no current transit service. Weekday service would be offered, at improved levels compared with the 69W.

- Route 595 - Boedeker/Medical City: This new LRT-feeder route would replace the outer end of Route 67. Beginning at the Park Lane LRT station, buses would travel west on Park Lane, continue north via the Boedeker Drive corridor past Medical City, and terminate at the North Central Transit Center. Service would be offered Monday through Friday. Peak period service levels would be similar to existing Route 67; base service would be increased.

- Route 596 - Baltimore/North Park: This new LRT-feeder route would replace part of current Route 33. Beginning at the Mockingbird LRT station, buses would proceed west on Mockingbird Lane and north along the Golf Drive/ Baltimore Drive corridor to Northwest Highway, and then access the Park Lane LRT station via Boedeker Drive and Park Lane. Connections to LRT and several other bus routes will be available at both ends of the line. Service would be offered on weekdays, with improved frequencies compared to the existing service.

- Route 597 - Mockingbird Hills: This new LRT-feeder route would replace the current Route 19M branch. Beginning at the Mockingbird LRT station, buses would proceed east on Mockingbird Lane as far as Hillgreen Drive, and then loop via Brookcove and Greentree Lanes. The current diversion via Ravendale Lane would be eliminated; it is only two blocks off of Mockingbird Lane. Similar to the 19M, service would be offered only during weekday peak periods. This route would replace part of the Route 413 (existing Route 13) segment proposed for elimination.

- Route 598 - Shady Brook: This new LRT-feeder route would replace most of outer Route 6. Beginning at the Lovers Lane LRT station, buses would proceed east and then north, using Lovers Lane, Amesbury Drive, Southwestern Boulevard, and Shady Brook Lane. The route would continue by diverting through large apartment complexes along Melody Lane, Eastridge Drive and Ridgecrest Road, and then access the Park Lane LRT station from the east via Park Lane. Connections to LRT and several other bus routes will be available at both ends of the line. Service would be offered seven days a week, at improved levels compared to existing Route 6.

- Route 599 - Greenville North: This new LRT-feeder route would replace outer portions of current Routes 1 and 6. In addition, service levels along Greenville Avenue between Park Lane and Forest Lane would be improved, and new transit service would be available north of Forest Lane. The basic route would begin at the Park Lane LRT station, proceed north along Greenville Avenue (diverting via Walnut Hill Lane, Manderville Lane and Meadow/ Kirkland Park Road) as far as Walnut Street. Service would operate seven days a week. Extended weekday trips would continue west on Walnut Street, through the Hamilton Park area (now served during peak periods by the 1F), and then access the North Central Transit Center via Forest Lane and Coit Road.

An analysis of bus bay capacity at the three LRT stations indicates adequate capacity:

- Park Lane - seven minutes per berth
- Lovers Lane - ten minutes per berth
- Mockingbird - six minutes per berth.

OAK CLIFF PLAN

A summary of the Oak Cliff Plan bus routes and changes is presented in Exhibit 4-4. Route numbers shown in quotes on the exhibit are those used by DART staff in their plans. A detailed route-level discussion is presented below. The discussion is arranged according to route number, with existing and proposed new routes listed together in numerical order. A geographical representation of the plan is shown in Exhibit 4-5.

More than 30 bus routes currently operate within the Oak Cliff LRT service area. Light rail-based service changes are suggested for all of these routes except one. The latter is Route 66, the Loop 12 Crosstown. There are also several proposed routes that are not clearly associated with any existing service; they are treated as entirely new routes.

Similar to the North Central Plan, new or substantially changed routes have been assigned new numbers -- generally reflecting the service types and primary route numbers from which they were developed. In the case of several Oak Cliff LRT-feeder routes where the most appropriate number was not free, the 501-508 series has been used.

- Route 2 - Ervay: This route currently operates as a radial local service from downtown Dallas, primarily along Ervay Street. Service is provided seven days a week. Base service operates as far as Hatcher Street; with extended peak period trips continue via the Central Expressway service road as far as Loop 12 (2C).

  Only a minor alignment adjustment is suggested for this route. In order to access LRT, buses would divert about two blocks from Ervay Street in the vicinity of the Lamar station. CBD-oriented rail-bus transfers at this station may not be significant -- the station is close to downtown and the bus route will continue to operate there as well. However, there is some potential for transfers to facilitate trips between outlying areas, and no other bus service would be available at the station. Route 2 service levels would not change.

- Route 4 - Bishop: This route currently operates as a radial local service from downtown Dallas, utilizing the Bishop/Llewellyn Streets corridor, terminating just north of Clarendon Drive. The route operates seven days a week.

  It is proposed to extend Route 4 west along Clarendon Drive as far as Westmoreland Road (passing the Tyler-Vernon LRT station), and then continue south to terminate at the Westmoreland LRT station. The Clarendon Drive service would represent a new east-west transit corridor that is somewhat parallel to, but does not duplicate, the light rail line. Route 4 would continue to operate to downtown Dallas, with similar weekday and Saturday service levels, and slightly improved frequencies on Sunday.

Exhibit 4-4
BUS/LIGHT RAIL INTERFACE PLAN SUMMARY - OAK CLIFF AREA

CURRENT ROUTE			PROPOSED ROUTE			OAK CLIFF AREA LRT STATIONS		
NO.	TYPE	SERVICE	NO.	TYPE	SERVICE	SERVED	CHANGES FROM CURRENT	NOTES
2	RL	7-day	2	R	7-day	Lamar	Divert via LRT	
4	RL	7-day	4	R	7-day	Tyler,Westmoreland	Extend w. on Clarendon	Subst for #11; new service corridor
5	RL	Peak	--	--	--	---	Eliminate route	Covered primarily by #405
10	RL	7-day	10	R	7-day	Westmoreland	Extend to LRT; add trips	Subst for #11
11	RL	7-day	11	R	7-day	Hampton	Eliminate Montreal Segment	Covered by extended #453 diversion
15	RL	7-day	501	F	7-day	Zoo	Cut back to feed LRT	Suppl. with peak #515
16	RL	Peak	--	--	--	---	Eliminate route	Route #453 to deviate two trips per peak
22	RL	7-day	522	F	7-day	Zoo	Extend to Red Bird TC; terminate at zoo station	New service corridor; Suppl. with peak #122
30	RL	7-day	502	F	7-day	Zoo	Cut back (LRT); s. to Ann Arbor only	Suppl. with peak #630
38	RL	7-day	504,538	F	7-day	Illinois, Corinth	Cut back to feed LRT	Divide into two routes
41	UC	6-day	441	C	6-day	Keist,Corinth	S. loop via Kiest/Polk (not US 67)	Replace #56, better transfers
42	RLS	5-day	42	R	6-day	Tyler-Vernon	Extend to Wheatland	Replace #56; also divert via Red Bird TC
45	UC	7-day	445	C	7-day	Westmoreland,Illinois	Extend w. to loop via Larue	Replace outer #68
47	RL	7-day	47	R	7-day	Illinois-Ledbetter, Morrell	Extend along Lancaster	Subst for #55
48	RL	7-day	548	F	7-day	Westmoreland	Cut back to feed LRT	Suppl. with new #503
53	UC	7-day	453	C	7-day	Hampton	Some trips via Montreal loop (from #11)	
54	RL	7-day	--	--	--	---	Eliminate route	Covered by new #70,508
55	RLS	7-day	505,506,507	F	7-day	Ledbetter	Cut back to feed LRT	Divide into three routes
55X	RLS	Peak	--	--	--	---	Eliminate route	Covered by LRT,feeders
56	RLS	6-day	--	--	--	Tyler-Vernon	Eliminate route	Covered by #42
61	RLS	7-day	--	--	--	Tyler-Vernon	Eliminate route	Covered by #405,605
62	RL	7-day	62	R	7-day	Zoo	Cut back (LRT); Extend to Wheatland	---
66	UC	7-day	466	C	7-day	Ledbetter,VA Hosp	[No change]	
68	RL	7-day	68	--	--	---	Eliminate route	Covered by #76,445,508, and new #68
74	RLS	Peak	174	LS	Peak	---	Service to Red Bird TC	Interline with #122 or #278
76	RL	7-day	76	R	7-day	Westmoreland	West only to LRT; subst. Marsalis for Ewing	"Complements" #10,404,508
78	RE	5-day	278	EXP	5-day	---	Add stop at Red Bird TC	Coordinate schedule with #205 in CBD
304	RC	6-day	404	C	6-day	Westmoreland	Via Westmoreland,Illinois - to serve LRT	Eliminated section served by #76
405	RC	7-day	405	C	7-day	Tyler	S. to Wheatland (not Illinois TC)	Covers #61; Suppl. with peak #605
515	CF	Peak	515	F	Peak	Ledbetter	Cut back to feed LRT	
530	CF	Peak	130	LS	Peak	Illinois	Extend south of I-20	Replace #30P; Ltd stops along Marsalis
555	CF	5-day	555	F	5-day	Ledbetter	Cut back to feed LRT	
--	--	--	68	R	7-day	Westmoreland	New Route "C" - Ft Worth Ave	Replace #16,48,54,68 trunk; re-use #68 route designation
--	--	--	503	F	7-day	Westmoreland	New Route "48B" - s. Westmoreland	To Red Bird Mall
--	--	--	508	F	7-day	Westmoreland	New Route "B" - Mt Creek,Cockrell	Replace outer #54,68,76
--	--	--	105	LS	Peak	Tyler	New Route "561"	Ltd Stops along southern #405 alignment
--	--	--	122	LS	Peak	Zoo	New Route	Ltd Stops along southern #522 alignment

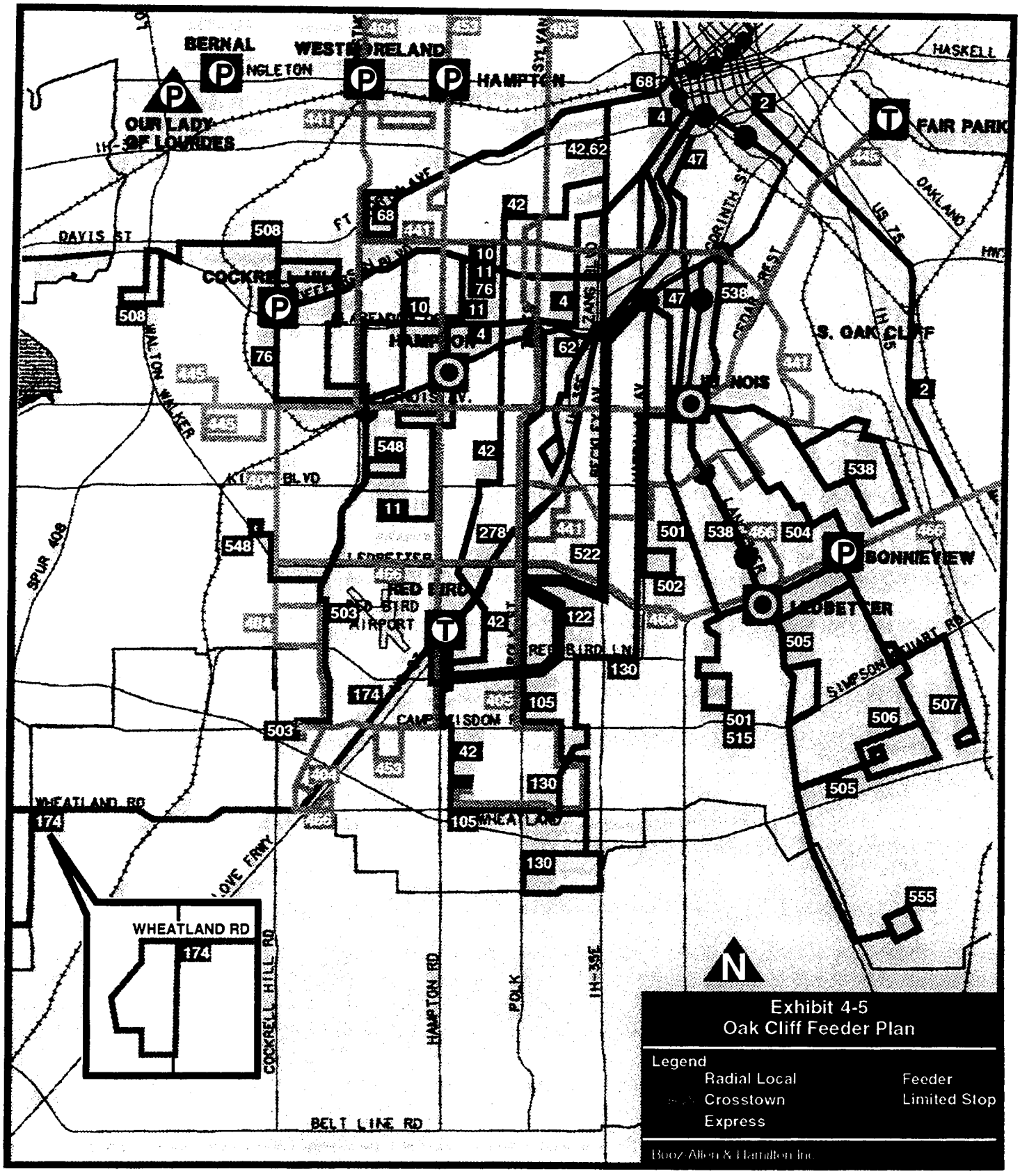


Exhibit 4-5
Oak Cliff Feeder Plan

Legend

- Radial Local
- Crosstown
- Express
- Feeder
- Limited Stop

Booz Allen & Hamilton Inc.

- Route 5 - Tyler: This route was recently downgraded from a full-service radial local route to a supplemental peak-only operation. Rather than serving downtown Dallas, base service in the Sylvan Street/Tyler Drive/Vernon Street corridor is now provided by crosstown Route 405.

  The remaining trips on Route 5 would be eliminated as well; sufficient alternative service would be available through a Route 405-LRT transfer.

- Route 10 - Sunset: This route currently operates as a radial local service from downtown Dallas, primarily along Jefferson Boulevard and Hampton Road/Superior Street. Service is provided seven days a week, extending south to Poinsettia Drive (near Illinois Avenue). Evening and Sunday trips are combined with Route 11.

  A short extension is proposed to access the Westmoreland LRT station. This would become the western terminus, enabling convenient transfers with LRT and several other routes. In addition, a minor realignment from Hampton Road to Superior Street between Jefferson Boulevard and Brooklyn Street would eliminate service duplication with Route 453 (current Route 53) on Hampton Road. Route 10 would continue to operate to downtown Dallas and would be interlined with Route 11.

- Route 11 - Hampton: This route currently operates as a radial local service from downtown Dallas, primarily along Jefferson Boulevard and Marlborough Street/Hampton Road. Service is provided seven days a week. Most trips terminate at Barlow Drive and Montreal Street (near Illinois Avenue), while certain peak period trips instead use a western branch to Pierce and Engle Streets (11HI). Evening and Sunday trips are combined with Route 10.

  This route would serve the Hampton station. Route 11 would continue to be interlined with Route 10. In addition, selected trips (i.e., two per peak period) would be diverted to serve the Southwood area formerly served by Route 16.

- Route 15 - Ramona: This route currently operates as a radial local service from downtown Dallas, primarily along Ewing Avenue, Frio Drive and Ramona Street. Most trips continue south nearly to Camp Wisdom Road, principally along Singing Hills Drive. Service is provided seven days a week. Evening and Sunday trips are combined with Route 30.

  This route would be truncated at the Zoo LRT station, becoming LRT-feeder Route 501. Service on the segment south of Ledbetter Drive (Loop 12) would be supplemented in peak periods with revised Route 515 direct to the Ledbetter station. Service spans and frequencies would approximate current levels. The light rail line would provide the link to downtown.

- Route 16 - Southwood: This route currently operates as a radial service from downtown Dallas, utilizing Commerce Street, Fort Worth Avenue, Hampton Road and Southwood Drive. Service is provided only during weekday peak periods, with only limited stops made in most areas.

  Route 16 would be eliminated. Service between the Southwood area and the Hampton LRT station would be provided on selected peak period trips by Route 11. Service on the segments north of the station would be covered by other transit services. Service spans and frequencies would approximate current levels. The light rail line would provide the link to downtown.

- Route 22 - Beckley: This route currently operates as a radial local service from downtown Dallas, primarily along Commerce Street and Beckley Avenue (as far as Ann Arbor Avenue). Service is provided seven days a week. Evening and Sunday trips are combined with Route 62.

  This route would be extended south to the Red Bird Transit Center, utilizing a new transit corridor through the Glen Oaks neighborhood and along Red Bird Lane. This route would interface directly with LRT at the Zoo station and, provide an important corridor service along the full length of Beckley Avenue. Further, it would be supplemented during peak periods with limited-stop feeder Route 122, which would operate as far north as Clarendon Drive and then terminate at the Zoo light rail station. Route 22 would terminate at the Zoo station and therefore be designated as Route 522. The light rail system would provide the link to downtown.

- Route 30 - Marsalis: This route currently operates as a radial local service from downtown Dallas, primarily along Marsalis Avenue. Most trips terminate at Ann Arbor Avenue (30M). Selected peak period trips continue to just south of Camp Wisdom Road, principally utilizing Marsalis Avenue, Laureland Road and Greenspan Drive (30P). Service is provided seven days a week. Evening and Sunday trips are combined with Route 15.

  This route would be truncated at the Zoo LRT station, becoming LRT-feeder Route 502. All trips would also operate only as far south as Ann Arbor Avenue. Service beyond Ann Arbor Avenue would be replaced with new Route 130, a peak-only limited stop service feeding the Illinois LRT station. Service spans and frequencies on Route 502 would approximate current levels on Route 30. The light rail line would provide the link to downtown.

- Route 38 - Lisbon: This route currently operates as a radial local service from downtown Dallas, along Corinth Street to Illinois Avenue. From this point, the route splits into two branches (38E and 38W), which utilize separate alignments through the Lisbon/Cedar Crest area and terminate

at Ledbetter Drive. Service is provided seven days a week along the trunk and both branches.

This route would serve the Illinois LRT station and be truncated at the Corinth LRT station. For simplification, each outer branch would become a separate LRT-feeder service. The 38E branch would become Route 538, while the 38W branch would become Route 504. Service levels would not change from those currently offered. The light rail line would provide the link to downtown.

- Route 41 - Davis/Kiest: This route currently operates as a crosstown service, primarily along Westmoreland Road, Davis Street and Kiest Boulevard. The semi-circular alignment connects the West Dallas Industrial Center with the Fawn Valley/Fawn Ridge area, passing through the Oak Cliff business district. Service is provided Monday through Saturday.

  Reflecting the proposed standardized route designation policy, this service would be known as Route 441. The alignment would be adjusted slightly near the southern terminus to loop via Kiest Boulevard and Polk Street rather than the Highway 67 service road. This would permit better transfers to several other bus routes. It would also serve part of Kiest Boulevard in lieu of existing Route 56, which would be eliminated. No other LRT-based changes are suggested; access to LRT would be available at both the Corinth and Kiest stations.

- Route 42 - Elmwood: This route currently operates as a radial local service from downtown Dallas, primarily along Colorado Boulevard and Edgefield Drive (as far as Kiest Boulevard). Service is provided Monday through Friday.

  Route 42 would be diverted to serve the Tyler-Vernon station. It will continue to serve the CBD, and provide local service in a corridor comparatively close to downtown. Improved weekday base frequencies and new Saturday service are also suggested, however, based on proposals by DART staff.

  Route 42 would also be extended south on the current Route 56 alignment to Wheatland Road. A new diversion via the Red Bird Transit Center would be added as well.

- Route 45 - King Center/Illinois: This route currently operates as a crosstown service, primarily along Illinois Avenue and Cedar Crest/Martin Luther King Jr. Boulevard. The alignment connects the Mountain View College with the King Center, serving the Illinois Transit Center enroute. Service is provided seven days a week.

  Reflecting the proposed standardized route designation policy, this service would be known as Route 445. The alignment would be

adjusted on the western end to loop via Larue Street and Duncanville Road before continuing to the Mountain View College terminus. This would cover the outer portion of existing Route 68, which would be eliminated. No other LRT-based changes are suggested; access to LRT would be available at both the Westmoreland and Illinois stations.

- Route 47 - Moore: This route currently operates as a radial local service from downtown Dallas, primarily serving the north-south Moore Street/Denley Drive corridor. Service continues as far as the Illinois Transit Center, and operates seven days a week.

  Route 47 would be extended south via Lancaster Road as far as Ledbetter Drive (Loop 12), replacing an existing Route 55 segment. This route would essentially provide local service along or near the entire Oak Cliff/South Oak Cliff LRT right-of-way. The Corinth station and all stations from Illinois through Ledbetter would be directly served. It will also continue to serve the CBD, with service levels almost identical to the present.

- Route 48 - Westmoreland/Kimball: This route currently operates as a radial local service from downtown Dallas, primarily along Fort Worth Avenue and Westmoreland Road. Service continues as far as Bronze Way (south of Ledbetter Drive), and then proceeds west to the Army-Air Force Exchange Service Headquarters near Walton Walker Boulevard. Service is provided seven days a week.

  This route would be truncated at the Westmoreland LRT station, becoming LRT-feeder Route 548. The light rail line would provide the link to downtown. Service spans and frequencies would be similar to current levels on Route 48, except that fewer trips would be operated during peak periods. New Route 503 would also serve the portion along Westmoreland Road, and then continue south to the Red Bird Mall.

- Route 53 - Hampton Crosstown: This route currently operates as a crosstown service between the Parkland Medical Center complex and the Red Bird Mall, principally utilizing Hampton Road. Service is provided seven days a week.

  Reflecting the proposed standardized route designation policy, this service would be known as Route 453.

- Route 54 - Beverly Hills: This route currently operates as a radial local service from downtown Dallas, primarily along the Fort Worth Avenue corridor and into Cockrell Hill. Service is provided seven days a week.

  This route would be eliminated. Most of the alignment would be covered by new Route 70, which would serve Fort Worth Avenue and downtown Dallas, or new Route 508, which would feed LRT at the Westmoreland

station. Service levels on the new routes would be at least commensurate with those on existing Route 54.

- Route 55 - Lancaster: This route currently operates as a radial service from downtown Dallas. Non-stop service is offered along Corinth Street south to the Illinois Transit Center (as a prelude to LRT service). From this point, local service is provided along Lancaster Road, and then along three branches (55A, 55P and 55S) from Ledbetter Drive to the Alta Mesa/Paul Quinn College/Highland Hills area. Service is provided seven days a week except along the peak-only 55A branch. Late night and Sunday service utilizes a combined 55P/55S alignment.

  This route would be truncated at the Ledbetter LRT station. For simplification, each outer branch would become a separate LRT-feeder service. The 55A branch would become Route 505, the 55P branch would become Route 506, and the 55S branch would become Route 507. Service levels would not change significantly from those currently offered. The light rail line would provide the link to downtown.

- Route 55X - Lancaster/Schepps Freeway: This route currently operates as a radial limited-stop service from downtown Dallas, supplementing regular Route 55. It operates non-stop along IH-45 (Schepps Freeway) to Ledbetter Drive, and then makes local stops along the outer 55P and 55S branches described above. Service is provided during weekday peak periods only.

  This route would be eliminated. The light rail line and feeder Routes 506 and 507 would provide sufficient transit coverage in the service area to make Route 55X redundant. The resources necessary to operate this route appear better applied toward service improvements in other parts of the system where there are fewer transit alternatives.

- Route 56 - Club Oaks: This route currently operates as a radial limited-stop service from downtown Dallas. It operates non-stop via the Thornton Freeway to Kiest Boulevard, and then makes local stops south along the Rugged Drive/Mark Trail corridor and past the Oak Cliff Country Club, to terminate at Wheatland Road. Service is provided six days a week.

  This route would be eliminated. The outlying alignment would be covered by a restructured Route 42, which would operate to the Tyler-Vernon station. The light rail line would provide the link to downtown. Weekday service levels on the new route would be similar to those on existing Route 56; Saturday service would be improved.

- Route 61 - Glen Oaks: This route currently operates as a radial limited-stop service from downtown Dallas. It operates non-stop via the Thornton Freeway to Kiest Boulevard, and then makes local stops,

principally along Polk Street and Wheatland Road. Service is provided seven days a week.

This route would be eliminated. Base service along the outlying alignment would be covered by revised crosstown Route 405, which would pass the Zoo LRT station. Additional peak service would be provided by new LRT-feeder Route 605, operating with limited stops to the Zoo station. The light rail line would provide the link to downtown. Combined service levels on the new routes would be slightly less intensive than those on existing Route 61; new transit alternatives (e.g., extended Route 22) will be available in the general service area.

- Route 62 - Wynnewood: This route currently operates as a radial local service from downtown Dallas, primarily along Commerce Street, Beckley Avenue and Zangs Boulevard. The alignment extends south almost to Kiest Boulevard. Service is provided seven days a week. Evening and Sunday trips are combined with Route 22.

  This route would be diverted to the Zoo LRT station.

- Route 66 - Loop 12: This route currently operates as a crosstown service, primarily along Ledbetter Drive/Loop 12 in the Oak Cliff area, and then continuing east and north to Pleasant Grove and Casa Linda. The route serves several major activity centers, including the Red Bird Mall and Veterans Hospital. Service is provided seven days a week.

  Reflecting the proposed standardized route designation policy, this service would be known as Route 466. No LRT-based changes are suggested; access to LRT would already be available at both the Ledbetter and VA Hospital stations.

- Route 68 - Western Hills: This route currently operates as a radial local service from downtown Dallas, via Fort Worth Avenue, Hampton Road, Jefferson Boulevard, and various thoroughfares to terminate at Mountain View College. Service is provided seven days a week.

  This route would be eliminated. Most of the alignment would be covered by new or revised Routes 68, 76, 445 (45), and 508. Routes 70 and 76 would serve the Fort Worth Avenue and Jefferson Boulevard corridors, respectively, and continue to downtown Dallas. Route 445 would replace the outer portion of Route 68, including Mountain View College, and connect with LRT at the Westmoreland station. Route 508, would also operate to the Westmoreland station, replacing service in the Cockrell Hill area. The light rail line would provide the link between Westmoreland and downtown. Service levels on the new routes would be at least commensurate with those on existing Route 68.

- Route 68 - Fort Worth (New route with old #68): This new radial local route would replace the current trunk line of Routes 16, 48, 54 and 68

along the Fort Worth Avenue corridor between Westmoreland Road and downtown Dallas. Since this corridor is parallel and well north of the light rail line, there would be no interface between them. Service would be operated seven days a week, at frequencies somewhat reduced from the combined current levels, recognizing that LRT would be a preferred option for a large portion of the ridership.

- Route 74 - The Woods/Sugarberry: This route currently operates as a radial limited-stop service from downtown Dallas. It operates non-stop via the Thornton Freeway to Camp Wisdom Road, stops at the Red Bird Mall and south along Westmoreland Road, resumes non-stop operation west on Wheatland Road, and makes local stops at the outer end of the route. Service is provided only during weekday peak periods.

  Route 74 would be a limited-stop service route. The new route designation would be Route 174. Service frequencies would be ten minutes during the peak period. The new route would provide the same local service in the Clark/Flame Leaf and County View/Wheatland area. Additional stops would include the Red Bird Mall (American Way and Camp Wisdom), and the Red Bird Transit Center. The schedule for Route 174 would be coordinated or interlined with Route 122.

  Persons wishing to pay a local fare could transfer to Route 122 at the Red Bird Transit Centers for service to the Zoo station. The other option is to pay a premium fare and transfer to Route 278. Both options provide service to the CBD. Interlining Route 174 with either Route 122 or 278 would eliminate the need for transfers on one of these two options.

- Route 76 - Cockrell Hill: This route currently operates as a radial local service from downtown Dallas, primarily serving the Jefferson Boulevard corridor. The alignment continues west through Cockrell Hill and into the Arcadia Park/Mountain Creek area. Service operates seven days a week.

  This route will continue to serve the CBD, with service levels almost identical to the present. However, the outer end would be realigned. Buses would operate to the Westmoreland LRT station from Jefferson Boulevard, utilizing Cockrell Hill Road and Illinois Avenue. This change will enable valuable connections with several other transit lines at the Westmoreland station. It will also complement changes proposed for Route 304 (to become Route 404) that would permit efficient access for that route to the same station. The existing segment beyond Cockrell Hill Road and Jefferson Boulevard would be served by new LRT-feeder Route 508.

  A minor change would also be made to Route 76 closer to downtown Dallas. To compensate for the elimination of Routes 15 and 30 north of the Zoo station, Marsalis Avenue would be used instead of Ewing Avenue between the Trinity River viaducts and Jefferson Boulevard.

Route 10 would continue to operate along the affected segment of Ewing Avenue.

- Route 78 - Red Bird Express: This route currently operates as an express service between the Red Bird Transit Center and downtown Dallas in peak periods at an average frequency of eight minutes. Off-peak hourly service extends to the Red Bird Mall.

  The new route designation would be Route 278. Service frequencies would be ten minutes during the peak period and hourly during the off-peak. Interim stops to the CBD would include the Red Bird Mall (American Way and Camp Wisdom), and the Red Bird Transit Center. Off-peak, Route 278 would provide service between the Red Bird Mall and CBD, with an interim stop at the Red Bird Transit Center. The only impact to existing Route 78 riders is a change in peak period headways from an average of eight minutes to ten. Off-peak service remains unchanged.

  Route 78 is DART's most productive express route. Short-turning service at any of the rail stations in Oak Cliff would create a significant time-penalty for existing riders. A longer-term advantage of continuing this route will occur when the HOV facility on IH 35E/US 67 opens in the year 2007.

- Route 105 - Tyler Limited: This new route would operate as a supplemental limited-stop service along the revised Route 405 corridor (Tyler Drive/Polk Street) south to Wheatland Road from the Tyler-Vernon LRT station. Service would be offered only during peak periods, for a combined Route 405/105 frequency sufficient to replace the intensive peak levels currently provided along Route 61 in this corridor. At the Tyler-Vernon station, the light rail line would provide the link downtown.

- Route 122 - Beckley Limited: This new route would operate as a supplemental limited-stop service along the revised Route 22 corridor (Beckley Avenue/Glen Oaks) south to the Red Bird Transit Center from the Zoo LRT station. Service would be offered only during peak periods; it would enable a quicker trip from outlying areas than could be obtained on Route 22. At the Zoo station, the light rail line would provide the link to downtown and elsewhere.

- Route 130 - Polk Terrace Limited: This would be the new designation for existing Route 530, which would be extended and converted to a limited-stop service. The changes are detailed in the Route 530 discussion.

- Route 174 - Sugarberry Limited: This would be the new designation for existing Route 74, which would be cut back to the Red Bird Transit Center. The changes are detailed in the Route 74 discussion.

- Route 278 - Red Bird Express: Reflecting the proposed standardized route designation policy, this would be the new designation for existing Route 78. Other changes are detailed in the Route 78 discussion above.

- Route 304 - West Side Crosstown: This route currently operates as a crosstown service between the Red Bird Mall area and the City of Irving. In the Oak Cliff area, the alignment (from south to north) principally utilizes Westmoreland Road, Red Bird Lane, Cockrell Hill Road, Jefferson Boulevard, and Westmoreland Road again. The route then crosses the Trinity River and continues west and north into Irving. Service is provided Monday through Saturday.

  Reflecting the proposed standardized route designation policy, this service would be known as Route 404. The only LRT-based alignment change would be to operate via the Westmoreland LRT station. This change will enable valuable connections with LRT and several other bus lines. To facilitate this change, Illinois Avenue would be substituted for Jefferson Boulevard between Cockrell Hill and Westmoreland Roads. While this action would also remove the route from a portion of Cockrell Hill Road, revised Route 76 would serve the latter segment. Service levels would not change from the current schedule.

- Route 404 - West Side Crosstown: Reflecting the proposed standardized route designation policy, this would be the new designation for existing Route 304. Other changes are detailed in the Route 304 discussion.

- Route 405 - Tyler Crosstown: This route currently operates as a crosstown service between the Parkland Medical Center complex and the Illinois Transit Center. In the Oak Cliff area, the alignment principally utilizes the Sylvan Street/Tyler Drive/Vernon Street corridor and Illinois Avenue. Service is provided seven days a week.

  This route would be changed to continue south from Illinois Avenue via Polk Street (rather than accessing the Illinois Transit Center), and then to Wheatland Road, replacing the outer portion of existing Route 61. The segment along Polk Street between Illinois Avenue and Kiest Boulevard would represent a new transit corridor. Route 405 would continue to operate to the Medical Center, with improved weekday midday and Sunday service levels. A connection with LRT would be available at the Tyler-Vernon station. In addition, supplemental peak period service would be provided by limited-stop feeder Route 105, which would operate as far north as the light rail station.

- Route 441 - Davis/Kiest: Reflecting the proposed standardized route designation policy, this would be the new designation for existing Route 41. Other changes are detailed in the Route 41 discussion.

- Route 445 - King Center/Illinois: Reflecting the proposed standardized route designation policy, this would be the new designation for existing Route 45. Other changes are detailed in the Route 45 discussion.

- Route 453 - Hampton Crosstown: Reflecting the proposed standardized route designation policy, this would be the new designation for existing Route 53. Other changes are detailed in the Route 53 discussion.

- Route 466 - Loop 12: Reflecting the proposed standardized route designation policy, this would be the new designation for existing Route 66. As noted in the Route 66 discussion, there would be no other changes to this route.

- Route 501 - Ramona: This would be the new designation for existing Route 15, which would be cut back to become an LRT-feeder service. The changes are detailed in the Route 15 discussion.

- Route 502 - Marsalis: This would be the new designation for existing Route 30, which would be cut back to become an LRT-feeder service. The changes are detailed in the Route 30 discussion.

- Route 503 - Westmoreland/Red Bird: This new LRT-feeder route would connect the Westmoreland station with the Red Bird Mall. For the most part, the alignment would be confined to Westmoreland Road. Currently, this area is not served as a single transit corridor. The route would operate seven days a week, with frequencies based on current Route 48. Supplemental service will be available as well: north of Bronze Way with Route 548.

- Route 504 - Lisbon West: This would be the new designation for existing Route 38W, which would be cut back to become an LRT-feeder service. The changes are detailed in the Route 38 discussion.

- Route 505 - Alta Mesa: This would be the new designation for existing Route 55A, which would be cut back to become an LRT-feeder service. The changes are detailed in the Route 55 discussion.

- Route 506 - Paul Quinn: This would be the new designation for existing Route 55P, which would be cut back to become an LRT-feeder service. The changes are detailed in the Route 55 discussion.

- Route 507 - Bonnie View: This would be the new designation for existing Route 55S, which would be cut back to become an LRT-feeder service. The changes are detailed in the Route 55 discussion.

- Route 508 - Mountain Creek: This new LRT-feeder route would connect the Westmoreland station with the City of Cockrell Hill and the Arcadia Park/Mountain Creek area. It would replace segments of existing Routes 54 and 68 in the vicinity of Cockrell Hill, as well as the outer portion of

current Route 76. Mountain Creek passengers especially should be able to reduce their travel time from downtown and other points with the combined LRT/Route 508 service. The route would operate seven days a week, with frequencies based on current Route 76.

- Route 515 - Singing Hills: This route currently provides peak period service that supplements Route 15. From the outer terminus near Camp Wisdom Road, buses travel primarily via Singing Hills Drive and Ramona Street to the Illinois Transit Center.

  Route 515 would be cut back to operate only as far north as the Ledbetter LRT station. This would permit an earlier transfer to rail line, for a speedier trip toward downtown and other points. Service levels would remain the same as the current schedule.

- Route 522 - Beckley: This would be the new designation for existing Route 22, which would be cut back to become an LRT-feeder service. The changes are detailed in the Route 22 discussion.

- Route 530 - Polk Terrace: This route currently provides peak period service that supplements Route 30. From the outer terminus near Camp Wisdom Road, buses travel primarily via Greenspan Drive, Laureland Road and Marsalis Avenue to the Illinois Transit Center.

  Route 530 would be redesignated as Route 130. It would completely replace the current Route 30P branch. Limited-stop service would be offered along Marsalis Avenue, to speed up overall travel times from outlying areas. This is especially important since the route would be extended south of I-20, providing new transit service to the Beckleymeade neighborhood. Service levels would remain the same as the current schedule.

- Route 538 - Lisbon East: This would be the new designation for existing Route 38E, which would be cut back to become an LRT-feeder service. The changes are detailed in the Route 38 discussion.

- Route 548 - Westmoreland/Army Exchange: This would be the new designation for existing Route 48, which would be cut back to become an LRT-feeder service. The changes are detailed in the Route 48 discussion.

- Route 555 - Cedar Valley: This currently route provides special service to the Cedar Valley Community College from the Illinois Transit Center. Service is based on class schedules, and operates only on weekdays when classes are in session. The alignment is primarily along Lancaster Road, with local service as far south as I-20, and non-stop service beyond this point to the campus.

Route 555 would be cut back to operate only as far north as the Ledbetter LRT station. This would permit an earlier transfer to rail line, for a speedier trip toward downtown and other points. Service levels would remain the same as the current schedule.

OPERATING IMPACTS

Key operating statistics for both the bus routes currently operating within the study areas and the routes proposed for the 1996 plans have been assembled or calculated. Route-by-route statistics have been prepared, along with totals for each plan. The statistics include one-way trips, revenue miles and revenue hours for a weekday, Saturday and Sunday schedule. Peak vehicle requirements are also identified; they represent the maximum number of buses in service at any given time, which typically occurs during weekday peak periods. These operating statistics are important since they indicate the magnitude and extent of the system and provide a basis for estimating future operating costs.

Most of the current service information is based on the latest DART-operated and contractor (ATE) Scheduled Service Summaries. Some approximations were necessary to determine individual route statistics where interlined route data were available only by combined route-group. Current operational considerations were carried forward to the proposed plan where applicable (e.g., no interlining changes are assumed except where route groups would be physically split). In addition, proposed revenue hours were generally calculated as an extension of revenue miles (measured on a detailed base map), using the following average revenue speeds reflecting type of service:

- Radial (Local) 12.5 mph
- Express (Premium) 21.0 mph
- All Others 15.0 mph

These speeds were selected based on current schedules and information supplied by DART personnel that suggested revisions to current travel times, especially to improve schedule adherence.

Current and estimated statistics for the North Central Plan are presented in Exhibits 4-6 and 4-7, respectively. Exhibit 4-8 compares existing hours of service and service frequency to those proposed herein. Similar statistics for the Oak Cliff Plan are contained in Exhibits 4-9, 4-10, and 4-11. In both cases, all relevant existing and proposed routes are included, to facilitate comparisons. The routes are arranged to correspond with the order used previously in Exhibits 4-2 and 4-4 (the summaries of changes). Similar to the latter exhibits, route numbers shown in quotes were those used by DART internally.

Exhibit 4-6
Bus Operating Statistics
North Central - Current

Route	WEEKDAY				SATURDAY				SUNDAY			
	One-Way Trips	Revenue Miles	Revenue Hours	Peak Vehicles	One-Way Trips	Revenue Miles	Revenue Hours	Peak Vehicles	One-Way Trips	Revenue Miles	Revenue Hours	Peak Vehicles
1	65	617.5	51.5	5	42	399.0	31.4	1	21	200	17.3	1
6	75	825.0	54.6	9	50	550.0	33.5	2	48	528	31.8	2
13 (413)	67	1,051.9	59.4	5	57	894.9	54.9	4	0	0	0.0	0
19	82	615.0	46.2	5	31	232.5	18.3	1	17	128	10.5	1
20	60	354.0	29.5	3	32	188.8	14.9	1	21	124	10.8	1
21	68	516.8	46.6	4	34	258.4	21.7	1	29	220	20.6	1
24	60	318.0	30.9	4	29	153.7	16.2	1	30	159	17.5	1
27 (527)	47	390.1	26.5	7	0	0.0	0.0	0	0	0	0.0	0
28 (428)	83	1,676.6	89.7	7	58	1,171.6	56.3	4	27	545	30.5	2
33	44	387.2	31.7	3	0	0.0	0.0	0	0	0	0.0	0
34	60	318.0	30.9	3	29	153.7	16.2	1	30	159	17.5	1
67	50	505.0	41.4	4	0	0.0	0.0	0	0	0	0.0	0
69	75	840.0	59.6	14	0	0.0	0.0	0	0	0	0.0	0
73 (211)	69	1,131.6	65.8	8	0	0.0	0.0	0	0	0	0.0	0
77 (577)	40	488.0	37.3	9	38	419.2	28.5	2	0	0	0.0	0
82	94	1,428.8	82.6	13	46	712.8	45.4	3	0	0	0.0	0
88 (488)	52	488.8	33.7	3	0	0.0	0.0	0	0	0	0.0	0
133	12	216.0	9.4	3	0	0.0	0.0	0	0	0	0.0	0
200	69	1,449.4	59.3	9	0	0.0	0.0	0	0	0	0.0	0
201	55	842.4	38.2	12	0	0.0	0.0	0	0	0	0.0	0
519 ("19A")	0	0.0	0.0	0	0	0.0	0.0	0	0	0	0.0	0
521	0	0.0	0.0	0	0	0.0	0.0	0	0	0	0.0	0
533 ("33A")	0	0.0	0.0	0	0	0.0	0.0	0	0	0	0.0	0
567 ("67A")	0	0.0	0.0	0	0	0.0	0.0	0	0	0	0.0	0
569 ("69A")	0	0.0	0.0	0	0	0.0	0.0	0	0	0	0.0	0
582 ("82A")	0	0.0	0.0	0	0	0.0	0.0	0	0	0	0.0	0
590 ("A")	0	0.0	0.0	0	0	0.0	0.0	0	0	0	0.0	0
591 ("82C")	0	0.0	0.0	0	0	0.0	0.0	0	0	0	0.0	0
592 ("82B")	0	0.0	0.0	0	0	0.0	0.0	0	0	0	0.0	0
593 ("69C")	0	0.0	0.0	0	0	0.0	0.0	0	0	0	0.0	0
594 ("69B")	0	0.0	0.0	0	0	0.0	0.0	0	0	0	0.0	0
595 ("67B")	0	0.0	0.0	0	0	0.0	0.0	0	0	0	0.0	0
596 ("33B")	0	0.0	0.0	0	0	0.0	0.0	0	0	0	0.0	0
597 ("19B")	0	0.0	0.0	0	0	0.0	0.0	0	0	0	0.0	0
598 ("6A")	0	0.0	0.0	0	0	0.0	0.0	0	0	0	0.0	0
599 ("1/6"+"1F")	0	0.0	0.0	0	0	0.0	0.0	0	0	0	0.0	0
TOTAL	1,227	14,460.1	924.8	130	446	5,134.6	337.3	21	223	2,062.7	156.5	10

Exhibit 4-7
Bus Operating Statistics
North Central - Planned

Route	WEEKDAY One-Way Trips	WEEKDAY Revenue Miles	WEEKDAY Revenue Hours	WEEKDAY Peak Vehicles	SATURDAY One-Way Trips	SATURDAY Revenue Miles	SATURDAY Revenue Hours	SATURDAY Peak Vehicles	SUNDAY One-Way Trips	SUNDAY Revenue Miles	SUNDAY Revenue Hours	SUNDAY Peak Vehicles
1	57	342.0	27.4	4	42	252.0	20.2	2	23	138.0	11.0	2
6	0	0.0	0.0	0	0	0.0	0.0	0	0	0.0	0.0	0
13 (413)	67	663.6	44.2	4	57	564.3	37.6	4	0	0.0	0.0	0
19	78	444.6	35.6	4	31	176.7	14.1	2	20	114.0	9.1	2
20	60	384.0	30.7	4	32	204.8	16.4	2	25	160.0	12.8	2
21	52	280.8	22.5	3	26	140.4	11.2	2	26	140.4	11.2	2
24	52	322.4	25.8	4	29	179.8	14.4	2	22	136.4	10.9	2
27 (527)	72	367.2	24.5	5	0	0.0	0.0	0	0	0.0	0.0	0
28 (428)	83	1,801.1	120.1	7	58	1,258.6	83.9	4	27	585.9	39.1	3
33	50	300.0	24.0	4	0	0.0	0.0	0	0	0.0	0.0	0
34	68	421.6	33.7	7	29	179.8	14.4	2	22	136.4	10.9	2
67	0	0.0	0.0	0	0	0.0	0.0	0	0	0.0	0.0	0
69	0	0.0	0.0	0	0	0.0	0.0	0	0	0.0	0.0	0
73 (211)	69	1,283.4	61.1	8	0	0.0	0.0	0	0	0.0	0.0	0
77 (577)	52	395.2	26.3	7	38	288.8	19.3	2	0	0.0	0.0	0
82	0	0.0	0.0	0	0	0.0	0.0	0	0	0.0	0.0	0
88 (488)	52	551.2	36.7	3	0	0.0	0.0	0	0	0.0	0.0	0
133	12	234.0	15.6	3	0	0.0	0.0	0	0	0.0	0.0	0
200	69	1,449.4	59.3	9	0	0.0	0.0	0	0	0.0	0.0	0
201	55	842.4	38.2	12	0	0.0	0.0	0	0	0.0	0.0	0
519 ("19A")	48	196.8	13.1	2	0	0.0	0.0	0	0	0.0	0.0	0
521	68	251.6	16.8	2	34	125.8	8.4	1	33	122.1	8.1	1
533 ("33A")	58	232.0	15.5	3	0	0.0	0.0	0	0	0.0	0.0	0
567 ("67A")	64	217.6	14.5	2	0	0.0	0.0	0	0	0.0	0.0	0
569 ("69A")	70	308.0	20.5	3	0	0.0	0.0	0	0	0.0	0.0	0
582 ("82A")	46	280.6	18.7	3	0	0.0	0.0	0	0	0.0	0.0	0
590 ("A")	54	172.8	11.5	2	38	121.6	8.1	1	38	121.6	8.1	1
591 ("82C")	46	188.6	12.6	3	46	188.6	12.6	2	0	0.0	0.0	0
592 ("82B")	46	312.8	20.9	4	46	312.8	20.9	2	0	0.0	0.0	0
593 ("69C")	70	455.0	30.3	4	0	0.0	0.0	0	0	0.0	0.0	0
594 ("69B")	70	287.0	19.1	3	0	0.0	0.0	0	0	0.0	0.0	0
595 ("67B")	64	339.2	22.6	2	0	0.0	0.0	0	0	0.0	0.0	0
596 ("33B")	50	225.0	15.0	3	0	0.0	0.0	0	0	0.0	0.0	0
597 ("19B")	4	12.0	0.8	2	0	0.0	0.0	0	0	0.0	0.0	0
598 ("6A")	88	299.2	19.9	1	60	204.0	13.6	2	50	170.0	11.3	1
599 ("1/6"+"1F")	68	360.4	24.0	3	50	265.0	17.7	2	28	148.4	9.9	1
TOTAL	1,862	14,221.5	901.5	130	616	4,463.0	312.8	32	314	1,973.2	142.4	19

Exhibit 4-8
(Page 1 of 3)
COMPARISONS OF EXISTING WEEKDAY SERVICE FREQUENCIES TO PLAN NORTH CENTRAL - WEEKDAYS

ROUTE NUMBER	EXISTING HEADWAYS PEAK	BASE	SPAN OF SERVICE	(new) ROUTE NUMBER	PLANNED HEADWAYS PEAK	BASE	SPAN OF SERVICE
1	15	40	5:15am-12:30am	1	20	40	5:15am-12:30am
6	6	40	5:45am-8:30pm	6	Eliminated; covered by #598,599		
13	20	30	5:00am-10:00pm	413	20	30	5:00am-10:00pm
19	VARIES	30	5:00am-12:30am	19	30	30	6:45am-6:15pm
20	20	40	5:15am-12:30am	20	20	40	5:15am-12:30am
21	20	30	5:15am-11:00pm	21	20	30	5:00am-11:00pm
24	15	40	5:15am-11:15pm	24	20	40	5:15am-11:15pm
27	7-15	-	PEAK	527	10	-	PEAK
28	30	45	5:00am-11:30pm	428	30	45	5:00am-11:30pm
33	30	60	5:45am-7:15pm	33	20	40	5:45am-7:15pm
34	15	40	5:15am-11:19pm	34	10	40	5:15am-11:15pm
67	30	60	5:45am-9:30pm	67	Eliminated; covered by #567,595		
69	25	50	5:30am-8:00pm	69	Eliminated; covered by #519,569,593,594		
73	11-15	40	5:00am-8:15pm	211	11-15	-	PEAK
77	5-15	-	PEAK	577	10	40	5:00am-8:10pm
82	12-16	70	5:15am-	82	Eliminated; covered by #582, 591, 592		
88	30	45	5:45am-9:45pm	488	20	40	5:45am-9:45pm
133	30	-	PEAK	133	30	-	PEAK
"19A"	-	-	-	519	30	30	6:45am-6:15pm
"21"	-	-	-	521	20	30	5:00am-11:00pm
"33A"	-	-	-	533	20	40	5:45am-9:30pm
"67A"	-	-	-	567	30	40	5:45am-9:30pm
"69A"	-	-	-	569	20	30	5:30am-8:00pm
"82A"	-	-	-	582	20	70	5:15am-8:45pm
"A"	-	-	-	590	20	60	5:00am-12:00am
"82C"	-	-	-	591	20	70	5:15am-8:45pm
"82B"	-	-	-	592	20	70	5:15am-8:45pm
"69C"	-	-	-	593	20	30	5:30am-8:00pm
"69B"	-	-	-	594	20	30	5:30am-8:00pm
"67B"	-	-	-	595	30	40	5:45am-9:30pm
"33B"	-	-	-	596	20	40	5:45am-7:15pm
"19B"	-	-	-	597	VARIES	-	PEAK
"6A"	-	-	-	598	10	30	5:30am-9:30pm
"1/6","1F"	-	-	-	599	20	30	5:30am-9:30pm

Exhibit 4-8
(Page 2 of 3)
COMPARISONS OF EXISTING SATURDAY SERVICE FREQUENCIES TO PLAN NORTH CENTRAL - SATURDAYS

ROUTE NUMBER	EXISTING HEADWAYS PEAK	BASE	SPAN OF SERVICE	(new) ROUTE NUMBER	PLANNED HEADWAYS PEAK	BASE	SPAN OF SERVICE
1	-	56	5:15am-12:30am	1	-	60	5:15am-12:30am
6	40	40	5:15am-8:30pm	6	<----------Eliminated---------->		
13	30	30	6:15am-9:00pm	13	30	30	6:15am-9:00pm
19	72	72	5:30am-12:30am	19	60	60	5:30am-12:30am
20	60	60	6:00am-12:30am	20	60	60	6:00am-12:30am
21	60	60	5:15am-11:00pm	21	60	60	5:00am-11:00pm
24	60	60	5:15am-11:15pm	24	60	60	5:15am-11:15pm
27	-	-	-	527	-	-	-
28	45	45	5:15am-11:00pm	28	45	45	5:15am-11:00pm
33	-	-	-	33	-	-	-
34	60	60	5:15am-11:15pm	34	60	60	5:15am-11:15pm
67	-	-	-	67	<----------Eliminated---------->		
69	-	-	-	69	<----------Eliminated---------->		
73	-	-	-	211	-	-	-
77	45	45	5:15am-8:15pm	77	45	45	5:15am-8:15pm
82	40	40	5:50am-10:00pm	82	<----------Eliminated---------->		
88	-	-	-	88	-	-	-
133	-	-	-	133	-	-	-
	-	-	-	519	-	-	-
"21"	-	-	-	521	60	60	5:00am-11:00pm
	-	-	-	533	-	-	-
	-	-	-	567	-	-	-
	-	-	-	569	-	-	-
	-	-	-	582	-	-	-
"A"	-	-	-	590	60	60	5:30am-11:30pm
"82C"	-	-	-	591	60	60	
"82B"	-	-	-	592	60	60	
	-	-	-	593	-	-	-
	-	-	-	594	-	-	-
	-	-	-	595	-	-	-
	-	-	-	596	-	-	-
	-	-	-	597	-	-	-
"6A"	-	-	-	598	30	30	5:30am-8:00pm
"1/6","1F"	-	-	-	599	40	40	5:30am-9:30pm

Exhibit 4-8
(Page 3 of 3)
COMPARISONS OF EXISTING SUNDAY SERVICE FREQUENCIES TO PLAN NORTH CENTRAL - SUNDAYS

ROUTE NUMBER	EXISTING HEADWAYS PEAK	BASE	SPAN OF SERVICE	(new) ROUTE NUMBER	PLANNED HEADWAYS PEAK	BASE	SPAN OF SERVICE
1	-	70	5:15am-1:00am	1	-	60	5:15am-1:00am
6	-	-	-	6	<----------Eliminated---------->		
13	-	-	-	13	-	-	-
19	70	70	5:00am-1:00am	19	60	60	5:00am-1:00am
20	70	70	5:00am-12:30am	20	60	60	5:00am-12:50am
21	70	70	6:00am-11:30pm	21	60	60	6:00am-11:30pm
24	35	35	5:15am-11:15pm	24	45	45	5:15am-11:15pm
27	-	-	-	527	-	-	-
28	70	70	5:30am-9:30pm	28	60	60	5:30am-9:30pm
33	-	-	-	33	-	-	-
34	35	35	5:15am-11:15pm	34	45	45	5:15am-11:15pm
67	-	-	-	67	<----------Eliminated---------->		
69	-	-	-	69	<----------Eliminated---------->		
73	-	-	-	211	-	-	-
77	-	-	-	77	-	-	-
82	-	-	-	82	<----------Eliminated---------->		
88	-	-	-	88	-	-	-
133	-	-	-	133	-	-	-
	-	-	-	519	-	-	-
"21"	-	-	-	521	60	60	6:00am-11:30pm
	-	-	-	533	-	-	-
	-	-	-	567	-	-	-
	-	-	-	569	-	-	-
	-	-	-	582	-	-	-
"A"	-	-	-	590	60	60	5:30am-11:30pm
	-	-	-	591	-	-	-
	-	-	-	592	-	-	-
	-	-	-	593	-	-	-
	-	-	-	594	-	-	-
	-	-	-	595	-	-	-
	-	-	-	596	-	-	-
	-	-	-	597	-	-	-
"6A"	-	-	-	598	40	40	5:30am-8:00pm
"1/6","1F"	-	-	-	599	60	60	5:30am-8:00pm

Exhibit 4-9
Bus Operating Statistics
Oak Cliff - Current

Route	WEEKDAY				SATURDAY				SUNDAY			
	One-Way Trips	Revenue Miles	Revenue Hours	Peak Vehicles	One-Way Trips	Revenue Miles	Revenue Hours	Peak Vehicles	One-Way Trips	Revenue Miles	Revenue Hours	Peak Vehicles
2	85	272.0	27.5	5	68	217.6	22.7	2	33	105.6	12.3	1
4	68	299.2	27.0	3	34	149.6	12.6	1	29	127.6	11.9	1
5	6	35.4	2.5	1	0	0.0	0.0	0	0	0.0	0.0	0
10	75	487.5	43.1	4	38	247.0	20.9	2	17	110.5	10.5	1
11	73	547.5	48.5	5	35	262.5	22.2	1	17	127.5	12.1	0
15 (501)	80	696.0	52.3	8	42	365.4	28.8	1	17	147.9	12.1	0
16	5	44.7	2.7	2	0	0.0	0.0	0	0	0.0	0.0	0
22 (522)	56	408.8	34.1	4	32	233.6	18.4	1	17	124.1	10.8	1
30M (502)	95	665.0	50.0	7	42	294.0	23.1	2	18	126.0	10.3	1
30P	12	111.6	8.4	2	0	0.0	0.0	0	0	0.0	0.0	0
38 (504/538)	220	2,024.0	145.6	12	135	1,242.0	92.7	4	95	874.0	62.9	3
41 (441)	65	1,122.1	79.0	7	50	739.3	54.8	4	0	0.0	0.0	0
42	68	455.6	32.3	5	0	0.0	0.0	0	0	0.0	0.0	0
45 (445)	75	779.8	57.8	5	59	613.4	43.8	3	35	363.9	28.4	3
47	67	335.0	45.3	2	70	350.0	41.7	2	34	170.0	21.8	1
48 (548)	69	745.2	53.6	9	35	378.0	28.0	2	32	345.6	27.9	2
53 (453)	83	1,501.4	102.8	8	60	1,085.3	73.8	5	43	777.8	47.4	3
54	50	355.0	24.3	4	40	284.0	20.3	1	40	284.0	20.7	1
55 (505/506/507)	189	2,396.6	164.2	16	126	1,597.7	111.0	6	66	836.9	56.9	3
55X	67	779.8	36.3	9	0	0.0	0.0	0	0	0.0	0.0	0
56	68	890.8	42.6	4	22	288.2	14.6	1	0	0.0	0.0	0
61	146	1,722.8	88.3	20	107	1,262.6	64.7	4	58	684.4	35.1	2
62	57	359.1	29.9	4	32	201.6	15.9	1	17	107.1	9.3	0
66 (466)	87	2,527.3	154.1	11	91	2,643.5	149.4	10	40	1,162.0	64.6	5
68	56	526.4	37.9	9	26	244.4	18.1	1	24	225.6	18.2	1
74 (174)	19	364.8	15.8	6	0	0.0	0.0	0	0	0.0	0.0	0
76	44	453.2	31.9	4	33	339.9	21.1	1	30	309.0	27.8	1
78(278)	71	700.1	30.4	9	0	0.0	0.0	0	0	0.0	0.0	0
304 (404)	61	1,525.2	87.2	7	36	900.1	52.9	4	0	0.0	0.0	0
405	84	869.4	71.9	5	70	724.5	69.0	4	36	372.6	35.2	2
503 ("48B")	0	0.0	0.0	0	0	0.0	0.0	0	0	0.0	0.0	0
508 ("B")	0	0.0	0.0	0	0	0.0	0.0	0	0	0.0	0.0	0
515	24	122.4	9.2	2	0	0.0	0.0	0	0	0.0	0.0	0
530 (130)	28	154.0	11.6	2	0	0.0	0.0	0	0	0.0	0.0	0
555	16	80.0	5.5	1	0	0.0	0.0	0	0	0.0	0.0	0
605 ("161")	0	0.0	0.0	0	0	0.0	0.0	0	0	0.0	0.0	0
122	0	0.0	0.0	0	0	0.0	0.0	0	0	0.0	0.0	0
TOTAL	2,269	24,357.7	1,653.6	202	1,283	14,664.2	1,020.5	63	698	7,382.1	536.2	32

Exhibit 4-10
Bus Operating Statistics
Oak Cliff - Planned

Route	WEEKDAY One-Way Trips	WEEKDAY Revenue Miles	WEEKDAY Revenue Hours	WEEKDAY Peak Vehicles	SATURDAY One-Way Trips	SATURDAY Revenue Miles	SATURDAY Revenue Hours	SATURDAY Peak Vehicles	SUNDAY One-Way Trips	SUNDAY Revenue Miles	SUNDAY Revenue Hours	SUNDAY Peak Vehicles
2	105	367.5	29.4	5	68	238.0	19.0	2	41	143.5	11.5	1
4	68	489.6	39.2	4	34	244.8	19.6	2	37	266.4	21.3	2
5	0	0.0	0.0	0	0	0.0	0.0	0	0	0.0	0.0	0
10	60	420.0	33.6	4	48	336.0	26.9	2	40	280.0	22.4	2
11	60	302.4	24.1	4	48	302.4	24.1	1	40	252.0	20.2	1
15 (501)	74	451.4	30.1	6	36	219.6	14.6	1	21	128.1	8.5	1
16	0	0.0	0.0	0	0	0.0	0.0	0	0	0.0	0.0	0
22 (522)	78	569.4	37.9	4	28	204.4	13.8	1	28	204.4	13.8	1
30M (502)	89	391.6	26.1	5	36	158.4	10.6	1	22	96.8	6.5	1
30P	0	0.0	0.0	0	0	0.0	0.0	0	0	0.0	0.0	0
38 (504/538)	220	946.0	63.1	8	135	580.5	38.7	3	95	408.5	27.2	2
41 (441)	65	1,135.1	75.7	7	50	873.2	58.2	4	0	0.0	0.0	0
42	64	928.0	61.9	9	26	337.0	25.0	2	0	0.0	0.0	0
45 (445)	75	937.3	62.5	6	59	737.3	49.2	3	29	362.4	24.2	2
47	67	495.8	39.7	3	74	547.6	43.8	3	34	251.6	20.1	2
48 (548)	51	193.8	12.9	3	35	133.0	8.9	1	36	136.8	9.1	1
53 (453)	83	1,542.6	103.8	8	60	1,109.3	74.0	5	47	869.0	57.9	3
54	0	0.0	0.0	0	0	0.0	0.0	0	0	0.0	0.0	0
55 (505/506/507)	175	1,116.6	74.4	7	134	855.0	57.0	4	74	472.2	31.5	2
55X	0	0.0	0.0	0	0	0.0	0.0	0	0	0.0	0.0	0
56	0	0.0	0.0	0	0	0.0	0.0	0	0	0.0	0.0	0
61	0	0.0	0.0	0	0	0.0	0.0	0	0	0.0	0.0	0
62	57	359.1	29.9	4	40	252.0	20.0	2	40	252.0	20.0	2
66 (466)	87	2,527.3	168.5	11	103	2,992.1	199.5	10	52	1,510.6	100.7	5
68	0	0.0	0.0	0	0	0.0	0.0	0	0	0.0	0.0	0
68 (new)	56	280.0	22.4	3	32	160.0	12.8	1	32	160.0	12.8	1
76	44	356.4	28.5	3	33	267.3	21.4	2	34	275.4	22.0	2
74 (174)/78 (278)	60	1,212.0	60.0	10	0	0.0	0.0	0	0	0.0	0.0	0
304 (404)	61	1,549.6	103.3	7	36	914.5	61.0	4	0	0.0	0.0	0
405	96	1,396.8	93.1	7	70	1,018.5	67.9	5	44	640.2	42.7	3
503 ("48B")	48	216.0	14.4	3	24	108.0	7.2	1	24	108.0	7.2	1
508 ("B")	46	294.4	19.6	3	26	166.4	11.1	2	26	166.4	11.1	2
515	24	67.2	4.5	2	0	0.0	0.0	0	0	0.0	0.0	0
530 (130)	28	232.4	15.5	3	0	0.0	0.0	0	0	0.0	0.0	0
555	16	80.0	5.3	1	0	0.0	0.0	0	0	0.0	0.0	0
605 ("561")	40	272.0	18.1	5	0	0.0	0.0	0	0	0.0	0.0	0
122	20	146.0	9.7	3	0	0.0	0.0	0	0	0.0	0.0	0
TOTAL	2,017	19,276.3	1,307.2	148	1,235	12,795.3	884.3	62	796	6,984.2	490.7	37

Exhibit 4-11
(Page 1 of 3)

COMPARISON OF EXISTING WEEKDAYSERVICE FREQUENCIES TO PLAN OAK CLIFF - WEEKDAYS

ROUTE NUMBER	EXISTING HEADWAYS PEAK	BASE	SPAN OF SERVICE	(new) ROUTE NUMBER	PLANNED HEADWAYS PEAK	BASE	SPAN OF SERVICE
2	12	30	5:00am-12:30am	2	10	20	5:00am-12:30am
4	20	30	5:21am-11:10pm	4	20	30	5:21am-11:10pm
5	30	30	PEAK	5	Eliminate; covered by #405		
10	14	40	5:20am-7:25pm	10	20	40	5:20am-7:25pm
11	14	40	5:20am-7:25pm	11	20	40	5:20am-7:25pm
15	8	30	5:00am-12:30pm	501	10	20	5:00am-12:30am
16	2 TRIPS	-	PEAK	--	Eliminate; covered by #453		
22	20	40	5:00am-12:45pm	522	20	40	5:00am-12:45pm
30	8	30	5:00am-12:30pm	502	10	20	5:00am-12:30pm
38	12	24	5:00am-12:30am	504/538	10	20	5:00am-12:30am
41	20	30	4:30am-8:20pm	441	20	30	4:30am-8:20pm
42	15	50	5:30am-7:45pm	42	15	60	5:30am-7:45pm
45	20	30	5:00am-10:00pm	445	20	30	5:00am-10:00pm
47	35	35	5:30am-10:15pm	47	30	40	5:30am-10:15pm
48	10	50	5:00am-12:00am	548	20	40	5:00am-12:00am
53	20	30	4:50am-11:30pm	453	20	30	4:50am-11:30pm
54	15	60	5:00am-11:00pm	54	Eliminate; covered by new #70 and 508		
55	18	30	4:50am-1:00am	505,506,507	20	40	4:50am-1:00am
55X	8	-	PEAK	55X	Eliminate; covered by LRT service		
56	20	35	5:00am-11:30pm	56	Eliminate; covered by #42		
61	4	20	5:00am-12:00am	61	Eliminate; covered by #405 and 105		
62	20	40	5:00am-12:45pm	562	20	40	5:00am-12:45pm
66	20	30	5:00am-11:30pm	466	20	30	5:00am-11:30pm
68	10	54	5:10am-11:20pm	68 new	10	60	5:10am-11:20pm
74	10	-	PEAK	174	10	-	PEAK
76	30	60	5:30am-11:00pm	76	30	60	5:30am-11:00pm
78	8	60	6:00am-7:35pm	278	10	60	5:00am-8:00pm
304	30	40	5:00am-12:50pm	404	30	40	5:30am-12:50pm
405	-	-	-	405	20	20	5:00am-12:00am
515	30	-	PEAK	515	30	-	PEAK
530	30	-	PEAK	130	30	-	PEAK
555	60	60	8:30am-1:45pm and 5:09pm-9:10pm	555	60	60	8:30am-9:10pm
"C"	-	-	-	70	20	60	5:00am-12:00am
"48B"	10	50	5:00am-12:00am	503	20	40	5:00am-12:00am
"B"	-	-	-	508	20	60	6:00am-8:00pm
561	-	-	-	105	5	-	PEAK
-	-	-	-	122	20	-	PEAK

Exhibit 4-11
(Page 2 of 3)

COMPARISON OF EXISTING SATURDAY SERVICE FREQUENCIES TO PLAN
OAK CLIFF - SATURDAYS

EXISTING				(new)	PLANNED		
ROUTE NUMBER	HEADWAYS PEAK	HEADWAYS BASE	SPAN OF SERVICE	ROUTE NUMBER	HEADWAYS PEAK	HEADWAYS BASE	SPAN OF SERVICE
2	30	30	5:00am-12:30am	2	30	30	5:00am-12:30am
4	60	60	5:20am-11:10pm	4	60	60	5:20am-11:10pm
5	-	-	-	10	-	-	-
10	50	50	6:00am-6:00am	10	60	60	6:00am-6:00am
11	50	50	6:00am-6:00am	11	60	60	6:00am-6:00am
15	48	48	5:20am-12:00am	501	60	60	5:20am-12:00am
16	-	-	-	616	-	-	-
22	56	56	5:10am-12:30am	522	60	60	5:00am-12:45am
30	48	48	5:20am-12:00am	502	60	60	5:20am-12:00am
38	30	30	5:00am-12:30am	504/38	30	30	5:00am-12:30am
41	33	33	5:30am-9:00pm	441	30	30	5:30am-9:00pm
42	-	-	-	42	60	60	5:15am-8:00pm
45	30	30	6:00am-9:30pm	445	30	30	6:00am-9:30pm
47	35	35	5:30am-10:15pm	47	30	30	5:30am-10:15pm
48	60	60	5:15am-10:15pm	548	60	60	5:15am-10:15pm
53	30	30	6:30am-9:30pm	453	30	30	6:30am-9:30pm
54	50	50	6:00am-11:30pm	54	Eliminate; covered by new #70 and 508		
55	36	36	5:00am-1:00am	505,506,507	30	30	5:00am-1:00am
55X	-	-	-	55X	Eliminate; covered by LRT service		
56	80	80	5:15am-11:30pm	56	Eliminate; covered by #42		
61	20	20	5:00am-12:00am	61	Eliminate; covered by #405 and 105		
62	56	56	5:10am-12:30pm	562	60	60	5:00am-1:00am
66	40	40	6:15am-11:15pm	466	30	30	6:15am-11:15pm
68	64	64	5:45am-7:30pm	68 new	60	60	5:45am-7:30pm
74	-	-	-	174	-	-	-
76	60	60	5:15am-11:00pm	76	60	60	5:15am-11:00pm
304	30	60	5:30am-12:20am	404	30	60	5:30am-12:20am
405	-	-	-	405	30	30	5:00am-12:00am
515	-	-	-	515	-	-	-
530	-	-	-	130	-	-	-
555	-	-	-	555	-	-	-
"C"	-	-	-	70	60	60	5:30am-11:30pm
48B	-	-	-	503	60	60	5:15am-10:15pm
"B"	-	-	-	508	60	60	6:00am-8:00pm
561	-	-	-	105	-	-	-
-	-	-	-	122	-	-	-

Exhibit 4-11
(Page 3 of 3)
COMPARISON OF EXISTING SUNDAY SERVICE FREQUENCIES TO PLAN
OAKCLIFF - SUNDAYS

ROUTE NUMBER	EXISTING HEADWAYS PEAK	BASE	SPAN OF SERVICE	(new) ROUTE NUMBER	PLANNED HEADWAYS PEAK	BASE	SPAN OF SERVICE
2	70	70	5:00am-12:30am	2	60	60	5:00am-12:30am
4	70	70	6:00am-10:20pm	4	60	60	6:00am-10:20pm
5	-	-	-	-	-	-	-
10	70	70	5:00am-1:00am	10	60	60	5:00am-1:00am
11	70	70	5:00am-1:00am	11	60	60	5:00am-1:00am
15	70	70	5:00am-12:30am	501	60	60	5:00am-12:30am
16	-	-	-	616	-	-	-
22	70	70	5:00am-12:45pm	522	60	60	5:00am-12:45pm
30	70	70	5:00am-12:30pm	502	60	60	5:00am-12:30pm
38	40	40	5:00am-1:00am	504/38	30	30	5:00am-1:00am
41	-	-	-	441	-	-	-
42	-	-	-	42	-	-	-
45	50	50	6:30am-9:30pm	445	60	60	6:30am-9:30pm
47	70	70	5:00am-12:40am	47	60	60	5:00am-12:40am
48	70	70	6:30am-11:00pm	548	60	60	6:30am-11:00pm
53	70	70	5:30am-10:20pm	453	60	60	5:30am-10:20pm
54	70	70	6:00am-11:30pm	54	Eliminate; covered by new #70 and 508		
55	37	37	5:00am-1:00am	505,506,507	30	30	5:00am-1:00am
55X	-	-	-	55X	Eliminate; covered by LRT service		
56	-	-	-	56	Eliminate; covered by #42		
61	-	-	-	61	Eliminate; covered by #405 and 605		
62	70	70	5:00am-12:45pm	562	60	60	5:00am-1:00am
66	40	40	7:30am-10:00pm	466	30	30	7:30am-10:00pm
68	70	70	5:30am-7:45pm	68 new	60	60	5:30am-7:45pm
74	-	-	-	174	-	-	
76	70	70	6:45am-10:45pm	76	60	60	6:45am-10:45pm
304	-	-	-	404	-	-	-
405	-	-	-	405	30	30	5:00am-12:00am
515	-	-	-	515	-	-	-
530	-	-	-	130	-	-	-
555	-	-	-	555	-	-	-
"C"	-	-	-	70	60	60	5:30am-11:30pm
48B	-	-	-	503	60	60	6:30am-11:00pm
"B"	-	-	-	508	60	60	6:00am-8:00pm
561	-	-	-	105	-	-	-
-	-	-	-	122	-	-	-

Exhibit 4-12
COMBINED BUS/LIGHT RAIL INTERFACE PLAN IMPACTS

	WEEKDAY				SATURDAY				SUNDAY			
	One-Way Trips	Revenue Miles	Revenue Hours	Peak Vehicles	One-Way Trips	Revenue Miles	Revenue Hours	Peak Vehicles	One-Way Trips	Revenue Miles	Revenue Hours	Peak Vehicles
CURRENT												
North Central Plan	1,227	14,460.1	924.8	130	446	5,134.6	337.3	21	223	2,062.7	156.5	10
Oak Cliff Plan	2,269	24,357.7	1,653.6	202	1,283	14,664.2	1,020.5	63	698	7,382.1	536.3	32
Total LRT Feeder Plans	**3,496**	**38,817.8**	**2,578.4**	**332**	**1,729**	**19,798.8**	**1,357.8**	**84**	**921**	**9,444.8**	**692.8**	**42**
PROPOSED (FOR 1996)												
North Central Plan	1,862	14,221.5	901.5	130	616	4,463.0	312.8	32	314	1,973.2	142.4	19
Oak Cliff Plan	2,017	19,276.3	1,307.2	148	1,235	12,795.3	884.3	62	796	6,984.3	490.7	37
Total LRT Feeder Plans	**3,879**	**33,497.8**	**2,208.7**	**278**	**1,851**	**17,258.3**	**1,197.1**	**94**	**1,110**	**8,957.5**	**633.1**	**56**
CHANGE												
North Central Plan	635	(238.6)	(23.3)	0	170	(671.6)	(24.5)	11	91	(89.5)	(14.1)	9
Oak Cliff Plan	(252)	(5,081.4)	(346.4)	(54)	(48)	(1,868.9)	(136.2)	(1)	98	(397.8)	(45.6)	5
Total LRT Feeder Plans	**383**	**(5,320.0)**	**(369.7)**	**(54)**	**122**	**(2,540.5)**	**(160.7)**	**10**	**189**	**(487.3)**	**(59.7)**	**14**
PERCENT CHANGE												
North Central Plan	51.8%	-1.7%	-2.5%	0.0%	38.1%	-13.1%	-7.3%	52.4%	40.8%	-4.3%	-9.0%	90.0%
Oak Cliff Plan	-11.1%	-20.9%	-20.9%	-26.7%	-3.7%	-12.7%	-13.3%	-1.6%	14.0%	-5.4%	-8.5%	15.6%
Total LRT Feeder Plans	**11.0%**	**-13.7%**	**-14.3%**	**-16.3%**	**7.1%**	**-12.8%**	**-11.8%**	**11.9%**	**20.5%**	**-5.2%**	**-8.6%**	**33.3%**

In the North Central area, the feeder plan would result in a modest overall savings of revenue miles and hours for weekdays and weekends due to some routes being short-turned at LRT stations. The number of one-way trips would, however, increase significantly (i.e., by about 52 percent on weekdays). This reflects the substitution of additional trips along shorter alignments (that feed the LRT) for a large portion of the current service that continues downtown.

In the Oak Cliff area, the planned peak vehicle reduction would be far more pronounced -- from 202 existing peak vehicles to 148 -- a net savings of 54 peak weekday vehicles. There would be noticeable decreases in almost every other operating statistic compiled as well, reflecting the ability of LRT, with two branches serving Oak Cliff neighborhoods, to directly provide substantial coverage in the area. The only exception would be the number of one-way trips on Sundays, where the increase from 698 to 796 trips reflects maintaining at least a 60-minute base frequency on all routes operating.

The combined impact of both the North Central and Oak Cliff plans is shown in Exhibit 4-12. All bus service changes developed to complement and feed the complete LRT starter system are reflected. Scheduled revenue bus miles and hours, as well as the peak vehicle requirement, would be reduced substantially compared with existing conditions. The largest reduction in revenue miles (13.7 percent) would be on weekdays, with the smallest (52 percent) on Sundays. Similar results are projected for revenue hours.

The estimated cost impact (in 1994 budget dollars) is shown below in Exhibit 4-13. An estimated $5.2 million annual savings is estimated. This includes a variable cost savings of about $5.6 million off-set by an increase in the allocation of fixed costs to individual routes. Fixed costs are allocated to routes based on peak vehicles. The proposed bus/light rail interface plan calls for a reduction in peak vehicles by 54. Thus, fixed costs are spread over a smaller base. The dollar amount of total fixed costs does not change, but the amount allocated to individual routes is increased (i.e., $1,530 per peak vehicle). This change in fixed costs per route is approximately $0.4 million for the combined bus/light rail interface plan.

Exhibit 4-13
COMBINED BUS/LIGHT RAIL
INTERFACE PLAN OPERATING COST IMPACTS
(annualized FY94 budget dollars)

	Variable Costs	Fixed Costs	Total Annual Costs
North Central Plan	($394,516)	$198,900	($195,616)
Oak Cliff Plan	($5,214,601)	$226,440	($4,988,161)
Total Combine Plans	($5,609,117)	$425,340	($5,183,777)

DART could apply these savings toward improving other parts of the system, including:

- new weekend service
- increased service frequency
- improved schedule adherence
- implementation of Sector Study recommendations
- improved crosstown services
- other new services to respond to shifts in transit demand.

FUTURE BUS/LRT INTERFACE PLANNING CONSIDERATIONS

DART's Draft Transit System Plan Year 2010 includes expanding LRT services to more suburban areas. Existing bus service frequencies, hours and days of operation, and route densities in these areas are reflective of lower population densities. While the bus interface plan for the LRT starter system has resulted in a net cost reduction, it is possible that development of a bus interface plan for suburban areas will result in increased costs. Bus services will need to be expanded to meet increases in population and employment, as well as provide feeder service to LRT stations.

In developing these future plans, one strategy that may be appropriate is to provide paratransit feeder services for early morning and late night trains where demand may be lower (e.g., suburban areas). This may also apply to weekend feeder service. Other cities with similar population densities have used this approach to provide feeder service within available resources. Paratransit services are generally less costly on a per hour basis than fixed route bus services.

An additional benefit in other cities with similar densities is that paratransit services have been well received by customers. For example, in Montgomery County, paratransit service replaced late night bus feeder service from MARC trains. Costs were reduced dramatically and ridership increased 20 percent. In a rider survey, customers expressed the opinion that they felt more safe using paratransit service in off-hours.

DART's paratransit service contracts are periodically rebid. The potential for providing late night, early morning, and weekend feeder service should be an option in the service contracts at the time of these future rail extensions.

While the need to increase suburban bus service can be expected to grow, there will be opportunities to reduce or eliminate some existing routes. For example, build-out of the North Central LRT line could result in the demise of Routes 77, 6, 201, 202, and Route 211 (proposed herein). Route 80 could be eliminated with the Pleasant Grove LRT line opening. With LRT service to Garland Central, Route 81 could be short-turned at the South Garland Transit Center and Route 207 expanded to cover the Route 81 segment to Lake Ray Hubbard. Cost savings from elimination of these potentially competing services could be used to partially off-set the cost of increased and/or new services in suburban areas.

5.0 BUS/COMMUTER RAILTRAIN INTERFACE PLAN

5.0 BUS/COMMUTER RAIL INTERFACE PLAN

This section contains a detailed description of the DART bus route and service changes recommended to complement the Phase 1 "Railtran" line. Phase 1 Railtran service will be bi-directional during peak periods (i.e., weekdays, 5:49 a.m. to 9:00 a.m.; 4:05 p.m. to 7:17 p.m.) with average service frequencies of 25 minutes. This initial commuter rail service is expected to begin service in 1996, with three stations: Irving, Medical/Market Center, and Union Station in downtown Dallas. The Irving station will be located adjacent to the existing South Irving Transit Center, and the Medical/Market Center station will be near the Parkland Hospital complex. Several bus routes currently serve one or both of these areas; they are addressed in this plan. However, feeder service for the downtown rail terminal (Union Station), is not included.

The suggested bus route changes are moderate in scope. They reflect the limited hours and coverage of the initial train service, as well as the nature of the current bus services that would be affected. The feeder plan does, however, support other area transit services, and enhances the overall DART network. Each bus route operating in the defined study area has been examined individually and in the context of the entire "package", and is discussed in this document whether changes are suggested or not. The plan incorporates DART's feeder service guidelines to maximize the bus/rail interface without inconveniencing the majority of current passengers.

Input used in this study task was received from several sources, including:

- Suggestions from DART staff members;
- Results of DART's Irving Service Review;
- Field observations of the affected area;
- Route performance data and comparisons; and
- Available ridership data by route segment.

Consistent with the Bus/Light Rail Interface Plan presented in Section 4, several revisions are proposed in route identification nomenclature. The primary intent is to provide a more simplified, consistent, and logical route designation system. The revised route numbers would be loosely reminiscent of the existing system, but would be based on service type and apply systemwide.

The end result of this plan is a transit network designed to improve service to the majority of DART's current passengers and attract new riders in the commuter rail corridor and beyond, within the confines of a "subsidy-neutral" financial environment. The feeder plan has been designed for adaptation to future Railtran phases as well. In the remainder of this section, the feeder plan is described in detail. The bulk of the text concerns the specific bus route changes and rationale. A discussion of the impacts on key operating statistics is included as well.

GENERAL ISSUES

Certain overriding issues were found to affect the direction of this plan, particularly the types, magnitude and modest number of proposed bus route changes. They are station-specific, as described below.

Schedule Coordination

The Irving Railtran station will be located at the existing South Irving Transit Center. Seven bus routes already serve this facility; all but one (i.e., the Route 203 express to downtown Dallas) could conceivably provide rail feeder service adequately without significant alignment adjustments.

Schedule coordination between these bus routes and Railtran service, however, is an issue. The majority of bus trips are scheduled to facilitate a timed-transfer at the Transit Center. This minimizes waiting time for passengers transferring between bus routes. The established round-trip cycle times generally permit a South Irving "pulse" at intervals of no less than 30 minutes. Initial Railtran service is expected to operate on a 25 minute headway. The Railtran schedule with 25-minute headways precludes optimal connections between trains and buses without disrupting local travel patterns or substantially increasing the number of buses required.

In preparing the Phase 1 bus/commuter rail interface plan, the service frequency for a new route (i.e., Route 303 John Carpenter) is scheduled on a 25-minute frequency. All other routes would remain on existing frequencies with the exception of Route 203. The result is that wait times between bus and rail transfers will vary between five minutes and 28 minutes.

Changing bus service frequencies to coincide with the Railtran schedule would require significant additional resources. More important, however, is that bus routes between South Irving and other transit centers would no longer be coordinated. For example, Route 304 currently provides service between South and North Irving Transit Centers. Approximately 18 percent of average weekday riders on this route transfer from Route 304 to other services at the North Irving Transit Center. Changing the service frequency of Route 304 to 25-minutes to facilitate bus to Railtran transfers would increase the average wait time for current Route 304 transferring riders to more than ten minutes.

In Phase 3 of the Railtran Plan, service frequencies are shown as 20 minutes. With a 20-minute headway, bus/rail coordination is improved dramatically. Transferring customers would have an average wait time of ten minutes or less. The problem of schedule coordination is an issue, however, for Phases 1 and 2 where Railtran frequencies are 25-minutes. One option is to change the Railtran schedule to 30-minute headways for Phases 1 and 2 rather than the current plan of 25 minutes.

Irving Station Parking

Parking space at the South Irving Transit Center could become an issue. Route 203 provides express bus service to downtown Dallas throughout the day. Many

current riders of Route 203 park at either the South Irving Transit Center or the Bowie Park-And-Ride lot, located at the Bowie Junior High School on East 6th Street in Irving. The proposed plan is to phase-out Route 203 as Railtran service is phased-in. Those people who currently park at Bowie would therefore begin parking at the South Irving Transit Center.

The South Irving Transit Center has 157 parking spaces, of which approximately 130 are currently in use. The Bowie Park-And-Ride lot has 440 spaces with about 95 utilized on an average weekday.

One option is to continue to lease the Bowie Park-And-Ride lot for "overflow" parking at the South Irving Transit Center. Shuttle service between the two sites (i.e., approximately two miles apart) would be required. Resources made available from the phasing-out of Route 203 could be used to provide this shuttle service. This option is less than optimal from a "customer convenience" perspective. Provision of more parking at the South Irving Transit Center location is the preferred solution.

Medical/Market Center

There is currently a significant amount of transit service available in the general vicinity of this station. However, the precise station location is not centralized and not easily served by most of these bus routes without deviations that would inconvenience a majority of current riders. The station is also relatively close to downtown Dallas, and serves a distinctly-bounded area not likely to generate a significant amount of origin-based ridership. As a result, only very minor changes have been suggested for area bus routes in conjunction with the opening of the Medical Center Railtran station.

Rather than realigning most bus trips to meet the trains, it is suggested that expanding the existing privately-operated shuttle network that operates within the complexes be explored further. A joint public-private shuttle service between the Railtran Medical Center station and key employer sites could include employers at the Market Center as well. Employers could subscribe to the service on a monthly or quarterly basis. Shuttle service routes would be open to the general public, but the route alignment would be determined by the location of employers subscribing to the service. Marketing of service to the employees would be the responsibility of the employer, and could include things such as pass programs.

Handi-Ride vehicles could be used to provide shuttle services during prescribed time periods without impacting current capacity constraints. The cost of providing such services would likely be in the $30 to $45 per hour range, including DART administrative overhead. Assuming three vehicles in both the morning and evening peak periods (i.e., six peak hours per vehicle), the total cost of such service would be $540 to $810 per day (i.e., $137,700 to $206,550 annually). Farebox revenues would off-set costs to a small degree.

Implementation of Railtran service presents a unique opportunity for DART to try some alternative service delivery concepts. Similar service has been implemented by Orange County, California with positive results. What started out as employer subscription shuttle services have since evolved to fixed route services in several corridors.

PHASE 1 PLAN COMPONENTS

Twenty distinct bus routes were selected for scrutiny in this analysis. Most currently operate within the Irving-Medical/Market Center corridor; others are local Irving circulator routes that do not directly serve the station vicinity. Commuter rail-based service changes are suggested for many of these routes. In addition, a completely new route that would connect the station with the Highway 183 business corridor is recommended. This route is based on a proposal by DART's Service Planning Department.

A summary of the bus routes analyzed and the proposed changes is presented in Exhibit 5-1. A detailed route-level discussion is presented below. The discussion is arranged according to route number, with existing and proposed new routes listed together in numerical order. A geographical representation of the plan is shown in Exhibit 5-2; only bus routes that could potentially feed Railtran during Phase 1 are shown.

- Route 9 - King Center/Medical Center: This route currently operates as an east-west crosstown service connecting the M. L. King Center with the Parkland Medical Center. Principal thoroughfares are Peak Street/ Haskell Avenue, Maple Avenue and Harry Hines Boulevard. Service is provided seven days a week, and is operationally interlined with Route 300 at the western terminus.

  Reflecting the proposed standardized route designation policy, Routes 9 and 300 would be combined into new Route 409. The combined alignment would not be changed in conjunction with Railtran. The line is already designed to have good potential as a Railtran feeder, especially for Irving residents and reverse peak circulation to employment and commercial areas. Both the Medical Center and Irving stations are within close walking distance of bus stops.

- Route 13 - Mockingbird: This route currently operates as a crosstown service in the Mockingbird Lane corridor. It connects the Brook Hollow and Casa Linda areas, passing the periphery of the Medical Center area. Service is provided Monday through Saturday.

  Reflecting the proposed standardized route designation policy, this service would be known as Route 413. No specific commuter rail-based changes are suggested. It will not provide direct access to Railtran, but much of its alignment in the general area would be served by other routes that would provide this interface (e.g., Route 409).

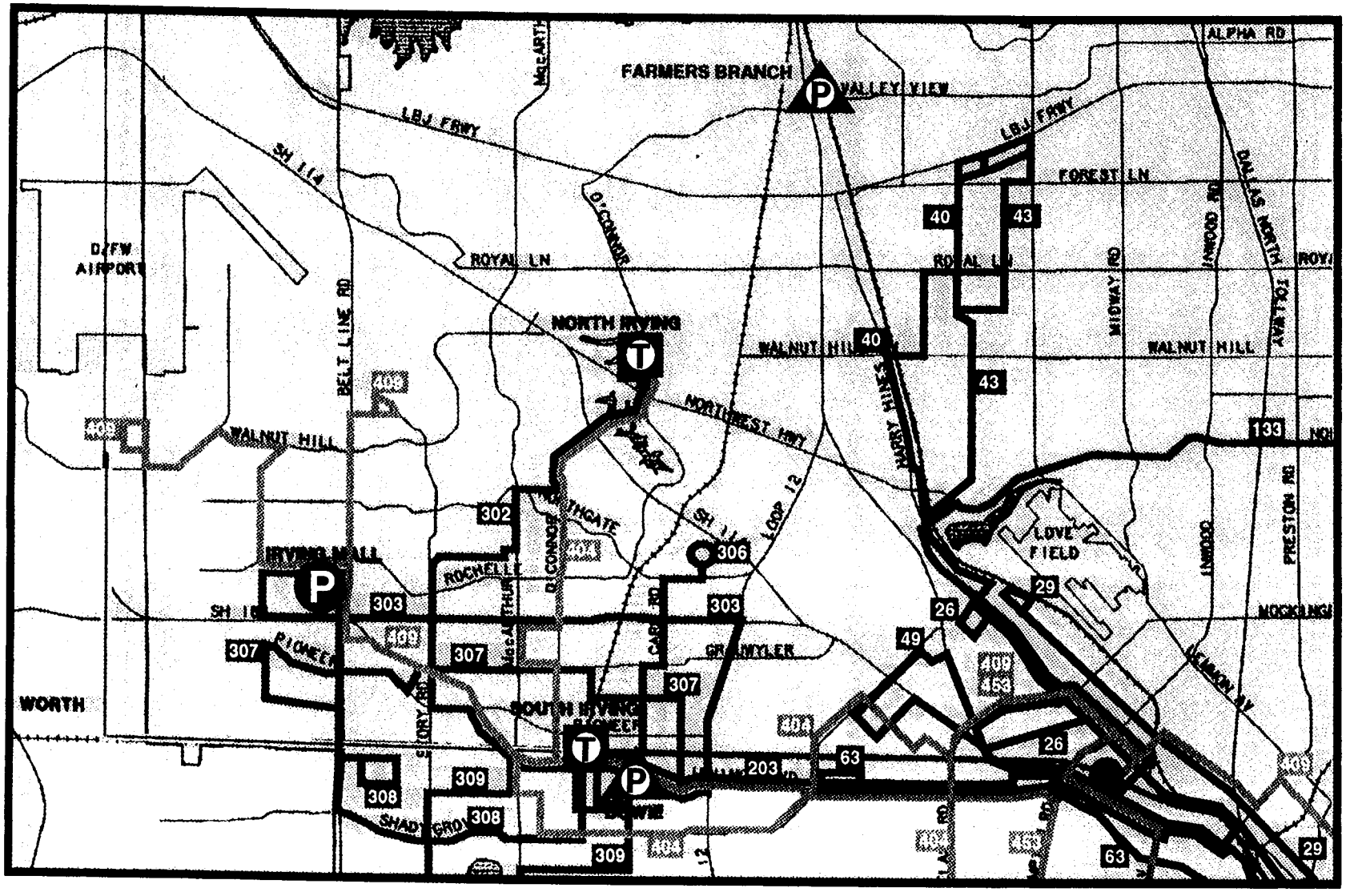


Exhibit 5-2
Commuter Rail Feeder Plan

Legend

- Radial Local
- Limited Stop
- Express
- Connector/ Feeder
- Crosstown

Booz Allen & Hamilton Inc.

- Route 26 - Hines: This route currently operates as a radial local service from downtown Dallas, primarily along Harry Hines Boulevard (passing the Medical Center area). Service is provided seven days a week. Base service operates as far as Mockingbird Lane (26M), with extended weekday service to Regal Row (26R), and selected peak period trips to the Stemmons Freeway service road (26S).

  This route would not be changed in conjunction with Railtran. Service operates along an established transit corridor that is somewhat parallel to the rail right-of-way, but caters to a more localized market. However, for those wishing to transfer, the Medical Center station is within close walking distance of bus stops on Harry Hines Boulevard.

- Route 29 - Maple: This route currently operates as a radial local service from downtown Dallas as far as Lovers Lane, primarily along Maple Avenue. Service is provided seven days a week.

  This route would not be changed in conjunction with Railtran. Service operates along a corridor that passes within the general vicinity of the Medical Center station, but is several blocks away. The disruption to established travel patterns and the time penalties involved appear to outweigh the benefits of diverting the route to access the Medical Center station.

- Route 40 - Brockbank: This route currently operates as a radial local service from downtown Dallas, primarily in the Harry Hines Boulevard/Denton Drive corridor (passing the Medical Center area). The outer terminus is at the Dedman Memorial Hospital, near Webb Chapel Road and Forest Lane. Service is provided seven days a week. The route is operationally interlined with Route 43, and Sunday trips utilize an alignment that incorporates portions of the latter. During peak periods, only limited stops are made along Harry Hines Boulevard.

  This route would not be changed in conjunction with Railtran. Service operates along a growing transit corridor that is somewhat parallel to the rail right-of-way, and tends to be saturated during peak periods. However, for those wishing to transfer, the Medical Center station is within close walking distance of the Harry Hines Boulevard and Lofland Street stop (which serves both local and limited-stop buses).

- Route 43 - Park Forest: This route currently operates as a radial local service from downtown Dallas, primarily in the Harry Hines Boulevard/Webb Chapel Road corridor (passing the Medical Center area). The outer terminus is at the Dedman Memorial Hospital, near Forest Lane. Service is provided seven days a week. The route is operationally interlined with Route 40, and all Sunday service is provided by modified Route 40 trips that incorporate portions of Route 43. During peak periods, only limited stops are made along Harry Hines Boulevard.

Similar to Route 40, this route would not be changed in conjunction with Railtran. Service operates along a growing transit corridor that is somewhat parallel to the rail right-of-way, and tends to be saturated during peak periods. However, for those wishing to transfer, the Medical Center station is within close walking distance of the Harry Hines Boulevard and Lofland Street stop (which serves both local and limited-stop buses).

- Route 49 - Brook Hollow: This route currently operates as a radial local service from downtown Dallas as far as Regal Row, primarily along the Stemmons Freeway service road. The route passes near the Medical Center area. Service is provided Monday through Friday.

  The possibility of truncating this route at the Medical Center station was explored. Rather than continuing to downtown Dallas (somewhat parallel to Railtran), it would connect the Brook Hollow area with the train. The train would provide the link to downtown. However, this alternative was determined not to be feasible, at least for Phase 1, when Railtran will only operate during peak periods. Route 49 would need to have separate peak versus off-peak alignments, with the latter continuing downtown to maintain the existing span of service. In addition, the Stemmons Freeway service roads east of the station would not be served during peak hours.

  In addition, service operates along a corridor that passes within the general vicinity of the Medical Center station, but is several blocks away. The time penalties involved with diverting the route to access the station appear to outweigh the benefits. Therefore, no changes are suggested for this route.

- Route 53 - Hampton Crosstown: This route currently operates as a crosstown service between the Parkland Medical Center complex and the Red Bird Mall, principally utilizing Hampton Road. Service is provided seven days a week.

  Reflecting the proposed standardized route designation policy, this service would be known as Route 453. The only change specifically related to commuter rail would be a short realignment and extension in the Medical Center area to permit the route to terminate on the station property. Significant Railtran feeder potential exists with this route, given its major north-south alignment in Oak Cliff.

- Route 63 - Industrial: This route currently operates as a radial local service from downtown Dallas as far as Regal Row, primarily along Industrial and Irving Boulevards. The route passes somewhat near the Medical Center area. Service is provided Monday through Friday.

Similar to Route 49, the possibility of truncating this route at the Medical Center station was explored. The same conclusion was reached as well. Buses would need to follow separate peak versus off-peak alignments, and the portion of Industrial Boulevard east of the station would not be served during peak hours.

In addition, service operates along a corridor that passes within the general vicinity of the Medical Center station, but is several blocks away. The time penalties involved with diverting the route to access the station appear to outweigh the benefits. Therefore, no changes are suggested to this route.

- Route 85 - Shady Trail: This route currently operates as a radial limited-stop service from downtown Dallas, utilizing the Woodall Rodgers and Stemmons Freeways non-stop to Northwest Highway, and then making local stops in the Shady Trail/Josey Lane corridor. There are two outer branches, one west along Valley View Lane and one north to Belt Line Road. The route passes the Medical Center area during the non-stop freeway portion. Service is provided on weekdays.

  Reflecting the proposed standardized route designation policy, this service would be known as Route 785. The route would not be otherwise changed in conjunction with Railtran. It serves a primarily reverse commute market that is far removed from the Railtran service area. While the alignment comes geographically close to the Medical Center station, in essence it bypasses the entire area -- operating on the freeway. The time penalties involved with diverting the route to access the station appear to outweigh the benefits.

- Route 133 - Northwest Highway-Parkland: This route currently operates as a limited-stop crosstown service, principally along Northwest Highway and Harry Hines Boulevard. It connects the South Garland Transit Center with the Medical Center/Market Center complex. Service is provided only during peak periods (from South Garland in the morning and returning in the evening).

  The only change specifically related to commuter rail would be a short realignment and extension in the Medical Center area, permitting the route to terminate on the station property. The idea is to bring all bus routes terminating at the Medical Center into the station, rather than having scattered terminal points in the vicinity. Route 133 itself is not expected to generate significant rail passenger activity as a feeder route. Its purpose is to bring employees to the Medical Center area in the morning and take them home in the evening. The service offered reflects this orientation.

- Route 203 - South Irving Express: This route currently operates as a premium express service, utilizing the Stemmons Freeway and Irving Boulevard non-stop to the Bowie Park & Ride and South Irving Transit Center. Service is provided on weekdays.

  Route 203 would compete directly with the Phase 1 Railtran service. While the latter will operate only during peak periods, both would offer a premium quality trip between South Irving and downtown Dallas. Similar fares are anticipated as well. A travel-time analysis revealed no significant difference between the two modes, although the bus is subject to traffic delays. Downtown train access, however, may be less convenient for many riders.

  Limited parking capacity at the Irving station is expected to pose a problem for train passengers. Currently, Route 203 utilizes the much larger Bowie lot for "satellite" parking. This facility is several miles from the Transit Center -- beyond reasonable walking distance.

  In order to promote Railtran as the preferred mode, peak bus service on Route 203 would be eliminated. In the off-peak, Route 203 would continue to operate on its existing schedule and route alignment.

- Route 300 - Irving Boulevard: This route currently operates as an east-west crosstown service connecting the Parkland Medical Center with the South Irving Transit Center and the Irving Mall area. Service is provided seven days a week, and is operationally interlined with Route 9 at the eastern terminus. Most weekday and Saturday trips continue to the DFW Airport South Shuttle Lot or to the Skyway Circle via Belt Line Road.

  Reflecting the proposed standardized route designation policy, Routes 9 and 300 would be combined into new Route 409. The combined alignment would not be changed in conjunction with Railtran. The line is already designed to have good potential as a Railtran feeder, especially for Irving residents and reverse peak circulation to employment and commercial areas. Both the Medical Center and Irving stations are within close walking distance of bus stops.

- Route 301 - Walnut Hill/North Irving: This route currently operates as a local circulator/feeder service in the City of Irving. It connects the Irving Mall with the North Irving Transit Center, primarily utilizing Belt Line Road and Walnut Hill Lane. Service is provided Monday through Saturday. A major change in the Saturday alignment is planned for January 1995. The new Saturday route will serve the South Irving Transit Center (instead of North Irving); it will not operate on Walnut Hill Lane north of Story Road.

  It is suggested that the new Saturday service be redesignated Route 311, since the alignment will be significantly different from the weekday

service. No further changes are proposed. Only the Saturday trips will access the Irving station. However, commuter trains will not be operating on weekends until later phases are implemented. Therefore, Routes 301 and 311 will not provide any feeder service in this plan.

- Route 302 - Story: This route currently operates as a local circulator/feeder service in the City of Irving. It connects the North and South Irving Transit Centers, primarily utilizing O'Connor and Story Roads. Service is provided Monday through Friday.

  This route would not be changed in conjunction with Railtran. The line as it currently operates indicates some potential as a Railtran feeder; it also already serves the Irving station location. The option of increasing the peak frequency from 30 to 25 minutes, corresponding with Railtran, was explored. However, it was determined that the additional resources necessary to accomplish this (without compromising the integrity of the existing alignment) would outweigh the benefits.

- Route 303 - John Carpenter: This new local circulator/feeder service in the City of Irving would connect the Irving station with the Highway 183 business corridor. Route 303 is based on a proposal by DART's Service Planning Department. It would serve an entirely new transit corridor where a strong "reverse-commute" market is developing. Many commercial and other employment centers are located in the area. From the Irving station, buses would proceed east via Irving Boulevard, north on Walton Walker Boulevard, and west along the Highway 183 (John W. Carpenter/Airport Freeway) service roads to Esters Road and the Irving Mall. Service would be offered on Monday through Saturday. During peak periods, buses would operate with the same headways (25 minutes) as the train, facilitating the interface at the station.

- Route 304 - West Side Crosstown: This route currently operates as a crosstown service between the City of Irving and Oak Cliff. In the Railtran corridor, the alignment principally serves O'Connor Road, Irving Boulevard and Brook Hollow. Both the North and South Irving Transit Centers are served. The route then crosses the Trinity River and continues south to the Red Bird Mall area, mostly via Westmoreland and Cockrell Hill Roads. Service is provided Monday through Saturday.

  Reflecting the proposed standardized route designation policy, this service would be known as Route 404. The only change in the Railtran corridor would be to use Shady Grove Lane and Oakland Drive/MacArthur Boulevard instead of Irving Boulevard through South Irving. The latter would continue to be served by Route 409 (current Route 300), while the new alignment is in a lower income area that currently has no transit service. This change is based on a proposal by DART's Service Planning Department. Significant Railtran feeder potential for the Irving station already exists with this route; the South Irving revision will enhance this potential.

- Route 305 - Rochelle: This route currently operates as a local circulator/feeder service in the City of Irving. It connects the Irving Mall with the North Irving Transit Center, primarily utilizing Rochelle Road. Service is provided Monday through Friday. A change in the alignment is planned for January 1995. The new alignment will deviate via Northgate and Tom Braniff Drives to serve the University of Dallas campus, compensating for Route 306 changes also scheduled (see below).

  No further changes are recommended for this route. Therefore, it will not provide any commuter rail feeder service in this plan.

- Route 306 - Nursery: This route currently operates as a local circulator/feeder service in the City of Irving. It connects the North and South Irving Transit Centers, primarily via Nursery Road, Carl Road, the University of Dallas campus, and the Highway 114 service roads. Route 306 operates only during peak periods on weekdays. Significant changes are slated for this route effective January 1995. The alignment will be shortened, with service north of the University of Dallas being eliminated (and replaced with a diversion on Route 305). In addition, the span of service will be expanded to include weekday base and evening trips.

  Due to the University of Dallas service, a substantial reverse-commute Railtran feeder market appears to exist for Route 306. Therefore, while no further alignment changes are recommended, a Railtran-based schedule improvement appears feasible. During peak periods, buses could operate with the same headways (25 minutes) as the train, facilitating the interface at the station. This adjustment would mandate one additional peak bus.

- Route 307 - Grauwyler: This route currently operates as a local circulator/feeder service, mostly in the City of Irving. It connects the Irving Mall with the Brook Hollow area to the east, primarily utilizing Grauwyler Street. Service is provided Monday through Friday.

  Reflecting a proposal by DART's Service Planning Department, this route would be altered on both extremities. The largest change would be on the east, where buses would operate to the Irving train station, primarily via Irving Heights Drive. The poor-performing route segment continuing across the Trinity River to Brook Hollow would be eliminated. On the west end, Route 307 would divert via the Esters Road loop instead of the current Route 308 service.

  Railtran feeder potential for the Irving station already exists with this revised route. The option of increasing the peak frequency from 30 to 25 minutes, corresponding with Railtran, was explored. However, it was determined that the additional resources necessary to accomplish this

(without compromising the integrity of the existing alignment) would outweigh the benefits.

- Route 308 - Shady Grove: This route currently operates as a local circulator/feeder service in the City of Irving. It connects the Irving Mall with the South Irving Transit Center, primarily utilizing Belt Line Road and Shady Grove Lane. Service is provided Monday through Friday.

  Reflecting a proposal by DART's Service Planning Department, service along the Esters Road loop would be replaced with revised Route 307 trips, while new transit service to the Tudor Lane/Rock Island Road neighborhood would be offered through a Route 308 diversion. Significant Railtran feeder potential for the Irving station already exists, and would continue to do so with the revised route. The option of increasing the peak frequency from 30 to 25 minutes, corresponding with Railtran, was explored. However, it was determined that the additional resources necessary to accomplish this (without compromising the integrity of the existing alignment) would outweigh the benefits.

- Route 309 - South Irving Loop: This route currently operates as a local circulator/feeder service in the City of Irving. It operates as two loops (clockwise 309A and counter-clockwise 309B), both anchored at the South Irving Transit Center. The alignment extends east to Nursery Road, south to Oakdale and Hunter Ferrell Roads, and west to Story Road. Service is provided on weekdays.

  This route would not be changed in conjunction with Railtran. The line as it currently operates indicates good potential as a Railtran feeder, and it already serves the Irving station location. It also would supplement Route 203 as a shuttle between the Bowie Park & Ride lot and the station (as noted above in the Route 203 discussion). The option of increasing the peak frequency from 30 to 25 minutes, corresponding with Railtran, was explored. However, it was determined that the additional resources necessary to accomplish this (without compromising the integrity of the existing alignment) would outweigh the benefits.

- Route 311 - Walnut Hill/South Irving: This would be the new designation for the revised Route 301 Saturday alignment (to be implemented in January 1995), which will differ significantly from the weekday configuration. The changes are detailed in the Route 301 discussion.

- Route 318 - Oakdale/Irving Mall: This would be a new Saturday-only service, combining elements of weekday Routes 308 and 309. It is based on a proposal by DART service planners. Route 318 would not interface with Railtran, at least in the early phases; there would be no common service periods. It is included here as a supporting element for the overall Irving plan.

- Route 404 - West Side Crosstown: Reflecting the proposed standardized route designation policy, this would be the new designation for existing Route 304. Other changes are detailed in the Route 304 discussion.

- Route 405 - Tyler Crosstown: This route currently operates as a crosstown service between the Parkland Medical Center complex and the Illinois Transit Center in Oak Cliff. Much of the alignment is along the Wycliff Avenue/Sylvan Street corridor. Service is provided seven days a week.

  The only change specifically related to commuter rail would be a short realignment and extension in the Medical Center area to permit the route to terminate on the station property. Significant Railtran feeder potential exists with this route, given its major north-south alignment in Oak Cliff.

- Route 409 - King Center/Irving Boulevard: This would be the new combined designation for existing Routes 9 and 300. Operationally, these two routes are already interlined. Other changes are detailed in the discussions pertaining to the latter routes.

- Route 413 - Mockingbird: Reflecting the proposed standardized route designation policy, this would be the new designation for existing Route 13. Further details regarding this route are presented in the Route 13 discussion.

- Route 453 - Hampton Crosstown: Reflecting the proposed standardized route designation policy, this would be the new designation for existing Route 53. Other changes are detailed in the Route 53 discussion.

- Route 785 - Shady Trail: Reflecting the proposed standardized route designation policy, existing radial limited-stop Route 85 would be known as Route 785. Other details are included in the Route 85 discussion.

PHASE 1 OPERATING IMPACTS

Key operating statistics for both the bus routes currently operating within the study area and the routes proposed for the Phase 1 bus/commuter rail interface plan have been assembled or calculated. While the feeder system is primarily directed toward the initial weekday peak period Railtran schedule, the statistics include one-way trips, revenue miles and revenue hours for a weekday, Saturday and Sunday schedule. This enables a more complete picture. Peak vehicle requirements are also identified; they represent the maximum number of buses in service at any given time, which occurs during the weekday peak periods. These operating statistics are important since they indicate the magnitude and extent of the system and provide a basis for estimating future operating costs.

Most of the current service information is based on the latest DART-operated and contractor (ATE) Scheduled Service Summaries. Some approximations were

necessary to determine individual route statistics where interlined route data were available only by combined route-group (especially for radial local services that continue through downtown Dallas to areas beyond the scope of this analysis). Current operational considerations were carried forward to the proposed plan where applicable (e.g., no interlining changes are assumed except where route groups would be physically split). In addition, proposed revenue hours were generally calculated as an extension of revenue miles (measured on a detailed base map), using these assumed average revenue speeds reflecting type of service:

- Radial (Local) 12.5 mph
- Express (Premium) 21.0 mph
- All Others 15.0 mph

These speeds were selected based on current schedules and information supplied by DART personnel that suggested revisions to current travel times, especially to improve schedule adherence.

Current statistics for bus routes in the feeder plan are presented in Exhibit 5-3. Similar statistics reflecting adoption of the plan are contained in Exhibit 5-4. In both cases, all relevant existing and proposed routes are included, to facilitate comparisons. Route numbers shown in parentheses in the exhibits are those used not currently used, but suggested to accompany plan implementation. Proposed service frequencies are shown in Exhibit 5-5.

This feeder plan would result in the net reduction of seven peak vehicles -- from the current 115 to 108. Total trips, revenue miles and revenue hours would also decrease moderately. Implementation of the bus/commuter rail plan presented in this section would result in a reduction of variable costs by approximately $193,500 annually. This includes several service changes recommended by DART staff in the Irving Sector study. The reduction in annual variable costs is primarily a result of changes to Route 203.

While variable costs are expected to decline, fixed costs per route can be expected to increase by about $4,326 per express peak vehicle and $614 per peak local vehicle. Total fixed costs do not increase, but the route-by-route allocation of these fixed costs goes up as a result of there being seven fewer peak vehicles. The net impact of changing the allocation of fixed costs by route is about $18,450 annually. Thus the net reduction of annual costs for bus feeder service to Phase 1 commuter rail is $175,000. This savings could be used to fund experimental shuttle service to employers in the Medical/Market Center area during peak periods, as described previously in this section.

Exhibit 5-3
Bus Operating Statistics
Railtran Plan - Current

Route	WEEKDAY				SATURDAY			SUNDAY		
	One-Way Trips	Revenue Miles	Revenue Hours	Peak Vehicles	One-Way Trips	Revenue Miles	Revenue Hours	One-Way Trips	Revenue Miles	Revenue Hours
9/300 (409)	165	1895.6	129.8	10	134	1522.7	99.5	82	783.1	51.2
13 (413)	67	663.6	44.2	4	57	564.3	37.6	0	0.0	0.0
26	226	1147.2	82.5	11	134	583.8	43.6	95	431.3	31.0
29	84	394.8	33.2	6	46	216.2	15.8	31	145.7	11.4
40/43 (40/740,43/743)	156	1840.8	133.4	12	97	1144.6	80.6	65	767.0	58.5
49	72	632.7	43.0	8	0	0.0	0.0	0	0.0	0.0
53 (453)	83	1501.4	102.8	8	60	1085.3	73.8	43	777.8	47.4
63	80	605.1	44.8	9	0	0.0	0.0	0	0.0	0.0
85 (785)	72	1245.6	58.2	7	0	0.0	0.0	0	0.0	0.0
133	12	216.0	9.4	3	0	0.0	0.0	0	0.0	0.0
203(a)	63	730.8	34.8	7	0	0.0	0.0	0	0.0	0.0
301 M-F	46	364.8	22.7	3	0	0.0	0.0	0	0.0	0.0
301 Sat (311)	0	0.0	0.0	0	20	156.5	9.9	0	0.0	0.0
302	46	354.2	22.7	2	0	0.0	0.0	0	0.0	0.0
(303)	0	0.0	0.0	0	0	0.0	0.0	0	0.0	0.0
304 (404)	61	1525.2	87.2	7	36	900.1	52.9	0	0.0	0.0
305	30	207.0	13.6	2	0	0.0	0.0	0	0.0	0.0
306	30	276.0	14.7	3	0	0.0	0.0	0	0.0	0.0
307	44	516.1	30.5	3	0	0.0	0.0	0	0.0	0.0
308	46	430.1	22.9	2	0	0.0	0.0	0	0.0	0.0
309	43	414.6	26.2	3	0	0.0	0.0	0	0.0	0.0
(318)	0	0.0	0.0	0	0	0.0	0.0	0	0.0	0.0
405	84	869.4	71.9	5	70	724.5	69.0	36	372.6	35.2
TOTAL	1,510	15,831.0	1,028.5	115	654	6,898.1	482.8	352	3,277.5	234.7

Exhibit 5-4
Bus Operating Statistics
Railtran Plan - Proposed

Route	WEEKDAY One-Way Trips	WEEKDAY Revenue Miles	WEEKDAY Revenue Hours	WEEKDAY Peak Vehicles	SATURDAY One-Way Trips	SATURDAY Revenue Miles	SATURDAY Revenue Hours	SUNDAY One-Way Trips	SUNDAY Revenue Miles	SUNDAY Revenue Hours
9/300 (409)	165	1,895.6	129.8	10	134	1,522.7	99.5	82	783.1	51.2
13 (413)	67	663.6	44.2	4	57	564.3	37.6	0	0.0	0.0
26	226	1,147.2	82.5	11	134	583.8	43.6	95	431.3	31.0
29	84	394.8	33.2	6	46	216.2	15.8	31	145.7	11.4
40/43 (40/740,43/743)	156	1,840.8	133.4	12	97	1,144.6	80.6	65	767.0	58.5
49	72	632.7	43.0	8	0	0.0	0.0	0	0.0	0.0
53 (453)	83	1,501.4	102.8	8	60	1,085.3	73.8	43	777.8	47.4
63	80	605.1	44.8	9	0	0.0	0.0	0	0.0	0.0
85 (785)	72	1,245.6	58.2	7	0	0.0	0.0	0	0.0	0.0
133	12	216.0	9.4	3	0	0.0	0.0	0	0.0	0.0
203	18	208.8	7.5	1	0	0.0	0.0	0	0.0	0.0
301 M-F	46	317.4	16.5	2	0	0.0	0.0	0	0.0	0.0
301 Sat (311)	0	0.0	0.0	0	20	178.0	11.3	0	0.0	0.0
302	46	354.2	22.7	2	0	0.0	0.0	0	0.0	0.0
(303)	0	0.0	0.0	0	0	0.0	0.0	0	0.0	0.0
304 (404)	61	1,525.2	87.2	7	36	900.1	52.9	0	0.0	0.0
305	46	368.0	25.0	2	0	0.0	0.0	0	0.0	0.0
306	46	271.4	14.5	3	0	0.0	0.0	0	0.0	0.0
307	44	514.8	30.5	3	0	0.0	0.0	0	0.0	0.0
308	46	430.1	22.9	2	0	0.0	0.0	0	0.0	0.0
309	43	414.6	26.2	3	0	0.0	0.0	0	0.0	0.0
(318)	0	0.0	0.0	0	0	0.0	0.0	0	0.0	0.0
405	84	869.4	71.9	5	70	724.5	69.0	36	372.6	35.2
TOTAL	1,497	15,416.7	1,006.3	108	654	6,919.6	484.1	352	3,277.5	234.7

Exhibit 5-5
RAILTRAN WEEKDAY SERVICE FREQUENCIES

PEAK STATION SERVED	ROUTE NUMBER	SERVICE FREQUENCY		SPAN OF SERVICE	(NEW) ROUTE NUMBER
		PEAK	BASE		
So. Irv. / Med. Ctr.	9/300	20	30	5:10am-12:00am	409
-	13	20	30	5:00am-10:00pm	413
Med. Ctr.	26	6	12	5:40am-12:15am	26
Med. Ctr. (a)	29	15	30	5:15am-12:00am	29
Med. Ctr.	40/43	18/40	30/40	4:50am-12:40pm	40/740,43/743
Med. Ctr. (a)	49	8	35	5:50am-9:00pm	49
Med. Ctr.	53	20	30	4:50am-12:15pm	453
Med. Ctr. (a)	63	7	35	5:40am-7:00pm	63
-	85	30	45	5:40am-7:00pm	785
Med. Ctr.	133	30	-	PEAK ONLY	133
So. Irv.	203	-	60	7:00am-8:30pm	203 (b)
-	301 M-F	30	60	6:00am-9:00pm	301 M-F
So. Irv.	301 Sat	60	60	9:00am-6:35pm	311 Sat
So. Irv	302	30	60	6:00am-9:00pm	302
So. Irv	-	25	60	5:30am-6:30pm	303 (c)
So. Irv	304	30	60	5:00am-12:50pm	404
-	305	30	60	6:00am-9:30pm	305 (c)
So. Irv	306	30 (d)	60	6:00am-7:00pm	306
So. Irv	307	30	60	6:15am-9:40pm	307
So. Irv	308	30	60	6:00am-9:30pm	308
So. Irv	309	30	60	6:00am-9:30pm	309
So. Irv	-	45	45	6:00am-8:00pm	318 Sat (c)
Med. Ctr.	405	20	30	5:15am-12:00am	405

(a) = Within a short walking distance.
(b) = Current express schedule off-peak.
(c) = Proposed new route.
(d) = The option of a 25-minute frequency during the peak would require an additional vehicle.

FUTURE BUS/COMMUTER RAIL INTERFACE PLANNING CONSIDERATIONS

DART's Draft Transit System Plan Year 2010 calls for Railtran service to be expanded in two subsequent phases. In Phase 2, mid-day trips would be added. Service would continue to operate on 25-minute headways. Service would be expanded to Fort Worth, with an additional stop in DART's service area (i.e., Centreport). In Phase 3, Railtran service would operate on 20-minute service frequencies, with an additional station at Belt Line Road. Hours of operation will be expanded to late night service.

In Phase 2, the challenge will be to provide a circulator system between the Centreport Railtran Station and employer sites at DFW Airport. The need for a circulator feeder service at DFW Airport was raised in DART's Grid Network Study as a barrier to provision of crosstown bus service to the area. The subscription shuttle concept proposed earlier in this section for the Medical/Market Center may have potential application to the DFW Airport circulation issue.

Bus/commuter rail schedule coordination will improve dramatically in Phase 3 with a 20-minute Railtran service frequency. The challenge in Phase 3 will be to provide feeder service at night. Currently, DART services in the South Irving area do not operate after 9:00 or 10:00 p.m. Demand responsive subscription services may provide a cost effective alternative to fixed route bus service for late night feeder service.

Route 203 would be eliminated with full implementation of Railtran services. Route 300 to DFW Airport would likely undergo a significant restructuring with Phase 2 Railtran service. Resources from these two route changes could provide a portion of the resources necessary to provide integrated bus feeder service to new stations and for extended hours of operation.

While Railtran is the first commuter rail service to be implemented in DART's service area, it is important to note that other future commuter rail services are also planned, including:

- **Stemmons Corridor:** 19-mile commuter rail line between Union Station in downtown Dallas and the North Carrollton Transit Center. Improvements in the Stemmons Corridor include a brand to the North Irving Transit Center.

- **Cotton Belt Corridor:** 13-mile commuter rail line along the Cotton Belt connecting the North Central LRT station with the Stemmons Corridor commuter rail line.

Implementation of commuter rail in the Stemmons Corridor would likely impact the operations of bus services such as:

- Route 202 North Irving/Las Colinas Express
- Route 204 Carrollton/Farmers Branch Express
- Route 208 Valley Ranch Express
- Route 85 Shady Trail Radial Limited Stop Service.

Suburban circulator/connector services would be affected at key stations and provide commuter rail feeder services. Other routes that are candidates for restructuring include:

- Route 40/43 Brockbank/Park Forest
- Route 304 Westside Crosstown
- Route 351 Coit/Parker Crosstown
- Route 352 Coit/Legacy Crosstown
- Route 400 Belt Line Crosstown.

The degree to which restructuring of bus routes is required will depend on commuter rail service frequency, station spacing, and station location.

6.0 GRID NETWORK PLAN

6.0 GRID NETWORK PLAN

DART has a number of regional crosstown and urban crosstown routes which begin to form a grid network. While a significant amount of travel in DART's service area is radial or CBD-bound, there is a growing trend of suburb-to-suburb travel and reverse commuting. Ridership trends by route type, presented in Section 2, show how this trend is developing. Information on emerging trends, presented in Section 3, further illustrates the need to focus on creating services to meet non-radial travel needs.

This section summarizes previous DART efforts for grid network planning, as well as preliminary observations and analyses regarding the feasibility of candidate crosstown routes.

PREVIOUS PLANNING EFFORTS

In July of 1992, DART issued the results of a Grid System Study. This study analyzed the origins and destinations of current transit riders and evaluated the potential travel patterns of choice riders. Key findings from this study include the following:

- **Current Transit Riders:** Four major non-CBD travel corridors include: (1) South Oak Cliff/Oak Cliff/West Dallas/Medical Center; (2) West Oak Cliff/Oak Cliff/South Dallas/Baylor Hospital; (3) Baylor Hospital/University of Texas Medical Area; and (4) South Dallas/University of Texas Medical Area.

- **Choice Riders:** Major destinations for choice riders include: (1) Love Field/Medical/Market Center area; (2) DFW; (3) shopping and employment centers in the LBJ Freeway/North Dallas Tollway area; (4) Red Bird area; and (5) North Central Corridor from Arapaho Rd. to the Northwest Highway.

The Grid System Study presented a number of desired travel lines and made preliminary suggestions for additional service needs.

Since July of 1992, DART service planners have refined the findings from the Grid Network Study. Exhibit 6-1 shows existing crosstown services, candidate crosstown routes being considered by DART planners, and the Draft Transit System Plan Year 2010. This visual representation of what is, what might be in terms of bus service, and what is planned in terms of major capital investments suggests several strategies:

- **Interim Bus Service:** Fixed route bus services to mimic proposed rail system until services are implemented.

- **HOV Express Services:** Fixed route bus services to take advantage of travel time savings on HOV facilities.

- **East/West Corridors:** While four east/west bus corridors are shown in the 2010 plan, existing and candidate routes do not necessarily address the plan for increased services in these corridors.

- **Potential Network Gaps:** Bus operator and road supervisor surveys and workshops indicated several other corridors needing crosstown services, including South Garland to Pleasant Grove and Pleasant Grove to Camp Wisdom and Cockrell Hill.

FEASIBILITY OF CANDIDATE ROUTES

Exhibit 6-2 presents a preliminary feasibility analysis of candidate crosstown routes. The first grouping is assumed to be either limited stop or express service. The second group is assumed to be regional crosstown. Since this list of candidate routes was developed, it is important to note that the July 25th service changes included implementation of four new routes that were somewhat reminiscent of several candidate routes. These include non-radial limited stop routes 133, and 134 and crosstown routes 402 and 405.

Assumptions used in developing Exhibit 6-2 include the following:

- service frequencies of 30 minutes for a 15 hour span of service; weekdays only

- average of 21 mph for express/limited stop services; 15 mph for crosstown services

- operation of all candidate routes by private provider, although for some routes deadhead mileage could be reduced by DART operation.

As a point of reference, existing averages for regional crosstown, urban crosstown, and regional express services include:

	pass./hour	cost/pass
regional crosstown	16.9	$3.77
urban crosstown	25.4	$2.89
regional express	24.2	$4.75
systemwide	26.4	$2.99

Comparing forecast ridership to existing standards begins to suggest a number of lines for implementation. These estimates of potential ridership, however, do not consider that existing radial routes and transfer patterns may already be meeting some of the demand or potential ridership of these candidate lines.

Exhibit 6-2
ESTIMATED PERFORMANCE OF CANDIDATE CROSSTOWN ROUTES

Route Name	Route Miles	Daily Rev. Miles	Daily Rev. Hrs.	Peak Vehicles	Est. Annual Costs ($000)	Est. Annual Riders (000)	Riders Per Hour	Cost Per Rider
Legacy Park/Plano/S. Garland	22.9	1,374.0	65.4	5	$832	88.3	5.3	$9.42
Carrollton/Richardson	14.3	858.0	40.9	3	$532	162.1	15.6	$3.28
Oak Cliff/North Irving	16.2	972.0	46.3	4	$594	254.6	21.6	$2.33
Oak Cliff/Richardson	20.4	1,224.0	58.3	5	$738	398.0	26.8	$1.85
Richardson/North Irving	17.2	1,032.0	49.1	4	$628	159.7	12.7	$3.93
Pleasant Grove/South Garland	15.4	924.0	44.0	4	$567	320.3	28.6	$1.77
Rowlett/Richardson	14.6	876.0	41.7	4	$541	152.4	14.3	$3.55
Carrollton/Medical Center	15.5	930.0	44.3	4	$570	107.2	9.5	$5.32
Red Bird/Prestonwood	21.3	1,278.0	60.9	5	$777	437.6	28.2	$1.77
Prestonwood/Garland	12.8	768.0	51.2	4	$648	311.7	23.9	$2.08
Inwood Crosstown	12.5	750.0	50.0	4	$631	227.4	17.8	$2.78
Illinois/Sylvan	11.5	690.0	46.0	4	$581	215.0	18.3	$2.70
Ledbetter/Medical Center	14	840.0	56.0	4	$702	271.0	19.0	$2.59
Illinois/Hampton	12.6	756.0	50.4	4	$633	253.9	19.8	$2.49
Clarendon Crosstown	9.7	582.0	38.8	3	$499	287.6	29.1	$1.73
Baylor/Medical Center	7.8	468.0	31.2	3	$405	245.2	30.8	$1.65
Walnut Hill Crosstown	14	840.0	56.0	4	$696	205.0	14.4	$3.40
TOTAL	**252.7**	**15,162.0**	**830.5**	**68**	**$10,574**	**4,097.1**	**19.3**	**$2.58**

Exhibit 6-2 indicates that five candidate routes have an average cost per passenger below $2.00. An additional six candidate routes have an average cost per passenger below the systemwide average of $2.99 per passenger. These eleven routes were evaluated in more detail, as described below.

- Oak Cliff/North Irving: The routing proposed by DART staff begins at the Hampton light rail station and follows the current Route 53 alignment to the Medical Center area. From the Medical Center area, this new route would travel to the North Irving Transit Center via SH 114. Implementation of this route would deflect ridership from existing Route 53. The route segment between the Medical Center and North Irving, is currently served by Route 202 which provides express service between the CBD and North Irving. Residents of Oak Cliff could take light rail to the Convention Center or West Side Transfer Center (adjacent to light rail station) and transfer to Route 202. Section 7 provides for coordinated transfers to Route 202 at the West Side Transfer Center. New service is therefore not recommended at this time.

- Oak Cliff/Richardson: Much of the demand for this candidate route will be met with implementation of the Oak Cliff and North Central light rail lines. The bus/rail interface plan for North Central includes a recommendation for Route 201 to Richardson to make outbound stops during the peak period at the Park Lane LRT station. Another option is for Oak Cliff residents to take light rail to the West End station, walk across the street, and take the bus for Route 201 outbound to Richardson. The CBD transfer center plan makes provision for this option. New service is therefore not recommended at this time.

- Pleasant Grove/South Garland: Persons traveling between South Garland and Pleasant Grove may do so by transferring between Routes 66 and 64, as indicated by the fact that eight percent of Route 64 riders transfer to Route 66. It is recommended that Route 66 be revised from 20 minute peak period headways to 15 minutes. Routing at the northern terminus would alternate between the White Rock area and the South Garland Transit Center. An additional three vehicles would be required in the peak periods. The annual operating cost for this improvement (including both fixed and variable) is estimated to be $732,200. Early implementation is recommended.

- Red Bird/Prestonwood: Route 78 currently provides express bus service between Red Bird and the CBD on eight minute peak period service frequencies. With implementation of light rail, the service frequency for Route 78 is recommended for ten minute peak period frequency. Route 205 provides express bus service between the CBD and Prestonwood on 30 minute peak period frequencies. Both routes have 60 minute off-peak service frequency. The CBD transfer center plan recommends that both of these routes be coordinated at the East Side Transfer Center. Schedule coordination of existing services is recommended rather than new route development.

- Prestonwood/Garland: This candidate route would link the Prestonwood Transfer Point and Garland Central via Spring Valley Road and Buckingham Road. Implementation of this route should be delayed to coincide with development of the Addison Transit Center. The estimated cost of this new candidate route is approximately $648,000 annually.

- Inwood Crosstown: This candidate route would link the Prestonwood Transfer Point and the Medical Center via Inwood Road. Existing routes serve segments of Inwood Road, but require a transfer to make the complete trip between Prestonwood and the Medical Center. Similar to the Prestonwood/Garland option (presented above), implementation of this route should be delayed to coincide with development of the Addison Transit Center. The estimated cost of this new candidate route is approximately $631,000 annually.

- Illinois/Sylvan: Route 405, implemented by DART on July 25, 1994, provides a link between the Illinois Transit Center and the Medical Center via Sylvan Avenue. Changes proposed in Section 4 relating to bus feeder service and light rail implementation ensure that this link in the grid network is maintained. With LRT implementation, Route 405 is proposed to be extended south to Camp Wisdom Road rather than stopping at the Illinois Transit Center. Service from the Illinois Transit Center to the CBD on rail and a transfer to Route 26 at the Convention Center provides a second option to arrive at the Medical Center area from West Oak Cliff. A third option is to transfer from light rail to commuter rail at Union Station.

- Ledbetter/Medical Center: Proposed changes to extend Route 405 to Camp Wisdom Road with LRT implementation will serve the same purpose as this candidate route. No additional changes are recommended.

- Illinois/Hampton: Route 53 currently provides service along Hampton Road between the Red Bird Transit Center and the Medical Center. Persons wishing to travel from either the Illinois or Hampton LRT stations may connect with commuter rail or bus Route 26 in the CBD for service to the Medical Center. Additional new service does not appear to be warranted at this time.

- Clarendon Crosstown: This candidate route would link Cockrell Hill Road with the East Dallas Fair Park transfer location. Service would be along Clarendon Road. Section 4 contains a recommendation to extend Route 4 to Westmoreland Road. Route 4 would travel on Clarendon Road to the Tyler-Vernon LRT station and then continue to the CBD. Future DART plans call for a new transit center at Fair Park. It is recommended that Route 4 be changed at such time to serve the Fair Park Transit Center rather than providing service to the CBD; LRT service would provide the link to the CBD for existing Route 4 riders.

Resources from eliminating the CBD segment could be used to fund service to Fair Park, as well as extending Route 4 to Cockrell Hill Road. In the interim, service between Oak Park and Fair Park is possible with existing Route 45 or Route 4 to the CBD and transfer to Route 44.

- Baylor/Medical Center: Route 44 is currently inter-lined with Routes 40 and 43, both of which provide service between the CBD and Medical Center. It is recommended that Route 44 be changed to serve Baylor Hospital en-route to East Dallas. Routes 40 and 43 could be re-routed from the East CBD transfer center to avoid much of the downtown traffic. The time savings associated with less CBD travel should be sufficient to allow changes in Route 44 with no overall cost impact. Persons wishing to travel from the CBD to the Medical Center area may do use using Route 26 or, in the future, commuter rail. Early implementation is recommended.

SUMMARY

Recommendations include the following:

- Two of the candidate routes are recommended for early implementation (i.e., Pleasant Grove/South Garland and Baylor/Medical Center) at an estimated annual cost of $732,200. Cost saving from changes in bus service upon LRT implementation could be used to offset this cost.

- Additional changes in Route 4 are recommended upon implementation of the LRT starter system and Fair Park Transit Center. These changes address the travel needs of the Clarendon Crosstown candidate route with little cost impact.

- Two of the candidate routes are recommended for implementation concurrent with the new Addison Transit Center (i.e., Prestonwood/Garland and the Inwood Crosstown) at an estimated annual cost of $1.3 million annually. The cost of these candidate routes will need to be considered relative to other service needs at the time of transit center completion.

- The remaining six candidate routes are addressed to a great degree by proposed LRT-bus feeder service and CBD transfer center and routing recommendations. Associated costs with these changes are included in other sections.

7.0 CBD TRANSFER CENTER OPERATIONS PLAN

7.0 CBD TRANSFER CENTER OPERATIONS PLAN

The Dallas Central Business District (CBD) will continue to be a dominant activity center for the Dallas metropolitan area and the major trip destination location for the Dallas Area Rapid Transit (DART). The development of light rail and commuter rail services into the Dallas CBD will lessen the relative amount of bus service into the downtown. However, the Dallas CBD will continue to attract the largest concentration of bus services and bus riders.

The objective of this analysis is to develop an operational plan for the remaining CBD-oriented bus services, coordinate these services into the development of two transfer centers, and integrate these services into the expanding rail network. The CBD analysis used the following as a baseline:

- The July, 1994 bus schedules and ridership levels.
- A bus to bus transfer matrix for an average weekday, based on on-board passenger surveys conducted in 1994.
- Preliminary site locations and initial layouts provided by DART in December, 1994.

To this analysis baseline, we have added the results of the latest light rail starter system and commuter rail feeder bus planning results that will reduce the concentration of bus trips into the CBD. The facilitation of the remaining bus services and the convenience of through and transferring passengers among the bus and rail services is the focus of this CBD service and transfer planning effort.

Based on research to date, we have attempted to consolidate the majority of through-downtown transfers into the CBD East and West Transfer Centers, as well as to minimize the delay impact on non-transferring passengers. The information from the investigation of conceptual service changes for rail feeder and crosstown services proved crucial to this analysis in conjunction with the results of the updated passenger transfer survey.

The considerations for the CBD service and Transfer Center planning study included the following:

- An attempt was made to minimize the added time inconvenience to non-transferring passengers.
- The majority of routes only stop at one terminal.
- Route assignment to the Transfer Centers was based on the maximum number of downtown transfers that can be diverted to these centers.

- Route assignment into the Transfer Centers emphasized the higher volume transfer routes, mainly considering the radial local and radial limited stop routes.

- Routes were assigned to the Transfer Centers based on transfer volumes from the origin-destination and current rider surveys.

SUMMARY

Based on the various iterations of bus routings into the terminals as well as assignment to specific berths, an operational plan was developed for coordinating DART's bus services and the developing rail network. Exhibit 7-1 shows peak trips by Transfer Center, assuming implementation of bus service changes recommended in previous sections for rail system start-up.

Exhibit 7-1
NUMBER OF PEAK PERIOD BUS TRIPS BY CBD TERMINAL WITH RAIL START-UP

		A.M. Peak
Number of Peak Hour Bus Trips	East	135
	West	130
	Both	22
Number of Berths	East	14
	West	13
Minutes per Berth Trip	East	5.0
	West	5.1

A summary of the passenger transfer numbers from these analyses is as follows:

- Total downtown transfers: 49,318
- Optimal with light rail implementation: 31,114 (63%)
- DART reassignment emphasizing balance and some rerouting: 23,778 (48%)
- **Final plan considering berth balancing, regional rerouting, and light rail implementation: 30,153 (61%)**

It is this last figure that indicates, with the start-up of the rail system, 61 percent of the passenger transfers will be redeployed to the transfer centers. This optimization is between the optimal and DART analyses values.

Contained in this section are details relative to preliminary analysis for route Transfer Center assignments, and estimated peak period CBD bus trip impacts resulting from rail start-up. Transfer Center and berthing assignments are included. Contained at the end of this section are a number of maps showing each bus route with assignment at one of the two CBD Transfer Centers. These drawings represent revisions to the existing schedule maps to take into account the effects of the light rail system as well as to allow for the buses to stop at the East or West Transfer Center. The routings into the terminals were assigned in an attempt to minimize additional route miles into the terminals and to minimize the inconvenience to non-transferring passengers.

PRELIMINARY SITE LAYOUTS

During the course of the study, DART identified two sites for their CBD transfer centers: the East Transfer Center bordered by Pearl, Live Oak, Olive and Pacific Streets; and the West Transfer Center bordered by San Jacinto, Pacific and Griffin Streets. The West Transfer Center has already been purchased and negotiations for the East Transfer Center are in progress. These locations were used in this study to coordinate Dallas bus services and transfer convenience.

For preliminary analysis purposes, maximum number of bus berths were assumed for each transfer center (i.e., 16 for the East and 13 for the West). Based on preliminary results from this study and public input from CBD businesses, the number of bus berths at the East Transfer Center were reduced by two. Exhibit 7-2 shows the site plan for each transfer center, as of December 1994, and includes:

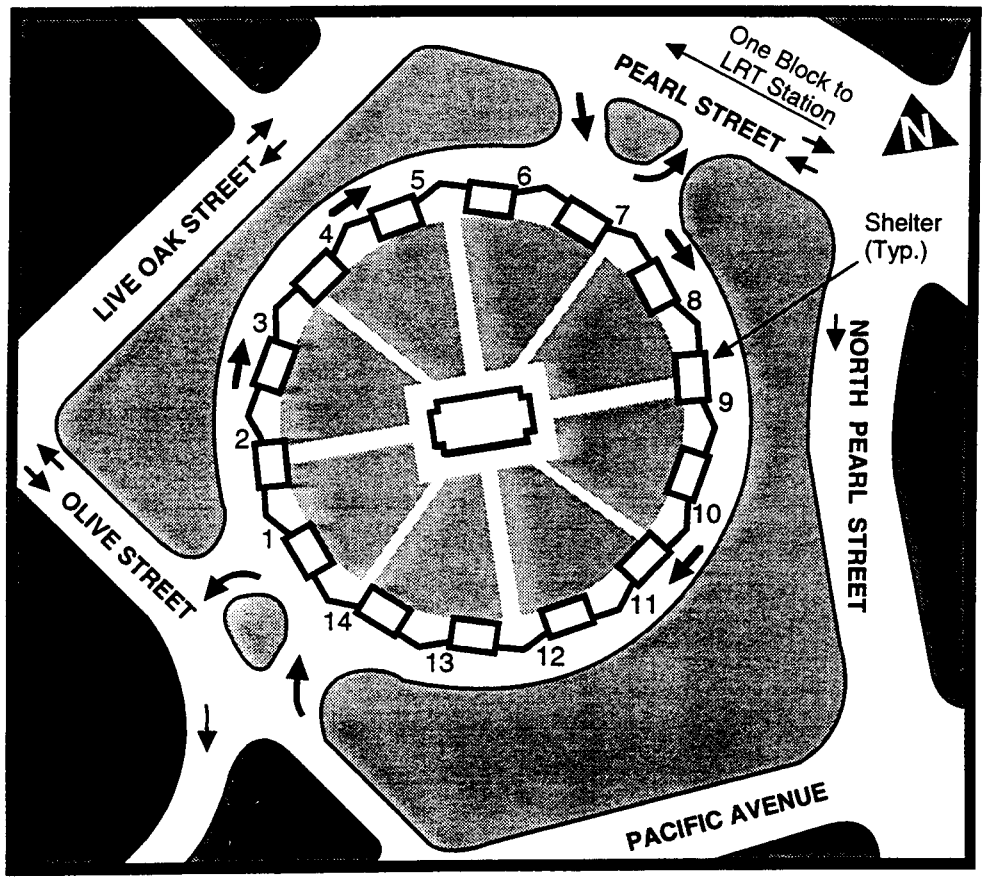
- **East Transfer Center:** 14 bus berths
- **West Transfer Center:** 13 bus berths.

TRANSFER CENTER ASSIGNMENT OBJECTIVES

The objective of these two transfer centers is to consolidate the majority of through-downtown transfers into one of the two transfer centers and to minimize the delay impact on non-transferring passengers. Three Transfer Center assignment objectives were examined for each route:

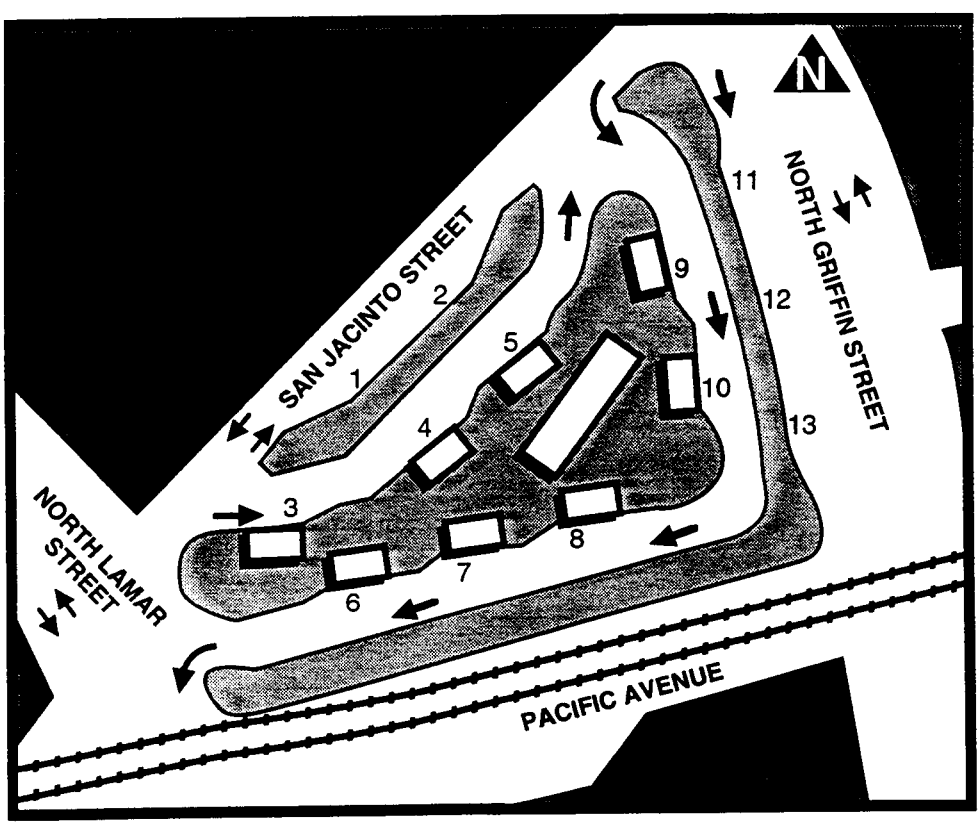
- Maximize off-street passenger transfers
- Minimize incremental service miles
- Minimize non-transferring passenger inconvenience.

Exhibit 7-2
CBD TRANSFER CENTER - PRELIMINARY SITE PLANS
as of February 1995



EAST SIDE TRANSFER CENTER

Maximum Buses = 14



WEST SIDE TRANSFER CENTER

Maximum Buses = 13

The major focus on assigning each route to the East or West Transfer Center was an attempt to move the on-street passenger transfers from the dispersed pattern along streets throughout downtown Dallas to Transfer Centers, increase transferring passenger convenience, and maximize the transfer connections available in the Transfer Center locations.

ROUTE ASSIGNMENT PROCESS

In performing this analysis, the first step was to assign each route going through the CBD to the East or West Transfer Center based on an existing interlined bus route's proximity to a Transfer Center location. The second step was to assign each route to one of the Transfer Centers based on non-transferring passenger convenience to the location of each Transfer Center. From here, if the first two steps indicated the same Transfer Center location, the bus route was assigned to this location. If the first two steps indicated different locations, additional analysis was conducted to determine the final Transfer Center assignment.

To perform this further analysis, a baseline transfer matrix was developed containing the numbers of weekday passengers coming from and transferring to every route traversing the CBD. The numbers of passenger transfers from CBD routes were summarized into a full matrix containing all "from" and "to" CBD bus routes. The process involved arranging the passenger transfers into several matrices that placed the transfers for the route in combination with routes already assigned to the East or West Transfer Center. From these combinations, the Transfer Center matrix with the higher number of transfers for each route was selected for the particular route assignment. Every attempt was made to ensure interlined routes were assigned to the same Transfer Center. In the few cases where the number of transfers for the Transfer Centers were the same, the routes were assigned to the Transfer Center with the highest or most available time per trip available for each berth.

Assignment of existing routes to Transfer Centers based on the analysis are shown below:

East Transfer Center: 1, 2, 4, 5, 8, 17, 20, 21, 22, 27, 29, 31, 50, 51, 52, 54, 58, 59, 62, 63, 80, 84, 206.

West Transfer Center: 3, 6, 7, 10, 11, 12, 14, 15, 16, 17, 18, 19, 23, 24, 25, 26, 30, 33, 34, 35, 36, 37, 38, 39, 40, 42, 43, 44, 46, 47, 48, 49, 55, 56, 60, 61, 62, 64, 65, 67, 68, 69, 73, 74, 75, 76, 77, 78, 81, 82, 83, 85, 200, 201, 202, 3, 204, 205, 207, 208, 210.

Both Transfer Centers: the Red and Green Hop-a-Bus routes (Route 17) were assigned to both the East and West Transfer Facilities, while the Blue will serve the West Facility only.

The results from this route assignment are summarized in Exhibit 7-3. This initial assignment produced an imbalance of bus trips at the West Transfer Center in addition to an unreasonable number of minutes per berth trip allotted for this Transfer Center.

Exhibit 7-3
NUMBER OF PEAK PERIOD BUS TRIPS BY CBD TERMINAL

		Existing Service To Maximize Transfers		Existing Service With Operating Constraints	
		A.M.	P.M.	A.M.	P.M.
Number of Peak Hour Bus Trips	East	77	74	154	156
	West	343	350	266	268
	Both	11	11	11	11
	Total	431	435	431	435
Number of Berths	East	14	14	14	14
	West	13	13	13	13
Minutes per Berth Trip	East	9.5	9.9	5.1	5.0
	West	2.2	2.2	2.8	2.8

MODIFIED ROUTE ASSIGNMENT PROCESS

As a consequence of these figures, DART provided some additional considerations regarding the assignment of the bus routes to the Transfer Centers. The objective of these considerations was to have a more equal balance of buses utilizing the East and West Transfer Centers. This equalization process addresses CBD business community concerns for balance in CBD bus traffic, as well as DART operational concerns (i.e., adequate berthing time and space issues at the West End Transfer Center).

The first of DART's modifications was to examine the routes coming from the Northeast corridor to determine if their convergence just north of the CBD is conducive to their operating to and from the East Transfer Center as opposed to the West Transfer Center. Combined with these are the routes coming into the CBD from the north that cross the Tollway and are able to use the East Transfer Center with a minimum impact to operations.

The second modification was to assign the majority of the 200 series express routes to the East Transfer Center rather than the West. This second iteration, resulted in the following Transfer Center route assignments for existing routes:

East Transfer Center: 1, 2, 3, 4, 5, 7, 8, 15, 17, 19, 20, 21, 22, 24, 25, 27, 29, 31, 35, 40, 43, 50, 54, 58, 59, 62, 63, 76, 80, 84, 200, 201, 203, 204, 205, 206, 207, 208, 210.

West Transfer Center: 6, 10, 11, 12, 14, 16, 17, 18, 23, 26, 30, 33, 34, 36, 37, 38, 39, 42, 44, 46, 47, 48, 49, 51, 52, 55, 56, 60, 61, 62, 64, 65, 67, 68, 69, 73, 74, 75, 77, 78, 81, 82, 83, 85, 202.

Both Transfer Centers: the Red and Green Hop-a-Bus routes (Route 17) serves both the East and West Transfer Facilities; the Blue serves the West Facility only.

Exhibit 7-3 presents the number of peak hour bus trips considering all of the referenced factors that allowed certain routes to be assigned to the East rather than the West Transfer Center. Considering the same number of berths, the minutes per berth trip is more balanced in this exhibit, and a significant number of peak hour bus trips have been moved from the West to the East Transfer Center. The West Transfer Center, however, still had too many vehicles to operate efficiently.

ADDITIONAL TRANSFER CONSIDERATIONS

As previously mentioned, routes were assigned to the either the East or West Transfer Facility based on transfer volumes from the baseline matrices produced from survey results. In the baseline assignment, there was a higher percentage of transfers taking place within the two transfer facilities as opposed to outside the transfer facilities.

The next step in the analysis was to incorporate the effects of the start-up of the light rail system with the bus routes continuing to serve the CBD and the transfer facilities. This was done by creating a matrix that presents the routes not affected by the light rail system and summing the numbers of transfers from the routes no longer coming into the CBD. The higher total transfer numbers for these matrices versus the baseline matrices confirm that the start up of the light rail system will indeed incorporate transfers from the bus routes no longer coming into the CBD, while maintaining a high number of transfers in the two transfer facilities.

The final examination of transfer data in matrix form incorporated modifications suggested by DART in an attempt to yield a better balance of trips against bus bays available. The numbers obtained from these matrices, while not as high as those in the optimized LRT matrices, are feasible and can be viewed as the middle ground between the unadjusted transfer numbers and ultimate balance of bus routes utilizing the transfer facilities. Exhibits 7-4 and 7-5 present the numbers of transfers for each route occurring at the transfer centers according to this iteration. At the bottom of the exhibits are the transfer numbers from light rail to each of the routes at the centers. The numbers within these exhibits are indicative of the high volumes of transfers that will occur for each route utilizing the transfer facilities.

LIGHT RAIL AND COMMUTER RAIL START-UP PLAN

To determine the effects of the light and commuter rail lines on the existing bus routes, service plans for each bus route were examined for existing, rail start-up and rail buildout. The routes affected by the LRT and commuter rail start-up are outlined in Exhibit 7-6. Over 125 peak-hour CBD bus trips are eliminated as a result of rail implementation. This has a significant impact on the sizing and operational feasibility of CBD Transfer Centers.

This final route assignment by center at the time of light rail start-up is shown below:

East Transfer Center: 1, 2, 3, 4, 7, 8, 19, 20, 21, 23, 24, 25, 29, 31, 34, 35, 37, 40, 43, 44, 50, 58, 59, 62, 63, 68, 76, 78, 80, 84, 200, 201, 203, 205, 206, 207, 208, 210.

Exhibit 7-4
TRANSFER MATRIX FINAL ASSIGNMENT
RAIL START-UP

EAST TRANSFER FACILITY

FROM \ TO	1	2	3	4	7	8	17	19	20	21	22	23	24	25	29	31	33	34	35	36	37	40	43	44	50	58	59	63	64	68	73	74	76	80	84	200	201	203	204	205	278	210	Grand Total
1	0	51	0	0	0	92	25	0	24	0	0	0	0	0	59	23	0	23	0	0	0	23	0	49	0	0	0	92	8	32	24	0	0	0	23	34	0	37	0	0	0	0	618
2	0	0	0	0	0	0	68	46	0	0	0	68	44	0	44	73	0	0	0	0	0	0	0	0	0	0	0	0	7	68	9	0	15	0	0	0	26	0	0	0	0	0	468
3	28	0	0	0	0	0	0	0	0	0	103	0	46	0	0	45	0	0	0	0	0	0	0	0	0	0	0	143	21	0	0	0	0	0	0	0	0	0	0	0	0	0	385
4	53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	60	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	123
7	0	53	0	0	0	0	0	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0	54	0	0	0	0	0	5	0	21	0	0	0	0	0	0	0	0	0	0	0	184
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	12	0	0	0	11	0	0	0	0	0	0	0	0	0	83
17	0	8	0	0	0	0	0	0	0	6	0	0	7	0	0	0	0	49	0	0	0	0	0	0	0	0	0	0	16	5	0	0	0	4	0	0	6	0	0	0	0	0	100
19	19	243	101	0	0	45	0	0	0	0	0	0	41	0	146	0	0	0	0	0	0	0	0	187	0	0	0	36	31	93	63	0	0	0	0	0	0	0	0	0	0	0	1,005
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0	116	0	0	0	0	0	19	0	0	9	0	0	0	0	0	0	0	0	0	0	0	164
21	8	0	0	0	0	0	0	0	0	0	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50
22	0	53	0	0	0	0	0	27	0	0	0	0	0	0	0	0	27	0	0	27	0	0	0	0	0	0	0	0	8	0	9	0	0	0	0	0	0	0	7	0	0	0	158
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	18
25	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0		0		0	0		0	0		0		0
29	0	0	0	0	0	0	0	0	0	0	101	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	21	0	33	9	0	0	0	0	34	0	0	0	0	0	0	204
31	0	0	0	0	0	0	0	0	66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	0	25	0	0	0	0	0	0	0	121
33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	17	0	25
34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	0	0	0	0	0	0	0	0	0	0	0	8	33	0	0	0	0	0	0	0	0	0	0	0	0	77
35	0	23	0	0	0	14	0	46	26	0	11	0	0	0	0	0	0	0	0	11	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	138
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	6	0	0	0	67
37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	26	0	0	0	0	0	0	0	0	0	6	0	0	0	37
40	117	0	0	0	0	0	117	122	0	68	0	0	0	0	0	122	0	68	49	0	0	0	0	0	49	0	0	0	239	0	0	0	0	0	0	0	0	0	68	0	0	0	1,019
43	0	90	0	0	0	0	0	0	0	0	0	0	0	0	0	70	0	0	0	0	0	7	0	5	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	44	0	0	246
44	42	24	56	0	0	0	0	62	0	0	17	0	0	0	0	0	0	0	7	0	0	0	51	0	0	0	0	43	44	0	21	0	0	0	0	0	0	0	0	0	0	0	367
50	0	0	0	4	0	0	0	242	174	0	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0	0	16	31	30	9	0	0	0	0	0	174	0	0	0	0	0	729
58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	6	0	0	0	0	0	0	0	0	0	0	0	0	0	66
59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	0	0	0	0	0	0	0	0	56	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	136
62	0	0	0	0	0	0	7	28	0	0	52	0	0	0	21	0	0	0	0	0	0	0	0	0	0	40	28	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	184
63	14	106	0	0	19	0	0	59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	75	0	16	16	0	90	0	0	19	0	0	0	0	24	0	0	19	0	474
64	13	31	18	30	10	27	60	104	0	12	18	5	13	0	20	12	0	22	0	17	14	20	18	80	15	0	18	98	0	41	46	0	0	0	13	0	0	0	6	6	0	9	795
68	32	32	0	23	0	0	0	96	0	65	0	0	0	0	0	0	0	0	0	0	0	30	0	34	0	0	0	0	0	0	96	0	8	0	32	0	0	0	0	0	0	0	448
73	0	9	0	9	18	0	6	68	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	9	17	35	0	0	0	0	0	0	0	0	0	0	0	0	181
74	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0	0	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86
76	0	0	0	0	0	0	0	11	0	0	28	0	0	0	11	11	0	0	0	0	0	0	0	11	8	0	0	0	11	0	0	11	0	0	0	0	0	0	0	0	0	0	103
80	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0		0		0	0	0		0	0		0
84	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	20
200	23	0	0	0	0	0	23	0	0	0	6	19	0	0	0	0	0	0	0	14	0	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	121
201	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0	24
203	0	5	0	0	0	0	38	0	0	0	0	0	0	0	0	0	0	0	0	26	0	0	0	0	0	0	0	0	0	0	29	0	0	0	0	0	0	0	7	29	0	0	134
204	0	0	0	0	6	0	14	0	0	0	0	0	0	0	0	0	0	0	0	21	0	0	0	7	0	0	0	47	4	11	0	0	0	0	0	0	0	0	0	6	15	0	130
205	0	55	0	0	0	0	0	0	28	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	125
278	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37
208	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
210	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	9
Total	349	782	176	67	53	178	393	912	318	151	428	92	180	0	377	451	89	222	62	143	14	204	204	520	72	76	75	643	679	411	370	30	34	7	92	68	205	61	107	85	69	9	9,459
RAIL SYSTEM TRANSFERS	298	423	84	65	85	287	180	913	130	330	233	5	260	152	204	424	48	46	12	222	143	119	531	416	17	0	212	770	423	123	410	0	113	4	44	68	24	42	33	96	380	0	6,369
GRAND TOTAL																																										17,828

Exhibit 7-5

TRANSFER MATRIX FINAL ASSIGNMENT
RAIL START-UP

WEST TRANSFER FACILITY

FROM \ TO	10	11	12	14	17	18	26	33	36	39	42	46	47	49	51	52	60	65	73	75	81	83	85	202	Grand Total
10	0	61	0	0	64	0	102	28	0	0	0	0	0	64	64	36	31	28	4	0	10	39	0	24	557
11	0	0	49	0	0	29	195	0	0	0	0	0	0	0	0	88	0	0	0	93	0	95	33	0	581
12	0	0	0	0	0	0	49	0	0	0	0	0	0	49	54	0	0	0	0	0	0	0	0	0	152
14	0	0	0	0	0	0	79	0	0	0	0	0	0	0	59	50	32	5	0	0	8	100	0	34	367
17	8	0	0	0	0	0	0	0	0	0	0	0	0	5	6	0	0	0	0	5	7	0	0	0	32
18	0	0	0	0	5	0	151	0	0	0	0	9	0	0	0	31	5	0	14	0	0	3	0	0	219
26	86	0	61	7	7	42	0	48	0	73	0	0	0	161	78	83	0	132	95	0	58	243	203	43	1,419
33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0	5	7	0	0	0	0	217	0	26	0	0	255
39	0	0	27	29	0	0	27	0	0	0	0	0	0	0	0	27	7	0	0	143	8	0	0	0	269
42	0	0	0	0	0	0	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49
46	0	0	0	0	0	17	19	0	6	10	0	0	0	6	0	0	0	0	0	0	0	76	0	0	136
47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	8	22
51	0	0	30	0	0	0	61	0	151	0	0	0	0	0	0	0	0	0	0	0	28	0	0	0	269
52	34	0	0	48	0	0	35	0	0	0	0	0	0	0	0	0	0	0	0	27	0	0	38	0	182
60	214	0	0	0	12	0	5	0	0	0	0	0	0	0	0	0	0	0	12	0	0	26	11	0	279
65	36	0	0	0	7	0	152	0	0	21	0	9	0	0	0	0	0	0	32	0	33	29	0	24	344
73	0	0	0	0	6	0	18	9	0	21	0	0	0	12	0	61	6	12	0	0	0	0	0	0	146
75	0	44	37	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	9	26	7	0	128
81	17	0	0	23	25	0	81	0	8	7	0	0	0	13	0	0	9	62	0	0	0	0	0	0	245
83	5	0	0	6	23	0	46	52	23	27	0	0	0	49	0	0	0	6	0	0	0	0	0	0	237
85	0	0	33	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	8	0	0	0	46
202	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	20	0	0	0	44
Total	400	105	236	113	149	87	1,074	137	188	160	0	18	0	389	274	377	91	246	157	485	202	663	291	134	5,977
RAIL SYSTEM TRANSFERS	336	151	270	226	180	116	121	48	222	217	12	60	36	463	267	430	188	144	410	207	251	846	593	554	6,348
GRAND TOTAL																									12,325

Exhibit 7-6
CBD ROUTES AFFECTED BY RAIL START-UP

Route Number	Route Name	Effect on Route
5	Tyler	BBB
6	Fair Oaks	BBBB
15	Ramona	BB
16	Southwood	BB
22	Beckley	BB
27	Village	BB
30	Marsalis	BB
38	Lisbon	BB
48	W-moreland/Kimb.	BB
54	Beverly Hills	BBB
55	Lancaster Limiited	BB
55X	Lancaster	BBB
56	Club Oaks	BBB
61	Glen Oaks	BBB
67	Boedeker	BBBB
68	Western Hills	BBB
68	New Route	AA
69	Lake Ridge	BBBB
74	Woods/Sugarberry	BB
77	North Central	BB
82	Richland	BBBB
203	So. Irving Express	AAA

Codes	Description
BB	- Eliminate CBD portion of route - Riders added to light rail - Transfers included in both centers
BBB	- Route eliminated altogether
BBBB	- Eliminate CBD portion of route but incorporate non-CBD portions in a new route - Riders added to new bus route - Transfers included in new route's center
AA	- New route covering portions of Routes 16 and 22 whose CBD portions have been eliminated
AAA	- Only peak period service is eliminated - Riders added to commuter rail

West Transfer Center: 10, 11, 12, 14, 18, 26, 39, 42, 46, 47, 49, 51, 52, 60, 64, 65, 75, 81, 83, 85, 202, 204.

Both Transfer Centers: the Red and Green Hop-A-Bus route (Route 17) serves both the East and West Transfer Facilities; the Blue Hop-A-Bus route serves the West Transfer Center only. Routes 33, 36, and 73 serve both facilities.

The figures previously shown in Exhibit 7-1 reflect this assignment.

BERTHING ASSIGNMENTS

The development of the CBD Transfer Facility operating plan continued with using DART's assumptions in designing 14 berths for the East Transfer Center and 13 berths for the West Transfer Center, along with considering the impacts of the rail starter system. The goals of the berthing assignment were the following:

- to maintain balance among the berths within each transfer center;
- to keep interlined routes at the same berth; and
- to minimize non-direct vehicle travel through the centers.

Each bus routing was examined to determine which berth would provide the easiest access into the facility with the least disruption to the existing route structure. Routes were grouped to facilitate the widest range of transfer options. From here, routes were placed at berths with a goal of balancing the numbers of buses using each of these berths. The a.m. peak hour bus trips with rail start-up numbers were used in this process. The results of this analysis are presented in Exhibit 7-7.

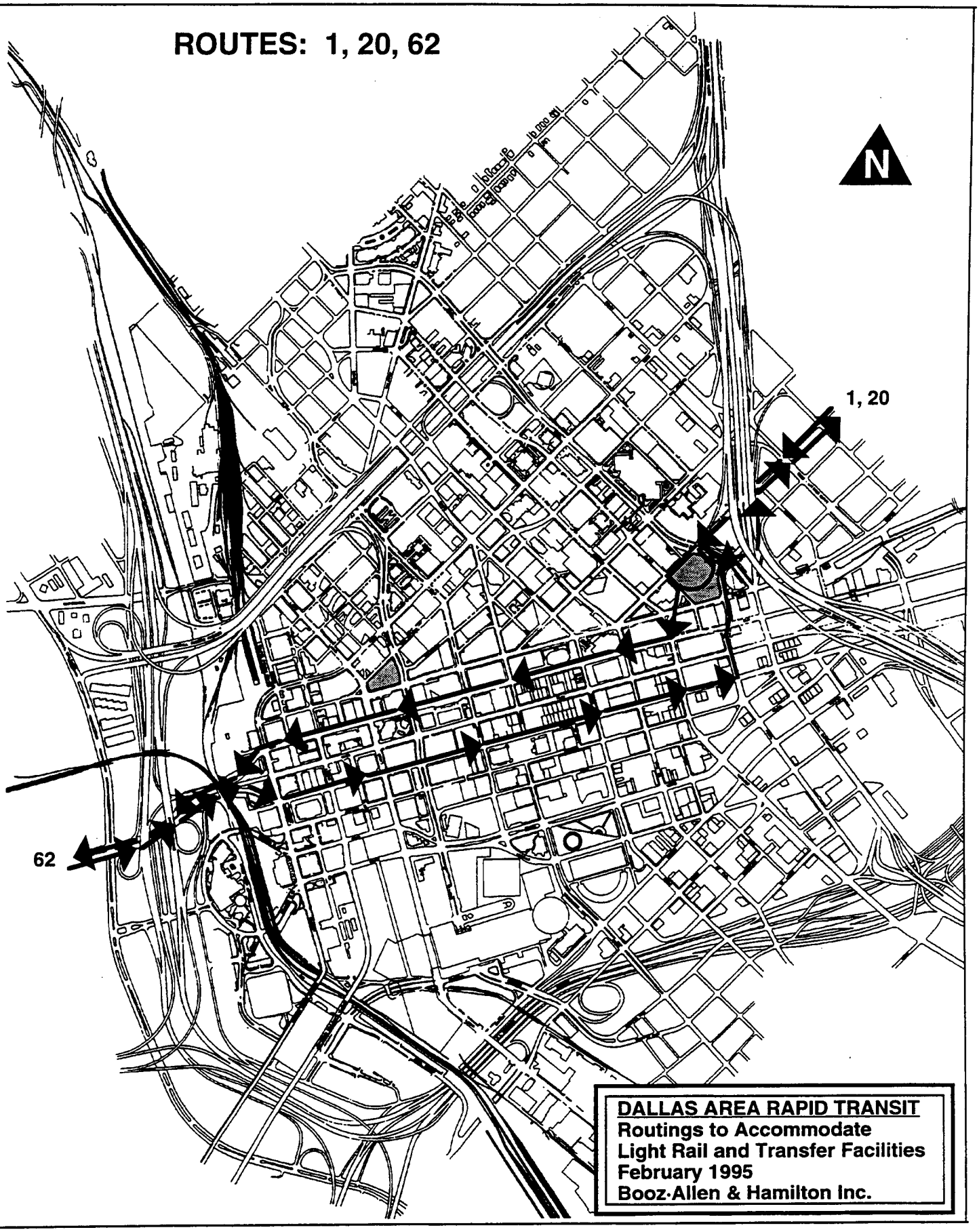
Exhibit 7-7
(Page 1 of 2)
BERTH ASSIGNMENTS
East CBD Transfer Center

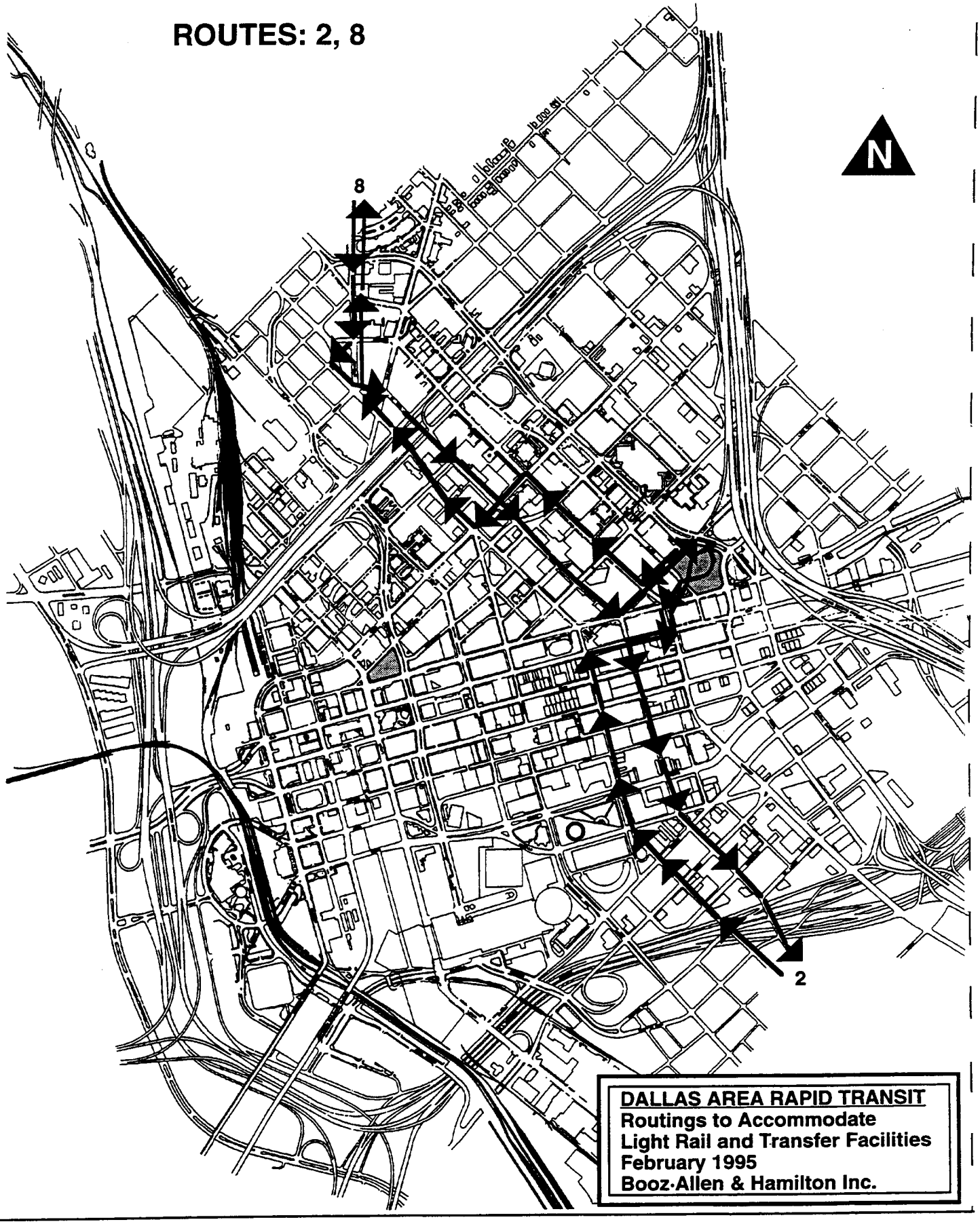
Berth No.*	Route Number	Route Name	Peak Hr. Buses
1	68	New route replacing 16 and 22	6
	280	Pleasant Grove Express	2
2	40	Brockbank	--
	43	Park Forest	--
	44	Oakland	14
3	31	Midway	4
	58	Canada/Bernal	2
	59	Ledbetter/Singleton	2
	35	West Commerce	2
	76	Cockrell/Mt. Creek	2
4	29	Maple	4
	37	Urbandale	4
	50	Piedmont	4
5	19	Abrams	2
	23	Lakewood	2
	25	Westshore	2
	201	Richardson Express	6
6	278	Red Bird Express	6
	200	East Plano Express	5
	203	South Irving Express	off-peak
7	205	Addison Express	4
	208	Valley Ranch Express	2
	210	West Plano Express	6
8	206	Glenn Heights Express	4
	207	Rowlett Express	2
9	17	Hop-A-Bus (Red and Green)	12
10	33	Baltimore	3
	36	Preston Hollow	3
	73	Spring Creek	4
11	4	Bishop	3
	21	SMU	3
	24	Capitol	3
	34	Vickery	3
12	1	Belmont	--
	20	Skillman	--
	62	Wynnewood	9
	84	Preston Hollow/Frankford	3
13	2	Ervay	6
	8	Oak Lawn	6
14	3	Junius	3
	7	Harwood	3
	63	Industrial	6

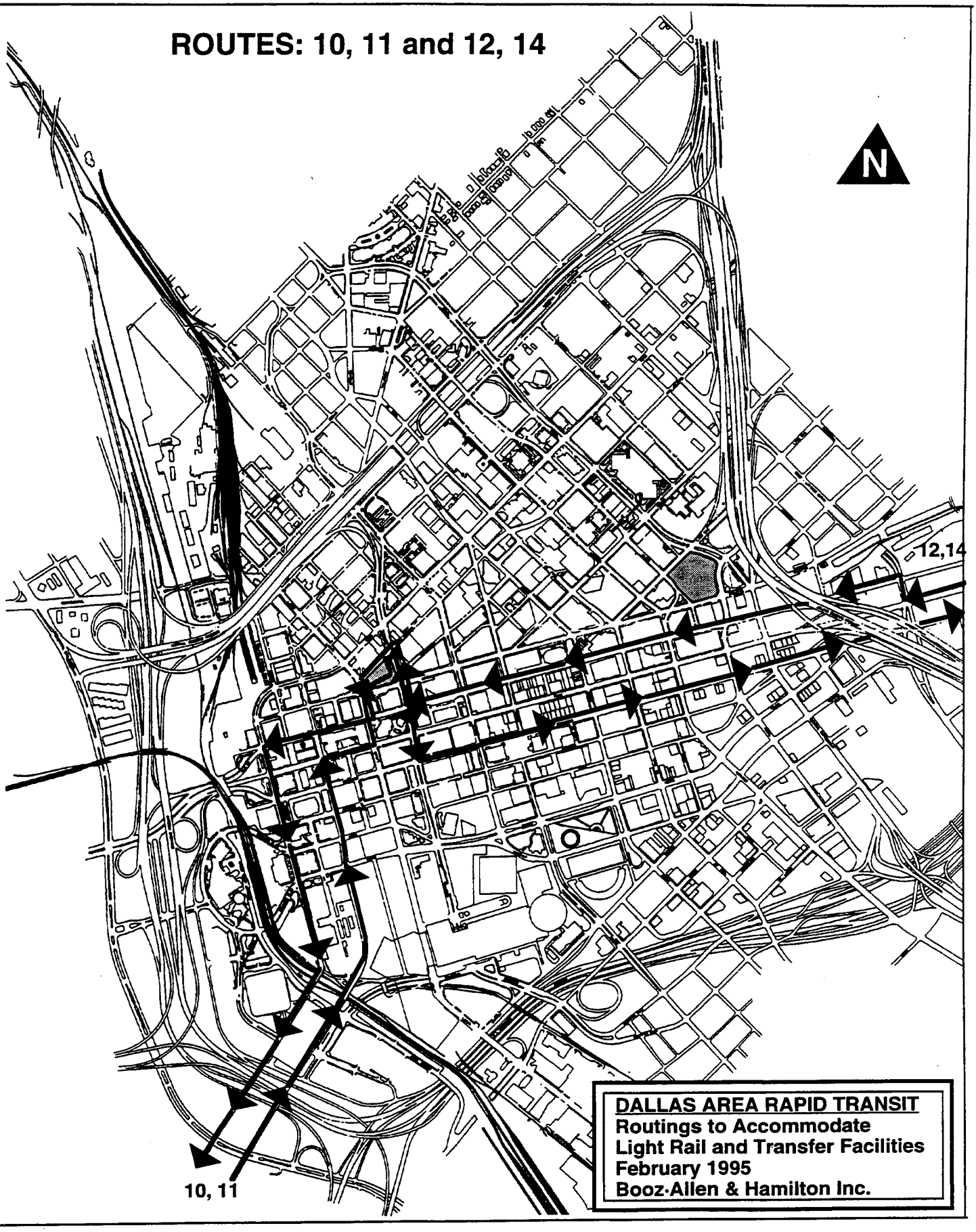
Exhibit 7-7
(Page 2 of 2)
BERTH ASSIGNMENTS
West CBD Transfer Center

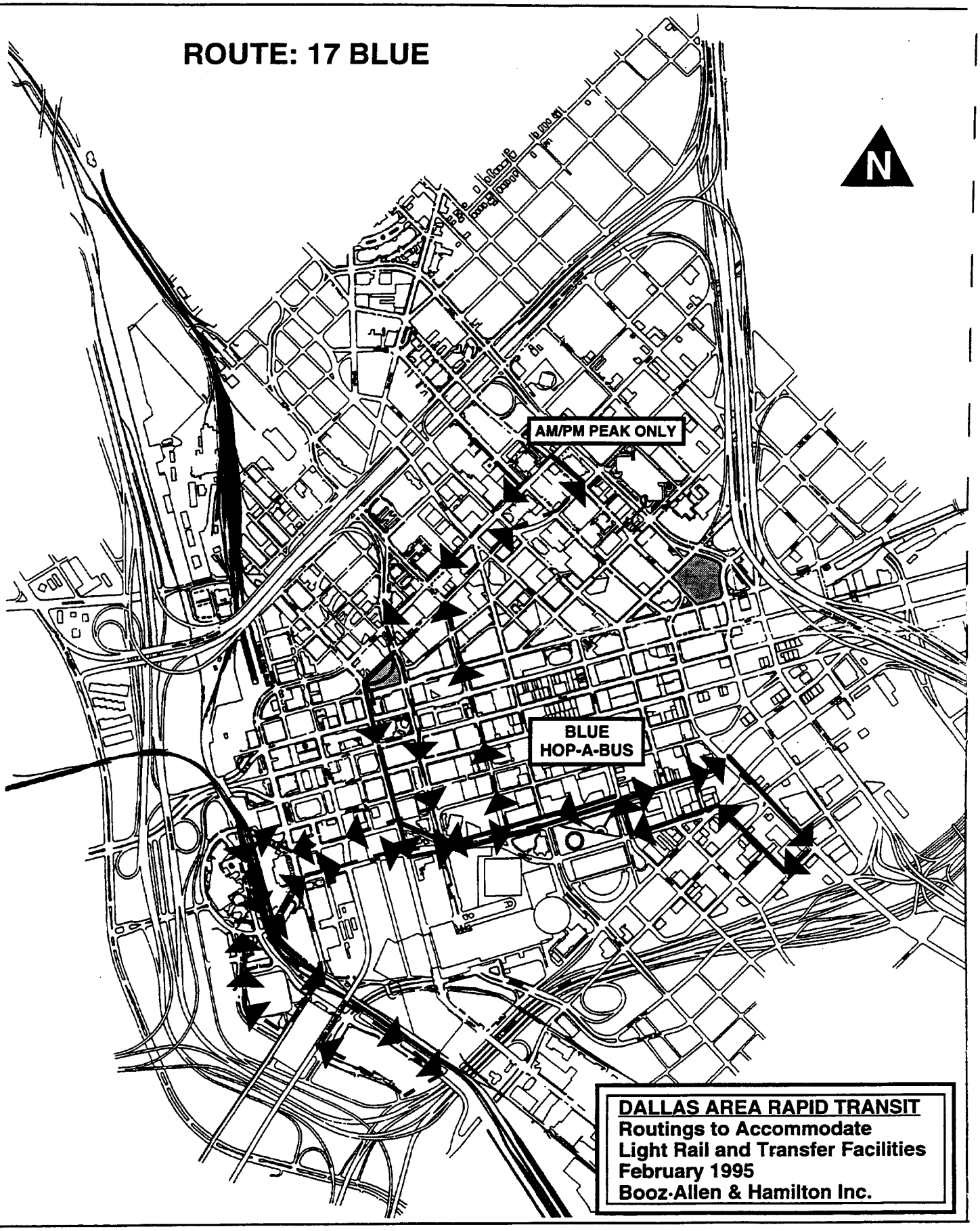
Berth No.*	Route Number	Route Name	Peak Hr. Buses
1	18	Parkview	4
	83	Prestonwood	5
	85	Shady Trail	2
2	204	Carrollton Express	11
3	17	Hop-A-Bus (Blue, Green, Red)	12
4	33	Baltimore	3
	51	Walnut Hill	2
	52	Bickers	2
	73	Spring Creek	4
5	42	Elmwood	5
	202	North Irving Express	6
6	10	Sunset	3
	11	Hampton	3
	12	Second	3
	14	Lagow	3
7	26	Hines	10
	49	Brookhollow	2
8	65	Pleasant Grove	12
9	46	Meadow	2
	47	Moore	2
	60	White Rock	8
10	36	Preston Hollow	3
	39	Love Field	6
	75	Murdock	3
11	64	Ferguson	12
12	81	Garland Express	12
13	64, 81	Share Space	6+6

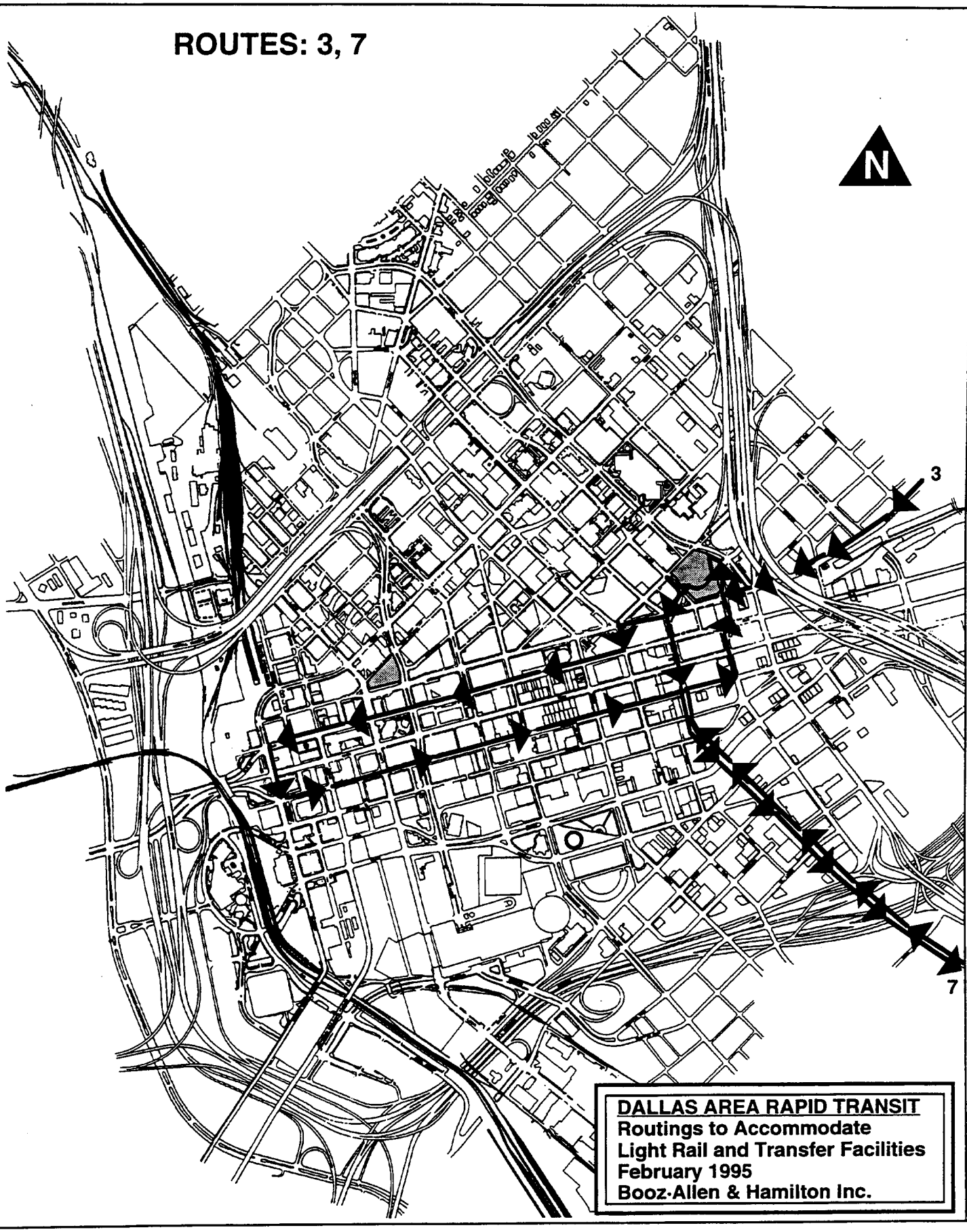
RECOMMENDED CBD BUS ROUTING

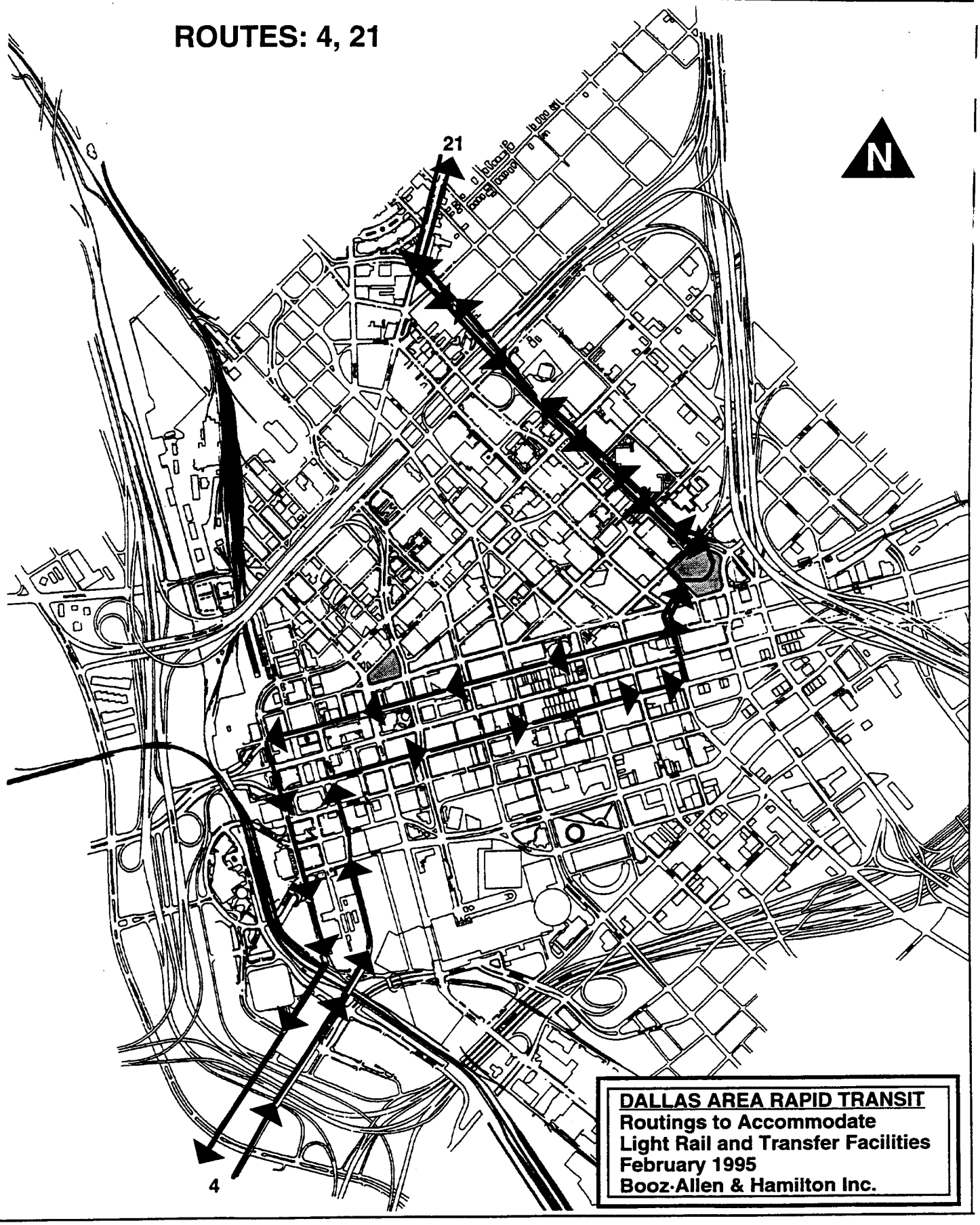

ROUTES: 1, 20, 62
N
1, 20
62
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.

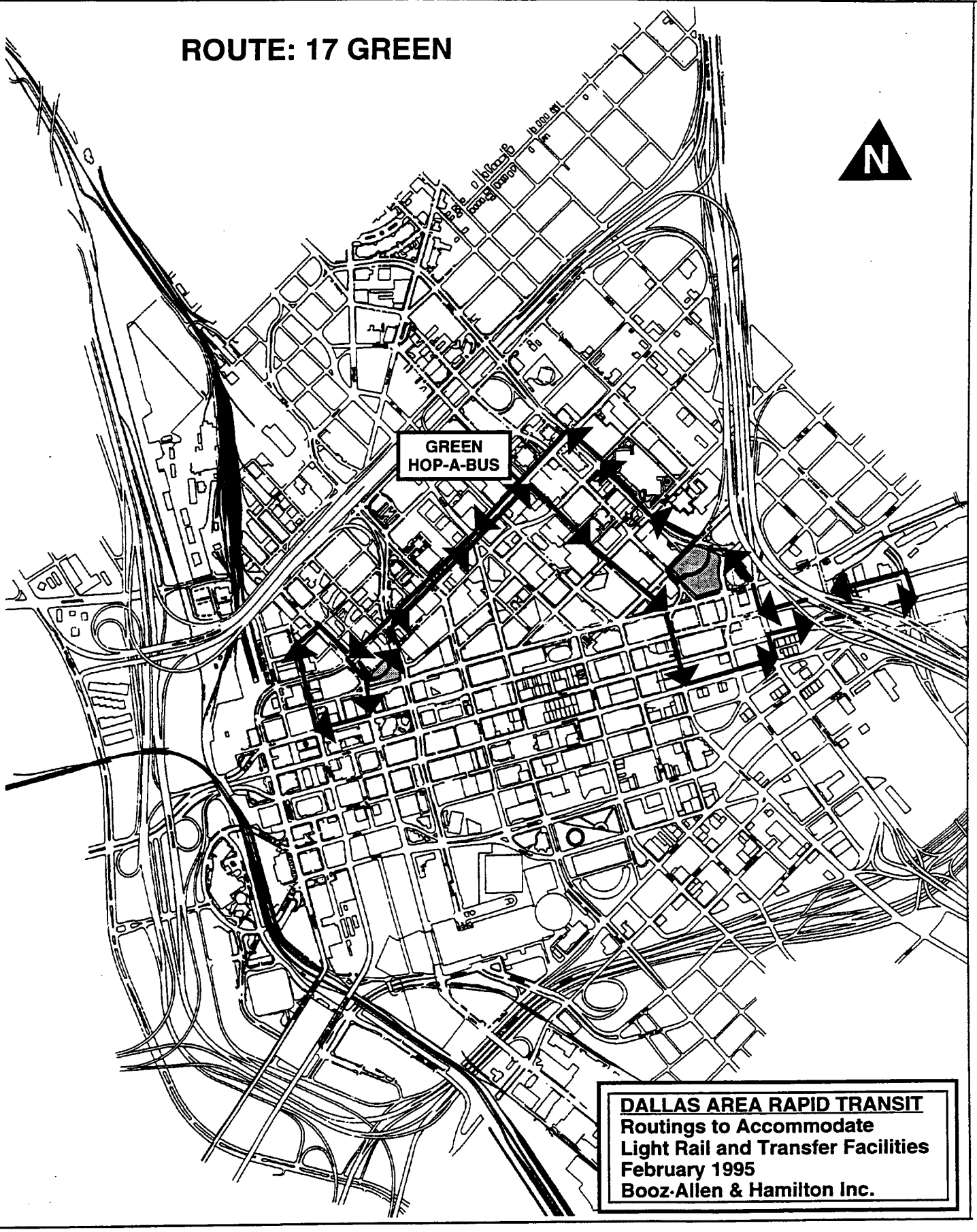

ROUTES: 2, 8
N
8
2
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.

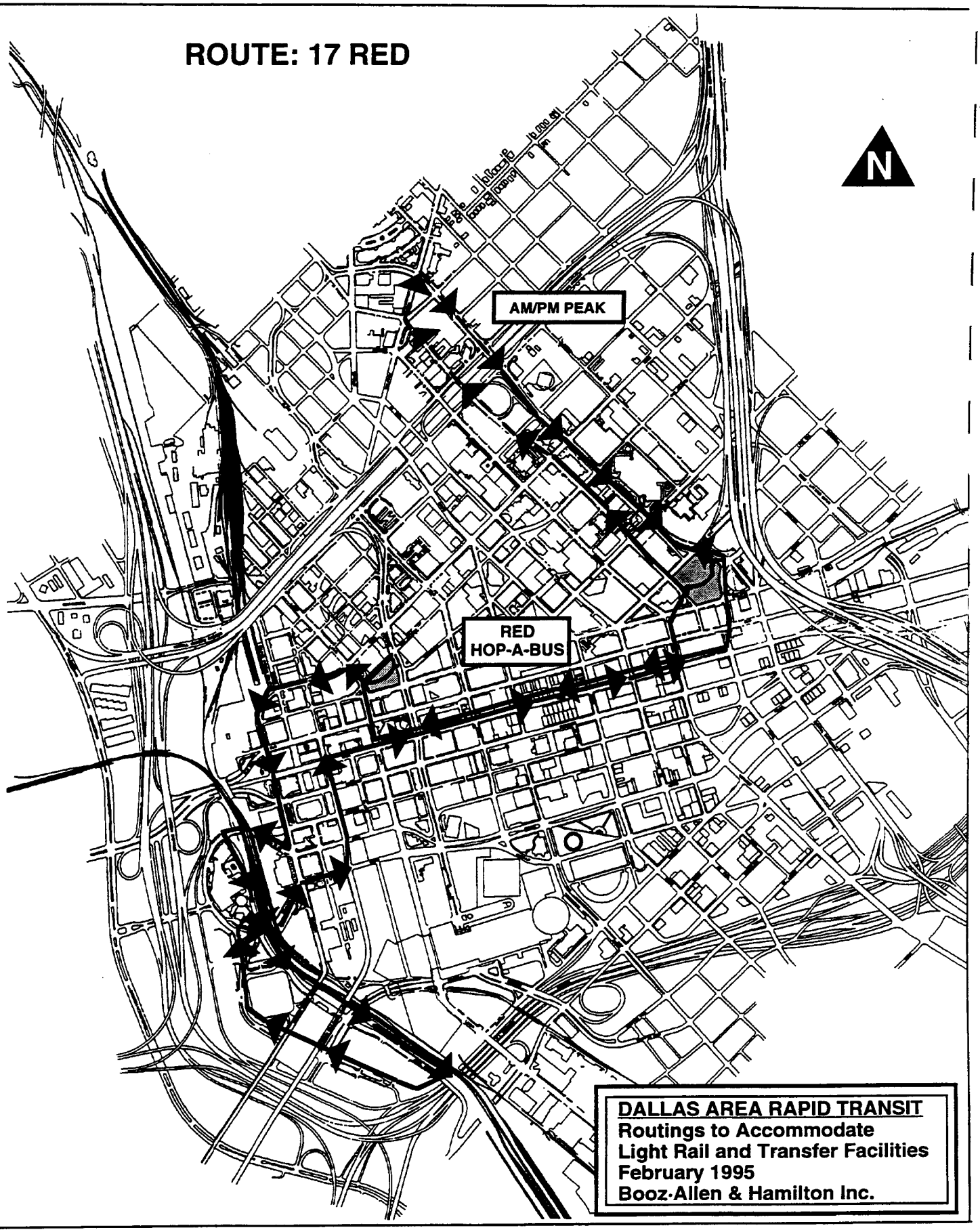

ROUTES: 10, 11 and 12, 14
N
12,14
10, 11
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.

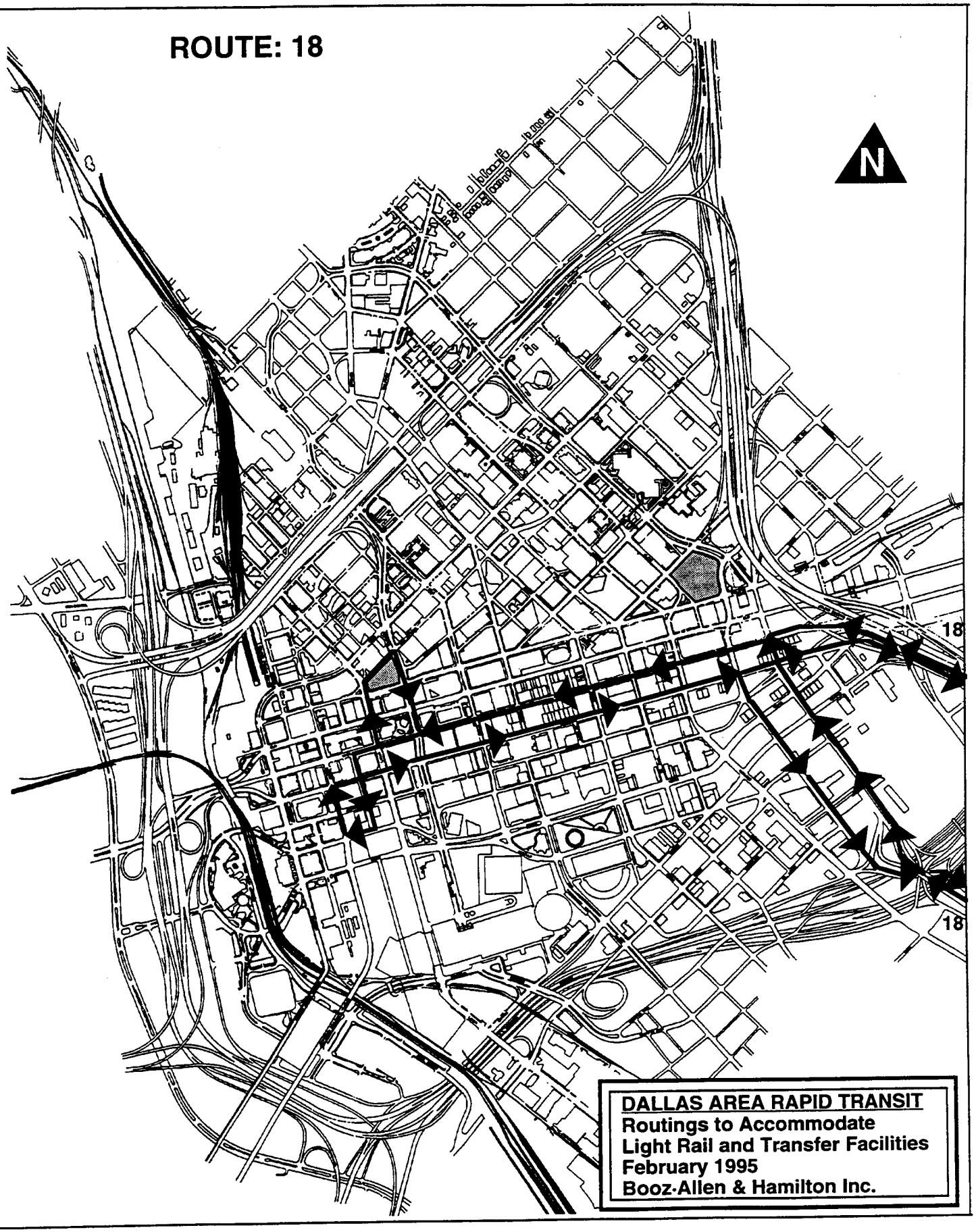

ROUTE: 17 BLUE
N
AM/PM PEAK ONLY
BLUE
HOP-A-BUS
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.

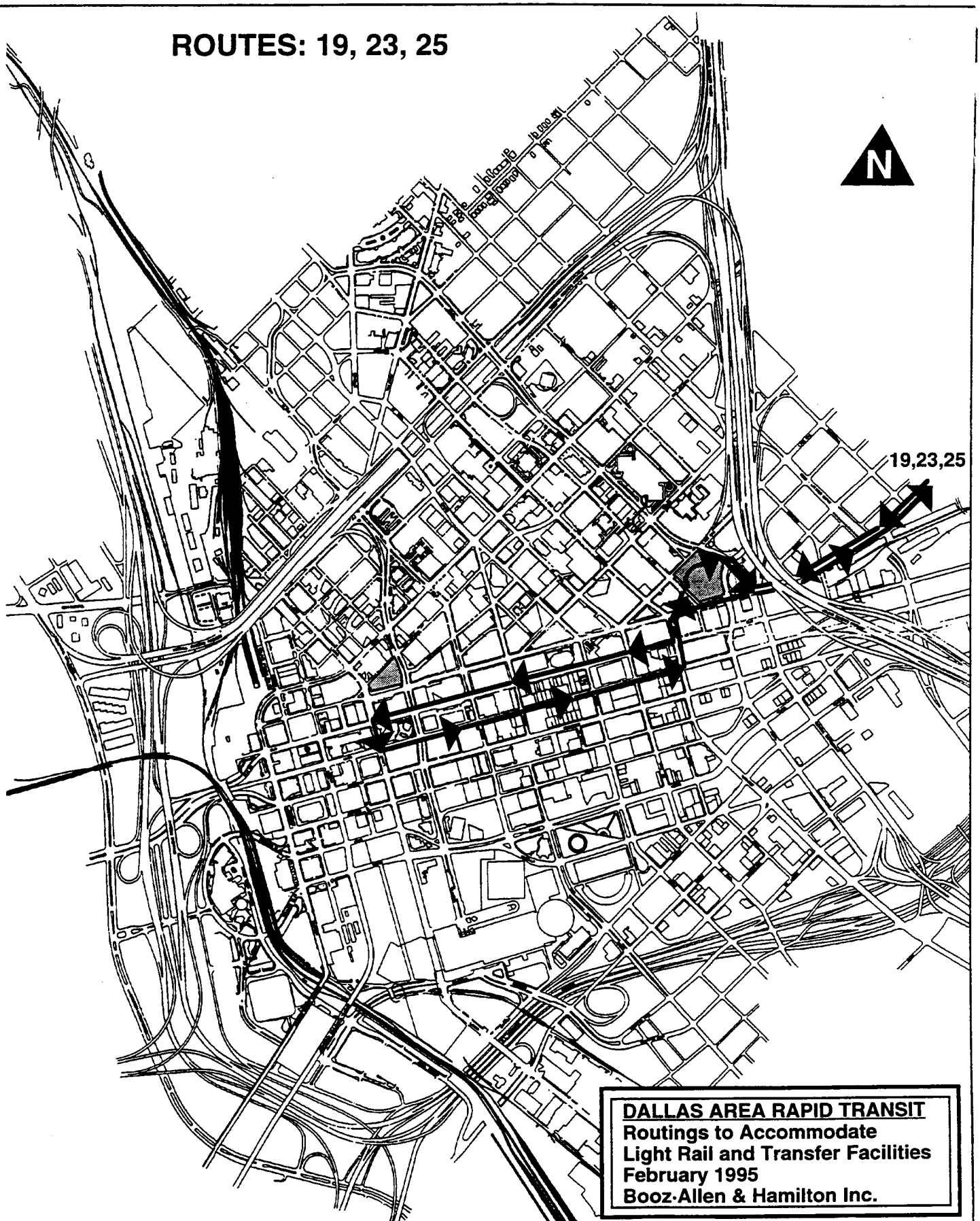

ROUTES: 3, 7
N
3
7
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.

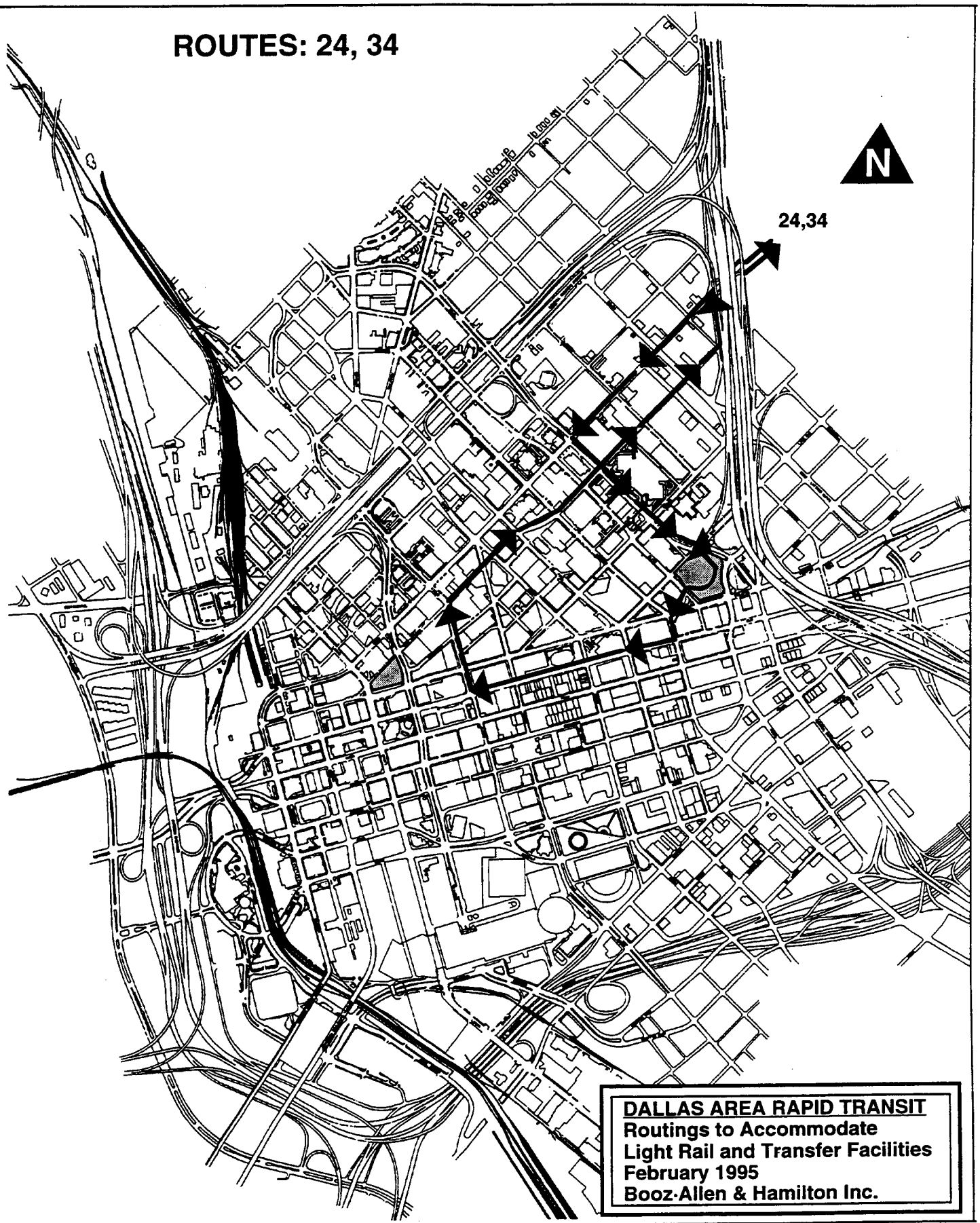

ROUTES: 4, 21
21
4
N
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.

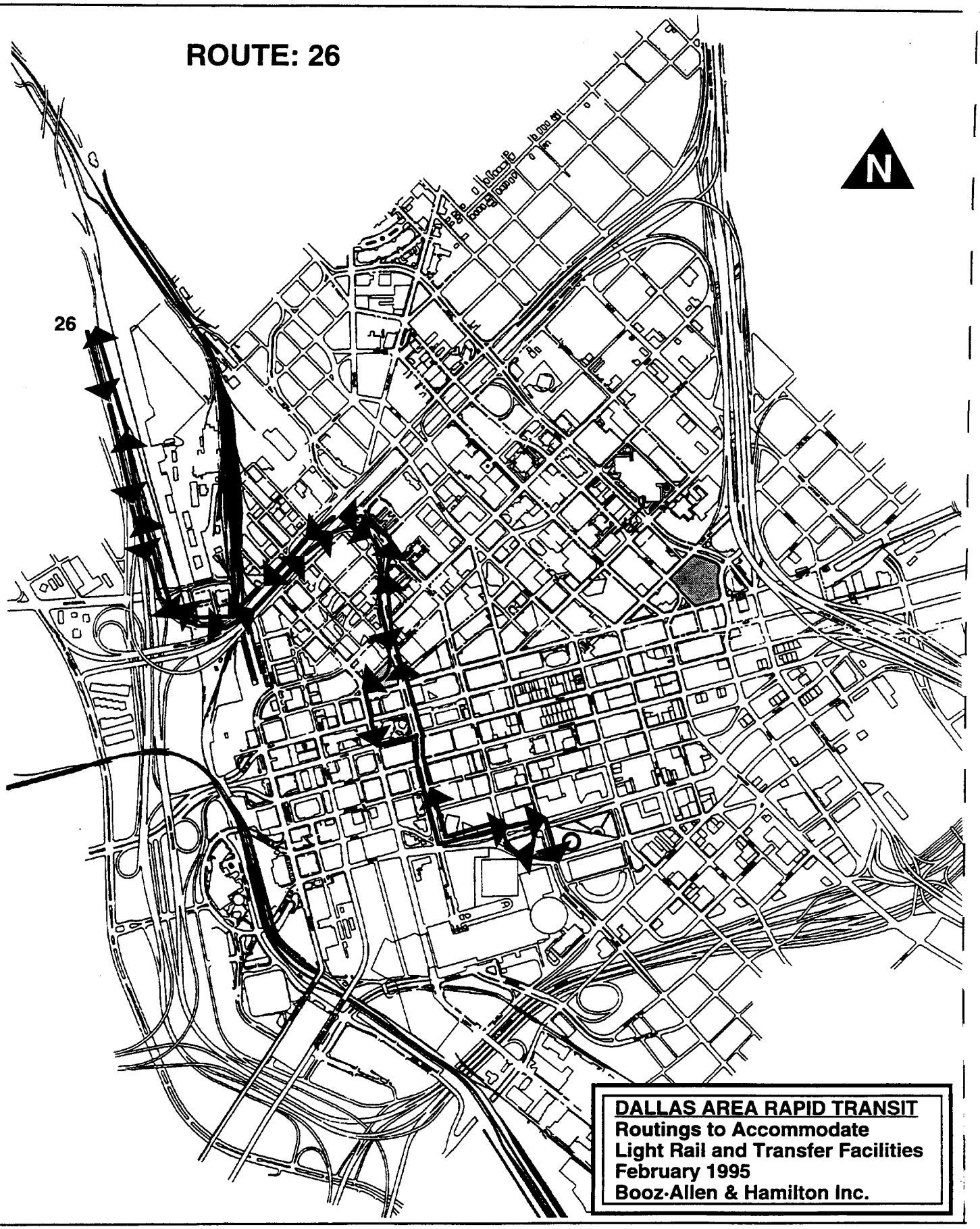

ROUTE: 17 GREEN
N
GREEN
HOP-A-BUS
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.

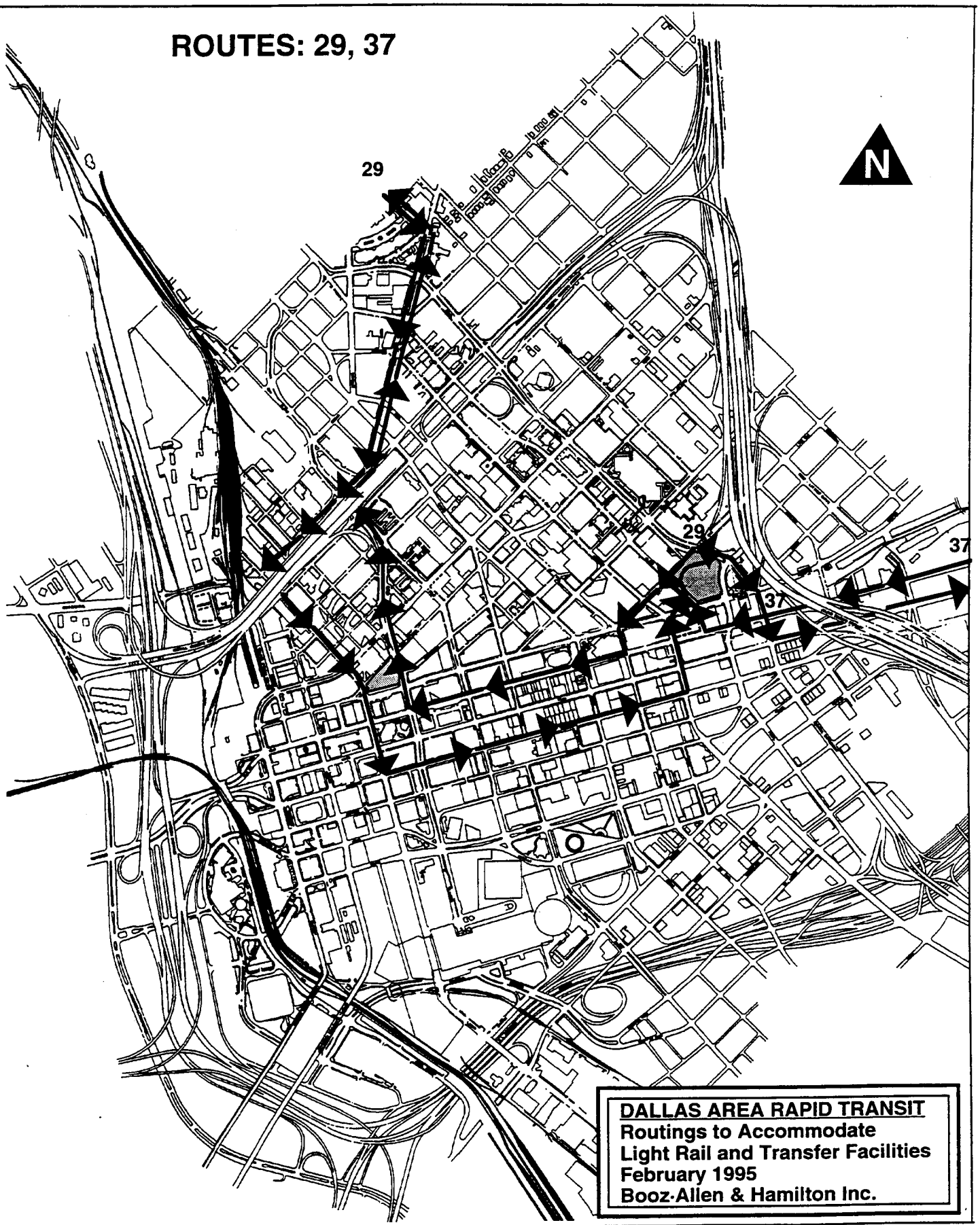

ROUTE: 17 RED
N
AM/PM PEAK
RED
HOP-A-BUS
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.

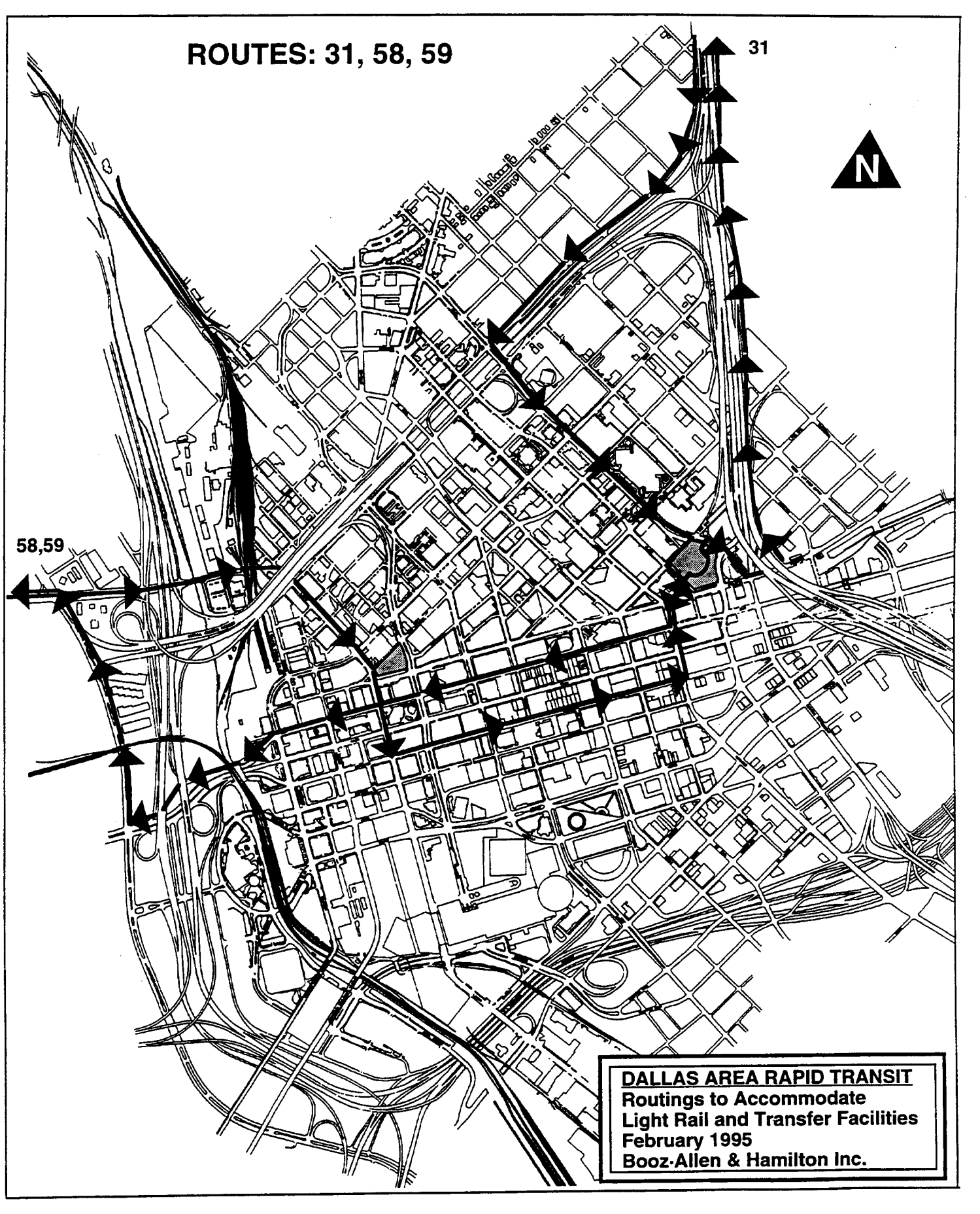

ROUTE: 18
N
18
18
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz-Allen & Hamilton Inc.

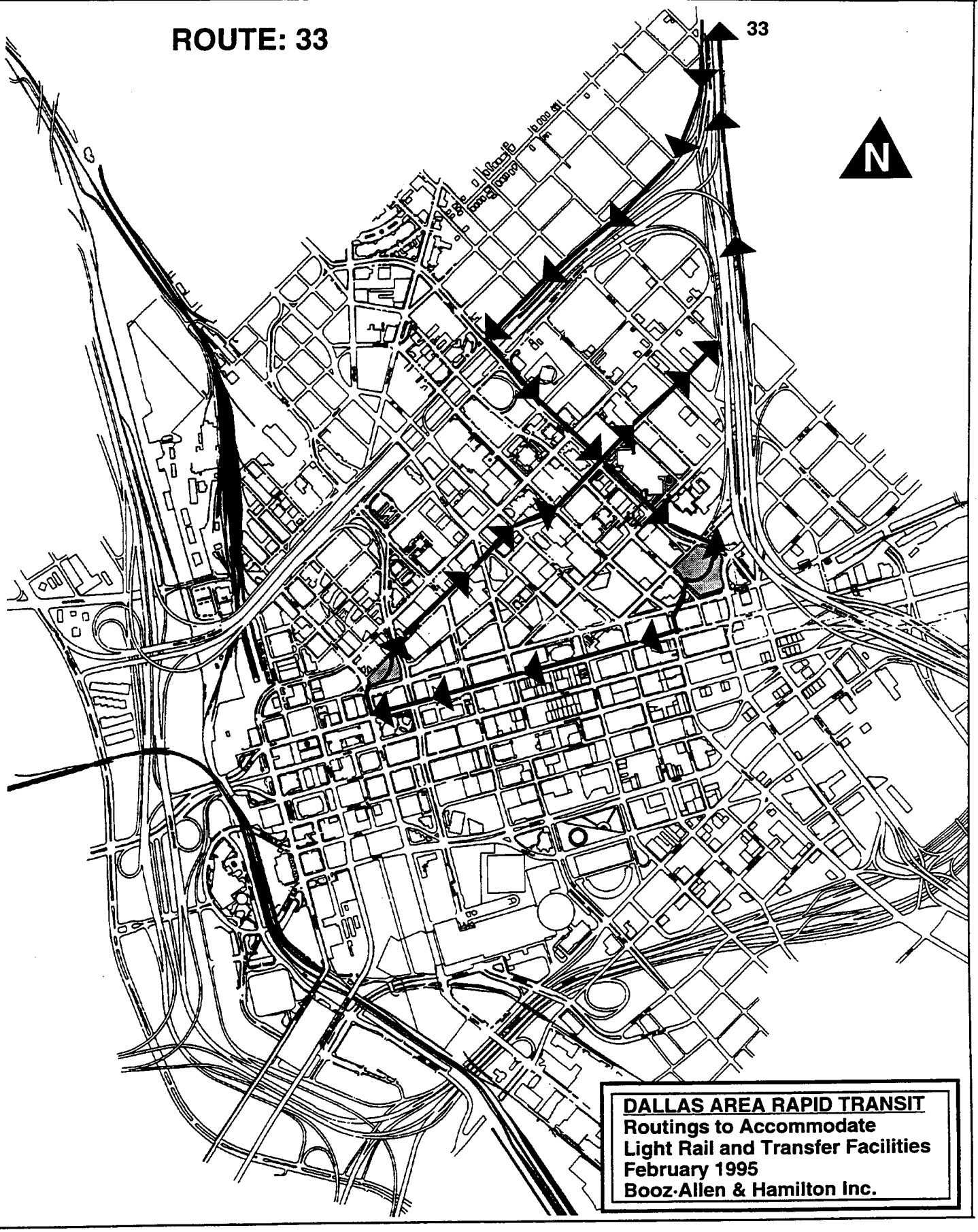

ROUTES: 19, 23, 25
N
19,23,25
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.

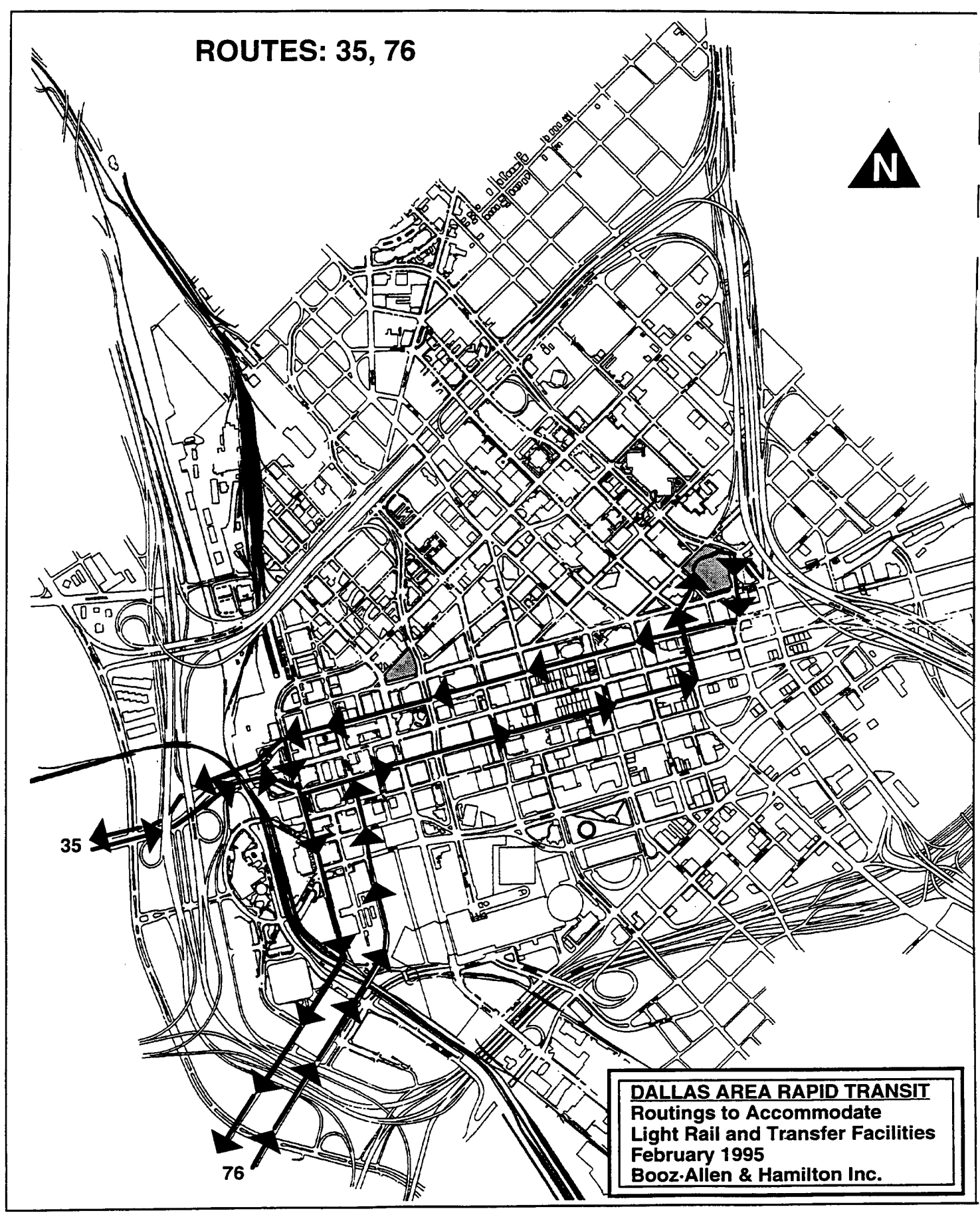

ROUTES: 24, 34
N
24,34
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.

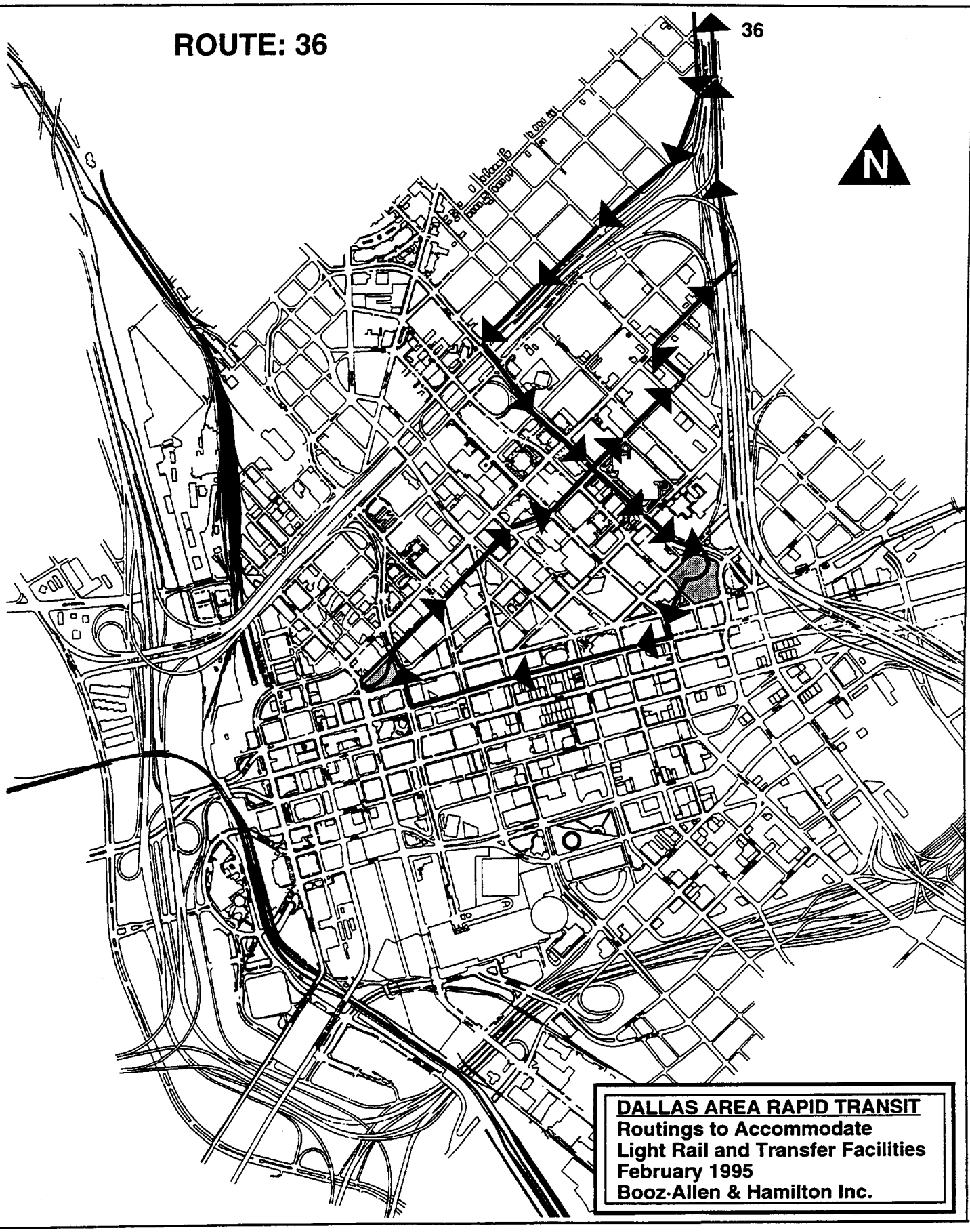

ROUTE: 26
N
26
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.


ROUTES: 29, 37
29
N
29
37
37
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.

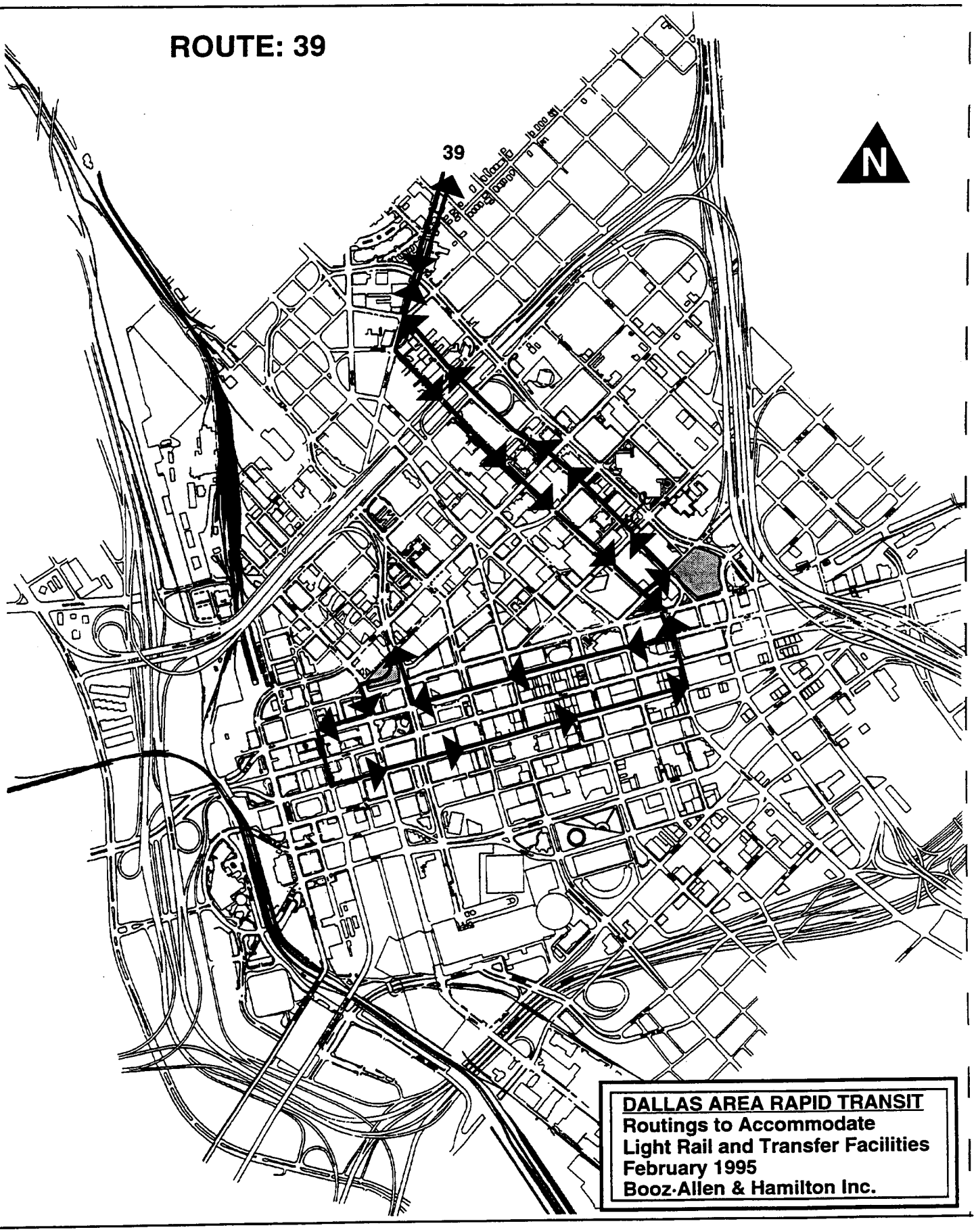

ROUTES: 31, 58, 59
31
N
58,59
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.


ROUTE: 33
33
N
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.

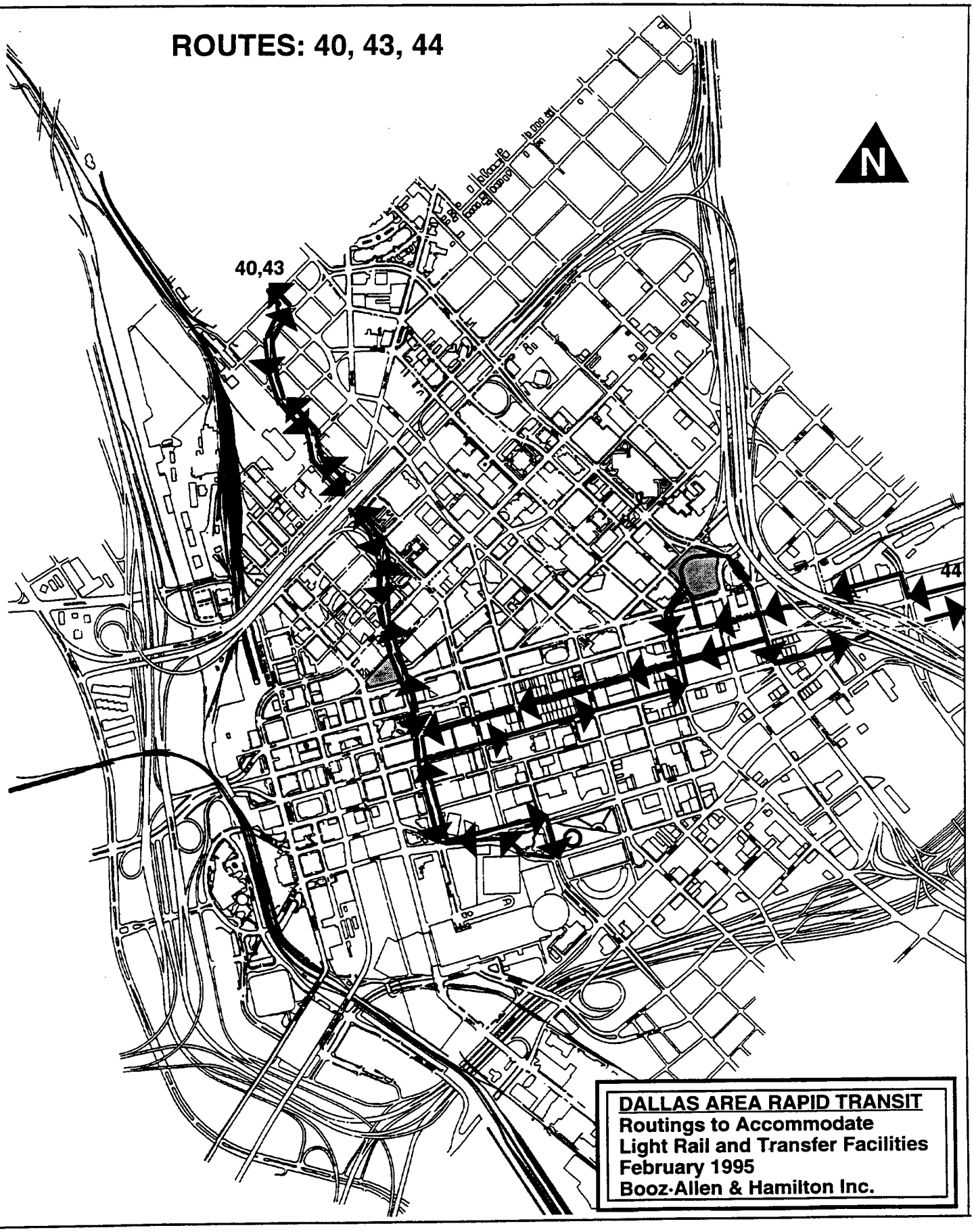

ROUTES: 35, 76
N
35
76
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.

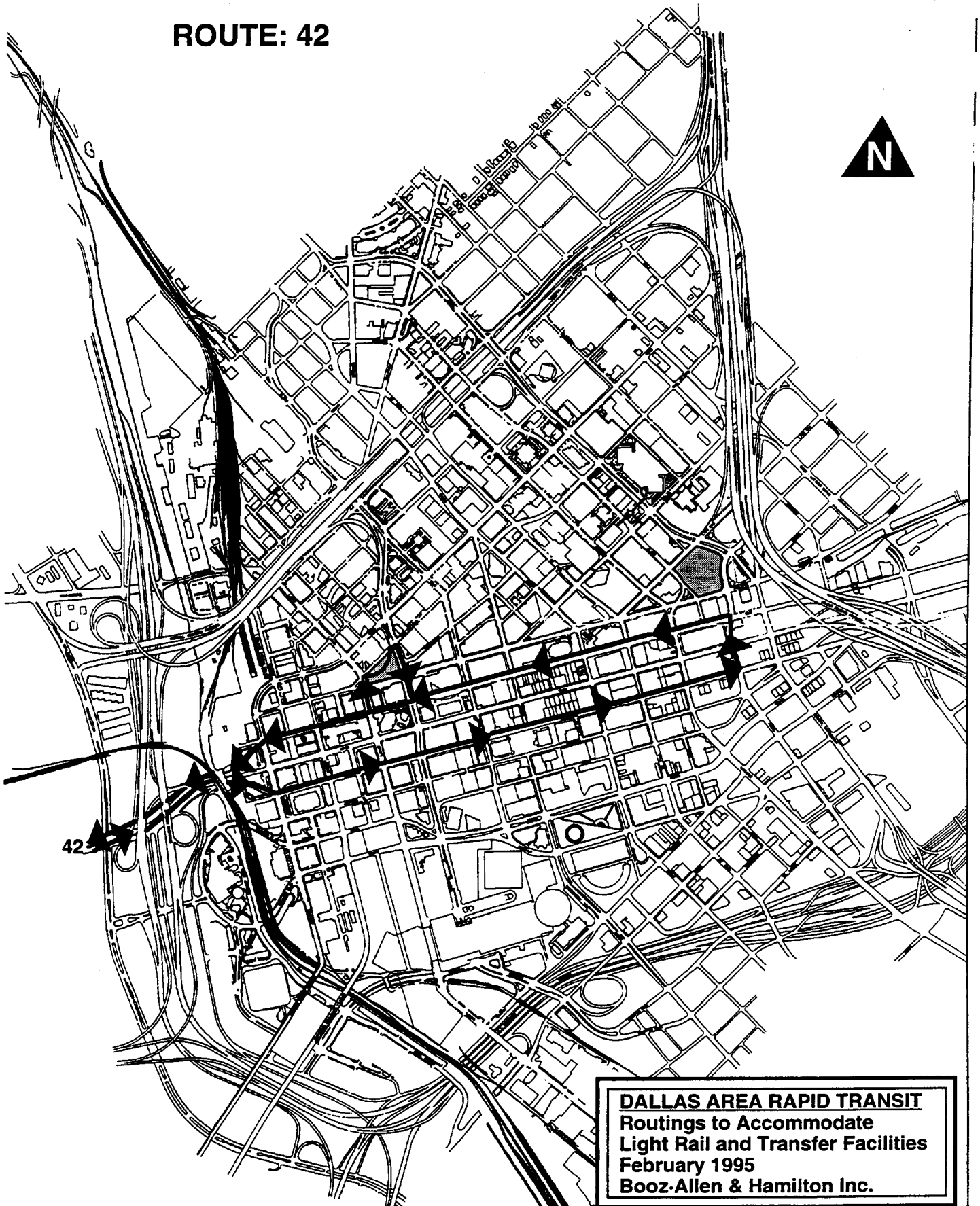

ROUTE: 36
36
N
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.

ROUTE: 39



DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.


ROUTES: 40, 43, 44
N
40,43
44
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.


ROUTE: 42
N
42
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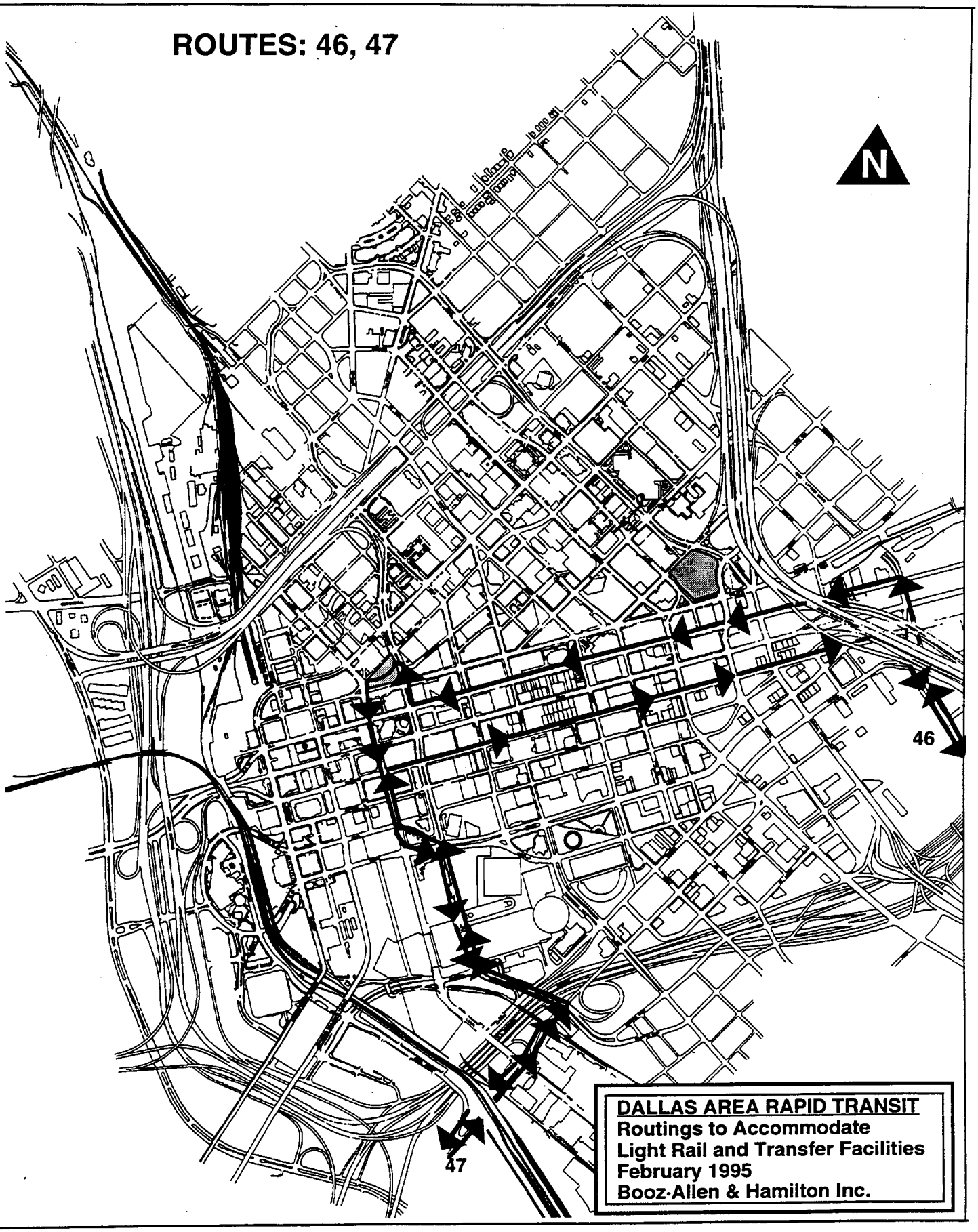
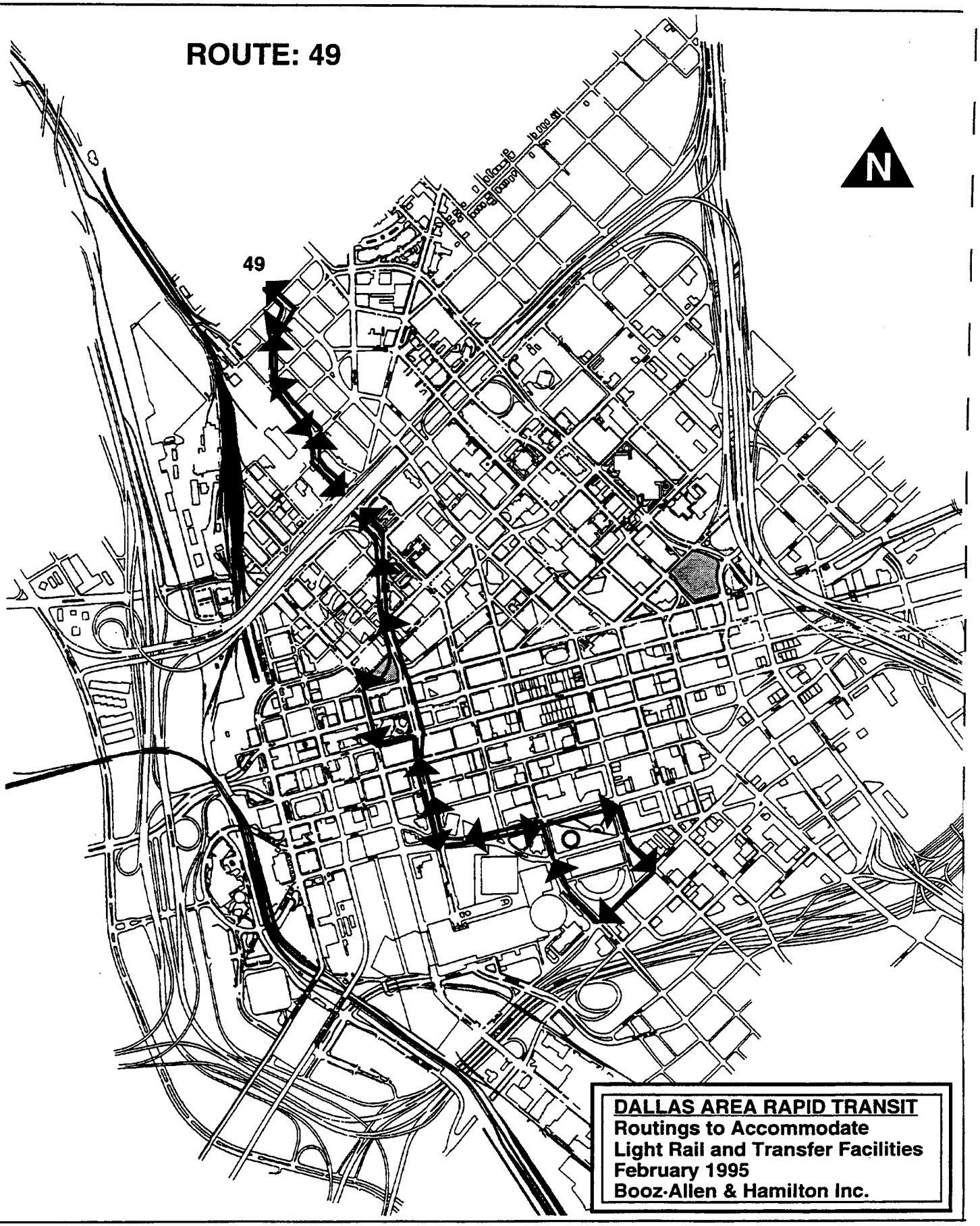
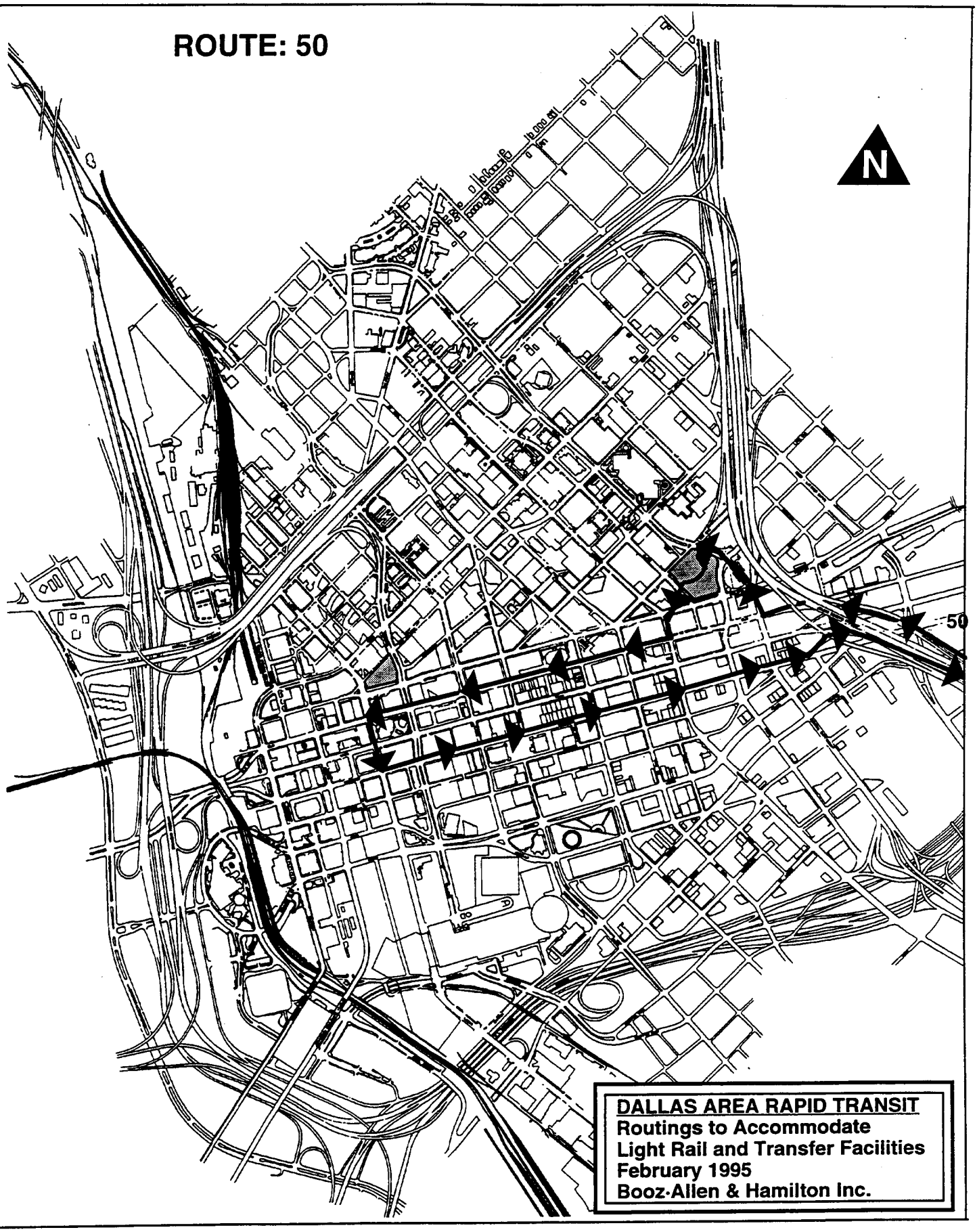
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.

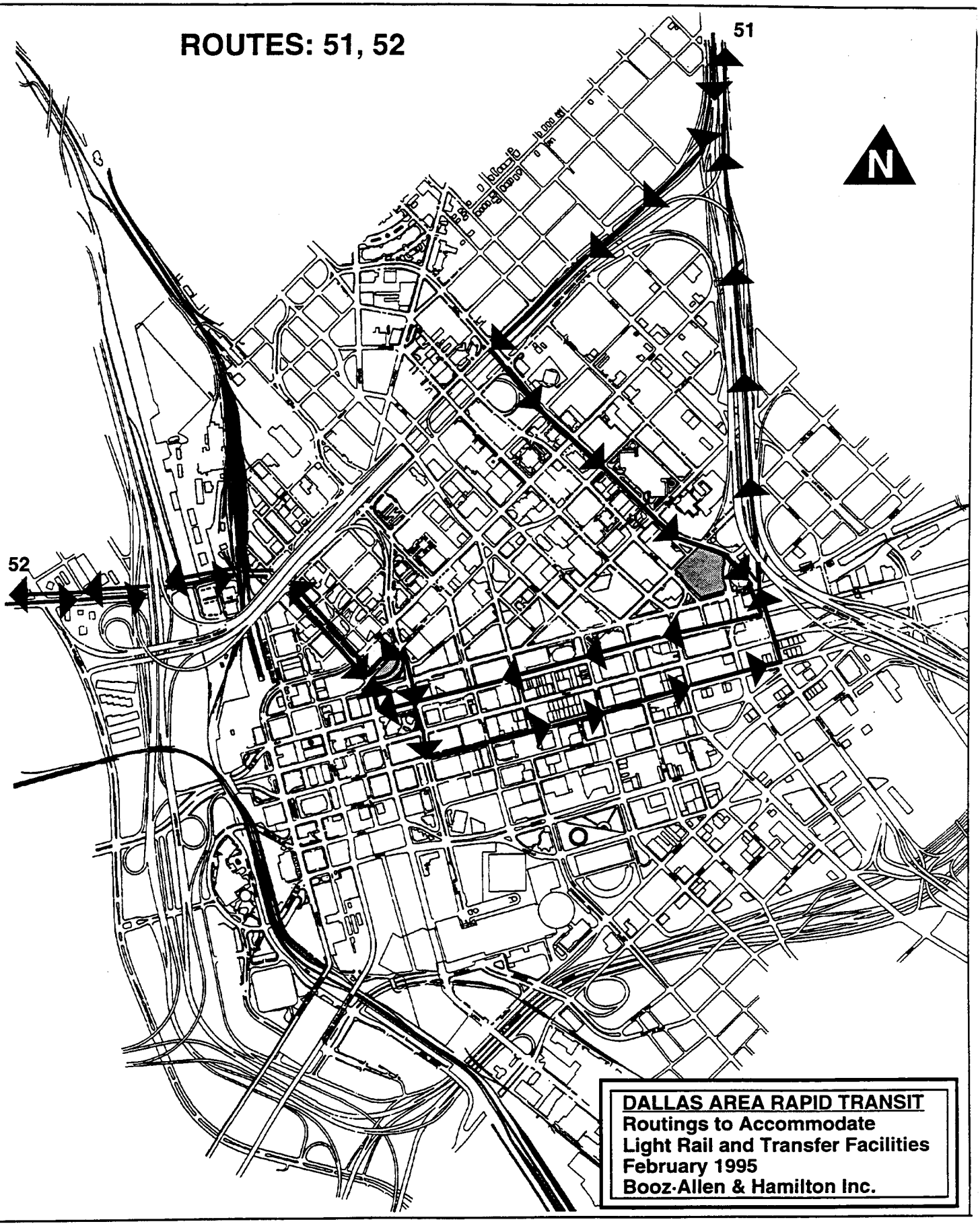

ROUTES: 46, 47
N
46
47
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.

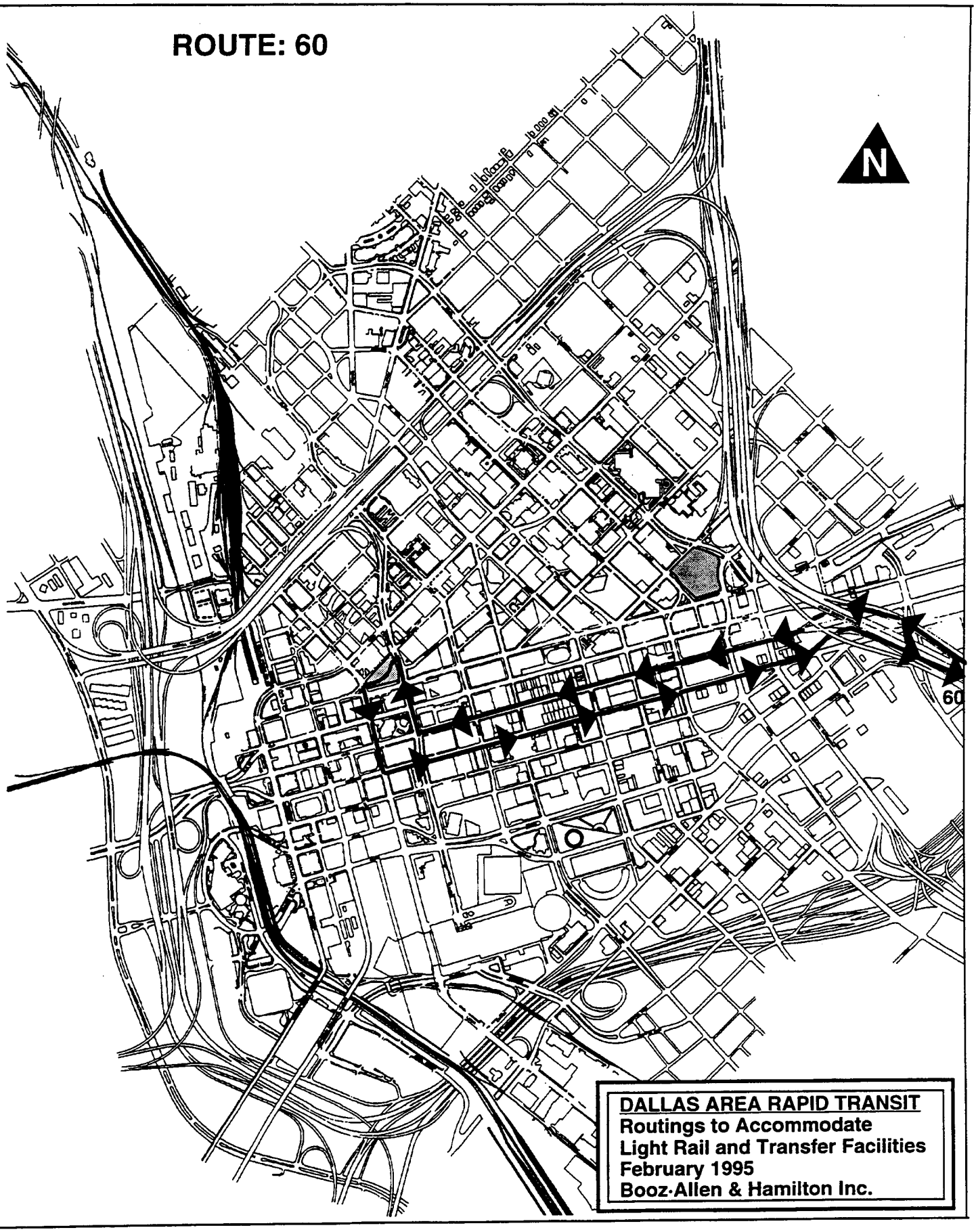
ROUTE: 49



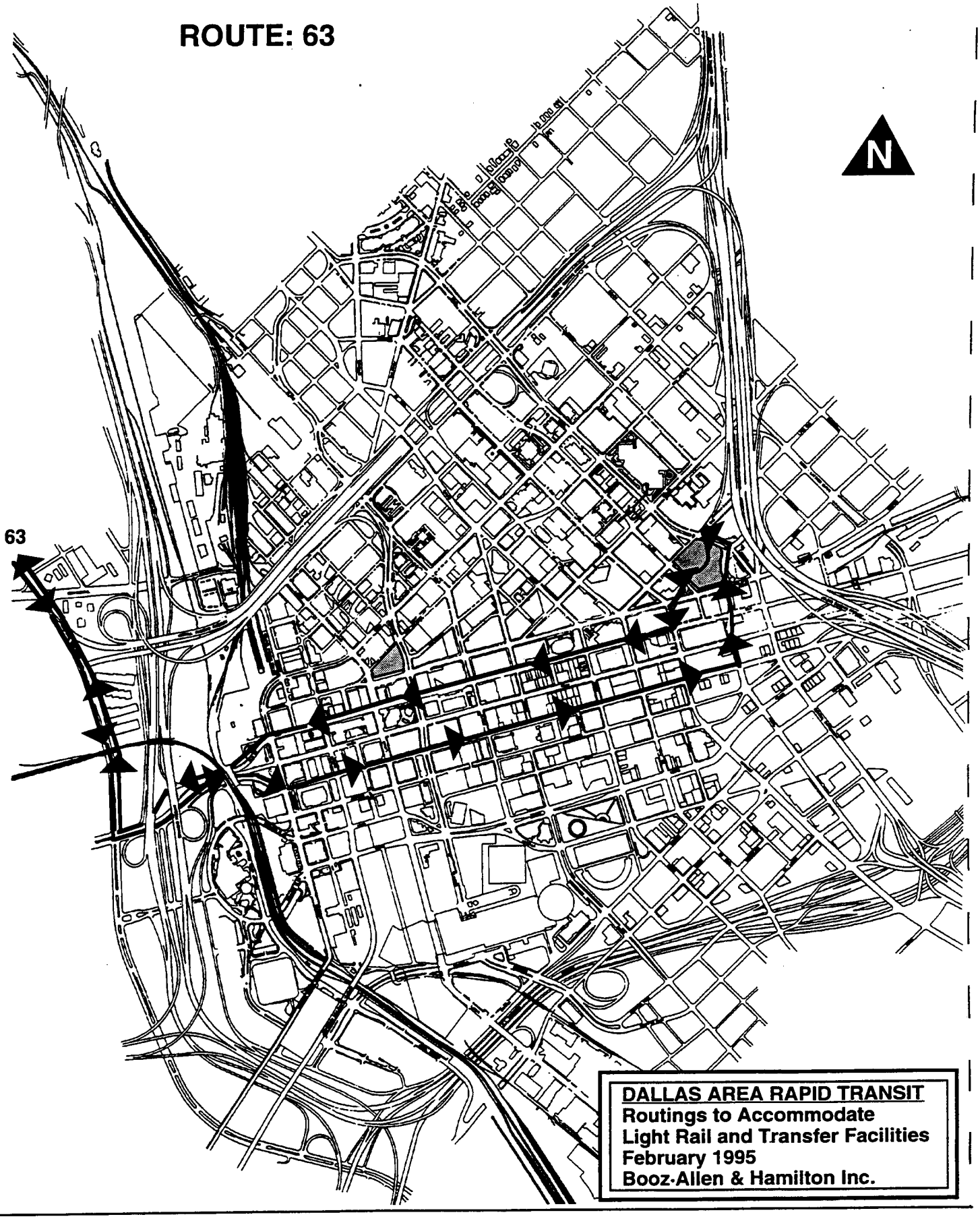
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.


ROUTE: 50
N
50
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.

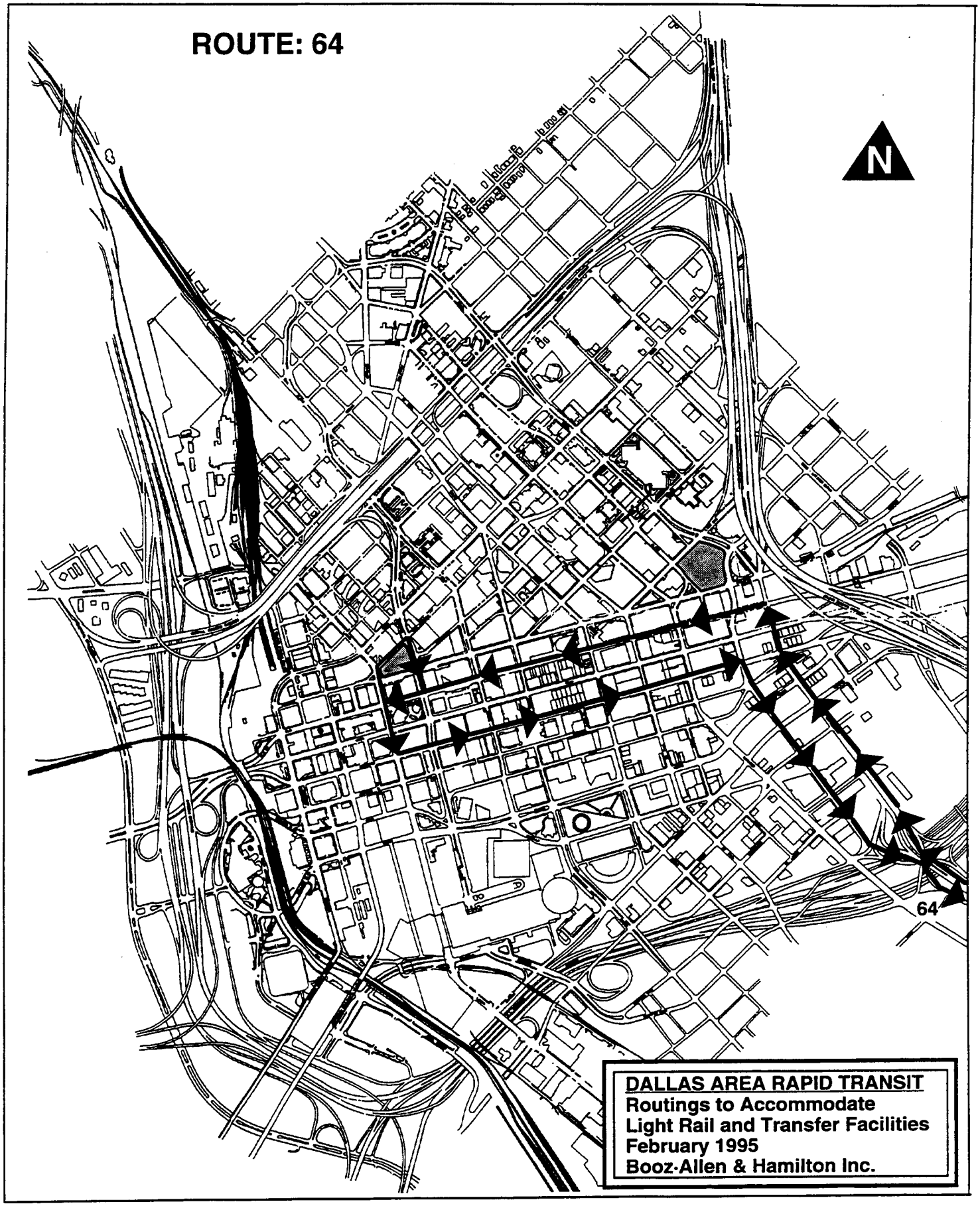

ROUTES: 51, 52
51
52
N
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.


ROUTE: 60
N
60
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.

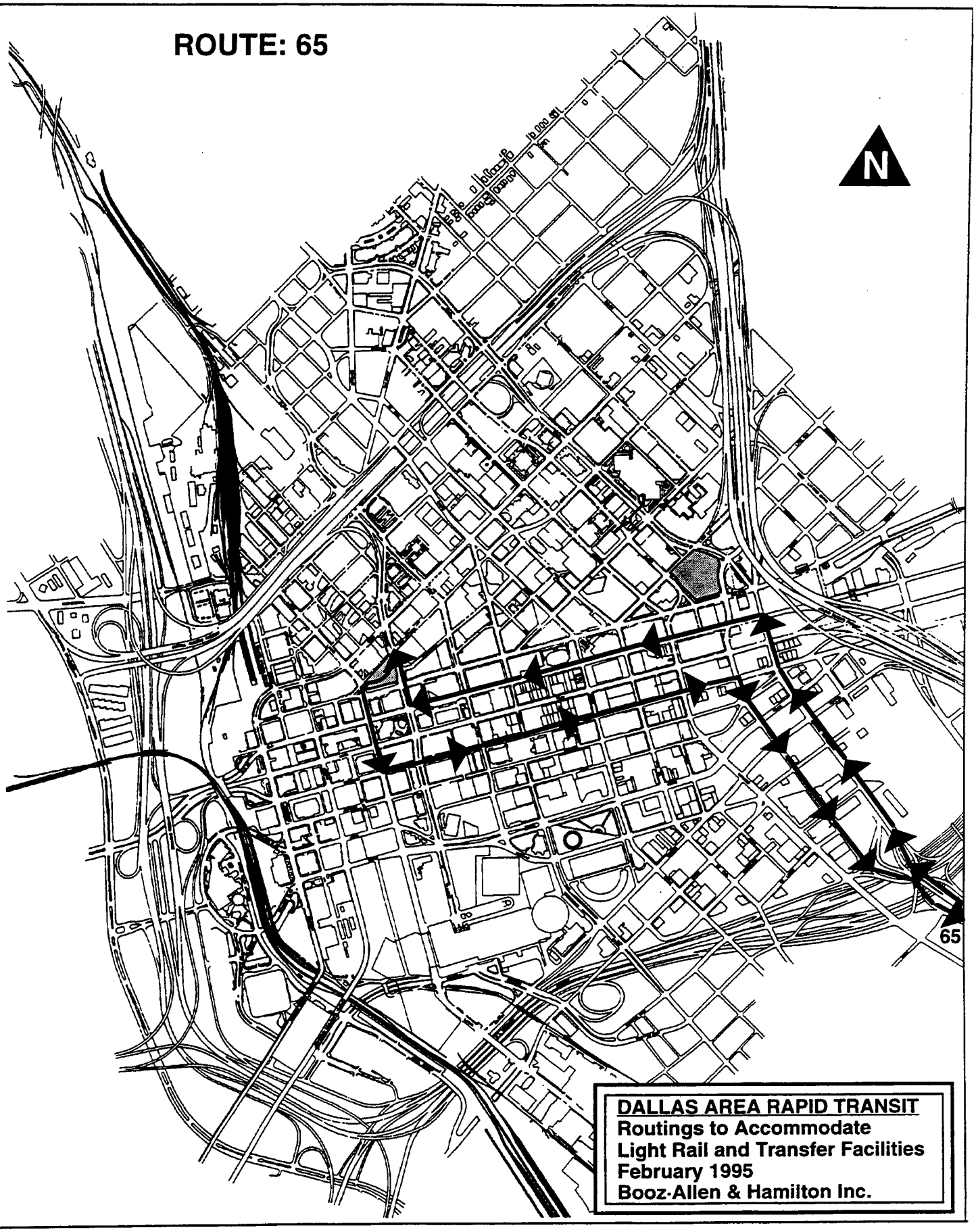
ROUTE: 63



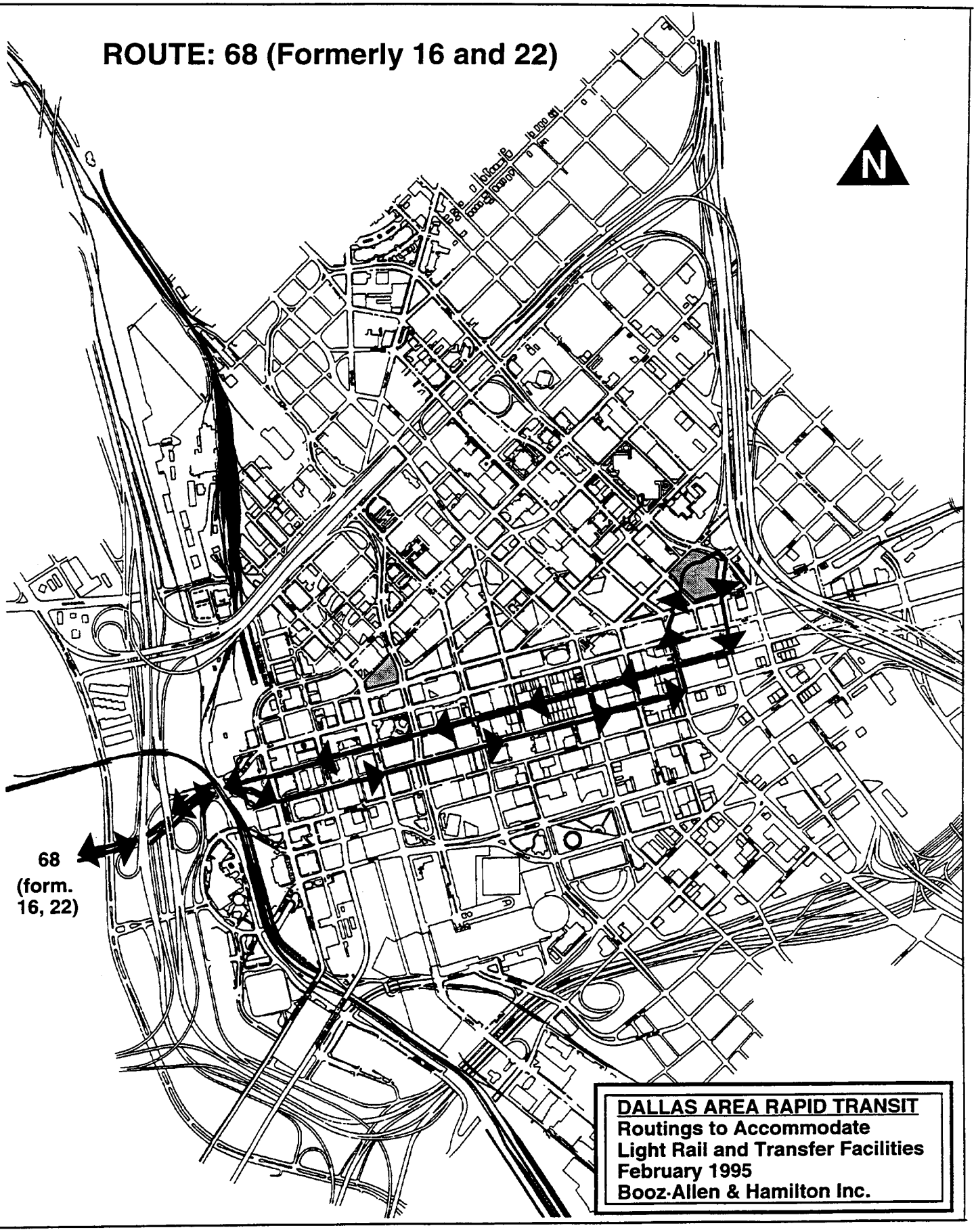
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.


ROUTE: 64
N
64
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.

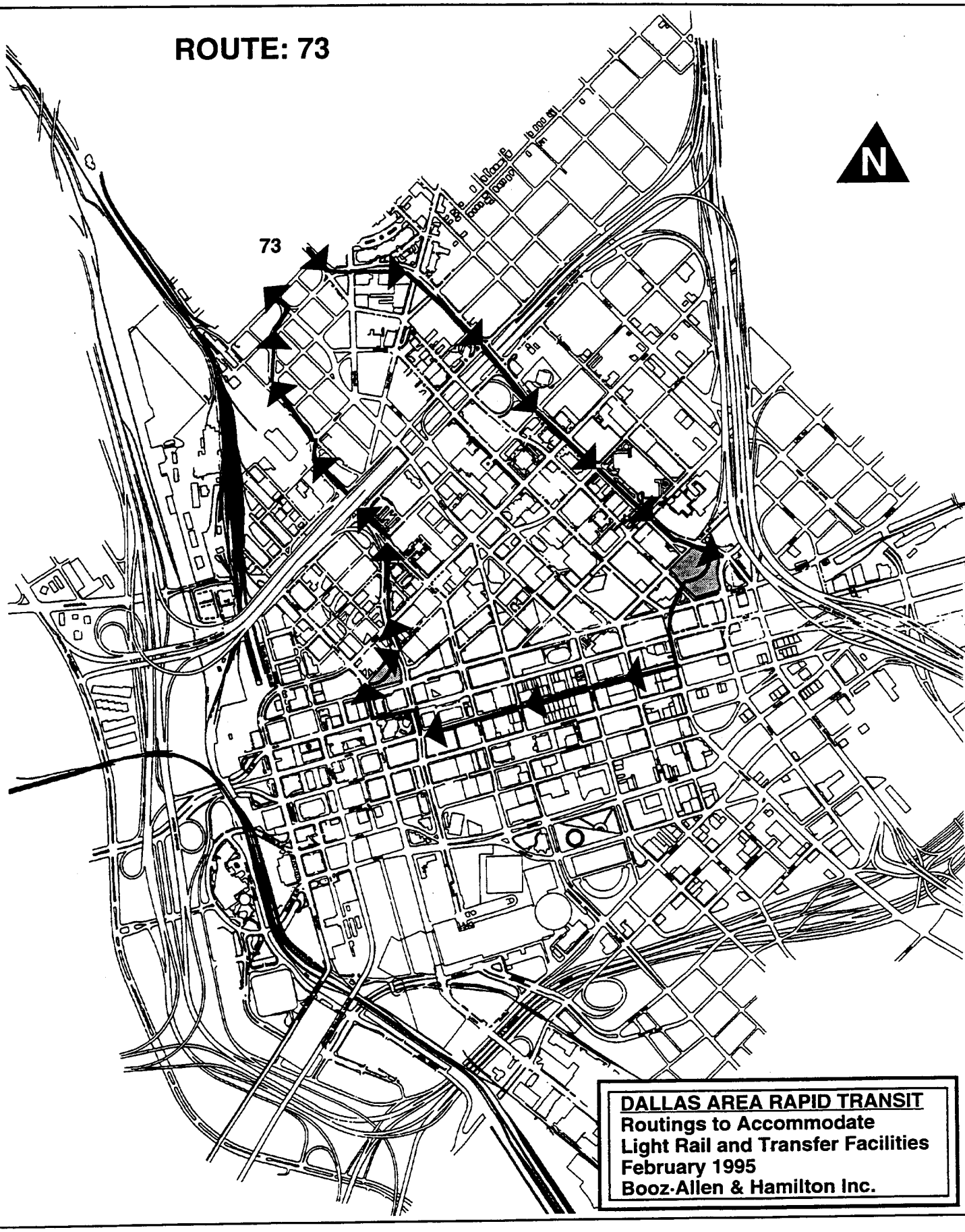
ROUTE: 65



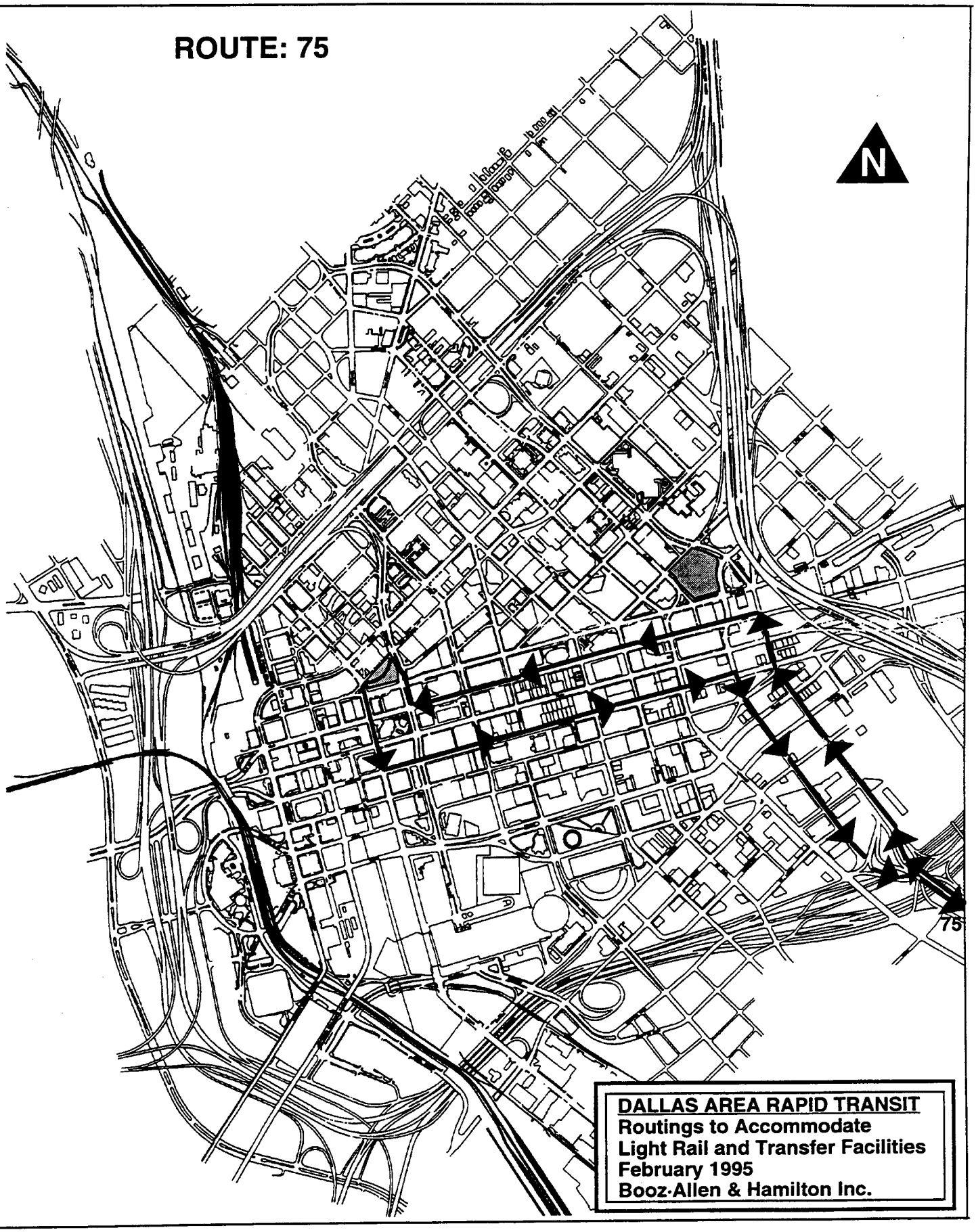
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.

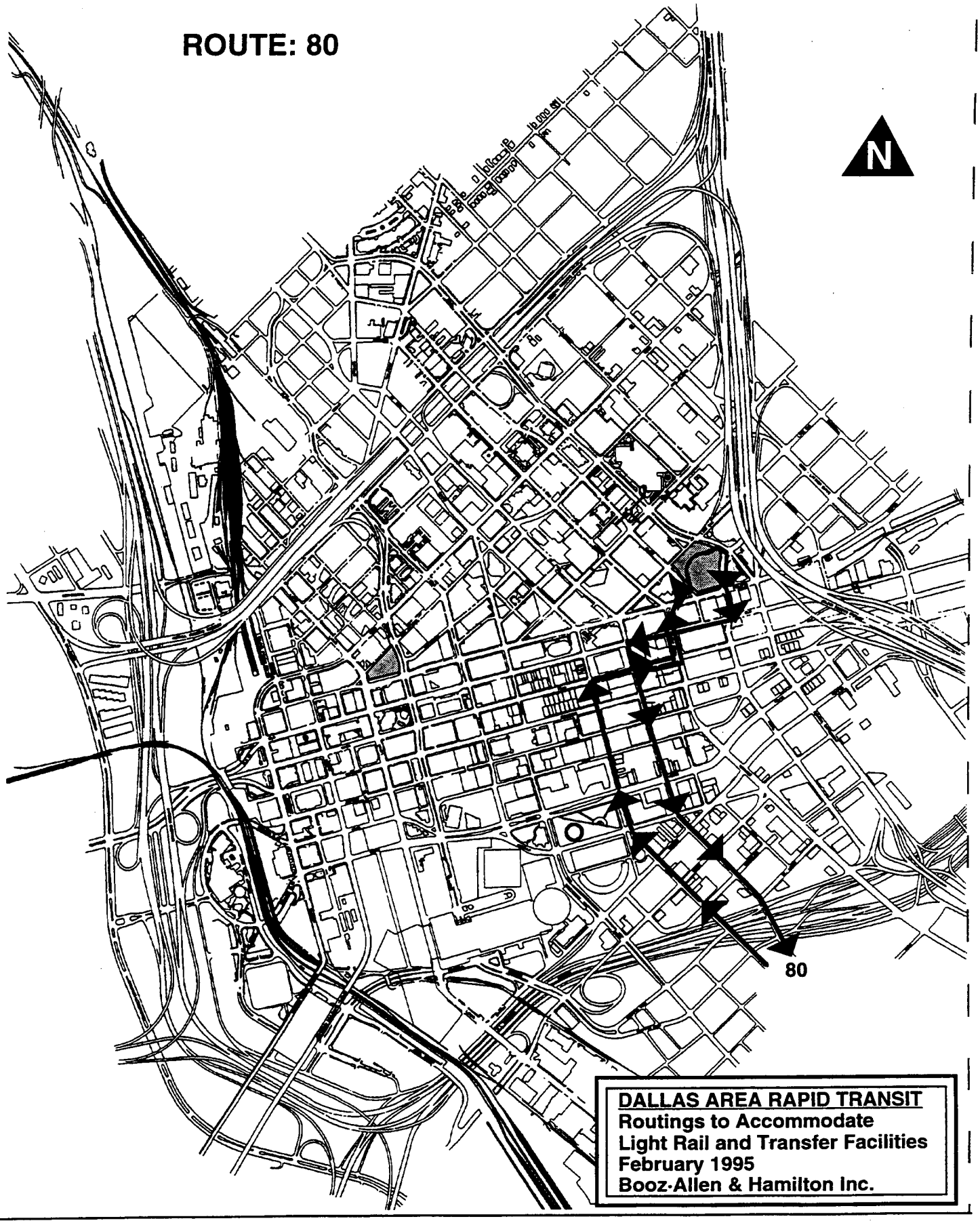

ROUTE: 68 (Formerly 16 and 22)
N
68
(form.
16, 22)
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz-Allen & Hamilton Inc.

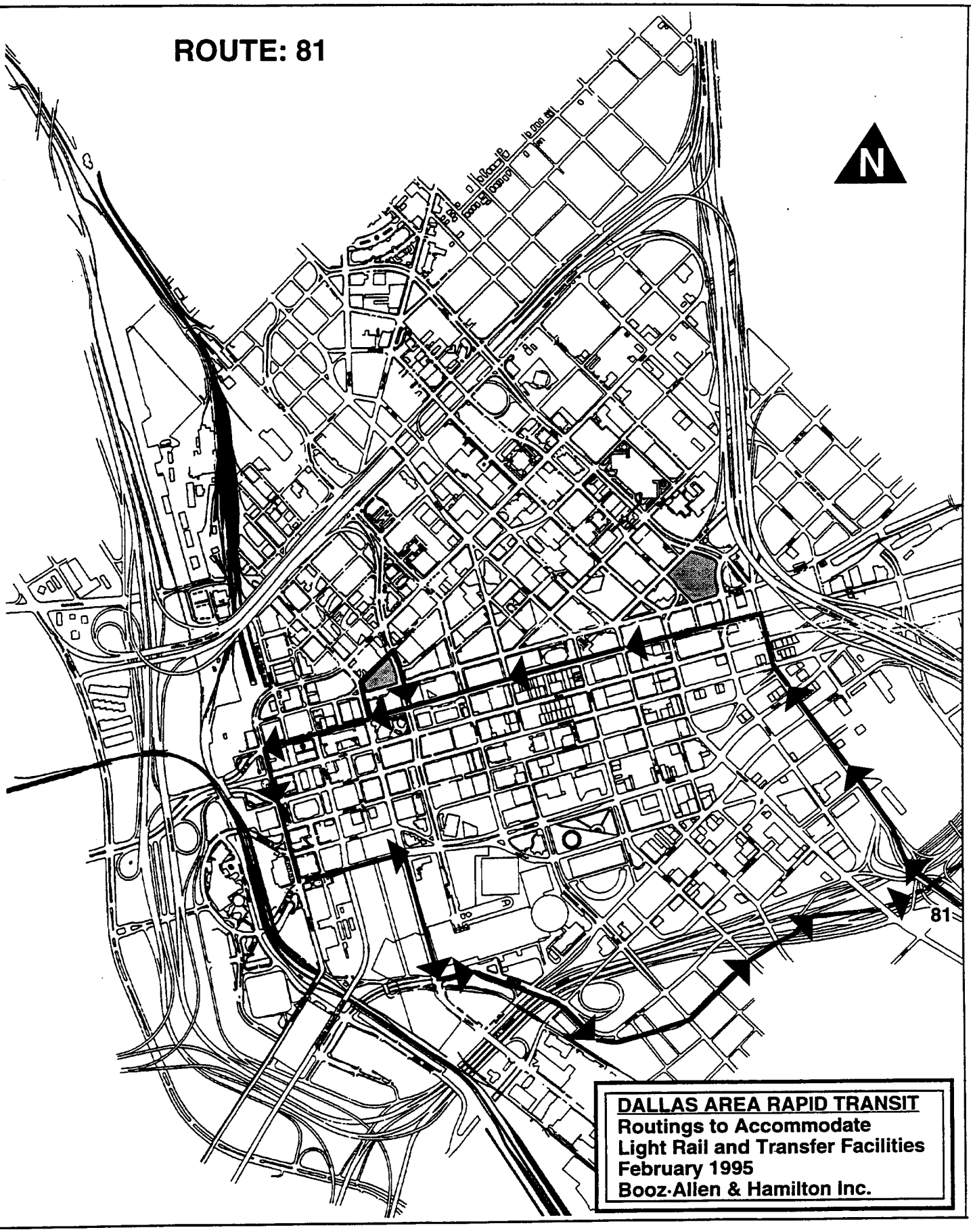
ROUTE: 73



DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.


ROUTE: 75
N
75
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.


ROUTE: 80
N
80
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.


ROUTE: 81
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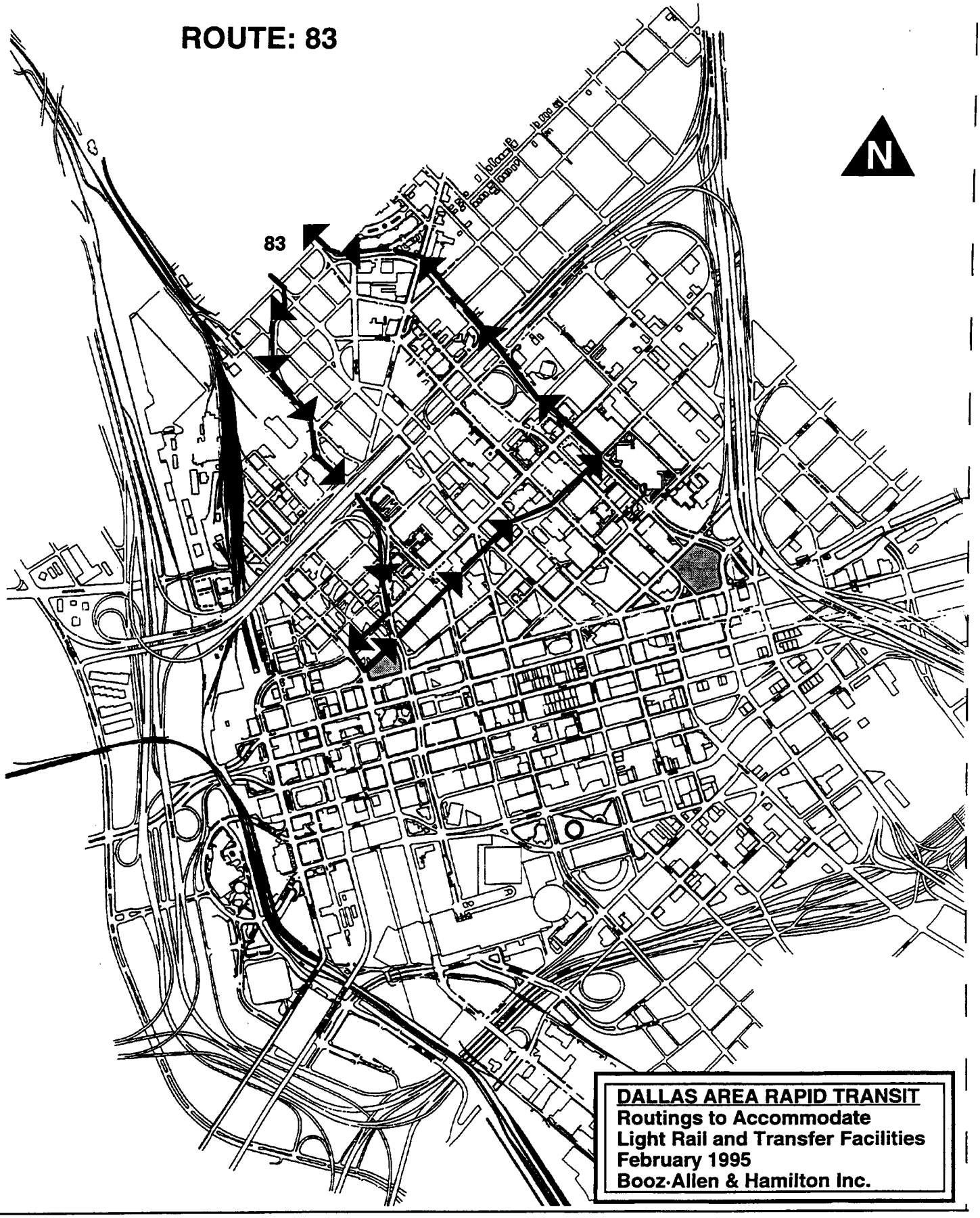
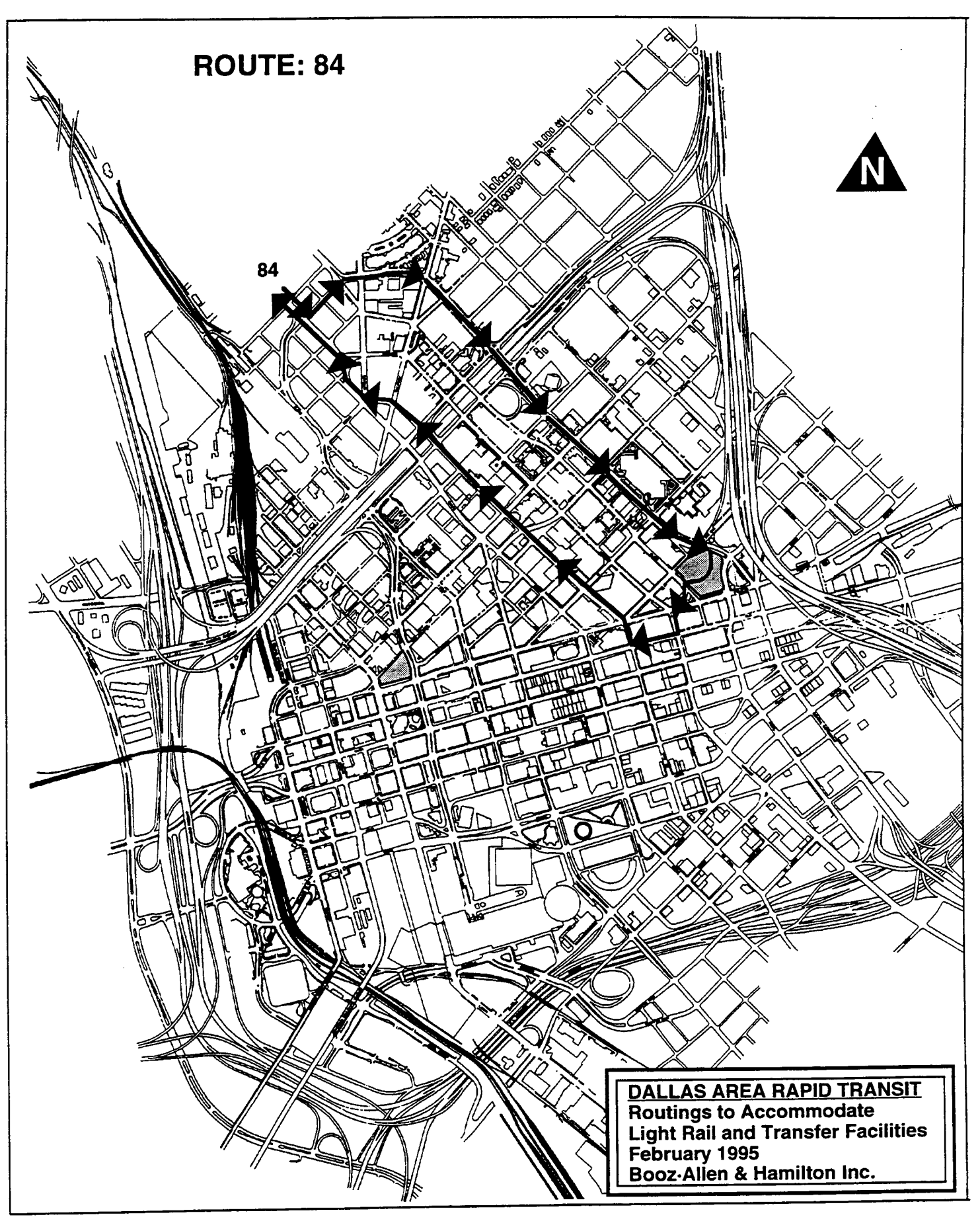
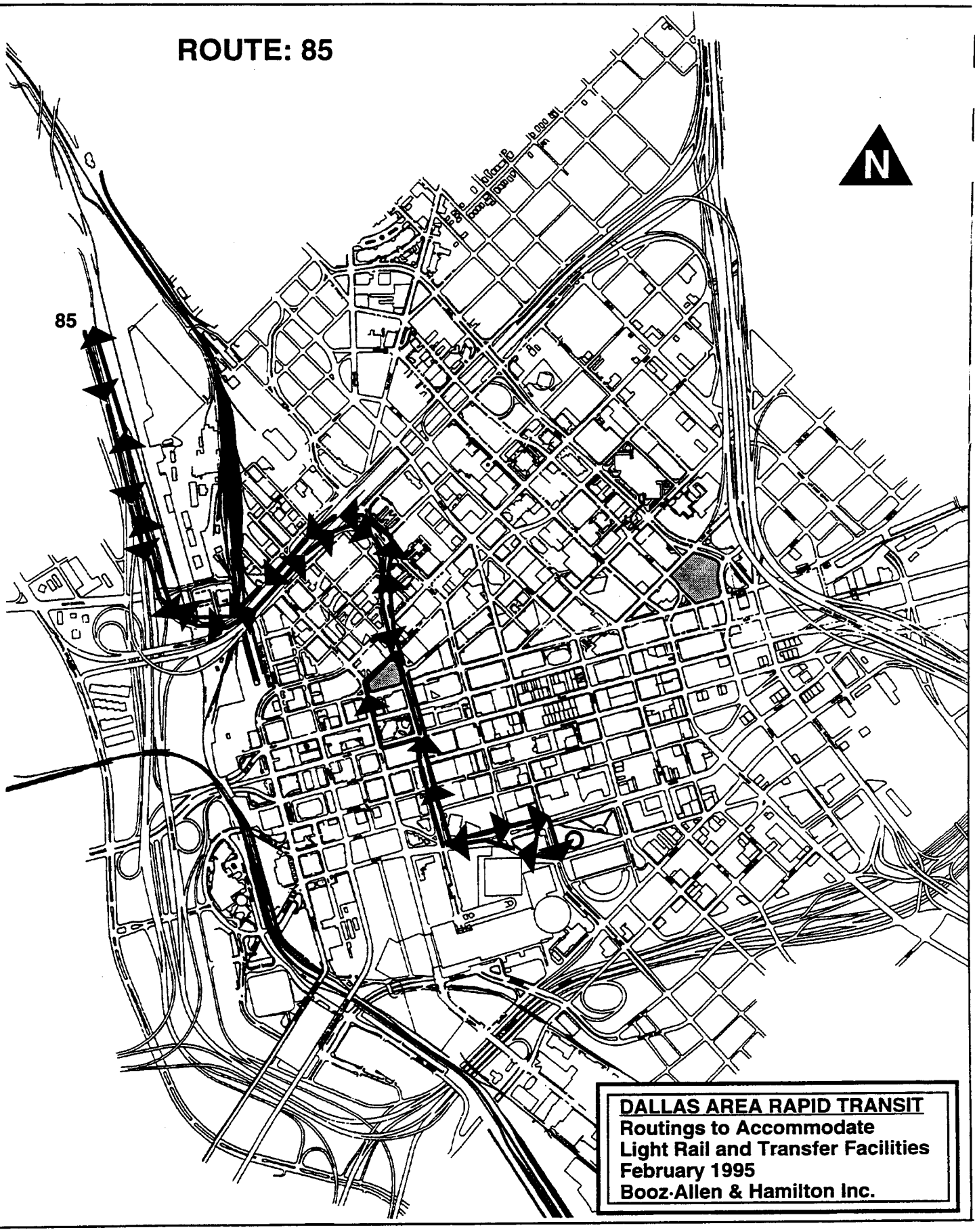
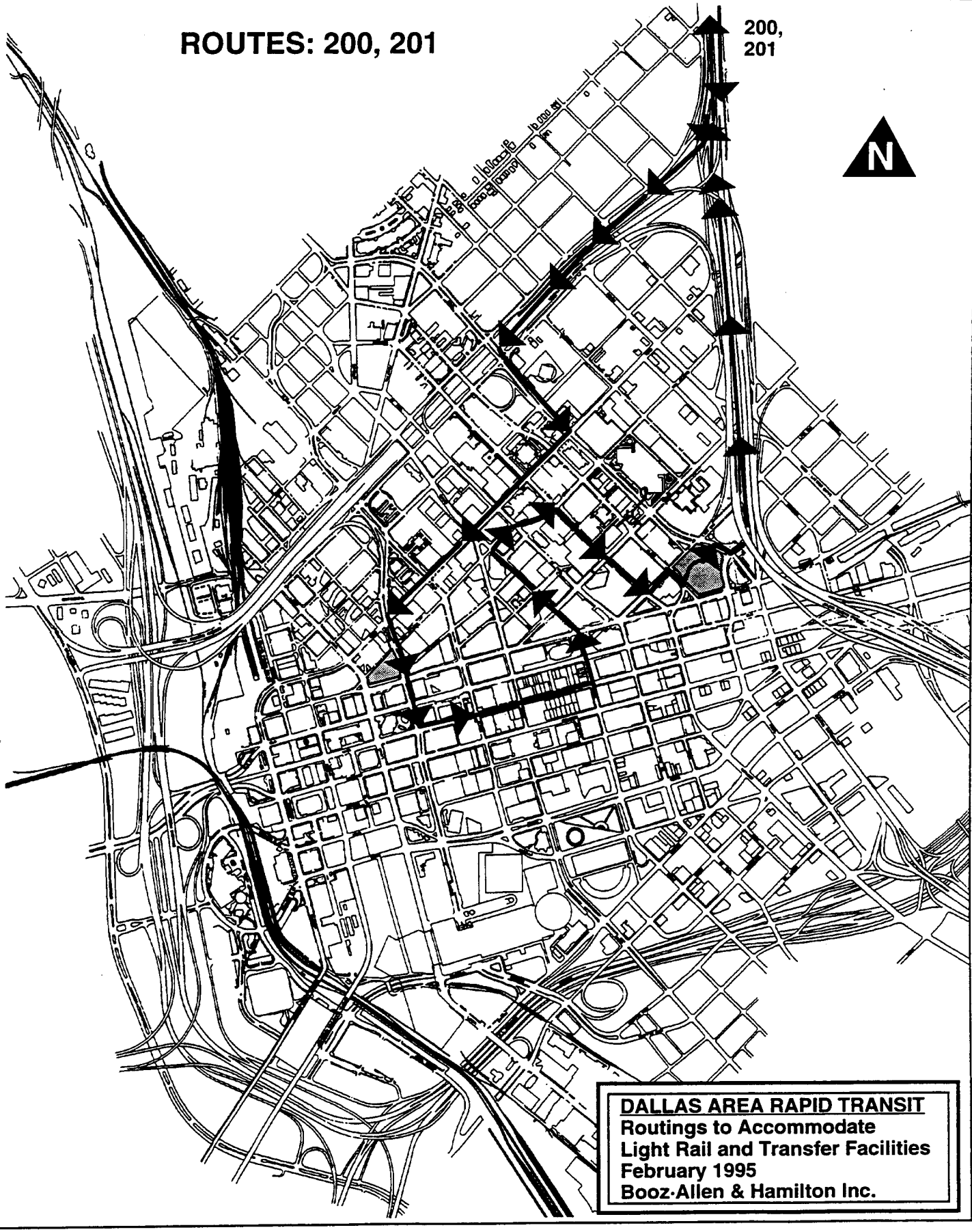
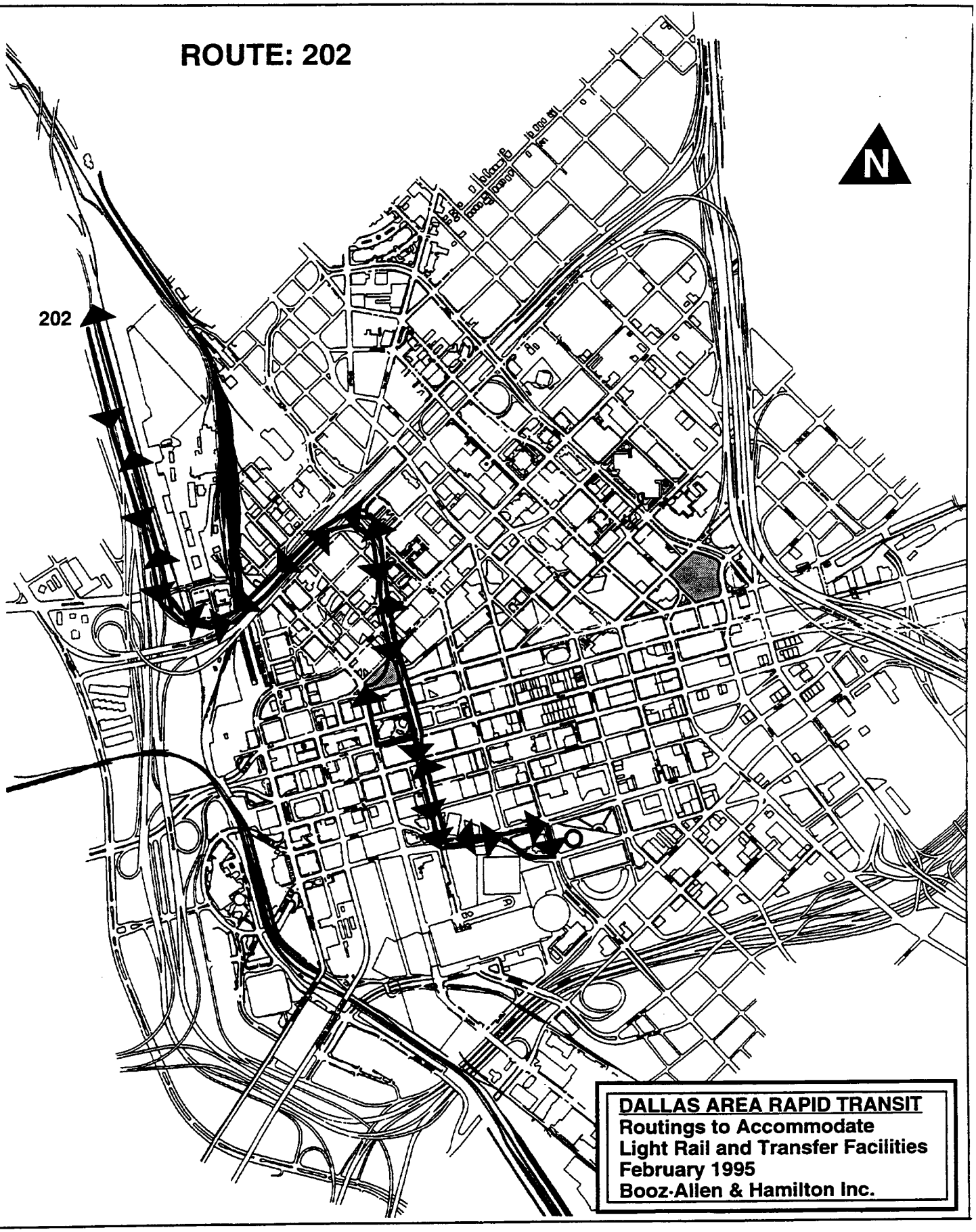
81
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.

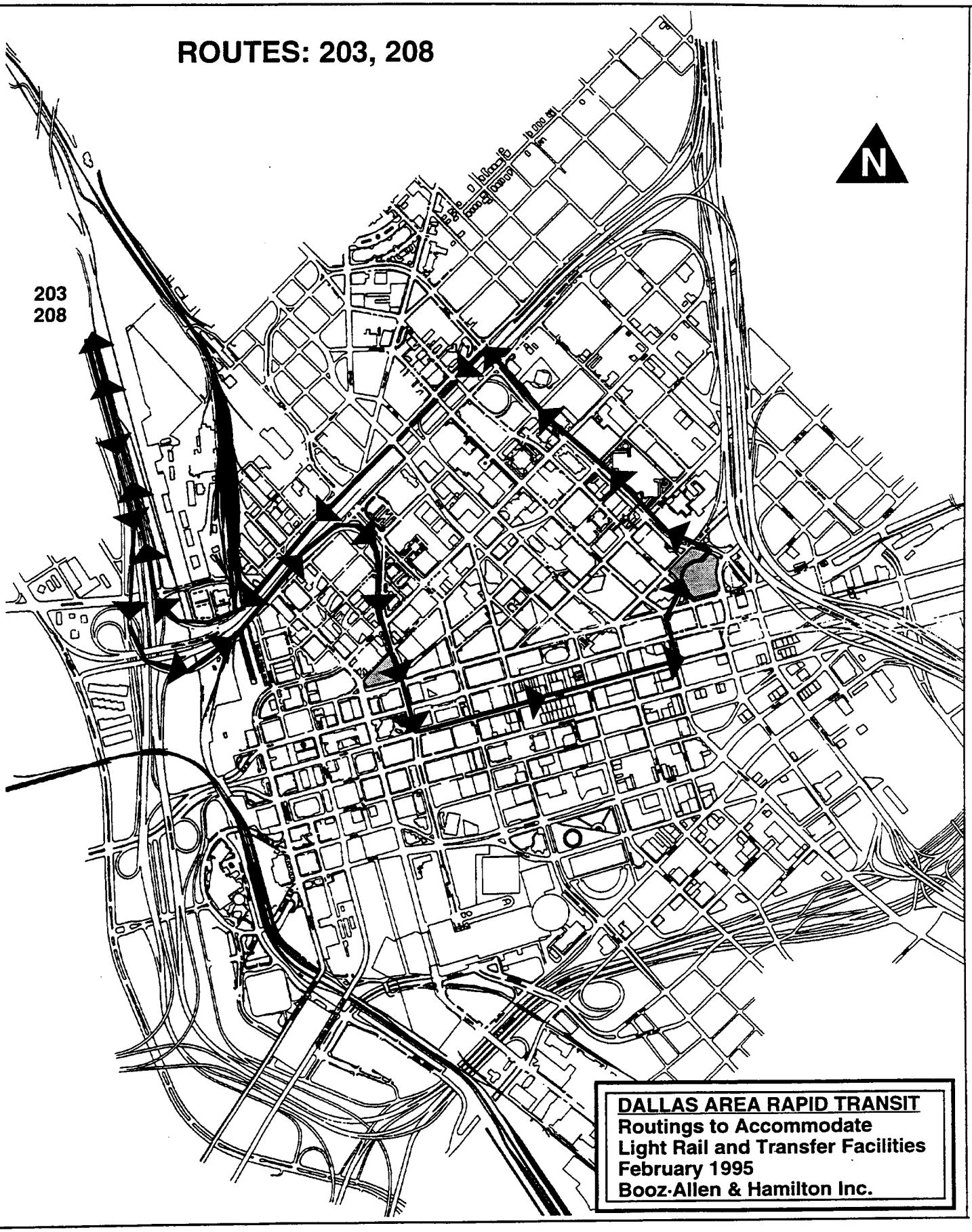

ROUTE: 83
83
N
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.

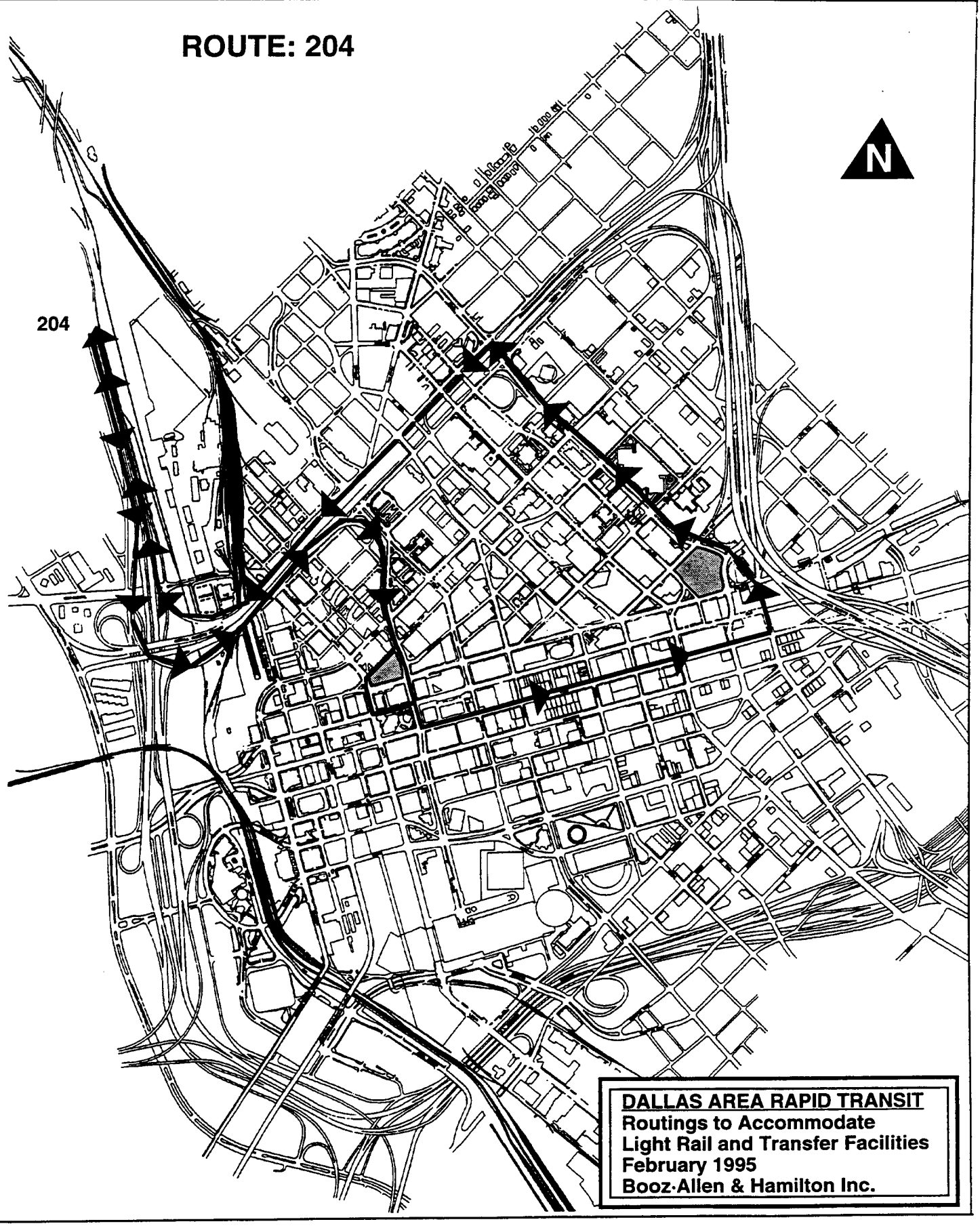

ROUTE: 84
84
N
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.


ROUTE: 85
85
N
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.


ROUTES: 200, 201
200,
201
N
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.


ROUTE: 202
202
N
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.


ROUTES: 203, 208
N
203
208
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.


ROUTE: 204
204
N
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
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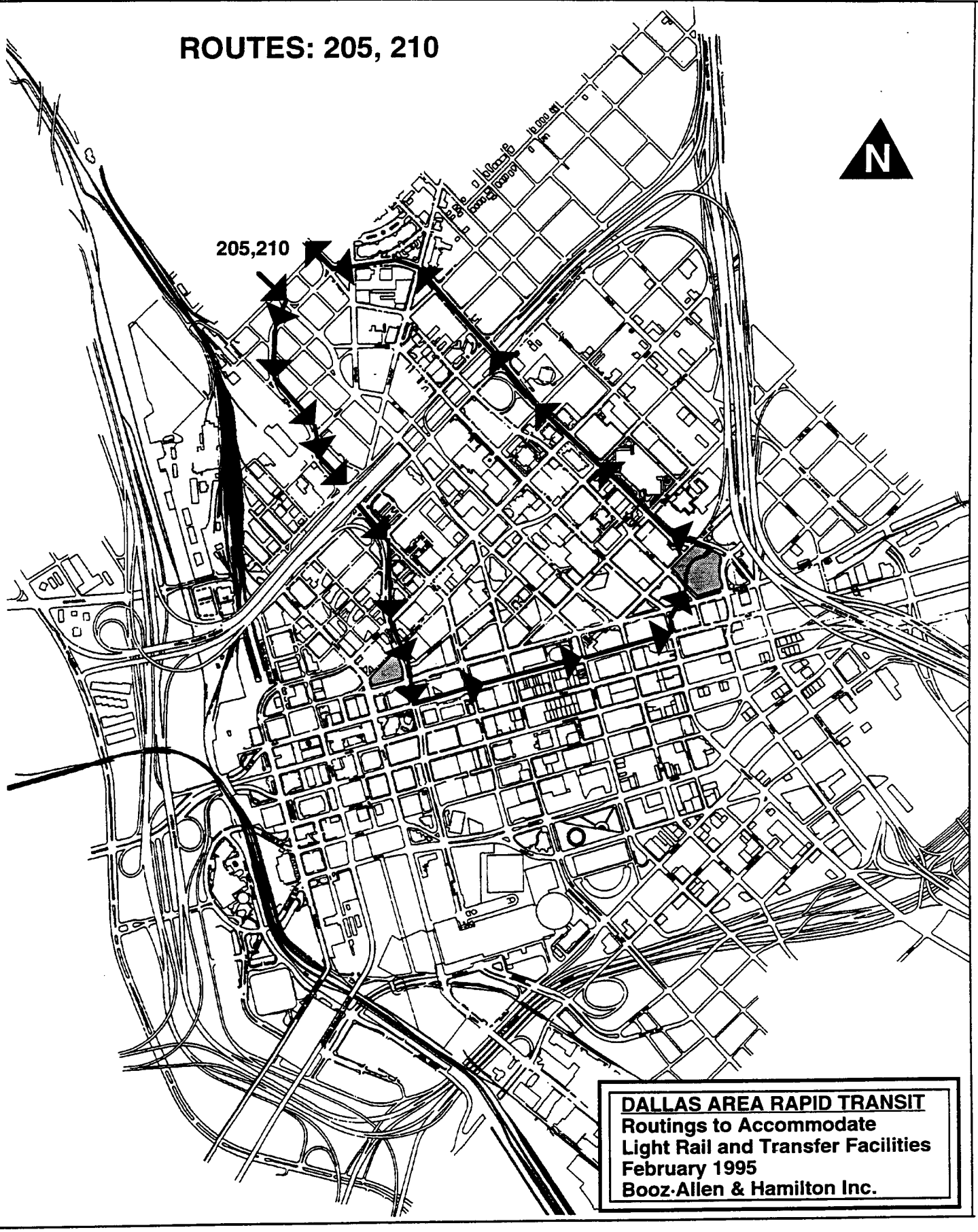
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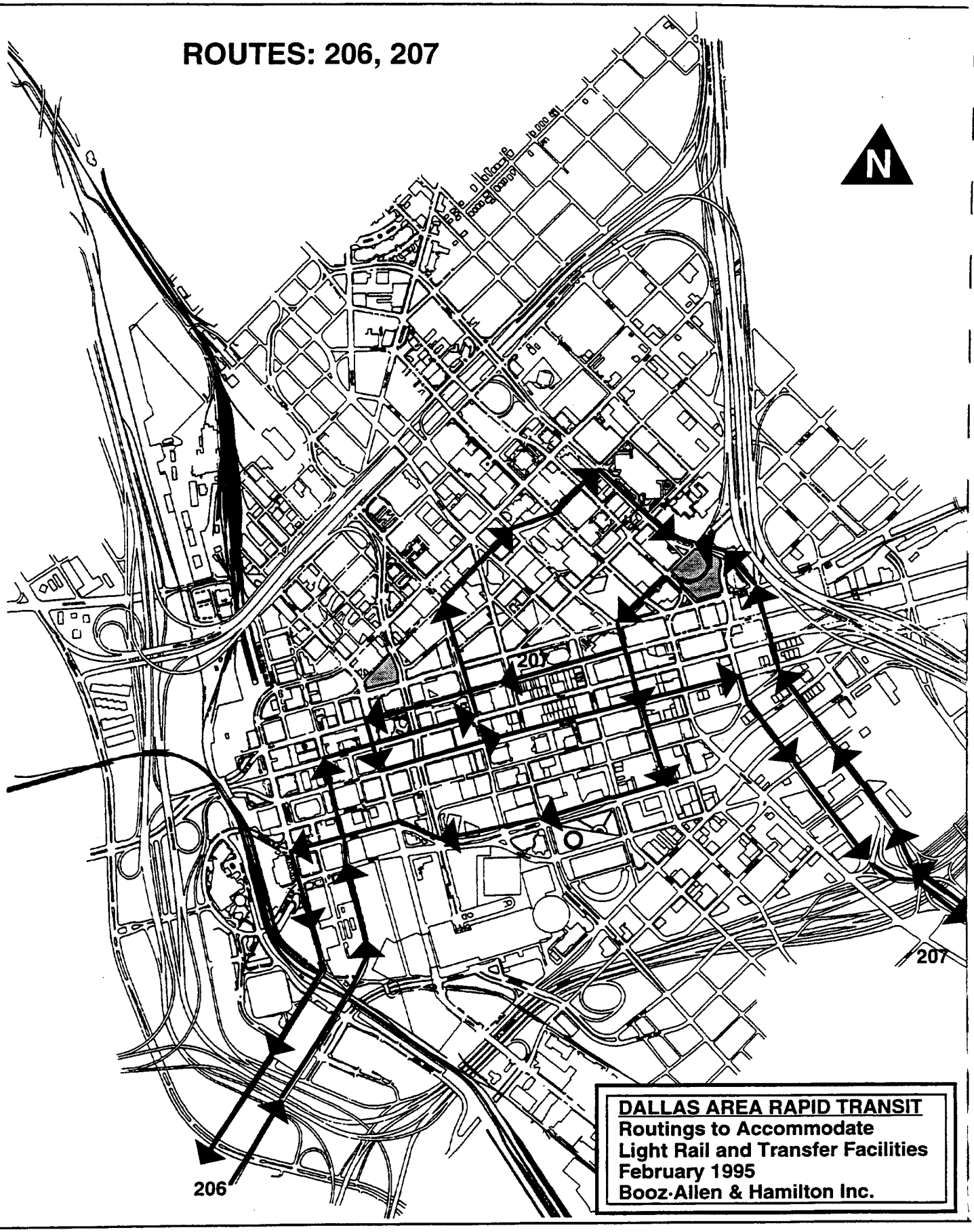
DALLAS AREA RAPID TRANSIT
Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
Booz·Allen & Hamilton Inc.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Routings to Accommodate
Light Rail and Transfer Facilities
February 1995
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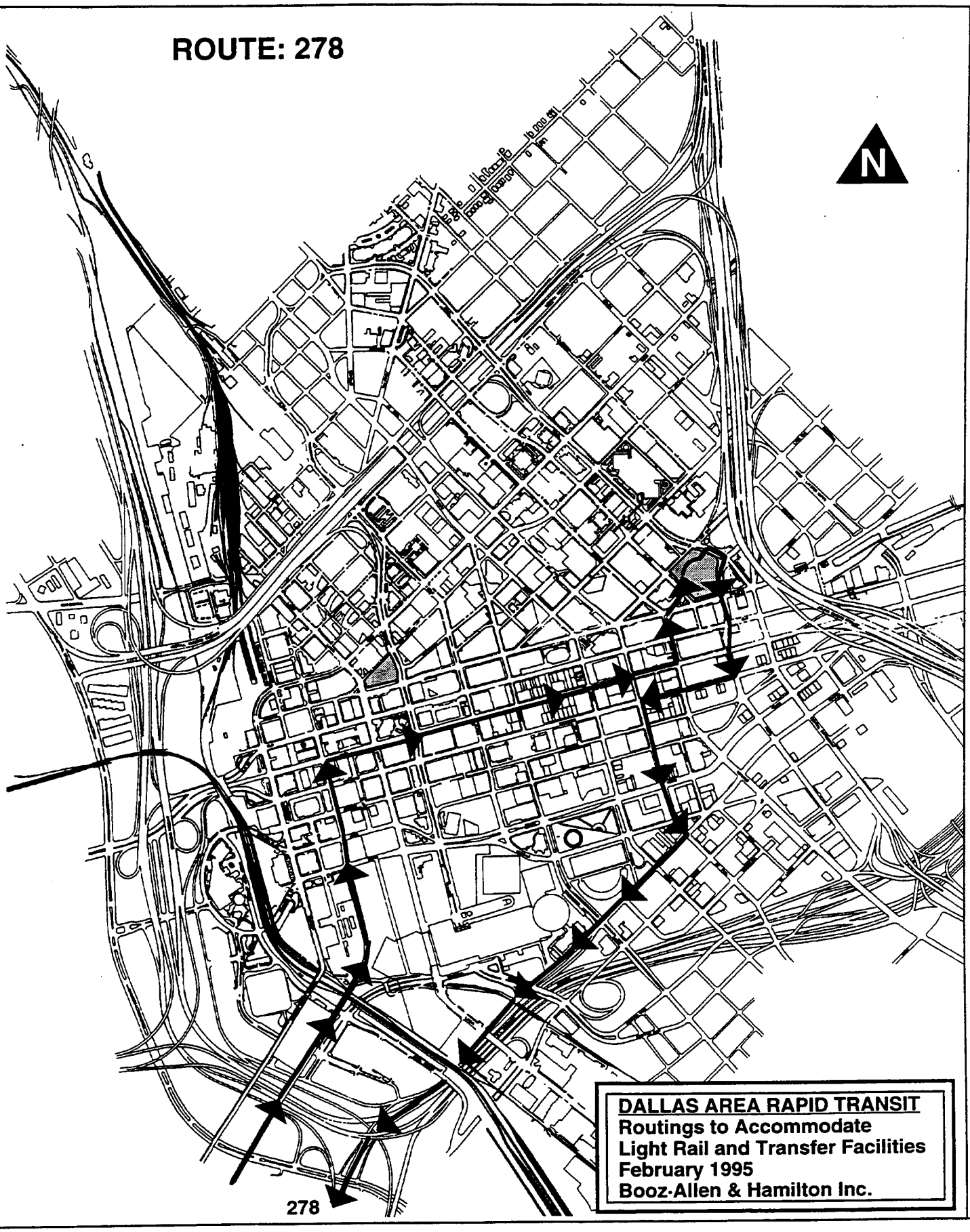
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DALLAS AREA RAPID TRANSIT
Routings to Accommodate
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8.0 ASSESSING OPPORTUNITIES FOR ROUTE PRIVATIZATION

8.0 ASSESSING OPPORTUNITIES FOR ROUTE PRIVATIZATION

DART has a successful history of recognizing and implementing the benefits of route service contracting or "privatization". Currently, almost half of the routes in the DART system are operated under contract. Collectively, these routes comprise 30 percent of the vehicle miles of service operated and represent 24 percent of the total operating cost of fixed route operations. This analysis of the potential for additional savings in operating expense through expanding the use of contract services is a reflection of DART's desire to continuously improve the productive use of fixed route expenditures to provide maximum service at the lowest possible cost.

This analysis of additional opportunities for contracting services is based on calculation of route operating costs for bus services currently operated directly by DART compared to costs associated with operating the same service under contract. Associated costs were calculated using unit cost statistics derived from current experience with contract operations. The basis for these cost calculations is the cost allocation models used in the service evaluation phase of this study of fixed route services which were calibrated from 1994 budget statistics. The details of the cost allocation process are described under separate cover in Appendix C.

As detailed in Appendix C, the allocation of operating expenses to individual routes involved a two-step process: 1) allocation of total DART operating expenses among the different services operated by DART (e.g., DART operated, contract operated, paratransit); and 2) allocation of the respective 100+ individual cost accounts for cost centers to individual routes. In total, fixed route service costs represent approximately 60% of the overall DART operating budget.

The second step in this allocation process required assigning each cost center among three categories of service variables: 1) total annual vehicle miles operated on the route; 2) total annual vehicle hours operated on the route; or 3) weekday peak vehicles required to operate the route. A fourth category of cost center involved costs that are independent in large measure to specific service quantities (fixed costs) which comprise items such as administrative overheads, service planning, and community affairs.

It is important to understand the nature of this fourth category of "fixed" cost as it pertains to an assessment of privatization opportunities. Fixed costs are not truly "fixed" but represent costs that do not vary with incremental changes in service delivery methods but could change significantly with major shifts in service delivery methods. For example, contracting one or two additional routes may have little or no effect on contracts and procurement cost centers -- contracting 20 or 30 additional routes could have a significant effect on the resources required to operate these cost centers. In the privatization context, fixed costs are actually "step functions" that would have to be re-examined if major changes in the quantity of contract services were contemplated.

The assessments and methodology presented here rely strictly on financial considerations and do not consider policy or other factors that may be involved in the

decision to actually contract out a particular service. For example, some systems have decided that the "core" system should remain as an agency operated integrated system from a policy perspective (the DART analogy would be the Radial Local service which carries over half of all the riders using DART operated service). As such, the assessments and methodology should be thought of as a "decision support" tool and less as a "decision making" tool.

ROUTE COST CALCULATION FORMULAS

The cost allocation formulas used to calculate comparative route cost for DART operated and contractor operated service in this analysis are expressed as:

DART Annual Route Operating Cost =

$1.31 X total annual vehicle miles +
$26.37 X total annual vehicle hours +
$13,144 X weekday peak vehicles +
$45,833 X weekday peak vehicles for fixed cost.

Contracted Annual Route Operating Cost for Suburban Local Service =

$0.97 X total vehicle miles +
$17.66 X total annual vehicle hours +
$34,823 X weekday peak vehicles contractor fixed cost +
$32,126 X weekday peak vehicles DART transfer fixed cost.

Contracted Annual Route Operating Cost for Express Service =

$0.73 X total vehicle miles +
$17.70 X total annual vehicle hours +
$34,823 X weekday peak vehicles contractor fixed cost +
$32,126 X weekday peak vehicles DART transfer fixed cost.

Currently, all but two express routes (i.e., Rte. 78 Red Bird Express, Rte. 80 Pleasant Grove Express) are contractor operated.

The calculation of contract fixed cost involves the existing unit rates for contractor generated fixed cost (currently referred to as "domicile charges") plus a transfer to the route being analyzed of DART fixed overhead and administrative costs associated with the operation of the route.

Exhibit 8-1 shows an example calculation for Route 044 which is a radial local route operated by DART. The first sample calculation multiplies the service variables (i.e., miles, hours and peak vehicles) by their respective unit costs to produce a total current cost of $5,697,702. The second part of the sample performs a similar calculation using the same service quantity variables but multiplying by the contract unit prices producing a cost of $5,096,956. For this example the potential savings if no changes occurred in deadhead mileage would be $660,746 annually (i.e. $5,697,702 minus $5,096,956).

EXHIBIT 8-1 -- EXAMPLE CALCULATION
CURRENT ROUTE OPERATING COST AND CONTRACT OPERATING COST

Example Route 044 -- Radial Local

Total Annual Vehicle Miles =	1,331,525
Total Annual Vehicle Hours =	87,298
Weekday Peak Vehicles =	28

1. Current Cost For Dart Operated Service =

$1.31 X 1,331,525 =	$1,744,298
$26.37 X 87,298 =	$2,302,048
$13,144 X 28 =	$368,032
$45,833 X 28 =	$1,283,324
Current Cost =	**$5,697,702**

2. Contract Cost At Current Service Levels =

$0.97 X 1,331,525 =	$1,296,905
$17.66 X 87298 =	$1,541,683
$34,823 X 28 =	$975,044
$45,833 X 28 =	$1,283,324
Contract Cost =	**$5,096,956**

The calculation of comparative costs must also assess the change in vehicle miles and hours required to operate the route that may result from operating the route from a different base location while providing the same level of customer service. Annual vehicle miles and hours for a route are comprised of two distinct pieces -- those involved in actually providing revenue service to the customer and those involved in "deadheading" from the operating base to and from the beginning and ending points for revenue service. The comparisons presented in the following sections assume that revenue service to the customer will not change whether the route is examined as a DART operation or a contractor operation.

ASSESSING PRIVATIZATION OPPORTUNITIES

The assessment of contracting opportunities which follows is not meant to be an exhaustive analysis of every single DART route, but rather, provides a systematic procedure for performing such an analysis which includes:

- a first cut calculation of the savings for every route assuming no change in miles or hours;
- a calculation of the number of additional miles and hours that could be "tolerated" before the savings were eliminated (e.g., for some routes, even a 1-2% increase in mileage would wipe out the potential savings);
- a privatization prioritization system based on the magnitude of potential savings and mileage increase "tolerance";
- a listing of all routes in four priority categories; and
- a detailed calculation of cost savings for ten specific routes including actual changes in deadhead miles and hours that would occur under contractor operation.

Exhibit 8-2 calculates the potential savings from contract operation of all DART operated routes ranked in descending order of potential savings assuming no changes in deadhead miles or hours. This exhibit is useful in examining individual route opportunities but should not be interpreted as concluding that the summation of contracting all routes would be $8.6 million. The step functions of fixed costs previously discussed and the fact that some costs such as facilities operation and maintenance would change drastically make this a completely erroneous conclusion. Further, the deadhead mileage that may increase or decrease with assignment to the nearest alternate facility is not calculated at this stage of the analysis. For this first step in the process, the exhibit displays the mileage "tolerance" factor previously discussed. These two statistics form a useful prioritization system for selecting candidate routes for contracting.

EXHIBIT 8-2 -- SAVINGS FROM CONTRACT OPERATION OF DART ROUTES AT CURRENT MILES

Route Number	Route Type	Peak Veh.	Total Annual Vehicle Miles	Total Annual Vehicle Hours	Current Total Route Cost	Contract Cost With Current Miles & Hrs	Savings At Current Miles & Hours	Mileage Increase To "Zero" Savings	% Increase To "Zero" Savings
044	RL	28	1,331,525	87,298	$5,697,702	$5,096,956	$600,746	156,938	11.8%
026	RL	22	1,130,490	75,528	$4,770,109	$4,209,354	$560,756	150,600	13.3%
066	UC	11	947,646	53,313	$3,296,027	$2,751,731	$544,296	187,446	19.8%
061	RLS	34	1,488,965	75,913	$5,957,588	$5,533,179	$424,408	114,207	7.7%
009	UC	10	729,557	44,968	$2,731,296	$2,311,283	$420,012	132,577	18.2%
053	UC	8	564,893	35,424	$2,145,957	$1,821,042	$324,915	100,790	17.8%
040	RL	11	596,728	40,454	$2,497,233	$2,182,847	$314,386	85,944	14.4%
015	RL	27	896,017	68,415	$4,570,265	$4,258,641	$311,623	65,565	7.3%
032	RLS	14	672,889	41,584	$2,803,733	$2,518,951	$284,781	76,074	11.3%
064	RLS	21	878,166	50,936	$3,732,097	$3,448,639	$283,457	72,180	8.2%
060	RL	13	633,854	40,331	$2,660,578	$2,378,147	$282,431	75,277	11.9%
031	RL	11	542,576	38,549	$2,376,059	$2,096,460	$279,598	72,362	13.3%
051	RL	9	459,917	35,647	$2,073,296	$1,803,389	$269,906	68,834	15.0%
001	RL	16	587,031	47,409	$2,962,818	$2,699,507	$263,311	57,259	9.8%
036	RL	6	385,505	28,434	$1,608,678	$1,361,562	$247,116	69,967	18.1%
039	RL	23	813,326	54,215	$3,851,578	$3,604,704	$246,873	55,702	6.8%
035	RL	9	427,465	32,116	$1,937,671	$1,709,423	$228,248	57,076	13.4%
010	RL	18	558,466	48,974	$3,084,621	$2,860,635	$223,986	43,728	7.8%
083	RLS	6	450,016	22,532	$1,537,552	$1,320,167	$217,385	74,102	16.5%
013	UC	5	367,616	20,103	$1,306,578	$1,116,357	$190,221	62,640	17.0%
050	RL	8	377,728	26,102	$1,654,949	$1,474,116	$180,833	46,337	12.3%
041	UC	7	358,131	24,010	$1,515,134	$1,337,428	$177,706	47,585	13.3%
002	RL	11	348,590	34,080	$2,004,090	$1,828,595	$175,494	33,455	9.6%
045	UC	5	295,246	20,712	$1,227,833	$1,056,624	$171,209	47,840	16.2%
028	RC	5	326,169	19,383	$1,233,296	$1,063,272	$170,024	52,156	16.0%
029	RL	12	433,529	32,430	$2,130,826	$1,962,843	$167,983	37,102	8.6%
004	RL	7	306,421	24,813	$1,468,569	$1,301,244	$167,326	39,402	12.9%
073	RLS	8	367,787	21,458	$1,519,464	$1,382,421	$137,044	36,460	9.9%
003	RL	5	164,560	20,120	$1,041,023	$918,881	$122,142	21,874	13.3%
085	RLS	8	389,793	18,482	$1,469,815	$1,351,299	$118,517	34,187	8.8%
056	RLS	4	266,127	12,666	$918,537	$805,513	$113,024	37,341	14.0%
024	RL	7	222,046	19,850	$1,227,164	$1,131,416	$95,748	18,791	8.5%
047	RL	2	115,374	10,419	$543,843	$457,686	$86,157	21,719	18.8%
005	RL	4	158,304	11,238	$739,632	$675,275	$64,357	15,087	9.5%
084	RLS	5	219,275	11,174	$876,794	$814,187	$62,607	16,861	7.7%
018	RLS	10	297,705	20,525	$1,521,008	$1,458,996	$62,012	12,653	4.3%
077	RLS	9	275,591	16,665	$1,331,273	$1,288,634	$42,640	9,119	3.3%
006	RLS	12	353,041	20,484	$1,710,371	$1,673,481	$36,889	7,782	2.2%
082	RLS	16	445,205	26,747	$2,232,169	$2,196,478	$35,691	7,234	1.6%
042	RLS	19	475,601	31,921	$2,585,357	$2,559,424	$25,933	4,819	1.0%
049	RL	8	200,277	12,893	$1,074,167	$1,068,008	$6,159	1,155	0.6%
080	RE	2	60,920	3,063	$278,531	$274,741	$3,790	840	1.4%
063	RL	9	207,213	13,826	$1,166,834	$1,171,897	($5,063)	(895)	-0.4%
078	RE	9	238,349	11,059	$1,134,656	$1,153,358	($18,702)	(3,865)	-1.6%
027	RLS	8	173,018	10,287	$969,738	$995,436	($25,698)	(4,467)	-2.6%
074	RLS	6	136,247	6,186	$695,470	$725,885	($30,415)	(5,709)	-4.2%
Total / Average		**508**	**21,674,895**	**1,422,736**	**$95,871,977**	**$87,210,113**	**$8,661,863**	**2,152,789**	**9.9%**

Exhibit 8-3 graphically displays this priority system. Routes that fall in the upper right hand quadrant of Exhibit 8-3 would be considered priority 1 candidates since the potential savings are above average and the mileage "tolerance" is also above average. The remaining quadrants are similarly prioritized with routes having below average savings potential but above average mileage "tolerance" being priority 2. Priority 4 routes should probably not even be considered except for the few that fall in the upper right portion of the quadrant.

Exhibit 8-4 is a two-page listing of the specific routes and their related statistics in each priority category. The routes in each category are ranked in descending order of mileage "tolerance".

In Exhibit 8-5, several representative routes are selected for detailed analysis including a sample from each priority category but drawing more heavily from categories 1 and 2. In the case of these routes, each route was analyzed to calculate current deadhead miles for pull-ins and pull-outs from its current base for weekdays, Saturdays and Sundays. Routes were then assigned to the nearest existing contractor garage facility and the pull-in and pull-out mileage for weekdays, Saturdays and Sundays were re-calculated. Deadhead increases/decreases were then converted to annual equivalents using current year service schedule factors of 255 weekdays, 52 Saturdays and 58 Sunday and holiday schedules.

It should be noted that four of the five priority 1 routes actually result in having reduced deadhead increasing their potential savings over the preliminary calculation of Exhibit 8-2.

The priority 2 routes selected for this test display increased deadhead mileage in two of the three samples but the increases are not sufficient to offset the savings possible with contracting.

The priority 4 route selected produces increases in deadhead mileage which reduces the potential savings to less than 7% of current costs and would probably not be considered as a candidate.

Routes 056 (priority 2) and 061 (priority 3) resulted in increases in deadhead mileage that were so high that they not only wiped any potential savings but actually resulted in substantially higher costs under contract operations. These two routes are not shown on Exhibit 8-5.

Together, this group of ten routes could result in savings of $2,776,000 if they were privatized.

It is recognized that DART is currently in the process of considering alternatives for new facilities both for its own operations and for contractor operations. These plans have not progressed sufficiently to provide specifics to be used in this current analysis, however, the methodology described here for prioritizing routes and calculating the resulting savings can easily be applied to any future sites that may be considered for either DART or contractor operations.

Exhibit 8- 3

Impact Of Contracting DART Routes Related To Mileage That Could Be Added Without Eliminating Savings

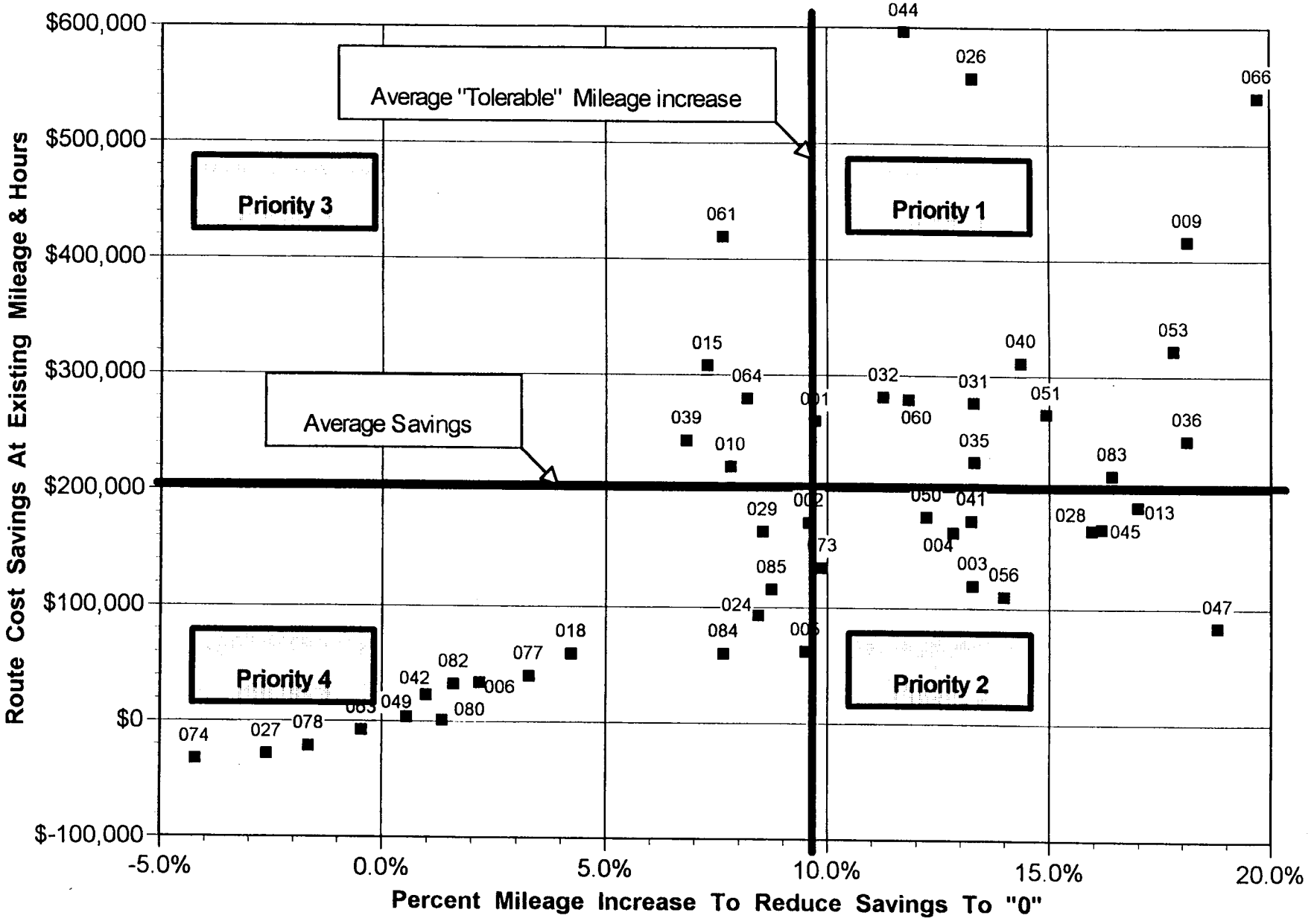

EXHIBIT 8-4 -- SAVINGS FROM CONTRACT OPERATION OF DART ROUTES AT CURRENT MILES (Page 1 of 2)

Route Number	Route Type	Peak Veh.	Total Annual Vehicle Miles	Total Annual Vehicle Hours	Current Total Route Cost	Contract Cost With Current Miles	Savings At Current Miles & Hours	Mileage Increase To "Zero" Savings	% Increase To "Zero" Savings
Priority 1 - Routes With Above Average Potential Savings And Above Average Mileage "Tolerance"									
066	UC	11	947,646	53,313	$3,296,027	$2,751,643	$544,384	187,482	19.8%
009	UC	10	729,557	44,968	$2,731,296	$2,311,203	$420,092	132,607	18.2%
036	RL	6	385,505	28,434	$1,608,678	$1,361,514	$247,164	69,983	18.2%
053	UC	8	564,893	35,424	$2,145,957	$1,820,978	$324,979	100,813	17.8%
013	UC	5	367,616	20,103	$1,306,578	$1,116,317	$190,261	62,655	17.0%
083	RLS	6	450,016	22,532	$1,537,552	$1,320,119	$217,433	74,121	16.5%
051	RL	9	459,917	35,647	$2,073,296	$1,803,317	$269,978	68,855	15.0%
040	RL	11	596,728	40,454	$2,497,233	$2,182,759	$314,474	85,972	14.4%
035	RL	9	427,465	32,116	$1,937,671	$1,709,351	$228,320	57,097	13.4%
031	RL	11	542,576	38,549	$2,376,059	$2,096,372	$279,686	72,387	13.3%
026	RL	22	1,130,490	75,528	$4,770,109	$4,209,178	$560,932	150,654	13.3%
060	RL	13	633,854	40,331	$2,660,578	$2,378,043	$282,535	75,308	11.9%
044	RL	28	1,331,525	87,298	$5,697,702	$5,096,732	$600,970	157,004	11.8%
032	RLS	14	672,889	41,584	$2,803,733	$2,518,839	$284,893	76,107	11.3%
Total / Average		**163**	**9,240,677**	**596,281**	**$37,442,468**	**$32,676,366**	**$4,766,102**	**1,371,045**	**14.8%**
Priority 2 - Routes With Below Average Potential Savings And Above Average Mileage "Tolerance"									
047	RL	2	115,374	10,419	$543,843	$457,670	$86,173	21,723	18.8%
045	UC	5	295,246	20,712	$1,227,833	$1,056,584	$171,249	47,853	16.2%
028	RC	5	326,169	19,383	$1,233,296	$1,063,232	$170,064	52,171	16.0%
056	RLS	4	266,127	12,666	$918,537	$805,481	$113,056	37,353	14.0%
003	RL	5	164,560	20,120	$1,041,023	$918,841	$122,182	21,882	13.3%
041	UC	7	358,131	24,010	$1,515,134	$1,337,372	$177,762	47,602	13.3%
004	RL	7	306,421	24,813	$1,468,569	$1,301,188	$167,382	39,417	12.9%
050	RL	8	377,728	26,102	$1,654,949	$1,474,052	$180,897	46,355	12.3%
073	RLS	8	367,787	21,458	$1,519,464	$1,382,357	$137,108	36,479	9.9%
Total / Average		**51**	**2,577,543**	**179,683**	**$11,122,649**	**$9,796,777**	**$1,325,872**	**350,836**	**13.6%**

EXHIBIT 8-4 -- SAVINGS FROM CONTRACT OPERATION OF DART ROUTES AT CURRENT MILES (Page 2 of 2)

Route Number	Route Type	Peak Veh.	Total Annual Vehicle Miles	Total Annual Vehicle Hours	Current Total Route Cost	Contract Cost With Current Miles	Savings At Current Miles & Hours	Mileage Increase To "Zero" Savings	% Increase To "Zero" Savings
Priority 3 - Routes With Above Average Potential Savings And Below Average Mileage "Tolerance"									
001	RL	16	587,031	47,409	$2,962,818	$2,699,379	$263,439	57,290	9.8%
064	RLS	21	878,166	50,936	$3,732,097	$3,448,471	$283,625	72,226	8.2%
010	RL	18	558,466	48,974	$3,084,621	$2,860,491	$224,130	43,758	7.8%
061	RLS	34	1,488,965	75,913	$5,957,588	$5,532,907	$424,680	114,286	7.7%
015	RL	27	896,017	68,415	$4,570,265	$4,258,425	$311,839	65,614	7.3%
039	RL	23	813,326	54,215	$3,851,578	$3,604,520	$247,057	55,746	6.9%
Total / Average		**139**	**5,221,971**	**345,862**	**$24,158,966**	**$22,404,195**	**$1,754,771**	**408,920**	**7.8%**
Priority 4 - Routes With Below Average Potential Savings And Below Average Mileage "Tolerance"									
002	RL	11	348,590	34,080	$2,004,090	$1,828,507	$175,582	33,473	9.6%
005	RL	4	158,304	11,238	$739,632	$675,243	$64,389	15,095	9.5%
085	RLS	8	389,793	18,482	$1,469,815	$1,351,235	$118,581	34,207	8.8%
029	RL	12	433,529	32,430	$2,130,826	$1,962,747	$168,079	37,125	8.6%
024	RL	7	222,046	19,850	$1,227,164	$1,131,360	$95,804	18,803	8.5%
084	RLS	5	219,275	11,174	$876,794	$814,147	$62,647	16,873	7.7%
018	RLS	10	297,705	20,525	$1,521,008	$1,458,916	$62,092	12,670	4.3%
077	RLS	9	275,591	16,665	$1,331,273	$1,288,562	$42,712	9,135	3.3%
006	RLS	12	353,041	20,484	$1,710,371	$1,673,385	$36,985	7,803	2.2%
082	RLS	16	445,205	26,747	$2,232,169	$2,196,350	$35,819	7,261	1.6%
080	RE	2	60,920	3,063	$278,531	$274,725	$3,806	844	1.4%
042	RLS	19	475,601	31,921	$2,585,357	$2,559,272	$26,085	4,847	1.0%
049	RL	8	200,277	12,893	$1,074,167	$1,067,944	$6,223	1,167	0.6%
063	RL	9	207,213	13,826	$1,166,834	$1,171,825	($4,991)	(883)	-0.4%
078	RE	9	238,349	11,059	$1,134,656	$1,153,286	($18,630)	(3,850)	-1.6%
027	RLS	8	173,018	10,287	$969,738	$995,372	($25,634)	(4,456)	-2.6%
074	RLS	6	136,247	6,186	$695,470	$725,837	($30,367)	(5,700)	-4.2%
Total / Average		**155**	**4,634,704**	**300,910**	**$23,147,894**	**$22,328,712**	**$819,182**	**184,415**	**4.0%**

EXHIBIT 8-5 – FINANCIAL IMPACT OF CONTRACT OPERATION OF SELECTED DART ROUTES

Route Number	Route Type	Priority Category	Peak Veh.	Total Annual Vehicle Miles	Total Annual Vehicle Hours	Contract Deadhead Miles Change	Contract Deadhead Hours Change	Contract Total Annual Miles	Contract Total Annual Hours	Current Total Route Cost	Contract Cost With Miles Change	Contract Savings With Miles Change
083	RLS	1	6	450,016	22,532	(1,436)	(213)	448,580	22,319	$1,537,552	$1,314,956	$222,596
066	UC	1	11	947,646	53,313	3,644	372	951,290	53,685	$3,296,027	$2,761,754	$534,273
013	UC	1	5	367,616	20,103	(10,879)	(1,312)	356,738	18,791	$1,306,578	$1,082,558	$224,020
053	UC	1	8	564,893	35,424	(12,273)	(1,158)	552,620	34,266	$2,145,957	$1,788,575	$357,382
009	UC	1	10	729,557	44,968	(15,373)	(1,428)	714,185	43,540	$2,731,296	$2,271,013	$460,283
073	RLS	2	8	367,787	21,458	(24,098)	(6,626)	343,690	14,832	$1,519,464	$1,241,863	$277,601
041	UC	2	7	358,131	24,010	8,757	439	366,888	24,449	$1,515,134	$1,353,646	$161,488
045	UC	2	5	295,246	20,712	13,852	1,636	309,098	22,348	$1,227,833	$1,098,970	$128,863
064	RLS	3	21	878,166	50,936	(4,965)	(1,222)	873,202	49,714	$3,732,097	$3,422,064	$310,033
085	RLS	4	8	389,793	18,482	3,825	848	393,618	19,330	$1,469,815	$1,369,931	$99,884
Total / Average			**89**	**5,348,851**	**311,938**	**(38,945)**	**(8,665)**	**5,309,907**	**303,273**	**$20,481,753**	**$17,705,330**	**$2,776,423**

DART PROVIDED FACILITY FOR CONTRACTOR USE

The current ATE contract includes $7,452,112 in domicile costs. DART estimates that 30 percent (i.e., $2.2 million) is for buildings and land, as shown in Exhibit 8-6. These costs are annual operating costs to DART. The capital cost for DART to build a new facility is estimated at $30.0 million. Assuming federal funding participation, the cost of this new facility to DART would be $6.0 million. If DART were to build a new facility for contractor use, annual operating costs could be reduced. This reduction, however, would most likely be considerably less than the $2.2 million for the buildings and land due to expenses associated with facility operation and maintenance (e.g., utilities). Nevertheless, capital investment by DART of $6.0 million (i.e., local share for a $30.0 million new facility) would pay for itself in operating cost savings over a three to five year period. If shop tools were capitalized, the payoff time would be slightly less (i.e., 2.3 to 3.8 years).

Given the potential payoff period of three to five years for DART participation, it is recommended that DART pursue this option further.

Exhibit 8-6
ESTIMATED BREAKDOWN OF ATE DOMICILE COST VIS-A-VIS DART PROVIDED FACILITY

1994 BUDGET TOTAL = $7,452,112	
30% = Buildings and Land =	$2,235,634
30% = Administration =	$2,235,634
20% = Shop Overhead (Fringes/Supplies/etc.) =	$1,490,422
5% = Miscellaneous Overhead =	$372,606
5% = Tools =	$372,606
10% = Profit =	$745,211
	$7,452,112
Local Share of $30 million facility =	**$6,000,000**
Payoff Time Period (buildings & land charge) = Assuming other costs don't go up as a result of switch to new facility (e.g., shop overhead)	**2.7-5(a) Years**
Payoff Time Period (if tools were capitalized) =	**2.3-3.8(a) Years**

(a) *Extended payoff period assumes that some portion of buildings and land $2.2 million annual cost is for facility maintenance and operations.*