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DATE: January 29, 2001

TO: Michael Murphy, Town of Addison

FROM: Tim Baldwin

SUBJECT: Status of Transit Market Analysis for the Cotton Belt Corridor

BRW received a Notice to Proceed on December 14, 2000, for this project. Attached is a spreadsheet showing the status of the various elements of this report, along with a copy of the draft report elements completed thus far.

The project is approximately 65% complete. Most narrative data collection elements (report summaries, relationship to other projects) are complete in draft form. The most difficult element of the project – securing and analyzing NCTCOG demographic and travel market data – is well under way, as we have recently secured all the NCTCOG datasets needed and are developing GIS maps and data tables for each element. We anticipate the bulk of that analysis to be completed in draft form by Friday, February 9.

The major narrative elements remaining to be completed concern an analysis of issues to be analyzed further (including a phasing and staging scenario analysis), and conclusions and recommendations. It is our goal to have a complete draft report ready for your review by Friday, February 16.

BRW, INC.
Town of Addison
Transit Market Analysis for the Cotton Belt Corridor
Status of Project Documentation
(1/29/01)

Report Element	*Type of Information*	*Status*
1. Introduction	Narrative	Draft complete
2. History and Background		
Brief History of Corridor	Narrative	Draft complete
DART History	Narrative	Draft complete
NCTCOG Regional Rail	Narrative	Draft complete
North Crosstown Study	Narrative	Draft complete
Northwest MIS	Narrative	Draft complete
NCTCOG N. Crosstown TF	Narrative	Draft complete
3. Demographic Summary		
Corridor Definition (TSZ's)	NCTCOG data set/map	Being processed; complete by 2/9
Population trends	NCTCOG data set/map	Partially complete; complete by 2/9
Employment trends	NCTCOG data set/map	Being processed; complete by 2/9
Socioeconomic trends	NCTCOG data set/map	Being processed; complete by 2/9
Economic trends	NCTCOG/local data	Being processed; complete by 2/2
Land use trends	NCTCOG data set/map	Being processed; complete by 2/9
Development trends	Narrative; GIS map	Draft ready 2/9
Traffic/transp. trends	NCTCOG data set/map	Being processed; complete by 2/2
	NCTCOG Mobility 2025 data	Draft complete
D/FW Airport Influences	Narrative	Draft complete
	NCTCOG data set/map	Being processed; complete by 2/9
4. Moving in the Corridor		
Activity Centers	Narrative; GIS map	Partially complete; complete by 2/9
	NCTCOG data set/map	Being processed; complete by 2/9
Regional Travel Patterns	NCTCOG data set/map	Being processed; complete by 2/9
Corridor Travel Patterns	NCTCOG data set/map	Being processed; complete by 2/9
5. Ridership/Cost-Effectiveness Analysis		
Previous Analyses	Narrative	Draft complete
DART comparison	Narrative	Draft complete
National comparison	Narrative	Draft complete
New trends	Narrative	Draft complete by 2/9
6. Key Issues		
Track conditions	Narrative	Draft complete by 2/9
At-grade crossings	Narrative	Draft complete by 2/9
Other neighborhood issues	Narrative	Draft complete by 2/9
Technology alternatives	Narrative	Draft complete by 2/9
Regional connectivity	Narrative	Draft complete by 2/9
Potential station locations	Narrative	Draft complete by 2/9
Phasing/staging scenarios	Narrative	Draft complete by 2/9
7. Conclusions/ Recommendations	Narrative	Draft complete by 2/9

1.

INTRODUCTION

The Cotton Belt railroad corridor, as it is usually described, stretches more than 22 miles from downtown Plano to the north end of D/FW International Airport (see **Figure 1-1**). Purchased by DART in 1990 as part of the agency's long-term railroad preservation programs, the corridor has long been identified by DART as a potential fixed-guideway corridor serving the rapidly growing east-west travel markets in the northern tier of DART's service area suburbs. However, most of DART's rail program has, to this point, been designed as a radial system focused on downtown Dallas. Virtually all of DART's light rail and commuter rail lines, as described in the original 1983 Service Plan and amended several times since, are either in place, under construction, or in some stage of planning for implementation.

DART is now poised to embark on its next wave of regional – and possibly inter-regional – planning. The agency has initiated the procurement process to hire a consultant to help it update its long-range system plan. This effort will ask one crucial question: What happens next? The new Transit System Plan will consist of three major elements:

1. An element that will establish the future direction of DART and the region regarding transit, including the identification of key issues, the establishment of goals and objectives, and the provision of a framework for the discussion of key policy issues.

Figure 1-1 Cotton Belt Corridor

2. An element that will develop a strategic action plan for the continuing incremental development of DART's transit system, including the identification of major opportunities and obstacles, inter-relationships with other plan elements, and the proposed timing of projects.
3. An element that will identify specific projects to achieve the goals and objectives, including physical/operational/technological recommendations and a capital investment plan that is tied to a phasing and staging plan.

Concurrently with the pending development of the new DART System Plan, local leaders in the northern Dallas County area have expressed interest in re-examining the Cotton Belt corridor with the intent of determining its viability as one of DART's next priority corridors. Along those lines, the Town of Addison asked BRW, Inc., to conduct a Transit Market Analysis for the Cotton Belt corridor.

This Transit Market Analysis is an attempt to develop a quantitative assessment of existing and forecast conditions along the Cotton Belt Corridor related to demographics, land use patterns and densities, traffic volumes, trip densities and trip-making patterns, and other factors. The results of this analysis may be used by the Town of Addison and its neighboring communities to demonstrate the potential strengths of the Cotton Belt alignment as a future transit corridor.This report is not intended as a political document. It is not an advocacy statement, nor is it intended to be adversarial in nature in promoting one solution or alignment over another with DART and other regional decision-makers on behalf of the Town of Addison. Instead, it is intended to examine, in one comprehensive yet concise and objective report, the technical issues related to the Cotton Belt corridor that will be made available to DART and other agencies as it considers its next priority corridors for study, funding, and implementation.

In addition to this introduction, this report consists of six additional sections:

- An exploration of the Cotton Belt Corridor's history as a potential rapid transit corridor, and its relation to other transportation studies in the area over the past two decades;
- An assessment of demographic, transportation, and land use and development conditions that exist now along the corridor and that are forecast to exist through the year 2025;
- An assessment of trip-making and travel patterns in the corridor, both existing and forecast, with an exploration of the major origins and destinations within and external to the study corridor;
- An analysis of past ridership and cost forecasts for rail transit solutions in the corridor, a qualitative update of those forecasts based on updated demographic and development projections, and an analysis of how those ridership and cost figures compare to other DART corridors and fixed guideway corridors nationwide;
- A compilation and exploration of key issues to be considered when examining the Cotton Belt corridor as a fixed guideway corridor, including the issue of grade crossings and track conditions along the corridor, potential inter-connectivity to the DART system and other regional transportation networks, an examination of potential passenger station locations, and the development of potential phasing and staging implementation scenarios; and
- A chapter on conclusions and recommendations as to where DART and the Town of Addison should proceed in the near future.

2.

THE COTTON BELT CORRIDOR IN CONTEXT: HISTORY AND BACKGROUND

BRIEF HISTORY OF THE COTTON BELT CORRIDOR

In December 1990, DART purchased approximately 54 miles of the Cotton Belt railroad from Wylie to North Fort Worth at a purchase price of $21.5 million. DART purchased the line for two primary reasons. First, the agency wanted to preserve the corridor as a future potential transit right-of-way. Second, DART wanted to use a portion of the corridor to reroute freight trains from the Sante Fe line in east and northeast Dallas, which was slated for eventual light rail service. Initially, the entire length of the Cotton Belt was to be used for freight rerouting from the Santa Fe line, but additional connections were made by the Santa Fe and Kansas City Southern through Denton instead.

Currently, the DGNO railroad operates two to four local freight trains per day on the Cotton Belt between Carrollton and Plano, with most of the freight customers being located in Carrollton. West of I-35E, the Fort Worth and Western Railroad handles both local freight and the Tarantula tourist train between Grapevine and Fort Worth.

DART's commuter rail staff has assessed the potential of the Cotton Belt as a transit corridor. Its assessment notes that the track is in generally poor shape from US 75 west, and would need a complete rebuild for any passenger service. The most expensive rebuild component would be in structures and signals, particularly west of I-35E in the Trinity River bottoms. The corridor is 100 feet wide in most places, with the existing track located in the center of the right-of-way. Most existing freight

customers are located on the south side of the line, which would provide an opportunity for the placement of transit tracks on the north side of the right-of-way without impeding access for exiting freight customers.

THE CORRIDOR AND DART SERVICE AND SYSTEM PLANS

Original 1983 DART Service Plan

The original DART Service Plan, approved by the voters in August 1983, included the 12-mile Cotton Belt corridor as part of that plan's Phase II program (see **Figure 2-1**). According to the compilation of the DART Service Plan developed in January 1991, the Plano/Addison/Carrollton line was described as follows:

> The line heads in an easterly direction from Belt Line Rd. in Carrollton (the Stemmons line) towards Plano, passing through Addison and Dallas. The line is within the St. Louis and Southwestern (Cottonbelt) railroad right-of-way. The line terminates near 10th Street in Plano (junction with the North Central line). The entire line is at-grade. An additional unprogrammed line extends north from Station 21 (Tollway) in an unspecified horizontal and vertical alignment parallel to the Dallas North Tollway to S.H. 121, turning southwest to Paige Rd. near The Colony. (*Source: January 1991 compilation of DART Service Plan*)

The compilation notes that the Service Plan specified stations locations along the line as being:

- Josey;
- Marsh;
- Tollway;
- Prestonwood/Preston;
- Coit; and
- Custer.

Figure 2-1 Cotton Belt Alignment in 1983 DART Service Plan

In addition, the Service Plan compilation noted grade separations along the line at:

- Denton Dr.;
- Josey La.;
- Marsh La.;
- Addison Rd.;
- Preston Rd.;
- Coit Rd.;
- Custer;
- U.S. 75; and
- Plano Parkway.

The 1983 Service Plan also included the Galleria Spur as part of its Phase III. This line, approximately 2 miles long, "heads in a southerly direction from the Plano/Addison/Carrollton line at Station 21 (Tollway) near Inwood Rd. The line parallels Inwood Rd. to I-635. The line is aerial unless right-of-way will permit at-grade construction." Only one station was listed on this line, at Alpha Rd./Galleria, and grade separations were noted at Belt Line, Spring Valley, and Alpha.

Subsequent DART Service and System Plans

Since the adoption of the 1983 Service Plan, DART has taken several actions related to the corridor. By 1988, just before that year's bond election, the line's description was changed to one of several "unprogrammed rail alignments." During the development of the 1989 System Plan, the corridor was actually considered (though briefly) as one alternative for two-way permanent high-occupancy vehicle (HOV) lanes, in competition with another east-west HOV alternative along S.H. 190. Ultimately, the Cotton Belt right-of-way was recommended for "future right-of-way preservation" in the 1989 System Plan.

As mentioned above, DART purchased the corridor from Wylie to North Fort Worth (a distance of 54 miles) in 1990 as part of the agency's long-range corridor preservation program; DART has agreements with local railroads to allow freight service on the corridor.

In November 1995, DART revised its System Plan and re-examined the Cotton Belt corridor. By this time, the Cotton Belt was one of several alignments in the "North Crosstown Corridor" as needing further study:

> Formerly referred to as the Cotton Belt Corridor, this is the east/west travel corridor in the northern portion of the Service Area. As part of the development of the Transit System Plan, discussions were held with neighborhood representatives, member city elected officials and the NCTCOG on this issue. The consensus of opinion was that the Transit System Plan should not identify a particular alignment or technology at this time. It was felt that a major investment study (MIS) should be done to identify the need for an east/west alignment and consider several alternate technologies and alignments, including consideration of the Burlington Northern and Santa Fe, as well as SH-190 and the Cotton Belt. The initial study limits will generally extend from Plano to Irving including D/FW International Airport.
>
> It is expected that the MIS will take approximately two years to complete. The MIS should begin within six months after final adoption of the Transit System Plan... (*Source: DART Transit System Plan, June 1995*).

As of the date of the preparation of this report, DART had not yet initiated this study, though it is anticipated that it could possibly be included in the scope of the next General Planning Consultant contract, expected to be issued in early 2001.

The 1995 System Plan map (see **Figure 2-2**) noted the Cotton Belt, along with the SH-190 corridor and additional railroad corridors in the region, as being alternatives "for future study."

Figure 2-2: Cotton Belt and Adjacent Corridors in 1995 DART System Plan

The 1995 System Plan document also catalogued the resolutions of DART Service Area jurisdictions related to the Cotton Belt alignment. Those resolutions included:

- Addison: "Cotton Belt Corridor to DFW Airport should be adopted as a future rail line. Initiate demand and financial studies immediately. Construction schedule should be supplied to the member cities."
- Carrollton: "Cotton Belt rail line identified as a viable alternative and placed in the Plan to be extended west of I-35E to DFW within the 10-year financing program or as soon as possible."
- Dallas: "Strongly opposes diesel locomotive service on Cotton Belt Corridor, but would, after review, strive to support other rail technology when ridership warrants if:
  - the technology has characteristics comparable to light rail in noise,vibration, emission and other environmental concerns, and
  - the corridor is developed from the Plano Transit Center to DFW Airport."
- Garland: "Cotton Belt to DFW Airport should be adopted as a future rail line. Initiate demand and financial studies on Cotton Belt with construction beginning as studies indicate the demand."
- Irving: "Develop a complete feasibility assessment of... Cotton Belt corridor to DFW Airport."
- Plano: "Extend Cotton Belt rail line to DFW Airport. Initiate demand and financial studies immediately."
- Richardson: "Cotton Belt rail line [to] be identified and placed in the Plan and extended west of I-35E to DFW within the 10-year financing program or as soon as possible."

- Rowlett: "Cotton Belt rail line [to] be identified and placed in the Plan and extended west of I-35E to DFW within the 10-year financing program or as soon as possible."

DART Construction Program

After the initiation of the DART LRT Starter System in 1996 and 1997, the agency has proceeded with its planning and design program for system extensions. In particular, the North Central LRT line extension from Park Lane to downtown Plano is under construction, with revenue service slated to begin in 2003. That LRT line includes a station in downtown Plano north of the UPRR's intersection with the Cotton Belt alignment. At that intersection, DART is replacing the at-grade crossing with an aerial structure. **Figure 2-3** shows the planned design of the line and its potential interface with the Cotton Belt corridor.

Figure 2-3: Cotton Belt/North Central LRT Line Interface

THE CORRIDOR AND THE NCTCOG REGIONAL COMMUTER RAIL STUDY

In 1994, NCTCOG sponsored the *Regional Commuter Rail Feasibility Study* to examine potential commuter rail lines in the Dallas-Fort Worth area. It ranked the Cotton Belt alignment from Plano to D/FW Airport as the top-ranked corridor in the entire region. (By way of comparison, the BNSF alignment, also under consideration by DART as a potential east-west link in the northern Dallas County area, was ranked 9th out of twelve corridors examined in the Dallas-Fort Worth area).

The report noted several characteristics of the Cotton Belt corridor:

- Its right-of-way is approximately 100 feet;
- Its overall track condition was rated "poor;"
- It serves approximately two freight trains per day in each direction;
- It currently has speed restrictions of 35 MPH;
- It has 18 at-grade crossings;
- It does not require Federal Railroad Administration (FRA)-compatible vehicles, meaning that service can be separated by time or space from existing freight traffic;
- It has high operational suitability;
- It has high environmental sensitivity, primarily due to its proximity to residences and/or schools; and
- It is suitable for alternative modes such as HOV lanes and bicycle trails.

The report also made recommendations on the vehicles and equipment to be used, potential administration and operations arrangements, potential station locations, and a sample operating plan. Its appendix includes an

assessment of track conditions, an inventory or grade crossings, and existing drainage structures, turnout locations, and mileposts.

The report developed several operating scenarios for the corridor. Possible service scenarios for Plano to Carrollton included service every 30 minutes with 3 equipment sets, or service every 40 minutes with 2 equipment sets, with a travel time of approximately 30 minutes. From Plano to D/FW, three trainsets could provide hourly frequencies, six trainsets could provide 30-minute frequencies, and four trainsets could provide a combined schedule with 30-minute frequencies to Carrollton and 60-minute frequencies to the airport. Hours of service would be weekday peak hours from 6 a.m. to 9 a.m., and evening peak hours from 4 p.m. to 7 p.m.

The service could utilize bi-directional vehicles similar to the DART RDC cars (stainless steel, air conditioned, self propelled diesel rail cars), new self-propelled diesel rail cars, or standard single-level or bi-level push-pull coaches. The report envisioned the possibility of DART contracting with local railroads to operate and maintain the service.

Possible station locations include: Southern Pacific/DART LRT Crossing, Collin Creek Mall, Coit Road, Preston Road, Addison Road Transit Center, Marsh Lane, Stemmons Freeway, MacArthur Road, D/FW Airport. Stations would be modest and would consist of platforms, simple shelters, parking lots, and commuter drop-off areas.

To operate from Plano to Carrollton with a 30-minute frequency, two sidings would be required for passing, and with a 40-minute frequency, one siding would be required. From Carrollton to D/FW Airport with a 30-minute frequency, two sidings would be required, and with a 60-minute frequency, one siding would be required. Fares were recommended to be similar to the Dallas-Irving commuter fares and similar to park-and-ride express fares.

The report also noted the availability of land along the right-of-way near the intersection of I-35E and Belt Line in Carrollton for a vehicle storage area, light vehicle maintenance and inspection facility, and track maintenance and signal maintainer's facility.

No cost estimates were given for the Cotton Belt service scenarios outlined in the report.

Appendix 1 contains existing conditions field assessment of the corridor, the highway and railroad crossing inventory, and the existing drainage structures, turnout locations, and mile post stations of the corridor, as documented in the report.

THE COTTON BELT AND THE DART NORTH CROSSTOWN CORRIDOR STUDY

Probably the most comprehensive analysis of the Cotton Belt and other nearby corridors was contained in the 1997 report for DART conducted by BRW as part of that firm's General Planning Consultant work. The North Crosstown Corridor Preliminary Feasibility Study examined all potential east-west corridors in an area bounded roughly by US 75 on the east, SH-121 on the north, Belt Line Rd. on the west, and LBJ Freeway on the south. The report's purpose was to examine all potential alignments to "provide the foundation for a future Major Investment Study."

Four alignments were studied in the analysis:

- The (then) Burlington Northern railroad from SH-121 to its intersection with the Cotton Belt near Carrollton;
- The Cotton Belt alignment from Plano to D/FW Airport, with a possible eastern terminus at Addison;
- The Kansas City Southern corridor from the DART Northeast LRT line in Garland to the Burlington Northern line north of Addison; and

- An alternative using the SH-190 right-of-way from the Kansas City Southern to the Burlington Northern.

The Cotton Belt was divided into four segments for this report's analysis:

- Segment F1: from the North Central LRT line to the intersection of the Kansas City Southern (2.92 miles);
- Segment F2: from the Kansas City Southern to the Addison Transit Center (5.98 miles);
- Segment F3: from the Addison Transit Center to the Burlington Northern intersection in Carrollton (4.89 miles); and
- Segment F4: from the Burlington Northern in Carrollton to D/FW Airport (8.29 miles).

Table 2-1 summarizes the report's analysis of the Corridor's physical conditions.

Table 2-1: Cotton Belt Corridor Physical Conditions

Segment	ROW Width	Major At-Grade Street Crossings	Overall Track Condition
F1: Plano to KCS (2.92 miles)	100'	10th, Ave. F, Plano Pkwy., Alma Dr., Custer	Good
F2: KCS to Addison TC (5.98 miles)	100'	Waterview, Coit, McCallum, Hillcrest, Davenport, Campbell, Davenport, Preston, Quorum, Addison	Fair
F3: Addison TC to BN (4.89 miles)	100'	Midway, Marsh, Kelly, Josey, Denton Dr.	Poor
F4: BN to D/FW (8.29 miles)	100'	MacArthur, Denton Tap, Freeport Pkwy., Royal, County Line	Fair

Source: DART North Crosstown Corridor Preliminary Feasibility Study, BRW, 1997

The report also analyzed travel time and access characteristics of the corridor. **Table 2-2** summarizes those characteristics. Travel times are computed by assuming a 35 MPH average speed for traditional push-pull commuter rail and 45 MPH for self-propelled diesel multiple unit (DMU) commuter rail vehicles (which has identical travel times and average speeds as light rail). Access characteristics are gauged by measuring population and employment within a half-mile of the corridor and by cataloging sensitive land uses within 1,000 feet of the corridor.

Table 2-2: Cotton Belt Corridor Travel Time and Access Characteristics

Segment	Travel time (min.)		1990/2020 Demographics		Sensitive Land Uses within 1000'		
	Commuter Rail	LRT/ DMU	Population within ½ mi.	Employment within ½ mile	Resi-dential	Parks	Schools
F1: Plano to KCS (2.92 miles)	5 min.	4 min.	4,300/5,300	11,800/21,100	Low	3	0
F2: KCS to Addison TC (5.98 miles)	10.25 min.	8 min.	17,200/24,500	18,600/31,900	Modera te	3	0
F3: Addison TC to BN (4.89 miles)	8.5 min.	6.5 min.	12,600/14,800	24,500/31,900	Low	4	0
F4: BN to D/FW (8.29 miles)	14 min.	11 min.	5,800/17,200	8,000/16,600	Low	2	1
Corridor Totals (22.08 miles)	37.75 min.	29.5 min.	39,900/61,800	62,900/101,500		12	1

Source: DART North Crosstown Corridor Preliminary Feasibility Study, BRW, 1997

The analysis showed a travel time of almost 38 minutes from Plano to D/FW along the Cotton Belt using traditional push-pull commuter rail vehicles, and just under 30 minutes using self-propelled DMU technology or light rail. Population was projected to increase along the corridor by 55% between 1990 and 2020, and employment was projected to increase

by just more than 61%. Regarding sensitive land uses, the report noted that Segment F2 had the highest concentration of sensitive land uses, as it is located largely within a single-family residential area. The report also noted that residential areas located south of Segment F1 and north of Segment F4 are buffered from the rail corridor by strips of vacant land or open space.

The report also analyzed capital costs for implementing rail service in the corridor. **Table 2-3** summarizes the capital cost analysis.

Table 2-3: Capital Cost Analysis for Rail Service Options in the Cotton Belt Corridor

Segment	Capital Cost in millions		
	LRT	Commuter Rail	DMU
F1: Plano to KCS (2.92 miles)	$64	$25	$35
F2: KCS to Addison TC (5.98 miles)	$132	$57	$72
F3: Addison TC to BN (4.89 miles)	$108	$46	$50
F4: BN to D/FW (8.29 miles)	$182	$79	$99
Corridor Totals (22.08 miles)	$486 ($22/mile)	$207 ($9.4/mile)	$256 ($11.6/mile)

Source: DART North Crosstown Corridor Preliminary Feasibility Study, BRW, 1997

The table shows that light rail is the most expensive option, followed by DMU and conventional commuter rail. Capital costs assumed improvements and upgrades such as new structures and new or rehabilitated track to achieve the average speed requirements of each mode.

The study concluded that, of the four alignments and subsequent route combinations studied, the Cotton Belt:

- was one of two with the greatest level of access to high density employment in 2020;

- was one of two with the highest level of system connectivity to existing and planned transit services and facilities; and
- was one of two with the most direct travel routes across the corridor and an associated lower capital cost and travel time.

THE COTTON BELT AND THE DART NORTHWEST CORRIDOR MAJOR INVESTMENT STUDY

This study, produced for DART in 2000, recommended a Locally Preferred Investment Strategy (LPIS) for the corridor extending from downtown Dallas along I-35E to Farmers Branch, Carrollton, and West Addison, and to North Irving. It recommended:

- the addition of two reversible HOV lanes and one general purpose lane in each direction on I-35E in the Carrollton area;
- implementation of light rail service along the UPRR right-of-way that parallels I-35E, with an aerial passenger station at Belt Line/Old Downtown Carrollton (see **Figure 2-4**). The report notes that this station provides an "Opportunity for future rail transfer with potential rail lines along the Cotton Belt RR and/or the BN RR." (p. 190). The report also shows the LRT line in an aerial structure crossing over the Cotton Belt near downtown Carrollton. **Figure 2-5** shows an aerial close-up of the LRT line in downtown Carrollton, showing its proximity to the Cotton Belt corridor; and **Figure 2-6** is a plan drawing showing the LRT aerial structure as it crosses over the Cotton Belt near Belt Line; and
- implementation of light rail service through Irving and Las Colinas to the north entrance of D/FW Airport. No specifics are given on a station location other than that is near the north shuttle parking lot, with an eventual people mover connection to the rest of the airport.

Figure 2-4: Northwest MIS LRT Recommendation

Figure 2-5: LRT Alignment in Carrolton and Proximity to Cotton Belt

Figure 2-6: Plan View of Northwest LRT Line Crossing of Cotton Belt in Carrollton

THE CORRIDOR AND NCTCOG TRANSPORTATION PLANS

The NCTCOG Mobility 2020 Regional Transportation Plan evaluated several potential rail alternatives for future implementation beyond that already programmed. The report mentioned the work of the North Crosstown Corridor Evaluation Task Force, which consisted of interested public and private sector individuals and was aimed at identifying mobility solutions in the North Dallas County/South Collin County area. The report recommended that the Task Force continue its evaluation, with further examination of the engineering feasibility and environmental implications of:

- rail along the Santa Fe line and the Burlington Northern line, including the feasibility of an alternative connection along SH-190;
- rail along the full Cotton Belt corridor, from Parker Road in Plano to D/FW Airport; and
- rail along the Cotton Belt with a possible eastern terminus at the Addison Intermodal Center and a western terminus at D/FW Airport.

As NCTCOG moved into its 2025 Plan preparation, the North Crosstown Corridor Task Force continued its evaluation and worked with NCTCOG staff to prepare Technical Recommendations for possible inclusion into the Plan. The Task Force examined nine potential light rail alignments and seven possible commuter rail corridors. During the course of its investigation, the Task Force carried three commuter rail alignments forward for further study (see **Figure 2-7**):

- Alternative 4, which consisted of the Cotton Belt alignment from Plano to D/FW Airport;
- Alternative 7, which consisted of the Cotton Belt from Plano westward to the Santa Fe line, running northwest to its intersection with the Burlington Northern line, then southward to re-enter the Cotton Belt near Carrollton and on to D/FW Airport; and

Figure 2-7: North Crosstown Corridor Task Force "Short List" of Commuter Rail Alignments

- Alternative 8, which consisted of the Santa Fe line from Garland northwest to its intersection with the Burlington Northern, then proceeding southwest to re-enter the Cotton Belt near Carrollton and on to D/FW Airport.

Table 2-4 summarizes the analysis conducted for the three short-listed commuter rail corridors, with data on mobility, environmental/quality of life issues, and cost-effectiveness.

Table 2-4: North Crosstown Corridor Task Force Analysis of Short Listed Commuter Rail Corridors					
Category	**Criteria**	**Measure**	**Alternative 4**	**Alternative 7**	**Alternative 8**
Mobility	*Ridership*	Daily Boardings/ Alightings	4,134	4,686	5,957
	Activity Centers	Employment at Activity Centers	323,100	270,075	263,600
Environmental/ Quality of Life	*Noise Impacts*	Environmental exposure*	27.7%	24.9%	34.6%
	Sensitive Sites	Schools within ½ mile	9	12.5	16
		Fire stations within ½ mile	5	4	6
		Fire station service areas that cross line	10	10	14
		School attendance boundaries that cross line	41	54.5	61
	Traffic Impacts	At-grade crossings	38	36	39
		Needing separation	6	2	2
Cost-Effectiveness	*Cost-Effectiveness*	Length of alternative (miles)	21.94	36.91	41.65
		Daily passenger miles	36,609	40.551	52,108
		Annual passenger miles****	9,520,000	10,540,000	13,550,000
		Capital cost**	$159,700,000	$215,700,000	$240,700,000
		Annualized capital costs***	$19,200,000	$25,900,000	$28,900,000
		Annualized fare revenue****	$1,100,000	$1,200,000	$1.500,000
		Net cost	$18,100,000	$24,700,000	$27,400,000
		Net cost/annual passenger miles	$1.90	$2.35	$2.02
		Net cost/annual riders	$16.86	$20.29	$17.69

*Notes: * - Percent of line with existing single- or multi-family housing within 85 feet*
*** - Assumes $3M per grade separation and $1.4 M per at-grade crossing*
**** - Assumes DART unit costs and 0.12026 capital recovery factor (20 years at 3.5% discount)*
***** - Assumes 260 days/year annualization factor and $1/ride*
Source: NCTCOG Mobility 2025 North Crosstown Corridor Overview of Technical Recommendations, January 2000

The table shows that Alternative 4 (the Cotton Belt alignment) is the most cost-effective of the three short-listed alternatives examined when evaluating net cost per passenger miles and net cost per rider.

However, the final Mobility 2025 Regional Transportation Plan did not incorporate these findings and instead recommended that the Task Force "continue to work with the communities and local governments in the area to establish a clear recommendation."

3.

THE COTTON BELT CORRIDOR: WHAT IT LOOKS LIKE NOW, AND WHAT IT WILL LOOK LIKE IN THE FUTURE

INTRODUCTION

The purpose of this section is to explore the demographic and economic issues related to the Cotton Belt corridor and its adjacent communities. This information has been gathered from a wide variety of sources, ranging from NCTCOG to local chambers of commerce and state and local governmental agencies. The intent of this analysis is to demonstrate the study corridor's socioeconomic trends compared to other parts of the Dallas-Fort Worth region, particularly those already being served (or planned to be served) by DART rail lines.

CORRIDOR DEFINITION

[listing/map of TSZ's/tap zones/census tracts used in this study – Jim Estus to provide]

POPULATION TRENDS

[from NCTCOG TSZ data – current and forecast, and analysis of highest growth areas – Jim Estus to produce]

By way of comparison, the NCTCOG Mobility 2025 plan notes that between 1995 and 2025, population growth will occur as follows:

- in the entire North Central Texas region, population will grow from 4.2 million in 1995 to 6.9 million in 2025, an increase of almost 63%;
- in Dallas County, population is forecast to grow from 1.9 million in 1995 to 2.6 million in 2025, an increase of 34%;
- and in Collin County, population is projected to grow from 370,000 in 1995 to 917,000 in 2025, an increase of 148%.

EMPLOYMENT TRENDS

[from NCTCOG TSZ data – current and forecast, and analysis of highest growth areas – Jim Estus to produce]

By way of comparison, the NCTCOG Mobility 2025 plan notes that between 1995 and 2025, employment growth will occur as follows:

- in the entire North Central Texas region, employment is anticipated to increase from 2.4 million to 4.1 million, an increase of almost 170%;
- in Dallas County, employment is forecast to grow from 1.4 million in 1995 to 2.1 million in 2025, an increase of 49%; and
- in Collin County, employment is projected to grow from 128,000 in 1995 to 357,000 in 2025, an increase of almost 180%.

SOCIOECONOMIC CONDITIONS AND TRENDS

[from NCTCOG TSZ and census tract data – income, ethnicity, auto ownership, etc. – Jim Estus to produce]

ECONOMIC CONDITIONS AND TRENDS

[from NCTCOG TSZ and census tract data, and chamber of commerce/comptrollers office. Retail sales, office space and developments, hotel rooms, etc.]

CORRIDOR LAND USE TRENDS

[from NCTCOG land use data – Jim Estus to produce]

CORRIDOR DEVELOPMENT TRENDS AND ACTIVITY CENTERS

[review of major new developments along or adjacent to corridor]

CORRIDOR TRAFFIC AND TRANSPORTATION CONDITIONS

[primarily from NCTCOG traffic counts and forecasts – major congested roadways; TIP information, etc.]

The NCTCOG Mobility 2025 Plan shows that the portion of North Dallas County that includes the Cotton Belt corridor from Coit Road on the east to Las Colinas on the west was noted as an area of severe peak-period congestion in 1995 (see Figure ___). The Plan also notes that even with all Mobility 2025 recommendations, the area experiencing severe peak-period congestion includes most of the Cotton Belt corridor from Plano to Las Colinas (see Figure __).

The 2025 Mobility Plan also details a number of travel performance measures for the entire region and localized districts. Table __ shows the results of that analysis.

Table __: Regional vs. Corridor Mobility Performance Measures

Area/ District	Avg. Trips/Person			Vehicle Miles of Travel (Millions)			Percent Time Spent in Delay			Annual Cost of Congestion (Millions)		
	1995	2025	% Chg	1995	2025	% Chg	1995	2025	% Chg	1995	2025	% Chg
Region	NA	NA	NA	106.0	189.8	28%	NA	NA	NA	$3,921	$7,378	88%
Dallas Co.	3.0	3.1	3%	53.5	83.8	57%	32.5	33.2	2%	$2,257	$3,372	49%
Collin Co.	2.2	2.3	5%	7.7	21.2	175%	30.3	39.7	31%	$277	$1,083	291%
Cotton Belt Districts												
12	5.8	5.2	(10%)	2.4	4.6	92%	30.2	33.6	11%	$89	$184	107%
13	2.5	2.7	8%	2.2	6.3	186%	37.2	35.7	(4%)	$123	$268	118%
14	6.2	6.6	6%	2.0	3.0	50%	38.3	41.4	8%	$113	$179	58%
15	3.4	3.9	15%	3.1	5.2	68%	43.2	45.2	5%	$213	$360	69%
16	3.5	4.6	31%	2.4	4.2	75%	31.7	37.9	20%	$102	$226	122%
31	NA	NA	NA	1.2	2.1	75%	36.8	33.8	(8%)	$55	$78	42%
Total	*21.4*	*23.0*	*7%*	*13.3*	*25.4*	*91%*	*36.2*	*37.9*	*5%*	*$695*	*$1,295*	*86%*

Source: NCTCOG Mobility 2025 Plan

D/FW Airport Influences on the Corridor

Dallas/Fort Worth International Airport is an obvious major factor in the potential use of the Cotton Belt as a rail transit alignment, as it has a huge influence on travel patterns and employment throughout the North Central Texas region.

BRW recently completed a study on revamping internal bus circulation at the airport in anticipation of the new people mover system now being designed. That study developed the following conclusions about passenger and employee movement into and out of D/FW:

- D/FW is now world's busiest airport in terms of operations, and the 3rd busiest in passenger numbers, with an annual passenger usage of approximately 60 million. Of that figure, about 60% are hubbing, or connecting to other flights within the airport, meaning that about 40% of all passengers (or 24 million) use D/FW as an origin or destination airport and travel to or from it on the local roadway system.

- Based on the 60 million annual passenger number, D/FW's typical weekday passenger activity is 200,000. As mentioned above, approximately 60% (or 120,000) are hubbing and never leave the airport property. The other 40% (or 80,000) are either arriving from or departing to the surrounding area.

- Roughly half of the 80,000 are local residents, with the other half coming into the Dallas-Fort Worth area for business or recreation.

- Of the 40,000 local residents who use the airport daily, about 90% use their own cars and park in the airport's parking lots. The other 10% are using taxis, shuttles, and buses.

- Of the 40,000 non-locals who use the airport, most are using rental cars, with the remainder using taxis, shuttles, and buses.

- Total employment at the airport is approximately 42,000, including airport employees; airline employees (flight crews, ticket counter/gate employees, baggage handlers, operations personnel, line maintenance and maintenance base employees, and others); other contract firms such as curbside baggage checking (skycaps), aircraft cleaners, security personnel, janitorial and others; terminal retail shop and food service employees; and other fringe employees such as air cargo, package express (such as Federal Express), airport post office, freight forwarders, airline kitchens, and others.

- Public transit service provided by DART is aimed at employees. DART has two routes serving the airport: Route 202 from the SH-114 corridor to the north, serving north employee lots; and Route 409 from the SH-183/Walnut Hill area, serving south parking lots. The T in Fort Worth provides express service from downtown hotels and from a park-and-ride lot on the northeast side of downtown; this service focuses on airport passengers.

D/FW is embarking on a five-year capital improvements plan that includes implementation of a new secure automated people mover and maintenance facility serving all terminals (including a new Terminal D that will be designed to handle all international flights).

4.

MOVING IN AND THROUGH THE COTTON BELT CORRIDOR

INTRODUCTION

The purpose of this section is to examine the travel patterns within and external to the Cotton Belt corridor. This analysis is aimed at determining the major focal points of trip-making along the corridor; the splits between internal and external trips; and the potential for the corridor to be a self-sustaining transit alignment and a supplemental alignment to other DART corridors based on the analysis of travel patterns.

MAJOR CORRIDOR ACTIVITY CENTERS: KEY ORIGINS AND DESTINATIONS

The first step in the analysis of travel patterns is to determine the major focal points of activity, or the key origins and destinations along the Cotton Belt corridor that might serve as focal points for travel both within and external to the alignment. As noted in Section 2, the DART 1983 Service Plan designated potential station locations for the Cotton Belt alignment between Plano and Carrollton as (see **Figure 4-1**):

- Josey;
- Marsh;
- Tollway;
- Prestonwood/Preston;
- Coit; and
- Custer.

Figure 4-1: DART 1983 Service Plan Station Locations on Cotton Belt Alignment

Since the 1983 Service Plan, development patterns have changed along the corridor, resulting in the need to refocus and refine the major activity centers along the alignment.

[list of major activity centers along corridor; map]

CORRIDOR TRAVEL PATTERNS IN A REGIONAL CONTEXT

[where are people going to from the corridor related to regional travel patterns, from NCTCOG trip tables]

TRAVEL PATTERNS WITHIN THE CORRIDOR

[focus on travel patterns from major points along the right-of-way as determined in 4.1; how that has changed in last 5-10 years, 2025 forecast]

5.

COTTON BELT CORRIDOR RIDERSHIP AND POTENTIAL COST-EFFECTIVENESS

INTRODUCTION

PREVIOUS RIDERSHIP/COST-EFFECTIVENESS ANALYSES

As noted earlier, the NCTCOG North Crosstown Corridor Task Force conducted a technical analysis of potential rail alignments in the study area, and short-listed three commuter rail alignments for further study. Of those three, the Cotton Belt alignment was the most cost-effective when measuring costs per passenger miles and rider (see Section 2.6).

That analysis forecast that a commuter rail alignment on the Cotton Belt corridor would carry 4,134 riders per day, or an annual ridership of 1,074,840. The alignment's capital cost was projected at $159.7 million, or approximately $7.3 million per mile.

The NCTCOG analysis measured cost-effectiveness by calculating annualized capital costs (multiplying the capital cost figure by 0.12026 (a 20-year, 3.5% discount factor), calculating a fare revenue estimate (based on annual riders multiplied by a flat $1 fare), calculating a net annualized capital cost (subtracting the fare revenues from the annualized capital costs), and calculating a cost per annual passenger mile and a cost per annual rider using that net annualized capital cost. When calculated in that manner, the Cotton Belt alignment had a net cost per annual passenger mile of $1.90, and a net cost per annual rider of $16.86.

However, other agencies calculate cost-effectiveness in different ways. This section is an attempt to measure the Cotton Belt commuter line's potential cost effectiveness (as determined in the NCTCOG analysis) compared to other commuter rail and light rail projects locally and nationwide.

To ensure the consistency of comparisons, this report uses DART's cost-effectiveness formulas. For example, the most recently completed DART Major Investment Study – the Northwest Corridor – uses the following formulas to measure cost-effectiveness:

- annualized capital costs are determined by multiplying a project's capital costs by 0.082 for light rail projects (a discount factor of __%), and by 0.077 for commuter rail projects (a discount factor of __%); and
- annualized riders are calculated by multiplying daily riders by 302 for light rail projects and 271 for commuter rail projects.

Cotton Belt Ridership and Cost-Effectiveness Compared to Other DART Corridors

The first cost-effectiveness analysis examines the Cotton Belt as it compares to other DART projects. Table ? shows the results of that analysis.

Table ? Cotton Belt Cost Effectiveness Compared to Other DART Projects

Project	Capital Cost	Annualization Factor	Annualized Costs	Daily Riders	Annualization Factor	Annualized Riders	Annual Cost/Rider	Status
Commuter Rail								
Cotton Belt (1)	$159.7 M	0.077	$12.3 M	4,134	271	1,120,300	$10.98	Under study
Railtran Ph II (2)	$153.5 M	0.077	$11.8 M	10,950	271	2,967,500	$3.98	Partially open
Light Rail								
NW Corr. (3)	$1,400 M	0.082	$114.8 M	24,700	302	7,460,000	$15.40	Entering PE
SE Corr. (4)	$450 M	0.082	$36.9 M	19,500	302	5,889,000	$6.27	Finished MIS
No. Cent. Ext. (2)	$517.2 M	0.082	$42.4 M	17,000	302	5,134,000	$8.26	Under const.

Sources: NCTCOG North Crosstown Corridor Task Force, January 2000
FTA New Starts Report
NW Corridor MIS Report, BRW, 2000
DART web site

The table notes that the Cotton Belt has a higher cost-effectiveness calculation than the light rail line proposed for the Northwest Corridor, and is comparable to the cost per rider calculation for the North Central LRT extension.

COTTON BELT RIDERSHIP/COST-EFFECTIVENESS COMPARED TO OTHER CORRIDORS NATIONWIDE

The next analysis compares the Cotton Belt to other major transit projects nationwide. Table ? shows the results of that analysis.

Table ? Cotton Belt Cost-Effectiveness Compared to Other Nationwide Transit Projects

Project	Capital Cost	Annualization Factor	Annualized Costs	Daily Riders	Annualization Factor	Annualized Riders	Annual Cost/Rider	Status
Commuter Rail								
Cotton Belt (1)	$159.7 M	0.077	$12.3 M	4,134	271	1,120,300	$10.98	Under study
Raleigh Phase I (2)	$284 M	0.077	$21.9 M	14,000	271	3,794,000	$5.76	Recommended
SD Oceanside (2)	$213.7 M	0.077	$16.5 M	15,100	271	4,092,100	$4.02	Highly Rec.
Seattle (2)	$401 M	0.077	$30.9 M	12,300	271	3,333,300	$9.26	Recommended
Tampa Bay (2)	$726.3 M	0.077	$55.9 M	22,000	271	5,962,000	$9.38	Not recommended
Denver East (3)	$315.9 M	0.077	$24.3 M	12,900	271	3,495,900	$6.96	LPA
N. Front Range (4)	$652 M	0.077	$50.2 M	10,290	271	2,785,600	$18.00	LPA
Light Rail								
Austin NW/N (2)	$516.7 M	0.082	$42.4 M	51,000	302	15,402,000	$2.75	Not yet rated
Cincinnati I-71 (2)	$675.8 M	0.082	$55.4 M	19,800	302	5,979,800	$9.27	Not recommended
Denver SE (2)	$595.7 M	0.082	$48.9 M	29,250	302	8,833,500	$5.53	Const. in 2001
Denver SW (2)	$176.3 M	0.082	$14.5 M	22,000	302	6,644,000	$2.18	Open
Denver West (5)	$257.8 M	0.082	$21.1 M	24,540	302	7,411,100	$2.85	LPA
KC S'town (2)	$247.7 M	0.082	$20.3 M	10,800	302	3,261,600	$6.23	Not recommended
Minn. Hiawatha (2)	$446 M	0.082	$36.6 M	24,800	302	7,489,600	$4.88	Recommended
Norfolk (2)	$524.6 M	0.082	$43.1 M	14,740	302	4,451,500	$9.66	Not recommended
Phoenix (2)	$390 M	0.082	$32.0 M	18,800	302	5,617,200	$5.69	Not recommended
Pittsburgh (2)	$512.5 M	0.082	$42.0 M	25,000	302	7,550,000	$5.57	Not recommended
Portland N/S (2)	$1,186 M	0.082	$97.3 M	42,700	302	12,895,400	$7.54	Not recommended
Sacramento S (2)	$222 M	0.082	$18.2 M	25,000	302	7,550,000	$2.41	Not yet rated
SLC Downtown (2)	$748 M	0.082	$61.3 M	2,500	302	755,000	$81.24	Not recommended
SLC N/S (2)	$312.5 M	0.082	$25.6 M	23,000	302	6,946,000	$3.69	Open
SD Mid-Coast (2)	$104.6 M	0.082	$8.6 M	22,599	302	6,824,900	$1.26	Highly rec.
SD Mission V. (2)	$361 M	0.082	$29.6 M	10,800	302	3,261,600	$9.08	Highly rec.
S. Jose West (2)	$325 M	0.082	$26.6 M	7,500	302	2,265,000	$11.77	Open
Seattle Link (2)	$2,920 M	0.082	$239.4 M	155,000	302	46,810,000	$5.12	Highly rec.
St L East (2)	$426.7 M	0.082	$35.0 M	16,000	302	4,832,000	$7.24	Open

Sources:
(1) NCTCOG North Crosstown Corridor Task Force, January 2000
(2) FTA New Starts Report
(3) Denver Regional Council of Governments, 1997
(4) Colorado Dept. of Transportation, 2000
(5) Denver Regional Transportation District, 1997

The table shows that the Cotton Belt compares favorably to several commuter rail and light rail corridors that are in various stages of implementation. For example, the Cotton Belt's cost-effectiveness is similar to that of the new Seattle Sounder commuter rail system, which is now under construction. The Cotton Belt's cost-effectiveness calculation is also similar to that of the San Diego Mission Valley light rail line (under design) and is actually better than that of the San Jose West light rail line, which is open for revenue service.

This analysis shows that the Cotton Belt would fare favorably in a cost-effectiveness evaluation, which is one of the primary criteria used by the

Federal Transit Administration in evaluating, ranking, and funding projects.

Recent Trends/Developments That Could Impact Ridership and Cost-Effectiveness

[summary of new developments along corridor that could improve the cost-effectiveness of the route]

6.

KEY ISSUES TO BE EXPLORED FURTHER

INTRODUCTION

TRACK CONDITIONS

[summary of info from Regional Commuter Rail report – what it would take to upgrade tracks for commuter service]

AT-GRADE CROSSINGS

[summary of major crossings, issues, traffic warrants]

Other Neighborhood Issues

TECHNOLOGY ALTERNATIVES

REGIONAL CONNECTIVITY

POTENTIAL STATION LOCATIONS

[examination of other studies' recommendations, and a look at a few adjustments that could be made to improve the system, what a station would entail, land use impacts, etc. – including DFW Airport]

7.

CONCLUSIONS AND RECOMMENDATIONS

Michael Murphy

To: tim_baldwin@urscorp.com
Subject: RE: report status

Mike
Michael E. Murphy, P.E.
Director of Public Works
Town of Addison
(972)450-2878

-----Original Message-----
From: tim_baldwin@urscorp.com [mailto:tim_baldwin@urscorp.com]
Sent: Friday, February 16, 2001 11:47 AM
To: bshipp@ci.addison.tx.us; mmurphy@ci.addison.tx.us
Subject: report status

Bill/Mike -- we are still having trouble processing the demographic and travel model info from NCTCOG. In particular, the travel model info is causing us fits from both a tabular and graphic standpoint. But I am proceeding to put together as much of the narrative as I can in the absence
of the travel model info. I am working with our GIS person to get it straightened out, but we will continue to work on it next week.

In the meantime, I have attached an updated version of the economic conditions memo I sent last week. It includes info on retail sales subject
to sales tax, home sales, and a few other items we have added.

I should be wrapping up the conclusions this afternoon, which I will then
modify based on the final travel model info. Sorry for the delay -- we'll
keep pushing to get it finished.

Let me know if you have any questions.

thanks!

(See attached file: ECONOMIC CONDITIONS AND TRENDS.doc)

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ECONOMIC CONDITIONS AND TRENDS

Hotel Rooms

An analysis of hotel rooms can provide some insight to the amount of travel being focused on a particular area, either for business purposes or leisure travel. Table __ shows a compilation of hotel rooms in the study area and other areas around the region.

Table __
Hotel Room Comparisons

City/Area	Number of hotel rooms
Cotton Belt Corridor cities:	
Addison	3,701
Farmers Branch	2,300
Carrollton	575
Richardson	2,485
Plano	1,169
Subtotal	*10,230*
Las Colinas	4,017
Downtown Dallas	6,136
Downtown Fort Worth	2,231

Sources: Cotton Belt Corridor cities' information from individual city web sites and Metrocrest Chamber of Commerce; other cities' data from local chambers of commerce.

The table shows that the cities along the Cotton Belt corridor have more hotel rooms than downtown Dallas and downtown Fort Worth combined, and more than twice the number found in Las Colinas. This indicates a high amount of business travel, convention business, and leisure travel being generated by the study area cities that could potentially benefit from a fixed guideway system.

Office Space

An analysis of office space in the study area and comparable areas around the region can provide some insight into the amount of commercial employment intensity in a given area. Table __ shows the results of that analysis.

Table __
Office Space Comparison

City/Area	Current office space (square footage)
Cotton Belt Corridor cities:	
Addison	10,833,823
Farmers Branch	N/A
Carrollton	N/A
Subtotal for three cities:	*(22,750,000)*
Richardson	(12,300,000)
Plano	
Subtotal	*35,050,000*
Las Colinas	20,000,000
Downtown Dallas	31,000,000
Downtown Fort Worth	8,700,000

Sources: Addison from Town of Addison staff; Addison/Farmers Branch/Carrollton subtotal from *Greater Dallas Office Guide*; Richardson, Plano, Las Colinas, and Downtown Dallas from *Real Estate Market Overview, Dallas 2000*, The Real Estate Center, Texas A&M University; downtown Fort Worth from *Real Estate Market Overview, Fort Worth-Arlington 2000*, The Real Estate Center, Texas A&M University.

The table shows that the cities along the Cotton Belt corridor have a larger total concentration of office space than downtown Dallas, downtown Fort Worth, or Las Colinas, another indicator of a potential employment market for a fixed guideway transit system.

Another method of analysis is to compare office vacancy rates. Table __ shows the office vacancy rates of the Cotton Belt area compared to other employment centers in the D/FW area.

Table __
Office Vacancy Comparison

City/Area	Current office vacancy percentage
Cotton Belt Corridor cities	16.3%
Las Colinas	17.2%
Downtown Dallas	30.2%
Downtown Fort Worth	15.9%

Sources: Cotton Belt Corridor cities, Las Colinas and Downtown Dallas from *Greater Dallas Office Guide;* Downtown Fort Worth from *Real Estate Market Overview, Fort Worth-Arlington 2000*, The Real Estate Center, Texas A&M University.

The table shows that the Cotton Belt corridor cities have a lower office vacancy rate than all other employment centers with the exception of downtown Fort Worth.

Retail Space

An analysis of retail space in a given area may be an indicator of the robustness of the area's local economy, especially when compared to other high-activity areas. Table __ shows the results of the data compilation on retail space in the study area and other areas in the region.

Table __
Retail Space Comparisons

City/Area	Current retail space (square footage)
Cotton Belt Corridor cities:	
Addison	1,949,735
Farmers Branch	N/A
Carrollton	N/A
Subtotal for three cities:	*(21,220,000)*
Richardson	5,000,000
Plano	8,843,000
Subtotal	*35,063,000*
Las Colinas (includes Coppell and Central Lewisville)	12,300,000
Downtown Dallas	4,600,000
Downtown Fort Worth	9,912,000

Sources: Addison from Town of Addison staff; Addison/Farmers Branch/Carrollton subtotal, Las Colinas, and Downtown Dallas from *Real Estate Market Overview, Dallas 2000*, The Real Estate Center, Texas A&M University; Richardson and Plano data from city staff; Downtown Fort Worth from *Real Estate Market Overview, Fort Worth-Arlington 2000*, The Real Estate Center, Texas A&M University.

The table shows that the five cities in the study area combined have almost three times the retail space of the Las Colinas area, four times the amount of retail space of downtown Fort Worth, and almost seven times the amount of retail space listed in downtown Dallas.

Retail Sales

Another indicator of the corridor's relative economic strength is its retail sales. Table __ shows the study's area retail sales compared to other parts of the Dallas-Fort Worth region in 1995 and 1999 (the last full year for which information is available).

Table __
Corridor Retail Sales Analysis

City/Area	Retail Sales Subject to State Sales Tax (in millions)		
	1995	1999	% change
Cotton Belt Corridor zip codes:			
Addison	$66.7	$193.8	190%
Carrollton	$1,129.7	$1,498.1	33%
Farmers Branch	$1,921.9	$1,940.9	1%
North Dallas	$2,079.1	$8,916.3	329%
Plano	$2,617.9	$4,251.9	62%
Richardson	$1,373.5	$1,654.5	20%
Subtotal	*$9,188.8*	*$18,455.5*	*101%*
Las Colinas	$1,035.9	$1,901.9	84%
Downtown Dallas	$5,539.6	$6,795.5	23%
Downtown Fort Worth	$498.7	$412.4	-1%

Source: Texas Comptroller of Public Accounts

The table shows that retail sales in the Cotton Belt study corridor increased faster between 1995 and 1999 than Las Colinas, Downtown Dallas, and Downtown Fort Worth, another indication of a very strong local economic base.

Home Sales

The existing home sales market in the Cotton Belt corridor is among the most robust in the entire Dallas area. According to the *Real Estate Market Overview, Dallas 2000* (The Real Estate Center, Texas A&M University):

- Plano led the Dallas area with 4,342 total sales of existing homes in 1999, with an average 51 days on the market;
- Carrollton-Farmers Branch was the 5th-largest existing home sales area (out of 29 catalogued), with 2,164 home sales in 1999, and an average of 34 days on the market;
- Far North Dallas was the 7th-largest existing home sales area,with 1,460 home sales in 1999, and an average of 53 days on the market; and
- Richardson was the 8th-largest existing homes sales area, with 1,430 homes sales in 1999, and an average of 45 days on the market.

CORRIDOR DEVELOPMENT TRENDS AND ACTIVITY CENTERS

One indicator of an area's economic strength is the new development occurring in that area. The following new development trends have been noted in the past few months in the Cotton Belt corridor:

From the *Greater Dallas Office Guide 2000*:

- The Telecom Corridor in Richardson continues to be one of the area's busiest office markets, with many economic experts predicting that the Corridor will add 40,000 new jobs to the area by 2010, making it the second-largest employer in the Dallas-Fort Worth area;

- Other recent major high-tech office leases in the Richardson area include Southwestern Bell at One Telecom, I-Net at Collins Crossing, Prism at Fall Creek, and Cisco at Turnpike Commons East;
- The 50-acre Galatyn Park in Richardson is now about a year away from opening and will include a full-service 330-room hotel, a DART light rail station, a 1,500-seat auditorium for conferences and performance arts, and two new Nortel anchor office buildings;
- The Far North Dallas office market, which includes Addison, Carrollton, and Farmers Branch, is "one of the busiest in the Metroplex in terms of new construction, leasing activity, and relocations.... rivaled only by Las Colinas and the Telecom Corridor".

Additional recent development trends noted in the *Real Estate Market Overview, Dallas 2000* (The Real Estate Center, Texas A&M University) include:

- Fujitsu Network Service has recently added 250 jobs in Plano;
- Compaq Computers is employing 100 workers at a new telecommunications division in Plano;
- An $8 million student housing project is under construction at the University of Texas at Dallas;
- The Collin County Community College District has purchased a site for the Courtyard Center for Professional and Economic Development, an 80,000-square-foot complex in Plano;
- The Villa Verona is a new 16-story apartment tower constructed near the Galleria Mall;
- A 101-room Wingate Inn hotel opened in Addison in 2000, a 176-room Addison/Quorum Courtyard opened in April 2000, and a Hilton Garden Inn opened in the spring of 1999;

- A 330-room Renaissance by Marriott Hotel is planned for Richardson's Telecom Corridor, and a 123-room Riuchardson Campbell Courtyard opened in 2000;
- In Richardson, the Collins Crossing Tower office building opened in September 1999 with 300,000 square feet in eleven floors, the new One Telecom Building added 226,000 square feet of office space to the city, the Commons Office Center opened in 1999 with 172,781 square feet, and Telecom Central includes three new buildings with a total of 263,000 square feet;
- In Plano, new office buildings include Country Wide Mortgage with 463,600 square feet, Omnicom Group with two buildings and 250,000 square feet, and the Park Center office building with 806,000 square feet;
- In Farmers Branch, the Centura Office Tower was completed in 2000 with 432,000 square feet, the new One International office tower has 351,000 square feet, and the new Hickory Centre has 221,000 square feet;
- In Carrollton, the International Business Park is adding 103,000 square feet of office space in two towers;
- New industrial developments include a 129,000-square-foot research and development facility for Panja, Inc., in Richardson, and a 630,000-square-foot distribution facility for Home Interiors and Gifts in Carrollton.

Michael Murphy

From: tim_baldwin@urscorp.com
Sent: Monday, February 26, 2001 9:17 AM
To: mmurphy@ci.addison.tx.us
Subject: RE: report status

Hi Mike - sorry for the delays. Our GIS person has (as far as I can tell)
all the NCTCOG data files and maps and is putting them together for me now.
I have all the other text ready - as soon as we get the data files and maps incorporated, I can send everything to you. I hope we can wrap this
up by the end of the week -- I'll let you know if it's delayed beyond that.

thanks

Tim Baldwin
BRW, Inc.
1225 17th St. #200
Denver, CO 80202
phone 303-312-4520
fax 303-293-8585

Sent:□I Murphy

From: tim_baldwin@urscorp.com
Sent: Friday, January 05, 2001 4:45 PM
To: mmurphy@ci.addison.tx.us
Subject: Cotton Belt project

Mike - I had hoped to get down there on the 9th, but it looks like that isn't going to happen. We are working on the data collection and will meet
here on Tuesday with our GIS people to start getting the demographic and travel model info from NCTCOG in presentable shape.

I will definitely be back in Texas the week of January 29, so perhaps we can get together then to see where things stand. By that time, we should
have most of the analysis completed and ready to review so we can begin making recommendations and conclusions. I want to send you an early draft
in the next week or two so you can get a feel for the types of things we're
including.

Thanks -- I'll be in touch again soon.

Tim Baldwin
BRW, Inc.
1225 17th St. #200
Denver, CO 80202
phone 303-312-4520
fax 303-293-8585

BRW
A DAMES & MOORE GROUP COMPANY

Graystone Centre
3010 LBJ Freeway
Suite 1320
Dallas, Texas 75234
972 406 6950 Tel
972 406 6951 Fax

October 13, 2000

Mr. Michael Murphy
Town of Addison
16801 Westgrove Drive
PO Box 9010
Addison, Texas 75001-9010

Dear Mr. Murphy,

Based on our meetings of September 20 and October 11, 2000, BRW has prepared a revised scope of work and estimated fees to conduct a Transit Market Analysis for the Area North of LBJ Freeway. This market analysis will emphasize a quantitative assessment of existing and future conditions related to demographics, land use patterns and densities, traffic volumes, trip densities and trip-making patterns that fall in the market area of the DART-owned Cottonbelt Railroad corridor. This analysis will take into account the trip-making patterns between the Plano/Richardson area to north Dallas, Addison, Farmers Branch, and westerly toward DFW Airport and surrounding communities. In accordance with direction from you and Mayor Wheeler, it is intended that this information be used by the Town of Addison and its neighboring communities to demonstrate the strengths of this market area as a future transit corridor.

BRW proposes that the data source for this analysis be NCTCOG 1995 and 2025 demographics and travel demand forecasts, as well as secondary data gathered by City staff. BRW is able to download much of this data from the DFWINFO website, and then manipulate the data in Geographic Information Systems (GIS) to illustrate the demographic and trip characteristics in the area and between different Transportation Analysis Zones (TAZ's). Thus, the majority of the analysis will be presented in tabular and map format to facilitate understanding and to assist the Town of Addison in making a strong case for transit in this area.

We greatly appreciate the opportunity to work with Addison on this study. If you have any additional questions regarding this approach, please feel free to contact me at 303/293-8080.

Sincerely,

Kay Shelton for Rick Pilgrim

Rick Pilgrim
BRW, Inc.

C: Tim Baldwin – BRW Denver

TAZ = Transportation Analysis Zone

Revised 10/13/00

Scope of Services – Transit Market Analysis for North Central Dallas Region

TASK 1 – DATA COLLECTION

1.1 Confirm Study Area. For the purposes of this analysis, the study area will be defined as the area north of LBJ Freeway, including the cities of Plano, Richardson, Dallas (north of LBJ), Addision, Carrolton, Farmers Branch, Coppell and Grapevine, as well as DFW Airport. BRW will meet with Town of Addison staff (and other invitees) to confirm the extent of the Study Area.

1.2 Collect and summarize demographic, travel demand and transportation system performance data for the study area for the base year (1995) and forecast year (2025) from existing sources, primarily from NCTCOG, but also from DART, TxDOT, DFW Airport, US Census, and study area cities as necessary. Data should include:

- TAZ boundary definitions in GIS format
- Population or households by TAZ
- Employment by TAZ
- Total trip ends by TAZ
- Work trip ends by TAZ
- Existing and forecast passengers for DFW Airport
- Existing and forecast employees for DFW Airport
- Existing data on travel patterns of DFW Airport users
- Existing data on trip originations of major area employers
- Daily traffic volumes and volume/capacity (v/c) ratios or Level of Service (LOS) for key east-west roadways (Beltline, SH 190, LBJ Freeway, etc.):
  - Existing (1995/2000) conditions
  - Existing and committed roadway network in study area (for a 2025 No Build scenario)
  - Mobility 2025 network

1.3 Collect and summarize land use and land use development density information from study area cities and NCTCOG. BRW will work with the Town of Addison to submit a written request to each Town that they provide their comprehensive plans and specifically identify existing and planned major land use developments within 1 to 2 miles of the corridor.

Town staff will be responsible for collecting the following data and will supply the data to BRW. These secondary parameters will consist of the following:

- Square feet of office development by TAZ
- Square feet of regional retail development by TAZ
- Number of hotel rooms by TAZ
- Retail sales/sales tax by major retail mode or City since 1980.

BRW will tabulate and organize the data. Graphic depictions will be generated as necessary.

1.4 Collect and summarize previous studies conducted for the Cottonbelt Corridor by DART, NCTCOG.

1.5 Four representative TAZ's will be selected in the study area and travel times will be compared for transit and highway trips to major activity centers. The major activity centers will consist of:

Galleria?

- Dallas CBD
- DFW Airport
- Love Field
- Richardson Telecom Corridor (vicinity of SH 190/US 75)

Addison?

TASK 2 – ANALYZE TRANSPORTATION AND LAND USE DATA

2.1 Map land use in the Study Area using NCTCOG existing land use information. Highlight planned high density projects as supplied by Study Area cities.

2.2 Using GIS, plot population, employment and trip-making totals and densities for each TAZ. Based on trip density, identify up the major activity centers in the study area, and compare their demographic and trip density data to other key regional activity centers, including the Dallas CBD, Las Colinas, and the Medical/Market Center.

TASK 3 – DRAFT AND FINAL REPORT

3.1 BRW will prepare a summary draft report that presents the above information in a non-biased, quantitative format. Included in this report will be an overview of how this information could be used to support the upcoming DART 2025 System Plan. BRW will also include a list of issues identified in Cottonbelt Corridor (eg. Noise, at grade crossings, etc.) through a review of previous work by DART and the NCTCOG North Crosstown Corridor Task Force.

3.2 Based on comments from the City of Addison, a Final Report will be developed. One (1) original reproducible report will be provided along with electronic files.

TASK 4 – SUMMARY OF PROBLEM AND OPPORTUNITY

4.1 Develop an Executive Summary of problem statements and opportunities relative to increased rail transit investment in the Study Area. The summary will be a maximum of 10 slides/charts for public presentation. Review with staff and make revisions as needed. One draft/review cycle is assumed. BRW will attend one meeting with the Mayor to review results.

4.2 Provide final summary presentation to Town in Powerpoint format (one hard copy and electronic version)

ESTIMATED LEVEL OF EFFORT
TRANSIT MARKET ANALYSIS FOR NORTH CENTRAL DALLAS REGION
10/11/00

	Labor Hours				
Task	Project Manager	Senior Planner	Planner	GIS Analyst	Totals
1 - Data Collection					
1.1 Study Area	1	1	2	0	4
1.2 Demo/travel data	0	2	4	14	20
1.3 Land use data	0	4	8	12	24
1.4 Previous studies	0	2	4	0	6
1.5 Travel Times	0	2	2	8	12
2 - Analyze Data					0
2.1 Land use	2	2	8	8	20
2.2 Travel	2	4	8	28	42
3 - Reports					
3.1 Draft report	2	4	12	2	20
3.2 Final Report	2	2	4	2	10
4 - Summary	6	0	0	18	24
TOTALS	15	23	52	92	182
Est. Hourly Rate (Burdened)	$140	$80	$60	$65	
Labor Costs	$2,100	$1,840	$3,120	$5,980	$13,040
Expenses					$1,950
TOTAL ESTIMATED PROJECT COST					**$14,990**

Schedule - Depending upon receipt of the data from NCTCOG and study area cities, BRW will complete the work through Task 3.1 by December 1, 2000. Completion of all work including final meetings will occur by December 22, 2000.
If requested by the Town of Addison, BRW will be available for on-call follow up services on an hourly basis.

D.A.R.T. UPDATE
October 23, 2000

***On October 18, 2000. Town of Addison staff (Ron Whitehead, Chris Terry, Mike Murphy) and Town of Addison Mayor Scott Wheeler met with DART Staff (Jay Kline, Sharron Hodgkins) to discuss and express our desire to be placed on the New Project System Plan for commuter rail service from Town of Addison to DFW Airport.

***Staff is working on developing a "Wish List" describing the Town of Addison wants and needs for the upcoming system plan.

***Public Hearing is scheduled for October 24th, at DART office to discuss locations of other associated Transit Centers.

***Staff is in scope and fee review with BRW. Plan is to meet with other demographics agencies before making final decision on firm.

D.A.R.T. **PROGRESS REPORT**
DATE: October 16, 2000

During the past four weeks staff has had two meetings with BRW Consultants to structure a "Transit Market Analysis" as a market tool to assist Town of Addison in promoting the extension of "Commuter Rail" service from the Addison/North Dallas Area to DFW Airport. Initial meeting (Sept. 18th) was to discuss scope and purpose of project. Second meeting (Oct. 11th) was for Mayor Wheeler to share his vision of what he expected from the Analysis.

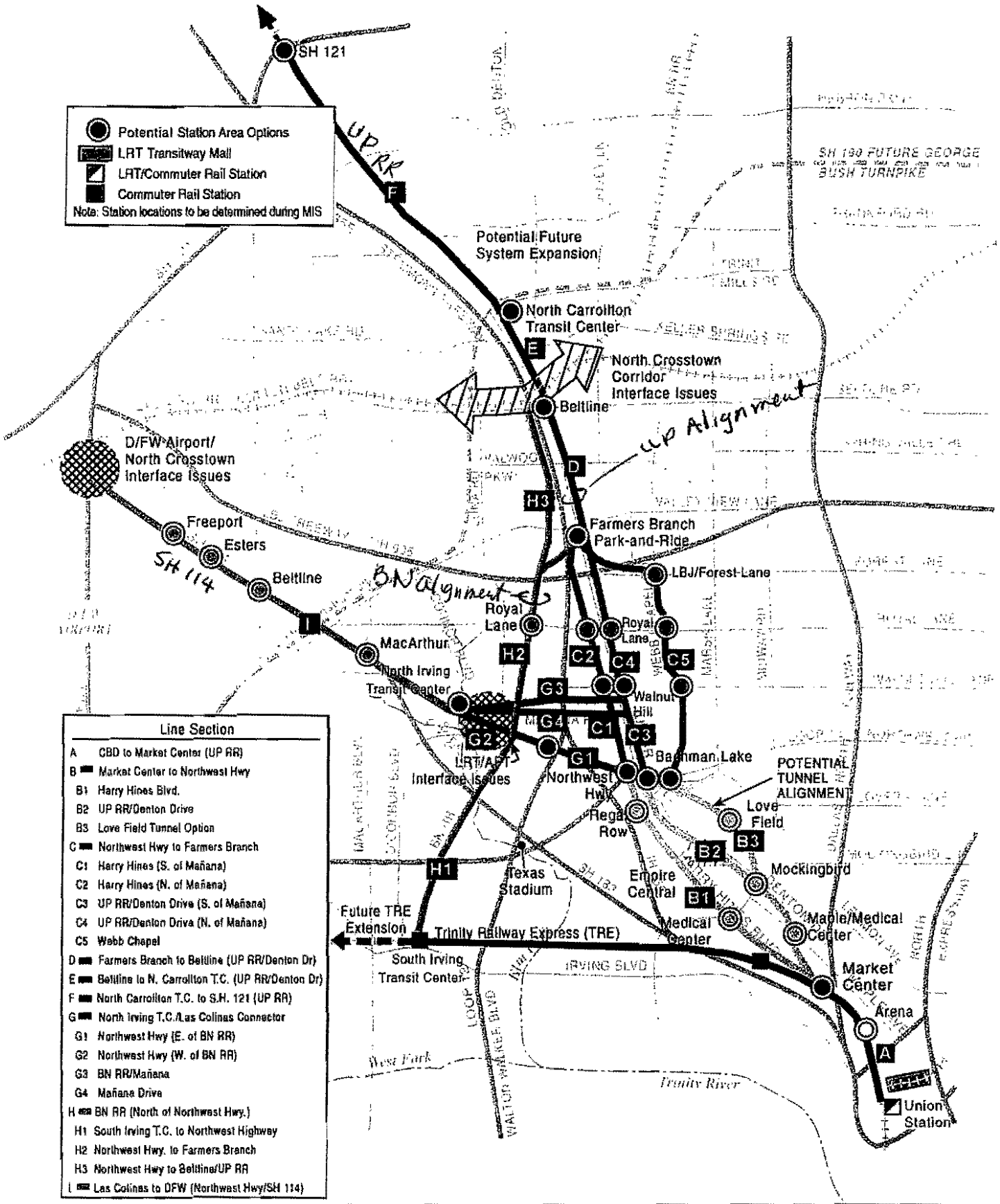
Basic consensus of meeting was to research not only demographics that would be associated with this type of analysis but to include those numbers that would help the mayor politically move this project forward. (See attached reports dated September 27th and October 13th)

Staff is scheduled to meet with Jay Kline on Wednesday October 18, 2000 from 1:30 – 3:00 pm. Jay is the Senior Manager for System Planning and Program Development. Our goal is to get in on ground floor of "New" system plan to include "Commuter Rail" service from Addison Transit Center to DFW Airport.

DART/KCRL/COTTONBELT 10-3-00
BKW Consulting/Assistance

Read Call from Tim Baldwin of BKW Denver Office. Kay Shelton & Steve Salin are now with DART and will not be working on the project.

Rick Pilgrim, the Denver Office Mgr will be meeting with us. The work will be handled out of the Denver Office



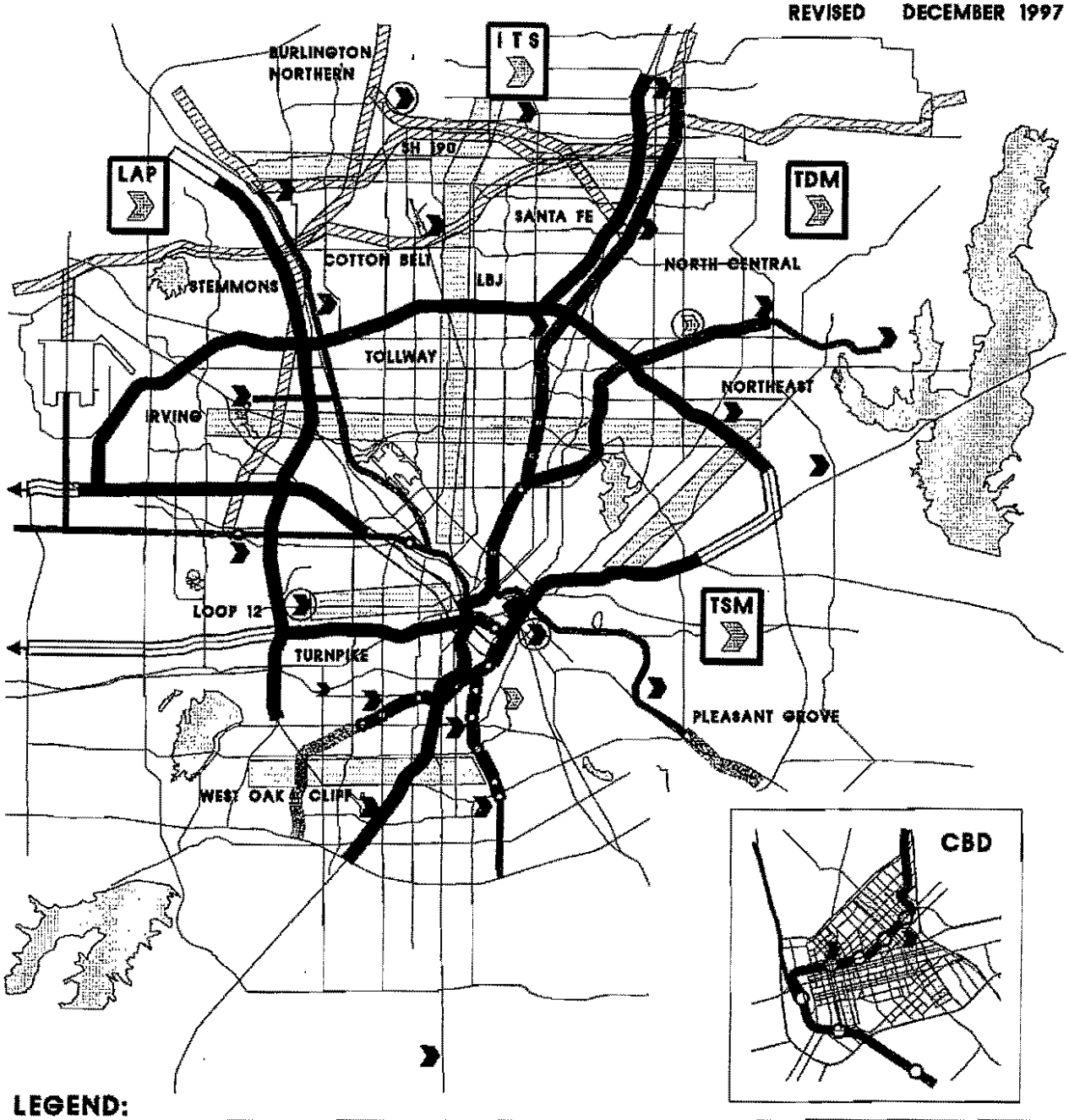
NORTHWEST CORRIDOR MAJOR INVESTMENT STUDY

Northwest Corridor MIS
Fixed Guideway Transit - Line Sections

Source: BRW, Inc.
Date: June, 1998

TRANSIT SYSTEM PLAN
YEAR 2010

APPROVED NOVEMBER 1995
REVISED DECEMBER 1997



LEGEND:

RAIL

- STARTER SYSTEM & STATIONS
- LIGHT RAIL (FULL CAPACITY)
- LIGHT RAIL (INTERMEDIATE CAPACITY)
- COMMUTER RAIL
- ALTERNATIVE FOR FUTURE STUDY (MAY REQUIRE SERVICE PLAN AMENDMENT)
- FUTURE SYSTEM EXPANSION
- FUTURE SYSTEM EXPANSION (MAY REQUIRE SERVICE PLAN AMENDMENT)

HOV LANES

- DART PARTICIPATION
- NO DART PARTICIPATION

BUS

- TRANSIT CENTER /PARK & RIDE
- PASSENGER TRANSFER LOCATION
- BUS OPERATING FACILITY
- FACILITY LOCATION SUBJECT TO SERVICE PLAN AMENDMENT
- BUS CORRIDORS

GENERAL MOBILITY

- TSM — TRANSPORTATION SYSTEM MANAGEMENT
- ITS — INTELLIGENT TRANSPORTATION SYSTEMS
- TDM — TRAVEL DEMAND MANAGEMENT
- LAP — LOCAL ASSISTANCE PROGRAM

FAX COVER SHEET

DCM GROUP BRW
A DAMES & MOORE GROUP COMPANY

Graystone Centre
3010 LBJ Freeway, Suite 1320
Dallas, Texas 75234
972/406-6950 tel
972/406-6951 fax

Planning
Transportation
Engineering
Urban Design

refaxed

Date: ~~Sept 27 2000~~ Oct 6, 2000

To: ~~Mike Murphy~~ TO: Jim Pierce

Company: Addison

Fax No: 972-450-2837

From: Kay Shelton

If you do not receive 5 pages, including this cover sheet, please call 972/406-6950.

NOTES: Scope + Estimate for your review.

C: Tim Baldwin, Rick Pilgrim
BRW Denver

cc Mike
Chris
Bill Shipp

BRW
A DAMES & MOORE GROUP COMPANY

Graystone Centre
3010 LBJ Freeway
Suite 1320
Dallas, Texas 75234
972 406 6950 Tel
972 406 6951 Fax

September 27, 2000

* What about the 'market area' to Downtown?

Mr. Michael Murphy
Town of Addison
16801 Westgrove Drive
PO Box 9010
Addison, Texas 75001-9010

Dear Mr. Murphy,

Based on our meeting of September 20, 2000, BRW has prepared an initial scope of work and estimated fees to conduct a Transit Market Analysis for the Area North of LBJ Freeway. This market analysis will emphasize a quantitative assessment of existing and future conditions related to demographics, land use patterns and densities, traffic volumes, trip densities and trip-making patterns that fall in the market area of the DART-owned Cottonbelt Railroad corridor. This analysis will take into account the trip-making patterns between the Plano/Richardson area to north Dallas, Addison, Farmers Branch, and westerly toward DFW Airport and surrounding communities. It is intended that this information can be used by the Town of Addison and its neighboring communities to demonstrate the strengths of this market area as a future transit corridor. This corridor provides a critical east-west link between planned rail extensions to Plano and Carrollton, as well as to the north end of DFW Airport, as well as assist communities in achieving their transit-oriented development goals.

BRW proposes that the data source for this analysis be NCTCOG 1995 and 2025 demographics and travel demand forecasts. BRW is able to download much of this data from the DFWINFO website, and then manipulate the data in Geographic Information Systems (GIS) to illustrate the demographic and trip characteristics in the area and between different Transportation Analysis Zones (TAZ's). Thus, the majority of the analysis will be presented in tabular and map format to facilitate understanding and to assist the Town of Addison in making a strong case for transit in this area.

We greatly appreciate the opportunity to work with Addison on this study. If you have any additional questions regarding this approach, please feel free to contact me at 972/406-6950.

Sincerely,

Steve Salin, AICP
BRW, Inc.

C: Chris Terry – Town of Addison
Tim Baldwin, Rick Pilgrim – BRW Denver

Scope of Services

TASK 1 – DATA COLLECTION

1.1 Confirm Study Area. For the purposes of this analysis, the study area will be defined as the area north of LBJ Freeway, including the cities of Plano, Richardson, Dallas (north of LBJ), Addision, Carrolton, Farmers Branch, Coppell and Grapevine, as well as DFW Airport. BRW will meet with Town of Addison staff (and other invitees) to confirm the extent of the Study Area.

1.2 Collect and summarize demographic, travel demand and transportation system performance data for the study area for the base year (1995) and forecast year (2025) from existing sources, primarily from NCTCOG, but also from DART, TxDOT, DFW Airport, US Census, and study area cities as necessary. Data should include:

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- Existing and forecast employees for DFW Airport
- Existing data on travel patterns of DFW Airport users
- Existing data on trip originations of major area employers
- Daily traffic volumes and volume/capacity (v/c) ratios or Level of Service (LOS) for key east-west roadways (Beltline, SH 190, LBJ Freeway, etc.):
  - Existing (1995/2000) conditions
  - Existing and committed roadway network in study area (for a 2025 No Build scenario)
  - Mobility 2025 network

1.3 Collect and summarize land use and land use development density information from study area cities and NCTCOG. BRW will work with the City of Addison to submit a written request to each City that they provide their comprehensive plans and specifically identify existing and planned major land use developments within 1 to 2 miles of the corridor.

1.4 Collect and summarize previous studies conducted for the Cottonbelt Corridor by DART, NCTCOG.

TASK 2 – ANALYZE TRANSPORTATION AND LAND USE DATA

2.1 Map land use in the Study Area using NCTCOG existing land use information. Highlight planned high density projects as supplied by Study Area cities.

2.2 Using GIS, plot population, employment and trip-making totals and densities for each TAZ. Based on trip density, identify up the major activity centers in the study area, and compare their demographic and trip density data to other key regional activity centers, including the Dallas CBD, Las Colinas, and the Medical/Market Center.

2.3 For up to four (4) major activity centers in the study area, the number of trips from other TAZs to the activity centers will be illustrated in GIS format . The number of trips from the region, from within the Study Area by City will be tabulated.

TASK 3 – DRAFT AND FINAL REPORT

3.1 BRW will prepare a summary draft report that presents the above information in a non-biased, quantitative format. Included in this report will be an overview of how this information could be used to support the upcoming DART 2025 System Plan. BRW will also include a list of issues identified in Cottonbelt Corridor (eg. Noise, at grade crossings, etc.) through a review of previous work by DART and the NCTCOG North Crosstown Corridor Task Force.

3.2 Based on comments from the City of Addison, a Final Report will be developed. One (1) original reproducible report will be provided along with electronic files.

ESTIMATED LEVEL OF EFFORT
ADDISON TRANSIT MARKET ANALYSIS

	Labor Hours				
Task	Project Manager	Senior Planner	Planner	GIS Analyst	Totals
1 - Data Collection					
1.1 Study Area	2	2	2	0	6
1.2 Demo/travel data	0	2	4	14	20
1.3 Land use data	0	2	4	4	10
1.4 Previous studies	0	2	4	0	6
2 - Analyze Data					0
2.1 Land use	2	2	8	8	20
2.2 Travel	2	4	8	32	46
2.3 Trips	2	4	8	32	46
3 - Reports					
3.1 Draft report	2	4	12	2	20
3.2 Final Report	2	2	4	2	10
TOTALS	12	24	54	94	184
Est. Hourly Rate (Burdened)	$140	$80	$60	$65	
Labor Costs	$1,680	$1,920	$3,240	$6,110	$12,950
Expenses					$2,000
TOTAL PROJECT COST					$14,950