3.0 AFFECTED ENVIRONMENT

This chapter describes the existing natural and built environment conditions in the project corridor that would be affected by the Selected LRT Alternative and the other alternatives and design options considered during the Draft EIS. This information provides a baseline against which each alternative is compared for environmental changes or impact.

3.1 LAND USE

This section describes current land use patterns in the DART Service Area and in the project corridor. It also outlines land use policies and plans of the local jurisdictions in the corridor and identifies major activity centers and community facilities. The project corridor is defined as an area approximately one-half mile wide on either side of the Selected LRT Alignment and the other Design Option alignments that were considered in the Love Field and the Medical Center areas during the Draft EIS.

3.1.1 Regional Summary

The DART Service Area is located in the Dallas/Fort Worth Metroplex – one of the fastest growing major metropolitan areas in the nation. DART provides transit service to 13 member cities within a 700 square mile region, with the City of Dallas as its urban center. All of DART's light rail transit lines provide access to downtown Dallas. The proposed project would be located within three cities – Dallas, Farmers Branch and Carrollton. The Dallas Central Business District (CBD) is the southern anchor of the corridor and Frankford Road in Carrollton is the northern terminus. The majority of the project corridor lies within the City of Dallas. Dallas is the commercial and industrial center for the Metroplex – approximately 15% of the City's land area is devoted to commercial, industrial and institutional uses. The City has a substantial residential population. In 2000, Dallas had a population of 1,188,580. According to NCTCOG, the largest single land use within the City is single-family residential, comprising 31% of the land area.

The City of Farmers Branch is the smallest of the cities within the corridor. As of the 2000 Census, the City had 27,508 residents. According to NCTCOG, approximately 33% of Farmers Branch's land area is devoted to residential uses. Commercial, industrial and institutional land uses comprise 32% of the land area. The City of Carrollton lies in the northern portion of the project corridor. It is the ninth largest city in the Metroplex with a 2000 population of 109,576. Residential land uses within Carrollton comprise 33% of its land area according to NCTCOG. Commercial, industrial and institutional land uses comprise 16% of the land area.

A very high percentage of the industrial and commercial land uses within Carrollton, Farmers Branch and the northwest sector of Dallas lie within the project corridor. The land use pattern in the area surrounding the corridor is heavily influenced by transportation accessibility. In the western portions, commercial and industrial uses are dominant. These areas are accessible to rail and major highways including IH 35E, IH 635, Northwest Highway and the new SH 190 President George Bush Turnpike (PGBT). In areas just to the east of the project corridor, land uses are mostly residential with a mixture of multi and single-family housing. The Elm Fork of the Trinity River lies just west of the project corridor.

3.1.2 Existing Land Use

Land use along the Selected LRT Alignment in the project corridor are described in this section. **Figures 3-1 to 3-3** illustrate general land use patterns within the corridor. (These maps were prepared from NCTCOG's 2000 Land Use Data.) **Table 3-1** below provides the number of acres and percentage of land area by each land use category.

Figure 3-1 Generalized Land Use - South

Figure 3-2 Generalized Land Use - Middle

Figure 3-3 Generalized Land Use – North

TABLE 3-1 CORRIDOR LAND USE		
Land Use Category	**Acres**	**% of Land Area**
Commercial	1,587	13%
Dedicated Land	469	4%
Industrial	3,499	29%
Infrastructure	2,030	17%
Institutional	526	4%
Multi-family	354	3%
Other Residential	54	0.4%
Single Family	1,499	12%
Under Construction	8	0.1%
Vacant	1,994	16%
Water	128	1%
Total Acres	12,148	

Source: Renee Perkins Jaynes; North Central Texas Council of Governments; April 2001

The table and figures clearly illustrate the high concentration of nonresidential land uses within the corridor. Industrial uses comprise 29% of the land area. This is a much higher percentage than any of the corridor cities. Dallas, Farmers Branch and Carrollton range from 7% to 15%. The second most prevalent use in the corridor is infrastructure – 17% of the land area. This compares to 4% to 5% for the corridor cities. Commercial uses within the corridor are also higher-13% compared to 4% for Carrollton, 5% for Dallas, and 11% for Farmers Branch.

As expected, residential land use within the project corridor is much lower than the corridor cities. Only 16% of the land area is devoted to residential compared to 36% for Dallas and 33% for Farmers Branch and Carrollton. The corridor also has less vacant land than the cities, with 16% vacant compared to 22% for Farmers Branch, 24% for Dallas, and 36% for Carrollton. A more detailed description of land use in each city within the corridor is presented below.

Dallas

The Dallas Central Business District (CBD) anchors the southern portion of the project corridor. The predominant land use within the CBD is commercial, representing over half the land area. Downtown Dallas is the location of over 2,500 businesses and approximately 29.4 million square feet of office space. The second highest land use in the Dallas CBD is institutional. The uses in this category include governmental agency offices, educational facilities, and arts and cultural institutions. Within the last decade, the downtown area has been experiencing an increase in multi-family residential housing. The Central Dallas Association reports that as of the third quarter 2000, 31 housing developments were either planned or under construction within one mile of downtown Dallas. This represents a total of 6,100 units, with over 2,000 of these units planned within the CBD Freeway Loop. Just north of the CBD, the line is adjacent to the new American Airlines Center. A 70-acre mixed-use redevelopment and in-fill project, known as the Victory Development, is planned for the area adjacent to the Center.

North of downtown, the land use pattern in the corridor becomes more varied and mixed. The western portion of the corridor is heavily dominated by industrial and commercial uses. The eastern portion is a mixture of residential, commercial and industrial. The residential uses include some single-family structures, however the majority are higher density multi-family uses. Reverchon Park, a major recreational facility and park, is also located in this portion of the project corridor.

Heading north along the line, the proposed alignment parallels Harry Hines Boulevard. Just west of Harry Hines is the Dallas Market Center complex. This complex is the world's largest wholesale merchandise mart comprised of six buildings containing 6.9 million square feet of space. Numerous hotels can be found in this area, with frontage along IH 35E (Stemmons Freeway). East of the Market Center is a mixture of uses, from single family residential to industrial and commercial. North of Wycliff Avenue the proposed alignment crosses over Harry Hines Boulevard and rejoins the DART-owned UPRR right-of-way. The land uses immediately east of the proposed alignment are primarily older industrial uses, with some vacant land and structures. The exception to this is 5225 Maple where an apartment complex is currently under construction by the Maple Avenue Development Corporation. Land uses fronting on Maple Avenue are primarily retail and office, with some light industrial. Single-family and multi-family residential uses are located east of Maple. The land uses immediately west of the proposed alignment are predominantly social and medical service businesses, and parking for Parkland Hospital. Approximately ¼ mile west of the alignment is Parkland Hospital, Salvation Army facilities, Children's Medical Center and Zale Lipshy Hospital. The University of Texas Southwestern Medical School is within ½ mile of the proposed alignment.

Along Denton Drive, south of Inwood, the land uses are residential and commercial to the east, with commercial and industrial uses to the west and fronting along Denton Drive and Inwood Road. Rusk Middle School is located at the northeast corner of Inwood and Denton. Heading north along Denton to Mockingbird, land uses are primarily commercial and industrial with some small pockets of residential west of Denton Drive. There is active rail freight activity in the area. Weichsel Park is located on the east side of Denton Drive, north of Inwood Road.

North of the Medical District, the proposed alignment continues in the DART-owned UPRR ROW. In this area, the Dallas Love Field influences the land uses in the corridor. Dallas Love Field is the City of Dallas' central hub for regional business and commuter air travel and home to Southwest Airlines. Industrial and heavy commercial uses can be found around Dallas Love Field, particularly to the south and east. Just west of Dallas Love Field, the corridor contains single-family residential areas. North of Dallas Love Field the proposed alignment lies primarily within the DART ROW and parallels Denton Drive. The land use pattern along the remaining parts of the corridor reflects the influence of the railroad and the interstate access – industrial with a number of warehouse/distribution uses. The area just north of Dallas Love Field includes the Bachman Lake recreational area – a major recreational facility for the City of Dallas. The corridor also intersects Northwest Highway where the primary land uses are commercial and multi-family. The area also contains several governmental facilities including DART's Northwest Bus Operations Facility, the City of Dallas Northwest Police Substation, City of Dallas sanitation facilities and the Bachman Water Treatment Plant.

North of Northwest Highway, the land uses along the corridor are primarily industrial and heavy commercial. The alignment parallels Denton Drive, and Harry Hines Boulevard is located just to the west. A site has been selected at the northeast corner of Denton Drive and Lombardy Lane for the new Northwest Rail Operating Facility. Land uses surrounding the site include industrial, commercial, institutional, and multi-family.

The Asian Trade District is located just west of the proposed alignment in this section of the corridor north and south of Royal Lane. Multi-family and single-family residential uses begin approximately 1/4 to 1/2 mile east of the corridor. At LBJ Freeway, highway commercial is the dominant use including several automobile dealerships. North of LBJ, office and industrial continue as the dominant use in the corridor.

Farmers Branch

In the City of Farmers Branch, the Farmers Branch Historical Park is located in the project corridor. This 22-acre park contains several historical structures and a visitor's information center promoting

the heritage of Farmers Branch. Single family residential is also found in this section of the corridor. North of Valley View Lane, industrial land uses are again predominant in the corridor. The western portion of the corridor contains heavy commercial uses fronting IH 35E. The eastern portion of the corridor contains single-family residential uses.

Carrollton
North of Valwood Parkway, the uses are primarily industrial and heavy commercial to the west, and industrial and single family to the east. Old Downtown Carrollton is located just south of Belt Line Road. In this historical area, land uses include retail and public open spaces. North of Belt Line, the predominant land uses are industrial on the west and adjacent to the rail line, and single family to the east. A City of Dallas Water Treatment Plant is also in this portion of the project corridor, south of SH 190 President George Bush Turnpike. The Frankford Trade Center, a major industrial park, is located south of Frankford Road, the project terminus. Trinity River (Elm Fork) floodplain and a gold course property lie just north of the LRT terminus.

3.1.3 Land Uses in Design Option Areas

Several design options were considered during the Draft EIS. In the Dallas Love Field area, a tunnel alignment to serve the airport and a station at Dallas Love Field was analyzed but not selected. In the Medical Center area, five alternative alignments through that area were considered (Harry Hines Base and Options A, B, C, D). The Harry Hines Base Alignment located the LRT and two stations within the median of Harry Hines Boulevard. The northernmost UTSW/Exchange Park Station was on the east side of Harry Hines at the UTSW North Campus. Four additional Design Options (A, B, C, and D) were considered. Design options A, B, and C, turned the LRT east just north of Lofland and placed a station at the northeast corner of Lofland and Harry Hines. Design Option D turned the LRT just north of Motor and placed a station at the northeast corner of Motor and Harry Hines. Land uses in the areas where Design Options were considered during the Draft EIS are described below. The land uses adjacent to the Selected LRT Alternative are included in the previous section.

Dallas – Love Field Design Option
Land uses at Dallas Love Field are primarily aviation-related. In order to assess the effects of implementing an LRT tunnel under airport property and station near a planned terminal, an understanding of the uses and facilities is provided in this section. Airport facilities are divided into two categories: landside and airside. Airside facilities include the runways, taxiways and other facilities associated with the movement of aircraft. Landside facilities include those uses that support airport operations and related businesses.

Dallas Love Field airside facilities include two parallel east-west runways (13L-31R and 13R-31L), and a single north-south runway (18-36). Full-length Taxiways A and B (13L-31R), C (13R-31L), and D (18-36) provide the entrance and exits at each runway end. Other taxiways provide additional access to and from runways and taxiways to non-movement areas. Runway protection zones (RPZ's) are located at both runway ends and influence land uses to keep runways clear of objects and development.

Related to the airside facilities are navigational aids (NAVAIDs). NAVAIDs provide pilots with guidance and position information and are used to define airspace routes. Primary terminal NAVAIDs (those facilities located at airports) include Instrument Landing Systems (ILS) and supplementary aids.

The ILS provides the aircraft with three basic types of navigational information. Lateral guidance information indicates to the aircraft whether it is to the right, left, or aligned with the runway approach course line. This information is provided by the ILS Localizer (LOC). Vertical guidance information indicates the aircraft position above, below, or along the proper descent angle towards the runway touchdown point. This information is provided by the ILS Glide-Slope (GS). Distance

information indicates the aircraft's approximate distance from the runway threshold. This information is provided indirectly by the ILS Outer and Middle Markers (OM, MM) in conjunction with the applicable instrument approach procedure chart, and directly by the Distance Measuring Equipment (DME) located at the LOC. Supplementary aids such as Compass Locators (LOM) are sometimes provided at one or both of the Marker sites to assist the aircraft in locating the ILS course. Approach lighting systems with sequenced flashers and other visual aids are usually provided to work in conjunction with the ILS. Use of ILS facilities becomes mandatory in poor weather conditions – providing the landing approach path information necessary when visibility is obscured.

FAA uses a 'three or four letter identifier' located before the acronym of the NAVAID to identify the location of the NAVAID, as shown below:

- LOC – Localizer
- GS – Glide Slop
- MM – Middle Marker
- OM – Outer Marker
- RVR – Runway Visual Range
- MALSR – Medium-Intensity Approach Lighting System With runway Alignment Indicator
- LOM – Compass Locator at the ILS
- VASI – Visual Approach Slope Indicator
- SSALR – Simplified Short Approach Lighting System with Rail
- DME – Distance Measuring Equipment
- REIL – Runway End Identification Lights

Dallas Love Field has four Instrument Landing Systems on runways 31L, 31R, 13L, and 13R. All runways at Dallas Love Field have some type of visual aid. These facilities are identified below:

- Runway 31L – LVF LOC, LVF GS, LVF MM, LVF OM, LVF RVR, LVR MALSR, CONIS LOM
- Runway 31R – OVW LOC, OVW GS, OVW MM, OVW MALSR, DAL RVR, DAL VASI
- Runway 13R – DPX LOC, DPX GS, DPX MM, DALB VASI, DALB SSALR
- Runway 13L – DAL LOC, DAL GS, DAL MM, DAL OM, DAL DME, DAL RVR, DAL MALSR
- Runway 36 – DALC VASI, DALA REIK
- Runway 18 – DALA VASI

Landside facilities include the terminal building and associated facilities and gates. Currently, Dallas Love Field has 17 gates in use. The West Concourse has 14 gates in use. The North Concourse has 10 available gates, but all are used for loading, office or training spaces. The East Concourse was demolished in Spring 2002. Southwest Airlines occupies the West Concourse. Passenger and public functions are located on the second level, while operations and administrative-related uses are at ground level and the second floor. The Central Lobby is the focal space of the terminal building, providing ticketing, concessions, seating and public amenities. The area southeast of the terminal building includes the old East Ticket Wing, which is mostly vacant.

Dallas – Medical Center Design Options

Design Options A, B, and C, would have left Harry Hines right-of-way just east of Parkland Hospital, in a shallow tunnel. The land uses in the area include parking, commercial and industrial. The Salvation Army's Carr P. Collins Social Services Center is adjacent to the proposed alignment options in this area. The land uses heading east along the three alignments to Maple Avenue are primarily light and heavy industrial, with some limited office uses. Hernandez Elementary School is located just north of Medical Center Design Option A, west of Maple Avenue. Along Maple Avenue, there are retail and industrial uses. Maple Avenue is known as the "Main Street" of the

area (historically known as "Little Mexico"). Medical Center Design Option D, developed during the DEIS comment period, would have left the Harry Hines right-of-way north of Motor Street in a shallow tunnel. Land uses along Option D are similar to those for Option B, with the exception that the land uses around the station area are primarily Parkland Hospital support facilities and parking. Northeast of Parkland property, the alignment would re-join the UPRR south of O-K Paper. East of Maple along Denton, the design options share a common alignment with the Selected LRT Alternative.

The fifth alignment option considered in this area (the Harry Hines Base Alignment) would have continued north in the median and along the eastern side of Harry Hines Boulevard north of Inwood Road. It would have turned east at Treadway Drive and paralleled Mockingbird Lane on its south side, then re-joined the UPRR ROW north of Mockingbird. The area along Harry Hines Boulevard from Motor Street to Mockingbird Lane is dominated by the social and medical service industry including the University of Texas Southwestern Medical Center, Parkland Hospital, Children's Medical Center, and Salvation Army facilities. Land uses around the Medical Center District are primarily office and industrial, with some pockets of older residential uses to the east and west. The south side of Mockingbird Lane is primarily office and light industrial uses, including the Exchange Park office complex.

3.1.4 Local Land Use Plans/Policies

Local plans and policies related to land use and growth need to be considered when examining existing conditions. The corridor lies within the jurisdiction of three municipalities: Dallas, Farmers Branch and Carrollton. A review of the plans and policies affecting property within the project corridor is summarized below by city.

Dallas

The City of Dallas adopted ***The Growth Policy Plan*** in 1987 as a policy framework for land use and development within the City. The plan was amended in 1990 and 1993. The plan calls for the City to support growth nodes, where appropriate, to utilize the transportation capacity provided by the DART system. The plan encourages transit-supportive development by calling for higher density mixed-use development around transit stations in areas appropriate for redevelopment or new development. The plan also states that station area plans should be prepared to address transportation linkage issues, site layout and design, and possible increased densities around DART stations.

In addition to ***The Growth Policy Plan***, the City has several subarea plans covering the project corridor. The following is a brief outline of these studies.

- ***The Northwest Highway Urban Design Study*** (1999) – This study supports planning efforts by DART and recognizes the economic potential for redevelopment with the construction of a light rail station at the intersection of UP (DART) railroad right-of-way and Northwest Highway.

- ***The Stemmons/Harry Hines Corridor Implementation Study*** (1996) – This study addresses land use, infrastructure and transportation issues within the corridor. It recommends revitalization strategies for strengthening businesses within the corridor, particularly the Asian Trade District.

- ***The Northwest Highway Area Revitalization Neighborhood Improvement Study*** (1992) – This study focuses on revitalization and stabilization strategies for the residential and commercial areas along Northwest Highway. The report references the Dallas Love Field North Land Use Study and that report's recommendations for the DART rail line and station.

- ***Dallas Love Field - North Area Land Use Study*** (1988) – This study addresses land use and airport related issues for the residential area just north of Dallas Love Field Airport. The study recommends that any light rail alignment in the area should provide access to Bachman Lake Park and the Bachman Recreational Facility. The study also recommends that DART concentrate parking facilities for the line near the Northwest Highway Station and provide only limited parking at the Walnut Hill Station. The study also requests DART to consider shared parking facilities in the Bachman Lake Park area.

- ***Dallas Love Field West Land Use Study*** (1987) - This study addresses land use issues for the residential areas immediately west of Dallas Love Field Airport. The plan discusses the proposed light rail alignment as one source of mass transportation available to the community. One concern expressed in the study was the potential impact of the DART line. The report recommends that DART consider the Harry Hines Corridor as an alternative to the railroad corridor. It also recommends that station area plans be prepared to analyze the potential impact of proposed transit stations on existing residential areas. If a station is placed adjacent to a residential area, the study recommends that commercial redevelopment be limited and of a neighborhood-service scale.

- ***Dallas Love Field East Land Use Study*** (1986) - This study addresses land use issues for the residential and commercial areas immediately east of Dallas Love Field. The report references the proposed Denton Drive alignment for the LRT line stating that the project would bring enhanced bus service to the Study Area.

Farmers Branch
The City adopted a ***Comprehensive Plan*** in 1989 and it is currently being updated. It addresses land use, transportation, public services and utilities, and city design. It sets forth a generalized pattern of land use and transportation, and establishes policies and guidelines for the City's future development.

The City of Farmers Branch has prepared plans for the Old Farmers Branch Area in anticipation of the future rail line. The report entitled ***Revitalization of the Old Farmers Branch Area*** was prepared for the City in 1991. This report recommends strategies for redevelopment of the area noting the major influence the DART rail station would have on the viability and character of the area's redevelopment. The report includes a conceptual development plan identifying potential joint development opportunities. The City has purchased several parcels in the station vicinity and is planning for transit-supportive land uses around the station. The City has also created a Tax Increment Financing (TIF) district designed to attract transit-supportive development near the proposed station area. In Fall 2000, the city revisited its revitalization plan and is currently conducting more detailed land planning and public involvement activities to build support for transit-oriented land uses around the Farmers Branch Station.

Carrollton
The City of Carrollton's ***Comprehensive Plan*** was adopted in 1991 and has been amended several times, most recently in October 2001. The City is currently updating the plan and staff anticipates its completion by early 2003. The current plan addresses DART issues in its Transportation Section. The two policies addressing DART focus on the mode of public transportation provided (encouraging paratransit as an alternative to cross-town fixed route service) and stressing coordination of local transportation improvements with DART's transit facilities. The ***Comprehensive Plan*** also identifies the future DART rail line in its Transportation Plan. The plan update will address several planning issues related to the DART project, focusing on the neighborhoods and commercial areas in proximity to the LRT stations.

The City's ***Old Downtown Carrollton Plan*** (1988) encourages the development of a light rail transit station in the vicinity of the Old Downtown area. The plan focuses on increasing pedestrian access in the downtown area. The City has recently completed a study called the ***Carrollton Renaissance Initiative***. It examines the commercial and residential redevelopment opportunities in Old Downtown Carrollton. This included planning for the DART station near Old Downtown Carrollton focusing on station location, conceptual layout of the station, urban design, parking, and opportunities for linkages with adjacent land uses. The study also examined planning issues for the Trinity Mills and Frankford station areas.

Other Land Use and Master Plans

There are several other land use and land development plans affecting property within the project corridor. Several of these are large-scale master plans developed by private and institutional property owners within the corridor.

- ***Dallas Plan*** – The Dallas Plan is a citywide plan developed by a privately funded, non-profit organization created to form a partnership between the City of Dallas and hundreds of local organizations and individuals. This plan was initiated in 1992 and adopted by the Dallas City Council in 1994. It is a 30-year comprehensive plan that focuses on citywide projects and policy issues. The Dallas Plan organization recently completed a study of the biotechnology industry in Dallas. Focus of the study was the "biotech corridor" that is located in the Harry Hines Medical District. The report proposes an action plan for enhancing the biotechnology industry in Dallas. They recommend creating a biotechnology area near UTSW. LRT is considered an important transportation component of achieving the plans.

- ***UTSW Medical Center Master Plan*** – Located within the City of Dallas, the UTSW Medical Center has a Master Plan to accommodate their future facility needs. The initial Master Plan used by DART in the early stages of planning focused on their needs through approximately 2010. This plan showed a light rail corridor that generally followed the Harry Hines Base Alignment for LRT service to the Medical District area. The major components of the plan included development of several buildings in the North Campus area (some of which are under construction), and construction of student housing south of Mockingbird between Forest Park and Maple Avenue (completed in 2001).

  UTSW updated their Master Plan at the end of 2001 to extend the plan to the years 2012 and 2025. The new 2012 and 2025 Master Plans reflect an LRT alignment consistent with the Selected LRT Alternative. The new plans also include renovations and new buildings in the North Campus and South Campus areas, additional student housing, and new clinical facilities. Footprints for future buildings are now located in the area that was designated for the UTSW/Exchange Park Station bus facility area (under the Harry Hines Base Alignment) and in an area where the alignment alternative would have transitioned from Treadway to Mockingbird.

- ***Dallas Love Field Master Plan*** – This plan was adopted in 2001 by the City of Dallas to guide the airport's future landside and airside development. Phase 1 of the Master Plan entails opening additional gates, relocating a cargo building, developing a new commercial vehicle courtyard, demolition of the East Concourse, and initiating new roadway development. Phase 2 is demand-driven and emphasizes maximizing use of additional gates, completing the roadway development, and constructing a possible new East Terminal where the vacant ticket wing is located south of the existing terminal. The landside phasing approach could end with demolition of the vacant ticket wing, construction of roadways at the location of a possible East Terminal and adding a potential LRT station, followed by construction of the proposed new East Terminal. The Master Plan includes the proposed LRT and a Love Field Station in its landside development phasing plans, and reflects the station in the vicinity of the possible

future East Terminal building. Phase 1 elements are underway, whereas Phase 2 elements include potential projects under the ***Master Plan****;* no final decisions or plans have been made.

- ***Southwest Airlines Master Plan*** – This plan is currently being developed by Southwest Airlines for the build-out of their headquarters along Denton Drive at the northwest end of Dallas Love Field airport. In addition to several new facilities to accommodate planned growth, the Master Plan identifies a potential future DART light rail station north of Burbank Street.

3.1.5 Schools, Community Services, Facilities, and Resources

Schools and community facilities within the project corridor are examined in this section. The majority of the residential areas lie in the eastern portion of the corridor. Most of the schools and community facilities serving the project area are also located in this area. **Table 3-2** identifies the schools and community facilities in the corridor. **Figures 3-4, 3-5 and 3-6** graphically depict their locations.

TABLE 3-2
SCHOOLS AND COMMUNITY FACILITIES

Facility	Location	Figure No.
Elementary Schools		
Arlington Park Community Learning Center, DISD	5606 Wayside Drive, Dallas	D-1
Onesimo Hernandez, DISD	5555 Maple Avenue, Dallas	D-2
Obadiah Knight, DISD	2615 Anson Road, Dallas	D-3
Maple Lawn, DISD	3120 Inwood Road, Dallas	D-4
Julian T. Saldivar, DISD	9510 Brockbank Drive, Dallas	D-5
Central Primary, CFBISD	1600 South Perry Road, Carrollton	C-1
Hope Medrano, DISD	2221 Lucas Drive, Dallas	D-29
Middle Schools		
Thomas J. Rusk, DISD	2929 Inwood Road, Dallas	D-6
Vivian Field, CFBISD	13551 Dennis Road, Farmers Branch	FB-1
Colleges and Universities		
UTSW Medical Center and School	5323 Harry Hines Boulevard, Dallas	D-7
El Centro College	801 Main Street, Dallas	D-8
TWU Dallas Parkland Campus	1810 Inwood Road, Dallas	D-9
Parker College of Chiropractic	2500 Walnut Hill Lane, Dallas	D-10
Dallas Christian College	2700 Christian Parkway, Farmers Branch	FB-2
Major Medical and Social Service Facilities		
Children's Medical Center	1935 Motor Street, Dallas	D-11
Texas Scottish Rite Hospital	2222 Welborn Street, Dallas	D-12
Parkland Memorial Hospital	5201 Harry Hines Blvd., Dallas	D-13
Zale Lipshy University Hospital	5151 Harry Hines Blvd., Dallas	D-14
St. Paul University Hospital	5909 Harry Hines Blvd., Dallas	D-15
UT Southwestern Medical Center	5323 Harry Hines Blvd., Dallas	D-7
Salvation Army Carr P. Collins Social Srvs. Ctr.	5302 Harry Hines Blvd., Dallas	D-16
Salvation Army Adult Rehab. Center	5554Harry Hines Blvd., Dallas	D-17
Salvation Army Texas Divisional Headquarters	6500 Harry Hines Blvd., Dallas	D-18
Gravley Center	1111 W. Belt Line Road, Carrollton	C-2
Public Recreation Centers		
Pike Recreation Center	2807 Harry Hines Blvd., Dallas	D-19
Reverchon Recreation Center	3505 Maple Avenue, Dallas	D-20
Grauwyler Recreation Center	7780 Harry Hines Blvd., Dallas	D-21
Polk Recreation Center (Love Field Des. Opt. Only)	6801 Roper Street, Dallas	D-22
Bachman Recreation Center	2750 Bachman Drive, Dallas	D-23
Crosby Road Recreation Center	1610 Crosby Road, Carrollton	C-3
Thomas Center	1620 Denton Drive, Carrollton	C-4
Public Safety Facilities		
DFD Station Number 18	660 N. Griffin Blvd., Dallas	D-24
DFD Station Number 42	3333 W. Mockingbird Lane, Dallas	D-25
DFD Station Number 43	2844 Lombardy Lane, Dallas	D-26
DFD Station Number 30	11381 Zodiac Lane, Dallas	D-27
FB Fire Station Number 1	2535 Valley View, Farmers Branch	FB-3
DPD Northwest Patrol Division	9801 Harry Hines Blvd., Dallas	D-28

Source: Renee Perkins Jaynes, December 2001, April 2003

Figure 3-4 Schools and Community Facilities - South

Figure 3-5 Schools and Community Facilities - Middle

Figure 3-6 Schools and Community Facilities – North

3.1.6 Major Activity Centers

A portion of the proposed project lies within the Stemmons Corridor – an area with one of the highest employment concentrations in the region. NCTCOG predicts that the Stemmons Corridor will contain 31% of total forecasted regional employment by 2010. A 1997 Transportation Management Study prepared for the corridor found a relatively low population to employment ratio in the area. Thus, the corridor has significant transportation needs due to its high employment concentration and the fact that a significant number of people travel to this destination for employment.

The project corridor contains several large employers, both commercial and institutional, surrounded by smaller supporting businesses and industries. These "activity centers" require transportation for both their employees and patrons. Three of the top five employers found within the City of Dallas are located within the corridor: Parkland Memorial Hospital, UTSW Medical Center, and Southwest Airlines.

Table 3-3 identifies the major activity centers and employers within the corridor. **Figures 3-7, 3-8 and 3-9** depict their location relative to the LRT alignment and station locations. A brief description of the largest of these centers is outlined below.

Dallas

- *Harry Hines Medical Center District (D-29 through D-36)* - This major activity center has significant transportation needs – it is the location of five major medical facilities including Dallas County's Parkland Hospital (D-30). A substantial number of patrons to Parkland, and the other facilities, rely on public transportation. The UTSW Medical Center (D-33) is a major medical facility as well as school. UTSW had the second highest level of employment within the district in January 2000 – 6,157 employees. In addition, the University's Master Plan outlines several new facilities to be constructed in the area.

- *Dallas Market Center (D-53)* - This complex is the world's largest wholesale merchandise mart covering more than 100 acres and consisting of six buildings containing 6.9 million square feet of space. The Dallas Market Center conducts 50 markets annually, attended by more than 130,000 retail buyers. Numerous hotels are located around the Market Center, including the Wyndam Anatole Hotel with approximately 1,500 employees (in January 1999).

- *Dallas Love Field (D-57)* – This major activity center is the City of Dallas' central hub for regional business and commuter air travel. This area is also the location of Southwest Airlines Corporate Headquarters and several other aviation related industries. In 2000, Southwest Airlines was the fifth largest employer in the City with 3,250 employees.

- *Other Dallas Centers* - A new arena north of downtown Dallas – the American Airlines Center (D-50) – opened in July 2001. A seventy-acre urban neighborhood is planned in the area, known as the Victory Project. A mixture of land uses is envisioned for the project – from residential to retail, hotel and office.

Farmers Branch

In Farmers Branch, there are several major employers within the project corridor. They tend to be more geographically dispersed making it difficult to identify specific activity centers in this section of the corridor. The majority of these employers are concentrated along the proposed LRT alignment and in areas just west of the LRT line. Within Farmers Branch, there are five employers in the corridor with more than 200 employees.

Carrollton

There are approximately 28 employers with 100 or more employees located within the City of Carrollton's portion of the project corridor. Nine of these employers have more than 200 employees. The majority of these employers, as in Farmers Branch, are concentrated along the proposed LRT alignment and in areas just west of the LRT line. One major activity center can be clearly identified – the Frankford Trade Center (C-6) at the northern end of the project corridor. It is a major industrial park and is designated as a Foreign Trade Zone.

TABLE 3-3
MAJOR ACTIVITY CENTERS AND EMPLOYERS

Name	Location	Figure No.
Harry Hines Medical District		
Children's Medical Center	1935 Motor Street, Dallas	D-29
Parkland Memorial Hospital	5201 Harry Hines Blvd, Dallas	D-30
Zale Lipshy University Hospital	5151 Harry Hines Blvd, Dallas	D-31
St. Paul University Hospital	5909 Harry Hines Blvd, Dallas	D-32
UT Southwestern Medical Center	5323 Harry Hines Blvd, Dallas	D-33
Salvation Army Carr P. Collins Social Services Center	5302 Harry Hines Blvd, Dallas	D-34
Salvation Army Adult Rehab. Center	5554Harry Hines Blvd, Dallas	D-35
Salvation Army Texas Divisional Headquarters	6500 Harry Hines Blvd, Dallas	D-36
Other Hospitals		
Texas Scottish Rite Hospital	2222 Welborn Street, Dallas	D-37
Higher Education Centers		
UT Southwestern Medical Center	5323 Harry Hines Blvd, Dallas	D-38
UT Southwestern North Campus	6000 Harry Hines Blvd, Dallas	D-39
El Centro College	801 Main Street, Dallas	D-40
Texas Women's University	1810 Inwood Road, Dallas	D-41
Dallas Christian College	2700 Christian Parkway, Farmers Branch	FB-4
Government Centers		
Dallas County Frank Crowley Courts Bldg.	133 N. Industrial Blvd, Dallas	D-42
Dallas County Administration Building	411 Elm Street, Dallas	D-43
Dallas County Records Building	500 Main Street, Dallas	D-44
Dallas County Old Criminal Courts Building	400 Main Street, Dallas	D-45
Dallas County Old Red Courthouse	100 S. Houston Street, Dallas	D-46
Dallas County George L. Allen Sr. Courts Building	600 Commerce Street, Dallas	D-47
DART, Northwest Service Center	2424 Webb Chapel Ext, Dallas	D-48
Farmers Branch City Hall	13000 William Dodson Pkwy, Farmers Branch	FB-5
Major Employers and Other Major Centers		
West End Market Place & Historic District	603 Munger Avenue, Dallas	D-49
American Airlines Center & Victory Project	2500 Victory Avenue, Dallas	D-50
Centex Corporation	2728 N. Harwood, Dallas	D-51
Republic Insurance	2727 Turtle Creek Blvd, Dallas	D-52
Dallas Market Center Complex	2100 Stemmons Freeway, Dallas	D-53
IBM Corporation	13800 Diplomat Road, Farmers Branch	FB-6
TD Industries	13850 Diplomat Road, Farmers Branch	FB-7
Stream International	1235 W. Trinity Mills Road, Carrollton	C-5
Southwest Airlines	2702 Love Field Drive, Dallas	D-54
Wyndham Anatole Hotel	2201 N. Stemmons Freeway, Dallas	D-55
K-C Aviation, Inc.	7350 Cedar Springs Road, Dallas	D-56
Dallas Love Field Airport	2702 Love Field Dr, Dallas	D-57
United Parcel Service	10155 Monroe Dr, Dallas	D-58
Frankford Trade Center	Trade Center Drive, Carrollton	C-6

Source: Renee Perkins Jaynes, December 2001

Figure 3-7 Major Activity Centers and Employers - South

Figure 3-8 Major Activity Centers and Employers - Middle

Figure 3-9 Major Activity Centers and Employers - North

3.2 SOCIOECONOMIC CHARACTERISTICS AND NEIGHBORHOODS

This section describes the population and employment tends for the region, the project corridor (approximately one-half mile on either side of the Selected LRT Alternative) and the geographic areas impacted by the alternative alignments considered. It also outlines neighborhoods affected by the LRT project.

3.2.1 Population Dynamics

The Metroplex is the fastest growing large urban area in the nation according to the 2000 Census. The area grew by 29%, or approximately 1.2 million persons, between 1990 and 2000. The City of Dallas had an 18% increase in population from 1990 to 2000 – with a 2000 population of 1,188,580 residents. NCTCOG predicts that Dallas' population will grow by 22% between 1995 and 2025. The City of Carrollton grew by 27,407 residents, or 33%, between 1990 and 2000. This is the highest rate of population growth for all cities in the project corridor. The City's population in 2000 was 109,576. Carrollton is projected to increase its population by 41% by 2025. The City of Farmers Branch grew by 3,258 residents from 1990 to 2000. The City's population in 2000 was 27,508. Farmers Branch is projected to increase its population by 20% by 2025.

The corridor Study Area also experienced population growth between 1990 and 2000. The corridor is projected to continue adding residents. NCTCOG estimates that the corridor will increase its population by 39% between 1995 and 2025. **Table 3-4** below outlines NCTCOG's population projections for the corridor cities and Study Area.

TABLE 3-4
POPULATION PROJECTIONS (1995-2025)

Area	Population		Absolute Growth	Percentage Growth
	1995	2025	1995-2025	1995-2025
Dallas	1,034,400	1,263,550	229,150	22 %
Carrollton	90,950	128,700	37,750	42%
Farmers Branch	24,500	29,400	4,900	20%
Study Area	81,920	114,122	32,202	39%

Source: NCTCOG, April 2001

For transportation planning purposes, it is important to identify where this population growth has occurred. **Table 3-5** examines the population change from 1990 to 2000 for the corridor cities and census tracts. (See **Figures 3-10** and **3-11** for 1990 and 2000 Census Tract boundaries.) Only census tracts with a significant land area in the project corridor are included in this analysis.

The population growth rate for the corridor cities ranged from 13% to 33%. The median rate of increase for the corridor census tracts was 29%. Twenty of the twenty-three census tracts examined gained population. Seven tracts gained 1,000 or more residents. In Dallas, this includes the Stemmons Corridor (south of Northwest Highway) and areas around Dallas Love Field, north of Bachman Lake to Walnut Hill Lane, and north of Royal Lane to LBJ Freeway. In Carrollton, it includes an area north of Ryan Avenue to West Jackson Road.

The Study Area has a high percentage of racial minority residents. Approximately 42% of the project corridor's residents are members of a racial minority, compared to approximately 33% for the DART Service Area and Dallas County. The project corridor also has a high percentage of individuals of Hispanic origin, 38%, compared to approximately 16% for the County and Service Area. The 2000 Census data shows that the project corridor experienced a substantial increase in its Hispanic population during the last decade. Several areas more than doubled in the percentage of their population of Hispanic origin.

TABLE 3-5 POPULATION (1990-2000)		
City	**Change**	**%Change**
Dallas	181,703	18%
Carrollton	27,407	33%
Farmers Branch	3,258	13%
Census Tract		
4.01	337	9%
4.03	1,010	19%
4.04	726	18%
4.05	646	28%
5	920	19%
6.01	3,112	48%
19	784	73%
21	0	N/A
31.01	-930	(33%)
72.01	5,755	117%
96.1	2,113	63%
97.01	991	28%
98.03	1,002	39%
99	-61	(4%)
100	6,349	195%
137.13	754	48%
137.14	916	20%
137.17	851	40%
137.16	1,104	30%
137.19	888	35%
139.01	535	19%
140.01	281	8%
140.02	979	301%
Median	**888**	**29%**

Source: Renee Perkins Jaynes; U.S. Census Bureau, 1990 and 2000 Data

The project corridor is similar to the County and DART Service Area in the percentage of its population under the age of 18, approximately 25% to 26% of the residents.

The corridor, as a whole, has a higher percentage of elderly, approximately 22%, as compared to Dallas County and the DART Service Area, which are both under 10%. Some areas within the corridor did not follow this pattern and were below the County and Service Area average. Census Tracts 4.04 and 6.01 had a much lower percentage of elderly, only 5% and 3%, respectively.

The average median household income of the project corridor is lower than the County or the DART Service Area. The average median household income was $28,628 in 1990 compared to $42,183 for the Service Area. The percentage of persons defined as low income was also higher – 16% of the population compared to approximately 13% for the Service Area and Dallas County. In census tract 19, 67% of the residents were low income in 1990.

The project corridor population was also more transit dependent than Dallas County in 1990. Approximately 12% of the residents reported no access to an automobile compared to 8% for the County. The highest concentrations of transit dependent residents are located from Downtown Dallas to Inwood Road. In this segment of the corridor, 28% to 66% of the population stated that they had no access to an automobile.

3.2.2 Labor Force and Employment Centers

This section outlines employment trends and projections for the region, Dallas County and the Study Area.

Employment Trends

The Study Area has one of the highest employment concentrations in the region. The corridor contains traditional suburb to downtown travel, but also reverse commute travel from the southern portions of Dallas County to employment centers within the corridor. The corridor has significant transportation needs due to its high employment concentration and the fact that a significant number of people travel to this area for employment.

According to NCTCOG, all census tracts within the corridor experienced employment growth between 1990 and 1998. A majority of the tracts had double-digit growth, with two tracts having an increase of over 50% (Tracts 4.05 and 17.02). Nine tracts added 1,000 jobs or more, with census tract 100 adding 15,237 jobs. Total employment for these areas in 1990 was 364,717. The estimated employment for 1998 was 420,310. This represents an increase of 55,593 jobs or 15%.

Figure 3-10 1990 Census Tract Boundary Map
REVISED TO ADD CENSUS TRACT 6.01

Figure 3-11 2000 Census Tract Boundary Map
REVISED TO ADD CENSUS TRACT 6.01

Distribution Patterns

Downtown Dallas has the densest geographic concentration of employment within the Study Area. In 1990, downtown employment was 107,443. NCTCOG estimates that employment increased by 12% in 1998, to 120,602 jobs. Census Tract 21, with 66% of its land area residing in the project corridor, was projected to have a 21% increase in total employment from 1990 to 1998. The majority of the employment in the Study Area is located along the Stemmons Corridor (from Downtown Dallas to Northwest Highway). Employment was estimated to be 196,607 in 1998 – a 15% increase from 1990.

North of Northwest Highway and south of LBJ Freeway there are a significant number of warehouse/distribution firms. These uses tend to have lower employment per square foot of space when compared to office or manufacturing uses. Approximately 14% of total corridor employment in 1998 is found in these census tracts. This area had an estimated 59,966 jobs in 1998, representing a 15% increase from 1990.

North of LBJ Freeway, the Cities of Carrollton and Farmers Branch had 13% of total corridor employment in 1998 – an estimated 55,108 jobs. This geographic area was projected to have the highest rate of employment growth between 1990 and 1998 – 23%.

Employment Projections

A number of sources project that the North Central Texas Region will continue to have strong employment growth, continuing to outpace the national employment growth rate. NCTCOG projects total regional employment will increase from 2,296,200 in 1995 to 3,952,700 in 2025 – a 72% increase. Dallas County is projected to receive the greatest share of this growth, 42% or 700,100 jobs.

NCTCOG predicts that the City of Dallas' employment will grow by 39% from 1995 to 2025. Dallas is projected to have the highest total absolute growth among the corridor cities – employment is projected to increase by 338,100 jobs. The City of Carrollton is projected to have the highest rate of job growth in the corridor, with an increase of 55% or 26,100 jobs. Farmers Branch is also projected to increase its employment, with a 47% increase or 25,500 jobs. The project corridor had an estimated 298,449 jobs in 1995. Employment is projected to increase to 365,747 jobs by 2025. This represents an increase of 67,298 or 22%. Employment projections are shown in **Table 3-6**.

TABLE 3-6
EMPLOYMENT PROJECTIONS (1995-2025)

Area	1995 Jobs	2025 Jobs	1995-2025 Growth	1995-2025 %Growth
Study Area	298,449	365,747	67,298	22.55%
Dallas	857,150	1,195,250	338,100	39.44%
Carrollton	47,200	73,300	26,100	55.30%
Farmers Branch	53,850	79,350	25,500	47.35%

Source: Renee Perkins Jaynes; North Central Texas Council of Governments, April 2001.

3.2.3 Neighborhoods

There are numerous residential areas throughout the project corridor. Many of these do not have distinct boundaries or identities. Almost all of the residential land uses are located east of the proposed LRT Line. One exception is a neighborhood known as "Love Field West". **Figure 3-12** depicts the neighborhoods in the project corridor with defined geographic boundaries. Below is a brief description of each area.

Figure 3-12 Neighborhoods

Uptown (Dallas)
This neighborhood is located just north of downtown Dallas and west of North Central Expressway. This mixed-use area consists of multi-family residential, a limited amount of single family residential, and a mix of hotels, commercial offices, service and retail businesses. The area is designated as a City of Dallas Public Improvement District that provides public amenities and services to the area.

Oak Lawn (Dallas)
This neighborhood is located north of Woodall Rodgers Freeway, east of Stemmons Freeway and Harry Hines Boulevard, west of North Central Expressway and south of Inwood Road. It is a mixed-use area that includes single family residential and multi-family uses. The area has a significant amount of retail, office and service businesses. It also includes a major city park and open space – Lee Park. Development within the Oak Lawn area is subject to the development standards and guidelines contained in the Oak Lawn Special Purpose District Ordinance.

Love Field West
This neighborhood is located directly west of Dallas Love Field airport in Dallas. The general boundaries are Harry Hines on the west, Bachman Lake Park on the north, Dallas Love Field airport on the east, and Inwood Road on the south. The predominant housing type in this neighborhood is single-family residential. The neighborhood does contain a limited number of duplexes, multi-family structures and mobile homes. This area was the subject of a land use planning study in 1987.

Love Field North or Bachman Area
This area is just north of Bachman Lake Park bounded by Harry Hines on the west, Marsh Lane on the east and Walnut Hill Lane on the north. A significant amount of housing in this area is multi-family. A study prepared by the City of Dallas in 1988 reported that approximately 75% of the housing units were apartments and 25% single family residential. This area has been the subject of several studies by the City including the ***Love Field North Land Use Study*** (1988) and the ***Northwest Highway Area Revitalization/Neighborhood Improvement Study*** (1992).

Love Field East
This area is located just east of Dallas Love Field airport, west of the Dallas North Tollway, north of Mockingbird Lane and south of Shorecrest/Northwest Highway. The neighborhood has both single family and multi-family uses. There are commercial and retail uses along the major thoroughfares. A land use study was adopted for this area in 1986.

Little Mexico (Dallas)
This area centers on Maple Avenue and is generally bounded by Inwood Road on the north, Harry Hines on the west, Cedar Springs on the east, and McKinney Avenue on the south. Maple Avenue is known as the “Main Street” for Little Mexico, which historically has been the focal point for the Hispanic community in Dallas. The area is served today by the Maple Avenue Economic Development Corporation (created in 1982) – a non-profit provider of affordable housing.

Old Farmers Branch Area (Farmers Branch)
This area is located just east of IH 35E, west of Rawhide Creek, north of Farmers Branch Lane and south of Spring Valley. This area contains a 22-acre historical park with homes and structures dating back to the mid-1800s. The Branch Crossing Neighborhood, located in Old Farmers Branch, is part of the City’s Renaissance Neighborhood Program. This program is designed to encourage infill housing and amenities in existing neighborhoods and encourage renovation of the existing structures while preserving a sense of history and character.

Old Downtown Carrollton (Carrollton)
This is the older commercial section of the City of Carrollton. It contains historic structures including a public square and gazebo that marks the center of downtown. The city recently studied this neighborhood. The ***Carrollton Renaissance Initiative*** recommended several public/private strategies for improving the commercial and residential areas. The Carrollton City Council approved the report and the DART LRT Station Areas, part of the Selected LRT Alternative, in June 2002.

Francis Perry and Carrollton Heights Neighborhoods (Carrollton)
These are the older residential areas adjacent to Old Downtown Carrollton. The Francis Perry Neighborhood is located just south of Belt Line Road and Carrollton Heights is located just north of Belt Line Road (see **Figure 3-12**). The ***Carrollton Renaissance Initiative*** examined station impacts in these areas and recommends standards for new development activity.

Duncan Heights (Carrollton)
This residential area is located east of the LRT ROW and north of Northside. For most of the neighborhood, commercial uses serve as a buffer between the railroad and the residences. However, a few homes in this area are in close proximity to the LRT ROW.

3.3 TRANSPORTATION

The proposed project would have to interface with the existing transportation system of roadways, highways, railroads, pedestrian/bicycle facilities, bus routes, and transit centers. This section describes the existing conditions of the transportation infrastructure within the project corridor, and lays the groundwork for determining what changes will have to be made to accommodate light rail.

3.3.1 Transit Services and Facilities

The project corridor is served by a network of 20 DART bus routes. Bus transit services operate in mixed traffic on city streets and on IH 35E south of IH 635 (**Figure 3-13**). Buses utilize high occupancy vehicle (HOV) lanes on IH 35E north of IH 635, and on IH 635 east of IH 35E. There are six local, two express, five circulator, one rail-feeder, and six cross-town routes in the corridor. The “circulator” routes operate between transit centers in outer Dallas and in the suburbs. There is also an express cross-town route that provides east-west service on IH 635 and two routes near the corridor that operate between Dallas Love Field and downtown Dallas. The corridor bus network generally is oriented in a north-south direction, radiating from downtown Dallas located at the southeast end of the Study Area. Cross-town service to the suburbs and outlying areas is limited.

There are two transit centers within the corridor providing park-and-ride facilities at major bus transfer centers. The North Carrollton Transit Center provides over 1,000 parking spaces and is served by one express bus route to downtown Dallas (Route 204) and two circulator bus routes. The Farmers Branch Park and Ride provides 240 parking spaces and is served by express bus Route 247 to downtown Dallas and two to six other circulator and cross-town bus routes depending on the time of day.

Finally, there is a commuter rail line operated by DART that travels through the southern end of the corridor. The Trinity Railway Express (TRE) rail line links downtown Dallas and downtown Fort Worth. The first ten miles of the service between downtown Dallas and South Irving opened in 1996, with stations at Union Station, the Medical/Market Center, and South Irving. The second 17 miles extended the service into Richland Hills in September 2000. Service to downtown Fort Worth opened in December 2001.

Figure 3-13 Existing Bus Routes

Transit Operations and Ridership

Many of the 20 bus routes serving the corridor would need to be restructured when light rail service is initiated. The average ridership on the bus routes currently operating in the corridor is summarized in **Table 3-7**. Service descriptions and headways for each of the routes are summarized in **Table 3-8**. The bus routes traveling through the study corridor have a total average ridership of more than 1 million passengers each month, almost 90 percent of which use the system on weekdays. These routes account for about 27 percent of DART's total system-wide bus ridership. The highest ridership routes are found along Harry Hines Boulevard (through the Medical Center District) and Maple Avenue.

TABLE 3-7
EXISTING CORRIDOR BUS RIDERSHIP

Route	Average Weekday	Average Saturday	Average Sunday	Average Month End Passengers
Local Routes				
26	4,870	2,331	1,299	121,656
29	3,196	1,696	965	80,958
39	1,713	862	683	43,858
44	8,730	4,504	2,330	219,396
49	1,755	383	10	40,191
59	2,571	424	162	58,903
Express Routes				
204	1,517	No Service	No Service	33,370
247	107	No Service	No Service	2,350
Circulator (Suburban) Routes				
321	236	No Service	No Service	5,196
322	602	No Service	No Service	13,235
331	459	183	No Service	10,831
333	537	222	No Service	12,702
344	238	44	No Service	5,422
Cross-Town Routes				
400	1,847	643	12	43,263
405	2,533	1,441	1,072	65,780
409	4,745	2,678	1,463	120,954
428	4,040	2,175	734	100,516
453	3,459	1,698	1,130	87,404
486	2,172	954	226	52,496
Rail Feeder Routes				
539	274	20	No Service	6,100

Source: Parsons Transportation Group; DART; March 2001

Several types of transit use occur within the corridor. Some transit users drive to a park-and-ride lot and board a bus bound for downtown or destinations within the corridor. Other transit users walk to bus stops near their homes and board the bus bound for their place of employment. Depending on their destination, some of these latter transit users may use the transit centers to transfer from one bus route to another in order to reach their final destination. Finally, some transit users use the commuter rail that crosses through the south end of the corridor. These users are primarily long-haul commuters who drive to park-and-ride lots in suburban Fort Worth and Irving and ride the train into downtown Dallas. The first two types of transit users described above will be the ones most impacted by the extension of light rail into the corridor.

TABLE 3-8
CORRIDOR BUS OPERATIONS SUMMARY

Route	Description	Service Frequency (minutes)	
		Peak	Off-Peak
Local Routes			
26	King Arthur via Regal Row via Brookriver via Record Crossing to Dallas City Hall	10	20
29	Maple via Downtown Dallas via St. Augustine to Prairie Creek	15	40
39	Dallas Love Field to Downtown Dallas	15	40
44	RHD Medical Center via Brookhaven College via Downtown Dallas to Bexar Street	20	40
49	Regal Row to Downtown Dallas	10	40
59	Farmers Branch Park & Ride via Belt Line Road via Downtown Dallas via West Dallas to Tumalo Trail	20	40
Express Routes			
204	North Carrollton Transit Center to Downtown Dallas	5	40
247	Farmers Branch Park & Ride to Downtown Dallas	15	45
Circulator (Suburban) Routes			
321	Addison Transit Center to Farmers Branch Park & Ride	30	60
322	Skylane via Addison Transit Center to Farmers Branch Park & Ride	30	60
331	Trinity Medical Center to Farmers Branch Park & Ride	35	60
333	Addison Transit Center to Carrollton Transit Center	30	40
344	Downtown Dallas via Tollway to Carrollton Transit Center	30	60
Cross-Town Routes			
400	Garland Central Transit Center via Richardson Transit Center via Addison Transit Center to North Irving Transit Center	30	60
405	Parkland Medical Center to Ledbetter Station	30	40
409	Downtown Dallas to Medical/Market Center Station	16	35
428	South Garland Transit Center via Park Lane Station via Webb Chapel via Medical/Market Center to North Irving Transit Center	30	60
453	Medical Center to Southwest Center Mall	16	30
486	Garland Central Transit Center via North Central Transit Center to Farmers Branch Park & Ride	30	30
Rail Feeder Routes			
539	Medical/Market Center Station via Dallas Love Field Airport to Lovers Lane Station	30	40

Source: Parsons Transportation Group; DART; March 2001

Considering the large amount of employment and lack of residential development within the study corridor, DART's transit system is vital to the economic vitality of the corridor. It provides job opportunities for people from all areas and demographics (including those who are "transit dependent"), and it provides employers with a wider range of the labor pool. As employment opportunities increase within the corridor, the transit system will become even more important to employers and employees alike.

Transit Use Incentives

There are two transit pass programs that DART provides to promote transit usage through large employers. The FareShare program allows employers to provide their employees with monthly DART transit passes at reduced costs. The E-Pass program is an annual DART pass provided by the company to all employees. It provides unlimited transportation on all DART fixed-route bus and rail service, and free emergency taxi rides home. These programs, especially the E-Pass, become an additional company benefit and can help attract employees.

According to DART, there are 38 companies within the corridor that currently provide E-Passes to their 17,481 employees. However, it is impossible to know how many of these employees take advantage of the pass. The largest employer providing the E-Pass is Parkland Memorial Hospital with 6,400 employees. TXU, Bank of America, and Adam's Mark Hotel are the largest downtown employers providing E-Passes to their employees (about 1,500 employees each). The total number of employees with access to an E-Pass is roughly equal between the downtown area and the Medical/Market Center area.

3.3.2 Roads and Highways

The existing highway system in the corridor includes several freeways, a tollway, and a network of arterial roadways and local streets (**Figure 3-14**). Throughout the corridor, the proposed alignment runs along several arterial roadways, including Harry Hines Boulevard, Denton Drive, and Broadway Street. Harry Hines is a major six-lane divided arterial extending northwest from downtown Dallas and serving the Medical/Market Center area and commercial land uses. Denton Drive is a smaller, two-lane and four-lane arterial roadway that parallels the DART ROW (UPRR) freight line and Harry Hines Boulevard, providing access primarily to industrial areas. Denton Drive becomes a four-lane roadway within Farmers Branch serving industrial and residential areas. Finally, Denton Drive becomes Broadway Street when it enters Carrollton. Broadway Street is a minor, two-lane arterial roadway that serves a limited number of industrial and commercial areas.

In the northern half of the corridor, the proposed alignment runs closely parallel to the principal freeway in the area, IH 35E (Stemmons Freeway). IH 35E is part of a system of highways that radiates from the Dallas CBD freeway loop. IH 35E runs generally north-south. Currently there is a high occupancy vehicle (HOV) lane in each direction on IH 35E between IH 635 and Trinity Mills Road, and there are plans to extend the HOV lanes south of IH 635 to Loop 12.

Two limited-access highways cross the corridor, the largest of which is IH 635 (LBJ Freeway). LBJ Freeway is a "cross-town," outer loop freeway around the City of Dallas and currently has an HOV lane in each direction between US 75 and IH 35E. Plans are being prepared to widen the freeway and add HOV lanes, with construction slated to begin in about 2008. The President George Bush Turnpike (PGBT) is a second circumferential highway (toll facility, under construction in 2000 and now complete) near the northern end of the corridor in the City of Carrollton. The Turnpike currently is open from Garland through north Dallas and Carrollton to IH 35E. There are plans to extend the Turnpike southwest to connect to SH 161 at IH 635.

A grid-like street pattern of major arterial roadways exists for most of the corridor, though the grid is less defined west of the proposed alignment. Along most of these major arterial roadways, high traffic volumes contribute to congestion delays. The high volume-to-capacity ratios on many of these arterials result in unacceptable traffic operating conditions as defined by local and national standards. All major surface streets in the corridor, except Northwest Highway and Oak Lawn Avenue, cross the DART ROW (UPRR) tracks at-grade. The tracks cross the frontage roads of LBJ Freeway, but are grade-separated from the freeway's main lanes. Similarly, the tracks cross the frontage roads of the President George Bush Turnpike, but are grade-separated from the main lanes and the freeway-to-freeway connection ramps.

Traffic Volumes and Trends

Traffic volumes in the Dallas urbanized area are considered some of the highest in Texas. IH 35E carries an average of 160,000 to 270,000 vehicles per day within the corridor. IH 635 (LBJ Freeway) provides east-west access through the corridor and carries an average of 170,000 vehicles per day west of the corridor, and 300,000 vehicles per day east of the corridor. These volumes are the highest in the Dallas urbanized area. Traffic volumes on most of the arterial roadways in the study corridor are also high, with several carrying over 30, Selected characteristics of the streets serving the Study Area are shown in **Figure 3-14.**

Figure 3-14 Existing Roadway Network

Most of the major roadways crossing the study corridor are spaced about one mile apart as part of a larger grid. This grid is less defined west of IH 35E due to the Elm Fork of the Trinity River. Major roadways paralleling the corridor are on a more random pattern near the corridor because of the diagonal alignment of IH 35E and the UPRR line. The existing traffic volumes on all the freeways and arterial roadways within the study corridor are shown in **Figure 3-15**. The traffic volume information for the major roadways paralleling the corridor is listed in **Table 3-9**, and for the major roadways crossing the alignment in **Table 3-10**. These include the existing traffic volumes, existing levels of service, projected 2025 traffic volumes, and their projected 2025 levels of service. The level of service is a measure of the relative delay and congestion experienced on a roadway, with "A" the best, and "F" the worst. Levels of service "E" and "F" are considered unacceptable.

The primary flow of traffic within the corridor is east and west along the arterial thoroughfares and IH 635 toward IH 35E and then north and south along IH 35E. Heavy north-south traffic also occurs on Denton Drive and Harry Hines Boulevard. North of IH 635, IH 35E exhibits traditional commuter traffic patterns in that most traffic is traveling south towards downtown during the AM peak, and most is traveling north away from downtown during the PM peak. South of IH 635, this pattern is less defined, with heavy traffic volumes in both directions during both peak periods. In addition, IH 635 itself exhibits congestion in both directions during both peak periods in the vicinity of IH 35E. These patterns are due to the high concentration of employment within the corridor and on IH 635.

Historically, traffic volumes on Dallas freeways have increased 5 to 10% per year since 1995. Traffic volumes on major roadways approaching IH 35E and IH 635 are at or near capacity on almost all roadways. Increases in traffic volumes on these roadways have historically averaged around 3% per year with a few locations increasing as much as 10% per year.

Tables 3-9 and 3-10 show that most of the roadways within the study corridor operate with unacceptable levels of service. The tables also show projected 2025 traffic volumes and levels of service on those roadways after certain programmed improvements are made. Traffic volumes on most roadway segments are projected to increase, with a corresponding degradation in level of service. Future traffic volumes are expected to decrease on some segments of IH 35E due to future highways that will be built by 2025, including PGBT, SH 161, and the Trinity Parkway. However, congested conditions and unacceptable levels of service will continue on IH 35E.

The project corridor has one of the highest employment concentrations in the region, second only to downtown Dallas, and has relatively little residential population. Therefore, the corridor is not only a route to downtown Dallas, but also a major commute destination, attracting trips from all areas of the region. As a result, travel within the corridor is comprised of traditional suburb to downtown trips, northern suburb trips that terminate within the corridor, and reverse commute trips from the southern portions of Dallas County that terminate within the corridor. All of these traffic patterns converge within the corridor to create high traffic volumes and varying levels of congestion in both directions during each peak period, and to extend the duration of the traditional peak periods. Considering the corridor as a whole, peak period congestion is widespread on the major roadways and the length of the peak period has been increasing.

Tables 3-9 and **3-10** show that most of the freeway and roadway segments in the study corridor currently operate with unacceptable levels of service on a typical weekday. In addition, most of the roadways are at their ultimate build-out conditions, so reconstruction cannot mitigate current conditions or handle the projected traffic growth. For example, while the corridor already has the second highest concentration of employment in the region, there is land available for further development. While employment centers will continue to grow within the corridor, the already under-represented residential sector is not expected to grow significantly. As a result, there will be more jobs within the corridor, but a smaller proportion of nearby housing, which means more, longer commuter trips bound to the corridor in the future.

Figure 3-15 Existing Traffic Volumes

TABLE 3-9
MAJOR ROADWAYS PARALLELING THE LRT LINE

Roadway	Section	2000 ADT[1]	2000 LOS[2]	2025 ADT[1]	2025 LOS[2]
IH 35E Stemmons Freeway	SH 121 to SH 190	155,000	F	226,000	F
	SH 190 to Belt Line Road	170,000	F	175,000	F
	Belt Line Road to IH 635	207,000	F	172,000	F
	IH 635 to Loop 12	261,000	F	294,000	F
	SH 183 to Downtown	270,000	F	235,000	F
Broadway	Jackson to Whitlock	2,000	B	1,000	B
	Whitlock Road to Belt Line	8,000	F	10,000	F
	Belt Line to Valwood Parkway	6,000	D	4,000	B
Denton Drive	IH 635 to Royal Lane	13,000	F	23,000	F
	Walnut Hill Lane to Loop 12	7,000	D	16,000	F
	Loop 12 to Mockingbird Lane	12,000	D	19,000	F
Maple Avenue	Inwood Road to Wycliff	13,000	D	15,000	D
Harry Hines Boulevard	IH 635 to Royal Lane	21,000	F	43,000	F
	Walnut Hill Lane to Loop 12	33,000	F	39,000	F
	Inwood Road to Wycliff	38,000	F	45,000	F

[1] – Average daily traffic in both directions. All freeway traffic counts were collected in 1999, all arterial traffic counts were collected in 2000. Future 2025 volumes estimated by NCTCOG.
[2] – Level of Service determined by NCTCOG.

Source: Parsons Transportation Group; NCTCOG; 2000-2001

TABLE 3-10
MAJOR ROADWAYS CROSSING THE LRT LINE

Roadway	Lanes at the Crossing[1]	2000 ADT[2]	2000 LOS[3]	2025 ADT[2]	2025 LOS[3]
Frankford	6	32,000	F	23,000	E
SH 190 Pres. George Bush Turnpike	Tollway	Under Construction	Under Construction	139,000	F
Trinity Mills	NA[4]	31,000[4]	F	32,000	F
Jackson	2	7,000	D	9,000	F
Whitlock	4	23,000	F	33,000	F
Old Denton	6	10,000	B	48,000	F
Belt Line	6	34,000	F	46,000	F
Crosby	4	15,000	F	12,000	F
Valwood Parkway	6	21,000	D	23,000	F
Valley View	6	27,000	F	39,000	F
LBJ WB Frontage Rd	2[5]	6,000	D	17,000	F
IH 635 LBJ Freeway	Freeway	297,000	F	252,000	F
Forest	4	25,000	F	16,000	F
Royal	6	27,000	F	39,000	F
Merrell	2	8,000	F	8,000	F
Walnut Hill	6	30,000	F	36,000	F
Lombardy	2	16,000	F	22,000	F
Webb Chapel Extension	6	18,000	B	19,000	B
Shorecrest	2	7,000	F	7,000	F
Mockingbird	6	41,000	F	43,000	F
Inwood	6	38,000	F	45,000	F
Motor	2	11,000	F	23,000	F
Maple	4	13,000	D	15,000	F

[1] – Includes lanes in both directions on two-way streets unless noted otherwise.
[2] – Average daily traffic in both directions. All traffic counts were collected in 2000. Future 2025 volumes estimated by NCTCOG.
[3] – Level of Service determined by NCTCOG.
[4] – Under construction along with SH 190. Traffic volume is from 1999.
[5] – Two WB lanes (one-way) on the WB approach; one lane in each direction on the EB approach.

Source: Parsons Transportation Group; 2000-2001

3.3.3 Railroads

There are four active rail lines traversing the project corridor as shown in **Figure 3-16**. Three of these rail lines are now owned by DART and the fourth is owned by the Burlington Northern Santa Fe Railroad (BNSF RR). Currently there are active freight operations on three of the rail lines, and active DART commuter rail with some minor freight operations on the other. The primary rail line in the corridor is the DART-owned UPRR line, along which it is proposed to construct most of the new light rail extension. The UPRR line is a single and double-track alignment that runs from north of downtown Dallas to the northwest, past Dallas Love Field, to Farmers Branch, Carrollton, and Lewisville. The line generally parallels IH 35E and has multiple sidings and spurs that serve individual customer sites on both sides of the alignment. A detailed description of the track configuration and freight operations on this line is presented in Section 3.3.4. It is proposed that separate LRT tracks be constructed along the UPRR alignment and co-exist alongside or above sections of operational freight track.

As the UPRR line enters downtown Dallas, it joins the DART-owned Trinity Railway Express (TRE) commuter rail line which connects downtown Dallas to downtown Fort Worth. This line also carries some minor freight operations, and is planned to be doubled-tracked in the near future. Separate LRT tracks are proposed in this part of the corridor.

The BNSF is another major north-south rail line in the vicinity of the corridor. The BNSF is an active freight rail line and crosses from the west side of the corridor to the east side through the busy interchange at IH 35E and Belt Line Road. In addition, the DART-owned St. Louis Southwestern Railroad (Cotton Belt) line runs east-west and crosses the corridor just north of Belt Line Road. Although active, the Cotton Belt line currently carries just one freight train a day in each direction between Carrollton and Plano.

The IH 35E and Belt Line Road interchange area has a combination of congested thoroughfares which intersect near and cross two active freight rail lines, with a nearby intersection of three rail lines. This complicated transportation interface easily becomes overloaded with rail and vehicular traffic during peak periods. For these reasons, it is proposed that the light rail service along the DART ROW be grade-separated at this location.

3.3.4 Movement of Freight

Due to the high concentration of manufacturers, warehouses, and large institutional employers within the corridor, the movement of freight is extremely important to the economic vitality of the corridor. Large amounts of freight are transported into, out of, and within the corridor every day by truck and by rail. In addition, IH 35E serves as a major North American Free Trade Agreement (NAFTA) trucking route between Mexico, the United States, and Canada.

Freight Transported by Truck

Most of the freight transported within the corridor is transported by truck. The primary roadway facilities for truck movements are illustrated in **Figure 3-17**. Designated truck routes are shown, as well as other thoroughfares that have heavy local truck traffic. Based on field observations and compared to Dallas as a whole, there is a higher amount of local truck traffic within the corridor due to the industrial nature of its land use. In addition, there is a higher number of trucks on IH 35E (compared to other north-south freeways) due not only to the industrial nature of the corridor, but also to its international NAFTA designation.

Some of the freight transported through the Dallas-Fort Worth Metroplex by truck is categorized as hazardous material, and is therefore restricted to certain routes within urbanized areas. The primary hazardous material routes in the Study Area are identified in **Figure 3-18**. Within the corridor, the transportation of hazardous material is allowed on IH 35E and the portion of IH 635 that is east of IH 35E. These regional route restrictions are extensions of ordinances adopted by the City of Dallas to control the transportation of hazardous material.

Figure 3-16 Existing Railroads

Figure 3-17 Existing Truck Routes

Figure 3-18 Existing Hazardous Material Routes

Freight Transported by Rail

Although trucks transport the majority of freight, a large amount of freight is transported by rail within the corridor. There are four active freight rail lines operating within or across the corridor. As described above, several of these lines transport freight across the corridor, but the UPRR line is primarily used to pick up and deliver freight to customers within the corridor. Deliveries to customers on the UPRR line are provided by the Dallas, Garland, and Northeastern Railroad (DGNO). Approximately 6,000 to 7,000 carloads of freight originate and terminate annually at approximately 30 individual freight customer locations on the UPRR line within the corridor. The largest customer is Coca-Cola, located on a spur south of Mockingbird Lane, which shipped about 2,000 carloads of freight in both 1999 and 2000. The average number of annual carloads shipped to and from each customer along the line is 245 carloads, with most shipping less than that.

DGNO accesses the UPRR line at three junctions (see **Figure 3-16**):

- Dallas Junction, also called DFW Junction, which is located near the Oak Lawn Avenue underpass, south of the Harry Hines Boulevard grade crossing. This junction connects to the Trinity Railway Express (TRE) line.

- The Brookhollow Lead, which is located between Wyman and Burbank Streets adjacent to Dallas Love Field, and connects to Mockingbird Yard on the TRE line.

- The Carrollton Connection, which is located north of the Belt Line Road grade crossing and provides access to and from DGNO's Mercer Yard in Carrollton.

DGNO serves customers in both directions, north and south, from the Brookhollow Lead and from the Carrollton Connection. Based on a review of 1999 and 2000 statistics, approximately 32 percent of DGNO's carloads originate and terminate north of the Carrollton Connection, 40 percent between the Carrollton Connection and the Brookhollow Lead, and 28 percent between the Brookhollow Lead and Dallas Junction. Therefore, approximately 60 percent of current freight operations would be unaffected, while approximately 40 percent of current freight operations would be rerouted in some fashion. Overall, train travel time between the northern and southern segments of the line would be increased, but since these trains run only once or twice a day, the impact is not significant.

DGNO currently provides freight service to the UPRR line with three crews. One crew begins operating a train at 7:00 AM daily Monday through Friday and serves customers north of the Carrollton Connection. The other two crews cover all of the switching between Carrollton Connection and Dallas Junction. One crew begins operating a train at 8:00 AM (six days per week) and the other starts at 8:00 PM (five days per week). DGNO also operates a train, the Mockingbird Hauler, from Carrollton Connection at 8:00 PM to interchange cars with BNSF and UP at Irving and Mockingbird Yards on the TRE line, which then returns to the Carrollton Connection.

Mercer Yard in Carrollton serves as DGNO's base of operations for freight service on the UPRR line. Based on current operation, all of the cars bound for customers within the corridor move on the Mockingbird Hauler to Mercer Yard in Carrollton, and are blocked at Mercer for various destinations on the UPRR line. In addition, DGNO currently uses various side tracks and spurs along the corridor for storage of cars awaiting placement and to accumulate cars for movement to Mercer Yard. On September 7, 2000, there were 113 railcars stored on various spurs and sidings along the freight rail line within the Study Area.

The railroad storage tracks and spurs used for serving freight customers and for storing railcars were summarized on **Figure 3-16**. Details of existing spurs are shown on the plans in Appendix C. There are four single track and three double track sidings. There are 31 spurs off of the UPRR line

within the Study Area (though many of these branch off further into several sub-spurs). Most of the main spurs (24) are on the east side of the existing rail line. Less than half of the main spurs are used actively for freight deliveries, with most of the remaining spurs used to store railcars.

3.3.5 Non-Motorized Circulation

This section describes existing pedestrian and bicycle circulation in the corridor.

Pedestrian Circulation

Pedestrian circulation facilities in the Study Area are essentially provided as part of the roadway facility cross-section. This typically includes sidewalks, pedestrian crossings, and pedestrian signals. However, there are large sections along the proposed alignment where these pedestrian facilities are not provided.

Specifically, Broadway Street is largely a two-lane roadway with no curb or sidewalk (except within Old Downtown Carrollton). Likewise, Denton Drive is largely a two-lane roadway with no curb or sidewalk. Although sections of Denton Drive have been improved to four-lane sections with curbs, these sections also do not have sidewalks along most of their length. Harry Hines Boulevard has some sidewalks within the Medical District, but these sidewalks are not contiguous and are not present along most of its length. This lack of sidewalks along the proposed alignment is primarily due to the industrial nature of the land use and the lack of residential development along these roadways.

Despite this lack of sidewalks, pedestrian activity does occur along these roadways south of Belt Line Road. Specifically, some employees of the various businesses along Denton Drive ride the bus to work and therefore must walk to work from the closest bus stop. In addition, there are some small restaurants along the corridor that depend on business from nearby workers. Therefore, pedestrians are often seen walking on the edge of the roadway or in the ditch along Denton Drive. Many of these pedestrians cross Denton Drive without the benefit of a pedestrian crosswalk or signal. There are traffic signals on Denton Drive to facilitate a safe crossing, but these are spaced at about one mile increments.

Along Harry Hines Boulevard, most of the hospitals within the Medical District do not attract pedestrians from the roadway except from nearby bus stops. However, there is a lot of pedestrian activity between the Parkland Hospital Complex and the parking facilities across the street. To manage the interface of the busy roadway and the high pedestrian demand, there is a traffic signal with pedestrian buttons as well as a pedestrian bridge that crosses over Harry Hines and connects the hospital to a parking garage.

Beyond sidewalk construction, specific pedestrian circulation systems have not been developed by the three cities in the corridor. However, the City of Carrollton Park and Recreation Department has completed a Hike-and-Bike system component as part of their Park Master Plan. This plan takes into account the future locations of LRT stations. Similarly, the City of Farmers Branch plans to develop a pedestrian/bicycle path east of the LRT line between Valwood and Farmers Branch Lane that will connect the nearby neighborhoods to the new development they are planning around the Farmers Branch Station.

Bicycle Circulation

All three corridor cities maintain various pedestrian trails and bike routes as part of their park systems, and the City of Dallas has developed a plan for bicycle circulation facilities. The City of Dallas developed the ***Greater Dallas Bike Plan*** Map in 1992, and updated it in 1995 and 1997. This plan element identifies the following facilities in Dallas, Farmers Branch, and Carrollton:

- East-West Signed Routes

- North-South Signed Routes
- Unsigned and Future Routes
- Paved Paths
- Unpaved Off-Road Trails

North-south signed bicycle routes serving the study corridor are Route 23, Route 29, and Route 37. Route 23 parallels almost the entire corridor and is located on various streets along the way. From the south, it enters the corridor on Empire Central and then continues north on Denton Drive. At Northwest Highway, Route 23 begins to parallel the corridor on a combination of north-south streets (such as Timberline, Brockbank, and Dennis) and then begins to follow multiple residential streets north of IH 635 just east of the corridor. The route terminates in downtown Carrollton at Belt Line Road.

Although they are north-south routes, Routes 29 and 37 simply cross the corridor. Route 29 crosses Harry Hines Boulevard within the UTSW Medical Center area and Route 37 crosses Harry Hines near Wycliff Avenue. Two east-west signed bicycle routes also cross the corridor. Route 280 crosses Denton Drive on the north edge of Dallas Love Field and Route 290 crosses Denton Drive on Walnut Hill Lane.

Finally, there are several unsigned routes that parallel or cross the corridor. Route 19 is located on Denton Drive between Lombardy Lane and Valley View Lane. Route 300 crosses the corridor on Southwell Road, Route 330 crosses on Valwood Parkway, and Route 340 crosses on Crosby Road.

3.3.6 Parking

In general, the supply of parking in the project corridor generally meets or exceeds current demands. While parking is not permitted on principal arterials, free parking is generally allowed on most minor arterials, collectors, and local streets in the corridor. In addition, small and large activity centers within the corridor provide adequate free and fee parking in off-street facilities for patrons and employees.

On-street parking is not permitted on any of the four-lane or six-lane principal arterials in the study corridor. However, there is a limited amount of on-street parking on the two-lane sections of Broadway Street and Denton Drive. The first section of on-street parking is on Broadway Street in Old Downtown Carrollton between Belt Line Road and Roberts Street. There is parallel parking on one or both sides of the street. Old Downtown Carrollton contains small retail and office buildings on a closely-spaced grid of two-lane streets with on-street parking.

The second section of on-street parking is on Denton Drive between Forest Lane and Royal Lane. This parking occurs primarily on the shoulder between Denton Drive and the railroad tracks, an area that is not designated or regulated for parking use. The parking occurs in random patterns along the roadside and appears to be overflow parking from nearby automobile-related businesses.

The final section of on-street parking is on Denton Drive between Northwest Highway and Webb Chapel Extension. This section of Denton Drive has high-density apartment complexes on both sides of the street, which causes the high demand for parking in the area. Where on-street parking does occur, it is not delineated nor clearly regulated. Denton Drive does not have curbs or sidewalks in this area and the unmarked parallel and 90-degree parking takes place in the paved and unpaved drainage ditches on the west side of the roadway. Similar on-street parking also occurred on the east side of the roadway until the Fall 2001 when No Parking signs were placed on that side of Denton Drive.

The vast majority of parking within the corridor is off-street parking that serves specific uses (parking lots and parking garages). Most businesses and institutions along the corridor provide adequate parking capacity for their employees, customers, and suppliers with their own parking lots on their property. In addition, DART provides off-street parking for transit users at the North Carrollton Transit Center and the Farmers Branch Park-and-Ride.

As **Table 3-11** shows, the North Carrollton Transit Center parking lot is 59 percent occupied on a typical weekday with about 600 parked cars. The Farmers Branch Park-and-Ride parking lot is less utilized with a 22 percent occupancy of about 50 cars.

TABLE 3-11
PARKING UTILIZATION
AT EXISTING DART FACILITIES

Facility	Parking Spaces	Utilization Rate[1]
North Carrollton Transit Center	1,021	59%
Farmers Branch Park-and-Ride	240	22%

[1] Based on a count of occupied spaces during periods of peak parking.

Source: Parsons Transportation Group; March 2001

The largest concentration of off-street parking exists in the Market Center and Medical Center District areas. Multiple large surface lots and parking garages are located near the proposed alignment. Within the Medical Center District most of the off-street parking is for a fee, ranging from $2 to $5 per day.

Some parking garages are restricted to employees only, and others require passes or decals. There are eight large parking garages and seven surface parking lots easily accessible from Harry Hines Boulevard in the Medical Center District. Additional parking facilities are along Medical Center Drive. One parking garage (at Lofland Street) provides a pedestrian bridge over Harry Hines Boulevard that connects to Parkland Hospital.

On-street parking is generally not allowed on the side streets within the Medical District. However, there is metered on-street parking located on some side streets including City-enforced metered parking on Lofland Street and on Redfield Street.

The Market Center area also has large amounts of parking, with most located in large surface parking lots at no cost to Market users. Market Center parking has no direct access from Harry Hines Boulevard. Demand patterns for the Market Center parking is more event based as compared to the constant, daily demand experienced by the Medical Center District.

3.3.7 Regional Transportation Improvement Plans

Mobility 2025: The Metropolitan Transportation Plan is the 25-year plan to guide the implementation of roadway and transit improvements in the Dallas-Fort Worth Metropolitan Area. The original plan was developed as ***Mobility 2010*** in 1990 and was updated in 1993. In 1997 the plan was updated and renamed the ***Mobility 2020 Plan***. The ***Mobility 2025 Plan*** was developed in January 2000 and most recently updated in May 2001. Previous versions of the plan recommended the implementation of commuter rail in the Northwest (Stemmons) Corridor, but the current plan recommends an extension of DART's light rail system in the corridor, based on the results of the MIS. The plan also recommends additional transit-related improvements in the corridor including high occupancy vehicle (HOV) facilities on IH 35E and IH 635; managed HOV facilities on PGBT; express buses serving the HOV facilities; expanded cross-town bus service; circulator service in high density employment areas; and local feeder buses to serve proposed rail lines and park-and-ride lots.

The ***Mobility 2025 Plan*** also includes recommendations for Congestion Management System (CMS) strategies throughout the region. These CMS strategies are short-range, relatively non-capital intensive measures focusing on transportation system management (TSM) and travel demand management (TDM) strategies such as:

- Traffic Signal Improvements and Intersection Improvements;
- Incident Detection and Response Systems including motorist assistance patrols;
- Advanced Traffic Management Systems relaying real-time travel information;
- Employer Trip Reduction Programs at large employers; and
- Vanpool Programs.

The 2000 Transportation Improvement Plan for the Dallas-Fort Worth Metropolitan Area, the TIP, identifies all of the roadway and transit improvements programmed for construction within the next eight years. The projects presented within the 2000 TIP were chosen to implement improvements consistent with the ***Mobility 2025 Plan***. Roadway improvement plans for the corridor identified within the 2000 TIP will provide some additional traffic-carrying capability to respond to the projected population and employment growth. Despite the existing transportation infrastructure and planned improvements, significant traffic congestion is anticipated to occur in the corridor between now and the year 2025. Unacceptable volume-to-capacity ratios are expected to occur on most arterial roadways in the study corridor. In addition, increases in congestion are anticipated on many of the arterial roadways in the study corridor.

The 2000 TIP identifies extensions of DART's LRT system into the Carrollton and Irving/DFW corridors and HOV facilities on IH 35E and IH 635 as the principal transit projects for improving mobility within the Northwest Corridor. Additional transit-related programs include “Ozone Alert” fare programs, the acquisition of more transit vehicles to expand service and the CMS strategies discussed above. No other improvements directly related to transit currently are committed for implementation in the corridor. The following is a summary of key anticipated improvements in the corridor:

- Install ITS video and communications system on IH 35E and IH 635 Corridors (2001);
- Add travel lanes on Motor Street from Harry Hines Boulevard to Maple Avenue (2002);
- Add travel lanes on Oak Lawn Avenue from IH 35E to Maple Avenue (2002);
- Add travel lanes on Denton Drive from Webb Chapel Extension to Farmers Branch city limits (2003);
- Add travel lanes on Inwood Road from Lemmon Avenue to Harry Hines Boulevard (2003); and,
- Upgrade the spread spectrum radio communication system on Belt Line Road from Luna Road to Webb Chapel (2003).

The Denton Drive improvement is being closely coordinated with the LRT project as it is adjacent to the DART rail ROW.

The next version of the TIP will be the 2002 TIP, which will focus on new projects programmed for 2003 and 2004 and would include some new long-term projects programmed through 2010. Local governments and transportation agencies have compiled lists of prioritized improvement projects and have submitted them to NCTCOG for consideration of inclusion in the new 2002 TIP, which should be finalized by the end of 2002.

3.4 AIR QUALITY

This section describes the study methodology and the affected environment for the air quality analysis.

The purpose of the analysis is to determine the potential impacts of the proposed Selected LRT Alternative on the air quality in the Study Area in Collin, Dallas, Denton and Tarrant Counties. The impact analysis was performed by comparing the predicted ambient air concentrations for the various proposed alternatives to the National Ambient Air Quality Standards (NAAQS).

3.4.1 Study Methodology

For assessing the air quality impacts, a mesoscale as well as a microscale analysis was performed. A mesoscale pollutant burden analysis was performed to assess air quality impacts on a corridor level. The 2025 pollutant emissions associated with the various alternatives were calculated for carbon monoxide (CO), volatile organic compounds (VOC), and oxides of nitrogen (NOx). The latter two pollutants, precursors of ozone (O_3), serve as an indicator of the ozone impact in the area.

Total emissions for this area were estimated using the regional travel demand forecasting model maintained by the NCTCOG). This model estimates the vehicle travel resulting from the combination of land use, socioeconomic levels, and the available transportation system, including both transit and private automobiles.

The microscale analysis was performed to estimate CO concentrations at one major intersection, Valley View Lane and Denton Drive. This intersection was selected from those along the alignment and near stations and associated park-and-ride lots since it is expected to be impacted the greatest by construction of the proposed project. A number of receptors at the study site were selected to determine the "worst case" outdoor levels of CO concentrations in the vicinity.

Figure 3-19 shows the location of the selected receptor. This study site was selected based on the projected traffic volumes, congestion, and proximity of sensitive receptors to the intersection.

It was assumed that if modeled CO concentration at the intersection most impacted by the full build scenario did not violate the CO standard, then no CO concentrations at other intersections would violate the CO standard.

CO emissions were estimated using emission factors provided in the document entitled "Conformity of Mobility 2025 Update: Metropolitan Transportation Plan and 2002 TIP, 2025 Mobile5b Emission Factors-Urban Counties". The final CO emission rates were calculated by multiplying the MOBILE5B emission factors by the estimated VMT by speed. The vehicle miles traveled (VMT) were also classified according to vehicle speed. **Table 3-12** presents a summary of the emission rates used.

In addition to CO emission rates, a number of other variables were also used for the micro-scale analysis. The selected variables represent worst-case assumptions regarding meteorological conditions, vehicle fleet operating characteristics, traffic, and local terrain, and are taken from the ***U.S. EPA Users' Guide CAL3QHC v2.0*** (September 1995). These variables and their value are summarized below.

- Ambient Temperature: 44 degrees Fahrenheit (average January Temperature)
- Stability Class: "D" (stable atmosphere)
- Wind Speed: 1 meter/second (minimum speed of model)
- Wind Direction: All wind directions in 10 degree increments
- Mixing Height: 1,000 meters
- Settling Velocity: 0 meters/second
- Deposition Velocity: 0 meters/second
- Background CO: 4.4 ppm (1-hour) and 2.5 (8-hour) from 1414 Hinton Street Monitoring Station
- 8-hour Persistence Factor: 0.7

Figure 3-19 Carbon Monoxide Monitoring Stations & Selected CO Microanalysis Location

TABLE 3-12 SUMMARY OF YEAR 2025 MOBILE5B EMISSION RATES, IN GRAMS/VEHICLE MILE TRAVELED (VMT)		
Speed (mph)	AM CO Emission Rate (grams/ VMT)	PM CO Emission Rate (grams/ VMT)
1-3	16.30	16.30
10	7.02	7.02
20	4.48	4.48
30	2.79	2.79
40	1.98	1.98
50	1.62	1.62
60	2.24	2.24
65	2.86	2.86

Source: NCTCOG, Parsons Transportation Group, August 2001

Emission and Dispersion Models: Emission rates were based on those presented above. CAL3QHC air dispersion model was used to predict CO concentrations.

Vehicle Fleet Characteristics: The vehicle mix was integrated in the emission factors provided by NCTCOG. Dallas and surrounding Counties (Collin, Denton and Tarrant) have voluntarily elected to use reformulated gasoline.

Site Characteristics: Surface roughness was selected based on standard guidelines, the particular terrain, and land use of the modeled site. Surface roughness influences the dispersion of pollutants. Surface roughness corresponding to a suburban commercial area was used. Optimum signal timing, within the constraints of reasonable cycle lengths and intersection geometrics, were assumed. Specific receptor locations were selected based upon the front door, or corner of the nearest building in each intersection quadrant, if buildings existed. The goal was to identify a location where people might be exposed to vehicle-generated pollutants between one to eight hours. The peak hour traffic volumes were used for the microscale analysis.

3.4.2 Affected Environment

The Dallas-Fort Worth metropolitan area has a continental climate with annual temperatures ranging from below 10 degrees to over 100 degrees Fahrenheit. Average monthly temperatures range from 44 degrees Fahrenheit in January to 86 degrees Fahrenheit in July. Prevailing winds are from the south, and the level to rolling terrain of the metropolitan area allows air masses to move easily over the region. As a result, long-term air pollution episodes resulting from stagnant air masses are uncommon. Ozone pollution episodes in the Dallas-Fort Worth area are usually associated with the summer months, with high temperature and intense sunlight, which is more conducive to ozone production than winter months.

Motor vehicles emit a variety of pollutants including CO, NOx, VOC, PM_{10}, and lead (Pb). O_3 is not directly emitted from automobiles, but is formed in the atmosphere by chemical reactions involving HC, NOx, and sunlight.

The EPA has established primary and secondary NAAQS for these pollutants. The primary standards were set to protect the public health. The lower secondary standards were established to prevent other adverse effects of air pollutants. These air quality standards are presented in **Table 3-13**.

Attainment Status

The Texas Commission on Environmental Quality (TCEQ) under the guidance of EPA, is the lead state agency responsible for developing plans and implementing regulations for clean air. The 1990 Federal Clean Air Act Amendments (CAAA) requires that the TCEQ and EPA designate

areas affected by these regulations. The North Central Texas area (composed of Collin, Dallas, Denton and Tarrant counties) is in "attainment" of the federally established air quality standards except for O_3, based on violations of federal standards for O_3 at air monitoring sites within the region. The TCEQ and the City of Dallas operate air-monitoring stations throughout the metropolitan area, including three in the vicinity of the proposed project. These monitoring stations were shown on **Figure 3-19**.

TABLE 3-13
NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)

POLLUTANT/ AIR CONTAMINANT	PRIMARY STANDARD[1]	SECONDARY STANDARD[2]	APPLICATION OF STANDARD
Carbon Monoxide (CO)	9.5 ppm by volume	9.5 ppm by volume	Maximum 1-hour concentration not to be at or above this level more than once per calendar year.
	35.5 ppm by volume	35.5 ppm by volume	Maximum 8-hour concentration not to be at or above this level more than once per calendar year.
Ozone (O_3)	0.125 ppm[3] by volume	0.125 ppm by volume	Maximum 1-hour concentration not to be at or above this level more than 3 days over 3 calendar years.
Particulate Matter (PM_{10})	51 micrograms per cubic meter	51 micrograms per cubic meter	The 3-year average of the annual arithmetic mean concentrations at each monitor within an area is not to be at or above this level.
	155 micrograms per cubic meter	155 micrograms per cubic meter	The 3-year average of the annual 99th percentile concentration for each monitor within an area is not to be at or above this level.
Oxides of Nitrogen (NOx)	0.054 ppm by volume	0.054 ppm by volume	Maximum annual arithmetic mean not to be at or above this level.
Lead (Pb)	1.55 micrograms per cubic meter	1.55 micrograms per cubic meter	Maximum arithmetic mean averaged over a calendar quarter not to be at or above this level.
Sulfur Dioxide (SO_2)	0.035 ppm by volume	-	Maximum annual geometric mean not to be at or above this level.
	0.145 ppm by volume	-	Maximum 24-hour concentration not to be at or above this level more than once a year.
	-	0.55 ppm by volume	Maximum 3-hour concentration not to be at or above this level more than once a year.

1. The primary air quality standards are defined as the levels of air quality necessary, with an adequate margin of safety, to protect the public health.
2. Secondary standards are the levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant on property, material, vegetation, etc.
3. ppm = parts per million.

Source: EPA, June 1997

It should be noted that after passage of the 1990 Clean Air Act Amendments (CAAA), the North Central Texas area was originally classified as a "moderate" non-attainment area, meaning it had an ozone design value between 138 and 160 parts per billion (ppb) (the fourth highest monitored 1-hour average O_3 concentration at the same monitoring site in a three-year period). In order to comply with the CAAA's 1996 deadline for moderate non-attainment areas, the Dallas/Ft. Worth region was allowed no more than three exceedances at any single monitor over a three-year period. However during 1994-1996, six of the eight monitors in the North Central Texas area recorded more than three exceedances, with two recording 12 exceedances each.

Thus, the north central Texas area was reclassified as a "serious" O_3 non-attainment area as mandated in Section 181(b)(2)(A) of the CAAA. The reclassification required the TNRCC to submit a new "demonstration of attainment" State Implementation Plan (SIP) to the EPA by the spring of 2000.

Under the new SIP, TNRCC determined that reduction in NOx emissions were also required to meet the 1-hour NAAQS for ozone of 125 ppb. Previously the north central Texas area was under a NOx waiver and only VOCs were required to be reduced. In late April 2000, TNRCC submitted the final set of recommended control measures required to attain the federal ozone standards. EPA published a proposal to approve the Dallas/Fort Worth SIP in the Federal Register on January 18, 2001 (Federal Register, Volume 66, Number 12, page 4756). Final approval is pending. The next major SIP submittal for the DFW area will be for the mid-course review in 2004.

3.5 NOISE

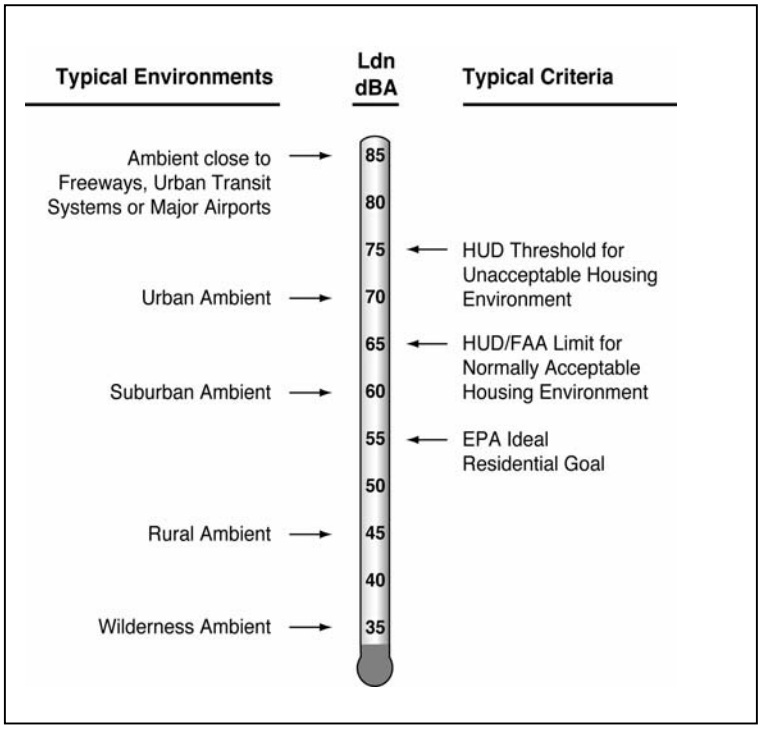
This section describes the methodology used to characterize the existing noise conditions along the corridor, and provides background information on airborne noise issues related to the proposed transit project.

Noise is typically defined as unwanted or undesirable sound, where sound is characterized by small air pressure fluctuations above and below the atmospheric pressure. The basic parameters of environmental noise that affect human subjective response are (1) intensity or level, (2) frequency content and (3) variation with time. The first parameter is determined by how greatly the sound pressure fluctuates above and below the atmospheric pressure, and is expressed on a compressed scale in units of decibels. By using this scale, the range of normally encountered sound can be expressed by values between 0 and 120 decibels. On a relative basis, a 3-decibel change in sound level generally represents a barely-noticeable change outside the laboratory, whereas a 10-decibel change in sound level would typically be perceived as a doubling (or halving) in the loudness of a sound.

The frequency content of noise is related to the tone or pitch of the sound, and is expressed based on the rate of the air pressure fluctuation in terms of cycles per second (called Hertz and abbreviated as Hz). The human ear can detect a wide range of frequencies from about 20 Hz to 17,000 Hz. However, because the sensitivity of human hearing varies with frequency, the A-weighting system is commonly used when measuring environmental noise to provide a single number descriptor that correlates with human subjective response. Sound levels measured using this weighting system are called "A-weighted" sound levels, and are expressed in decibel notation as "dBA." The A-weighted sound level is widely accepted by acousticians as a proper unit for describing environmental noise.

Because environmental noise fluctuates from moment to moment, it is common practice to condense all of this information into a single number, called the "equivalent" sound level (Leq). Leq can be thought of as the steady sound level that represents the same sound energy as the varying sound levels over a specified time period (typically 1 hour or 24 hours). Often the Leq values over a 24-hour period are used to calculate cumulative noise exposure in terms of the Day-Night Sound Level (Ldn). Ldn is the A-weighed Leq for a 24-hour period with an added 10-decibel penalty imposed on noise that occurs during the nighttime hours (between 10 P.M. and 7 A.M.). Many surveys have shown that Ldn is well correlated with human annoyance, and therefore this descriptor is widely used for environmental noise impact assessment.

Figure 3-20 Examples of Typical Outdoor Noise Exposure



Source: Harris, Miller, Miller, and Hanson, 2001

Figure 3-20 provides examples of typical noise environments and criteria in terms of Ldn. While the extremes of Ldn are shown to range from 35 dBA in a wilderness environment to 85 dBA in noisy urban environments, Ldn is generally found to range between 55 dBA and 75 dBA in most communities.

As shown in **Figure 3-20**, this spans the range between an "ideal" residential environment and the threshold for an unacceptable residential environment according to U.S. Federal agency criteria.

3.5.1 Transit Noise Criteria

Noise impact for this project is based on the criteria as defined in the U. S. Federal Transit Administration (FTA) guidance manual ***Transit Noise and Vibration Impact Assessment*** (FTA Report DOT-T-95-16, April 1995). The FTA noise impact criteria are founded on well-documented research on community reaction to noise and are based on change in noise exposure using a sliding scale. Although more transit noise is allowed in neighborhoods with high levels of existing noise, smaller increases in total noise exposure are allowed with increasing levels of existing noise.

The FTA Noise Impact Criteria group noise sensitive land uses into the following three categories:

Category 1: Buildings or parks where quiet is an essential element of their purpose.

Category 2: Residences and buildings where people normally sleep. This includes residences, hospitals, and hotels where nighttime sensitivity is assumed to be of utmost importance.

Category 3: Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and places of worship.

Ldn is used to characterize noise exposure for residential areas (Category 2). For other noise sensitive land uses such as parks and school buildings (Categories 1 and 3), the maximum 1-hour Leq during the facility's operating period is used.

There are two levels of impact included in the FTA criteria. The interpretation of these two levels of impact are summarized below:

- Severe: Severe noise impacts are considered "significant" as this term is used in the National Environmental Policy Act (NEPA) and implementing regulations. Noise mitigation will normally be specified for severe impact areas unless there is no practical method of mitigating the noise.

- Impact: Sometimes referred to as moderate impact, in this range of noise impact, other project-specific factors must be considered to determine the magnitude of the impact and the need for mitigation. These other factors can include the predicted increase over existing noise levels, the types and number of noise-sensitive land uses affected, existing outdoor-indoor sound insulation, and the cost effectiveness of mitigating noise to more acceptable levels.

The noise impact criteria are summarized in **Table 3-14**. The first column shows the existing noise exposure and the remaining columns show the additional noise exposure from the transit project that would cause either moderate or severe impact. The future noise exposure would be the combination of the existing noise exposure and the additional noise exposure caused by the transit project.

3.5.2 Existing Noise Conditions

Noise-sensitive land use along the project corridor was first identified based on preliminary alignment drawings, aerial photographs, visual surveys and land use information from the MIS process. Based on this review, summary descriptions of noise-sensitive land use and existing noise sources along the corridor, from south to north, are as follows:

- Harry Hines Boulevard (Oak Lawn Avenue to Motor Street) - Although much of this area is commercial, there are several motels as well as a single-family residential neighborhood along the northeast side of Harry Hines Boulevard. Most of the residences are currently shielded from existing traffic noise by first-row commercial buildings. In addition to traffic on Harry Hines Boulevard, existing noise sources along this corridor segment include Dallas Love Field aircraft traffic, railroad operations on the opposite side of Harry Hines Boulevard, and miscellaneous commercial activities.

- Harry Hines Boulevard (Motor Street to Record Crossing Road) - The southernmost portion of this area is in close proximity to the Selected LRT alignment. Areas to the north are associated with the Harry Hines Base Alignment, which was considered in the Draft EIS. This segment of the corridor passes through the Medical Center District, which includes Parkland Hospital, UTSW Medical Center, Zale Lipshy University Hospital, St. Paul University Hospital and Salvation Army social service facilities, including a chapel (the Salvation Army Temple) at the corner of Harry Hines Boulevard and Mockingbird Lane. All of the hospitals are high-rise buildings located on the southwest side of Harry Hines Boulevard, and noise-sensitive outdoor land use is limited to a few scattered benches in front of the hospitals. The existing noise environment is dominated by a high volume of bus, truck and automobile traffic on Harry Hines Boulevard, Dallas Love Field aircraft traffic and hospital sources (e.g., ambulance sirens).

- Harry Hines, Maple Avenue/Denton Drive Area (Medical Center Design Options and UPRR) - This section begins in the Medical Center area, heading north from Harry Hines Boulevard, through a mostly industrial area to Maple Avenue and Denton Drive. This area covers Design Options A, B, C and D as well as the Selected LRT alignment (UPRR) in the Medical Center area. These alignments are in the vicinity of the Salvation Army Carr P. Collins Social Services Center residential buildings near Harry Hines Boulevard, O-K Paper Company, single-family residences, two schools, a medical clinic, Weichsel Park, an existing apartment complex and an apartment complex currently under construction. Video Post and Transfer, a noise and vibration sensitive business, is also located in this area. The existing noise environment is dominated by Dallas Love Field aircraft traffic, and by local automobile traffic.

TABLE 3-14
FTA NOISE IMPACT CRITERIA

Existing Noise Exposure Leq or Ldn	Project Noise Exposure Impact Thresholds, Ldn or Leq (dBA)			
	Category 1 or 2 Sites		Category 3 Sites	
	Impact	Severe Impact	Impact	Severe Impact
<43	Amb.+10	Amb.+15	Amb.+15	Amb.+20
43	52	58	57	63
44	52	59	57	64
45	52	59	57	64
46	52	59	57	64
47	52	59	58	64
48	53	59	58	64
49	53	59	58	64
50	53	60	59	65
51	54	60	59	65
52	54	60	59	65
53	54	60	60	65
54	55	61	60	66
55	55	61	61	66
56	56	62	61	67
57	56	62	62	67
58	57	62	62	67
59	57	63	63	68
60	58	63	63	68
61	58	64	64	69
62	59	64	65	69
63	60	65	65	70
64	60	66	66	71
65	61	66	66	71
66	61	67	67	72
67	62	67	68	72
68	63	68	69	73
69	64	69	69	74
70	65	69	70	74
71	65	70	70	75
72	65	71	70	76
73	65	72	70	77
74	65	72	70	77
75	65	73	70	78
76	65	74	70	79
77	65	75	70	80
>77	65	75	70	80

Note: Ldn is used for land uses where nighttime sensitivity is a factor; maximum 1 hour Leq is used for land use involving only daytime activities.

Source: Federal Transit Administration, April 1995

- Love Field Design Option - There are no sensitive land uses in the vicinity of the Love Field Design Option. Noise levels are dominated by aircraft operations.

- South of Mockingbird Lane (Harry Hines Boulevard to Denton Drive) - Although this area is primarily commercial and industrial, there are a few single-family homes that remain on Bomar Avenue and Manor Way. The existing noise environment in this area is dominated by Dallas Love Field aircraft traffic.

- Denton Drive (Empire Central to Burbank Avenue) - There is a large single-family residential area located along this segment of the corridor on the southwest side of Denton Drive, including a school and two churches. In addition to Dallas Love Field aircraft traffic, the

dominant noise source, other contributors to the noise environment in this neighborhood include traffic on Denton Drive and limited DGNO freight train movements on the existing railroad line between the houses and Denton Drive.

- Denton Drive (Webb Chapel Extension to Northwest Highway) - This short segment of the corridor includes several large apartment complexes on both sides of Denton Drive. As in the other areas adjacent to Dallas Love Field, aircraft traffic is the dominant noise source. Other contributors to the noise environment in this area include traffic on Denton Drive, limited DGNO freight train movements and local resident activities.

- Farmers Branch - Noise-sensitive land use along the corridor in Farmers Branch includes a small number of single-family residences, a church and a park, all located to the east of Denton Drive and the DGNO railroad line. There is also a motel on the west side of the corridor. Existing noise sources in this area include Denton Drive traffic and a limited number of DGNO train operations.

- Carrollton - Noise-sensitive land use along the corridor in Carrollton includes a small number of single-family residences, one apartment complex, a church, several motels and a trailer park. Existing noise sources include traffic on Broadway Street (an extension of Denton Drive) and a limited number of DGNO train operations.

Existing ambient noise levels in the above areas were characterized through direct measurements at selected sites along the proposed alignment during the period from March 5 through March 7, 2001 and from November 7 through November 8, 2001. Estimating existing noise exposure is an important step in the noise impact assessment since, as indicated above in Section 3.5.2, the thresholds for noise impact are based on the existing levels of noise exposure. The measurements included both long-term (24-hour) and short-term (typically one hour) monitoring of the A-weighted sound level at representative noise-sensitive locations.

All of the measurement sites were located in noise-sensitive areas, and were selected to represent a range of existing noise conditions along the corridor. **Figure 3-21** shows the general location of the seven long-term monitoring sites (LT-1 through LT-7) and six short-term monitoring sites (ST-1 through ST-6). At each site, the measurement microphone was positioned to characterize the exposure of the site to the dominant noise sources in the area. For example, microphones were located at the approximate setback lines of the receptors from adjacent roads or rail lines, and were positioned to avoid acoustic shielding by landscaping, fences or other obstructions.

The results of the existing ambient noise measurements, summarized in **Table 3-15**, were used as a basis for determining the existing noise conditions at all noise-sensitive receptors along the corridor. However, because of the variability and dominance of aircraft noise and train horn noise at certain locations, supplementary estimates and adjustments to the measured noise levels were made to generalize the results along the corridor. The resulting characterization of existing ambient noise conditions is summarized below.

- Harry Hines Boulevard (Oak Lawn Avenue to Motor Street) - The Ldn measured at the nearest residence in this area (Site LT-1) was 70 dBA, dominated by noise from traffic on Harry Hines Boulevard. This site is located at 150 feet from the center of Harry Hines Boulevard, with a partial view of the road (view angle of about 90 degrees). Thus, the Ldn at other locations in this area can be estimated by applying appropriate adjustments to the measured level for distance and shielding.

Figure 3-21 Ambient Noise Monitoring Locations

TABLE 3-15
SUMMARY OF EXISTING AMBIENT NOISE MEASUREMENT RESULTS

Site No.	Measurement Location Description	Start of Measurement		Meas. Time (hrs)	Noise Exposure (dBA)	
		Date	Time		Ldn	Leq
	Selected LRT Alternative (Base Alignment with Medical Center Design Option D)					
LT-1	S.F. Res.@ 2219 Douglas Avenue – Dallas	3-6-01	14:00	24	70	--
LT-2	S. F. Res @2805 Cherrywood Avenue – Dallas	11-7-01	10:00	24	72	--
LT-3	S.F. Res.@ 2614 Bomar Avenue – Dallas	3-5-01	00:00	24	62	--
LT-4	S.F. Res. @ 7319 Denton Drive – Dallas	3-6-01	12:00	24	73	--
LT-5	S.F. Res.@ 12815 Bee St. – Farmers Branch	3-5-01	00:00	24	65	--
LT-6	M.F. Res.@ 1309 Northside Drive–Carrollton	3-5-01	00:00	24	76	--
LT-7	Trailer Home #30@2200 N. IH35E–Carrollton	3-5-01	00:00	24	67	--
ST-1	Parkland Memorial Hospital – Dallas	3-6-01	16:00	1	65*	66
		11-8-01	11:00	1		64
		11-7-01	23:00	1		59
ST-3	Rusk Middle School – Dallas	11-7-01	16:00	1	--	73
ST-5	Apt. #1014 @ Rush Creek Apts. – Dallas	3-6-01	11:00	5	63	64
		11-7-01	07:00	1		62
		11-8-01	00:01	1		56
ST-6	Farmers Branch Historic Park – Farmers Branch	3-5-01	10:00	½	--	55
	Other Alignments Considered					
ST-2	Edison Hernandez Academy – Dallas	11-7-01	15:00	1	--	67
ST-4	Salvation Army Temple – Dallas	11-8-01	15:00	1	--	61

*See text for a discussion of the estimation of the Ldn from the short-term data.

Source: Harris, Miller, Miller, & Hanson Inc., 2001

- Harry Hines Boulevard (Motor Street to Record Crossing Road) - Although no long-term noise measurements were made in this area, a short-term measurement was made at Parkland Hospital (Site ST-1). The measurement location was 150 feet from the center of Harry Hines Boulevard, and is representative of the closest hospital buildings in this area. The Leq measured during a peak traffic hour at this site was 66 dBA, the Leq measured during an off-peak hour at this site was 64 dBA, and the Leq measured during a nighttime hour at this site was 59 dBA. The Ldn was estimated to be 65 dBA based on a formula in the FTA guidance manual using the three short-term noise measurements conducted at this site.

- Harry Hines/Maple Avenue/Denton Drive Area (Medical Center Design Options and UPRR) - The Ldn measured at a residence (LT-2) in this area was 72 dBA, dominated by noise from aircraft from Dallas Love Field. Base on this measurement and on Love Field noise contours, the Ldn is estimated to range from 67 dBA to 73 dBA at residential sites in this area. In addition, short-term noise measurements were conducted at Edison Hernandez Elementary School (ST-2) and Rusk Middle School (ST-3). The Leq noise exposure level measured during peak traffic hours, was 67 dBA at the elementary school and 73 dBA at the middle school. The Leq levels at Weichsel Park and Video Post and Transfer, located near the middle school, are also taken to be 73 dBA. The Leq at the medical clinic is taken to be 70 dBA, based on typical daytime hourly Leq data from nearby measurement site LT-2.

- Love Field Design Option - No measurements were taken since no noise sensitive uses are present.

- South of Mockingbird Lane (Harry Hines Boulevard to Denton Drive) - The existing Ldn is taken to be 62 dBA at the few noise-sensitive receptors in this area, based on the

measurement results at Site LT-2. This is a conservatively low value, based on measurements during "north flow" conditions at Dallas Love Field, with arriving aircraft flying over this area. The noise contours for Dallas Love Field suggest that the Ldn is about 10 decibels higher under "south flow" conditions, when aircraft depart over this area. In addition, a short-term measurement (ST-4) was conducted at the Salvation Army Temple on the corner of Harry Hines Boulevard and Mockingbird Lane. The peak-hour Leq at this site was 61 dBA.

- Denton Drive (Empire Central to Burbank Avenue) - The Ldn measured at a home along Denton Drive in this area (Site LT-3) was 73 dBA, dominated by noise from aircraft at Dallas Love Field; without aircraft noise, the measured data suggest that the background Ldn at this location is about 61 dBA. However, because the airport noise contours show that the Ldn varies widely with location along Denton Drive in this area, the existing Ldn has been estimated based on a combination of the background noise level and the minimum aircraft noise levels predicted for either northwest or southwest aircraft flow conditions at Dallas Love Field. The resulting site-specific existing Ldn values range from 65 dBA at Burbank Avenue to 78 dBA at Empire Central.

- Denton Drive (Webb Chapel Extension to Northwest Highway) - The Leq measured during a five-hour mid-day period at an apartment complex located 125 feet east of Denton Drive (Site ST-5) was 64 dBA. The Leq measured during a peak hour was 62 dBA and the Leq measured during a nighttime hour was 56 dBA. The Ldn was estimated to be 63 dBA based on a formula in the FTA guidance manual using the three-short-term noise measurements conducted at this site. For residences in this area on the west side of Denton Drive, located only about 75 feet from the road, the existing Ldn is estimated to be 3 decibels higher based on distance, yielding an estimate of 68 dBA.

- Farmers Branch - The Ldn measured at a residence located about 200 feet east of Denton Drive in Farmers Branch was 65 dBA. This level can be used to characterize the Ldn at other receptors in Farmers Branch, by applying adjustments based on the distance to Denton Drive. At Farmers Branch Historical Park (Site ST-6), the existing noise environment is characterized by the measured short-term Leq of 55 dBA.

- Carrollton - The measurements in Carrollton indicated Ldn values of 76 dBA at a residence near the Northside Drive grade crossing (Site LT-6), and 67 dBA at a trailer park on the west side of Broadway Street (Site LT-7). However, the Ldn at Site LT-6 was dominated by extremely loud noise from DGNO train horns, with a maximum noise level of 105 dBA between 2:00 A.M. and 3:00 A.M. Without the train horn noise, the Ldn in this area is estimated to be 66 dBA. Due to the variability and intensity of this source, the latter value is used to characterize the existing noise environment at noise-sensitive locations along the corridor in Carrollton.

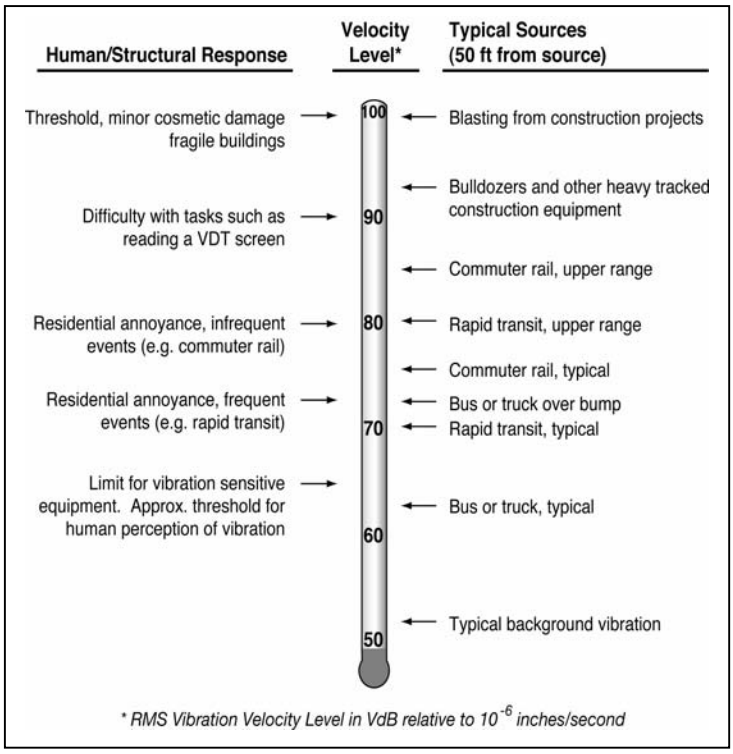
3.6 VIBRATION

This section describes the methodology used to characterize the existing vibration conditions along the corridor, and provides background information on ground-borne vibration issues related to the proposed transit project.

Ground-borne vibration is the oscillatory motion of the ground about some equilibrium position that can be described in terms of displacement, velocity or acceleration. Because sensitivity to vibration typically corresponds to the amplitude of vibration velocity within the low-frequency range of most concern for environmental vibration (roughly 5-100 Hz), velocity is the preferred measure for evaluating ground-borne vibration from transit projects.

The most common measure used to quantify vibration amplitude is the peak particle velocity (PPV), defined as the maximum instantaneous peak of the vibratory motion.

Figure 3-22
Typical Ground-Borne Vibration Levels and Criteria



Source: FTA Transit Noise & Vibration Impact Assessment, April 1995

PPV is typically used in monitoring blasting and other types of construction-generated vibration, since it is related to the stresses experienced by building components. Although PPV is appropriate for evaluating building damage, it is less suitable for evaluating human response, which is better related to the average vibration amplitude. Thus, ground-borne vibration from transit trains is usually characterized in terms of the "smoothed" root mean square (rms) vibration velocity level, in decibels (VdB), with a reference quantity of one micro-inch per second.

VdB is used in place of dB to avoid confusing vibration decibels with sound decibels. **Figure 3-22** illustrates typical ground-borne vibration levels for common sources as well as criteria for human and structural response to ground-borne vibration.

As shown, the range of interest is from approximately 50 to 100 VdB, from imperceptible background vibration to the threshold of damage. Although the approximate threshold of human perception to vibration is 65 VdB, annoyance is usually not significant unless the vibration exceeds 70 VdB.

3.6.1 Ground-Borne Vibration Criteria

The FTA ground-borne vibration impact criteria are based on land use and train frequency, as shown in **Table 3-16**. There are some buildings, such as concert halls, recording studios and theaters that can be very sensitive to vibration but do not fit into any of the three categories listed in **Table 3-16**. Due to the sensitivity of these buildings, they usually warrant special attention during the environmental assessment of a transit project. **Table 3-17** gives criteria for acceptable levels of ground-borne vibration for various types of special buildings. The Love Field Design Option included a tunnel alignment under Dallas Love Field property. Specifically, vibration from tunnel boring and LRT operations may have affected existing navigational aids (NAVAIDS) and associated underground or surface equipment used for aircraft operations. These facilities would have also warranted special attention during final design should the Love Field Design Option have been selected. Prior to construction, FAA would need to approve DART's plans and review and concur with the vibration analysis of the potential construction and operational impacts to airport facilities.

TABLE 3-16
GROUND-BORNE VIBRATION AND NOISE IMPACT CRITERIA

Land Use Category	Ground-Borne Vibration Impact Levels (VdB re 1 micro inch/sec)		Ground-Borne Noise Impact Levels (dB re 20 micro Pascals)	
	Frequent Events[1]	Infrequent Events[2]	Frequent Events[1]	Infrequent Events[2]
Category 1: Buildings where low ambient vibration is essential for interior operations.	65 VdB[3]	65 VdB[3]	[4]	[4]
Category 2: Residences and buildings where people normally sleep.	72 VdB	80 VdB	35 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use.	75 VdB	83 VdB	40 dBA	48 dBA

Notes:
1. "Frequent Events" is defined as more than 70 vibration events per day. Most rapid transit projects fall into this category.
2 "Infrequent Events" is defined as fewer than 70 vibration events per day. This category includes most commuter rail systems.
3. This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.
4. Vibration-sensitive equipment is not sensitive to ground-borne noise.

Source: Federal Transit Administration, April 1995

TABLE 3-17
GROUND-BORNE VIBRATION AND NOISE IMPACT CRITERIA FOR SPECIAL BUILDINGS

Type of Building or Room	Ground-Borne Vibration Impact Levels (VdB re 1 micro-inch/sec)		Ground-Borne Noise Impact Levels (dB re 20 micro Pascals)	
	Frequent Events[1]	Infrequent Events[2]	Frequent Events[1]	Infrequent Events[2]
Concert Halls	65 VdB	65 VdB	25 dBA	25 dBA
TV Studios	65 VdB	65 VdB	25 dBA	25 dBA
Recording Studios	65 VdB	65 VdB	25 dBA	25 dBA
Auditoriums[3]	72 VdB	80 VdB	30 dBA	38 dBA
Theaters[3]	72 VdB	80 VdB	35 dBA	43 dBA

Notes:
1. "Frequent Events" is defined as more than 70 vibration events per day. Most transit projects fall into this category.
2. "Infrequent Events" is defined as fewer than 70 vibration events per day. This category includes most commuter rail systems.
3. If the building will rarely be occupied when the trains are operating, there is no need to consider impact. As an example consider locating a commuter rail line next to a concert hall. If no commuter trains will operate after 7 pm, it should be rare that the trains interfere with the use of the hall.

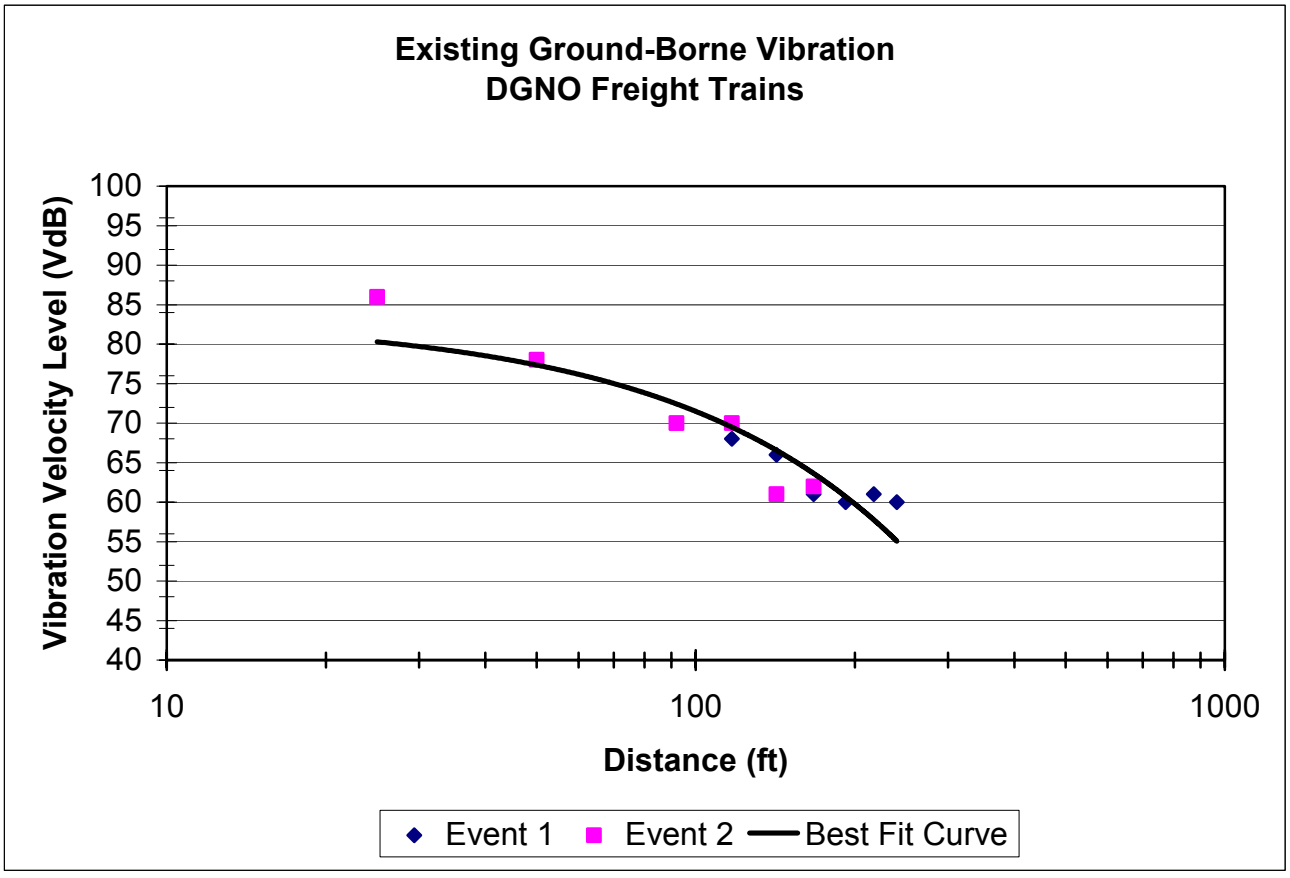
It should also be noted that **Table 3-16** and **Table 3-17** include separate FTA criteria for ground-borne noise, the "rumble" that can be radiated from the motion of room surfaces in buildings due to ground-borne vibration. Although expressed in dBA, which emphasizes the more audible middle and high frequencies, the criteria are set significantly lower than for airborne noise to account for the annoying low-frequency character of ground-borne noise. Because airborne noise tends to mask ground-borne noise for above ground (i.e. at-grade or elevated) rail systems, ground-borne noise criteria are primarily applied where airborne noise is not a dominant factor. As such, ground-borne noise criteria are applied only to well-insulated interior spaces of noise-sensitive institutional buildings adjacent to the project alignment (e.g., Video Post and Transfer).

3.6.2 Existing Vibration Conditions

Because significant sources of existing ground-borne vibration along the Northwest Corridor are limited to infrequent, low-speed freight train movements on the DGNO railroad line north of Mockingbird Lane and aircraft activity level at Dallas Love Field, the vibration measurements for this project focused on characterizing the vibration propagation characteristics of the soil at representative locations along the corridor. Five vibration testing sites, at the locations shown in **Figure 3-23**, were selected to represent a range of soil conditions in areas along the corridor that include a significant number of vibration-sensitive receptors. At each of these sites, ground-borne vibration propagation tests were conducted by impacting the ground and measuring the input force and corresponding ground vibration response at various distances. The resulting force-response transfer function can be combined with the known input force characteristics of the DART light rail vehicle to predict future vibration levels at locations along the project corridor.

Measurements of existing ground-borne vibration were limited to two train events at Site V-2, in the residential neighborhood along Denton Drive on the west side of Dallas Love Field. The results, shown in **Figure 3-24**, suggest that the existing ground vibrations from DGNO freight train operations are perceptible within about 150 feet from the track.

Figure 3-24
Maximum Existing Ground-Borne Vibration from Freight Train Operations



Source: Harris, Miller, Miller, and Hanson, 2001

Figure 3-23 Ground-Borne Vibration Measurement Locations

3.7 VISUAL AND AESTHETIC RESOURCES

3.7.1 Methodology

A visual inventory of the corridor was undertaken to provide an overview of the various character areas along the corridor. The purpose of this inventory is to document the visual and aesthetic resources within the corridor that may be impacted by the proposed action. The analysis of potential impacts presented in Section 5.6 addresses how the proposed action will affect the views, vistas and areas of special design character. This includes not only the character of the built environment, but of the natural environment, as well.

3.7.2 Overview of the Corridor

The project corridor begins in the urban core of downtown Dallas, as it departs from the light rail system in the West End, and then quickly transitions through an area of office parks and hospital facilities to an industrial corridor. As it approaches its terminus to the north, it reaches the downtowns of two suburban communities, Farmers Branch and Carrollton. It is typical of a railroad corridor, given its history, in that it is lined with small industrial and commercial sites that have, in their past, relied on the railroad for the delivery of goods.

Whether adjacent to Harry Hines Boulevard, Stemmons Freeway, Denton Drive, or Dallas Love Field, the alignment is fronted by the back door of many businesses and other uses due to its history as an active freight railroad corridor. The exception is those places where the alignment will depart from the railroad corridor to serve activity centers such as the Medical Center area.

3.7.3 Corridor Assessment Unit Descriptions

For the purpose of documenting the visual inventory of the corridor, the Study Area was, based on field observation, categorized into ten assessment units, shown in **Figure 3-25**. Each of these units was delineated based on its general visual character and the commonality of its land uses. **Table 3-18** provides a general rating of each unit's visual quality, sensitivity to change, primary viewers, and sensitive visual assets or receptors. **Table 3-19** provides definitions of the ratings used in evaluating each assessment unit. The ten assessment units are described below:

Unit 1 – West End/Arena

This unit is comprised of a variety of buildings and architectural styles, which begin the transition from the historic West End north towards Market Center. The red brick architecture of older buildings is carried through the design of the new American Airlines Center arena. The area has an industrial-era character, which quickly changes as the line progresses north.

Unit 2 - Market Center

The visual landscape of the Market Center unit is characterized by the landscaping and modern architecture of the low to mid-rise office, market and hotel buildings located west of the rail alignment. The area also has older commercial buildings and motels on the east side of Harry Hines Boulevard, which buffer Harry Hines Boulevard and the UPRR from an adjacent single-family residential neighborhood. Along the UPRR, the visual landscape is dominated by industrial/warehouse uses.

Unit 3 - Medical Center

The Medical Center unit is characterized by its landscaped median, and the institutional architecture of several interconnected hospitals and supporting medical buildings. Towards the southern end of the unit, a pedestrian bridge connects Parkland Hospital to its parking garage across Harry Hines. To the north, the North and South campuses of UTSW are connected by a pedestrian and bus shuttle bridge ("campus connector") crossing Harry Hines. The environment of the Medical Center is very much indoors, with minimal surface sidewalks and pedestrian ways to connect buildings to each other and to parking garages and lots.

Figure 3-25 Visual Analysis Units

TABLE 3-18
GENERAL RATING OF CORRIDOR VISUAL ASSESSMENT UNITS

Unit	Name	City	Primary Viewers	Visual Quality	Visual Sensitivity	Sensitive Receptors/Assets
1	West End / Arena	Dallas	A, E, G	Moderate-High	Moderate	West End properties, American Airlines Center
2	Market Center	Dallas	A, B, C, E	Moderate-High	Moderate	Reverchon Park, Turtle Creek Pump Station, Market Center, SF residences to east, offices, hotels
3	Medical Center	Dallas	A, C, E, H	Moderate-High	High	Hospitals, MF residences, offices, Harry Hines Blvd. landscaping
3A	Inwood	Dallas	A, B, D,E, F, H	Low-Moderate	Moderate	SF residences to the east, schools, park, low-rise industrial
4	Love Field	Dallas	A, B, C, D, F	Low	Low	SF residences to west, Knight School, Bachman Lake Park
5	Northwest Hwy. / LBJ Freeway	Dallas	A, C, E, F	Low-Moderate	Moderate-High	MF residences to east, offices
6	Farmers Branch	Farmers Branch	A, B, E, D, G	Moderate	Moderate	FB Historical Park, SF residences, municipal center
7	North Farmers Branch	Farmers Branch	A, C, F	Low	Low-Moderate	Low rise industrial uses and MF residences
8	Downtown Carrollton	Carrollton	A, E, G	Moderate-High	High	Old Downtown Carrollton, SF and MF residences, historic properties and parks
9	Carrollton / Frankford	Carrollton	A, B, C, D, F	Moderate	Moderate	SF residences, offices, Ken Good Park

Source: S.R. Beard & Associates, 2001

TABLE 3-19
EVALUATION RATING DEFINITIONS

Primary Viewers	Visual Quality	Visual Sensitivity
A = Arterial Motorists B = Single Family Residents C = Multi-Family Residents D = Recreational Users E = Commercial/Office Tenants F = Industrial Tenants G = Downtown Pedestrians H = Others	**High =** Assessment unit or portions thereof is of significant visual or aesthetic quality to the primary viewers. **Moderate =** Assessment unit or portions thereof is of average visual or aesthetic quality to the primary viewers. **Low =** Assessment unit is of little or no visual or aesthetic quality to the primary viewers.	**High =** Introduction of new elements into the assessment unit could significantly impact the quality of the visual/aesthetic resource as observed by the primary viewers. **Moderate =** Introduction of new elements into the assessment unit may impact the quality of the visual/aesthetic resource unit or a portion thereof as observed by the primary viewers. **Low =** Introduction of new elements into the assessment unit is not likely to have an impact on any visual/aesthetic resource as observed by the primary viewers.

Source: S.R. Beard & Associates, 2001

Unit 3A - Inwood
The Inwood unit is characterized by low rise light industrial and older commercial uses towards its southern end. As it extends north towards Inwood Road, it is adjacent to additional light industrial and commercial uses, as well as two schools, Weichsel Park and a single-family residential neighborhood.

Unit 4 - Dallas Love Field
The Dallas Love Field unit is a low-rise industrial area that is indicative of development adjacent to many airports. Warehouses and aviation related offices lining the east side of the railroad corridor serve air cargo, maintenance and other functions at the airport itself. The single-family residential area to the west of the corridor faces toward the alignment and Dallas Love Field Airport.

Unit 5 - Northwest Highway/LBJ Freeway
The Northwest Highway to LBJ Freeway unit is predominantly railroad-served industrial uses, with low-rise buildings that back onto the corridor. In the vicinity of the Northwest Highway station, there are two- and three-story multi-family residential developments, as well as commercial and retail uses.

Unit 6 – Farmers Branch
The Farmers Branch Unit is best characterized as the town center. Residential and civic uses to the east of the corridor have tree-lined streets, and older homes and buildings house small businesses. The unit is also characterized by the presence of public offices and their architecture, which is indicative of their importance in the community.

Unit 7 - North Farmers Branch
The North Farmers Branch Unit is a suburban industrial corridor. The buildings, most of which are fenced in, are set back farther from the railroad corridor than in the more southerly segments of the line. Towards the northern end of the unit, multi-family housing faces the alignment with a view from balconies and patios across a parking lot.

Unit 8 – Downtown Carrollton
The Downtown Carrollton unit is unique to the suburban end of the line. The original railroad depot and downtown area are indicative of a turn-of-the-century farming settlement. While the character of the buildings, both old and new, is of varying aesthetic character, most are either rehabilitated or restored to add to the quality of the pedestrian environment in downtown.

Unit 9 – Carrollton/Frankford
At the northernmost end of the line, the Carrollton/Frankford unit is the most suburban, with newer industrial and warehouse uses set back from the line, many behind security and privacy fencing. There is a public park with small lakes just south of the Trinity Mills station. The line terminates at the Frankford station just south of the Elm Fork of the Trinity River.

3.8 CULTURAL RESOURCES AND PARKLANDS

This section describes the existing cultural resources including but not limited to historic resources, archeological resources, and Section 4(f) resources potentially affected by the proposed project. First the regulatory framework governing cultural resources is presented; next historic resources are presented and analyzed, followed by archeological resources and Section 4(f) resources.