



Appendix B

Technical Memoranda and Reports

Disclaimer:

Technical memoranda and reports were prepared as independent documents to support the preparation of the Final Environmental Impact Statement (FEIS) for the Dallas CBD Second Light Rail Alignment (D2 Subway). Information from these documents was incorporated into the FEIS to provide information on existing conditions, and in some cases, assess potential impacts to the resources. Information contained in the FEIS is the most current and supersedes information in the technical memoranda and reports.



B-13

Indirect and Cumulative Impacts Assessment and Mitigation Technical Memorandum



Technical Memorandum

Date: Tuesday, September 24, 2019

Project: Task Order 39 – Dallas CBD Second Light Rail Alignment

To: Kay Shelton, Project Manager, DART Capital Planning

From: Kristine Lloyd, GPC6 EIS Task Manager

Subject: DART GPC VI – Contract C-2012668 DART CBD Second Light Rail Alignment Indirect and Cumulative Impacts Assessment and Mitigation; HDR PN 10024656

Introduction: This Technical Memorandum identifies the potential indirect and cumulative impacts associated with the Locally Preferred Alternative (LPA) for the Dallas Area Rapid Transit (DART) Dallas Central Business District (CBD) Second Light Rail Alignment (D2 Subway).

Objective: DART is preparing a Supplemental Draft Environmental Impact Statement (SDEIS) to assess the impacts and benefits of rail passenger service on the D2 Corridor. The SDEIS will build upon the 2010 DEIS and be made available to the public for review and comment. Project oversight will be conducted by the Federal Transit Administration (FTA).

Regulatory Setting: The Council on Environmental Quality (CEQ) requires that potential indirect and cumulative impacts be considered during the National Environmental Policy Act (NEPA) process. Indirect impacts (i.e., effects) are defined as impacts that are “caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable” per the CEQ (40 CFR §1508.8) and may “include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.” In addition, the CEQ (40 CFR §1508.7) defines cumulative impacts as “the impact on the environment which results from the incremental impact of the proposed action when added to other past, present and reasonably foreseeable future actions.”

The potential indirect and cumulative impacts of the proposed project are described below utilizing guidance from the 2016 American Association of State Highway and Transportation Officials (AASHTO) Practitioner’s Handbook on *Assessing Indirect Effects and Cumulative Impacts under NEPA*. The methodology for the project is consistent with DART, FTA, and CEQ guidance regarding indirect and cumulative impacts assessments.

Impact Assessment: In addition to direct impacts, major transportation projects may also have indirect impacts on land use and the environment. For this analysis, the evaluation of indirect impacts is focused on induced growth impacts. Induced growth impacts are defined by AASHTO as “changes in the location, magnitude or pace of future development that result from changes in accessibility caused by the project.” An example of an induced growth impact is the commercial development resulting from the creation of a new rail station and the environmental impacts associated with this development. The primary goal of the



indirect impacts analysis is to understand the relationship between the proposed project, the induced growth and the resources potentially affected as a result of the induced growth.

The Area of Influence (AOI) developed for the project is composed of a 0.5-mile radius around the project alignment beginning at Victory Park on the west, and ending at Deep Ellum on the east. It is approximately 1,882 acres in size (3 square miles), including the CBD in Downtown Dallas. The 0.5-mile radius was selected as the AOI to include those areas where induced growth and development could occur from the proposed stations and alignment. The AOI includes a portion of the following districts in downtown Dallas: Design, Victory Park, Uptown, Arts, Riverfront, West End Historic, Thanksgiving Commercial Center, Baylor, Main Street, Civic Center, Reunion/Union Station, Farmers Market, and Deep Ellum.

The CBD is characterized by commercial buildings, arts and cultural centers, recreational facilities, City Hall and other government sites, parking, and small parks. Residential housing is mostly limited to multi-family housing units. Most of the CBD is already developed with small amounts of vacant land left available for future uses. The inner CBD is composed of commercial, industrial, institutional, park and public space, and residential land uses. The outer CBD is characterized as industrial to the south; office space and multi-family housing to the southwest; recreational to the southeast; residential to the north and northeast; and primarily multi-family and recreational areas to the northwest. The orange and green Light Rail Transit (LRT) lines would be rerouted to connect with the D2 line. Districts within the CBD and the AOI are described below in **Table 1**.

Table 1. Summary of Districts within the AOI

District	Description
Design	Located between Stemmons Freeway and the Trinity River at Oak Lawn. This district contains a variety of retail outlets, featuring a wide variety of merchandise (antique malls), services and art, as well as office spaces. A growing market of mixed-use and residential lofts and condominiums are being developed.
Victory Park	Master planned development with modern office, residential, entertainment, and mixed-use projects, centered on the American Airlines Center, and home to the Dallas Mavericks and Dallas Stars. The area features public plazas with outdoor art and special events. As part of a prior agreement, DART owns a surface transit right-of-way through the area from Victory Station to Woodall Rodgers Freeway.
Uptown	A dense, urban mixed-use district which includes the State Thomas neighborhood. The area includes high-rise condos, townhouses, office towers and mixed-use developments and serves as a popular entertainment district with numerous restaurants, bars, shops, and services along McKinney Avenue, the spine road of the district.
Arts	This district is bound by Ross Street to the south, Woodall Rodgers Freeway to the north, Field Street to the west, and Julius Schepps Freeway to the east. Home to a number of facilities and institutions that attract visitors from throughout the region, including cultural, educational and religious facilities, such as the Dallas Museum of Art, Nasher Sculpture Garden, Morton H. Meyerson Symphony Center, and the Dallas Center for the Performing Arts. Popular for concerts, outdoor festivals, lectures, youth educational programs, and other cultural programs and home to a growing number of office and residential towers.

District	Description
Riverfront	As the front door to the Trinity River, this district has created one of the most significant changes to the Dallas skyline with the construction of the Margaret Hunt Hill Bridge, designed by internationally renowned architect and engineer Santiago Calatrava. From an array of unique antique shops to the famous tacos and longhorns of Fuel City, the Riverfront District is home to some of Dallas' most-loved stops. The district is experiencing rapid development and redevelopment centered along Riverfront Boulevard, including an eclectic mix of restaurants, retail, and mid-rise apartments and mixed-use developments.
West End Historic	This district contains a collection of restored warehouses that served Dallas' early railroad terminals. These buildings now house a collection of restaurants, offices, and apartments. This district contains Dealey Plaza, the site of the Kennedy assassination, as well as the John F. Kennedy Memorial, El Centro College, and Dallas World Aquarium. New mixed-use developments have been built that mimic the West End's original red brick architecture. The area was initially revitalized in the 1990s as an entertainment district and has experienced a second building boom in recent years.
Thanksgiving Commercial Center	Located in the heart of downtown Dallas, this district is a dense, urban environment consisting of many iconic skyscrapers and several landmarks, including Thanksgiving Tower, Thanksgiving Square, Bryan Tower, and Plaza of the Americas. While traditionally an office-focused district, several conversions of older skyscrapers have made the district more mixed-use in nature, with the addition of residences and ground floor retail.
Baylor	Baylor University Medical Center anchors this district, which is comprised of pedestrian-friendly streets, historic homes, condos and apartments. This district is home to several nonprofit organizations located along Swiss Avenue, as well as the Latino Cultural Center, Bryan Place neighborhood, and Exall Park.
Main Street	This district, the historic core of downtown Dallas, has seen rapid redevelopment over the past two decades. The Neiman Marcus flagship store, Comerica Bank Tower, Bank of America Plaza, The Joule, Magnolia Hotel, The Adolphus, and numerous restaurants combine to form the central space known as the Main Street District. With landmarks such as Main Street Garden, Belo Garden, Stone Street Gardens, and Pegasus Plaza, as well as historic buildings that have been converted to residential buildings, the Main Street District has become a true 24/7 live, work, and play environment.
Civic Center	Home to the Omni Dallas Hotel and the Kay Bailey Hutchison Convention Center, one of the largest convention centers in the country, this district is the regional hub of many landmark destinations. Within the district is Dallas City Hall, Earle Cabell Federal Building and Courthouse, J. Erik Jonsson Central Library, George L. Allen Sr. Courts Building, Pioneer Plaza, and Pioneer Park Cemetery.
Reunion/ Union Station	This district, originally named La Reunion by 200 French colonists in the mid-1800s, is widely known for two primary landmarks: Reunion Tower and Union Station. Reunion Tower, one of Dallas' most iconic symbols, includes Five Sixty, a restaurant by Wolfgang Puck. Union Station is a hub for the Trinity Railway Express, DART Light Rail, and Amtrak Intercity Rail. This district is also the planned location of the downtown Dallas High Speed Rail station which will have direct connections to DART Light Rail, the Trinity Railway Express, Amtrak, and the Dallas Streetcar.

District	Description
Farmers Market	Anchored by the Dallas Farmers Market, which has been providing the people of Dallas with fresh fruits, vegetables, and meats for more than six decades, this district encompasses a large area bounded by Jackson Street, North Central Expressway, R.L. Thornton Freeway, and St. Paul Street. Not only does this district offer unique food and specialty vendors, including the newly enclosed Shed 2, but it is also home to a collection of historic buildings, contemporary townhomes, and apartments. This district has experienced huge growth in residential development over the past decade, mainly townhomes and apartments, with additional developments under construction and planned over the next few years.
Cedars	The Cedars is one of the oldest Dallas neighborhoods. By the 1980s, the Cedars had transformed from a residential area to a commercial/industrial area. Residential ownership spiked in recent years including dwellings consisting of contemporary lofts, apartments, townhomes, and some single-family homes. The district has also seen an influx of new business and development. The Cedars is home to many artists and creatives. The Cedars lacks the large corporate offices found within the CBD giving it a different feel than other parts of downtown Dallas. Transit-oriented development is planned around the Dallas terminal of the planned high speed rail including offices, residences, hotels, and commercial uses.
South Dallas/ Fair Park	The district is known for its art deco architecture and the lively Fair Park which hosts the State Fair of Texas each year. Most of Fair Park was designed in the 1930s by Akin Dahl. It contains the Women's Museum built in 1910, the Leonhardt Lagoon, Natural History Museum, and William Blair Jr. Park. This district is a historic region that has not experienced much economic or population growth over the past few decades. However, younger residents have started revitalizing and settling in the district. The outskirts of Fair Park are full of vacant lots that developers plan on setting aside for redevelopment.
Deep Ellum	Nestled east of downtown Dallas, this district was established as Freedman's Town by former slaves after the Civil War. Today it is an eclectic entertainment district comprising avant-garde shops, nightclubs, art galleries, restaurants, and loft and apartment developments. The district is currently experiencing rapid development and redevelopment with several large developments planned or under construction, including the dense mixed-use Epic Development immediately east of SH 345 on Elm Street.

Sources: Dallas Regional Chamber, 2018. GP6 Team, April 2019.

The evaluation of potential indirect impacts as a result of the proposed Build Alternative follows the four-step process outlined by AASHTO. This section is organized by the following four steps of the indirect impacts analysis:

- Step 1: Assess the potential for increased accessibility;
- Step 2: Assess the potential for induced growth;
- Step 3: Assess the potential for impacts on sensitive resources; and
- Step 4: Assess potential minimization and mitigation measures.

Step 1: Assess the potential for increased accessibility.

The proposed project was evaluated to assess the potential for increased accessibility within the AOI. D2 Project schematic plans were analyzed for potential accessibility changes within the project limits. The D2 Project would interface with the DART LRT Orange and Green lines and would introduce five new stations:



Museum Way, Metro Center, Commerce, CBD East, and Live Oak. **Table 2** provides the accessibility potential of each station.

Table 2. Access at Proposed Stations

Proposed Station	Accessibility at Station	Accessibility to Other Areas
Museum Way	Existing parking is available at two Perot Museum parking lots and a paid parking lot between Munger Avenue and the Aquarium near the proposed station. The station would eventually be incorporated into the museum's area plan which includes a multi-story parking garage.	Adjacent to the Perot Museum of Nature and Science. Connects to all other proposed stations for the D2 Project. Interfaces with the DART Orange and Green LRT Line.
Metro Center	Existing parking is available at the paid parking lot between Ross Avenue and San Jacinto Street, metered street parking along San Jacinto Street, the paid parking lot between Patterson Street and Pacific Avenue, and metered street parking along Patterson Street.	The station would be located near the West Transfer Center. The station offers easy access to the Red and Blue lines one block away at Akard Station from Metro Center Station. Connects to all other proposed stations for the D2 Project. Interfaces with the DART Orange and Green LRT Line.
Commerce	Existing parking is available at the paid parking garage at Lane Street and Commerce Street.	Located near AT&T's headquarters and the Magnolia and Adolphus hotels. Connects to all other proposed stations for the D2 Project. Interfaces with the DART Orange and Green LRT Line.
CBD East	Existing parking is available at the paid parking lot between Main Street and Commerce Street, the paid parking lot between Elm Street and Main Street, metered street parking on Elm Street, and the paid parking lot between Pacific Avenue and Elm Street.	Bus transfer at the East Transfer Station would be possible from the CBD East Station. Connects to all other proposed stations for the D2 Project. Interfaces with the DART Orange and Green LRT Line.
Live Oak	Existing parking is available at metered street parking and public street parking along Swiss Avenue, public parking spaces along Hawkins Street, public parking spaces along Good Latimer Expressway, and the paid public parking lot between Swiss Avenue and Pacific Avenue.	Connects to all other proposed stations for the D2 Project. Interfaces with the DART Orange LRT Line. The Deep Ellum Station is being relocated approximately 560 feet north to Live Oak Street.

Source: D2 Project Team, 2019

As shown in **Table 2**, most of the proposed stations have existing parking areas available which would enable rail users to drive to the station and board at these locations. As mentioned above, all proposed stations would be connected by the proposed D2 rail line which would result in increased accessibility throughout the AOI for rail users, in addition to connecting to the proposed high-speed rail system to be located in the Cedars. Rail users can access areas along the corridor from any of the proposed stations, as well as areas along the other existing rail line corridors through connections at the proposed stations. Additionally, riders departing at the proposed stations could connect to bus options to reach a farther



distance than from walking and biking; however, it is more likely that riders are attempting to reach destinations within walking distance to the stations.

Although all stations are interconnected through the proposed D2 rail line, once reaching the desired station, additional transportation modes may be needed to reach ultimate destinations. Destinations near or within walking distance from the D2 stations would receive the most benefit and increased accessibility.

Step 2: Assess the potential for induced growth.

The purpose of Step 2 is to identify growth potential as a result of the proposed accessibility changes. Step 2 identifies changes in type, location, and pace of growth potentially resulting from the implementation of the proposed D2 project. Induced growth impacts are determined using information about potential increased accessibility and access changes, as identified in Step 1.

Feedback from local planners was collected in September 2018 to get their professional opinion on potential areas of development and redevelopment. Local planners and staff provided feedback and input on future developments planned or likely to occur, potential impacts of the proposed project, and induced growth within the AOI. Input was received from City of Dallas Area Redevelopment Senior Coordinators. Their planners identified areas that could be impacted by the proposed D2 project. Using the feedback from local planners as well as information from the North Central Texas Council of Governments (NCTCOG) Regional Data Center, the potential for induced growth was determined and areas of development and redevelopment were identified. It is anticipated that the proposed project has the potential to increase the rate and intensity of potential development specifically in the Victory and Deep Ellum Districts. The east end of downtown into the western edge of Deep Ellum is currently experiencing a development boom with a variety of mixed-use improvements including office space, a hotel, a residential high-rise, and a renovation of the historic Knights of Pythias Temple. **Table 3** lists current development within the AOI.

Table 3. Current Developments within the Study Area

Development Type	Recently Completed	Under Construction	Announced	Speculated	Total	Districts Containing Developments
Cultural	0	1	0	2	3	Civic (1); West End (2)
Education	0	2	0	1	3	West End (1); Baylor (1); Main Street (1)
Hotel	6	1	2	1	10	West End (1); Main Street (3); Deep Ellum (1); Civic (1); Reunion (1); Victory (1); Uptown (1); Baylor (1)
Mixed-Use	8	5	9	0	22	Design (3); Riverfront (2); Farmers Market (1); Deep Ellum (1); Arts (4); Civic (2); Main Street (3); Uptown (4); Victory (2)

Development Type	Recently Completed	Under Construction	Announced	Speculated	Total	Districts Containing Developments
Multi-Family	16	8	3	1	28	Main Street (6); Deep Ellum (3); West End (2); Farmers Market (6); Uptown (2); Baylor (2); Victory (5); Arts (2)
Office	10	5	9	2	26	Arts (3); West End (4); Reunion (1); Civic (1); Main Street (6); Deep Ellum (2); Design (1); Farmers Market (2); Uptown (3); Victory (3)
Parking	3	1	2	0	6	Deep Ellum (1); Main Street (2); Arts (2); Civic (1)
Recreation	1	2	3	0	6	Farmers Market (3); Main Street (2); West End (1)
Retail	9	0	0	0	9	Deep Ellum (7); Main Street (1); Victory (1)
Service	1	4	0	0	5	Main Street (1); Deep Ellum (3); Victory (1)
Single-Family	1	0	0	0	1	West End (1)
Total	55	29	28	7	119	

Sources: NCTCOG, Research and Information Services Department, 2018. GP6 Team, September 2018. Downtown Dallas Inc., March 2019.

A cartographic analysis was conducted to examine the amount of developable land within the AOI. The geographic area of the AOI is 1,882 acres, but approximately 735 acres are composed of roadways. The remaining 1,147 acres are assigned land uses by NCTCOG 2015 data so that number was used to calculate the amounts of developable and undevelopable land in the AOI. **Table 4** lists the land use types and acres within the AOI. Approximately 20% (235 acres) of the AOI is developable which includes parking areas and vacant parcels that are subject to induced growth effects. Undevelopable parcels within the AOI make up approximately 80% (912 acres) and consist of parks and recreation areas that restrict most urban development, as well as already developed land. More focused development around project stations would also enhance accessibility and job opportunities for transit-dependent populations from throughout the service area.

Table 4. Land Use Categories within the AOI

Land Use Category	Acres within the AOI	Percent Total within the AOI
Developed Land (Airport, Cemetery, Commercial, Education, Group Quarters, Hotel/Motel, Industrial, Institutional, Large Stadium, Mixed Use, Multi-family, Office, Railroad, Retail, Single Family, Transit, Under Construction, Utilities)	869	76

Undevelopable Land (Flood Control, Small Water Bodies, Parks and Recreation, Water)	43	4
Developable/Redevelopable Land (Parking and Vacant)	235	20
Total AOI	1,147	100%

Source: NCTCOG

Step 3: Assess the potential for impacts on sensitive resources.

Step 3 aims to evaluate how induced growth could potentially impact resources. Sensitive resources that are considered relevant for analysis of impacts by the proposed project are socioeconomic resources, including land use, community cohesion, community facilities, parks, recreational facilities, and EJ communities. Each of these socioeconomic resources are considered sensitive because of their potential to be limited and irreplaceable.

Information on socioeconomic resources was gleaned from the Socioeconomic and Land Use technical memos for the D2 Project. Sixty community facilities, including museums, performing arts centers, post offices, churches, federal buildings, libraries, police stations, schools, and fire departments exist within the AOI. Community cohesion is represented throughout the AOI by 12 neighborhood associations and homeowners associations (HOAs), and 9 DISD schools which serve to bind neighbors to one another under a common identity or set of ideals. There are 43.58 acres of parks and recreational areas within the AOI. While there are no Environmental Justice (EJ) communities within the AOI, there are 33 blocks with a minority population greater than 50 percent scattered throughout the AOI, and three block groups with Limited English Proficiency (LEP) populations greater than 5 percent.

It is anticipated that socioeconomic resources within the AOI would benefit from the proposed D2 Project. Businesses and communities along the corridor could benefit from the potential for Transit Oriented Development (TOD) near new transit stations, as well as from additional access that could draw customers and employees to businesses. Services that accommodate population growth in the region may positively impact schools and community facilities in the AOI. The proposed D2 project would also enhance accessibility and job opportunities for transit-dependent populations throughout the service area and have a beneficial impact on low income and/or minority populations as housing, employment, and mobility options would be enhanced. The proposed project is expected to have long-term positive effects on the economy of the downtown region in the way of job growth, increased housing, and increased mobility and accessibility for commuters. The proposed project would act as an asset to the area by enhancing access to both established and growing markets in the region and downtown, including the south Victory Park area, the Commerce Street corridor, and the eastern portion of the CBD where new development and redevelopment initiatives are currently underway. No substantial impacts to any human or natural resources are anticipated as a result of the proposed D2 line or its construction.

Step 4: Assess potential minimization and mitigation measures.



Various methods were utilized to assess the existing and future conditions of the AOI. Cartographic review, GIS analysis, review of planning documents, and city planner input were utilized in this report. City planners provided professional judgment based on years of experience and knowledge of development trends specific to the AOI. The consensus of city planners is that the proposed D2 Project would potentially add momentum to ongoing development within the AOI. The induced growth impacts from the D2 Project would be considered a benefit for the area and surrounding communities. As mentioned in Step 3, socioeconomic resources are the only resource that has the potential to be impacted by induced growth from the proposed project. Any negative impacts to socioeconomic resources could be minimized through the continued monitoring of safety, access, traffic volumes, and parking demands at and near proposed station locations. Additionally, impacts to community resources would be minimized and mitigated through existing land use development regulations which would govern induced development projects within the AOI. Indirect impacts from the project, particularly potential land use redevelopment effects, are consistent with local goals and trends. As a result, no mitigation is proposed for induced growth impacts.

Cumulative Impacts

The purpose of the cumulative impacts analysis is to assess the direct and indirect impacts of the proposed project within the larger context of past, present, and future activities that are independent of the proposed project, but which are likely to affect the same resources in the future. This approach evaluates the incremental impacts of the proposed project in respect to the overall health and abundance of selected resources.

Cumulative impacts are analyzed in terms of the specific resource being affected by the proposed project. Before initiating the cumulative impacts analysis, key resources/issues are identified and it is determined whether a cumulative analysis is warranted for each resource/issue. The cumulative impacts analysis focuses on 1) those resources substantially impacted by the project (directly or indirectly) and 2) resources currently in poor or declining health or at risk even if project impacts (either direct or indirect) are relatively small. The proposed action would likely have a net beneficial cumulative impact on socioeconomic resources in the project area. The D2 Project would not directly or indirectly impact resources in poor or declining health; therefore, a cumulative effects analysis is not required.

Conclusions

To assess indirect impacts of the proposed project, the AOI was defined, areas and resources subject to induced growth were identified, and a detailed analysis of sensitive resources was carried out. The plans of various communities and entities within the AOI and population trend data were discussed. This technical analysis was presented based on cartographic analysis and feedback from planners. Minimization and mitigation measures were discussed as they pertain to the potentially impacted resources and environmental regulations in place within the AOI.

Based on the amount of developable land within the AOI, the pace of development within the region, and the response of local planning experts, the proposed project has potential to induce development, but is not anticipated to generate substantial induced development. Along the 2.4-mile corridor, 80% of the AOI



is already developed and been converted to urbanized use or is undevelopable due to land use restrictions; the amount of developable land within the AOI is 20%, which limits the potential for induced growth. However, planners indicated that the proposed project has the potential to increase the rate and intensity of potential development, specifically in the Victory and Deep Ellum Districts. Businesses and employers along the corridor are anticipated to benefit from the proposed project because of additional access opportunities around proposed stations for potential employees and customers. Impacts to community resources would be minimized and mitigated through existing land use development regulations. Induced growth impacts would be outweighed by the positive impacts to the community and economic development throughout the Downtown region.