This work is sponsored by Dallas Area Rapid Transit (DART) and the Federal Transit Administration (FTA).

The content of this report is draft material, specific to the Downtown Dallas Transit Study Continuing AA and does not necessarily reflect the official views or policies of DART or FTA at the time of publication. This report does not constitute a contract, standard, specification, or regulation.

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1.0 Introduction

Dallas Area Rapid Transit (DART) initiated the D2 Alternatives Analysis/Draft Environmental Impact Statement (D2 AA/DEIS) in April 2007 to identify a locally preferred alternative (LPA) for transit investments in downtown Dallas. DART published the D2 AA/DEIS document in March 2010. The D2 AA/DEIS described and evaluated four build alternatives, known as B4 Lamar-Young, B4a Lamar-Marilla, B4b Lamar-Convention Center Hotel, and B7 Lamar-Commerce. Several comments were submitted during the AA/DEIS public comment period, including recommendations to consider a potential new alignment from Victory to Union Station identified in the recent City of Dallas Downtown 360 Plan, examine lower cost alternatives, and try to avoid specific impacts associated with some of the alternatives. Figure 1-1 illustrates the original DEIS alternatives and highlights the potential Dallas 360 Plan corridor.

Figure 1-1 Phase 2 Alternatives

Source: DART

In addition to the public and agency comments, the DART Board of Directors approved a 20-year financial plan in September 2010 that included substantial differences from prior assumptions in the D2 AA/DEIS. Specifically, the economic downtown and desire to more closely match capacity to demand resulted in a peak LRT system headway change from 10-minutes to 15-minutes during the peak periods. The financial plan also removed funding for all 2030 Transit System Plan projects. These two changes affected the timing for the D2 project
need and as a result, it was removed from the 20-year financial plan and selection of an LPA was deferred.

There are also several streetcar planning and implementation projects underway which need to be more closely evaluated with respect to D2. As a result of all of these changes, DART is undertaking the D2 Phase II AA Study with the assistance of a Federal Transit Administration (FTA) discretionary AA grant to address the public hearing comments through new or refined alternatives, update the project purpose and need, redefine project timing under new conditions, and work toward identification of an LPA.

1.1 Purpose of Report

The purpose of this report is to:

- Present refinements to AA/DEIS alternatives based on comments received during the AA/DEIS public and agency comment period in Spring 2010;
- Present a range of alternatives developed for the new corridor from Victory to Union Station as identified in the Dallas 360 Plan;
- Document the screening methodology and criteria for screening a long list of potential new corridor alternatives; and
- Summarize the screening evaluation results of new corridor alternatives and recommend a short list of alternatives for more detailed evaluation.

2.0 AA/DEIS Alternative Refinements

The section presents potential refinements to the four D2 AA/DEIS Alternatives based on comments received during the public and agency review period. Most comments involved impacts on adjacent property and buildings that would be directly affected by one or more of the alternatives, particularly the impacts of Alternative B4 on the First Presbyterian Church and Alternatives B4a and B4b on the Scottish Rite Temple (Figure 2-1). Other comments focused on the high cost of the alternatives.

The refinements to the DEIS Alternatives focused on eliminating or mitigating property impacts and/or reducing the cost of construction. These refinements were presented and discussed with City of Dallas staff at a series of DART/City coordination meetings and reviewed with D2 stakeholders at two discussion and comment sessions. The impacts and issues associated with each Alternative are presented below, followed by a description of the proposed refinement.
2.1 B4 Lamar-Young (Harwood District Station)

The B4 Alternative at-grade Harwood District Station has several impacts on the First Presbyterian Church property along the north side of Young Street between Harwood and St. Paul Streets. These impacts result from the need for additional right-of-way to accommodate the station platforms. Specifically, the B4 Alternative will impact the Presbyterian Church multi-story parking garage, surface parking and Young Street access to the Church community center.

**Refinement**

Eliminate the Harwood District station. This will mitigate, but not completely eliminate the physical impacts to Church property by reducing the amount of property required along the north side of Young Street and retain direct vehicle access to surface parking areas (Figure 2-2). However, the multi-story parking garage will still be affected. If the garage is acquired, the amount and location of replacement parking will be determined with the church representatives.

Eliminating the Harwood Station will have some affect on ridership and will reduce the capital and operating costs of the B4 Alternative.
Figure 2-2 Refinement (w/o Station) vs. DEIS (w/ - Station) at First Presbyterian Church

Source: DART
2.2  **B4a and B4b Lamar-Marilla (Farmers Market Station)**

The Farmers Market Station with both the B4a and B4b Alternatives will impact the Scottish Rite Temple parking lot as the alignment crosses Young Street near the intersection of Young and Pearl Streets. Approximately 53 of the total 123 parking spaces will be displaced.

**Refinement**

The impact of the Farmers Market station on the Scottish Rite property can be mitigated by reconfiguring the existing parking area and providing nearby replacement parking. Approximately 70 spaces will remain immediately adjacent to the Scottish Rite Temple in the existing parking lot and 53 spaces will be provided for exclusive Scottish Rite Temple use on the excess property adjacent to the Farmers Market station (see Figure 2-3). The site could accommodate up to 209 spaces, if others in the Farmers Market area are willing to partner with DART to provide an additional 156 spaces.

**Figure 2-3 Existing and Proposed Parking at Scottish Rite/Farmers Market Station**
There are two elevated options for reducing the property impacts and cost of the B4 Lamar-Young Alternative.

**Option 1**
This option retains the B4 Alternative alignment between Woodall Rodgers and Deep Ellum, but changes the configuration from tunnel/at-grade sections to all elevated with elevated stations at Metro Center, Government Center and Farmers Market. The elevated alignment retains four lanes of vehicular traffic in Young Street, eliminates the impact on the City Hall parking garage Young Street entrance and on First Presbyterian Church property, and reduces construction cost. It will negatively impact the development of vacant property required between Main and Field Streets. The elevated structure will have potential visual impacts on urban area parks, historic districts and buildings along the alignment, and will require support columns within existing street and/or sidewalk space.

**Option 2**
Option 2 is also an all elevated configuration, but instead of following the B4 tunnel alignment between Main and Field/Young Streets, it continues elevated in Lamar and curves east at Young Street. Two elevated stations will be located on Young Street; between Griffin and Field Streets and between Ervay and St. Paul Streets (See Figure 2-4).
Compared to Option 1, Option 2 is the preferred all-elevated B4e alignment for the following reasons. Option two:

- Eliminates the need for substantial advance right-of-way preservation and the cost of property acquisition along the tunnel alignment between Main and Field/Young Streets;
- Allows future development of these currently vacant sites between Main and Field/Young Streets without the restrictions imposed by an elevated LRT structure; and
- Provides an elevated station closer to the OMNI Convention Center Hotel.

2.4 B7 Lamar-Commerce (IH 45 Reconstruction)

All of the DEIS Alternatives pass under the IH 45 elevated ramp structure at-grade and merge with the DART Green Line south of the Deep Ellum Station. This section of IH 45 is programmed for reconstruction and a number of alternative highway and ramp configurations are under consideration. This presents the opportunity to refine and perhaps facilitate the D2 connection at Deep Ellum, especially the location of the B7 Alternative tunnel portal and at-grade connection. No specific refinement is proposed at this time; however, as the AA study continues there are opportunities to refine the B7 connection in cooperation with TxDOT.
2.5 Alternative B7a Lamar-Commerce

An important objective of the Study is to maximize rail operating efficiency, flexibility and service to DART customers. A strategic re-assessment of the B Alternatives operating plan indicated that additional connections to the North Central Corridor and/or Southeast Corridor might better accomplish this objective. Two options were identified that extended the B7 Lamar-Commerce Alternative in both directions.

**Option 1 North Connection**

This option would provide a direct tunnel connection from Commerce Street to the existing North Central Corridor tunnel, while still maintaining the Commerce Street connection to the Southeast Corridor at Deep Ellum. Specifically, the connection would accommodate southbound to westbound and eastbound to northbound train movements between the North Central Corridor and Commerce Street, thus relieving capacity constraints on the existing Transit Mall. However, no southbound to eastbound or westbound to northbound connection between the North Central Corridor and Deep Ellum would be provided. Instead of an underground Main Street Garden station along Commerce Street, a station would be located under the East Bus Transfer Center.

**Option 2 South Connection**

Option 2 continued the B7 tunnel alignment south of Metro Station under Lamar Street to a connection with the Southeast Corridor in the Convention Center area. It was determined that in order to construct this option, the B7 alignment under Commerce Street would need to be shifted south to Jackson or Wood Streets, including a new tunnel alignment from Metro Station.

**Assessment**

The Option 2 alignment south under Lamar Street was determined to be unworkable while still maintaining the B7 alignment under Commerce Street. The Option 1 alignment with a connection north to the existing North Central Corridor tunnel, one underground station along Commerce Street and another station under the East Bus transfer Center was workable at the concept engineering level of design, but would require an additional mile of tunnel and a new operating plan that differed from all other alternatives. This alignment designated B7a is shown in Figure 2-5.
Figure 2-5 Alternative B7a Lamar-Commerce

Source: Parsons Brinckerhoff
3.0 New Corridor Alternatives

The City of Dallas Downtown 360 Plan recommends a preferred light rail corridor that connects Victory Station and Union Station to the Convention Center Hotel area (see Figure 1-1). This corridor would use existing right-of-way within which Trinity Railway Express (TRE), Amtrak and freight currently operate. DART LRT operates within most of this section as well, with the Green/Orange Lines heading north, and the Blue and Red Lines heading south from the West Junction. There is also a single, north-south non-revenue track connection at the West Junction.

The four AA/DEIS alternatives all use a common segment that turns east immediately south of Victory Station, use DART-owned right-of-way through the Victory development, provide a station at the new Perot Museum of Nature and Science and provide a station and transfer opportunity with the West End LRT Station and West Bus Transfer Center. The new corridor eliminates these two stations and replaces them with a Union Station interface, and in some cases provides an additional station adjacent to the Omni Convention Center Hotel and Convention Center. All of the new corridor options will entail major bus route and service revisions so that many of the transfers that take place in the West End under the AA/DEIS Alternatives (where all four LRT lines would interface), will now take place near Union Station.

Prior to developing potential alternatives within this new corridor, the study team conducted a field tour and researched the area to document issues, opportunities, and constraints. Appendix A presents the findings of this field tour and subsequent research in the form of a Constraints Map.

Thirteen (13) preliminary alignment concepts were initially developed and are presented in Appendix B. These concepts were discussed with City of Dallas and DART staff, reviewed against the constraints map, and refined into a short list of the most promising five options. These options include different combinations of tunnel, elevated and at-grade alignments and station configurations, as described in the following sections. With the exception of an elevated option, four of the alignment options utilize existing LRT track infrastructure north of Woodall Rodgers Freeway to Victory Station.

3.1 C3 Union Station-Young Street (Tunnel)

This alignment extends from north of Woodall Rodgers to Young Street. Figure 3-1 presents the conceptual plan and profile. It begins at-grade with a two-track turn out on the east side of the Green and Orange line tracks just north of Woodall Rodgers, where it transitions into City of Dallas owned property. It would parallel the existing DART tracks south under the Woodall Rodgers Freeway main lanes and ramps to I-35E on TxDOT property. Just south of the interchange the alignment descends into a tunnel portal and passes under the DART West Junction. South of the West Junction the alignment curves southwest in tunnel under the Blue, Red, TRE commuter rail, freight and Amtrak lines and then curves southeast continuing under the Reunion Boulevard West roadway and Ferris Plaza on a diagonal alignment. At the southeast corner of Ferris Plaza the alignment turns east under Young Street and continues east to a tunnel portal in Young Street between Griffin and Field Streets. The alignment continues east at-grade in Young Street until joining the DEIS B4 Alternative alignment at Young and Field Streets.

This alignment has a new underground station at Ferris Plaza serving as a connection with Union Station, the Oak Cliff streetcar line terminus, and a potential new Union Station Bus Transfer Center (See Figure 3-1). The station will be within a ¼ mile walking distance to the...
Omni Convention Center Hotel, approximately 1,110 feet. The station will be designed to facilitate vertical circulation and pedestrian access to the surrounding destinations and activity centers.

Figure 3-1 C3 Union Station-Young Street (Tunnel)

![Map of Dallas area with routes and stations labeled]

Source: Parsons Brinckerhoff

3.2 C3a Union Station-Convention Center Hotel-Marilla Street (Tunnel)

This alignment extends from north of Woodall Rodgers to Marilla Street. Figure 3-2 presents the conceptual plan and profile. As with Option C3, it begins at-grade with a two-track turn out on the east side of the Green and Orange line tracks just north of Woodall Rodgers, where it transitions into City of Dallas owned property. It will parallel the existing DART tracks south under the Woodall Rodgers Freeway main lanes and ramps to IH 35E on TxDOT property. Just south of the interchange the alignment descends into a tunnel portal and passes under the DART West Junction. South of the West Junction the alignment continues in a tunnel west of and parallel to the Blue and Red Lines to Union Station. South of Union Station the alignment curves southeast under parking lots, the Houston Street Bridge ramp, and the Media Center parking garage. The alignment continues east through the space between the Omni Convention Center Hotel and the Convention Center where an existing overhead pedestrian bridge connects those two facilities. At Lamar Street the alignment joins the DEIS B4b Alternative, continuing to City Hall and Marilla Street.

This alignment has a new underground station along the west side of Union Station below the TRE commuter rail and Amtrak platforms. It will have vertical circulation providing a connection with Union Station, the existing DART Red and Blue platforms, TRE, and Amtrak. It will also
allow for a pedestrian connection to the Oak Cliff streetcar line terminus on Houston Street. As with C3, this option would include a potential Union Station Bus Transfer Center. This alignment has a second underground station between the Omni Convention Center Hotel and Convention Center in the space currently occupied by the existing overhead pedestrian bridge.

**Figure 3-2 C3a Union Station-Convention Center Hotel-Marilla Street (Tunnel)**

![Map of C3a Union Station-Convention Center Hotel-Marilla Street (Tunnel)](source: Parsons Brinckerhoff)
### 3.3 C3b Union Station-Young-Marilla Streets (Tunnel)

This alignment extends from north of Woodall Rodgers to Young and Marilla Streets (Figure 3-3). It has the same at-grade and tunnel alignment and underground station location at Ferris Plaza as Option C3. Instead of coming to grade via a tunnel portal in Young Street, this alignment curves southeast on a diagonal past the Omni Convention Center Hotel and connects to the DEIS B4b Alternative alignment west of Lamar Street.

This alignment has a new underground station at Ferris Plaza serving as a connection with Union Station, the Oak Cliff streetcar line terminus, and a potential new Union Station Bus Transfer Center. The station would be less than a ¼ mile walk to the Omni Convention Center Hotel, approximately 1,110 feet. The station will be designed to facilitate vertical circulation and pedestrian access to the surrounding destinations and activity centers.

**Figure 3-3 C3b Union Station-Young-Marilla Street (Tunnel)**

![Map of C3b Union Station-Young-Marilla Streets (Tunnel)](image)

Source: Parsons Brinckerhoff
3.4  C3c Victory-Union Station-Young Street (Elevated)

This alignment extends from north of Victory Station to Young Street (See Figure 3-4). It is entirely elevated within the Victory-Union Station railroad right-of-way until just north of Union Station where it transitions to a connection with Young Street using City of Dallas owned property and streets. The alignment begins with a new double track adjacent to the existing Green and Orange Lines north of Victory Station, rising to an elevated alignment above Victory Station. It continues south and rises over the Woodall Rodgers Interchange and along the west side of the West Junction. At the Main Street triple underpass bridge the alignment would curve southeast crossing above the Blue, Red, TRE, freight and Amtrak line tracks. The alignment continues elevated on a diagonal above the Reunion Boulevard West roadway, Houston Street and Ferris Plaza. At the southeast corner of Ferris Plaza the alignment turns east into Young Street and continues elevated before descending to grade between Market and Lamar Streets joining the at-grade B4 Alternative alignment at Young and Field Streets or the elevated B4e Alternative alignment at Lamar Street.

This alignment has a new elevated station above the existing Victory Station and an elevated station at Ferris Plaza serving as a connection with Union Station, the Oak Cliff streetcar line terminus, and a potential new Union Station Bus Transfer Center. The station would be less than a ¼ mile walk to the Omni Convention Center Hotel, approximately 1,110 feet. The station will be designed to facilitate vertical circulation and pedestrian access to the surrounding destinations and activity centers.

Figure 3-4 C3c Victory-Union Station-Young Street (Elevated)

Source: Parsons Brinckerhoff
3.5 C3d Union Station-Young Street (At-Grade)
This alignment extends from north of the West Junction to Young Street. Figure 3-5 illustrates the conceptual plan and profile. It is entirely at-grade within the Victory-Union Station railroad right-of-way until just north of Union Station where it transitions to a connection with Young Street using City of Dallas owned property and streets. The alignment begins with a new track constructed parallel to the existing single, non-revenue LRT track on the west side of the West Junction to create a double-track section. Just south of the West Junction these two tracks intersect and crosses the two Red and Blue Line tracks in the area of the Main Street triple underpass bridge with an at-grade flat junction. At the Reunion Circle underpass bridge the alignment begins to descend into the space occupied by the Reunion Boulevard roadway, crosses Houston Street and reaches grade on a diagonal alignment through Ferris Plaza. At the southeast corner of Ferris Plaza the alignment turns east into Young street and continues east at-grade until joining the DEIS B4 Alternative alignment at Young and Field Streets.

This alignment has a new at-grade station at Ferris Plaza serving as a connection with Union Station, the Oak Cliff streetcar line terminus, and a potential new Union Station Bus Transfer Center. The station will be within a ½ mile walking distance to the Omni Convention Center Hotel, approximately 1,110 feet.

Figure 3-5 C3d Union Station-Young Street (At-Grade)
4.0 Screening Evaluation of New Corridor Alternatives

The goal of the screening evaluation is to narrow down the list of alternatives to a short list for detailed evaluation. The overall evaluation process used in the D2 Study is illustrated in Figure 4-1. The Step 1 Screening Evaluation for new Union Station Corridor options is described in this report. It is based on a conceptual level of engineering definition and planning. This step relies heavily on existing available information and professional judgment, as well as input from DART and study participants. Qualitative and quantitative data is used to support the screening results presented in Section 4.2. At this point, capital cost estimates have not been developed for new corridor options so relative cost comparisons are made based on the alignment and station configurations informed by known issues and constraints. As the D2 Phase II Study progresses, more detailed technical analyses will be conducted in Step 2 involving fewer alternatives. The detailed evaluation will be used to support recommendations and decisions in Step 3.

4.1 Screening Methodology and Criteria

The screening process is focused on the new Victory to Union Station Corridor identified in the Dallas 360 Plan and the five alternative alignments identified in Section 3. Table 4-1 shows six evaluation categories, associated criteria and related "measures of effectiveness" for each criterion used to evaluate the alignment options. Comparative information on many of these criteria, along with discussions and comments from participants in the Study formed the basis for selecting the most promising alternatives to move forward.
Table 4-1 New Union Station Corridor Screening Criteria

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<td>Transit Operations</td>
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Source: Parsons Brinckerhoff

The key screening evaluation categories and criteria are engineering feasibility and corridor constraints. The new corridor has four operating railroads within limited right-of-way over several bridges, along with numerous adjacent property and building constraints, all of which make meeting DART LRT design standards a challenge. The DART West Junction, one of two major junctions that control access to the downtown transit mall, is located within the new corridor. Maintaining the operational reliability and flexibility of these junctions is one of the most important objectives of the D2 project. The Dallas 360 Plan envisions an LRT station near Union Station with connections to streetcar, bus, commuter rail and Amtrak as well as serving the Convention Center Hotel. These objectives will entail changes to the dense network of local streets and underpasses around Union Station as well as adjacent public and private property. Finally, the configuration of the station(s) and alignment (tunnel, elevated, at-grade), directly affects the relative cost of these options.

4.2 Public and Agency Input

The Phase 2 Study includes public and agency input at key stages of the work from a Stakeholder Advisory Committee, a Technical Advisory Committee, a Community Advisory Committee and meetings with the general public. For the screening of alternatives identified in this report, discussions were held for the Technical and Stakeholder Advisory Committee.
Meetings on November 15, 2012, Public Meeting on February 13 and Technical Advisory Committee on May 9, 2013. Many of the questions and comments from the public and public agencies will be addressed during the next stage of the study, Detailed Evaluation. The important input to the Study from these discussions is summarized below:

- What happens to the DART owned right-of-way between Victory Station and Woodall Rodgers freeway if one of the C3 alternatives is selected rather than a B alternative?
- The new elevated alternative may not be appropriate for downtown Dallas.
- What are the implications for the Alternatives if High Speed Rail comes to downtown Dallas?
- What are the implications for DART member cities outside the City of Dallas of the extra cost of providing a direct tunnel connection to the Dallas Omni Hotel?
- How do the alternatives contribute to the ease of transfer between DART rail lines and reduced travel time between end points?
- DART needs to select an alternative quickly so that the right-of-way for future construction can be preserved.
- Does the number of air travelers destined to and from the Omni Hotel warrant selecting an alternative that serves it?
- Is there sufficient demand to warrant service between Union station and Convention Center?

In addition, a series of meetings were held with representatives from the City of Dallas to sort through the new alternative options to Union Station and to ensure coordination with the City’s 360 Plan and the joint DART/City of Dallas streetcar planning studies. These discussions directly contributed to the identification, development and screening of the C3 Alternatives.

### 4.3 Evaluation Results

Table 4-2 compares the five new corridor alternatives in terms of the most important screening criteria. All of the alternatives have significant constraints. The geology along the corridor is less conducive to tunneling (Alts. C3, C3a, C3b) than areas to the east, a condition complicated by the operation of four railroads. The elevated Alternative C3c will require a new station at Victory and high, visually intrusive structures above the Woodall Rodgers Interchange and the Historic Triple underpass adjacent to Dealy Plaza. The At-Grade Alternative C3d requires a flat junction that would degrade rather than improve transit operations and capacity. Both the elevated and at-grade options would have the greatest negative impacts on Ferris Plaza, the local street system and future extension of the Oak Park Streetcar terminus at Union Station. However, these options are likely to have lower construction costs than the tunnel options. Only one alternative (C3a) has a station at both Union Station and the Omni Convention Center Hotel. The Tunnel options will require reconfiguration of highway ramp structures under the Woodall Rodgers interchange and property acquisition to accommodate the north tunnel portal.

All of these screening considerations were presented and discussed with the DART Board, City of Dallas, Study Stakeholders and the public. Based on the screening results and these discussions, Alternatives C3 and C3a were selected to be carried forward. The shaded columns in Table 4-2 show the Alternatives C3b, C3c and C3d that will not be carried forward. The key reasons for advancing or deferring the new corridor alternatives are presented in Section 5.0 Summary.
Table 4-2 Screening Comparison of Union Station Corridor Alternative Alignments

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<td></td>
<td>At Grade/Tunnel 2.12 miles</td>
<td>At Grade/Tunnel 2.35 miles</td>
<td>At Grade/Tunnel 2.19 miles</td>
<td>2.95 miles</td>
<td>1.95 miles</td>
</tr>
<tr>
<td>1c Meets minimum DART design criteria</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No (less than 20ft between LRT and freight)</td>
</tr>
<tr>
<td>2a Natural Environment</td>
<td>Geology-higher cost of tunneling and underground Union Station construction.</td>
<td>Geology-higher cost of tunneling and underground Union Station construction.</td>
<td>Geology-higher cost of tunneling and underground Union Station construction.</td>
<td>Geology-higher cost of tunneling and underground Union Station construction.</td>
<td>Geology-higher cost of tunneling and underground Union Station construction.</td>
</tr>
<tr>
<td>2c Transport Infrastructure</td>
<td>Construction approvals from 4 operating RR's and TxDOT.</td>
<td>Construction approvals from 4 operating RR's and TxDOT.</td>
<td>Construction approvals from 4 operating RR's and TxDOT.</td>
<td>Construction approvals from 4 operating RR's and TxDOT.</td>
<td>Construction approvals from 4 operating RR's.</td>
</tr>
<tr>
<td>3 Transit Operations</td>
<td>Precludes streetcar along Young Street.</td>
<td>May conflict with HSR at Union Station.</td>
<td>May conflict with HSR at Union Station.</td>
<td>Precludes streetcar along Young Street.</td>
<td>Precludes streetcar along Young Street or at-grade crossing of LRT on Houston Street.</td>
</tr>
<tr>
<td></td>
<td>Requires relocation of West Bus Transfer Center.</td>
<td>Requires relocation of West Bus Transfer Center.</td>
<td>Requires relocation of West Bus Transfer Center.</td>
<td>Requires relocation of West Bus Transfer Center.</td>
<td>Requires relocation of West Bus Transfer Center.</td>
</tr>
<tr>
<td>4 New Stations (# of)</td>
<td>E=Ellevated Union Station (T)</td>
<td>2 Union Station (T)</td>
<td>1 Union Station (T)</td>
<td>2 Union Station (T)</td>
<td>1 Union Station (A)</td>
</tr>
<tr>
<td>5b Traffic Impacts</td>
<td>RR frontage road reconfigured</td>
<td>RR frontage road reconfigured</td>
<td>RR frontage road reconfigured</td>
<td>Elevated Structure in Young Street may reduce vehicle capacity.</td>
<td>Closes Reunion Blvd.</td>
</tr>
<tr>
<td></td>
<td>RR Portal in Young Street reduces vehicle capacity</td>
<td>RR Portal in Young Street reduces vehicle capacity</td>
<td>RR Portal in Young Street reduces vehicle capacity</td>
<td>Elevated Structure in Young Street may reduce vehicle capacity.</td>
<td>Block Houston Street with Station.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>At grade in Young Street may reduce vehicle capacity.</td>
</tr>
<tr>
<td>6 Relative Capital Cost</td>
<td>High</td>
<td>Highest</td>
<td>Higher</td>
<td>High</td>
<td>Lower</td>
</tr>
<tr>
<td>7 Potential Fatal Flaws</td>
<td>No Station at Omni Convention Center Hotel, but within walking distance of new station under Ferris Plaza.</td>
<td>No Station at Omni Convention Center Hotel, but within walking distance of new station under Ferris Plaza.</td>
<td>No Station at Omni Convention Center Hotel, but within walking distance of new station under Ferris Plaza.</td>
<td>Obstructs Woodall Rodgers (Calatrava Bridge) and Dealy Plaza view corridors.</td>
<td>New at-grade crossover junction immediately south of West Junction.</td>
</tr>
<tr>
<td></td>
<td>Cost</td>
<td>Cost</td>
<td>Cost</td>
<td>Cost</td>
<td>Cost</td>
</tr>
</tbody>
</table>

Source: DART and Parsons Brinckerhoff
5.0 Summary

5.1 Alternatives Carried Forward

- **Alternative B4 Lamar-Young without Harwood Station**

  Removing the Harwood Station will mitigate the impacts on the First Presbyterian Church property, maintain two lanes of vehicular traffic in both directions on Young Street and reduce the costs of Alternative B4. Some impact on ridership will occur.

- **Alternative B4e Lamar-Young (Elevated)**

  With an elevated configuration from Woodall Rodgers to Deep Ellum and by remaining on Lamar Street to Young Street, this alternative alignment reduces cost and property acquisition. The trade-offs involve physical and visual impacts of an elevated structure and stations in the CBD environment.

- **Alternative B7a Lamar-Commerce**

  This Alternative refinement provides a tunnel connection to the North Central Corridor providing increased operating efficiency, flexibility and the potential for increased mobility, but at significantly higher cost.

- **Alternative C3 Union Station-Young Street (Tunnel)**

  This alignment has no station at the Omni Convention Center Hotel, but the LRT Station under Ferris Plaza is within walking distance of the hotel, the Oak Cliff Streetcar terminus and the existing Union Station. The tunnel portal and at-grade alignment in Young Street will reduce vehicular traffic capacity and preclude a streetcar route on Young Street. The alignment has a lower cost than Alternative C3a. The City of Dallas requested that this option be carried forward.

- **Alternative C3a Union Station-Convention Center Hotel-Marilla Street (Tunnel)**

  This alignment has a station at both Union Station and the Omni Convention Center Hotel. There will be minimal impact on City Streets and less construction impact on the Ferris Plaza area. Construction of an underground station immediately west of Union station will temporarily disrupt the Blue, Red, TRE, freight and Amtrak lines, as well as access to Union Station. It does not preclude any alignment option for connecting the Oak Cliff Streetcar line with the McKinney Avenue Trolley through Downtown Dallas. The underground LRT station location will influence the design and construction of a High Speed Rail station. The City of Dallas requested that this option be carried forward.
5.2 Alternatives Not Carried Forward

- **Alternative B4e Lamar-Young (Elevated Option 1)**

  This elevated option follows the same alignment as the B4 tunnel alternative and will reduce cost, but increase negative impacts on currently vacant property between Main and Field/Young Streets, in addition to adding physical and visual impacts of an elevated structure and stations.

- **Alternative B7 Lamar-Commerce (South Option 2)**

  This option continued the B7 tunnel alignment south of Metro Station under Lamar Street to a connection with the Southeast Corridor in the Convention Center area, but was unworkable while still maintaining the alignment along Commerce Street.

- **Alternative C3b Union Station-Young-Marilla Streets (Tunnel)**

  This alignment is similar to C3, but connects to DEIS Alternative B4b alignment rather than B4. It has no station at the Omni Convention Center Hotel and has a higher cost than C3.

- **Alternative C3c Victory-Union Station-Young Street (Elevated)**

  Because of limited right-of-way and the physical constraints of existing rail lines, bridges and highway ramps, this alignment requires a second station elevated above the existing Victory Station and a high elevated structure above the Woodall Rodgers Interchange. The elevated structure will impact the Woodall Rodgers view corridor of the Calatrava Bridge and the views from Dealy Plaza as it passes over the Main Street triple underpass bridge. The elevated structure columns in Young Street will preclude a streetcar route on Young Street.

- **Alternative C3d Union Station-Young Street (At-Grade)**

  The at-grade alignment crossover of the Red and Blue mainline tracks immediately south of the West Junction will further degrade current operations along the Transit Mall and impair rather than improve CBD and system wide service reliability and operational flexibility over the long term. Realignment of TRE, freight and Amtrak tracks to the west will be required to add a second LRT track and meet design standards for track separation around the West Junction. The historic Main Street triple underpass bridge will require widening along the side facing Dealy Plaza. Street and traffic impacts in the Union Station area will be substantial. The Reunion Blvd. underpass road north of Union Station will be closed and filled-in to accommodate the transition of the alignment from the rail corridor to Young Street. The Houston Reunion Blvd. intersection will be permanently closed. Ferris Plaza will be required for an LRT Station with bus transfer connections. A portion of Young Street will be converted to LRT right-of-way reducing vehicular traffic capacity from Record Street to Field Street. The option of extending the Oak Cliff Streetcar line beyond its terminus at Union Station along Young Street is precluded. A streetcar extension north on Houston Street will require an at-grade crossing of the LRT alignment.
5.3 Next Steps

This section outlines the next steps for developing and selecting a second LRT alignment through downtown Dallas. Having completed the D2 Project AA/DEIS and Public hearing, DART is currently advancing the D2 Phase II AA Study process of alternative refinements, lower cost alternatives and new Union Station Alternatives leading to a recommendation for a Locally Preferred Alternative.

- **Evaluation of Alternatives**

  The D2 Alternatives are being evaluated using the methods and criteria for an alternatives analysis (AA) required by the FTA. The alternatives analysis and environmental assessment consider the extent to which the No Build and LRT Alternatives meet the D2 Study’s Purpose and Need, and discuss the alternatives’ potential effect on transportation and the environment. A financial evaluation compares capital and operating costs, in addition to the affordability given the available funding sources. Public and agency participation in the study is also considered.

- **Selection of Locally Preferred Alternative (LPA)**

  Stakeholder meetings, public meetings and presentations to the City of Dallas and the DART Board are being held to present the results of the Study and gather comments and public input. The meetings and presentations also serve to gain greater understanding of the issues and preferences for the alternatives.

  The evaluation of alternatives is ongoing. When the detailed evaluation of alternatives is completed, these results will be presented to the DART Board. The DART Board will select an LPA.

  Upon the adoption of an LPA by the DART Board, an application for advancing the D2 project into the PE/EIS phase will be prepared and submitted to FTA.

  Depending on project schedule and available local or regional funding, DART will develop a strategy for advancing the project with federal funding as well as to complete the PE/EIS effort.
Appendix A
Union Station Corridor Constraints Map

Victory Station to Union Station and Convention Center Corridor
“C3 Alternatives Series”
Key Issues and Constraints

Issue: Right of Way (ROW)
Location: Entire Corridor & Specific Locations
Description: Limited & constrained DART owned ROW, One Victory Park, Victory Apartments, media structures area.

Issue: Structures
Location: One Victory Park parking garage, Media Corridor buildings, Ferris Building, Convention Center Hotel, Pedestrian Bridge
Description: Proximity to alignment

Issue: Highway Ramps & Brs
Location: Specific Locations
Description: Lamar Street bridge/underpass, Woodall Rodgers elevated interchange and ramps with I-35E, Elm, Main, Commerce Sts, bridge/underpass, Reunion Blvd. north & south bridge/underpass, Houston St. viaduct

Issue: Utilities
Location: Specific Locations
Description: Electric transmission towers, underground flood retention (UFR), overhead rail signal bridge north of Union Station, Undefined RR Communication utilities, Lamar/Griffin Storm Drain, Young Street wastewater lines, Young Street Electrical duct banks and water line

Issue: Visual Resources
Location: Specific Locations throughout the corridor
Description: Dealey Plaza, Union Station, Young St corridor from Lamar St to Union Station
(Not on map)

Issue: Parkland, Location: Corridor Wide
Description: Marty’s Park, Dealey Plaza, Reunion Park, Ferris Plaza, and Lubbock Plaza

Issue: LRT Station
Location: Union Station area
Description: Type (at-grade, tunnel, elevated) of station for system-wide benefits; geology impacts
(See Geology/Soils map)

Source: Parsons Brinckerhoff
### Appendix B

**Thirteen Conceptual New Corridor Alignment Options**

(Shaded options 9-13 selected for screening evaluation)

<table>
<thead>
<tr>
<th>#</th>
<th>Name</th>
<th>Route and Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>C1a Victory-Young (Elevated)</strong></td>
<td>Transition to elevated south and east of Victory Station, then bridge to west side of tracks and descend to grade under Woodall Rodgers and transitioning back to elevated past West End Junction bridging the tracks north of Union station to an elevated station on a diagonal above Reunion Blvd/Ferris Plaza immediately northeast of Union Station and continuing east along Young Street.</td>
</tr>
<tr>
<td>2</td>
<td><strong>C1b Victory-Young (Elevated)</strong></td>
<td>Transition to elevated north of Victory station with an elevated station at Victory Station and an elevated alignment continuing south along the west side of the corridor with the same elevated alignment and elevated Union station as C1a to Young Street.</td>
</tr>
<tr>
<td>3</td>
<td><strong>C1c Victory-Marilla (Elevated)</strong></td>
<td>Transition to elevated south and east of Victory Station, then bridge to west side of tracks and descend to grade under Woodall Rodgers and transitioning back to elevated past West End Junction bridging the tracks north of Union station to an elevated station immediately adjacent to the West side of Union Station, then just south of the station curving east and transitioning to an at-grade station between the Convention Center Hotel and the Convention Center, then at-grade past the entrance to City Hall and continuing at-grade in Marilla Street.</td>
</tr>
<tr>
<td>4</td>
<td><strong>C1d Victory-Marilla (Elevated)</strong></td>
<td>Transition to elevated north of Victory station with an elevated station at Victory Station and an elevated alignment continuing south along the west side of the corridor with the same elevated alignment, elevated Union station and at-grade Convention Center Station as C1c to Marilla Street.</td>
</tr>
<tr>
<td>5</td>
<td><strong>C2 Victory-Young (Tunnel)</strong></td>
<td>Same as presented in D2 AA Concept Alternatives and Screening Reports, 2007-2008. Tunnel portal just south and east of Victory station with alignment along east side of corridor to underground station on a diagonal northeast of Union Station continuing to at-grade alignment in Young Street.</td>
</tr>
<tr>
<td>6</td>
<td><strong>C2a Victory-Young (Tunnel)</strong></td>
<td>Tunnel portal just south and east of Victory station with tunnel alignment curving to west side of the corridor, continuing south under Woodall Rogers and West End Junction, then curving east under the existing tracks just north of Union Station to an underground station under Reunion Blvd/Ferris Plaza on a diagonal immediately northeast of Union Station</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td><strong>C2b Victory-Young (Tunnel)</strong></td>
<td>Tunnel portal north of Victory station with an underground station at Victory Station and a tunnel alignment continuing south along the west side of the corridor, under Woodall Rogers and West End Junction, then curving east under the existing tracks just north of Union Station to an underground station under Reunion Blvd/Ferris Plaza on a diagonal immediately northeast of Union Station continuing to at-grade in Young Street.</td>
</tr>
<tr>
<td>8</td>
<td><strong>C2c Victory-Marilla (Tunnel)</strong></td>
<td>Tunnel portal north of Victory station with an underground station at Victory Station and a tunnel alignment continuing south along the west side of the corridor, under Woodall Rogers, West End Junction and existing RR trackage to an underground station immediately west of Union Station, then just south of the station curving east to an underground station between the Convention Center Hotel and the Convention Center, then continuing under City Hall to a tunnel portal east of City Hall in Marilla Street.</td>
</tr>
<tr>
<td>9</td>
<td><strong>C3 Victory-Young (At-grade/tunnel)</strong></td>
<td>At-grade turnout on the east side of the corridor and under the Woodall Rodgers Interchange ramps to a tunnel portal, then under the West End Junction in tunnel to a new Union Station under Ferris Plaza and portal in Young Street.</td>
</tr>
<tr>
<td>10</td>
<td><strong>C3a Victory-Marilla (At-grade/tunnel)</strong></td>
<td>At-grade turnout on the east side of the corridor and under the Woodall Rodgers Interchange ramps to a tunnel portal, then under the West End Junction in tunnel to a new Union Station, Convention Center Hotel Station and portal in Marilla.</td>
</tr>
<tr>
<td>11</td>
<td><strong>C3b Victory-Young-Marilla (At-grade/tunnel)</strong></td>
<td>At-grade turnout on the east side of the corridor and under the Woodall Rodgers Interchange ramps to a tunnel portal, then under the West End Junction in tunnel to a new Union Station under Ferris Plaza, continuing in tunnel to Young Street, City Hall and a tunnel portal in Marilla Street.</td>
</tr>
<tr>
<td>12</td>
<td><strong>C3c Victory-Young (Elevated)</strong></td>
<td>Same as C1b with elevated structure over Woodall Rodgers Interchange.</td>
</tr>
<tr>
<td>13</td>
<td><strong>C3d Victory-Young (At-Grade)</strong></td>
<td>At-grade turnout on the west side of the corridor north of West End Junction to a new junction at Main Street Bridge continuing into Reunion Blvd., a new at-grade station in Ferris Plaza then turning west into Young Street.</td>
</tr>
</tbody>
</table>

Source: Parsons Brinckerhoff and AZB Engineers