SECTION 2
ALTERNATIVES

This section of the Final Environmental Impact Statement (EIS) discusses the various Design/Build Alternatives, as well as the No-Build Alternative. It summarizes information from the previous studies that examined the feasibility of high speed rail in Florida. It then moves to the current Florida High Speed Rail (FHSR) Study and examines the study corridors that are initially identified, evaluated, and documented within the study area. Then, the corridors/station locations retained for further analysis are presented. The last Design/Build Alternatives discussion combines corridors/station locations retained for further analysis with the viable design/build technology proposals.

2.1 HISTORICAL OVERVIEW OF HIGH SPEED RAIL

Over the last 20 years, there has been increasing growth in population and significant change in land use from rural to urban along the Interstate 4 (I-4) corridor. In recognition of these changes and the need to increase the overall transportation capacity, the Florida Legislature began addressing high speed rail options in the 1970s. Section 1, Purpose and Need, provides a detailed description of the history of high speed rail studies in Florida. The following paragraphs summarize the early studies' significant conclusions which provide the foundation for this current high speed rail study.

In 1976, the Florida Transit Corridor Study[1] proposed use of:

- Limited access highway medians as a potential location for high speed rail.
- Existing rail corridors, both on and parallel to the existing roadway facilities.
- A rail envelope within medians of limited access roadways set at 44 feet (ft.) for a dual track.

In 1984, the Florida Future Advanced Transportation Report[2] recommended using:

- Public/private partnerships to proceed with the implementation of a FHSR system.
- Existing publicly-owned right-of-way (ROW) for the system.

In 1993, The Florida Department of Transportation (FDOT) completed three studies. The first, High Speed/Intercity Rail Passenger System Planning and Assessment of Routes and Alignments[3], was an examination of possible routes. The second, Florida High Speed and Intercity Rail Market and Ridership Study[4], concluded that:

- Recreational travel and business travel were the predominant trip purposes for high speed travel.
- The location of the alignment and the locations of stations were more significant to the success of FHSR than factors such as cost or type of rail.

The third, High Speed Rail Transportation Study - Tampa Bay to Orlando Corridor[5], concluded that the I-4/Interstate 275 (I-275) corridor was the Preferred Alternative for high speed rail implementation between the Tampa Bay and Orlando areas.

In 1995, FDOT produced Florida Intercity Rail Passenger Service, Options for the 21st Century, A Component of the Florida Transportation Plan[6]. It recommended that a public/private franchise be established for a cost effective and marketable intercity rail network.

In 1996, The Florida Overland eXpress Study[7] (FOX) provided an opportunity for Federal Railroad Administration (FRA), Federal Highway Administration (FHWA), and FDOT to provide information about the proposed FHSR system and corridor/station alternatives to the general public. This study was terminated before completion in 1998.

In 2000, the Florida Legislature authorized the Cross-State Rail Feasibility Study[8] which focused on the physical and financial feasibility of the I-4 corridor between the Tampa Bay and Orlando areas. This study concurred with previous studies' findings that suggested the interstate median as the preferred alignment location.

Concurrently with the Cross-State Rail Feasibility Study, Florida voters approved the *Constitutional Amendment on High Speed Rail*, and in 2001, the Florida Legislature enacted the *Florida High Speed Rail Authority Act*. The Florida Legislature identified the initial study segments to link the major urban areas of St. Petersburg, Tampa, and Orlando, and required FHSR construction by November 2003.

In 2001, the Florida High Speed Rail Authority (FHSRA) initiated a Project Development and Environment (PD&E) study to support the preparation of this Final EIS, with logical termini defined as the Tampa Central Business District (CBD) on the west, and the Orlando International Airport on the east. The study area is shown in Figure 2-1. The No-Build and design/build alternatives considered in this Final EIS and studied during the PD&E study are discussed in the following subsections. Although Florida voters repealed the *Constitutional Amendment on High Speed Rail* in November 2004, the requirements set forth in the *Florida High Speed Rail Authority Act* still remain valid.

2.2 NO-BUILD ALTERNATIVE

The No-Build Alternative assumes that a FHSR system would not be built between Tampa and Orlando. The requirements of the legislative mandate for the FHSRA to build a high speed ground transportation system would not be met. An additional mode of travel for daily commuters, visitors, and residents of the area would not be available, and existing modes would have to satisfy all travel demand.

The No-Build Alternative includes planned and programmed transportation projects within the study area that are on the financially constrained "needs" plan. Those projects are summarized in Section 1, Purpose and Need. Although roadway demand continues to grow, the No-Build Alternative would not offer diversion from the roadway to FHSR. As a result, capacity and level of service (LOS) would decrease sooner than if FHSR was built. The resulting anticipated need

to improve capacity and the LOS of the Tampa to Orlando transportation corridor will likely result in the use of the alignment identified for the FHSR for additional travel lanes. This will result in similar environmental consequences identified with the proposed project.

2.3 DESIGN/BUILD ALTERNATIVE ANALYSIS

In its 2002 Report to the Florida Legislature[9], the FHSRA found that a traditional design-bid-build approach to the legislative mandate would not meet the aggressive November 2003 construction date or the directive to maximize private/public investment in high speed rail. The FHSRA concluded that the legislative directives could be more reasonably achieved by incorporating the Design, Build, Operate, Maintain, and Finance (DBOM&F) procurement process into the *National Environmental Policy Act* (NEPA) process. This allowed the proposers to identify technology-specific impacts which would be evaluated during the PD&E Study. The process also identifies operational characteristics and financing options to assist the FHSRA in selecting a design/build firm.

In order to narrow the focus of the evaluation process, the PD&E Study started with an initial screening of corridors and station sites to eliminate non-viable alternatives from further consideration. The Florida High Speed Rail Screening Report[10], completed in October 2002, documents the initial evaluation process in detail and Section 2.3.1 summarizes the report's findings.

After the non-viable alternatives were screened from further evaluation, the FHSRA solicited proposals to DBOM&F a high speed ground transportation system between Tampa and Orlando. The DBOM&F proposal responses are the basis for the alternatives considered in this Final EIS. Section 2.3.3 provides additional information on the selection of the DBOM&F proposals that are further evaluated in the Final EIS. Section 4 of the Final EIS describes the potential impacts of the alternatives.

Table 2-1
Milestones in the Combined EIS/DBOM&F Process

Milestone	Date
Florida High Speed Rail Act establishes project limits for the first phase of the FHSR, which includes the corridor between Tampa and Orlando.	2001
PD&E Study identifies initial Preliminary Study Corridors Evaluation for the Tampa-Orlando HSR corridor.	January 2002
Preliminary Study Corridors Evaluation screens viable corridors.	October 2002
The FHSRA issues request for DBOM&F proposals. The request for proposals (RFP) identifies parameters for proposal, including alignments, design criteria, and operations.	October 2002
DBOM&F proposals submitted and evaluated for responsiveness to FHSRA's RFP. Design/Build alternatives identified for evaluation in EIS.	February-April 2003
The FHSRA and FRA approve DEIS for public review.	August 2003
The FHSRA identified Design/Build Alternative 2 as the Preferred Alignment. Preparation of the FEIS was initiated.	October 27, 2003
Florida voters rescinded FHSR Amendment.	November 2, 2004
The FHSRA revised Preferred Alignment to Design/Build Alternative 1 and directed completion of the FEIS and Record of Decision.	November 10, 2004

2.3.1 Preliminary Corridors

The FHSR PD&E Study initially identified six potential FHSR routes:

- Within the median of I-4
- Parallel to the existing CSX Rail Line (A-Line)
- Within the abandoned CSX "S" Rail Line (S-Line)
- Parallel to the Central Florida Greeneway (S.R. 417)
- Parallel to the Bee Line Expressway (S.R. 528)
- Connections through undeveloped land in Hillsborough and Osceola counties

The study area was divided from west to east into six corridors, A through E. The corridors are also shown on Figure 2-1.

The study's corridor evaluation process began by breaking each corridor into smaller geographical segments and labeling them as Segments 1, 2, and so forth. The route location, or alignment, was then given an alphabetical label, such as Alignments a, b, c, and so forth. The division and alphabetical labeling was necessary in order to track and compare quantified impacts in geographic areas. The entire process of identifying, quantifying, and comparing various FHSR route locations within each segment was documented in the Florida High Speed Rail Screening Report.

The evaluation process reduced the number and location of the alignments within each corridor. A matrix summary of the potential environmental impacts identified in the evaluation process is contained in the Screening Report. Of the 44 original segments, many did not meet the purpose and need of the project; therefore, the number of segments was reduced to 19 as a result of this evaluation. The matrix provides specific information as to why an alignment was eliminated or retained. The criteria used to eliminate infeasible alignments are:

- Structure and Embankment Quantity
- Wetlands Acreage by Quality
- Floodplains and Floodway Acreage
- Protected Species Habitat Acreage
- Historic Sites
- Contamination Sites
- Churches and Schools
- Cemeteries
- Public Recreation sites
- Public Services
- ROW

The eliminated and retained alignments are described in the following paragraphs. Figures 2-2 through 2-6 display the eliminated and retained alignments in Corridors A through E. Each figure shows the retained alignments in yellow and the eliminated alignment in a black-dashed line. Section 2.5 discusses station sites evaluated, eliminated, and retained for further evaluation.

Corridor A

Alignments within Corridor A, Segments 1 through 4, are identified in Figure 2-2.

Segment 1 extends from the eastern edge of the Hillsborough River, as the western boundary, to the intersection of Morgan Street and Harrison Street, as the eastern boundary. Four alignments were evaluated for Segment 1 and two were retained. Alignments a and b were eliminated and alignments c and d retained. Table 2-2 summarizes the alignment descriptions and the reasons for eliminating or retaining alignments.

Table 2-2
Summary of Alignments Evaluated in Corridor A
Segment 1-Hillsborough River to Morgan/Harrison Street

Alignment	Description	Retained for Further Evaluation	Comments on Alignments
a	New alignment, grade-separated south and parallel to I-275.	No	• Inadequate horizontal clearance between the proposed station and the alignment. • Impacts the greatest number of significant historic structures (5). • Impacts the greatest amount of wetlands (1.8 ac.). • Does not allow for a future extension of HSR service west of the Hillsborough River, without constructing a longer and more costly structure across the river.
b	New alignment, grade-separated north and parallel to I-275.	No	• A new structure is required to cross over I-275/I-4 interchange, adding substantial project costs. • Relocation impacts to elderly and low-income residences west of Hillsborough River precluding a future FHSR connection to the west. • Access impacts and potential re-construction in the low- income, historic district Tampa Heights and the new Stetson University Campus.
c	New alignment, grade-separated; crosses existing commercial area of small businesses and surface parking lots.	Yes	• Minimizes environmental impacts. • Facilitates a FHSR connection to the west.
d	New alignment, grade-separated.	Yes	• Minimizes environmental impacts.

Segment 2 extends from the western boundary of the Morgan Street and Harrison Street intersection to the intersection of Kennedy Boulevard and the Lee Roy Selmon Crosstown Expressway, as the eastern boundary. Four alignments were evaluated for Segment 2, and two were retained. For Segment 2, alignments b and d are retained and alignments a and c were eliminated. Table 2-3 summarizes the alignment descriptions and the reasons for eliminating or retaining alignments.

Table 2-3
Summary of Alignments Evaluated in Corridor A
Segment 2 – Morgan/Harrison Streets to Kennedy Boulevard/Lee Roy Selmon Crosstown Expressway

Alignment	Description	Retained for Further Evaluation	Comments on Alignments
a	Grade-separated, new alignment between Morgan Street and Nebraska Avenue.	No	• Requires the greatest amount of ROW. • Creates the greatest number of potential commercial relocations.
b	Grade-separated, new alignment between Morgan Street and Nebraska Avenue. It crosses an existing commercial area of primarily small businesses and surface parking lots. It is near the entry to Perry Harvey Sr. Park and the historic Union Station.	Yes	• Reduces the amount of ROW required. • Minimizes the number of potential commercial relocations. • Avoids impacts to Perry Harvey Sr. Park and does not impact Nick Nuccio Parkway. • Connects with Alignment c in Segment 1.
c	Grade-separated, new alignment that crosses the entry to Nick Nuccio Parkway, a gateway into historic Ybor City and primary access to the Central Park Village public housing development. The Parkway as a City of Tampa linear park.	No	• Requires complete reconstruction of the Nick Nuccio Parkway, adding to overall project costs. • Disrupts traffic access to Ybor City and the Central Park Village. • Impacts the linear park within the Parkway.
d	Grade-separated, new alignment parallel and east of I-275.	Yes	• Minimizes impacts to Perry Harvey Sr. Park. • No direct impacts to historic structures.

Segment 3 extends from the intersection of Kennedy Boulevard and the Lee Roy Selmon Crosstown Expressway, as the western boundary, to the mid-block of 36th and 37th Streets, as the eastern boundary. Three alignments were evaluated for Segment 3 and two were retained. Alignments c and d are retained, and alignment b is eliminated in Segment 3. Table 2-4 summarizes the alignment descriptions and the reasons for eliminating or retaining alignments.

Table 2-4
Summary of Alignments Evaluated in Corridor A
Segment 3 – Kennedy Boulevard/Lee Roy Selmon Crosstown Expressway to 36th/37th Street

Alignment	Description	Retained for Further Evaluation	Comments on Eliminated Alignment
b	Grade-separated, new alignment, parallel to the CSX C-Line.	No	• The alignment bisects the Ybor City National Historic Landmark District and impacts the greatest number of historic structures. • The elevated structure would create unacceptable visual impacts to historic resources and redeveloped areas in Ybor City. • The alignment conflicts with the Hartline transit system's planned light rail system in same corridor.
c	Grade-separated, new alignment from Kennedy Boulevard to the former CSX S-Line, north of Adamo Drive; The former CSX S-Line is a mixture of CSX and other public/private owners.	Yes	• No impacts to the Ybor City National Historic Landmark District.
d	Grade-separated, new alignment crosses into the I-4 median above the proposed entry/exit to Ybor City at 14th/15th Streets.	Yes	• Avoids direct impacts to the newly developed Ybor City area. • Contained within the I-4 median. • Minimal impacts to Perry Harvey Sr. Park.

Segment 4 extends from the mid-block of 36th and 37th Streets, as the western boundary, to the interchange of U.S. 41 and I-4, as the eastern boundary. Four alignments were evaluated for Segment 4, and two were retained. Segment 4, alignment d is retained in the I-4 median and alignment c from the mid-block of 36th and 37th Streets to east of 39th Street is retained. Alignments a, b, and the portion of c from east of 39th Street were eliminated from further evaluation. Table 2-5 summarizes the alignment descriptions and the reasons for eliminating or retaining alignments.

Table 2-5
Summary of Alignments Evaluated in Corridor A
Segment 4 – 36th/37th Street to U.S. 41/I-4 Interchange

Alignment	Description	Retained for Further Evaluation	Comments on Eliminated Alignment
a/b	Grade-separated, new alignment, connecting between CSX A-Line and I-4.	No	• Connects only to previously eliminated alignments in Segment 3.
c	Grade-separated, new alignment from the former CSX S-Line, north of Adamo Drive to east of 39th Street; The former CSX S-Line is a mixture of CSX and other public/private owners.	Yes	• The eliminated portion from 39th Street east to the U.S.41/I-4 interchange impacts industrial properties and requires crossing the CSX A-Line.
d	Grade-separated, new alignment within the I-4 median.	Yes	• Contained within the existing ROW of the I-4 median.

Corridor B

Corridor B, including segments 1 and 2 are identified in Figure 2-3.

Segment 1, along the I-4 alignment, extends from the interchange of U.S. 41 and I-4, as the western boundary, to just west of the Mango Road exit at C.R. 579, as the eastern boundary. Segment 1, along the CSX Line extends from the intersection of 39th Street, as the western boundary, to just east of I-75, as the eastern boundary. Segment 1 alignments pass the Seminole Indian Reservation and the Florida State Fairgrounds that are located to the south of I-4. Three alignments were evaluated for Segment 1 and two were retained. Alignments c and d, which cross the Tampa Bypass Canal, were retained and alignment b was eliminated. Table 2-6 summarizes the alignment descriptions and the reasons for eliminating or retaining alignments.

Table 2-6
Summary of Alignments Evaluated in Corridor B
Segment 1 – In I-4 Median
U.S. 41/I-4 Interchange to West of Mango Road/C.R. 579

Alignment	Description	Retained for Further Evaluation	Comments on Alignments
b	Grade-separated, new alignment, parallel to the CSX A-Line in Ybor City.	No	• Connects only to previously eliminated alignments in Corridor A. • Requires the greatest amount of new ROW.
c	Grade-separated, new alignment extends from the former CSX S-Line through the Uceta Yards to the existing CSX A-Line ROW until the I-75 median.	Yes	• Minimizes the amount of new ROW required.
d	Grade-separated, new alignment within the I-4 median.	Yes	• Minimizes the amount of new ROW required.

Segment 2 provides a connector located within the I-75 ROW. It connects from the CSX A-Line, as the southern boundary, to I-4, as the northern boundary. The area contains industrial and agricultural land uses interspersed with commercial and office complexes, such as the Sabal Office Park. Three alignments were evaluated for Segment 2 and one was retained. Alignment b is retained and alignments a and c were eliminated. Table 2-7 summarizes the alignment descriptions and the reasons for eliminating or retaining alignments.

Table 2-7
Summary of Alignments Evaluated in Corridor B
Segment 2 – CSX A-Line to I-4

Alignment	Description	Retained for Further Evaluation	Comments on Eliminated Alignment
a	Grade-separated, new alignment parallel to U.S. 301.	No	• Relocates four commercial properties. • Disrupts access and acquires parking from the Florida State Fairgrounds. • Requires a new crossing of the Bypass Canal.
b	Grade-separated, new alignment, within the I-75 median.	Yes	• Has the least amount of overall impacts.
c	Grade-separated, new alignment parallel and east of I-75, within existing interstate ROW.	No	• Impacts the greatest amount of wetlands and floodplains. • Requires the greatest amount of ROW.

Corridor C

Preliminary alignments for Corridor C are displayed in Figure 2-4.

Corridor C extends from just east of I-75, as the western boundary, to just east of the Hillsborough and Polk County lines, as the eastern boundary. Land uses along the I-4 alignment include pasturelands and commercial uses, such as Cracker Barrel, Lazy Days Campground, and Rooms To Go. Two alignments were evaluated for Segment 1 and one was retained. Alignment d, located within the I-4 median, is retained. Alignment a was eliminated because of numerous community impacts in Plant City. Table 2-8 summarizes the alignment descriptions and the reasons for eliminating or retaining alignments.

Table 2-8
Summary of Alignments Evaluated in Corridor C
East of I-75 to East of Hillsborough/Polk County Line

Alignment	Description	Retained for Further Evaluation	Comments on Alignments
a	Grade-separated, new alignment parallel to CSX tracks.	No	• The elevated guideway would create a disruptive visual impact in Plant City's established neighborhoods and downtown. • The alignment bisects and creates adverse impacts to the Plant City Historic District. • The alignment would create proximity impacts to numerous churches, schools, parks and community facilities.
d	Grade-separated, new alignment, within the I-4 median.	Yes	• Significantly fewer impacts to downtown Plant City and NRHP-listed Plant City Historic District.

Corridor D

Preliminary alignments for Corridor D, Segments 1 through 3, are identified in Figure 2-5.

Segment 1 extends from just east of the Hillsborough/Polk County line, as the western boundary, to the interchange of Socrum Loop Road, as the eastern boundary. Land uses along the I-4 include industrial and commercial uses, such as a horse trailer sales lot, Tree Sweet citrus facility, Lakeland Interstate Park, and an abandoned Owens-Corning factory. Interspersed among these uses are large open pasturelands. Three alignments were evaluated for Segment 1 and one was retained. Alignment d, located within the I-4 median, is retained. Alignments a and c were eliminated. Table 2-9 summarizes the alignment descriptions and the reasons for eliminating or retaining alignments.

Table 2-9
Summary of Alignments Evaluated in Corridor D
Segment 1 – Hillsborough/Polk County Line to I-4/Socrum Loop Interchange

Alignment	Description	Retained for Further Evaluation	Comments on Alignments
a	Grade-separated, new alignment parallel to CSX tracks.	No	• The alignment bisects and creates adverse impacts to the Lakeland Historic District. • There are significant ROW and business relocation impacts within downtown Lakeland. • The alignment would create proximity impacts to numerous community resources including churches, parks, schools and public facilities.
c	Grade-separated, new alignment connecting alignments a and d.	No	• The alignment connects only to eliminated alignments in Corridor C • The alignment creates significant wetland impacts (152 acres) within its 3.4-mile length.
d	Grade-separated, new alignment, within the I-4 median.	Yes	• Avoids impacts to downtown Lakeland and the Lakeland Historic District. • Overall least amount of impacts.

Segment 2 extends from the Socrum Loop Road interchange, as the western boundary, to just west of the C.R. 557 interchange, as the eastern boundary. Commercial uses are clustered near the interchanges. Other land uses vary from residential to pastureland, pine groves, and orange groves. A portion of the area west of I-4 contains the Green Swamp, which is an Area of Critical State Concern. Two alignments were evaluated for Segment 2 and one was retained. Alignment d, located in the I-4 median, is retained. Alignment a was eliminated due to numerous community impacts in Auburndale. Table 2-10 summarizes the alignment descriptions and the reasons for eliminating or retaining alignments.

Table 2-10
Summary of Alignments Evaluated in Corridor D
Segment 2 – I-4/Socrum Loop Interchange to West of I-4/C.R. 557 Interchange

Alignment	Description	Retained for Further Evaluation	Comments on Alignments
a	Grade-separated, new alignment parallel to CSX tracks through Polk County and the City of Auburndale.	No	• The alignment bisects and disrupts the established development in Auburndale. • The alignment creates proximity effects to numerous churches, schools, parks and community facilities. • The alignment only connects to the eliminated alignment in Corridor C.
d	Grade-separated, new alignment, within the I-4 median.	Yes	• Overall least amount of social impacts.

Segment 3 extends from just west of the C.R. 557 interchange, as the western boundary, to just east of the World Drive interchange in the Celebration area, as the eastern boundary. The land use pattern along I-4 is predominately passive agriculture with some residential developments. The southern portion of the project area contains three small cities: Lake Alfred, Haines City, and Davenport. Four alignments were evaluated for Segment 3 and one was retained. Alignments a, b, and c were eliminated. These alignments would be on new alignment and grade-separated through much of the developed city properties in this segment. Alignment d, within the I-4 median, is retained. Table 2-11 summarizes the alignment descriptions and the reasons for eliminating or retaining alignments.

Table 2-11
Summary of Alignments Evaluated in Corridor D
Segment 3 – West of I-4/C.R. 557 Interchange to East of I-4/World Drive Interchange

Alignment	Description	Retained for Further Evaluation	Comments on Eliminated Alignment
a	Grade-separated, new alignment from Davenport through undeveloped land to north of I-4.	No	• The alignment impacts nearly 2.195 acres of high quality wetlands. • The alignment requires the greatest amount of ROW compared to all other alignments. • The alignment connects only eliminated alignments in Corridor B, C, and D to I-4 alignments.
b	Grade-separated, new alignment between Lake Alfred and Haines City.	No	• The alignment connects only to an eliminated alignment in Corridors B, C, and D.
c	Grade-separated, new alignment parallel to the CSX rail tracks through Haines City.	No	• The alignment bisects established neighborhood and commercial development in Auburndale and Lake Alfred. • The alignment creates proximity impacts to a greater number of (17) churches and (five) public recreation sites. • The alignment connects only to previously eliminated alignments in Corridors B, C, and D.
d	Grade-separated, new alignment, within the I-4 median.	Yes	• Overall least amount of impacts. • Avoids impacts to the cities of Auburndale and Lake Alfred.

Corridor E

Alignments within Corridor E, Segments 1 through 4, are identified in Figure 2-6.

Segment 1 extends from just east of the World Drive interchange in the Celebration area, as the western boundary, to just west of the Osceola Parkway, as the eastern boundary. Disney's Wide World of Sports complex is located on the west side of I-4 and the Celebration community is to the east. Three alignments were evaluated for Segment 1 and one was retained. Alignment d, within the I-4 median, is retained. Alignments a and c were eliminated. Table 2-12 summarizes the alignment descriptions and the reasons for eliminating or retaining alignments.

Table 2-12
Summary of Alignments Evaluated in Corridor E
Segment 1 – World Drive Interchange to Osceola Parkway

Alignment	Description	Retained for Further Evaluation	Comments on Alignments
a	Grade-separated new alignment north of and parallel to I-4.	No	• The alignment impacts the greatest amount of wetlands (321 ac.). • New commercial development has occurred in the alignment. • The alignment only connects to a previously eliminated alignment in Corridor D.
c	Grade-separated new alignment that connects alignment a and d.	No	• New commercial development has occurred in the alignment. • The alignment only connects to eliminated alignment a.
d	Grade-separated alignment in the I-4 median.	Yes	• Overall least amount of impacts.

Segment 2 extends from just west of the Osceola Parkway, the western boundary, onto the Bee Line Expressway (S.R. 528), and extends until just west of the John Young Parkway, the eastern boundary. Land uses along I-4 to the east and west are predominantly tourist-oriented developments. At the I-4/Bee Line Expressway (S.R. 528) interchange, Sea World dominates the southeast corner, while the Orange County Convention Center (OCCC) dominates the northeast corner. Beyond the OCCC, rural/agricultural lands owned by Universal Studios border the north side of the Bee Line Expressway (S.R. 528). Five alignments were evaluated for Segment 2 and three were retained. Alignments a, c, and d are retained. Alignments b and e were eliminated. Table 2-13 summarizes the alignment descriptions and the reasons for eliminating or retaining alignments.

Table 2-13
Summary of Alignments Evaluated in Corridor E
Segment 2 – Osceola Parkway to John Young Parkway

Alignment	Description	Retained for Further Evaluation	Comments on Alignments
a/c	Grade-separated new alignment parallel and south of S.R. 536, connecting into the Central Florida Greeneway.	Yes	• Provides connection to the Central Florida Greeneway.
b	Grade-separated new alignment connecting I-4 and the Central Florida Greeneway.	No	• Impacts the greatest amount of wetlands acres. • Impacts the greatest amount of protected species habitat. • New structure over I-4/S.R. 536 adds substantial project costs. • Only allows access to Disney property, with no option for access to a proposed nearby station within the I-4 median.
d	Grade-separated within the I-4 median and along the north side of the Bee Line Expressway ROW; Provides connection to the proposed Orange County multi-modal center at International Drive and OCCC.	Yes	• Overall least amount of impacts. • Overall least cost.
e	Grade-separated new alignment along U.S. 192, between I-4 and the Central Florida Greeneway.	No	• Disrupts access to two large commercial land uses and Celebration community, creating longer and more expensive spans of FHSR guideway. • The alignment requires a high rise structure over a ramp of the I-4/U.S. 192 interchange that add substantial project costs.

Segment 3, along the Bee Line Expressway (S.R. 528), extends from just west of the John Young Parkway, as the western boundary, to just east of the Boggy Creek Road/Tradeport Drive intersection, as the eastern boundary. As the Bee Line Expressway (S.R. 528) intersects John Young Parkway, the segment continues east along Taft-Vineland Road. The land use in this area is predominantly light industrial. Three alignments were evaluated for Segment 3. Two alignments were originally retained; however, later analysis determined engineering constraints prevented their construction. No alignments were retained for further study.

Segment 4 extends along the Bee Line Expressway (S.R. 528), which is the northern boundary, from just west of the John Young Parkway intersection east along Taft-Vineland Road to Orlando International Airport on South Access Road. The southern boundary of Segment 4 extends along the Central Florida Greeneway (S.R. 417), and then turns northward and enters Orlando International Airport from the south along South Access Road. The west end of the Central Florida Greeneway (S.R. 417) is predominantly low-density residential developments,

such as Hunters Creek Community. Two combined alignments, e/g and f/h, were evaluated and retained for Segment 4. Table 2-14 summarizes the alignment descriptions.

Table 2-14
Summary of Alignments Evaluated in Corridor E
Segment 4 – John Young Parkway to Orlando International Airport

Alignment	Description	Retained for Further Evaluation
e/g	Grade-separated new alignment within the Bee Line and Taft-Vineland ROW.	Yes
f/h	Grade-separated new alignment within Central Florida Greeneway ROW; and along the South Access Road ROW into the proposed Orlando International Airport South Terminal.	Yes

Figure 2-7, Corridor/Stations for Further Evaluation, displays all of the eliminated and retained alignments by corridor.

2.3.2 Corridors for Further Evaluation

The evaluation process described in the previous section, and presented in greater detail in the Florida High Speed Rail Screening Report, compared alignments within each geographic corridor segments and eliminated those with significant social, natural, or physical environmental impacts and that failed to meet purpose and need. The retained and eliminated alignments within the corridor segments were presented to the public in January 2003 for review and comment. See Section 6 of this report for additional information regarding the public information process. Station sites retained for further study are discussed in Section 2.5 and shown on Figure 2-7.

In order to compare impacts along the entire trip from terminus to terminus, the retained alignments within each segment are aggregated within each corridor to form eight different routes (A1, B1, C1, etc.), as shown in Table 2-15, and then the various routes are linked together to form four viable corridors (A, B, C, etc.), as shown in Table 2-16. Although all data is organized by segment so that impacts can be easily tracked, all future discussions will focus on retained routes within each viable corridor.

Table 2-15
Retained Routes

Segments	Route
Corridor A	
$A_1c + A_2d + A_3d + A_4d$	= A1
$A_1d + A_2b + A_3c + A_4c$	= A2
Corridor B	
B_1d	= B1
$B_1c + B_2b$	= B2
Corridor C	
C_1d	= C1
Corridor D	
$D_1d + D_2d + D_3d$	= D1
Corridor E	
$E_1d + E_2d + E_4egh$	= E1
$E_1d + E_2ac + E_4fh$	= E2

The Viable Corridors are shown on Figure 2-7, Corridors/Stations for Further Evaluation.

Table 2-16
Viable Corridors

Routes	Corridor
A1 + B1 + C1 + D1 + E1	Corridor 1
A1 + B1 + C1 + D1 + E2	Corridor 2
A2 + B2 + C1 + D1 + E1	Corridor 3
A2 + B2+ C1 + D1 + E2	Corridor 4

Corridors 1 through 4 comprise the Viable Corridor.

2.3.3 Design/Build Alternatives Selection Process

As previously discussed, the FHSRA selected and incorporated a DBOM&F process into the EIS analyses process. The second stage of the DBOM&F was initiated on October 7, 2002, when the FHSRA solicited proposals to construct a high speed ground transportation system, from Tampa to Orlando. The RFP consisted of a variety of data collected by the FHSRA to date. The RFP data included:

- Florida High Speed Rail Corridor Screening Report, October, 2002
- Florida High Speed Rail Preliminary Engineering Plans
- PD&E Study Preliminary Engineering Calculations and Tables
- Florida High Speed Rail Design Criteria
- Preliminary Engineering Geotechnical Data
- FDOT I-4 Design Plans (1 CD)
- Preliminary Conceptual Drainage Report
- Station Alignment and Concept Plans

- Digital Terrain Model and Surveyor's Report
- Utility Data Plans
- FHSRA Ridership Study

In order to reduce costs for the respondents, the RFP required only Viable Corridors 1 and 2 for the design/build evaluation. However, all four Viable Corridors are evaluated in this Final EIS, and any one of them could be selected and negotiated with the respondents.

Five proposals from four different companies were received on February 10, 2003. The proposers were:

- Et3.com Inc.
- Fluor Bombardier
- Georgia Monorail Consortium (Proposal 1 and Proposal 2)
- Global Rail Consortium

On April 17, 2003, two of the respondents were determined by the FHSRA to be non-responsive and are not included within this document. They are Et3.com Inc. and Georgia Monorail Consortium. A letter dated April 17, 2003, from the FHSRA explains the reasons for the determination of non-responsiveness.

The FHSRA preliminarily found that two proposals were responsive and were to be evaluated as Design/Build Alternatives in the Final EIS. The two teams and their technologies are: Fluor Bombardier, which proposed the use of a gas turbine train technology, and the Global Rail Consortium, which proposed the use of an electric train technology. The two proposals contain different technologies, track systems, rail locations, and station sites.

The four Viable Corridors shown in Table 2-16 result in eight Alternatives, with four alternatives for each technology. The Fluor Bombardier group proposal is represented as the gas turbine train and the Global Rail Consortium proposal as the electric train. The alternative combinations of location and technology are identified in Table 2-17.

Table 2-17
Design/Build Alternatives

Viable Corridors	Technology	Alternatives
Corridor 1	Gas Turbine Train	Alternative 1
Corridor 2	Gas Turbine Train	Alternative 2
Corridor 3	Gas Turbine Train	Alternative 3
Corridor 4	Gas Turbine Train	Alternative 4
Corridor 1	Electric Train	Alternative 5
Corridor 2	Electric Train	Alternative 6
Corridor 3	Electric Train	Alternative 7
Corridor 4	Electric Train	Alternative 8

The Design/Build Alternatives 1 through 8, are shown on Figure 2-8.

2.4 DESIGN/BUILD ALTERNATIVES

Within the RFP documents for DBOM&F, FHSRA identified engineering and operational characteristics that firms responding to the RFP were to meet. The design criteria was intended to provide a starting point from which various proposed technologies would be refined. Two technologies have been identified for continued analysis. The Flour-Bombardier proposal utilizes the gas turbine (gas turbine train) technology and the Global Rail Consortium proposal utilizes an electrified, modified, electric train technology. The following section identifies key elements of the RFP responses.

2.4.1 Design/Build Alignment Variations

Although the RFP required one corridor for the FHSR from downtown Tampa to the Disney area in Osceola County, the RFP required two alternative corridors from the Disney area to the Orlando International Airport. The first corridor is within the north side ROW of the Central Florida Greeneway (S.R. 417) to Boggy Creek Road and into the proposed south terminal at Orlando International Airport. The second corridor is within the north side ROW of the Bee Line Expressway (S.R. 528) from I-4 to John Young Parkway continuing east in the median of Taft-Vineland Street, as coordinated with Orange County. This corridor then follows the Orlando Utilities Commission rail line into the south of Orlando International Airport.

The typical sections, plan sheets, vertical profiles, and station concepts are included in Appendix A-1, Sheets 1 through 204. The plan sheets identify horizontal alignments that are within the existing 44 ft. median envelope of the interstate/freeway alignments. The plan sheets also identify horizontal alignments that require new ROW with a 60 ft. envelope. The vertical clearance identified in the plan sheets provides a minimum of 19 ft. clearance between top of rail and bottom of structure utilizing an electrified train system. The following text describes the variations of the horizontal and vertical alignment geometry proposed by the Fluor Bombardier Gas Turbine Train and the Global Rail Consortium Electric Train. Appendix A-2 includes the plan sheets identifying variations to the alignment as proposed by the gas turbine train and electric train proposals.

Gas Turbine Train

In specific areas, the Fluor-Bombardier Gas Turbine Train proposal varies from track location alignments, vertical alignments, and ROW defined by the FHSRA in the RFP:

- Alignment shifts to the north and west of I-4 at a maximum distance of 550 ft. to enter the Disney Station (see Appendix A-2, Sheets 119A through 124A, 155A, and 156A).
- Alignment transitions from I-4 and shifts south to the Central Florida Greeneway (S.R. 417) median instead of the north side of the Central Florida Greeneway (S.R. 417). The alignment also transitions from the Central Florida Greeneway (S.R. 417) median to Orlando International Airport at a maximum of 325 ft. to the north and west of the FHSR alignment (see Appendix A-2, Sheets 159A through 181A).

- The gas turbine train proposal varies from the vertical profile provided by the FHSRA at some locations with a vertical profile that is generally set a few ft. higher. These variances would result in the replacement of the following overpass road bridges:

  – C.R. 559 Polk County
  – S.R. 557 Polk County
  – C.R. 545 Polk County
  – I-75 Ramps (3) Hillsborough County

- The gas turbine train proposal revises the vertical alignment at two locations identified for wildlife crossings. The RFP identified emergency crossovers between the east and west traffic lanes due to the separation between interchanges. These crossovers were located in conjunction with wildlife crossings that FDOT has planned as a part of future I-4 improvements. The gas turbine train proposal identifies a vertical alignment following the interstate vertical alignment, not allowing for these crossings. However, an elevated roadway crossing over the rail alignment is proposed for emergency vehicles at a single location with no provision for wildlife crossings.
- The typical sections for the gas turbine train technology are shown in various scenarios in Appendix A-4. Where new ROW is required, the gas turbine train proposal identifies the need to increase the 60 ft. wide envelope to 75 ft., with an additional 20 ft. of temporary construction easement.
- The gas turbine train proposes to use the median of the Central Florida Greeneway (S.R. 417); therefore, additional ROW identified to the north side of this transportation corridor would not be required within this proposal.

Electric Train

The Global Rail Consortium Electric Train technology would be constructed within the FHSRA's defined ROW and vertical alignments. Typical sections for the technology are shown in Appendix A-4. However, the proposal contains the following track location variances from the alignment defined by the FHSRA:

- Alignment shifts to the east 28 ft. as it leaves I-4 and continues on to the Tampa CBD station site (see Appendix A-2 Sheet 2A).
- Alignment shifts to the north, a maximum of 1,565 ft. as it leaves the Boggy Creek Road and travels north to Orlando International Airport (see Appendix A-2, Sheets 152A through 154A and 183A).

The proposers' variances and other differences are incorporated into the definition of the design/build alternatives and are considered in this Final EIS.

2.4.2 Operations

The FHSRA, as part of the DBOM&F RFP, requested that performance standards and LOS be established that would optimize ridership and revenues. These standards, as a minimum, would

identify trip times between termini and stations, frequency of service, and adequate capacity for passengers.

The DBOM&F documents identified the following minimum performance standards:

- Operating Speed
  The proposed technology must meet the requirements of the legislative mandate and be capable of operating on an unconstrained alignment at speeds in excess of 120 miles per hour (mph).
- Trip Times
  The proposed technology and operating plan must provide a 1 hour, 10 minute maximum travel time between Tampa and Orlando International Airport including stops for passenger boarding/de-boarding at all intermediate stations.
- Passenger Capacity
  The proposed technology, train configuration (consist), and operating plan should be capable of providing a minimum passenger capacity of 250-seated passengers per consist. In the event that the proposed technology uses a train configuration that does not provide this minimum capacity, then the proposer may provide additional service frequency to achieve equivalent passenger capacity.
- Intercity Service
  The proposed intercity service would include a minimum of 12 round trips per day between Tampa and Orlando International Airport. The operator may propose an operating plan without stops at intermediate stations; however, operators would propose a plan that optimizes the overall system ridership.
- Hours of Operation
  Minimum service hours would be from 6:00 AM until 8:00 PM.
- Service Ramp-up
  The operator may propose to phase-in new service over the first two operating years of the project, if opening service of the project is not less than 8 intercity round trips per day.
- Service Expansion
  The operator may propose increased service above minimum levels in order to optimize ridership and revenue.

The gas turbine train and the electric train systems have the following operational characteristics:

Gas Turbine Train

The gas turbine train proposal indicates that a maximum speed of 125 mph would be obtained, meeting the minimum speed requirements. This results in travel times between 65 minutes for the Central Florida Greeneway (S.R. 417) alignment and one hour, 10 minutes for the Bee Line Expressway (S.R. 528) alignment, which is at or near the maximum trip time identified by the FHSRA. Non-stop travel times are noted to be 58 and 63 minutes. The difference is the longer Bee Line Expressway (S.R. 528) alignment compared to the Central Florida Greeneway

(S.R. 417) alignment in Orange County. No trip times were provided for the shuttle trips between Orlando International Airport and the Disney area.

The gas turbine train proposal identifies that the ridership information prepared for and provided by the FHSRA was utilized in the development of the operations plan. This ridership information includes the Tampa-Orlando Investment Grade Ridership Study, Operations Plan, November 14, 2002 and the Investment Grade Ridership Study, Summary Report, November 20, 2002.

A fleet of six trains is proposed to provide intercity and shuttle service in the Disney area. The shuttle service would be provided between Orlando International Airport and Walt Disney World and would operate on the same mainline tracks as the intercity service. No non-stop service was identified in the proposed operational plan. The operating hours are identified between 6:00 AM and 11:00 PM. The gas turbine train proposal meets the FHSRA criteria related to capacity, trip times, operating speeds, and hours of operation.

Electric Train

The electric train proposal indicates that a maximum speed of 160 mph would be obtained resulting in trip times of 55 minutes with stops and 44 minutes non-stop between Tampa and Orlando International Airport. The shorter Central Florida Greeneway (S.R. 417) alignment reduces the stated trip times by one minute. The travel times for the shuttle service are 14 minutes for the Central Florida Greeneway (S.R. 417) alignment and 15 minutes for the Bee Line Expressway (S.R. 528) alignment.

The electric train proposal references the Investment Grade Ridership Study, Summary Report, November 20, 2002, for the development of their operations plan. This report was prepared by two independent consultants for the FHSRA and documented the results of each of these analyses. The operations plan for the electric train proposal is based on the average of the two analyses.

A fleet of five trains is proposed with four trains providing intercity and shuttle service and one train identified as a spare. Five passenger cars and two power cars, one on each end of the consist, provide a total of 250 seats. Four direct trips are proposed between Tampa and Orlando with 12 trips providing intercity service. An additional 17 shuttle trips are proposed between Orlando International Airport and the Disney area. The operating hours are identified between 5:50 AM and 11:15 PM. The electric train proposal meets the FHSRA criteria related to capacity, trip times, operating speeds, and hours of operation.

2.4.3 Bridge Structures

The bridge structures for the FHSR project would be designed to specifications identified in the FDOT Structures Design Guidelines[11], AASHTO LRFD Bridge Design Specifications[12], and AREMA 2002 Manual for Railway Engineering[13].

The FHSRA has required that the rail alignment be grade–separated, which results in the use of significant bridge structures through the corridor. The FHSR provided vertical profiles that cumulatively represent a total bridge structure length ranging from 16.5 miles (mi.) to 30.1 mi. for the alternative alignments in the study area. The total length of the alignments, as provided by the FHSRA, ranges from 83.8 mi. to 85.7 mi.

Gas Turbine Train

The gas turbine train proposal identified bridge structures of either concrete, or a combination of concrete and steel elements. Conventional construction methods would be employed to construct the bridge structures. Appendix A-4, Figures 2-21 through 2-27 illustrate the proposed gas turbine train typical sections for bridges.

Electric Train

The electric train proposal identified the use of concrete box girders for all spans. Appendix A-4, Figures 2-28 through 2-31 include typical bridge sections with various types of column support.

2.4.4 Retaining Walls

Retained earth walls would be utilized in areas that require fill, where ROW is not adequate to allow for a typical slope embankment. This occurrence is typical throughout the proposed alignments located within an interstate or freeway median. FHSRA requires a minimum of 10 ft. from centerline of track to near face of the wall.

Gas Turbine Train

The gas turbine train proposal substituted retained earth fills for elevated bridges, where feasible, as an optimization/enhancement, thereby reducing bridge structures by approximately 35 to 42 percent between Tampa and Orlando. A standard barrier and chain link fence would extend above the wall.

Electric Train

The electric train proposal maintains required vertical clearance by depressing the alignment in locations to pass underneath overhead structures. Where the width of the I-4 median does not permit the appropriate grading of new ditches, retaining walls would be used. Where this occurs, the design would incorporate a conventionally reinforced bottom slab and a pumping system to remove storm drainage, thereby ensuring that the rail corridor maintains positive drainage away from the ballast. The bottom slab would be designed to resist hydrostatic uplift from groundwater and would support retaining walls on either side of the track section. A standard barrier and chain link fence would extend above the wall.

2.4.5 Barriers

The FHSRA identified the following guidelines for utilizing barriers to protect the rail alignment and objects within the rail corridor:

- Permanent highway barriers would be installed between the rail line and immediately adjacent parallel roadways, in accordance with FRA regulations.
- Where the rail line is on pier-supported structures within 100 ft. of the highway, barriers would be required to protect piers and the occupants of highway vehicles.
- Overhead highway bridge pier structures within the rail corridor would be protected using crash barriers.
- FHSR systems would have protection against guideway and ROW entry by unauthorized persons, large animals, and objects. A 6-ft. chain link fence would be installed within the guideway between the barrier structure and the track. Fencing would not be required where the barrier or retaining wall height exceeds the height of the fence. Overhead highway bridge structures would include chain link fencing across the width of the guideway, plus 20 ft. on each side to aid in the prevention of vandalism.
- FHSR systems would include an intrusion detection system, capable of detecting large objects that strike or rupture the chain link fence. Where fencing is not required (at high retaining walls or barriers), the intrusion detection system would be furnished using electromechanical or other appropriate means of detection. The intrusion detection system would be tied into the train control system to allow either warning or train stop, as determined by the system safety study performed during the design and construction phase.
- Should a system that provides train-operating speeds in excess of 125 mph be proposed, the additional FRA operating requirements of 49CFR 213.361 would be met during the design and construction phase. These requirements include the preparation and approval, through the FRA, of a "Right-of-way Plan" from the owner of a class 8 and 9 track that is required for trains operating at speeds over 125 mph. This plan would contain provisions in areas of demonstrated need for the prevention of: vandalism, launching of objects from overhead bridges or structures into the path of the trains, and intrusion of vehicles from adjacent ROW.

Gas Turbine Train

The gas turbine train proposal states the median barriers would typically support a chain link fence to prevent unauthorized access. Placing a 6-ft. chain link fence 30 inches (in.) inside the barrier (as proposed by the FHSRA) provides an area for rubbish to collect between the fence and the barrier. Mounting the fence on top of the barriers optimizes the design by increasing the clearance between the train and adjacent structures, eliminating rubbish accumulation, and reducing potential maintenance costs.

An intrusion detection system, as identified by the FHSRA, has not been provided as part of the gas turbine train proposal because FRA does not require an intrusion detection system when the

maximum operating speed is 125 mph or less. Access detection would be provided at access/egress gates in the fencing.

Electric Train

The electric train proposal states that, because the proposed FHSR system is located within the I-4 corridor with its centerline within 100 ft. of a highway travel lane, a continuous concrete barrier wall would be placed along both edges of the I-4 paved, inside shoulder. These barriers would protect against intrusion by unguided automotive vehicles including motorcycles, automobiles, light trucks, and over the road trucks. The electric train typical section places 6-ft. chain link fence along both sides of the corridor, whether at-grade or on structure. The electric train design would meet or exceed the minimum level of protection, including intrusion detection system and barriers between roadways as described in the RFP.

2.4.6 Drainage

The process for drainage design approvals would be coordinated with the Florida Department of Environmental Protection (FDEP) and the Water Management Districts (WMD) in the four county areas.

The criteria and regulations of the agency responsible for the water body ultimately receiving the discharge would be used. Where two or more agencies control a portion of the FHSR corridor, more stringent criteria must be met. Portions of the I-4 corridor in Hillsborough County that have been re-constructed already account for potential stormwater generated by FHSR and little modification to existing stormwater management systems is expected.

For the remaining portions of the FHSR, there are some options to be considered for pollution abatement volume treatment, attenuation, and flood compensation associated with the permitting process.

- Utilizing an existing FDOT surface water management system within the ROW, as is, can be the most economical option.
- Modifying the outfall of an existing FDOT surface water management system with the ROW.
- Constructing a new surface water management system within the FDOT ROW or adjacent land owned by the State.
- Adding an ex-filtration trench system may be considered as a surface water management system alternative.
- Adding stormwater management systems under elevated structures is also an option.
- The purchase of adjacent land to be used as a surface water management system is an option.

Construction of the FHSR would create impacts to existing drainage systems. It is the responsibility of the DBOM&F firm to remedy any impacts in accordance with FDOT, FDEP, WMDs, and applicable local authority criteria.

Gas Turbine Train

The gas turbine train proposal includes drainage design and quantities based on information provided by the FHSRA, with minor adjustments to reflect optimizations to the design.

The retaining wall sections would have drainage solutions including:

- Barrier wall inlets on both sides
- Barrier wall inlets on one side
- Ditch conveyance
- Trunkline inside the wall

It is also assumed that existing drainage structures and piping are adequate to carry the load imposed by the rail alignment. Existing box culverts would be removed and replaced in the rail corridor within the road median only. The box culverts located under the roadway corridor would not be replaced.

Floodplain compensation for potential floodplain impacts has not been determined in the gas turbine train proposal. Also, no provision has been made for a weather station or flood detection equipment.

While the FHSRA noted that I-4 in Hillsborough County can accommodate drainage from the FHSR, the gas turbine train proposal's preliminary review of aerials and plans indicate that ponds are not sufficiently spaced to warrant this assumption. If existing stormwater ponds and structures cannot be modified for additional volumes, then the gas turbine train proposal states additional ROW would be required for a stormwater management system.

Electric Train

The electric train proposal states that drainage would be designed within the criteria identified by the FHSRA.

The electric train proposal would collect storm water on the track area in perforated drain tiles after percolating through the ballast(s). The drain lines, extending longitudinally along the outside of the tracks with outlets, as needed, to empty into the existing drains or into the new trunk lines, would run parallel to the shoulder of the driving lanes on I-4. Where the median width permits, the design would forgo the subsurface trunk lines and utilize ditches between the roadway shoulder and the barrier wall, or track section to collect and transfer storm drainage.

Storm water would be conveyed in ditches or trunk lines to the existing transverse drainage system, which currently transports water under and to the outside of I-4. The proposed longitudinal system reduces the number of transverse drainage pipes beneath the track structure. This longitudinal design was chosen to keep the conveyance system as high as possible. It also eliminates higher strength concrete pipes necessary to support trainloads and eliminates any future maintenance concerns with pipe beneath the train and track envelope.

Should existing cross drain culvert capacity be exceeded, the electric train proposal includes resizing these pipes or installing new cross drains at appropriate locations. Additionally, the proposal would address the requirements for erosion and sediment control and provide plans for stormwater pollution prevention.

Construction of the FHSR would create impacts to existing drainage systems. The electric train proposal identifies the responsibility as theirs to remedy any impacts in accordance with FDOT, FDEP, and WMD requirements and applicable local authority criteria.

2.4.7 Highway Modification

Any highway modifications must meet FDOT roadway standards and/or local agency roadway standards. The FHSRA has provided an alignment within transportation corridors that minimizes impacts to the existing roadways. Within the median of the interstates, geometry of rail alignments has been provided that requires design variations from the FDOT and FHWA standards. These design variations include reduced shoulder widths to accommodate the geometry of the rail alignment. However, the reduced shoulder widths still meet minimum shoulder width requirements of the state and federal agencies.

Construction of the FHSR would require coordination with roadway agencies for concurrence to the maintenance of traffic plans. The proposers would have to obtain concurrence from these agencies for construction within existing transportation corridors and to show that impacts to existing traffic would be minimized. The construction of the FHSR would require approval/authorization from FHWA, FDOT, and the Orlando-Orange County Expressway Authority (OOCEA) to be within the ROW of the transportation corridors within the respective agency's jurisdiction. The FHSRA would require a Memorandum of Agreement (MOA) with OOCEA for use of the Central Florida Greeneway (SR 417) ROW.

Gas Turbine Train

The gas turbine train proposal states that no highway modifications result from their proposal; however, as discussed in Section 2.3.7, the gas turbine train proposal identified three crossroad overpasses and three ramp structures that would need to be replaced with the proposed gas turbine train vertical alignment. The proposed gas turbine train alignment also proposes to be within the median of the Central Florida Greeneway (S.R. 417), however, no approval from the OOCEA has been provided for use of the Greeneway median.

Electric Train

The electric train proposal also states that no highway improvements are proposed except near stations and at maintenance facilities. The electric train proposal identifies a Disney area station alternative in the median of I-4. This would require approximately one mi. of the westbound I-4 lanes to be reconstructed. The electric train proposal utilizes the Central Florida Greeneway (S.R. 417) alignment along the north side of the ROW as identified by the FHSRA.

2.4.8 Operational and Maintenance Facility

The FHSRA identified two potential sites per technology for an Operational and Maintenance (O&M) facility. Both sites are located in the vicinity of Orlando International Airport. The available sites at Orlando International Airport would provide sufficient size, compatible land use, and minimal environmental impacts at the project's eastern terminus. One site would serve only the Bee Line Expressway (S.R. 528) alignment, whereas the second site could serve either the Bee Line Expressway (S.R. 528) or the Central Florida Greeneway (S.R. 417) alignment. Figure 2-9 shows the locations of the O&M Facilities as proposed by the FHSRA.

The O&M facility would allow the following main functions:

- Rolling stock maintenance
- Workshops and storage for fixed (infrastructure) assets
- Accommodation of maintenance staff
- Track access to the alignment for maintenance personnel

The rolling stock maintenance would employ a technology-specific vehicle maintenance shop that would incorporate facilities including:

- Train washing
- Multiple service and inspections tracks
- Dedicated preventative maintenance track
- Dedicated heavy maintenance track
- Dedicated axle storage track
- Dedicated wheel truing track
- Drop table
- Electrical and mechanical
- Supervisors and support offices

Major specialist equipment required to maintain the rolling stock would include:

- Wheel diagnostic machine
- Train washer
- Fueling system
- Wheel truing machine
- Drop table
- Gantry crane
- Fuel storage
- Sand and delivery system

- Sewage treatment
- Bridge/monorail cranes

An external, expandable, vehicle storage area would support the vehicle maintenance shop. The fixed (infrastructure) assets would have dedicated facilities, including a maintenance storage track, secure storage areas, and a specialist workshop.

Major special equipment required to maintain the fixed assets would include:

- High-rail utilities
- Track geometry vehicle
- Rail grinder
- Production tamper
- Ballast regulator

The maintenance facility would also accommodate FHSR staff in a dedicated administration building that would also contain the Operations Control Center.

Gas Turbine Train

The gas turbine train proposal utilizes the proposed site directly south from Orlando International Airport (Site 3 on Figure 2-9). The gas turbine train proposal identifies an alternative site for the facility that would serve only the Bee Line Expressway (S.R. 528) alternative (Site 2 on Figure 2-9). This site is located east of the site identified by the FHSRA. The gas turbine train proposal also identifies that a larger area is required for the O&M facility including additional ROW for track spurs at the approaches to the O&M facility. An additional 5 ac. are identified in the gas turbine train proposal. The O&M facility layouts for the proposed gas turbine train sites are shown in Appendix A-4, Figures 2-42 through 2-45.

Electric Train

The electric train proposal states that the sites as identified by the FHSRA, location and size, are adequate for their technology requirements (Sites 1 and 3 on Figure 2-9). A single plan for both proposed sites of the electric train O&M facility is shown in Appendix A-4, Figures 2-46 and 2-47.

2.5 STATIONS

The development of the potential station locations for the FHSR was based on identifying locations that minimized environmental impacts and that could be accessed from the mainline tracks with reasonable alignment geometry and cost. The following sections identify the process and factors that led to the proposed station locations, and the selection of the two remaining viable station proposals.

2.5.1 Preliminary Station Locations

The FHSRA identified potential station sites for each of the proposed station locations: Tampa, Lakeland, Disney area, OCCC, and Orlando International Airport. The sites were identified in discussions with local governmental agencies to ensure conformity with local plans, future growth plans, and intermodal connectivity. The following text discusses station(s) by location, proposed sites, and any evaluation or coordination with local governments identifying analytical reasons for eliminating or retaining a proposed station site. Station sites eliminated were either infeasible or failed to meet the purpose and need of FHSR. A site map of the viable station locations is presented in Figure 2-10.

Tampa

In coordination with local officials and agencies, FHSRA identified two sites for a station in the downtown area of Tampa and these are presented in Figure 2-2.

- Site A is located between Tampa Street and Marion Street, I-275, and Fortune Street. This is the proposed area for the Tampa Intermodal Site that would provide connections to an extension of the existing Ybor City Trolley, future light rail, bus, and a pedestrian corridor connected to the CBD via Franklin Street.
- Site B would be located in or adjacent to Union Station on Nick Nuccio Parkway and Nebraska Avenue. Union Station is an historic site and currently serves as the Amtrak passenger terminal for Tampa.

Coordination with the local governmental agencies identified Site A as the preferred location due to the long range capabilities of this site to accommodate intermodal connections, and current plans for redevelopment in this area.

The FHSRA eliminated Site B from further consideration due to the historic site designation and the modifications that would be required to accommodate high speed rail. Insufficient developable land for a new high speed rail station adjacent to Union Station was another factor. Within the immediate limits of Union Station are the existing Lee Roy Selmon Crosstown Expressway with future improvements, the beginning of Nick Nuccio Parkway (entranceway into Ybor City), and the Central Park Village, a low-income housing complex owned by the Tampa Housing Authority.

Lakeland

In coordination with the City of Lakeland, City of Plant City, and Polk County, eight potential stations were identified for the proposed Lakeland station and are presented in Figure 2-5. The following discussion identifies each station and the reasons for not including the site for continued evaluation, as determined at this stage of the project.

- Site A is located in the northwest quadrant of the Kathleen Road/I-4 interchange. This site is privately owned and currently undeveloped, but would require development and approval for the infrastructure required for the station. The property owner has expressed

interest in working with the FHSRA for this potential site. The City of Lakeland acknowledges the benefits of a station at the Kathleen Road interchange to establish connectivity to the local bus system and accommodate proposed growth in this area of the city.

This site has been eliminated from consideration due to the limited width of the property. The station platform would run the width of the property resulting in additional impacts to surrounding properties. This proposed site is located near a ridgeline that would require long lengths of additional structure and very high embankment to maintain acceptable vertical alignment approaches into and out of the station to the west. The CSX rail line borders the western edge of this property and would also influence the vertical alignment.

- Site B is located in the northeast quadrant of the Kathleen Road/I-4 interchange. This site is privately owned with development occurring in the vicinity. Infrastructure is in place that could be utilized by a potential station at this site. The existing ground is higher than the interstate; therefore, the elevated tracks over I-4 would rise to meet the existing ground. The horizontal alignment of I-4 from the eastern approaches provide for the track alignment to leave the median and minimize ROW impacts to properties along the northern interstate ROW. The City of Lakeland acknowledges the benefits of a station at the Kathleen Road interchange to establish connectivity to the local bus system and accommodate proposed growth in this area of the city. This site was retained for further evaluation in the Final EIS.

- Site C is in the southwest quadrant of the Kathleen Road/I-4 interchange on the abandoned site of the Owens/Illinois facility. This site presents some alignment challenges, both vertically and horizontally, for access to the site to and from the I-4 corridor. The City of Lakeland acknowledges the benefits of a station at the Kathleen Road interchange to establish connectivity to the local bus system and accommodate proposed growth in this area of the city.

  This site was eliminated from further consideration due to the topographic features at the area. The station site is at the lower elevations of a ridge that would require long lengths of additional structure and very high embankment for the tracks to merge into and diverge out of the median of I-4 to access the station. In order to maintain acceptable vertical alignment approaches into and out of the station, it would require that the station platforms be elevated at significant height from the existing ground.

- Site D is located at the S.R. 33/Socrum Road and I-4 interchange. The site surrounds an abandoned rest area adjacent to I-4 and is in an area of heavy congestion. The inability to access the station from the existing transportation network is a primary concern identified by the City of Lakeland and Polk County.

This site has been eliminated from further consideration based on the coordination with local governmental, which revealed concerns about the additional congestion in this area of Lakeland and the future planning by these agencies for a station on the west side of Lakeland.

- Site E is located in the northwest quadrant of the Polk Parkway (west access)/ I-4 interchange. This site was identified through coordination with the City of Plant City and supported by the ridership study. The proposed station could be located in the median with crossover access to and from the station site north of the interstate. Access would be provided from Clark Road and infrastructure improvements would be required. The site was retained for further evaluation in the Final EIS.

- Site F is located in the southwest quadrant of the S.R. 33/I-4 interchange, approximately 4 mi. east of the Socrum Road interchange. This site is undeveloped and would require the extension of all infrastructure services from the City.

  This site has been eliminated from further consideration based on concerns of the City of Lakeland that the site was not compatible with future land use plans.

- Site G is located in the southeast quadrant of the Kathleen Road/I-4 interchange in the Lakeland Interstate Business Park. Basic infrastructure for the station exists at this proposed site.

  This site has been eliminated from further consideration based on the horizontal approaches into and out of the I-4 median. A series of horizontal curves directly east of the proposed site would require an additional bridge structure to access the station site and minimize ROW impacts and relocations to commercial properties along the southern ROW line of the interstate. The topography, with I-4 being at a higher elevation than the proposed site, would require the station platform to be located approximately 30 ft. over the existing ground.

- Site H is located at the downtown Lakeland Amtrak station. Expansion of the existing station is limited with impacts to the existing CSX rail line and to Lake Mirror. The Lake Mirror Promenade is listed in the National Register of Historic Places (NRHP).

  This site has been eliminated from further consideration since the alignment segment that would serve this location (Alignment a in Corridor D) was eliminated from further consideration during the corridor screening evaluation of the project, as identified in Section 2.3.1.

Disney Area

In coordination with Walt Disney World, three potential station sites were identified on Disney property with a fourth site identified in the I-4 median that could potentially provide a station on

non-Disney property. These sites are presented in Figure 2-6. The following discussion identifies the proposed station sites.

- Site A is located west of I-4 and north of U.S. 192. Disney's World of Sports is located west of this proposed site and the station's roadway access ties into the existing roadway system.

- Site B is located west of I-4 between U.S. 192 and the Osceola Parkway. Infrastructure does not exist at this proposed site.

- Site C is located west of I-4 and south of Osceola Parkway. Infrastructure does not exist at this proposed site.

- Site D is located in the median of I-4 between U.S. 192 and the Osceola Parkway. The platforms would be located in the median with station facilities located to the east or west of I-4.

Due to the close proximity of these four sites to each other, Sites A and C have been eliminated from further consideration. Elimination is based on the close proximity of the station sites to major crossroads, U.S. 192, and Osceola Parkway. Close coordination has been maintained with Walt Disney Company; and if the proposed station site is on Disney property, it would be located to minimize impacts to future Disney plans and maximize the benefits to FHSR. Sites B and D are contained within the same boundary limits and are combined as Site B/D for further analysis.

Orange County Multi-modal Center

The Orange County Multi-modal Center site is located in the northeast quadrant of the International Drive/ Bee Line Expressway (S.R. 528) interchange. Orange County has acquired land and is planning a transportation hub serving the OCCC and the International Drive Activity Center. The station site is presented in Figure 2-6.

Several FHSR alignments serving this site were examined during the preliminary screening of alternatives. The station and alignment would be located along the north side of the Bee Line Expressway (S.R. 528) ROW with station platforms located within the ROW of the interchange area. The platform and station facilities would be connected to the parkway and the proposed multi-modal center by a pedestrian bridge.

Orlando International Airport

The station at Orlando International Airport would be located on the eastern side of the future south terminal expansion. The Greater Orlando Aviation Authority (GOAA) Airport Master Plan identifies the western site of the south terminal to be constructed first. The FHSR station, if constructed, would be located in an area of future terminal expansion. The design of this station would be closely coordinated with GOAA. The site is presented in Figure 2-6.

In order for the station to be connected to the main GOAA terminal facilities, the airport internal transportation system would need to be extended to the FHSR system and other infrastructure improvements consistent with GOAA's plan would have to be accelerated. The implementation and funding of airport infrastructure would also need to be closely coordinated with GOAA.

2.5.2 Viable Station Locations

The preliminary station location evaluations identified for continued evaluation are shown in Figure 2-10.

From the preliminary information gathered, the FHSRA developed a draft program identifying minimum station requirements as follows:

- Bus and drop-off facilities 95,000 square ft. (SF)
- Pedestrian Plaza 5,000 SF
- Station Concourse and Waiting 27,500 SF
- Ticketing 1,800 SF
- Public Restrooms 2,000 SF
- Vending/concessions 8,000 SF
- Equipment/Mechanical Space 1,000 SF
- Platforms (2 per station) 800 linear ft. (LF) each
- Vertical Circulation 5,000 SF
- Parking 500 Spaces

The ancillary uses and additional issues associated with the Disney area and Orlando International Airport stations have been identified through continued coordination with the respective parties. The following discussion identifies the additional points of coordination for these two proposed stations.

Disney Area Station

In coordination with the Walt Disney Company, one potential site (Site B/D) was identified for further evaluation on Disney property west of I-4 between the U.S. 192 and Osceola Parkway interchanges. To access Site B, the FHSR alignment would leave the I-4 median west of the U.S. 192 interchange and east of the Osceola Parkway interchange. Site D is proposed with a station platform located in the median and the station facility located west of I-4. The Walt Disney Company has indicated support of a FHSR station with ancillary uses within the station limited to:

- Food and non-alcoholic beverage machines
- ATM machine(s)
- Public telephones
- Internet or rail informational kiosks
- Public restroom facilities
- Ticketing facilities

Orlando International Airport Station

The operator of FHSR would manage and operate waiting and ticketing areas associated with the station. Other ancillary uses, such as concessions and food services, would be operated by GOAA or vendors selected by GOAA.

2.5.3 Design/Build Station Locations

The stations included in the gas turbine train and electric train proposals are identified in Appendix A-4.

The stations identified by the gas turbine train and electric train proposals that would be analyzed through the environmental analysis process and documentation are as follows:

Tampa Station:	Site A
Lakeland Station:	Site E (Site B is also evaluated in the EIS, as requested by the City of Lakeland)
Disney Area Station:	Site B/D
Orange County Multi-Modal Center	
Orlando International Airport	

The City of Lakeland requested direct coordination with the proposers to pursue additional dialogue on the proposed Lakeland station. Site B is preferred by the City of Lakeland and the environmental assessments at this site would be included in the environmental documentation.

2.6 PREFERRED ALTERNATIVE

The Project Development & Environment (PD&E) Study investigated four alternative alignments that were analyzed on the potential impacts of two separate technologies. This resulted in a total of eight alternative alignments with Alternatives 1 through 4 analyzed based on the gas turbine technology and Alternatives 5 through 8 analyzed based on the electrified technology. The eight alternative alignments were evaluated based on the technological differences, engineering and environmental impacts, costs, and other factors impacting the selection of the alignment. Development of alignments provided an analysis of socio-economic, natural, and physical environmental impacts within the proposed corridors. The impacts of the design/build alternatives and the No-Build Alternative are identified in Section 4 of this document.

The Draft EIS was issued August 21, 2003 and three Public Hearings were held in early October 2003 at locations along the FHSR corridor. The PD&E study, the Draft EIS and comments on the Draft EIS were given consideration by the FHSRA prior to the October 27, 2003 FHSRA Board meeting where a recommendation of the Preferred Alternative was initially identified with two MOAs as caveats. At the November 10, 2004 FHSRA Board meeting, the FHSRA revised

their initial recommendation of the Preferred Alternative because the two MOAs had not been executed.

Identification of the Preferred Alternative

The FHSRA considered the two separate areas, Tampa and Orlando, in the decision process to identify a Preferred Alternative. All alternative alignments are on I-4 through Polk and Osceola counties. Two separate alignments were considered in Tampa (Hillsborough County), the CSX and I-4 alignments; and in Orlando (Orange County), Florida Turnpike's BeeLine Expressway (S.R. 528) and the Central Florida Greeneway (S.R. 417).

On October 27, 2003, the FHSRA unanimously passed a motion identifying the I-4 alignment in Hillsborough County as the preferred alignment. The FHSRA also initially identified the Central Florida Greeneway (S.R. 417) alignment as the preferred alignment in Orange County subject to the execution of two MOAs. The two MOAs required the following:

- An acceptable agreement between the FHSRA and Walt Disney Company related to donation of ROW and commitments to support ridership for the project
- An acceptable agreement between the FHSRA and the OOCEA related to use of the Central Florida Greeneway (S.R. 417) ROW.

The FHSRA ranked the Fluor Bombardier Team (gas turbine technology) as the preferred proposer. The initial Preferred Alterative was Alternative 2, which is the combination of the I-4 alignment in Hillsborough County and the Central Florida Greeneway (S.R. 417) alignment in Orange County utilizing the gas turbine technology. On November 10, 2004, the FHSRA revised the recommendation of the Preferred Alternative because the two MOAs described previously, had not been executed. With this action, the FHSRA recommended Alternative 1 (gas turbine technology) as the Preferred Alternative, which is the combination of the I-4 alignment in Hillsborough County and the Bee Line Expressway (S.R. 528) alignment in Orange County.

Description of Preferred Alternative

The Preferred Alternative, Alternative 1, begins at the Downtown Tampa Station located between Tampa Street and Marion Street, I-275, and Fortune Street. The FHSR alignment follows I-275 along the south and east ROW of this transportation corridor. The alignment is in the southeast quadrant of the I-275/I-4 interchange with the rail alignment crossing into the I-4 median in the area of 15th Street. The majority of the FHSR alignment between the Tampa station and the crossing into the I-4 median is within the Ultimate ROW identified in the Tampa Interstate Study (TIS) for future interstate improvements, however, some additional ROW will be required.

The alignment continues east within the I-4 median through Hillsborough and Polk Counties. The preferred station, as identified by the first preferred proposer, serving the Polk County/City of Lakeland area is located in the northwest quadrant of the Polk Parkway/I-4 interchange. The station is proposed with a median platform with a pedestrian bridge crossing to the main station

on the north side of I-4. The City of Lakeland requested continued consideration of a station option at the Kathleen Road site located in the northeast quadrant of that interchange with I-4. The city is continuing discussions with the preferred proposer for consideration of this site. The I-4 median is not wide enough to provide a median platform at this site; therefore, the mainline tracks of the FHSR would leave the median of I-4 west of the CSX crossing of I-4 and reenter the median east of the U.S. 98 interchange at I-4. The alignment will remain within the I-4 ROW. The environmental impacts associated with this option are included in the impact analysis.

Entering Osceola County, the alignment remains within the I-4 median. The proposed Disney Station is located north of U.S. 192. The station platform is located in the median and station facility is located west of I-4 between U.S. 192 and the Osceola Parkway.

The alignment continues in the I-4 median until the I-4/Bee Line Expressway (S.R. 528) interchange, where it leaves the I-4 median and runs along the north side of the Bee Line Expressway (S.R. 528) within the existing ROW.

The Orange County Multi-modal Center site is located in the northeast quadrant of the International Drive/ Bee Line Expressway (S.R. 528) interchange. The station and alignment would be located along the north side of the Bee Line Expressway (S.R. 528) ROW with station platforms located within the ROW of the interchange area.

The alignment continues on the north side of Bee Line Expressway (S.R. 528) until east of the Bee Line Expressway (S.R. 528)/John Young Parkway interchange, where it leaves the Bee Line Expressway (S.R. 528) and runs on new alignment east to Taft-Vineland Road. The alignment continues along Taft-Vineland Road and enters the City of Orlando property near Tradeport Drive. It then follows the Orlando Utilities Commission rail line as a new alignment traversing from south to north through the limits of Orlando International Airport, east of the proposed South Terminal.

The rail alignment into the property of Orlando International Airport has been coordinated to be within the rail corridor traversing through the limits of the airport, as identified in the Orlando International Airport Master Plan. The FHSR O&M facility is located on the southern portion of the Orlando International Airport property east of the South Access Road. The limits of the O&M facility have been located to avoid any impacts the conservation area located south of the airport.

The Preferred Alternative with the location of the proposed stations and the O&M Facility is shown in Figure 2-11. The conceptual engineering plans, including the horizontal and vertical alignments, of the Preferred Alternative are attached as Appendix C.

Preferred Alternative Analysis

The FHSRA identified further options for inclusion with the Preferred Alternative at the December 17, 2003, board meeting. The options to the Preferred Alternative as identified by the preferred proposer include the following:

- Double track configuration for the entire alignment.
- Provision for future electrification.

The proposed alignments have been analyzed through all phases of the FHSR study as a double track configuration; therefore, no changes to the analysis are required. Providing for future electrification, the preferred proposer in coordination with the FHSRA, has identified features that result in no additional environmental consequences than the impacts documented in the Environmental Consequences of the Preferred Alternative. The features for future electrification include construction of the base foundations for future installation of catenary poles and incorporation of conduit for future electrification within the identified ROW of the Preferred Alternative.

2.7 ENVIRONMENTALLY PREFERRED ALTERNATIVE

The Environmentally preferred alternative is the No Build Alternative, which although failing to meet the project purpose and need, would result in less direct and indirect impact to the environment.

2.8 REFERENCES

1. Florida Transit Corridor Study; Alan Vorhees and Associates; March 1976.

2. Florida Future Advanced Transportation Report; Florida High Speed Rail Committee; April 1984.

3. High Speed/Intercity Rail Passenger System Planning Assessment of Routes and Alignments (and Appendices); Wilbur Smith Associates; 1993.

4. Florida High Speed and Intercity Rail Market and Ridership Study (and Technical Appendices); KPMG Peat Marwick: July 1993.

5. High Speed Rail Transportation Study – Tampa Bay to Orlando Corridor; ICF Kaiser Engineers; September 1993.

6. Florida Intercity Rail Passenger Service, Options for the 21st Century, A Component of the Florida Transportation Plan; January 1995.

7. Florida Overland eXpress Study; Florida Overland eXpress; 1999.

8. Coast to Coast Rail Feasibility Study / Cross-State Rail Feasibility Study; STV Incorporated; June 2001.

9. 2002 Report to the Legislature; Florida High Speed Rail Authority; Tallahassee, Florida; January 2002.

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Florida High Speed Rail Screening Report; Parsons Transportation, PBS&J; Tampa, Florida; October 2002.

11. Structures Design Guidelines; Florida Department of Transportation; Tallahassee, Florida; 2001.

12. Load Resistance Factor Design Bridge Design Specifications; American Association of State Highway Transportation Officials; Washington, D.C.

13. Manual for Railway Engineering; American Railway Engineering and Maintenance of Way Association; Landover, Maryland; 2002.