3.0 ALTERNATIVES

The Cincinnati Streetcar project would involve the construction and operation of a modern streetcar system and a maintenance and storage facility. This section describes the alternatives under consideration and explains how the two Build Alternatives are the result of coordination and integration of various transportation projects and studies over a span of 12 years. This section also conceptually describes the trackway, stations, vehicles, traction power substations, and maintenance and storage facility.

The two Build Alternatives have been developed to a level of detail to enable a reasonable comparison of each alternative. For comparative purposes, a No Build Alternative is also evaluated. Based on the analysis presented in this Environmental Assessment, Build Alternative 1 is the recommended preferred alternative.

3.1 No Build Alternative

The No Build Alternative is retained as a baseline for evaluation of the Build Alternatives. It includes existing and programmed improvements in the Ohio Kentucky Indiana Regional Council of Governments (OKI), Fiscal Year 2008-2011 Transportation Improvement Plan (TIP) for transit and roadways in the Cincinnati Streetcar project study area, specifically Freedom Way and additional roads, sidewalks, signals and lighting within The Banks street grid project.

3.2 Build Alternatives

3.2.1 Alternatives from Previous Studies

Many transit alternatives have been considered for the study area, as part of regional studies and central core-focused studies dating back to 1998 (Appendix A). In addition to highway improvements, improved bus service, light rail transit, and a circulator for the central area of Cincinnati have been studied and proposed. Several of the transportation infrastructure projects over the past 12 years made recommendations for a light rail and/or streetcar system to be utilized in the City of Cincinnati's core area.

The Cincinnati Streetcar would implement the locally preferred alternative that emerged from previous alternative studies that analyzed various options for the Downtown, Over-the-Rhine (OTR), and Uptown area. These studies are further listed and described in Section 2.4 and Appendix A.

Fixed guideway rail transit was the locally preferred option in the I-71 corridor major investment studies (MIS), as documented in the *I-71 Corridor Transportation Study Final Report* (August 1998). The I-71 corridor included the connection between Downtown, OTR and Uptown. Several modes, including Bus Rapid Transit (BRT) and High Occupancy Vehicle (HOV) lanes, were fully evaluated. The light rail-type mode was selected over the other options due to its superior performance in several evaluation categories, including:

- Maximum coverage of major employers within ¼-mile of stations.
- Change in corridor vehicle miles of travel and regional vehicle miles of travel vs. No Build during the peak period.

- Change in corridor hours of delay and corridor freeway hours of delay vs. No Build during the peak period.
- Estimated earnings and employment in the corridor.
- Air pollution cost savings for volatile organic compounds (VOC), carbon monoxide (CO) and nitrogen oxides (NO_x) and savings in auto, parking and public services costs.

Streetcar was the locally preferred alternative selected after an extensive evaluation process as documented in the *Central Area Loop Study Final Report* (December 2001). The streetcar was rated superior to other technologies, including bus-based systems, in terms of average weekday local and visitor trips, technical life expectancy and utilization of existing infrastructure.

The MetroMoves Plan (2002) featured a regional rail plan that incorporated the locally preferred alternatives that emerged from a series of corridor-based major investment studies conducted by OKI and incorporated into OKI's regional long range plan. The plan identified multiple modes of transportation including expanded bus service, light rail, streetcars, and commuter rail.

The MetroMoves process, which followed the completion of the I-71 and Central Area Loop studies, engaged in a value engineering process that focused on the alignment between the downtown and uptown areas of Cincinnati. As a result, the costly and environmentally challenging Mount Auburn tunnel was eliminated from the I-71 corridor plan. It was replaced with a more direct light rail alignment, using abandoned rail rights-of-way alongside I-71, and incorporation and extension of the streetcar alignment from the Central Area Loop Study from OTR to Uptown. The streetcar connection, which later led to the City of Cincinnati's in-depth Feasibility Study, was selected over other modes because:

- It employed an existing locally preferred alternative already adopted into the regional long range plan;
- Provided a superior replacement connection between downtown, OTR and Uptown, including the medical centers and University of Cincinnati; and
- Exhibited superior economic development potential based on the experience of other cities.

The feasibility of specific alignments for a modern streetcar throughout Downtown Cincinnati was also studied. A streetcar through Downtown Cincinnati and adjoining neighborhoods was a common element in many of the previous transportation studies. Potential alignments were developed to connect other modes of existing and planned transit for the region. A streetcar would connect with Metro and TANK bus service (CTC has been operating in downtown Cincinnati only since 2008), connect with the Riverfront and Government Square transit centers, and connect to proposed light rail and commuter rail stations. To date, light rail and commuter rail lines have not been funded or developed. They remain in the 2030 Regional Transportation Plan but as unfunded projects; the streetcar between Downtown and Uptown is also in the long range plan as a viable project within fiscal constraints.

Subsequent city and regional economic development initiatives such as Go Cincinnati and Agenda 360 were not conducted to develop and analyze alternative strategies but have endorsed the implementation of the streetcar within its context as a locally preferred strategy in the region's long range transportation plan.

BRT, commuter rail, and light rail primarily serve longer haul trips and commuter trips from outlying areas. The streetcar's primary function is as an urban circulator and pedestrian

circulator and complements other modes of transit. As a preferred alternative, the streetcar better meets the goals for improving circulation and supporting economic development in Cincinnati.

3.2.2 CBD-OTR Build Alternatives

Three Build Alternatives were developed in the *Cincinnati Streetcar Feasibility Study* (July 2007) (Feasibility Study). It was conducted to determine if streetcar transit would be a viable and practical urban circulator in Downtown Cincinnati and OTR. The study identified and evaluated potential streetcar corridors:

- Alternative A – on Main/Walnut streets in the Central Business District (CBD) and Elm/Race streets in OTR
- Alternative B – on Main/Sycamore streets in the CBD and Elm/Race streets in OTR
- Alternative C – on Elm/Race streets in the CBD and OTR

Each of the alternatives connected The Banks area, south of Second Street, with the Findlay Market/Brewery District in the northwest quadrant of OTR.

The screening analysis of these alternatives was based on a quantitative and qualitative assessment of the relative advantages and disadvantages, benefits and costs, and potential impacts of the alternative alignments. Evaluation criteria included:

- Land use and development patterns
- Property characteristics within up to three blocks of proposed alignments
- Vertical clearance
- Distance of alignments
- Existing bridge design characteristics
- Number of right turns
- Ease of access to potential maintenance facility sites
- Potential connections to future lines
- Number of existing parking spaces
- Peak hour bus traffic
- Interface with the Government Square transit center
- Need for signal preemption
- Potential conflict points with pedestrians.

After the initial screening analysis, a Stakeholder Working Group for the project expressed its preference for a fourth alternative that would use Vine Street, bi-directionally, through the CBD and OTR.

However, further screening analysis concluded that use of Vine Street would prove too problematic for several reasons:

- Two-way operation on Vine Street in the CBD would be difficult to achieve due to the one-way northbound traffic pattern and the disruptions to traffic flow that the streetcar would also have on traffic on parallel streets.
- An alignment on Vine Street in OTR would aggravate an already congested traffic situation and would require a re-design of the roadway and sidewalks, replacing a completely new streetscape that was installed ten years earlier.

- Vine Street is a successful commercial street in both the CBD and OTR, with fewer redevelopment opportunities than those along the proposed alignments in Alternatives A, B, and C.

As a result, the screening process continued with the Stakeholder Working Group concluding that Alternative A, with some modifications at its northern end, is the preferred alignment for the following reasons:

- Sycamore Street (Alternative B) was considered too far east in the CBD to effectively serve downtown workers and visitors, minimizing its ridership potential.
- Alternative B does not provide a convenient interface with existing bus service.
- The southern terminus of Sycamore Street is at Third Street, with no direct connection across Ft. Washington Way (I-71) to The Banks and riverfront. A southbound alignment would require several turning movements that would disrupt through traffic on Third Street, which acts as a frontage road for traffic entering downtown from I-71 and U.S. 50.
- Elm and Race streets (Alternative C) was considered too far west in the CBD to effectively serve downtown workers and visitors, minimizing its ridership potential.
- The Elm Street and Race Street bridges across Fort Washington Way (I-71) were not designed to accommodate rail. Both bridges would require expensive and disruptive modifications. The Main Street and Walnut Street bridges were previously designed to accommodate rail with minimal modifications and disruption.
- Elm and Race streets would serve the western portions of The Banks development, which is a later phase of the project and currently not funded. It would also require a lengthy walk to riverfront attractions such as the Great American Ballpark.
- Redevelopment opportunities on the west side of the CBD are not as great as those along the east side.
- Alternative C does not provide a convenient interface with existing bus service.

3.2.3 Uptown Connector Build Alternatives

Four alternative routes for the CBD-OTR connection to Uptown were introduced in the Feasibility Study. The evaluation methodology was based on a fatal flaw analysis and the adopted goals identified in the Feasibility Study. A technical evaluation of the alternative routes is in Appendix B. The alignment options were:

- Bi-directional on McMicken Avenue and McMillan Street
- Bi-directional on West Clifton Avenue
- A one-way loop via West Clifton Avenue, McMillan Street and Vine Street
- Bi-directional on Vine Street

A screening process similar to the CBD-OTR alternatives was applied to the Uptown connector alignment.

None of the alternatives exhibited characteristics that were contrary to the goals. The McMicken Avenue/McMillan Street alternative met or exceeded all objectives, except one. The West Clifton Avenue alternative also met or exceeded all objectives, expect one. This alternative exceeded goals for more objectives than all other alternatives. The West Clifton Avenue/Vine Street Loop alternative met all but three objectives. The Vine Street alternative did not meet the most goals when compared to the other alternative routes. It also exceeded the fewest goals compared to the other alternative routes.

The West Clifton Avenue and West Clifton Avenue/Vine Street Loop alternatives were recommended with caution for further study due to their grades. The West Clifton alternative has grades of up to 8.6 percent; grades on Vine Street are up to 7.0 percent.

3.2.4 Build Alternatives Considered

Alternative A from the Feasibility Study was selected as the alignment to move forward into the current Cincinnati Streetcar project. This alignment includes modifications where the northern end was extended beyond Findlay Market to serve the "Brewery District." The Build Alternatives (1 and 2) under consideration build upon this alignment by adding an extension to the Uptown area (Figure 5 and Appendix C). The Build Alternatives were developed to provide a connection to the University of Cincinnati (UC) and the Uptown area. Each was developed to access either the west side of the university campus or the east side and eventually the Cincinnati Zoo.

Build Alternatives 1 and 2 have a common alignment through Downtown Cincinnati and OTR, between the Riverfront and Henry Street (Appendix C). The alternatives differ in their northern routes that will serve Uptown between Findlay, McMillan and Corry streets.

3.2.4.1 Build Alternative 1

Build Alternative 1 begins at Great American Ballpark at Freedom Way and Main Street; runs north on Main Street to 12th Street; runs west on 12th Street to Elm Street; continues north on Elm Street to Henry Street; east on Henry Street to Race Street; south on Race Street to Central Parkway; east on Central Parkway to Walnut Street; south on Walnut Street to Freedom Way; and east on Freedom Way to Main Street.

Build Alternative 1 would also have an Uptown connector alignment that follows Findlay Street to Vine Street and runs north along Vine Street to Corry Street and ends at Short Vine Street.

3.2.4.2 Build Alternative 2

Build Alternative 2 begins at Great American Ballpark at Freedom Way and Main Street; runs north on Main Street to 12th Street; runs west on 12th Street to Elm Street; continues north on Elm Street to Henry Street; east on Henry Street to Race Street; south on Race Street to Central Parkway; east on Central Parkway to Walnut Street; south on Walnut Street to Freedom Way; and east on Freedom Way to Main Street.

Build Alternative 2 would have a connector alignment to Uptown that follows Findlay Street to Vine Street and then follows West Clifton Avenue to Calhoun and McMillan streets.

3.2.5 Recommended Preferred Alternative

Following the environmental considerations and impacts analysis (Section 5.0) of the No Build and both Build Alternatives, Build Alternative 1 is the recommended preferred alternative for the Cincinnati Streetcar Project. Reasons for recommending this alternative as the preferred are discussed in Section 8.0.

3.3 Maintenance and Storage Facility Alternatives

A maintenance and storage facility (MSF) is where transit vehicles are stored and maintained, and from where they are dispatched and recovered for the delivery of service.

The MSF for the Cincinnati Streetcar project would be designed to store a maximum of 12 vehicles. The MSF building would be approximately 250 feet in length by approximately 50 feet in width. This will accommodate the seven vehicles required for the currently proposed system and additional vehicles should the system be expanded in the future. Two service bays, washing equipment, parts and equipment storage, employee and administrative facilities also would also be accommodated. Potential locations for the MSF are shown in Figure 6. Conceptual layout plans are shown in Appendix D. Impacts of the MSF are described by category in Section 5.0.

Example of Maintenance and Storage Facility in Portland, OR

Three potential sites have been identified for the MSF:

Location 1: South side of Henry Street (120 Henry Street)

This 36,000-square foot site is located in OTR. It is currently owned by Nineteen Ten Elm Street, LLC and consists of a 30,000-square foot industrial building with basement located on this site. The area is within an "Urban Mix" zone; the building itself is not a historic resource.

Location 2: 115 North side of Henry Street (115 West McMicken Avenue)

This 27,000-square foot site is located in OTR. It is currently owned by VOA/ORV Property Company, Inc. and consists of a 21,000-square foot industrial building without a basement. The building currently serves as a halfway house for the Volunteers of America halfway house. The area is within an "Urban Mix" zone. This zoning district allows for a balance of uses.

Location 3: Broadway between Third Street and East Pete Rose Way

This 54,000-square foot in site and is owned by the City of Cincinnati. It is currently an unpaved construction staging site situated beneath expressway ramps with no structures. The area is within a "Downtown Development" zone.

Based on a comparative analysis of the three MSF sites, Location 1 on the south side of Henry Street at 120 Henry Street is recommended as the preferred MSF site.

Example of Existing Maintenance and Storage Facility in Seattle, WA

Figure 5. Build Alternatives

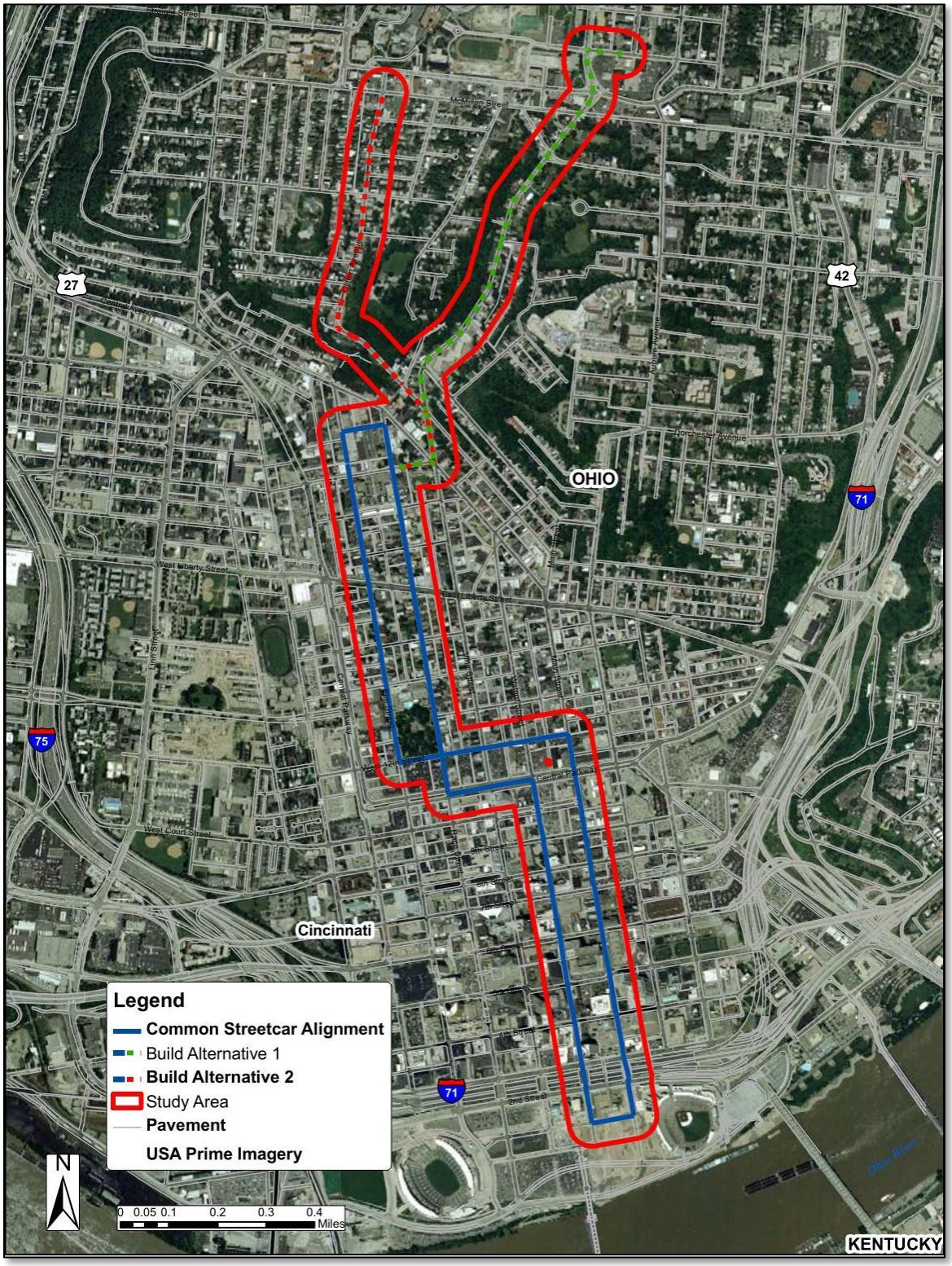

Figure 6. Stations and Maintenance Storage Facility Locations