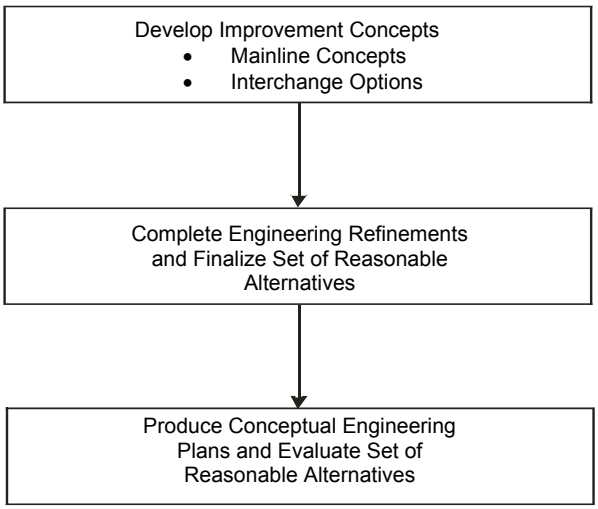
CHAPTER II
Alternatives

This chapter presents the definition of the alternatives considered for improvements on I-64 from west of Spoede Road in St. Louis County to west of Sarah Street in the city of St. Louis, and on I-170 from south of Brentwood Boulevard to Eager Road. This chapter includes: (1) a discussion of the development of the initial improvement concepts, (2) the development of a methodology to evaluate those concepts, and (3) the evaluation of the defined set of alternatives that were carried forward for more detailed evaluation as part of this environmental impact statement.

The process to develop and evaluate potential improvements that address the purpose and need for the project is described in this chapter. The process began with the development of a large number of improvement concepts. The initial improvement concepts included the consideration of all modes of transportation. It was determined that none of the travel modes individually would address all of the transportation needs within the I-64 Corridor. For that reason, both transit and highway improvements are being pursued. Transit concepts are being further developed by Bi-State Development Agency (Metro). Highway improvements and specifically improvements to I-64 are the subject of this EIS.

The highway improvement concepts include both mainline concepts and interchange options. These initial concepts were first evaluated at individual locations. In the second step of the process, those interchange and mainline concepts that addressed the project purpose and need were then combined to create corridor-wide alternatives. As engineering review and refinement was completed, a number of the concepts were refined or eliminated from further consideration. In the third analysis phase, a set of reasonable project alternatives were evaluated in greater detail. This process is illustrated in Figure II-1 below and described in detail in the following sections of this chapter.

Figure II-1
Process to Develop Alternatives



A considerable amount of public involvement was conducted during the formulation and evaluation of potential improvements. Three corridor subcommittees were formed and used to provide input into the evaluation process. A subcommittee was formed for each of the subcorridors: the Greenway, the Thruway and the Parkway. Participants in these subcommittees were representatives of individual neighborhood associations, representatives of local governments or individual citizens. In addition, region-wide public meetings were also held. The I-64 Public Hearing was held on January 29, 2003 at the St. Louis Science Center. Attendees were able to submit written comments or verbal comments to a court reporter. More details on the public involvement process and the function of the subcommittees can be found in Chapter VIII – Comments and Coordination.

A. Improvement Concepts

Conceptual design for improvement of the existing I-64 facility was completed to formulate specific mainline and interchange design options. The initial Build Concepts were developed based on general guidelines. The guidelines support the purpose and need of the project with specific attention given to improving design criteria and minimizing the need for additional right-of-way. These guidelines included:

- *Physical Constraints* – As directed by input from adjacent communities and the project subcommittees, due to the tight right-of-way constraints along I-64 and I-170, options were developed that require less area and minimize impacts to existing land uses, environmental and social concerns.
- *General Design Criteria* – Build Concepts followed the American Association of State Highway and Transportation Officials (AASHTO) design criteria. The AASHTO design criteria incorporate standards applicable to the Americans with Disabilities Act (ADA).

1. CONCEPT DEFINITION

The following types of improvements have been considered:

a. No-Build Concept

The No-Build Concept includes minor short-term activities, including pavement overlays, routine maintenance and bridge repair. Many of the bridges in the I-64 Corridor are 60 years old or more, and this concept would involve maintenance activities required to keep these bridges open for as long of a period as possible.

b. Reconstruction Concept

The existing I-64 roadway through the study corridor is generally a six-lane facility, with three lanes of travel in each direction from Spoede Road to McCausland Avenue and an eight-lane facility, with four lanes of travel in each direction, from McCausland Avenue to Sarah Street. West of Spoede Road, I-64 has recently been reconstructed to eight lanes. Due to the existing need or the need that will exist within the next 20 years to replace deteriorated pavement and bridges, the Reconstruction Concept assumes reconstruction of the pavement and replacement or rehabilitation of bridges that are structurally deficient. The Reconstruction Concept includes only minor changes or modifications to the existing configuration of the I-64 and the I-170 mainline and to the configuration of interchanges on I-64 and I-170. In addition, the Reconstruction Concept would not bring the roadway within the study corridor up to Missouri Department of Transportation (MoDOT) and Federal Highway Administration (FHWA) recommended standards and policies for reconstructed urban freeways.

c. Transportation System Management (TSM) / Travel Demand Management (TDM) Concept

Transportation System Management (TSM) improvements are low cost system enhancements that improve the transportation system efficiency. TSM includes the use of a wide range of strategies aimed at making more efficient use of existing transportation facilities. Listed below are possible TSM improvements:

- ***Minor Interchange Improvements*** include improvements to ramp merge and diverge configurations and surface street intersection improvements. Improvements at ramp terminal intersections with surface streets include constructing turn lanes, realigning intersections and adding or improving existing traffic signal systems. These improvements can be implemented within existing right-of-way.

- ***Intelligent Transportation Systems (ITS)*** implement technology-based systems to improve safety and more efficiently manage the transportation system. In the realm of roadway operations, ITS focuses on smoothing traffic flow through enhanced traveler information, minimizing the impact of incidents and regulating traffic flow. Traffic flow can be managed through ramp metering and traveler information to allow motorists to make informed travel decisions. Incident management strives to detect, respond, manage and clear incidents that impact traffic flow. Devices used in freeway management systems include traffic sensors, closed-circuit television cameras, variable message signs (message boards), highway advisory radio, ramp metering, public safety agency communication links, media communication and web pages.

- ***Travel Demand Management (TDM)*** measures are designed to reduce congestion on the existing transportation infrastructure by encouraging commuters and/or employers to:

  - Vary the time and location of trips (flexible work hours)
  - Support ride sharing and car pooling
  - Support increased transit use
  - High Occupancy Vehicle (HOV) lanes

d. Transit Concepts

Public transportation options and transit options within the I-64 corridor were evaluated as part of the Cross County MTIA Study and the Daniel Boone MTIA Study, as discussed in Chapter I. There has been past consideration of I-64 being used as a possible alignment for light rail transit either in the middle of the highway or along one side within existing right-of-way. It was decided in these studies that west of I-170 light rail transit would best be extended by utilizing existing or abandoned rail corridors located north of the I-64 study corridor that serve the same travel market as I-64.

The extension of MetroLink (light rail transit) east of I-170 is currently being designed by Bi-State Development Agency (Metro) on an alignment located north of Forest Park to the city of Clayton and then south paralleling I-170 crossing under I-64 and ending at I-44. During the MTIA studies, public involvement by others including public hearings was extensive, and a summary is available by request to EWGCC. Given a number of considerations, including ridership forecasts, the extension of rail was not further considered within or immediately adjacent to the I-64 right-of-way. This extension of MetroLink would provide mobility benefits to those living or working in the corridor, and these benefits have been considered as part of the travel forecasting and as a potential joint development opportunity as described in Chapter IV – Environmental Consequences.

The transit concepts do not fully address the purpose and need for action, as defined in Chapter I. The extension of MetroLink is being pursued as part of a separate location and design study sponsored by the Bi-State Development Agency (Metro). Thus, transit concepts were not carried forward for further analysis in this EIS.

e. Build Concepts

The Build Concepts include the reconstruction of existing I-64 from just west of Spoede Road to just west of the Sarah Street overpass and on I-170 from south of Brentwood Boulevard to Eager Road, the section of I-170 that is part of the I-170/I-64 interchange. The reconstruction includes actions to reconstruct deteriorated pavement, replace functionally or structurally obsolete bridges, and to improve roadway capacity, operations, geometrics and safety. Major improvements would be made to interchanges along I-64 and the Galleria Parkway interchange on I-170 as well as to both the I-64 mainline and a short portion I-170 mainline.

Below is a description of the major concepts considered for the I-64 and I-170 mainline concepts and for the interchange options.

Mainline Concepts

The mainline concepts were based on the need to reconstruct the existing mainline to modern standards. By updating the roadway to modern standards, safety would be substantially improved, pavement life would be restored, and traffic flow would be improved. There was also a desire to increase capacity west of I-170, so a review of the concepts for adding additional lanes was also conducted. Below are some definitions of some improvements used in the mainline concepts.

- ***Basic Through Lanes*** – Additional through lanes are considered when a Level of Service (LOS) analysis of the roadway's capacity indicates that the existing mainline capacity does not accommodate existing or projected future demand. The LOS analysis from Chapter I – Purpose and Need for Action indicates undesirable levels of service on the I-64 mainline with existing traffic. However, in dense urban areas, it is not always feasible to add additional through travel lanes.

- ***Auxiliary Lanes*** – An auxiliary lane is the portion of the roadway which adjoins the traveled way for speed change, turning, storage for turning, weaving movements related to traffic either entering or leaving the freeway, and other purposes supplementary to through-traffic movements. Auxiliary lanes are used to improve the freeway's operational efficiency where interchanges are closely spaced, the distance between the end of the taper on the entrance ramp and the beginning of the taper on the exit ramp are short, and/or where local frontage roads do not exist. Because of the close interchange spacing within the study corridor, the use of auxiliary lanes was considered between every interchange.

- ***Collector-Distributor Roads (CD Roads)*** – CD roads are lanes of traffic separated from the freeway by barriers or structures, which allow entering and existing traffic to merge and weave at lower speeds, away from the mainline traffic. After merging and weaving is complete, the lanes merge back into the faster lanes of the freeway. They allow traffic movements to occur off the mainline, minimizing the impact of traffic movements on mainline travel. However, because of their separation from the mainline, they require more right-of-way than auxiliary lanes.

At an early point in the analysis, it was recognized that if the existing roadway were reconstructed to existing standards in 2004, additional right-of-way would very likely be necessary. Even if no operational improvements or capacity improvements were made, the potential need for additional right-of-way in the area of Forest Park was of particular concern. Forest Park is located on both sides of I-64 for a portion of the project's length. Because Forest Park is a publicly owned park, a Section 4(f) evaluation was conducted.

Section 4(f) has been part of Federal law in some form since 1966. The purpose of Section 4(f) is to insure that the most feasible and prudent transportation decision is selected so as to best serve the needs of the traveling public while preserving the natural beauty of public parks, recreation lands, wildlife and waterfowl refuges, and historic sites.

Consequently, Forest Park is protected by Section 4(f), and detailed evaluations and multiple mainline concepts were considered for the project corridor to limit right-of-way impacts. These concepts were considered for the section of I-64 that begins just west of Big Bend Boulevard overpass and ends west of the Sarah Street overpass depending on the concept under consideration. The mainline Build Concepts that were considered are described below.

Build (Upgrade to Current Criteria, Add Capacity from Spoede Road to I-170) – This Build Concept is based on reconstructing the existing mainline to the desirable standards used by MoDOT and FHWA for urban freeways. These standards include twelve-foot driving lanes, twelve-foot outside shoulders, twelve-foot inside shoulders, and auxiliary lanes or CD roads as necessary to improve the freeway's operational efficiency. The Build Concept is also based on the need to add one additional through lane for each direction from Spoede Road to I-170 and to make additional operational improvements from west of Spoede Road to west of Sarah Street. Operational improvements to the mainline include such items as auxiliary lanes and CD roads as defined above. Interchange configurations would also improve the operations of the mainline. With the extremely tight interchange spacing in this corridor, mainline concepts are dependent on and must be very closely integrated with the interchange options. CD roads were considered at the following locations: between the Spoede Road and Lindbergh Boulevard interchanges, and the Brentwood Boulevard/I-170/Hanley Road interchange area.

New Alignment Concept – One Build Concept for I-64 would be to construct I-64 to the south of the existing alignment for up to one-third the length of the project corridor in order to build outside of the Forest Park boundaries. The concept reviewed assumed that I-64 would be constructed on new alignment approximately 500 to 600 feet (150 to 180 meters) south of the existing I-64 mainline. The new alignment would tie back into the existing I-64 alignment east of Bellevue Avenue and west of Sarah Street, thus avoiding taking right-of-way from Forest Park. Other similar Build Concepts could be to carry a new I-64 alignment for a longer length within the I-64 corridor.

Double-Deck Concept – This concept looked at building a "double-deck" highway for as much as two thirds of the project corridor. The "double-deck" highway would provide eight lanes of traffic (four lanes up on structure and four lanes down near existing grade) within the existing right-of-way. The lower level lanes, either eastbound or westbound I-64, would be depressed by about 30 feet (9.1 meters) lower than existing grade so that the higher lanes would be built near the elevation of the existing facility. This strategy would help minimize impacts associated with elevated roadways located adjacent to sensitive properties. However, with this concept it is extremely difficult to maintain access at existing interchanges without substantial right-of-way impacts.

Lid Concept (Cut and Cover Concept) – In this approach, I-64 and its eight lanes of traffic would be depressed, a tunnel constructed and then fill placed on top of the tunnel. If used in the Parkway Subcorridor, portions of parkland that currently exist on both sides of I-64 would be

reconnected above the interstate on the fill that acts as a cover over the interstate. Interstate 64 would be lowered up to 30 feet (9.1 meters) throughout the entire Parkway Subcorridor. At interchanges, the tunnel would end so that the ramps could come out of the tunnel to access the arterial roadways. The strategy would require tunnel easements within the existing right-of-way, but the areas above the interstate on structure would be open for public use, perhaps even as parkland.

Existing Right-of-Way Concept – A review was conducted to see if it would be possible to rebuild I-64 and stay within the existing right-of-way. This concept would not result in the desired MoDOT lane and shoulder width standards for urban freeways.

Interchange Options

A considerable amount of study was given to the analysis of interchange options within the corridor as part of the Build Concept. Initial analysis documented in Chapter I – Purpose and Need for Action had demonstrated the ineffectiveness of the existing interchange configurations to move traffic efficiently and safely. Due to tight interchange spacing, the complex travel movements, many interchanges, and the dense pattern of adjacent land uses, a number of interchange options were studied for each interchange location.

The public, through the committee structure, provided input into the development of interchange options. As with mainline concepts, there are substantial constraints to expanding right-of-way for interchange options. The potential to limit right-of-way impacts was emphasized by participating committee members, local governments and from project emails related to the I-64 project. Because of right-of-way constraints, large-scale rural or suburban type interchanges, such as a standard diamond or a cloverleaf, were excluded from the initial consideration of interchange options. The interchange types that were evaluated when considering the freeway Build Concept include the following:

- No Interchange or Interchange Removal
- Half Diamond Interchange
- Half Single Point Urban Interchange
- Compact Diamond / Tight Diamond Interchange
- Single Point Urban Interchange (SPUI)
- Folded Diamond Interchange
- Offset Diamond Interchange
- Split Diamond Interchange
- Collector-Distributor Interchange System (CD Roads)
- Outer Road Interchange System
- Three-Level Single Point Urban Interchange

A detailed definition of each interchange type is discussed in Appendix A.

2. EVALUATION METHODOLOGY AND SCREENING

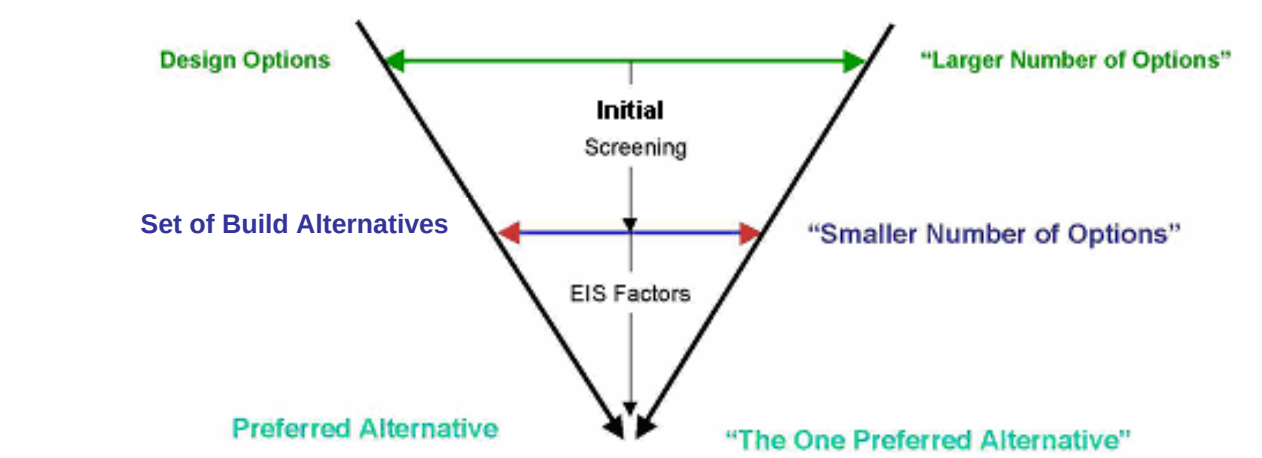
a. Overview of Screening Process

The evaluation process used in this EIS screened the improvement concepts at increasing levels of detail. This process is shown in Figure II-2 Evaluation Process.

As shown in Figure II-2, a large number of options were evaluated to see if they met the purpose and need of the project in the initial screening. The initial screening included evaluation of purpose and need criteria such as adherence to design standards, improve safety

and improve traffic operations. The initial screening also included other criteria incorporated from engineering factors and input from the I-64 project advisory committees. These other criteria include: access management, access to adjacent residences and businesses, impact to existing natural environment, impact to built environment, impact to social environment, and cost. The purpose of the initial screening was to reduce the number of Build Concepts to determine which Build Concepts were the most reasonable and feasible. After the initial screening, a set of reasonable alternatives was then evaluated further, according to EIS factors discussed in detail in Chapter IV – Environmental Consequences.

Figure II-2
Evaluation Process



b. Initial Screening Methodology

To begin the evaluation process, a set of nine factors was defined to use as criteria. The criteria directly relate to the goals stated within the purpose and need and also include categories to rate general impacts. The mainline concepts were then compared using the criteria. The same criteria were used to screen the large number of interchange options; however, more specific criteria were derived to better suit interchange issues. The mainline concepts and interchange options were compared using the following nine criteria shown in Table II-1:

Table II-1
Criteria Used in Initial Screening of Improvement Concepts

Criterion	Mainline Concept	Interchange Option
Access	This criterion measures whether the mainline concept increased or decreased the number of access points between the crossing arterial roadways and I-64. Ratings were assigned based upon comparison of access points between the concepts, with fewer access points considered desirable.	This criterion measures relative time to reach specific destinations served by an interchange, given differences in conceptual design. Two primary destinations were identified for each interchange group, one on the north side and another on the south side of I-64. Usually major commercial land uses were used as destinations. In some cases, residential or major intersections away from the interchange area were used as destinations. Travel time was estimated to each destination from each direction. Ratings were assigned based upon the comparisons of total travel times.

Criterion	Mainline Concept	Interchange Option
Access Management	The mainline concepts were not evaluated for access management, so the concepts received a neutral rating.	This criterion measured whether intersection spacing to next closest arterial intersection adjacent to the interchange met the basic MoDOT standard of 700 feet (215 meters).
Cost	Generalized cost estimates were obtained and used for comparison between mainline concepts to determine ratings.	The same methodology listed for the mainline concept applies to the interchange option.
Design Criteria	Design Criteria evaluated the degree to which the concept met design standards. The design standards used as part of this evaluation included the following: • Lane width of twelve feet (3.6 meters) • Vertical clearance a minimum of 16 feet-6 inches (5.0 meters) for bridges over I-64. Vertical clearance a minimum of 15 feet-6 inches (4.7 meters) for I-64 bridges over major cross streets. Vertical clearance a minimum of 15 feet-2 inches (4.6 meters) for I-64 bridges over minor cross streets. • Inside and outside shoulders of twelve feet (3.6 meters) • Vertical grade less than or equal to four percent Ratings were assigned by the degree to which each concept met the design criteria.	Design Criteria evaluated the degree to which the option met design standards. The design standards used as part of this evaluation are the same as the mainline concepts with additional criteria applied to the interchanges: • Lane width of twelve feet (3.6 meters) • Vertical clearance a minimum of 16 feet-6 inches (5.0 meters) • Inside and outside shoulders of twelve feet (3.6 meters) • Vertical grade less than or equal to four percent on the I-64 mainline • Vertical grade less than or equal to five percent on the exit and entrance ramps • Cross street design standards varied in accordance with the local municipality design standards For interchange options, each design standard was rated and the total score for this element is the average of the design criteria items.
Impact to Built Environment	The impact to the built environment is defined as the extent to which the mainline concept would impact existing buildings, streets, trails, railroads, parking facilities, etc. outside existing I-64 right-of-way. Ratings were assigned according to comparisons between mainline concepts.	The same methodology listed for the mainline concept applies to the interchange option.
Impact to Natural Environment	The impact to the existing vegetation, waters, wetlands and wildlife is determined by the extent to which the mainline concept would reduce the amount of natural vegetation within or outside existing I-64 right-of-way. Ratings were assigned according to comparisons between mainline concepts.	The same methodology listed for the mainline concept applies to the interchange option.
Impact to Social Environment	Impacts to existing urban neighborhoods and commercial areas were considered in terms of the degree to which the design concept enhanced or removed connectivity across I-64 with respect to adjacent neighborhoods. Ratings were assigned according to comparisons between mainline concepts.	Impacts to social environment were considered in terms of the degree to which the design option enhanced connectivity with adjacent neighborhoods.

Criterion	Mainline Concept	Interchange Option
Safety	For the evaluation, the following items were used to represent elements reflecting the safety of a given design concept: • Driver expectation – extent of non-traditional design • Lane continuity – evaluation based on comparing the number of mainline lanes versus ramp lanes at decision areas Ratings were assigned by the degree to which concept met the safety elements.	For the purposes of this evaluation, the following items were used to represent elements reflecting the safety of a given design option. • *Conflict points* – the points at which traffic streams cross through an intersection within the limits of the design option, such as where a left turn movement crosses an opposing through movement • *Variation in speed* – measured as the distance and/or complexity associated with merging into the mainline or to the intersecting arterial. It is quantified below. Merge distance meets standard 800 feet with 25 mph ramp (245 meters with 40 km/hr ramp) 400 feet with 40 mph ramp (125 meters with 65 km/hr ramp) • *Driver expectation* – measured as the extent of non-traditional design. It is quantified below. Direct ramp to arterial interchange Direct system-to-system movement Indirect ramp to arterial interchange Directness of system-to-system movements Each design standard is rated, and the total score for this element is the average of the design criteria items.
Traffic Operations	The mainline levels of service were estimated for the year 2020 traffic forecast condition. *Highway Capacity Manual (2000 edition)* was used to estimate levels of service based on density for vehicles traveling in both the a.m. and p.m. peak hours. Ratings were assigned relative to the degrees of levels of service.	The intersection levels of service was estimated for the year 2020 traffic forecast condition. Traffic simulation models were used to estimate the summation of travel times for vehicles traveling in both the a.m. and p.m. peak hours. Ratings were assigned relative to the degrees of levels of service and comparisons of travel times.

Source: HNTB Corporation, 2002.

3. INITIAL SCREENING OF IMPROVEMENT CONCEPTS

a. Mainline Concept Screening

A preliminary screening was completed by evaluating the relative effectiveness of each mainline concept according to the methodology described above. Ratings were specifically assigned based on the following definitions:

- Project benefits greatly exceed current conditions, substantially address the purpose and need, and/or are higher relative to other concepts. This rating is represented by the "●" symbol.

- Project benefits moderately exceed current condition, moderately address the purpose and need, and/or are somewhat higher relative to other concepts. This rating is represented by the "◒" symbol.
- Project benefits are equal to current conditions, neutrally address the purpose and need, and/or are mid-level in response relative to other concepts. This rating is represented by the "○" symbol.
- Project benefits are less than current conditions, negatively impact the purpose and need, and/or are lowest in response relative to other concepts. This rating is represented by the "–" symbol.
- The concept did not fulfill the goals stated in the purpose and need or produced impacts that are considered unreasonable. This rating is represented by the "**X**" symbol.

Table II-2 below is a summary of the screening performed on the mainline concepts listed in Section A. Results of the screening show that the Build Concept (Upgrade to Current Criteria, Add Capacity from Spoede Road to I-170) will be carried forward for further detailed study in this EIS. A discussion of the screening process is provided in Appendix A.

Table II-2
Initial Screening of Improvement Concepts

Concept Descriptions	Design Criteria	Safety	Traffic Operation	Access Mgmt.	Access	Impact t0 Natural Environment	Impact to Built Environment	Impact to Social Environment	Cost
No-Build	X	X	–	○	–	○	–	–	●
Reconstruction	X	○	–	○	○	○	○	○	◒
Transportation System Management	X	○	○	○	○	○	○	○	◒
Travel Demand Management	X	○	○	○	○	○	○	○	○
Build (Upgrade to Current Criteria, Add Capacity from Spoede to I-170)	●	●	◒	○	◒	–	–	◒	○
Build – (New Alignment)	●	●	◒	○	◒	–	X	X	–
Build – (Double-Deck Structure)	◒	◒	◒	○	–	–	○	–	X
Build – (Lid Concept through Parkway)	◒	◒	◒	○	–	–	–	◒	X
Build – (Existing right-of-way through Parkway)	X	○	○	○	○	○	○	○	○

● = Substantially Addresses Needs ◒ = Moderately Addresses Needs ○ = Neutral - = Negative Impact
X = Determined not to Meet Project Purpose and Need

Source: HNTB Corporation, 2002.

Concepts Determined Not to Meet Screening Criteria

There are a number of concerns related to the *"No-Build Concept"* not meeting the purpose and need for the project. Specific needs included in the purpose and need that are not addressed by the No-Build Concept include:

- The No-Build Concept does not address freeway condition/interchange design features component of the project Purpose and Need. While the No-Build Concept would require extensive maintenance to keep I-64 operable, it would only provide a short-term improvement to pavement condition, and it would not bring the freeway within the study corridor up to MoDOT standards for urban freeways.

- I-64 would remain congested as the No-Build Concept would not address providing increased capacity between I-170 and Spoede Road.

- The No-Build Concept would potentially decrease the level of safety on I-64. As the roadway would continue to deteriorate, the number and rate of vehicle accidents may increase. While extensive maintenance may be able to extend the life of the existing bridges, temporary closures could occur.

- The No-Build Concept will not improve traffic operation or reduce congestion. It would not provide for improved traffic operations at the interchange areas located in the project corridor. However, the No-Build Concept may result in less disruption during construction than would the other concepts. This short-term benefit would be offset in the long-term from the continuous maintenance and poor traffic operations as compared to the other concepts.

- There would be no positive benefits related to community redevelopment. The No-Build Concept would not enhance neighborhood connectivity or improve access which could potentially stimulate economic growth. However, the No-Build Concept would have less disruption and would result in smaller negative short-term impacts to accessibility and economic sales than would result from interchange or mainline reconstruction.

Due to these reasons, the concept does not meet the purpose and need of the project; however, it will be carried forward for further evaluation in the EIS as a baseline.

The *Reconstruction Concept* was evaluated and, similar to the No-Build Concept, it would not bring the freeway within the study corridor up to MoDOT and nationally accepted design standards for urban freeways nor would it address needed improvements in traffic level of service or traffic safety. Due to these reasons, the concept does not meet the purpose and need of the project.

Deployment of the *TSM or TDM Concept* without substantial geometric improvements would not satisfy the purpose and need for the project related to meeting the desired MoDOT design standards. The ITS deployment discussed for the TSM/TDM Alternative should be included in Build Alternative to maximize the return on investment in new roadway infrastructure. Deploying ITS would make operations of an improved facility more efficient. Other TDM measures such as carpool/vanpool and flexible work hours should also be encouraged as part of a regional travel demand management solution. HOV lanes were not carried forward as part of the TSM/TDM concept. The St. Louis region has not developed a regional HOV strategy, and a HOV facility for this section of I-64 would not by itself increase vehicle occupancy on I-64. Actions by the Bi-State Development Agency (Metro) and EWGCC indicate that the preferred transit capital investment has been concentrated in the development of the MetroLink System. To the extent practical, provisions for this concept should be considered in the concepts carried forward for more detailed consideration.

Build Concepts on new alignments were evaluated. These alternatives could involve a new alignment to the south or to the north of Forest Park. While the parkland could be avoided, the

Build-Avoidance Concept on new alignment would involve high impacts to the adjacent built environment that includes many historic neighborhoods and structures. Other impacts include urban development disruptions along approximately 2½ miles (4.0 kilometers) of the Parkway Subcorridor. Construction of an improved I-64 on a new alignment is considered unreasonable and unfeasible due to those impacts.

A *Build Double-Deck Concept* was examined using stacked elevated structures for over four miles (6.4 kilometers) between Kingshighway Boulevard and Laclede Station Road. This concept would carry four lanes of I-64 traffic on elevated structures above the remaining four lanes. The costs of such a system of bridges would be over $700 million from I-170 to Kingshighway, more than twice the cost of other Build concepts in this area, and there would also be some visual impacts and problems related to connections with cross streets. A stacked structure would require changes in grade to cross streets at interchange areas, thus resulting in impacts to properties along the intersecting arterials. Also, with the double-deck structure concept, there would be some difficulty in replacing existing overpasses, which maintain the connectivity of the adjacent communities to Forest Park. The double-deck structure is also considered to adversely impact the visual environment in the vicinity of Forest Park. For these reasons, the Double-Deck Concept was eliminated from further consideration.

A *Build Lid Concept* (cut and cover concept) was also evaluated. The Lid Concept would provide improved connectivity between the small portion of parkland located south of I-64 and the majority of parkland located north of I-64. However, this concept would still have permanent property impacts. This concept would require construction easements on land in Forest Park adjacent to I-64. It could also acquire additional right-of-way at the Kingshighway Boulevard and Hampton Avenue interchange areas. The structures and tunnel accommodations would cost approximately $200 million, nearly three times the cost of the Build Concept in this area. For these reasons, the Build Lid Concept was eliminated from further consideration.

The *Build Existing Right-of-Way Concept* would reconstruct I-64 within existing right-of-way from Kingshighway Boulevard to Hanley Road. The physical improvements that comprise the Build Concept cannot fit within existing right-of-way; meaning, it is not possible to rebuild this section of I-64 within the existing right-of-way while meeting desired MoDOT urban freeway design standards. Not meeting these desired standards would result in a conflict with the purpose and need for the project. Additionally, recurring traffic congestion and safety problems that exist today would not be addressed. For these reasons the Build Existing Right-of-Way Concept was eliminated from further consideration.

Further discussion and more details of the Section 4(f) issues involving Forest Park, other parkland and impacts to historical structures are presented in the Section 4(f) portion of this document.

b. Interchange Option Screening

A large number of interchange options were initially considered so a screening process was used to identify the most feasible set of interchange options to be carried further in the analysis.

Table II-3 identifies with a "●" a narrowed set of interchange options that were evaluated further and used as a basis of discussion publicly from late 2001 to early 2002. Details of the screening process as applied to each interchange and interchange type decisions that were made during the initial screening are discussed in Appendix A.

Table II-3
Design Options within the Build Concept after Screening

Interchange Location	Interchange Type											
	No Interchange	Half Diamond	Half Single Point	Compact Diamond	Single Point	Folded Diamond	Split Diamond	Offset Diamond	Fly-over Directional	Collector-Distributor	One-Way Outer Road	3 –Level Single Point
Spoede								●				
Lindbergh					●							●
Clayton-Warson		●										
McKnight				●								
I-170	Special Case – See Below											
Laclede Station	●											
Big Bend					●							
Bellevue	●*	●										
McCausland	Special Case – See Below											
Hampton					●							
Kingshighway					●							
Tower Grove							●					

Interchange Location	Interchange Type				
	CD Option I-170 Connects to Brentwood	CD Option I-170 Connects to Eager	CD Option I-170 Outer Roads	One-Way Outer Roads I-170 Connects to Brentwood	One-Way Outer Roads I-170 Connects to Eager
I-170		●			

Interchange Location	Interchange Type							
	Compact Diamond at McCausland, Half Diamond at Oakland	Compact Diamond at McCausland, Half Diamond at Skinker	Compact Diamond at Oakland, Half Diamond at McCausland	Compact Diamond at McCausland, Half diamond at Skinker (Indirect ramp to Oakland)	Compact Diamond at McCausland, Half Diamond at Skinker (Braided Ramp to Oakland)	Compact Diamond at McCausland, Half Single Point at Clayton	Compact Diamonds at McCausland and Clayton	Compact Diamonds at McCausland and Oakland
McCausland/ Oakland/Clayton/ Skinker		●			●			

* The no interchange option at Bellevue Avenue includes indirect access to Bellevue Avenue via a ramp to Wise Avenue at the McCausland Avenue interchange. A ramp to westbound I-64 would also be provided via Wise Avenue for Bellevue Avenue motorists.
"●" denotes the narrowed set of Build Options identified as part of the Build Concept.
Source: HNTB Corporation, 2002.

B. Engineering Refinements

In the second step of the evaluation process, those interchange and mainline concepts that addressed the project purpose and need were then combined to create corridor-wide alternatives. In some locations, several interchange and mainline options were identified that were consistent with the project purpose and need. While the options were often very similar, small variations in the type of interchange or small alignment shift had different property or traffic impacts. Additional analysis of engineering, traffic and impacts was conducted as more detailed engineering concepts and vertical profiles were prepared.

As additional analysis progressed, options were further defined based upon engineering review and input from community leaders and the subcorridor committees. A region-wide public meeting was also held to obtain comments on the set of reasonable alternatives that was the outcome of this step in the evaluation process. The following text describes the refinement process that occurred. The product of this process was a set of refined alternatives that were further analyzed as part of this EIS.

The areas in which additional engineering refinement was completed included:

- Lindbergh Boulevard interchange
- Clayton Road / Warson Road interchange
- Brentwood Boulevard / I-170 / Hanley Road / Galleria Parkway interchange
- Bellevue Avenue interchange
- Hampton Avenue interchange

1. LINDBERGH BOULEVARD INTERCHANGE

Two options were initially considered at the I-64/Lindbergh Boulevard interchange. These included two variations of a Single Point Urban Interchange (SPUI), a 3-level SPUI and a 2-level SPUI. A 3-level SPUI provides for unimpeded through movements for I-64 and for Lindbergh Boulevard. A 2-level SPUI would result in signal control for the movements on Lindbergh Boulevard. The 3-level SPUI option also included consideration of a grade separation at Clayton Road and Lindbergh Boulevard that would separate through traffic flow at that intersection. The Clayton Road/Lindbergh Boulevard intersection located south of the Lindbergh Boulevard interchange is congested during peak hour conditions. This intersection is located less than ¼ mile (400 meters) south of I-64 and was outside the Lindbergh Boulevard interchange area, but traffic simulation was performed to evaluate how congestion from this intersection could affect I-64 mainline operations. The 2-level SPUI leaves the existing at-grade intersection at Clayton Road/Lindbergh Boulevard intersection without improvements to that intersection.

Because it grade-separates Clayton Road above Lindbergh Boulevard, the 3-level option would provide improved traffic operations at that intersection and less congested access to and from I-64. However, it has higher costs and would impact more adjacent properties than the 2-level option. The 2-level option has a lower overall cost, plus traffic analysis shows that congestion at the Clayton Road/Lindbergh Boulevard intersection would not reach and/or affect I-64 mainline operations. For these reasons, the 3-level SPUI was eliminated from further consideration.

2. CLAYTON ROAD / WARSON ROAD INTERCHANGE

In discussions with the public after the initial screening, a half single point interchange option was suggested as a modification of the half diamond interchange option. Conceptual layouts of a half single point option were studied, and the conceptual design showed an increase of

impacts to the adjacent built environment near the Clayton Road/South Outer 40 intersection. The half single point option has been eliminated from further consideration due to concerns with traffic operations and driver expectancy.

3. BRENTWOOD BOULEVARD / I-170 / HANLEY ROAD / GALLERIA PARKWAY INTERCHANGE

The results of the initial screening identified the CD option where I-170 connects to Eager Road for further study. This area of the corridor includes a complex and closely spaced network of major streets. It also is the location of system-to-system interchange movements between I-64 and I-170. The area has moderate residential density. A number of established residential areas have been converted into major commercial uses including the St. Louis Galleria mall and a commercial center along Eager Road. The project alternatives have potentially large impacts to adjacent properties. As a result, options were developed and refined that would potentially reduce property impacts. The two primary CD options include:

- I-170 interchange Option 1 (or the flat option), places the CD roads located between Brentwood Boulevard and Hanley Road adjacent to the I-64 mainline lanes.
- I-170 interchange Option 2 (or the stacked option) with depressed CD roads, stacks the I-64 mainline lanes above the CD roads by using structures in an effort to conserve right-of-way.

Both I-170 Options 1 and 2 provide similar traffic access throughout the area except that I-170 Option 1 would not provide direct access from Hanley Road to Brentwood Boulevard when using the north CD road. To resolve this difference, a third option was developed by adding that additional traffic movement to I-170 Option 1 via a direct ramp on the north CD road.

As the conceptual design of the three I-170 options evolved, the relative footprints of the flat options (I-170 Option 1 and I-170 Option 3) were found to be very similar. Since I-170 Option 3 provides additional traffic movements not present in I-170 Option 1, and the footprints between Option 1 and 3 would be very similar, I-170 Option 1 essentially evolved into Option 3 and was not carried forward for further study.

Another issue that was evaluated for both the flat and stacked options is whether the I-64 mainline lanes should be shifted north or shifted south. In addition, the I-170 mainline lanes were evaluated shifting east or west.

It was found that along I-170 both the stacked and flat options had essentially the same configuration and as such, had similar impacts to the adjacent properties. However, along I-64, the geometric layouts of both the stacked and flat differed to the east of Brentwood Boulevard. By placing the CD roads beneath the mainline, the property impacts associated with the stacked option were less than with the flat option. The two I-64 alignment options west of Brentwood Boulevard had different impacts and as such both were carried forward for further study. Shifting the I-64 mainline lanes north or south in the area west of Brentwood Boulevard represented a trade-off of different land uses. Existing conditions on the north side include Black Creek, and a stormwater detention storage area for the St. Louis Galleria mall, which drains into Black Creek. The adjacent properties on the south side of I-64 include six buildings that are part of the Town and Country apartment complex. Adding to the complexity, the flyover connections between I-64 and I-170 also shift north and south when the I-64 mainline shifts, so properties along both sides of I-170 are impacted by the decision of where to place I-64. It was decided that these trade-offs west of Brentwood Boulevard would be defined and studied further as Build Alternatives.

Shifting the I-64 mainline lanes north or south in the area east of Brentwood Boulevard also represents a trade-off of different land uses. The adjacent north side properties along Everett Avenue and Hanley Downs consist of residential properties located in the city of Richmond Heights. The flyover connections between I-64 and I-170 could also impact residences along Everett Avenue, Linden Avenue and McMorrow Avenue that include properties located in Lavinia Gardens evaluated in the Section 4(f) Evaluation.

If the I-64 mainline were to shift south in the area east of Brentwood Boulevard, seven commercial parcels would be impacted. The properties most likely impacted due to a southern shift of I-64 are as follows, starting from the west moving east:

- The multi-story Magna Bank commercial building, located directly west of Brentwood Boulevard and north of Eager Road located in the city of Richmond Heights.
- The Brentwood Promenade (a big box strip mall) located in the city of Brentwood east of Brentwood Boulevard and south of Eager Road.
- The Dierbergs grocery store with mixed use commercial, retail and restaurants located in the city of Brentwood south of Eager Road.
- The Meridian development which plans to redevelop into mixed use commercial and retail land and also the future site of the MetroLink light rail transit Park-and-Ride station located in the city of Brentwood west of Hanley Road and south of Eager Road.
- Vacant parcels of land planned to redevelop as a possible aquarium museum or other commercial uses located east of Hanley Road and north of Dale Avenue residing in the city of Richmond Heights.
- The city of Richmond Height's Community Center, including a public library, gymnasium, swimming pool and meeting rooms located east of Hanley Road and south of I-64 right-of-way.

In the area east of Brentwood Boulevard, the decision was made that the I-170 Build Alternatives would shift the I-64 centerline north to minimize cost and impacts to commercial and public/semi-public land uses; however, two Build Alternatives would still require evaluation of footprints that would minimize impact to the north side parcels. The decision to go north or south west of Brentwood Boulevard, or to construct Option 2 or 3 is considered further during the evaluation of refined alternatives.

4. BIG BEND BOULEVARD / BELLEVUE AVENUE INTERCHANGE

Interchange access options for Big Bend Boulevard and Bellevue Avenue were discussed at length with numerous stakeholders. Currently, half interchanges are located at both Big Bend Boulevard and Bellevue Avenue. Big Bend Boulevard is designated as an arterial street by EWGCC and by St. Louis County, while Bellevue Avenue is labeled a collector street. The Build Alternatives would create a more standardized access by providing for a full interchange at Big Bend Boulevard rather than two half interchanges. Given Big Bend's designation as an arterial route, Big Bend Boulevard was chosen as the location for full access. This decision is also consistent with the Cross County MTIA recommendations.

Following the decision to provide full access at Big Bend Boulevard, concerns were expressed about removing the access at Bellevue Avenue. The removal of access at Bellevue Avenue was included as part of the MTIA recommendations. A major consideration for retaining access at Bellevue is to accommodate emergency travel to and from St. Mary's Hospital. Today,

motorists and emergency vehicles accessing St. Mary's Hospital from the west use ramps at Bellevue Avenue. St. Mary's Hospital's emergency entrance currently is located on Bellevue Avenue a ¼ mile (420 meters) north of I-64. Local businesses and representatives of St. Mary's Hospital stressed the importance of providing ramps at Bellevue Avenue for emergency access and minimizing economic impacts. However, comments were received from some residents located adjacent to the ramps and from the City of Richmond Heights who indicated that they would like to have the ramps closed.

St. Mary's Hospital identified a need for preserving the direct hospital access at Bellevue Avenue as well as access back to I-64 from the hospital. Additional information was obtained to determine the level of use and need for direct ramp access to and from St. Mary's Hospital. Among the institutional, commercial and residential uses along Bellevue Avenue, St. Mary's Hospital is a large employer and traffic generator in the area. As of the year 2000, St. Mary's was licensed for 602 beds, employed 1,900 people and had 1,000 physicians on staff representing many medical specialties. St. Mary's is affiliated with St. Louis University Medical School by being the home to the school's OB/GYN department. Other services include comprehensive obstetrics and cardiology services, including high-risk obstetrics, open-heart surgery, short-stay surgery units, a knee/hip center offering total joint replacements and advanced breast cancer detection service lines. The hospital also offers a large variety of other standard medical and outpatient services.

In 2000, St. Mary's admitted 16,856 patients and had 204,712 outpatient visits. In 1994, the hospital opened the emergency department and now offers 18 large patient rooms, special facilities for OB/GYN patients, a decontamination room to treat chemical exposures, an area for minor emergencies and one area specifically designed to quickly identify and treat heart problems. Regionally, the hospital often provides services covering areas west of its location because two other hospitals are located directly east of St. Mary's on I-64. Forest Park Hospital at Hampton Avenue and BJC Hospital at Kingshighway Boulevard are about 1.5 and 2.5 miles away respectively. Heading west from St. Mary's, the next hospital along I-64 is over seven miles away at I-270.

The entrance ramp on the north side of I-64 was also desired by St. Mary's Hospital to provide a consistent access location for patients and visitors returning from the hospital to I-64 and direct access to medical personnel and ambulances making trips to off-site locations. St. Joseph's, Kirkwood and St. Mary's Hospital all have related services. With related services there is often a need to be within 20 minutes of another facility for on-call services.

The highest level of emergency activity occurs at Level 1 Trauma Centers. St. Mary's is not such a center. However, access to the medical services listed above was an important consideration in developing access options at Bellevue Avenue.

The City of Richmond Heights is in opposition to the Bellevue ramps. The City has stated its opinion that the residential displacement resulting from the construction of the Bellevue Avenue ramps is not offset by benefits to the hospital. The City has stated that since St. Mary's is not a Level 1 Trauma Center, that the need for emergency access is provided at Big Bend Boulevard; that the time differential between access at Big Bend Boulevard and Bellevue Avenue is minimal; and that even if a ramp access were provided to the hospital, there is little justification for a ramp serving trips from the hospital.

If Bellevue Avenue access were maintained, a question was then raised again by the city of Richmond Heights and local property owners asking if full access at Big Bend Boulevard would still be required. New ramps at Big Bend Boulevard also result in residential displacements.

The response by MoDOT was that full access at Big Bend Boulevard would serve major travel movements to-and-from the south county area. Big Bend Boulevard, along with Hanley Road, are two arterial routes that provide this connection south of I-64, following the decision to not extend I-170 as determined in the Cross County MTIA (see Chapter I). While Big Bend Boulevard currently only accesses to and from the east on I-64, full access would provide a standard full interchange and would reduce cut-through traffic on local streets between Big Bend Boulevard and Bellevue Avenue caused by the current split interchange configuration.

a. Initial Options

For the reasons listed above, a number of access options were reconsidered at Bellevue Avenue.

From this list, the following interchange options were further refined and traffic analysis completed for consideration as part of the Build Alternatives. (The traffic analysis is summarized in Table II-4. The following text highlights the findings expressed in the table.)

1. *No Change to current layout.*

Option 1 maintains the existing traffic problems of creating closely spaced weaving ramp movements between Big Bend Boulevard and Bellevue Avenue. Using projected year 2020 traffic, these weave movements are expected to operate at failing levels of service (LOS F). The loop ramps at Big Bend Boulevard are also geometrically substandard and do not provide sufficient deceleration distance.

2. *Full interchange using SPUI at Big Bend, with no access at Bellevue.*

Option 2 provides satisfactory traffic operations at Big Bend Boulevard, and by removing access at Bellevue Avenue, there are no traffic weaving problems. This option does not provide direct freeway access at Bellevue Avenue which was extremely important with the local businesses and St. Mary's Hospital as discussed above.

3. *Full interchange at Big Bend using tight diamond, keep Bellevue ramps as currently exists.*

Full access provided by Option 3 at Big Bend Boulevard would lessen the use of the Bellevue Avenue ramps thus improving the projected weaving LOS to E in the peak direction. However, LOS E was not considered to be satisfactory for reconstruction of I-64, and short weaving distances were also a safety concern not satisfying the purpose and need of the project.

4. *Full interchange at Big Bend using SPUI, keep Bellevue ramps as currently exists.*

Option 4 was similar to Option 3 for I-64 mainline considerations such as traffic weaving and safety improvements. The SPUI also would add slightly better traffic operations at the ramp termini at Big Bend Boulevard.

5. *Tight diamond at Big Bend, with combined CD ramps to Bellevue to-and-from the west.*

Option 5 would use a tight diamond at Big Bend Boulevard and ramp connections from Bellevue Avenue would cross at-grade with Big Bend Boulevard, sharing traffic access along Big Bend Boulevard's ramps to-and-from I-64. The future traffic operation was shown to operate at LOS D or better at the shared intersections on Big Bend Boulevard. However, one movement for northbound Big Bend Boulevard was shown to operate at LOS E during the morning peak hour.

Table II-4
Big Bend Boulevard and Bellevue Avenue Traffic Analysis

Option	Year	I-64 Weaving LOS		Ramp Intersection LOS		Comment
		AM peak hour	PM peak hour	AM peak hour	PM peak hour	
1: Big Bend & Bellevue no change	2000	WB E EB F	WB E EB E	BB North C BB South A Bel North E Bel South F	BB North D BB South A Bel North B Bel South F	BB LOS approximated from delay and queues on ramps.
1: Big Bend & Bellevue no change	2020	WB F EB F	WB F EB F	BB North E BB South A Bel North E Bel South F	BB North F BB South A Bel North B Bel South F	BB LOS approximated from delay and queues on ramps.
2: Big Bend SPUI, Bellevue no access	2020	No weave with Bellevue	No weave with Bellevue	BB B Bel na	BB C Bel na	
3: Big Bend diamond, Bellevue no change*	2020	WB D EB E (L > 2500' for LOS D)***	WB E EB D (L = 1400' for LOS D)***	BB North C BB South C Bel North B Bel South C	BB North C BB South B Bel North B Bel South D	Assumed existing weave lengths of 1170' WB & 1110' EB. In AM, NB LOS D & 300' queue.
4: Big Bend SPUI, Bellevue no change*	2020	WB D EB E (L > 2500' for LOS D)***	WB E EB D (L = 1400' for LOS D)***	BB B Bel North B Bel South C	BB C Bel North B Bel South D	Assumed existing weave lengths of 1170' WB & 1110' EB.
5: Big Bend diamond, Bellevue shared ramps to Big Bend	2020	No weave with Bellevue	No weave with Bellevue	BB North C BB South D Bel North B Bel South C	BB North C BB South C Bel North B Bel South D	In AM, NB LOS E & > 300' queue, WB ramp LOS D & 300' queue. In PM, WB ramp LOS D & 300' queue.
6: Big Bend SPUI, Bellevue braided**	2020	No weave with Bellevue	No weave with Bellevue	BB B Bel North B Bel South C	BB C Bel North B Bel South D	
7: Big Bend SPUI, one Bellevue braided ramp	2020	No weave with Bellevue	No weave with Bellevue	BB B Bel North na Bel South C	BB C Bel North na Bel South D	Lack of Bellevue entrance ramp affects travel patterns on local streets
8: Big Bend SPUI, McCausland U-turn	2020	No weave with Bellevue	No weave with Bellevue	BB B Bel na	BB C Bel na	Increases traffic on Wise Avenue and affects travel patterns on local streets

BB = Big Bend Boulevard, Bel = Bellevue Avenue
* Design exceptions required due to geometric constraints.
** Preferred Build Alternative as refined in the following section.
*** Weave LOS improves compared to existing because Big Bend's full access affects travel patterns on ramps and I-64 traffic volumes.

6. *Full interchange using SPUI at Big Bend Boulevard, with access at braided half interchange ramps to Bellevue Avenue.*

Option 6 provides for the best traffic operation. A SPUI at Big Bend would operate at LOS C during peak hours. The braided ramps to-and-from Bellevue would eliminate weaving movements and provide the fastest access to the Bellevue ramp termini.

7. *Full interchange using SPUI at Big Bend, with braided interchange exit ramp to Bellevue on south side, no ramp on north side.*

Option 7 would only provide one ramp at Bellevue Avenue. The primary need of St. Mary's is to provide access to the hospital for emergency vehicles. The exit ramp will provide this access. Because trips by emergency vehicles originate from locations other than St. Mary's Hospital, not constructing the entrance ramp would not affect emergency response services. Not having a

Bellevue Avenue entrance ramp would also reduce the access from this area to I-64. Such travel would need to utilize the Big Bend Boulevard ramps diverting emergency vehicle travel patterns to local streets which was undesirable to St. Mary's Hospital and local residents.

8. *Full interchange at Big Bend Boulevard using SPUI. Access to Bellevue Avenue via a special U-Turn ramp at the McCausland Avenue interchange that would connect to Wise Avenue, which connects to Bellevue Avenue.*

Option 8 would not provide direct ramp connects to Bellevue Avenue. The U-turn ramp at McCausland to Wise Avenue would increase the traffic on a neighborhood street (Wise Avenue). There was an expressed desire by the local residents to not have emergency vehicles traveling along local streets in residential areas.

b. Refined Analysis

Of the eight options, options 2, 5, 6 and 8 provided satisfactory traffic service for mainline operation and best support the goal of improving traffic safety. Further analysis was completed to further differentiate the remaining interchange access options. All of the remaining options were considered to adequately meet project goals of improving traffic safety, vehicle capacity and roadway geometry designed to meet current design standards in 2004 with minimal exceptions. These remaining considerations included:

- Impacts to property, either requiring full acquisition or partial acquisition of individual parcels;
- Travel time differences
- Impacts to local streets

Property Impacts

The property impacts are less for the Option 2 and Option 8 that do not provide access at Bellevue Avenue. These options would require nine and eight fewer single family acquisitions, respectively. The impacts to multifamily are similar between options. Option 2, 7 and 8 are expected to not require a total acquisition of a quad-plex unit on the north side of I-64.

Travel Time Differences

Simulated traffic analysis was conducted for eastbound travel to the hospital for the options. The analysis shows that all of the build options significantly reduce delay on the mainline thereby reducing travel time to St. Mary's Hospital as compared to the No-Build Option. The direct ramps provided by Option 6 and 7 had the best travel times. These options reduced the travel times by approximately 50 seconds in the a.m. peak hour and 40 seconds in the p.m. peak hour. Option 5 had a higher travel time than the No-Build Option. Option 8 had a slightly higher travel time than did Options 6 and 7. Traffic simulations for the year 2020 were prepared for the westbound direction. The information provided indicated a travel time savings of 15 seconds in the a.m. peak and 30 seconds in the p.m. peak by providing access to I-64 from Bellevue Avenue as compared to Big Bend Boulevard.

The City of Richmond Heights provided a current (year 2003) travel time study of the need for ramps at Bellevue Avenue. The study showed the following average travel time savings per vehicle with ramps at Bellevue: eastbound a.m. peak hour – up to 18 seconds; eastbound p.m. peak hour – up to 44 seconds; westbound a.m. peak hour - up to 137 seconds; and westbound p.m. peak hour – up to 164 seconds. The two studies provide a range of potential travel time savings resulting from ramps at Bellevue. Greater travel time savings assumed in the future

year simulations are a result of improved signal operation resulting from the construction of a single point interchange at Big Bend Boulevard.

Impacts to Local Streets

All of the options except Option 6 would likely result in increased hospital related traffic on Wise Avenue. Wise Avenue is located just north of I-64 and connects Big Bend Boulevard with Bellevue Avenue. Wise Avenue has residences that front both sides. Option 2 with no access at Bellevue Avenue would likely result in hospital traffic using Wise Avenue. Option 8 would result in hospital related traffic using Wise Avenue between McCausland Avenue and Bellevue Avenue. Option 6 would impact Wise Avenue primarily on trips from the hospital to I-64.

Preferred Build Alternative

Based on the analysis of the above factors, Option 6 was identified to be part of the Build Alternatives included in the Thruway. The primary reasons were that the recommended concept could retain the existing access, the minimization of impacts to local streets and that it provided the lowest travel access time, recognizing this importance in emergency medical situations.

Table II-5
Big Bend Boulevard and Bellevue Avenue Estimated Impacts
(Impacts between Big Bend Boulevard and Bellevue Avenue)

Evaluation Factors	Units	Big Bend/Bellevue Options					
		No-Build	**Option 2** *BB SPUI, No Bel access*	**Option 5** *BB Tight Diamond, Bel CD ramps*	**Option 6** *BB SPUI, Bel braided ramps*	**Option 7** *BB SPUI, Bel braided exit ramp*	**Option 8** *BB SPUI, No Bel access, McC U-turn*
Social Considerations							
TOTAL ACQUISITIONS							
Single-Family Residential	Dwelling Units	-	9	16	18	11	10
Multi-Family Residential	Dwelling Units	-	44	48	48	44	44
Business	Establishment	-	1	1	1	1	1
Public/Semi-Public Facilities	Buildings	-	-	-	-	-	-
PARTIAL ACQUISITIONS							
Single-Family Residential	Dwelling Units	-	5	7	7	7	5
Multi-Family Residential	Dwelling Units	-	4	-	-	4	4
Business	Establishment	-	2	2	2	2	2
Public/Semi-Public Facilities	Buildings	-	1	2	1	1	1
PROJECTED TRAVEL TIME							
From Brentwood to	AM Minutes	11:10	4:41	4:52	4:03	4:03	4:30
St. Mary's Hospital	PM Minutes	5:57**	4:49	4:56	4:20	4:20	4:37
From Big Bend to	AM Minutes	5:12	3:12	3:20	2:36	2:36	3:04
St. Mary's Hospital	PM Minutes	3:54	3:21	3:26	2:53	2:53	3:10

BB = Big Bend Boulevard, Bel = Bellevue Avenue, McC = McCausland Avenue
** Assumes traffic growth on Bellevue ramps due to lack of full access at Big Bend

5. HAMPTON AVENUE INTERCHANGE

The single point option at Hampton Avenue was identified for further study based on the Initial screening, but the option could include several design variations:

- An optional roundabout located at the Washington Avenue (Hampton Avenue)/Wells Drive intersection.

- An optional direct ramp from eastbound I-64 to eastbound Oakland Avenue.
- An option to grade-separate the Hampton Avenue/Oakland Avenue intersection or reconstruct it as an at-grade intersection.

A roundabout located at the Washington Avenue (Hampton Avenue)/Wells Drive intersection is presented as an alternative to a four-way signalized intersection. In discussion with the city of St. Louis, Forest Park entities and in conjunction with their Forest Park Master Plan, they indicated that a roundabout in this location was desirable. A roundabout is shown as part of the Build Alternatives.

A direct ramp from eastbound I-64 to eastbound Oakland Avenue is presented to improve the access to the commercial and institutional land uses that exists today east of Hampton Avenue. Current travel patterns must exit at Oakland Avenue 0.8 miles (1.3 kilometers) west of Hampton Avenue and then use Oakland Avenue traveling adjacent to local neighborhoods and I-64 to access Forest Park and destinations located east of Hampton Avenue. If motorists were familiar with the local city street system, an existing alternative route would be to exit I-64 at Hampton Avenue and use several local neighborhood streets to access Oakland Avenue. From there, Oakland Avenue and the developments located east of Hampton Avenue could then be accessed. The direct ramp would resolve this access problem, plus it was found that the ramp could be provided as part of the Build Alternative without increasing right-of-way impact. Therefore, the direct ramp to eastbound Oakland Avenue is considered to be part of the Build Alternative.

The decision to grade-separate the Hampton Avenue/Oakland Avenue intersection or to reconstruct the intersection at-grade resulted in a trade-off. In discussions with the local neighborhoods and stakeholders, there was a strong desire to keep Oakland Avenue at-grade with Hampton Avenue. The option to take Oakland Avenue under Hampton Avenue improves access management, but at a higher cost while providing similar traffic operations along Hampton Avenue. Because the community preferred to keep Hampton and Oakland at-grade, and because traffic operations were acceptable with both options, the at-grade intersection option would be carried forward as part of the Build Alternative.

C. Reasonable Alternatives

This section describes the characteristics of the reasonable set of alternatives and includes the No-Build Alternative and the Build Alternatives.

1. NO-BUILD ALTERNATIVE

a. Description

Overview

The existing I-64 roadway through the study corridor is generally a six-lane facility with three lanes of travel in each direction from Spoede Road to McCausland Avenue and an eight-lane facility, with four-lanes of travel in each direction from McCausland Avenue to Sarah Street. Interstate 64 is approximately 10.9 miles (17.5 kilometers) through the study corridor and contains 17 interchanges when including the section of I-170 between I-64 and the Brentwood/ I-170 interchange.

A 0.8-mile (1.2-kilometer) long portion of I-170 is also contained within the study corridor. Interstate 170 is a three-lane facility that begins at I-64 and travels north. The existing I-170 Interchange is comprised of a complex system of access ramps to I-64 from Brentwood

Boulevard, I-170, Hanley Road, and Eager Road. The I-170 interchange is a directional interchange but without an eastbound I-64 to northbound I-170 connection.

The I-64 interchanges represent a number of design types and vary in condition, but many have extremely tight horizontal geometrics for the ramp loops, short merge areas, tight weaves, and deteriorated pavement on the ramps and deteriorated bridges. See Chapter I – Purpose and Need for Action, Section A for a more complete description of existing I-64.

The western section of the I-64 corridor was built in the early 1940s and the eastern section of I-64 was built in the early 1960s. As a consequence, the pavement structure and many of the bridges have reached, or are reaching their design life and require replacement. Table I-1 and Table I-2 in Chapter I – Purpose and Need for Action of this report provide more details about the current condition of the bridges and pavement within the study corridor.

The No-Build Alternative includes only minor short-term activities, including pavement overlays, routine maintenance and bridge repair. Many of the bridges in the I-64 Corridor are 60 years old or more, and this concept would involve maintenance activities required to keep these bridges open for as long of a period as possible. While the No-Build Alternative does not meet the purpose and need for the project because it does not meet current design standards in 2004, the No-Build Alternative serves as a baseline against which the other alternatives can be compared.

b. Transportation System Management (TSM) / Transportation Demand Management (TDM) / Safety Improvements

The TSM/TDM portion of the No-Build Alternative includes minor geometric modifications at the 17 existing interchanges, deployment of ITS technologies and implementing several trip reduction strategies for the corridor. Such strategies would include:

- ITS field devices consistent with the plan for deploying ITS under the Gateway Guide program. Such devices include: traffic sensors, closed-circuit television surveillance cameras, dynamic message signs, highway advisory radio and a communication backbone to support these devices.

- Other regional ITS tools would also assist in managing traffic in the I-64 corridor. These include the Transportation Information Center, ramp meters, motorist assist patrols, communication links with public safety agencies, the Gateway Guide Web site, and the traffic hotline and media tie-ins.

- TDM measures such as carpool/vanpool and flexible work hours would be encouraged as part of a regional travel demand management solution.

Due to existing geometric design deficiencies, deploying the ITS equipment along the corridor in the No-Build Alternative would not substantially increase the roadway capacity under normal conditions thus recurring traffic congestion would not be substantially affected. The ITS deployment would reduce the impact of non-recurring congestion by more efficiently handling incidents that temporarily reduce roadway capacity. By reducing the impact of incidents, travel time reliability would be increased providing motorists more confidence that they will experience the expected travel time for a given trip. Traditional traffic operations analysis procedures do not do a good job of quantifying these benefits.

Safety benefits as a result of enhanced incident management include a decrease in crashes caused by roadway users surprised by congestion. These secondary crashes would be

reduced because non-recurring traffic congestion would be reduced. If an incident is cleared more quickly, the congestion would dissipate sooner, eliminating the hazardous condition of bumper-to-bumper traffic on a freeway. Maximum safety benefits would be experienced in corridors that operate near capacity. During peak traffic flow periods without incidents traffic flows freely, but when an incident reduces capacity slightly a queue can occur. On corridors that experience recurring congestion on a regular basis, drivers expect backups, thus the conditions are not as hazardous.

Recurring traffic congestion resulting from traffic demand exceeding the roadway's capacity is a major problem in the No-Build Alternative. Deployment of TSM/TDM strategies without substantial geometric improvements does not address that problem, and therefore would not satisfy the purpose and need for the project. The ITS deployment discussed above should be included in the No-Build Alternative to maximize the return on investment in roadway infrastructure. Deploying ITS would make operations of a facility more efficient.

c. Pedestrian and Bicycle Design Improvements and Considerations

Pedestrian and bicycle considerations for the No-Build Alternative in the study corridor can be categorized according to three types:

- Separate pedestrian and bicycle interstate crossings that can not be accessed by vehicular traffic,
- Shared interstate crossings accommodating pedestrians, bicycles and vehicular traffic, and
- Separate corridors or paths parallel to the I-64 corridor for use only by pedestrians and bicycles.

The following text describes what is included in the No-Build Alternative with respect to pedestrian and bicycle considerations.

Pedestrian and Bicycle Interstate Crossings (Stand Alone Structures)

There are five existing pedestrian crossings within the I-64 study corridor. Four would remain open in the No-Build Alternative. Four of those five crossings would remain as is without reconstruction or improvements. The locations are as follows:

- Existing pedestrian bridge in the city of Richmond Heights, St. Louis County, located approximately 1,000 feet (305 meters) south of the Galleria Parkway interchange across I-170. The No-Build Alternative would leave this pedestrian bridge in place without design improvements.
- Existing pedestrian bridge in the city of Richmond Heights, St. Louis County, located approximately 350 feet (110 meters) west of the Big Bend Boulevard interchange. The No-Build Alternative would not improve this bridge and it would remain closed. The pedestrian and bicycle movements across I-64 would continue to share the adjacent Big Bend Boulevard bridge across I-64 with vehicular traffic. For the No-Build Alternative to reopen this crossing, it would require removal and replacement of the existing bridge structure.
- Existing pedestrian bridge at Forest Park Community College in the city of St. Louis, located approximately 2,200 feet (670 meters) east of the Hampton Avenue interchange. The No-Build Alternative would leave the bridge in place while not improving or rehabilitating the structure.

- Existing pedestrian tunnel underneath I-64 in the city of St. Louis, located approximately 1,000 feet (305 meters) west of the Science Center overpass. The No-Build Alternative would leave the existing tunnel in place and open to the public without improvement or rehabilitation.
- Existing pedestrian bridge over I-64 in the city of St. Louis, located approximately 900 feet (275 meters) east of Kingshighway Boulevard interchange. The No-Build Alternative would reconstruct this bridge in its existing location to current design and ADA standards.

Pedestrian and Bicycle Interstate Crossings (shared with vehicular crossings)

Existing bridges and underpasses across I-64 vary in respect to pedestrian and bicycle considerations. Some bridges have sidewalks for pedestrians, while others do not. The existing bridges do not have dedicated bicycle paths. Bicyclists navigate over bridges either by using existing sidewalks, where applicable, or by riding with traffic on the roadway. In general, high volumes of vehicular traffic and poorly defined bicycle routes exist at most crossings.

The No-Build Alternative would reconstruct the cross street bridges and underpasses slightly improving pedestrian and bicycle conditions according MoDOT design standards. Striping or widening the interstate crossings for bicycle routes or pedestrian sidewalks would not extend beyond state right-of-way and would taper into existing conditions. Coordination with adjacent stakeholders and municipalities would continue to occur throughout the process.

Existing Pedestrian/Bicycle Paths Along the I-64 Corridor

Existing parallel bicycle and/or pedestrian paths in the study corridor are very few in number. Currently there are no paths within the I-64 right-of-way.

d. Construction Sequencing

During the maintenance activities that constitute the No-Build Alternative, the existing I-64 facility would stay in operation. The amount of traffic on I-64 and traffic access between I-64 and the local roadway system would be impacted only during times of pavement overlay and with bridge maintenance.

e. Capital Costs

The estimated construction cost for the No-Build Alternative is approximately $54 million in current year (2002) dollars. There are no right-of-way, relocation or mitigation costs associated with the No-Build Alternative. As the work will not be initiated for a number of years in the future, the cost will be greater in the future when the construction is initiated. Table II-6 below lists the cost for the three subcorridors.

Table II-6
Estimated No-Build Alternative Construction Cost (in year 2002 dollars)

Cost Item	Greenway Subcorridor Cost	Thruway Subcorridor Cost	Parkway Subcorridor Cost	Total Cost
Right-of-Way, Relocation, Mitigation	$ 0	$ 0	$ 0	$ 0
Construction	16,170,000	19,960,000	17,870,000	54,000,000
No-Build (Total)	**$16,170,000**	**$19,960,000**	**$17,870,000**	**$54,000,000**

Source: MoDOT District 6 and HNTB Corporation, 2002.

2. BUILD ALTERNATIVE

a. Design Criteria

The Build Alternative includes the reconstruction of I-64 from west of Spoede Road to west of Sarah Street and the reconstruction of I-170 from the Brentwood Boulevard overpass south to Eager Road. Throughout the study corridor, a smoother I-64 and I-170 profile would be created by eliminating hills and curves as much as possible to improve the sight distance on the interstates. For the project, the control points for the profile would be the provision of sufficient clearance at the overpasses for vehicles on I-64. With the points set at the overpasses, the grade would then be smoothed out between the control points. Most of the needed grade changes would be made on I-64 since it would be completely reconstructed. This also minimizes grade changes on cross streets and the need to reconstruct nearby entrances located off of those cross streets. An attempt has been made to balance out the earthwork cuts and fills to the existing terrain as much as possible to minimize cost.

Entrance and exit ramps at interchanges would be lengthened to provide time to slow down on exit ramps and to speed up on entrance ramps. Twelve-foot driving lanes, twelve-foot outside shoulders, and twelve-foot inside shoulders would be provided from west of Spoede Road to west of Sarah Street and on I-170 from the Brentwood Boulevard overpass south to Eager Road.

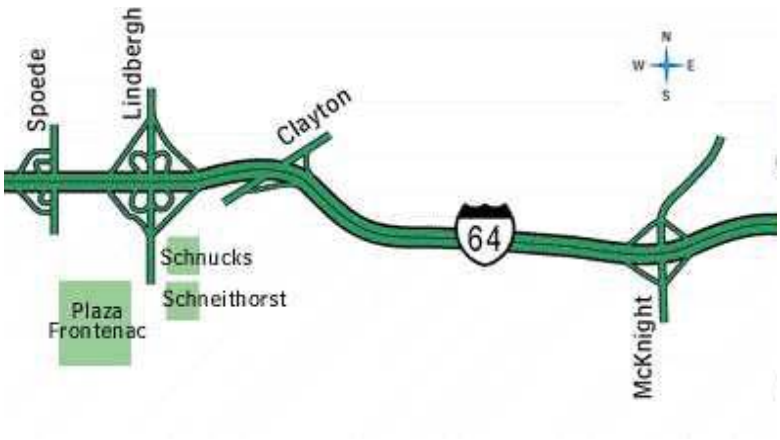
Throughout the project, bicycle and pedestrian access would be preserved and moderately enhanced by providing wider sidewalks and shoulders on structures crossing I-64. Where there are other, specific improvements for bike and pedestrian users, they are described in the subcorridor and interchange descriptions.

The anticipated right-of-way and construction easements that would be necessary as part of the Build Alternatives are shown on the project plates. It is an aim of the design to minimize the amount of right-of-way/construction easements necessary. At this level of design, property which may potentially be acquired or partially acquired is identified as an area of additional right-of-way or as a construction easement. During final design, a more precise determination of property acquisition will be made; and at that time, it will be determined if the property currently identified as impacted would be acquired.

b. Description

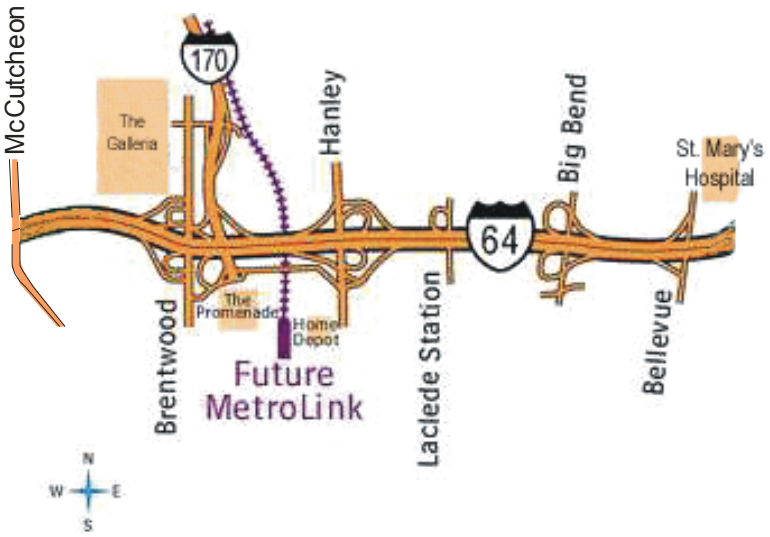
The Build Alternatives are comprised of alternatives within each subcorridor. The Build Alternatives for the entire corridor will include combinations of the alternatives for the subcorridors. The following is a description of the Build Alternatives for each of the three subcorridors. The Build Alternatives within each subcorridor are summarized below:

Greenway Subcorridor (Spoede Road to McCutcheon Road)



- ***Build Alternative*** – The one Build Alternative in this subcorridor includes reconstructing the existing I-64, with a widening from six to eight through lanes between Spoede Road and McCutcheon Road.

Thruway Subcorridor (McCutcheon Road to Bellevue Avenue)



- ***Build Alternative*** – Within this subcorridor, the Build Alternatives include reconstructing the existing roadway system with the widening of the I-64 mainline between McCutcheon Road and I-170. There are four Build Alternatives for this subcorridor. These include:

  - ***Thruway Alternative 2*** – A depressed CD system between west of Brentwood Boulevard and Hanley Road, with I-64 mainline lanes elevated and the alignment west of I-170 partially located to the south of existing right-of-way. Eight mainline lanes are provided west of I-170.

  - ***Thruway Alternative 2a*** – A depressed CD system between west of Brentwood Boulevard and Hanley Road, with I-64 mainline lanes elevated, and the alignment west of I-170 partially located to the north of existing right-of-way. Eight mainline lanes are provided west of I-170.

  - ***Thruway Alternative 3*** – A CD system between west of Brentwood Boulevard and Hanley Road, located adjacent to the freeway mainlines, and the alignment west of I-170 partially located to the south of existing right-of-way. Eight mainline lanes are provided west of I-170.

  - ***Thruway Alternative 3a*** – A CD system between Hanley Road and west of Brentwood Boulevard located adjacent to the freeway mainlines, and the alignment west of I-170 partially located to the north of existing right-of-way. Eight mainline lanes are provided west of I-170.

Parkway Subcorridor (Bellevue Avenue to west of Sarah Street)

- ***Build Alternatives*** – There are two Build Alternatives for this subcorridor. Parkway Alternative 1 in this subcorridor includes a ramp to Oakland Avenue from I-64 located just east of McCausland Avenue. In Parkway Alternative 2, this ramp is omitted.

The following is a description for each of the subcorridors. The following descriptions move from the western end of the corridor to the east.

Greenway Subcorridor – Mainline I-64

The following is a description of the Build Alternatives being considered for the Greenway Subcorridor. The Greenway Subcorridor Alternative is shown in plates G1-G7 in Appendix C.

There is one Build Alternative being considered for the Greenway Subcorridor. The alternative begins just west of Spoede Road and would provide four through lanes in each direction from west of Spoede Road through the Greenway Subcorridor. Four lanes in each direction already exist west of the Spoede Road interchange, so this alternative would continue the four lanes in each direction to the east.

There would be no auxiliary lanes from west of Spoede Road to the Spoede Road interchange. There would be auxiliary lanes both east and westbound from the Spoede Road interchange to the Lindbergh Boulevard interchange. Auxiliary lanes would be provided on eastbound I-64 from the Clayton Road/Warson Road on-ramp to the McKnight Road interchange. There would also be auxiliary lanes both east and westbound from the McKnight Road interchange to the Brentwood Boulevard interchange in the Thruway Subcorridor. The typical section for the Greenway Subcorridor is shown in Exhibit II-1.

West of Spoede Road the reconstructed I-64 profile would be similar to the existing profile. There would be a large cut between Spoede Road and Lindbergh Boulevard when compared to the existing profile where retaining walls would be used to minimize the need for right-of-way/construction easements. Just west of McKnight Road a hill would be smoothed out and the profile of I-64 would be lowered under McKnight Road to provide sufficient roadway clearance.

The Build Alternative for the Greenway Subcorridor would require some additional right-of-way or construction easements. West of the Spoede Road interchange to Warson Road, a small strip of additional right-of-way/construction easement would be needed on both the north and south sides of I-64. In a few places, entire properties may be taken depending on whether the remaining property would still be considered useful. Larger property impacts are shown to the

west of Lindbergh Boulevard. From Warson Road to Ladue Lane, minimal additional right-of-way would be necessary. A small strip of additional right-of-way/construction easement would be needed on both the east and west side of Lindbergh Boulevard to the north and south of I-64. From Ladue Lane to the McKnight Road interchange, a small strip of additional right-of-way/construction easement would be needed on both the north and south side of I-64.

Greenway Subcorridor – Refined Alternatives

Based upon comments received on the alternatives presented in the DEIS, additional engineering refinements were examined.

Spoede Road to Lindbergh Boulevard – Comments were received on the DEIS from a number of Frontenac residents and the city of Frontenac requesting that efforts be made to minimize impacts to commercial, public and semi-public properties located on the south side of I-64 from Spoede Road to Lindbergh Boulevard. The city of Frontenac has a limited number of commercial properties and efforts were made to examine if there were additional options for preserving the commercial function of this area. Additional engineering analysis was completed to examine small shifts in the potential future alignment of I-64 in this vicinity. Changes in impacts from the preferred alternative as shown in the DEIS were then identified.

Three I-64 alignments were considered between Spoede Road and Lindbergh Boulevard. The initial alignment included in the DEIS followed the existing centerline. A second alignment included a shift 16 feet (4.9 meters) to the north of the existing centerline. A third alignment included a shift 86 feet (26.2 meters) north of the existing centerline. A comparative assessment of the three options was completed and included these factors: project costs, constructability issues, total acquisitions, partial acquisitions, neighborhood/community cohesion and visual quality. The comparative impacts are summarized in Table II-7.

- ***Option A*** – The alignment shown in the DEIS held the centerline of the project at the same location as the existing centerline. This option resulted in property impacts on both sides of I-64 due to adding an additional lane in each direction and widening inside and outside shoulders. Near Spoede Road and Lindbergh Boulevard, Option A included two total residential acquisitions and eleven partial residential acquisitions. It required the total acquisition of two business buildings and two public works buildings in the city of Frontenac. Option A also had one partial business property impact and four partial property impacts to public/semi-public facilities.

- ***Option B*** – In this option, the alignment is shifted approximately 16 feet (4.9 meters) to the north in order to avoid taking the two office buildings and the two public works buildings between Spoede Road and Lindbergh Boulevard. As compared to Option A, this alignment resulted in fewer business and semi-public impacts and in less project cost. Compared to Option A this option increases by three, the number of full property acquisitions located on the north side of I-64.

- ***Option C*** – The third option examined moving the alignment further north to further lessen property impacts on the south side of I-64, but results in an additional number of full property impacts to residential properties on the north side between Spoede Road and Lindbergh Boulevard. In this option, the alignment is shifted approximately 86 feet (26.2 meters) to the north in order to avoid property impacts on the south side of I-64. Some households located north of I-64 express concerns about the loss of trees that would occur with Option A and Option B. Some of these households expressed a desire to have full acquisition rather than have partial acquisition. Under this option, there are twelve total single family acquisitions, one partial acquisition and no business or public/semi-public impacts near the area from Spoede Road to Lindbergh Boulevard.

A neighborhood meeting was held to discuss these options. No clear consensus on a desired option was apparent from the residents who attended.

Changes in Impacts to Greenway Subcorridor – Both Option B and Option C were shown to result in project cost savings as compared to Option A. Cost savings primarily resulted from savings in right-of-way and relocation costs by avoiding two large business buildings from full acquisition. Other partial impacts to public/semi-public properties were also reduced. Between Spoede Road and Lindbergh Boulevard, Option C resulted in the greater reduction of impacts on the south side of I-64. However, Option C resulted in the need to fully acquire ten additional single family residences. Option B was determined to be preferred, as it minimized impacts to businesses and public/semi-public properties on the south side of I-64, while not requiring a total taking of residences on the north side of I-64. Through engineering techniques to minimize impacts, the property impacts on the north side of I-64 are unchanged from the DEIS. There have been additional refinements with regard to engineering design at two locations. The first is west of Spoede which resulted in additional residential displacements due to the channel realignment of an unnamed tributary of Deer Creek. The second refinement is east of Spoede Road where no right-of-way will be required from the Wright School.

Table II-7
Greenway Comparative Impacts Since DEIS

Evaluation Factors	Units	Greenway Refinement		
		A (DEIS)	B*	C
Engineering and Traffic Considerations				
PROJECT COST				
Construction Cost Estimate	$ (Million)	$140.0	$138.8	$137.5
right-of-way and Relocation Cost	$ (Million)	21.2	9.9	14.6
TOTAL PROJECT COST	$ (Million)	$161.2	$148.7	$152.1
Social Considerations				
TOTAL ACQUISITIONS				
Single-Family Residential	Dwelling Units	14	14	23
Multi-Family Residential	Dwelling Units	0	0	0
Business	Establishments	2	0	0
Public/Semi-Public Facilities	Buildings	0	0	0
PARTIAL ACQUISITIONS				
Single-Family Residential	Dwelling Units	87	87	77
Multi-Family Residential	Dwelling Units	0	0	0
Business	Number	8	10	7
Public/Semi-Public Facilities	Number	7	6	3
NEIGHBORHOOD/COMMUNITY COHESION	Rating			
Environmental Considerations				
VISUAL QUALITY				
Views From I-64	Rating			
Views Toward I-64	Rating			

Impact Rating Scale:  - Low Impact - Low/Moderate Impact - Moderate Impact - Moderate/High Impact - High Impact
* Indicates Preferred Alternative

Greenway Subcorridor – Interchanges

Spoede Road – The Build Alternative for the interchange configuration at Spoede Road would be an offset diamond with roundabouts providing combined access to/from Spoede Road and the north frontage road. This interchange configuration would provide all four traffic movements

between I-64 and Spoede Road with local access being provided via reconstructed frontage roads. The roundabouts would be yield controlled with signals anticipated on Spoede Road where the outer roads connect. The roundabouts would tie together the two-way outer roads and the I-64 ramps. The roundabouts would be designed to handle school buses, fire trucks, etc. according to design standards. The I-64 centerline would be realigned slightly to the north to better use the existing right-of-way. There would be two intersections on Spoede Road to access the interchange rather than the four that exist today. Signage would stay much the same on Spoede Road as it is today and the new interchange would function similar to the existing interchange. Entrance and exit ramps would be lengthened to provide time to slow down on exit ramps and to speed up on entrance ramps.

Lindbergh Boulevard – The Build Alternative for the interchange configuration at Lindbergh Boulevard is a single-point urban interchange. In this configuration, traffic to and from I-64 merge at a single point where there would be one set of signals. There would be dual left turn lanes at the single-point. The ramps would be lengthened to provide time to slow down on exit ramps and to speed up on entrance ramps. There would be two through lanes northbound and two through lanes southbound on Lindbergh Boulevard. The Clayton Road/Lindbergh Boulevard intersection would remain much as it is today. The refined alternative for Lindbergh Boulevard does not make the Clayton Road/Lindbergh Boulevard intersection worse, but it also does not improve it. Efforts are underway to improve the intersection, but that improvement would not be a part of this project.

Clayton Road/Warson Road – The Build Alternative for the interchange configuration at Clayton Road would be a half diamond providing westbound I-64 with access to Clayton Road and Clayton Road with access to eastbound I-64. The I-64 centerline would be shifted slightly south and South Outer 40 Drive would be rebuilt and move slightly south, though both would mostly stay within existing right-of-way. The existing fence, which separates South Outer 40 Drive from I-64, would be replaced with a concrete barrier. The Warson Road traffic signal, maintained by the city of Ladue, would be coordinated with the traffic signals at the ramp terminals.

McKnight Road – The Build Alternative for the interchange configuration at McKnight Road would be a tight urban diamond. McKnight Road would remain a two-lane road, but would have a four-lane bridge over I-64 with one through northbound lane, one through southbound lane, one turning lane northbound and one turning lane southbound. The interchange would include single lane on and off-ramps to and from I-64 with single turn lanes at ramp intersections. The ramps would be lengthened to provide time to slow down on exit ramps and to speed up on entrance ramps. The existing intersection at McKnight Road and York Drive would be stop controlled northbound, but not southbound like existing conditions. The intersection at Godwin Lane and McKnight Road would remain similar to existing conditions. Other local road impacts include relocating Ladue Lane slightly to the north of its present location, reconstructing but not relocating a portion of Meadow Acres Road due to its proximity to the I-64 ramps, and removing a portion of Northcote Road; with the east portion connected to Middlesex Drive and the west portion changing to a dead-end. As a consequence of the partial removal of Northcote Road, access to two homes would need to be relocated, and one property would be purchased. There are also a few properties north of I-64, near the westbound off-ramp, that may be purchased entirely. McKnight Road would be raised slightly over I-64, and as a result, the road would need to be rebuilt from north of Monmouth Drive to north of York Drive.

Thruway Subcorridor – Mainline I-64 and I-170

The following is a description of the Build Alternatives being considered for the Thruway Subcorridor. The Thruway Subcorridor Alternatives are shown in plates T1-T24 in Appendix C.

The four through lanes that began west of the Greenway Subcorridor would reduce to three through lanes and a I-170 ramp lane in the Thruway Subcorridor as I-64 approaches Brentwood Boulevard from the west. Three through lanes would be provided from Brentwood Boulevard through Hanley Road. This mainline section includes the connection to I-170. Two primary interchange configurations are under consideration at I-170 and the auxiliary lane configurations change depending on which interchange option is being viewed. The auxiliary road configurations, mainline profiles and right-of-way/construction easements will be discussed with the interchange configuration descriptions in the Brentwood Boulevard/I-170/Hanley Road/ Galleria Parkway interchange area.

From Hanley Road to just east of McCausland Avenue, three through lanes would be provided both eastbound and westbound. Between Hanley Road and Big Bend Boulevard/Bellevue Avenue area, two auxiliary lanes would be provided both eastbound and westbound. Between Big Bend Road and McCausland Avenue, there would be one auxiliary lane in each direction. The auxiliary lanes would be carried under Bellevue Avenue.

The I-64 mainline alignment between Laclede Station Road and Big Bend shifts to the south when compared to existing conditions because of properties identified as significant in the cultural survey. A more detailed explanation of this area is given in the Section 4(f) portion of this document. Typical sections for the Thruway Subcorridor are shown in Exhibits II-1 and II-2.

Thruway Subcorridor – Refined Alternatives

In response to concerns about property impacts in the Thruway, additional engineering refinements were studied. The refinements were examined in an effort to reduce the number of displacements in the Thruway. Many of the refinements completed apply to each of the four Thruway Build Alternatives.

The first refinement applies to Alternatives 3 and 3a and results in a reduction of the project footprint along I-170. In the vicinity of I-64/I-170 interchange, the I-170 mainline and ramp connections with I-64 would be elevated. Unlike initially proposed, ramps between I-170 and Eager Road would not be constructed adjacent to the I-170 mainline. Access to Eager Road would be made by constructing a frontage road between Galleria Parkway and Eager Road. Motorists accessing Eager Road to and from I-170 would use the proposed frontage road and pass through the Galleria Parkway interchange. The footprint of the project in this vicinity would be reduced by constructing the frontage road under the elevated section of I-170. McMorrow Avenue would not be vacated and would extend and connect with Antler Drive thereby retaining existing access to the Lavinia Gardens neighborhood. Due to engineering considerations, the refinement cannot be made to Alternatives 2 and 2a.

A second refinement would apply only to Alternatives 3 and 3a. The refinement would lower the vertical profile of the I-64 mainline from west of the MetroLink crossing to Boland Avenue. The vertical profile would be lowered below existing conditions closer to the ground profile that existed prior to the construction of I-64 over 40 years ago. With this refinement, Hanley Road would carry over I-64, similar to existing conditions. Laclede Station Road would also carry over I-64, unlike current conditions. With this refinement, the interchange ramps east of Hanley Road could be shortened (still within current design standards) resulting in minimizing property impacts and visual impacts to the Hanley Park Addition neighborhood and to the Heights Community Center.

A third refinement was studied to potentially reduce property impacts on the north side of I-64 between Big Bend Boulevard and Bellevue Avenue. The city of Richmond Heights had indicated concern about property impacts in this location. One measure to minimize these impacts would be to use a tunnel or box culvert rather than bridge structure to accommodate the braided ramps.

This modification would reduce impacts to grades and reduce the need for retaining walls. The result of the modification would be to lessen property impacts and temporary construction impacts. However, engineering analysis at this level of detail was inconclusive to whether property impacts could be reduced. For this reason, this refinement is not shown in any other alternatives.

The fourth refinement examined in the Thruway was to shift I-64 mainline alignment slightly south between Bellevue Avenue and McCausland Avenue in order to reduce property impacts along West Park Avenue. This small shift would result in missing an apartment complex and adjacent residences. It would result in the need to acquire one additional residence and increase the area of partial acquisition on the south side of I-64. This refinement can be made to all Thruway alternatives.

Changes in Impacts in Thruway Subcorridor

The refinements listed above had the same impacts to both Alternative 3 and 3a as shown in Table II-8. The refinements resulted in a reduction of nine total single family acquisitions and 30 total multi-family acquisitions. The refinements resulted in a reduction in total acquisitions to two businesses and a reduction in partial acquisitions to one public/semi-public property.

The refinements would minimize impacts to cultural resources. Impacts for Alternatives 3 and 3a were reduced in the Lavinia Gardens District, while impacts to the Clayton Park Addition (Bennett Avenue) and to the Heights Community Center were eliminated.

Based on the possible reduction of impacts, the refinements to Alternative 3 are included as part of the preferred alternative in this FEIS.

Table II-8
Refined Thruway Impacts Since DEIS

Evaluation Factors	Units	Thruway Refinement			
		Alt. 2 (DEIS)/Refined	Alt. 2A (DEIS)/Refined	Alt. 3* (DEIS)/Refined	Alt. 3A (DEIS)/Refined
Social Considerations					
TOTAL ACQUISITIONS					
Single-Family Residential	Dwelling Units	(75) 75	(80) 80	(103) 94	(108) 99
Multi-Family Residential	Dwelling Units	(122) 92	(82) 52	(122) 92	(82) 52
Business	Establishments	(43) 43	(46) 46	(43) 41	(46) 42
Public/Semi-Public Facilities	Buildings	(0) 0	(0) 0	(0) 0	(0) 0
PARTIAL ACQUISITIONS					
Single-Family Residential	Dwelling Units	(19) 18	(25) 24	(21) 21	(23) 23
Multi-Family Residential	Dwelling Units	(1) 1	(1) 1	(2) 2	(2) 2
Business	Number	(6) 6	(6) 6	(6) 6	(6) 6
Public/Semi-Public Facilities	Number	(2) 2	(2) 2	(2) 1	(2) 1

* Indicates Preferred Alternative

Thruway Subcorridor – Interchanges

Brentwood Boulevard/I-170/Hanley Road/Galleria Parkway – The refined alternative for this area includes two primary options, each with two variations. One variation shifts the alignment west of the Brentwood Boulevard interchange to the south and the other variation shifts the

alignment west of Brentwood Boulevard to the north. The two variations are being considered because there are right-of-way issues on both the north and south side of I-64 that require further analysis and discussion. The north variations west of Brentwood Boulevard affect a stormwater detention pond, a potential wetland and, to some degree, an apartment complex on the south side of I-64. The south variations substantially impact the apartment complex.

One of the primary deficiencies of the current interchange configuration that the Build Alternatives seek to address is the lack of direct interstate-to-interstate access from eastbound I-64 to northbound I-170. Currently this movement requires vehicles to exit I-64 at Brentwood Boulevard and use local streets, resulting in a large amount of traffic congestion. The refined Build Alternatives under consideration provide direct interstate-to-interstate access between I-170 and I-64.

There is a proposed MetroLink light rail transit line in this area with a drop-off station without public parking at Galleria Parkway and a Park-and-Ride station at Hanley Road. The I-64 project is being coordinated with the proposed MetroLink line expansion. The proposed corridor for MetroLink would be lowered under I-64 so that the I-64 profile can be lowered to meet current highway design standards. The MetroLink extension is currently scheduled to be completed and operational before I-64 construction begins.

The profile for I-64 changes with each of the options, but the profile for I-170 stays the same in each option. There would be auxiliary lanes between McKnight Road and Brentwood Boulevard. There would be eight capacity lanes in this area, but two of the capacity lanes, one eastbound and one westbound, become the direct connection ramps between I-64 and I-170. East of the I-170 interchange there would be three capacity lanes.

STACKED OPTION 2

The major features of this option would be:

- Stacked roadways on I-64 using structures beginning west of Brentwood Boulevard underpass to east of Hanley Road underpass with the interstate movements on the top level and the CD roads on the lower level.
- Direct connections between I-64 and I-170 using flyover ramps. Direct access from eastbound I-64 to northbound I-170 would be provided, unlike existing conditions.
- Full access between Brentwood Boulevard and I-64, like existing conditions.
- Full access between Hanley Road and I-64, like existing conditions.
- Half access between Galleria Parkway and I-170, unlike existing conditions.
- Full access between Brentwood Boulevard and Hanley Road via CD roads on the lower level.
- No access from eastbound Eager Road to northbound Hanley Road, unlike existing conditions.
- No access from northbound Hanley Road to westbound Eager Road, unlike existing conditions.
- I-64 would be carried over Hanley Road, unlike existing conditions.
- Smaller impact footprint east of I-170 than Build Options 3 and 3a.

The typical section for Alternative 2 in this portion of the Thruway Subcorridor is shown in Exhibit II-2.

The following is a description of the major traffic movements that could be made if this alternative interchange configuration were constructed.

Interstate 64 Upper Level Movements

Eastbound I-64 Traffic Movements – Eastbound I-64 can exit on one ramp that provides two choices, right to the Brentwood Boulevard or left to a flyover ramp to Northbound I-170. Brentwood Boulevard would be a SPUI under I-64. Eastbound I-64 can also exit on a ramp further to the east carrying over the top of Brentwood Boulevard that connects to the eastbound lower level CD road leading to the Hanley Road single point interchange.

Westbound I-64 Traffic Movements – Westbound I-64 can exit on a ramp which provides two options, right to Hanley Road or left underneath Hanley Road to the westbound lower level CD Road which connects to Brentwood Boulevard single point interchange. Westbound I-64 can also exit on a ramp further west, which connects with northbound I-170.

Southbound I-170 Traffic Movements – Southbound I-170 can exit to Galleria Parkway (there is currently no exit ramp there today), Eager Road or I-64. Once on the Eager Road exit ramp, a traveler can exit to the right to a loop ramp that connects with the lower level CD road to go to Hanley Road or exit to the left to access Eager Road. Besides the Galleria Parkway and Eager Road exit ramps on I-170, the right lane provides access to westbound I-64 and the left lane provides access to eastbound I-64. The current ramp to southbound I-170 from Galleria Parkway would be removed because it would be too close to the new flyover ramps to rebuild and abide by the design standards.

Northbound I-170 Traffic Movements – To travel northbound on I-170, westbound I-64 can exit on a ramp which directly connects with northbound I-170. Eastbound I-64 would use the flyover ramp, as described above. Brentwood Boulevard and Hanley Road traffic can enter northbound I-170 by using Eager Road, the Eager Road entrance ramp, or the Hanley Road single point interchange. A traveler can also enter northbound I-170 from Galleria Parkway. The current northbound exit ramp to Galleria Parkway from northbound I-170 would be removed because it would be too close to the I-64 ramps to rebuild and abide by the design standards.

Interstate 64 Lower Level Movements

Brentwood Boulevard – From Brentwood Boulevard, a motorist can enter eastbound I-64 by using a ramp to the lower level CD road that goes under Hanley Road to enter I-64. Using the CD road, the motorist can also exit to Hanley Road using the single point interchange. From Brentwood Boulevard it would also be possible to go westbound on I-64 by taking a ramp that joins the CD road and merges into I-64 west of McCutcheon Road overpass.

Hanley Road – From Hanley Road, a traveler can enter I-64 eastbound by using a ramp to the lower level CD road. A motorist then has three options once on the CD road: northbound I-170, westbound I-64 or Brentwood Boulevard.

STACKED OPTION 2A

The major features and traffic movements would be the same as described in Option 2; only the I-64 horizontal alignment would be shifted to the north, in the area west of Brentwood Boulevard.

Profile Impacts for Option 2 and 2a

Because this option consists of stacked roadways, in general there would be two sets of vertical grades; one for mainline I-64 and the other for the lower level CD roads. Currently, Hanley Road is over the top of I-64, but in this option, I-64 would go over the top of Hanley Road. Because of this change, the grade problems near Laclede Station Road that are seen in Options 3 and 3a would be avoided. Laclede Station Road would not have height restrictions when using the underpass. Options 2 and 2a shift the I-64 mainline lanes slightly to the north in the area west of Brentwood Boulevard to better use existing right-of-way. At Hanley Road, the stacked options use structures to create three levels: CD roads on the lower level, Hanley Road single point interchange on the middle level at approximately the same grade as Hanley Road is today and I-64 over the top of the CD roads and Hanley Road. The profile of the CD roads under Hanley Road would be approximately 20 feet (6.1 meters) lower than existing I-64 to limit the total height needed to the stack the roadways. Abiding by the design standards, the I-64 profile would be designed for high speeds, and the CD road profile would be designed for lower speeds. Option 2 has a greater impact on right-of-way/construction easements to the south of I-64, west of I-170 while Option 2a has a greater impact on right-of-way/construction easements to the north of I-64 west of I-170. Overall, Options 2 and 2a reduce the right-of-way impacts north of I-64 from east of I-170 to Hanley Road interchange as compared to Options 3 and 3a.

FLAT OPTION 3

The major features of this option would be:

- Direct connections between I-64 and I-170 using flyover ramps. Direct access from eastbound I-64 to northbound I-170 would be provided, unlike existing conditions.
- Full access between Brentwood Boulevard and I-64, like existing conditions.
- Full access between Hanley Road and I-64, like existing conditions.
- Half access between Galleria Parkway and I-170, unlike existing conditions.
- Full access between Hanley Road and Brentwood Boulevard using Eager Road and a CD road, except for access from Brentwood Boulevard to northbound Hanley Road.
- No access from northbound Hanley Road to westbound Eager Road, unlike existing conditions.
- Interstate 64 would be carried over Hanley Road, unlike existing conditions.
- Greater impact footprint east of I-170 when compared to the Build Options 2 and 2a.

The typical section for Alternative 3 in this portion of Thruway Subcorridor is shown in Exhibit II-2.

The following is a description of the major traffic movements that could be made if this alternative interchange configuration were constructed.

Eastbound I-64 Traffic Movements

Motorists traveling on eastbound I-64 can exit to Brentwood Boulevard at a SPUI with Brentwood Boulevard going underneath I-64. Eastbound I-64 can also exit on a direct flyover ramp to travel northbound on I-170. Lastly, eastbound I-64 can exit to the CD Road. The CD road goes over the top of Brentwood Boulevard, parallels eastbound I-64 and provides access to Hanley Road using single point urban interchange.

Local Road Access to Eastbound I-64

From Brentwood Boulevard travelers can access eastbound I-64. From Hanley Road there would be access to eastbound I-64.

Westbound I-64 Traffic Movements

Traffic traveling on westbound I-64 can exit east of Hanley Road to a single ramp that provides two choices: right to Hanley Road or left to a CD road which gives access to Brentwood Boulevard or to northbound I-170. An additional direct flyover ramp west of Hanley Road provides direct access from westbound I-64 to I-170.

Local Road Access to Westbound I-64

Using the CD road, Hanley Road has access to northbound I-170 or to westbound I-64. Brentwood Boulevard can access westbound I-64 using the single point interchange.

Southbound I-170 Traffic Movements

Southbound I-170 can exit to Galleria Parkway (there is currently no exit ramp there today), to Eager Road, or to the right for access to westbound I-64 or exit to the left to the CD road which provides access to Hanley Road and to eastbound I-64. The current I-170 on-ramp from Galleria Parkway would be removed because it would be too close to the new flyover ramps to be rebuilt abiding by the current design standards at the time of the facilities' design and construction.

Northbound I-170 Traffic Movements

To travel northbound on I-170, westbound I-64 would use the direct ramp just west of Hanley Road, and eastbound I-64 would use the direct flyover ramp. Brentwood Boulevard traffic can enter northbound I-170 by using the Eager Road entrance ramp. Hanley Road traffic can enter northbound I-170 by using the CD road via the Hanley Road single point interchange. Motorists on southbound Hanley Road can also access northbound I-170 by using westbound Eager Road and the Eager Road entrance ramp. A traveler can also enter northbound I-170 from Galleria Parkway. The current northbound I-170 exit ramp to Galleria Parkway would be removed because it would overlap with the ramps from I-64.

Local Road Access to Other Local Roads

Traffic from Hanley Road can access Brentwood Boulevard by using the westbound CD road, but traffic from Brentwood Boulevard can only access Hanley Road by using Eager Road. Once on eastbound Eager Road, travelers can only go southbound on Hanley Road. That situation represents a loss of access when compared to existing conditions because full access between Brentwood Boulevard and Hanley Road exists via Eager

Road. Traffic on southbound Hanley Road can also still access Brentwood Boulevard using westbound Eager Road, like existing conditions.

FLAT OPTION 3A

The major features and traffic movements would be the same as described in Option 3, but the I-64 horizontal alignment differs by shifting to the north in the area west of Brentwood Boulevard.

Profile Impacts for Option 3 and Option 3a

In general, Options 3 and 3a shift the centerline of I-64 approximately 60 feet (18.3 meters) to the north when compared to existing I-64. Interstate 64 goes over Hanley Road in Options 3 and 3a similar to the stacked Options 2 and 2a. As a result, the clearance problems further to the east on Laclede Station Road crossing under I-64 would not occur. Options 3 and 3a have greater right-of-way/construction easement impacts north of I-64 between I-170 and Laclede Station Road than the stacked Options 2 and 2a. Option 3 has greater right-of-way/construction easement impacts to the south and west of I-64 and I-170 while Option 3a has greater right-of-way/construction easement impacts to the north and west of I-64 and I-170.

Big Bend Boulevard/Bellevue Avenue – The refined alternative for the interchange design at Big Bend Boulevard/Bellevue Avenue would be a SPUI at Big Bend Boulevard with braided ramps forming a half diamond interchange at Bellevue Avenue. The I-64 mainline lanes would be shifted slightly north, west of Big Bend Boulevard. It would then be shifted slightly southeast of Big Bend Boulevard. With this design, full access would be provided between Big Bend Boulevard and I-64. Dual left turns on the ramps and on Big Bend Boulevard would be provided. The Big Bend Boulevard and Dale Avenue intersection would remain as it is currently, as would the Big Bend Boulevard and Wise Avenue intersection. Big Bend Boulevard would be carried over I-64 as it is today, but I-64 would be lowered to improve roadway clearance for traffic on I-64. The Boland Avenue overpass, the Claytonia Terrace underpass, the Highland Terrace overpass and the Bellevue Avenue overpass would be rebuilt similar to existing conditions. Vertical profile changes around those crossings to achieve sufficient height clearances would occur on I-64.

There would be right-of-way/construction easement impacts north of I-64 and west of Big Bend Boulevard. Additionally, there would be right-of-way/construction easement impacts north and south of I-64 between Big Bend Boulevard and Bellevue Avenue. The existing right-of-way is very narrow through this area, and it would be extremely difficult to make roadway improvements without requiring additional right-of-way. By reconstructing the Big Bend Boulevard interchange to full access with I-64, right-of-way impacts to Harter Avenue parcels located north and west of I-64 and Big Bend Boulevard would be anticipated. The right-of-way purchases anticipated along Harter Avenue would be enough to allow the I-64 mainline alignment to shift north slightly, minimizing impact on the south side of I-64 along Lovella Avenue.

Parkway Subcorridor – Mainline I-64

The following is a description of the refined Build Alternatives being considered for the Parkway Subcorridor. There have been no changes made to the Parkway Subcorridor since the approved DEIS.

Four basic through lanes begin again just to the east of McCausland Avenue and would continue through Boyle Avenue. Auxiliary lanes would be provided between Clayton

Road/Skinker Boulevard and Hampton Avenue, and also between Kingshighway Boulevard and Tower Grove Avenue. Refer to Parkway Subcorridor plates number P1 to P8 for the conceptual design of the Build Alternative. The typical section for the Parkway Subcorridor is shown in Exhibit II-1.

Parkway Subcorridor – Interchanges

McCausland Avenue/Clayton Avenue/Oakland Avenue/Skinker Boulevard – The refined alternative for this interchange area includes a compact diamond interchange at McCausland Avenue and ramps providing a partial access interchange at Clayton Road/Skinker Boulevard intersection. An eastbound I-64 braided off-ramp to Oakland Avenue is an option still under consideration. If constructed, the Oakland Avenue off-ramp would cross over the McCausland Avenue on-ramp to eastbound I-64. The other option would be to leave out the eastbound off-ramp serving Oakland Avenue. The braided ramp option increases the right-of-way/construction impact area south of I-64 in this area and may also require the reconstruction of some local streets. In both options, McCausland Avenue would remain two through lanes northbound and two through lanes southbound. There would be single-lane on and off-ramps between I-64 and McCausland Avenue. The existing on-ramp from Oakland Avenue to westbound I-64 would not be rebuilt. Traffic currently using that on-ramp would use the McCausland Avenue or Hampton Avenue on-ramps to westbound I-64. The on-ramp from Wise Avenue/Berthold Avenue intersection to westbound I-64 would not be rebuilt, but there would be a new on-ramp directly connecting McCausland Avenue to westbound I-64. Berthold Avenue west of McCausland Avenue would end in a cul-de-sac. The intersections of Clayton Road/Skinker Boulevard and Clayton Avenue-Oakland Avenue/McCausland Avenue-Skinker Boulevard would remain like existing conditions. The Oakland Avenue overpass, the Clayton Avenue overpass and the Clayton Road/Skinker Boulevard ramps would be rebuilt similar to existing conditions.

Hampton Avenue – The refined alternative for the Hampton Avenue interchange would be a single point urban interchange. Interstate 64 would be shifted slightly north at Hampton Avenue to better stay within existing right-of-way limits. East of Hampton Avenue, I-64 would be shifted slightly south to preserve parkland on the north side of I-64. By shifting I-64 south, reconstruction of a section of Oakland Avenue between Highlander Drive and the Science Center overpass would occur. More detail of this I-64 alignment and impacts to parkland is covered in the Section 4(f) portion of this document.

Oakland Avenue and Hampton Avenue would remain at-grade. Left turns from northbound Hampton Avenue to westbound Oakland Avenue would not be allowed, and traffic from eastbound I-64 using the Hampton Avenue single-point would not be allowed to make a left turn onto eastbound Oakland Avenue. These restricted traffic movements would be the same as current conditions. Oakview Place would become a one-way northbound street, but would not be reconstructed. An optional direct ramp from eastbound I-64 to eastbound Oakland Avenue could be constructed without additional right-of-way impact.

Tamm Avenue overpass would be rebuilt in its existing location. Clayton Avenue would be vacated east of Hampton Avenue to Oakland Avenue. Clayton Avenue west of Hampton Avenue to Berthold Avenue changes to one-way westbound from Hampton Avenue to the hospital entrance and remains a two-way street to Berthold Avenue. The traffic signal at Hampton Avenue and Clayton Avenue would be removed to help traffic flow on Hampton Avenue. Berthold Avenue west and east of Hampton Avenue would remain a two-way street. There would be a roundabout constructed at the Hampton Avenue/Wells Drive intersection in Forest Park.

There are a number of pedestrian issues connected with this interchange. The existing pedestrian overpass on Oakland Avenue east of Highlander Drive would be rebuilt west of its existing location. Pedestrians would cross Oakland Avenue at Highlander Drive intersection to access the bridge. The Science Center overpass would remain as it is today. A new underground tunnel east of the Science Center overpass would replace the current tunnel and provide a safer environment for pedestrian access. The multi-use path along Wells Drive in Forest Park would cross under Hampton Avenue and Tamm Avenue.

There would be minimal right-of-way/construction easement issues through the interchange area and between this interchange and the Kingshighway Boulevard interchange; however, parkland surrounds the existing right-of-way. Due to the wider shoulders and longer on and off-ramps associated with the Build Alternative, impact areas mainly occur between interchange areas.

Kingshighway Boulevard – The refined alternative for Kingshighway Boulevard would be a single point urban interchange. The I-64 mainline would shift south in the area east of Kingshighway Boulevard. Kingshighway Boulevard would be above I-64 just as it is today with I-64 being lowered slightly to provide for adequate clearance under Kingshighway Boulevard. Kingshighway Boulevard's alignment would shift slightly west at I-64. Dual left turn ramps merging into single lane on and off-ramps would be provided on Kingshighway Boulevard to and from I-64. There would be improvements to the Oakland Avenue/Kingshighway Boulevard intersection. Three through lanes would be provided north and southbound on Kingshighway Boulevard like existing conditions.

A pedestrian bridge currently extending from the Central Institute of the Deaf campus across I-64 would be rebuilt slightly to the west. The Kingshighway Boulevard overpass would also offer enhanced pedestrian and bike access via wider sidewalks. Other pedestrian issues west of Kingshighway Boulevard are described above under the Hampton Avenue interchange discussion.

Impact areas of right-of-way/construction easements would mainly be anticipated in areas between Kingshighway Boulevard and the adjacent interchanges due to longer ramps and wider shoulders designed in accordance to the current design standards at the time of the facilities' design and construction. Refer to Parkway Subcorridor plates P1 to P8 for impact area limits.

Tower Grove Avenue/Boyle Avenue – The refined alternative at this interchange area would be a split diamond between Tower Grove Avenue and Boyle Avenue. New ramps would be provided to and from the west between I-64 at Tower Grove Avenue. The on-ramps to and from Boyle Avenue would be rebuilt and remain similar to today's configuration. Tower Grove Avenue may be realigned south of the proposed interchange to Chouteau Avenue. Taylor Avenue, Newstead Avenue, Tower Grove Avenue, and Boyle Avenue overpasses would be rebuilt like they are today except with wider sidewalks. A new, one-way westbound road from Boyle Avenue to Tower Grove would be provided adjacent to the north side of I-64. Papin Street changes to one-way eastbound from Tower Grove Avenue to Boyle Avenue on the south side of I-64 on street parking on Papin would remain, but would be restricted during peak hours. The Clayton Road/Boyle Avenue intersection would be rebuilt to a standard four-way signalized intersection to help traffic flow to and from the new interchange. The four-way stop sign controlled intersections would remain at Chouteau Avenue/Tower Grove Avenue and Chouteau Avenue/Boyle Avenue.

c. TSM / TDM / ITS / Safety Improvements

Deployment of ITS elements and coordination with the St. Louis Transportation Information Center are an important part of the Build Alternatives. The TSM / TDM portion of the Build Alternative includes the same strategies mentioned in the No-Build Alternative.

d. Pedestrian and Bicycle Design Improvements and Considerations

Pedestrian and bicycle considerations for the Build Alternatives are similar to that in the No-Build Alternative. These considerations include three types:

- Separate pedestrian and bicycle interstate crossings that can not be accessed by vehicular traffic,
- Shared interstate crossings that accommodate pedestrians, bicycles and vehicular traffic, and
- Separate corridors or paths parallel to the I-64 corridor for use only by pedestrians and bicycles.

The following text describes what is included in the Build Alternatives with respect to pedestrian and bicycle considerations.

Pedestrian and Bicycle Interstate Crossings (Stand Alone Structures)

There are five existing pedestrian crossings within the I-64 study corridor. Four would be reconstructed in the Build Alternative. The locations are as follows:

- Pedestrian bridge in the city of Richmond Heights, St. Louis County, located approximately 1,000 feet (305 meters) south of the Galleria Parkway interchange across I-170. The Build Alternative would remove and reconstruct this bridge near its existing location near Antler Drive to current design and ADA standards.
- Pedestrian bridge in the city of Richmond Heights, St. Louis County, located approximately 350 feet (110 meters) west of the Big Bend Boulevard interchange. The Build Alternative would remove this bridge without replacement. The pedestrian and bicycle movements across I-64 would continue to share the adjacent Big Bend Boulevard bridge across I-64 with vehicular traffic. This pedestrian bridge would be removed, as it is close to the Big Bend Bridge. Improvements to the proposed Big Bend Boulevard bridge would be incorporated to enhance pedestrian and bicycle access according to the shared crossing strategy described in upcoming sections.
- Pedestrian bridge at Forest Park Community College in the city of St. Louis is located approximately 2,200 feet (670 meters) east of the Hampton Avenue interchange. The bridge would be re-built to the west of the existing bridge so that the ramp reaches the ground at Highlander and Oakland Avenues. Access to the new bridge would be improved by incorporating a crosswalk at Highlander Avenue across Oakland Avenue that would provide pedestrian access to the new bridge from the Highlands office park and Forest Park Community College. Within Forest Park, the north terminus of the bridge would be coordinated with the drop off location of the existing Forest Park shuttle bus. The bridge and its connections would be built to current design standards at the time of the facilities' design and construction and ADA compliant.
- Pedestrian tunnel underneath I-64 in the city of St. Louis, located approximately 1,000 feet (305 meters) west of the Science Center overpass. The tunnel would be re-built to

the east of the Science Center and would provide a more open, straight crossing with increased visibility and would include the addition of a 10-foot wide path connection from the tunnel to the Forest Park Recreational Path and from the tunnel to Oakland Avenue. The tunnel would extend 270 feet (80 meters) underneath I-64 and connect Oakland Avenue with Forest Park and the park's existing trail system. Design consideration would be undertaken to preserve as much of the existing trees and vegetation as possible.

- Pedestrian bridge over I-64 in the city of St. Louis, approximately 500 feet (150 meters) east of Kingshighway Boulevard interchange. The Build Alternative would construct a new pedestrian bridge west of the existing bridge and east of Kingshighway Boulevard to current design and ADA standards.

Pedestrian and Bicycle Interstate Crossings (shared with vehicular crossings)

Pedestrians – New bridge or underpass crossings would accommodate pedestrians with design standards to improve accessibility and safety. The design standards include complying with the ADA design recommendations. Based on a meeting with Paraquad, an organization representing persons with disabilities, flatter pedestrian grades than those indicated by AASHTO guidelines and voice activated crossings will be considered in the design process. Circulation and accessibility would be accomplished through defined walks, crosswalks and synchronized signals. Separating walkers from traffic by using curbs and vertical edge treatments of railings and barrier walls would enhance safety. Pedestrian level lighting would supplement street lighting to provide additional security, safety, and enhance the pedestrian environment.

Bicycles – Select vehicular bridges and underpasses would have dedicated bicycle lanes where the improvements are planned to continue beyond the limits of existing I-64 right-of-way. These bridges would be connectors for existing or proposed bicycle corridors and trails as identified by local and regional government agencies. Many local and regional proposed bicycle trail plans are in their draft stages at the present time. Coordination with the regional stakeholders is on-going to identify the bridges selected for bicycle path improvements. Additional bridges may be included if dedicated trails are further identified during the design process.

Bicycle Routes

The St. Louis Regional Bicycle Facilities Plan prepared by EWGCC identifies two bicycle routes that will cross I-64. These two routes are along Bellevue Avenue and Tower Grove Avenue. The path on Tower Grove Avenue would connect the Central West End and Tower Grove Park neighborhoods within the city of St. Louis. The path on Bellevue Avenue will connect neighborhoods and public facilities located on each side of I-64. Signage and/or striping on existing roadways would designate these paths. The Build Alternatives would accommodate the proposed bicycle paths on the reconstructed bridges.

Pedestrian and Bicycle Paths Along the I-64 Corridor

Currently there are no parallel paths or designated bike routes located within the existing I-64 right-of-way. The Build Alternative would not adversely impact existing pedestrian/bicycle corridors outside state right-of-way within the study corridor.

Provisions would be made to accommodate a bicycle route along the reconstructed South Outer 40 Drive near the Clayton Road/Warson Road interchange in the Greenway Subcorridor. Currently, many pedestrians and cyclists use this roadway to access the commercial land uses

along Clayton Road from the residential areas along South Outer 40 Drive. Provisions will also be made, if desired by adjacent property owners, to reconstruct the horse path and ramps to existing box culverts located in the vicinity of Log Cabin Lane.

The dual path system in Forest Park would be accommodated by the Build Alternative at Hampton Avenue. The Build Alternative proposes a tunnel underneath Hampton Avenue for the dual path system. This improves the safety of the trail, which currently crosses the busy Washington Avenue (Hampton Avenue)/Wells Drive intersection at-grade. The trail then proceeds west along the south side of the St. Louis Zoo parking lot. The Build Alternatives would then relocate the trail to travel underneath the Tamm Avenue bridge over I-64. The abutment of the reconstructed bridge would be extended to accommodate the relocated trail.

e. Construction Sequencing

During the construction of the Build Alternatives, the existing I-64 facility would stay in operation; however, the amount of traffic on I-64 and traffic access between I-64 and the local roadway system would be impacted. Interstate 64 is an important east-west corridor in the St. Louis region for commuter traffic, multi-state traffic and commercial use for businesses within the study corridor, so its mainline capacity to some degree would be maintained. Measures would be required to maintain traffic service on I-64, on the local roadways, and local roadway access to I-64.

The construction sequencing and maintenance of traffic strategy for constructing I-64 would be designed ideally using three guidelines:

- A minimum of two through lanes on I-64 would service traffic each way, eastbound and westbound, during a given construction period on the I-64 mainline.
- To some degree, efforts would be made to maintain traffic service across I-64 along major arterial roadways during a given construction period. The major arterials in the study corridor are: Lindbergh Boulevard, Brentwood Boulevard, Hanley Road, Big Bend Boulevard, Hampton Avenue and Kingshighway Boulevard.
- Wherever practical, two adjacent major arterial interchanges along I-64 would not have access to I-64 closed at the same time. This guideline would aid maintenance of traffic by allowing adjacent interchanges not under construction to service traffic deliberately avoiding areas under construction.

Some interchange areas have been identified as being an exception to this guideline because the roadways are so closely spaced and the Build Alternative cannot be constructed in an efficient manner without addressing the whole area. These interchange areas include: the Spoede Road/Lindbergh Boulevard area, the Brentwood Boulevard/I-170/Hanley Road area, the Big Bend Boulevard/Bellevue Avenue area and the Kingshighway Boulevard/Tower Grove Avenue/Boyle Avenue area.

Due to the complexity of the Brentwood Boulevard/I-170/Hanley Road area, the anticipated construction sequencing strategy would be unique compared to the other segments of the I-64 corridor. A discussion of the I-170 area construction sequencing strategy is done separately. The following strategies apply to constructing the I-64 corridor not within the Brentwood Boulevard/I-170/Hanley Road area.

Mainline I-64 Reconstruction

In accordance with the construction sequencing guidelines, the proposed method to construct the I-64 mainline lanes would be to build the lanes half at a time while shifting one direction of

traffic to the opposite side. Two lanes would remain open to traffic in each direction during a given period. This means that I-64 would be reduced by at least one through lane each way when under construction. Using this method, construction of half the new I-64 lanes, bridges, shoulders, walls and ramps would be accomplished while traffic uses the other half of the existing facility. Once the first half of the construction is completed, it would be opened to traffic. The mainline traffic would then shift onto the new pavement, and the remaining half of the I-64 lanes, bridges, shoulders, walls and ramps would be constructed. Often when first shifting the traffic to one side, the side consisting of the existing pavement carrying the traffic is not wide enough to accommodate the lanes. As a result, temporary widening would be provided to the outside of the existing pavement during these construction periods. The impacts of temporary widening were considered in the preparation of this EIS.

The decision to build the north half or the south half of I-64 first differs depending on which interchange is being reconstructed. That decision would be based on the proposed changes in the horizontal alignment of I-64, vertical grade changes of I-64 and the layout of the existing ramps accessing I-64. In general, whenever the eastbound lanes (south half) of I-64 are being constructed and the westbound lanes (north half) carry both westbound and eastbound traffic, ramp connections would only be maintained to the westbound lanes by using temporary connections, existing ramps and newly constructed ramps open to traffic.

The opposite situation would also be true. In general, whenever the westbound lanes (north half) of I-64 are being constructed and the eastbound lanes (south half) carry both eastbound and westbound traffic, ramp connections would only be maintained to the eastbound lanes by using temporary connections, existing ramps and newly constructed ramps open to traffic. Due to these limitations, often the mainline connections to-and-from the arterial would only have access to half of I-64; meaning, traffic would only access either westbound or eastbound I-64 determined by the staging of the I-64 mainline. Whenever the ramp access is removed between the local roadway and I-64, nearby existing I-64 interchanges exist that are often not located much farther than ½ mile (0.8 kilometers) away using alternative routes.

A challenge of constructing I-64 half at a time would be the use of temporary shoring in areas where deep cut or fills of earthwork would exist between construction stages. For example, in areas where the proposed I-64 vertical profile differs greatly from the existing profile, temporary shoring would be used because of the different elevations. New pavement would remain adjacent to the existing pavement during the construction period.

Local access to individual parcels and property holders in the area adjacent to the construction would be maintained through the use of newly constructed pavement, temporary connections, temporary widening of existing and/or the use of nearby alternative routes. In some cases, the connections to local property holders would be sequenced and completed first to maintain traffic access to them. For example at Spoede Road interchange, there are parcels that would use the reconstructed frontage roads for access, and staging that access first would be part of the construction sequencing strategy.

Utility relocation and temporary widening of I-64 would also be performed first in preparation for mainline I-64 traffic shifting to one side for construction. Utility relocation and drainage structures would also be constructed in coordination with the I-64 mainline construction. Crossroad drainage devices would be constructed and located to provide for water flow through the area during construction.

Wherever possible, soundwalls and retaining walls would be built in their final locations as soon as possible to help mitigate the temporary noise impacts from construction. Noise impacts during construction is one area of great concern in discussions with the public and the project's

advisory committees because of the dense urban nature of the I-64 corridor. Construction zone strategies that could be implemented to address construction noise and vibration impacts include:

- Restricting night operations for particularly loud or vibration intrusive construction practices, and
- Using temporary noise mitigation screens in residential area impacts to reduce dB levels.

The reconstruction of mainline I-64 and the interchanges throughout this corridor would require the extensive use of retaining wall structures. Several types of retaining walls that may be used include: cast-in-place walls, mechanically stabilized earth (MSE) walls, tie back walls, etc. The type of wall used in a particular location would depend on the amount of construction space available when building the wall. Temporary shoring may be necessary to construct many of the retaining walls due to the close proximity of traffic and right-of-way restrictions. Some retaining walls may require staged construction caused by traffic sequencing. These would require the use of temporary shoring during transition periods.

Cross Street Overpass and Underpass Reconstruction

Widening the I-64 mainline would require the replacement of the cross street bridges over the mainline. There would not be enough room between existing bridge columns for the new lanes and still achieve sufficient roadway clearances. However, replacement of the cross street bridges over the mainline should be fairly straightforward. For most of these bridges it would be advantageous to place columns in the center median of I-64. Placing columns in the median would reduce span lengths and the depth of the bridge section helping avoid roadway clearance issues.

There are several major arterials that cross and access I-64 in the study corridor. Because of the magnitude of traffic they service for the region, measures and construction stages would be designed to maintain traffic service along these major arterials during construction. Adjacent interchanges to these major north-south arterials often are smaller collector roadways or local crossings that do not have the capacity to handle much diversion of traffic making them poor alternative routes.

There are also several minor arterials, collector or local cross streets that cross I-64 in the study corridor. In many cases, it would be advantageous to close the cross streets and build the new bridges. If MoDOT working with local municipalities, decides that it would be necessary for the cross street to stay open, the bridges would be built in stages one half at a time. With lane restrictions, half of the bridge would be constructed while traffic service shifts and remains open on the other half. After half of the bridge is complete, the traffic would then shift to the newly constructed portion of the bridge until the remaining half is complete.

A construction challenge on mainline I-64 is that the existing cross street bridges over I-64 do not have the bridge span necessary for the existing lanes carrying traffic on I-64 and the new pavement construction to exist side-by-side at one time. To address this challenge, the existing bridge would be removed while the first half of mainline I-64 was being constructed. In most cases, the major arterial bridges would be constructed in stages to maintain traffic service across I-64 while the mainline was being constructed. For the minor arterial bridges which would have to be closed, the reconstructed mainline would be built up to the existing overpass before it would be removed, so access across I-64 would be maintained for as long as possible. For an interchange with a loss of access across I-64, it would be expected that traffic access

across I-64 would be replaced and open to traffic within one year. During reconstruction, access across I-64 would be via a nearby alternative cross street.

Where I-64 spans over a roadway underpass, the same method used on I-64 mainline of shifting traffic to one side at a time would be applied. This situation would be challenging and complex, because it may require temporary bridge widening of some existing I-64 bridges. The bridge widening would occur because the lanes servicing the traffic must exist on half of the bridge while the other half is reconstructed. This may result in a loss of access across I-64 at the underpass. During the time that no access across I-64 would be allowed, access would be made by using a nearby alternative cross street.

Interchange Reconstruction

In accordance with the construction sequencing guidelines no two adjacent major arterial interchanges along I-64 should have ramps closed at the same time. As a result, I-64 mainline reconstruction would be limited to construction zone lengths that do not span across two major interchanges and their respective access points to I-64.

One challenge resulting from this approach is linking new pavement and existing pavement at the points where the construction zones begin and end. The newly constructed I-64 mainline would need to transition back to existing conditions or match new pavement constructed in a previous construction period. Because the horizontal alignment and vertical profile of the proposed Build Alternative in most cases would be similar to existing conditions, these temporary transition points at the construction zone termini would be expected to cause minimal disruption to traffic service. Areas where the horizontal alignment and vertical profile deviate far from existing conditions would not be preferred areas to temporarily connect existing and newly constructed pavement for traffic use.

Exceptions to the guidelines would exist where existing adjacent interchanges are so close to each other that the construction areas around one interchange overlap onto the adjacent interchange. Such is the case for the Spoede Road/Lindbergh Boulevard area, the Brentwood Boulevard/I-170/Hanley Road area, the Big Bend Boulevard/Bellevue Avenue area, and the Kingshighway Boulevard/Tower Grove Avenue/Boyle Avenue area. These areas could be sequenced together; measures would be designed so that access across and between the local roadways and I-64 were coordinated for efficient maintenance of traffic.

I-64 and I-170 Reconstruction in the Brentwood Boulevard/I-170/Hanley Road Area

The Brentwood Boulevard/I-170/Hanley Road area is challenging, and would require the most innovative construction sequencing of the project. There are four alternatives still under consideration, but from a construction sequencing standpoint, the interchange area would be either widened (Option 3) or stacked (Option 2) to accommodate CD lanes and access ramps. Four flyover ramps would also be added to the interchange to improve traffic movement efficiency. The options that shift the I-64 alignment north or south, west of Brentwood Boulevard, would not be expected to greatly change the construction sequencing. As a result, the discussion below will separate the flat option and stacked roadway options as requiring different construction sequencing strategies.

Reconstruction of the interchange bridges would be very complex. The options would require a 15-foot (4.6 meters) separation of I-64 from west of Brentwood Boulevard to east of I-170. The separation would be required to allow construction of the flyover ramp columns along the center of I-64. Even with the columns at the center of I-64 the flyover ramp spans would approach 250 feet (75 meters). The longest spans on the flyover ramps would be around 350 feet (110

meters) that involve difficult structural engineering. The western flyovers would be required to clear the single point interchange ramps at Brentwood Boulevard.

Columns with steel capbeams, some with lengths of 100 feet (30 meters), would be required where the west flyover ramps tie into I-170. The long steel capbeams would allow the columns to be placed to clear southbound I-170.

Stacked Option 2 – The most complex interchange option to construct would be Option 2, the stacked roadway option. Option 2 would be the most complex because I-64 would be built over ramps and CD lanes from west of Brentwood Boulevard to east of Hanley Road. Steel capbeams would also be required on the bents under I-64 allowing clearance of the bent columns to the ramps and CD lanes. The construction complexities previously listed for the I-64/I-170 interchange would also be present for Option 2.

Reconstructing I-170 and Galleria Parkway would be sequenced half at a time. Traffic would shift to one side of the existing facility, while construction takes place on the other half. After construction is finished, the traffic would shift to the new pavement, and construction would occur on the remaining half. The existing interstate-to-interstate connections and the new flyovers would be sequenced with the I-170 construction. The flyovers would be built on their new alignment and would not connect to I-64 or open to traffic until the I-64 mainline construction occurs. Measures would be made to maintain the existing I-64/I-170 connections open to traffic as long as possible to serve traffic.

In general, the I-64 mainline can be constructed half at a time keeping two lanes open in each direction. Separate from the I-64 construction, the CD roads would be constructed on the lower level. At some point, the I-64 mainline traffic would have to be shifted to half of the mainline so that half of the I-64 elevated mainline can be constructed. When that half of the mainline is complete, traffic would be shifted to the new pavement so the remaining half of the I-64 mainline could be constructed. The lower level CD roads could be constructed in phases along with the I-64 mainline. The profiles of the elevated roadway sections and the CD roads underneath would govern when and how the stages would be constructed.

Brentwood Boulevard underpass and the single point diamond interchange would be constructed in phases half at a time while still maintaining traffic service. Hanley Road interchange would be more complex because of the adjustments of vertical grades that would take place to construct the three-levels of roadways at that location. Access across I-64 on Hanley Road would be extremely difficult to maintain at all times unless the new bridge is constructed in phases around the existing bridge. Most likely, Hanley Road traffic would use Eager Road to access I-170 and Brentwood Boulevard if access would be restricted.

Flat Option 3 – Because this option is wider than the stacked option and wider than existing right-of-way east of Brentwood Boulevard, much of the I-64 and CD road construction does not involve bridge structures. Due to the purchase of new right-of-way, as much construction as possible would occur adjacent to existing I-64 while not reducing capacity or impacting traffic service on I-64.

Reconstructing I-170 and Galleria Parkway would be sequenced half at a time. Traffic would shift to one side of the facility then to the other, while construction occurred on the opposite half. The flyovers would be built but would not connect to I-64 or open to traffic until the I-64 mainline construction occurs. Measures would be made to maintain the existing I-64/I-170 connections open to traffic as long as possible. After as much construction as possible is complete along I-170 and on new right-of-way north of I-64, the construction of I-64 would begin half at a time.

Traffic on I-64 would shift to one side while construction of half of I-64 would occur. Construction on the other half of I-64 would occur after the first half of I-64 could be opened to traffic.

Similar to the stacked option, Brentwood Boulevard underpass and the single point diamond interchange would be constructed in phases half at a time while still maintaining traffic service. Hanley Road interchange would be constructed in a similar way. Access across I-64 on Hanley Road would be extremely difficult to maintain at all times unless the new bridge is constructed in phases around the existing bridge. Construction may be accelerated with design-build. Most likely Hanley Road traffic would use Eager Road to access I-170 and Brentwood Boulevard if access would be restricted.

f. Project Costs

The estimated construction cost for the Build Alternatives are approximately $544 to $598 million in current year (2003) dollars depending upon which Build Alternative is under evaluation. As the work will not be initiated in the current years, the cost will be greater in the future when the construction is initiated. Relocation costs are estimated using an average of relocation costs incurred for MoDOT District 6 for the years 1999-2000. Right-of-way and construction costs were estimated by MoDOT District 6 based upon current cost experience. Table II-9 provides a cost summary for the three I-64 subcorridors.

Table II-9
Estimated Build Alternative Construction Cost
(in year 2003 dollars)

Build Alternatives		Greenway Subcorridor Cost	Thruway Subcorridor Cost	Parkway Subcorridor Cost	Total Cost
WITH Oakland Avenue Ramp					
Stacked Alt. 2	R/W , Relocation, Mitigation	$9,910,000	$60,000,000	$8,220,000	$78,130,000
	Construction	$138,820,000	$265,600,000	$115,870,000	$520,290,000
	Total	**$148,730,000**	**$325,600,000**	**$124,090,000**	**$598,420,000**
Stacked Alt. 2a	R/W, Relocation, Mitigation	$9,910,000	$54,860,000	$8,220,000	$72,990,000
	Construction	$138,820,000	$267,530,000	$115,870,000	$522,220,000
	Total	**$148,730,000**	**$322,390,000**	**$124,090,000**	**$595,210,000**
Flat Alt. 3	R/W, Relocation, Mitigation	$9,910,000	$64,240,000	$8,220,000	$82,370,000
	Construction	$138,820,000	$218,170,000	$115,870,000	$472,860,000
	Total	**$148,730,000**	**$282,410,000**	**$124,090,000**	**$555,230,000**
Flat Alt. 3a	R/W, Relocation, Mitigation	$9,910,000	$55,090,000	$8,220,000	$73,220,000
	Construction	$138,820,000	$218,620,000	$115,870,000	$473,310,000
	Total	**$148,730,000**	**$273,710,000**	**$124,090,000**	**$546,530,000**

Build Alternatives		Greenway Subcorridor Cost	Thruway Subcorridor Cost	Parkway Subcorridor Cost	Total Cost
WITHOUT Oakland Avenue Ramp					
Stacked Alt. 2	R/W, Relocation, Mitigation	$9,910,000	$60,000,000	$7,830,000	$77,740,000
	Construction	$138,820,000	$265,600,000	$113,240,000	$517,660,000
	Total	**$148,730,000**	**$325,600,000**	**$121,070,000**	**$595,400,000**
Stacked Alt. 2a	R/W, Relocation, Mitigation	$9,910,000	$54,860,000	$7,830,000	$72,600,000
	Construction	$138,820,000	$267,530,000	$113,240,000	$519,590,000
	Total	**$148,730,000**	**$322,390,000**	**$121,070,000**	**$592,190,000**
Flat Alt. 3 (Preferred)	R/W, Relocation, Mitigation	$9,910,000	$64,240,000	$7,830,000	$81,980,000
	Construction	$138,820,000	$218,170,000	$113,240,000	$470,230,000
	Total	**$148,730,000**	**$282,410,000**	**$121,070,000**	**$552,210,000**
Flat Alt. 3a	R/W, Relocation, Mitigation	$9,910,000	$55,090,000	$7,830,000	$72,830,000
	Construction	$138,820,000	$218,620,000	$113,240,000	$470,680,000
	Total	**$148,730,000**	**$273,710,000**	**$121,070,000**	**$543,510,000**

Source: MoDOT District 6 and HNTB Corporation, 2002.

Construction is assumed to begin in year 2008. The year in which the project is completed will depend upon the level of funding provided. Three potential funding scenarios were considered although other funding scenarios unknown at this time could occur. In the full funding scenario, construction projects would be contracted within three years and the entire project completed in six years. With partial funding, the rate of funding would be slightly slower, resulting in the project taking up to eight years. Under this scenario, construction projects would be contracted in the first five years and the entire project completed in eight years. The third funding scenario assumes relatively low levels of funding per year. In a minimal funding scenario, projects would be contracted and completed over 16 years. In all three scenarios, construction is assumed to begin in the year 2008.

If construction costs are assumed to increase three percent per year, the total project costs would increase between the current year and the year the last project segment is contracted. With inflation, the total project costs would range between $668 million and $853 million by the time the projects were completed.

Table II-10
Estimated Build Alternative Project Cost with Three Potential Funding Scenarios
(adjusted for inflation in millions of dollars)

Build Alternatives	Construction Year Cost (year 2003)	Construction Year Cost (year 2008)	Full Funding (6 years)	Partial Funding (8 years)	Minimal Funding (16 years)
WITH Oakland Avenue Ramp					
Stacked Alt. 2	$ 598.4	$ 693.7	$ 736.0	$ 758.0	$ 853.2
Stacked Alt. 2a	$ 595.2	$ 690.0	$ 732.0	$ 754.0	$ 848.6
Flat Alt. 3	$ 555.2	$ 643.6	$ 682.8	$ 703.3	$ 791.6
Flat Alt. 3a	$ 546.5	$ 633.5	$ 672.1	$ 692.3	$ 779.2

Build Alternatives	Construction Year Cost (year 2003)	Construction Year Cost (year 2008)	Full Funding (6 years)	Partial Funding (8 years)	Minimal Funding (16 years)
WITHOUT Oakland Avenue Ramp					
Stacked Alt. 2	$ 595.4	$ 690.2	$ 732.3	$ 754.2	$ 848.9
Stacked Alt. 2a	$ 592.2	$ 686.5	$ 728.3	$ 750.2	$ 844.3
Flat Alt. 3 (Preferred)	$ 552.2	$ 640.2	$ 679.1	$ 699.5	$ 787.3
Flat Alt. 3a	$ 543.5	$ 630.1	$ 668.4	$ 688.5	$ 774.9

Source: MoDOT District 6 and HNTB Corporation, 2003.

The total estimated project costs adjusted for inflation for the Build Alternatives are shown in Table II-10 for the three funding scenarios. Lower costs are shown for the funding scenarios with a shorter construction length.

D. Traffic

The traffic characteristics of the No-Build and Build Alternatives were assessed in order to assist in the refinement and evaluation of the alternatives. The results of this analysis are presented in the following sections.

1. TRAVEL DEMAND AND METHODOLOGY

a. Overview

The ability to provide a more efficient transportation system is an integral component of I-64 improvements. Interstate 64 in St. Louis County and city of St. Louis serves as a primary east-west route for commuting traffic and for persons accessing the residences, businesses, services and major destinations located within the corridor, to downtown St. Louis and in the west St. Louis County area.

To evaluate the relative traffic impacts of each alternative, the regional travel demand forecasting model developed and maintained by EWGCC was used. This model was used to develop future year traffic volumes (year 2020) with and without each of the improvement alternatives. The results of the model were used in developing a.m. and p.m. peak hour volume forecasts for the No-Build and Build Alternatives for the refined mainline and interchange area alternatives. In addition, the benefits of each alternative were evaluated in terms of operating costs, vehicle travel times, and vehicular crash savings.

The regional traffic demand model, while providing accurate comparison information for vehicle miles traveled (VMT) and vehicle hours traveled (VHT), is not sensitive enough to distinguish between small alignment changes. The traffic simulation model did provide a differentiation between the flat and stacked Build Alternatives at the I-170 area and this information is reported in the tables below.

b. Average Annual Daily Traffic (AADT)

The assigned year 2020 model volumes represent the daily number of vehicle trips at a specific point on the roadway network. The year 2020 volumes for the No-Build and the Build Alternatives are shown in Table II-11. The forecasted traffic differences between the No-Build and Build Alternatives are not large and only occur in the sections of I-64 that would be widened. The other sections of I-64 would operate at capacity for both alternatives.

Table II-11 Year 2020 Forecasted Average Annual Daily Traffic (AADT)

Mainline Section	No-Build Year 2020 ADT (from PTG model)**	Build Year 2020 ADT*
Greenway (Spoede to McKnight)	150,000-185,000	160,000-195,000
Thruway (McKnight to I-170)	160,000	170,000
Thruway (I-170 to Bellevue)	145,000	145,000
Parkway (Bellevue to Clayton)	125,000 – 150,000	125,000 – 150,000
Parkway (Clayton to Sarah)	125,000 – 150,000	125,000 – 150,000
I-170 (Brentwood Blvd. to I-64)	95,000	95,000

*1997 Cross County MTIA future Build recommendations were used for Build conditions (see Chapter I).
**PTG is a consultant to MoDOT Planning and Traffic Division, District 6.

c. Vehicle Miles Traveled (VMT)

Overall system measures for the No-Build and Build Alternatives were calculated to further study the number of times motorists spend traveling I-64 and the number of miles traveled. These measures are used as a basis of comparison between alternatives. The St. Louis regional traffic demand model was used to complete the analysis. The traffic simulation modeling also aided this evaluation by analyzing ramp terminals. Table II-12 illustrates the future (year 2020) system measures for the St. Louis regional metropolitan area. The results indicate that motorist travel more miles for the Build Alternatives when compared to the No-Build Alternative when forecasting future VMT. The additional VMT associated with the Build Alternatives result from the Build Alternative's higher traffic volumes presented in Table II-12. The findings show that the additional capacity and operational benefits from the Build Alternative would improve travel times and result in the ability for more travelers to use a higher speed facility, enabling travel of longer distances, resulting in a small increase in the number of miles traveled.

Table II-12 Year 2020 Forecasted Vehicle Miles Traveled (VMT)

Alternative	Daily VMT	Difference from No-Build
Region with No-Build	67,025,434	0
Region with Build (I-170 Stacked)	67,191,053	165,619
Region with Build (I-170 Flat)	67,191,484	166,050

Source: HNTB Corporation, 2002.

d. Vehicle Hours Traveled (VHT)

The amount of time vehicles are on the road is a function of how far motorists must travel between their origin and destination as well as the level of congestion encountered. The VHT is calculated by summing the travel time made by each vehicle trip in the network. Similar to VMT, the St. Louis regional traffic demand model was used to complete the analysis. The traffic simulation modeling also aided this evaluation by analyzing ramp terminals. The results indicate that motorist travel time decreases for the Build Alternatives when compared to the No-Build Alternative in Table II-13. The decrease in travel time is a result of the additional capacity and operational improvements associated with the Build Alternative that enable motorists to reduce the amount of time spent in traffic congestion within the project corridor.

Table II-13 Year 2020 Forecasted Vehicle Hours Traveled (VHT)

Alternative	Daily VHT	Difference from No-Build
Region with No-Build	2,148,772	0
Region with Build (I-170 Stacked)	2,139,417	- 9,355
Region with Build (I-170 Flat)	2,139,402	- 9,370

Source: HNTB Corporation, 2002.

e. Level of Service

An analysis of the level of service (LOS) of freeway mainline segments located between interchange areas for the a.m. and p.m. peak hours of travel was completed. The *Highway Capacity Manual 2000* methodology was used. Table II-14 illustrates the future (year 2020) peak hour volume levels of service expected for the I-64 study corridor. The results indicate that many of the mainline freeway segments located between interchange areas would operate at an unsatisfactory LOS (LOS E or F) for the No-Build Alternative.

Table II-14
No-Build Alternative Year 2020 Freeway Segment Level of Service
(a.m. and p.m. Peak Hour)

Location	EB No. of Lanes	WB No. of Lanes	AM Peak Hr. EB/WB Volumes	PM Peak Hr. EB/WB Volumes	AM Peak Hr. EB/WB LOS	PM Peak Hr. EB/WB LOS
Ballas Rd. to Spoede Rd.	3+auxiliary	3+auxiliary	7485 / 5382	6460 / 6580	E / D	E / E
Spoede Rd. to Lindbergh Blvd.	3	3	6414 / 5346	6476 / 6329	F / E	F / F
Lindbergh Blvd. to Clayton Rd./Warson Rd.	3	3	6353 / 5497	6036 / 6591	F / E	F / F
Clayton Rd./Warson Rd. to McKnight Rd.	3	3	6600 / 5845	6267 / 6600	F / F	F / F
McKnight Rd. to Brentwood Blvd./I-170	3+auxiliary	3+auxiliary	7062 / 5505	5957 / 6920	E / D	D / E
Brentwood Blvd./I-170 to Hanley Rd.	3+auxiliary	3+auxiliary	7028 / 6580	6451 / 7536	E / D	E / F
Hanley Rd. to Laclede Station Rd.	3	3	6132 / 6296	5818 / 6444	F / F	F / F
Laclede Station Rd. to Big Bend Blvd.	3	3	6297 / 6316	5885 / 6479	F / F	F / F
Big Bend Blvd. to Bellevue Ave.	3+auxiliary	3+auxiliary	7159 / 6752	6433 / 7552	D / D	D / D
Bellevue Ave. to McCausland Ave.	3	3	6070 / 5577	5287 / 6287	F / E	E / F
McCausland Ave. to Oakland Ave./Clayton Rd.	3+auxiliary	3+auxiliary	5840 / 4563	4522 / 5820	E / D	D / E
Oakland Ave./Clayton Rd. to Hampton Ave.	4	3+auxiliary	6320 / 5890	5337 / 6847	E / D	D / E
Hampton Ave. to Kingshighway Blvd.	4	4	6384 / 5358	5137 / 7120	E / D	D / E
Kingshighway Blvd. to Sarah St.	3+auxiliary	4	5570 / 5405	4917 / 6475	D / D	D / E
I-170 (I-64 to Galleria Pkwy.)	3+auxiliary (NB)	3+auxiliary (SB)	4564 / 3563 (NB) / (SB)	4131 / 4536 (NB) / (SB)	C (NB) C (SB)	C (NB) D (SB)
I-170(Galleria Pkwy. to Brentwood Blvd.)	3 (NB)	3 (SB)	5014 / 4163 (NB) / (SB)	4731 / 5136 (NB) / (SB)	D (NB) D (SB)	D (NB) D (SB)

Above LOS information based on *Highway Capacity Manual 2000*, Transportation Research Board, Chapters 23-25.

The analysis was performed by the HNTB Corporation as part of Job No. J6I0978 (Right-of-way, aesthetic design and traffic modeling for the I-64 corridor from Spoede to Tower Grove), 2002.

The same methodology and analysis was performed for the a.m. and p.m. peak hours of travel for the Build Alternative. Table II-15 illustrates the future (year 2020) peak hour volumes and LOS expected for the I-64 study corridor. The results indicate that nearly all of the mainline freeway segments located between interchange areas would operate at a satisfactory LOS (LOS D or above) for the Build Alternative.

Traffic analysis of the No-Build and Build Alternatives was completed in more detail evaluating weaving areas, ramp merge and diverge areas and LOS for the ramp terminals. The *Highway Capacity Manual 2000* methodology was used to complete the analysis; plus, the traffic model simulations were created and were used. Appendix B contains the results of the evaluation. In general, the No-Build analysis continued to result in an unsatisfactory LOS (LOS E or F) while the Build Alternative results in satisfactory LOS (LOS D or above).

Table II-15
Build Alternative Year 2020 Freeway Segment Level of Service
(a.m. and p.m. Peak Hour)

Location	EB No. of Lanes	WB No. of Lanes	AM Peak Hr. EB/WB Volumes	PM Peak Hr. EB/WB Volumes	AM Peak Hr. EB/WB LOS	PM Peak Hr. EB/WB LOS
Ballas Rd. to Spoede Rd.	4	4	7510 / 5164	6250 / 6268	E / C	D / D
Spoede Rd. to Lindbergh Blvd.	4+auxiliary	4+auxiliary	7244 / 5128	6266 / 6017	D / C	C / C
Lindbergh Blvd. to Clayton Rd./Warson Rd.	4	4	6995 / 5280	6003 / 6012	D / C	D / D
Clayton Rd./Warson Rd. to McKnight Rd.	4	4	7273 / 5628	6234 / 6497	D / D	D / D
McKnight Rd. to Brentwood Blvd.	4+auxiliary	4+auxiliary	6907 / 5288	5924 / 6341	D / C	C / C
Brentwood Blvd. to I-170	3	3	6568 / 4986	5661 / 5945	C / D	C / C
I-170 to Hanley Rd.	3+auxiliary	3+auxiliary	6496 / 5587	5949 / 6310	D / D	C / D
Hanley Rd. to Big Bend Blvd./Bellevue Ave.	3+2 auxiliaries	3+2 auxiliaries	5978 / 6079	5785 / 6330	C / C	C / C
Big Bend Blvd./Bellevue Ave. to McCausland Ave.	3	3	5751 / 5340	5187 / 6124	D / C	C / D
McCausland Ave. to Clayton Rd./Skinker Blvd.	4	3+auxiliary	5521 / 4592	4422 / 5662	C / C	C / D
Clayton Rd./Skinker Blvd. to Hampton Ave.	4+auxiliary	4+auxiliary	6301 / 6100	5526 / 6972	C / C	C / D
Hampton Ave. to Kingshighway Blvd.	4+auxiliary	4	6365 / 5568	5326 / 7245	D / D	C / D
Kingshighway Blvd. to Tower Grove Ave.	4+auxiliary	4+auxiliary	5551 / 5615	5106 / 6600	C / C	C / C
Tower Grove Ave. to Sarah St.	3+auxiliary	4	4921 / 5015	4436 / 5550	C / C	C / D
I-170 (I-64 to Galleria Pkwy.)	3 (NB)	3 (SB)	4564 / 3563 (NB) / (SB)	4131 / 4536 (NB) / (SB)	D (NB) C (SB)	D (NB) D (SB)
I-170 (Galleria Pkwy. to Brentwood Blvd.)	3 (NB)	3 (SB)	5014 / 4163 (NB) / (SB)	4731 / 5136 (NB) / (SB)	D (NB) C (SB)	D (NB) D (SB)

Above LOS information based on *Highway Capacity Manual 2000*, Transportation Research Board, Chapters 23-25.

The analysis was performed by the HNTB Corporation as part of Job No. J6I0978 (Right-of-way, aesthetic design and traffic modeling for the I-64 corridor from Spoede to Tower Grove), 2002.

2. CRASH DATA AND ANALYSIS[1]

Crash information for this analysis was obtained through the MoDOT's traffic management database and reports. The analysis of the existing crash rates and amounts by type is included in Chapter I – Purpose and Need for Action of this EIS. The analysis of the existing conditions provides a benchmark on which to evaluate the Build and No-Build forecasted safety measures

[1] Accident statistics and safety data summarized or presented in this section are protected under federal law. See Appendix AA.

and benefits. Crash data obtained from MoDOT has crashes categorized by severity: property damage only (PDO), injury and fatality.

Motorists in the No-Build Alternative would be exposed to the same crash risk or rate that currently exists. To forecast the No-Build Alternative's future year 2020 number of crashes, the assumption was made that the existing I-64 corridor crash rates would not change when compared to existing conditions. Existing rates are listed in Chapter I – Purpose and Need for Action. Because the No-Build Alternative would in general rebuild the facility as is, no substantial improvements to safety and the design standards would occur to reduce the crash rates.

Because the rate at which the crashes occur remains the same as existing, but the amount of traffic using the facility increases, the total amount of crashes increases over time for the No-Build Alternative. Table II-16 indicates the total amount of crashes by type that the No-Build Alternative would expect in year 2020.

Table II-16
Forecasted No-Build Alternative Average Annual Number of Crashes
(Year 2020)

Mainline Section	Property Damage Only	Injury	Fatal	Total
West of Spoede to west of Lindbergh	41	20	0	61
West of Lindbergh to west of Clayton/Warson	93	37	0	130
West of Clayton/Warson to west of McKnight	53	25	1	79
West of McKnight to west of Brentwood	75	30	0	105
West of Brentwood to west of Hanley	146	50	0	196
West of Hanley to west of Laclede Station	125	54	0	179
West of Laclede Station to west of Big Bend	42	17	0	59
West of Big Bend to west of Bellevue	52	24	0	76
West of Bellevue to west of McCausland	32	11	0	43
West of McCausland to west of Hampton	71	27	0	98
West of Hampton to west of Kingshighway	50	22	0	72
West of Kingshighway to west of Tower Grove	68	30	0	98
West of Tower Grove to Sarah Street	37	18	0	55
I-170 (Brentwood Blvd. to I-64)	62	26	0	88
Total	**947**	**391**	**1**	**1,339**

Source: HNTB Corporation, 2002.

The Build Alternative crash rate methodology establishes the new and improved crash rate projections for the improved facility using the existing average statewide rates for urban interstates. The current crash rates for I-64 are greater than the statewide average (see Chapter I – Purpose and Need for Action). The improved facility is assumed to improve safety and decrease crash rates, at a minimum to match current statewide average crash rates for urban interstates.

Where the existing crash rate by mainline section was found to be less than the statewide average, the existing rate was used because the Build Alternative and the updated design standards are not expected to decrease safety benefits or increase crash rates. These new rates were then applied to the forecasted travel demand traffic volumes and the mainline section lengths to determine the number of projected crashes by type for the Build Alternative. The

results were then rounded to the nearest whole crash per each mainline segment. The Build Alternative could then be compared to the No-Build Alternative to estimate the safety benefits.

The list below shows the Build Alternative crash rates used.

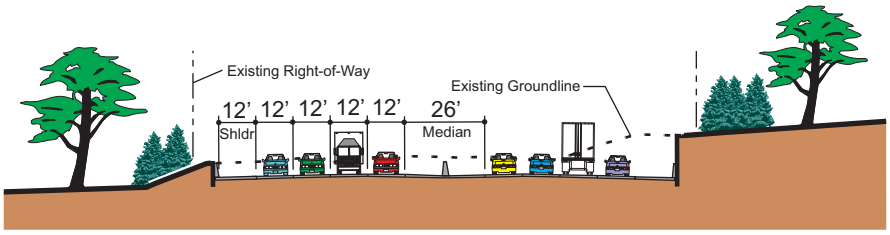
- Property Damage Only crash rate equals 87.3 crashes per hundred million vehicle miles traveled (HMVMT)
- Injury crash rate equals 34.0 per HMVMT
- Fatal crash rate equals 0.3 per HMVMT
- Total crash rate equals 121.6 per HMVMT

In general, the rate at which crashes occur reduces in the Build Alternative, but the amount of traffic using the facility increases, so a trade-off occurs when estimating the forecasted number of crashes. In this case, the total amount of crashes decreases over time for the Build Alternative, because the crash rate reduction compensated for the forecasted increases in traffic volumes. Table II-17 indicates the total amount of crashes by type that the Build Alternative would expect in year 2020. Findings indicate that the design variations at the I-170 area and the McCausland interchange within the Build Option are negligible when forecasting future crash rates.

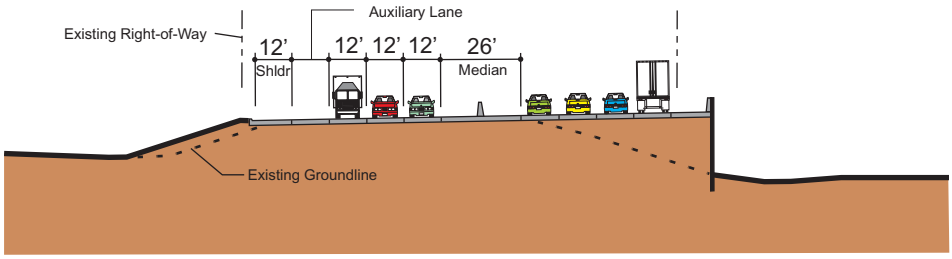
Table II-17
Build Alternative Forecasted Average Annual Number of Crashes
(Year 2020)

Mainline Section	Property Damage Only	Injury	Fatal	Total
West of Spoede to west of Lindbergh	32	16	0	48
West of Lindbergh to west of Clayton/Warson	32	12	0	44
West of Clayton/Warson to west of McKnight	54	25	1	80
West of McKnight to west of Brentwood	57	21	1	79
West of Brentwood to west of Hanley	46	17	0	63
West of Hanley to west of Laclede Station	25	9	0	34
West of Laclede Station to west of Big Bend	19	7	0	26
West of Big Bend to west of Bellevue	25	11	0	36
West of Bellevue to west of McCausland	17	6	0	23
West of McCausland to west of Hampton	52	19	0	71
West of Hampton to west of Kingshighway	51	19	0	70
West of Kingshighway to west of Tower Grove	43	16	0	59
West of Tower Grove to Sarah Street	28	10	0	38
I-170 (Brentwood Blvd. to I-64)	25	9	0	34
Total	**506**	**197**	**2**	**705**

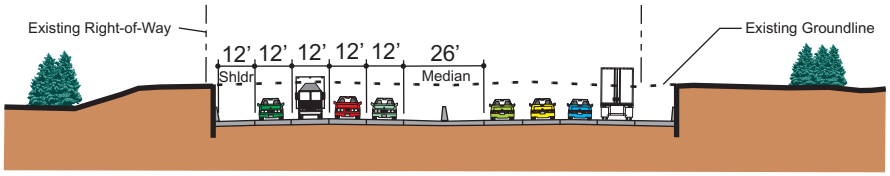
Source: HNTB Corporation, 2002.



TYPICAL GREENWAY
(EAST OF SPOEDE ROAD)



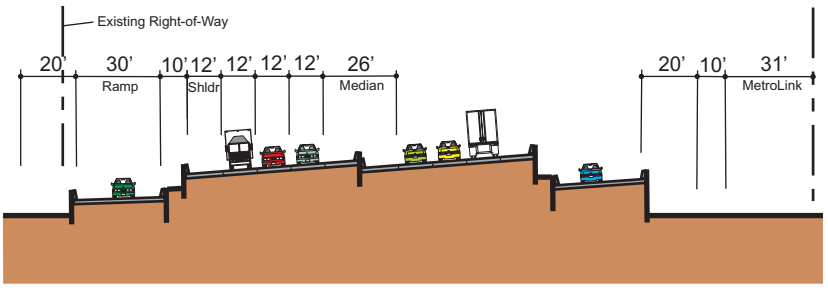
TYPICAL THRUWAY
(WEST OF BIG BEND BLVD.)



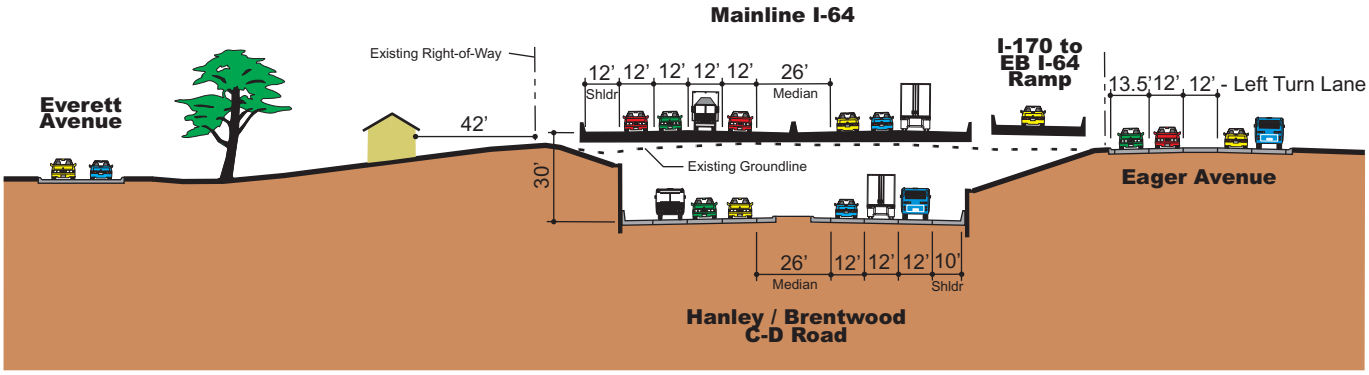
TYPICAL PARKWAY
(WEST OF HAMPTON)

I-64 CORRIDOR STUDY

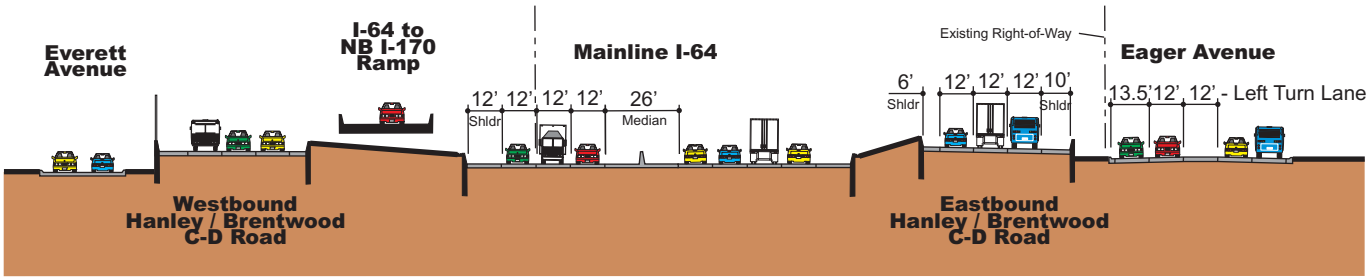
TYPICAL SECTIONS
(Views Looking East)
Exhibit II-1



I-170 WITH SINGLE LANE RAMPS
(NORTH OF GALLERIA PKWY. LOOKING NORTH)



I-64 / I-170 INTERCHANGE AREA
(ALTERNATIVES 2 & 2a EAST OF BRENTWOOD Looking East)



I-64 / I-170 INTERCHANGE AREA
(ALTERNATIVES 3 & 3a EAST OF BRENTWOOD Looking East)

THE NEW I-64

MoDOT

TYPICAL SECTIONS
I-64/I-170 INTERCHANGE AREA
Exhibit II-2

I-64 CORRIDOR STUDY