SECTION 3

Alternatives Considered

This section describes the process used to develop and evaluate the range of alternatives for the I-270 North EA to correct the existing and future problems identified in the Purpose and Need Statement (**Section 2**). The development and evaluation of alternatives was based on engineering evaluations; agency coordination; consideration of social, economic, and environmental impacts; and public input. The alternatives retained for detailed analysis are described in this section. The justifications for eliminating alternatives from further consideration are also discussed. This section concludes by describing the Preferred Alternative and the justification for its identification.

3.1 Overview of the Alternative Development Process

Starting from an infinite number of ways to solve any problem, the process to identify the Preferred Alternative was based on a screening process that began by identifying a wide range of initial alternatives that could potentially address the transportation needs established by the study. These initial alternatives were called ***Conceptual Alternatives***. The Conceptual Alternatives were developed in accordance with principles of interstate design and appropriate design standards with consideration of existing planning goals, public involvement, potential environmental impacts, and engineering judgment. The primary screening tool used to evaluate the Conceptual Alternatives was an analysis of how well they could satisfy the study's Purpose and Need. Those that were determined to at least minimally satisfy the study's Purpose and Need were advanced for further consideration.

Starting with the Conceptual Alternatives, engineering evaluations (tempered by agency coordination; social, economic and environmental constraints; and public input) were conducted to develop configurations suitable for implementation. These alternatives were called the ***Reasonable Alternatives***. The Reasonable Alternatives were further developed and refined according to more detailed engineering analysis and known constraints, allowing for the establishment of preliminary study footprints. This allowed for detailed impact assessments, cost estimates, and traffic evaluations.

The alternative that best accomplishes the Purpose and Need for the proposed action, while avoiding, minimizing, or mitigating the impacts to the social and natural environment, was identified as the ***Preferred Alternative***. The Preferred Alternative is discussed throughout this document.

Pursuant to the circulation, coordination, and evaluation of this I-270 North EA, the Preferred Alternative may be accepted, refined, rejected, or replaced. If accepted, this alternative will then be known as the ***Selected Alternative***. The NEPA process will either determine that there are no significant impacts resulting from the Preferred Alternative (thus concluding with a Finding of No Significant Impact [FONSI]), or identify that there are significant impacts (thus requiring the preparation of an Environmental Impact Statement).

Figure 3-1 depicts the overall process of alternative development and evaluation.

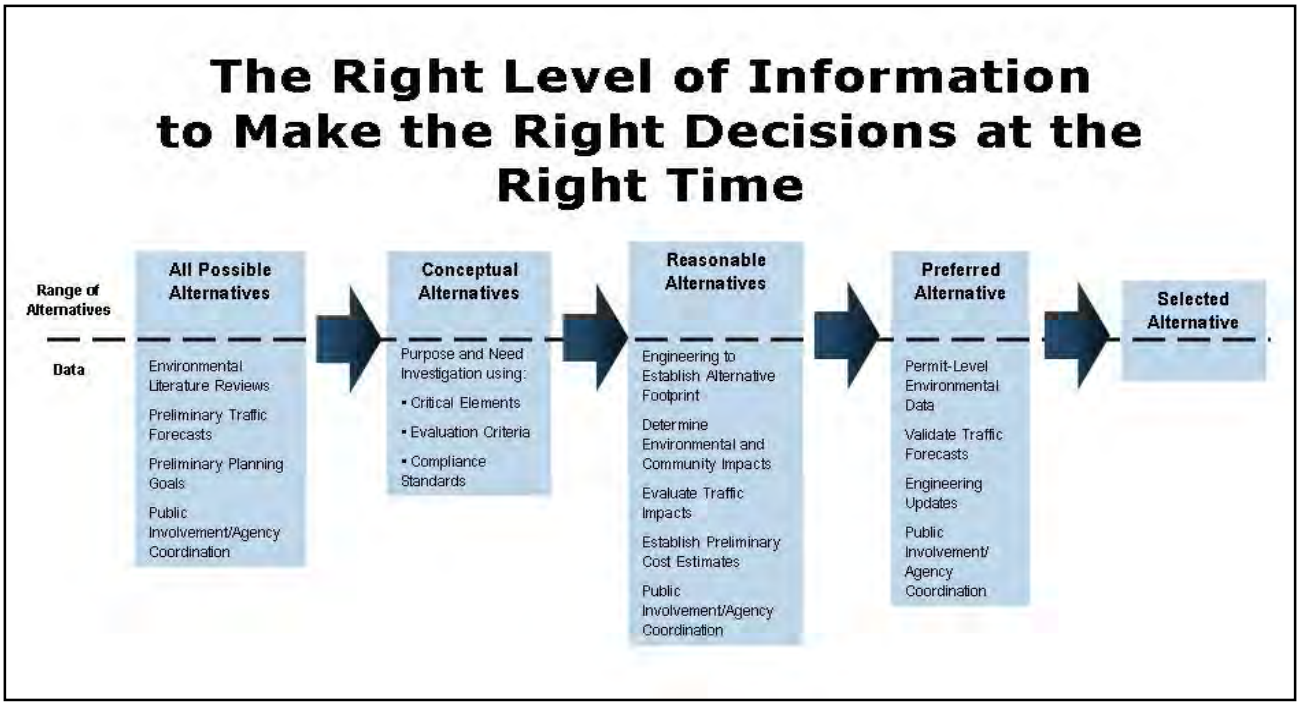


Figure 3-1. Process of Alternative Development and Evaluation

3.2 Development and Evaluation of Conceptual Alternatives

The Conceptual Alternatives represent the wide range of initial alternatives that could potentially address the transportation needs established by the study. Those that were determined to minimally satisfy the study's Purpose and Need were advanced for further consideration.

The heart of the I-270 North EA location study is the development and evaluation of alternatives to achieve the study's goals. This includes achieving the study's Purpose and Need, satisfying the goals of MoDOT, achieving the community's desires, and minimizing negative impacts to the human and natural environment. The initial round of alternative development was the identification of Conceptual Alternatives. The Conceptual Alternatives represented reasonably foreseeable solutions that could satisfy all transportation problems that affect the study area.

Out of a broad range of Conceptual Alternatives, only those alternatives that satisfied study's Purpose and Need moved on to become Reasonable Alternatives. To determine if an alternative satisfied the study's Purpose and Need, the alternative was qualitatively evaluated against the study's Purpose and Need elements. Alternatives determined to be substantially flawed in terms of one or more Purpose and Need elements were eliminated from further consideration.

A Conceptual Alternative had to be minimally consistent with all Purpose and Need elements identified for the I-270 North EA to be considered a Reasonable Alternative. This section summarizes the material contained in the Conceptual Alternative Screening and Reasonable Alternative Recommendations Technical Memorandum (available upon request).

3.2.1 Process Used to Develop Conceptual Alternatives

Conceptual Alternatives were developed using a process that involved three separate, but related, components. The first component was developing the configuration of the interstate mainline. The development of mainline alternatives focused on the number of basic lanes in each direction and the location and length of auxiliary lanes between interchanges. The second component involved developing and analyzing interchange configurations at the existing crossroads along I-270. The third component

involved developing the configuration of Dunn Road and Pershall Road, as well as the corresponding intersections with the crossroads along I-270.

For purposes of alternative development, the corridor was initially divided into 11 subareas with each subarea covering one or two interchanges and the associated portion of the mainline I-270. In each subarea, up to three conceptual interchange types and Dunn/Pershall Road configurations were developed. Alternative A in each subarea included interchange configurations with one-way Dunn Road and Pershall Road. Alternative B involved interchange configurations with two-way Dunn Road and Pershall Road. Alternative C included a third interchange type with two-way Dunn Road and Pershall Road. As long as the one-way and two-way outer roads transition in logical locations, the interchange alternatives presented in this document are interchangeable (e.g., interchange Alternative A could be paired with Alternative B or Alternative C at the next interchange). The configuration of Dunn Road and Pershall Road between Hanley/Graham Road and New Halls Ferry Road, however, had to be either all one-way or all two-way to satisfy operational requirements and meet driver expectancy.

Once the Conceptual Alternatives were identified, the subareas were combined into four map areas and renamed as Alternatives 1 and 2. This allowed for easier viewing of large portions of the corridor to provide a better understanding of how the alternatives worked from one interchange to the next. With the previously noted exception, individual interchange alternative configurations could still be mixed and matched.

3.2.2 Conceptual Alternatives Not Requiring Complete Rebuild

The wide range of initial alternatives included build alternatives as well as alternatives that do not require the construction of completely new facilities. These are described as follows.

3.2.2.1 No-Build Alternative

The No-Build Alternative for the I-270 North EA would consist of maintaining the current roadways in essentially their current condition. Routine maintenance would continue to be conducted, and occasional minor safety upgrades would be implemented. No capacity additions or major improvements would be made. Overall, the No-Build Alternative does nothing to meet the study Purpose and Need. It is described in this document to provide a baseline condition against which the changes associated with the other alternatives may be evaluated.

The No-Build Alternative assumes that no capacity additions on major improvements would be constructed, thus many impacts—positive and negative—associated with a new facility, would not occur. These impacts would include expenditure of funds, land use changes that include converting existing development or public lands into highway right-of-way, potential increased economic development, improved multi-modal accessibility and improved safety. The No-Build Alternative is not a no-cost concept as maintenance and repair of the existing roadway infrastructure would be needed to ensure the continued use of the corridor. Given the age of the corridor, maintenance costs are an increasing concern.

3.2.2.2 Transportation System Management and Travel Demand Management

Transportation System Management (TSM) solutions focus on improving the existing system, without construction of additional new infrastructure. TSM techniques include minor roadway upgrades, adding or upgrading traffic signals, and improving signage and route guidance. Minor roadway upgrades would generally be implemented within the existing right-of-way and could include interchange configuration improvements, surface street intersection improvements, construction of new turn lanes, and lane/shoulder widening. In many ways, the build alternatives being developed incorporate the essence of TSM solutions. Where the transportation problems are greater, more expansive new build solutions are necessary. Relying solely on TSM will not allow I-270 to operate as needed.

Travel Demand Management (TDM) solutions reduce congestion on existing transportation infrastructure. In that way, existing roadways can function acceptably for a longer time. For example, decreasing the dependency on single-occupant vehicles, altering the time and location of trips (flexible work hours), supporting ridesharing, and supporting increased transit use are typical TDM measures. These measures are also components of the emerging alternatives. For example, at the MO 370 interchange, one of the alternatives provides space for a potential park/ride facility (or other transit-related use). Likewise, bicycle/pedestrian uses are components of the study's Purpose and Need. The study team is also working directly with Metro Transit (the region's transit agency) and the trucking community to coordinate their needs, mission, and concerns. Accomplishing the study's goals will not be possible without incorporating TDM; however, neither will it solely rely on it.

3.2.3 Conceptual Build Alternatives

As described in **Section 3.2.1**, the Conceptual Alternatives were established in 11 separate subareas that were eventually combined into four map areas. The number of basic lanes on the interstate is the same for all alternatives. There are four basic lanes in each direction between I-70 and MO 367 and three basic lanes in each direction between MO 367 and the Chain of Rocks Bridge. The number, locations, and lengths of auxiliary lanes are dependent on the interchange and Dunn/Pershall Road configurations associated with each alternative.

Table 3-1 (at the end of this section) lists the conceptual interchange types along the study corridor. The Conceptual Alternatives were developed to address the transportation related problems referenced in the I-270 North EA Purpose and Need Statement. They are founded on basic urban freeway planning and design principles, and have been engineered to be feasible in three dimensions based on study design criteria. It should be noted that at the conceptual stage of development, there were no proposed changes to the interchanges at I-70, MO 370, and I-170.

Configuration of the Conceptual Alternatives

In each subarea, up to three conceptual interchange types and Dunn/Pershall Road configurations were developed:

- Alternative A uses interchange configurations with a one-way Dunn Road and Pershall Road system.
- Alternative B uses interchange configurations with a standard two-way Dunn Road and Pershall Road system.
- Alternative C uses an alternative interchange type with a two-way Dunn Road and Pershall Road.

Graphic depictions of the Conceptual Alternatives are shown in the Conceptual Alternatives and Screening Memo (available upon request).

3.2.4 Evaluation and Screening of the Conceptual Alternatives

A qualitative evaluation process was undertaken to screen the Conceptual Alternatives against the study's Purpose and Need, operational expectations, stakeholder interests, and environmental impacts. The following subsections identify the important conclusions drawn about the Conceptual Alternatives. These conclusions were drawn by consensus within MoDOT. Those alternatives eliminated from further consideration were determined as not being minimally consistent with the goals of MoDOT, the community's desires, and the minimization of negative impacts to the human and natural environment. The alternatives not explicitly eliminated within these subsections were deemed minimally consistent with the Purpose and Need and will be carried forward as Reasonable Alternatives.

3.2.4.1 Suitability of One-Way Outer Roads

Outside of the densest part of the corridor, roughly between Hanley/Graham Road and Old Halls Ferry Road, one-way configurations for Dunn Road and Pershall Road were considered and eliminated from consideration. These one-way configurations were designated as Conceptual Alternative A.

Alternative A in Subarea 03 (MO 370 to McDonnell Boulevard) is configured as a partial cloverleaf interchange at McDonnell Boulevard with reconfigured one-way Dunn and Pershall Roads. The one-way Dunn/Pershall Road configuration, which requires substantial new right-of-way acquisition (for re-construction of Pershall Road), does not contribute to improved mobility and operations within the I-270 corridor. Furthermore, it largely reduces accessibility to land uses along the proposed Pershall Road immediately west of Lindbergh due to distance between McDonnell Boulevard and Lindbergh Boulevard. To a slightly lesser degree, accessibility and mobility to/from land uses north of I-270 will also be reduced.

Elimination of Select One-Way Alternatives

Given the lack of benefits associated with the one-way Dunn Road and Pershall Road configuration, in Subareas 3, 4, 8, 9, 10, and 11, the project team and MoDOT concluded that Alternative A is not minimally consistent with the study's Purpose and Need and was therefore eliminated from further consideration.

Alternative A in Subarea 04 (Lindbergh Boulevard) is configured as a partial cloverleaf Interchange at Lindbergh Boulevard with one-way Dunn Road and Pershall Road through the interchange. The existing two-way Dunn Road north of I-270 is reconfigured as one-way. The existing two-way Brookes Drive south of I-270 and west of Lindbergh, is extended east to McDonnell Boulevard, converted to one-way, and becomes Pershall Road. The existing two-way Pershall Road south of I-270 and east of Lindbergh would also be converted to one way. The one-way Dunn/Pershall Road configuration, which requires a substantial amount of new construction for Pershall Road (west of Lindbergh), does not contribute to improved mobility and operations within the I-270 corridor. Furthermore, it reduces accessibility to land uses along the proposed Pershall Road. To a slightly lesser degree, accessibility and mobility to/from land uses north of I-270 will also be impacted. Similarly, the one-way Dunn/Pershall Road configuration negatively impacts accessibility and mobility east of Lindbergh Boulevard through the I-170 interchange to Hanley/Graham Road without notable mobility and operational benefits to the I-270 corridor.

Alternative A in Subarea 08 (MO 367) is configured as a partial cloverleaf interchange at MO 367 with a directional/fly-over ramp from EB I-270 to NB MO 367 and two-way Dunn Road and Pershall Road through the interchange. Near the western limit of the subarea, two-way Dunn Road would connect to one-way Dunn Road approaching Old Halls Ferry Road. To the east, two-way Dunn Road would continue to Bellefontaine Road where it could transition to a one-way Dunn/Pershall Road configuration. With no continuous existing Pershall Road south of I-270, the limitations resulting from the system interchange at MO 367, and the constraints associated with the Bellefontaine Conservation Area in the southeast quadrant of the interchange, a configuration with continuous one-way Dunn Road and Pershall Road was dismissed from consideration. Such a configuration would limit accessibility and mobility to/from land uses along existing Dunn Road and Pershall Road, including Christian Hospital Northeast. Furthermore, extending Pershall Road to the east through the MO 367 interchange and to Bellefontaine Road would be costly and would result in impacts to the Bellefontaine Conservation Area.

Alternative A in Subarea 09 (Bellefontaine Road) is configured as a diamond interchange at Bellefontaine Road with Dunn Road relocated to the north at Bellefontaine Road. Dunn Road and Pershall Road are configured as one-way east of Bellefontaine Road with the one-way Pershall Road being largely new construction to provide a connection to Lilac Avenue to the east. West of Bellefontaine Road, Dunn Road remains two-way as it provides a connection to MO 367 and Christian Hospital Northeast. The one-way Dunn/Pershall Road configuration, which requires substantial new construction for Pershall Road east of Bellefontaine Road, does not contribute to improved mobility and operations within the I-270 corridor. Furthermore, it negatively impacts accessibility to land uses along the existing Dunn Road east of Bellefontaine Road without notable operational benefits.

Alternative A in Subarea 10 (Lilac Avenue) is configured as a diamond interchange. Dunn Road and Pershall Road are located similarly to their existing configuration with the exception that they are converted to one way. Pershall Road is partially new construction both west and east of Lilac Avenue, providing connections

to Bellefontaine Road and Riverview Drive. The one-way Dunn/Pershall Road configuration, which requires substantial new construction for Pershall Road, does not contribute to improved mobility and operations within the I-270 corridor. Furthermore, it negatively impacts accessibility to land uses along the existing Dunn Road and severely compromises the accessibility of the land uses along Pershall Road west of Lilac Avenue without notable operational benefits.

Alternative A in Subarea 11 (Riverview Drive) is configured as a diamond interchange at Riverview Drive with one-way Dunn Road and Pershall Road. Existing Dunn Road is located close to its existing location and converted to one-way west of the existing rest area and Welcome Center. Pershall Road is newly constructed west of Riverview Drive, providing a connection to Lilac Avenue. The one-way Dunn/Pershall Road configuration, which requires substantial new construction for Pershall Road, does not contribute to improved mobility and operations within the I-270 corridor. Furthermore, it negatively impacts accessibility to land uses along the existing Dunn Road and severely compromises the accessibility of the land uses along Pershall Road west of Lilac Avenue without notable operational benefits.

Given the lack of benefits associated with the one-way Dunn Road and Pershall Road configuration, in Subareas 3, 4, 8, 9, 10, and 11, MoDOT concluded that Alternative A is not consistent with the study's Purpose and Need and was therefore eliminated from further consideration.

3.2.4.2 Suitability of Two-Way Outer Roads

Conceptual Alternatives B and C considered interchanges with two-way outer road systems. Few of these configurations were eliminated from consideration.

Alternative B in Subarea 06 (New Florissant Road to Washington Street/Elizabeth Avenue) is configured as a split diamond interchange with two-way Dunn Road relocated to the north at Washington Street/Elizabeth Avenue and one-way connector roads connecting New Florissant Road to Washington Street/Elizabeth Avenue. The WB connector road crosses under I-270 as it approaches New Florissant Road. This alternative is very similar in form and function to Alternative C in the same location. Alternative C is configured as a split diamond interchange with one-way connector roads and two-way Dunn Road. The configuration differs in that the connector roads are offset to the south of I-270, thus eliminating the need to relocate Dunn Road at Washington Street/Elizabeth Avenue. Eliminating this Dunn Road relocation eliminates substantial impacts along Dunn Road and Washington Street north of I-270 including a number of relocations. Given the considerable similarities in configuration and operational benefits of Alternatives B and C, MoDOT concluded that Alternative C is essentially an optimized configuration of Alternative B and as such, a separate consideration of Alternative B could be abandoned moving forward.

What Roadway Configuration did the Build Alternatives use?

The majority of existing I-270 included in the I-270 North EA study corridor has inside shoulder widths of 4 or 5 feet. With a 2-foot concrete barrier along centerline, the resulting existing median width is either 10 or 12 feet. In the development of the Conceptual Alternatives, and the refinement and analysis of the Reasonable Alternatives, it was assumed that, with few exceptions, the center median would ultimately be reconstructed as 12-foot, full-width inside shoulders in both directions of I-270. This results in a median width of 26 feet.

The assumption of reconstruction with full-width inside shoulders is not intended to exclude the possibility of partially reconstructing or rehabilitating portions of the corridor with 10- to 12-foot medians. Such rehabilitation or partial reconstruction with 10- to 12-foot median width may be pursued by MoDOT with the intention of maximizing existing infrastructure life, minimizing construction costs, and/or minimizing environmental impacts. The assumption of reconstruction with full-width inside shoulders should not be construed as project commitment.

The predictive safety analysis was based on the assumption of 12-foot, full-width inside shoulders. The results of these analyses formed the foundation of the safety-related performance measures. If MoDOT elects to rehabilitate or partially reconstruct portions of the corridor with an existing 10- to 12-foot median width, the predictive safety analysis will need to be re-run to evaluate the impacts of the narrower inside shoulders.

3.3 Development and Evaluation of Reasonable Alternatives

Based on the evaluation and coordination of the Conceptual Alternatives, a series of Reasonable Alternatives was developed. These configurations conform to the study's design standards, satisfy the study's Purpose and Need, and fulfill the study's desired operational characteristics and performance measures. These configurations represent changes to the I-270 corridor that will result in acceptable future conditions. The selection of a preferred alternative will be based on the differentials in impacts, costs, and performance/operating characteristics that they represent. This subsection summarizes the Reasonable Alternatives and outline the major differences in impacts, costs, and operations. **Section 4** provides greater detail regarding the impact determinations. **Section 6** examines the public outreach and agency coordination. These efforts included how well the Reasonable Alternatives satisfied stakeholder needs.

To simplify the presentation and analysis of the Reasonable Alternatives, the nomenclature used for the Conceptual Alternatives was altered. The Conceptual Alternatives used 11 subareas and configurations using alphabetical designators. The Reasonable Alternatives focus on four map areas and numerical designators. It is possible to draw a line connecting the Conceptual Alternatives to the Reasonable Alternatives.

The relationship between the Conceptual Alternatives and the Reasonable Alternatives is shown in **Table 3-1** (at the end of this section).

3.3.1 Configuration of Reasonable Alternatives

Depictions of the Reasonable Alternatives showing the study's footprint and important resources and impacts are shown in **Appendix A – Exhibits 4** and **5**.

The configurations of the Reasonable Alternatives are numbered and organized into four map areas. The configurations are interchangeable on an interchange-by-interchange basis with the exception of the portion of the corridor from Hanley/Graham Road to Old Halls Ferry Road. In this part of the corridor, Alternative 1 or Alternative 2 must be chosen across all interchanges within this area. The Reasonable Alternatives are described in the following subsections.

3.3.1.1 Reasonable Alternative 1

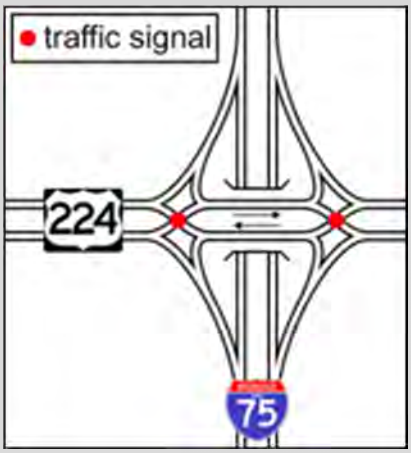
Map Area 1: I-70 to McDonnell Boulevard

Continuous auxiliary lanes (EB and WB) will be added between St. Charles Rock Road and MO 370. Shoulder and other ancillary lane characteristics will be improved. At St. Charles Rock Road, a diverging diamond interchange will replace the diamond interchange. A southbound (SB) auxiliary lane will be added through the MO 370 interchange. A new NB exit to Missouri Bottom Road (to separate from the existing exit serving MO 370 and Missouri Bottom Road) will be constructed. At McDonnell Boulevard, a diverging diamond interchange will replace the existing diamond interchange.

Map Area 2: McDonnell Boulevard to Hanley/Graham Road

The only alternative at the existing cloverleaf Lindbergh Boulevard interchange is a partial cloverleaf configuration. It will add an additional lane on I-270, east of Lindbergh. It will remove the WB collector-distributor road and the WB-to-SB loop ramp at Lindbergh Boulevard and replace them with a diamond ramp. Dunn Road will be grade-separated from the interchange. I-270 and Lindbergh interchange traffic will be

What is a Diverging Diamond Interchange?



One of the unique features included in several locations is the diverging diamond interchange. From any direction as traffic enters the interchange, a right exit is provided for the "right turns." Then the highway crosses over or under the opposing traffic of the same highway, so that traffic is now on the left side of the road. After the crossover, a direct left exit is given for the "left turns." The highway then crosses over or under both directions of the cross highway. It then receives the left turns of the cross highway from a left entrance ramp. After receiving this traffic, the highway crosses over or under the opposing highway of the same highway again to get on the right side of the road. Lastly, the highway receives the right turns from the cross highway.

Among its advantages are synchronized signals that substantially reduce delay. It increases the capacity of turning movements. It reduces the number of conflict points (14 for diverging diamond interchanges, 26 for conventional). There is better sight distance at turns. Wrong way entry to ramps is extremely difficult. Pedestrian crossings cover shorter distances.

Among the disadvantages of a diverging diamond interchange are driver unfamiliarity. Pedestrians may be required to cross free-flowing traffic. Free-flowing traffic on the non-freeway road is impossible. Exiting traffic cannot re-enter the freeway in the same direction, which creates the following issues:

It is difficult to implement stops for express transit buses.

Drivers who accidentally take the wrong exit must turn around somewhere along the crossroad.

Emergency management cannot use the exit and entrance ramps to allow freeway traffic to bypass a crash at the bridge.

An oversize load cannot use the exit and entrance ramps to bypass a low bridge.

separated from Taylor/Lynn Haven. An auxiliary lane will be added on EB I-270 between Lindbergh and I-170. Two-way Dunn Road and Pershall Road will be maintained largely in their existing locations. Shoulder and other ancillary lane characteristics will be improved.

Map Area 3: Hanley/Graham Road to Old Halls Ferry Road

The focus of Reasonable Alternative 1 is converting the outer road system (Dunn Road and Pershall Road) from a two-way system to a one-way system. There are two different variations under consideration (Variations 1 and 1a). The interchange ramps within this area will be consolidated into a split diamond configuration. Variation 1 will extend the split diamond configuration from West Florissant to Old Halls Ferry. Variation 1a will limit the split diamond to between West Florissant to New Halls Ferry. The improvements include the following:

- Addition of a basic lane EB and WB on I-270
- Improvement of shoulders and other ancillary lane characteristics
- Reconstruction of Dunn Road and Pershall Road into a one-way configuration
- Reconstruction of the interchanges from New Florissant Road to Washington Street/Elizabeth Avenue as a split diamond interchange (entrances and exits configured as slip ramps from Dunn Road and Pershall Road)
- Reconstruction of the interchanges from West Florissant Avenue to New Halls Ferry Road as a split diamond interchange (entrances and exits configured as slip ramps from Dunn Road and Pershall Road)
- Addition of additional ramps between New Florissant Road and Washington Street/Elizabeth Avenue (from I-270 EB to I-270 WB) and between West Florissant Avenue and New Halls Ferry Road (from I-270 EB to I-270 WB)
- Construction of EB Dunn Road to WB Pershall Road turnarounds at New Florissant Road and West Florissant Avenue
- Construction of a turnaround, in both directions, at New Halls Ferry Road
- Construction of additional overpass turnarounds in both directions of Dunn Road and Pershall Road between Washington Street/Elizabeth Avenue and West Florissant Avenue
- Addition of auxiliary lane(s) EB and WB on I-270 between interchanges

Map Area 4: East of Old Halls Ferry Road to Chain of Rocks Bridge

Starting at Old Halls Ferry Road, the improvement will maintain the existing Dunn Road and Pershall Road operation (two-way). An additional basic lane EB and WB on I-270, from Old Halls Ferry Road to MO 367, will be added. The only alternative at the existing cloverleaf MO 367 interchange is a partial cloverleaf configuration. It will use a fly-over ramp for the EB-to-NB movement. The MO 367 entrance ramp from Dunn Road and exit ramps to I-270 will be reconstructed with a grade-separated, braided ramp configuration. An additional auxiliary lane EB and WB on I-270, from MO 367 to Bellefontaine Road, will be added. At the Bellefontaine Road interchange, the existing diamond interchange will be reconfigured. The slip ramps will be removed and Dunn Road relocated. At the Lilac Avenue interchange, the existing diamond configuration will be modified. Most noticeably, the ramps will be moved closer to I-270. An additional basic lane EB and WB on I-270, from the Lilac Avenue interchange to Chain of Rocks Bridge, will be added. At the Riverview Drive interchange, the existing diamond configuration will be modified with extended ramp speed-change lanes (when Chain of Rocks Bridge is replaced).

3.3.1.2 Reasonable Alternative 2

Map Area 1: I-70 to McDonnell Boulevard

The existing numbers of I-270 lanes is maintained. Shoulder and other ancillary lane characteristics will be improved. At St. Charles Rock Road, the existing diamond interchange will be modified. The existing road will be widened and dedicated left-turn lanes added. At McDonnell Boulevard, a partial cloverleaf interchange will replace the existing diamond interchange. An additional new one-way outer road between Missouri Bottom and McDonnell Boulevard. In addition, a new underpass will connect the new one-way outer roads near Anglum Road.

Map Area 2: McDonnell Boulevard to Hanley/Graham Road

The only alternative at the existing cloverleaf Lindbergh Boulevard interchange is a partial cloverleaf configuration. It will add an additional lane on I-270, east of Lindbergh. It will remove the WB-to-SB loop ramp at Lindbergh with a direct connection to the north. Dunn Road will be extended through (under) the interchange. An auxiliary lane will be added on EB I-270 between Lindbergh and I-170.

Map Area 3: Hanley/Graham Road to Old Halls Ferry

The focus of Reasonable Alternative 2 is retaining the existing two-way outer road system. Like Reasonable Alternative 1, an addition through lane on I-270 will be constructed. The interchange ramps will also be consolidated into a split diamond configuration. Variation 2a will extend the split diamond configuration from West Florissant to Old Halls Ferry. Variation 2 will limit the split diamond to between West Florissant to New Halls Ferry (the opposite of Reasonable Alternative 1). The two-way configuration of Dunn Road and Pershall Road will be retained, although some sections of both roads would be relocated. An overpass at Lafayette Street will be added. The New Florissant Road and Washington Street/Elizabeth Avenue interchange is essentially a single interchange. The West Florissant and the Old Halls Ferry interchange is essentially a single interchange.

Map Area 4: East of Old Halls Ferry Road to Chain of Rocks Bridge

The only alternative at the existing cloverleaf MO 367 interchange is a partial cloverleaf configuration. It will use a fly-over ramp for the EB-to-NB movement. It will straighten the ramp from WB 270 to MO 367. It will transform the exit ramp on SB 367 to transition from freeway to arterial.

At the Bellefontaine Road interchange, the existing diamond interchange will be converted into a partial cloverleaf interchange. At the Lilac Avenue interchange, the existing diamond interchange will be converted into a partial cloverleaf interchange. At the Riverview Drive interchange, the existing diamond configuration will be converted into a partial cloverleaf interchange.

3.3.2 Performance/Operating Characteristics Summary

Table 3-2 (located at the end of this section) provides a summary of how the Reasonable Alternatives operate. The discussion is primarily comparative. All Reasonable Alternatives are considered to minimally satisfy the operational needs of the I-270 corridor. Table 3-2 is organized to facilitate comprehension of the detailed and similar configurations. It uses the map areas described previously. It summarizes the treatments and highlights the primary differences. The importance of these differences will depend largely on the individual stakeholder.

3.3.3 Environmental Impact Summary

Table 3-3 (located at the end of this section) provides a summary of the important environmental impacts associated with the Reasonable Alternatives. For the most part, the Reasonable Alternatives are contained within the existing I-270 right-of-way. No more than 79 acres of new right-of-way acquisition is expected. This increases the study's footprint by less than 7.8 percent. Most right-of-way acquisition is either limited to a narrow strip along the existing roadway frontage or through the acquisition of an entire tax map parcel for structure acquisitions. Consequently, direct impacts to the human and natural environment are limited.

Many impacts are identical among the alternatives. For example, all configurations will require a narrow strip acquisition from the Little Creek Nature Center. This minor impact will be coordinated thoroughly with the administrator. Other impacts are configuration-specific; for example, the one-way outer road system could potentially add to Metro Transit's operating costs and travel times. Most resources are not impacted by the reasonable alternatives.

3.3.4 Cost, Public Involvement, and Acquisition Impact Summary

Table 3-4 (located at the end of this section) presents a summary of the important cost, public involvement, and acquisition impacts associated with the Reasonable Alternatives. While this category probably has the greatest differences among the impacts associated with the Reasonable Alternatives, they are just one factor in decision-making. The structure acquisitions encompass different owners, but similar land use types. The sentiment that emerged from public engagement outlined in the Public Involvement Plan (discussed more thoroughly in **Section 6**) was distinct but from a relatively small population.

Construction costs were developed based on the expected 5 percent level of design. Examples of the items that could be calculated by area, length, or volume are pavement and base, bridges, and retaining/sound walls. The items not quantifiable used a stochastic method utilizing factors or metrics to quantify cost such as cost-per-mile, percentage of construction cost, or cost-per-interchange. The cost estimates have been updated to 2016 dollars. Technical memorandums describing the cost estimate methodology and the 2016 updating process are available upon request.

3.3.5 Changes from Reasonable Alternatives

Evaluation and coordination of the Reasonable Alternatives led to further investigations to improve their performance and reduce impacts. These changes were minor. To prevent confusion, the useful changes were incorporated into the Reasonable Alternatives presented in this document. These changes were ultimately incorporated into the Preferred Alternative.

3.3.6 Preferred Alternative Decision-Making Factors

The I-270 North EA corridor is large and complex. The stakeholders are numerous and diverse. The differences among the alternatives are subtle on a macro, or system basis, but distinct on a micro/property-specific basis. These factors make the Preferred Alternative recommendation difficult. This section will summarize the key decision-making factors that underlie the selection of the Preferred Alternative (Reasonable Alternative 1 with Variation 1a).

Figure 3-2 summarizes the important elements associated with the Preferred Alternative as identified in this I-270 North EA.

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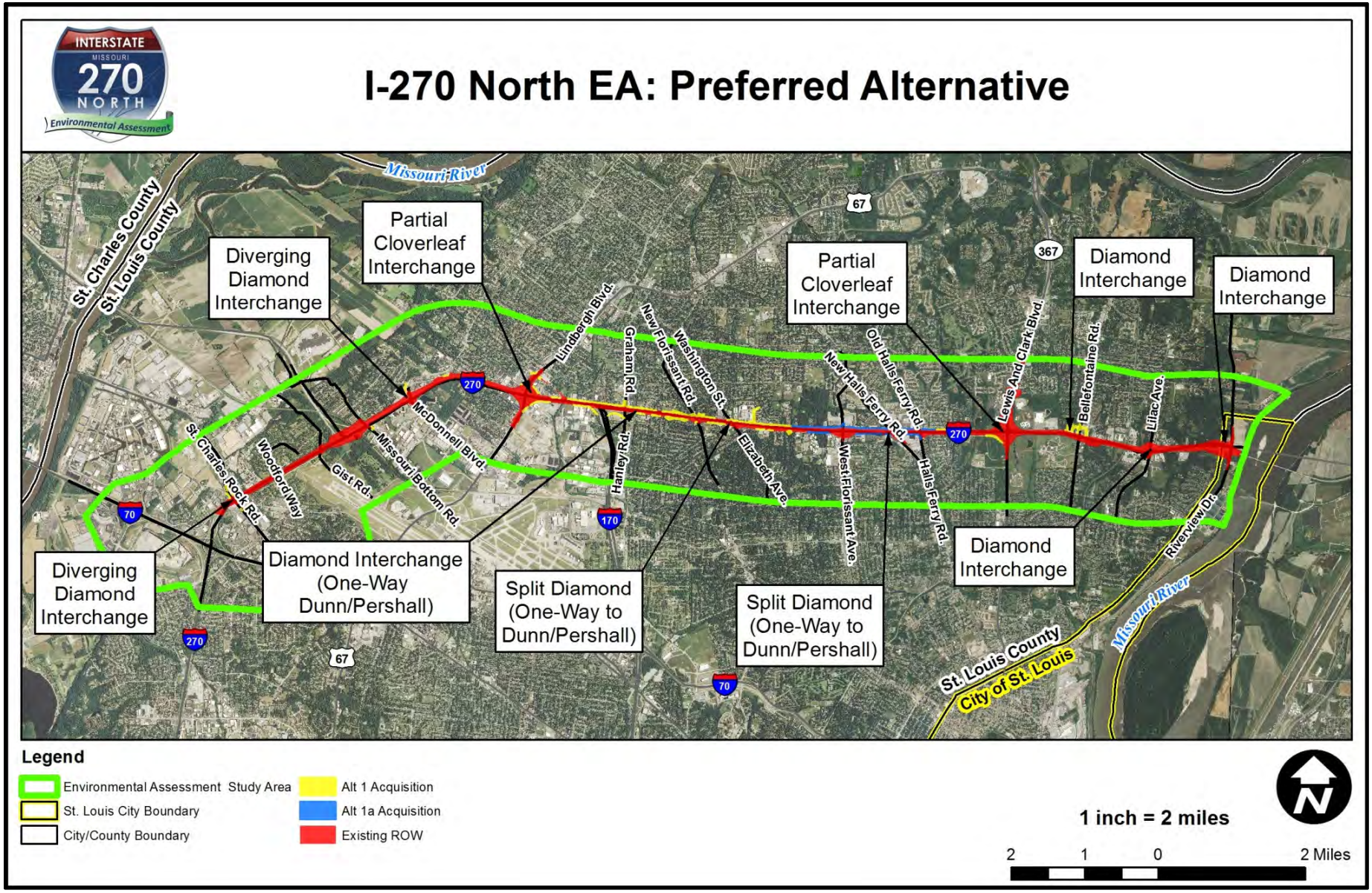

Figure 3-2. I-270 North Environmental Assessment Preferred Alternative

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3.3.6.1 Preferred Alternative Decision-Making Factors – Map Area #1[1]

In Map Area 1 (I-70 to McDonnell Boulevard) the major decisions points were among the interchange treatments at St. Charles Rock Road and McDonnell Boulevard. In both instances, a diverging diamond configuration was chosen. The differentiators are summarized as follows:

St. Charles Rock Road (diverging diamond – DDI)	**McDonnell Boulevard (diverging diamond – DDI)**
Greater public support	Greater public support
Continuity with other DDIs in area	Fewer relocations
Comparable costs and impacts	Maintains existing local traffic patterns
Eliminates traffic conflict points	Maintains existing land use patterns
Reduces delay	Less expensive
	Continuity

3.3.6.2 Preferred Alternative Decision-Making Factors – Map Area #2

In Map Area 2 (McDonnell Boulevard to Hanley/Graham Road), the major decision point was the configuration of the Lindbergh Boulevard interchange. Ultimately, a single configuration was chosen. This partial cloverleaf is applicable across all alternatives and addresses the required movements, desired LOS, and the constraints in the area.

3.3.6.3 Preferred Alternative Decision-Making Factors – Map Area #3

In Map Area 3 (Hanley/Graham Road to Old Halls Ferry Road), the major decision points were the configuration of the outer road system (Dunn/Pershall Road) and the configuration of the interchange ramps. The Preferred Alternative is Reasonable Alternative 1 with Variation 1a. Dunn/Pershall Road is converted to a one-way system throughout the length of Map Area #3. The interchange ramps within this area are consolidated into a split diamond configuration that extends to New Halls Ferry Road.

The differentiators between Alternative 1 and Alternative 2 are summarized as follows:

- On average, trips will be approximately 1.6 percent longer, but will take 5.5 percent less time to traverse
- Greater public support for a one-way configuration
- Fewer property acquisitions
- Fewer relocations
- Driveway operations improved
- Fewer predicted crashes
- Higher operational costs for Metro Transit
- Equivalent alterations to emergency medical services patterns
- Lower stream impacts
- Pedestrians expected to encounter fewer conflict points with automobiles (bicyclists may experience more)
- Less expensive
- Reduces traffic conflict points

[1] Because of the size of the project area, the map areas can only be practically depicted on large roll plots. To show the project in a more user-friendly way (and include them in hard copy versions of this document), **Appendix A** uses a template where the project is shown in a series of 13 sections. The Map Area boundaries are depicted in text.

3.3.6.4 Preferred Alternative Decision-Making Factors – Map Area #4

In Map Area 4 (Old Halls Ferry Road to Chain of Rocks Bridge), the Preferred Alternative is Reasonable Alternative 1. The major decision points were the interchange configurations for MO 367 (partial cloverleaf), Bellefontaine Road (diamond interchange), Lilac Avenue (diamond interchange), and Riverview Drive (diamond interchange). The differentiators are summarized as follows:

Greater public support
Fewer relocations
Maintains Lilac Avenue Park-and-Ride lot
Lower Dunn Road alterations
Avoids Great Rivers Greenway properties
Solutions appropriate to site locations

3.3.7 Preferred Alternative

Based on the evaluation of the Reasonable Alternatives, a Preferred Alternative emerged. This subsection summarizes the Preferred Alternative chosen for further consideration. The Preferred Alternative conforms to the study's design standards, satisfies the study's Purpose and Need, and fulfills the study's desired operational characteristics/performance measures, and minimizes impacts to the human and natural environment.

3.3.7.1 Configuration of the Preferred Alternative

The Preferred Alternative for this study is Reasonable Alternative 1 with the 1a variation between West Florissant Avenue and New Halls Ferry Road. The details of the lane work and transportation improvements associated with the Preferred Alternative is contained in **Appendix A – Exhibit 6**. The depiction of the Preferred Alternatives' footprint and important resources and impacts are shown in **Appendix A – Exhibit 4.** The specifics of the Preferred Alternative are described below.

In Area 1: I-70 to McDonnell Boulevard

- Add continuous auxiliary lanes between St. Charles Rock Road and MO 370, NB and SB
- Reconstruct the St. Charles Rock Road interchange as an improved interchange within the identified footprint
- Add SB auxiliary lane through the MO 370 interchange; maintain existing number of lanes NB
- Improve connections between northbound I-270, MO 370 and Missouri Bottom Road
- Reconstruct the McDonnell Boulevard interchange as an improved interchange within the identified footprint

In Area 2: McDonnell Boulevard to Hanley/Graham Road

- Add continuous auxiliary lanes between McDonnell Boulevard and Lindbergh Boulevard
- Reconstruct the Lindbergh Boulevard interchange as an improved interchange within the identified footprint
- Separate I-270 and Lindbergh Boulevard interchange traffic from Taylor/Lynn Haven
- Add basic lane EB and WB on I-270, east of Lindbergh Boulevard to Route 367

Preferred Alternative

The Preferred Alternative for the I-270 North EA project is Reasonable Alternative 1 with the 1a variation between West Florissant Avenue and New Halls Ferry Road.

The Preferred Alternative conforms to MoDOT's EPG, satisfies the project's Purpose and Need, and fulfills the project's desired operational characteristics/performance measures. It also minimizes impacts to the human and natural environment.

- Add auxiliary lane EB I-270 from Lindbergh Boulevard to I-170
- Maintain/improve two-way Dunn Road and Pershall Road, mainly in existing location

In Area 3: Hanley/Graham Road to Old Halls Ferry Road

- Add basic lane EB and WB on I-270
- Reconstruct Dunn Road and Pershall Road within the identified footprint, improving mobility and maintaining access. This includes conversion to a one way outer road system with turn-around connections where needed
- Reconstruct the interchanges between Hanley and New Halls Ferry as improved interchanges within the identified footprint
- Construct overpass turnarounds, U-turns and additional ramps, as necessary, to achieve environmental commitments, established LOS, mainline weaves, Vehicle Hours of Delay, and Average Speed performance measures identified in **Table 3-5**. The need for out of direction travel, along transit routes, will also be improved.
- Add auxiliary lane(s) EB and WB on I-270 between interchanges

In Area 4: Old Halls Ferry Road to Chain of Rocks Bridge

- Maintain/improve Dunn Road and Pershall Road, mainly in their existing locations and configurations
- Add basic lane EB and WB I-270 from Old Halls Ferry Road to MO 367
- Reconstruct the MO 367 interchange as an improved interchange within the identified footprint
- Add auxiliary lane EB and WB I-270 from MO 367 to Bellefontaine Road
- Reconstruct the Bellefontaine Road interchange as an improved interchange within the identified footprint
- Relocate Dunn Road to the north at Bellefontaine Road
- Maintain number of existing basic lanes from Bellefontaine Road to the Lilac Avenue interchange
- Reconstruct the Lilac Avenue interchange as an improved interchange within the identified footprint
- Add basic lane EB and WB on I-270 from the Lilac Avenue interchange to Chain of Rocks Bridge
- Reconstruct the Riverview Drive interchange as an improved interchange within the identified footprint

Figure 3-2 summarizes the important elements associated with the Preferred Alternative as identified in this I-270 North EA.

The Preferred Alternative as presented in this I-270 North EA is composed of alternative configurations that meet a set of minimum performance measures agreed upon prior to the development of study alternatives. In some cases, the Preferred Alternative exceeds the minimum level for a given set of performance measures. The minimum performance measures are listed in **Table 3-5**. The performance measures are broken out into corridor-wide measures, such as severe and fatal crashes, level of service, mainline weaves, vehicle hours of delay and average speed. The performance measures were also broken out into location-specific operational measures, such as lane configuration, access and exit details.

Because of the size and scope of the study, MoDOT intends to investigate all available study delivery options, including design-build and/or phased delivery. The engineering associated with various alternate project delivery options differs from those of the traditional design-bid-build approach. These differences are intended to identify uniquely innovative solutions and cost and time saving technologies. MoDOT intends to take full advantage of these savings while remaining consistent with the study's established performance measures and the study's Purpose and Need.

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Table 3-1. Pathway from Conceptual Alternatives to Reasonable Alternatives

Conceptual Alternative ID and Description		Location	Result	Reasonable Alternative ID	
CONCEPTUAL ALTERNATIVE SUBAREA 01: I-70 TO ST. CHARLES ROCK ROAD					REASONABLE ALTERNATIVE MAP AREA 1
C	Diverging Diamond Interchange	St. Charles Rock Road	Continued*	1	
B	Diamond Interchange		Continued	2	
CONCEPTUAL ALTERNATIVE SUBAREA 02: WOODFORD WAY DRIVE TO GIST ROAD					
B	Freeway with Auxiliary Lanes	St. Charles to MO 370	Continued*	1,2	
CONCEPTUAL ALTERNATIVE SUBAREA 03: MO 370 TO McDONNELL BOULEVARD					
A	**Partial Cloverleaf Interchange (One-Way)**	McDonnell Boulevard	**Eliminated**	**---**	
C	Diverging Diamond Interchange		Continued*	1	
B	Partial Cloverleaf Interchange		Continued	2	
CONCEPTUAL ALTERNATIVE SUBAREA 04: LINDBERGH BOULEVARD					REASONABLE ALTERNATIVE MAP AREA 2
A	**Partial Cloverleaf Interchange (One-Way)**	Lindbergh Boulevard	**Eliminated**	---	
B	Partial Cloverleaf Interchange		Continued*	1,2	
CONCEPTUAL ALTERNATIVE SUBAREA 05: I-170 TO HANLEY ROAD/GRAHAM ROAD					
A	Diamond Interchange (One-Way Dunn Road)	Hanley/Graham Road	Continued*	1	REASONABLE ALTERNATIVE MAP AREA 3
B	Diamond Interchange (Two-Way)		Continued	2	
CONCEPTUAL ALTERNATIVE SUBAREA 06: NEW FLORISSANT ROAD TO WASHINGTON STREET/ELIZABETH AVENUE					
A	Split Diamond Interchange (One-Way)	New Florissant Road to Washington Street/Elizabeth Avenue	Continued*	1	
B	**Split Diamond Interchange with Offset Connector Roads (Two-Way)**		**Eliminated**	---	
C	Split Diamond Interchange (Two-Way)		Continued	2	
CONCEPTUAL ALTERNATIVE SUBAREA 07: WEST FLORISSANT AVENUE TO OLD HALLS FERRY ROAD					
A	Split Diamond Interchange (One-Way)	to Old Halls Ferry Road	Continued*	1	
A1	Split Diamond Interchange (One-Way)	to New Halls Ferry Road	Continued*	1a	
C	Split Diamond Interchange (Two-Way)	to Old Halls Ferry Road	Continued	2	
B	Split Diamond Interchange (Two-Way)	to New Halls Ferry Road	Continued	2a	
CONCEPTUAL ALTERNATIVE SUBAREA 08: MO 367					REASONABLE ALTERNATIVE MAP AREA 4
~~A~~	**Partial Cloverleaf Interchange (One-Way)**	MO 367	**Eliminated**	---	
B	Partial Cloverleaf Interchange		Continued*	1,2	
CONCEPTUAL ALTERNATIVE SUBAREA 09: BELLEFONTAINE ROAD					
A	**Diamond Interchange (One-Way)**	Bellefontaine Road	**Eliminated**	---	
C	Diamond Interchange		Continued*	1	
B	Partial Cloverleaf Interchange		Continued	2	
CONCEPTUAL ALTERNATIVE SUBAREA 10: LILAC AVENUE					
A	**Diamond Interchange (One-Way)**	Lilac Avenue	**Eliminated**	---	
B	Diamond Interchange		Continued*	1	
C	Partial Cloverleaf Interchange		Continued	2	
CONCEPTUAL ALTERNATIVE SUBAREA 11: RIVERVIEW DRIVE					
A	**Partial Cloverleaf Interchange (One-Way)**	Riverview Drive	**Eliminated**	---	
C	Diamond Interchange		Continued*	1	
B	Partial Cloverleaf Interchange		Continued	2	

* This treatment will ultimately become part of the Preferred Alternative.

Table 3-2. Performance/Operating Characteristics Summary for the Reasonable Alternatives

Reasonable Alternative	Description	Key Features	Level of Service (2040)	Transit Impacts	Bike/Pedestrian Impacts	Freight Movement Impacts
AREA 1: I-70 TO MCDONNELL BOULEVARD						
ST. CHARLES ROCK ROAD						
Alternative 1	Diverging Diamond Interchange	• Synchronized signals reduce delay • Reduced number of conflict points	C	Unable to exit/ re-enter freeway in same direction	Can be more difficult to navigate	Easier to make turns for oversize/ overweight trucks
Alternative 2	Diamond Interchange	• Greater driver familiarity • Exiting traffic can re-enter freeway in same direction	C	--	Easier to navigate	--
MO 370 TO MCDONNELL BOULEVARD						
Alternative 1	Diverging Diamond Interchange	• Synchronized signals reduce delay • Reduced number of conflict points	C	Unable to exit/ re-enter freeway in same direction	Can be more difficult to navigate	Easier to make turns for oversize/ overweight trucks
Alternative 2	Partial Cloverleaf Interchange	• Loop ramp allows free flow NB to WB movements • New one-way connector improves traffic flow	C	--	--	Guardrail often damaged on loop ramps by trucks
AREA 2: EAST OF MCDONNELL BOULEVARD TO HANLEY ROAD/GRAHAM ROAD						
LINDBERGH BOULEVARD						
Alternative 1	Partial Cloverleaf Interchange	• Improved connection between WB 270 and NB Lindbergh • Improved connection for SB Lindbergh and WB I-270 • Eliminating loop ramp reduces conflicts/improves safety • Continuous Dunn Road under Lindbergh	D	--	Eliminating loop ramp improves navigation	Guardrail often damaged on loop ramps by oversize/ overweight trucks
AREA 3: HANLEY ROAD/GRAHAM ROAD TO OLD HALLS FERRY ROAD						
ONE-WAY OUTER ROAD SYSTEM						
HANLEY ROAD/GRAHAM ROAD				One-way outer road system could potentially add approximately $800,000 to Metro's annual operating costs and increase travel time and transfer fares for customers living/working along the one-way road sections	One-way outer roads tend to benefit pedestrians due to fewer conflict points	25 percent fewer crashes
Alternative 1	Diamond Interchange	• Dunn/Pershall Road operate as one-way outer roads • Access to/from I-270 via slip ramps	B			
NEW FLORISSANT ROAD TO WASHINGTON STREET/ELIZABETH AVENUE						
Alternative 1	Split Diamond Interchange	• Dunn/Pershall Road operate as one-way outer roads • Access to/from I-270 via slip ramps	C			
WEST FLORISSANT AVENUE TO OLD HALLS FERRY ROAD					One-way outer roads tend to result in out-of-direction travel for bicyclists creating more conflicts with automobiles	
Alternative 1	Split Diamond Interchange (to **Old** Halls Ferry)	• Dunn and Pershall operate as one-way outer roads • Access to/from I-270 via slip ramps • No direct ramps from WB I-270 to New Halls Ferry	C			
Alternative 1a	Split Diamond Interchange (to **New** Halls Ferry)	• Dunn and Pershall operate as one-way outer roads • Access to/from I-270 via slip ramps • No direct ramps from WB I-270 to Old Halls Ferry	C			
TWO-WAY OUTER ROAD SYSTEM						
HANLEY ROAD/GRAHAM ROAD				Two-way outer road system is considered to be the same as the No-Build or current routes	Two-way outer roads tend to create more conflicts for pedestrians	Ramp Connections to New Halls Ferry: 30 percent fewer crashes
Alternative 2	Diamond Interchange	• Dunn and Pershall Roads operate as two-way outer roads	B			
NEW FLORISSANT ROAD TO WASHINGTON STREET/ELIZABETH AVENUE						
Alternative 2	Split Diamond Interchange	• Dunn and Pershall Roads operate as two-way outer roads • New Florissant and Washington Street/Elizabeth Avenue operate as one interchange	D			
WEST FLORISSANT AVENUE TO OLD HALLS FERRY ROAD					Two-way outer roads tend to provide more direct travel routes for bicyclists	Ramp Connections to Old Halls Ferry: 32 percent fewer crashes
Alternative 2	Split Diamond Interchange (to **Old** Halls Ferry)	• Dunn and Pershall Roads operate as two-way outer roads • No direct ramps from WB I-270 to New Halls Ferry	D			
Alternative 2a	Split Diamond Interchange (to **New** Halls Ferry)	• Dunn and Pershall Roads operate as two-way outer roads • No direct ramps from WB I-270 to Old Halls Ferry	D			
AREA 4: EAST OF OLD HALLS FERRY ROAD TO RIVERVIEW DRIVE						
MO 367						
Alternative 1	Partial Cloverleaf Interchange	• Provides free flow movement from EB I-270 to MO 367 • Transitions SB MO 367 ramps from freeway to arterial • Removes loop ramps improving safety and operations	C	-	-	Guardrail often damaged on loop ramps by oversize/ overweight trucks
BELLEFONTAINE ROAD						
Alternative 1	Diamond Interchange	• Removes slip ramps • Relocates Dunn Road	B	-	-	-
Alternative 2	Partial Cloverleaf Interchange	• Removes slip ramps • Relocates Dunn Road • Loop ramp allows free flow NB to WB movements	B	-	-	Guardrail often damaged on loop ramps by oversize/ overweight trucks
LILAC AVENUE						
Alternative 1	Diamond Interchange	• Moves WB I-270 ramps closer to the freeway to avoid relocating Dunn Road	B	-	-	-
Alternative 2	Partial Cloverleaf Interchange	• Relocates a portion of Dunn Road • Loop ramp allows free flow NB to WB movements • Requires EB I-270 off-ramp to go under Dunn Road	B	-	-	Guardrail often damaged on loop ramps by oversize/ overweight trucks
RIVERVIEW DRIVE						
Alternative 1	Diamond Interchange	• Requires extension of ramps to the east when the bridge is replaced	B	-	-	-
Alternative 2	Partial Cloverleaf Interchange	• Moves all ramps to the west of Riverview Drive • Relocates Dunn Road	B	-	-	Guardrail often damaged on loop ramps by oversize/ overweight trucks

Table 3-3. Major Environmental Impact Summary for the Reasonable Alternatives

Reasonable Alternative	Description	Parks and Recreation Impacts	Environmental Justice Impacts	Waterway Impacts	Bike/Pedestrian Impacts	Traffic Noise Impacts
AREA 1: I-70 TO MCDONNELL BOULEVARD						
ST. CHARLES ROCK ROAD						
Alternative 1	Diverging Diamond Interchange	No property acquisition from Carrollton Disc Park; operational impacts are not expected.	Diverging diamond interchanges can limit some transit bus and emergency management services operations.	Nearly Identical Cowmire Creek Crossings	Depending on design, diverging diamond interchanges can require pedestrians to cross free-flowing traffic.	Existing traffic noise levels at Carrollton Apartments will require investigation of noise barriers; relative to traffic noise, the alternatives are roughly equivalent.
Alternative 2	Diamond Interchange		Alternative maintains existing roadway configuration.		-	
MCDONNELL BOULEVARD						
Alternative 1	Diverging Diamond Interchange	None	Diverging diamond interchanges can limit some transit bus and emergency management operations.	None	Depending on design, diverging diamond interchanges can require pedestrians to cross free-flowing traffic.	Relative to noise sensitive land uses in this area, the major difference among the alternatives is the use of an outer road between Missouri Bottom Road to McDonnell Boulevard.
Alternative 2	Partial Cloverleaf Interchange	None	Frontage Road between Missouri Bottom Road to McDonnell Boulevard (and Anglum Road connection) may improve neighborhood connectivity.	Larger footprint within MO 370 interchange will increase work within Cowmire Creek.	(1) Possible Park-and-Ride lot at Missouri Bottom Road may increase bike/ pedestrian opportunities (2) Possible bike/pedestrian connection at Anglum Road. (3) Frontage Road proposed adjacent to Garrett Elementary School.	
AREA 2: EAST OF MCDONNELL BOULEVARD TO HANLEY ROAD/GRAHAM ROAD						
LINDBERGH BOULEVARD						
Alternative 1	Partial Cloverleaf Interchange	No property acquisition from Brookes Park, but trees within right-of-way may be removed.	Improved interchange will benefit local users	None	Direct Dunn Road connection through Lindbergh interchange should improve bike/ pedestrian operations	Existing traffic noise levels in Brookes Park area will require investigation of noise barriers
AREA 3: HANLEY ROAD/GRAHAM ROAD TO OLD HALLS FERRY ROAD						
HANLEY ROAD/GRAHAM ROAD						
Alternative 1	Diamond Interchange (One-Way Dunn/Pershall Road)	No expected impacts to the Myers House.	One-way operation at Graham Road eliminates need for buttonhook entrance at New Florissant Road. Metro Transit estimates that one-way outer roads will increase their operating expenses.	None	One-way outer roads tend to benefit pedestrians (because of fewer conflict points). One-way outer roads tend to result in out-of-direction travel by bicyclists, thus creating more conflicts with automobiles.	Relative to traffic noise, there are limited difference between alternatives. Noise barrier investigations will be conducted wherever traffic noise impacts are expected.
Alternative 2	Diamond Interchange (Two-Way Dunn/Pershall Road)		To maintain two-way operation at Graham, a new overpass is necessary. EB Dunn Road traffic must use the overpass. The overpass causes displacements at South Lafayette and potential bike/pedestrian pathway impacts.		Existing pathways maintained to the extent possible.	
NEW FLORISSANT ROAD TO WASHINGTON STREET/ELIZABETH AVENUE						
Alternative 1	Split Diamond Interchange (One-Way Dunn/Pershall Road)	None	One-way operation at New Florissant Road and Washington Street is primarily within the existing corridor. Important exceptions include the creation of a connection between Dunn Road and Waterford, behind the Grandview Plaza Shopping Center and the possible mid-block crossover at Grandview Drive. If local vehicle operation is maximized, neighborhood impacts could be discernible. Metro Transit estimates that one-way outer roads will increase their operating expenses	Limited culvert extensions for Fountain Creek	One-way outer roads tend to benefit pedestrians (because of fewer conflict points). One-way outer roads tend to result in out-of-direction travel by bicyclists creating more conflicts with automobiles.	Relative to noise sensitive land uses in this area, the major difference among the alternatives is the realignment of Dunn Road near Washington Street and New Florissant Road. The traffic levels along the outer roads are minor components of the traffic noise level along I-270.
Alternative 2	Split Diamond Interchange (Two-Way Dunn/Pershall Road)	Reconfiguration of outer road will create a new road around the Gittemeier House. No expected impacts to the historic integrity of the site.	The buttonhook at New Florissant Road result in several displacements. Otherwise, two-way operation is mostly within the existing corridor.	Larger footprint at New Florissant Road may increase work within Fountain Creek	Buttonhook at New Florissant Road may increase travel distances. Intersection relocation may provide opportunity to better accommodate bikes/pedestrian.	

Table 3-3. Major Environmental Impact Summary for the Reasonable Alternatives

Reasonable Alternative	Description	Parks and Recreation Impacts	Environmental Justice Impacts	Waterway Impacts	Bike/Pedestrian Impacts	Traffic Noise Impacts
WEST FLORISSANT AVENUE TO OLD HALLS FERRY ROAD						
Alternative 1	Split Diamond Interchange (West Florissant Avenue to Old Halls Ferry Road – One-Way Dunn/Pershall Road)	Possible acquisition from Little Creek Nature Area. Acquisition limited to narrow linear strip along Dunn Road. Driveway will be improved as necessary to benefit the facility.	EB Dunn Road traffic from Old Halls Ferry Road to MO 367 will not be possible. Cut-through traffic may result. Metro Transit estimates that one-way outer roads will increase their operating expenses.	All alternatives have limited culvert extensions of existing culverts within Maline Creek tributaries at New Halls Ferry Road and Old Halls Ferry Road. These alternatives have no other impacts.	One-way outer roads tend to benefit pedestrians (because of fewer conflict points). One-way outer roads tend to result in out-of-direction travel by bicyclists creating more conflicts with automobiles.	Relative to noise sensitive land uses in this area, the major difference amongst the alternatives is the realignment of Dunn Road near West Florissant/New Halls Ferry/Old Halls Ferry Road. Noise sensitive receptors are limited, but the Little Creek Nature Area is in the area. The traffic levels along the outer roads are minor components of the traffic noise level along I-270.
Alternative 1a	Split Diamond Interchange (West Florissant Avenue to New Halls Ferry Road – One-Way Dunn/Pershall Road)		Additional turnaround provided from WB Dunn Road to EB I-270. Metro Transit estimates that one-way outer roads will increase their operating expenses.		One-way outer roads tend to benefit pedestrians (because of fewer conflict points). One-way outer roads tend to result in out-of-direction travel by bicyclists creating more conflicts with automobiles.	
Alternative 2	Split Diamond Interchange (West Florissant Avenue to New Halls Ferry Road – Two-Way Dunn/Pershall Road)		Under both two-way alternatives, Dunn Road will be realigned (in different ways) through the commercial areas between West Florissant Avenue and Old Halls Ferry Road.	This alternative has a new Dunn Road crossing of the Maline Creek, near New Halls Ferry Road.	A new Pershall Road segment will be created between New Halls Ferry and Old Halls Ferry. This will be located adjacent to I-270.	
Alternative 2a	Split Diamond Interchange (West Florissant Avenue to Old Halls Ferry Road – Two-Way Dunn/Pershall Road)			This alternative has the new Dunn Road crossing of the Maline Creek and a revised crossing of Maline Creek at Netherton Drive.	Informal vehicle connection between New Halls Ferry and Old Halls Ferry Road (within Home Depot parking lot) will be formalized, standardizing bike/pedestrian operation in this area.	
AREA 4: EAST OF OLD HALLS FERRY ROAD TO RIVERVIEW DRIVE						
MO 367						
Alternative 1	Partial Cloverleaf Interchange	No direct impacts to Bellefontaine Conservation Area.	-	Limited culvert extensions of existing culverts for Maline Creek tributaries.	-	None – areas of frequent human use approximately 500 feet from I-270.
BELLEFONTAINE ROAD						
Alternative 1	Diamond Interchange	None	-	New crossing of Watkins Creek for relocated Dunn Road and replacement of existing culverts elsewhere.	-	None – no noise sensitive receptors.
Alternative 2	Partial Cloverleaf Interchange	None	-	New crossing of Watkins Creek for relocated Dunn Road. The existing culverts will also be replaced.	Larimore Road closed. Outer road connection to Bellefontaine Road detoured to Larimore Parkway Drive—increasing trip lengths or increasing cut-through movements.	
LILAC AVENUE						
Alternative 1	Diamond Interchange	None	-	None	-	Existing roadway/receptor configuration is similar to proposed configuration.
Alternative 2	Partial Cloverleaf Interchange	None	-	None	Loop ramp eliminates Park-and-Ride lot.	Loop ramp brings WB I-270 exit ramp closer to the Northgate/Raintree apartment complex.
RIVERVIEW DRIVE						
Alternative 1	Diamond Interchange with Two-Way Dunn Road	No impact to Dundee Park or Watkins Estate.	-	Limited culvert extensions of existing culverts within Watkins Creek.	-	None – no noise sensitive receptors.
Alternative 2	Partial Cloverleaf Interchange	Planning needed to avoid encroachment on Watkins Estate. No impact to Dundee Park.	-		-	

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Table 3-4. Cost and Acquisition Summary for the Reasonable Alternatives

Reasonable Alternative	Description	Preliminary Structure Acquisition Estimates	Preliminary Property Acquisition Estimates	Total Estimated Construction Cost	Percentage of PIM #2 Respondents Viewing the Configuration as "Very Beneficial" or "Beneficial"
AREA 1: I-70 TO MCDONNELL BOULEVARD					
ST. CHARLES ROCK ROAD AREA					
Alternative 1	Diverging Diamond Interchange	None	Less than 1 acre	$58,300,000	80 percent
Alternative 2	Diamond Interchange	None	Less than 1 acre	$54,100,000	28 percent
MCDONNELL BOULEVARD AREA					
Alternative 1	Diverging Diamond Interchange	None	Less than 1 acre	$107,900,000	76 percent
Alternative 2	Partial Cloverleaf Interchange	• Three single-family residences east of Missouri Bottom Road (Villa Teresa) • Arby's and Auto World, Inc. in the northeastern quadrant of McDonnell Boulevard	± 5 acres	$155,100,000	41 percent
AREA 2: EAST OF MCDONNELL BOULEVARD TO HANLEY ROAD/GRAHAM ROAD					
LINDBERGH BOULEVARD AREA					
Alternative 1	Partial Cloverleaf Interchange	None	± 4 acres	$84,500,000	73 percent
AREA 3: HANLEY ROAD/GRAHAM ROAD TO OLD HALLS FERRY ROAD					
HANLEY ROAD/GRAHAM ROAD AREA					
Alternative 1	Diamond Interchange (One-Way Dunn)	• Two single-family residences at Pershall Road and Brackleigh Lane	Less than 2 acres	$59,000,000	78 percent
Alternative 2	Diamond Interchange (Two-Way)	• Two single-family residences at Pershall Road and Brackleigh Lane • Displacements at South Lafayette Street include Tires Wholesale, one single-family residence, Life Smile Dental, One Hour Cleaning, and one vacant commercial building	± 5 acres	$65,300,000	32 percent
NEW FLORISSANT ROAD TO WASHINGTON STREET/ELIZABETH AVENUE AREA					
Alternative 1	Split Diamond Interchange (One-Way Dunn/Pershall Road)	• Twenty-one single-family residences: six at Santa Cruz Drive, and fifteen between DuBourg Lane and Jean Drive • Plaza Duchesne: Kwik Mart and five others and Gary's A+ Auto/ Joe's Auto Mart • Creative Cuts: Pershall/Jean	± 13 acres	$103,500,000	78 percent
Alternative 2	Split Diamond Interchange (Two-Way Dunn/Pershall Road)	• Twenty-two single-family residences: five at Santa Cruz Drive, fourteen between DuBourg Lane and Jean Drive, and three at New Florissant Road • BP, Circle K, one office complex (three operations), Kling Orthodontics, Boain Dental, and one vacant commercial building • Creative Cuts: Pershall/Jean	± 13 acres	$115,100,000	32 percent
WEST FLORISSANT AVENUE TO OLD HALLS FERRY ROAD AREA					
Alternative 1	Split Diamond Interchange (to Old Halls Ferry Road – One-Way)	None	± 6 acres	$96,100,000	73 percent
Alternative 1a	Split Diamond Interchange (to New Halls Ferry Road – One-Way)	None	± 6 acres	$100,600,000	76 percent
Alternative 2	Split Diamond Interchange (to New Halls Ferry Road – Two-Way)	• Dobb's Tire at West Florissant Avenue • Applebee's, Crossings Shopping Center (five operations), ZX, Plumber's Supply, Mobil, and Donut Delite at New Hall's Ferry Roads	± 38 acres	$137,100,000	73 percent
Alternative 2a	Split Diamond Interchange (to Old Halls Ferry Road – Two-Way)	• Dobb's Tire at West Florissant Avenue • Two single-family residences at Landseer Drive • Applebee's, Popeye's, ZX, Plumber's Supply, Mobil, and Donut Delite at New Hall's Ferry Road	± 34 acres	$130,000,000	73 percent
AREA 4: EAST OF OLD HALLS FERRY ROAD TO RIVERVIEW DRIVE					
MO 367 AREA					
Alternative 1	Partial Cloverleaf Interchange	None	± 1 acres	$74,900,000	76 percent
BELLEFONTAINE ROAD AREA					
Alternative 1	Diamond Interchange	• Pizza Hut restaurant	± 8 acres	$35,900,000	59 percent
Alternative 2	Partial Cloverleaf Interchange	• Shell gasoline station, National Rent-to-Own, Saullo's Pizza, Larimore Liquor, and Laundromat	± 7 acres	$38,800,000	30 percent
LILAC AVENUE AREA					
Alternative 1	Diamond Interchange	None	None	$42,300,000	54 percent
Alternative 2	Partial Cloverleaf	None	Less than 1 acre	$41,100,000	22 percent
RIVERVIEW DRIVE AREA					
Alternative 1	Diamond Interchange	None	None	$36,700,000	63 percent
Alternative 2	Partial Cloverleaf	None	± 2 acres	$27,100,000	42 percent

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Table 3-5. Performance Measures (minimum acceptable levels) for the I-270 North EA

Corridor-Wide Measures			
Performance Measure	**Standard**	**Preferred Alternative Performance**	**Alternate Configuration Criteria**
Safety			
Severe Crashes	Percent Reduction over Design Year No-Build	Corridor-wide reductions over No-Build vary by subarea	Should achieve a reduction in Severe Crashes in all subareas compared to the No-Build as measured by following the Highway Safety Manual procedures and/or using the ISATe tool. Safety assumptions are included in **Appendix B**.
Fatal Crashes	Percent Reduction over Design Year No-Build	Corridor-wide reductions over No-Build vary by subarea	Should achieve a reduction in Fatal Crashes in all subareas compared to the No-Build as measured by following the Highway Safety Manual procedures and/or using the ISATe tool. Safety assumptions are included in **Appendix B.**
Access, Mobility, and System Reliability			
Level of Service	Design Year LOS E or better during Peak Hour	All mainline sections, ramps, and cross-road intersections within the study area operate at LOS E or better during Peak Hour	Should achieve LOS E on all mainline, ramps, and crossroad intersections during Peak Periods. LOS measured by applying Highway Capacity Manual (HCM) 2010 thresholds to density and delay results from the VISSIM model.
Mainline Weaves	Design Year LOS E or better during Peak Hour	All mainline weaves operate as LOS E or better during Peak Hour	Should achieve LOS E or better for all mainline weaves as measured by applying HCM 2010 thresholds to density results from the VISSIM model.
Vehicle Hours of Delay (VHD)	Reduction in Design Year VHD over No-Build	AM Peak reduction of 72 percent PM Peak reduction of 75 percent	AM Peak increase in average speed of at least 70 percent. PM Peak increase in average speed of VHD of at least 70 percent. Corridor-wide VHD reported directly from VISSIM.
Average Speed	Increase in Design Year Average Speed over No-Build – Defined by corridor-wide vehicle miles traveled (VMT)/vehicle hours traveled (VHT)	AM Peak increase of 36 percent PM Peak increase of 63 percent	AM Peak reduction of VHD of at least 30 percent. PM Peak reduction of VHD of at least 60 percent. Average speed is defined by corridor-wide VMT/VHT. Corridor-wide VMT and VHT are reported directly from VISSIM.

The location study conducted as part of the I-270 North EA assumes that, with few exceptions*, all bridges and roadway pavement will ultimately be reconstructed in accordance with the Preferred Alternative. Cost estimates and predictive safety analyses have been completed with this assumption. Reuse and/or rehabilitation of some pavements and bridge structures may be feasible while still meeting the overall performance measures and characteristic requirements of the Preferred Alternative, including safety criteria. Therefore, reuse or rehabilitation of existing infrastructure, in itself, will not be considered in conflict with the commitments set forth in this document provided that the configuration associated with reuse or rehabilitation of the infrastructure meet the minimum performance measures, characteristic requirements, and criteria committed to herein.

Note: *Exceptions include potential reuse of select mainline and ramp bridges within the MO 370 interchange and the I-170 interchange ramps.

Table 3-5. Performance Measures (minimum acceptable levels) for the I-270 North EA

Site-Specific Measures	
Location	**Preferred Alternative Features**
Mainline I-270 (between I-70 and Hanley/Graham Road)	Four basic lanes in each direction with auxiliary lanes as necessary to maintain I-270 operations.
Dunn/Pershall Road (between I-70 and Hanley/Graham Road)	Two-way Dunn and Pershall Roads in existing or realigned locations as required for mainline and crossroad operations and access.
St. Charles Rock Road Interchange	Improved interchange providing full access to/from I-270.
MO 370 Interchange	Improve EB I-270 exits for WB MO 370 and Missouri Bottom Road. Maintain all existing access to/from I-270.
Missouri Bottom Road Interchange	Improve EB I-270 exits for WB MO 370 and Missouri Bottom Road. Maintain all existing access to/from I-270.
McDonnell Boulevard Interchange	Improved interchange providing full access to/from I-270.
Lindbergh Boulevard Interchange	Improved interchange providing full access to/from I-270. Improve traffic traveling to/from Lindbergh Boulevard from/to I-270 from the Taylor/Lynn Haven interchange. Continuous two-way Dunn Road through interchange with grade separation with Lindbergh Boulevard. Continuous two-way Pershall Road from Lindbergh Boulevard to the east.
I-170 Interchange	Access to WB I-270 from both directions of Dunn Road. Maintain all existing access to/from I-270.
Mainline I-270 (between Hanley/ Graham Road and MO 367)	Four basic lanes in each direction with axillary lanes as necessary to maintain I-270 operations.
Dunn/Pershall Road (between Hanley/ Graham Road and MO 367)	One-way Dunn and Pershall Roads in existing or realigned locations between Hanley/Graham Road and New Halls Ferry Road and two-way Dunn and Pershall Roads in existing or realigned locations east of New Halls Ferry Road as required for operations and access.
Hanley/Graham Road to New Halls Ferry Road	Balanced/complementary ramp pairs. Access to/from each crossroad from/to I-270 with travel through two or fewer signals. Turnarounds as necessary to achieve the LOS and other study requirements.
MO 367 Interchange	Improved interchange providing full access to/from I-270. Free flow EB I-270 movements to NB MO 367. Eliminate weaving movements within the interchange. Free flow SB MO 367 movements to I-270.
Mainline I-270 (Between MO 367 and Mississippi River)	Three basic lanes in each direction with axillary lanes as necessary to maintain I-270 operations.
Dunn/Pershall Road (Between MO 367 and Mississippi River)	Two-way Dunn and Pershall Roads in existing or realigned locations as required for mainline and crossroad operations and access.
Bellefontaine Road Interchange	Improved interchange providing full access to/from I-270.
Lilac Avenue Interchange	Improved interchange providing full access to/from I-270.
Riverview Drive Interchange	Improved interchange providing full access to/from I-270.