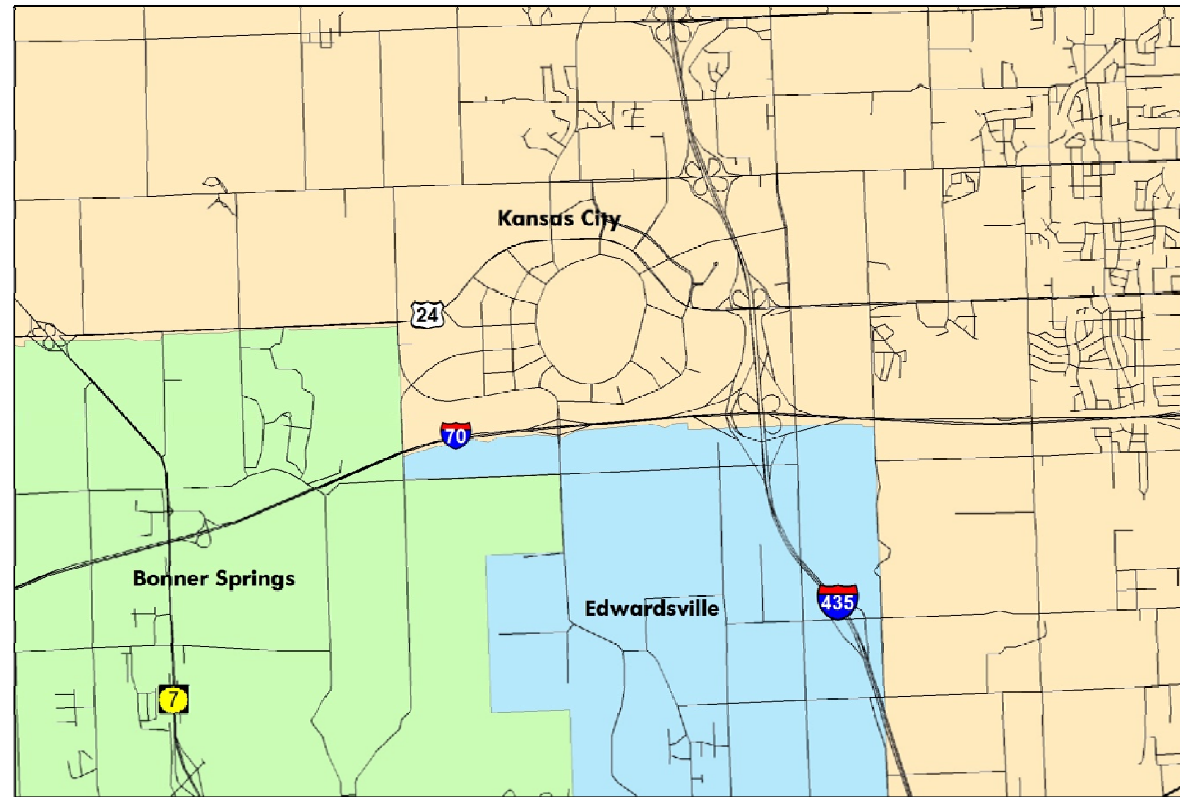


EXECUTIVE SUMMARY

The Kansas Department of Transportation (KDOT) and the Unified Government of Wyandotte County and Kansas City, Kansas (UG) retained GBA to complete a **regional transportation master plan** of traffic operations and geometric needs along the I-70 and I-435 corridors near the Village West region of western Wyandotte County. The study area was generally bounded by Donahoo Road to the north, Kansas Avenue to the south, K-7 to the west, and 78th Street to the east. See **E.S. 1** for a map of the study area.



E.S. 1 – Study Area

The goal of this study was to produce an area-wide projection of expected development impacts, and prepare roadway improvement master plan concepts which KDOT and the local governments can implement in order to create and maintain desirable levels of service and safety on I-70, on I-435, and at major interchanges and critical intersections within the transportation study area. Even with the existing and planned major new developments in this region, there is **currently over 8,000 acres** of low-density, undeveloped, and / or agricultural property within the study area **available to be developed** for commercial, entertainment, office, and residential use. This future development will create significant traffic congestion on the existing roadway system.

General project tasks:

- Collect traffic counts during weekday PM peak hour and during Saturday peak hour
- Determine existing land uses within study area to populate traffic analysis zones (TAZ) (See **Exhibit 2.3.1**)
- Develop PM and Saturday VISUM travel demand model of existing TAZs and existing roadway conditions
- Calibrate existing travel demand model to replicate existing traffic conditions
- Determine future land uses for Design Year 2040 and Full Build-out scenarios (See **Exhibit 2.4.1**)
- Develop PM and Saturday VISUM travel demand model of future traffic TAZs and existing roadway conditions plus future planned improvements (See **Planned Major Roadway and Traffic Control Improvements**)
- Develop PM and Saturday VISUM travel demand models of future interchange scenarios
- Complete detailed evaluation of critical locations and corridors

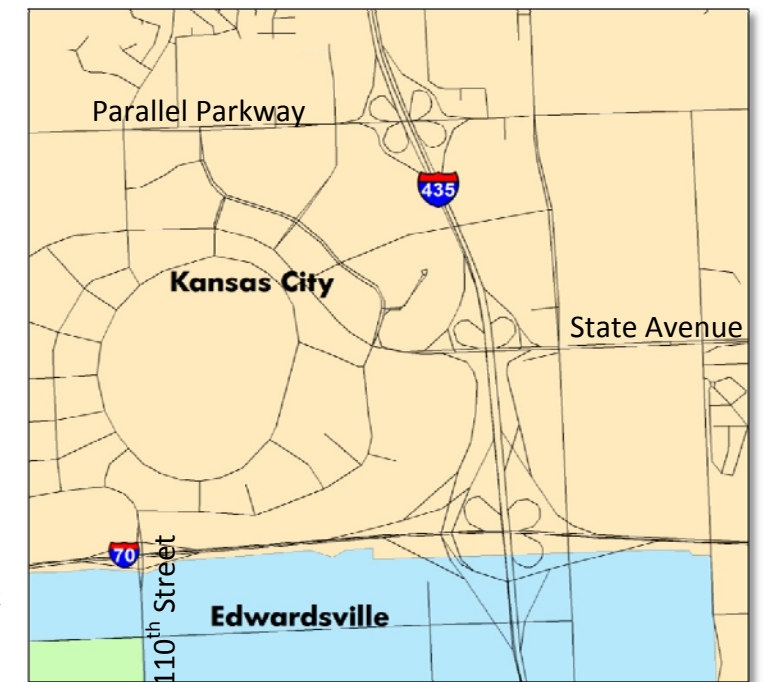
Planned Major Roadway and Traffic Control Improvements

- Widening of State Avenue to three lanes in each direction between K-7 and 94th Street
- Widening of Parallel Parkway to three lanes in each direction between K-7 and 98th Street
- Improving 118th Street to a major arterial type roadway between State Avenue and Donahoo Road
- Widening Donahoo Road to a major arterial type road between K-7 and I-435
- Improving Leavenworth Road to a major arterial type roadway between K-7 and I-435
- Major reconstruction of the system interchange of I-70 and K-7 per the KDOT design concept and widening of I-70 to 3 lanes in each direction through the study area
- Construction of interchanges on K-7 at Parallel Parkway, Leavenworth Road, and Donahoo Road per K-7 Corridor Management Plan
- Construction of K-7 frontage road system per K-7 Corridor Management Plan
- Relocation of intersection of 98th Street and State Avenue per Schlitterbahn development plan
- Realignment of 98th Street along Schlitterbahn development
- Addition of traffic signals at primary intersections throughout the study area

There are 4 sub-areas within the Village West region where detailed analysis and modeling were completed, including the **I-435 & State Avenue** interchange area, the **I-435 & Parallel Parkway** interchange Area, the **I-70 & I-435** system interchange, and the **I-70 and 110th Street** interchange area. See **E.S. 2** for a map of the Village West region. Additionally, detailed analyses of critical individual intersections were completed for major intersections and corridors within the Village West Area where future capacity or congestion issues are anticipated.

Interchange improvement alternatives analyzed as part of this study included **Diverging Diamond Interchanges, Single Point Urban Interchanges, and Standard Diamond Interchanges.**

The improvement alternatives that provided the most acceptable traffic flow characteristics and capacity for future traffic projections were then further evaluate by developing detailed preliminary geometric design layouts. These detailed **preliminary design layouts** were developed to identify expected **construction costs, right-of-way impacts, and expected utility impacts.** Additionally, **full project costs, including construction costs, design engineering services, utility relocation estimates, and construction management costs,** were estimated to provide the total project cost of each of the improvement options.



E.S. 2 - Village West Region

Based upon the completed traffic projections and analyses; preliminary geometric design layouts; and estimates of total improvement project costs, the following list of recommended improvements have been determined. The improvements listed are organized by priority of need to address traffic congestion. These recommendations are only concepts and will be refined as part of final design. It is important to note currently **no funding** has been **identified** for design or construction of the following improvement recommendations.

IMPROVEMENT RECOMMENDATIONS

1. STATE AVENUE AND VILLAGE WEST PARKWAY SINGLE POINT URBAN INTERCHANGE (\$23,400,000)

The conversion of the existing at-grade intersection to a single point urban interchange was evaluated and found to provide the best operations at this location. This proposed improvement utilized the existing Village West Parkway lanes, incorporated the planned widening improvements on State Avenue with an elevated section over Village West Parkway, included ramps to and from State Avenue, and allowed turning movements at the intersection and through movements on Village West Parkway to occur beneath the elevated section of State Avenue. Currently this interchange operates at LOS B with several movements failing. This new interchange would be expected to operate at a good overall LOS C under future traffic conditions. All movements at the interchange would be expected to operate with LOS C or LOS D, and some would experience LOS A operations. In addition, the State Avenue through movements would be grade-separated above Village West Parkway and would not be controlled by the traffic signal located below. This would greatly improve operations during peak flow events on State Avenue, such as major retail events or sporting event weekends. Preliminary design layouts indicate that most of this proposed interchange improvement could be constructed within the existing right-of-way or Unified Government controlled property.

A significant benefit of this grade-separated improvement alternative is the ability to maintain north / south access across State Avenue during major traffic events on State Avenue. Traffic movements between the new Penn National / Hollywood Casino, to be located at Kansas Speedway, and the Village West / Legends development area would be maintained throughout major traffic events that primarily use State Avenue for direct access to I-435. The ramps between State Avenue and Village West Parkway could be closed or certain movements restricted during peak flow periods to maintain through traffic movements on each roadway. Additionally, emergency access routes north / south across State Avenue would be greatly enhanced by the construction of this grade-separated interchange. Renderings of the proposed SPUI interchange at State Avenue and Village West Parkway can be seen on **Exhibit 4.4.2** and **Exhibit 4.4.3**.

Since the existing interchange of I-435 and State Avenue currently acts as a constraint to traffic flows traveling toward the Village West Parkway and State Avenue intersection from the east, reconstructing the I-435 and State Avenue partial clover-leaf interchange with the higher capacity interchange would be expected to overload the at-grade intersection of Village West if this improvement was completed first. Conversely, if the intersection of State Avenue and Village West Parkway was first reconstructed as a single point urban interchange, the existing constrained operations at I-435 would still have a metering effect on westbound State Avenue but would not negatively impact this new improvement's operations.

2. I-435 & STATE AVENUE DIVERGING DIAMOND INTERCHANGE (\$10,750,000)

The recommended improvement option at this location is the conversion of the State Avenue interchange with I-435 from the existing partial cloverleaf interchange into a diverging diamond type interchange. A diverging diamond interchange (DDI) has the traffic on the non-freeway road cross to the opposite side of the through roadway at the freeway underpass. This is a significant improvement in safety, since no left turns must clear opposing traffic, and all movements have discrete lanes and most movements are controlled by traffic signals. Under this improvement scenario, the existing I-435 overpass bridges will be able to be maintained and used as part of the improvement, a significant cost savings. Additionally, this design can improve the efficiency of an interchange, as the lost time for various phases in the cycle can be redistributed as green time; there are only two clearance intervals (the time for traffic signals to change from green to yellow to red) instead of the six or more

required for other interchange designs. **Exhibit 4.8.2** details the geometric configuration of the proposed DDI for this location.

3. STATE AVENUE WITH 98TH STREET

As proposed by the Schlitterbahn development plan, the signalized 98th Street intersection should be reconstructed at the location identified with the recommended lane configurations. The proposed intersection layout should be modified to provide for the required width in the median for the eventual construction of a third eastbound left turn lane when traffic volumes warrant its construction. No cost is associated with this improvement as it should be constructed as part of the Schlitterbahn improvement.

Additionally, as redevelopment occurs on the south side of State Avenue near 98th Street, reserve and / or acquire additional right-of-way for the eventual construction of the Pre-98th Street Loop Configuration with One-Way operations, as described in Section 4.5.4. This geometric improvement is anticipated to be needed when the eastbound triple left turn movement becomes congested and the overall operation of the intersection begins to fail.

4. PARALLEL PKWY WITH 106TH STREET, VILLAGE WEST PKWY, AND 110TH ST/HUTTON RD. (\$1,000,000 per intersection)

The intersections of Parallel Parkway with 110th Street / Hutton Road, with Village West Parkway, and with 106th Street are currently running a north/south split phase signal timing plan due to lane geometry and intersection layout. North/south left turn and through traffic movements must share lanes, severely limiting the traffic signal phasing options. The split phase timing acts as an operations constraint and forces poor signal timings, inefficient coordination of signals, and reduced intersection levels of service along the Parallel corridor. Each of these three intersections should have additional lanes constructed and median nose locations reviewed to allow concurrent left turn phasings and separate lanes for left turning and through traffic movements. It is estimated that construction costs for needed geometric and traffic signal improvements would cost approximately \$1,000,000 per intersection.

5. I-435 & PARALLEL PARKWAY INTERCHANGE IMPROVEMENTS (DDI: \$9,400,000 / Standard Diamond: \$10,600,000)

Reconstruct the existing clover-leaf interchange of I-435 with Parallel Parkway as a Standard Diamond Interchange or a Diverging Diamond Interchange. The Standard Diamond Interchange requires additional through lanes under I-435 when compared to the DDI and would be expected to be more expensive to construct. The DDI provides more capacity than the Standard Diamond Interchange, increasing the traffic able to use Parallel Parkway. Both interchange choices would be an acceptable alternative to the existing cloverleaf interchange and each design concept utilizes the existing I-435 bridges. The selection for this interchange replacement should consider the observed operations of the State Avenue and I-435 interchange DDI improvement. Layouts of the proposed DDI and Diamond Interchange at Parallel Parkway and I-435 can be seen on **Exhibit 5.5.1** and **Exhibit 5.5.2**, respectively.

After the interchange improvement is completed, the right-in / right-out intersection at 104th Street / Prairie Crossing could be modified to become a fully directional, signalized intersection if development activity north of Parallel Parkway requires.

6. I-70 & I-435 SYSTEM INTERCHANGE ENHANCEMENTS (\$25,250,000)

The construction of a northbound I-435 to westbound I-70 flyover, while expensive, does fit into the existing system interchange layout. This improvement would be expected to increase the capacity of critical movements within the interchange, while also providing improved safety and overall operations. This flyover concept should be considered for further future evaluation and implementation if overall traffic conditions and safety continue to degrade as projected due to the three loop ramps and associated mainline weaving sections. The design layout of the proposed flyover ramp from Northbound I-435 to Westbound I-70 can be seen on **Exhibit 6.4.1**.