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211th STREET CORRIDOR STUDY

HIGHWAY J TO HIGHWAY Y

PECULIAR (CASS COUNTY), MISSOURI

Prepared For:

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FINAL REPORT

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STUDY TEAM

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1.0 INTRODUCTION

Cass County and the City of Peculiar have coordinated with the Missouri Department of Transportation (MoDOT) to conduct this study of the 211th Street corridor. When constructed, the majority of the 211th Street corridor will serve as a local roadway under either City or County jurisdiction, based upon the incorporation limits. However, coordination with MoDOT has also been required throughout this corridor study for the proposed 211th Street interchange onto U.S. Highway 71. This highway is currently in the process of being upgraded to interstate standards, and will be redesignated as Interstate 49 by MoDOT and the Federal Highway Administration (FHWA) in the near future. This corridor study has been completed by a Consultant Team led by George Butler Associates (GBA) for engineering and environmental concerns, with assistance from Patti Banks Associates (PBA) for public involvement and from URS Corporation for socioeconomic and cultural / historic resource evaluations.

This document summarizes the process, findings, and recommendations of the environmental and transportation planning study that has been completed for the five-mile long section of the 211th Street corridor between Highway J and Highway Y within the City of Peculiar and Cass County, Missouri. This corridor study has included extensive research and field investigations of the existing conditions within the study area, as described in ***Section 2.0*** of this document. Based upon these existing features, the most feasible horizontal alignments (i.e., curved and straight segments) and vertical profiles (i.e., hills and valleys) have been prepared for each of the four roadway corridor segments that have been evaluated during this study. The overall corridor study process is further detailed in ***Section 3.0*** of this report.

An extensive public involvement process that has been included within this corridor study process has allowed the City, County, and MoDOT to gain the valuable input of key public / private stakeholders, affected property owners, and the general public-at-large regarding the intended purpose of the planned 211th Street corridor and its ultimate alignment. This corridor study has also included detailed evaluations of each potential corridor segment, based upon numerous engineering, socioeconomic, and environmental factors that are further described in ***Section 4.0*** of this report. In this manner, the initial alternatives for the 211th Street corridor have been refined into a set of more feasible alignment alternatives, and ultimately, the preferred alignment for the corridor has been identified and recommended.

1.1 Study Corridor Definition

The 211th Street study corridor spans approximately five miles from Highway J on the east end to Highway Y on the west end, as shown on the Study Area Map above. Based upon direction that the project team received from MoDOT, these two State-maintained highways have served as the

logical termini for this corridor study. This improved route for 211th Street would also connect through a new, proposed interchange onto U.S. Highway 71 (i.e., future Interstate 49), as mentioned previously.

1.2 Previous Studies

An *Access Justification Report (AJR)* for this proposed interchange was previously completed by GBA and submitted to MoDOT on December 31, 2009. The City's adopted Comprehensive Master Plan identified the 211th Street corridor improvements and associated U.S. Highway 71 interchange as the highest priority projects that will be needed to encourage the anticipated future development of the adjacent and surrounding areas of the City. The City's adopted Master Plan, Future Land Use Map, and the initial improvement alternatives studied in the AJR are described in further detail in ***Section 3.1*** of this report. The previously submitted AJR document demonstrated that the construction of the proposed 211th Street interchange was justified to serve the future access needs. Any feasible improvements that could be made to the existing roadway facilities and Highway J/C interchange would ultimately be inadequate to serve the expected future traffic demands. Operational analyses completed during the AJR study revealed that it would be extremely difficult to route all of the City's expected development-related traffic onto U.S. Highway 71 through the single existing Highway J/C interchange, and that inadequate traffic operations would be experienced at all intersections within the study area without an additional highway access point.

It should be noted that although MoDOT has accepted the previously completed AJR document, it has not yet been forwarded to the FHWA for review and/or approval. Currently, MoDOT has a standing agreement with the FHWA that will require full federal oversight for any improvements to the U.S. Highway 71 corridor once the conversion to Interstate 49 is completed. Since the standards for this future interstate corridor, or even for the AJR documentation itself, might change prior to the time that funding is secured and a construction timeline is established for the proposed 211th Street interchange, the previously submitted AJR document may still need to be revised to include any updated data and/or analyses required at that time. Therefore, submittal of the AJR document by MoDOT to the FHWA for approval will only occur once all of these related issues are resolved.

The addition of the proposed 211th Street interchange would be expected to better serve the anticipated traffic within the northern portions of the City of Peculiar, as well as the surrounding County lands, associated with the continued growth and development along the entire length of the U.S. Highway 71 corridor within Cass County. Although significant improvements will still be required at many of the adjacent intersections and on the nearby roadways within the study area, these improvement needs would be reduced on a network-wide basis with the construction of an additional access point onto U.S. Highway 71 at 211th Street.

The proposed 211th Street interchange was also shown to provide significant relief to the existing Highway J/C interchange currently serving the City of Peculiar, reducing the traffic congestion and improving the overall safety within this existing interchange area. Also, the provision of a second interchange at 211th Street to serve the City of Peculiar would ensure that any future improvements required within the Highway J/C interchange could be minimized. Therefore, the proposed 211th Street interchange was determined to represent the most feasible improvement to serve the study area from a regional traffic operations standpoint.

1.3 Project Status

Last year, City and County officials worked with MoDOT District 4 management to include the proposed 211th Street interchange on the Long-Range Transportation Plan (LRTP) administered by the Mid-America Regional Council (MARC), the Metropolitan Planning Organization (MPO) for the bi-state Kansas City metropolitan region. In order for any improvement project to be eligible to receive the federally-allocated funds available through MoDOT, the project must first be approved and prioritized on the LRTP by MARC.

On the April 7, 2009 ballot, City of Peculiar voters showed strong support for the use of General Obligation (GO) bonds to partially finance both the 211th Street improvements and the U.S Highway 71 (i.e., future I-49) interchange. The ballot question described future GO bonds totaling $8,000,000 "for the purpose of extending and improving" the City's streets. The ballot question also indicated that no less than 90% of the bond proceeds would be dedicated "to build an interchange and connecting roads to the interchange." Only 10% of the GO bond proceeds will go toward improving the City's existing streets. Promotional materials that were presented to the voters also explained that their support of the GO bonds could also aid in the City's pursuit of Federal and State funds for the interchange project. It was made clear that the City would not issue these bonds unless cost-sharing funds were also committed from Federal and/or State sources.

Since 2007, the City staff has pursued additional sources of funding for the proposed 211th Street interchange project, including "stimulus" funding through The American Recovery and Reinvestment Act (ARRA) of 2009; funding through Community Development Block Grants (CDBG); and direct Federal Appropriations though their representatives in Washington, D.C. Also, the Cass County Commission has continued to show strong support for the project, and has committed more than $400,000 toward the production of this 211th Street Corridor Study and the previously submitted AJR to confirm the feasibility of the project.

The proposed 211th Street interchange project would have independent utility by virtue of its planned connections to the existing roadways on each side of U.S. Highway 71 (i.e., Peculiar Drive on the west and School Road on the east). City and County officials believe that construction of the 211th Street interchange will be an essential first step in the establishment of another east-west arterial corridor through the northern portions of Cass County, with possible extensions and future connectivity into the suburban areas within Kansas. It is likely that funding for this proposed interchange will eventually be allocated through MARC's project prioritization process, although there is currently no specific timetable for federal funding availability for this project.

Therefore, this corridor study represents an initial step in the planning process to consider the entire 211th Street corridor from Highway J to Highway Y. This document summarizes the preliminary environmental evaluations and transportation planning analyses performed during the course of the study, in addition to the public and stakeholder input received. The recommended alternatives presented in this corridor study report should ultimately serve as a blueprint for the future 211th Street corridor and provide guidance in terms of its general alignment, configuration, and character. However, it should be noted that additional planning and engineering analyses will still be required for a Location Study prior to the actual design and/or construction of any improvements along the 211th Street corridor. Further, a detailed environmental review process and additional public involvement hearings will be required if any Federal funding allocations are obtained for this project. At this time there are no specific improvement projects that have been programmed or planned within the study area by the City, County, or MoDOT.

1.4 Regional Connectivity

The proposed 211th Street interchange would provide a vital connection within the existing and planned street and highway network serving the City of Peculiar, and would likely be the primary catalyst for the planned development and growth within the northern half of the City. Likewise, the initial improvement of 211th Street between Peculiar Drive and School Road would provide important local connections to serve the already developing areas within the City, as well as to the nearby Ray-Pec school district complex. Again, it should be noted that the proposed 211th Street interchange onto U.S. Highway 71 (i.e., future I-49) will be under the purview of MoDOT and the FHWA, while the local roadway connections would be under City or County jurisdiction.

However, the regional roadway connectivity would not be significantly improved without the westward extension of 211th Street from Harper Road to Highway Y, a distance of approximately three miles. The existing Highway J/C interchange is located about 1.4 miles to the southeast of the proposed 211th Street interchange location, and direct connections between Highway C and Highway YY are currently available within the City of Peculiar's downtown district via Peculiar Drive. Although the two-lane, paved Highway YY does serve as a parallel east-west route located about one mile to the south of the 211th Street study corridor, Highway YY is presently lined with residential subdivisions and rural, residential estates. Highway YY would not be able to provide the same direct access to the large, undeveloped land parcels within the study corridor as an improved 211th Street would, especially those properties along the north side of the planned roadway corridor.

Similarly, although the North Cass Parkway interchange with U.S. Highway 71 was opened to traffic in 2010, it is located about 3.5 miles to the north of the 211th Street study corridor. Due to its distance from the growth centers in northern Peculiar, this new interchange is not expected to attract and/or serve a significant amount of traffic from within the 211th Street corridor study area. There are currently no plans for other interchanges to be provided between the planned 211th Street and existing North Cass Parkway interchanges; however, the available separation distance between these locations would likely allow the construction of an additional interchange someday that could provide some operational benefits at both the North Cass Parkway and 211th Street locations.

1.5 Purpose and Need

The City of Peculiar's adopted Comprehensive Master Plan and Future Land Use Maps (adopted in November 2008) indicate that significant commercial and industrial development is planned within the immediate vicinity of the proposed 211th Street interchange, as well as along the entire study corridor length within the City limits. The City's staff and residents desire to create a destination retail center located in the southeast quadrant of the proposed interchange, with large commercial / employment centers located immediately to the north across 211th Street. Another key component of the City's anticipated growth and economic development will be a regional industrial center that is planned for the northwest quadrant of the proposed interchange, where a significant amount of electrical power is already available to support any large-scale industrial users.

Ultimately, City and County officials believe that additional westward connectivity by means of another corridor such as 211th Street must be provided in order to improve the viability of these planned future developments. An improved 211th Street corridor will also allow the more efficient transport of people, goods, and services from Peculiar to the remainder of the Kansas City metropolitan area located to the northwest of the City. Therefore, in addition to providing significant roadway system linkage benefits and improving the overall safety and

capacity conditions on the City's other existing roadways, the 211th Street corridor is also expected to support the anticipated economic development within the northern portions of the City. While the construction of the 211th Street corridor and highway interchange may not be the only catalyst for land use development on the surrounding properties, certainly there is interdependency between such developments and the additional access that will be provided by an improved roadway network that will increase their viability.

To serve this future need, the City envisions 211th Street as an arterial roadway that is also sensitive to the various character areas through which it will pass. The roadway's lane configurations, widths, lighting levels, pedestrian accommodations, and degree of landscaping / aesthetic treatments and amenities will need to be varied appropriately in order to remain consistent with the adjacent land uses that the roadway is intended to serve.

2.0 EXISTING CONDITIONS

Prior to the preparation of the initial alternatives for the 211th Street corridor, extensive research and field studies were performed by the Consultant Team in order to establish the existing conditions for the corridor study. It should be noted that these field investigations of the existing conditions were generally constrained within a distance of approximately 175 feet on each side of the respective alignment centerlines for each of the existing and/or planned corridor segments defined by the initial project alternatives. The following paragraphs summarize the key existing features within the study area.

2.1 Street Network

U.S. Highway 71 is the primary north-south route providing access from the City of Peculiar to the Kansas City metropolitan area to the north, as well as to Harrisonville and the remainder of Cass County to the south. As mentioned previously, the City is currently served by an existing diamond interchange onto U.S. Highway 71 with Highway J/C. These two State-maintained highways provide direct connections to many of the other major streets within the City of Peculiar. It should be noted that Highway C runs westward into the City's downtown district before turning southward, while Highway J runs eastward from the existing interchange for a distance of about one-half mile before turning northward.

Highway J then runs in a north-south orientation through the eastern portions of the City of Peculiar, continuing northward through the 211th Street study corridor and toward the City of Raymore. At the eastern end of the study corridor, 211th Street intersects Highway J at a "T"-type intersection located approximately 1.3 miles to the northeast of the existing Highway J/C interchange with U.S. Highway 71. Between the intersections with Highway J and School Road, this approximately one-mile long segment of 211th Street is located within the City limits and abuts mostly residential subdivisions and rural estates on both sides of the roadway. This roadway segment is also adjacent to the Ray-Pec school campus, which is located in the northeast quadrant of the intersection of 211th Street with School Road.

211th Street continues westward from the intersection of School Road for a distance of about 3,000 feet and then turns to the northwest to serve as the eastern frontage road for U.S. Highway 71. This outer roadway runs northward for a distance of about 0.6 miles before terminating at a private residence. This section of 211th Street abuts mostly agricultural lands and one rural residence with several out buildings on the north side of the roadway, and several single-family residences located just east of U.S. Highway 71. It should be noted that this segment of 211th Street located to the west of the School Road intersection lies within the unincorporated portions of Cass County.

On the west side of U.S. Highway 71, two separate sections of the 211th Street corridor currently exist. First, a narrow, 600-foot long asphalt roadway segment provides a connection between Peculiar Drive and Harper Road within the City limits, and abuts only one property with a single-family residence and associated out buildings located on the south side of the roadway.

Finally, the westernmost mile of the existing 211th Street study corridor extends from the intersection with Mullen Road westward to Highway Y. This existing section of 211th Street is already platted, but is located within the unincorporated portion of Cass County between the cities of Peculiar and Belton. Also, this western mile of 211th Street is mostly developed with residential subdivisions and single-family homes along the north side of the roadway, while agricultural lands and some rural estates abut the south side of the roadway.

Three existing roadways currently provide primary north-south connectivity through the study area to the west of U.S. Highway 71. Serving as the western termini for the project, Highway Y runs in a north-south orientation serving the study area from the north toward the nearby City of Belton. Other north-south routes in this area, like Mullen Road, Knight Road, and Harper Road, also currently serve the portions of the City of Peculiar that were considered for the purposes of this corridor study. Located just west of U.S. Highway 71, Peculiar Drive (i.e., Old Highway 71) serves as a north-south frontage roadway and also provides connectivity through the City's downtown area to Highway C.

On the east side of U.S. Highway 71, School Road also provides north-south connectivity from Highway J near the existing interchange, through the residential areas located east of U.S. Highway 71, and northward to 211th Street. School Road also serves the adjacent Ray-Pec school district campus which lies along the east side of School Road to the north of 211th Street, and then continues northward into Raymore. The Study Area Map provided in ***Section 1.0*** of this report provides an aerial view of the existing street network that has been described in this section.

2.2 Traffic Controls

All of the existing intersections located within the study area are currently controlled with stop signs. Only the ramp terminal intersections located within the existing U.S. Highway 71 interchange with Highway J/C are controlled with traffic signalization.

The eastern segment of 211th Street located to the east of U.S. Highway 71 is controlled with stop signs at the intersections with both Highway J and School Road. Likewise, stop signs are in place for vehicles approaching the four existing "T"-type intersections along 211th Street to the west of U.S. Highway 71 at Peculiar Drive, Harper Road, Mullen Road, and Highway Y.

2.3 Typical Sections

The typical roadway cross-sections that are currently provided on the four existing segments of 211th Street are varied, and can be described as follows:

- Currently, 211th Street exists as a two-lane asphalt roadway, with turf shoulders and adjacent drainage ditches, from Highway J westward to the intersection with School Road. This eastern mile of the study corridor lies within an existing 60'-wide right-of-way.

- Between the School Road intersection and U.S. Highway 71, 211th Street is only a narrow gravel road, with no shoulders and rather steep ditch drop-offs. This gravel section of 211th Street is also located within an existing 60'-wide right-of-way.

- To the west of U.S. Highway 71, 211th Street has only a narrow 16'- to 18'-wide asphalt cross-section for its existing connection between Peculiar Drive and Harper Road.

- The two-lane asphalt roadway segment of 211th Street that is located between Mullen Road and Highway Y also has turf shoulders and shallow drainage ditches. This section of 211th Street occupies an existing right-of-way that varies from 40 feet to 60 feet in width.

2.4 Horizontal & Vertical Alignments

All existing segments of 211th Street have been constructed on the current section and/or property lines separating the abutting properties, and are essentially tangent (i.e., straight-line) sections of roadway. Horizontal curvature is present on the existing roadway alignments in only two locations, both located on the east side of U.S. Highway 71.

An offset (i.e., with separated north-south approaches) intersection currently exists where School Road intersects 211th Street near the southwest corner of the Ray-Pec school district complex, as shown on the Study Area Map in ***Section 1.0*** of this report. However, the through movements on 211th Street continue in an east-west orientation through this complex intersection, while the north-south School Road traffic negotiates the two existing horizontal curves in this location. The City anticipates that School Road will eventually be realigned to the west of its current location, as future improvements are made along the 211th corridor to improve the overall safety in the vicinity of the schools.

Another existing horizontal curve is present on the gravel segment of 211th Street to the west of the School Road intersection, where 211th Street turns northward as the frontage roadway along the east side of U.S. Highway 71. Based upon the preliminary layouts prepared for the planned 211th Street interchange and included within the previously submitted AJR document, this existing curvature on 211th Street will be eliminated when the frontage roadway is relocated and realigned farther eastward in order to make room for the northbound on-ramp onto U.S. Highway 71.

The terrain along the entire length of the 211th Street corridor can generally be described as gently rolling, and without any excessive centerline profile grades (i.e., hills or valleys). In fact, the maximum profile grades along the existing portions of 211th Street are all below five percent. By comparison, MoDOT's roadway design standards typically allow for a maximum profile grade of up to seven percent. On the approaches to the existing intersections along the 211th Street corridor, the grades are generally slight and would appear to have no detrimental effects on the sight distances available for drivers on the minor, side-street approaches, or on the vehicular traffic operations at any of these locations.

2.5 Posted Speed Limits

First, it should be noted that the regulatory speed limit within the incorporation limits of the City of Peculiar is 25 miles per hour (mph), except where otherwise posted. Likewise, all county roads located within Cass County have a 35-mph speed limit, unless otherwise posted.

The posted speed limit on all of the existing segments of 211th Street located between Highway J and Highway Y is 35 mph, except for the short section of 211th Street located between Peculiar Drive and Harper Road where the posted speed limit is currently 25 mph. It should be noted that the existing gravel section of 211th Street between School Road and U.S. Highway 71 would be subject to the County-wide regulatory speed limit of 35 mph since no other speed limit is posted. In addition, a speed limit reduction zone is located along 211th Street adjacent to the Ray-Pec school district complex (i.e., from the eastbound, gravel approach to the School Road intersection eastward to the school property line). Between the hours of 7:00 a.m. and 4:30 p.m. on school days, the speed limit on this segment of the existing roadway is reduced to 25 mph.

As the eastern terminus of the study corridor, Highway J has a 50-mph speed limit approaching 211th Street from the north, which decreases to 45 mph to the south of the 211th

Street intersection as drivers enter the City of Peculiar. School Road has a posted speed limit of 35 mph both to the north and south of the 211th Street study corridor. However, a similar speed limit reduction zone is in effect along School Road from the 211th Street intersection northward to about the north property line of the Ray-Pec school district complex.

Running along the west side of U.S. Highway 71, Peculiar Drive has a posted speed limit of 55 mph through the specific corridor study area. Just south of the Siena Drive intersection, the speed limit on Peculiar Drive reduces to 45 mph. This 45 mph speed limit is in effect until just south of the Highway YY (Summerskill Road) intersection, where the speed limit reduces again to only 35 mph entering the City's downtown district. Nearby, the posted speed limit on Harper Road is only 25 mph to the south of Highway YY, but is 35 mph on the north side of Highway YY and through the existing intersection with 211th Street.

Intersecting the westernmost mile of the existing 211th Street corridor that is located within unincorporated Cass County, Mullen Road has a posted speed limit of 35 mph through its intersection with 211th Street. As the western terminus of the study corridor, Highway Y has a posted speed limit of 55 mph through the entire corridor study area, including the intersections with both 211th Street and Highway YY.

Finally, Highway YY has a posted speed limit of 45 mph westward from its existing intersection with Peculiar Drive, past the city limit located just east of the Martha Road intersection, to the intersection with Highway Y.

2.6 Access Control

The practice of access control typically utilizes raised medians and islands in order to restrict driveway access near to an intersection and/or prevent some vehicle turning movements within the intersections along a roadway segment. Access control measures are typically employed to improve both the traffic operations at the intersections, as well as improve the roadway safety by prohibiting dangerous turning maneuvers.

Currently, there are no access control restrictions along any of the existing sections of 211th Street within the study area. The existing Highway J/C interchange also currently provides full access for vehicular movements at that location, since no raised medians are provided. Likewise, full access is currently allowed along all of the other arterial and collector streets that will be expected to serve the expected growth and development along the 211th Street corridor.

In addition, the preliminary layouts that were developed for the recommended 211th Street interchange configuration and included in the previously submitted AJR document will allow full, unrestricted access of movements from U.S. Highway 71 to the 211th Street corridor, and vice versa. However, separation of the east-west vehicular traffic with raised median dividers was planned for the 211th Street corridor through the proposed interchange area. Due to the close spacing of the planned intersections between School Road and Peculiar Drive, raised medians were recommended to restrict any intermediate access drives that might be allowed in the future to right-in, right-out vehicle movements.

2.7 Drainage Structures

There are several varieties of drainage structures and pipe crossings located along the existing 211th Street corridor between Highway J and U.S. Highway 71, where tributaries of the East Branch creek currently cross the roadway. First, a corrugated metal pipe (CMP)

crossing is provided to convey ditch drainage along the west side of Highway J. A reinforced concrete box (RCB) structure under 211th Street is located about one-quarter mile to the west of the Highway J intersection (i.e., between the existing intersections with Kendall Road and Sicklebar Drive). The creek tributary served by this RCB crossing eventually joins another East Branch tributary that crosses through the large RCB under Highway J, located just to the south of the 211th Street intersection. In addition, there are also two other RCB structures across the existing gravel section of 211th Street. These drainage structures are located about one-sixth mile and one-half mile to the west of the existing School Road intersection with 211th Street.

A tributary of the East Creek crosses 211th Street through a large CMP crossing located about 250 feet east of the intersection with Highway Y. Along the existing segment of 211th Street between Highway Y and Mullen Road, two other metal pipe crossings with headwalls serve the localized drainage needs. Finally, a CMP also crosses the west leg of 211th Street at the Mullen Road intersection to convey north-south ditch drainage.

It should be noted that all of these existing stream and drainage crossings of 211th Street are transverse (i.e., perpendicular across the road) to the existing roadway segments. As such, these cross-road pipes and box drainage structures may need to be extended and/or replaced in order to accommodate any future roadway improvements. The actual improvement needs will be further evaluated and determined during the final design stages of this project. A more detailed description of these stream crossings, as well as some others located on the adjacent roadways within the corridor study area, is provided later within this document in ***Section 4.5.1***.

2.8 Bridges

Currently, there are no bridge structures located along the existing segments of 211th Street or within the corridor study area. The most significant stream that crosses the study corridor is the East Creek of the South Grand River, which runs generally in a north-south orientation approximately one-quarter mile to the east of the existing Mullen Road intersection with 211th Street. According to the latest FEMA flood insurance maps for the area, East Creek is one of four areas designated as 100-year floodplains within the project area (see ***Section 4.5.3***). The floodplain associated with the East Creek also contains a regulated floodway, according to the available information.

Where the East Creek of the South Grand River currently crosses Highway YY, located about one mile to the east of the Highway Y intersection, an existing two-lane bridge structure spans the associated drainage channel. It should be noted that this structure, which is owned and maintained by MoDOT, has a posted load limit rating of 19 tons for single-unit vehicles, and 30 tons for other heavy truck traffic.

2.9 Railroad Crossings

There are no active railroad crossings of the five-mile long 211th Street study corridor between Highway J and Highway Y. However, from the existing field surveys and investigations, a mainline track owned by the Burlington Northern railroad was previously located adjacent to Peculiar Drive (Old Highway 71) and crossed 211th Street just to the west of the existing intersection. Based upon the property information available from Cass County, it appears that the railroad right-of-way has been permanently abandoned and sold to the adjacent private parcels or dedicated to the public street right-of-way.

2.10 Mined Land / Quarries

There is one existing limestone quarry located within the 211th Street corridor study area. This active quarry is owned and operated by Hunt Martin Materials, LLC. The overall quarry property is bounded by Harper Road on the east, Mullen Road on the west, and Highway YY on the south. The northern boundary of the quarry property is generally the section line which aligns with the existing portions of 211th Street located between Peculiar Drive and Harper Road, as well as between Mullen Road and Highway Y.

The total quarry property has over 500-acres of open-pit mined areas, and over 300-acres of non-mined areas. In general, the active mining operation to date has occurred within the area bounded by Highway YY northward to the planned 211th Street corridor, and from Mullen Road eastward to Knight Road. The Missouri Department of Natural Resources maintains oversight responsibilities for the ongoing mining activities within the existing quarry properties.

Although the quarry also owns the property generally bounded by 215th Street northward to the 211th Street corridor, and from Knight Road eastward to Harper Road, no mining operations of any kind have yet occurred within this one-half square mile parcel. According to representatives of Hunt Martin Materials, LLC, the quarry also possesses some mining rights for the property located along the north side of the planned 211th Street corridor, from Harper Road westward for a distance of about three quarters of a mile. The owners / operators of the quarry have indicated their interest in possible future undermining within these non-mined areas, including potential underground crossings of the future 211th Street roadway. However, Special Use Permits would need to be approved by the City of Peculiar in order for any undermining to occur.

No other mined lands, quarries, or underground caverns were identified or discovered within the corridor study limits.

2.11 Bicycle / Pedestrian Facilities

Currently, there are no sidewalks or bike paths provided anywhere along the existing sections of 211th Street that are under either City or County jurisdictions.

3.0 STUDY PROCESS

This study of the 211th Street corridor started with an evaluation of the existing planning documents available from the City of Peculiar. In addition, a series of initial meetings were held to gather input regarding the corridor study project from staff and elected officials from the City, County, and MoDOT. Again, based upon the direction received from MoDOT, the logical termini for the project were determined to be from Highway J on the east to Highway Y on the west in order to ensure that the overall project would have connectivity within the State highway system. Also, as described previously in ***Section 2.0*** of this document, extensive research and field investigations of the existing corridor conditions were performed by the Consultant Team prior to the preparation of the initial alternatives for the 211th Street corridor.

3.1 Initial Corridor Alternatives

The development of the initial corridor alternatives for 211th Street reflected the transportation and land use planning efforts previously performed by the City of Peculiar. It should be noted that throughout the City's master planning process, coordination with both Cass County and the City of Belton occurred to ensure a common and consistent vision for the growth and development within this portion of the county. As a result, the City's previously adopted Comprehensive Master Plan and Future Land Use Maps were instrumental in determining the desired alignment of 211th Street through the study area. The adopted Future Land Use Map is illustrated on ***Exhibit 1*** below.

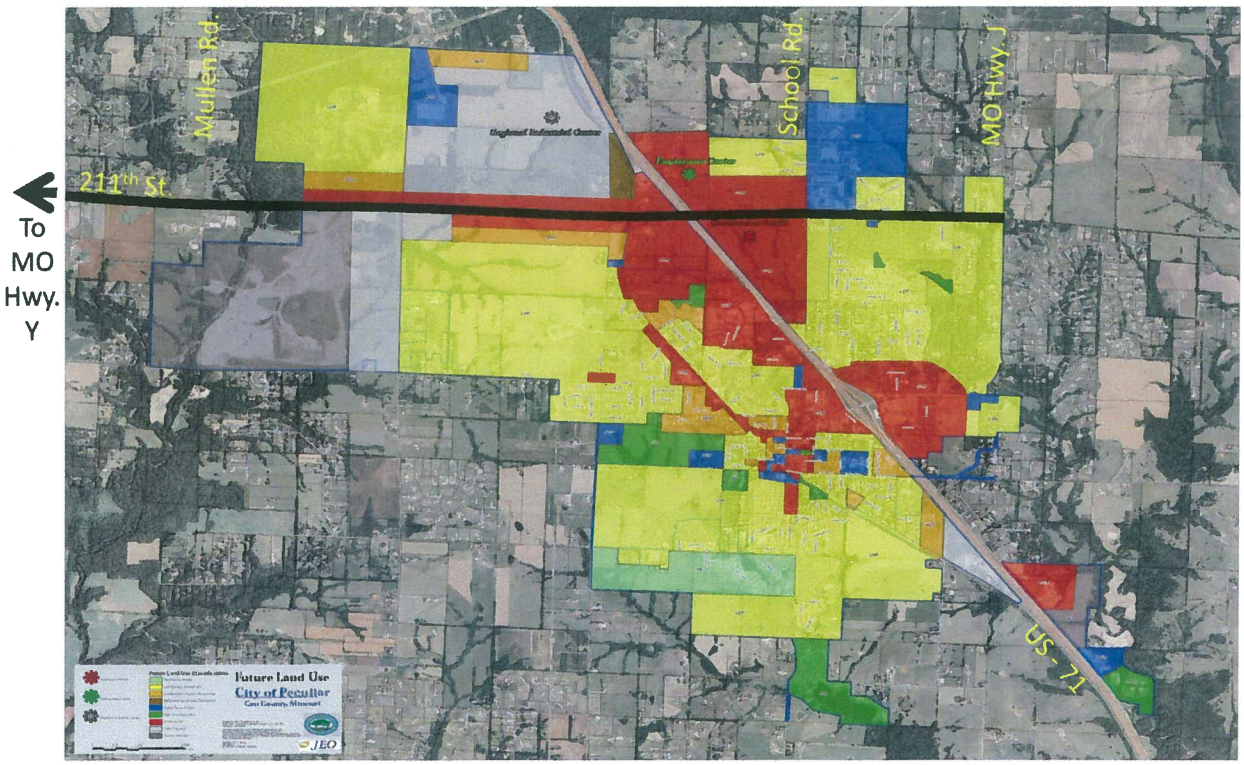


Exhibit 1: *City of Peculiar Future Land Use Map*

As shown on the exhibit, the existing 211th Street corridor generally serves as a delineating boundary between the various types of future land uses that are expected to develop along the corridor and within the northern portions of the City of Peculiar. However, from the School Road intersection westward to near Knight Road, commercial developments (shown

in red on the exhibit) are planned to immediately abut both sides of the roadway and have frontage along the 211th Street corridor. Therefore, the initial corridor improvement alternative considered for 211th Street in this study generally included a straight roadway alignment that incorporated the existing street segments along 211th Street from Highway J to U.S. Highway 71, from Peculiar Drive to Harper Road, and from Mullen Road to Highway Y.

In addition to taking advantage of the investments in the existing infrastructure already made by the City and County and generally maintaining access to the existing adjacent land uses, the straight alignment of the initial improvement alternative also had the benefit of remaining along the existing property and/or section lines separating the large, undeveloped tracts along the 211th Street corridor. For these reasons, no off-alignment alternatives were initially defined. With this particular alignment choice, logically-spaced shared access points could be easily provided in order to maintain access for the adjacent properties on both sides of the future roadway. It should also be noted that the previously submitted AJR document considered the straight connection of 211th Street between its existing intersections with School Road and Peculiar Drive, and recommended the construction of a standard diamond interchange configuration with a pair of bridges for the U.S. Highway 71 mainline traffic in order to create an underpass for 211th Street.

3.2 Feasible Corridor Alternatives

Throughout this corridor study process, the initial alternative for the 211th Street corridor was continuously modified so that more feasible alignments and approaches were gradually developed. This incremental refinement process was especially aided by the input received from City, County, and MoDOT staff and/or elected officials; major property owners and public and/or private stakeholders with vested interests in the development of the 211th Street corridor; and the general public-at-large. The extensive public involvement process included in this corridor study is summarized within this document in ***Section 4.2***. In addition, a comprehensive log that includes the public involvement documentation generated during this process is attached to this document as ***Appendix C***.

Based upon the completed field investigations and input received from public and private stakeholders, several key modifications were made to the alignment of the initial improvement alternative for the 211th Street corridor. The majority of these alignment modifications were made in response to major topographic features or other environmental concerns within the large, undeveloped tracts of land located between Harper Road and Mullen Road. The justifications for several of these primary alignment modifications are described in the following paragraphs:

- Geotechnical engineering-related concerns about the existing open-pit mining operation from around Knight Road westward, including the prior disturbance of the ground along the quarry's northern property boundary and the resulting questions about the soil stability and/or its suitability for use as a roadbed, necessitated the shifting of the planned 211th Street corridor alignment slightly northward to minimize any detrimental quarry-related impacts on the design of the future roadway.

- Stakeholder concerns about storm water runoff from the future roadway, potential silting, and other impacts on a large, private pond located along the south side of the 211th Street corridor and just east of the East Creek crossing resulted in additional horizontal curvature being incorporated so that the alignment of the roadway turned farther north of the existing property / section line.

- The required crossing of the East Creek of the South Grand River, located approximately one-quarter mile to the east of Mullen Road, was found to represent the most significant environmental constraint upon the planned 211th Street alignment. In order to minimize both the potential environmental impacts on this creek's flood plain and federally-regulated floodway, as well as to provide the most cost effective bridge structure to facilitate this crossing, a more perpendicular route across the channel was desired. The resulting alignment shifts and horizontal curvature allowed this more advantageous angle for the bridge crossing of the creek, while also maintaining the desired tie-in for the roadway as the east leg of the existing intersection of Mullen Road with 211th Street.

- Based upon public input received at the first open house meeting held during this corridor study process in December 2009, another feasible corridor alternative was later developed. Some County residents at this meeting expressed concerns regarding the potential widening of the existing segment of 211th Street between Mullen Road and Highway Y, as well as the expense of the required crossing of East Creek for the feasible alignment presented at the meeting.

  In response, the Consultant Team evaluated several alternate routes where possible connections for 211th Street might be made between Harper Road and Highway Y. These potential alignments were evaluated based upon their proximity to other existing roadway connections within the expanded study area, and the overall desire to minimize potential impacts on the state-regulated quarry property, other environmentally-sensitive areas, and local residential developments.

  - A possible alignment located between the existing sections of Harper Road and Knight Road would have limited regional benefit in terms of new connectivity, given the close proximity of the adjacent north-south roadways.

  - Due to the environmental implications that might be associated with the construction of any future roadway within the quarry property where open-pit mining has already occurred, the area from the quarry's east property line to the East Creek of the South Grand River was determined to be undesirable.

  - The provision of another north-south alignment in the vicinity of Mullen Road would create nearly as much concern as the first feasible alignment developed. A bridge crossing of East Creek would still be required to allow the future roadway to reach this area. Environmentally, there are also more numerous small ponds and creek tributaries in this area that would need to be mitigated or avoided by the future roadway alignment. In addition, the area is already platted with several residential subdivisions and a future roadway located within this area would also be in close proximity to the existing Highway Y corridor, reducing its overall benefits to regional connectivity.

  Therefore, the most desirable corridor that was identified for an alternate north-south connection between 211th Street and Highway Y (via Highway YY) was located in the vicinity of Knight Road. Several alignment options for this alternative alignment were presented to the general public at another open house meeting in May 2010, and were further refined during additional meetings with City and County officials, as well as with the property owners that would be directly affected by the alignment.

The final recommended alternate alignment generally turns the 211th Street corridor in a southwesterly direction at a point located about three-fifths of a mile west of existing Harper Road, crossing Knight Road just to the north of 215th Street, runs along the eastern property boundary of the existing quarry, and then curves westward to align with Highway YY.

3.3 Study Corridor Evaluations

The four feasible improvement alternatives considered for the purposes of this corridor study of 211th Street between Highway J and Highway Y are shown on ***Exhibit 2*** below. For the purposes of discussion and comparison within this document, the potential corridor segments were delineated and given independent designations. Corridor Segments A and B address the eastern and middle portions of the study corridor, respectively, while corridor Segments C1 and C2 represent the connection alternatives for the 211th Street corridor to the west of Harper Road. The following paragraphs provide additional detail regarding each of the respective alternative alignments.

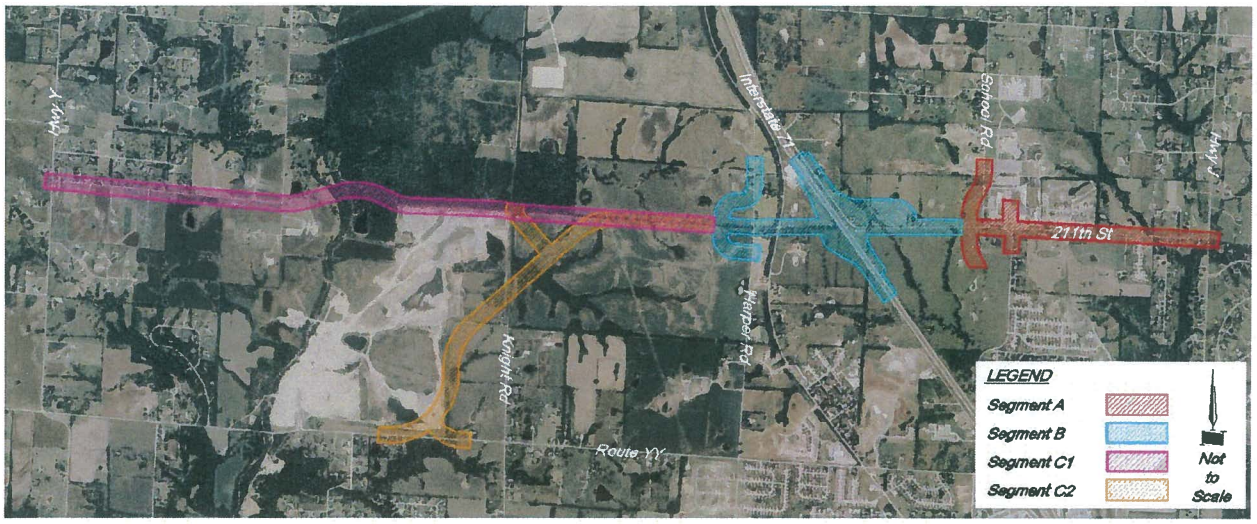


Exhibit 2: *All Corridor Segments for Study*

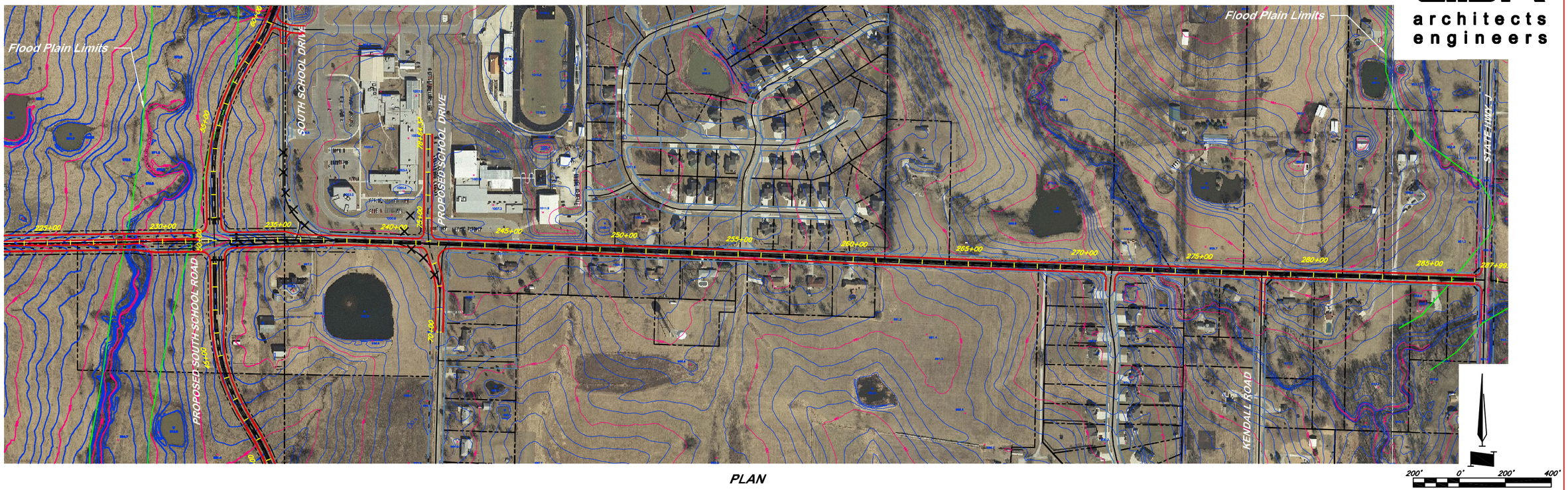
3.3.1 Corridor Segment A

This study corridor segment is generally located between the existing intersection with Highway J on the east end of the project and the relocated School Road intersection, as shown on the attached ***Exhibit 3***. It is planned that this eastern one-mile section of the existing 211th Street roadway would be widened from its existing two-lane configuration to provide a three-lane roadway with a width measuring 40 feet, back to back of curb. This configuration would provide one travel lane in both the eastbound and westbound directions, while also accommodating left-turning movements with a center turn lane. It is expected that this widening improvement could be constructed within the existing right-of-way, plus temporary grading easements, except in the vicinity of the relocated School Road intersection where up to 100 feet of right-of-way might be needed.

As mentioned previously, it is anticipated that the existing School Road intersection might be realigned slightly westward from its current location. This potential realignment would eliminate the existing offset intersections with 211th Street, and would be expected to increase the overall safety of the roadways near this location.

EXHIBIT 3 - SEGMENT A

GBA
architects
engineers



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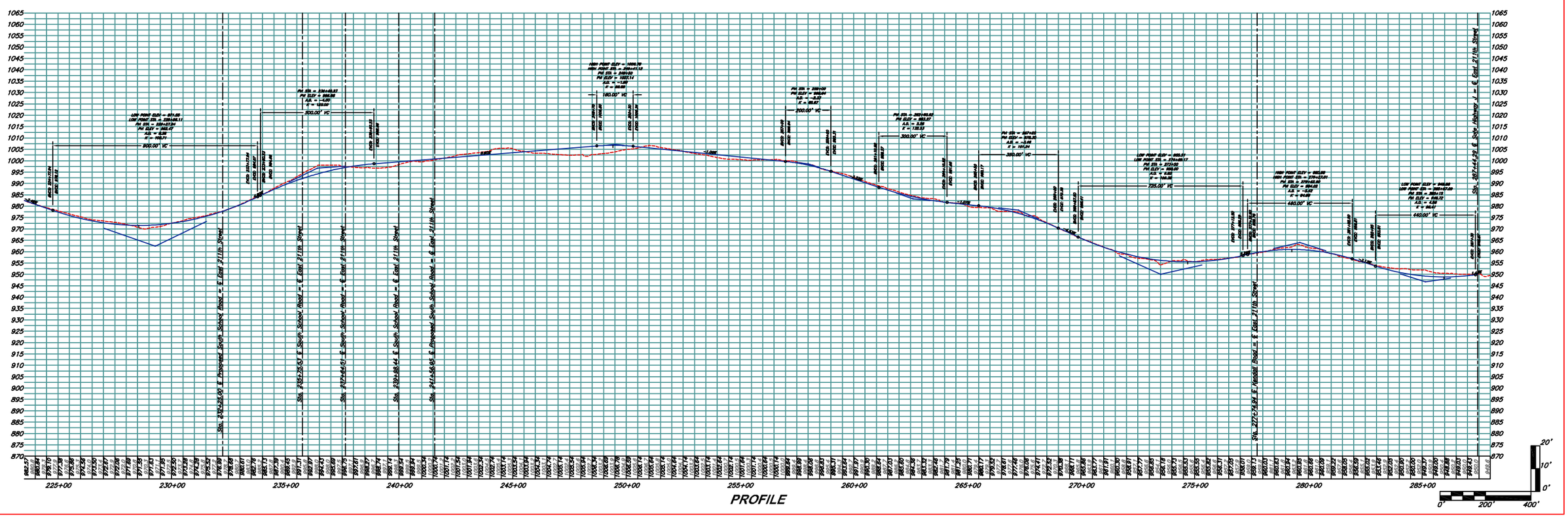

PROFILE

As shown on ***Exhibit 3***, the existing school drives onto both School Road and 211th Street could be realigned to provide more standard four-legged intersection configurations. In this manner, access to both the Ray-Pec school district complex and the adjacent residential neighborhoods along School Road to the south of 211th Street could be maintained.

3.3.2 Corridor Segment B

This study corridor segment is generally located between the relocated School Road intersection and the similarly relocated Harper Road intersection and includes the U.S. Highway 71 interchange area, as shown on the attached ***Exhibit 4***. It should be noted that this particular segment of the 211th Street corridor was studied in detail and summarized within the previously submitted AJR documentation. Based upon the expected traffic projections and intersection operations, it is anticipated that the Harper Road intersection will need to be relocated about 750 feet to the west of its existing location in order to provide an adequate separation distance from the major Peculiar Drive intersection.

The approximately one-quarter mile long segment of 211th Street between the relocated intersections of School Road and the proposed Northeast Outer Road is expected to be widened to provide a standard five-lane median-divided arterial roadway cross-section, with a width of about 72 feet, back to back of curb. It is expected that an additional 40 to 50 feet of permanent right-of-way will be required to accommodate this planned roadway section, plus some temporary grading easements. In addition, about 2,300 feet of the Northeast Outer Road would need to be realigned and reconstructed in order to accommodate the proposed new interchange ramps, as previously discussed.

211th Street is expected to be widened to accommodate a median-divided seven-lane arterial roadway cross-section, plus auxiliary lanes, with a typical width of about 92 feet, back to back of curb, for the approximately one-quarter mile long segment between the relocated Northeast Outer Road intersection and the proposed northbound U.S. Highway 71 interchange ramps. Along this roadway segment, an additional 70 to 85 feet of permanent right-of-way will be required in places to accommodate this planned roadway section, plus some temporary grading easements.

Through the proposed interchange with U.S. Highway 71, 211th Street would be expected to ultimately provide four travel lanes in both the eastbound and westbound directions, separated by a raised dividing island. It should be noted that the ultimate eight-lane configuration on 211th Street that is depicted on ***Exhibit 4*** is consistent with the recommendations from the previously submitted AJR document. The U.S. Highway 71 mainline bridges would be required to ultimately accommodate this roadway width of 104 feet, back to back of curb, plus additional width as required for roadside clearances and pedestrian accommodations. Approximately five acres of additional right-of-way will be required on each side of U.S. Highway 71 in order to accommodate the construction of the proposed interchange ramps.

211th Street would ultimately need to provide a seven- to nine-lane wide median-divided arterial cross-section, including dual left-turn lanes and other auxiliary lanes, within the approximately one-quarter mile long segment between the Peculiar Drive intersection and the proposed southbound interchange ramps to and from U.S. Highway 71. It is expected that this future roadway segment with a typical

EXHIBIT 4 - SEGMENT B

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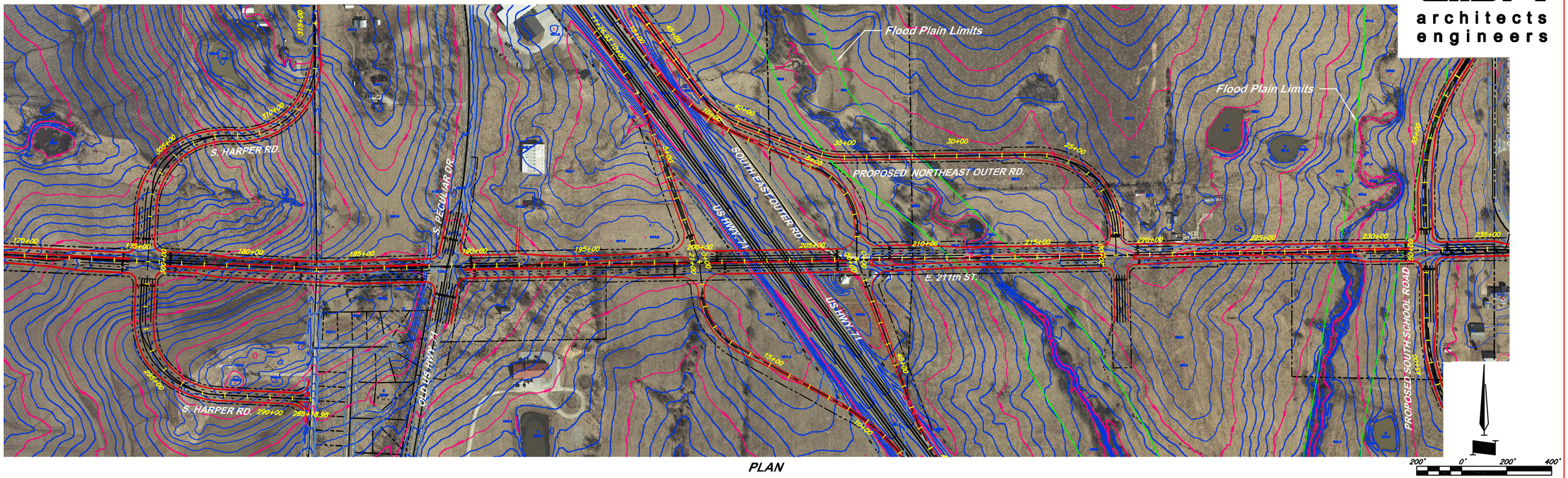
architects
engineers



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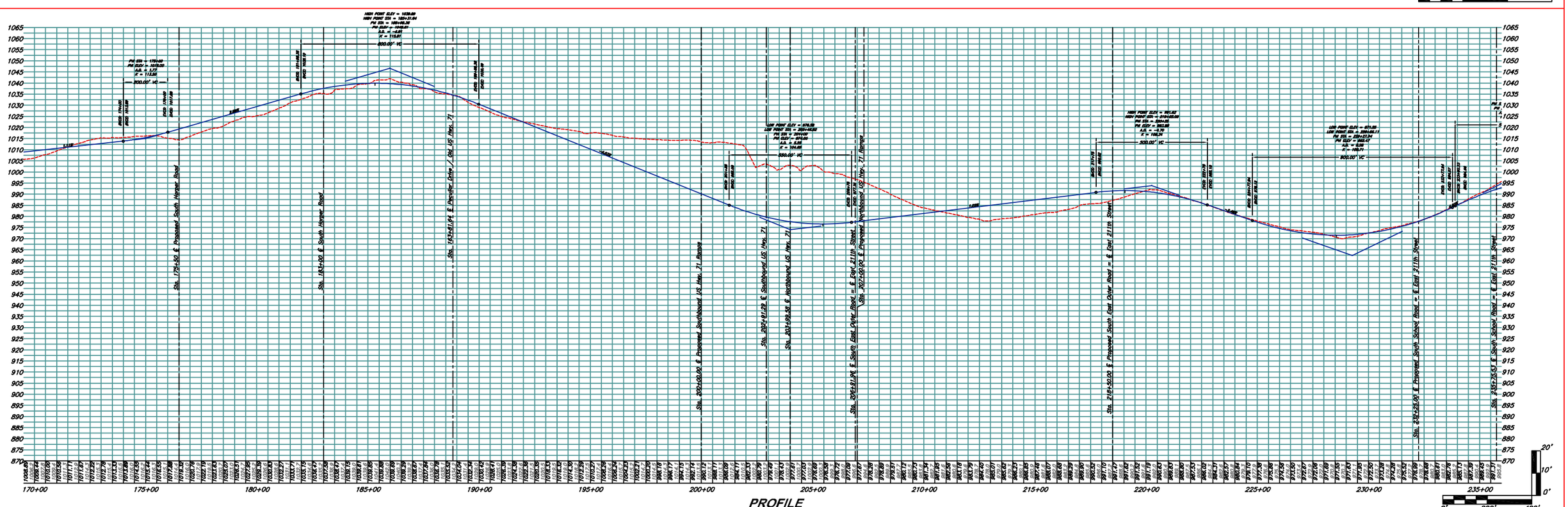

PROFILE

width of about 92 feet, back to back of curb, will require a total permanent right-of-way that is up to 150 feet in width, plus grading easements that may or may not be temporary.

The seven- to eight-lane wide median-divided arterial cross-section on 211th Street would continue westward from the Peculiar Drive intersection to the relocated Harper Road location. Dual left-turn lanes and other auxiliary lanes would also be required on this roadway segment. Again, this section of 211th Street could require a permanent right-of-way width up to 150 feet, plus some temporary grading easements.

3.3.3 Corridor Segment C1

Segment C1 represents the first alternative alignment for the 211th Street corridor to the west of Harper Road. As depicted on the attached ***Exhibits 5A and 5B***, this corridor runs generally in an east-west orientation along the existing section line, with only minor horizontal alignment modifications away from the section line. As described previously, this segment utilizes the existing roadway section on 211th Street between the intersections with Mullen Road and Highway Y.

The approximately two-mile long section of this corridor improvement alternative that is located between the relocated Harper Road intersection and the existing intersection with Mullen Road would need to be designed as a standard five-lane median-divided arterial roadway in order to effectively handle the expected traffic. This roadway configuration would provide two travel lanes in both the eastbound and westbound directions, as well as provide for exclusive left-turn lanes to be accommodated within the roadway median wherever required. The roadway segment would have a typical width of 72 feet, back to back of curb, and would require about a 100'-wide roadway right-of-way, plus temporary grading easements. Finally, this portion of the future roadway corridor would include the approximately 700-foot long bridge structure over the East Creek of the South Grand River.

The western mile of this alternative corridor that is located within the unincorporated portions of Cass County would be expected to be widened and improved to provide a three-lane roadway with a width measuring 40 feet, back to back of curb. Again, this configuration would provide one travel lane in both the eastbound and westbound directions, while also accommodating left-turning movements with a center turn lane. It is expected that this widening improvement could be constructed within a 60- to 70-foot wide right-of-way, plus temporary grading easements.

3.3.4 Corridor Segment C2

Segment C2 represents the second alternative alignment for the 211th Street corridor to the west of Harper Road. As depicted on the attached ***Exhibit 6***, this corridor runs generally in a southwesterly orientation away from the existing east-west section line. From a point located about three-fifths of a mile to the west of Harper Road, this alternate alignment crosses Knight Road just to the north of the half-section line (i.e., about 215th Street), runs southward along the eastern property boundary of the existing quarry, and then curves westward to align with Highway YY.

The approximately 1.5-mile long section of this corridor improvement alternative would also need to be designed as a standard five-lane median-divided arterial roadway in order to effectively handle the expected traffic. Again, this roadway

EXHIBIT 5A - SEGMENT C1

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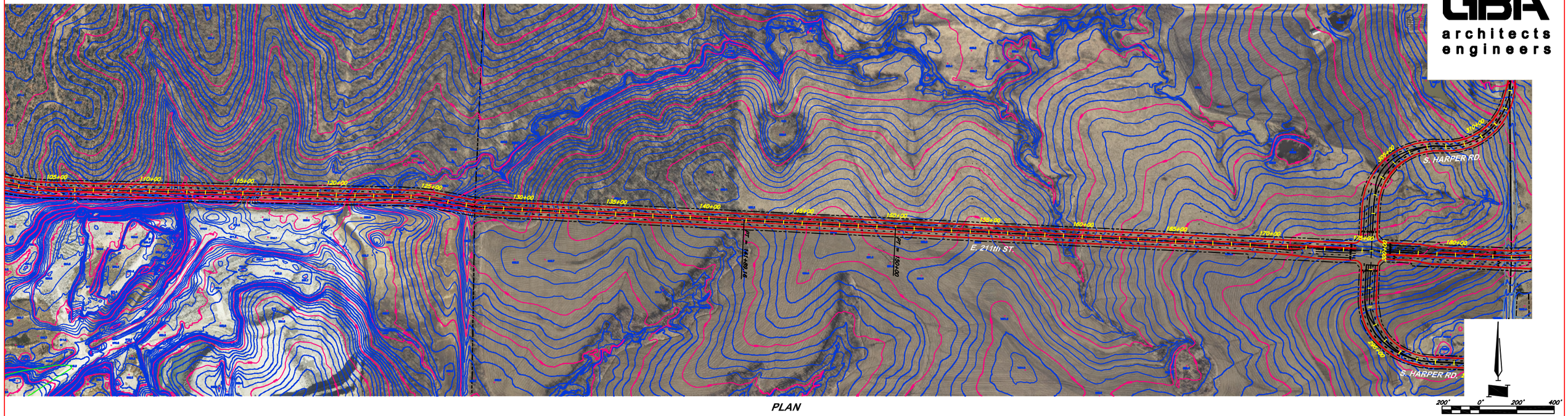
architects
engineers



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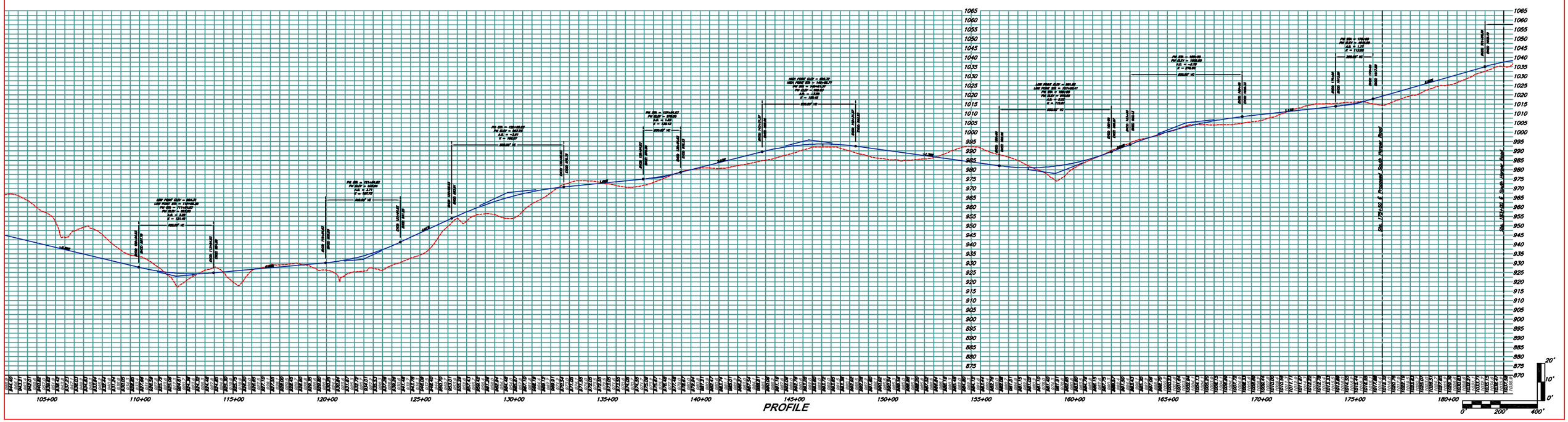

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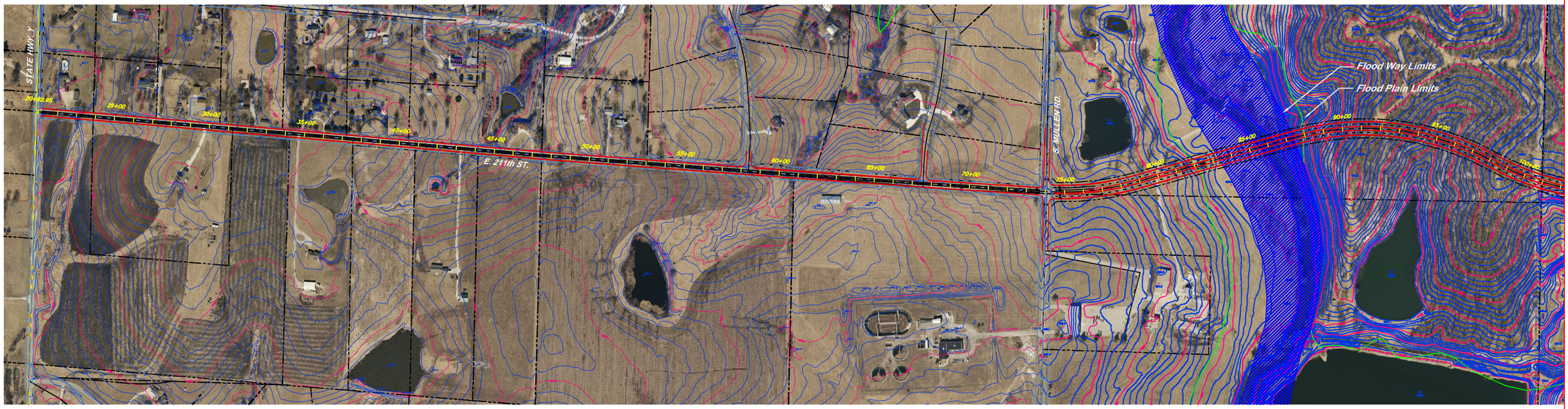
EXHIBIT 5B - SEGMENT C1



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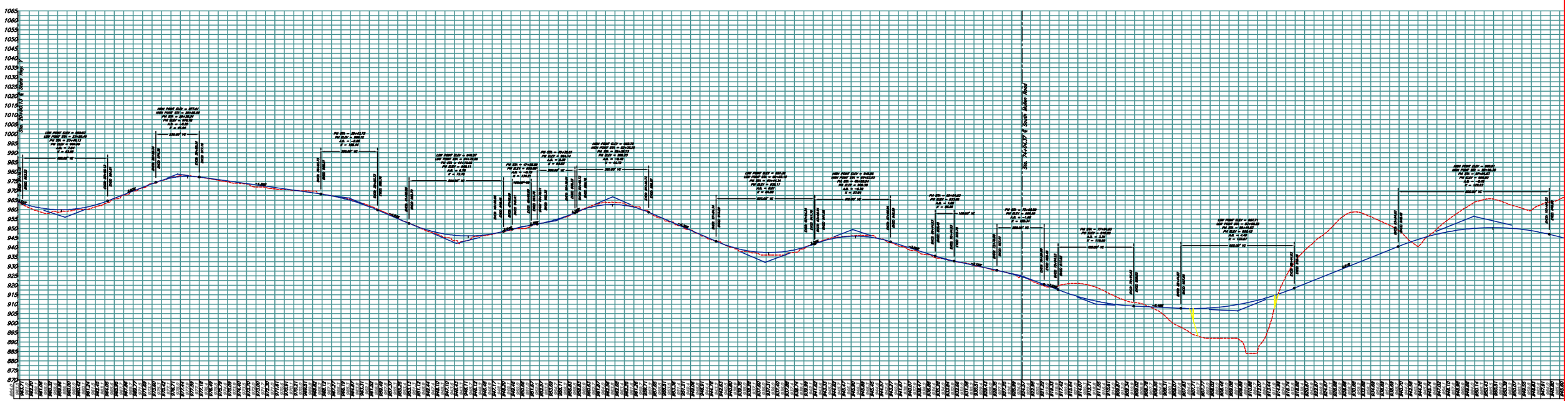

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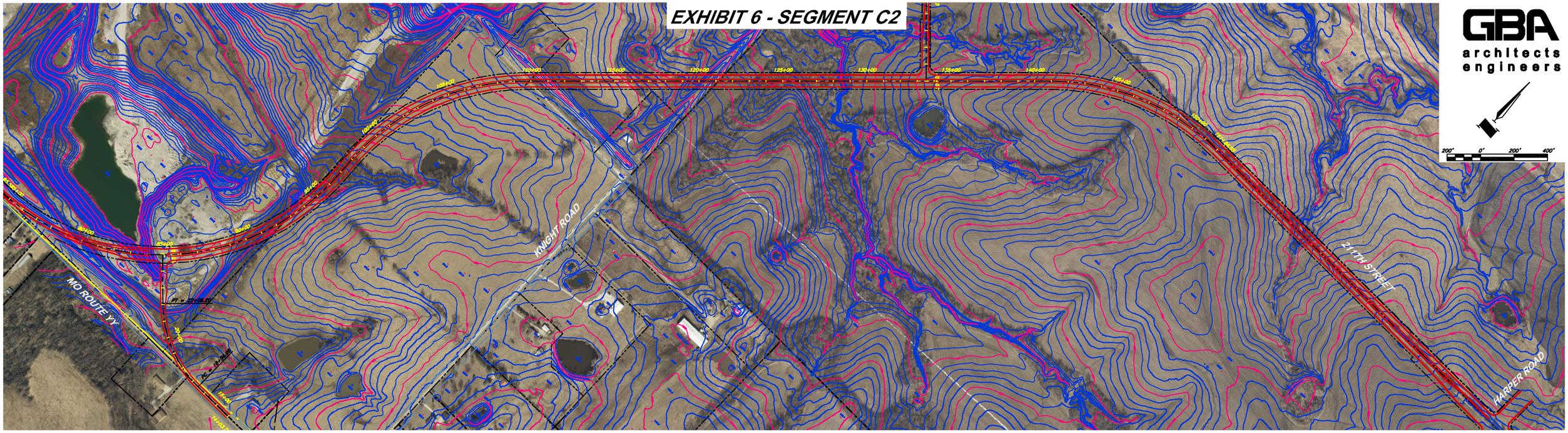
EXHIBIT 6 - SEGMENT C2



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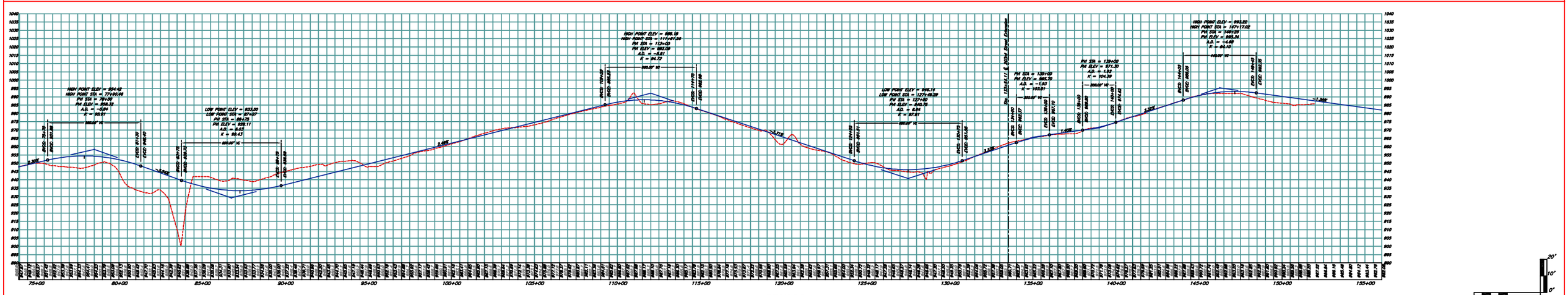

PROFILE

configuration would provide two travel lanes in each direction, and allow exclusive left-turn lanes to be accommodated within the roadway median wherever required. The roadway segment would have a typical width of 72 feet, back to back of curb, and would require about a 100'-wide roadway right-of-way, plus temporary grading easements.

Because the primary goal of this future roadway would be to enhance the overall east-west connectivity through the region, the proposed roadway would be aligned to generally maintain the route's continuity through the new intersection that would be created with Highway YY. As shown on the exhibit, a short segment of connecting roadway would need to be constructed east of the future roadway to allow Highway YY to intersect the new roadway at a perpendicular angle. Likewise, another connecting roadway would need to be constructed in the vicinity of 213th Street. In order to maintain access to the large, undeveloped properties located to the north of the original east-west section line, a short connecting roadway segment running generally to the northwest from the future roadway would also be accommodated by this alternate corridor plan.

It should be noted that this alternative corridor connecting 211th Street to Highway YY near the southeast corner of the existing quarry property only considered a short transition back to the existing two-lane highway configuration immediately west of the new intersection with Highway YY. Therefore, the alternative corridor Segment C2 does not include any construction of widening improvements to the segment of Highway YY between this corridor segment's western terminus and the existing intersection with Highway Y located approximately 1.5 miles to the west.

Although no detailed environmental investigations were completed along Highway YY to the west of Segment C2, this corridor study has also estimated the future roadway improvements that might be needed along this particular 1.5-mile segment of Highway YY between the end of corridor Segment C2 and the Highway Y intersection. It is likely that widening of the roadway to provide a three-lane cross-section that accommodates left-turn lanes where required will be needed to further enhance the implementation of corridor Segment C2. In addition, the replacement of the existing bridge structure across East Creek will most likely also be required, as well as the acquisition of additional rights-of-way along this segment. The completed traffic analyses for the alternate Corridor A-B-C2 indicated that auxiliary left- and right-turn lanes, as well as traffic signal installations, may ultimately be required at any major development-related access points that are located along this segment of Highway YY. The $12 million preliminary estimated construction cost of these roadway widening and bridge replacement improvements along this 1.5-mile segment of the Highway YY corridor has not been included within the detailed evaluations for corridor Segment C2.

3.3.5 Design Speeds

The exhibits provided within this document for each of the four study corridor segments include both preliminary horizontal layouts and vertical profile designs for these future roadway alternatives. It should be noted that these preliminary layouts utilized a 40 mph design speed that would allow a 35 mph posted speed limit for the three-lane wide roadway segments planned on 211th Street within both Segment A and Segment C1. For all other roadway segments on 211th Street planned to provide a five-lane or wider arterial roadway cross-section, the horizontal and vertical

designs shown accommodated a 50 mph design speed, so that the roadways could ultimately be posted with a 45 mph speed limit.

3.3.6 Bicycle / Pedestrian Accommodations

The provision of bicycle and pedestrian facilities will be another important design element to be included within each of the planned corridor segments. Based upon the stakeholder and public input received, the safe movements of bicycles and pedestrians will be critical at the major corridor intersections where crossings will be provided, as well as through the proposed highway interchange area.

Along the eastern portions of the project and through the interchange area, a more linear sidewalk and bike path system is envisioned. This type of design will better accommodate the narrow roadway rights-of-way that will be available along corridor Segment A and adjacent to the commercial land uses that are planned along corridor Segment B on both sides of the proposed interchange. Also, it would be reasonable to provide a wider, combination sidewalk / bike path along the north side of these two corridor segments so that access to the existing Ray-Pec school district complex is further facilitated.

To the west of Harper Road, a more "natural" experience for bicycles and pedestrians is desired, based upon the stakeholder input received. The use of curvilinear path alignments and trail-style amenities would be preferred along both corridor Segments C1 and C2, which may require additional coordination with adjacent property developers and the future dedication of additional rights-of-way. In order to address the safety concerns expressed by the operators of the existing quarry, it is recommended that any planned sidewalks or bike paths be provided only along the north side of corridor Segment C1 or along the east side of corridor Segment C2.

3.4 Traffic Analysis

An extensive trip generation and assignment process was performed during and described within the previously developed AJR document. This process involved the detailed evaluation of each respective development parcel indicated on the City's Future Land Use Map (see ***Exhibit 1***). Based upon a variety of transportation planning factors, the expected trip generation for the entire City of Peculiar was projected in order to represent the projected Design Year 2035 traffic horizon within the study area. The assignment process utilized in the AJR only estimated the amount of development that could be expected to occur on each respective land use parcel within the 25-year growth horizon. Because this development-related increase will likely be tied to economic conditions and other factors, it is difficult to predict exactly how the traffic growth will occur over this time period.

Within the previously submitted AJR documentation provided to MoDOT, traffic-related information was included that ultimately provided the justification for the proposed 211th Street interchange with U.S. Highway 71. This traffic engineering data included detailed turning movement volumes at the study intersections along the 211th Street corridor in the vicinity of the planned interchange during both the critical morning and evening peak hours. In addition, supporting documentation was provided that summarized the expected operational conditions at these same study intersections, included individual movement and overall intersections levels of service (LOS) and expected vehicular queue lengths.

3.4.1 Traffic Volume Projections

For the purposes of this corridor study, the previously developed traffic volume projections were expanded to cover the entire corridor length from Highway J to Highway Y, rather than just the smaller area of interest between Peculiar Drive and School Road that was evaluated during the AJR process. In addition, for the existing State-maintained highways (i.e., Highway J, Highway Y, and Highway YY) not previously considered during the AJR traffic study process, a one percent annual growth rate was utilized to project the background traffic for the Design Year 2035 traffic volume horizon, generally resulting in about a 35 percent increase over the existing traffic volumes on these highways. Also, for both of the traffic assignments completed in this corridor study, the eventual westward continuation of these roadway improvements was assumed via 219th and 223rd Streets to provide future roadway linkage to the existing U.S. Highway 69 interchange within Kansas.

The resulting daily traffic volume projections for the initial corridor alternative (now designated as corridor Segments A-B-C1) are shown on ***Exhibit 7*** below. In addition, for the purpose of comparison between the alternate alignments being considered for the 211th Street corridor and/or connections within this study, the expected daily traffic volumes along the Highway YY corridor were also determined through this expanded traffic assignment process.

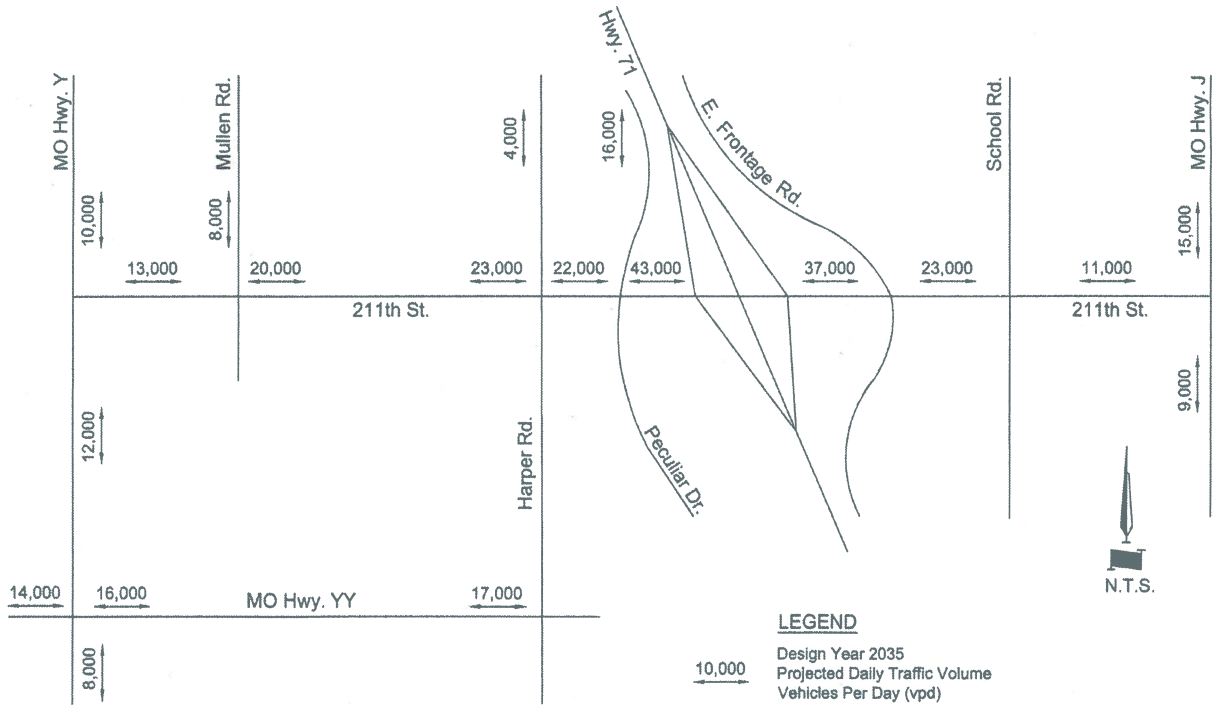

Exhibit 7: *ADT Volumes for 211th Street Alternative (Corridor A-B-C1)*

As shown on the exhibit and as first detailed in the previously submitted ARJ document, more than 40,000 vehicles per day (vpd) would be expected through the planned 211th Street interchange if the northern portions of the City of Peculiar experience the growth and development that is anticipated and allowed by the future land use plans.

Between 20,000 and 23,000 vpd would be expected to utilize the 211th Street corridor between the Northeast Outer Road and relocated School Road intersections on the east side of the U.S. Highway 71 interchange, as well as between Peculiar Drive and Mullen Road on the west side of the interchange, where the five-lane median-divided arterial roadway cross-section was planned within corridor Segment C1. The eastern mile of the corridor between School Road and Highway J, as well as the western mile of the corridor between Mullen Road and Highway Y, would be expected to carry between 11,000 and 13,000 vpd. These expected daily traffic volumes would be adequately served by the proposed three-lane roadways along these segments of the 211th Street corridor.

It should be noted that these daily traffic volume projections, as well as the expected hourly volumes at the study intersections during both the critical morning and evening peak commuter periods, are also provided within the attached Traffic Analysis documentation contained in ***Appendix B*** (see ***Figure B1 through Figure B3***).

Similarly, another set of traffic volume projections was prepared to depict the expected daily traffic volumes within the corridor study area if the alternative alignment connection between 211th Street and Highway YY were constructed. The resulting daily traffic volume projections are shown below on ***Exhibit 8*** for the alternate corridor with Segments A-B-C2.

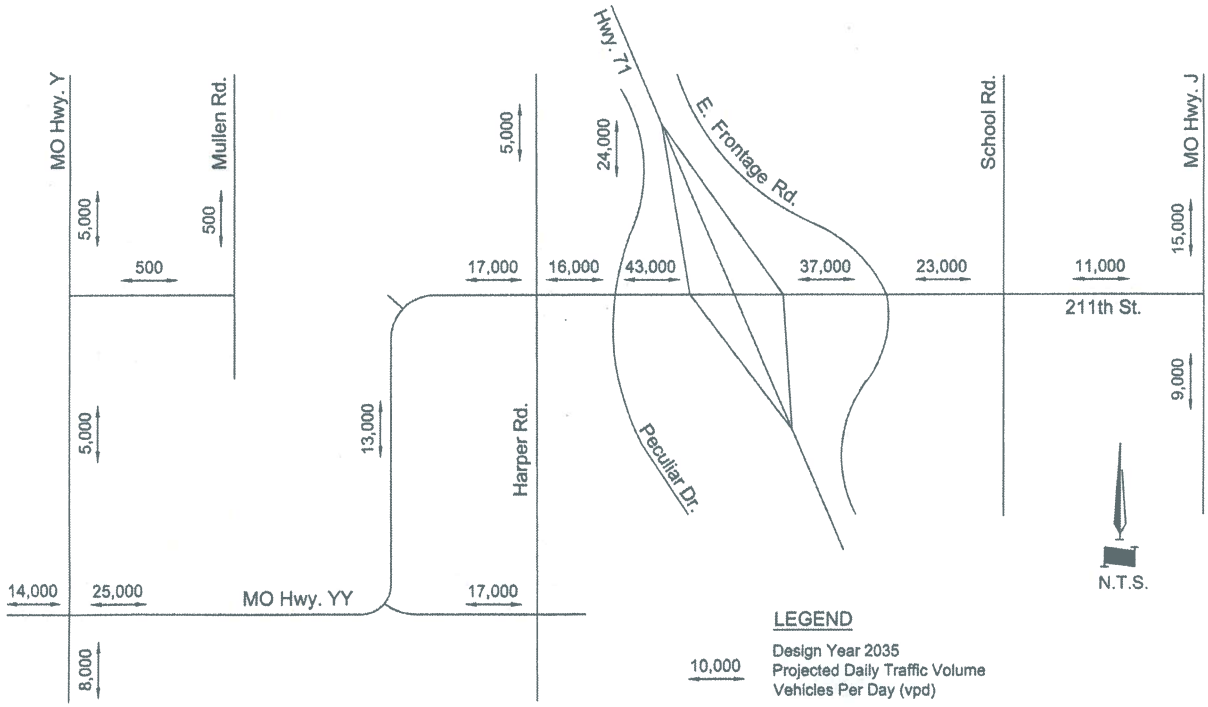

Exhibit 8: *ADT Volumes for Highway YY Alternative (Corridor A-B-C2)*

As shown on this exhibit, traffic volumes from the Peculiar Drive intersection eastward through the planned U.S. Highway 71 interchange and along the eastern portions of the 211th Street corridor would be unchanged if this alternate alignment were utilized to the west of Harper Road. Within the western portions of the study area, the developed traffic projections indicate that the connection of 211th Street to

Highway Y via Highway YY would not be expected to provide as attractive a route for vehicles attempting to enter either the existing or developing areas of the City, particularly from the remainder of the Kansas City metropolitan area to the northwest of the area.

The traffic projections show that much less traffic would be expected to approach the area from the northwest via either Highway Y or Mullen Road without the additional crossing of East Creek that would be provided within corridor Segment C1. In addition, those vehicles that would still come from the north via these routes would need to travel farther southward to the Highway YY corridor in order to access the new developments within the northern portions of the City. In response, these vehicles would be expected to utilize other existing routes that provide more direct access from the northwest to these developing areas, including Harper Road, Peculiar Drive, and even U.S. Highway 71.

The Highway YY corridor would be expected to experience higher traffic volumes as well, since attracted vehicles from the south and west of the Highway Y intersection would have no choice but to utilize this existing corridor to enter the City. Finally, the effectiveness of the proposed 211th Street connection between the new Highway YY intersection and Harper Road would be significantly reduced, serving only about two-thirds of the projected traffic volume that would be expected to utilize the route provided by corridor Segment C1.

Again, the daily traffic volume projections, as well as the expected hourly volumes at the study intersections during both the critical morning and evening peak commuter periods with this alternate corridor configuration, are provided within the attached Traffic Analysis documentation contained in ***Appendix B*** (see ***Figure B6 through Figure B8***).

3.4.2 Traffic Operations

Detailed volume / capacity analyses were completed for each of the 211th Street alternative corridors for the projected Design Year 2035 traffic volume conditions. These completed peak hour analyses determined the expected Level of Service (LOS) operations and vehicle queue lengths for the individual movements at all of the study intersections, as well as the overall LOS conditions that would be provided at any of the signalized study intersections. A brief description of the "*Highway Capacity Manual (HCM)*" criteria for vehicle delay and LOS is provided on ***Exhibit B1*** within the attached ***Appendix B***. For both of the potential 211th Street corridor alignment alternatives, the projected morning and evening peak hour conditions were analyzed utilizing the latest version (i.e., ver. 7.0) of the Trafficware Synchro software.

It should be noted that MoDOT's "practical design" criteria were generally utilized in order to determine the required lane configurations at the study intersections, in the absence of any local City or County LOS standards. Thus, the overall traffic operations at any signalized intersections were optimized to perform at LOS "D" or better, although some individual vehicular movements were allowed to perform with LOS "E" operations.

For the purposes of this corridor study, some assumptions have been made regarding both the number and location of access points needed to serve the large, undeveloped parcels of land between Harper Road and Mullen Road. In general,

these access points were appropriately located in order to provide full access for turning movements at about one-half mile spacing, so that strict access management could be maintained along these potential alignment corridors in the future. The use of access management along this corridor is recommended so that the roadway can fulfill its primary purpose of carrying through traffic, while also ensuring that safe and efficient traffic operations can occur at the major study intersections. At the same time, the recommended one-half mile intersection spacing should provide an adequate amount of access and ensure mobility throughout the street network for traffic associated with the adjacent development tracts.

With regard to the expected traffic controls at these full access locations, most of the study intersections would also be expected to satisfy warrants for traffic signalization under the projected traffic volume conditions analyzed, given the expected corridor and side street volumes at these locations. Although there was some initial discussion regarding the provision of roundabout intersection configurations at any of these proposed access locations, it should be noted that input received from the general public during the course of the public involvement process for this corridor study was generally negative; therefore, no analysis of roundabouts has been provided within this document.

Summaries of the expected peak hour traffic operations at the study intersections are provided as part of the Traffic Analysis documentation in the attached ***Appendix B***. For the expected traffic operations during the Design Year 2035 morning and evening peak hours with the initial corridor alignment (Segment A-B-C1), please see ***Figure B4 and Figure B5***, respectively. Likewise, the LOS and vehicle queuing summaries for the operations with the alternative corridor alignment (Segment A-B-C2) are provided on ***Figure B9 and Figure B10*** for the morning and evening peak hours, respectively.

3.5 Segment Evaluations

In order to be able to identify the preferred five-mile corridor alignment for 211th Street between Highway J and Highway Y, a comprehensive evaluation of each potential corridor segment was also performed. A methodical approach was developed and utilized to carefully consider each corridor segment's potential benefits to and effects upon the surrounding community and environment.

A very detailed description of each particular evaluation criteria considered and the associated impacts expected for each of the respective corridor segments along 211th Street is provided within ***Section 4.0*** of this corridor study document. However, the evaluation criteria utilized in order to determine the preferred improvement corridor can be briefly summarized by the following general categories:

- Engineering and construction-related factors, including estimated segment construction costs, additional right-of-way needs, and overall constructability;

- Consensus opinion and support for the alternative corridor alignments from the project stakeholders and the public-at-large that was obtained through the extensive public involvement process during this corridor study, as well as consistency with the previous transportation planning efforts of the City and County;

- The overall results of the transportation planning process and completed traffic operational analyses, and the resulting effects on future travel routes and access to the surrounding properties;

- The expected potential social, economic, and cultural / historic impacts on the surrounding community, including any displacements of adjacent properties;

- The overall effects on the regional water resources, including the streams, ponds, and wetlands located within close proximity to any of the potential roadway corridors;

- Any potential environmental impacts on wildlife or regulatory lands, like parks and prime farmland, or due to other environmentally-sensitive sites.

4.0 SEGMENT EVALUATION CRITERIA

For the purposes of this corridor study, a comprehensive evaluation of each potential corridor segment along 211th Street was performed. The methodical approach utilized for this evaluation is summarized and presented on the "*Segment Summary Matrix*" attached as ***Table 1***. This table summarizes the numerous evaluation criteria that were utilized to rank the favorability of each potential corridor segment, and therefore each resulting alternative alignment.

The factors evaluated and described in the following paragraphs can be categorized as follows: engineering factors, including overall project costs, right-of-way needs, and constructability; general consensus from the stakeholders and public-at-large obtained through the extensive public involvement process; the overall results of the transportation planning process and traffic operations analyses; the expected potential social, economic, and cultural / historic impacts on the surrounding community; affects on regional water resources, including streams, ponds, and wetlands; and other potential environmental impacts on wildlife or otherwise regulatory lands.

4.1 Engineering and Construction

Engineering factors are generally related to the physical infrastructure improvements needed to construct the proposed future roadway within the 211th Street corridor. To complete these evaluations, detailed engineering estimates were prepared for each of the four respective segments along the 211th Street corridor. The preliminary estimates of the probable construction costs for each segment of the roadway included the expected earthwork, paving, and hardscape construction items (i.e., curbs and medians) required. It should be noted that these preliminary estimates also included a 10 percent contingency factor to account for other roadway-related items, such as drainage, pedestrian sidewalks and/or trails, street lighting, and landscaping improvements.

In addition to the estimated construction costs, the amounts of additional right-of-way required to accommodate the construction of each proposed roadway segment was also calculated, based upon the preliminary grading limits established by the preliminary design layouts and vertical profiles depicted on the attached ***Exhibits 3 through 6***. Finally, the potential constructability of each segment was subjectively evaluated in terms of its ease of construction, maintenance of existing access, and need for the construction to be completed while the existing roadway was still being utilized by vehicular traffic.

4.1.1 Estimated Construction Cost

The preliminary estimates of the probable construction costs for each of the four corridor segments evaluated for the purposes of this study are detailed on the attached ***Tables 2 and 3***. Estimates for corridor Segment A, Segment B, and Segment C1 that were included in the first feasible corridor alignment alternative for 211th Street are depicted on ***Table 2***. The estimated construction cost for the alternative corridor Segment C2 is depicted on ***Table 3***.

Segment A
The estimated construction cost for this segment, which generally provides a three-lane roadway on 211th Street between Highway J and the relocated School Road intersection, would be approximately $11.3 million dollars.

Table 1
211th Street Corridor - Segment Summary Matrix

						Corridor Alignment Alternatives		
Segment Evaluation Criteria	**Units**	**Segment A** **Hwy. J to School Rd.**		**Segment B** **School Rd. to Harper Rd.**		**Segment C1** **Harper Rd. to Hwy. Y**		**Segment C2** **Harper Rd. to Hwy. YY**
Engineering and Construction								
Estimated Construction Cost	Dollars	$11.3 Million		$27.5 Million		$27.0 Million		$16.6 Million *
Additional Right-of-Way	Acres	4		30		26		27 *
Ease of Construction								
Public Involvement Process								
Consistency with Master Plan								
Property Owner Support								
Public Input								
Transportation Planning								
Ease of Travel								
Property Access								
Potential Social, Economic, and Cultural Impacts								
Number of Potential Displacements	Each	0		4		0		0 *
Community Impacts								
Affected Cultural / Historic Sites	Each	0		0		0		0 *
Water Resources Impacts								
Number of Stream Crossings	Each	2		4		5		5 *
Affected Pond Amounts	Acres	1.91		0.22		2.40		0.26 *
Affected Wetland Areas	Acres	0		0		0		0 *
100-Year Floodplain (Floodway) Areas	Acres	1.40 (0)		6.41 (0)		1.23 (3.35)		0 (0)*
Environmental Impacts								
Threatened / Endangered Species	Each	0		0		0		0 *
Affected Parklands	Each	0		0		0		0 *
Prime Farmland Areas	Acres	7.21		29.31		39.10		15.59 *
Affected Mined Lands	Acres	0		11.80		26.03		68.60 *
Hazardous Waste Sites	Each	0		0		0		0 *

* **Does NOT include estimated $12 Million, additional R/W, or other impacts for Hwy. YY bridge and widening improvements from 211th Street connection to Hwy. Y intersection (1.5 miles).**

Most Favorable **Favorable / Neutral** **Least Favorable**

Table 2

Preliminary Estimate of Probable Construction Costs and R/W
Preferred 211th Street Corridor (Segments A-B-C1)

Segment	Section	Cost/Unit	Earth Work (CY) Cut	Earth Work (CY) Fill	Asphalt (SY) Surface	Asphalt (SY) Base	Concrete (SY)	Curb & Gutter (LF)	Median Curb (LF)	TOTAL COST	R/W (SF)	R/W (Ac.)
			$ 5.00	$ 5.00	$ 100.00	$ 50.00	$ 30.00	$ 20.00	$ 15.00			
A	Relocated School Rd.	Quantity	11,291	7,972	27,380	14,608	101	5,583			136,265	3.13
		Section Cost	$ 56,455	$ 39,860	$ 2,738,000	$ 730,400	$ 3,030	$ 111,660	$ -	$ 3,679,405		
A	School to J Hwy	Quantity	27,250	5,747	25,450	29,154	5,899	10,842			36,698	0.84
		Section Cost	$ 136,250	$ 28,735	$ 2,545,000	$ 1,457,700	$ 176,970	$ 216,840	$ -	$ 4,561,495		
										$ 8,240,900		**3.97**
									10% Contingency	$ 824,090		Total Ac.
									25% Survey, Design, Inspection	$ 2,266,248		
									Segment A Cost	**$ 11,331,238**		
B	Harper to School	Quantity	190,991	28,725	54,105	59,544	9,270	10,186	10,032		482,876	11.09
		Section Cost	$ 954,955	$ 143,625	$ 5,410,500	$ 2,977,200	$ 278,100	$ 203,720	$ 150,480	$ 10,118,580		
B	Harper Road	Quantity	54,560	16,830	15,991	17,665		5,029			189,249	4.34
		Section Cost	$ 272,800	$ 84,150	$ 1,599,100	$ 883,250	$ -	$ 100,580	$ -	$ 2,939,880		
B	Peculiar Dr.	Quantity			5,999	6,516		1,648			40,081	0.92
		Section Cost	$ -	$ -	$ 599,900	$ 325,800	$ -	$ 32,960	$ -	$ 958,660		
B	Outer Rd.	Quantity	15,987	5,611	8,427	8,942					151,211	3.47
		Section Cost	$ 79,935	$ 28,055	$ 842,700	$ 447,100	$ -	$ -	$ -	$ 1,397,790		
B	71 Hwy Interchange	Quantity									451,588	10.37
		Section Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,620,000		
										$ 20,034,910		**30.19**
									10% Contingency	$ 2,003,491		Total Ac.
									25% Survey, Design, Inspection	$ 5,509,600		
									Segment B Cost	**$ 27,548,001**		
C1	Bridge Crossing	Quantity		-	-	-	-	-	-	-		
		Section Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,500,000		
C1	Y to Sta. 152+00	Quantity	212,287	133,971	60,812	71,762	22,120	24,759	847		850,836	19.53
		Section Cost	$ 1,061,435	$ 669,855	$ 6,081,200	$ 3,588,100	$ 663,600	$ 495,180	$ 12,705	$ 12,572,075		
C1	Sta. 152+00 to Harper	Quantity	22,014	8,820	13,220	15,556	4,055	4,629	4,532		263,514	6.05
		Section Cost	$ 110,070	$ 44,100	$ 1,322,000	$ 777,800	$ 121,650	$ 92,580	$ 67,980	$ 2,536,180		
										$ 19,608,255		**25.58**
									10% Contingency	$ 1,960,826		Total Ac.
									25% Survey, Design, Inspection	$ 5,392,270		
									Segment C1 Cost	**$ 26,961,351**		
									GRAND TOTAL (Segment A-B-C1 Costs):	**$ 65,840,589**		

Table 3

Preliminary Estimate of Probable Construction Costs and R/W
211th Street Connection to Highway YY (Segment C2)

Segment	Section	Cost/Unit	Earth Work (CY) Cut	Earth Work (CY) Fill	Asphalt (SY) Surface	Asphalt (SY) Base	Concrete (SY)	Curb & Gutter (LF)	Median Curb (LF)	TOTAL COST	R/W (SF)	R/W (Ac.)
			$ 5.00	$ 5.00	$ 100.00	$ 50.00	$ 30.00	$ 20.00	$ 15.00			
C2	211th/YY Connection	Quantity	60,841	60,213	40,310	48,238	13,834	15,592	14,276		757,096	17.38
		Section Cost	$ 304,205.00	$ 301,065.00	$ 4,031,000.00	$ 2,411,900.00	$ 415,020.00	$ 311,840.00	$ 214,140.00	$ 7,989,170.00		
C2	Sta. 152+00 to Harper	Quantity	22,014	8,820	13,220	15,556	4,055	4,629	4,532		263,514	6.05
		Section Cost	$ 110,070.00	$ 44,100.00	$ 1,322,000.00	$ 777,800.00	$ 121,650.00	$ 92,580.00	$ 67,980.00	$ 2,536,180.00		
C2	203rd Connection	Quantity	7,989	14,950	5,373	6,635		3,783			100,069	2.30
		Section Cost	$ 39,945.00	$ 74,750.00	$ 537,300.00	$ 331,750.00	$ -	$ 75,660.00	$ -	$ 1,059,405.00		
C2	YY/YY Connection	Quantity	3,685	5,191	2,460	3,010		1,651			32,919	0.76
		Section Cost	$ 18,425.00	$ 25,955.00	$ 246,000.00	$ 150,500.00	$ -	$ 33,020.00	$ -	$ 473,900.00		
		Total	94,529	89,174	61,363	73,439	17,889	25,655	18,808			**26.48**
		TOTAL COST	$ 472,645.00	$ 445,870.00	$ 6,136,300.00	$ 3,671,950.00	$ 536,670.00	$ 513,100.00	$ 282,120.00	$ 12,058,655		Total Ac.
									10% Contingency	$ 1,205,866		
									25% Design, Survey, Inspection	$ 3,316,130		
									Segment C2 Cost	**$ 16,580,651**		

Segment B
The widened roadway section from the relocated School Road intersection to the relocated Harper Road intersection, including the proposed U.S. Highway 71 interchange ramps and bridges, would cost about $27.5 million dollars.

Segment C1
The estimated construction cost for the arterial roadway section from the relocated Harper Road intersection to Mullen Road, including the bridge structure to cross the East Creek of the South Grand River, as well as the three-lane roadway between Mullen Road and Highway Y, would be approximately $27.0 million dollars.

Segment C2
The alternative corridor alignment between 211th Street and Highway YY to the west of Harper Road, including all other ancillary connecting roadways, would cost about $16.6 million dollars. Again, it should be noted that the western limit of this construction cost estimate is the end of the lane transition located just west of the new Highway YY intersection.

A very rough estimate of the possible costs associated with further improvements along the 1.5-mile long Highway YY corridor from this western project terminus to the Highway Y intersection, including widening of the roadway and replacement of the existing bridge structure over the East Creek, was estimated to be at least an additional $12 million dollars. When considered in total, the costs of Segment C2 construction plus these additional improvement costs would be expected to be slightly more than the total estimated construction cost for Segment C1.

4.1.2 Additional Right-of-Way

The proposed typical sections for each of the alternative corridor segments evaluated during this corridor study are detailed on the attached ***Exhibits 3 through 6***. Based upon the estimated grading limits resulting from the preliminary horizontal and vertical layouts prepared during the course of this corridor study, the expected amounts of additional right-of-way that would be required to construct each respective segment of the 211th Street corridor were also calculated. These right-of-way calculations are also are detailed on the attached ***Tables 2 and 3***.

Segment A
An estimated 4 acres of additional right-of-way would be required to construct this roadway segment between Highway J and the relocated School Road intersection. It should be noted that this area includes the additional right-of-way required to accommodate the planned realignment of School Road both north and south of 211th Street.

Segment B
An estimated 30 acres of additional right-of-way would be required to construct this segment of the 211th Street corridor. It should be noted that this area includes the additional right-of-way required to accommodate the planned realignment of the Northeast Outer Road, the realignment of Harper Road both north and south of 211th Street, and the area need to accommodate the U.S. Highway 71 interchange ramps.

Segment C1
An estimated 26 acres of additional right-of-way would be required to construct this segment of the 211th Street corridor between Harper Road and Highway Y.

Segment C2
An estimated 27 acres of additional right-of-way would be required to construct this alternate alignment section connecting 211th Street to Highway YY. It should be noted that this area includes the additional right-of-way needed to provide the associated connecting roadways on Highway YY and to maintain access to the large, undeveloped properties located to the north of the 211th Street corridor. However, this calculated area does not include any additional right-of-way that might be needed to accommodate any future widening along the 1.5-mile long segment on Highway YY between the western terminus of this corridor segment and the Highway Y intersection.

4.1.3 Ease of Construction

The potential constructability of each segment was subjectively evaluated in terms of its expected overall ease of construction. Factors affecting this evaluation included the general complexity of the roadway design for each respective corridor segment along 211th Street, the expected difficulty in maintaining access to the existing adjacent properties, and whether or not the construction would need to be completed while the existing roadway was still being utilized by vehicular traffic.

Segment A
The construction of the widening improvements along this section of 211th Street would not be unlike any other typical roadway construction project. Access would need to be maintained to the adjacent properties and public street connections at all times during the construction project. It is anticipated that the roadway could remain open to vehicular traffic while the adjacent roadway widening and construction was being completed.

Segment B
The construction of this segment of 211th Street would be somewhat complex, especially with the potential impacts on the U.S. Highway 71 mainline traffic associated with the construction of the interchange ramps and bridges. Traffic on the highway would most likely need to be diverted with temporary bypass detours in order to allow the necessary excavation and bridge construction for the proposed underpass interchange with 211th Street. In addition, it would be necessary to maintain local access for the existing residences along both 211th Street and the existing outer road throughout the duration of the construction project. On the west side of U.S. Highway 71, it is expected that the existing 211th Street roadway segment between Peculiar Drive and Harper Road could be completely closed during construction. Work within these two existing intersections could be phased so that one of these north-south routes into the City would be available at all times, with local detours provided via the existing Highway YY connection.

Segment C1
Most of the construction for this segment of the 211th Street corridor would occur within the large, undeveloped properties between the relocated Harper Road intersection and Mullen Road, including the construction of the planned bridge structure crossing the East Creek of the South Grand River. As such, there should be relatively few concerns within this section of the project related to construction sequencing or the maintenance of access to the surrounding properties.

The construction of the widening improvements along the existing section of 211th Street between Mullen Road and Highway Y would be a rather typical roadway

construction project. Access would need to be maintained to the adjacent properties and residential subdivisions at all times during the construction project. It is anticipated that the roadway could remain open to vehicular traffic while the adjacent roadway widening and construction was being completed.

Segment C2
Again, most of the construction required for this alternative segment of the 211th Street corridor would occur within the large, undeveloped properties between the relocated Harper Road intersection and Highway YY. The highest level of complexity for this roadway segment's construction would be the significant embankment that would be required, and any other similar geotechnical issues, that might be associated with the roadway's alignment through the southeast corner of the existing quarry property. In addition, maintaining the existing vehicular traffic along the Highway YY corridor while constructing the required alignment tie-ins would require detailed design of the construction sequencing and possibly require the use of shoo-fly detours.

4.2 Public Involvement

Throughout this project, the City and County worked with residents and stakeholders to determine the preferred alignment of the 211th Street corridor. The public involvement process began during the Fall of 2009 and ended in November 2010 with the presentation of a preferred alternative for 211th Street to the general public. The recommendation of the preferred alternative was based on the community comments received, as well as the results of the future land use evaluations, environmental impact assessments, and transportation planning analyses. Over the course of the year-long public involvement process, an estimated 291 people participated and about 120 comment cards, letters, emails, and fliers were received.

4.2.1 Consistency with Master Plan

In November 2008, the City of Peculiar completed and adopted a new Comprehensive Master Plan. In this document, a new interchange on U.S. Highway 71 at 211th Street was designated as the City's top priority transportation project. The extension of 211th Street from this new interchange to the west was designated as the second priority project, and the widening of 211th Street from the interchange to Highway J was the third priority. A hard copy of the adopted Comprehensive Master Plan is available for review by the general public at Peculiar's City Hall.

As part of the City's Master Plan process, a series of meetings were held to gain input from residents and stakeholders. These meetings were extensive, and offered a variety of formats for public involvement. Focus groups met on July 25-26, 2007 where questions regarding specific topics were asked of the participants. "Town Hall" open house-style meetings were also held at four different times on these same dates. Finally, a 3-day long charrette was conducted with over 30 interested residents on August 7-9, 2007.

The results of these many public meetings are summarized in the Comprehensive Master Plan document that is available online on the City's website. A follow-up interview with the facilitator of these public meetings determined that many of the attendees were in favor of the three improvement projects along 211th Street that constitute the preferred alignment alternative in this corridor study. No objections

were voiced regarding the extension of 211th Street to the west through undeveloped lands.

Also, previous and subsequent discussions with the operators of the nearby limestone quarry indicated support of a 211th Street connection from the quarry site to either Peculiar Drive or U.S. Highway 71. This westward connection would provide an alternate route to Highway YY through the City for quarry truck traffic, and would not impede the future quarry mining operations.

4.2.2 Property Owner Support

The public involvement process began with group stakeholder meetings that were held at Peculiar City Hall to discuss the initial improvement alternatives for 211th Street (as described previously in ***Section 3.1*** of this document) with individuals who represented the local communities, Raymore-Peculiar School District, large property owners, and other key stakeholders. The City and the Consultant Team combined the initial feedback gathered from these stakeholders with additional engineering analysis in order to develop a revised set of alternatives, which were called the feasible alternatives for further study.

4.2.3 Public Input

These feasible alternatives were then presented to the City's Board of Aldermen, and soon thereafter the community-at-large reviewed them at a public open house held on December 8, 2009. Community members who attended this December meeting expressed concern about the potential impacts to nearby properties if 211th Street between Mullen Road and Highway Y were widened. As a result of this input, new alternatives that involved connecting 211th Street to Highway Y via Knight Road and Highway YY were subsequently explored. The various Highway YY connections were presented to the community during the May 17, 2010 open house. Significant opposition to the alternate connection via Knight Road and Highway YY was received from residents along both Knight Road and Highway YY during and following this open house meeting. The lack of adequate public support for this option was acknowledged by the City, County, and Consultant Team during the subsequent evaluations of these feasible alternatives. A third and final open house was held on November 9, 2010, during which the preferred alternative for the 211th Street alternative was presented.

4.2.4 Process Summary

The final public comments received during the last open house meeting for the ***211th Street Corridor Study*** were generally related to the following topics:

- A preference for a corridor that uses 211th Street to provide a connection between Highway Y and Highway J, rather than using Highway YY to make the connection.
- The desire by some residents, especially between Mullen Road and Highway Y, to leave 211th Street as it currently exists to maintain the existing, rural character of the corridor.
- Concerns regarding future development plans, adjacent property access, and land acquisition impacts.

- General questions about the project purpose (as described previously in ***Section 1.5*** of this document), the availability of potential funding, and the anticipated design and/or construction timelines.
- The potential for future connections to Belton and to other State routes located beyond the extents of the Study Area for this corridor.
- Other general traffic-related issues at the existing U.S. Highway 71 interchange with Highway C/J, on Mullen Road, and around the existing Raymore-Peculiar school campus.

The handouts provided at all three open house public meetings explained that the preferred alignment alternative is intended to serve as a blueprint for the future 211th Street corridor, providing only guidance in terms of the necessary improvements for the roadway, such as access point spacing, grading limits, and estimated right-of-way needs. The recommended alternative for the corridor will also need to consider the overall roadway character, which relates to the cross-sectional width of the roadway as well as preservation of scenic views and natural resources, landscaping and aesthetics, and accommodations / amenities for different modes of travel, including pedestrians and bicyclists.

4.3 Transportation Planning

The transportation planning elements included in these evaluations of the respective corridor segments were generally subjective and related to the projected traffic volumes, expected traffic operations, and levels of vehicular queuing and congestion. In addition, the ability to provide and/or maintain the required degree of access that would be appropriate for the respective land uses on the properties adjacent to the future roadway corridor was also considered.

4.3.1 Ease of Travel

This criterion was intended to describe the expected ease with which vehicles will ultimately be expected to traverse along each respective segment of the future 211th Street corridor. In general, this ease of travel criterion represents an objective composite ranking for the traffic operations along each of the respective alternative corridor segments. This ranking also includes the vehicle delays, Levels of Service, and vehicle queuing conditions at the study intersections along each respective corridor segment. Based upon the traffic volume assignment process and traffic engineering analyses completed for the purposes of this corridor study, it was determined that the planned roadway configurations along the length of the 211th Street corridor will generally be expected to remain adequate to serve the anticipated Design Year 2035 traffic loads.

However, some increased congestion would typically be expected during the peak hour traffic conditions along the Segment B corridor, located between the relocated intersections of School Road and Harper Road and including the planned U.S. Highway 71 interchange. This congestion is to be somewhat expected given the proximity of the interchange area to the largest and most intense areas of growth and development planned for the northern portions of the City, such as the destination retail center and office / employment center on the east side of the highway and the regional industrial center that is proposed to the northwest of the interchange.

4.3.2 Property Access

In general, there should be very few concerns with either maintaining access to adjacent properties along the existing segments of the 211th Street corridor, or with the provision of adequate, appropriately spaced public cross streets to serve the anticipated future developments along the corridor. As shown on the preliminary roadway layouts prepared during this corridor study, one-quarter mile spacing can be generally be provided between the major, full access intersections along the Segment B corridor, where the most dense commercial development is anticipated. Likewise, it is expected that the City and County will collaborate to ensure that adequate driveway access is provided along the future 211th Street corridor to the large, undeveloped properties between Harper Road and Mullen Road.

One detrimental access-related impact would be associated with Segment C2, the alternate alignment connecting 211th Street to Highway YY. The owners of the existing quarry property have expressed concerns regarding the potential impacts that this particular corridor would have upon their future operations. Again, the quarry property also includes the one-half mile section along the 211th Street corridor between Harper Road and Knight Road. The construction of the future roadway on this alignment would essentially bisect the quarry properties, and could therefore cause potential difficulties for both the quarry mining and transportation operations. In addition, the provision of the northwestern connecting roadway to provide access to the properties located north of the 211th Street section line would create a small triangular portion of the quarry property that could no longer be mined.

4.4 Social, Economic, and Cultural / Historic Resources

The following sections describe the potential impacts that could be expected in association within the respective segments of the 211th Street corridor in terms of potential community impacts and any effects on cultural / historic resources.

4.4.1 Potential Displacements

A total of up to four (4) residential displacements within the Segment B corridor may occur due to these properties being situated within close proximity to the required additional right-of-way areas for the 211th Street corridor (see ***Appendix A – Figure A13***). No other residential or commercial displacements are anticipated to occur within any of the other segment corridors.

4.4.2 Community Impacts

Utilizing demographic information available from the U.S. Census Bureau, evaluations of the socioeconomic conditions within the City of Peculiar and Cass County were made. In addition, the social impacts on the surrounding community resulting from the proposed roadway improvements were assessed.

4.4.2.1 Socioeconomics and Environmental Justice

Executive Order 12898 (February 11, 1994) directs agencies to identify and address "disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." The racial makeup of the City of Peculiar in 2000 was 97 percent white with the remainder as minorities, compared to 96

percent white for Cass County as a whole. The median household income in the City of Peculiar in 2008 was $53,639, compared to $61,922 for Cass County as a whole. Approximately 7.5 percent of the families in the City of Peculiar were below the poverty level in 2008. This contrasts to 7.3 percent for Cass County as a whole (U.S. Census Bureau, 2010).

No significant adverse impacts to human health or other environmental effects have been identified in this study. In addition, a review of the adjacent properties within the corridor study area near the four alternative roadway segments did not reveal any environmental justice areas. Therefore, there would be no disproportionately adverse human health or environmental effects on minority or low-income populations.

4.4.2.2 Direct and Indirect Impacts

The area's public and community services such as schools, health care, social services, and fire protection would not be affected by the proposed roadway project. The project could require the acquisition of up to four (4) residential properties. In addition, increasing the street right-of-way would require the acquisition of additional frontage property from adjacent owners. However, no businesses or industries would be negatively affected or relocated as a result of the proposed project.

Overall, the impacts associated with these roadway improvements are expected to be positive, resulting in safer and more efficient movement of travelers. There are not expected to be any detrimental noise impacts other than those normally associated with traffic on an arterial-type roadway. The proposed improvements will not alter the community through community splitting, negatively impact the community cohesion, or hamper the provision of community services. In fact, travel patterns and emergency vehicle movements should be somewhat improved by the more direct connectivity that these proposed improvements will provide.

4.4.3 Affected Cultural / Historic Resources

In accordance with Section 106 of the National Historic Preservation Act (NHPA), as amended (16 USC 470 *et seq.*), a background literature search was conducted to identify known and potential cultural resources within the project area. A preliminary field survey of architectural resources was also conducted.

Architecture

A cultural resources literature review (regarding cultural resources management projects) was conducted to identify previous studies and known resources in the project area and vicinity. This information, as well as a review of the architectural inventories at the State Historic Preservation Office (SHPO), Missouri Department of Natural Resources, conducted on November 3, 2009, confirmed that no properties listed in the National Register of Historic Places (NRHP) are present in the project area. The nearest NRHP listed property is the Robert A. Brown House, located approximately six miles southeast of the project area.

An architectural historian conducted a field survey of architectural resources in the study area on December 7, 2009. For purposes of Section 106 Review and Compliance of the National Historic Preservation Act of 1966 (P.L. 89-665, as

amended), the Missouri State Historic Preservation Office requests MoDOT to submit photographs of buildings at least 45 years old that may be affected by its projects. Aerial photographs and field reconnaissance identified 60 structures in the vicinity of the proposed project. A topographic map dated 1954 and field survey methods identified 4 properties with existing buildings in the project area that were greater than 45 years of age. These properties were assessed for their historical and architectural significance by applying the National Register Criteria for Evaluation as instructed by *National Register Bulletin 15* and in accordance with Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's regulations at 36 CFR Part 800. None of these buildings (or their more recent counterparts) appears to possess architectural significance or fulfill the eligibility criteria for listing on the NHRP.

Archaeology

The proposed project is located in a rural setting and approximately half of the project area has been subjected to previous disturbances in the form of filling, grading, and construction activities for the existing roadway. These activities have removed or disturbed the soils of the project site to an extent that is highly unlikely that any undisturbed evidence of prehistoric occupation still exists on these areas of the project.

Background research conducted at the cultural resources library of the SHPO indicated that there have been two Phase I archaeological surveys that cross or abut the project area (CS-017 and CS-053; Environmental Research Center of Missouri, Inc., 1990 and 1999). In addition, there have been two Phase I surveys within one mile of the study area (CS-002 and CS-026; Environmental Research Center of Missouri, Inc., 1982; Sturdevant 1994). There are no previously reported archaeological sites within the study area. There are also no previously reported archaeological sites located within 1 mile of the study area.

The survey by Environmental Research Center of Missouri, Inc., 1990 (CS-017) was for a proposed sewer improvement project and crosses the western portion of the project near Mullen Road. The survey did not identify any sites in the vicinity of the proposed project. The survey by Environmental Research Center of Missouri, Inc., 1999 (CS-053) included an approximately five-acre site located adjacent to the south side of 211th Street near the eastern portion of the project area. The survey did not identify any sites in the vicinity of the proposed project.

A systematic archaeological survey will be conducted during the final design phase, once the right-of-way needs have been determined. Any archaeological sites that might be affected by the project will be addressed in accordance with the regulations (36 C.F.R. 800) implementing Section 106 of the National Historic Preservation Act (16 U.S.C. 470). Identified cultural resources will be evaluated according to the Department of the Interior's "*Standards and Guidelines for Archaeology and Historic Preservation*," in consultation with the Missouri State Historic Preservation Officer.

4.5 Water Resources

The National Wild and Scenic Rivers System was created by Congress in 1968 (Public Law 90-542; 16 U.S.C. 1271 et seq.) to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. Designated rivers are classified as a) wild river areas; b) scenic river areas;

and c) recreational river areas. No designated Wild, Scenic, or Recreational areas are situated near any of the segment corridors.

In addition, the State of Missouri has identified Outstanding State Resource Waters that are high quality waters with a significant aesthetic, recreational or scientific value. Outstanding State Resource Waters receive special protection against any degradation in water quality as per 10 CSR 20-7.031(2) (C). No public water supply waters or Outstanding State Resource Waters are situated near any of the segment corridors.

Section 404 of the Clean Water Act authorizes the U.S. Army Corps of Engineers (Corps) to regulate the discharge of dredged and fill material in all waters of the U.S. including streams, impoundments (e.g., ponds and lakes), and wetlands. The Corps issues permits for discharges of material under the Department of Army Permit Program. Stream crossings associated with the construction, expansion, modification, or improvement of linear transportation projects may qualify for Nationwide Permit (NWP) 14 "*Linear Transportation Projects*." Under NWP 14, impacts cannot exceed ½-acre; otherwise, an Individual Permit will be required. The project must also comply with the NWP General Conditions and the Regional Conditions established by the Kansas City District Regulatory Office. The Corps will make a final determination as to the extent of its jurisdiction and the appropriate permit(s) for all regulated activities.

As summarized below, the study identified several potential waters of the U.S., including streams and ponds, within the segment corridors. No lake or wetland features were identified within any of the segment corridors. The level of Corps permitting associated with potential stream and/or pond impacts will be determined during the final design phases of the project.

4.5.1 Streams

Segment A
A total of two (2) stream crossings were identified within the Segment A corridor (see ***Appendix A - Figures A1 and A5***).

1. Tributary to East Branch located 1,150 feet west of Highway J along 211th Street.
2. Tributary to East Branch located 1,000 feet north of 211th Street along School Road.

Segment B
A total of four (4) stream crossings were identified within the Segment B corridor (see ***Appendix A - Figures A2 and A6***).

1. Tributary to East Branch located 840 feet west of School Road along 211th Street.
2. Tributary to East Branch located 2,450 feet west of School Road along 211th Street.
3. Tributary to East Branch located 800 feet northeast of U.S. Highway 71 and 211th Street intersection along the proposed N.E. Outer Road.
4. Tributary to East Creek located 900 feet northwest of 211th Street and Harper Road intersection along the proposed S. Harper Road.

Segment C1
A total of five (5) stream crossings were identified within the Segment C1 corridor (see ***Appendix A - Figures A3 and A7***).

1. Tributary to East Creek located 2,400 feet west of Harper Road along proposed 211th Street.
2. Tributary to East Creek located 4,600 feet east of Mullen Road along proposed 211th Street.
3. Tributary to East Creek located 4,000 feet east of Mullen Road along proposed 211th Street.
4. East Creek located 1,350 feet east of Mullen Road along proposed 211th Street.
5. Tributary to East Creek located 240 feet east of Highway Y along 211th Street.

Segment C2
A total of five (5) stream crossings were identified within the Segment C2 corridor (see ***Appendix A - Figures A4 and A8***).

1. Tributary to East Creek located 2,400 feet west of Harper Road along proposed 211th Street.
2. Tributary to East Creek located 1,450 feet northeast of 215th Street and Knight Road intersection along proposed 211th Street.
3. Tributary to East Creek located 1,150 feet northeast of 215th Street and Knight Road intersection along proposed 211th Street.
4. Tributary to East Creek located 2,850 feet north of 215th Street and Knight Road intersection along proposed 211th Street.
5. Tributary to East Creek located 1,250 feet west of Highway YY and Knight Road intersection along Highway YY.

4.5.2 Ponds

Segment A
Two (2) ponds totaling 1.91-acres were identified within the Segment A corridor (see ***Appendix A - Figure A5***).

1. 0.70-acre pond located 1,950 feet west of Highway J along 211th Street.
2. 1.21-acre pond located 4,900 feet west of Highway J along 211th Street.

Segment B
One (1) 0.22-acre pond was identified 2,750 feet west of 211th Street and School Road intersection in the Segment B corridor (see ***Appendix A - Figure A6***).

Segment C1
Four (4) ponds totaling 2.40-acres were identified within the Segment C1 corridor (see ***Appendix A - Figure A7***).

1. 0.10-acre pond located 840 feet east of Mullen Road along proposed 211th Street.
2. 1.49-acre pond located 840 feet east of Mullen Road along proposed 211th Street.
3. 0.43-acre pond located 2,425 feet east of Highway Y along 211th Street.
4. 0.38-acre pond located 1,500 feet east of Highway Y along 211th Street.

Segment C2
One (1) 0.26-acre pond was identified 625 feet northwest of 215th Street and Knight Road intersection in the Segment C2 corridor (see ***Appendix A - Figure A8***).

4.5.3 Floodplains

An evaluation of floodplain impacts is mandated by Executive Order 11988, Floodplain Management, and subsequent federal floodplain management guidelines. When available, flood hazard boundary maps (National Flood Insurance Program) and flood insurance studies for the project area are used to determine the limits of the base (100-year) floodplain and the extent of encroachment.

The Federal Emergency Management Agency (FEMA) has mandated that projects can cause no rise in the regulatory floodway. Project-related fills within the regulatory floodway require a No Rise Certification and Floodplain Development Permit from the local floodplain administrator. If a project causes a rise within the regulatory floodway, then a Letter of Map Revision (LOMR) is required from FEMA.

In addition, project-related fills can cause no more than a one-foot rise in the 100-year floodplain (fringe); otherwise, a LOMR is required. Fills that cause less than a one-foot rise still require a No Rise Certification and Floodplain Development Permit.

Below is a summary of the 100-year floodplain / floodway areas identified within each of the segment corridors. The level of FEMA permitting will be determined during the final design phases of the project.

Segment A
A total of 1.40-acres of 100-year floodplain were identified at the intersection of Highway J and 211th Street in the Segment A corridor (see ***Appendix A - Figure A5***). No regulatory floodways were identified within Segment A corridor.

Segment B
A total of 6.41-acres of 100-year floodplain were identified 900 feet east of U.S. Highway 71 and 211th Street in the Segment B corridor (see ***Appendix A - Figure A6***). No regulatory floodways were identified within Segment B corridor.

Segment C1
A total of 1.23-acres of 100-year floodplain and 3.35-acres of regulatory floodway were identified about 725 feet east of 211th Street and Mullen Road intersection in the Segment C1 corridor (see ***Appendix A - Figure A7***).

Segment C2
No 100-year floodplain or floodway areas were identified within the Segment C2 corridor.

4.6 Environmental Impacts

The following sections describe any potential environmental impacts upon wildlife or protected parklands within the future 211th Street corridor segments. In addition, expected impacts upon prime farmland within the area are quantified, and other environmentally-sensitive sites, such as mined lands and hazardous waste sites, are identified.

4.6.1 Threatened & Endangered Species

The Endangered Species Act, the Migratory Bird Treaty Act, and other state and federal laws protect threatened & endangered plant and animal species and their

designated critical habitats. If state-listed species are known to occur near a project site, further coordination with the Missouri Department of Conservation (MDC) is necessary to minimize impacts to these species and their habitats. If federally-listed species are known to occur, then further coordination with the U.S. Fish and Wildlife Service (USFWS) is necessary.

According to the MDC Heritage Program database, the federally threatened and state endangered Mead's Milkweed (*Asclepias meadii*) is known to occur on undisturbed prairie habitat in Cass County. An on-line MDC Natural Heritage Review indicates that no records of species or habitats of concern were identified within any of the segment corridors. However, the MDC and USFWS should be consulted during the final design phases to confirm that no species or habitats will be affected by the project.

4.6.2 Parklands

Section 4(f) of the Department of Transportation Act protects lands that are publicly owned or held by means of a long-term lease and are intended for use as public parks, recreation areas, wildlife and waterfowl refuges, or any public or private significant historical site. Federally-funded transportation projects cannot impact such parklands, unless there are no feasible and prudent alternatives. This regulation could potentially affect these proposed 211th Street improvements, if Federally-allocated funding is eventually obtained. Some public parks have also been purchased or improved by Section 6(f) funding from the Land and Water Conservation Fund (LWCF) Act. Proposed use of Section 6(f) lands for transportation purposes requires extensive coordination with state and federal agencies. Section 6(f) parks cannot be converted to other uses unless reasonably equivalent land of equal fair market value is provided as a replacement.

No Section 4(f) / 6(f) parklands were identified within any of the segment corridors for 211th Street.

4.6.3 Prime Farmland

The U.S. Department of Agriculture (USDA) is the agency primarily responsible for implementation of federal policy with respect to the Farmland Protection Policy Act (FPPA, 7 CFR Part 658). The purpose of FPPA is "to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses, and to assure that federal programs are administered in a manner that, to the extent practicable, will be compatible with state, unit of local government, and private programs and policies to protect farmland." The USDA Natural Resources Conservation Service (NRCS) maintains county-by-county lists of prime farmland soils subject to FPPA regulations.

Below is a summary of the prime farmland identified within each of the segment corridors. It should be noted that corridor areas situated within City limits are not subject to FPPA involvement; therefore, prime farmland soils located within City of Peculiar incorporation limits were not considered in this evaluation. During the final design phases of the project, a Form AD-1006 Farmland Conversion Impact Rating will be completed for NRCS review to further evaluate potential impacts to prime farmland.

Segment A
A total of 7.21-acres of prime farmland soils were identified within Segment A, including Deepwater silt loam, 2-5% slopes (40053); Arisburg silt loam, 1-5% slopes (10000); and Verdigris silt loam, 0-1% slopes, occasionally flooded (46005).

Segment B
A total of 29.31-acres of prime farmland soils were identified within Segment B, including Barco loam, 2-5% slopes (40034); Arisburg silt loam, 1-5% slopes (10000); and Verdigris silt loam, 0-1% slopes, occasionally flooded (46005).

Segment C1
A total of 39.10-acres of prime farmland soils were identified within Segment C1, including Barco loam, 2-5% slopes (40034); Arisburg silt loam, 1-5% slopes (10000) and Verdigris silt loam, 0-1% slopes, occasionally flooded (46005).

Segment C2
A total of 15.59-acres of prime farmland soils were identified within Segment C2, including Barco loam, 2-5% slopes (40034); Arisburg silt loam, 1-5% slopes (10000) and Verdigris silt loam, 0-1% slopes, occasionally flooded (46005).

4.6.4 Mined Lands

The study identified a limestone quarry property owned and operated by Hunt Martin Materials, LLC. This quarry is bounded by Harper Road on the east, Mullen Road on the west, and Highway YY on the south. The property has over 500-acres of open pit-mined areas, and over 300-acres of non-mined areas. All of the segment corridors for 211th Street are situated within portions of the rock quarry property, except for Segment A.

Segment B
A total of 11.80-acres of Segment B is situated within the non-mined areas of the property along Harper Road.

Segment C1
A total of 26.03-acres of Segment C1 is situated within mined and non-mined areas along the northern boundary of the quarry property.

Segment C2
A total of 68.60-acres of Segment C2 is situated within mined and non-mined areas along the northern, central and southeast portions the property. The southern portion of Segment C2 is situated within an existing open pit area that appears to be significantly deep and impounded with water.

4.6.5 Hazardous Waste Sites

A review of various federal and state environmental databases was conducted to identify sites within the study segments that may contain hazardous materials, petroleum products or other sources of contamination. The databases reviewed included - Hazardous Waste Treatment, Storage and Disposal Facilities; Voluntary Cleanup Program (VCP); Brownfields; National Priority List (NPL); Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), solid waste landfills, aboveground and underground storage tanks, and leaking underground storage tanks.

At the time of the review, no environmental database sites were identified within any of the segment corridors.

4.7 Preferred Corridor

The "*Segment Summary Matrix*" presented on the attached ***Table 1*** details the numerous evaluation criteria described in this section of the document that were utilized to rank the favorability of each potential corridor segment, and therefore each resulting alternative alignment for the 211th Street corridor. As shown on the attached ***Table 1***, these evaluation criteria were then color-coded to represent the overall feasibility of each respective corridor segment along 211th Street (i.e., rated as "most favorable," "favorable / neutral," or "least favorable"). The construction of an improved 211th Street generally located within the existing roadway right-of-way and on the existing section line would be justified between Highway J and the relocated Harper Road intersection. As shown in the summary table, all of the evaluation criteria for both corridor Segment A and Segment B were ranked as either "most favorable" or "favorable / neutral."

The summary matrix of evaluation factors essentially allows a side-by-side comparison of the two alternative alignments for the 211th Street corridor to the west of the relocated Harper Road intersection. Again, it should be noted that these evaluations of corridor Segment C2 did <u>not</u> include the expected impacts for the 1.5-mile long section of Highway YY from the western terminus of this segment westward to the existing Highway Y intersection. When the preliminary estimated improvement costs for this additional length of roadway are also considered, it is very likely that the total estimated construction cost of the 211th Street corridor connection to Highway Y via Highway YY will ultimately exceed that of corridor Segment C1. Additionally, corridor Segment C2 itself already requires a very similar amount of additional right-of-way to accommodate its construction as does Segment C1. Therefore, any additional right-of-way required along the remaining Highway YY segment outside of the limits of this corridor study will continue to increase the net difference in the property impacts expected for these corridor alternatives.

Several other key factors must be weighed in the ultimate choice to be made between the alternative corridors:

- For corridor Segment C1, overall access to more developable land along 211th Street is provided and can therefore contribute to the levels of economic development desired by the City and County.

- The intended importance of another east-west corridor through the region will be better realized by utilizing corridor Segment C1, as demonstrated by the projected traffic volume estimates.

- The existing quarry property represents a key stakeholder located within the study area between Harper Road and Mullen Road that must be considered for its continued viability and environmental sensitivity, as discussed previously in ***Section 2.10*** of this report. Segment C2 essentially bisects this property and would likely create future logistics concerns for its operators.

- It must be noted that the majority of affected property owners and public / private stakeholders within the corridor study area have expressed their preference for corridor Segment C1 throughout the public involvement process.

- Corridor Segment C1 is also consistent with the previous master planning efforts completed by both the City and County, and continues to be supported by the staffs and elected representatives of these entities.

For these reasons listed above, and other factors further detailed previously, the preferred alignment alternative for the 211th Street corridor is recommended to follow the route provided by Segments A-B-C1, as depicted on ***Exhibit 9*** below.

Exhibit 9: *Preferred 211th Street Corridor*

5.0 CONCLUSIONS

Previously completed transportation planning studies have indicated the need for a second interchange onto U.S. Highway 71 in order to serve the northern portions of the City, including the nearby Ray-Pec school district complex. This planned interchange would be expected to serve as the catalyst for the City's anticipated growth and development along the 211th Street corridor. Several major developments, including a destination retail center, large commercial / office employment centers, and a regional industrial center, are expected to be served by the planned interchange. However, the viability of these planned developments will likely also be related to the ability of the surrounding roadway network to support these uses. Ultimately, westward connectivity from U.S. Highway 71 via another corridor like 211th Street must be provided in order to allow the efficient transport of people, goods, and services from Peculiar to the remainder of the Kansas City metropolitan area to the northwest of the City.

To serve this need, the City envisions 211th Street as an arterial roadway that is also sensitive to the various character areas through which it will pass. The roadway's configuration, width, lighting levels, pedestrian accommodations, and degree of landscaping / aesthetic treatments and amenities will need to be varied appropriately in order to remain consistent with the adjacent land uses that the roadway is intended to serve.

Through this completed corridor study process, it has been determined that the most feasible alignment for the 211th Street corridor would be the route provided by Segments A-B-C1, as identified and described in this document. This preferred alignment alternative will take advantage of the City's and County's previous investments in infrastructure by utilizing the existing roadway segments already provided along the corridor, and also minimizes the impacts on the surrounding community and environment.

It should be noted that the preferred alignment recommendation from this corridor study is intended to serve as a blueprint for the future 211th Street corridor, providing only guidance in terms of the necessary improvements for the roadway and the associated impacts. Further alignment location and engineering studies will still be needed prior to the construction of any future roadway. These future studies will include additional opportunities for public input and coordination between residents, affected property owners, and other project stakeholders with City, County, and State officials to ensure that the future roadway best serves the regional needs.