Scope of Work

East Elizabethtown Connectivity Study
Hardin County
Item No. 4–445.00

Groundbreaking by Design.

Project Information

The Radcliff/Elizabethtown Metropolitan Planning Organization (MPO) awarded Qk4, Inc. the East Elizabethtown Transportation Connectivity Study in April 2020. The study will analyze locations and improvement options, both highway and pedestrian, along and east of US 31 W in Hardin County, Kentucky. Study focus will be to identify and evaluate short- and long-range improvement opportunities to improve connectivity, mobility and safety in the study area as shown on **Figure 1**.

The consultant team consists of Qk4 (prime), supported by Stantec for traffic modeling, K. S. Ware and Associates for geotechnical services, plus Corn Island Archaeology and Third Rock Consultants for environmental services.

Study Goals and Purpose (copied from March 8, 2020 RFP)

The city of Elizabethtown has experienced rapid growth in commercial development and traffic volumes along several routes in recent years. This has resulted in safety issues in the downtown area including pedestrian safety and significant congestion issues especially around the US 62/I-65 interchange. Numerous businesses have opened in recent years at this interchange including hotels, gas stations and restaurants. This is also the exit that is highly utilized by southbound travelers on I-65 to access Ring Road and US 31w for large retail outlets and additional restaurants.

The City of Elizabethtown has also expressed interest in revitalizing the southern part of the community. A new school is under construction on New Glendale Road (KY 1136) that could increase traffic and residential development in this area. Several businesses have located in the downtown area along US 31w which has increased the pedestrian and vehicular traffic. Access to the east side of Elizabethtown from the south is impeded by traffic flow around the courthouse square and also the railroad crossing just south of the courthouse.

The purpose of this study is to identify and evaluate immediate and long-range improvement opportunities to improve connectivity, mobility and safety along and east of US 31W in the Elizabethtown/Hardin County area.

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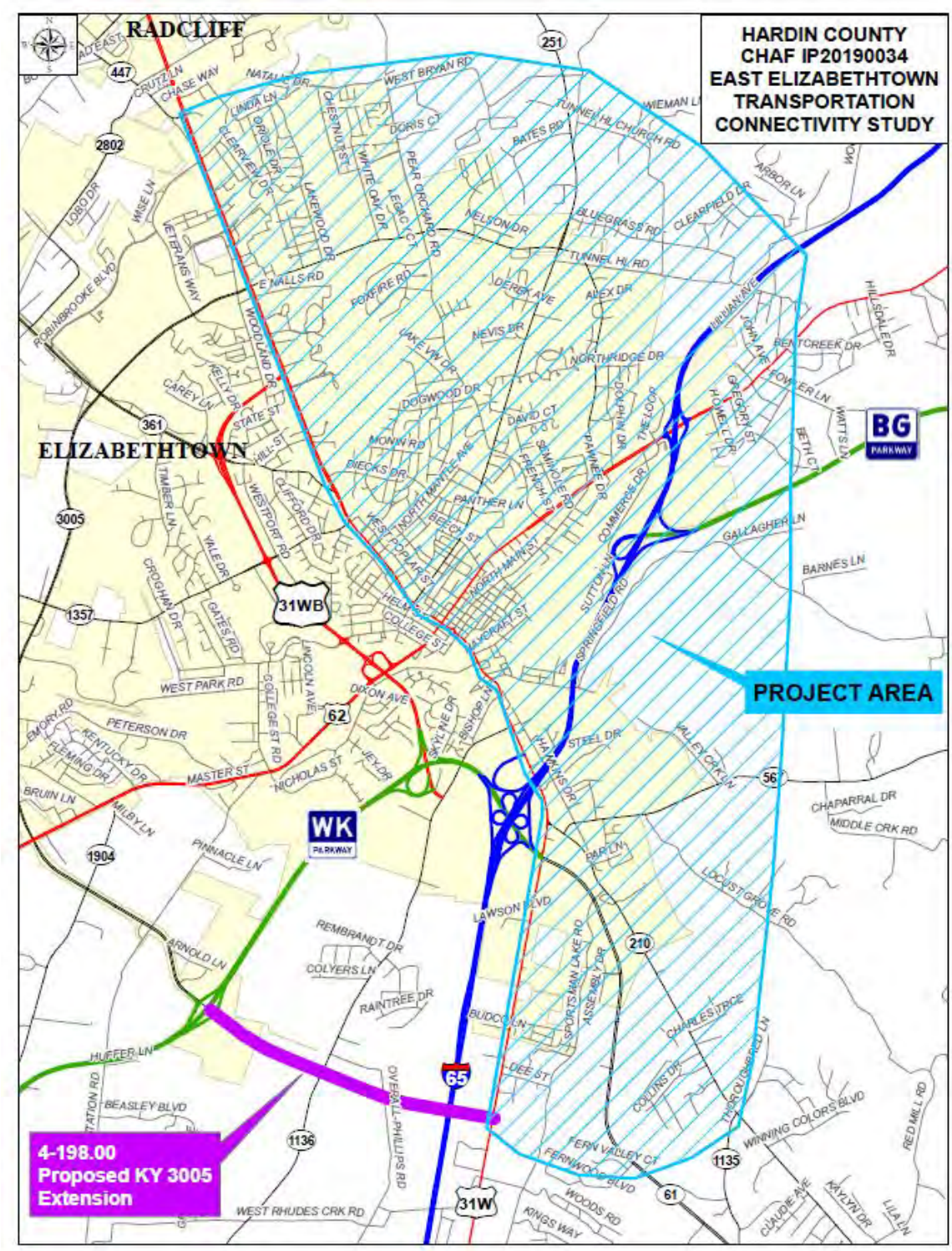

Figure 1: Study Area from RFP

Scope of Work

Qk4 will provide engineering and planning services for the completion of the East Elizabethtown Transportation Connectivity Study (Connectivity Study) examining transportation networks in the study area, generally areas in Elizabethtown and Hardin County east of US 31W. Qk4 will work with the local official and stakeholders (LO/S) to develop short- and long-term improvements to address identified safety, capacity and mobility needs beneficial for future project development and implementation by KYTC, Radcliff/Elizabethtown MPO, City of Elizabethtown, Hardin County, or other entities.

TASK 1.0 Project Management

Project management activities include coordination with Radcliff/Elizabethtown MPO through project-related meetings, informal meetings, and distance communications such as written, video, telephone correspondence. Qk4's Project Manager (PM) will monitor project activities, scopes, and budgets. The PM will prepare and submit invoices, monthly reports, and PSC invoice forms to the MPO. Qk4 will be responsible for internal quality assurance/quality control procedures. Quality control will be emphasized in preparation and submittal of study materials.

TASK 2.0 Evaluate Existing Conditions

Qk4 will obtain information for an existing conditions inventory from the KYTC Highway Information System (HIS) where available, supplemented with basic field data, as necessary, through desktop review and site visits. Input from the project team, local officials, and stakeholders will be incorporated.

2.1 Mapping – Qk4 will assemble and prepare geographic information system (GIS) data and aerial mapping for use in project displays, on-line viewing and interaction, and presentations.

2.2 Systems and Characteristics – Qk4 will obtain the following HIS data from the KYTC's HIS database and other sources as appropriate. The data will be compiled and mapped in the study area using GIS, noting geometric deficiencies. The following roadway information will be included:

- Lanes, shoulder and median widths
- Horizontal and vertical deficiencies
- Bridge geometrics, clearances, and deficiencies
- Truck routes, functional classification and roadway system designations
- Bicycle/pedestrian accommodations and/or available ADA plans
- Transit

2.3 Field Reviews and Supplemental Data Collection – Qk4 will conduct desktop data reviews and field visits as necessary to collect basic existing conditions information. Examples of supplemental data could include site-specific information to better understand problems and potential solutions, such as sight distance issues, turning issues, signal data, traffic control devices, and other geometric or existing conditions that could complicate possible projects. No as-built plan reviews are included in this effort.

2.4 Identification and Review of Other Transportation Projects and Reports – During initial stages of study, Qk4 will compile a list of previously identified area transportation-related projects. This task includes mapping projects listed in Kentucky's current Highway Plan, identified on Continuous Highway Analysis Framework (CHAF) forms, listed in Radcliff/Elizabethtown's Metropolitan Transportation Plan (MTP) and Transportation Improvement Program (TIP), and identified in local plans and other planning studies. Findings will be presented on maps with summary information tabulated for quick reference.

2.5 Existing (2020) Traffic Volume, Classification, and Turning Movement Counts – Qk4 will assemble readily available existing traffic volumes for the study area roadways, including truck percentages, K-factors, and peak hour directional distributions as available.

It is estimated that approximately ten (10) turning movement counts at key intersections on the major arterials, such as US 31W, US 62, KY 3005, and KY 251, will be collected to provide up-to-date turning movement information, once schools are back in session. All traffic will be summarized in exhibits and/or tables. Where appropriate and is feasible to get good reliable data, these counts will include origin/destination and travel time information using Miovision connect hardware. For example, on US 62 between Ring Road and through the I-65 interchange area.

Qk4 will adjust recent volume counts to the current year based on appropriate historical trends, adjusting pre-2020 volumes to create a consistent existing year (2020) dataset.

2.6 Existing Capacity Analysis – Qk4 will perform level of service (LOS) and volume-to-capacity (v/c) ratios analyses on study area highway segments for worst traffic hour (AM or PM peak) in concurrence with current Highway Capacity Manual (HCM) procedures. HCM procedures will be applied to the counted intersections to calculate intersection LOS and v/c measures as well.

Information will be summarized in tables and/or charts for inclusion in meetings with the project team and local official/stakeholders.

2.7 VHD (Vehicle Hours of Delay) Congestion Factor and Travel Times – Qk4 will compile congestion factors and projected travels times for study routes, based on GIS delay metrics and recent year speed data for AM and PM weekday peak hours provided by KYTC.

2.8 Obtain Crash Information and Perform Crash Analyses – Qk4 will request KYTC crash data for three full years (January 2017 through December 2019) for study area routes. KYTC will provide narrative portions from individual crash reports in high crash spots and fatal crash locations. Qk4 will summarize and map this data by severity and manner of collision.

Critical Crash Rate Factors (CCRFs) will be developed for spots and segments on state-maintained study routes, based on methodology and rates developed by the Kentucky Transportation Center's

Analysis of Traffic Crash Data in Kentucky (2014 – 2018) or latest version available. This information will be analyzed to identify possible safety needs.

If needed to make more informed decisions, Qk4 will review officer comments in individual crash records to identify trends at high CCRF/EEC and fatality locations. Qk4 will summarize crash reports using tables, text, exhibits, and charts as appropriate to display and communicate the crash analysis.

2.9 Perform Excess Expected Crashes Analyses – If available, Qk4 will use the new Crash Data Analysis Tool, provided by KYTC, to calculate Excess Expected Crashes (EEC) for the main study area routes. EECs will be used as a comparative measure to CCRF analysis. If the tool is not available, GIS-based EEC values from SHIFT 2020 will be presented for reference.

2.10 Summarize Existing Conditions and Provide Exhibits – Qk4 will summarize information and provide exhibits for meetings and documentation.

TASK 3.0 Traffic Model, Turning Movement, and Microsimulation Forecasts

The Radcliff/Elizabethtown MPO travel demand model along with existing mainline and turning movement counts, will form the basis of the traffic projections for this project. A future year, and an interim year, shall be decided upon by the MPO and shall be used for traffic projection.

3.1 ADT Forecasts

3.1.1 Review Radcliff/Elizabethtown MPO Model Files – Upon receipt of Radcliff/Elizabethtown MPO's base network, Stantec will review the operations, layout, and background assumptions. Committed transportation improvements will be identified and added to the model as needed. One meeting with KYTC Division of Planning Traffic Modeling Team and up to two coordination calls on traffic modeling assumptions and procedures are assumed. The model will also provide growth rates to project 2020 highway segment volumes to the future analysis years.

3.1.2 Update Houses and Job Forecasts – Stantec will use available date to forecast future volumes of houses and jobs per zone, as necessary.

3.1.3 Compare Base Counts – Stantec will compare base year model assignment with existing traffic counts (Task 2.5) and determine difference and percentage-based adjustments for future year assignments.

3.1.4 Technical Memo – Stantec will produce a Traffic Model Report once traffic counts are compiled that contains base traffic volumes on key roadways, truck percentages, and future No-Build volumes derived using the Radcliff/Elizabethtown MPO model.

3.2 Turning Movement Forecast

Building from assembled traffic data and the travel demand model, Qk4 will generate the existing future year turning movement forecasts, including daily, AM peak, and PM peak volumes.

3.3 Traffic Microsimulation Modeling

Once future traffic forecasts are prepared, a VISSIM microsimulation network(s) for one focus area (US 62 from Ring Road through the I-65 interchange) will be developed to examine traffic operations at a more detailed scale.

3.3.1 Microsimulation Modeling – Based on current geometry, signal operations, and existing conditions data from Task 2 (travel time, queue lengths, origin-destination trends, etc.), Qk4 will construct a microsimulation model of the US 62 corridor approaching the I-65 interchange, with an AM and PM peak hour analysis period. The existing network will be calibrated to reflect current operating conditions, then projected to the future analysis year to model future operational benefits from proposed improvements (Task 7).

3.3.2 Documentation – A technical memo describing the development of the microsimulation model, assumptions, and its application will be prepared to document this component of the analysis.

TASK 4.0 Future LOS and Capacity Analysis

4.1 Level of Service and Volume to Capacity Metrics – Qk4 will provide future year LOS and v/c for the same routes as in Task 2.6, based on future forecast volumes. Future year traffic operations data will be summarized in tables, charts, or maps for use in meetings project team and local official/stakeholders meetings. The future LOS analysis will be used to determine at which point in the future movements at the I-65/US 62 interchange begin to fail and warrant improvement.

TASK 5.0 Red Flag Environmental Overview/Socioeconomic Study

5.1 Literature and Database Review

Third Rock and Corn Island will compile and present environmental data that may affect the design, development, and implementation of any proposed improvements. The types of data collected will include known places of significant historical or cultural value, potential hazardous materials, and noise sensitive receptors. Other features such as aquatic resources (e.g., floodplains, wetlands, and sinkholes) shall be identified based on available data. The effort will consist of collecting the electronic databases, data files, and published data to produce a planning-level environmental footprint of red flag issues in GIS format. Findings will be incorporated into the draft and final report and materials for project team meeting(s).

5.1.1 Red Flag Ecological Resources – Available GIS data for key resources will be compiled, including National Wetland Inventory (NWI) mapping, US Geological Survey streams and wells, Federal Emergency Management Agency (FEMA) floodplains, Natural Resource Conservation Service (NRCS) soil survey classifications, US Fish and Wildlife Service (USFWS) threatened/endangered species and critical habitats in the vicinity, etc.

5.1.2 Red Flag Hazmat Resources – Third Rock will research the EPA database for major hazmat concerns and conduct field visits to identify other potential sites. A review of oil and gas well information available from the Kentucky Geological Survey will also occur.

5.1.3 Red Flag Community Resources – Third Rock will compile available databases to identify parks and recreation areas, conservation easements/nature preserves, Land and Water Conservation (LWCF) funded properties, or other agency-managed facilities to note potential Section 4(f) and Section 6(f) issues; as well as special lands, including cemeteries, schools, public service facilities, and churches.

5.1.4 Historic and Archaeology – Corn Island will conduct literature research to identify previous studies throughout the study area, supplemented by field reconnaissance (Cultural Historic only) to identify potentially eligible sites and districts near proposed improvement concepts.

5.1.5 Socioeconomic Study – Third Rock will compile a summary of socioeconomic data will be included in the final report and all documentation will be included in the Appendix. This shall include information on environmental justice populations, but not reach a conclusion on effects to such populations.

5.2 Environmental Footprint – Qk4 will display data obtained from the literature review. Informational materials pertaining to the Environmental Overview will be prepared for project team meetings. The materials will include exhibits and maps of the environmental footprint, or similar materials, as appropriate. Sensitive environmental information, such as threatened and endangered species or archaeological sites, will not be included on publicly accessible mapping.

TASK 6.0 Geotechnical Overview

KS Ware will complete a geotechnical overview based on literature searches and on-line information. No field work would be conducted. A geotechnical summary report will be provided to the KYTC Geotechnical Branch for review and included as an appendix. Geotechnical information will be used to help develop cost estimates and identify red flag issues, such as shale bedrock and karstic areas.

TASK 7.0 Development of Improvement Concepts and Cost Estimates

Planning-level improvement concepts along study routes will be developed based on the existing conditions analysis, field reviews, and input from the project team and local official/stakeholders.

7.1 Development of Improvement Concepts – The range of improvement concepts will focus on short-term improvement options at both intersections and area-wide levels. Long-term improvement options may be of a broader perspective and include system improvements and/or new transportation features or corridors. Local improvements will also be considered although future project implementation would be the responsibility of local governments, Radcliff/Elizabethtown MPO, and/or private developers.

Short-Term Improvements—These will include relatively low-cost, improvements such as new and/or additional signals, signal system optimization/coordination, turn pockets or lanes, storage lanes, signage, pavement markings, geometric changes (sight distance, realigning horizontal or vertical curves, etc.), access management options, and pedestrian and bicycle facilities.

Long-Term Improvements—These will focus primarily on higher cost projects at locations that may not currently be a safety or mobility issue but will likely be in the future. These types of projects may include determining if additional lanes are necessary in the future to meet increased traffic demand, the addition of two-way left turn lanes, shoulder improvements, curve re-alignments, new alignment connections, new road corridors, interchange modification, a new interchange with I-65, and other major projects identified by the LO/S and the public.

Local Improvements—This type of improvements is primarily for the local road system and may include the addition of turn lanes, access points, traffic calming, and sight distance improvements such as clearing vegetation. While this study will provide the opportunity to list and prioritize local projects, funding and implementation for these types of improvements will occur at the local levels.

The focus of the Connectivity Study is safety, capacity and mobility improvements for highway users and pedestrians.

7.2 Cost Estimates. Planning-level design and construction cost estimates for all project phases will be developed for each conceptual improvement. District 4 and the Radcliff/Elizabethtown MPO will review the estimates for concurrence.

7.3 Evaluate Preliminary Improvement Concepts. Potential environmental, utility, and right-of-way costs will be quantified, if possible, and potential safety and capacity impacts will be analyzed. Results will be summarized in a matrix for use in project team prioritization decisions.

7.4 Prioritization of Improvement Concepts. Project priorities (high, medium, or low) will be developed for all recommended projects based on improvement concept analysis, cost estimates, and input received from the project team, public input, and local official/stakeholders.

7.5 Project Sheets Project priorities will be detailed in a summary matrix and on one-page project sheets. The sheets will be stand-alone descriptions of projects that provide concise overviews of transportation issues. Project location maps, existing conditions and safety issues, and cost estimate information will be included as appropriate for easy reference. The sheets will also include performance base planning data, such as LO/S priority, FAST ACT performance measures, future LOS, crash reduction factors, and other such data important to decision-makers regarding advancement of the project.

TASK 8.0 Meetings and Public Involvement

Connectivity Study activities will include meetings with the project team (PTM), Hardin County and Elizabethtown local officials/stakeholders (LO/S), and the general public. The PTM members will be determined by the MPO and KYTC. Meetings will occur either in person or via video-conferencing. GIS based-online, public solicitation to identify transportation needs and problem areas will be offered via a webpage and social media.

Qk4, in coordination with KYTC and Radcliff/Elizabethtown MPO, will build a database of LO/S members. Qk4 will prepare group emails and virtual meetings to introduce the LO/S to the Connectivity Study. Qk4 in partnership with Radcliff/Elizabethtown MPO, will coordinate meeting logistics and invite attendees.

This task includes meeting preparation, attendance, and summaries. Draft materials will be provided to the project team for review at least two weeks ahead of the meeting; project team reviewers will provide any comments within one week.

8.1 Meetings

8.1.1 Project Team Meetings – Up to two Qk4 personnel will attend each of three project team meetings, assumed to be held in Elizabethtown. Main purposes of each are described below:

- **Project Team Meeting No. 1** – an in-person or video meeting to review existing conditions and prepare for the first LO/S meeting.
- **Project Team Meeting No. 2** – an in-person or video meeting to review public/stakeholder input; discuss congestion and safety issues and preliminary improvement concepts.
- **Project Team Meeting No. 3** – an in-person or video meeting to review prioritization input and final recommendations.

8.1.2 Local Official/Stakeholders Meetings – Up to three Qk4 personnel will attend stakeholder engagement activities:

- **LO/S Meeting No. 1** – an in-person or video meeting with local elected officials and other stakeholders to provide a study overview, existing conditions review and seek input on study area needs. Online engagement activities will be launched concurrently with this meeting.
- **LO/S Meeting No. 2** – an in-person or video meeting with local elected officials and other stakeholders to present improvement concepts and seek input on implementation priorities.

8.1.3 MPO Meetings – At least one Qk4 staff will attend up to four MPO meetings to provide study information and updates to committee members.

- **MPO Policy Committee Meeting** – Qk4 will provide study information and updates to committee members for up to two meetings.
- **MPO Technical Advisory Committee Meeting** – Qk4 will provide study information and updates for up to two meetings.

8.1.4 Online Public Engagement – A social media platform including Facebook, Twitter, and Instagram will be used to promote the study, and a web site developed to communicate information and receive public input. Qk4 will also provide an interactive online GIS mapping tool to collect public input on transportation needs and safety concerns on study routes. The public site will remain active for a predetermined period (e.g., 15 days) to allow for data collection, analysis, and compilation prior to the following project team meeting. This task includes site development and maintenance, and analysis of input received. A link to the site will be shared with the project team for review prior to the public launch.

TASK 9.0 Study Report Preparation

Qk4 will prepare a final report and an executive summary documenting the Connector Study. The report will provide a comprehensive record of the study, summarizing all analyses, project team and local official/stakeholder input, on-line engagement, and evaluation of the results. It will include recommended projects listed on individual sheets documenting existing issues, project type, cost estimates, and prioritization.

9.1 Draft Report – Qk4 will prepare and submit a draft report and a separate draft Executive Summary for review to the Radcliff/Elizabethtown MPO and District 4. The Executive Summary will be included as a foreword to the draft and final reports. Hard copies of the draft report and draft Executive Summary and electronic versions (i.e., Word with “track changes” on and or PDFs) will be submitted as requested.

9.2 Final Report – Qk4 will address the MPO and KYTC comments in the final report and will hard copies to as needed. At a minimum, study documentation will include as appendices in the report the following:

- Crash History
- Traffic Forecast Report
- Environmental Overview
- Socioeconomic Data
- Meeting Summaries and On-line engagement

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Project Milestone Schedule*

Milestone	Activity	Dates	% Complete
Project Team Meeting No. 1	Existing Conditions Review; Public Engagement Preparation		30%
Local Officials/Stakeholders Meeting No. 1	Existing Conditions Review; Collect Input on Safety and Capacity Concerns		
Launch Website and Social Media	Provide Existing Conditions and Collect Online Input on Safety and Capacity Issues		
MPO Policy Committee Meeting; Technical Advisory Committee Meeting	Provide study information and updates		
Project Team Meeting No. 2	Review Input; Discuss Safety and Capacity Concerns		60%
Traffic Forecast Report			
Local Officials/Stakeholders Meeting No. 2	Present Improvement Concepts; Prioritization Exercise		
MPO Policy Committee Meeting; Technical Advisory Committee Meeting	Provide study information and updates		
Project Team Meeting No. 3	Review Prioritization Input; Final Recommendations		80%
Draft Report			85%
Final Report			100%

**Subject to change based on approval of scope of work and fee*