Draft Scope of Work

Crete, NE-BNSF Railway Corridor Highway/Rail Grade Crossing Safety Study Project

Project Understanding

The Crete, NE-BNSF Railway Corridor Highway/Rail Grade Crossing Safety Study Project will examine eight existing at-grade crossings in the vicinity of Crete, NE, to look for opportunities to improve safety, mobility, emergency access, and railroad operating efficiency in this busy BNSF rail corridor. There have been several highway-rail incidents in the City and adjacent portions of Saline County. The study will conduct an Alternatives Analysis for the corridor, located on BNSF's Hastings Subdivision, that consists of examining past crash history, performing traffic modeling and analyses to determine potential safety and mobility improvements for the Crete area for the future. These potential options include the following specific highway/rail at grade crossings;

- Conceptual engineering for a potential railroad/vehicle grade separation at Main Avenue (BNSF Milepost 79.64);
- Conceptual engineering for grade crossing upgrades/modifications and/or closures at:
    - Road 2000 (BNSF Milepost 82.24)
    - Blue River Road/Road 2100 (BNSF Milepost 81.23)
    - Arizona Avenue (BNSF Milepost 80.68)
    - W 13th Street (BNSF Milepost 80)
    - Hawthorne Avenue (BNSF Milepost 79.25)
    - Boswell Avenue (BNSF Milepost 79.03) and
    - SH 103 (BNSF 77.65)

The analysis will also look at the adjustments of crossing warning systems timing, railroad signal systems, and track alignment and superelevation to accommodate consistent railroad speed regimes through the City of Crete and its environs. This could potentially improve mobility through Crete by reducing the number of times vehicles wait at crossings for trains to pass and improve Amtrak and BNSF train schedule performance.

The study will also complete an environmental evaluation for the corridor, preliminary engineering for each discrete capital project, as well as cost estimates. The project will develop environmental documentation to enable the city to pursue future construction funding opportunities, conduct technical studies, and develop engineering to a 30% level for each project element. Its scope includes tasks appropriate to the Federal Railroad Administration's (FRA's) National Railroad Partnership Program/Federal-State Partnership Program (Project

Planning and Development Lifecycle Stages). This would position the project to enter the next two FRA Lifecycle Stages, Final Design and Construction.

Scope of Services

Task 1 – Project Management

Project management will be provided throughout the duration of the project. This includes the work necessary to guide and direct overall processes and project team. Project Management will consist of overseeing the study and production efforts including administering the contract, monitoring schedule and budget progress, and directing its quality control activities. It is anticipated that the substantive tasks included in this Scope of Work will require approximately 24 months (2 years) to complete, excluding an estimated 2 months of project initiation and project closeout.

Task 1 Activities

1. Develop Project Management Plan for project.
    - Approved project Budget (per FRA requirements)
2. Monthly invoice and Progress Reports
    - 1 per month – 24 total months, 24 total
3. Developing and Maintaining Project Schedule
    - Develop Baseline project Schedule
    - Utilize MS Project to develop and maintain project schedule.
    - Monthly Schedule updates
4. Bi-weekly Team Coordination Meetings
    - 24 Total with eight (8) consultant staff each
5. Coordination of Consultant Team and Sub-consultants
6. FRA, Agency, and key stakeholder meetings
    - 24 Total with two (2) consultant staff each
7. Quality Control/Quality Assurance Plan Development
    - Include in PMP
8. Procurement Strategy

- Develop a comprehensive procurement strategy for cost-effective, timely, and construction strategies necessary for project delivery. Activities may include consultant/contractor solicitation development, construction planning, scheduling, and other development in in accordance with BNSF and local agency guidelines.

9. Change and Risk Management

Task 2 – Stakeholder/Public/Community Outreach

The community engagement consultant will prepare a draft and a final Stakeholder and Community Engagement Plan and will work with the Project Leadership Team (PLT) and the project's engineering/planning consultant to prepare a preliminary Project Purpose and Need to initiate the engagement process. The Stakeholder and Community Engagement Plan will identify a comprehensive set of strategies designed to elicit feedback from all stakeholders and preferences for interaction (in person or virtual) to ensure that a wide range of viewpoints are captured.

Task 2 Activities

1. Create Stakeholder and Community Outreach Plan
2. Community Outreach Planning and Coordination
    - Prepare plans for each public open house or meeting, 2 total events
    - Prepare and conduct public notifications for the events
    - Event attendance by consultant (2 total, 3-hour meetings with 2 staff members)
    - Prepare post-event summaries including public feedback received
3. Conduct two Design Charette Events in the community
4. On-line public open house for public involvement
    - Preparing and hosting one open house
    - Prepare post-meeting summaries including public feedback received
5. Social Media engagement Activities supporting outreach efforts.
6. Graphics Preparation
    - Prepare concept and/or preliminary level plan and/or alternative graphics for additional grant applications and public/community outreach events.
7. Stakeholder and Community Engagement

- In accordance with the final Stakeholder and Community Engagement Plan, the stakeholder and community engagement consultant will work with the grantee and the PLT to implement the plan and will ensure that all voices are heard. A Draft and Final Community Engagement Report shall be prepared.

Task 3 – Transportation and Traffic Study

This task will consist of conducting a traffic analysis of up to 15 intersections. The analysis will include the following scenarios: existing, future no-build, and future build #1 and future build #2. The existing traffic patterns will be utilized to understand volumetric travel pattern shifts that would occur due to either closures or grade separations. The two future build scenarios have not yet been identified and therefore are not described in detail in this task. The study will include a safety analysis of existing crash history and provide recommendations focused on reducing the number of and severity of the crashes.

Task 3 Activities

1. Data Collection: Traffic counts will be collected at up to 15 intersection in the yellow pin locations shown (AM and PM Peak period counts) on the map on the following page. The AM and PM peak 2-hour periods are assumed to occur from 7:00 to 9:00 AM and from 4:00 to 6:00 PM.

2. Field Observations: Up to two (2) staff will be on-site during the traffic data collection periods to observe traffic operations, queuing, and driving behaviors within the project area.

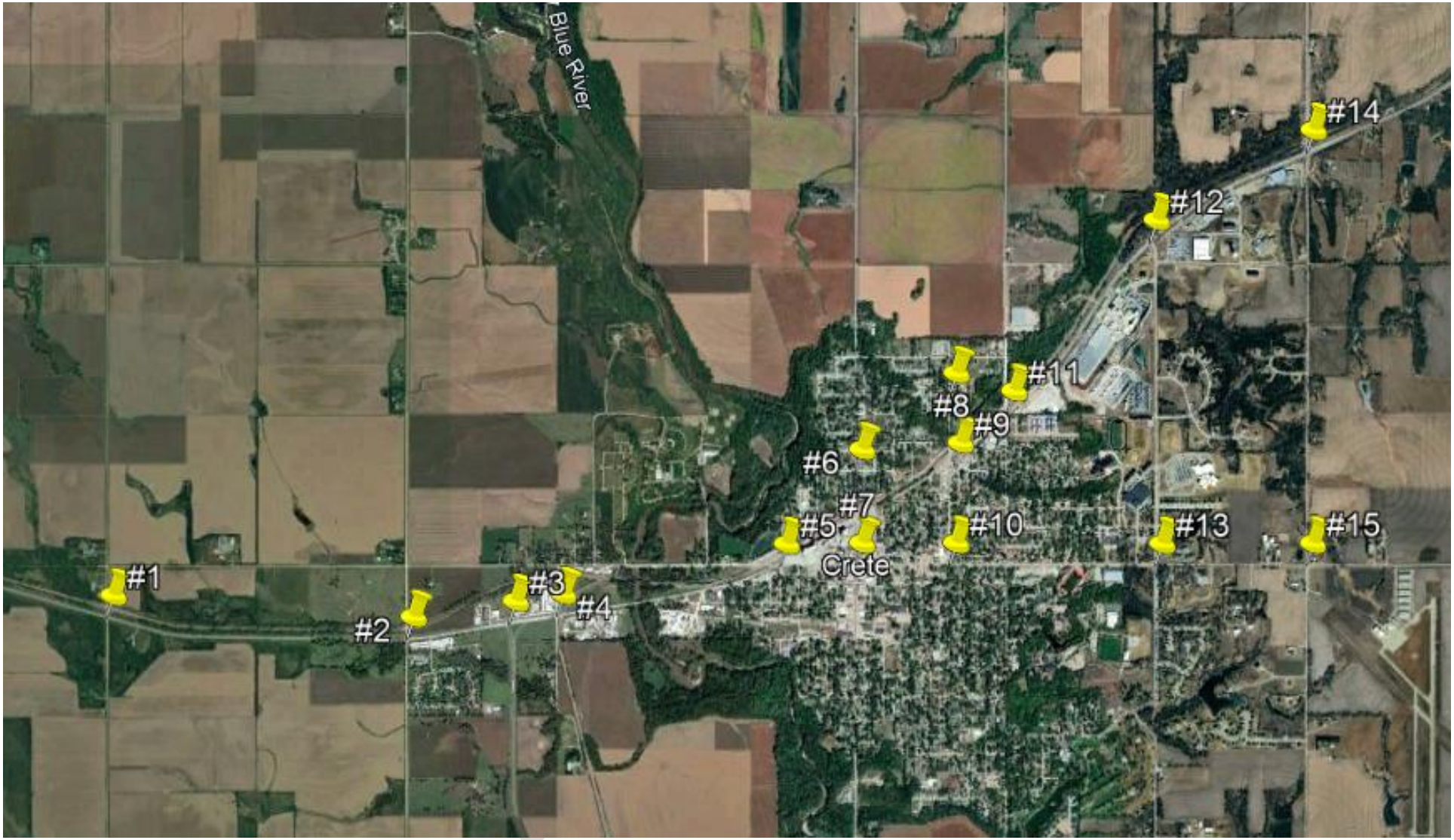
3. Safety Analysis: Consultant will obtain the most recent five years of crash data from the FRA and NDOT and perform a safety analysis for the study area. The existing crashes will be summarized in table and figure form. For the analysis we will utilize the Extended Highway Safety Manual (HSM) Spreadsheet Tool to summarize the predicted performance of future safety in terms of crashes by severity (fatal, injury A, injury B, injury C, and property damage only) and expected average crash frequency. The build conditions will be compared to the no-build condition.

4. Traffic Volume Development: The existing traffic counts will be adjusted to the peak month. An annual growth rate will be calculated and utilized to predict future year vehicular demands at the study area intersections and rail crossing locations.

5. Operations Analysis: The Synchro operations analysis software will be used to analyze traffic operations for the AM and PM peak hours for the following scenarios: existing, future no-build, future build #1, and future build #2. If study area intersections are predicted to fail to meet the applicable operational standards in the future year build conditions, mitigations will be summarized that would allow the intersections to meet standards.

6. Report: The analysis will be summarized and documented in a draft Traffic Safety and Operations Report. Client will review the draft report and provide one set of consolidated non-conflicting comments. The comments will be reviewed and incorporated into a final report.

Anticipated Intersection Traffic Count Locations



Task 4 – Alternatives Analysis

The Consultant, in collaboration with BNSF Railway, will assess the condition of current railroad operations and roadway infrastructure and other relevant conditions within the project area to prepare the Alternatives Analysis Summary document. This assessment will include information on the roadway crossing characteristics, train operations and safety, road network performance and traffic analysis, maintenance activities, and engineering/capacity constraints of the existing highway facilities and/or railway infrastructure. This task will identify any planned or programmed infrastructure improvements contained in state and local planning documents and check to determine whether rail operators have planned infrastructure enhancements within the project study area [to be defined]. The Alternatives Analysis Summary document will also include conceptual design alternatives for roadway alignments/cross-sections and preliminary cost estimates.

Task 4 Activities

- Conceptual design and alternatives analysis for grade separation at Main Avenue crossing
- Conceptual design and alternatives analysis for grade crossing upgrades/modifications and/or closures at:
    - Road 2000 (BNSF Milepost 82.24)
    - Blue River Road/Road 2100 (BNSF Milepost 81.23)
    - Arizona Avenue (BNSF Milepost 80.68)
    - W 13th Street (BNSF Milepost 80)
    - Hawthorne Avenue (BNSF Milepost 79.25)
    - Boswell Avenue (BNSF Milepost 79.03) and
    - SH 103 (BNSF 77.65)
- Conceptual design for railway infrastructure improvements necessary to achieve identified speeds (wayside signal, track, etc.)
- A concept level roll plot will be developed to be used as the basis of design for preliminary design services. This will identify basic alignment, roadway configurations, and ROW impacts. This will be the basis of initial discussions with project stakeholders prior to moving to a 30% preliminary design level.
- Draft Alternatives Analysis Summary document
- Final Alternatives Analysis Summary document

Task 5 – Environmental

For the environmental review, the Consultant shall prepare Technical Reports (TRs) to support both the NEPA and SEPA documentation complying with the National Environmental Policy Act

(NEPA), State Environmental Policy Act (SEPA) and other applicable environmental regulations. The environmental review will analyze the proposed improvements following completion of preliminary design. The Consultant will review potential effects on environmental elements required by NEPA and SEPA as appropriate including: construction period and long-term operational impacts; direct, indirect, and cumulative impacts; measures to avoid, minimize, or mitigate for impacts; and any potential additional measures that could be employed to otherwise minimize or mitigate remaining impacts.

Task 5 Activities

1. Discipline Memos
    - Transportation
    - Wetland Delineation
    - Biological Assessment
    - Section 106 Assessment for Cultural, Historic, and Archeological resources
    - Noise, Air Quality, and Vibration
    - Hazardous Materials
    - Section 4(f) Assessment
    - Critical Areas
    - Nebraska Environmental Protection Act Requirements
2. Draft & Final NEPA documentation
3. Draft & Final SEPA documentation

Task 6 – Utilities

Task 6 Activities

1. Initial Coordination with Utility Agencies
    - Identifying impacted utility agencies/Initial Utility Contacts
2. Utility Coordination and Meetings
    - Ongoing coordination meetings with utility agencies to identify conflicts with proposed design
    - Utility Coordination Meetings

        - 3 Total with three (3) consultant staff each

3. Utility Conflict Plans

    - Develop initial utility conflict plans for distribution to impacted utility agencies.

Task 7 – Geotechnical

The purpose of this work element is to provide geotechnical engineering design, and construction recommendations for the proposed grade separation or roadway modification projects. Much of the grade separation could consist of either embankment fill slopes/fill walls placed or cut slopes/cut walls (depending on the final design solutions), where highly organic soil may be present under the proposed construction areas. Explorations will be completed to determine the soil and groundwater conditions that underlie the proposed improvements. Methods for mitigating the impacts of the presence of these soils will be evaluated and will vary depending on tested soil conditions. Geotechnical engineering recommendations will be developed for walls, structures, bridges, tunnels, pavements, signal pole foundations, soil bearing pressures for utility structures, and infiltration for potential LID technologies for drainage.

Task 7 Activities

1. Kickoff Meeting
2. Collect and review available geotechnical data
3. Pavement Coring
    - Preparation of Exploration Plans
    - Utility locates for pavement cores
    - Conduct pavement coring explorations
    - Generate logs and photographs
4. Geotechnical Borings
    - Preparation of Exploration Plans
    - Utility locates for soil borings
    - Conduct geotechnical boring explorations
    - Generate boring logs and soils laboratory testing
5. Geotechnical Design

- Evaluate field and laboratory data
- Develop geologic profiles
- Generate AASHTO seismic design parameters
- Structures/retaining wall design and recommendations
- Storm water facility analysis
- Signal pole/luminaire design and recommendations
- Groundwater monitoring
- Draft Geotechnical Engineering Report
- Final Geotechnical Engineering Report

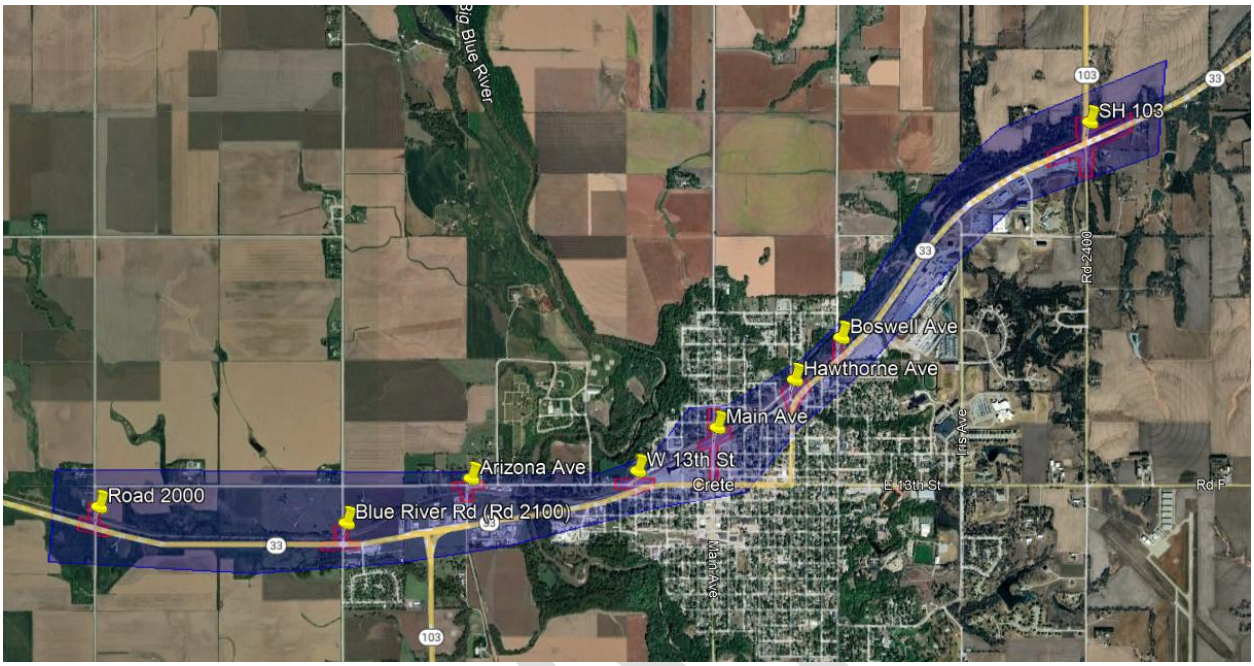
Task 8 – Surveying

Development of topographic and cadastral survey base mapping for the project area. Survey activities will be a combination of topographic, cadastral, and aerial mapping. Refer to the exhibit below for the boundaries.

Task 8 Activities

1. Field Reviews
2. Data collection – existing roadway, ROW, and utility information
3. Horizontal and Vertical Control Networks
4. Establishing Road Centerline Alignments and Rights-of-Way base mapping
5. Aerial Topographic survey with boundaries shown in blue below.
6. Supplemental Topographic and Cadastral Survey with boundaries shown in red below.
7. Alignment, ROW, and Survey Control Plans

Red: Ground Topographic and Cadastral
Blue: Aerial Survey



Task 9 – Preliminary Engineering & Plans Preparation

The Consultant will complete preliminary engineering for FRA review and approval, consistent with the FRA-approved National Environmental Policy Act (NEPA) document. Preliminary engineering will include all design development and documentation to demonstrate the effectiveness, feasibility, and readiness of the Project. The Consultant will prepare the preliminary engineering plans (30%) and specifications for the construction of each discrete capital projects.

Task 9 Activities

1. Data Collection
    - Roadway, utility, and rail as-built collection and review
    - Existing Site Conditions
    - 3 site/field visits with two (2) consultant staff per visit
2. Type, Size, and Location (TS&L) Analysis for grade separation of Main Avenue
    - This preliminary design report will detail different bridge/structures needs for the grade separated crossing.

3. 30% Plans Preparation

   - A 30% preliminary level set of plans will be developed to be used as the basis of design for final design services but also for use in obtaining future grant funding for the entire project or partial elements of the project.

   - The 30% preliminary design objectives will be to include the:

     - 30% preliminary engineering design for a railroad/vehicle grade separation at Main Avenue & BNSF Railway.

     - 30% preliminary engineering design for grade crossing upgrades/modifications and/or closures at:

       - Road 2000 (BNSF Milepost 82.24)
       - Blue River Road/Road 2100 (BNSF Milepost 81.23)
       - Arizona Avenue (BNSF Milepost 80.68)
       - W 13th Street (BNSF Milepost 80)
       - Hawthorne Avenue (BNSF Milepost 79.25)
       - Boswell Avenue (BNSF Milepost 79.03) and
       - SH 103 (BNSF 77.65)

   - 30% preliminary plans to be developed include the following disciplines:

     - Cover Sheet & Note Plans

     - Alignment, Right-of-Way, and Survey Control Plans (covered in survey scope)

     - Typical Sections

     - Site Preparation/Removal Plan

     - Roadway/Paving Plans

     - Drainage Plan

     - Structural/Wall Plan

     - Channelization and Signing Plans

   - Once the 30% plans preparation is completed, a right-of-way (ROW) needs evaluation will be completed for the grade separation location. This will be developed on plan sheets to show where anticipated ROW acquisitions,

temporary construction easements, and potential (if needed) permanent easements.

4. Estimating

    - Preparation an itemized quantity takeoff of bid items and a bottom-up engineer's estimate for the project at the preliminary level submittal. Where practical, the bid items shall be NDOT standard bid items described in NDOT standard specifications and listed in NDOT standard bid item list. The Consultant shall modify unit costs on the basis of their experience and judgment to reflect specific construction requirements of this contract and the general bidding environment.

5. QC Review of 30% Design Deliverables

    - Consultant will conduct an internal QC process on the 30% design deliverables. This process will follow the Consultant QC standard process and stored electronically as verification the process has been completed.

6. NDOT Coordination

    - NDOT Coordination Meetings

        - Consultant will attend up to 10 meetings with NDOT to collaborate on required design elements, discuss alternatives, structure types, and overall design discussions.

        - Consultant will set up initial kickoff meeting with NDOT to identify necessary documentation.

    - NDOT Documentation Support

        - Develop an outline of required documentation needed for project work on NDOT facilities.

        - Support developing required NDOT documentation up to the hours within the scope. It is anticipated that this level of effort will not cover all required documentation, but to get the project documentation completed to a level to support ongoing design deliverables, potential grant funding, NDOT/agency decision points, and overall progress of preliminary engineering.