Space Coast Transportation Planning Organization
Vision Zero Speed Management & Lighting Study
Work Order 25-20K
Scope of Services
07/31/25

A. INTRODUCTION

The Space Coast Transportation Planning Organization (SCTPO) will conduct a Speed Management and Lighting Study for roadways identified on the SCTPO's Vision Zero High Injury Network (HIN) in Brevard County, FL. The Study will focus on speed management and lighting recommendations to improve multimodal safety along these high crash roadways, and potentially positioning local agencies to obtain Safe Streets and Roads for All (SS4A) implementation grant funding.

Under this Work Order, Kittelson & Associates, Inc. (KAI) (referenced as the Consultant) will work with the SCTPO to perform the Speed Management and Lighting Study.

B. SCOPE TASKS

The Consultant will assist the SCTPO with the following tasks as part of the Speed Management Study:

- Task 1 Data Collection
- Task 2 Speed Data Analysis
- Task 3 Determine Suggested Speed Limit Revisions
- Task 4 Speed Management Toolbox
- Task 5 Speed Management and Safety Field Reviews
- Task 6 Speed Management Study Summary Report

The Consultant will assist the SCTPO with the following tasks as part of the Lighting Study:

- Task 1 Initial Lighting & Crash Data Analysis
- Task 2 Lighting Justification Analysis
- Task 3 Lighting Study Summary Report

Other general tasks include:

- Task 1 Internal Project Meetings
- Task 2 External Project Meetings/Presentations
- Task 3 Project Administration

C. SPEED MANAGEMENT STUDY

TASK 1 DATA COLLECTION

1.1 High Injury Network (HIN) and Traffic Data Collection

The Consultant will obtain the most current HIN roadways from the SCTPO's most current State of the System (SOS) Report. This roadway network will be utilized as the starting point to help identify and prioritize speed management locations and identify potential improvements. The Consultant will also obtain and summarize traffic data for the HIN roadways from the SCTPO's most current SOS Report. Additional traffic data collection may be identified during the Study and coordinated with the SCTPO for collection.

1.2 Vehicle Speed Data Collection

Vehicle speed data will be purchased from the TomTom Application Programming Interface (API) for connected vehicles (CV) traveling on Brevard County roadways for the most recent six month period. TomTom sample rates vary, but claims to cover one in every five vehicles on the road globally. Over a six-month data period, the collected speed data should yield enough samples for a reasonable speed analysis. The Consultant will post-process the vehicle speed data.

1.3 General Data Collection

The Consultant will collect the following data from various SCTPO work products (SOS, Bicycle & Pedestrian Master Plan, etc.) to support **Task 2**:

- Infrastructure:
  - Traffic signals locations;
  - Existing sidewalks, shared-use paths, and bicycle facilities;
  - Number of lanes;
  - Posted speed(s); and
  - Context and functional classifications.
- Bicycle and pedestrian activity generators (parks, schools, businesses, etc.).
- Planned, programmed, and recently completed roadway projects.
- Existing and future land use, including plans for new developments in the Study area.
- Transportation disadvantaged areas as identified in the Vision Zero Action Plan.

1.4 GIS Basemap

It is anticipated that the Consultant will utilize the same basemap as what is utilized in the SOS Report to display the existing conditions information and show results from the various analyses performed as part of **Task 2**. The Consultant will adjust roadway labels accordingly based on the analysis results.

Deliverables

- *The efforts in **Task 1** will be documented in the final report discussed in **Task 6***
- *Geodatabase with collected data*

TASK 2 SPEED DATA ANALYSIS

2.1 Speed Data Analysis

Speed statistics and estimates of the 95^{th}, 85^{th}, and 50^{th} percentile speeds and the 10 mph pace for HIN non-limited access roadways will be extracted from the CV data. Speed data will be provided for weekends and weekdays by hour.

2.2 Speed Data Comparison

The initial step in this task will be to categorize HIN roadway segments by context classification from the most recent SOS Report. The posted speed limits for the HIN roadway segments will then be compared to the context classification target speed ranges given in the most current version of the Florida Design Manual (FDM). The speed data obtained in **Task 2.1** will also be compared to the context classification target speed ranges. For roadways with C1 Natural and C2 Rural context classifications, only the 85^{th} percentile speeds will be compared to the posted speed limit and target speed ranges.

For the HIN roadway network, a comparative analysis of observed speeds to posted speeds will be conducted to determine the following:

- Roadways where the posted speed limit exceeds the context classification's allowable target speed range from the FDM.
- Identify roadways where the 95^{th} percentile speed recorded exceeds the posted speed by more than 20 mph for up to and including 50 mph posted speed, and more than 25 mph for 55 mph and greater posted speed.
- Roadways where 85^{th} and/or 50^{th} percentile speeds exceed both the posted speed and the context classification's allowable target speed range.
- Roadways where 85^{th} and/or 50^{th} percentile speeds exceed the posted speed but not the context classification's allowable target speed range.
- Roadways where 85^{th} and/or 50^{th} percentile speeds exceed the context classification's allowable target speed range but not the posted speed.
- Roadways where 85^{th} and/or 50^{th} percentile speeds did not exceed either the posted speed or the context classification's allowable target speed range.

Considerations will be given to roadways where recorded speed exceeds the posted speed by 50+ mph or recorded speed is 100+ mph to align with the Dangerous Excessive Speeding Law (HB 351/SB 1782).

2.3 Identify Critical Speed Management Network

Based on the results of **Task 2.2**, a State Road and Local Road Critical Speed Management Network will be determined. These corridors will be utilized to identify suggested target/posted speed limits as discussed in **Task 3**.

Deliverables

- *The efforts in **Task 2** will be documented in the final report discussed in **Task 6***
- *Mapping via ArcGIS Online and PDF of the State Road and Local Road Critical Speed Management Network*
- *ArcGIS data and files for the State Road and Local Road Critical Speed Management Network*

TASK 3 DETERMINE SUGGESTED SPEED LIMIT REVISIONS

Based on the results from **Task 2**, suggested speed limits will be computed for up to 40 corridors on the Critical Speed Management Network determined in **Task 2.3**. It is anticipated these 40 corridors will be spread across each of the HIN modes (10 vehicle, 10 bicycle, 10 pedestrian, and 10 motorcycle), as applicable. The NCHRP 17-76 Speed Limit Setting Tool will be utilized for this task.

Deliverables

- *The efforts in **Task 3** will be documented in the final report discussed in **Task 6***
- *Mapping via ArcGIS Online and PDF of Suggested Speed Limit Revisions*
- *ArcGIS data and files for the Suggested Speed Limit Revisions*

TASK 4 SPEED MANAGEMENT TOOLBOX

Speed related safety countermeasures and complete streets principles have been utilized at the national and state levels for decades. This task will identify best practices and real-world case studies for various speed management strategies, focusing on safety benefits supported by before-and-after data. The findings will be used to prepare a "toolbox" of speed management strategies that could be implemented on the Critical Speed Management Network to achieve the potential target speeds identified in **Task 3**.

Deliverables

- *The efforts in **Task 4** will be documented in the final report discussed in **Task 6***
- *Speed Management Toolbox*

TASK 5 SPEED MANAGEMENT AND SAFETY FIELD REVIEWS

Based on the results of **Task 1** through **Task 4**, applicable roadway owners and operators (e.g., FDOT or municipalities) will be met with as discussed in **Task 2.1 Coordination Meetings**. These meetings will be held to determine which Critical Speed Management Network roadways will be selected for further detailed safety review and potential implementation recommendations. It is anticipated that up to 10 roadways will be selected for the analysis discussed in this Task.

5.1 Existing Conditions and Map Creation

Existing conditions will be reviewed for each of the 10 roadways and figures showing the following features will be created to support the field review:

- Traffic signals locations;
- Existing sidewalks, shared-use paths, and bicycle facilities;
- Posted speed(s);
- Context and functional classification;
- Transit routes and stops;
- Bicycle and pedestrian activity generators (parks, schools, businesses, etc.);
- Existing and future land use; and
- Overlaps with transportation disadvantaged areas.

5.2 Crash Mapping

Crash maps will be created for each of the 10 roadways showing the crash location, crash type, severity, and highlighting any speeding/aggressive driving related crashes. It is anticipated that crash reports will be reviewed and summarized for any fatal and serious injury crashes that occurred.

5.3 Field Reviews

A field review will be conducted for each of the 10 roadways to verify existing conditions, observe speed behavior, and identify potential speed management and safety related improvements. It is anticipated that up to three (3) Consultant staff will attend these reviews and they will take place over two (2) days (five corridors the 1st day and five corridors the 2nd day).

5.4 Identify Safety and Speed Management Improvements

Safety and speed management improvements will be identified for each of the 10 roadways to support the recommended speed limit revisions and the safe system approach using the Speed Management Toolbox created as part of **Task 4**.

5.5 Development of Preliminary Planning Level Cost Estimates

Planning level cost estimates will be created for the improvements determined in **Task 5.4**.

Deliverables

- *The efforts in **Task 5** will be documented in the final report discussed in **Task 6***
- *Mapping, safety improvements, and planning level cost estimates for each of the 10 roadways selected for further analysis*

TASK 6 SPEED MANAGEMENT STUDY SUMMARY REPORT

6.1 Draft Final Report

The Consultant will summarize **Task 1** through **Task 5** in a draft Final Report. It is anticipated the SCTPO will provide one (1) round of review comments on the draft Final Report.

6.2 Revised Final Report

Based on the edits/comments received from the SCTPO, the Consultant will revise the Final Report and produce a final version for the SCTPO's records.

6.3 One-Page Infographic Summary

Based on the final version of the Final Report, the Consultant will create a One-Page Infographic Summary that includes the key findings of the Speed Management Study.

Deliverables

- *Draft and Final Report*
- *One-Page Infographic Summary*
- *Four (4) hard copies of the Final Report will be prepared for the SCTPO once the document is finalized. An electronic version in PDF format will also be submitted to the SCTPO.*

D. LIGHTING STUDY

TASK 1 INITIAL LIGHTING & CRASH DATA ANALYSIS

1.1 Historical Safety Review & Critical Lighting Network Identification

Utilizing the same HIN obtained for the Speed Management Study, corridors and intersections will be identified for a State Road and Local Road Critical Lighting Network if they have 30 percent or more of their crashes occurring during night/dusk/dawn lighting conditions.

1.2 Crash Mapping

Crash maps will be created for the State Road and Local Road Critical Lighting Network showing the crash location, crash type, and severity for nighttime related crashes. It is anticipated that crash reports will be reviewed and summarized for any fatal and serious injury crashes that occurred.

1.3 Desktop Lighting Review

For the Critical Lighting Network identified in **Task 1.1**, a desktop review via Google Earth will be conducted to determine the following:

- Roadways and intersections with lighting present;
- Roadways and intersections with no lighting is present; and
- Roadways and intersections with partial lighting (i.e., sporadic/inconsistent for roadways, not in all corners at intersections).

The desktop data collected will be overlaid on the crash mapping to determine if the nighttime crashes occurred in areas where lighting/partial lighting is present.

Deliverables

- *The efforts in **Task 1** will be documented in the final report discussed in **Task 3***
- *Mapping via ArcGIS Online and PDF of the State Road and Local Road Critical Lighting Network*
- *ArcGIS data and files for the State Road and Local Road Critical Lighting Network*

TASK 2 LIGHTING JUSTIFICATION ANALYSIS

Based on the results from **Task 1**, the Consultant will follow the guidelines outlined in the Florida Design Manual 231 – Lighting and conduct a lighting justification analysis for up to 20 segments/intersections with no existing lighting or partial lighting. FDOT follows the warrants for lighting of corridors and interchanges established by AASHTO. The warrants are based on benefit-cost ratios determined from the Average Daily Traffic (ADT), the ratio of night to day crashes, initial cost, and maintenance. A lighting justification will be conducted in accordance with Manual on Uniform Traffic Studies (MUTS), Chapter 14. If the lighting warrant is met, then a net present value analysis can be performed.

2.1 Lighting Justification Analysis

The initial lighting justification analysis is based upon geometric factors using the Lighting Geometric and Operational Form No. 750-020-20. The factors required to complete the form are the following:

- Geometric Factors:
    - Number of lanes
    - Lane width
    - Number of median openings per mile
    - Driveways and entrance per mile
    - Horizontal curve radius
    - Vertical curve
    - Sight distance
    - Parking
- Operations Factors
    - Signalized intersections
    - Left turn lanes
    - Median width
    - Operating or posted speed
    - Pedestrian and bicycle activity
- Environmental Factors
    - Percentage of development

- Area classification
- Distance from development to roadway
- Ambient lighting
- Raised median curb

- Collision Factors
  - Night-to-Day collision ratio

If the night-to-day crash ratio is 2:1 or greater, lighting is automatically warranted regardless of the overall point score. Crashes reported as dawn or dusk should be considered as night crashes.

2.2 Nighttime Field Reviews

A nighttime field review will be conducted for the locations where lighting is justified based on the analysis performed in **Task 2.1**. It is anticipated that up to two (2) Consultant staff will attend these reviews and they will take place over three (3) nights.

2.3 Development of Planning Level Cost Estimates

Planning level cost estimates will be created for justified lighting improvements along the corridors and at intersections. Planning level cost estimates will also include maintenance and operational cost estimates following discussions with local agencies.

2.4 Net Present Value Analysis

The purpose of the net present value analysis is to determine if the roadway lighting is justified. If the crash cost reduction resulting from providing lighting is equal to or greater than cost of construction, maintenance, and operation of the lighting, then the lighting is justified.

The predictive methodologies contained in the HSM 1st Edition – Part C and NCHRP 17-58, Safety Prediction Models for Six, Seven, and Eight-Lane and One-Way Urban and Suburban Arterials are utilized to complete the following steps:

- Step 1: Identify or compute crash frequencies for NO LIGHTING CONDITIONS
- Step 2: Quantify monetary cost of crashes for NO LIGHTING CONDITIONS
- Step 3: Identify or compute crash frequencies for LIGHTED CONDITIONS
- Step 4: Quantify monetary cost of crashes for LIGHTED CONDITIONS
- Step 5: Compute difference: BENEFIT = Monetary cost of crashes for NO LIGHTING CONDITIONS – Monetary cost of crashes for LIGHTED CONDITIONS
- Step 6: Compute Net Present Value for each location
- Step 7: Rank lighting improvement projects by Net Present Value

Deliverables

- *The efforts in **Task 2** will be documented in the final report discussed in **Task 3***
- *Draft mapping via ArcGIS Online and *.PDF maps of Ranked Lighting Improvement Projects*
- *Final ArcGIS data and files for the Ranked Lighting Improvement Projects*

TASK 3 LIGHTING STUDY SUMMARY REPORT

3.1 Draft Final Report

The Consultant will summarize **Task 1** and **Task 2** in a draft Final Report. It is anticipated the SCTPO will provide one (1) round of review comments on the draft Final Report.

3.2 Revised Final Report

Based on the edits/comments received from the SCTPO, the Consultant will revise the Final Report and produce a final version for the SCTPO's records.

3.3 One-Page Infographic Summary

Based on the final version of the Final Report, the Consultant will create a One-Page Infographic Summary that includes the key findings of the Lighting Study.

Deliverables

- *Draft and Final Report*
- *One-Page Infographic Summary*
- *Five (5) hard copies of the Final Report will be prepared for the SCTPO once the document is finalized. An electronic version in PDF format will also be submitted to the SCTPO.*

E. GENERAL PROJECT TASKS

TASK 1 INTERNAL PROJECT MEETINGS

1.1 Kick-Off Meeting

Up to two (2) Consultant staff will attend a two-hour in-person Kick-Off Meeting with the SCTPO to discuss the goals and anticipated outcomes of the Study. The Consultant will present a draft schedule to the SCTPO during this meeting.

1.2 Bi-Monthly Project Status Meetings

Up to two (2) Consultant staff will attend up to six (6) bi-monthly project status meetings with the SCTPO to discuss Study progress and receive input on tasks completed. The purpose of these meetings is to maintain clear communication between the SCTPO and the Consultant. It is anticipated that each of these meetings will be held in person and be one (1) hour in length. The Consultant will prepare a meeting agenda and prepare/distribute a meeting summary following each of these meetings.

TASK 2 EXTERNAL PROJECT MEETINGS/PRESENTATIONS

2.1 Coordination Meetings

Up to two (2) Consultant staff will attend up to ten (10) coordination meetings with the SCTPO and partner agencies to discuss Study progress and recommended safety improvements as outlined below:

- Up to five (5) in person initial meetings; and
- Up to five (5) virtual follow-up meetings.

It is anticipated that each of these meetings will be one (1) hour in length. The Consultant will prepare a meeting agenda and prepare/distribute a meeting summary following each of these meetings.

2.2 Presentations

The Consultant will coordinate with the SCTPO to develop a presentation summarizing the Study. It is anticipated that up to one (1) KAI staff will make up to two (2) in-person presentations at the end of the Study:

- SCTPO Technical Advisory Committee (TAC) and Citizens Advisory Committee (CAC); and
- SCTPO Governing Board.

Additional meetings may be conducted by the SCTPO:

- SCTPO Vision Zero Leadership; and
- SCTPO Bicycle/Pedestrian/Trails Advisory Committee (BPTAC).

TASK 3 PROJECT ADMINISTRATION

Project Manager: Patty Rendon (patricia.rendon@sctpo.com) will serve as the SCTPO project manager, and Fanny Kristiansson (fkristiansson@kittelson.com) will serve as the Consultant project manager for this Work Order.

Quality Control: The Consultant will designate appropriate senior staff to conduct Quality Control (QC) reviews of work products.

Project Schedule: The Consultant will prepare and submit a detailed project schedule identifying major tasks, their durations, and task relationships. The Consultant will keep the schedule up to date monthly. The beginning date of the services will be the date of authorization for this Work Order. Any changes to the schedule necessitated by circumstances outside the Consultant's control will be coordinated with the SCTPO. It is anticipated the project will be complete 12 months after authorization.

Invoices: Invoices will be prepared in the format prescribed by the SCTPO. A detailed invoice including a narrative description of the work performed by the Consultant during the period covered by the invoice for each item in the scope will be submitted. The final invoice will be labeled "Final" and project close-out procedures will be followed.

Deliverable Coordination: The Consultant will prepare, package, and coordinate deliverables with the SCTPO.

Budget: This work will be completed as a lump sum task order. A detailed summary budget table for the Consultant is attached.