

Attachment A - *DRAFT*

Nitsch Engineering Scope of Services
(Date: 10/31/2023)

MassDOT, Highway Division - District 4

Contract No. 117977

Project File No. N/A

Nitsch Project No. 15135.P

Middleton – Maple Street (Route 62) Local Bottleneck Reduction Program Design Services

The following scope of services has been completed in accordance with the standardized scope of services guidelines established by MassDOT. This scope of services is to be completed by Nitsch Engineering under Nitsch's Local Bottleneck Reduction Program Design Service Contract with MassDOT and is consistent with the scoping field visit with the Town of Middleton and discussion at the scoping field meeting held on September 12, 2023. Nitsch Engineering performed the site walk with the Town of Middleton representatives and understands the primary issues relative to the physical and operational characteristics of the roadway and the intersections. The limits of the project include the following intersections and roadway segments:

- Maple Street (Route 62) from S Main Street (Route 114) to Washington Street
- Washington Street from Maple Street (Route 62) to Central Street
- Central Street from Park Street to the Rail Trail (Howe-Manning Elementary School)
- Intersection of Washington Street and Maple Street (Route 62)
- Intersection of Washington Street and Central Street

The following is the detailed scope for each applicable section:

SECTION 100 PROJECT DEVELOPMENT ENGINEERING

102 Preliminary Project Area Analysis

Nitsch Engineering will visit the project site and review existing site conditions and inventory traffic related items that will be considered during the design. Nitsch Engineering will prepare an overview that evaluates the project area in light of the project's purpose and need, including landscape impacts, to determine any additional studies that are beyond the Scope of Services that may be required. We will review any applicable planning criteria, degree of citizen and agency involvement, and other issues and factors that may influence the design of the project.

Nitsch Engineering will conduct an additional site visit to observe the AM/PM student pick-up/drop-off along Central and Washington Street for the Howe-Manning Elementary School.

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103 Reasonable Alternative(s) Identification

Nitsch Engineering will evaluate the feasibility of implementing traffic calming measures along Washington Street. It is assumed that traffic calming elements will be incorporated into the existing roadway and that resurfacing of the roadway is not required.

Nitsch will also evaluate the feasibility of extending the dedicated turn lanes of the westbound approach on Maple Street (Route 62) to S Main Street (Route 114) at the Maple Street (Route 62) intersection. It is assumed that geometric modifications for the queue lanes will be within the Town ROW and not require resurfacing of the entire roadway. Nitsch will present our findings and recommendations to the Town of Middleton. Geometric improvements will be incorporated into the westbound intersection approach design as required to help facilitate traffic movements and mitigate congestion, and along Washington Street to deter cut through traffic.

SECTION 200 FUNCTIONAL DESIGN REPORT

204 Prepare Traffic Volumes

Nitsch Engineering will coordinate the procurement of the appropriate traffic counts for the study area and provide an assessment of data to determine factors for background growth and seasonal adjustments and prepare the future design volumes. Nitsch Engineering will retain Precision Data Industries, LLC (PDI) as a direct expense to perform traffic counts.

PDI will conduct:

- 48-hour Automatic Traffic Recorder (ATR) count on Maple Street (Route 62), between S Main Street (Route 114) and Washington Street;
- 48-hour Automatic Traffic Recorder (ATR) count on Washington Street between Maple Street (Route 62) and Central Street;
- 48-hour Automatic Traffic Recorder (ATR) count on Central Street between Washington Street and Park Street;
- 11 hours of Turning Movement Traffic Counts (TMC) from 7:00 AM to 6:00 PM at the intersection of S Main Street (Route 114), Maple Street (Route 62), Lake Street, and Central Street.

207 Operational Analysis for Existing Conditions

For the westbound approach to the Maple Street (Route 62) / S Main Street (Route 114) intersection, Nitsch Engineering will determine the Peak-Hour Factor, and Truck Percentage. Nitsch Engineering will determine, tabulate, and discuss Level of Service (LOS), volume-to-capacity ratio, and vehicle delays in accordance with MassDOT's A Guide on Traffic Analysis Tools and average and 95th percentile Queue calculations. We will analyze existing traffic volumes (No Build).

Nitsch Engineering will tabulate graphically the queues of the AM/PM student pick-up/drop-off along Central and Washington Street for the Howe-Manning Elementary School.

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210 Operational Analysis for Future Conditions

Nitsch Engineering will analyze Future Traffic Volumes (in both No-Build and Build) for the westbound approach to the Maple Street (Route 62) at S Main Street (Route 114) intersection.

Design of modifications to the existing MassDOT signal, signal equipment modifications, timing adjustments, pedestrian timing, of the existing MassDOT owned signal at the intersection is not included within this proposal's scope of services.

211 Preferred Alternative

Nitsch Engineering will provide a discussion of traffic calming alternatives considered along Washington Street. We will meet with the Town of Middleton to present these traffic calming alternatives to determine the preferred alternatives for this project.

Nitsch Engineering will review and provide alternatives for the queuing related to the AM/PM student pick-up/drop-off along Central and Washington Street for the Howe-Manning Elementary School.

215 Construction Cost

Nitsch Engineering will develop concept level estimates for up to two (2) alternatives.

216 Conclusion and Recommendation

Nitsch Engineering will provide a conclusion and recommendation.

217 Report Preparation

Nitsch Engineering will prepare a technical memorandum for Maple Street (Route 62) and Washington Street describing existing conditions, detailing the design alternatives related to intersection queues, traffic calming, and improvements with appropriate graphics, descriptive text, and cost estimates justifying the recommended alternative presented. The written evaluation of alternatives will include a description of the alternatives, a comparison of the advantages and disadvantages of each alternative and supporting data for the conclusions. Those alternatives that are eliminated from further study will include descriptions with statements as to why further consideration is not warranted.

Nitsch Engineering will prepare a separate technical memorandum regarding the queuing along Central Street related to the AM/PM student pick-up/drop-off along Central and Washington Street for the Howe-Manning Elementary School. We will provide recommendations to improve the location of the pick-up/drop-off for the Town to consider for implementation. As part of this, we will meet with the Town of Middleton to discuss the queuing and present the alternatives. Design of internal site circulation for the school or observation during implementation is not included as part of this proposal.

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SECTION 300 25% HIGHWAY DESIGN SUBMISSION (PRELIMINARY DESIGN)

Field Survey

The general limit of the topographic survey consists of 625 feet of Maple Street, 550 feet of Washington Street and 325 feet of Central Street, totaling approximately 1,500 feet. Limits of the topographic survey will extend 15-20 feet past the back of sidewalk or to the face of abutting retaining walls as shown on the Survey Limits Sketch. Nitsch Engineering will perform the following:

- Utilizing the primary horizontal and vertical control provided by MassDOT, Nitsch Engineering will set additional horizontal control along the project limits in areas that are unlikely to be disturbed and set benchmarks along the project length approximately every 500'.
- Perform research to collect right-of-way plans and their instruments for the surveyed roads. Perform research to collect deed information and plans showing the locations of abutting parcels. Easements shown on plans collected during research will be plotted within the project limits. Ownership information will be plotted and based on deed information, record plans, and town assessor records.
- Perform field reconnaissance and calculations to locate existing monumentation to determine the location of the roadway sidelines. Record utility providers will be contacted to obtain available information detailing the locations of utilities and visible utilities will be located, inverts measured, & underground utilities plotted based on research obtained from utility companies. Invert elevations, sizes, and directions will be obtained for drainage and sewer only, electric and communication manholes will not be opened.
- Perform an on-the-ground topographic survey for approximately 1,500 linear feet of existing roadway comprising of approximately 1.5 acres. The topographic information will be collected in a manner suitable to prepare 1-foot contours for site design purposes and will include the location of observable surface improvements within the survey limits such as edge of pavement, pavement markings, curbing, sidewalks, driveway entrances, walls (top and bottom), fences, trees, buildings, building entrances and exterior steps as applicable.
- Submit electronic files appurtenant to the survey as they are completed for MassDOT review and submission of electronic files following the MassDOT folder structure will be submitted once approved by MassDOT.

All work will conform to the latest version of the Survey Manual, CAD Standards Manual, and the Field Survey Guidelines and Baseplan Requirements for Survey and Design Consultants.

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Figure 1: Survey Limits Sketch

301 Project Initiation and Data Compilation (Survey Task)

Nitsch Engineering will compile and review available documents of existing features in the vicinity of the proposed work. Included, as part of this task, is the investigation of utility installations and right of way research.

302 Utility Coordination (Survey Task)

Nitsch Engineering will contact utility companies to verify locations of existing utilities and to assess impacts to those facilities.

303 Survey Coordination and Controls (Survey Task)

Nitsch Engineering will coordinate the ground survey effort, and review survey controls and closures, baseline ties, and overall quality of survey.

304 Base Plans, Profiles and Typical Sections (Survey Task)

Nitsch Engineering will prepare base plans based on ground survey and research. Nitsch will perform a field review of base plan information.

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306 Plot Existing Layout Lines (Survey Task)

Nitsch Engineering will plot and calculate existing layout line geometry and note property owners within the proposed survey limits.

307 Meetings and Liaison

Nitsch Engineering will attend up to four (4) coordination meetings, as scoped with MassDOT and the Town of Middleton. The purpose of these meetings is to coordinate the design progress, describe our approach and address comments and concerns. Nitsch Engineering will prepare and distribute minutes of the meetings.

308 Determine Roadway Cross Section

Nitsch Engineering will determine the proposed roadway cross sections based on functional classification, traffic volumes, local environmental and cultural resources, and the Guidebook along Maple Street (Route 62) and Washington Street.

309 Preliminary Horizontal Geometry

Nitsch Engineering will evaluate and develop horizontal geometry changes at the intersections and modify intersection geometry as required to improve traffic movements and implement traffic calming.

310 Preliminary Vertical Geometry

Nitsch Engineering will develop vertical geometry for the traffic calming elements along Washington Street based on the proposed design speed giving consideration to drainage, construction costs, and the interfacing with the proposed horizontal geometry.

316 Construction Details

Nitsch Engineering will provide details of key features not satisfactorily described in the *Construction Standard Details*. Key details will include the labeling of key materials in accordance with the Standard Nomenclature and Materials Specifications.

318 Preliminary Drainage and Utility Studies

Nitsch Engineering will investigate project impacts on existing surface and closed drainage systems only as it may relate to proposed curb modifications and traffic calming elements along Maple Street (Route 62) and Washington Street. Nitsch Engineering anticipates only minor drainage modifications due to curb line modifications on Maple Street (Route 62) and the consideration of raised intersections or speed humps along Washington Street.

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319 Lane Configurations

Nitsch Engineering will assess travel lane configurations for the roadways and the intersections within the project based on traffic flow requirements and capacity.

321 Signs and Pavement Markings

Nitsch Engineering will prepare preliminary sign and pavement marking plans to document changes associated with conceptual design.

322 Traffic Management

Nitsch Engineering will develop a general methodology for constructing the proposed project to minimize the impact to facility users and abutters, while at the same time addressing construction costs and constructability. Nitsch Engineering will prepare preliminary temporary traffic control plans. The preparation of these plans will include a preliminary estimate that considers the use of police and/or flaggers to be used for traffic control.

324 Constructability Review

Nitsch Engineering will review the proposed project so that the project does not present unusual matters that would unduly increase the cost the project or present potential scheduling delays during construction resulting in claims for extra work. Particular attention will be given to the proposed construction staging and available right of way.

325 Quality Control (QC) Review

Nitsch Engineering will perform a review of the quality and accuracy of the documents so that key aspects of the information to be presented to MassDOT are prepared in accordance with the *Guidebook*, the *Standard Specifications for Highways and Bridges* and the most recent Supplemental Specifications, Standard Nomenclature and Engineering Directives. Nitsch Engineering will review the design for conformity to design standards.

326 Preliminary Construction Estimate

Nitsch Engineering will prepare a preliminary cost estimate using MassDOT's Weighted Average Bid Application (WABA). The estimate will be prepared with a level of detail commensurate with a 25% submittal.

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326A Special Provisions

Nitsch Engineering will prepare draft special provisions based on the latest edition of the Standard Specifications for Highways and Bridges and Supplemental Specifications, and verify that items in the estimate that are listed in the Standard Nomenclature with an asterisk (*) has a special provision. Nitsch Engineering will review that special provisions are drafted only when absolutely necessary to describe a specific or unique activity to be performed by the contractor.

SECTION 800 PS&E SUBMISSION (FINAL DESIGN)

Once Nitsch Engineering receives approval of the plans submitted for the preliminary design submission, Nitsch Engineering will proceed with the preparation of the contract plans and bid documents under the final design stage.

801 Respond to Preliminary Design Submission Comments

Nitsch Engineering will prepare formal written responses to comments received regarding MassDOT's preliminary design submission review. Nitsch Engineering will also attend one (1) comment resolution meeting, if required.

802 Finalize Plans, Specifications and Estimate

Nitsch Engineering will review comments from the preliminary design review and update the plans, specifications, and estimate to address the comments. Final plans, specifications, and estimate will be submitted to MassDOT and the Town of Middleton for review.

Nitsch Engineering will attend up to two (2) coordination meetings with MassDOT and the Town of Middleton. The purpose of these meetings is to coordinate the design progress, describe our approach and address comments and concerns. Nitsch Engineering will prepare and distribute the minutes of the meetings.

805 Quality Control (QC) Review

Nitsch Engineering will complete a final Quality Control (QC) review of the PS&E prior to submitting the documents to MassDOT and the Town of Middleton.

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SECTION 900 CONSTRUCTION ENGINEERING

Nitsch Engineering will provide construction engineering services; such services will include pre-bid and pre-construction meetings, review of shop drawings, responses to requests for information, and site visits.

901 Pre-Bid Services

Nitsch Engineering will review and respond to inquiries from the Town of Middleton related to the bid documents. Nitsch Engineering will participate in one (1) Pre-Bid Conference and will provide written responses to contractors' questions.

902 Pre-Construction Conference

Nitsch Engineering will attend one (1) Pre-Construction Conference and will answer questions and prepare the minutes of the meeting.

903 Highway Shop Drawings and Signal Permit

Nitsch Engineering will review shop drawings submitted by the contractor. Nitsch Engineering anticipates up to five (5) shop drawings.

906 Furnishing Advice and Field Visits

Nitsch Engineering will assist the Town of Middleton in interpreting the contract documents. Nitsch will conduct field visits to the project site during construction as requested by the Town to provide consultation on design intent and assist in addressing unforeseen conditions. Nitsch will attend periodic status and coordination meetings as required. Nitsch Engineering anticipates up to six (6) field visits as part of this task.

Nitsch will review and prepare responses to up to four (4) contractor requests for information (RFIs). After construction is substantially completed, Nitsch Engineering will attend a punch list meeting on-site with the Town of Middleton. During the meeting, Nitsch Engineering will prepare a punch list of items that were not completed in accordance with the design documents.