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May 5, 2016

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Mr. Charles Brown, PE, PLS
North Carolina Department of
Transportation Location & Surveys Unit
1588 Mail Service Center
Raleigh, NC 27699-1588

Re: Certification Letter for JMT Project No.: 14-0929-009
NCDOT TIP No.: B-4537, Project No.: W03095
Job ID No.: D04BP1-con-jmt

The purpose of this letter is to review and certify the Professional Surveying Services performed by JMT on the above referenced project. A scoping meeting was held on site at Bridge #127 on SR 1002 over Jacket Swamp (Breeches Creek) in Halifax County on February 23, 2016 to discuss the requirements and scope of the proposed work for B-4537. The assignment was to perform a conventional topographic survey for the replacement of Bridge #127 and raising of the road grade by NCDOT along SR-1002. JMT received project files, plan sheets, a list of guidelines and contact information from Paul Woodard.

All reports and deliverables were submitted to Paul Woodard in the Wilson Location and Surveys office.

Sincerely,

Michael Zmuda, LS, PE
Senior Associate

I, Michael W. Zmuda, a Professional Surveyor in the State of North Carolina, hereby certify to the best of my knowledge and belief that the Professional Surveying Services performed for the North Carolina Department of Transportation under my supervision between the dates of March 22, 2016 and May 5, 2016 for TIP No.: B-4537, Project No.: W03095 are in accordance with the NCDOT Location and Surveys Surveying Agreement (LSC No. 7000015732) dated January 6, 2015 and with accepted Surveying and Engineering general practices and procedures.

Michael W. Zmuda, PLS #L-5205
Senior Associate



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NCDOT Final Survey Report for Bridge #127

May 5, 2016

Project No.: 33753.1.2

TIP No.: B-4537

County: Halifax

LS No.: 04-16-003

Job ID No.: n/a

Project Description: Bridge #127 in Halifax County – Bridge replacement on SR 1002 (Ringwood Rd.) over Breeches Creek.

Survey limits: Limits are defined as 300' from both ends of the bridge and 75' either side of the centerline of the roadway. The total length of surveys is 650' along the roadway. This is an English project and will be mapped at a 1"=50' Scale in Microstation using NCDOT Location & Surveys Workspace.

Date of Survey: Field work was performed in March & April 2016

Surveyed by: JMT

Control: Control for this project was established by JMT. GPS monuments were set utilizing Spectra Precision SP80 dual frequency GPS units with a minimum of 2 hour static observations. Observation times were dictated by existing site conditions and overall project size. The observations were sent through and post processed by OPUS. The OPUS reports are included as part of JMT's deliverable.

Baseline points were established by conventional traverse methods. Three sets of angles were turned for each point in a closed traverse that was constrained to the main GPS control monumentation. The closure report is included in the transmittal.

Elevations were established by an OPUS solution. A differential level loop was run through each GPS monument to verify and determine elevation differences between points. The elevations and coordinate values established by OPUS were further adjusted by applying a Least Square adjustment to all points and a scale factor was established to obtain ground coordinates. A "best fit" statistical summary and adjusted station report has included as part of JMT's deliverable to NCDOT

Control for this project is North Carolina 3200 State Plane Coordinates NAD83/NA2011 Horizontal Datum and NAVD88 Vertical Datum.

Geographic Position (Lat/Long): 36°12'24.30"N / 77°43'48.21

NOTES:

- Wetland locations were not included as part of this survey
- Existing right of way was based on deeds and plats of record; a title abstract was not furnished to JMT by NCDOT

UTILITIES:

NC811 was contacted (no ticket was called in) and they provided a listing of utility owners participating in the 811 system that were listed as having facilities within the project area. The listing included the following utility companies: CenturyLink and Halifax Electric. A site visit also indicated the possible presence of water facilities based on visible evidence of water structures east and west of the project area. Contact was made with CenturyLink, Halifax Electric, and Halifax County Utilities requesting copies of facility records for our use in mapping the utility lines in the project area. Halifax County has an 8-inch water main along the north side of Ringwood Road. CenturyLink has a fiber optic and a copper cable on the south side of Ringwood Road. Halifax Electric has an overhead system and an underground system along the south side of Ringwood Road. The Halifax Electric facility records are schematic in nature and the approximate alignment of this facility was unclear with respect to the project area. The electronic designation of this facility indicates it is outside the limits of survey, however its location has been shown on the survey for clarity. An electronic sweep of the area was performed and an electronic signal was obtained on an unknown conductor along the north side of Ringwood Road. The disposition of this conductor is not known. The lines shown in the survey/utility file were electronically designated in the field and locations surveyed by JMT unless otherwise identified as Quality Level C (where electronic signals could not/were not obtained).

DTM (Digital Terrain Modeling): DTM collection was conducted within the project limits. A TIN file was made using Side Option: Dissolve; Stoking Options: Curve Stroke tolerance was 0.10' and Minimum Linear Distance was 25'; Side Length was 100'.

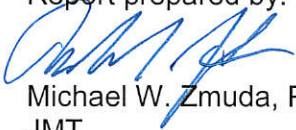
Consultant delivered the following:

- Baseline text file
- Pole Data Report
- Final Survey Report
- FS Design file
- DTM design file
- Project TIN file
- Project GPK file
- Deed Book/Plat Book (Digital PDF format)
- GPS Observation Log Sheets
- Raw Traverse Closure Report
- Certification Letter

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Report prepared by:



Michael W. Zmuda, PLS
JMT
Survey Manager