



JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
An Employee Owned Company

May 5, 2016

Over **40** Years
of Engineering Excellence

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-5660, 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 Bridges #65 and #66 on SR 1100 over Deep Creek in Halifax County on February 23, 2016 to discuss the requirements and scope of the proposed work for B-5660. The assignment was to perform a conventional topographic survey for the replacement of Bridges #65 and #66 and also raising of the road grade by NCDOT along SR-1100. JMT received project files, plan sheets, a list of guidelines and contact information from Paul Woodard.

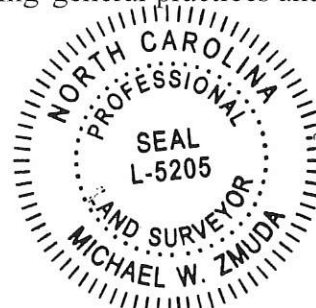
All reports and deliverables were submitted to Paul Woodard in the Wilson Location and Surveys office.

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 April 11, 2016 and May 5, 2016 for TIP No.: B-5660, 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



9201 Arboretum Parkway Suite 310 Richmond, VA 23236 Telephone (804) 323-9900 Fax (804) 323-0596 www.jmt.com

ENGINEERING PLANNING ENVIRONMENTAL
CONSTRUCTION MANAGEMENT WATER/WASTEWATER SURVEYING LANDSCAPE ARCHITECTURE
ARCHITECTURE GEOTECHNICAL FACILITIES ENGINEERING INFORMATION TECHNOLOGY



Creating A Brighter Future®

NCDOT Final Survey Report for Bridge #65

May 5, 2016

Project No.: 45615.1.1
TIP No.: B-5660
County: Halifax
LS No.: 04-16-014
Job ID No.: n/a

Project Description: Bridges #65 and #66 in Halifax County – Bridge replacement on SR 1100 (Bells Bridge Road.) over Deep Creek.

Survey limits: Limits are defined as 300' from the eastern end of the eastern bridge and 300' west of the western end of the western bridge and 75' either side of the centerline of the roadway. The approximate total length of surveys is 1,275' along the roadway centerline. 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 locations were established 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 files 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° 04'26.40"N / 77°26'24.01"W

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
- Site contained numerous used tires that had been discarded along the toe of slope/edge of swamp

Utilities: No underground utilities found with project limits

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
- 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

Report prepared by:



Michael W. Zmuda, PLS
JMT
Survey Manager