



January 13, 2012

Mr. Tim Allen
Assistant Director of Engineering
Forsyth County Department of Engineering
110 East Main Street
Suite 120
Cumming, Georgia 30040

Re: **Professional and Design Services for Intersection Improvements
Task Order Number 3, INT #0208
AC Smith Road/Jot Em Down Road at Mayfield Road, PEI 60**

Dear Mr. Allen:

The numerous letters received by Forsyth County from Mr. Joe Mehaffey require definitions to be made before the questions or assertions set forth in these letters can be discussed. The design for this intersection improvement contractually is to be in accordance with all American Association of State Highway and Transportation Officials (AASHTO) design standards and follow Georgia Department of Transportation (GDOT) guidelines. The intersection in question at AC Smith Road/Jot Em Down Road at Mayfield Road, herein referred to the ACS Roundabout, does meet all AASHTO design standards and GDOT guidelines in place at the time of project design.

For further clarification, "Standards and Specifications" are accepted in the transportation industry as being minimums in most cases of transportation design. According to AASHTO "The intent of this policy is to provide guidance to the designer by referencing a recommended range of values for critical dimensions. It is not intended to be a detailed design manual that could supercede the need for the application of sound principles by the knowledgeable design professional. Sufficient flexibility is permitted to encourage independent designs tailored to particular situations." A Policy on Geometric Design of Highways and Streets, 2004, AASHTO, pg. xliii In fact, there is a process in place at GDOT, a Design Exception that can be approved by the GDOT Chief Engineer to deviate from even the AASHTO standards. The ACS Roundabout meets all AASHTO Standards as constructed. This information is provided for clarification of the transportation design process.

The document used to provide design guidance for this project is Federal Highway Administration (FHWA) Publication Number FHWA-RD-00-067 "Roundabouts: An Informational Guide". As the title says, this document is an information guide, not a book of policy. It gives helpful direction to the qualified design professional to design roundabout intersections. "Since there is no absolutely optimum design, this guide is not intended as an inflexible "rule book", but rather attempts to explain some principles of good design and indicate potential tradeoffs. In this respect, the "design space" consists of performance evaluation models and design principles such as those provided in this guide,

combined with the expert heuristic (“involving or serving as an aid to learning, discovery, or problem-solving by experimental and especially trial-and-error methods” Merriam-Webster Dictionary) knowledge of the designer. Adherence to these principles still does not ensure good design, which remains the responsibility of the designer” FHWA Publication Number FHWA-RD-00-067 “Roundabouts: An Informational Guide”, Foreword. Therefore, the guidelines in this document are gathered best practices and suggestions for the qualified design professional to utilize in the design process. The ACS Roundabout meets the guidelines contained in this document. Though it is clear that deviation from this document is possible if required by the project constraints and still meets the goals of the project without compromising the safety of the facility.

Approaching the safety reconstruction of the intersection at AC Smith/Jot Em Down Road at Hopewell Road, Forsyth County identified a variety of project goals. The intersection needs to provide for future growth through year 2019, to operate efficiently to avoid delays associated with multi-way stop control and to minimize the crash potential to provide the safest possible operation. Traffic operational analysis was performed and potential operations strategies were compared in terms of safety, efficiency and cost in light of Chapters 3, 4, & 5; FHWA Publication Number FHWA-RD-00-067 “Roundabouts: An Informational Guide”. This resulted in selection of a roundabout design for implementation at this intersection. The roundabout is a more efficient facility for moving increasing volumes of vehicles safely and makes the area more bicycle and pedestrian friendly. Due to relatively low traffic volumes at the intersection, even in the 2019 time horizon studied as a part of this project, the Urban Compact Roundabout provided safety and efficiency benefits while minimizing impacts to adjacent property. The area surrounding this intersection is currently rural in character, but with its proximity to SR 400 and multiple new subdivisions being/recently constructed in the area, the County saw an opportunity to give the area a more inviting situation to all modes of transportation. These benefits coupled with the goals to provide a facility that safely conveys the design vehicle, minimizes property impacts, construction costs, and improves safety in the area led to the selection of the urban compact roundabout now constructed at the site.

The roundabout at AC Smith/Jot Em Down Road at Hopewell Road was designed according to Federal Highway Administration (FHWA) Publication Number FHWA-RD-00-067 “Roundabouts: An Informational Guide”. This roundabout meets the safety standard of care of the roadway design industry. FHWA guidelines for roundabouts purposely limit the diameter of the roundabout so that the travel speeds within the roundabout are 15 to 20 mph. This lower speed reduces the number and severity of crashes when compared to larger diameter Traffic Circles or Rotaries. One challenge in rural roundabout installations is that drivers might attempt to take the roundabout at higher speeds than it was designed for until they become familiar with its operation. The new facility is designed to slow the approaching motorist and convey them more efficiently than a four-way stop, but roundabout facilities, in general, are not high speed conveyance facilities. The turning radii in the intersection quadrants meet standards for an intersection given the geometric and right of way constraints present at the site. Each project is designed and constructed to provide a safe, efficient project in the constraints of that given site. The goal of a safe and efficient intersection treatment for all modes of

transportation with minimal right of way property impacts and construction costs has been achieved at this intersection.

The inscribed diameter of the roundabout intersection is 92 feet as constructed. This falls into the Urban Compact roundabout category shown in "Exhibit 6-4" FHWA Publication Number FHWA-RD-00-067 "Roundabouts: An Informational Guide", pg 133. The category name of "urban" does not mean that this roundabout must only be used in an urban setting. "At single-lane roundabouts, the size of the inscribed circle is largely dependent upon the turning requirements of the design vehicle". FHWA Publication Number FHWA-RD-00-067 "Roundabouts: An Informational Guide", pg 146 The design vehicle for the ACS Roundabout is a School Bus and WB-40 (45.5 foot long) truck. This choice is bolstered by the received resident letter received regarding this intersection "In fact, in years past, I have not seen but a very, very small number of Tractor Trailers come through and I suspect most of them were lost". In addition, given the site conditions and project goals described above, and the fact that all approach roads are "No Through Truck Routes" by Forsyth County Ordinance 89, this particular size roundabout was selected for the intersection.

The circulatory roadway width meets the FHWA design guidelines. Chapter 6, Sections 6.3.2-6.3.4; FHWA Publication Number FHWA-RD-00-067 "Roundabouts: An Informational Guide" describe the process to set the circulatory roadway width. The entry width is the first step in designing the circulatory width. "To maximize the roundabout's safety, entry widths should be kept to a minimum...Therefore, determining the entry width and circulatory roadway width involves a tradeoff between capacity and safety. The design should provide the minimum width necessary for capacity and accommodation of the design vehicle in order to maintain the highest level of safety. Typical entry widths for single-lane entrances range from 14 to 16 feet" FHWA Publication Number FHWA-RD-00-067 "Roundabouts: An Informational Guide", pg 147. The entry widths at the ACS Roundabout are 14 feet with 10-11 foot wide lane widths on the approach roadways. "The required width of the circulatory roadway is determined from the width of the entries and the turning requirements of the design vehicle. In general, it should always be at least as wide as the maximum entry width (up to 120 percent of the maximum entry width) and should remain constant throughout the roundabout." FHWA Publication Number FHWA-RD-00-067 "Roundabouts: An Informational Guide", pg 149. The current circulatory roadway width is a constant 17 feet which meets the above guidelines as it is 120 percent of the maximum entry width.

Due to inscribed radius length, a truck apron was added to the roundabout design to be able to convey the design vehicle. The paragraph beginning "In some cases..." FHWA Publication Number FHWA-RD-00-067 "Roundabouts: An Informational Guide", pg 149 describes the guideline in this situation. The dyed and stamped concrete truck apron contrasts the black asphalt to create a visual impediment to the drivers of all smaller vehicles to allow orderly progression through the intersection. Due to the skew of Hopewell Road on the north side of the intersection, the northeast quadrant of the intersection requires use of a triangular shaped truck apron area for right turns between Jot Em Down Road to Hopewell Road to delineate the desired travel path of smaller vehicles and at the same time provide enough maneuverable area to convey a larger trucks and school buses. This contrasting pavement colored is employed to delineate the roundabout entry and exit points of the intersection.

The red concrete truck apron is a safety feature that allows vehicles of multiple sizes to be conveyed safely through the intersection. The resident proposed removal of part of the red raised stamped concrete pavement constituting the truck apron and replacing it with asphalt would create an unsafe situation in which speeds within the ACS Roundabout would be too high for the situation; it would be a deviation from the FHWA guidelines and against the design judgment of the Design Professional Engineer. Again, the FHWA Guidelines are followed in the ACS Roundabout design. In fact, IF the project design vehicle and the constraints were different and a larger inscribed radius roundabout was utilized, the same or very similar entry widths and circulatory roadway width would be used.

The current signing and marking for the roundabout is according to FHWA Guidelines. The recommended signage for a roundabout intersection according to Section 7.1.3 Warning Signs; FHWA Publication Number FHWA-RD-00-067 "Roundabouts: An Informational Guide", pg 189, a W2-6 sign with a speed advisory plate is utilized. The GDOT guidelines do not recommend speed advisory plates, although they are allowed at the discretion of the design engineer. The existing 20 MPH Speed Advisory signs could be reduced to 15 MPH if desired or simply removed. The MUTCD W2-6 sign located at least 187.5 feet from the intersection entrance on all approach legs is in accordance with MUTCD Table 2C-4. Guidelines for Advance Placement of Warning Signs; Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), FHWA, 2009 Edition, pg 108 Approach roadway geometrics in combination with these retro-reflective signs, the roadway cross sectional change, the splitter islands, one-way signs and reflective pavement markers (RPM) make this intersection safe for night time travel and meet the FHWA Guidelines for this situation. No further use of reflective markings or speed zone reductions is recommended for this intersection. "For rural (setting) roundabouts, illumination is recommended but not mandatory." FHWA Publication Number FHWA-RD-00-067 "Roundabouts: An Informational Guide", pg 203 If Forsyth County decided to provide lighting at this intersection as a service to the constituents in the area, this would be permissible. The "Yield Ahead" sign added by Forsyth County in addition to the Signing and Marking Plans for the project, though not necessary to meet design standards or guidelines, is permissible. The assertion that a two-lane roundabout would be required if this area became urbanized is pure speculation and not founded on any analyses. In fact, the currently constructed roundabout will serve the projected traffic volumes up to nearly 30 years in the future according to the independently prepared 2011 Forsyth County Comprehensive Transportation Plan.

Sidewalk and more importantly curb and gutter was added to the ACS Roundabout to provide a change in cross section for the driver of the open shoulder roadway approaching this intersection. "On an open rural highway, changes in the roadway's cross section can be an effective means to help approaching drivers recognize the need to reduce their speed. Rural highways typically have no outside curbs with wide paved or gravel shoulders. Narrow shoulder widths and curbs on the outside edges of pavement, on the other hand, generally give drivers a sense they are entering a more urbanized setting, causing them to naturally slow down. Thus, consideration should be given to reducing shoulder widths and introducing curbs when installing a roundabout on an open rural highway. Curbs help to improve delineation and to prevent "corner cutting", which helps to ensure low speeds. In this way, curbs help to confine vehicles to the intended design path." FHWA Publication Number FHWA-RD-00-067 "Roundabouts: An Informational Guide", pg 177 The presence of curb and

gutter to greatly increase safety then led to the forward looking decision to include sidewalk and pedestrian facilities. The assertion that these facilities will need to torn out before any significant pedestrian traffic develops is speculation and not based on any accepted traffic projection technique. In fact, as described above, the currently constructed roundabout will serve the area and its technically sound and accepted traffic projections for nearly 30 years, sufficient time for pedestrian traffic to develop in the area.

The use of simulators for transportation project design is common and has been for many years. The use of a roundabout simulator, although well within the capabilities of Pond & Company, was not included in the scope and fee of the design of this project. Furthermore, it is not current industry standard that every intersection be run through a simulation.

Pond & Company is and has provided expert design engineering services since 1965 and is very grateful to Forsyth County for the opportunity to design the ACS Roundabout.

The roundabout design at the AC Smith/Jot Em Down Road at Hopewell Road intersection improves the safety and efficiency of the intersection while minimizing the property impacts and construction cost for the project while meeting AASHTO Standards, FHWA, and GDOT Design Guidelines.

Sincerely,

POND & COMPANY



Bryon Letourneau, P.E.
Senior Project Manager

CC: File