NCDOT-PDEA Natural Environment Section

CENTERLINE

A Newsletter from the NCDOT - PDEA, Natural Environment Section

Volume 2, Issue 5 January 2015

View Point

Happy 40th Birthday NCDOT's Delegated Erosion Control Program,

By: Don Lee, CPESC
State Roadside Environmental Engineer

Building transportation infrastructure requires navigating complex phases of planning, design, permitting, and construction driven by safety, mobility, conservation of resources and delivery time. The amount of inputs required - from the Purpose and Need phase to the facility opening - is enormous and seems to be growing with changes to Federal and State regulations.

While reflecting on the complexity of steps in building transportation infrastructure, the wisdom of the 1973 NC Sedimentation Pollution Control Law becomes increasingly obvious.

The law mirrored the Federal Erosion and Sedimentation practices, but set forth a unique opportunity for North Carolina land development. The General Assembly included an option for DENR (Department of Natural and Economic Resources at the time) to delegate erosion and sedimentation control programs to local governments and other State Agencies.

Subsequently, the Sedimentation Control Commission was formed and it granted NCDOT a delegation to operate a system of plan approval, inspection and self-monitoring program in 1974. And 40 years later, we are still complying with the delegation requirements, moving dirt, and building transportation corridors.

(Continued on page 3)

GIS Tools to Support NCWAM

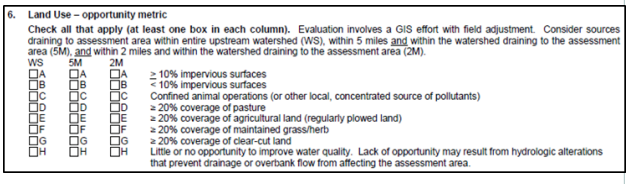
By: Dave Johnson, Environmental Senior Specialist

As a condition of State and Federal Environmental Permitting requirements, the North Carolina Department of Transportation (NCDOT) is responsible for the GIS Tools to Support NCWAM.

No one knows exactly where it came from but a frequently quoted statistic in the GIS industry states that 80% of data within a business enterprise has a spatial or locational component. Thinking of a few examples here in NES the statistic seems to hold true: *Are there streams and wetlands impacted by that TIP? Is there enough room to restore this stream within the right of way? Is this bat roost affected by the new bypass?* NCDOT has a variety of products to assist us in answering these questions from ArcGIS Online maps which are accessible on mobile devices to desktop GIS software for advanced analysis. Use of GIS technology has flourished throughout the department and its likely most of us have found ways to leverage it to help us do our jobs more efficiently. As the Strategic Mobility Formula is implemented and project loads begin to increase it will benefit us all to find ways to work smarter not harder.

At the time of this writing, North Carolina Wetland Assessment Method (NCWAM) draft implementation guidance is under review by the USACE. It is expected to be released shortly. While the specific details of the implementation guidance are not yet available, it is probably safe to assume that assessments will soon become a required part of our workflow. For those unfamiliar with NCWAM it is "…an accurate, consistent, rapid, observational, and scientifically based field method to determine the level of function of a wetland…". Below is an introduction to two GIS tools related to NCWAM that should help us expedite the process of performing NCWAM assessments.

The first tool is a custom ArcGIS toolbox that was created for ArcGIS desktop. It assists the user in answering question 6 from the Field Assessment Form aka FAF. Question 6 is used to gauge the wetlands opportunity to improve water quality. The assessor is asked to consider the entire watershed for the wetland being assessed.



6. **Land Use – opportunity metric**

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

WS	5M	2M	
☐A	☐A	☐A	≥ 10% impervious surfaces
☐B	☐B	☐B	< 10% impervious surfaces
☐C	☐C	☐C	Confined animal operations (or other local, concentrated source of pollutants)
☐D	☐D	☐D	≥ 20% coverage of pasture
☐E	☐E	☐E	≥ 20% coverage of agricultural land (regularly plowed land)
☐F	☐F	☐F	≥ 20% coverage of maintained grass/herb
☐G	☐G	☐G	≥ 20% coverage of clear-cut land
☐H	☐H	☐H	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.

(Continued on page 3)

Project Spotlight

I-440 Improvement Project

By: Jill Gurak, Project Director-Transportation Atkins

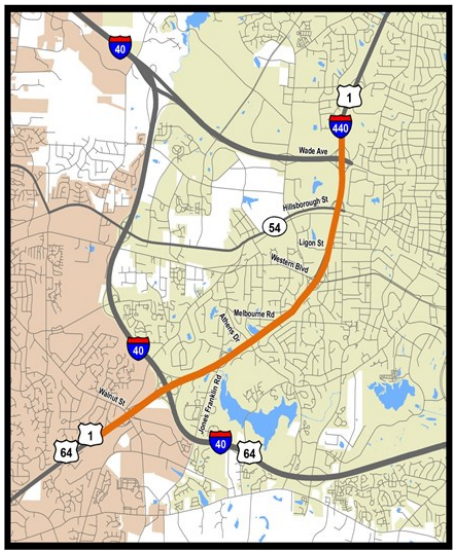
Project Team

John Williams, PDEA
Leza Mundt (retired), PDEA
Felix Davila, FHWA
Mary Pope Furr, HES
Diane Wilson, HES
Tony Houser, Roadway Design
Doumit Ishak, Congestion Management
Joey Hopkins, Division 5
Jill Gurak, Atkins
David Bass, Atkins
Tom Kelly, Atkins

This article focuses on two aspects of the I -440 Improvement Project (U-2719), the alternatives evaluation process and the public involvement program.

Currently, the project team is in the process of finalizing the detailed study alternatives for the Environmental Assessment.

The Project



The I-440 Improvement Project proposes to widen approximately five miles of I-440 (Raleigh Beltline) from south of Walnut Street in the Town of Cary to north of Wade Avenue in the City of Raleigh. The project also includes upgrades and/or rehabilitation of interchanges and structures on I-440 within the project limits.

Within the project limits I-440 has four through lanes connecting to six lane sections on either end creating a "bottleneck" with existing daily congestion projected to worsen in the future, . In addition, this is the oldest section of the Raleigh Beltline (constructed in the 1960's) and is in need of rehabilitation.

The Alternatives Evaluation Process

To study potential options for improvements, the project was divided into seven separate elements plus one best-fit option for widening of the mainline. These seven elements are listed below, along with the number of detailed study alternatives (DSAs) to be included in the Environmental Assessment for each:

- Walnut Street and I-40 interchange area (2 DSAs)
- Jones Franklin Road interchange (1 DSA)
- Athens Drive bridge (2 DSAs)
- Melbourne Road interchange (2 DSAs)
- Western Boulevard interchange (1 DSA)
- Ligon Street crossing (2 DSAs)
- Hillsborough Street and Wade Avenue interchanges (3 DSAs)

There was a good reason for treating the project as separate elements in the initial alternatives evaluation. If the project was considered as a whole from end-to-end, then the various combinations of the numerous interchange and crossing options would add up to so many different end-to-end alternatives, that the evaluations would be meaningless. For example, options for I-40 interchange do not influence options for the Western Boulevard interchange, so they didn't need to be considered together in order to identify the detailed study alternatives for each interchange location. Where it did matter, the interchanges were considered together, such as at Hillsborough Street and Wade Avenue.

The first step in the screening evaluation was to sketch a variety of options for each interchange and crossing. The sketches were then compared for their ability to improve traffic operations and for potential impacts to surrounding resources. Some options were eliminated because they would substantially impact resources such as a park, floodplain, utilities, or structures compared to other options. Some options were eliminated because they would not improve traffic flow as well as others or were substantially more expensive. Others were eliminated for a combination of reasons.

Based on the screening results of Step 1, the best options were then carried forward to Step 2, where the sketches were advanced to concept designs, and traffic operations and potential impacts were compared again where necessary. The final results of the screening comparisons are the set of alternatives NCDOT recommends for detailed study in the environmental assessment.

Another interesting item in the alternatives evaluation is the traffic operations metrics used to evaluate the I-40 interchange and the Wade Avenue and Hillsborough Street interchange area. For these two interchange areas, the options were modeled in VISSIM and measures of effectiveness other than the typical level of service were used for comparison. For this study it was determined that peak hour average travel speeds, number of vehicles processed, and total delay time would be the most useful measures of effectiveness. Several options were eliminated based on the traffic operations comparisons.

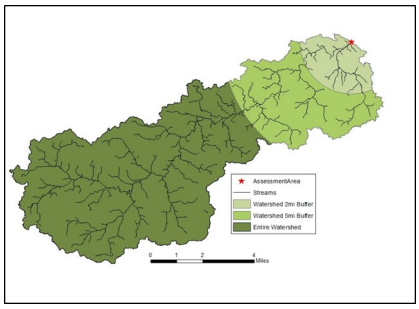
The Public Involvement Program

The project corridor is in an urban area, surrounded by a variety of land uses adjacent to the right of way: residential neighborhoods (including environmental justice concerns), office and retail devel-

(Continued on page 4)

(GIS Tools Continued from page 1)

The user must then divide the watershed into zones within 5 miles and 2 miles respectively of the assessment area . Once these zones are created the assessor must estimate percent of various land uses along with a count of confined animal operations (CAFO's) within the watershed zones. In practice it can be challenging to consistently gauge land use visually, especially in



relatively large watersheds. This task itself is a classic ArcGIS exercise and all the required data are easily procured. It can be conducted manually but since the same steps are repeated for each respective NCWAM assessment it has been packed as a script tool that is executed using ArcToolbox. (ArcGIS Spatial Analyst extension is required to run the tools). I'll spare you all the unglamorous details of the script function. It simply takes all the required data into account and produces a text file that can be used to quickly complete the question on the FAF. The entire process takes about 10 minutes and for me this has expedited the prefield preparation time for an assessment. The tool can also yield data that provides a mapping foundation for answering other GIS based NCWAM questions and possibly the regulatory considerations found at the top of the FAF.

The other tool is the NCWAM Toolbox created under a grant by North Carolina Division of Water Resources . The NCWAM Toolbox is comprised of two components 1- a Trimble formatted data dictionary and 2- an MS Access database . The data dictionary is essentially a digital representation of the paper based Field Assessment Form. It can be completed on our Trimble GPS units in the field and then imported into the MS Access database once back in the office. Originally the results of an assessment had to be transposed from the paper FAF to a spreadsheet and then a macro was executed to calculate the functional rating of the wetland in question. With the new NCWAM Toolbox, the functional rating is automatically calculated once the data dictionary is imported into the MS Access database component. The user also has the option to collect assessment area boundaries or points of interest using the GPS. Those files can be exported as map layers and can be used to supplement documentation for NCWAM assessments. One other benefit of the database is that it functions as a container to organize, store and share multiple NCWAM assessments. Overall the NCWAM Toolbox improves data keeping and expedites the process of documenting an assessment.

So as we find ourselves officially adding NCWAM to our workflows and expecting an increased project volume, it is likely we will find these tools a necessity in the near future. If anyone would like a demo of either tool, feel free to stop by and see me.

(Happy Birthday continued from page 1)

In retrospect, the positive impact of the 1973 NCGA Delegation is tremendous and probably created the greatest added efficiency for reducing construction time and achieving environmental compliance. Countless hours are saved by maintaining an internal plan approval process that mirrors how the DENR-Land Quality Section approves private plans. During construction, revisions pop up every week; can you imagine the logistical bottleneck if plan revisions had to go for agency review? Currently, environmental compliance in NCDOT's construction projects is achieved by a systematic approach of checks and balances managed from the Chief Engineer's office. The Chief's office publishes a hierarchal list of design changes which include safety first and erosion control second. After each annual DENR audit, the NCDOT Erosion & Sedimentation Control Program has been reissued for 40 consecutive years!

This *Happy 40th Birthday*! shout out needs to go to all partners, including the contracting industry of NC, DENR-Land Quality Section, the Sedimentation Control Commission and the Chief Engineer's office for shaping and reshaping and the most successful environmental delegation in the history of transportation construction in NC.

(I-440 Improvement Progject continued from page 2)

opments, parks and historic sites, the NC Museum of Art, NC State University, and Meredith College. There is very little vacant land.

The public involvement program includes a number of different methods to promote participation in the project. These include large-scale public meetings with non-standard map displays and VISSIM movies, as well as small group meetings, interviews with community leaders, a Stakeholder Advisory Committee, and a project video. A few of these methods are highlighted below.

The project video is a 6-minute narrated video tour of the project corridor highlighting the need for the project and issues encountered by travelers along the corridor. You can view the video (and all public meeting materials) on the project website: www.ncdot.gov/projects/i-440improvements/.

The video has been shown at a number of events, including the Concurrence Point 1 (CP1) Merger Team meeting and the first Public Meeting. CP1 was readily achieved as a result of the video. Many compliments were received from citizens at the public meeting, helping build community confidence in the project development process.

The Stakeholder Advisory Committee was formed at the onset of the project. We knew there would be a high level of interest in this project from many groups in the area. The committee's purpose is to provide a venue for detailed feedback and input, and to have committee members share project information with their groups. Members represent a variety of interests along the corridor, and include various departments in the City of Raleigh and Town of Cary, NC State University, University Club, Meredith College, NC Museum of Art, Raleigh Historic Development Corporation, Hillsborough Street Community Service Corporation, North Carolina Railroad, West Citizens Advisory Committee (a City-sponsored neighborhood organization), Capital Area MPO, and Oak City Baptist Church (in the Method community). The committee met, and will meet, at major project milestones: scoping/purpose and need, alternatives for detailed study, environmental assessment, and after the public hearing. Smaller group meetings are held throughout the process with these groups and other groups as requested.

As we have moved forward in the process, one of the smallest features along the corridor has generated many comments and concerns. This is the exist-

ing one-lane traffic culvert carrying Ligon Street under I-440. The Ligon Street culvert was included in the original I-440 construction to provide a connection between the Oak Grove Cemetery west of I-440 and the Method

Road community and churches east of I-440. The culvert also now provides a connection between NC State University research facilities located on both sides of I-440.

The Method community was established in 1871 when a group of former slaves pooled funds to purchase the land. They subdivided it, and sold lots to African American families. Berry O'Kelly, one of the community's most influential members, established the Berry O'Kelly School, which is now Method Road Park, a resource eligible for the National Register of Historic Places. The Oak Grove Cemetery also was determined eligible for the National Register.

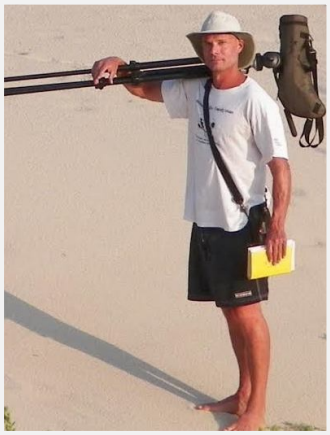
Information on the history of the culvert and its connection to the community and cemetery was provided through an interview at the home of Mr. Rudy Lofton, the cemetery caretaker. Mr.

Edward Curtis, another long-time resident, also participated. Mr. Curtis was instrumental in the Method Civic League's coordination with the NC Department of Highways (as NCDOT was known in the early 1960s) to request the culvert in order to preserve the connection between the community and the cemetery. In fact, he still had a copy of the original letter! The project team also met with community residents on a Saturday morning in July 2014 to discuss the project and the community. These meetings helped the project team understand the area's history and that the Ligon Street culvert is still important to the community.

(Continued on page 6)

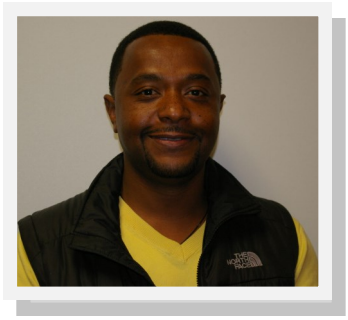
NES Ribbon Cuttings

Jim Hauser was recently promoted to the Environmental Supervisor II position with in the NES ICI/On-site Mitigation Group. Jim has 16 years of service with the NCDOT. In Jim's new role, he will supervise staff and provide expertise for water quality modeling and insure that the NCDOT remains compliant as it pertains to ICI issues. Please extend a BIG congratulations to Jim has he transitions in to his new responsibilities!!!



Mike "Fuz" Sanderson Received the 2014 Environmental Leadership Award from the Piedmont Wildlife Center in November. Fuz was recognized by the Center for his continual work in outdoor education and in fulfillment of the center's mission to foster healthy connections among people, wildlife and nature.

Fuz dedicates most of his annual leave to teaching for various programs throughout the state and he coordinates the annual Piedmont Earthskills Gathering at Shakori Hills in March.

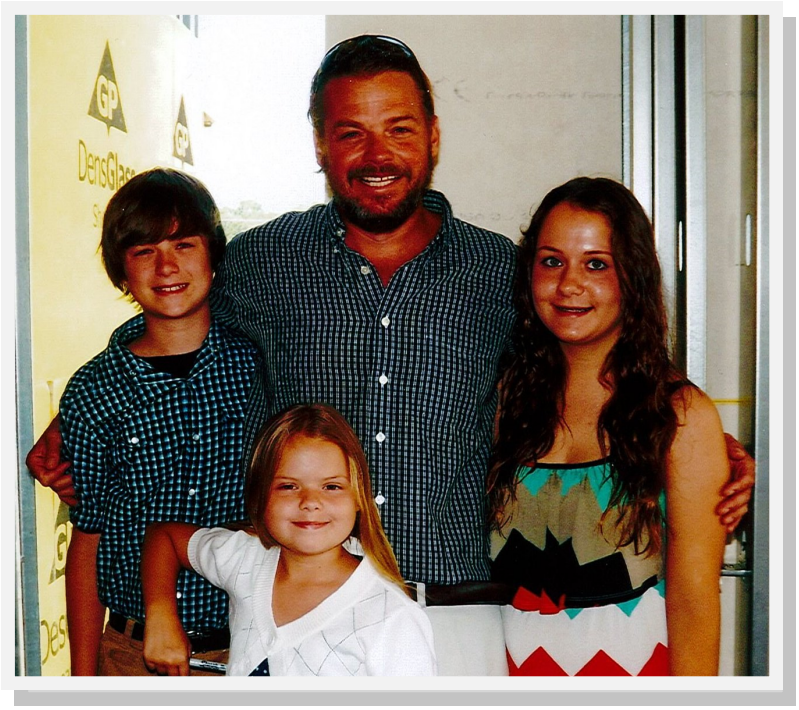


Congratulations to Pete Allen!!! Pete was recently promoted to the Journey Engineer position within the NES Engineering Group. Pete has been employed full time with the Department since 1996 and has been with the NES for the past 7 years. His previous work experience has involved mitigation monitoring and construction oversight. In his new position, Pete will take a larger role in the mitigation monitoring and stewardship program. He will also become more involved in the consultant oversight of mitigation design work and construction oversight. Thank you Pete for all your contributions!!!

Update on 2015 ICOET Conference

As mentioned in a previous edition of Centerline, the NC Department of Transportation was selected to be the host state for the 2015 International Conference on Ecology & Transportation. This is a joint effort including NCDOT, CTE and ITRE. The conference will be held September 20-24, 2015 in Raleigh, North Carolina, USA. On November 25th, the "Call For Abstracts" was sent out with a deadline for submissions of January 30, 2015. Please view the link at http://www.icoet.net/ICOET_2015/index.asp for details. Next year will prove to be a busy year as preparations continue to intensify for this big event and the Natural Environment Section will be asking both our internal and external North Carolina partners for their support as the event gets closer.

Employee Spotlight



Byron Moore is a Natural Environment Engineer in the Natural Environment's Section Engineering Group. He was born and raised in Nash County. He received a BS in Biological and Agricultural Engineering from NC State University in 1990 and is a registered Professional Engineer. Byron began working at NCDOT in 1990 as an employee for Roadside Environmental Unit.

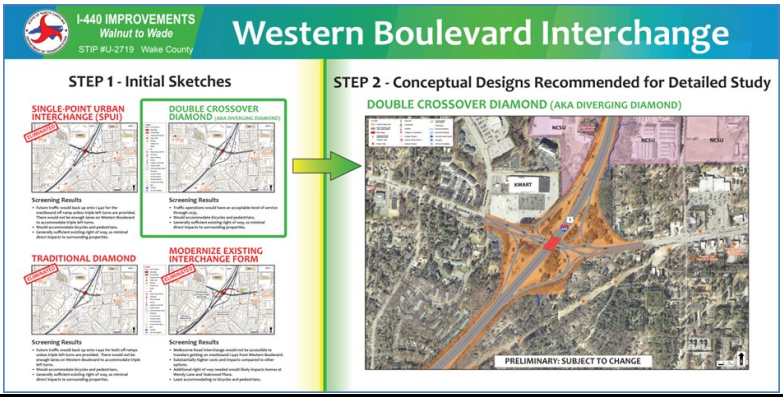
In his current role as a Natural Environment Engineer, Byron is responsible for the design, providing construction assistance, monitoring and long-term stewardship of the Department's stream, wetland and buffer mitigation sites. Byron works with other DOT employees from various Units and Divisions, consultants and environmental regulatory agencies to ensure that NCDOT fulfills its permit requirements.

Byron is married to Kim Moore, who also is a NCDOT employee. They have 3 children: Ellie, 15, Sam, 13, and Ava, 9. Byron enjoys spending time with his family and working on the family farm.

(I-440 Improvement Progject continued from page 4)

The most recent public involvement event was the November 2014 Public Meeting #2, held to receive public input on the alternatives recommended for detailed study. As discussed above, numerous sketch concepts were evaluated for all the interchanges and crossings along the corridor. At the meeting, the results of all the studies were clearly communicated on maps, one for each of the seven separate project elements. Each map showed the sketch options on the left side, along with the reasons each sketch was eliminated or retained. On the right side were the concept designs of the alternatives recommended for detailed study.

Attendees could focus in on just the interchanges or crossings they were interested in. In addition, VISSIM movies showing future peak hour traffic flow for the I-40 interchange alternatives and the Wade Avenue and Hillsborough Street interchange alternatives were playing on computers in the map room. The Western Boulevard map is shown below. All the alternatives maps are posted on the project website under "Materials from Public Meeting".



NCDOT

Project Development Environmental Analysis Unit

Natural Environment Section

https://connect.ncdot.gov/resources/Environmental/Pages/default.aspx

Main Office:

NCDOT-PDEA
NATURAL ENVIRONMENT SECTION

Newsletter Contact Information

Philip S. Harris, PE
(919)707-6123
pharris@ncdot.gov

Bruce Ellis
(919)707-6115
bellis@ncdot.gov