

## NC State University Center/Institute Annual Report

2024

<b>Name of Center or Institute:</b>	Institute for Transportation Research and Education
<b>Center Acronym:</b>	ITRE
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### **Building where Center/Institute's main office is located:**

Research Building IV

### **Address of Center/Institute's main office:**

909 Capability Drive, Suite 3600, Raleigh, NC 27606-3870

### **Location**

Centennial Campus

### **Mission and Vision Statement**

Institute for Transportation Research and Education (ITRE) carries out research, training and technical support activities in the areas of surface and air transportation for a host of national, state, and local clients to address the nation's critical transportation issues.

### **Research Impact**

Institute for Transportation Research and Education (ITRE) research programs — and the Institute's related training and technology transfer activities — continue to have a significant impact on the transportation practice both locally and nationally. The following are highlights from ITRE's activities in this FY.

=== RESEARCH ===

### TRB COMMITTEES AND ANNUAL MEETING PRESENTATIONS

ITRE maintains an ongoing, high-profile presence and role in the Transportation Research Board (TRB), a division of the National Academy of Sciences, Engineering, and Medicine. ITRE research staff and affiliated faculty serve as active full members of nine standing TRB committees. Much of the important business of setting national transportation research direction is done by these committees at the TRB Annual Meeting held every January in Washington, D.C. In addition to critical committee work, ITRE researchers and affiliated faculty participated in four technical workshops and presented 46 research papers this year: 34 in poster sessions and 12 in lectern sessions. For more information on TRB visit: <https://trb.org>

### STRIDE CONSORTIUM

ITRE has conducted research annually since 2016 for the Southeastern Transportation Research, Innovation, Development and Education (STRIDE) Center, a University Transportation Center (UTC) funded by a grant from the U.S. Department of Transportation (USDOT). As the UTC for Region 4 (Southeast U.S.),

STRIDE is a multi-university research consortium that includes NC State and is housed at the University of Florida Transportation Institute (UFTI). The UTC grant provides the consortium with up to \$14 million over five years towards developing novel strategies for reducing traffic congestion. STRIDE research efforts are addressing congestion through new in-vehicle technologies, telecommunications advances, and the rise of shared mobility and autonomous vehicles. STRIDE is also working to strengthen the regional transportation workforce and practice through educational and technology transfer activities. The STRIDE regional UTC will be wrapping up in the fall of 2024.

In this FY, ITRE led the completion of the following STRIDE research projects:

- \* Project J3: Identifying and Mitigating Congestion Onset
- \* Project A4: Identification of Non-recurring Congestion and Mitigating Strategies
- \* Project B4: Integrated Corridor Management: Cooperative Signal Control with Freeway \* Operations and Ramp Metering
- \* Project J5: Assessing & Addressing Deficiencies in the HCM Weaving Segment Analyses, Part II
- \* Project L6: Locating and Costing Congestion for School Buses and Public Transportation, Phase II

The above-mentioned projects also involve researchers at other member universities in the STRIDE consortium. For more information on STRIDE visit: <https://stride.ce.ufl.edu>

## INTELLIGENT TRANSPORTATION SYSTEMS / CONNECTED AUTONOMOUS VEHICLES (ITS/CAV)

ITRE has made significant strides in the areas of Intelligent Transportation Systems (ITS) and Connected and Autonomous Vehicles (CAV) over the past year. ITRE is leading a groundbreaking research project for the North Carolina Department of Transportation (NCDOT) that examines managed freeway concepts on one of the country's most important interstates, I-40. This project is unique, and is one of only two managed freeway projects in the United States. It utilizes a suite of ITS technologies such as cooperative adaptive ramp metering, queue warning, dynamic lane control, speed control, and hard shoulder running to improve safety, reliability, and efficiency. The significance of this project cannot be overstated, as it sets a precedent for innovative freeway management and has the potential to transform traffic management practices nationwide.

In the field of CAV, ITRE is actively engaged in multiple projects, with an emphasis on preparing North Carolina's infrastructure for the advent of autonomous vehicles. ITRE's "CAV infrastructure readiness – Phase II" project involved comprehensive evaluations of the state's current infrastructure and laid the groundwork for necessary updates and improvements.

ITRE is also playing a pivotal role in the Multimodal Connected Vehicle Pilot (MMCVP), a USDOT-funded project to implement connected vehicle technologies on 26 signalized intersections around the NC State campus. ITRE is leading the evaluation of this technology. As part of NCDOT's Center of Excellence for Connected Autonomous Vehicles, ITRE is developing digital twin models for testing AVs in real-world scenarios along with CAV communication protocols. ITRE researchers have also developed artificial intelligence (AI)-based longitudinal AV control models that significantly improve the performance of AVs compared to traditional car-following models such as intelligent driver model (IDM), Adaptive Cruise Control (ACC), Cooperative Adaptive Cruise Control (CACC), and Wiedemann 1999.

## PORT AND FERRY

The NCDOT-sponsored Research Project (RP) 2023-14 “Natural Hazards Vulnerability Assessment of the NCDOT Ferry Division Assets” is studying the North Carolina (NC) ferry system to assess current and future natural hazard vulnerability and develop adaptation options to improve ferry system resilience. The study is assessing the vulnerability of all of the Ferry Division’s infrastructure assets with respect to natural hazards (present and forecast to the 2040 and 2060 planning horizons) and a comparative approach to prioritize assets for adaptation measures. The results will assess criticality and vulnerability for ferry assets at the individual asset scale, terminal scale and route scale. Vulnerability assessments were conducted for flood and erosion vulnerability, highway access vulnerability and community impacts. Potential adaptation options, implementation timeframes and comparative adaptation costs will be presented. The final results and methodology are structured in a manner that will allow them to be incorporated into the NCDOT Statewide Resilience Improvement Plan.

## FREIGHT AND SUPPLY CHAIN

As part of RP 2023-09 “Economic Contribution of North Carolina’s Supply Chain,” ITRE defined and quantified the economic contribution of the supply chain to North Carolina’s economy. The research team focused on 14 of North Carolina’s highest-producing sectors within its supply chain. An economic contribution analysis was completed for each sector, demonstrating how North Carolina’s supply chain impacts the state’s economy. Additionally, an analysis of the essential factors of production for the industries that comprise each sector was undertaken. In-state and out-of-state industry inputs were delineated to demonstrate existing supply chain success as well as opportunities for strategic business attraction. Employment hotspots were also discussed to show areas of concentrated economic activity within each sector. The research team also explored emerging industries, sector growth, and the value of the existing transportation network.

## RAIL

ITRE staff developed a study of the economic contribution of the NC rail system—both freight and passenger rail. The research utilized both NCDOT and ITRE-collected data and an IMPLAN® model was used for analysis. The results showed that the North Carolina rail system has an annual economic impact of over \$20 billion and supports 88,000 jobs in the state, with economic contributions dispersed throughout the state. This research analyzed 2019 economic data and 2022 passenger ridership data to estimate impacts that reflect the most recent complete data available while avoiding pandemic induced disruptions.

In addition, the Federal Railroad Administration (FRA)-funded effort to expand previous static rail trespass work into South Carolina and Georgia was completed. This project involved selecting four sites, two in each state, and placing motion activated thermal cameras during a week in each of the four seasons to monitor incidences of rail trespass. Similar to the NCDOT Static Rail Trespass projects completed in recent years, the goal of this project was to inform the FRA on the frequency of trespassing on railroad tracks, as it is magnitudes higher than the number of actual pedestrian strikes—meaning the potential for more pedestrian strikes is much higher than previously estimated. This project found that actual crossing events were much higher than anticipated, especially in urban areas where pedestrian activity between origins and destinations were separated by tracks. Notably, school-aged children were present at one site in overwhelming numbers.

## TRAFFIC SAFETY

ITRE’s Highway Systems group recently completed a high-profile grant in the area of safety. This grant, funded by NCDOT, developed movement-based safety performance functions (MBSPFs) that can calculate expected crash frequencies based on turning movement count data, conflict type, geometric data, and

traffic control devices. This surrogate safety analysis method is based on real crash data, whereas all other surrogate methods are qualitative in nature. The method can be used to calculate expected crash rates for any intersection facility regardless of whether it has been constructed before. The findings indicated that this method was more accurate at predicting crash rates at signalized intersections than currently accepted methods in the Highway Safety Manual.

The Highway Systems group is also continuing work on a grant funded under National Cooperative Highway Research Program (NCHRP) project 07-108 to evaluate several types of alternative intersections using crash and surrogate data. ITRE is serving as a subcontractor to the University of North Carolina (UNC) Highway Safety Research Center (HSRC), and will primarily be responsible for surrogate analysis methods building on prior work on MBSPFs.

The Highway Systems group is also conducting research on the potential operational and safety benefits of the dynamic zipper merge (DZM) system for NCDOT. Anecdotally, DZM systems have appeared to be beneficial to NCDOT in reducing traffic congestion, particularly in work zones where there is a lane closure. However, NCDOT has employed ITRE to determine the potential significance of the improvements the DZM system brings to lane closures in work zones. As a part of this research, ITRE will also provide guidance to NCDOT on when and where to best implement the DZM system to maximize traffic safety and efficiency.

Finally, two new projects were funded by NCDOT that will begin in August 2024. The first will look at the development of collision modification factors (CMFs) for Signal Progression. Signal progression benefits related to traffic flow have been documented for decades; however, little is known about potential safety benefits of coordination. The second project will examine the development of CMFs for a variety of new roundabout applications in NC.

## PAVEMENT

ITRE was formerly a leader in pavement management surveys in the 1980s, 1990s and 2000s, but the group eventually disbanded as private vendors emerged making big promises on asset data collection, including pavement condition surveys. ITRE conducted multiple projects to assess the accuracy of several of these vendors and found the results to be mixed. ITRE recently completed a project for the United States Army Corps of Engineers (USACE) on the feasibility of collecting pavement distress data using a camera attached to a vehicle in state parks, then rating the pavement segments captured in the video. The results were promising but somewhat labor intensive. ITRE has now partnered with UNC Charlotte to determine the feasibility of using machine learning (ML) to gather pavement crack data for the purpose of rating cracking on those segments. So far, the results have been promising in that ML algorithms have been able to identify cracks. While the research team is still in the process of training the various algorithms to better identify crack types, the team is also testing the ability of AI to quantify cracks to provide a rating of crack distresses, including alligator, longitudinal and transverse cracking.

## AVIATION

NC State, with ITRE as the lead, is a core university partner of the Alliance for System Safety of UAS through Research Excellence (ASSURE), the Federal Aviation Administration (FAA)'s Center of Excellence (CoE) for Uncrewed Aircraft Systems (UAS) Research. Since ASSURE's inception in 2015, ITRE aviation researchers have been part of eleven funded research projects totaling over \$1.5 million in awards. This CoE is aimed at continuing and enhancing the safe, successful integration of drones into the

public airspace, and NC State's contributions include advanced use cases such as Shielded Operations and Disaster Preparedness and Response, as well as Economic and Market Impact analyses for various UAS-related sectors. As part of the 2024 FAA Reauthorization Act, Congress recently tasked ASSURE with establishing a credentialing process for Public Safety UAS operators. This initiative, known as ASSURED SAFE, will offer training in the Law Enforcement, Fire, and Emergency Services domains to agencies across the US at the Local, State, and Federal levels. The Reauthorization Act also extended the ASSURE CoE, which was previously set to expire in 2025.

Partnerships and collaborations are mainstays for ITRE and NC State. The Institute and university have worked with NCDOT, nonprofits, industry partners, the United States Army and businesses to facilitate outreach and engagement in the community. Many of NC State's technology initiatives focus on youth development, in particular around science, technology, engineering and math (STEM) educational topics. In 2024 those STEM activities include support for NCDOT's Aviation Career Education (ACE) Academies, the Catalyst program (as part of The Science House, an on campus, national award-winning high school program designed to create STEM opportunities for students with disabilities), and the TRIO Pre-College Upward Bound program. Each of these initiatives help further interest in aviation careers and increase awareness of ITRE's aviation research portfolio.

NC's Research Triangle region has been selected for a \$24 million National Science Foundation (NSF) grant to build an advanced wireless communication testbed called Aerial Experimentation Research Platform for Advanced Wireless (AERPAW), which is centered around programmable Uncrewed Aerial Vehicles (UAVs) and radio systems. On today's 4G networks, fixed cellular base stations communicate with mobile phones. On the AERPAW platform, the base stations can also be mobile, with the ability to transmit and receive radio waves from user devices while moving on-demand. For example, in the aftermath of a natural disaster such as a hurricane, existing cellular networks may be damaged. As a result, aerial base stations could position themselves to provide the best wireless coverage to victims and first responders who would otherwise have no cellular connectivity. The platform also has the potential to help pilots fly drones beyond line of sight, allowing for improved air traffic control under FAA regulations. NC State is leading the AERPAW research with ITRE staff as a co-principal investigator on the project.

NC State was selected by the FAA in the first group of universities and colleges to be recognized as a member of the UAS Collegiate Training Initiative (UAS-CTI), an initiative that continued in this FY. UAS-CTI recognizes institutions that prepare students for careers in unmanned aircraft systems. In order to qualify for the initiative, schools must offer a bachelors or associates degree in UAS or a degree with a minor, concentration or certificate in UAS. Schools must provide curriculum covering various aspects of UAS training, including hands-on flight practice, maintenance, uses, applications, privacy concerns, safety and federal policies concerning UAS.

As part of North Carolina's biennial State of Aviation Study, ITRE assists NCDOT's Division of Aviation in examining and determining the economic contribution of commercial and general aviation airports in North Carolina, both on the statewide and the local/county levels. ITRE's aim is to produce an easily understood, concise and effective summary which highlights this economic contribution for use by the Division of Aviation and all local airport managers and economic development groups. The Division of Aviation uses this tool to show the existing contribution of aviation activities to various audiences such as the NC General Assembly, NCDOT's Board of Transportation, industries located in North Carolina, as well as industries that could potentially be located in North Carolina. The Division also distributes the report to local airport managers for use in discussing infrastructure needs with local government officials and in attracting business customers.

## SUSTAINABLE AND RESILIENT TRANSPORTATION

ITRE has been awarded a University Transportation Center of Excellence from NCDOT. The North Carolina Sustainable and Resilient Infrastructure University Center of Excellence (NC SuRe Infrastructure Center) is a three-year, \$1 million dollar award to develop cutting edge, practice ready research to support NCDOT's research needs to address disruptions in the transportation system stemming from natural hazards, everyday disruptions and other unexpected large-scale disruptive events within the network. The goal is to reduce transportation system disruptions, minimize the impact of system disruptions, and more effectively recover from disruptions in the transportation network. The NC SuRe Infrastructure Center consortium is led by ITRE, and includes internal NC State partners in the Department of Civil, Construction and Environmental Engineering; North Carolina Clean Energy Technology Center; and Department of Computer Science. The external consortium partners include Fayetteville State University (Department of Mathematics and Computer Science; Department of Intelligence Studies and Geospatial Science) and East Carolina University (Department of Construction Management; Department of Economics). The Center projects focus on three research themes:

1. Resilient infrastructure and asset management
2. Electric vehicle infrastructure resilience
3. Resilient cybersecurity practices for traffic management centers and intelligent transportation systems.

Research products from these projects will yield future-focused, practice-ready solutions for enhancing the sustainability and resilience of NCDOT transportation infrastructure investments.

=== TECHNICAL ASSISTANCE ===

## BICYCLE AND PEDESTRIAN

ITRE staff have continued to enhance the NC Non-Motorized Volume Data Program (NMVDP) through upgrades to Eco-Counter Bicycle-Pedestrian loggers. In partnership with NCDOT and NC Capital Area Metropolitan Planning Organization (CAMPO), ITRE completed the 4G wireless technology upgrade of 13 loggers in Wake County and developed assessments for each of the 21 total loggers. These loggers are now transmitting current count information to the cloud for incorporation into the Eco-Visio data visualization software. Communication has been established with local municipalities to address the remaining needed upgrades.

ITRE also installed three Eco-Counter devices in Greensboro, NC that will be utilized to capture permanent counts of bicycle and pedestrian behavior for the City of Greensboro. These counts will be used by the city to gain a better understanding of walking and bike riding behavior in the city, which can be used in planning for future bicycle and pedestrian infrastructure.

In addition, ITRE has now completed the 1st phase of NM COAST (Non-Motorized Count Assurance Tool) for NCDOT-IMD. The tool is currently under review for further development and release to the public.

## ECONOMIC AND POLICY ASSESSMENT

As part of RP 2024-14 "Measuring the Economic, Mobility, and Health Benefits of Multimodal Projects," ITRE is working to provide data-driven, evidence-based approaches for measuring the benefits of non-highway (pedestrian, bicycle, transit, rail, ferry and aviation) multimodal projects that can be effectively implemented in the State Transportation Improvement Program (STIP). The research team will focus on

exploring and quantifying benefits associated with co-locating these project types in North Carolina, with a focus on benefits associated with Economic Competitiveness and Development, Mobility and Connectivity, Equity, and Community Health. This project is scheduled to conclude May 31, 2025.

As part of a NCDOT Technical Assistance Request (TAR), ITRE is exploring the consideration of environmental measures to be included in the prioritization of highway mode projects for Prioritization 8.0 (P8). The first phase for introducing environmental measures will focus on Greenhouse Gases (GHGs), Criteria Pollutants (CPs) and Mobile Source Air Toxins (MSATs). These measures are in alignment with NCDOT, Federal Highway Administration (FHWA) and Governor's Office priorities related to clean energy and clean transportation requirements. This TAR will result in a white paper that includes a literature and state of the practice review focused on methods and data for including GHGs, CPs, and MSATs in the evaluation and prioritization of highway mobility projects. A rough draft of the white paper will be completed by October 2024.

As part of RP 2024-36 "Enhancing Strategic Prioritization Through Technical Assistance and Assessment," ITRE assists NCDOT with targeted needs associated with enhancing the Strategic Prioritization process. The project team will provide NCDOT with external analysis and expertise that is essential for supporting informed decisions related to updating the STIP. These efforts will include analysis as well as engagement with the Workgroup and the development of deliverables that can help improve long-term STIP outcomes.

## SYSTEMS PLANNING AND ANALYSIS

This FY the Triangle Regional Model (TRM) Service Bureau released TRM Generation 2 (TRMG2) v1.3, the new official travel demand model for the Research Triangle region. Work was also initiated on TRMG2 v2, the model that will be used to support development of the 2055 Metropolitan Transportation Plans (MTP) for CAMPO and the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (MPO). In addition to developing new data structures for the model, various enhancements have been implemented including a new non-motorized project evaluation tool, optimization of the project scenario manager to improve model run time, modification to the peak periods in the model to better align with transit operating schedules, and modifications to the structure of the mode choice model.

The TRM team continues to develop various tools to make it easier to access and evaluate output from the model, and also conducted research into the effects of teleworking on trip making using data from the Triangle Travel Survey. Strategic transportation planning was used to evaluate the impact of these changes on transportation system performance measures, and recommendations were made for how the MPOs can incorporate these findings into MTP development. The team also implemented enhancements to the procedures for developing equitable performance measures and evaluated the sensitivity of ridership forecasts for premium transit. The Triangle Travel Trends report was updated using the latest round of travel survey data, and planning for the next round of travel survey data collection is underway.

The TRM User Forum continues to be a success, with both a spring and fall forum well attended. Consultant application of the new model has resulted in a great exchange of information and ideas between the end users and developers of the TRM.

As part of RP 2023-011 "Guidance for Including Connected and Automated Vehicles in Travel Demand Models," ITRE developed a summary of literature on the potential impact of connected and automated vehicles (CAVs) on travel behavior. This knowledge, along with conversations with experts in the field, was used to develop an index of predictions and factors related to external drivers influencing CAV adoption rates, anticipated behavioral changes resulting from CAV adoption, and suggested modifications to travel

models to address these changes. This work further informed the development of scenario planning and model adjustment scenarios that were tested and evaluated through several case studies. A sensitivity analysis was conducted to inform the selection of asserted parameters and a cone of uncertainty. The development of a research report and implementation guidelines is currently underway.

## TRANSIT

The primary function of ITRE's Transit group is to provide ongoing assistance to NCDOT's Integrated Mobility Division (IMD) and the 98 transit systems in North Carolina. This assistance involves operations planning, data collection and analysis, developing funding formulas, and training on diverse topics important to the industry.

In addition to the regular tasks, this FY saw a significant expansion of roles. Prioritization is a data-driven process for determining where NCDOT should allocate scarce capital funding resources. The Transit group has assisted with prioritization scoring and analysis in previous years, with this year being the first time the group was also tasked with collecting project data directly from the applicants. ITRE will learn from this first experience with data collection to help guide project development and data development for future prioritization cycles.

Finally, the group continues to be involved in the emerging microtransit transportation mode by presenting to local staff, advisory boards, and conferences on the benefits and considerations of implementing microtransit as well as conducting original research on the topic.

## EQUITY ANALYSIS AND PRACTICES

The NCDOT-sponsored RP 2023-29 "EJ and Historical Transportation Impacts in NC" is nearly complete. The research team conducted a comprehensive review of national literature and best practices for equity data, environmental justice (EJ) screening tools and equity interventions in the transportation decision-making and investment process. The insight gained through the literature and state of the practice reviews was synthesized into an implementation-focused best practice matrix. Peer-reviewed literature, resources created by reputable organizations, and state and federal agency guidance were explored to provide NCDOT with insights on identifying and mitigating inequitable impacts associated with transportation systems and the transportation decision-making process. The review also includes an extensive and comprehensive examination of data and screening tools associated with environmental justice and equity.

As part of NCDOT-sponsored RP 2022-17 "Including Equity in Benefit-Cost Analysis," the research team focused on analyzing data and developing and testing a methodology for two cross-modal measures (physical health and air quality) against several case studies. Tools were developed that facilitate incorporating these measures into NCDOT's prioritization process for the purpose of leading to more equitable outcomes. The research project concluded in July 2023. A technology transfer focused on implementation assistance for methodologies and concepts in RP 2022-17 is underway and scheduled for completion in October 2024. Activities in this tech transfer will include but are not limited to:

- (1) Preparing a State of the Practice review that builds on work from RP 2022-17 to include recent examples of project prioritization processes that include equity.
- (2) Reaching a unified understanding with the Workgroup on what is meant by equity.
- (3) Providing a detailed accounting of how to use the methodology, workbook and GIS tool to evaluate complete street benefits within the prioritization process.

## MODELING AND COMPUTATION



ITRE has developed extensive expertise in the field of modeling and computation, leveraging advanced technologies to enhance traffic management and transportation systems. These methodologies are currently being utilized in almost all of ITRE's research projects, ensuring a robust and comprehensive approach to transportation research and development.

#### 1. Traffic Simulation Modeling:

ITRE employs both microscopic and macroscopic traffic simulation models to analyze and improve transportation systems. Microscopic simulation models focus on individual vehicle behaviors and interactions, allowing for detailed analysis of traffic flow, signal timing and congestion management. Macroscopic models, on the other hand, provide a broader overview of traffic patterns and trends, enabling large-scale planning and optimization of transportation networks. By integrating these two approaches, ITRE ensures comprehensive and accurate simulations that inform effective transportation solutions.

#### 2. Driver Behavior Simulation:

ITRE's state-of-the-art simulation lab is dedicated to studying and modeling driver behavior under various conditions. Utilizing high-fidelity driving simulators, researchers can replicate real-world scenarios to observe and analyze how drivers react to different traffic situations, environmental factors and roadway designs. This research is crucial for developing strategies to improve road safety, optimize traffic flow and enhance overall transportation system efficiency.

#### 3. Advanced Computational Techniques:

In addition to traditional simulation methods, ITRE incorporates advanced computational techniques such as machine learning and artificial intelligence. These techniques are used to process and analyze large datasets, predict traffic patterns and develop adaptive traffic control systems. By harnessing the power of AI, ITRE is able to create more responsive and efficient transportation networks that can adapt to changing conditions in real-time.

### GEOVISUAL ANALYTICS AND DECISION MANAGEMENT (GADA)

Geovisual Analytics and Decision Management (GADA) continues to partner with the NC Governor's Highway Safety Program (GHSP) and the NC State Highway Patrol (NCSHP) to support the shared mission of reducing traffic crashes and fatalities on North Carolina roads. The GADA team at ITRE provides technical and program support for the Commercial Vehicle Enforcement (CVE) section of the NCSHP, as well as North Carolina's NC Vision Zero program.

### COMMERCIAL VEHICLE ENFORCEMENT RESOURCE LAB (COVERLAB)

Commercial Vehicle Enforcement Resource Lab (COVERLAB) staff continue to support the CVE section of the NCSHP by providing technical and program assistance for the Federal Motor Carrier Safety Administration's (FMCSA) Motor Carrier Safety Assistance Program (MCSAP) and FHWA's Truck Size and Weight program. COVERLAB staff provide decision management services to help improve commercial vehicle enforcement effectiveness. This working partnership provides CVE with online performance measurement analytics, data-informed enforcement planning, on-demand requests, personnel allocation model development, performance optimization, grant writing assistance, special operations field support, and field research services. Learn more at [coverlab.org](http://coverlab.org).

### NC VISION ZERO

NC Vision Zero ([ncvisionzero.org](http://ncvisionzero.org)) is North Carolina's collaborative initiative to eliminate roadway deaths and injuries in North Carolina. The goal of the NC Vision Zero initiative is to unify all safety stakeholders to reduce traffic fatalities. ITRE works collaboratively with the NC Governor's Highway Safety Program (GHSP), the UNC Highway Safety Research Center (HSRC), and UNC's Injury Prevention Research Center (IPRC), to host and maintain the NC Vision Zero website and related tools. This provides access to program content and data visualization tools that service both the general public as well as traffic safety partners.

Among the online tools developed and maintained by ITRE for this initiative are:

- \* NC Vision Zero Analytics: A suite of data visualization tools for helping traffic safety partners and the general public measure and understand traffic fatality trends, locations, contributing circumstances, demographics and more. These data visualization tools include login-based performance measurement tools to assist the NC State Highway Patrol (NCSHP), GHSP, and other traffic safety stakeholders across North Carolina in tracking crash reduction performance goals, visualizing data for in-depth analysis, and streamlining reporting requirements.

- \* NC Vision Zero Target Tracking Dashboard: A gated online data analytics system for safety stakeholders to track traffic safety goals and identify effective data-informed strategies for reducing traffic fatalities in North Carolina. The state's crash reduction goals are visually presented to (and co-tracked by) both the NCSHP and GHSP staff. Users can see how well they are performing with "views" specific to their geographic location. This provides a common "ground truth" and the capability to more effectively prioritize safety countermeasure activities for reducing traffic crashes and fatalities.

- \* NC Vision Zero Public Dashboards: A series of public-facing data analytics tools for helping the general public answer questions about crash data, identify problem areas by geographic area, and enable insights for understanding crash data trends.

ITRE staff organized and co-hosted traffic safety training events in partnership with GHSP including the biennial NC Traffic Safety Conference and Expo ([nctrafficsafetyconference.org](http://nctrafficsafetyconference.org)). Held this FY in Greenville, the NC Traffic Safety Conference brought together over 600 professionals working in law enforcement, transportation engineering and planning, public health, university research, and non-profit advocacy from across the state. ITRE also co-hosted 'Different, Different World,' an experiential training workshop to help traffic safety professionals understand the challenges and improve their skills when communicating with individuals who are Deaf, Hard of Hearing, and DeafBlind.

#### OPERATIONS RESEARCH AND EDUCATION LAB (OREd)

The Operations Research and Education Laboratory (OREd) continues to provide essential long range facility planning services to public school districts across the state. For instance, many of North Carolina's fastest growing school districts rely on OREd's analysis to help guide the selection of new school sites. Efficient school siting reduces congestion and emissions, while increasing walkability and healthy lifestyles for students. Optimally positioning new schools ensures school facilities are well positioned to serve the needs of student populations for decades to come.

#### PUPIL TRANSPORTATION INFORMATION MANAGEMENT (TIMS)

The Pupil Transportation Information Management System (TIMS) at ITRE is an ongoing statewide project focused on maintaining and improving upon efficiency in school bus transportation at the district level. In FY 2024, TIMS staff provided technical assistance and training for operating computer-assisted school bus

routing and scheduling software to school district personnel. This routing system allows school districts to create effective bus routes and maintain student, transportation and street network data at the local level, providing district personnel with access to the most accurate and current information related to pupil transportation. To support these efforts, TIMS staff provide dozens of training classes and events per year as well as daily software and technical support to TIMS routing managers from school districts across the state. See Appendix E of this report for a listing of TIMS training classes delivered in FY 2024.

As part of the long-term relationship with the North Carolina Department of Public Instruction (NCDPI), TIMS project leaders at ITRE were identified as key stakeholders and included as primary members of the evaluation team related to NC House Bill 256, “THE SMART SCHOOL BUS SAFETY PILOT PROGRAM” (<https://www.ncleg.gov/Sessions/2021/Bills/House/PDF/H256v1.pdf>). TIMS Project Leaders continue to be involved in the evaluation of alternative school bus routing software from developers not currently approved for use in North Carolina.

In addition to traditional district-level Training and Support Services, TIMS project leaders have worked extensively with staff from NCDPI and Infinite Campus (the new statewide student information system) to develop student download files and a NC Specific Student Transportation Screen that is compatible with traditional TIMS methods of operations and local functionality. This work will continue next year when the other half of school districts in NC will switch from PowerSchool to Infinite Campus.

Finally, multiple school districts and charter schools have contracted with TIMS project leaders to help conduct various local map updates, efficiency studies and bus rerouting projects to explore improvements and enhancements to current school bus operations.

=== TRAINING ===

## HIGHWAY SYSTEMS TRAINING

In addition to highway systems research described earlier in this report, ITRE delivers a wide range of training workshops, courses, webinars and professional development events in the areas of highway engineering, preconstruction planning, operations and safety. Training is designed for engineers, technicians, maintenance and operations staff, and related professionals across the United States working in transportation and traffic safety. Some activities are tailored specifically to NCDOT personnel. ITRE’s Maintenance Operations and Safety Program is an established leader throughout the southeastern U.S. for training transportation department employees on work zone safety, flagging operations, and related safety and maintenance topics. 39 courses and activities totaling nearly 2000 instruction hours were offered this year, with nearly 3500 participants. See Appendix E of this report for a listing of the Highway Systems training activities in this FY.

## NORTH CAROLINA LOCAL TECHNICAL ASSISTANCE PROGRAM (NC LTAP)

The North Carolina Local Technical Assistance Program (NC LTAP) is one of the 51 Local Technical Assistance Program (LTAP) centers nationwide. NC LTAP provides local road departments with workforce development services, resources to enhance safety and security, and training videos and materials. In this FY, NC LTAP trained over 3500 practitioners statewide through 50 course offerings and 178 total class sessions. New classes offered this year included Pavement Preservation and Grants 101. Our free one hour webinar, NCBELS Ethics and Rules of Professional Conduct, was again offered to meet the new Professional Engineer licensing requirement. See Appendix E of this report for a listing of NCLTAP training activities in this FY.

## NORTH CAROLINA AIRPORT TECHNICAL ASSISTANCE PROGRAM (NC AIRTAP)

The North Carolina Airport Technical Assistance Program (NC AirTAP) is a joint effort of ITRE and the NCDOT Division of Aviation, with support from the NC Airports Association, to provide educational offerings, information resources and related assistance to the state's airport professionals. In this FY, NC AirTAP trained 284 participants in six Airport Leadership and Management classes. NC AirTAP also launched the Airport Board Member Training (ABMT), an online, on-demand program geared toward North Carolina local officials who govern the state's public airports. 8 ABMT modules have been released this FY, with 91 participants enrolled to date.

## TRUSTED OPERATOR PROGRAM

NC State's Trusted Operator drone pilot training program, developed by the Association for Uncrewed Vehicle Systems International (AUVSI), provides a certification process for pilots beyond their FAA part 107. Trusted Operator fills the gap between these minimally prescriptive operating regulations and a higher level of demonstrated knowledge, flight proficiency, safety and risk management practices that is expected to be valued by employers and customers of commercial UAS operators. Trusted Operator is a professional UAS community initiative aimed at supporting industry accepted remote pilot standards and protocols, which will result in the safe and sustainable advancement of the industry. NC State is one of a select group of institutions of higher education in the US accredited by AUVSI to deliver all levels of Trusted Operator certifications for pilots. As a training provider, the university is able to support student pilots and assist its community partners. In May 2024, the Trusted Operator program was renewed for 2 additional years. A total of 46 certificates have been administered to date (35 in FY 2024) across all three levels of Trusted Operator training to NC State students, employees, faculty and external enrollees.

## TRANSIT

The Transportation Leadership Development Program (TLDP) was designed by Virginia W. Blair in partnership with the Public Transportation Group at ITRE and the Integrated Mobility Division at NCDOT. The program brings together transportation professionals from urban and rural transit systems across North Carolina and provides them with an opportunity to improve their decision-making and leadership skills and, in turn, develop their own leadership style. The course is a 12-week program offered two times per year, and had a total of 20 participants in FY 2024.

### **Budget**

**Is the Center/Institute budget sufficient to continue operations for the next five years?**

Yes

### **Personnel List**

**Number of faculty members currently affiliated with the Center/Institute**

46

<b>Last name</b>	<b>First name</b>
Austin	Robert
Bardaka	Eleni
Barlaz	Morton
Boone	Kofi

Brill	Downey
Cahoon	Charles
Chen	Danjue
Chen	Karen
Coupet	Jason
Dubljevic	Veljko
Dutta	Rudra
Fathi	Yahya
Feng	Jing
Floyd	Brian
Frey	Chris
Gabr	Mo
Gandhi	Farhan
Griffith	Emily
Guvenc	Ismail
Hajbabaie	Ali
Hajibabai	Leila
Han	Kevin
Handfield	Rob
He	Yingchen
Hess	George
Hipp	Aaron
Hollar	Seth
Jaselskis	Edward
Jing	Yun
Lin	Shih-Chun
List	George
Liu	Min
Lobaton	Edgar
McCoy	Emily
McLaughlin	Richard
Mitasova	Helena
Nau	Jim
Pantic	Zeljko
Pasalar	Celen
Rasdorf	William

Roberson	Gary
Rouphail	Nagui
Sichitiu	Mihai
Tian	Renran
Vouk	Mladen
Welton	Steve

**Number of staff members currently affiliated with the Center/Institute**

46

**Number of full time equivalent Center/Institute personnel supported by State-appropriated funds as of June 30**

4.49

**Publications**

**Total number of annual Publications**

36

**Particularly noteworthy publications:**

- *A42 – From Manned Cargo to UAS Cargo Operations: Future Trends, Performance, Reliability, and Safety Characteristics Towards Integration into the NAS*  
 Bruner, T.; Carraway, K.; Haritos, T.; Silas, K.; Sugumar, R.; Cahill, C.; Johnson, M.; Lunnie, R.; Arnold, E.; Bert, S.; Findley, D.; Miller, T.; Noel, B.; Hendrix, J.; Harrison, D.; Warr, S.; Webb, N.  
 Available on assureuas.org (<https://assureuas.org/projects/uas-cargo-operations/>)  
 The use of large Uncrewed Aircraft Systems (UAS) to deliver cargo around the world is one of the prime economic use cases for UAS. This project shows that the first potentially economically-viable implementation of large-scale uncrewed air cargo (UAC) operations is integrating modified traditional aircraft into existing airport infrastructure using current FAA regulations. Further research on implementation is required to ensure a safe integration of UAC operations in the national airspace.
- *Modeling Framework for Predicting Lane Change Intensity at Freeway Weaving Segments*  
 Ahmed, I., Karr, A., Rouphail, N. M., & Chase, R. T.  
 Transportation Research Record: Journal of the Transportation Research Board  
 This study developed a modeling framework for predicting discretionary lane change (DLC) intensity on freeway weaving segments. The model performed well compared to the current Highway Capacity Manual (HCM7) model. Improved models of DLC intensity can be used to inform safer and more efficient freeway designs, especially in urban areas where interchanges are more closely spaced.
- *Review of the Continued Analysis of Supplemental Treatment Approaches of Low-Activity Waste at the Hanford Nuclear Reservation*  
 Applegate, J.; Croff, A.; Carpenter, C.; Daniel, D.; Forbes, T.; Hannigan, R.; Jantzen, C.; List, G.; Nozick, L.; Provix, J.; Rothwell, G.; Smith, A.; Smith, K.; and Whipple, C.  
 National Academies Press  
 Nuclear waste disposal remains one of the most costly and challenging technological problems facing the US government. Dr. List has been involved in assessments of ways to transport HazMat, especially nuclear waste and materials, for nearly three decades. This report reviews a proposed plan to treat and dispose of the low-level radioactive waste at the Hanford Nuclear Reservation in Washington state, which produced about two-thirds of the nation’s plutonium for nuclear weapons from 1944 to 1987.

### **Activities Supported by the Center/Institute**

- **NOTE**

In this FY, ITRE conducted 147 training courses and related educational activities. See Appendix E of this report for a listing and descriptions of the activities.

### **Educational Impact**

<b>NC State Undergraduate students:</b>	57
<b>NC State Master's students:</b>	25
<b>NC State PhD students:</b>	3
<b>NC State students (unknown status):</b>	0
<b>Non-NC State Undergraduate students:</b>	2
<b>Non-NC State Master's students:</b>	3
<b>Non-NC State PhD students:</b>	0
<b>Non-NC State student (unknown status):</b>	0
<b>Non-NC State K-12 students:</b>	0
<b>Other (Postdocs, industry professionals, etc.):</b>	9102

**Does this Center/Institute house a recognized academic program (including official certificate programs)?**

No

### **APPENDIX A – List of Graduate Students**

<b>Last name</b>	<b>First name</b>	<b>Graduated?</b>	<b>Continuing?</b>
Abjullah	Al Farabi	No	Yes
Adeyeye	Ayomide	Yes	No
Akinsanya	Taibat Amoke	No	Yes
Bawale	Abhinay Shivaji	Yes	No
Cline	Angela	No	Yes
Degbotse	Nadia	No	Yes
Hegde	Vighnesh Subray	No	Yes
Jamdade	Tanush Deependra	No	Yes
Kafashan	Fahim	No	Yes
Kolhatkar	Dhruv	No	Yes
Kulkarni	Ojas	No	Yes
Mauny	Harsh Rajesh Kumar	No	Yes
Mehta	Harshil	No	Yes
Mhalgi	Prachit Sandesh	Yes	No

Mullen	Matthew	Yes	No
Nimbalkar	Rushil	No	Yes
Niroumand	Ramin	Yes	No
Owens	Myah	Yes	No
Rijhwani	Sagar	Yes	No
Sailla	Preethi	Yes	No
Salovaara	Lauri	No	Yes
Sangamnerkar	Aditya Milind	Yes	No
Shah	Moksha Dharmesh Dharmesh	No	Yes
Smith	Colton	No	Yes
Stash	Kyra	No	Yes
Talla	Satya Sai Kiran	Yes	No
Warren	Mary	No	Yes
Watt	Macy	Yes	No



**APPENDIX B – Financial Report**

Funds Received and Expended	Academic Affairs	Agricultural Research	Agency Funds	Auxiliary Sales and Services	Contracts and Grants	Endowments	F and A Receipts	Foundations	Gift and Loan Funds	FYTD Activity: Total
Total Revenues	\$0	\$0	\$4,421	(\$1,179,599)	(\$7,884,114)	\$0	\$0	(\$19,092)	\$0	(\$9,078,384)
Personnel Expenditures	\$604,004	\$0	\$0	\$655,612	\$4,824,167	\$0	\$359,851	\$0	\$0	\$6,443,635
Operating Expenditures	\$2	\$0	\$5,218	\$574,225	\$1,127,067	\$0	\$246,510	\$0	\$0	\$1,953,023
Student Aid	\$0	\$0	\$0	\$0	\$4,516	\$0	\$0	\$0	\$0	\$4,516
Stipend Student	\$0	\$0	\$0	\$0	\$4,000	\$0	\$0	\$0	\$0	\$4,000
Stipend Non-Student	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Subcontracts	\$0	\$0	\$0	\$0	\$327,297	\$0	\$0	\$0	\$0	\$327,297
Transfers & Reserves	\$0	\$0	\$0	\$0	\$1,593,475	\$0	\$0	\$0	\$0	\$1,593,475
Total FYTD Expenditures	\$604,006	\$0	\$5,218	\$1,229,837	\$7,880,523	\$0	\$606,361	\$0	\$0	\$10,325,945

**Project IDs:** 567573, 377807, 501232, 534044, 567702, 567816, 500484, 568293, 501083, 533003, 376291, 583791, 562772, 573980, 535702, 377813, 535063, 567413, 500224, 531633, 531881, 562537, 583662, 534959, 531873, 534216, 584007, 375713, 376375, 371587, 534023, 573769, 534090, 566109, 377805, 562850, 567406, 371569, 582455, 583736, 573236, 500515, 536521, 991625, 534060, 568362, 583802, 532096, 535005, 501068, 573650, 991627, 532056, 534951, 535067, 500658, 500289, 573432, 583323, 583684, 376165, 500288, 265261, 501097, 583743, 573613, 531777, 583566, 535053, 566994, 531642, 500113, 532656, 567743, 575032, 377802, 535673, 531893, 531740, 375786, 377811, 500290, 501255, 531788, 536236, 573587, 531770, 569383, 376763, 215261, 501130, 532012, 567343, 568222, 535048, 562418, 583386, 501059, 535581, 567404, 567001, 568306, 534031, 562104, 572309, 375903, 377808, 535882, 500189, 531692, 531774, 501039, 534996, 535119, 569141, 376496, 531901, 562644, 567582, 573586, 207261, 531990, 567108, 532321, 567838, 531526, 535004, 535095, 371546, 500988, 568176, 569192, 536193, 573316, 500983, 568292, 583915, 376284, 500974, 534993, 567121, 572310, 534916, 536185, 531764, 536208, 562461, 566997, 687172, 377803, 536098, 536147, 568384, 583682, 500732, 567342, 257261, 501069, 500244, 501209, 562696, 584052, 501027, 573126, 569240, 583598, 531763, 534020, 535003, 536079, 581536, 583787, 573684, 563057, 535153, 377804, 568429, 377801, 567815, 572409, 567370, 532422, 535083, 567949, 571603, 573778, 534108, 569412, 583903, 562692, 568308, 573550, 573585, 535674, 566765, 500470, 532158, 581825, 583963, 531838, 531272, 583970, 501065, 531540, 531945, 536251, 568305, 532187, 991626, 532099, 568160, 573237, 501133, 534950, 562794, 583320, 567861, 762215, 375711, 501064, 566920, 500973, 533763, 536097, 567437, 572630, 583746, 501270, 535002, 557533, 573347, 687172-F, 376337, 535938, 761173, 573120, 375712, 583944, 531318, 533684, 536263, 375898, 531756, 534052, 534503, 534037, 501026, 562090, 562529, 567839, 568300, 533739, 567925, 582936, 533921, 535064, 551285, 567581, 534041, 536215, 582739

AWARDS							
amount_total	department	sponsor_name	transaction_type	red_pam_id	pl_list	title	program_type
\$176,123	062001-Inst for Trans Res. & Educ.	North Carolina A&T State University	Supplement	PAM-P20-000421	Samandar, Shoab (lead); Lin, Shih-Chun	Center of Excellence on Connected Autonomous Vehicles (NC-CAV)	Research
\$879	062001-Inst for Trans Res. & Educ.	Federal Aviation Administration	Supplement	PAM-P21-001962	Findley, Daniel (lead)	A-52 Disaster Preparedness and Emergency Response Phase II	Research
\$196,631	062001-Inst for Trans Res. & Educ.	NC Department of Transportation	Supplement	PAM-P22-001759	Findley, Daniel (lead)	NC Airport Technical Assistance Program 2022	Research
\$421,810	062001-Inst for Trans Res. & Educ.	NC Department of Transportation	Supplement	PAM-P22-002709	Findley, Daniel (lead)	Assessing Metrics and Indicators for the Office of Civil Rights	Research
\$33,314	062001-Inst for Trans Res. & Educ.	NC Department of Transportation	Supplement	PAM-P23-001381	Freedman, Jonah (lead)	TT 2014-44 - Non-Motorized Count Assurance Tool	Research
\$15,000	062001-Inst for Trans Res. & Educ.	University of North Carolina at Chapel Hill	New	PAM-P23-002317	Freedman, Jonah (lead); Wright, John (lead)	NCDOT Non-motorized Volume Data Program and Safety Program Support	Research
\$12,000	062001-Inst for Trans Res. & Educ.	FUJIFILM Diosynth Biotechnologies NC Inc. formerly FUJIFILM Diosynth Biotechnologies Holdings DE	New	PAM-P23-002570	Cunningham, Christopher (lead)	Task: Transportation Alternatives for Fuji Site in Holly Springs NC	Research
\$210,000	062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	PAM-P23-002574	Findley, Daniel (lead)	Local Technical Assistance Program (LTAP-131231) 2023	OSA & Public Service
\$150,000	062001-Inst for Trans Res. & Educ.	Kansas State University	New	PAM-P23-002707	Findley, Daniel (lead)	Kansas Department of Transportation (KDOT) Performance Management Dashboards	OSA & Public Service
\$115,853	062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	PAM-P23-002963	Ahmed, Ishtiak (lead); Vaughan, Christopher (lead); Samandar, Shoab	Effectiveness of NCDOT??? Dynamic Zipper Merge System	Research
\$125,000	062001-Inst for Trans Res. & Educ.	Federal Aviation Administration	New	PAM-P23-003069	Findley, Daniel (lead)	A73 - Conduct Science Technology Engineering and Math (STEM) Outreach to Minority K-12 Students Using Unmanned Aircraft Systems (UAS) as a Learning Platform	Research
\$179,345	062001-Inst for Trans Res. & Educ.	Central Pines Regional Council	New	PAM-P23-003166	Huntsinger, Leta (lead)	DCHC: Triangle Regional Model Service Bureau	Research
\$490,129	062001-Inst for Trans Res. & Educ.	NC Governors Highway Safety Program	New	PAM-P23-003256	Ferrara, Gregory (lead); Findley, Daniel	NC Vision Zero Technical and Program Support 2023-2024	Research
\$179,345	062001-Inst for Trans Res. & Educ.	NC Capital Area Metropolitan Planning Organization (CAMPO)	New	PAM-P23-003285	Huntsinger, Leta (lead)	CAMPO: Triangle Regional Model Service Bureau	Research
\$257,617	062001-Inst for Trans Res. & Educ.	NC Governors Highway Safety Program	New	PAM-P23-003329	Findley, Daniel (lead)	2024 North Carolina Observational Survey of Seat Belt Use	Research
\$179,345	062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	PAM-P23-003357	Huntsinger, Leta (lead)	NCDOT: Triangle Regional Model Services Bureau	Research
\$384,015	062001-Inst for Trans Res. & Educ.	NC Governors Highway Safety Program	New	PAM-P23-003361	Russ, Tracy (lead)	Governor's Highway Safety Program Conference & Event Support 2023/2024	Research
\$79,065	062001-Inst for Trans Res. & Educ.	Central Pines Regional Council	New	PAM-P23-003367	Huntsinger, Leta (lead)	DCHC TASK ORDER #5 RECURRENT TRIANGLE TRAVEL SURVEY: FY 2024 ??? 2025	Research
\$137,381	062001-Inst for Trans Res. & Educ.	NC Capital Area Metropolitan Planning Organization (CAMPO)	New	PAM-P24-000773	Huntsinger, Leta (lead)	RECURRENT TRIANGLE TRAVEL SURVEY: FY 2024 ??? 2025	Research
\$58,575	062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	PAM-P24-000774	Findley, Daniel (lead); Samandar, Shoab	Investigation of Ferry Wait Time Technology Implementation	Research
\$98,632	062001-Inst for Trans Res. & Educ.	Go Triangle	New	PAM-P24-000775	Huntsinger, Leta (lead)	GoTriangle TASK ORDER #5 RECURRENT TRIANGLE TRAVEL SURVEY: FY 2024 ??? 2025	Research
\$1,092	062001-Inst for Trans Res. & Educ.	Go Triangle	Correction	PAM-P24-000775	Huntsinger, Leta (lead)	GoTriangle TASK ORDER #5 RECURRENT TRIANGLE TRAVEL SURVEY: FY 2024 ??? 2025	Research
\$285,823	062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	PAM-P24-000776	Huntsinger, Leta (lead)	NCDOT RECURRENT TRIANGLE TRAVEL SURVEY: FY 2024 ??? 2025	Research
\$21,639	062001-Inst for Trans Res. & Educ.	University of North Carolina at Chapel Hill	New	PAM-P24-000968	Huntsinger, Leta (lead)	Lessons Learned from COVID-related Street Reconfigurations: How DOT Policies Can Facilitate Resilient Responses to System Disruptions (RP2024-017)	Research
\$1,000,000	062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	PAM-P24-001120	Brock, Tim (lead); Brutz, Heather; Samandar, Shoab; Underwood, Benjamin; Yoshizumi, Alexander	University Transportation Centers of Excellence Sustainable and Resilient Infrastructure	Research
\$420,000	062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	PAM-P24-001144	Cunningham, Christopher (lead)	Facilitation of Technical Assistance Program (FY 2023-2025)	Research
\$95,635	062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	PAM-P24-001243	Scott, Jeremy (lead)	PTG Training FY24	Research
\$1,451,262	062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	PAM-P24-001244	Monast, Kai (lead)	Transit Technical Assistance, Planning, and Technology Support	Research
\$293,265	062001-Inst for Trans Res. & Educ.	NC Department of Public Safety	New	PAM-P24-001403	Ferrara, Gregory (lead); Lippert, Colleen	MCSAP FY2024 Technical Support	Research
\$308,585	062001-Inst for Trans Res. & Educ.	NC Department of Public Instruction	New	PAM-P24-001546	Hart, Kevin (lead)	Technical Assistance to North Carolina Dept. of Public Instruction in the Implementation of the Transportation Information Management System (TIMS )	OSA & Public Service
\$66,718	062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	PAM-P24-001684	Bert, Steve (lead)	Implementation for Including Equity in Benefit-Cost Analysis	Research
\$195,480	062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	PAM-P24-001731	Findley, Daniel (lead)	2024 Public Perception of Transportation Fees in North Carolina	Research
\$319,837	062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	PAM-P24-001818	Bert, Steve (lead); Davis, Joy (lead); McCaleb, Emeline; Nicholas, Chase	Enhancing Strategic Prioritization Through Technical Assistance and Assessment	Research
\$138,262	062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	PAM-P24-001913	Cunningham, Christopher (lead)	NCDOT Research and Innovation Summit	Research
\$59,436	062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	PAM-P24-002793	Findley, Daniel (lead); Bert, Steve	Investigation of the Economic Effects of US809 on Yadkinville [Phase I]	Research
\$358,629	062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	PAM-P24-003166	Brock, Tim (lead); Boone, Kofi; McGill, Dru	Cemetery Mapping for Indigenous and Enslaved Peoples' Remains	Research
\$204,426	062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	PAM-P24-003308	Findley, Daniel (lead)	RP 2025-10: Assessment and Analysis of Methodologies for Initial Identification of Highway-Rail Grade Crossings for Potential Hazard Elimination Projects	Research
\$23,894	062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	PAM-P24-003572	Cunningham, Christopher (lead)	Updated Graphics and Report for "Urban Applications of innovative Intersections	Research
\$170,534	062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	PAM-P24-003604	Huntsinger, Leta (lead)	NCDOT: Triangle Regional Model Service Bureau	Research
\$530,806	062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	PAM-P24-003743	Cunningham, Christopher (lead)	Fundamental Engineering Principles	Research
\$142,594	062001-Inst for Trans Res. & Educ.	North Carolina A&T State University	Supplement	PAM-P20-000421	Samandar, Shoab (lead); Lin, Shih-Chun	Center of Excellence on Connected Autonomous Vehicles (NC-CAV)	Research
Sum: \$9,587,976							

PROPOSALS								
amount	total	department	sponsor name	transaction type	red_pt_id	pl_list	title	program_type
\$419,810		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	Supplement	P22-002709-01	Findley, Daniel (lead)	Assessing Metrics and Indicators for the Office of Civil Rights	Research
\$878		062001-Inst for Trans Res. & Educ.	Federal Aviation Administration	Supplement	P21-001962-01	Findley, Daniel (lead)	A-52 Disaster Preparedness and Emergency Response Phase II	Research
\$400,000		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	P24-000503	Cunningham, Christopher (lead)	Impact of All-Way Stop Control Intersections Along Rural and Suburban Corridors	Research
\$450,000		062001-Inst for Trans Res. & Educ.	University of Idaho	New	P24-000728	Hajbabaie, Ali (lead); Hajbabaie, Leila; List, George; Williams, Billy	Center for Transportation Cybersecurity and Risk Management (TCRM)	Research
\$33,314		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	Supplement	P23-001381-01	Freedman, Jonah (lead)	TT 2014-44 - Non-Motorized Count Assurance Tool	Research
\$58,575		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	P24-000774	Findley, Daniel (lead); Samandar, Shoaib	Investigation of Ferry Wait Time Technology Implementation	Research
\$99,724		062001-Inst for Trans Res. & Educ.	Go Triangle	New	P24-000775	Huntsinger, Leta (lead)	GoTriangle TASK ORDER #5 RECURRENT TRIANGLE TRAVEL SURVEY: FY 2024 ??? 2025	Research
\$285,823		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	P24-000776	Huntsinger, Leta (lead)	NCDOT RECURRENT TRIANGLE TRAVEL SURVEY: FY 2024 ??? 2025	Research
\$21,639		062001-Inst for Trans Res. & Educ.	University of North Carolina at Chapel Hill	New	P24-000968	Huntsinger, Leta (lead)	Lessons Learned from COVID-related Street Reconfigurations: How DOT Policies Can Facilitate Resilient Responses to System Disruptions (RP2024-017)	Research
\$350,000		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	Supplement	P24-001144-01	Cunningham, Christopher (lead)	Facilitation of Technical Assistance Program (FY 2023-2025)	Research
\$137,381		062001-Inst for Trans Res. & Educ.	NC Capital Area Metropolitan Planning Organization (CAMPO)	New	P24-000773	Huntsinger, Leta (lead)	RECURRENT TRIANGLE TRAVEL SURVEY: FY 2024 ??? 2025	Research
\$1,451,262		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	P24-001244	Monast, Kai (lead)	Transit Technical Assistance, Planning, and Technology Support	Research
\$293,265		062001-Inst for Trans Res. & Educ.	NC Department of Public Safety	New	P24-001403	Ferrara, Gregory (lead); Lippert, Colleen	MCSAP FY2024 Technical Support	Research
\$209,123		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	P24-001526	Samandar, Shoaib (lead)	Improving Travel Time Data Integration and Estimations for Strategic Prioritization	Research
\$308,585		062001-Inst for Trans Res. & Educ.	NC Department of Public Instruction	New	P24-001546	Hart, Kevin (lead)	Technical Assistance to North Carolina Dept. of Public Instruction in the Implementation of the Transportation Information Management System (TIMS )	OSA & Public Service
\$66,718		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	P24-001684	Bert, Steve (lead)	Implementation for Including Equity in Benefit-Cost Analysis	Research
\$195,480		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	P24-001731	Findley, Daniel (lead)	2024 Public Perception of Transportation Fees in North Carolina	Research
\$138,262		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	P24-001913	Cunningham, Christopher (lead)	NCDOT Research and Innovation Summit	Research
\$196,631		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	Supplement	P24-001951	Findley, Daniel (lead)	NC Airport Technical Assistance Program 2022	Research
\$42,209		062001-Inst for Trans Res. & Educ.	toXcel	New	P24-001995	Vaughan, Christopher (lead)	Strategies and Technologies for Warning, Detection, and Prevention of Trespassing in the Vicinity of Highway-Rail Grade Crossings: State of the Practice and Research Needs	Research
\$1,125,479		062001-Inst for Trans Res. & Educ.	University of Hawaii	New	P24-002306	Brock, Tim (lead); Bardaka, Eleni; Bert, Steve; Brutz, Heather; Hajbabaie, Ali; Hajbabaie, Leila; Huntsinger, Leta; Johnson, Jeremiah; List, George	Partnership for Adaptive Climate Change and Transportation	Research
\$210,000		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	P24-002487	Findley, Daniel (lead)	T2-87658 Local Technical Assistance Program (LTAP) 2024	OSA & Public Service
\$95,635		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	P24-001243	Scott, Jeremy (lead)	PTG Training FY24	Research
\$0		062001-Inst for Trans Res. & Educ.	High Street Consulting Group LLC	New	P24-002778	Huntsinger, Leta (lead)	NCDOT 2023 General Transportation Planning Services	OSA & Public Service
\$59,436		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	P24-002793	Findley, Daniel (lead); Bert, Steve	Investigation of the Economic Effects of US809 on Yadkinville [Phase I]	Research
\$266,124		062001-Inst for Trans Res. & Educ.	NC Governors Highway Safety Program	New	P24-002848	Findley, Daniel (lead)	2025 North Carolina Observational Survey of Seat Belt Use	Research
\$112,634		062001-Inst for Trans Res. & Educ.	University of North Carolina at Chapel Hill	New	P24-002849	Cunningham, Christopher (lead)	NCHRP 17-126: Crash Prediction Models for Alternative and Unconventional Intersections	Research
\$350,000		062001-Inst for Trans Res. & Educ.	Virginia Polytechnic Institute	New	P24-002896	Bert, Steve (lead)	ATTAINING Efficient Multi-Modal Freight Delivery in Alaska	Research
\$540,728		062001-Inst for Trans Res. & Educ.	NC Governors Highway Safety Program	New	P24-002920	Ferrara, Gregory (lead); Findley, Daniel	NC Vision Zero Technical and Program Support 2024-2025	Research
\$342,600		062001-Inst for Trans Res. & Educ.	Alliance for System Safety of UAS through Research Excellence (ASSURE)	New	P24-003002	Findley, Daniel (lead)	A84 Disaster Preparedness and Emergency Response Phase IV (ASSURE)	Research
\$150,000		062001-Inst for Trans Res. & Educ.	Ohio University	New	P24-003146	Findley, Daniel (lead); Bert, Steve	Preparing Appalachia for a Sustainable Electric Aviation Future (PASEAF)	OSA & Public Service
\$200,479		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	P24-003166	Brock, Tim (lead); Boone, Kofi; McGill, Dru	Cemetery Mapping for Indigenous and Enslaved Peoples' Remains	Research
\$21,139		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	P24-003167	Freedman, Jonah (lead)	CAMPO AREA BIKE/PED COUNTER UPGRADES	OSA & Public Service
\$323,224		062001-Inst for Trans Res. & Educ.	NC Governors Highway Safety Program	New	P24-003261	Russ, Tracy (lead)	2024/2025 GHSP Conference & Event Support Grant	OSA & Public Service
\$141,231		062001-Inst for Trans Res. & Educ.	Vanasse Hangen Brustlin, Inc. (VHB)	New	P24-003287	Russ, Tracy (lead)	Safe Streets & Roads for All (SS4A): City of Fayetteville with VHB	OSA & Public Service
\$300,000		062001-Inst for Trans Res. & Educ.	University of Alaska	New	P24-003288	List, George (lead); Bert, Steve; Birkland, Thomas; Dutta, Rudra; Findley, Daniel; Guvenc, Ismail; Hajbabaie, Leila; Sichert, Mihail	AV-based Logistics Support for Impoverished Rural Populations	Research
\$204,426		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	P24-003308	Findley, Daniel (lead)	RP 2025-10: Assessment and Analysis of Methodologies for Initial Identification of Highway-Rail Grade Crossings for Potential Hazard Elimination Projects	Research
\$170,534		062001-Inst for Trans Res. & Educ.	Durham, NC	New	P24-003520	Huntsinger, Leta (lead)	DCHC: Triangle Regional Model Service Bureau FY25	Research
\$170,534		062001-Inst for Trans Res. & Educ.	NC Capital Area Metropolitan Planning Organization (CAMPO)	New	P24-003521	Huntsinger, Leta (lead)	CAMPO: Transportation Regional Model Service Bureau FY25	Research
\$170,533		062001-Inst for Trans Res. & Educ.	Go Triangle	New	P24-003522	Huntsinger, Leta (lead)	Go Triangle: Transportation Regional Model Service Bureau FY25	Research
\$996,111		062001-Inst for Trans Res. & Educ.	MacroSys, LLC	New	P24-003557	Findley, Daniel (lead); Bert, Steve	Highway Cost Allocation Study (HCAS) [HPTS24008PR]	Research
\$23,894		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	P24-003572	Cunningham, Christopher (lead)	Updated Graphics and Report for "Urban Applications of Innovative Intersections"	Research
\$170,534		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	P24-003604	Huntsinger, Leta (lead)	NCDOT: Triangle Regional Model Service Bureau	Research
\$452,564		062001-Inst for Trans Res. & Educ.	US Dept. of Transportation (DOT)	New	P24-003677	Ferrara, Gregory (lead); Russ, Tracy	HP-CMV Safety Project: Southeast CMV Safety Summit	Research
\$530,806		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	P24-003743	Cunningham, Christopher (lead)	Fundamental Engineering Principles	Research
\$312,229		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	P24-003779	Findley, Daniel (lead)	RP2025-25 Professional Enhancement Program	OSA & Public Service
\$56,200		062001-Inst for Trans Res. & Educ.	toXcel	New	P24-003827	Samandar, Shoaib (lead)	Enhancing Transportation Safety with AI-Driven Complete Streets Analytics	Research
\$82,250		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	P24-003887	Scott, Jeremy (lead)	Project TitlePTG Training FY25	OSA & Public Service
\$293,170		062001-Inst for Trans Res. & Educ.	NC Department of Public Safety	New	P24-003898	Ferrara, Gregory (lead); Mohammed, Aleem	ITRE FY2025 Technical Support of NCSHP Commercial Vehicle Truck Size and Weight Enforcement Program	Research
\$638,081		062001-Inst for Trans Res. & Educ.	NC Department of Transportation	New	P24-004133	Findley, Daniel (lead)	2024-2025 Maintenance Technical Assistance Program	OSA & Public Service
\$0		062001-Inst for Trans Res. & Educ.	Alliance for System Safety of UAS through Research Excellence (ASSURE)	New	P24-004305	Findley, Daniel (lead)	Teaming Agreement for ASSURE	Research
\$400,000		140301-Civil, Const & Env Engineering	National Science Foundation (NSF)	New	P24-002767	List, George (lead); Catete, Veronica; Dubljevic, Veljko; Huntsinger, Leta	Operationalizing Ethical Practices to Better Serve Marginalized Communities in AI-Driven Transportation Forecasting & Civil Engineering Models	Research
Sum: \$14,069,254								

<b>Title of Journal Paper, Report or Other Publication</b>	<b>Author(s)</b>	<b>Name of Journal, Publisher or Client</b>	<b>Date Published</b>
A Limited, Real-World Assessment of Key Autonomous Vehicle Car Following Models.	Das, T., Samandar, S., Roupail, N., & Williams, B. (2023, September).	IEEE Xplore	2023
A41 - Investigate and Identify the Key Differences Between Commercial Air Carrier Operations and Unmanned Transport Operations	Haritos, T.; Bruner, T.; Carraway, K.; Silas, K.; Sharma, M.; Bert, S.; Arnold, E.; Findley, D.; Webb, N.; Johnson, M.; Lunnie, R.; Cahill, C.	Available on assureuas.org ( <a href="https://assureuas.org/projects/air-carrier-operations/">https://assureuas.org/projects/air-carrier-operations/</a> )	2024
A42 – From Manned Cargo to UAS Cargo Operations: Future Trends, Performance, Reliability, and Safety Characteristics Towards Integration into the NAS	Bruner, T.; Carraway, K.; Haritos, T.; Silas, K.; Sugumar, R.; Cahill, C.; Johnson, M.; Lunnie, R.; Arnold, E.; Bert, S.; Findley, D.; Miller, T.; Noel, B.; Hendrix, J.; Harrison, D.; Warr, S.; Webb, N.	Available on assureuas.org ( <a href="https://assureuas.org/projects/uas-cargo-operations/">https://assureuas.org/projects/uas-cargo-operations/</a> )	2024
A45 Shielded UAS Operations: Detect and Avoid (DAA): Final Report	Askelson, M.; Peters, J.; Scott, Q.; Theisen, C.; Nair, S.; Henry, M.; Arnold, E.	Submitted June 2024, in review by FAA, will be posted to ASSURE website when project is closed	2024
A45 Shielded UAS Operations: Detect and Avoid (DAA): Task 5 NCSU May 2024 Flight Test Report	Arnold, E.	Submitted June 2024, in review by FAA, will be posted to ASSURE website when project is closed	2024
A61 STEM Outreach – Conduct Science Technology Engineering and Math (STEM) Outreach to Minority K-12 Students Using Unmanned Aircraft Systems (UAS) as a Learning Platform (STEM IV)	Findley, D.; Arnold, E.; Carraway, K.; Kimerer, J.; Silas, K.; Walker, S.; Schrader, S.; Shepherd, A.	Available on assureuas.org ( <a href="https://www.assureuas.org/wp-content/uploads/2022/02/A61-Final-Report.pdf">https://www.assureuas.org/wp-content/uploads/2022/02/A61-Final-Report.pdf</a> )	2024
Advancing Highway Traffic Monitoring Through Strategic Research: 2024 Update	Tsapakis, I. et. al.	Transportation Research Circular	2024
Age Differences in Driver Visual Behavior and Vehicle Control When Driving with In-Vehicle and On-Road Deliveries of Service Logo Signs	Feng, J.; Deng, Y.; Lau, M.; Cauffman, S.; Johnson, E.; Cunningham, C.M.; and D. Kaber	International Journal of Industrial Ergonomics, ERGON-D-21-00544R2	2023
Analysis of driver behavior at grade-separated intersections to support design	Yunmei Liu, David Kaber, Christopher Cunningham, Thomas Chase, and Kihyun Pyo	Applied Ergonomics	2024
Analysis of Driver Behavior at Grade-Separated Intersections to Support Design.	Liu, Y; Kaber, D.; Cunningham, C.M.; Chase, T.; and K. Pyo	Human Factors in Technology and Society: Applied Ergonomics. Volume 118. Available at <a href="https://www.sciencedirect.com/science/article/pii/S0003687024000644">sciencedirect.com/science/article/pii/S0003687024000644</a>	2024

<b>Title of Journal Paper, Report or Other Publication</b>	<b>Author(s)</b>	<b>Name of Journal, Publisher or Client</b>	<b>Date Published</b>
Analytical and Microsimulation Model Calibration and Validation: Application to Roundabouts under Sight-Restricted Conditions	Chun, G.; Roupail, N.; Samandar, M.; List, G.; Yang, G.; and Akcelik, R.	Transportation Research Record 2677	2023
Arterial Signal Coordination Considering the Impacts of Left-Turn Waiting Areas	Wang, D., Du, P. & Yang, G.	Journal of Transportation Engineering, Part A: Systems	Oct 2023
Challenges & barriers for real-time integration of drones in emergency cardiac care: Lessons from the United States, Sweden, & Canada	Zegre-Hemsey, J.; Cheskes, S.; Johnson, A.; Rosamond, W.; Cunningham, C.; Arnold, E.; Schierbeck, S.; Claesson, A.	Resuscitation Plus	Mar 2024
Comparative Analysis of Alternative Powertrain Technologies in Freight Trains: A Numerical Examination Towards Sustainable Rail Transport	Aredaha, A.; Dua, J.; Hegazi, M; List, G.; and Rakha, H.	Applied Energy	2024
Data Fusion for Signalized Arterial Performance Measurement	S Samandar, N Roupail, T Chase, G Chun	STRIDE Project Report	2023
Developing Vehicle Weight Monitoring Program Design Guidelines Based on Advanced Data Analytics	Adivar, B.; List, G.; Adivar, M.; and Bhattacharya, S.	Final Report, NCDOT Project RP2022-061	2023
Development of Formal Constructability Review Meeting Guidelines for Transportation Agencies	Akhnoukh, A., Bonilla, M., Findley, D., and Rasdorf, W.	ASC2023 (59th Annual Associated Schools of Construction International Conference)	2023
Differential impacts of autonomous and connected-autonomous vehicles on household residential location.	Hasnat, M. M., Bardaka, E., & Samandar, M. S.	Travel behaviour and society	2023
Effects of Probabilistic Priority on Delay at Permissive Left-Turn Signalized Intersections	Wang, D., Yang, G., Tian, Z., Wei, D. & Mao, X.	IEEE Transactions on Intelligent Transportation Systems	May 2024
Evaluating the effectiveness of automated scheduling at rural transit agencies in North Carolina	Bhagat-Conway, M.; Pullo, L.; Monast, K.	Case Studies on Transport Policy	In Press
Evaluation of Self-Assessment “Ungrading” Practices in a STEM Course	Bonilla, M., and Findley, D.	Advances in Engineering Education	IN PRESS
Examining Contingency and Inflation Practices Within Several Departments of Transportation in the United States	Alsharif, A., Findley, D., Jaselskis, E., Dudley, T., Pyo, K., & Yang, G.	Transportation Research Record	2024
Examining Contingency and Inflation Practices Within Several Departments of Transportation in the United States	Abdullah Alsharif, Daniel J Findley, Edward Jaselskis, Thomas Dudley, Kihyun Pyo, Guangchuan Yang	Transportation Research Record	2024
Examining Factors Influencing the Acceleration Behavior of Autonomous Vehicles Through Explainable AI Analysis	anmay Das; Shoaib Samandar; Nagui Roupail; Billy Williams; Dan Harris	IEEE Xplore	2024

<b>Title of Journal Paper, Report or Other Publication</b>	<b>Author(s)</b>	<b>Name of Journal, Publisher or Client</b>	<b>Date Published</b>
Identifying and Mitigating Congestion Onset	List, G.; Williams, B.; Hunter, M.; and Hadi, M.	STRIDE Project Report	2024
Incorporation of Drone Technology Into the Chain of Survival for OHCA: Estimation of Time Needed for Bystander Treatment of OHCA and CPR Performance	Starks, M.; Blewer, A.; Chow, C.; Sharpe, E.; Van Vleet, L.; Arnold, E.; Buckland, D.; Joiner, A.; Simmons, D.; Green, C.; Mark, D.	Circulation: Cardiovascular Quality and Outcomes	Apr 2024
Modeling Framework for Predicting Lane Change Intensity at Freeway Weaving Segments	Ahmed, I., Karr, A., Roupail, N. M., & Chase, R. T.	Transportation Research Record: Journal of the Transportation Research Board	2023
Multi-Decadal Decarbonization Pathways for U.S. Freight Rail	List, G.; Hoffrichter, A.; Rakha, H.; Bardaka, E.; Johnson, J.; and Cao, Yu.	ARPA-E Project Report, DE-AR0001471	2023
NeTrainSim: A Network Freight Train Simulator for Estimating Energy/Fuel Consumption	Aredah, A.; Fadhoun, K.; Rakha, H.; List, G.; Hegazi, M.; and Hoffrichter, A.	SSRN	2024
Policy, management, and operation practices in U.S. microtransit systems	Ghimire, S.; Bardaka, E.; Monast, K.; Wang, J.; Wright, W.	Transport Policy	2024
Quadrant Roadway Intersections: Tradeoffs Between Control Delay Savings and Extra Travel Times	Yang, G.; Cunningham, C.M.; and M. Brown	Transportation Research Board: TRR Issue 6, Volume 2678, TRB, Washington, D.C.	2023
Review of the Continued Analysis of Supplemental Treatment Approaches of Low-Activity Waste at the Hanford Nuclear Reservation	Applegate, J.; Croff, A.; Carpenter, C.; Daniel, D.; Forbes, T.; Hannigan, R.; Jantzen, C.; List, G.; Nozick, L.; Provix, J.; Rothwell, G.; Smith, A.; Smith, K.; and Whipple, C.	National Academies Press	
Safety Effects for Conversion from Protected-Only Left Turn Phasing to Time-of-Day Protected-Permissive Left Turn Using Flashing Yellow Arrows	Lee, T.; Cunningham, C.M.; and C. Simpson	Transportation Research Board: TRR Issue 6, Volume 2677, TRB, Washington, D.C	
Surrogate safety measures: Review and assessment in real-world mixed conventional and autonomous vehicle platoons	Das, T., Samandar, M. S., Autry, M. K., & Roupail, N. M. (2023)	IEEE Access	2023
Transition probability matrices for pavement deterioration modelling with variable duty cycle times	Ángela Alonso-Solorzano, Heriberto Pérez-Acebo, Daniel J. Findley, Hernán Gonzalo-Orden	International Journal of Pavement Engineering	2023
Using Frequency Domain Analysis to Elucidate Travel Time Reliability Along Congested Freeway Corridors	Cheng, Q.; Zhou, X.; and List, G.	Transportation Research, Part B.	2024

Title of Course or Activity	Description	Instructional Format	Sessions Offered	Contact Hrs per Session	Total Participants
<b>AVIATION (NC AIRTAP; NGAT; UAS)</b>					
Airport Board Member Training	This self-paced, online training course is designed to guide new board members at North Carolina public airports in understanding and performing their administrative roles. There is no cost to enroll in the course.	Online	1	3.00	91
ALMP Course 4: Airport Funding and Finance	This one-day, in-person training course examines aspects of funding and financing for airport operations, maintenance, and construction.	Classroom	1	6.00	66
ALMP Course 7: The Fixed Based Operator (On-Demand)	This self-paced, online training course examines the role of a FBO, its services and management options, and how to create a good customer service climate at the airport.	Online	1	6.00	18
ALMP Course 8: Airport Public Relations and Communications	This self-paced, online training course discusses how to create and update communication, marketing and public relations plans for the airport.	Online	1	6.00	17
ALMP Course 10: Airport Leadership and Management Skills	This one-day, in-person training course presents concepts, tools and techniques for building success as an airport manager.	Classroom	1	6.00	63
ALMP Course 11: Future Airport Opportunities	Aviation is experiencing a technological paradigm shift that has not been seen since the introduction of jet aircraft. In addition, airports will have to adapt to economic and social changes simultaneously. This one-day hybrid course looks at these changes and offers strategies on how to deal with them.	Hybrid	1	6.00	75
ALMP Course 12: The Airport Consultant	This one-day, in-person training course discusses the role of the airport consultant in North Carolina. Real world airport projects will be referenced as examples to help participants understand the proper roles of the sponsor and consultant. Example projects will include planning, design, construction, through project completion, and closeout.	Classroom	1	6.00	45
UAS-TOP Level 1 Training	The Trusted Operator Program™ (TOP) provides a certification process for commercial uncrewed aircraft system (UAS) pilots beyond their FAA Part 107. TOP Level 1 operators are identified as skilled for flying missions that don't utilize waivers and for aircraft weighing less than 5 pounds.	Online	1	12.00	20

Title of Course or Activity	Description	Instructional Format	Sessions Offered	Contact Hrs per Session	Total Participants
UAS-TOP Level 2 Training	The Trusted Operator Program™ (TOP) provides a certification process for commercial uncrewed aircraft system (UAS) pilots beyond their FAA Part 107. TOP Level 2 operators are skilled for flying missions that utilize waivers, visual observers, or sensor operators and operate with elevated risk factors and complexity.	Online	1	16.00	13
UAS-TOP Level 3 Training	The Trusted Operator Program™ (TOP) provides a certification process for commercial uncrewed aircraft system (UAS) pilots beyond their FAA Part 107. TOP Level 3 operators are identified as skilled for flying missions in safety critical and complex areas that require higher levels of risk mitigation and for operations requiring development and testing of new procedures.	Online	1	18.00	6
<b>HIGHWAY SYSTEMS (PE/FE; FEP; HEC; MAINTENANCE OPERATIONS &amp; SAFETY; BIKE/PED; TRAFFIC SAFETY/VISION ZERO)</b>					
Applied Roundabout Design	This course presents the key geometric principles and guidelines used to develop and design a roundabout. The differences between older traffic circles and rotaries and new roundabout design features are highlighted. The course also addresses the typical questions of why, where, when and how roundabouts should be considered as an appropriate intersection solution.	Online	1	16.00	9
Basic Work Zone Installer Safety	This workshop teaches the basics of work zone traffic control. The course covers short-term operations – no longer than one work shift – and focuses on daytime activities.	Online	4	8.00	168
Basic Work Zone Installer Safety	This workshop teaches the basics of work zone traffic control. The course covers short-term operations – no longer than one work shift – and focuses on daytime activities.	Classroom	18	8.00	388
Escort Vehicle Operator: Training the Trainer	This course is designed to meet the training requirements set by the NC Department of Transportation to certify Oversize-Overweight load escort vehicle Instructors. Course components consist of defensive driving, escort driver requirements, Federal Guidelines, skills training, and an exam.	Classroom	2	8.00	11
Flagger Certification	This workshop is designed to train participants to be effective flaggers by teaching the basics of flagging operations and procedures.	Classroom	15	4.00	353



<b>Title of Course or Activity</b>	<b>Description</b>	<b>Instructional Format</b>	<b>Sessions Offered</b>	<b>Contact Hrs per Session</b>	<b>Total Participants</b>
Flagging Instructor Training	This workshop teaches participants the basics of flagging operations and then instructs them how to teach their own personnel these concepts	Online	1	8.00	22
Flagging Instructor Training - Recertification	This workshop teaches participants the basics of flagging operations and then instructs them how to teach their own personnel these concepts	Online	1	4.00	9
Intermediate Work Zone Safety	This workshop builds on the information covered in the Basic Work Zone Safety course, with particular emphasis paid to multi-lane urban streets. Multi-lane intersection work zones, detours, and mobile operations are covered in detail. Basic Work Zone Safety Training is a prerequisite for this course.	Online	4	8.00	160
Intermediate Work Zone Safety	This workshop builds on the information covered in the Basic Work Zone Safety course, with particular emphasis paid to multi-lane urban streets. Multi-lane intersection work zones, detours, and mobile operations are covered in detail. Basic Work Zone Safety Training is a prerequisite for this course.	Classroom	10	8.00	235
Fundamentals of Engineering Principles (FEP) Program	The FEP Program is a series of courses offering introductory engineering education for transportation technicians. FEP courses build a deeper conceptual understanding of transportation design, inspection, and field practices.	Online	2	366.00	424
Roadway Drainage	This workshop teaches the basics of roadway drainage	Online	4	16.00	81
Guardrail Installation and Repair	This workshop teaches the basics of guardrail installation and repair	Classroom	1	16.00	10
Site Development & Highway Access – Introductory Level	This class is meant to be a comprehensive introduction to highway access principles discussed in the NCDOT Driveway Access Manual and associated manuals.	Classroom	4	8.00	93
Site Development & Highway Access – Practitioner Level	This class looks at more complex case examples with discussions on government/developer involvement/interaction. The course is intended for TIA preparers; NCDOT district and traffic engineering staff; local government planning, transportation and traffic staff; and site developers. It is recommended that you complete the Introductory Level before you enroll in the Practitioner Level.	Classroom	4	12.50	64

Title of Course or Activity	Description	Instructional Format	Sessions Offered	Contact Hrs per Session	Total Participants
Traffic Signals Workshop: Principles, Detection, and Timing of Traffic Signals	This two-day workshop is designed to provide participants with an introduction to the fundamentals of individual traffic signals and traffic signal systems	Classroom	1	16.00	27
Work Zone Traffic Control Supervisor	This course is designed for NCDOT, larger municipalities, and highway contractors that work on all highway systems, including two-lane roads, multi-lane roadways, and high-volume, high-speed, controlled access facilities. This course covers traffic control plan reading and development, positive protection, work zone capacity, night work, and inspection. Part 6 of the MUTCD and state DOT "Roadway Standard Drawings" are used as the text for this course. Additional handouts are used to supplement these materials. All work zone durations are covered in this course. Participants will be tested at the conclusion of the workshop for NCDOT Work Zone Supervisor certification.	Online	2	17.50	64
Work Zone Traffic Control Supervisor	This course is designed for NCDOT, larger municipalities, and highway contractors that work on all highway systems, including two-lane roads, multi-lane roadways, and high-volume, high-speed, controlled access facilities. This course covers traffic control plan reading and development, positive protection, work zone capacity, night work, and inspection. Part 6 of the MUTCD and state DOT "Roadway Standard Drawings" are used as the text for this course. Additional handouts are used to supplement these materials. All work zone durations are covered in this course. Participants will be tested at the conclusion of the workshop for NCDOT Work Zone Supervisor certification.	Classroom	3	17.50	56
Work Zone Traffic Control Supervisor-Recertification	This workshop is intended for people who have completed ITRE's 'Work Zone Traffic Control Supervisor' course and now need recertification. This course will address updates in work zone safety, including any changes to NCDOT Roadway Standard Drawings and Part 6 of the Manual on Uniform Traffic Control Devices. All participants who successfully complete the course will be certified for another 4 years as a Work Zone Traffic Control Supervisor.	Online	2	8.00	32

<b>Title of Course or Activity</b>	<b>Description</b>	<b>Instructional Format</b>	<b>Sessions Offered</b>	<b>Contact Hrs per Session</b>	<b>Total Participants</b>
Work Zone Traffic Control Supervisor-Recertification	This workshop is intended for people who have completed ITRE's 'Work Zone Traffic Control Supervisor' course and now need recertification. This course will address updates in work zone safety, including any changes to NCDOT Roadway Standard Drawings and Part 6 of the Manual on Uniform Traffic Control Devices. All participants who successfully complete the course will be certified for another 4 years as a Work Zone Traffic Control Supervisor.	Classroom	3	8.00	34
Introduction Survey 123	This course provides context for the why behind using Survey123 during weather-related emergencies, offers staff with the steps to download the Survey123 application, obtain log-in information, demonstrates how to enter a survey for site-specific location and debris operations, etc. This class is designed for individuals that have not used Survey123 previously and staff that may need a refresher before the hurricane and winter seasons	Online	7	2.00	177
Snow and Ice Control for New Hire Operators	This course is designed to introduce new hires to the NCDOT's operating procedures prior to the winter season and activities during winter weather events. In addition, this class can serve as a refresher for any staff member	Online	8	2.00	211
Fundamentals of Engineering (FE) - Self-Paced - NCDOT	This is a review course for the civil engineering exam only and covers approximately 16 topics.	Online	1	130.00	18
Fundamentals of Engineering (FE) - Self-Paced - NCSU	This is a review course for the civil engineering exam only and covers approximately 16 topics.	Online	1	130.00	21
Fundamentals of Engineering (FE) - Self-Paced	This is a review course for the civil engineering exam only and covers approximately 16 topics.	Online	1	130.00	15
Fundamentals of Engineering (FE) - Tues/Fri - NCDOT	This is a review course for the civil engineering exam only and covers approximately 16 topics.	Online	1	130.00	20
Fundamentals of Engineering (FE) - Tues/Fri	This is a review course for the civil engineering exam only and covers approximately 16 topics.	Online	1	130.00	3

<b>Title of Course or Activity</b>	<b>Description</b>	<b>Instructional Format</b>	<b>Sessions Offered</b>	<b>Contact Hrs per Session</b>	<b>Total Participants</b>
Highway Engineering Concepts (HEC) Program - NCDOT	The HEC course reviews and reinforces the Fundamental Engineering Principles (FEP) course content through a project-based curriculum that applies engineering principles to real-world transportation engineering projects.	Classroom	1	130.00	17
Professional Engineering (PE) - Friday/Saturday - NCDOT - Classroom	This is a civil engineering professional engineering exam review course which covers breadth and depth topics in construction, geotechnical, transportation, and water resources and environmental. Only breadth topics are covered in the structural discipline.	Classroom	1	98.00	20
Professional Engineering (PE) - Friday/Saturday	This is a civil engineering professional engineering exam review course which covers breadth and depth topics in construction, geotechnical, transportation, and water resources and environmental. Only breadth topics are covered in the structural discipline.	Classroom	1	98.00	7
Professional Engineering (PE) - Self-Paced	This is a civil engineering professional engineering exam review course which covers breadth and depth topics in construction, geotechnical, transportation, and water resources and environmental. Only breadth topics are covered in the structural discipline.	Online	2	66.00	58
Professional Engineering (PE) - Study Aid - NCDOT	This is a civil engineering professional engineering exam review course which covers breadth and depth topics in construction, geotechnical, transportation, and water resources and environmental. Only breadth topics are covered in the structural discipline.	Online	2	66.00	17
Professional Engineering (PE) - Retake	This is a civil engineering professional engineering exam review course which covers breadth and depth topics in construction, geotechnical, transportation, and water resources and environmental. Only breadth topics are covered in the structural discipline.	Online	2	66.00	3
Professional Engineering (PE) - Tuesday Synchronous Online NCDOT	This is a civil engineering professional engineering exam review course which covers breadth and depth topics in construction, geotechnical, transportation, and water resources and environmental. Only breadth topics are covered in the structural discipline.	Online	1	66.00	5

<b>Title of Course or Activity</b>	<b>Description</b>	<b>Instructional Format</b>	<b>Sessions Offered</b>	<b>Contact Hrs per Session</b>	<b>Total Participants</b>
Professional Engineering (PE) - Tuesday Synchronous Online	This is a civil engineering professional engineering exam review course which covers breadth and depth topics in construction, geotechnical, transportation, and water resources and environmental. Only breadth topics are covered in the structural discipline.	Online	1	66.00	20
NCDOT Executive Education Program - Financial, Budget, and Procurement Processes (Advanced)	This comprehensive training course provides advanced training on NCDOT's various procurement procedures.	Online	1	30.00	1
NCDOT Executive Education Program - Financial, Budget, and Procurement Processes (Introduction)	This comprehensive training course provides introductory training on NCDOT's various procurement procedures. Also included is a big picture overview of NCDOT's financial processes, including the annual budget.	Online	1	10.00	2
NCDOT Executive Education Program - How to Grow at NCDOT	This comprehensive training course provides introductory training on NCDOT's various procurement procedures. Also included is a big picture overview of NCDOT's financial processes, including the annual budget.	Online	1	3.00	2
2024 NC Traffic Safety Conference & Expo	The premiere biennial event for North Carolina professionals to learn about traffic safety education, programming, research, technologies and law enforcement from local and national experts. Participants include state and local law enforcement officers, child passenger safety technicians, judicial officials, transportation engineers and planners, public health professionals and university researchers.	Classroom	1	72.00	607
Different, Different World Training	Different, Different World (DDW) is an experiential training workshop. Through hand-on exercises, participants experience communication challenges that individuals who are Deaf, Hard of Hearing, and DeafBlind face in their everyday lives. DDW will help strengthen your skills and awareness in effective communication using various tools and strategies with individuals who have hearing loss.	Classroom	1	2.50	18

**NC LOCAL TECHNICAL ASSISTANCE PROGRAM (NC LTAP)**

Title of Course or Activity	Description	Instructional Format	Sessions Offered	Contact Hrs per Session	Total Participants
ADA in Temporary Traffic Control	This workshop describes the challenges faced by individuals with disabilities as they travel in the built environment, and includes a discussion of the relevant legal authorities (ADA, PROWAG, MUTCD). The basic requirements of the Pedestrian Access Route are reviewed including width, protruding objects, cross slope, grade, surfaces and curb ramps/detectable warnings. The requirements for the alternate pedestrian access route are reviewed. Tools to minimize the impacts of construction/maintenance/utility operations on pedestrians will be discussed. The session will conclude with an interactive review/discussion of various work zone scenarios and best practices.	Classroom	2	4.00	40
ADA in Temporary Traffic Control	This workshop describes the challenges faced by individuals with disabilities as they travel in the built environment, and includes a discussion of the relevant legal authorities (ADA, PROWAG, MUTCD). The basic requirements of the Pedestrian Access Route are reviewed including width, protruding objects, cross slope, grade, surfaces and curb ramps/detectable warnings. The requirements for the alternate pedestrian access route are reviewed. Tools to minimize the impacts of construction/maintenance/utility operations on pedestrians will be discussed. The session will conclude with an interactive review/discussion of various work zone scenarios and best practices.	Online	1	2.00	26

Title of Course or Activity	Description	Instructional Format	Sessions Offered	Contact Hrs per Session	Total Participants
ADA Self Evaluations/Elements of PROWAG	With the 25-year anniversary of the passage of ADA, it is critical that local governments recognize their obligation to upgrade streets, sidewalks and facilities for accessibility. ADA requires that public agencies perform self-evaluations and prepare transition plans. They were to have been completed by July 26, 1992 and be updated periodically. The morning portion of the workshop examines the background to, contents of and enforcement of the self-evaluation and transition plan requirements. Several landmark court cases are also highlighted. A case study is presented to illustrate these items. Participants will leave the session with a “To Do” list of next steps they need to take and a toolkit of helpful resources. The afternoon session overviews the current criteria for accessible public rights-of-way including the pedestrian access route, curb ramps and detectable warnings, accessible pedestrian signals, street furniture, on-street parking and temporary traffic control requirements for pedestrians.	Online	1	6.00	21
ADA Self Evaluations/Elements of PROWAG	With the 25-year anniversary of the passage of ADA, it is critical that local governments recognize their obligation to upgrade streets, sidewalks and facilities for accessibility. ADA requires that public agencies perform self-evaluations and prepare transition plans. They were to have been completed by July 26, 1992 and be updated periodically. The morning portion of the workshop examines the background to, contents of and enforcement of the self-evaluation and transition plan requirements. Several landmark court cases are also highlighted. A case study is presented to illustrate these items. Participants will leave the session with a “To Do” list of next steps they need to take and a toolkit of helpful resources. The afternoon session overviews the current criteria for accessible public rights-of-way including the pedestrian access route, curb ramps and detectable warnings, accessible pedestrian signals, street furniture, on-street parking and temporary traffic control requirements for pedestrians.	Classroom	3	6.00	68

<b>Title of Course or Activity</b>	<b>Description</b>	<b>Instructional Format</b>	<b>Sessions Offered</b>	<b>Contact Hrs per Session</b>	<b>Total Participants</b>
Advanced Computer Skills: Practical Applications	This full-day workshop is entirely focused on practical applications of spreadsheets, reports, and presentations in your organization. The workshop will demonstrate the effectiveness of various computer programs with actual files that you use regularly.	Classroom	1	6.00	9
Asphalt Pavement Maintenance	This workshop covers pavement evaluation, asphalt mix materials, hot plant mix production and pavement construction methods, routing pavement maintenance techniques, and pothole patching.	Classroom	4	6.00	89
Asset Management		Classroom	2	8.00	21
Basic Computers: Reports and Presentations	This full-day workshop is focuses on practical applications of spreadsheets, reports, and presentations in your organization. The workshop will demonstrate the effectiveness of various computer programs with actual files that you use regularly.	Classroom	3	6.00	32
Basic Concepts of Supervision	The Basic Concepts of Supervision focuses on the elements that new supervisors should be aware of: tasks of a leader, being a role model, motivation techniques, communication skills, problem solving and decision making, conflict and time management, customer service and stress management. The workshop is interactive with lecture, small and large group exercises and skill practices. Participants will have opportunities to ask and answer questions related to the subjects as described.	Classroom	2	7.00	29
Basic Concepts of Supervision	The Basic Concepts of Supervision focuses on the elements that new supervisors should be aware of: tasks of a leader, being a role model, motivation techniques, communication skills, problem solving and decision making, conflict and time management, customer service and stress management. The workshop is interactive with lecture, small and large group exercises and skill practices. Participants will have opportunities to ask and answer questions related to the subjects as described.	Online	3	6.00	52
Basic Drainage/Roadway Drainage Maintenance	There are three things you need to have a good road: drainage, drainage, and drainage. This program covers drainage principles, drainage policy, ditches, pipes, and other drainage features, including installation maintenance and construction of drainage components.	Classroom	2	7.00	50



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Basic Work Zone Installer Safety	This workshop teaches the basics of work zone traffic control. The course covers short-term operations (no longer than one work shift) and focuses on daytime activities. This course must be completed before taking Intermediate Work Zone Safety Training.	Classroom	39	8.00	843
Chain Saw Safety	Use of a chain saw requires a whole host of special personal protective equipment, including special glasses, gloves, chaps, and more. This hands-on class will cover basic chain saw operational safety awareness (e.g. proper protective wear, starting, kick back prevention, cutting do's and don'ts) as well as body position during cutting and a few advanced topics. Each attendee will don the proper PPE for a routine sawing operation of felled trees, inspect the condition of the saw, check fluid levels, crank the saw and perform a successful cutting operation.	Classroom	2	4.00	46
Concrete: What? When? and How?	This class features the basics of concrete installation from the composition of concrete to an actual student hands on session demonstrating placing and finishing techniques. This course is geared to anyone interested in improving concrete skills and will provide students with a general knowledge of concrete. Part of this workshop will be hands-on working with concrete.	Classroom	2	7.00	38
Confined Space Entry and Lockout/Tagout	This workshop is a follow-up to the Trenching Competent Person workshop. It is a must for any field supervisor who has crews working in confined spaces, such as: manholes, catch basins, meter vaults, and excavations deeper than four feet.	Classroom	4	8.00	57
Construction Mathematics for Transportation Personnel	This class covers very practical areas for those who need to read plans, order and solve problems dealing with materials and supplies. Topics include reading blueprints; orienting plans (north arrow, vicinity map, or other clarifying features); measurements using scale; calculating area; materials factoring for asphalt, concrete, and stone; and estimating areas for odd shapes such as circles and triangles.	Classroom	1	6.00	28

Title of Course or Activity	Description	Instructional Format	Sessions Offered	Contact Hrs per Session	Total Participants
Designing Pedestrian Facilities for Accessibility	Facilities in the public right-of-way (including walkways, ramps, curb ramps and landings, crosswalks, and pedestrian overpasses and underpasses) must be designed, constructed and maintained to serve all users. This course identifies the applicable laws, regulations, guidelines and standards pertaining to accessibility for persons with disabilities. Requirements for ensuring accessibility in existing facilities versus work in new construction and alternations will be discussed. Design elements necessary for achieving accessibility in the public right-of-way will be reviewed. Best practices will be identified.	Classroom	1	7.00	25
Designing Pedestrian Facilities for Accessibility	Facilities in the public right-of-way (including walkways, ramps, curb ramps and landings, crosswalks, and pedestrian overpasses and underpasses) must be designed, constructed and maintained to serve all users. This course identifies the applicable laws, regulations, guidelines and standards pertaining to accessibility for persons with disabilities. Requirements for ensuring accessibility in existing facilities versus work in new construction and alternations will be discussed. Design elements necessary for achieving accessibility in the public right-of-way will be reviewed. Best practices will be identified.	Online	2	6.00	36
Effective Leadership Skills	Leadership involves effective communication with organizational members to build successful teams and achieve organizational goals. This course will include ideas for communicating clear goals, helping groups negotiate clear communication expectations, motivating employees, assessing team progress, and providing effective performance feedback. Furthermore, this course will provide an opportunity to prepare for a supervisory or leadership role by learning management concepts, tools, and techniques to build personal influence and succeed as a leader. Topics include ethics, organizational self-assessment, defining excellence, and team development.	Online	2	6.00	30

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Ethics in Public Works	This course focuses on the importance of ethics in Public Works. Course content includes legal requirements and restrictions under North Carolina state law that apply to public officials and employees – conflicts of interest in public contracting, prohibitions on accepting gifts and favors from vendors and contractors, misuse of confidential information, and misuse of public resources (otherwise known as embezzlement).	Classroom	1	6.00	10
Excavation Safety	This workshop will not only teach the participants to recognize danger, but will equip them with the tools to prevent dangerous accidents.	Classroom	1	7.00	29
Fall Protection	According to the Occupational Safety and Health Administration (OSHA) Fall Protection requirements, workers in local and state government, as well as construction firms can be subject to general industry regulations while performing some duties and construction industry regulations on other occasions. In addition, federal OSHA has issued quite a number of fall protection interpretations that pertain, but are not included in the two books of OSHA regulations. This class provides an overview of these many different fall protection provisions, interpretations and grandfathered work environments.	Classroom	2	7.00	22
Flagger Certification	This workshop is designed to train participants to be effective flaggers by teaching the basics of flagging operations and procedures.	Classroom	21	4.00	359
Fundamentals of Government	This course provides an overview of the American federal system with a focus on local government in North Carolina, particularly municipalities, including the organization and operation of municipal governments and their interactions with the community and in the intergovernmental system.	Online	1	6.00	6
Grants 101 Workshop		Classroom	1	7.00	10

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How to Keep Yourself and Your Agency Out of Court	This workshop provides an understanding of the importance and implications of tort liability risk for road agencies. The class will cover risk management principles, review risk management activities, and identify ways to reduce risk. Students will study examples that show the importance of considering human behavior when planning for their city or town.	Online	2	6.00	17
Inspecting Curb Ramps	This class will introduce the ADA requirements for the pedestrian access route. Requirements for ensuring accessibility in existing facilities versus work in new construction and alternations will be discussed. The focus of the class will be curb ramps in the public right-of-way.	Classroom	2	4.00	46
Inspecting Curb Ramps	This class will introduce the ADA requirements for the pedestrian access route. Requirements for ensuring accessibility in existing facilities versus work in new construction and alternations will be discussed. The focus of the class will be curb ramps in the public right-of-way.	Online	2	4.00	61
Intermediate Work Zone Safety	This workshop builds on the information covered in the Basic Work Zone Installer course, with particular emphasis paid to multi-lane urban streets. Multi-lane intersection work zones, detours, and mobile operations are covered in detail. Basic Work Zone Installer Training is a prerequisite for this course.	Classroom	14	7.00	184
Maintenance and Repair of Utility Cuts	This workshop expands on the discussion of utility cut repairs presented in the Asphalt Pavement Maintenance workshop and includes an in-depth review of the use of flowable fill concrete for utility cut maintenance and repair.	Classroom	2	4.00	63
Management Techniques for Experienced Managers	The Management Techniques for Experienced Managers is for supervisors and managers with some years of experience in their positions. Subjects include: resource management, negotiation skills, ethics, delegation, coordination with other units, team building, planning, setting priorities. A variety of instructional strategies is used: lecture, large group discussions, small group exercises and skill practices. The final activity brings all of the elements discussed earlier into focus by having the small groups complete a case study.	Classroom	1	7.00	26

Title of Course or Activity	Description	Instructional Format	Sessions Offered	Contact Hrs per Session	Total Participants
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Managing Conflict with the Public and Employees	This class focuses on three primary topics: conflict styles, strategies for de-escalating conflict, and steps for negotiating a mutually beneficial resolution to conflict. Participants will have the opportunity to practice conflict management strategies in role-play situations.	Classroom	2	7.00	46
NCBELS Ethics and Rules of Professional Conduct	This webinar focuses on teaching the newly-revised Continuing Professional Competency Rules along with guidance and examples of ethics and professional conduct. Satisfies the new requirement for the 1-hour Professional Development Hour (PDH) in Ethics or Rules of Professional Conduct.	Online	1	1.00	376
OSHA 10-Hour	This workshop is an important tool in meeting the Occupational Safety and Health Administration (OSHA) requirements to provide employees with an awareness of the basic hazards that exist in the field. Over a 10-hour period, this workshop covers many important basic safety requirements that field employees must know that are in OSHA's Standards for the Construction Industry. OSHA inspectors can enforce these safety rules for field employees working in the public or private sector.	Classroom	1	10.00	22
Pavement Preservation		Classroom	2	7.00	22
Pipe Installation		Classroom	1	7.00	25

Title of Course or Activity	Description	Instructional Format	Sessions Offered	Contact Hrs per Session	Total Participants
Reducing Roadway Departure Crashes	More than half of the annual fatal crashes in the U.S. relate to roadway departures, and they are the leading cause of traffic deaths in many states. This workshop provides participants with some tools for addressing roadway departure crashes. Topics covered include a discussion of engineering countermeasures as well as implementation strategies.	Classroom	1	7.00	6
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Road Safety 365	A one-day workshop that focuses on processes for incorporating safety into all aspects of local and rural road projects, and on making safety a priority through inclusion in the traditional decision-making process—365 days a year. The main goal of this workshop is to raise the safety awareness of practitioners on how to incorporate safety into project development and everyday work. It stresses the importance of road safety, and illustrates how it can be integrated into rural/local transportation project development at all stages: planning, design, construction, implementation, operations, and maintenance.	Classroom	2	7.00	43
Silica Standards – Strategies for Municipal Compliance	The Occupational Safety and Health Administration (OSHA) limits the permissible exposure level (PEL) for workers exposed to respirable crystalline silica to be 50 micrograms per cubic meter over an average 8-hour period. Municipalities and construction contractors are particularly impacted by this regulation because of the variety of tools that are routinely used on concrete pavement, sidewalk and curbing, asphalt pavement and other concrete related products in their day-to-day work activities. This seven-hour program helps large and small organizations plan for, implement and comply with this workplace standard.	Classroom	2	8.00	27

<b>Title of Course or Activity</b>	<b>Description</b>	<b>Instructional Format</b>	<b>Sessions Offered</b>	<b>Contact Hrs per Session</b>	<b>Total Participants</b>
Snow and Ice Control	In this workshop, participants learn snow and ice control procedures, properties of snow and ice and appropriate treatments, common deicing chemicals and alternative materials, winter storm preparation, and storm removal equipment and operations.	Classroom	3	7.00	65
Soil Fundamentals	This workshop focuses on the important aspects of highway sub-grade preparation, including soil classifications, compaction of fills, soil compaction tests, proof rolling, and the importance of proper drainage.	Classroom	2	6.00	41
Storm Water Hydrology	This workshop is an introduction to stormwater hydrology and drainage design. The morning session will concentrate on the movement of water over the earth's surface. The afternoon session will deal with the design elements of urban stormwater systems.	Classroom	3	8.00	66
Traffic Calming	Traffic engineers, street supervisors and other public officials face a growing number of complaints about high motor vehicle speeds and volumes in residential neighborhoods. This can occur on classifications from local streets to minor arterials. The issue can also occur on state highways passing through small- and medium-size communities. This workshop will discuss typical traffic problems in neighborhoods and their causes. Geometric design features and traffic control strategies to provide safer and more livable neighborhoods will be described, including residential area traffic circles, curb extensions (bulb-outs), median islands, realigned intersections, speed humps, chokers and diverters. Impacts of these features on roadway users (pedestrians/bicyclists, emergency vehicles, transit and maintenance and related vehicles) will be reviewed along with legal and liability issues. Attention will also be given to the process of traffic calming, including public participation, identification of the problem and plan development, approval and implementation.	Online	1	6.00	11

Title of Course or Activity	Description	Instructional Format	Sessions Offered	Contact Hrs per Session	Total Participants
Traffic Sign Retroreflectivity/Pavement Markings	Traffic signs provide an important means of communicating information to road users. They need to be visible to be effective. The nighttime environment presents many sign visibility challenges. Since drivers cannot see as many visual cues as they can during the day, this places greater reliance on signs and other traffic control devices. To provide nighttime sign visibility, most signs are made from retroreflective sheeting. Retroreflectivity is the property of a material that re-directs light back to the originating source. Since the retroreflective properties of signs deteriorate over time, road and street officials should assess their schedules for inspecting, cleaning and replacing signs to ensure that these maintenance activities meet the objectives of the Manual on Uniform Traffic Control Devices and, more importantly, the needs of drivers at night. This workshop will help practitioners gain a better understanding of sign retroreflectivity issues in order to improve the overall nighttime visibility of traffic signs.	Online	1	6.00	11
Trenching Competent Person	The Occupational Safety and Health Administration (OSHA) safety regulations for trenching and other types of excavations require a trained “competent person” to be at the excavation whenever any employees are involved working in or near the hole. This course teaches required OSHA technique for proper hands-on classification of soils that trained competent persons must be able to perform in order to meet the requirements of OSHA for soil types A, B and C.	Classroom	10	8.00	116



Title of Course or Activity	Description	Instructional Format	Sessions Offered	Contact Hrs per Session	Total Participants
Work Zone Traffic Control Supervisor	This three-day course is designed for NCDOT, larger municipalities, and highway contractors that work on all highway systems, including two-lane roads, multi-lane roadways, and high-volume, high-speed, controlled access facilities. This course covers traffic control plan reading and development, positive protection, work zone capacity, night work, and inspection. Part 6 of the MUTCD and state DOT "Roadway Standard Drawings" are used as the text for this course. Additional handouts are used to supplement these materials. All work zone durations are covered in this course. Participants will be tested at the conclusion of the workshop for NCDOT Work Zone Supervisor certification. Certification for the Basic and Intermediate Work Zone Safety Courses are both included in this course.	Classroom	9	20.00	191
Work Zone Traffic Control Supervisor-Recertification	This workshop is intended for people who have completed ITRE's 'Work Zone Traffic Control Supervisor' course and now need recertification. With NCDOT requiring recertification every 4 years, this course will address updates in work zone safety, including any changes to NCDOT Roadway Standard Drawings and Part 6 of the Manual on Uniform Traffic Control Devices. All participants who successfully complete the course will be certified for another 4 years as a Work Zone Traffic Control Supervisor.	Classroom	6	7.00	41
<b>PUBLIC TRANSPORTATION / TRANSIT</b>					
Operating Statistics Reporting	How to collect and report transit operating statistics.	Online	4	1.00	78
Transportation Leadership Development Program	This 12-week Transportation Leadership Development Program (TLDP) mixes self-study materials and seminars. During the course of study, participants work through exercises that promote a deeper understanding of effective decision-making, employee motivation, teamwork, and practical applications of creative ideas.	Classroom	2	62.00	20
<b>TRANSPORTATION INFORMATION MANAGEMENT SYSTEM (TIMS)</b>					
LEA Planning	Back to School Planning Webinar	Online	1	2.00	85
New Users	New Users Class	Online	1	12.00	9
Back to School for Directors	Back to School for Directors Webinar	Online	1	2.00	12

<b>Title of Course or Activity</b>	<b>Description</b>	<b>Instructional Format</b>	<b>Sessions Offered</b>	<b>Contact Hrs per Session</b>	<b>Total Participants</b>
Back to School\Open House Reports	Back to School for Operators Webinar	Online	1	2.0	67
eSQL	TIMS-eSQL Tips and Tricks	Online	1	2.0	13
Fall Route Updates	Fall Route Updates - Best Practices	Online	1	2.0	23
New Users	New Users Class	Online	1	12.0	10
Transfers & Mid-Day	Creating\Managing Transfer Stops and Mid-Day Routes	Online	1	8.0	12
TD2\TD2R Reports	Understand DPI Reports: TD2\TD2R	Online	1	2.0	68
New Users UPSTU	Overview of Student Update Process for New Staff	Online	1	1.0	29
MARIS #1	Part 1 of Mapping Certification	Online	1	12.0	9
MARIS #2	Part 2 of Mapping Certifications	Online	1	8.0	7
UPSTU & EMU	Edulog Maintenance Utilities - Common and Special	Online	1	1.5	17
TDTIMS Overview	Deep Dive Overview of TDTIMS	Online	1	2.0	66
TIMS Reports & Worklists	TIMS Reports: Basic and Custom	Online	1	4.0	14
TDTIMS Demo	Demo of TDTIMS Submission Process	Online	1	2.0	74
MARIS #3	Part 3 of Mapping Certification\Refresher Course	Online	1	2.0	10
Boundary Planning	Boundary Planning and Enrollment Analysis	Online	1	8.0	8
eSQL	TIMS-eSQL Tips and Tricks	Online	1	2.0	22
Reports and Worklists	TIMS Reports: Basic and Custom	Online	1	4.0	28
New Users	New Users Class	Online	1	12.0	9
MARIS #1	Part 1 of Mapping Certification	Online	1	12.0	9
Transfers & MidDay	Creating\Managing Transfer Stops and Mid-Day Routes	Online	1	8.0	11
MARIS #2	Part 2 of Mapping Certifications	Online	1	8.0	5
EMU & UPSTU	Edulog Maintenance Utilities - Common and Special	Online	1	2.0	25
MARIS #3	Part 3 of Mapping Certification\Refresher Course	Online	1	2.0	15
Planning #1	Summer and Fall Planning Webinar	Online	1	2.0	81
Boundary Planning	Boundary Planning and Enrollment Analysis	Online	1	8.0	9
Reports and Worklists	TIMS Reports: Basic and Custom	Online	1	4.0	32
Planning #2	Student Promotions and Fall Planning	Online	1	2.0	85
New Users	New Users Class	Online	1	12.0	11

<b>Title of Course or Activity</b>	<b>Description</b>	<b>Instructional Format</b>	<b>Sessions Offered</b>	<b>Contact Hrs per Session</b>	<b>Total Participants</b>
Planning #3	Summer School Prep and Planning	Online	1	2.0	111
NCPTA - Competition Overview	Overview with Participants	Classroom	1	1.0	13
NCPTA - Managing Driver Updates and Student Removals	Route Updates - Best Practices	Classroom	1	1.0	40
NCPTA - Transfer Stops and Mid Day Runs	Creating\Managing Transfer Stops and Mid-Day Routes	Classroom	1	1.0	28
NCPTA - Batch Fill Data Tricks	Purging and Importing Special Data via Spreadsheets	Classroom	1	1.0	29
NCPTA - The TIMS ESQLE Experience	TIMS-eSQL Tips and Tricks	Classroom	1	1.0	23
NCPTA - Basic Routing Principles, Tips & Tricks	Routing Concepts, Stpes, Tips and Tricks	Classroom	1	1.0	25
NCPTA - TIMS Server Management - Tips & Tricks	TIMS Server Managment - Tips and Best Practices	Classroom	1	1.0	21
NCPTA - New Routers (A Year in TIMS)	Understanding the Tasks\Seasons of TIMS	Classroom	1	1.0	13
NCPTA - Annual Service Indicators Dashboard Tool	Demo of Online TIMS Data Dashboard	Classroom	1	1.0	25
NCPTA - Boundary Refresher-Tips & Tricks	Boundary Planning and Enrollment Analysis	Classroom	1	1.0	16
NCPTA - Competition (Hands -On) 4 hrs	Annual TIMS Bus Routing Competition	Classroom	1	4.0	11
NCPTA - Maris Refresher- TIPS & Tricks	MARIS Refresher - Tips and Tricks	Classroom	1	1.0	15
NCPTA - TIMS & Infinite Campus	Update on TIMS and Infinite Campus	Classroom	1	1.0	31
NCPTA - Closing Ceremonies	TIMS Presentation and EOY Awards	Classroom	1	3.0	300
<b>TOTAL PARTICIPANTS FOR ALL COURSES AND ACTIVITIES</b>					<b>9102</b>