INDEX
TECHNICAL COORDINATION COMMITTEE MEETING
June 18, 2024

TECHNICAL COORDINATION COMMITTEE MEETING

June 18, 2024

Opening Remarks and Introductions

The North Carolina Technical Coordination Committee (NC-TCC) convened for its quarterly meeting on June 18, 2024, via Microsoft Teams. This gathering aimed to score the submitted STIC applications by the NC-TCC and disseminate updates on the progress and outcomes of ongoing projects. The North Carolina Transportation Innovation Council (NC-TIC's) mission is to cultivate a culture of collaboration within the North Carolina Department of Transportation (NCDOT), ensuring the swift adoption of significant innovations that contribute to the delivery of a contemporary, high-quality transportation system to the public.

Alyson Tamar welcomed attendees and introduced the meeting's agenda. Details regarding participant attendance is at the end of these minutes, the presentation slides can be found in the Appendix.

FHWA Update

Edward Parker, the Assistant Division Administrator, provided a brief update from the Federal Highway Administration (FHWA) recent leadership changes. The new National STIC Program Manager is Maria Rosa, taking over for Sara Lowry. Maria has spent 17 years with FHWA and is developing the schedule and agenda for the National STIC Network meeting. The last meeting took place in January 2023.

Amit Armstrong has been named as the new national managed for Accelerating Market Readiness (AMR) Program. Amit has spent 20 years with FHWA. This program provides funding to spur the advancement of emerging transformative innovations. It is available for testing and field evaluations, pilot demonstration projects, and document and dissemination of performance results. NCDOT has not utilized this program. A presentation on AMR will tentatively be added to the next NC-TCC meeting agenda.

NCTIC Updates

After the Federal Highway Administration (FHWA) updates, Alyson Tamar discussed the purpose

of today's meeting which was to vote on the two STIC applications shared with the NC-TCC to move the proposals forward with the available funding ($125,000).'

EDC 7 – DBE in Design Build Initiative

While the STIC Applications were being scored, Tonya Marriott (Deputy Director of the Office of Civil Rights) and Christy Berk (Policy Advisor of the Office of Civil Rights) presented on the DBE participation in Design Build. This effort is a part of the EDC 7 Strategic Workforce Development. Their presentation cannot be included in these minutes but a copy of their EDC 7 report can be found on the NCTIC website (NC Transportation Innovation Council (NC-TIC) (ncdot.gov)). Additionally, Tonya and Christy can be contacted directly for follow up. tmmarriott@ncdot.gov cgberk@ncdot.gov

STIC Application Presentations and Scoring

Daniel Carter presented on the Use of Artificial Intelligence to Improve Vulnerable Road User Safety submission. A copy of the application and presentation can be found in the appendix.

Matthew Carlisle presented on the Develop Great Talent submission. A copy of this application and presentation can be found in the appendix.

Following the presentations and Q&A, the applicants left the meeting. The NC-TCC then voted on the submitted applications via MS Forms. Voting was completed by NC-TCC voting members only. A copy of the list of voting members present and absent can be found at the end of these minutes. Fourteen votes were submitted. The questions and applicable weights for each question were discussed in the March meeting and included in the form. A copy of the questions and the weights (in parentheses) can be found below.

STIC Scoring Criteria

1. On a scale from 1 - 5, with 1 being not at all and 5 being completely, how much does the proposal advance the identification or practice of the identified innovation? (20)
2. On a scale from 1 - 5, with 1 being not at all and 5 being completely, how much would the proposal advance the innovation into application beyond research? (15)
3. On a scale from 1 - 5, with 1 being a mainstreamed idea and 5 being completely new, how new is this innovation for NCDOT? (15)

4. On a scale from 1 - 5, with 1 being not at all and 5 being completely, how much does the proposal advance the goals and mission of NCDOT? (NCDOT's six core goals and their current performance can be viewed here: https://www.ncdot.gov/about-us/our-mission/Performance/Pages/default.aspx) (30)
5. On a scale from 1 - 5, with 1 being not at all and 5 being completely, how much does the proposal meet the goals of the STIC Incentive Program? (Background information and goals of the STIC Incentive Program can be found here: https://www.fhwa.dot.gov/innovation/stic/guidance.cfm) (20)

The final scores were 3.86 for Developing Great Talent and 4.07 for Use of AI to Improve Vulnerable Road User Safety. The NC-TCC is interested in moving both forward, but the $125,000 Federal Match is insufficient to split and execute both scopes fully. The committee agreed to allow another month of collaboration with NCDOT to identify additional funding opportunities for a larger state match before finalizing the recommended award amount for each project.

Next Steps

The final recommendation is due to FHWA by August 9th. To meet this date, the following activities will take place.

Meeting with NCDIT-Transportation to discuss the STIC application that includes the use of AI to review the scope and make any adjustments to meet NCDIT-T's requirements. Following a finalization of the scope, additional funding sources will be secured. Curtis Bradley from the Research Office will work alongside the submitters to potentially complete the research scope items from the proposal through the research office.
Meeting with OCR and HR to discuss the STIC application that falls within the EDC-7 initiative, strategic workforce development.

Updates to the NC-TCC will be provided by July 12th with a request for final feedback by July 19th. Finalization of the applications and funding split will be completed by August 2nd to meet the recommendation submission timeline.

Adjournment

Concluding the open discussion, Alyson Tamer adjourned the meeting.

Attendance and Voting Members

NCTCC 06/18/24 Attendees **indicates a voting member* ***indicates a proxy for a voting member*	
Kristin Barnes*	Christy Berk
Boyd Tharrington	Curtis Bradley*
Terry Canales	Matthew Carlisle
Daniel Carter	Matt Clarke*
Becca Gallas*	Yolanda Jordan*
Kate Davison*	Chris Lukasina*
Caitlyn Mabry	Tonya Marriott
Keith Mims	Amanda Olive*
Edward Parker*	Ebony Pittman**
Lamar Sylvester*	Julie White*
Alyson Tamer*	Victor Barbour*
Voting Members not in attendance	
Robert Barrier	*Sam Boswell*
Ryan Brumfield	*Greg Dean*
Jed Dixon	*Brian Mayhew*
Jason Orthner	*Catherine Peele*
Ellis Powell	*Tara Robbins*
Tunya Smith	

Appendix A:
STIC Applications
Presentation Materials
Scoring Summary

Project Title: Using Artificial Intelligence to Improve Vulnerable Road User Safety

Unit: Traffic System Systems Engineer (NCDOT: Traffic Safety Data & Engineering)

Submitter: Daniel Carter, PE – Senior Traffic Safety Project Engineer

Project Abstract: Pedestrians, bicyclists, and other non-motorists represent the most vulnerable people traveling on our state's streets and roads. Crashes involving these vulnerable road users are often serious, with 18% of the crashes resulting in death or serious injury. Improving safety for non-motorists must begin with good knowledge on where they are traveling and what kinds of road safety issues are occurring.

Description: The scope of this work would be statewide, using turning movement counts collected on all state-owned roads and crash data involving vulnerable road users throughout the state, on both state-owned and locally-owned roads. This project is intended to develop the AI methodology as a proof-of-concept. Further continuation of a successful proof-of-concept in a future project would implement the methodology within NCDOT to process and extract the data statewide.

EDC: EDC7 – Nighttime Visibility for Safety

Project Length: 24 Months

Obligation Date: September 1, 2024

Total Cost: $125,000 **NCDOT Match:** $25,000 from TSMO

Task Breakdown:

Task	Timeline	Cost
Conduct initial meeting(s) with NCDOT to establish final scope and objectives of the project and identify data sources to be used in the project. Establish project team access to existing data.	2 months	$5,000
Identify existing AI-based methods or tools that could be used to accomplish project objectives. Evaluate each existing method or tool for use in this project. Determine to what extent custom programming is needed. Provide a summary of the evaluation to NCDOT staff and work with NCDOT to determine the most appropriate path to follow for the remaining tasks.	3 months	$15,000
Work with NCDOT staff to obtain existing data, consisting of turning movement count reports and crash narrative data. Prepare data for use by AI analysis, including formatting and data cleaning.	2 months	$15,000
Develop methodology to use AI to extract data from data sources to fulfill project objectives. This work might involve the use of existing methods or tools or the development of new methods or tools.	11 months	$65,000
This task will involve validating the results of the methodology by comparison to ground truth data. Identify, develop, or obtain data to be used as ground truth for validating the AI results. Refine methodology to improve results. Finalize the methodology or tool through iteratively working with the ground truth validation.	4 months	$20,000

Document methodology fully, including data processing steps, use of existing or developed AI systems, process flow, and code used. Provide recommendations for next steps to be undertaken in subsequent to implement the methodology statewide.	2 months	$5,000
TOTAL	**24 Months**	**$125,000**

NORTH CAROLINA
Department of Transportation

Using Artificial Intelligence to Improve Vulnerable Road User Safety

Daniel Carter

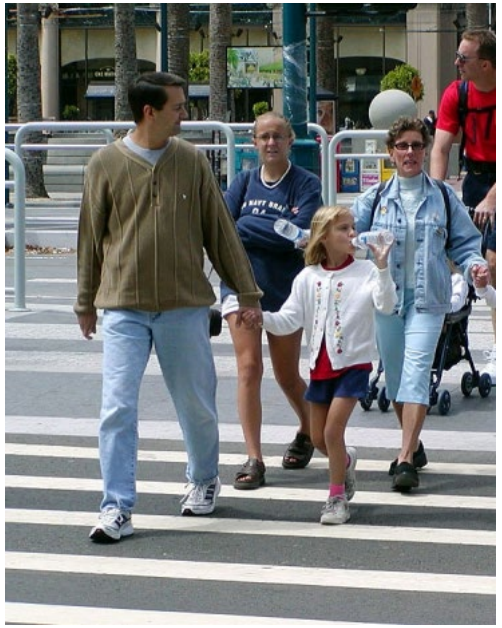
Presented to the NC-TIC Technical Coordination Committee

June 18, 2024

Connecting people, products and places safely and efficiently with customer focus, accountability and environmental sensitivity to enhance the economy and vitality of North Carolina

Motivation

- Vulnerable road users are a priority in NCDOT road safety efforts
- Pedestrians, bicyclists, and other non-motorists
- Improving safety for non-motorists requires:
  - good knowledge on where they are traveling
  - what kinds of safety issues are occurring



www.pedbikeimages.org / Dan Burden

Goal

- Good potential to use Artificial Intelligence (language processing) to glean information through data mining

Good knowledge on where they are traveling → Pedestrians counted in turning movement counts

What kinds of road safety issues are occurring → Crash narratives

Example: Turning Movement Count Data Mining

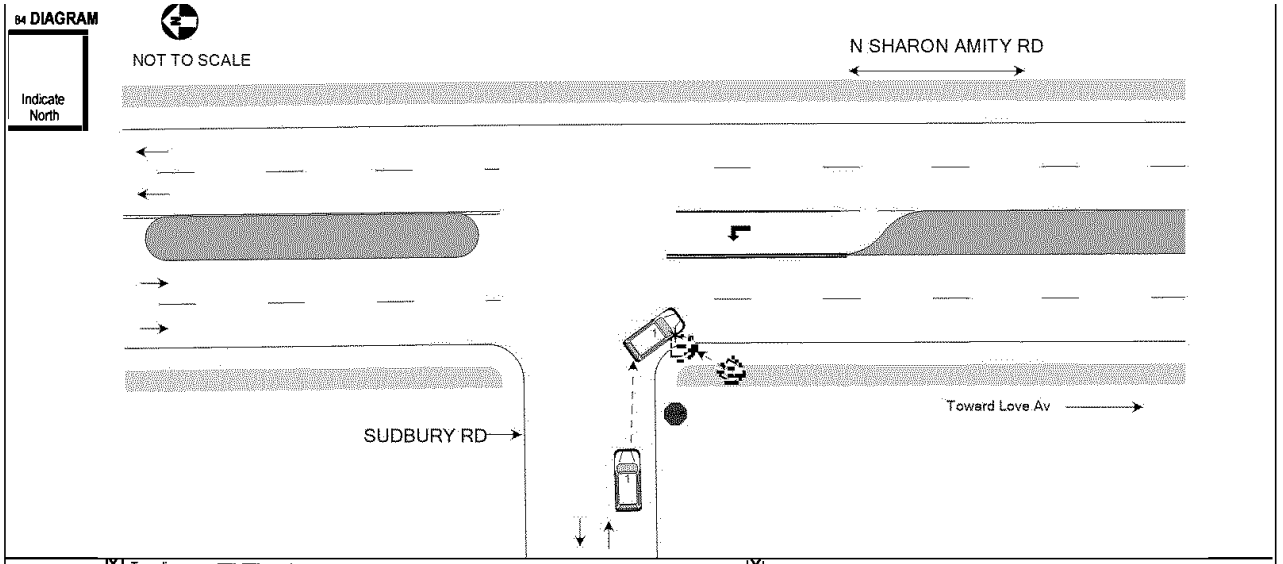
Groups Printed- Classes 1, 2, 3 - Classes 4, 5, 6, 7 - Classes 8, 9, 10 - Classes 11, 12, 13 - Bikes, Peds

	Mackenan Dr/Chalon Dr Southbound					US 64 Westbound					Mackenan Dr/Chalon Dr Northbound					US 64 Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
16:15	4	3	6	0	13	7	451	23	2	483	41	6	17	0	64	9	400	1	0	410	970
16:30	2	1	8	0	11	8	506	26	1	541	71	12	27	0	110	12	337	5	0	354	1016
16:45	5	1	2	0	8	11	574	18	1	604	48	11	21	0	80	15	404	7	0	426	1118
Total	17	6	24	0	47	36	1973	97	4	2110	201	31	83	0	315	47	1524	16	1	1588	4060
17:00	3	8	8	0	19	26	505	26	0	557	93	12	25	0	130	10	397	7	1	415	1121
17:15	5	1	3	0	9	34	514	13	0	561	53	15	18	0	86	22	361	5	0	388	1044
17:30	3	1	8	0	12	16	520	22	0	558	63	11	17	1	92	19	371	5	0	395	1057
17:45	1	6	8	0	15	26	487	30	0	543	46	7	20	0	73	18	366	2	0	386	1017
Total	12	16	27	0	55	102	2026	91	0	2219	255	45	80	1	381	69	1495	19	1	1584	4239
18:00	3	3	4	0	10	25	432	17	0	474	64	8	21	3	96	6	424	8	0	438	1018
18:15	3	2	4	0	9	13	383	8	1	405	36	2	8	0	46	5	393	3	0	401	861
18:30	5	4	7	0	16	10	339	6	1	356	23	2	12	0	37	6	278	1	1	286	695
18:45	2	1	7	0	10	11	323	7	1	342	28	1	6	0	35	11	317	4	0	332	719
Total	13	10	22	0	45	59	1477	38	3	1577	151	13	47	3	214	28	1412	16	1	1457	3293
Grand Total	215	98	420	0	733	509	17722	1435	35	19701	1530	165	723	7	2425	859	18642	189	17	19707	42566

Example 1: Crash Narrative Data Mining

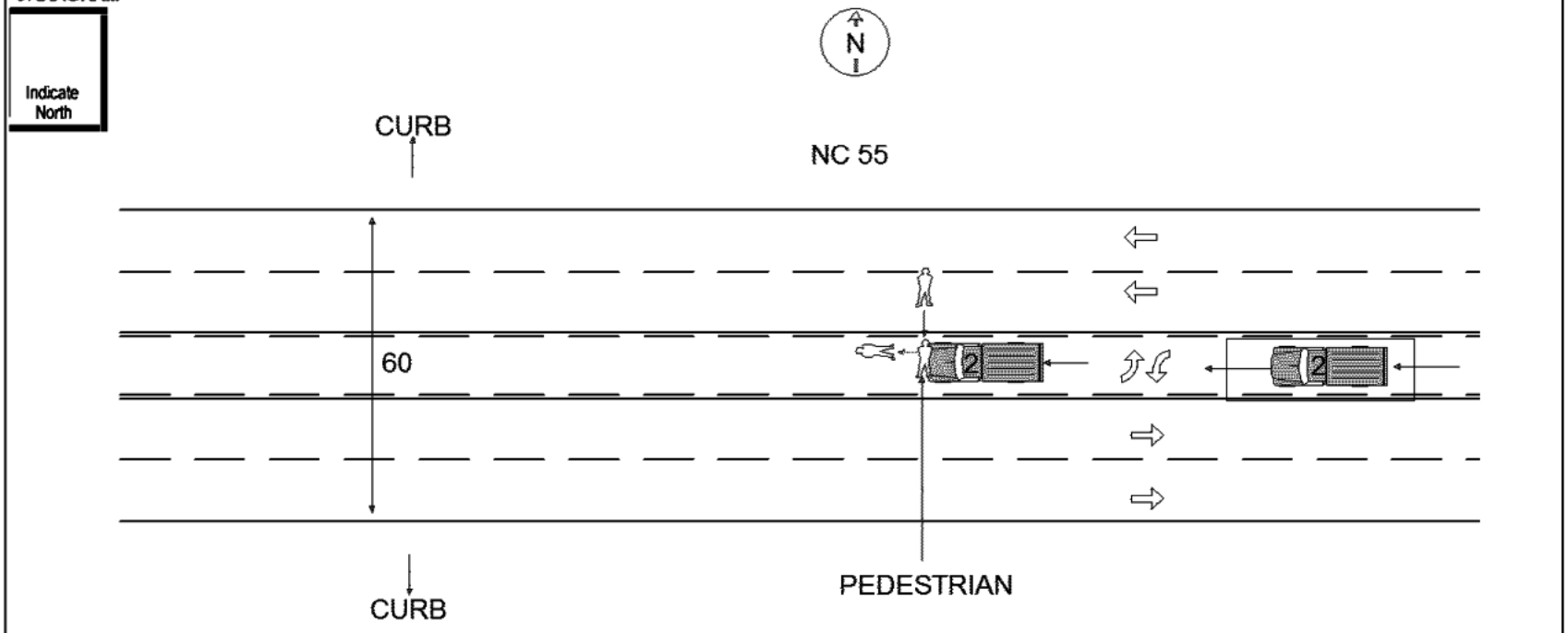
- Recorded by officer using fields on form:
  - Crash occurred at Sharon Amity Rd and Sudbury Rd
  - Vehicle making right turn
  - Units were on different roadways
  - Unit 2 was “pedestrian”
  - Pedestrian was entering or crossing
  - Pedestrian suffered B-level injury

- Thing we can learn from narrative:
  - Unit 2 was in motorized wheelchair
  - Sidewalk was present
  - Unit 2 was on sidewalk
  - Unit 2 was crossing Sudbury Rd
  - 911 was called and “blood on his lips” (indicates/verifies injury severity)



Example 2: Crash Narrative Data Mining

84 DIAGRAM



Unit# 1 was: ☒ Traveling ☐ Parked Facing ☐ ☒ ☐ ☐ N S E W on NC 55

Unit# 2 was: ☒ Traveling ☐ Parked Facing ☐ ☐ ☐ ☒ N S E W on NC 55

85 NARRATIVE (Include pertinent and unusual aspects, which are not listed elsewhere on the form)

UNIT 1 WAS A PEDESTRIAN WALKING SOUTH ACROSS THE LANES OF TRAFFIC ON NC 55. VEHICLE 2 WAS TRAVELING WEST IN THE TURNING LANE ON NC 55. UNIT 1 WAS TRYING TO CATCH HER DOG IN THE TRAVEL LANE. VEHICLE 2 WAS ATTEMPTING TO BLOCK TRAFFIC IN THE TURNING LANE AND COLLIDED WITH UNIT 1. UNIT 1 WAS TRANSPORTED PRIOR TO MY ARRIVAL. VEHICLE 2 CAME TO REST AT THE AREA OF IMPACT IN THE TURNING LANE. NOTE: THE DRIVER OF VEHICLE 2 AND UNIT 1 ARE HUSBAND AND WIFE.

Proposed Project Tasks

1. Scoping – Establish scope and data sources
2. Literature Review – Identify AI methods and tools
3. Data Preparation – Obtain and prepare source data
4. Develop Methodology – Use AI tools or develop new method
5. Refine Methodology – Validate results and adjust
6. Document Methodology – Document tools and process used

Total of all Estimated Cost - $125,000
Total Length of Time – 24 months
STIC Incentive Funds Requested: $100,000

Thank you!

Project Title: Developing Great Talent

Unit: Transportation Systems Management and Operations (Transportation Systems Management and Operations (ncdot.gov))

Submitter: Keith Mims, PE – State Signal Equipment Engineer

Project Abstract: This project will create the foundation for a statewide traffic signal training program. The project will deliver individual training modules on various traffic signal related topics, including construction, maintenance, and operations, that can be accessed by staff through a learning management system (LMS). This will help improve the efficiency, safety, mobility, and reliability of our highway system infrastructure.

Description: This project will create and deliver a group of individualized training modules related to traffic signal maintenance, construction, and operations. A partner firm/company will be hired to create and deliver the training modules. The firm/company will work with Department engineering and field staff in the creation and production of these training modules, the intent being that the video subjects performing training will be Department staff. Once completed and delivered, the training modules will be placed into a learning management system (LMS) and processes for delivering the training to the appropriate personnel will be developed.

EDC: EDC7 – Strategic Workforce Development

Project Length: 18 Months

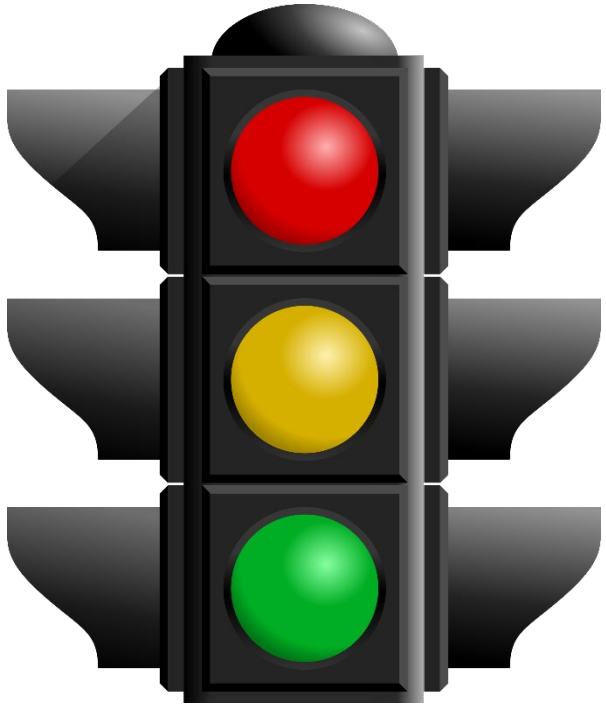
Obligation Date: September 1, 2024

Total Cost: $150,000 **NCDOT Match:** $30,000 from TSMO

Task Breakdown:

Task	Timeline	Cost
Partner with firm/company to create the training modules	3 months	
Finalize details around the training modules and how they will be created	3 months	
Creation of the training module	6 months	
Completion and delivery of the training modules	3 months	
Evaluate the effectiveness of the training modules and consider expansion	3 months	
TOTAL	**18 Months**	**$150,000**

NORTH CAROLINA
Department of Transportation



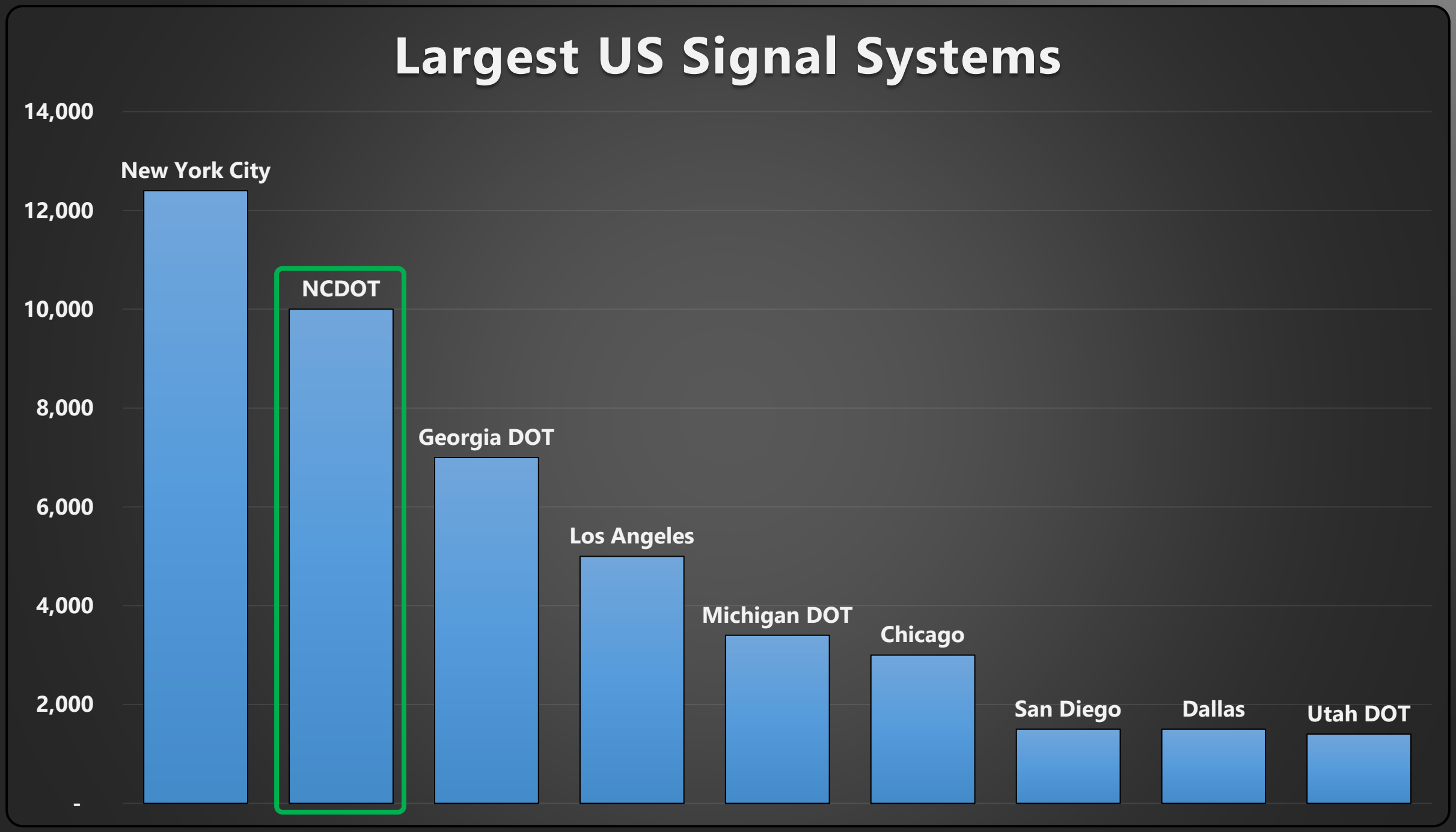
Developing Great Talent

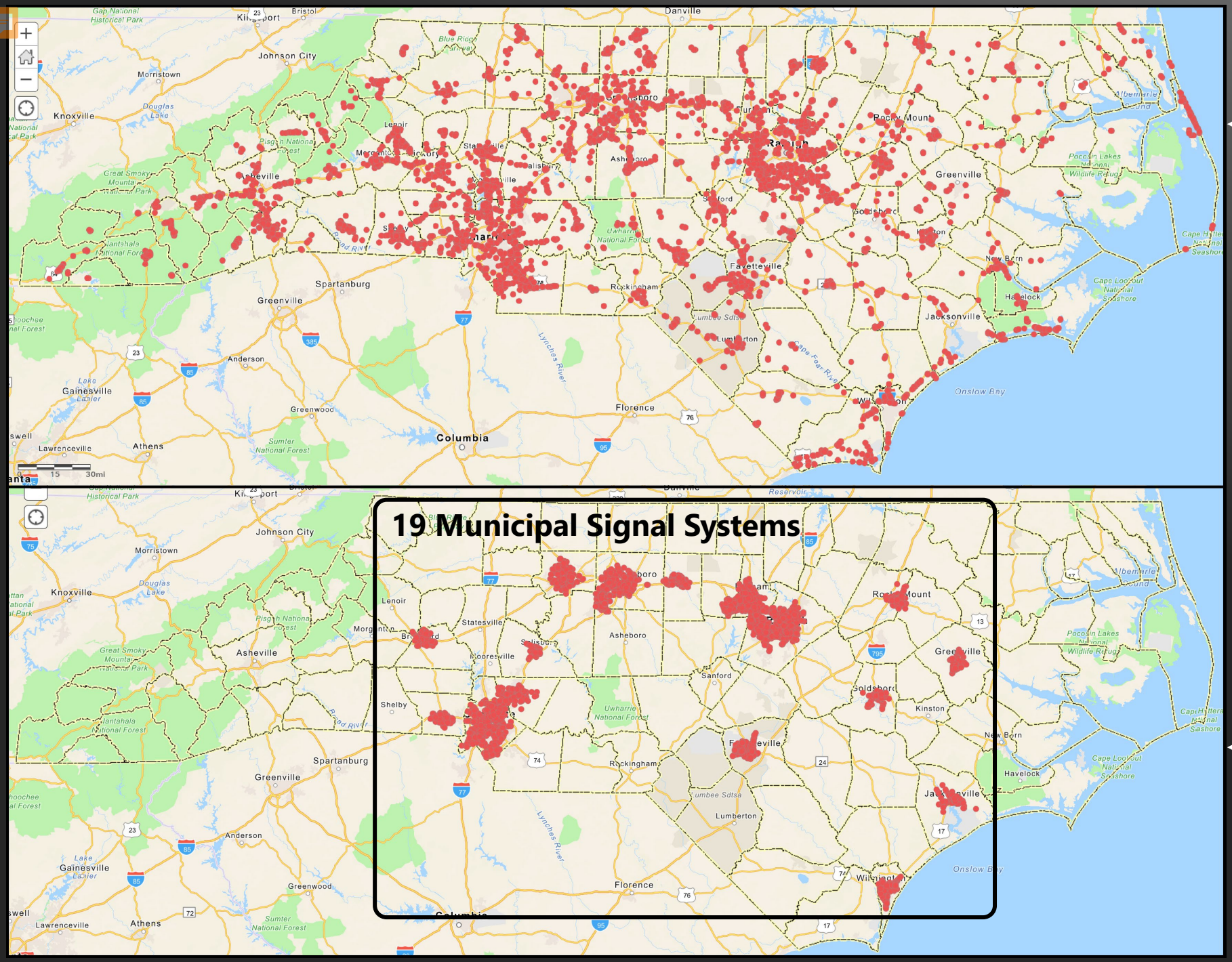
Traffic Signal Technician Training

STIC Incentive Funds Application

Matthew T. Carlisle, PE
State ITS & Signals Management Engineer

Largest US Signal Systems





6,000
State-Maintained

10,000
State-Owned

4,000
City-Maintained

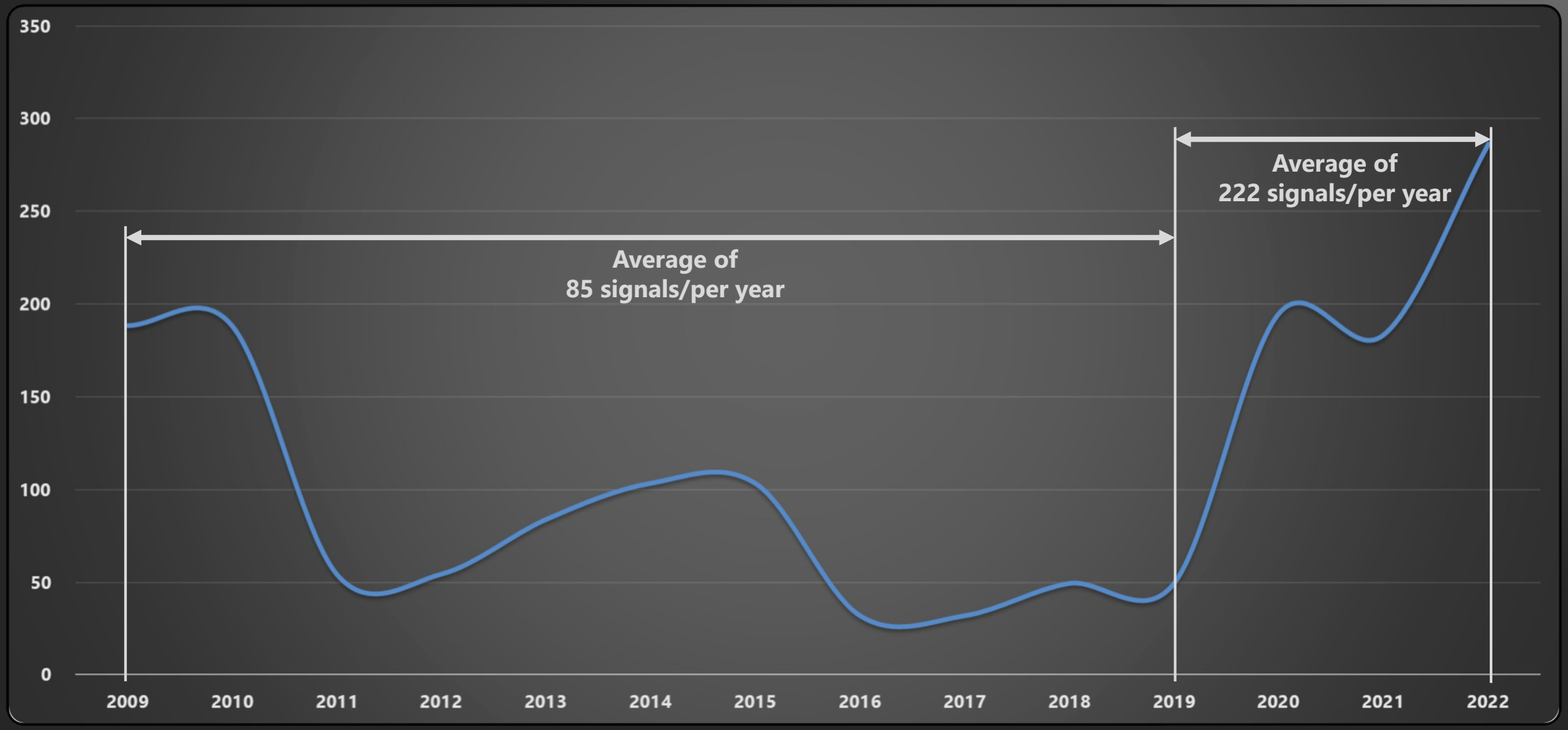
+

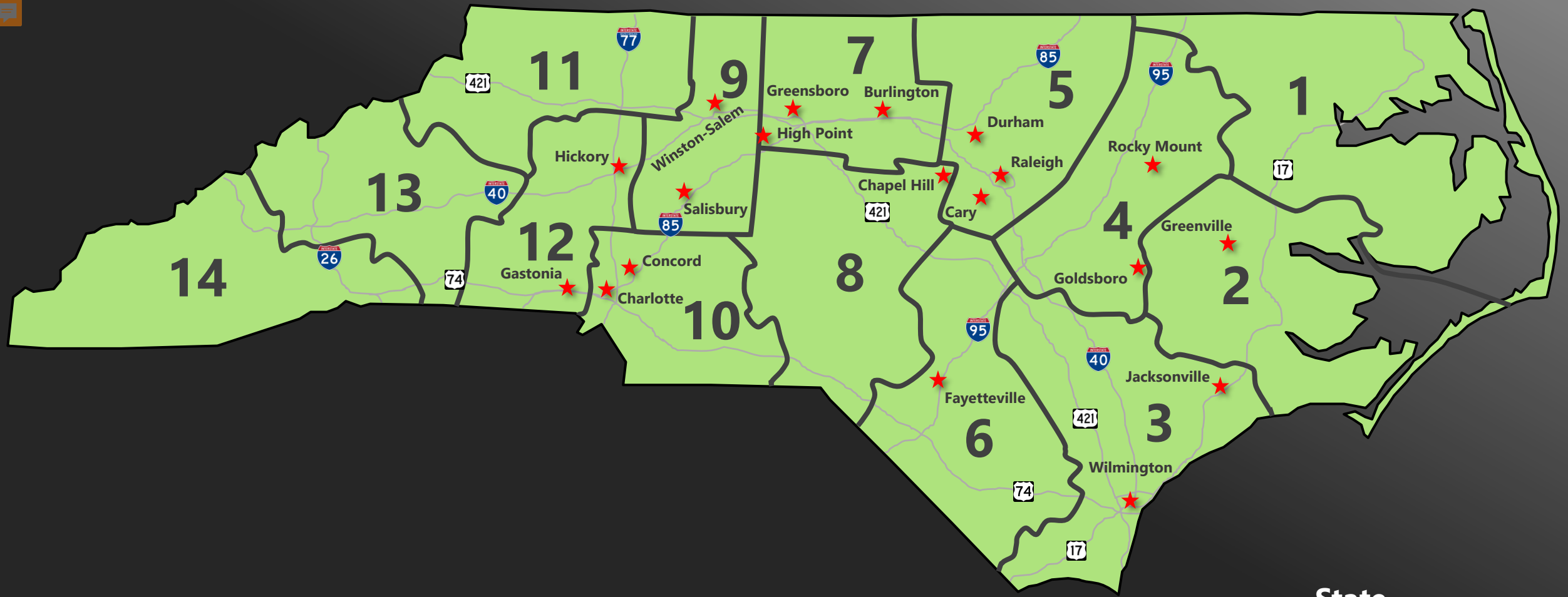
1,200
City-Owned

An Increasing Rate of Traffic Signal Growth

Year-Over-Year Growth

(state-maintained signals)





Signal Technician Staffing

State

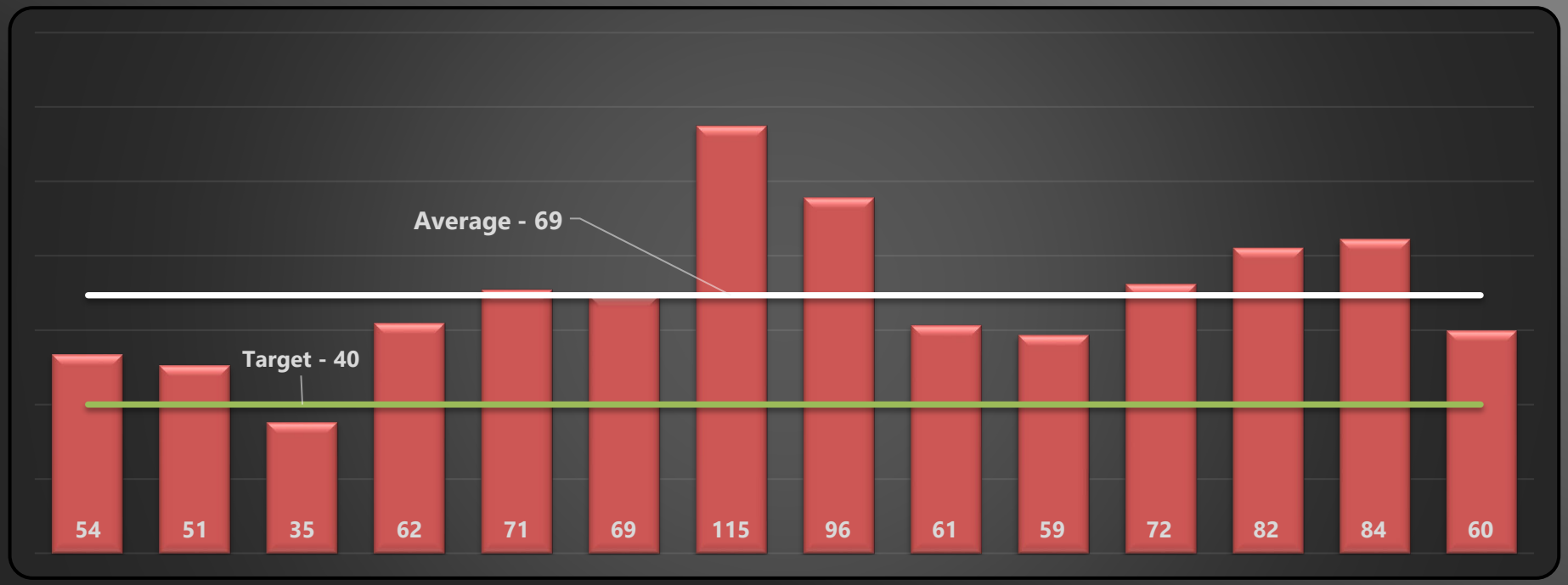
90 positions for 6,000 signals

Municipal

104 positions for 4,000 signals

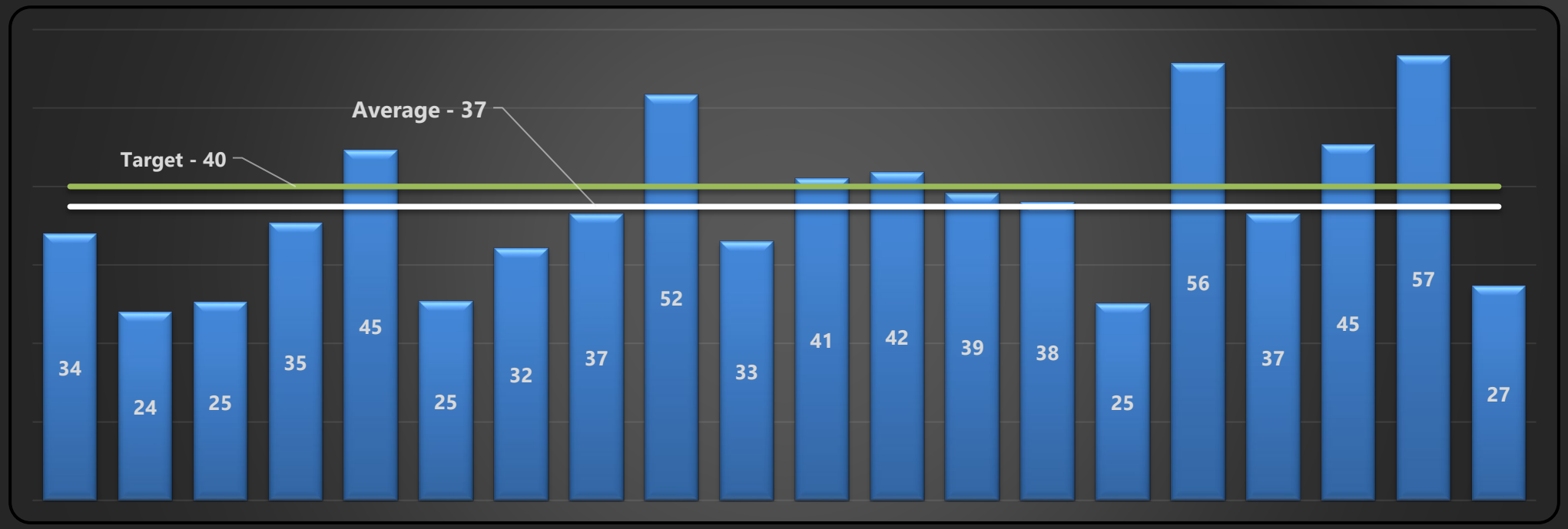
Signals per Technician

FHWA Recommendation: 30-40
Nationwide Survey: 51



Cities

Divisions



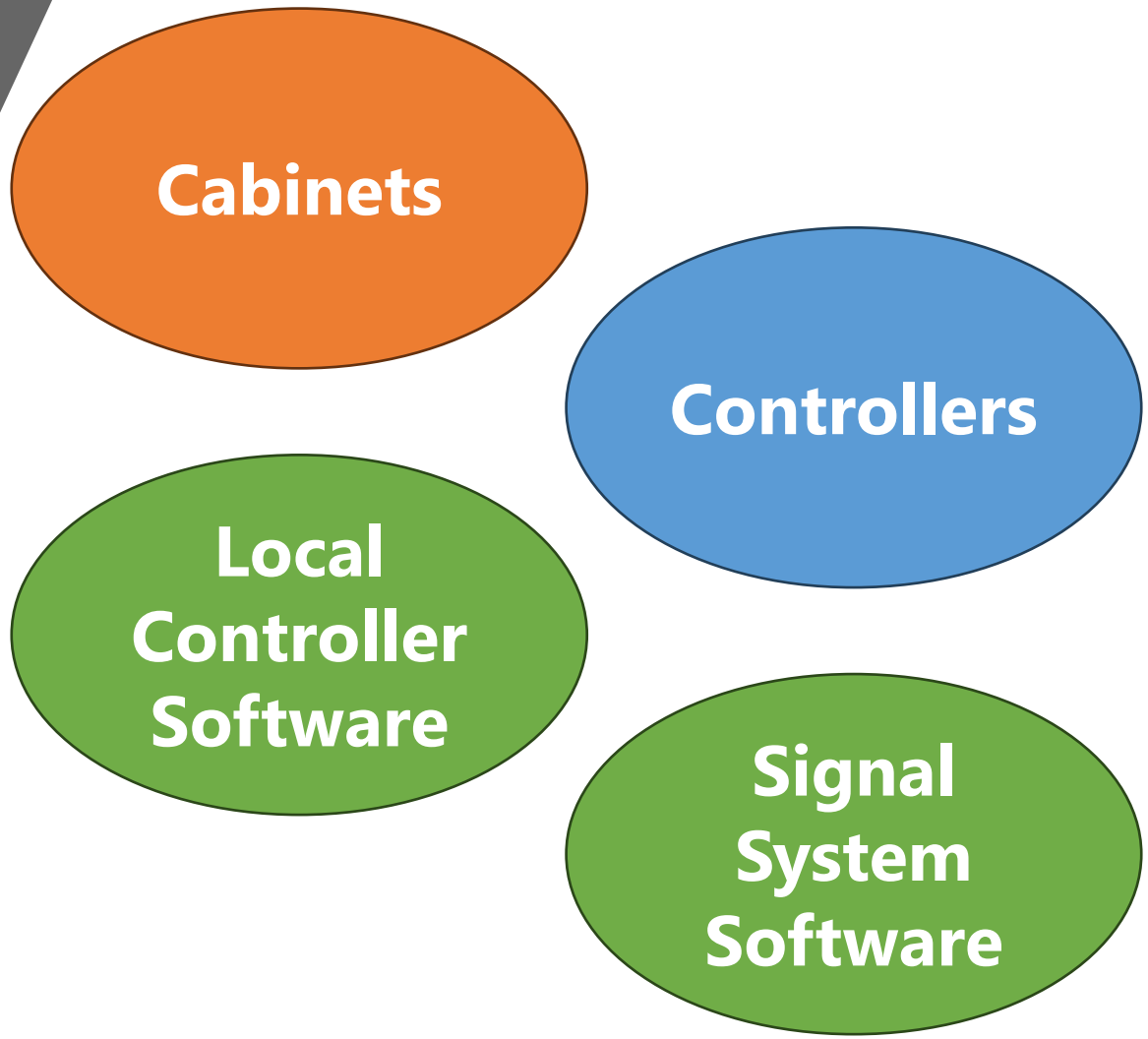
*data anonymized

A “Good” Level of Service
Signal Maintenance

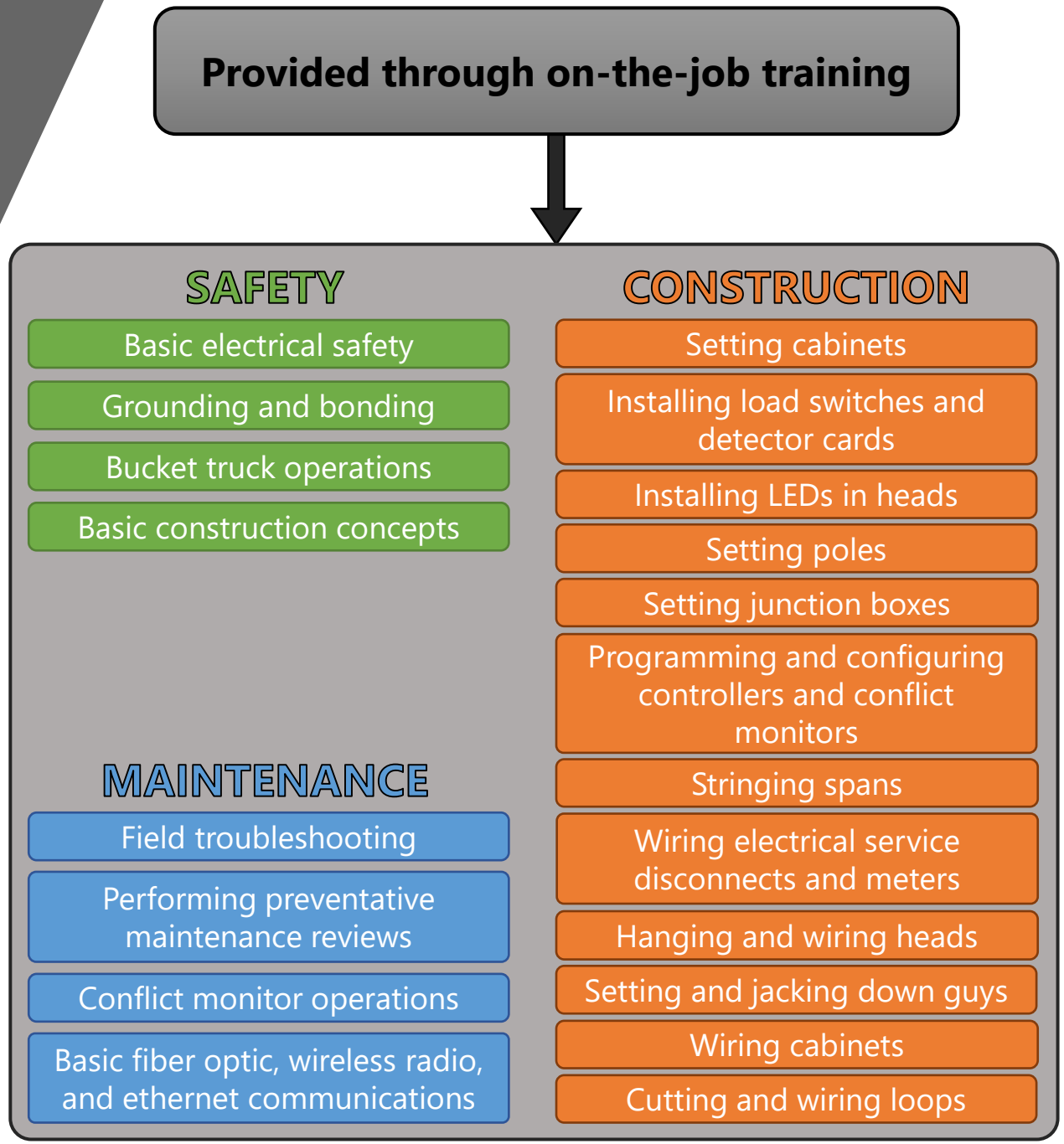
Scheduled Maintenance
- Operational Performance Reviews completed at 6-month intervals
- Replace LED modules within 15 years of service
- Annual conflict monitor testing and certification

Emergency Response
- On-Call 24/7/365
- Trouble calls, 4 hours
- Knockdowns, 8 hours
- Dead indication, next working day
- Repair/replace inoperative detection, 15 calendar days

Existing Training



Training Gaps



Strategic Workforce Development

Every Day Counts
Innovation for a Nation on the Move

Innovative strategies to identify, train, place, and retain workers in highway construction jobs that support the Nation's highway system.

According to a 2021 national survey by the Associated General Contractors of America (AGC), 89 percent of construction firms reported difficulty finding qualified workers.

EDC-7 Alignment

Developing Great Talent

Create the **foundation** for a Statewide Traffic Signal Training Program.

Deliver video training modules on various traffic signal related topics, including construction, maintenance, and operations, all of which can be accessed through NCDOT's learning management system (LMS).

Innovation

NCDOT staff as on-camera subjects

Make innovative signal maintenance practices the standard

Compact, right-sized video learning modules that can be accessed from any device at any time.

Part of a larger, blended-learning training program.

Collaboration

Divisions

Cities

Industry

Schedule and Costs

2024 Q3

PARTNER

Partner with a company

2024 Q4

FINALIZE

Identify subject matter experts, video subjects, and training topics

$15,000

2025 Q1

CREATE

Write, produce, and film videos

$120,000

2025 Q2

DELIVER

Cut, polish, and complete training videos. Post on LMS

$15,000

2025 Q4

EVALUATE

Evaluate effectiveness and expand

$120,000 (STIC funds)
+
$30,000 (TEC budget)
= **$150,000 Total Project**

Schedule and Costs +

2024 Q3

PARTNER

Partner with a company

2024 Q4

FINALIZE

Identify subject matter experts, video subjects, and training topics

2025 Q1

CREATE

Write, produce, and film videos

2025 Q2

DELIVER

Cut, polish, and complete training videos. Post on LMS

2025 Q4

EVALUATE

Evaluate effectiveness and expand

2026

EXPAND

Expand availability to cities

2027+

CERTIFY

Expand availability to industry and implement certification programs

Project Goals and Benefits

NCDOT Goals

A more efficient and standardized workforce will help NCDOT:

- *Be a Great Place to Work*
- *Improve Reliability & Connectivity of Transportation System*
- *Provide Great Customer Service*

SAFETY

Reduce risk of injury and ensure technicians perform their duties in the safest manner possible

STANDARDIZATION

Ensure that all state-owned signals are constructed, maintained, and operated with the same standards

EFFICIENCY

Minimize time required to train new technicians and allow peak performance sooner than relying solely on OJT

REACH

Latitude to hire employees with great growth potential when lacking candidates with experience

Contact Us

Matthew Carlisle, PE
mtcarlisle@ncdot.gov
(919) 814-4934

Keith Mims, PE
kmmims@ncdot.gov
(919) 814-4931

@NCDOT
NCDOT
NCDOTcommunications
@NCDOT
ncdotcom
ncdot_comm