FINAL REPORT

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A Centralized Repository on Workforce Development in the Southeast

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LIST OF ABBREVIATIONS

Abbreviation	Meaning
AASHTO	American Association of State Highway and Transportation Officials
APBP	Association of Pedestrian and Bicycle Professionals
ASCE	American Society of Civil Engineers
DOT	Department of Transportation
EDI	Equity, Diversity, and Inclusion
FHWA	Federal Highway Administration
ITE	Institute of Transportation Engineers
ITS	Intelligent Transportation Systems
ITS JPO	The Intelligent Transportation System Joint Program Office's Professional Capacity Building Program (United States Department of Transportation)
ITSA	Intelligent Transportation Systems (ITS) America
LTAP	Local Technical Assistance Program
MUTCD	Manual on Uniform Traffic Control Devices
NCHRP	National Cooperative Highway Research Program
NNTW	National Network for the Transportation Workforce
PCB	Professional Capacity Building
SDITE	Southern Division of ITE
SETWC	Southeastern Transportation Workforce Center
STEM	Science, Technology, Engineering, and Math
TTAP	Tribal Technical Assistance Program
TWD	Transportation Workforce Development
USDOT	United States Department of Transportation
UTC	University Transportation Center
UX	User Experience
WD	Workforce Development
WTS	Women's Transportation Seminar

ABSTRACT

State transportation industries and other public and private sector employers have consistently identified workforce development on the top of the needed capabilities for the advancement and maturity of their programs. This realization has become even more pressing with the increasing use of emerging technologies and strategies and the establishment of associated programs. The United States Department of Transportation (USDOT) University Transportation Centers (UTCs) and academic institutions including both universities and community colleges can play an important role in the success of these activities. This effort builds off the findings and recommendations of STRIDE Project C4 (*Transportation Workforce Development for State DOTs to Address Congestion for the Southeast Region).* That project developed a framework for training and education to support the diverse workforce development needs of the transportation sector in the Southeast region with an emphasis on the role of academic institutions. The project identifies current and future needs and defines the roles of the UTCs, universities, and community colleges in the region in the training and education activities. Among the recommendations from that project was that an inventory of existing training courses be gathered so that workforce development practitioners could identify existing needs for workforce development in the Southeastern United States. This project created a centralized inventory of available workforce development resources, with a primary focus on the Southeastern transportation industry. This inventory can currently be accessed at https://techtransfer.ce.ufl.edu/phase2resources-lookup/. The effort documented in this report builds on the national and the Southeast region's efforts to identify existing workforce development activities.

Keywords: Workforce development, training, safety, innovative technology, transportation

EXECUTIVE SUMMARY

Transportation workforce development (TWD), including strategies to educate, recruit, and retain the current and future transportation workforce, is crucial to maintaining the success of the industry as it experiences rapid technological growth, shifting labor supplies, and demographic change, among other forces of change. Although workforce development is a stated priority for many private and public sector stakeholders, and the challenges facing the industry are well understood, the existing state of practice is characterized by a lack of coordination among training providers.

This project follows the recommendation of STRIDE Project C4 (*Framework for the Development of a Diverse Transportation Workforce in the Southeast Region*) in establishing an inventory of information on TWD in the Southeast Region. The project builds on the findings of STRIDE Project C4, which previously defined the prevailing challenges facing the industry and potential strategies used to meet them, including the ability to identify and collect resources available within the Southeast Region. This inventory provides a resource to aid in the development of a coordinated workforce development strategy for the Southeast Region. By creating a single point of available resources, STRIDE can improve coordination among the diverse workforce development providers and users within the region and can identify opportunities for the development of new education and training materials. Creating such a platform will also facilitate additional networking and communication efforts between STRIDE and other regional stakeholders, as recommended by this study. While curating the list of resources, gaps found in the regional workforce development resources were sometimes narrowed or filled by federal or other national ones. The team found that, in general, the resources available for TWD in the Southeast tended to be free of charge, publicly available, and delivered through an online medium such as archived webinars or online classes.

This report allows end users to understand the function of the curated list in the context of TWD, to understand how the list was curated, how it can be accessed, and how to filter through the different categories in order to access their specific training needs. Future collaboration with professionals in the field could reveal additional resources, and/or allow collaboration with other, similar resource lists. The website can be found at the following location: https://techtransfer.ce.ufl.edu/phase2resources-lookup/.

We hope that this research will inspire other researchers to create additional content for TWD or to compile a similar list but of a larger scope. Additionally, this list could be helpful to state DOTs, federal organizations, and private organizations as they decide what type of TWD resources to commission or create.

1.0 INTRODUCTION

1.1 OBJECTIVE

The intention of this project is to follow the recommendation of STRIDE Project C4 (*Transportation Workforce Development for State DOTs to Address Congestion for the Southeast Region)* in establishing an inventory of information on transportation workforce development (TWD) in the Southeast Region. The project expands upon the findings of STRIDE Project C4, which previously defined the prevailing challenges facing the industry and potential strategies to allow them to identify, collect, and consolidate workforce resources available within the Southeast Region. Following the recommendations of the previous phase, this inventory is intended to provide a supportive resource to aid in the development of a coordinated TWD strategy for the Southeast Region. By creating a single point of available resources, STRIDE aims to improve coordination among the different TWD providers and users within the region, and to identify opportunities for the development of new education and training materials.

1.2 SCOPE

The Southeast Region encompasses 12 states and the commonwealth of Puerto Rico. These states and commonwealth, in alphabetical order, include Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Puerto Rico, South Carolina, Tennessee, Virginia, and West Virginia. The US Department of Transportation (USDOT) Region 4 University Transportation Center (UTC) includes only eight of these states as Arkansas, Louisiana, Virginia, West Virginia, and Puerto Rico are part of other UTCs.   Table 1 includes an overview of the major characteristics of each, including population, total employment, and total employment in transportation-related occupations.

Table 1. Summary of Population and Transportation-Related Employment, 2020				
State/Commonwealth	Total Population	Total Employment	Total Employment in Transportation-Related Occupations	Share of Total Employment
Alabama*	5,024,803	1,910,169	75,944	4.0%
Arkansas	3,012,232	1,174,759	60,692	5.2%
Florida*	21,569,932	8,444,982	359,955	4.3%
Georgia*	10,725,800	4,309,934	240,087	5.6%
Kentucky*	4,503,958	1,793,494	122,013	6.8%
Louisiana	4,651,203	1,779,669	78,698	4.4%
Mississippi*	2,956,870	1,090,083	57,226	5.2%
North Carolina*	10,457,177	4,322,076	181,479	4.2%
Puerto Rico	3,281,538	832,067	19,422	2.3%

Table 1. Summary of Population and Transportation-Related Employment, 2020				
State/Commonwealth	Total Population	Total Employment	Total Employment in Transportation-Related Occupations	Share of Total Employment
South Carolina*	5,130,729	2,027,881	78,913	3.9%
Tennessee*	6,920,119	2,915,020	192,980	6.6%
Virginia	8,632,044	3,744,370	144,709	3.9%
West Virginia	1,789,798	642,016	26,984	4.2%
* - Southeastern states that are a part of the USDOT UTC Region 4.				

TABLE 1: POPULATION AND TRANSPORTATION-RELATED EMPLOYMENT POPULATION AND TRANSPORTATION RELATED EMPLOYMENT OF SOUTHEASTERN STATES AND COMMONWEALTH (SOURCE: BUREAU OF TRANSPORTATION STATISTICS, N. D.) RETRIEVED FROM US BUREAU OF TRANSPORTATION STATISTICS, 2020; HTTPS://WWW.BTS.GOV/PRODUCT/STATE-TRANSPORTATION-STATISTICS)

The Southeastern transportation industry includes a diversity of stakeholders with differing needs based on their sector and field of practice. This section is organized in a table to provide a summary of stakeholders involved in TWD within the Southeastern region, documenting their place in the hierarchy of sectors and scopes. While not entirely comprehensive, this summary provides a general picture of who is involved and the roles they play in contributing to ongoing workforce development (WD) efforts in the region.

Table 2. Summary of Regional Stakeholders and Responsibilities		
	Stakeholder	Role
	Governmental Sector	
01	United States Department of Transportation (USDOT)	• To provide funding and direct support for programs and research • Develop broad policy goals and frameworks • To set and promote a comprehensive national agenda
02	Other Federal Transportation Administrations (e.g., FHWA, FTA, NHTSA, etc.)	• Facilitate and lead industry-specific assessments and programs • Align national programming with industry-specific needs
03	State-Funded Research Organizations (NNTW, etc.)	• To provide research and development of TWD strategies • To coordinate and inform other stakeholders on the implementation of TWD strategies
04	State Department of Transportation	• Conduct TWD efforts for State transportation workforces • Support other organizations in TWD efforts at the statewide scale
05	Local Technical Assistance Programs (LTAPs; Occasionally Integrated into State DOTs)	• To provide low-cost training assistance and other workforce support to local municipalities, counties, rural areas, and other related actors • To serve as a hub for TWD information and services within each of the states
	Non-Profit, Research, and Academic Sectors	
06	University Transportation Centers (UTC)	• To develop and support research initiatives that support and document TWD objectives • To coordinate with other organizations to develop innovative programs and advance TWD practices

Table 2. Summary of Regional Stakeholders and Responsibilities		
	Stakeholder	**Role**
07	Regional Research Non-Profits (e.g., SDITE, etc.)	• To coordinate TWD efforts through collaboration with organizations within the region • To assess and research the TWD concerns of the region
08	Secondary Education (e.g., Universities, Community Colleges, Technical, and Vocational Schools)	• Prepare students for careers in technical fields, including the transportation industry with a proper curriculum and other educational opportunities
09	K-12 Education (High Schools, Magnet Programs, etc.)	• Build awareness of and interest in transportation careers from an early age • Prepare students for secondary education programs including the STEM-based curriculum necessary for transportation careers
10	Public Sector Professional Organizations (e.g., AASHTO, APBP, ASCE, APA, ITE, ITSA, WTS, etc.)	• To serve as a connection between the workforce and research communities • Develop assessments and provide strategic frameworks for TWD practice • Develop and offer TWD resources in partnership with other actors
	Private Sector	
11	Private Industry Employers	• Provide and conduct training and recruitment for the workforce

TABLE 2: SUMMARY OF REGIONAL STAKEHOLDERS AND RESPONSIBILITIES

As previously demonstrated, there are few ways to design a universal approach to WD, either in conception or in practice (NASEM, 2019). This was exemplified best by the differing levels of participation and approaches of Southeastern Local Technical Assistance Programs (LTAPs) and State Departments of Transportation (DOT), although the private, educational, and non-profit sectors were not immune. Despite an understanding of the workforce challenges facing the industry at large, stakeholders have different approaches based on specific needs and available resources (Wang et al., 2021).

2.0 LITERATURE REVIEW

The intention of this literature review is to summarize the findings of the previous phase and support the recommendation for a centralized inventory of TWD resources. The primary addition of this phase is in establishing an understanding of previous efforts to conduct regional coordination of TWD, and to develop a sense of best practices for the formation of the inventory.

Summary of Results from STRIDE Project C4

Existing Challenges for the Southeastern Transportation Workforce

The primary findings of STRIDE Project C4 (*Transportation Workforce Development for State DOTs to Address Congestion for the Southeast Region)* reinforce the idea that the Southeastern transportation industry, and the industry at large, continues to face clear and present threats to the strength of its workforce and subsequently, its ability for continued success. Demographic changes, labor market forces, emerging technologies, and the growing need for interdisciplinary skillsets are the primary pressures for the continued success of the industry, and these issues require a renewed focus on TWD.

The previous study also found a fragmented understanding of the purpose and application of TWD within the Southeast. This lack of coordination among stakeholders within the region represents the largest barrier to the resolution of workforce challenges facing the Southeastern transportation industry. The previous study also found that, regarding strengths/gaps in the WD ecosystem, the region is generally strong in technical and professional skill development for existing employees. However, there has been little progress in recruitment and retention strategies, including K-12 education, labor practices, and workplace diversity. The prevailing issues and potential solutions have been documented in previous literature, though the application of this research as part of a coordinated effort to address these challenges has yet to be fully realized.

Creating A Workforce Development Typology

WD is a commonly understood term describing various efforts within and across industries to support employee outcomes and improvement. There is little documentation or agreement about a specific definition for WD, and few scholarly articles have attempted to create one (NASEM, 2012). The purpose of this section, within the broader goals of this project, was to develop a general typology of WD strategies. Categorizing strategies under the concept of WD will facilitate discussion and improve the development of a formal WD definition as it relates to its many manifestations in practice. A review of existing literature, in conjunction with the previous phase of this ongoing project, provides the basis for the development of this WD typology. Major themes and categorizations were noted from a selection of papers retrieved from scholarly searches for such keywords as "transportation workforce development," "transportation workforce development strategies," "transportation workforce

development categorization," "transportation workforce development types," and "transportation workforce development definition." Interpretation of the content of these papers allows for the identification of several major categories or sets of categories that fall within the definition of WD strategies: recruitment, retention, academic preparation, continuing education and training, business processes, and collaboration and coordination. The subsequent sections of this report summarize the major findings from existing literature and the conclusions that they inform. The introduction describes how WD coordination can work at different scales.

Over 90 papers were reviewed to determine the state and industry understanding of the definition of WD and WD strategies. While most literature uses the term "workforce development" quite commonly, few offer a clear definition of the term. For the purpose of this study, the understanding of WD, to remain consistent with the first phase, needs to encompass the skill-building strategies for recruitment, retention, training, and education for the current and future transportation labor force in response to specific challenges and needs. This definition draws from previous attempts to create a working definition and the typology of WD strategies evident in the existing literature, and is derivative of the definition proposed in a 2019 National Cooperative Highway Research Program (NCHRP) study, which defines WD as a set of "strategies aimed at developing competencies and skills for specific positions and individuals" (NASEM, 2019).

The industry focus for most papers is transportation. A few papers look into WD for health fields. Among TWD literature, most refer to the transportation workforce broadly, tending to lean towards a focus on operations and maintenance workers. A handful of papers specifically focus on engineers (Agarwal et al. 2008; Braden 2017; Lucer, 2011; Meléndez et al, 2015; Wan et al. 2021) or planners (NASEM, 2013), and particular transportation sub-industries (Joh & Li, 2015; Polzin & Ward, 2002; Giloth, 2000; O'Brien et al. 2020; NTI, 2016; NASEM, 2015; NASEM, 2018a; Weisenford et al. 2018; NASEM, 2018b; NASEM 2018c)

The WD strategies covered across all papers fall within a predictable range of ideas, from training, recruitment, and retention tactics to organizational collaborations and training to enhance worker outcomes. The goals of such strategies vary, but recurring themes of gender and ethnic/racial diversity, growing what has become an aging workforce, and adjusting for emerging technologies are quite prominent. Given the categories described in the previous phase, in conjunction with the range of strategies documented across existing literature, we developed a summary (Table 3) that shows the major types of WD strategies and the accompanying descriptions of what each entail.

TABLE 3. WORKFORCE DEVELOPMENT STRATEGIES AND THEIR DESCRIPTIONS	
WD Strategies	**Strategy Descriptions**
Recruitment	Methods of attracting, hiring, and onboarding new employees
Retention	Methods of encouraging and incentivizing employees to stay within a particular organization or industry
Academic Preparation	Methods of preparing students of all ages for the industry, as well as exposing them to specific career paths before seeking employment
Continuing Education & Training	Methods of effectively expanding employee knowledge, competency, and proficiency in relevant industry skillsets and awareness.
Career Development	Methods of creating pathways with proper support for upward career movement by individual employees
Knowledge Management	Methods of ensuring the transfer of industry knowledge across employees of different backgrounds and experience levels
Business Processes	Methods of structuring internal business processes to facilitate the success of other strategy categories
Collaboration & Coordination	Methods of inter-organizational processes used to facilitate the success of other strategy categories (external business processes)

The Need for a Workforce Development Inventory for the Southeast Region

Currently, there is no centralized source of information regarding TWD resources within the region. Both the literature and findings from STRIDE Project G4 agree that the lack of centralized information has detrimental effects on the ability of many stakeholders to coordinate and collaborate on TWD within the region. Better coordination and collaboration would help with addressing this and other workforce development challenges.

Literature outside of the transportation industry has similarly emphasized the need for regional coordination to address workforce development challenges. The most prominent of these is the discussion of workforce intermediation generally and in the healthcare industry in particular. Workforce intermediation involves the creation of a network of actors – employers, training providers, educational institutions, nonprofit service providers, unions, philanthropic groups, and public workforce entities—and services available to address the typical desires of

workforce development (training, recruitment, and retention). Within a particular industry, the network of workforce intermediaries is typically guided by a central organization.

However, while the transportation industry has an existing network of workforce intermediation, there is no centralized organization necessary to coordinate the efforts of the network, despite previous efforts to create one. The most notable effort is the creation of the National Network for the Transportation Workforce, which created five regional Centers to promote "a more strategic and efficient approach to transportation workforce development." The Southeastern region is overseen by the Southeastern Transportation Workforce Center (SETWC), housed within the University of Memphis. The SETWC previously inventoried the existing workforce development resources in the region. However, that information was dated and was not available to the research team on this project.

Selected Existing Efforts to Create a Workforce Development Repository

While there was no regional inventory of TWD resources in the Southeast, there are existing examples of efforts to create an inventory at different scales. Typically, existing efforts have come from organizations with a national scope, but with a narrow focus on a specific sector of the transportation workforce. This follows along with the findings that national leadership on workforce development is much stronger and more coordinated than that at a state or regional level. This section summarizes some key examples of existing workforce development inventories used to guide the development of a regional inventory for the Southeast, and to better understand the context surrounding the intention to create such an inventory. This list does not include *all* examples of workforce development inventories. Rather, it is intended to highlight key examples that can provide a template for best practices in the development of a regional inventory.

FHWA's Roadway Safety Professional Capacity Building Program

The Federal Highway Administration's (FHWA, n. d.-c) roadway safety professional capacity building program is a program intended to "provide resources to help safety experts and specialists develop critical knowledge and skills within the roadway safety workforce." While narrow in its intention to address roadway safety training concerns, the general mission of providing a centralized point of information regarding training and education to aid in the coordination of workforce development for transportation practitioners is similar to the goals of this project, serving as a key example to follow. Most notably, this program provides a comprehensive and easily navigable inventory of roadway safety training resources, continually updated by a member of FHWA staff. The inventory is searchable by topic, state and commonwealth, and publication year, and at the time of this writing, includes over 100 available resources related to roadway safety.

USDOT ITS JPO's Professional Capacity Building Program

The Intelligent Transportation System Joint Program Office's (ITS JPO, n. d.) Professional Capacity Building (PCB) Program has been operational since 1996 and is the "primary mechanism for educating today's and tomorrow's transportation workforce about current and future intelligent transportation technologies." The four main goals of the program are: 1) Partnership Building; 2) Training and Education; 3) Strategic Outreach and Communications; and 4) Program Management and Evaluation. The program serves multiple functions including delivering training materials to transportation practitioners across all sectors; determining the educational needs of ITS practitioners; providing a structure for coordination on emerging centers of ITS knowledge; serving as a centralized clearinghouse for ITS resources; and monitoring markers of progress for information transfer and training usage among ITS practitioners. The ITS PCB is a comprehensive example of strategic workforce development training delivery. While not a direct analog to the intentions of this project, it presents the clearest blueprint for strategic planning for the collection and dissemination of TWD resources.

As of the time of writing, the ITS PCB includes over 2,000 ITS-related workforce development resources available in its collected inventory. This inventory includes webinars, web courses, in-person or hybrid courses, workshops/seminars, certificate programs, and podcasts, among other training deliverables. The database is searchable by provider, delivery/resource type, competency level, topic, focus on connected vehicles, and learning path. The database also includes information on the cost of the resources, if applicable.

NNTW Workforce Development Resource Database

The National Network for the Transportation Workforce (NNTW, n. d.) hosts an online database of workforce development and training resources on their primary website. The NNTW is a collaboration of five regional centers that "seek to connect, empower, and advance the 21st-century transportation workforce through targeted research, education, and industry engagement." Each regional NNTW center is housed in a UTC within each region (Southwest, Southeast, West, Northeast, and Midwest) and aims to fill the gap in regional organizational capacity on TWD. Each NNTW regional center has specific focuses tailored to meet the unique needs of the region's transportation workforce.

The NNTW Resource Database provides workforce development and training resources at a national scale. At the time of this writing, the database includes 488 "Workforce Development Resources," and 305 "Education and Training Programs." The database is searchable by focus area, training type (provider sector), and education level.

A few NNTW regional centers have also attempted to create an inventory for their specific region. The most noteworthy example is that of the Southwest Transportation Workforce Center (SWTWC). This is the best available example of an effort to create a region-specific TWD resource inventory. The SWTWC's database includes 318 resources. In this research, the new database follows the same format as the NNTW national resource database.

Additionally, the SETWC previously compiled an inventory of workforce development resources in the Southeast. It was not active at the time of writing.

National Local Technical Assistance Program Association (NLTAPA) Information Exchange

The National Local Technical Assistance Program (LTAP) and Tribal Technical Assistance Program (TTAP) Association hosts an online database of available workforce development online training courses (NLTAPA, n. d.). The NLTAPA is an organization representing the 52 LTAP and TTAP centers in the United States, and aims to provide coordination, capacity building, and executive support to its member organizations. At the time of writing, this database included 881 online training resources, sourced from national, state/commonwealth, and local sources. While limited in functionality, the database is regularly updated and represents the efforts by LTAP/TTAP centers to coordinate workforce development activities. The individual LTAP/TTAP centers in the Southeast vary in their coordination of workforce development efforts, with few having a centralized inventory of available resources. The most noteworthy example within the region is the South Carolina LTAP Center.

Lessons Learned from Existing Efforts

There are myriad key takeaways when looking at existing efforts to create an inventory of workforce development resources. First, there is no true standard for creating a TWD resource inventory. Those who created some form of database before encountered problems such as the scope of decision making, and conclusions about what resources are included/excluded, the geographic scope, and the intended audience. Additionally, creators have to figure out how to make the website functional, serviceable, searchable, and updatable after initial publishing.

The upkeep of the website is critical as some of the resources will inevitably go out of service or become irrelevant. Second, potential researchers must figure out the core problem of knowledge overlap in terms of what a central repository should look like as there are currently too many different streams of information. Furthermore, a central repository would ideally store resources for all different transportation sectors equally, as current knowledge repositories are massively lopsided, with little information available to certain transportation sectors. Third and most important, the usefulness of existing inventories is unknown. There seems to be no data describing how transportation professionals typically search for or learn about training materials. This process differs among various sectors and modes, where professionals in each area of expertise function differently in their educational access and training.

Data Governance, Stewardship, and Maintenance

The transportation industry is characterized by its diverse network of often uncoordinated actors. While it has yet to be seen, the demand for coordination is strong. The diverse network of actors in the Southeast represents an opportunity for industry-wide

coordination on the creation of a centralized workforce development inventory or platform. Additionally, the success and sustainability of coordination for such a platform is reliant on leadership and the building of relationships across multiple sectors and transportation modes. Potential opportunities exist within the existing capacities of University Transportation Centers, STRIDE, and/or the National Network for the Transportation Workforce's Southeastern Transportation Research Center, where the key to the success of a centralized platform will be to establish clear roles for ownership/stewardship and maintenance.

3.0 Development of a Centralized Workforce Development Inventory

3.1 Introduction

This project included several steps to develop the workforce development inventory. Above we described how we gathered information from the literature review and other such inventories and then identified and collected available workforce development resources applicable to the Southeastern transportation industry to develop a publicly available platform for hosting such information. This platform provides access to the resource list, options to filter the data by field to help users find appropriate information. The resource list was developed via searches of available TWD resources.

This inventory of resources was summarized, cleaned, organized, and hosted through a publicly available, online platform, which was developed by the research team. This platform is easily managed, flexible in accommodating future updates, and accessible to potential users. The platform has been prototyped and shared with stakeholders and other contacts for review and feedback. Because of limited funding for the project, the functionality, the user experience (UX) design, and organizational hierarchies were decided between the designers of the website and the research team. Below we describe the process we used to develop the repository.

3.2 Methodology

3.2.1 – Inventory Curation

The research team conducted an inventory analysis of TWD resources in the Southeast, and resources of national transportation organizations, if the resources were appropriate and applicable to the Southeast. These resources were compiled between June 2022 and August 2023 where the search criteria were intended to cover as much of the breadth of existing resources on TWD as possible. This included searching for information by state and commonwealth, scope, sector, topic, mode, delivery method, typical national, regional, state, and local sources as search terms. This search was internally guided, following the information learned in the literature review, and in the previous phase of the project. This search was purely comprised of web-based resources, though the number of resources available on the internet was plentiful. Appendix A summarizes the websites used to prepare the inventory.

3.3 Results

The full-length resource-gathering process was performed between June 2022 and August 2023 where the team pursued a variety of different online resources to find WD resources such as federal organizations, state DOTs, LTAPs, and other websites that offered training for the different transit modes. The team created a finalized and polished list of over 700 resources which contained a variety of different columns (criteria) for the end-user's ease of access. These resources were set up so that users could select which type of resource they would specifically like to navigate to. These criteria included the state of the resource, whether it was a public or private resource, the topic, the transit method, how the education was delivered (online, in-person, and hybrid), if a fee was involved for the resource, when the link to the resource was last verified as being functional, the link to the resource, and finally the organization from which the resource came. The image below was sourced from the spreadsheet the team used to add data to in the initial gathering of resources.

TABLE 4 *RESOURCE DATA COLLECTION FIELDS*

Resource Name	State(s)	Scope (National, State, Regional, Local)	Sector (Public/Private)	Topic	Transit Mode	Resource Delivery Method	Fee (Y/N/Both)	Verified Functional as of:	Link to Resource	Sourced From

The various topics that the resources covered included construction, safety, transportation planning, emerging technology, maintenance/preservation, EDI (Equity, Diversity, and Inclusion), and recruitment, to name a few. Of the over 700 resources gathered, most were found to be provided by a public organization (either a federal or state body) and most are provided free of charge. The majority of the resources compiled were also provided by some public-sector organization and delivered online via a webpage. It is possible that some of the resources were out-of-date. A majority of the resources collected were not specific to one state, but rather are nationally applicable TWD materials. Certain states had more TWD resources than others, such as Florida, which had multiple individualized webinars and webpages, whereas Mississippi did not have any resources to offer its transportation workforce for continuing education.

3.4 Conclusion

This process of curating TWD resources for the Southeast took a considerable amount of time and included as many resources as possible that were available on the internet. Over 700 resources were gathered in this process, as outlined in 10 separate informational columns on the final resource sheet which included criteria such as fees, resource delivery method, and the topic of the resources. What the team found during this process was that although continuing education in TWD plays a significant role in the industry, limited resources were available to certain states while others had a variety of educational opportunities. As a result, nationally available and applicable resources are likely to provide benefits to those in states/ commonwealths with limited state-specific resources.

4.0 Post-Report Activities

After completion of this report, final technology transfer activities began. The primary activity was the creation and hosting of a webinar. This webinar provided information on 1) research purpose, 2) research methodology, 3) discussion of the findings, 4) meaning of the findings, 5) presentation and explanation of the curated inventory, and 6) brief examples of how to use the inventory. The webinar, which is linked to the STRIDE webpage for this project, provides essential information about the curated list, including how to access and use its associated website.

5.0 Summary of Results

Results of Resource Gathering

The curation of the resource list in this project produced a list of resources that was over 700 items long and consisted of resources which were public, private, free, at cost, delivered in various mediums and which covered a variety of different topics. Most resources in the list were found through a relatively direct and intuitive method, at little to no cost. Those that did require fees were often times able to be waived if verification was presented that the attendee was a member of some governmental organization such as a DOT.

Most of the websites or online resources were flexible in that they were oftentimes available through an online class or were a repeating in-person course which allowed scheduling flexibility. Additionally, many of the resources curated were not hyper-specified in terms of their audience. For example, resources found on the South Carolina LTAP, such as training modules about signage, the Manual on Uniform Traffic Control Devices (MUTCD), and asset management, were not exclusive to workers in South Carolina, but were also applicable to any transportation worker across the country.

Although there were over 700 resources gathered in our search, there is the potential for some to be out-of-date. Further investigation and possible discussions with the site managers could shed important light on this. Additionally, the resources gathered were undeniably unevenly spread, with most of the resources focused on roadway-based transportation, such as highways, and pedestrian and bicycling. Almost no resources were found to be available to those in the aviation industry, and few resources were found for rail operators or workers, especially in the Southeast. Gaps were also found in the TWD resources by state and commonwealth, where certain states such as Mississippi hosted fewer resources. The list allows workers from states with fewer resources to see what is available in nearby states.

6.0 CONCLUSION

The current state of TWD across the Southeast section of the nation is largely unorganized and without a central repository. This project helped fill this knowledge and resource gap by creating one such repository. This list was developed during 2022 and 2023 to include online-based resources which included a variety of different sites available in terms of how the education would be delivered, what the resource was about, what its cost was, and several other factors. The final 700+-item list of training and educational content was acquired by accessing state LTAPs, federal websites, and also private organizations' resources pages for applicable TWD materials. The list, though extensive, was still not comprehensive and would thus benefit from routine maintenance that adds, removes, and edits resources as needed. There were insufficient resources available for certain sectors, such as aviation, rail, and micromobility. Additionally, resources were lacking for state-specific knowledge, as state Local Technical Assistance Program (LTAPs) varied widely in the number of resources provided. Now, transportation workers in the Southeast have ready access to information about offerings from other states.

TWD agencies and transportation agencies alike, both in the public and private sector, can use this inventory to identify gaps in topics and other areas for growth in the diversity of education and training options in the Southeast. As transportation continues to adapt, transportation workers must be provided with sufficient resources to effectively operate in their jobs. Despite this need for more resources, it was encouraging to see how the resources that were found could benefit a large crowd of workers. For example, job-site safety training for construction workers and rider de-escalation training for transit operators were included in the materials. The resources currently available are certainly useful to the right audience; the fundamental issue is that the audience for this information is smaller than desired. Additionally, low-cost training courses and free-to-view webinars were abundant in this resource list, lowering the barrier of entry for the workforce who wanted to further their knowledge. Some courses were also self-paced, while some were in-person, to meet the various needs of the workers.

In addition to the transportation workforce, the WFD and education communities will also benefit. Ready access to such training resources can benefit educators by preparing them to teach concepts learned via TWD. The education community can also pay back the TWD community by helping create and deliver future TWD courses. WFD communities can also prioritize the creation of new resources based on the gaps in current availability.

7.0 RECOMMENDATIONS

Use Other Means of Resource Curation and List Expansion

This research is part of the ongoing effort to keep our transportation workforce up to date with the knowledge in their fields. This can be accomplished because our team was able to

gather resources solely on the internet to form part of that knowledge base. Accordingly, it is recommended that future researchers use similar or different means of collecting resources in the pursuit of forming a perfectly holistic list. Additional resource gathering could occur in a variety of ways. One likely effective avenue to explore would be that future researchers could interview professionals in the field about what resources are out there that they know about. This personalized information could then be added to the resource list. It is also entirely possible that other professionals in the realm would be willing to collaborate on this project, since the more hands-on-deck are available, the more resources could be gathered, and the completion of the above-proposed actions could be encouraged.

Contacting the Providing Agencies Directly

During the search for resources, the team considered the possibility that some resources might be outdated. This was likely due to a variety of reasons and was more prevalent at the state level. Directly contacting the agencies that provided this data could also prove useful as it may be that some of these websites are outdated. Also, some of the resources may be differently priced or differently available than currently listed.

Filling in Possible Gaps

Although the team was able to curate a significant number of resources, including almost every publicly accessible resource for the Southeast's transportation workforce, it is possible that the team missed some training material. Future researchers should look into the gaps in the curation of this list and add those resources in order to provide end-users with the best possible materials for a more prepared workforce.

8.0 REFERENCE LIST

Agarwal, A. W., & Dill, J. (2008). To be a Transportation Engineer or Not? How Civil Engineering Students Choose a Specialization. *Transportation Research Record*, 2046(1), 76–84. https://doi.org/10.3141/2046-10. Retrieved from https://journals.sagepub.com/doi/abs/10.3141/2046-10.

Braden, D. (2017, October 23). "US Driver Shortage Becomes Top Trucking Concern," *Journal of Commerce*. https://www.joc.com/article/us-driver-shortage-becomes-top-trucking-concern_20171023.html

Bureau of Transportation Statistics. (n .d.) *State Transportation Statistics/Transportation Economics.* Retrieved on January 2, 2024 from https://www.bts.gov/browse-statistical-products-and-data/state-transportation-statistics/transportation-economics.

National Academies of Sciences, Engineering, and Medicine (2018). *Transit Technical Training, Volume 2: Guide to Overcoming Barriers to Implementing Best and Innovative Training* (Transit Cooperative Research Program Research Report 199). https://doi.org/10.17226/25158

National Academies of Sciences, Engineering, and Medicine (2018). *Knowledge management resource to support strategic workforce development for transit agencies* (Transit Cooperative Research Program Research Report 194). https://doi.org/10.17226/24961

Giloth, R. P. (2000). Learning from the field: Economic growth and workforce development in the 1990s. *Economic Development Quarterly*, 14(4), 340-359. Retrieved from https://journals.sagepub.com/doi/abs/10.1177/089124240001400402

Joh, K., & Li, W. (2015). Developing an Interdisciplinary Transportation Certificate Program for Todays Transportation Workforce. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.673.8808&rep=rep1&type=pdf

Meléndez, E., Borges-Mendez, R., Visser, M. A., & Rosofsky, A. (2015). The restructured landscape of economic development: Challenges and opportunities for regional workforce development collaborations. *Economic Development Quarterly*, 29(2), 150-166. Retrieved from https://journals.sagepub.com/doi/abs/10.1177/0891242414566151

National Academies of Sciences, Engineering, and Medicine (NASEM). (2012). Attracting, Recruiting, and Retaining Skilled Staff for Transportation System Operations and Management. https://doi.org/10.17226/14603

National Academies of Sciences, Engineering, and Medicine (NASEM). (2013). Building a Sustainable Workforce in the Public Transportation Industry—A Systems Approach. https://doi.org/10.17226/22489

National Academies of Sciences, Engineering, and Medicine (NASEM). (2015). A Guide to Building and Retaining Workforce Capacity for the Railroad Industry. https://doi.org/10.17226/21904

National Academies of Sciences, Engineering, and Medicine (NASEM). (2018a). *Guidebook on Building Airport Workforce Capacity*. https://doi.org/10.17226/25263

National Academies of Sciences, Engineering, and Medicine (2018b). *Knowledge management resource to support strategic workforce development for transit agencies* (Transit Cooperative Research Program Research Report 194). https://doi.org/10.17226/24961

National Academies of Sciences, Engineering, and Medicine (2018c). *Transit Technical Training, Volume 2: Guide to Overcoming Barriers to Implementing Best and Innovative Training* (Transit Cooperative Research Program Research Report 199). https://doi.org/10.17226/25158

National Academies of Sciences, Engineering, and Medicine (NASEM). (2019). Transportation Workforce Planning and Development Strategies. NCHRP Synthesis 543. Washington, DC: The National Academies Press. https://doi.org/10.17226/25624.

National LTAP & TTAP Association (NLTAPA). (n. d.). *Online Learning Opportunities*. Retrieved December 21, 2023, from https://nltapa.org/searchable-database/

National Network for the Transportation Workforce (NNTW). *Workforce Development Resources.* Retrieved December 21, 2023, from https://www.nntw.org/resource-center/workforce-development-resources/

National Transit Institute (NTI) (2016). Workforce Development Summit Proceedings-Implementing, Disseminating, and Modeling Ladders of Opportunity–Proceedings (No. FTA Report No. 0096). United States. Federal Transit Administration. Office of Research, Demonstration, and Innovation. https://rosap.ntl.bts.gov/view/dot/39031

O'Brien, T., Matsumoto, D., Sanchez, D., Mace, C., Warren, E., Hala, E., & Reeb, T. (2020). Southern California Regional Workforce Development Needs Assessment for the Transportation and Supply Chain Industry Sectors. https://scholarworks.sjsu.edu/mti_publications/330/

Polzin, S. E., & Ward, B. G. (2002). Designing an interdisciplinary educational program to support transportation workforce development. *Transportation Research Record*, 1812(1), 143-150. https://journals.sagepub.com/doi/abs/10.3141/1812-

18?casa_token=wExPmaLhQ_gAAAAA:TDrXcRRw_TN3I-
B70jUiFZiE4dytgpO3CYlVEN9cITdw5NuUPBZrl9IcPqT7QrO39UTtY3jd8cmcGZo

Wang, Y., Brown, S., Chang, K., Connor, B., & Hajbabaie, A. (2021). Development of PacTrans
Workforce Development Institute.
https://digital.lib.washington.edu/researchworks/handle/1773/47855

Weisenford, J., Cronin, B., Ortiz, S., Majumdar, E., Thompson, C., Jenkins, J., ... & Lazaro, V.
(2018). Transit Technical Training, Volume 1: Guide to Applying Best Practices and
Sharing Resources (No. Project F-22). https://trid.trb.org/view/1530709

9.0 APPENDIX A: Online Workforce Development Resource Citations

AIDT. (n. d.). *Leadership Development Classes*. Retrieved from
https://www.aidt.edu/leadership-development-classes/

Alabama Local Technical Assistance Program (LTAP) & Alabama Transportation Assistance Program (ATAP). (n. d.). Retrieved from https://www.eng.auburn.edu/atap/

American Public Works (APWA) (2020) *APWA, Click, Listen, Learn.* Retrieved from
https://docs.google.com/document/d/1UXztb97J_f68j2DgS13hIGw_hApNyHgwKT2D6BfOHpU/edit

American Public Works (APWA) (n. d.). *APWA eCourses*. Retrieved from
https://www.apwa.org/course/

Auburn University Transportation Research Institute, Alabama Local Technical Assistance Program (ATAP). (n. d.). *Fundamentals of Roadway Geometric Design*. Retrieved from
https://eng.auburn.edu/atap/online-learning/atap-course-catalog

Automotive Service Excellence. (n. d.). *Test Series*. Retrieved from https://www.ase.com/test-series

Community Transportation Association of America (CTAA). (n. d.). Retrieved from
https://ctaa.org/

Easterseals Project Action (n. d.). *Travel Trainer Certification Program.* Retrieved from
https://www.projectaction.com/certification-programs/travel-trainer-certification/

Eno Center for Transportation (n. d.). *Resources/Webinars*. Retrieved from
https://enotrans.org/resources/webinars/

Federal Highway Administration (FHWA) (n. d.-a) *Center for Local-aid Support (CLAS) Innovation Exchange Webinars*. Retrieved August 29, 2023, from
https://www.fhwa.dot.gov/clas/training_tools/webinars.aspx

Federal Highway Administration (FHWA) (n. d.-b) *Federal-aid Essentials for Local Public Agencies (LPAs) videos*. Retrieved August 29, 2023, from
https://www.fhwa.dot.gov/federal-aidessentials/indexofvideos.cfm

Federal Highway Administration (FHWA) (n. d.-c) *Roadway Safety Professional Capacity Building Program.* Retrieved December 21, 2023, from https://rspcb.safety.fhwa.dot.gov/.

Federal Railroad Administration (FRA). (n. d.). *Training Rule Resources*. Retrieved from https://railroads.dot.gov/railroad-safety/divisions/safety-partnerships/training-standards-rule#collapse66758

Florida Department of Transportation (FDOT) (n. d.). *Social Marketing in Transportation Certificate Overview*. Retrieved from https://www.commuterservices.com/training/social-marketing-in-transportation-certificate/

Florida Department of Transportation (FDOT) (n. d.). *Curbing Transit Operator Distracted Driving Training*. Retrieved from https://ftson.org/distracteddriving//florida.html

Florida Rural Transit Assistance Program (RTAP). (n. d*.). Disability Etiquette for Transit Operators.* Retrieved from https://www.floridartap.org/docs/dereginformation.pdf

Florida Transit Safety and Operations Network (FTSON). (n. d.). Retrieved from https://ftson.org/

Georgia Department of Transportation (GDOT). (n. d.). *LTAP Schedule & Additional Training Classes*. Retrieved from https://www.dot.ga.gov/GDOT/Pages/LTAP.aspx

Intelligent Transportation Systems Joint Program Office (ITS JPO). (n. d.). *Cross-cutting Support: ITS Professional Capacity Building.* US Department of Transportation, Office of Assistant Secretary for Research and Technology, Office, ITS JPO. Retrieved December 21, 2023, from https://www.its.dot.gov/research_areas/pcb.htm

Mississippi Local Technical Assistance Program (MTAP), Mississippi Department of Transportation (MDOT). (n. d.). *Training Request Procedures*. Retrieved from https://mdot.ms.gov/documents/Planning/Workshops/LTAP/Training%20Procedures.pdf

National Aging and Disability Transportation Center (NADTC). (n. d.). *Learning Center*. Retrieved from https://www.nadtc.org/learning-center/

National Center for Mobility Management (NCMM). (n. d.). *Learning Course Catalog*. Retrieved from https://nationalcenterformobilitymanagement.org/e-learning-catalog/

National Highway Institute (NHI) (n. d.). *Training Course Search*. Retrieved from https://www.nhi.fhwa.dot.gov/course-search?tab=0&typ=3&sf=0&res=1

National Local Technical Assistance Program (LTAP) (n. d.). *Tailgate Talks*. Retrieved from https://nltapa.org/information-exchange/nltapa-tailgate-talks/

National LTAP and TTAP Association. (n. d.). *NLTAPA Lunch and Learn*. Retrieved from https://nltapa.org/resource_cat/nltapalunch/

National Rural Transit Assistance Program (RTAP). (n. d.). *Resource Catalog.* Retrieved from https://cloud.nationalrtap.org/Resource-Center/Advanced-Search/fid/152

National Rural Transit Assistance Program (RTAP). (n. d.). *Upcoming Webinars.* Retrieved from https://www.nationalrtap.org/Training/Webinars

National Transit Institute (NTI). (n. d.). Retrieved from https://www.ntionline.com/

National Workzone Safety. (n. d.). *Training*. Retrieved from https://workzonesafety.org/training/

North Carolina Local Technical Assistance Program (NCLTAP). (n. d.). *LTAP Training*. Retrieved from https://commerce.cashnet.com/cashneti/static/storefront/NCSUITRE/catalog/NC-LTAP

Bicycle and Pedestrian Information Center (Pedbikeinfo). (n. d.). *Federal FHWA Bikeway Selection Guide*. Retrieved from https://www.pedbikeinfo.org/webinars/webinar_details.cfm?id=80

Shared-Use Mobility Center. (n. d.). *Shared Autonomous Vehicles*. Retrieved from https://learn.sharedusemobilitycenter.org/learning_module/shared-autonomous-vehicles/

South Carolina Local Technical Assistance Program (SCLTAP). (n. d.). *Self-Paced Webinars*. Retrieved from https://www.scltap.org/online-training-resources/self-paced-webinars/

Strategic Highway Research Program (SHRP2) (n. d.). *Guidelines for the Preservation of High-Traffic-Volume Roadways (R26)*. Retrieved from https://web.transportation.org/shrp2/R26/

Strategic Highway Research Program (SHRP2), American Association of State Highway and Transportation Officials (AASHTO) (n. d.). *Guidelines for the Preservation of High-Traffic-Volume Roadways (R26)*. Retrieved from https://web.transportation.org/shrp2/R26/

Tennessee Transportation Assistance Program (TTAP). (n. d.). Course Calendar. Retrieved from https://ttap.utk.edu/training/course-calendar.php

Transit Training Network. (n. d.). *Courseware*. Retrieved from https://www.transittraining.net/courseware/

Transit Workforce Center (TWC). (n. d.). *Resource Center*. Retrieved from https://www.transitworkforce.org/resource/

University of Kentucky (UK). (n. d.). *Training*. Retrieved from https://www.kyt2.com/training