Part 1: The NNTW Partnership

PRESENTATION AGENDA

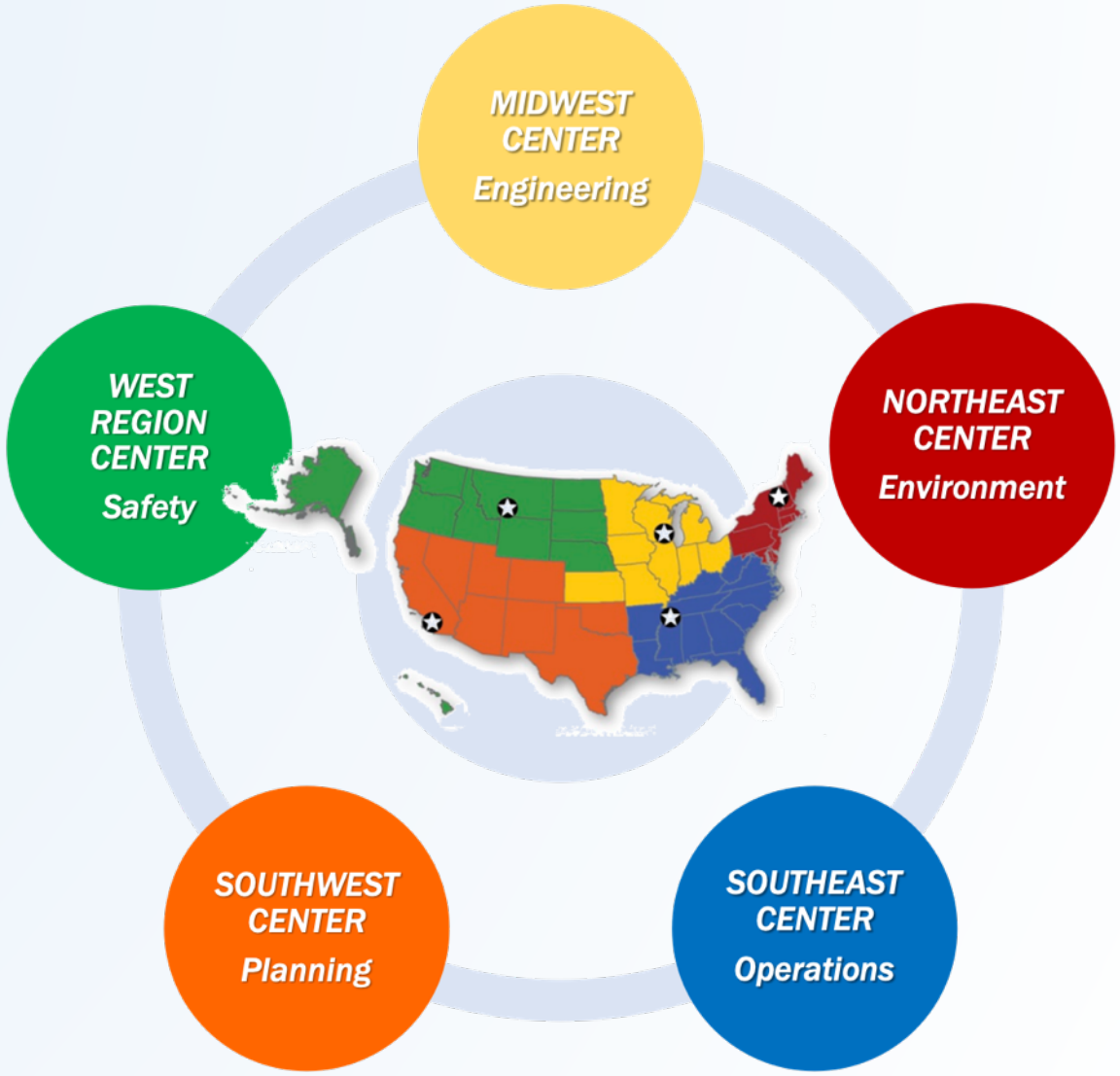
1:00pm Setting the Stage

1:15pm NNTW: Past Progress

2:00pm NTCPI: The Work Ahead

2:20pm FHWA: Workforce Development

2:50pm Break & Transition



Setting the Stage

FINDING COMMON GROUND

Focusing the Agenda: *Our Questions*

- What is your NNTW elevator pitch?
- What was NNTW's biggest contribution to the CTWD?
- Highway Construction Pilot: challenges and lessons learned?
- Forming industry/government/educator partnerships.
- Assessing regional/economic differences for workforce pilots.
- Connecting to other agencies for strategic/capital alliances.
- Professional organizations: who do you need to connect with?
- What are FHWA's biggest workforce development gaps?

Setting the Stage

FINDING COMMON GROUND

Focusing the Agenda: *Your Questions*

- What are the biggest challenges facing transportation? What's missing in meeting that challenge?
- What should a workforce development program do? How? How would you measure success?
- What are the key elements of a workforce development program? Where should it be focused? What should it try to accomplish? What should be its metrics?
- What should be the role of government?
- What should be the role of the private sector? Professional associations? Academia?

NNTW: A Strategic Partnership

CTWD MISSION SYNERGY

- **NNTW Provides National Leadership**, coordination, and assistance that supports initiatives to develop and expand the nation's transportation workforce.
- **Attracting, Retaining, and Advancing** the transportation workforce in the face of retirement, competition, and new technologies.
- **Engaging Women, Minorities, and Disadvantaged** populations to explore transportation careers.

NNTW: A Strategic Partnership

CTWD MISSION SYNERGY

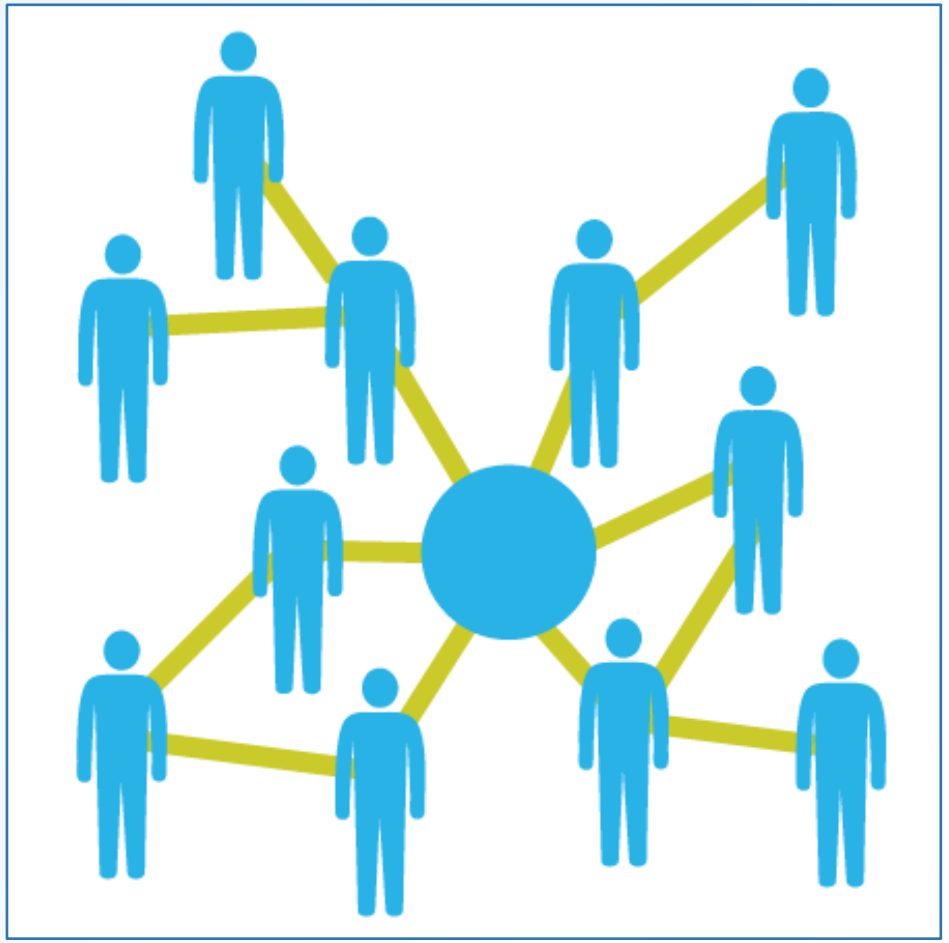
PERSPECTIVE: *How/where do you see NNTW "fitting-in" to the CTWD long-term strategic plan?*

What are FHWA's biggest Workforce Development gaps?

NNTW: A Strategic Partnership

COMMUNITIES OF PRACTICE

NATIONAL ENGAGEMENT



A National Network of Engaged Partnerships

- Building regional *Communities of Practice*.
- Sponsoring education and outreach programs.
- Leveraging resources and workforce initiatives.
- Sharing research, data, and best practices.

Consolidators, Facilitators, Partnership Builders

- Provide national leadership, coordination, and assistance.
- Build awareness/interest in transportation career options.
- A national hub for regional workforce research.
- Develop frameworks for regional action plans.

NNTW: A Strategic Partnership

COMMUNITIES OF PRACTICE

NNTW: A Strategic Partnership

COMMUNITIES OF PRACTICE

Women in Transportation

- Fed-Ex, DOL, Women's Foundation for Greater Memphis

National Transportation Training Directors

- NTTD, NHI, FHWA, AASHTO, TC3, TTAP

Transportation Research Board

- Knowledge Management Task Force
- Committee for Education & Training

Academy of Global Logistics

- Cabrillo, ESRI, CITT, Port of Long Beach,
- Metrans, LB Unified School District

Choosing Transportation: Attracting Women to the Profession

NNTW: A Strategic Partnership

PERSPECTIVE: *Do Communities of Practice represent a valued resource within the FHWA network?*

What other partnerships should CTWD/NNTW be pursuing to increase FHWA's network coverage?

NNTW: A Strategic Partnership

PROGRESS & ACCOMPLISHMENTS

A National Portfolio

- Jobs Needs & Priorities Report
- Highway Maintenance Apprenticeship
- Academy of Global Logistics at Cabrillo
- T-STEM Academy at East High
- Transportation Spotlight Program
- Choosing Transportation Summit
- Transportation CEO Series
- Empowering the New Mobility
- LATTC Planning Pilot Demo

NNTW: A Strategic Partnership

PROGRESS & ACCOMPLISHMENTS: Southwest

Empowering the New Mobility Workforce

- A network of Communities of Practice writ large
- Keeping pace with transformational technology
- Responding to socioeconomic shifts in transportation workforce
- Changing role of transportation provider in future ecosystem
- Creating innovation networks for new mobility workforce
- Skillful: A European approach

NNTW: A Strategic Partnership

PROGRESS & ACCOMPLISHMENTS: Southeast

T-STEM Academy at East High

- Summer Transportation Academy and Frosh Camp
- “Tell the Story” of Transportation and connections to STEM
- Transportation Ambassadors
- Transportation Challenges
- Advisory council
- CEO Series

Student Achievement and Growth

Problem-based learning

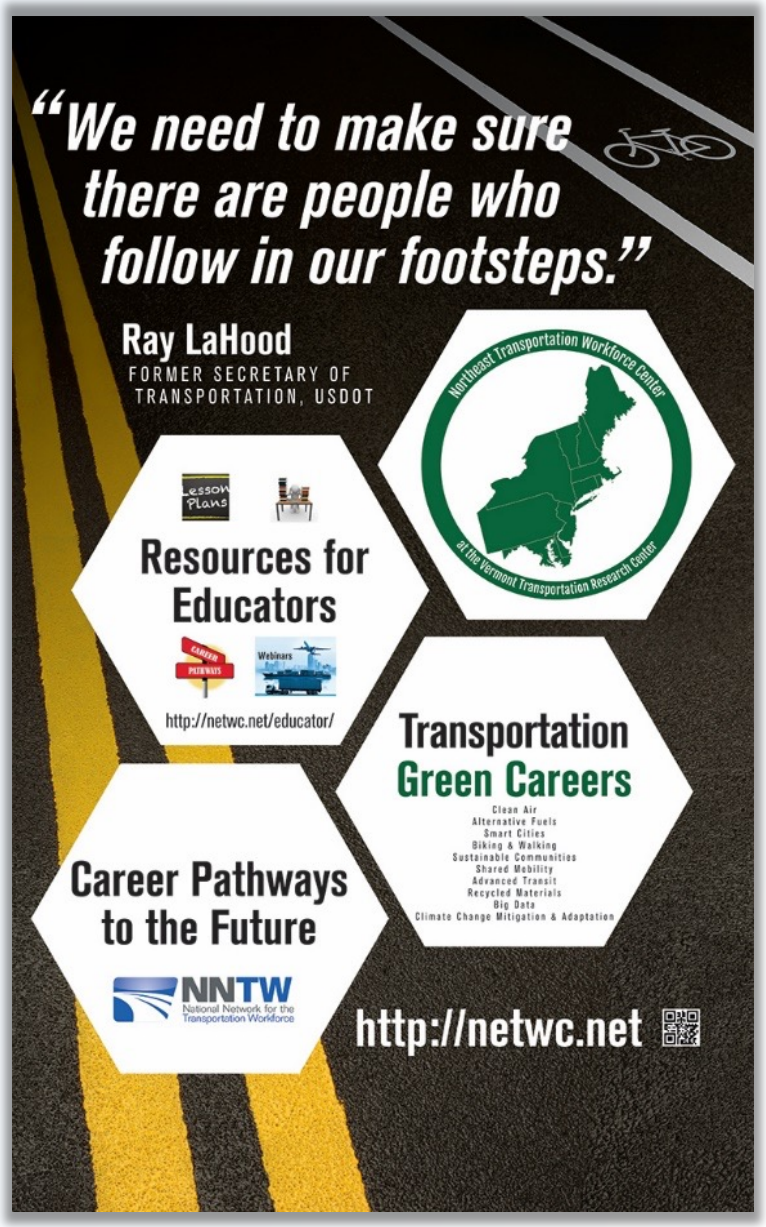
Continuous Professional Learning

Postsecondary, Industry, and Community Partnerships

NNTW: A Strategic Partnership

PROGRESS & ACCOMPLISHMENTS: Northeast

- Developing, testing, revising curricula for K-12, making them widely available to STEM and CTE programs.
- Revitalized national network of state DOT training directors to share knowledge, create new programs, curricula, and approaches to support state DOT workers.
- Engaged partners to advance FHWA brand and enhance workforce development activities in region and nationally.
- Building network infrastructure with online resource center and outreach activities, webinars, and conference presentations.
- Assessed regional demand-driven training and workforce development needs as part of Jobs Needs and Priorities reports.



NNTW: A Strategic Partnership

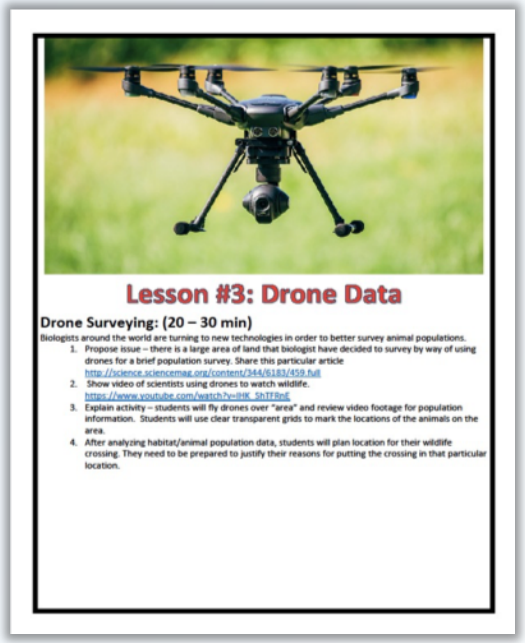
PROGRESS & ACCOMPLISHMENTS: West Region

Research Experience for Teachers: Innovative Transportation Systems

- Leverages $590K funding from NSF.
- Curriculum development/teacher training program on emerging technologies.
- National transportation curriculum dissemination plan.
- Leverages WRTWC network: CTE programs, state education departments, tribal and community colleges, industry partners.

Research Experience for Teachers in Innovative Transportation Systems

Leverages $590K funding from NSF



NNTW: A Strategic Partnership

PROGRESS & ACCOMPLISHMENTS: Midwest

Accelerating Apprenticeship Initiative

3- Part Webinar Series

- Partners: Community College, US DOL.

Highway Maintenance Apprenticeship

- Urgent need for skilled workers to maintain highway infrastructure.
- College articulation provides pathway to engineering tech/beyond.
- Responds to trends: emerging technologies; worker shortage.
- Partners: Highway agencies, technical college system, state DOT.
- Outcomes: Articulation agreements, degree credits, scalable approach, employer CoP, national registration.

NNTW: A Strategic Partnership

PERSPECTIVE: *Do these accomplishments suggest other ideas or areas that FHWA should be pursuing?*

What role should a government agency play in forwarding the goals of workforce development?

What role should academia play?

The Work Ahead

CAREER PATHWAY SOLUTIONS

The Work Ahead

PREPARING THE 21ST CENTURY WORKFORCE

The Research Behind Career Pathways

- Analyzing LMI to identify occupational priorities.
- Mining Burning Glass to est. competency models.
- Collaborating with working groups.
- Validating results through industry surveys.
- Designing prescriptive career pathway plans.
- Piloting demonstrations to test and evaluate.
- Working with local partners to develop impactful pathway implementation plans.

COMPARISON OF COMPETENCIES IN JOB LISTINGS/DESCRIPTIONS - APA AND SCAG

	Top Five Sought-After Competencies American Planning Association	Total Observations or Average Amount	Percentage n = 51
	Written and Oral Communication	31	61%
	Collect, Compile, and Analyze Data	24	47%
	Principles of Planning and Development	24	47%
	Presentations (Public Speaking)	22	43%
	Professional Relationships/Interpersonal Skills	21	41%

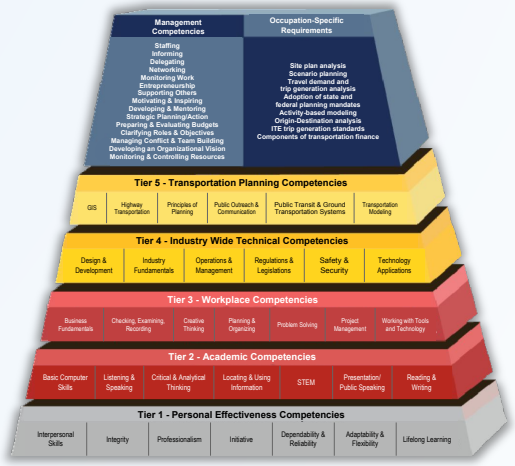
	Competencies/Requirements	Total Observations or Average Amount	Percentage n = 51
Knowledge	Analysis/Research/Report Methods	10	20%
	Principles of Planning and Development	24	47%
	ORG/MGMT/HR Practices	7	14%
	Transportation Modeling	1	2%
	Project Management Practices	6	12%
	Market Research	1	2%
	Funding/Grant Writing	2	4%
	Regulation/Legislation Related to Area	16	31%
	Business language, Document Drafting	7	14%
	Gov./City Structure (Boards, Councils, Commissions)	9	18%
	Budgeting/Financial Analysis	4	8%
	Foreign Language	2	4%
Technology	GIS	19	37%
	Standard Microsoft Appliations	12	24%
	Adobe Tools (Creative, Illustator)	6	12%
	CAD	2	4%
Skills/Abilities	Prepare Reports	15	29%
	Presentations (Public Speaking)	22	43%
	Public Interaction	20	39%
	Customer Service	2	4%
	Collect, Compile, and Analyze Data	24	47%
	Negotiation	2	4%
	Plan and Coordinate Projects	17	33%
	Teamwork	12	24%
	Work Independently	10	20%
	Professional Relationships/Interpersonal Skills	21	41%
	Written and Oral Communication	31	61%
	Leadership	11	22%
	Management/Supervision	12	24%
	Prepare/Administer Budgets	4	8%
	Multitasking	13	25%
	Strategic Mindset	2	4%
	Time Management/Organizational	3	6%
	Logical Thinking/Problem Solving	6	12%
Education	Bachelor's Degree	39	76%
	Master's Degree	3	6%
Certification	AICP	24	47%
	PE	3	6%
Work Experience	Work Experience (Average Years)	3.45	N/A
Salary	Salary (Average Lower Limit)	$ 46,653.86	N/A
	Salary (Average Upper Limit)	$ 61,757.87	N/A

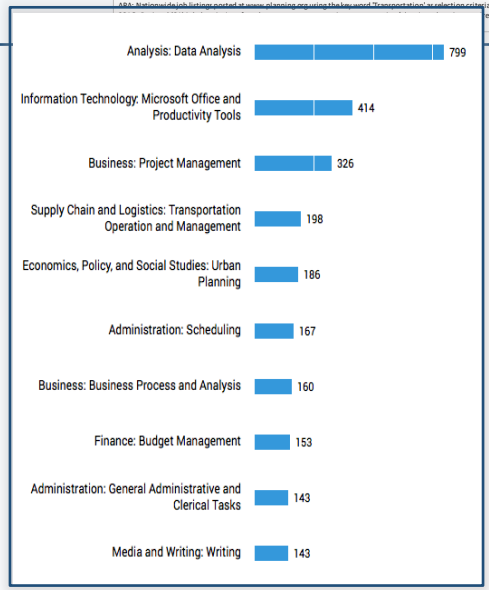
	Top Five Sought-After Competencies Southern California Association of Governments	Total Observations or Average Amount	Percentage n = 32
	Regulation/Legislation	23	72%
	Principles of Urb./Reg./Trans. Planning	22	69%
	Prepare Reports/Presentations	22	69%
	Collect, Compile, Analyze Data	21	66%
	Complex Problem Solving	19	59%

	Competencies/Requirements	Total Observations or Average Amount	Percentage n = 32
Knowledge	Analysis/Research/Report Methods	18	56%
	Statistical Theory/Methods	13	41%
	Principles of Urb./Reg./Trans. Planning	22	69%
	PR Techniques	4	13%
	Air Quality Planning	5	16%
	ORG/MGMT/HR Practices	9	28%
	Transportation Modeling	10	31%
	Project Management Practices	18	56%
	Regulation/Legislation	23	72%
	Economic Forecasting	4	13%
	Env./Sust. Practices	4	13%
	Gov./City Structure (Boards, Councils, Commissions)	3	9%
	Transportation Development Act	2	6%
	Budgeting	11	34%
	Principles in Transportation Demand Mgmt.	3	9%
Technology	GIS	8	25%
	SAS	3	9%
	Standard Office Appliations	3	9%
	Other Software Requirements	4	13%
Skills/Abilities	Prepare Reports/Presentations	22	69%
	Public Interaction	13	41%
	Collect, Compile, Analyze Data	21	66%
	Plan/Coordinate Projects	10	31%
	Teamwork	8	25%
	Work Independently	14	44%
	Gain Coop./Consesus thr. Disc. and Persuasion	9	28%
	Written and Oral Communication	8	25%
	Leadership	11	34%
	Management	10	31%
	Prepare/Administer Budgets	8	25%
	Complex Problem Solving	19	59%
Education	Bachelor's Degree	30	94%
	Master's Degree	2	6%
Work Experience	Work Experience (Average Years)	4.45	N/A
Salary	Salary (Average Lower Limit)	$ 99,018.40	N/A
	Salary (Average Upper Limit)	$ 137,865.37	N/A

Legend
Green cells represent the top five most commonly found knowledges and skills/abilities, and the top two technology competencies mentioned. Yellow cells represent the overall top five competencies for the respective scans (presented on top of the page).

Data sources





The Work Ahead

CAREER PATHWAY SOLUTIONS: Planning

Transportation Planning Professional (Plus)

- Partners: CSULB, UCI, UCLA, Cal Poly, CSUN, SDSU, SCAG, Esri, HNTB, LA Metro, South Bay COG, Gateway COG.
- Non-credit, stackable certifications for Planners.
- Cross-disciplinary competencies: Using GIS for communications, data visualization, project mgmt., vendor management, policy/legal, public speaking.
- A modular approach to professional credentialing.
- Target: professional practitioners, Planning students.


Illustration by Jimmy Collins

The Work Ahead

CAREER PATHWAY SOLUTIONS: Operations

Attracting Students to Transportation Operations Careers

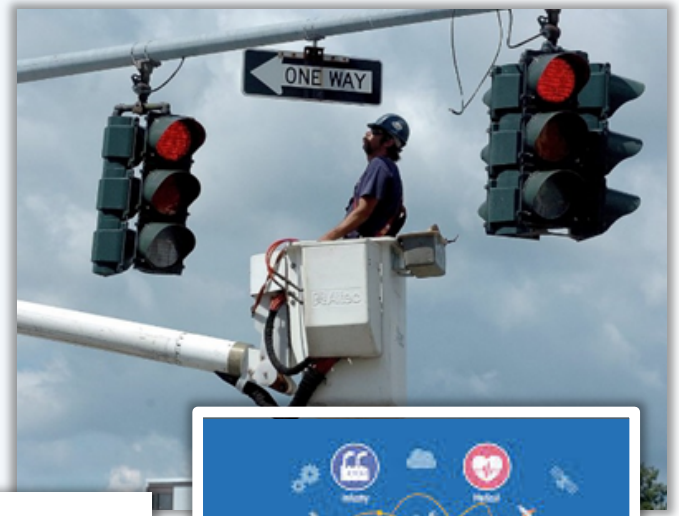
- Partners: TDOT, NOCoE, Gannet Flemming, TRC Eng., SW TN Community College, T-STEM Academy East High
- “Telling the Story” of Transportation Operations
- An Interactive Career Pathway Web Portal
- Transportation Operations Challenge Projects
- Impacting K-16 Education & Educators

The Work Ahead

CAREER PATHWAY SOLUTIONS: Environment

Smart City & Shared-Use Mobility Workforce Development Initiative

- Partners: Maine & New Hampshire DOT/LTAP/ITE, IMSA, Southern Maine Community College.
- Upskill workers with public/private contractors.
- Address key need for certified workers.
- Leverage immediate certification needs into a sustainable delivery system for expanded certifications with formal education partners.
- Integrate existing tools/curriculum/pathways for adoption by post-secondary education partners.
- Build pathway tools for recruitment and retention.



IMSA®

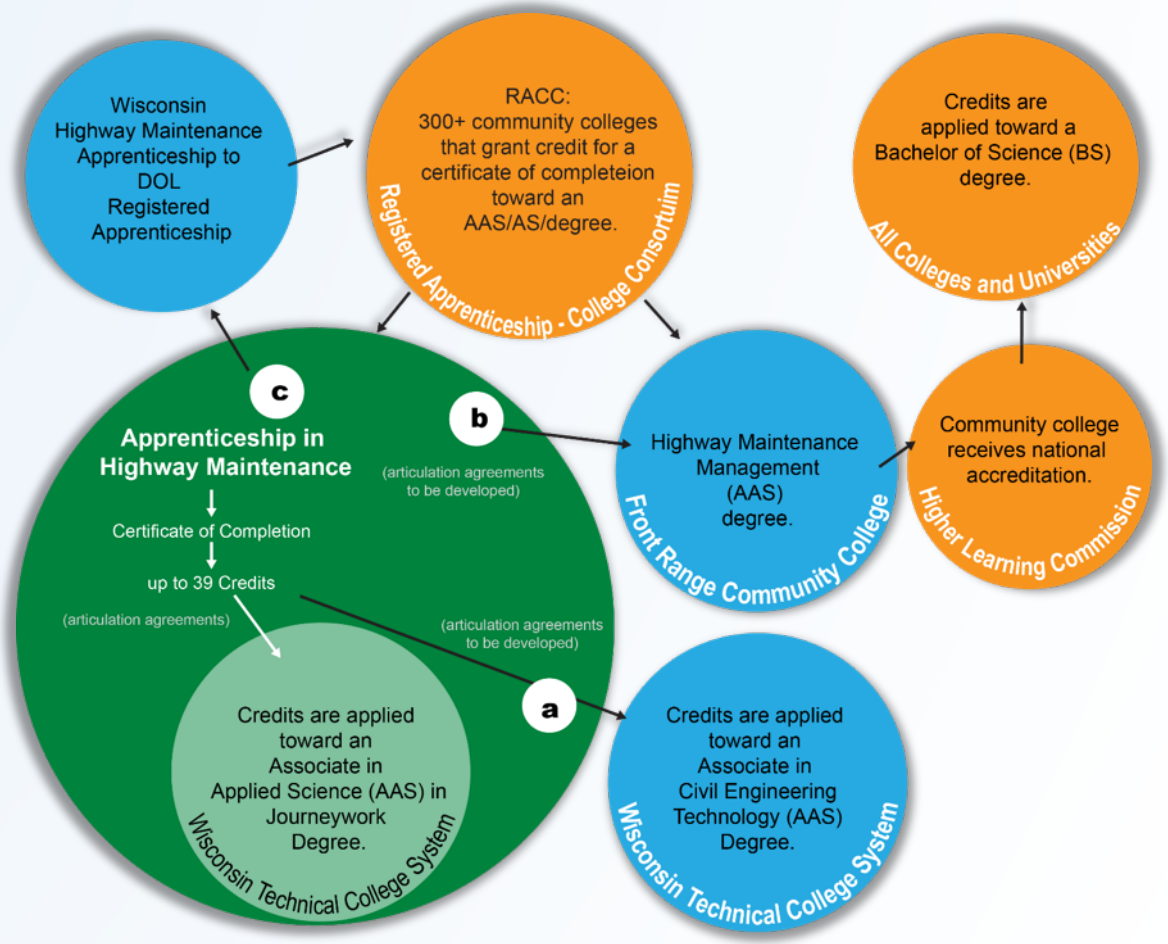
Your Partner in PUBLIC SAFETY

The Work Ahead

CAREER PATHWAY SOLUTIONS: Engineering/HM

Highway Maintenance Apprenticeship: An Entry to the Highway Maintenance Career Pathway

- Partners: Wisconsin Municipal Employers
- Establish and scale deployment of Highway Maintenance Apprenticeships.
- Engage employers through a CoP.
- Address barriers: institutional/market/curricular.
- Establish articulation; national registration.



The Work Ahead

CAREER PATHWAY SOLUTIONS: Safety

Integrating Safety Competencies into Transportation Training, Education, and Career Pathway Streams

- Partners: EPIC-N, NACE, Montana LTAP, National Center for Rural Road Safety
- Structured mechanism for transportation staff to obtain core safety competencies; receive recognition/prof. credentials.
- Pilot Local Roads Transportation Safety Recognition program.
- Develop adaptable model for infusing safety learning into multidisciplinary coursework.

The Work Ahead

A LONG-TERM VISION

"NNTW is dedicated to the development of the transportation workforce and building a sustainable national network structure with independent governance and membership to advance FHWA priorities through program and resource development that is tied to vibrant partnerships."

- Establish long-term strategic plan in core activity areas: K-12, post-secondary education/training, and professional development.
- Set goals and deliverables along a 10-year continuum.
- Sustain regional networks, partnerships, and resources.
- Continue developing on regional action plans.
- Actively address workforce challenges.
- Strategically approach assessing impact.

The Work Ahead

PERSPECTIVE: *As we look ahead to implementing these career pathway solutions, how well do these programs align with the goals of FHWA/CTWD?*

What's the right approach for FHWA to further these agendas? Is it demonstration programs? Long-term initiatives? Cooperative research programs (e.g., NCHRP)?

What is the right role for FHWA, and for that matter education and industry, in supporting these types of initiatives?

FHWA & Workforce Development

FHWA & Workforce Development

STRATEGIES FOR DEPLOYING NEW PROJECTS

EXPLOIT PARTNERSHIPS: Use existing partnerships to enhance, expand, explore new synergies (AASHTO + future of state DOT workforce, Advance CTE + role of CTE programs in preparing workers).

ESTABLISH LONG-TERM VISION: Efforts need 5-10 years to bear fruit; should be transformational not transactional.

UTILIZE WORK PRODUCTS: Support/promote Regional Center networks, partnerships, programs, resources, and products.

FOSTER INNOVATION: Outline workforce goals versus dictating specific programs or products.

ALLOW FLEXIBILITY: Allow grantee/contractor to address client needs and requests as they arise.

FHWA & Workforce Development

MAXIMIZING WORKFORCE INVESTMENT

- Collect/maintain usable data on activities/outcomes from programs.
- Review/evaluate past programs to provide foundation for future activities.
- Build off infrastructure/relationships established by Regional Centers.
- Coordinate investments to achieve local/regional/national impact.
- Dedicate funding to support long-term initiatives.
- Increase promotion of existing programs.

BREAK & TRANSITION

Part 2: The Career Pathways Initiative

PRESENTATION AGENDA

3:00pm Career Pathways Initiative

3:05pm Planning Demonstration Pilot

3:20pm Implementations Plans

4:10pm Summary & Open Discussion

4:30pm Closeout

First Year Accomplishments

- Formed Discipline Working Groups; established broad stakeholder network.
- Identified priority occupations; determined in-demand skillsets.
- Assessed state of education, training and experiential learning programs.
- Identified skills and training gaps, impact from transformative technologies.
- Drafted career pathways for priority occupations (post-secondary).

Generalizing 1st-Year Discoveries

STAKEHOLDER ENGAGEMENT: Discipline working groups critical to understanding industry perspective; may require different makeup research vs implementation.

TECHNOLOGY & WORKFORCE: Transportation sector undergoing changes due to emerging technologies, but forecasting those impacts may be fruitless.

LABOR MARKET ANALYSIS: LMI is essential in characterizing industry occupations, but understanding its limitations is key to proper analysis.

STATE OF PRACTICE: Mining real-time job listings provides critical insight into employer needs/demands. Proper filtering is key to accessing useable data.

EMPLOYMENT TRAINING: Public sector employers deploy on-the-job training to prepare new-hires, but few academic programs emphasis experiential learning.

BARRIERS & RECOMMENTATIONS: Most academic programs are institutionally siloed and therefore slow to adapt to industry changes and competency demands.

The Career Pathways Initiative

YEAR TWO PROJECT OBJECTIVES

Revised Year-Two Project Plan

Step 1: Finalize Planning Demo

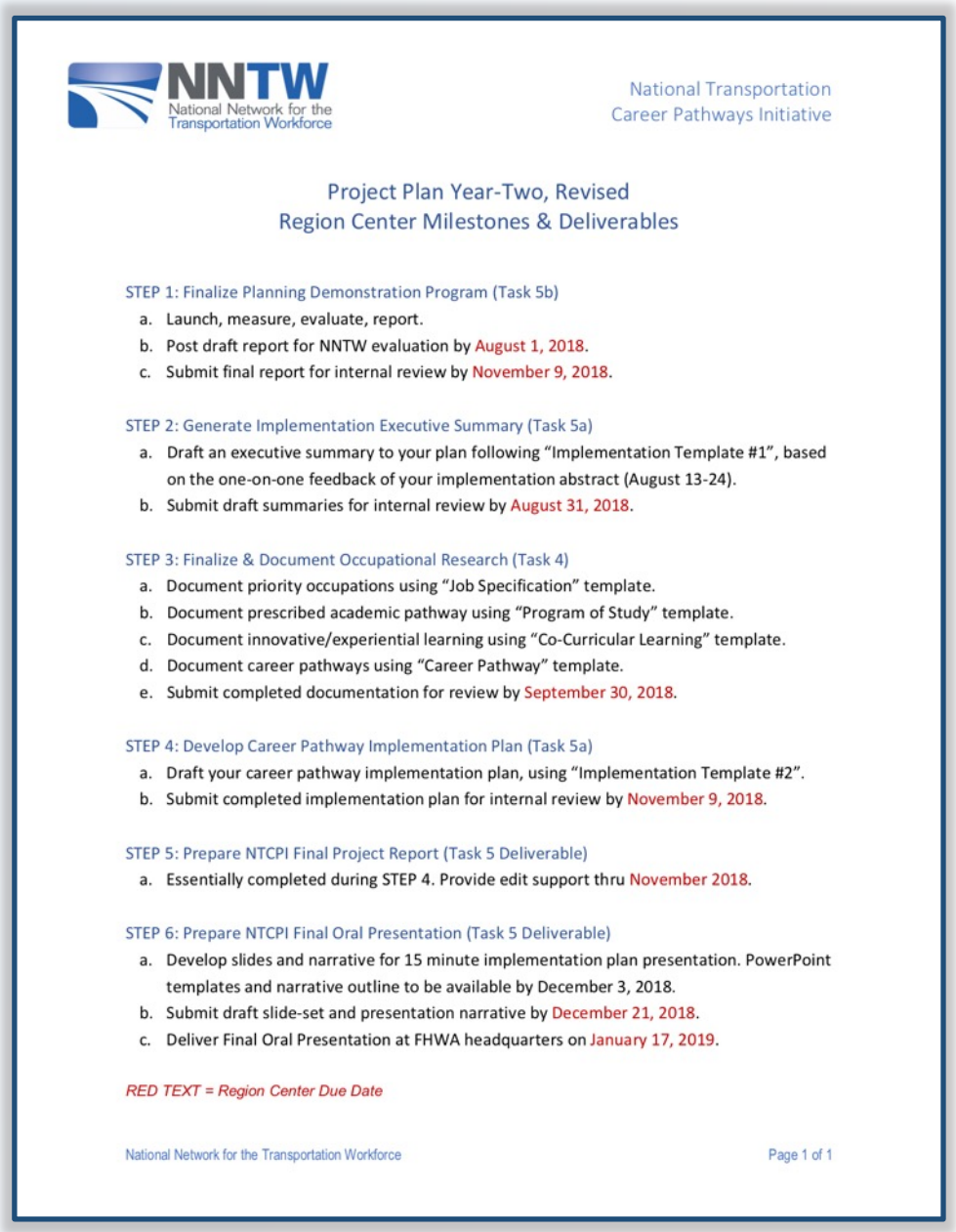
Step 2: Design Pathway Demonstrations

Step 3: Document Occupational Research

Step 4: Draft Pathway Implementation Plans

Step 5: Prepare Final Project Report

Step 6: Prepare Finalize Presentation



NNTW National Network for the Transportation Workforce

National Transportation Career Pathways Initiative

Project Plan Year-Two, Revised
Region Center Milestones & Deliverables

STEP 1: Finalize Planning Demonstration Program (Task 5b)

a. Launch, measure, evaluate, report.
b. Post draft report for NNTW evaluation by August 1, 2018.
c. Submit final report for internal review by November 9, 2018.

STEP 2: Generate Implementation Executive Summary (Task 5a)

a. Draft an executive summary to your plan following "Implementation Template #1", based on the one-on-one feedback of your implementation abstract (August 13-24).
b. Submit draft summaries for internal review by August 31, 2018.

STEP 3: Finalize & Document Occupational Research (Task 4)

a. Document priority occupations using "Job Specification" template.
b. Document prescribed academic pathway using "Program of Study" template.
c. Document innovative/experiential learning using "Co-Curricular Learning" template.
d. Document career pathways using "Career Pathway" template.
e. Submit completed documentation for review by September 30, 2018.

STEP 4: Develop Career Pathway Implementation Plan (Task 5a)

a. Draft your career pathway implementation plan, using "Implementation Template #2".
b. Submit completed implementation plan for internal review by November 9, 2018.

STEP 5: Prepare NTCPI Final Project Report (Task 5 Deliverable)

a. Essentially completed during STEP 4. Provide edit support thru November 2018.

STEP 6: Prepare NTCPI Final Oral Presentation (Task 5 Deliverable)

a. Develop slides and narrative for 15 minute implementation plan presentation. PowerPoint templates and narrative outline to be available by December 3, 2018.
b. Submit draft slide-set and presentation narrative by December 21, 2018.
c. Deliver Final Oral Presentation at FHWA headquarters on January 17, 2019.

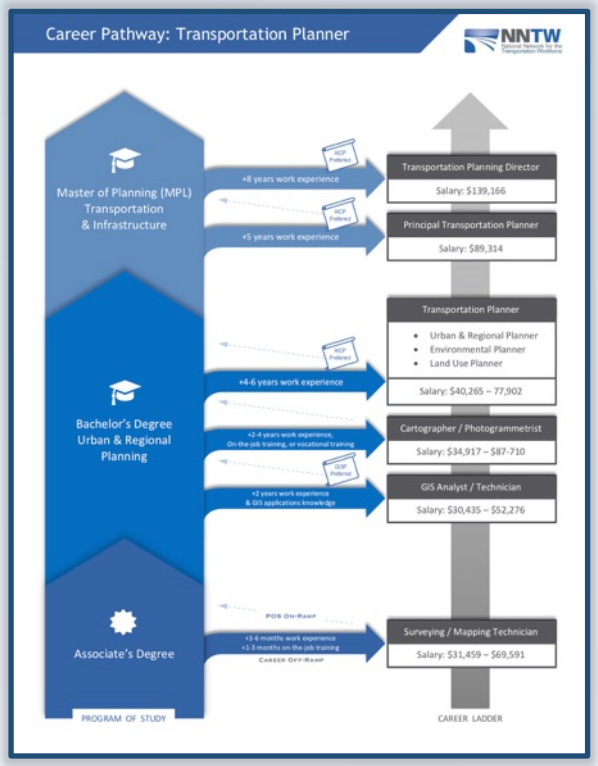
RED TEXT = Region Center Due Date

National Network for the Transportation Workforce Page 1 of 1

The Career Pathways Initiative

DOCUMENTING CAREER PATHWAYS

Pathway Graphic



Job Spec

Program of Study

Experiential Learning

The Career Pathways Initiative

DESIGNING IMPLEMENTATION PLANS

- **Articulate pathway strategies & designs** to K-12 & post-secondary partners.
- **Obtain partner letters of agreement** that identify role and contributions.
- **Target workforce administrators**; serve students & returning professionals.
- **Identify institutional barriers**; recommend actions to overcome.
- **Demonstrate connections** between K-12, 2-year, and 4-year programs.

Implementation Plan Organization

Section 1.0: Executive Summary

An overview of the full plan scope, with a focus on the first year's deployment. Intended to simplify project objectives, outcomes, and funding requirements for FHWA.

Section 2.0: Characterizing the Workforce

A summary of disciplinary research, discoveries, and outcomes that characterize this workforce. Includes the list of priority occupations, critical job competencies, and a description of any challenges to being competitive in the 21st century workplace.

Section 3.0: Career Pathway Design

An overview of the methodology used to design targeted career pathways for priority occupations. Includes a list of all pathways documented and a descriptive walkthrough of one example document set (¼-scale), with reference to a complete set attached.

Section 4.0: The Six Elements of Pathway Development

This significant ETA work in career pathway development will be addressed as one of the foundations underpinning the NNTW approach.

Section 5.0: Career Pathway Implementation

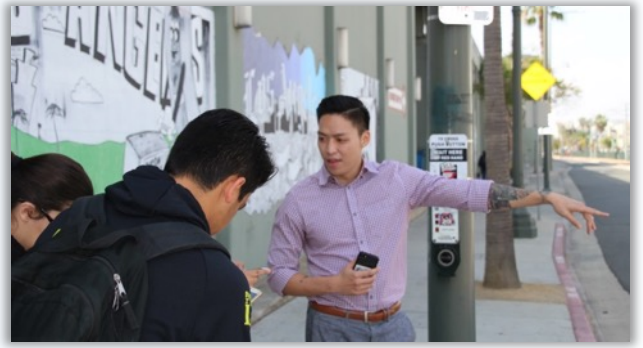
A plan for deploying a multi-year career pathway program—that represents at least one priority occupation—into the post-secondary educational space.

Section 6.0: Barriers to Deployment

A breakdown of all known challenges and barriers that are likely to impede a successful pathway implementation, including any that are legislative, policy, or funding related, with recommendations and/or strategies to overcome them.

The Planning Demonstration Pilot

LOS ANGELES TRADE-TECH LATTC A Community College



SWTWC Southwest Transportation Workforce Center

CALIFORNIA STATE UNIVERSITY, LONG BEACH
COLLEGE OF CONTINUING AND PROFESSIONAL EDUCATION

Alberto Semadeni

Has successfully completed

ARC 341: GIS Metropolitan Access Planning Systems

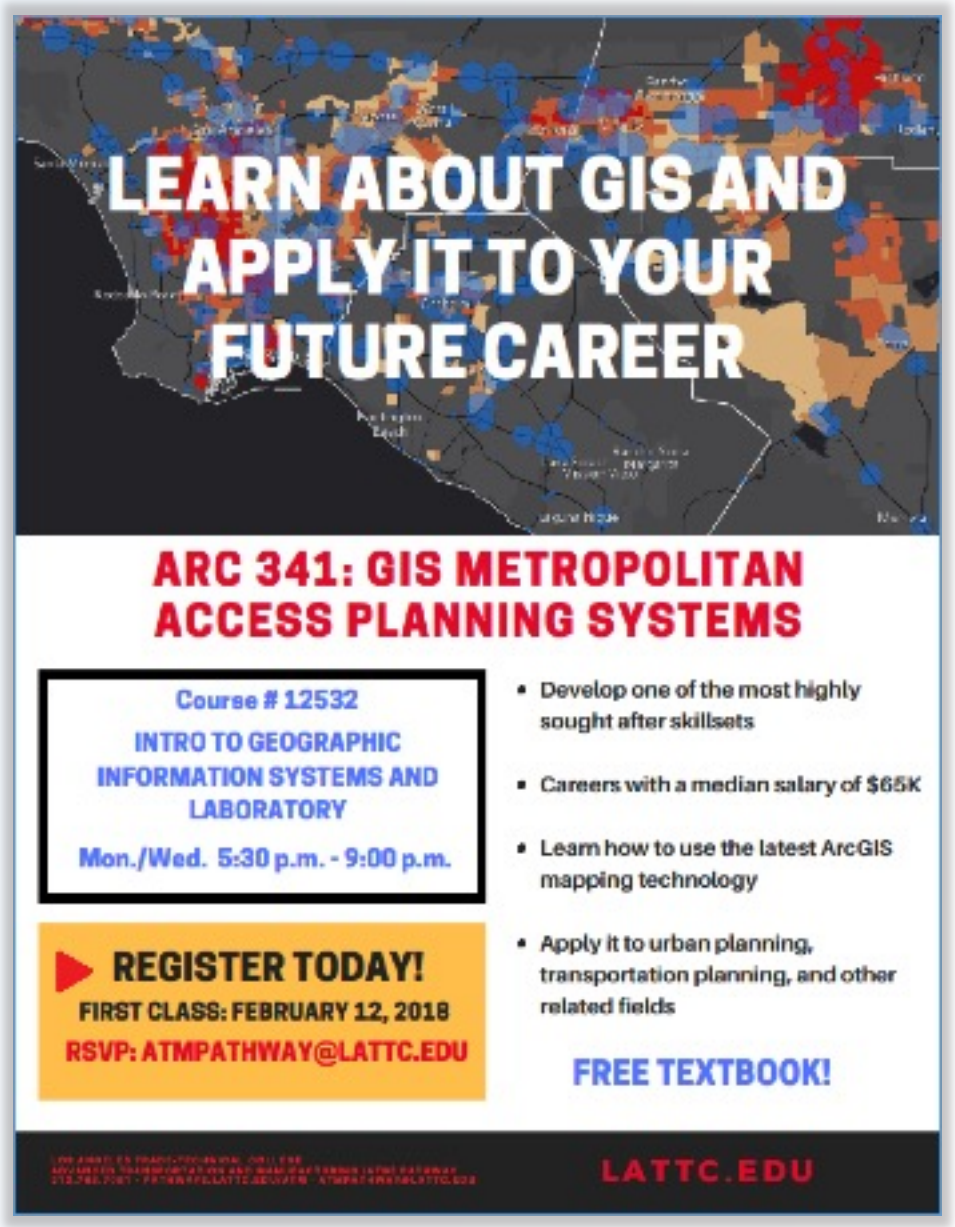
A course developed in partnership with the Southwest Transportation Workforce Center at CSULB and the Los Angeles Trade Technical College with support from the USDOT Federal Highway Administration.

May 26, 2018

The Planning Demonstration Pilot

PROGRAM AT A GLANCE

- Hybrid Intro to GIS Course w/ Planning Concepts
- 3-Unit Transfer Credit w/ Dual-Enrollment Option
- Launched Spring 2018 at L.A. Trade Technical College
- In Partnership w/ Transportation Workforce Institute
- Connected K12 Students to 2-Year & 4-Year Programs
- Provided Contextualized, Work-Based Learning
- Promoted Transportation Career Pathways
- Served Disadvantaged Student Population
- Comprehensive Industry Engagement



The Planning Demonstration Pilot

STUDENT LEARNING OBJECTIVES

Student Learning Objectives

- Introduce GIS Concepts
- Operate ArcGIS Software
- Manage Geodatabases
- Coordinate Systems
- Data Collection & Mapping
- Database Queries
- Spatial Joins & Overlays
- Project Teamwork

Course Syllabus

COURSE OUTLINE (Subject to Change)

Date/Week	Lecture Topic	Assignments
Week 1	Syllabus/Introduction to GIS	ArcGIS Online
Week 2	GIS Data	Chapter 1 *Who Uses GIS assignment due*
Week 3 Guest Speaker: Tom O'Brien (10-11)	Managing GIS Data Geodatabases	Chapter 2 Chapter 13 (pp. 379-384) *Chapter 1 assignments due (review)*
Week 4	Coordinate Systems	Chapter 3 *Chapter 2 assignments due (review)*
Week 5 Guest Speaker: Terry Bills (10-11)	Mapping GIS Data	Chapter 4 *Chapter 3 assignments due (review)*
Week 6 3/31 Spring Break	Campus Closed	
Week 7	Presenting GIS Data	Chapter 5 *Chapter 4 assignments due (review)*
Week 8	Attribute Data Midterm Exam	Chapter 6 *Chapter 5 assignments due (review)*
Week 9 Guest Speaker: Eric Shen (10-11)	Queries	Chapter 8 *Chapter 6 assignments due (review)*
Week 10	Collector App Group & Individual Projects Info	Field Data Collection Project Proposal Story Maps
Week 11	Spatial Joins	Chapter 9 Chapter 8 assignments due (review)
Week 12	Map Overlay and Geoprocessing Geocoding	Chapter 10 Chapter 9 assignments due (review) Mapping Mobility Project (Individual)
Week 13	Group Project	Group Project Chapter 10 assignments due (review)
Week 14	Group Project	Group Project
Final Exam	Additional Information will be provided	

The Planning Demonstration Pilot

TESTING PATHWAY STRATEGIES

Experiential Learning

- The Walk Audit & Data Collection activity.
- ArcGIS, Story Maps, and Data Visualization.

Contextualized Learning

- Intro GIS taught thru lens of transportation planning.
- Assignments mimic real-world planning activities.
- Intentional career pathway exposure/discussions.

Industry Engagement

- Industry involved in activity design, in-class lectures, providing resources, and completing evaluations.
- FHWA site visit and student interaction.

Experiential & Innovative Learning: Planning

NNTW National Network for the Transportation Workforce

Experiential Learning Programs for Planning Students

In addition to academic and technical preparedness, on-the-job training and other work-based learning experiences are critical components of worker readiness programs. These national programs provide co-curricular value to student career preparedness:

Sierra Club

Students of the Angeles Chapter Transportation Committee have the opportunity to engage with other members, leaders of the organization, and community members to network and develop impactful campaigns and initiatives.

Association for Public Policy Analysis & Mgmt (APPAM)

APPAM provides graduate student members with an opportunity to attend regional conferences and participate in a mentor-matching program.

American Planning Association (APA)

Attending an APA-accredited university or obtaining membership connects students to a network of professional planners and an opportunity to obtain an American Institute of Certified Planners (AICP) certification, the only national independent verification of planner qualifications.

Global Planners Network (GPN)

Student APA members are able to connect with GPN's global network of planning associations, through APA regional conferences here in the United States.

The Urban Land Institute (ULI)

ULI offers workshop and research competition opportunities hosted across the country, which support the development of member understanding on current urban planning challenges and how to address current trends in industry.

Southern California Association of Governments (SCAG)

SCAG offers college students paid internships that provide practical work experience and an opportunity to develop meaningful relationships with experts in their program of study. SCAG also offers local scholarships to high school and community college students and a two-week internship with a local planning agency, council of governments, or SCAG.

San Diego Association of Governments (SANDAG)

SANDAG offers paid internships for students with graduate coursework in urban planning, public policy, or related fields focusing on transportation planning. This one-year position provides a hands-on learning experience with guidance and mentoring of senior staff.

Innovative Learning Strategies for a Planning Program of Study

To establish curricular lessons and activities that incorporate the latest strategies for increasing student learning effectiveness and retention, a review of practices deployed by workforce and CTE practitioners reveals several approaches that would benefit students within a transportation planning program of study. These learning strategies include:

Competency-Based Curriculum

Curriculum that meets academic and quality standards that is designed and organized by competencies required for jobs and cross-walked with industry skill standards and certifications, where applicable. Job profiling and the use of "SMEs" should be considered to meet the competency needs of business.

Modularized Curriculum

Structure and sequence curriculum in modules tied to jobs with multiple entry/exit points, with multiple levels of industry recognized credentials built into the sequenced pathway.

Asynchronous Learning

Provide education and training for students and incumbent workers at times and locations convenient to students and employers, rather than instructors or institutions. This may include evenings or weekends, blended or "hybrid" delivery models, and delivery at off-campus locations.

Problem-Based Learning

Problem-based learning helps students who seek hands-on learning and want to be media-makers foster team-building and solve real life problems.

Experiential Learning

Incorporate opportunities for "learning-by-doing", including internships, co-op work experience, simulations, and team class projects that are assignments from local employers.

Context-Based Learning

By interpreting new information in the context or place of where and when it occurs and relating it to what we already know, we come to understand its relevance and meaning. To design effective strategies for learning requires an understanding of how context shapes learning.

Individual Learning

Learners are different and innovative learning environments reflect the various experiences and prior knowledge that each student brings to class. It's important that practices and processes help teachers engage each student where they are.

U.S. Department of Transportation Federal Highway Administration

SWTWC Southwest Transportation Workforce Center

"This material is based upon work supported by the Federal Highway Administration under Agreement No. DTFH6116H00030. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the Author(s) and do not necessarily reflect the view of the Federal Highway Administration."

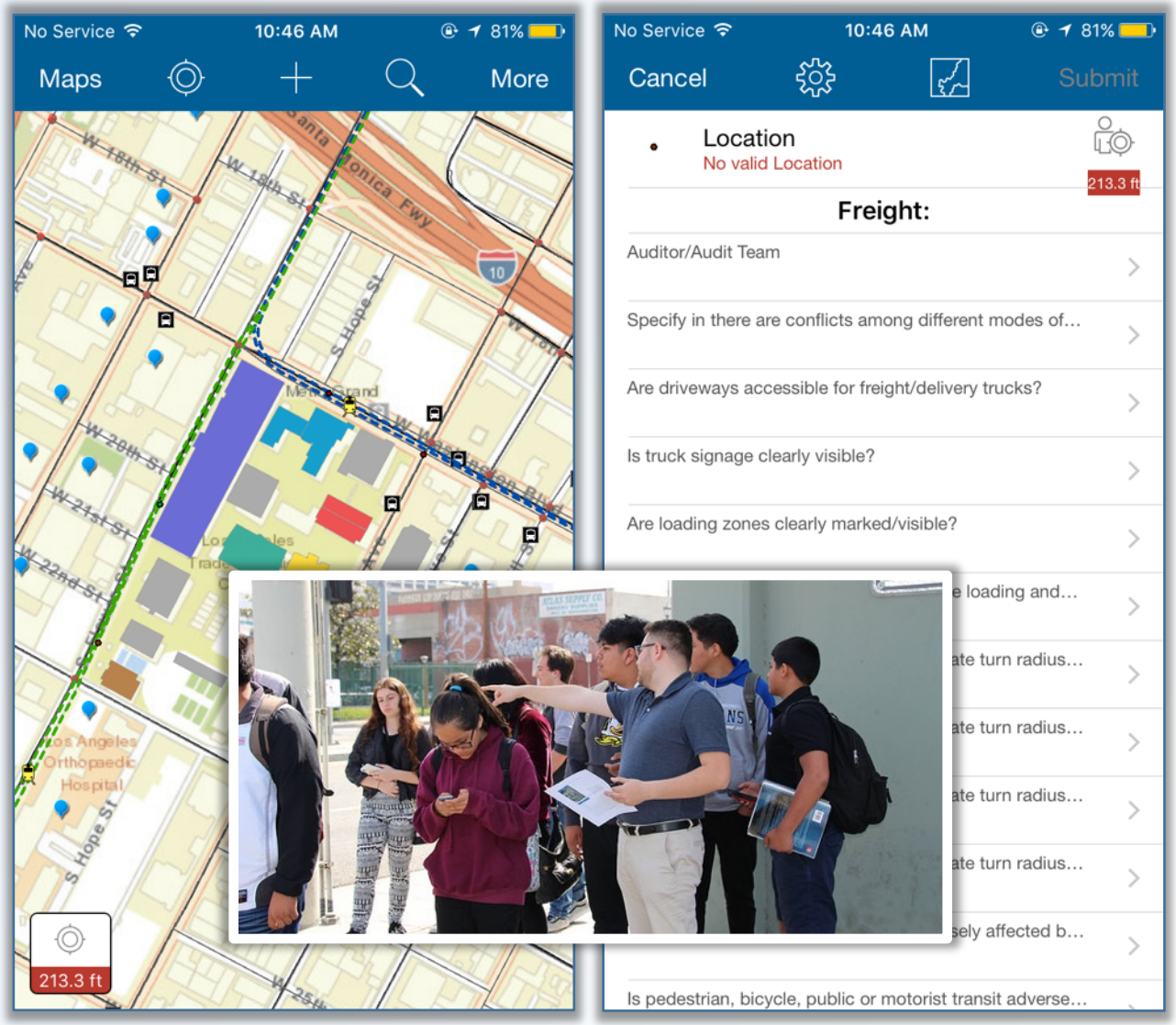
The Planning Demonstration Pilot

ENGAGING STUDENTS IN NON-TRADITIONAL WAYS

Engaging Students to Learn

- Infused planning-based projects into existing GIS course/curriculum.
- Engaged industry support: site visits, guest speakers, technology needs.
- Career pathway as curriculum: from college students to industry pros.
- Activities intentionally engage students around planning career pathway.

Work-Based Learning Activities

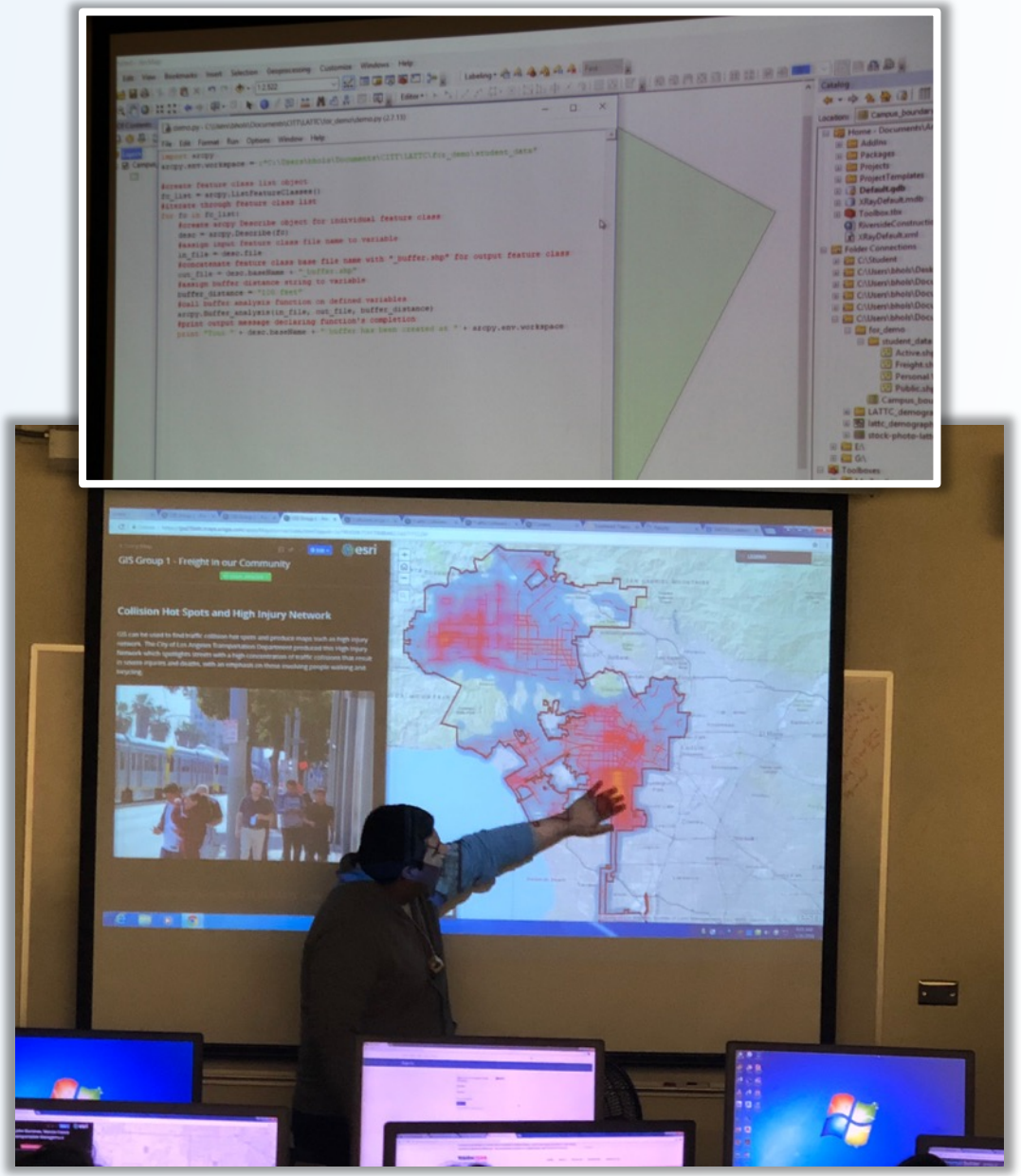


The Planning Demonstration Pilot

ENGAGING STUDENTS IN NON-TRADITIONAL WAYS

Engagement Across the Career Pathway

- CSULB Research Assistant's directed student teams thru walk audit activities.
- GIS graduate students introduced students to Python programming to transfer walk audit data into useable asset maps.
- Students engaged planning industry professionals during guest lectures.



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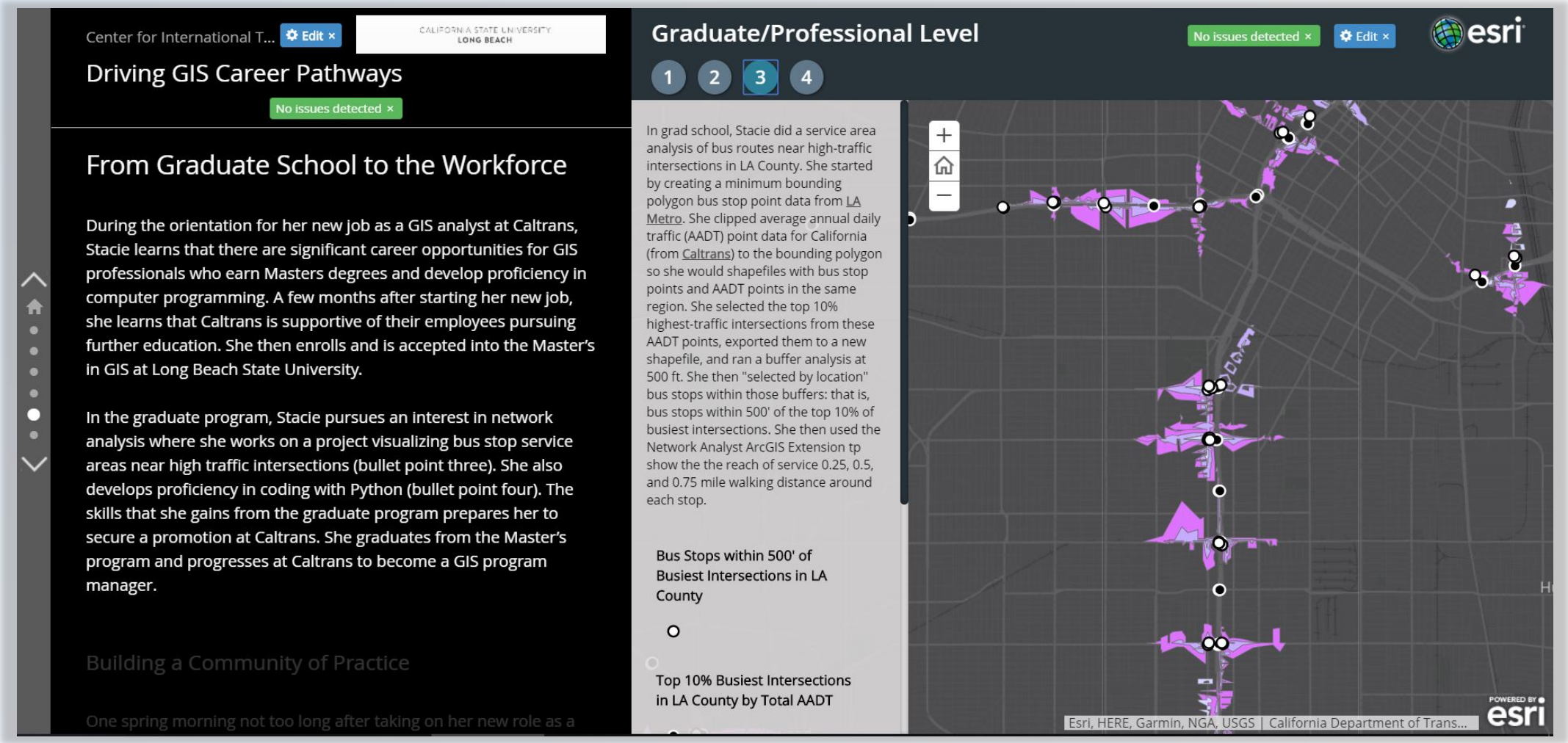
ENGAGING STUDENTS IN NON-TRADITIONAL WAYS

Teaching Through Story Maps

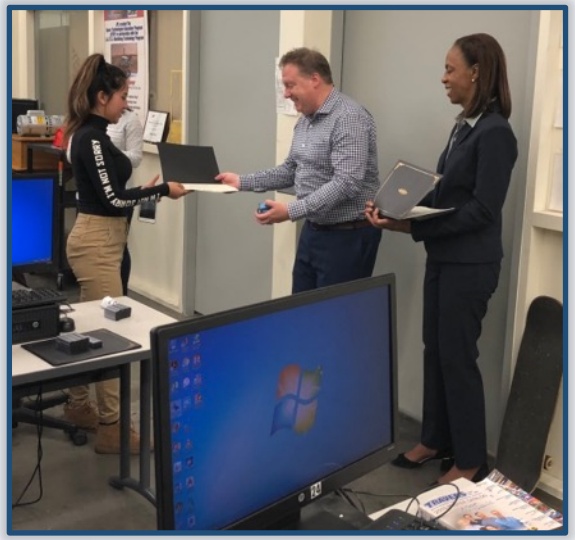


The Planning Demonstration Pilot

ENCOURAGING STUDENT SUCCESS

Encouraging Student Success

- In-Class Mentoring
- Open Talks with Employers
- Course Completion Certificate
- Graduation Ceremony
- FHWA Sponsor Visit



CALIFORNIA STATE UNIVERSITY, LONG BEACH
COLLEGE OF CONTINUING AND PROFESSIONAL EDUCATION

Alberto Semadeni

Has successfully completed

ARC 341: GIS Metropolitan Access Planning Systems

A course developed in partnership with the Southwest Transportation Workforce Center at CSULB and the Los Angeles Trade Technical College with support from the USDOT Federal Highway Administration.

May 26, 2018

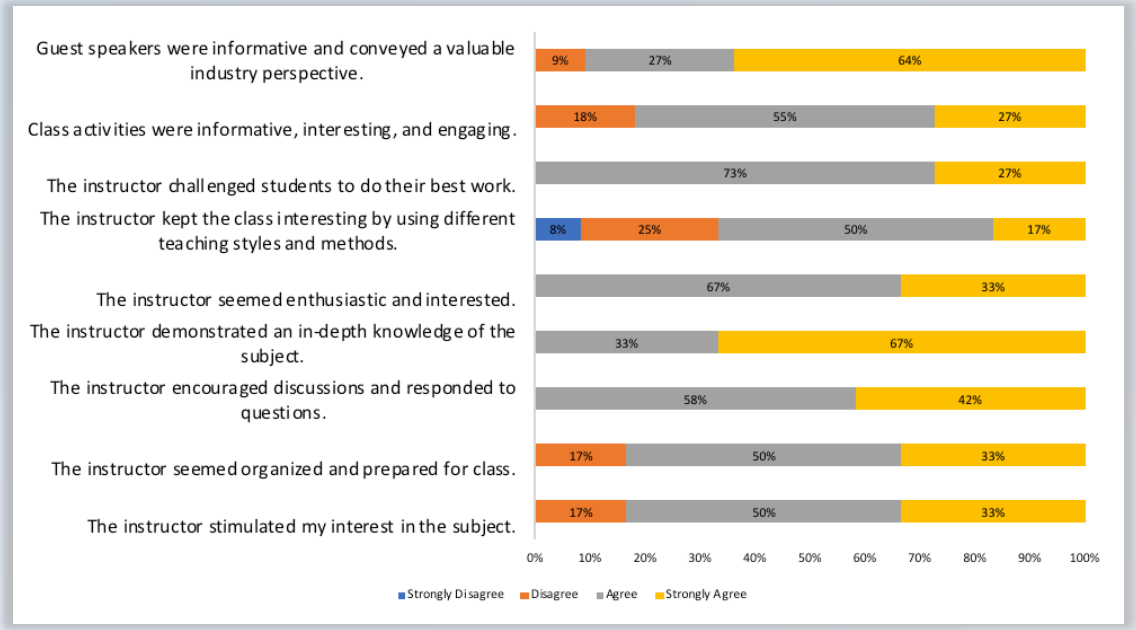
Janet Jenkins, Dean
College of Continuing & Professional Education

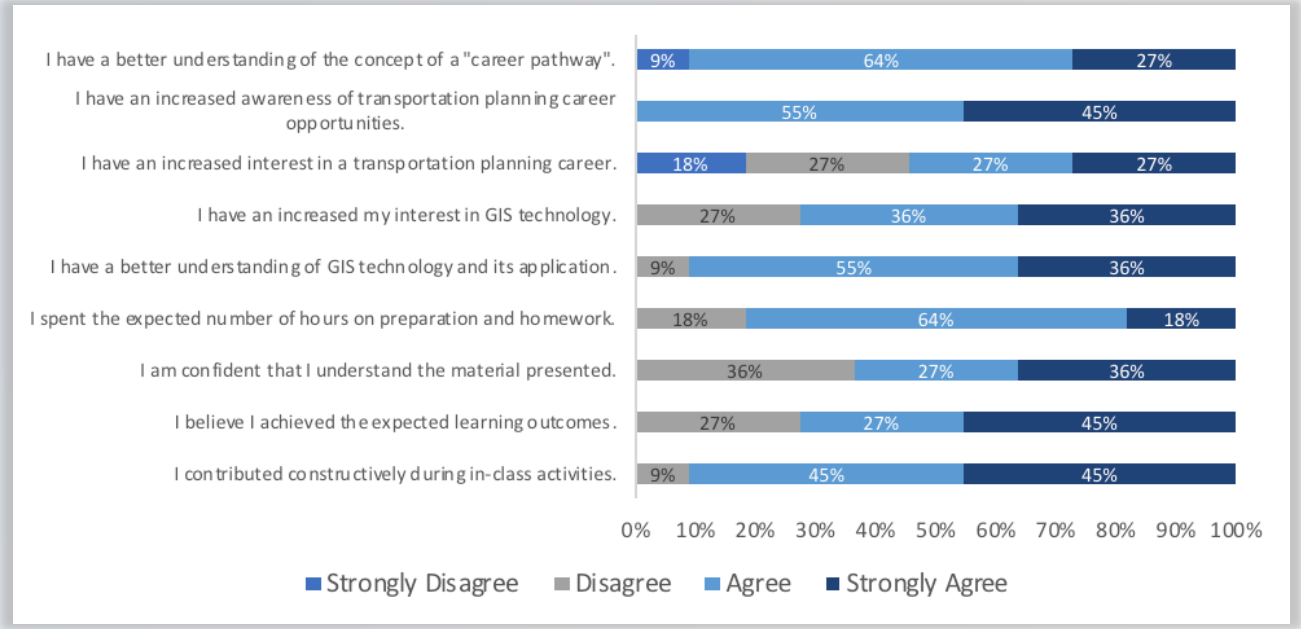
Thomas O'Brien, Executive Director
Center for International Trade & Transportation

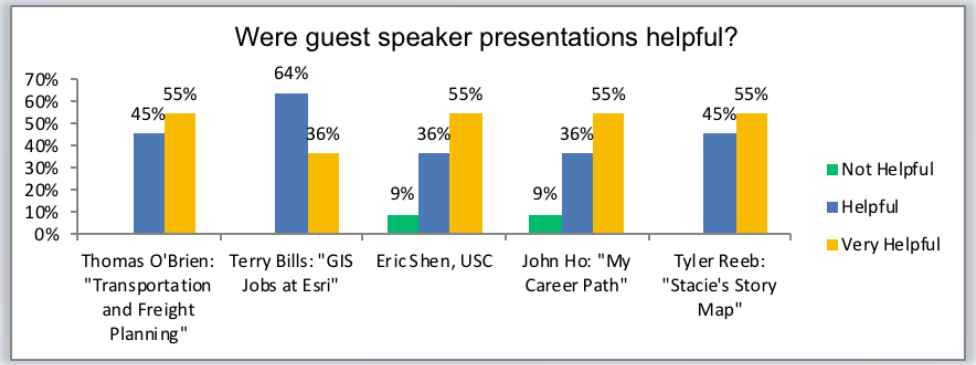
The Planning Demonstration Pilot

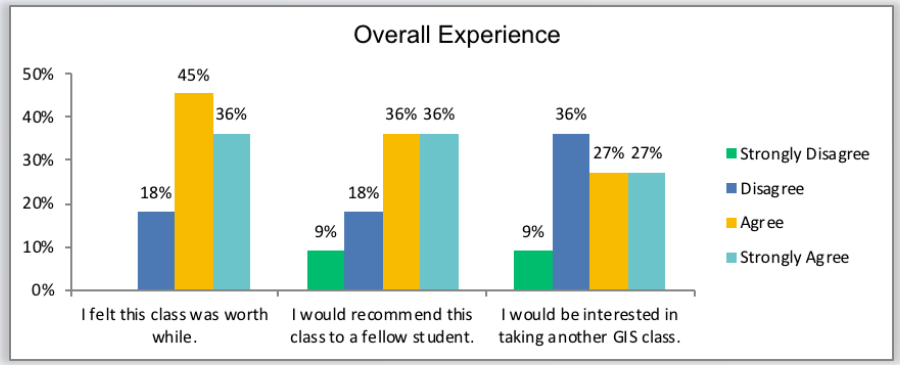
MEASURING THE OUTCOMES

Evaluations Collected from all Stakeholders









The Planning Demonstration Pilot

MEASURING THE OUTCOMES

Observations & Outcomes

- Transportation industry career options are not widely understood among students.
- K-12 and community college programs offer limited exposure to transportation career options.
- No apparent gender correlation relating to interest in or awareness of transportation careers.
- Limited exposure to transportation career options provides no guarantee of changing student attitudes or redirecting student career choice.
- Non-traditional learning options are highly favored over standard lecture/lab class delivery.

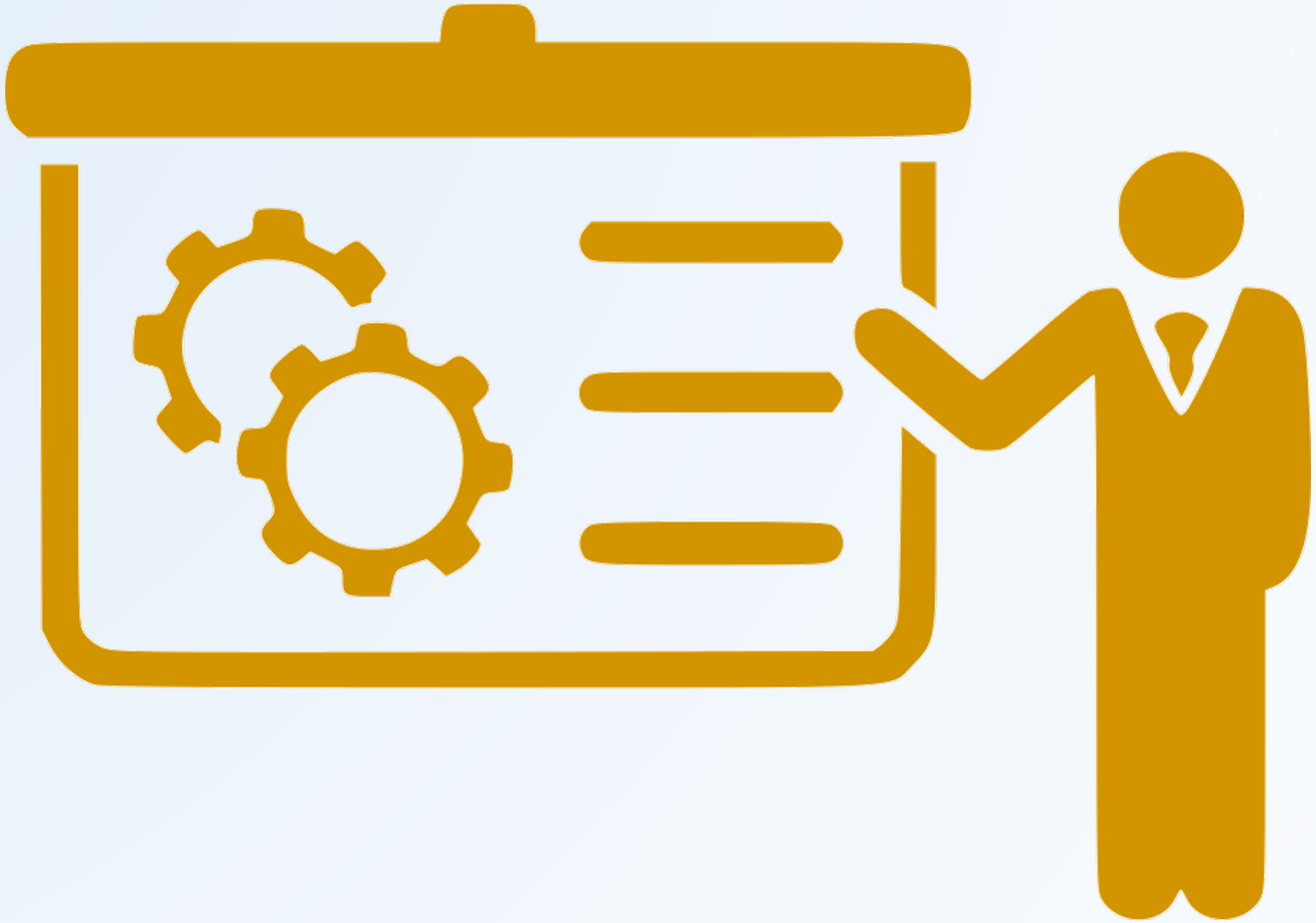
STUDENT INTROSPECTIVE RESPONSES

- *"Class made me realize there are many jobs out there."*
- *"I learned maps have more meaning. I also learned that there are so many steps to putting data on maps."*
- *"I am looking more into public transportation at University level education."*
- *"It has opened my eyes for a career in GIS."*
- *"It is part of my BA in Transportation degree."*

STUDENT AFFIRMATIVE RESPONSES

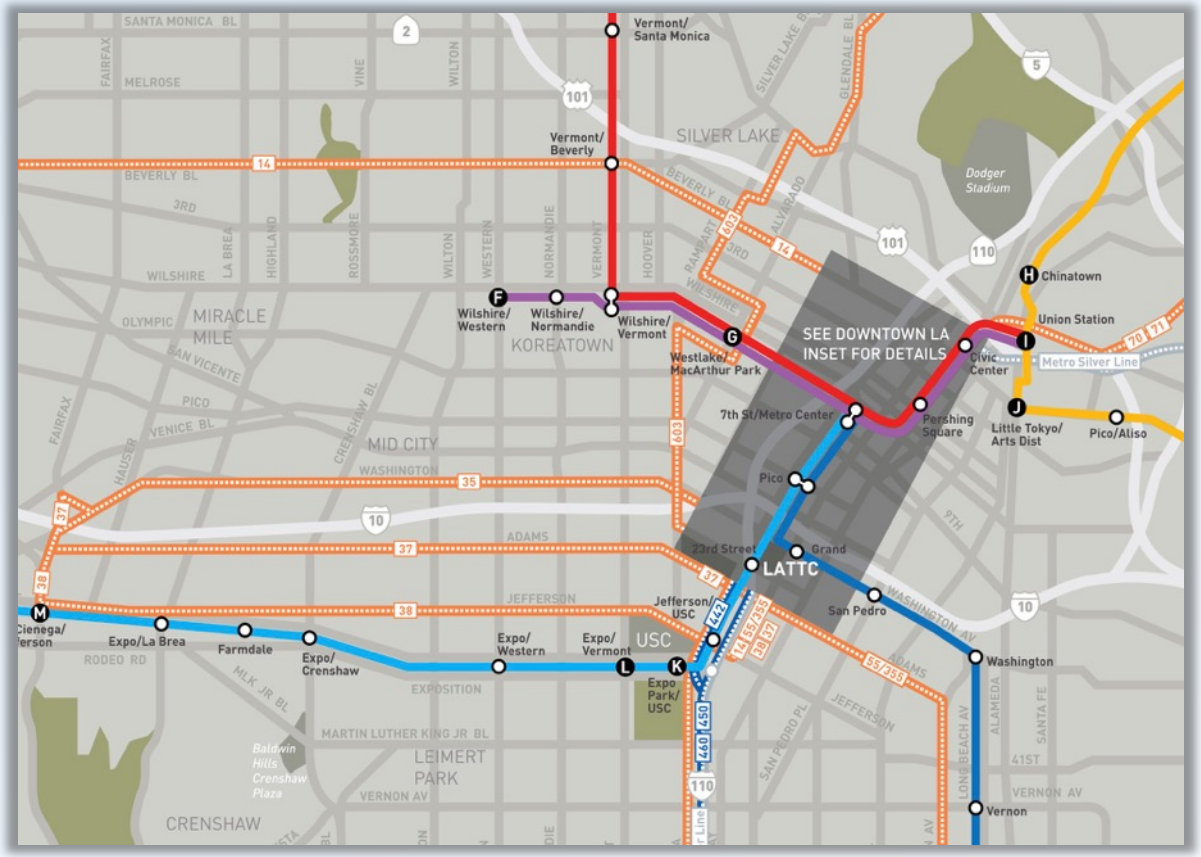
- *"Still interested in medicine. Class could been more fun."*
- *"I am not good at computers."*
- *"Somewhat interesting, Cannot see myself as GIS tech."*
- *"Interested in medicine, but class was an interesting."*
- *"I might want to go into the transportation industry for the money, but I don't know yet."*
- *"My original career plans are within the hospital."*
- *"Information interesting, but not something I want to do."*

The Implementation Plans



The Implementation Plans

TRANSPORTATION PLANNING

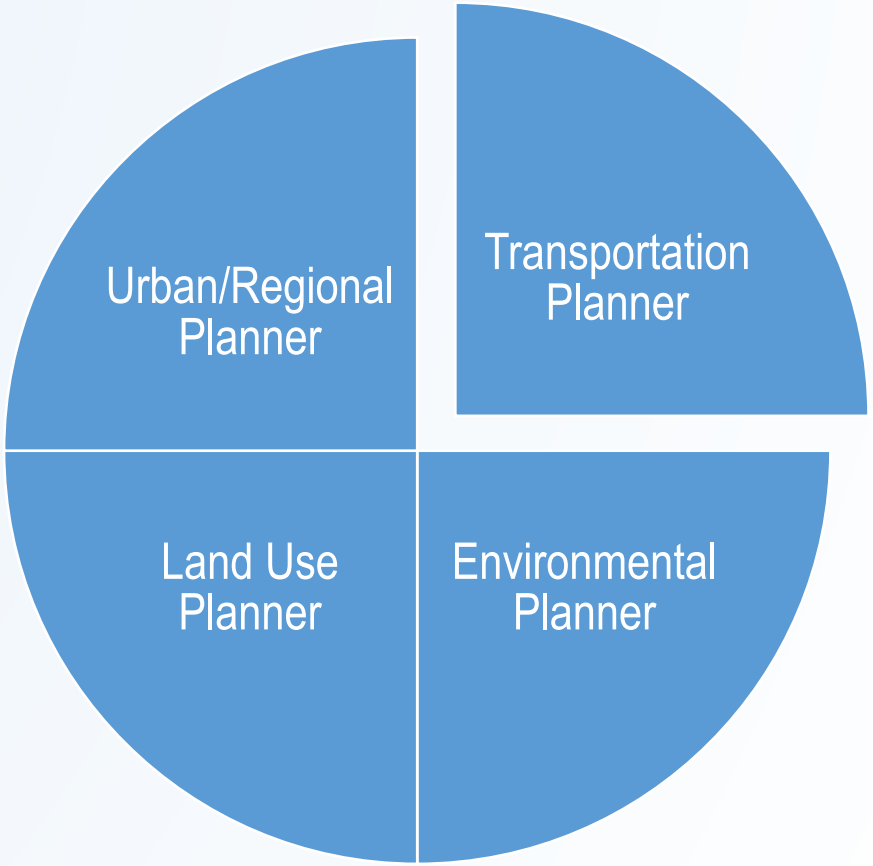


The Implementation Plans

TRANSPORTATION PLANNING

- *"Planners are responsible for designing, evaluating and planning the implementation of state, city or community transportation mediums …"* (Chron)
- Defined by a highly-vertical academic program and industry career specializations.
- Planners are mobile across those specializations.
- Expanding job responsibilities and advances in technology demand new and cross-disciplinary skill sets (policy, enviro, data viz, project mgmt, etc.)
- College grads lack workplace experience.

Who are Planners?



The Implementation Plans

TRANSPORTATION PLANNING

Priority Occupations

SOC CODE	OCCUPATION	CURRENT # EMPLOYEES, 2016	PROJECTED # EMPLOYEES, 2026	PRECENT CHANGE	2018 MEDIAN ANNUAL WAGE
19-3051	Urban & Regional Planner	36,000	40,600	12.8%	$71,490
19-3051*	Transportation Planner	36,000	40,600	12.8%	$71,490
19-3051*	Land Use Planner	36,000	40,600	12.8%	$71,490
19-3051*	Environmental Planner	36,000	40,600	12.8%	$71,490
17-1021	Cartographers & Photogrammetrists	12,600	15,000	19.4%	$63,990
17-1021*	GIS Analyst/Technician	12,600	15,000	19.4%	$63,990
17-3031	Surveying and Mapping Technician	60,200	66,600	10.6%	$43,340

** Titles not uniquely identified within the BLS database share common SOC labor market data.*

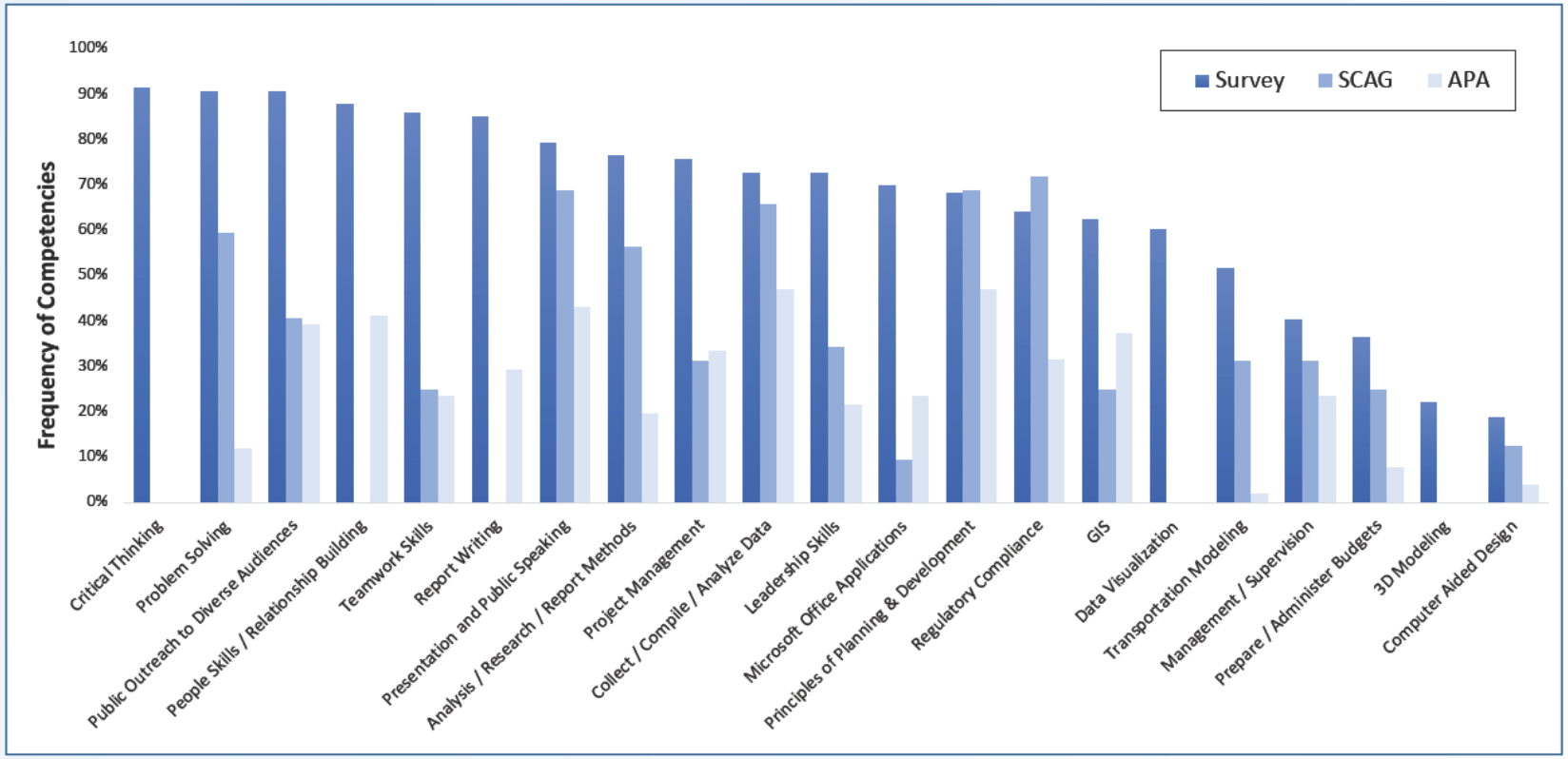
The Implementation Plans

TRANSPORTATION PLANNING

Top Industry Surveyed Competencies

- Critical Thinking
- Problem Solving
- Public Outreach
- Relationship Building
- Teamwork Skills
- Report Writing
- Presentation & Public Speaking
- Research & Analysis Methods
- Project Management
- Data Collection & Analysis
- Leadership Skills
- Regulatory Compliance
- GIS & Data Visualization

Critical Job Competencies



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TRANSPORTATION PLANNING

Gaps in Workforce Preparation

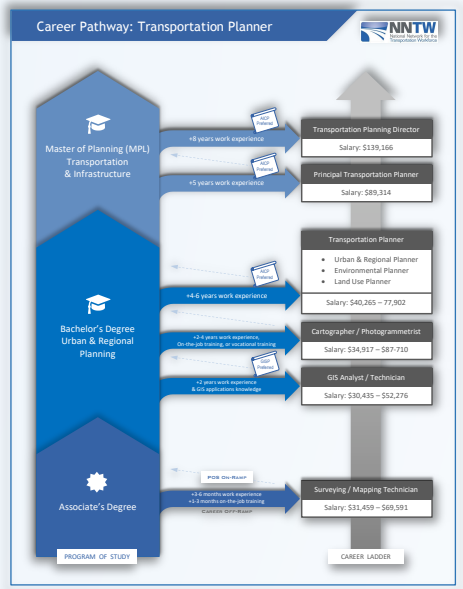
- Bachelors/masters degree required for employment, but virtually no community college feeder programs.
- Despite growing responsibilities and advancing tech, academic programs lack cross-disciplinary instruction.
- Experiential learning rare in college programs, programs often mismatched for employer needs.
- No pre-employment training provided by employers.
- Few targeted professional development opportunities.

The Implementation Plans

TRANSPORTATION PLANNING

Documenting the Pathway

- Academic ladder aligns with career ladder.
- Graphic illustrates multiple entry/exit points.
- Career ladder connects to jobs specifications.
- Full 6-year prescriptive student academic plan.
- Experiential learning programs and innovative learning strategies are fully enumerated.
- Simplified approach engages multiple audiences.

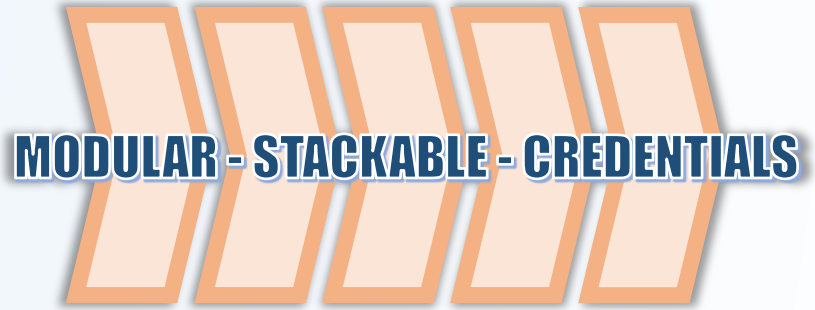


Transportation Planning Professional (Plus)

- Takeaways from the Demo: engage students through GIS; use competencies as bridge to training professionals.
- Fee-based continuing education program that provides planners with cross-disciplinary competencies.
- Multi-module program leads to professional credential.
- Target university students, practicing professionals.
- Recognized by industry/APA; complements academic planning programs; serves as professional development.

The Implementation Plans

TRANSPORTATION PLANNING



Replicating Proven GLS/MTOP Model for Planners

- Industry recognized approach.
- Hierarchical, modular credentialing.
- Leads to planning professional designation.
- Supported by SoCal Universities, APA, Esri, HNTB.
- College credit by exam; credit for prior learning.
- Sustainable; fee-based instruction is self-supporting.
- Capstone project-based learning, students work together in multi-disciplinary teams.
- ROI = access to employers, career advancement.


Illustration by Jimmy Collins

Committed Project Partnerships

Academic Leaders (Institutionalizing the Pilot)

- LA Trade Technical College, Pima Community College
- LA Community College District

Academic Leaders (Competency Modules)

- CSULB, USC, UCLA, UCI, Cal Poly, CSUN, SDSU

Industry Leaders (Employers & Associations)

- Esri, HNTB, LA Metro, APA, SCAG,
  South Bay COG, Gateway COG

Plan Outcomes & Impacts

- Assemble/convene competency steering committee.
- Module framework/syllabi for professional credential.
- CSULB/CPIE pilot run sponsoring 10 students (min).
- Roadmap for self-sustaining course series and catalog.
- Credit articulation with academic program partners.
- Train/credential 50 students over 3-year deployment.
- Longitudinal tracking program (proposed for NSF funding).

ARTICULATION

Barriers to Deployment

- Strict adherence to LMI obscures broader needs of today's planners, leads to academic programs that don't fully capture needs of industry.
- Well-established academic programs are resistant to innovative change.
- Curriculum slow to keep pace with industry, lacks cross-disciplinary focus.
- Lack of proper incentive for faculty professional development Few mandates on professional development stifles classroom innovation.
- Mismatch between employer internships and job tasks.
- Limited funding options restrict academic/workforce program growth.

The Implementation Plans

TRANSPORTATION OPERATIONS

The Implementation Plans

TRANSPORTATION OPERATIONS

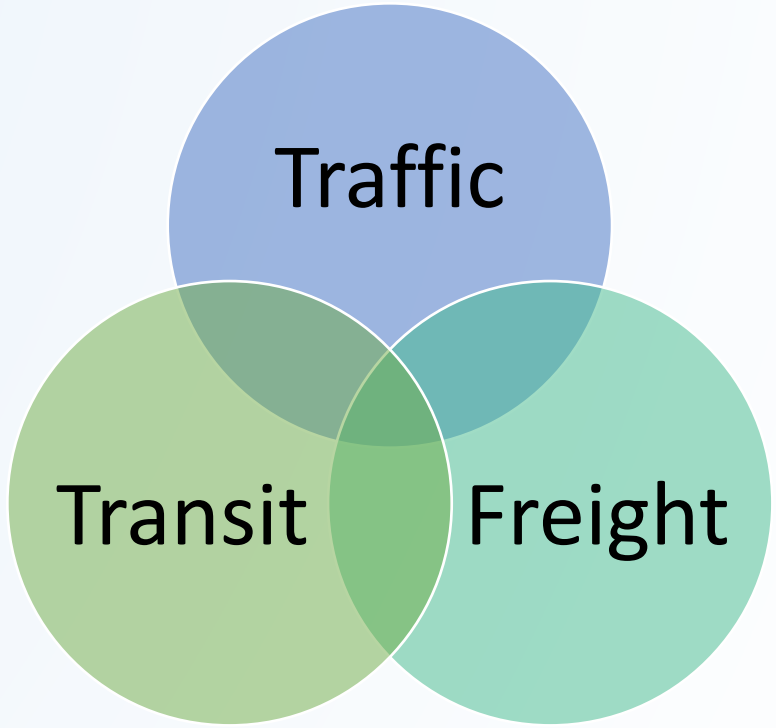
Operations professionals must be:

- Flexible, responsive, adaptive to an ever-changing set of technological tools/innovations;
- Capable of performing under pressure and making good decisions in high stress, high stakes environments.
- Effective communicators across wide range of stakeholders;
- Knowledgeable of system infrastructure and connectivity.

Operations has no common academic pathway.

Operations requires significant on-the-job training.

Who are Operations Professionals?



The Implementation Plans

TRANSPORTATION OPERATIONS

Priority Occupations

SOC CODE	OCCUPATION	CURRENT # EMPLOYEES, 2016	PROJECTED # EMPLOYEES, 2026	PRECENT CHANGE	2017 MEDIAN ANNUAL WAGE[1]
n/a	Project and Program Manager	n/a	n/a	n/a	n/a
11-3021	Computer & Information Sys. Mgrs.	367,600	411,400	11.90	$139,220
n/a	Operations Planners	n/a	n/a	n/a	n/a
53-6041	Traffic Technicians (Traffic Signal / ITS Technicians)	6,600	7,200	9.10	$45,670
n/a	Traffic Incident / Ops Center Mgrs.	n/a	n/a	n/a	n/a
17-2051	Civil Engineers (Traffic/Transit)	303,500	335,700	10.60	$84,770
53-3032	Heavy and Tractor-Trailer Truck Drivers (Commercial Drivers)	1,871,700	1,980,100	6.00	$42,480
53-3021	Bus Drivers, Transit or Inner-city (Commercial Drivers)	179,300	195,400	9%	$40,780
49-3031	Diesel Service Technicians and Mechanics	278,800	304,600	9.00	$46,360
13-1081	Logistician	148,700	159,000	6.90	$74,590
17-2122	Industrial Engineer	257,900	283,000	10.00	$85,880
15-2031	Operations Research Analyst	114,000	145,300	27%	$81,390

The Implementation Plans

TRANSPORTATION OPERATIONS

Common KSAs

- Local Agency Procedures
- Communication Skills (oral and written)
- Software Skills (specialized according to occupation)
- Problem Solving
- Interpersonal Skills
- Professional Judgement
- Data Collection & Analysis
- Ability to work in fast-paced environment

Critical Job Competencies

Operations Management	Systems/Operations Engineering	Operations Research & Data Science	Operations Technology
• Project & Program Managers[1] • Computer & Information Systems Managers • Traffic Incident Managers • Operations Planners	• Civil (Traffic) Engineers • Civil (Transit) Engineers • Industrial Engineers[2]	• Operations Research Analyst/Industrial Engineer • Data Science Analyst/Logistician	• Traffic Signal Technicians • Diesel Mechanics • Commercial Drivers

Gaps in Workforce Preparation

- The workforce of the future must possess more **interdisciplinary skills** that cross over traditional boundaries of academic preparation.
- One of most impacted discipline areas in terms of disruptive technologies.
- **Lack of awareness** and **misperception** of operations occupations are the most significant challenges.
- **Experiential learning** is crucial.

The Implementation Plans

TRANSPORTATION OPERATIONS

Documenting the Pathway

- Academic ladder aligns with career ladder.
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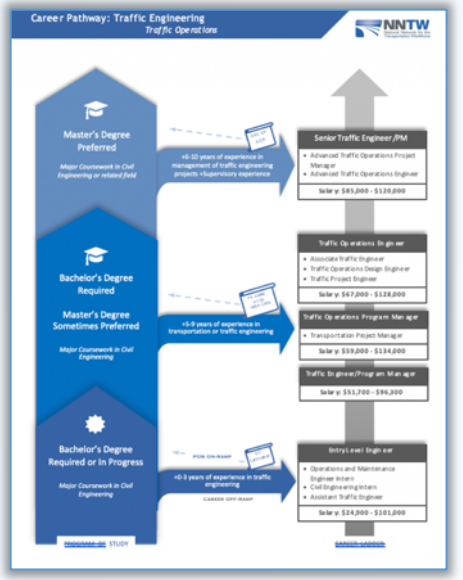


Attracting Students to Transportation Operations Careers

Interactive Transportation Operations Career Pathway Web Portal

- Convene DWG to establish vision.
- Develop operations profile sheet.
- Develop interactive pathways within each career cluster with iterative feedback.
- Develop/deploy national marketing strategy.
- Track portal users and impact.

Transportation Operations Challenge Projects

- Convene DWG to establish vision.
- Recruit participants; run pilot-test.
- Develop additional projects, deploy through expanded partnerships.
- Develop/deploy national marketing strategy.
- Track participants and impact.

Committed Partnerships

- Initial Partners: Institutionalizing the Pilot
  - Southwest TN Community College
  - T-STEM Academy at East High
  - TDOT, Gannet Fleming, NOCoE, TRC Engineering, Inc.
- Future Partners: Expansion
  - DWG entities (academic, public and private sector), ITE (for both academic and industry partners), Greater Memphis IT Council, TRB Standing Committee on Operations & Maintenance Personnel and other relevant committees

Plan Outcomes & Impact

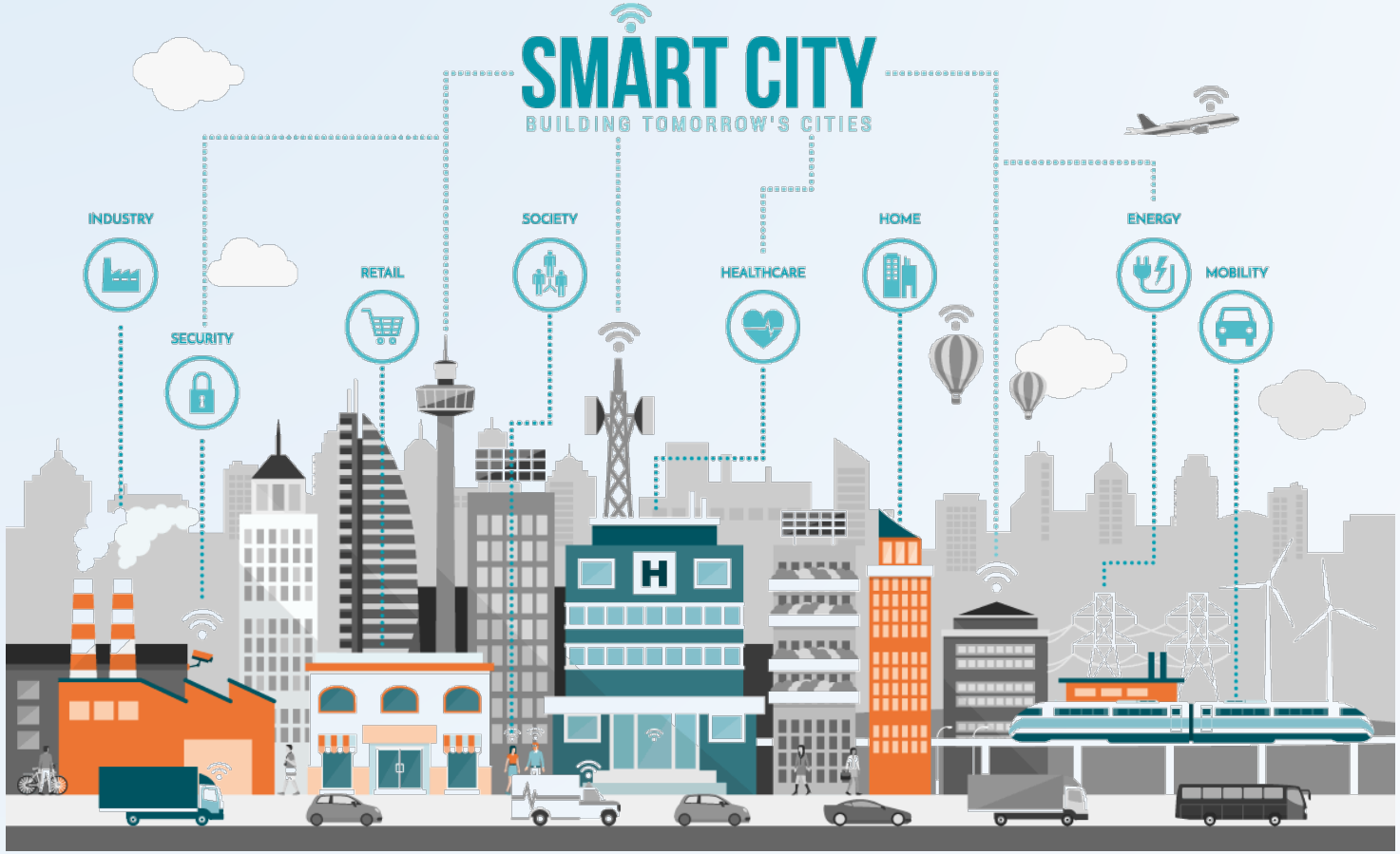
- Regularly convening advisory committee.
- Interactive pathways for four operations career clusters.
- Pilot first challenge projects at UofM, SWTCC, East High T-STEM, impacting 30 students minimum.
- Develop 15 operations challenge projects, impacting minimum of 300 students and 50 academic/industry partners.
- Develop longitudinal tracking program; develop proposals for private and federal agencies.

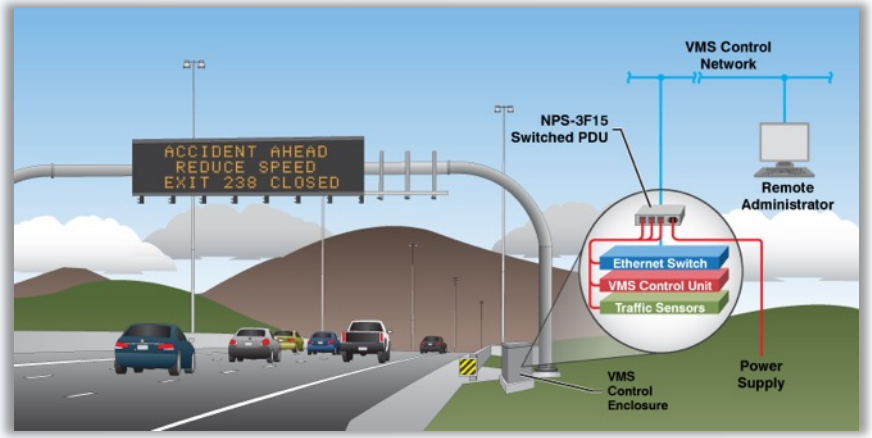
Barriers to Deployment

- Limited perspective of transportation operations and its relevance.
- Limited funding options restrict academic/workforce program growth.
- Integrating content into existing courses/programs with full course agendas.
- Maintaining partner engagement: “quick wins” are essential.
- Raising awareness of project resources.
- Connecting partners for wide-scale replication.

The Implementation Plans

TRANSPORTATION ENVIRONMENT



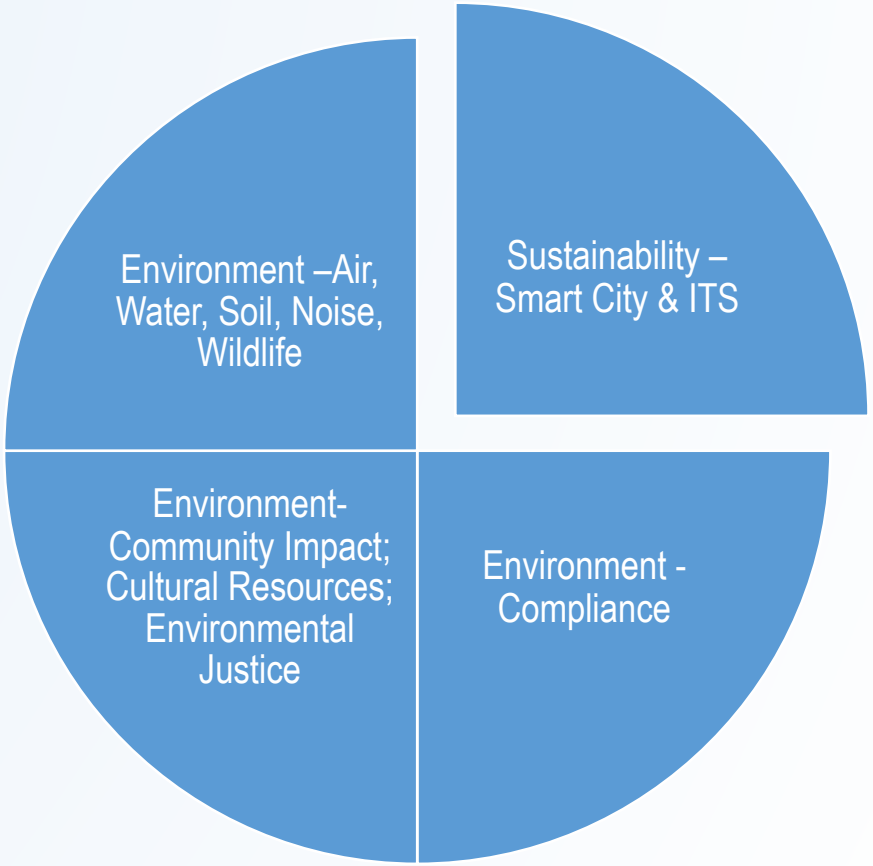


The Implementation Plans

TRANSPORTATION ENVIRONMENT

- The environmental workforce in transportation emerges from highly interdisciplinary knowledge sets and skills with a wide range of responsibilities and functions.
- Twenty plus subfields, with little overlap, providing highly specialized knowledge for transportation projects and initiatives; prepared in academically distinct fields with little or no preparation for, or knowledge of, transportation specific applications.
- Few entry positions for less than 4-year degree prep; College grads lack workplace experience.
- Lack of coherent field definition in emerging fields
- Opportunity to align with Smart Cities, ITS, and Shared Use Mobility (the “new” mobility fields) as environmental disciplines in transportation.

Who are Environmental Workers?



The Implementation Plans

TRANSPORTATION ENVIRONMENT

Priority Occupations

Transportation environmental traditional occupational fields, each with their own distinctive career pathway.

- Fish, Wildlife, Plants & Rare Species (including invasive plant species)
- Sustainability Systems
- Resilience
- Transit & TDM
- Bicycle & Pedestrian initiatives
- Planning & Modeling
- Compliance Focused Environmental Management
- Compliance in Projects (NEPA) & Public Process
- Parks & Recreation Areas
- Landscape Stewardship
- Farmland Soils and Agriculture
- Air Quality & Health
- Surface Water Quality (Storm Water Management, Wetlands & Waterways)
- Noise Abatement
- Hydrological Studies
- Community Impact Assessment
- Cultural (Historical & Archaeological) Resources
- Waste Management and Remediation
- Hazardous Materials
- EV Infrastructure / AV / CV systems

Emerging Occupation	BLS-related occupational categories
Smart City Coordinator / Transportation Engineering Bureau Chief	*Transportation Manager*
ITS Systems Director	*Computer an Information Systems Managers*
Signal Operations Supervisor	*Transportation Engineer*
Traffic Engineering Manager	*Transportation Engineer*
ITS Systems Engineer	*Computer Systems Engineers/Architects*
Signal Operations Engineer	*Electrical Engineer*
ITS Technician	*Electrical Engineering Technician* *Electrician* *Civil Engineering Technician* *Traffic Technician*

The Implementation Plans

TRANSPORTATION ENVIRONMENT

Priority Occupations

Aligning new occupations to BLS categories

SOC CODE	OCCUPATION	CURRENT # EMPLOYEES, 2016	PROJECTED # EMPLOYEES, 2026	PRECENT CHANGE	MEDIAN SALARY 2017
n/a	Smart City Coordinator / Transportation Engineering Bureau Chief	n/a	n/a	n/a	$114,852
11-3071.01	Transportation Manager	116,000	125,700	8%	$92,460
n/a	ITS Systems Director	n/a	n/a	n/a	$137,381
11-3021	Computer an Information Systems Managers	368,000	400,500	12%	$139,220
n/a	Signal Operations Supervisor	n/a	n/a	n/a	$97,638
17-2051.01	Transportation Engineer	304,000	329,000	12%	$84,770
n/a	Traffic Engineering Manager	n/a	n/a	n/a	$66,500
17-2051.01	Transportation Engineer	304,000	329,900	12%	$84,770
n/a	ITS Systems Engineer	n/a	n/a	n/a	$55,728
15-1199.02	Computer Systems Engineers/Architects	287,000	307,400	8%	$88.510
n/a	Signal Operations Engineer	n/a	n/a	n/a	$67,000
17-2071	Electrical Engineer	188,000	201,900	8%	$95,060
n/a	ITS Technician	n/a	n/a	n/a	$33,263
17-3023.03	Electrical Engineering Technician	137,000	149,000	4%	$63,660
47-2111	Electrician	667,000	749,000	12%	$54,110
17-3022	Civil Engineering Technician	75,000	82,200	8%	$51,620
53-6041	Traffic Technician	7,000	7800	8%	$46,670

The Implementation Plans

TRANSPORTATION ENVIRONMENT

Critical Job Competencies

The number one competency cited was:

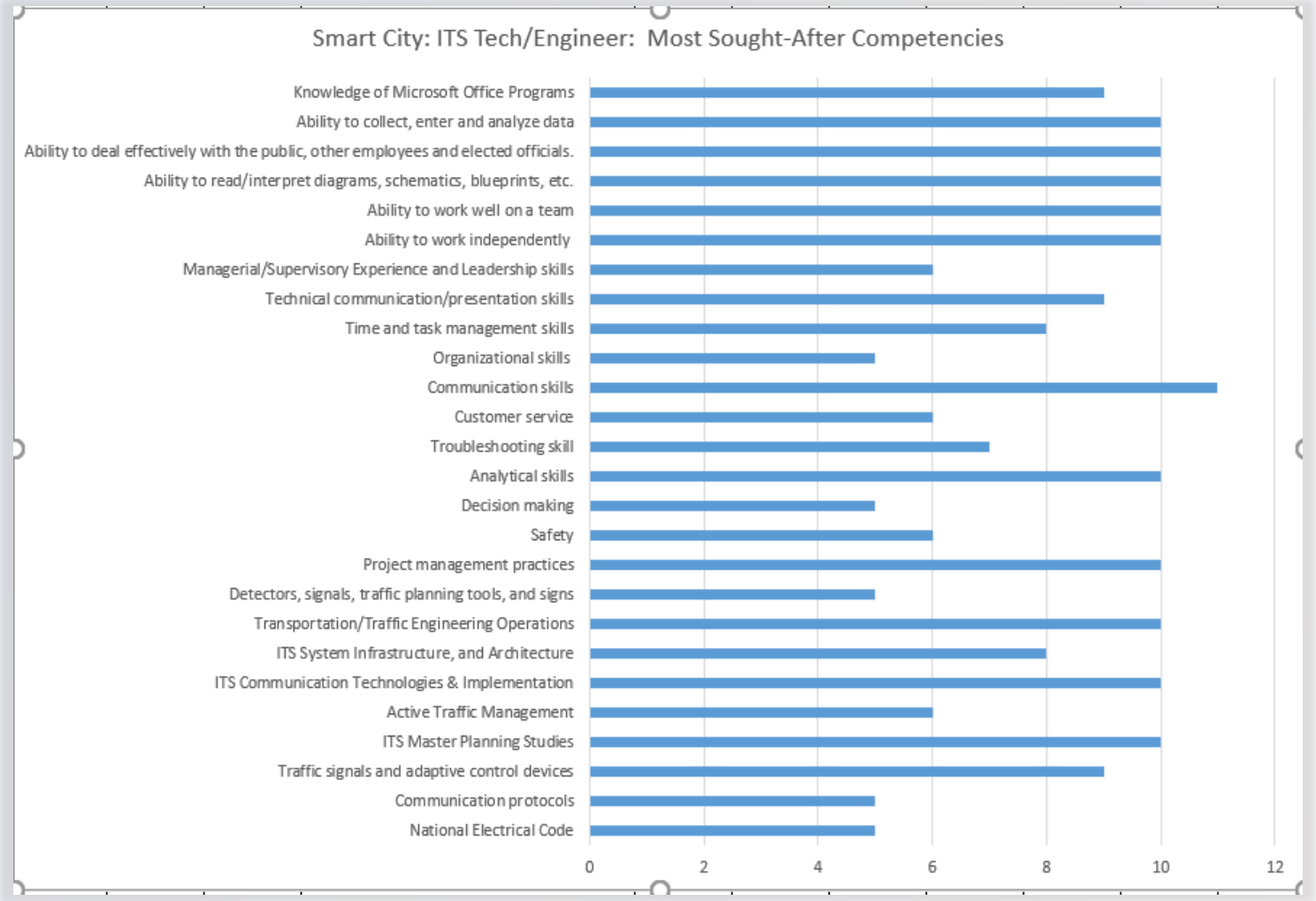
- *Communication Skills. This connects to many of the other competencies but demonstrates the importance that employers are placing on this attribute above all others, including technical competences.*

The next competencies could also be identified in any number of rapidly evolving fields:

- *Ability to deal effectively with the public*
- *Ability to work on a team*
- *Ability to work independently*
- *Analytical skills*
- *Project management practices*

And the final five are more technical competencies directed at the field

- *ITS Master Planning studies*
- *ITS communications technologies & implementation*
- *Transportation/Traffic engineering operations*
- *Ability to read/interpret diagrams, schematics, blueprints*
- *Ability to collect enter and analyze data*



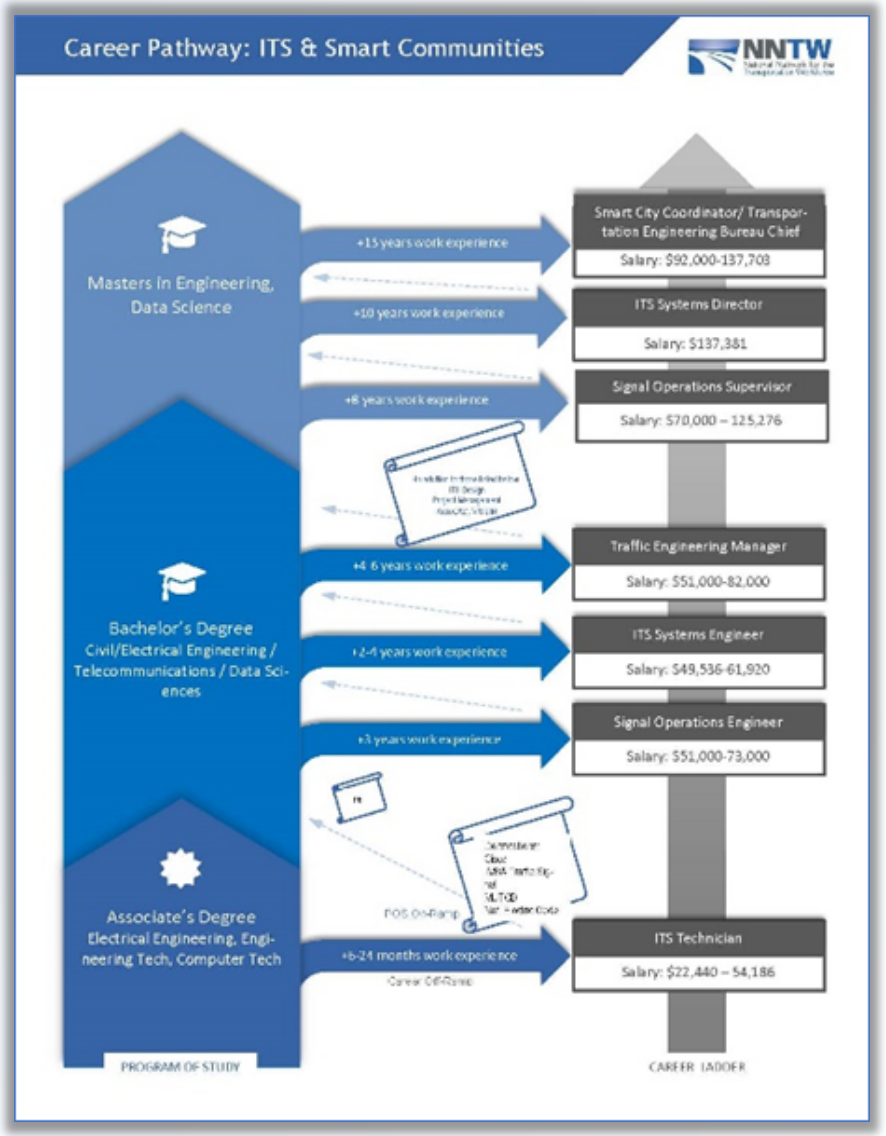
Gaps in Workforce Preparation

- Bachelors/masters degree required for most job opportunities, but virtually no direct community college feeder programs.
- Advanced technologies are being incorporated into work responsibilities and outcomes among older workers, without clear pathways to increase professional competencies, or actual resistance to new learning or responsibility.
- Skill sets and competencies are in high demand in other fields; difficult to define transportation as a field of focus, or a career path of choice.
- Academic programs remain in silos, while emerging fields and competencies require cross-disciplinary instruction and skills.
- New disciplines emerging in transportation, with new occupations and pathway still in formative stage.

ITS & Smart Communities Career Pathway Design

- Academic ladder needs development and growth in interdisciplinary options.
- Career ladder connects to jobs specifications.
- Student academic plan is not prescriptive; new programs and departments are emerging.
- Experiential learning programs and innovative learning strategies are outlined, but need further development.
- Opportunity to incorporate multiple non-academic programs and resources.

Documenting the Pathway



Smart City & Shared-Use Mobility Workforce Development Initiative

- Pilot effort to test a set of interventions to support the upskilling of current workers needing new skills and certifications.
- Assessment of specific employer needs in entry level ITS fields and certifications.
- Evaluation of previous training efforts set up by employers and partners.
- Pilot to test specific intervention to address a specific training to meet an urgent certification need.
- Assessment by at least one community college and one university program of how to integrate existing independent resources into their curriculum and programs.
- Host pathway information and tools on the emerging fields at educational institutions.
- Deploy interactive pathway tool, customization demonstration with local employers/educational programs.

Committed Partnerships

NETWC, working with the So. Maine Planning and Development Commission, which helped identify the problem and opportunity, has identified a set of project partners and is working on developing those relationships:

- Academic Partners: Institutionalizing the Pilot
  - Unv. Maine Orono; Unv. of Southern Maine; University of New Hampshire
  - Southern Maine Community College
- Academic Partners: Cross-Disciplinary Competencies & Certifications
  - IMSA New England; CITE, Transportation Tech, ITE, ITS PCB,
- Industry Partners: Employers & Associations
  - ITE state chapters, Maine/NH DOT, Maine/NH LTAP, Regional Commissions

Plan Outcomes & Impact

- Test specific interventions to support upskilling workers.

  Engagement of at least one community college and one university program in the training; with plan to develop or modify curriculum in at least one community college and one university program to prepare students directly for key certifications.

- Establish direct connections between current independent training curriculum and educational curriculum in 2 and 4 year programs.

- Host pathway information and tools on the emerging fields at educational institutions.

- Interactive pathway tool, customization demonstration with local employers/educational programs.

Barriers to Deployment

- Limited employer internships keep graduates inexperienced.
- Limited funding options restrict academic/workforce program growth.
- New fields and career pathways are not captured by LMI, leaving specific occupations, skill sets, and needs with no traditional documentation that is the basis for most academic program decisions;
- Needs of industry are developmental, not fixed, given the pace of technological change, making academic preparation problematic;
- Well-established academic programs are resistant to needed interdisciplinary approaches.
- Curriculum is slow to keep pace with industry, lacks cross-disciplinary focus.

The Implementation Plans

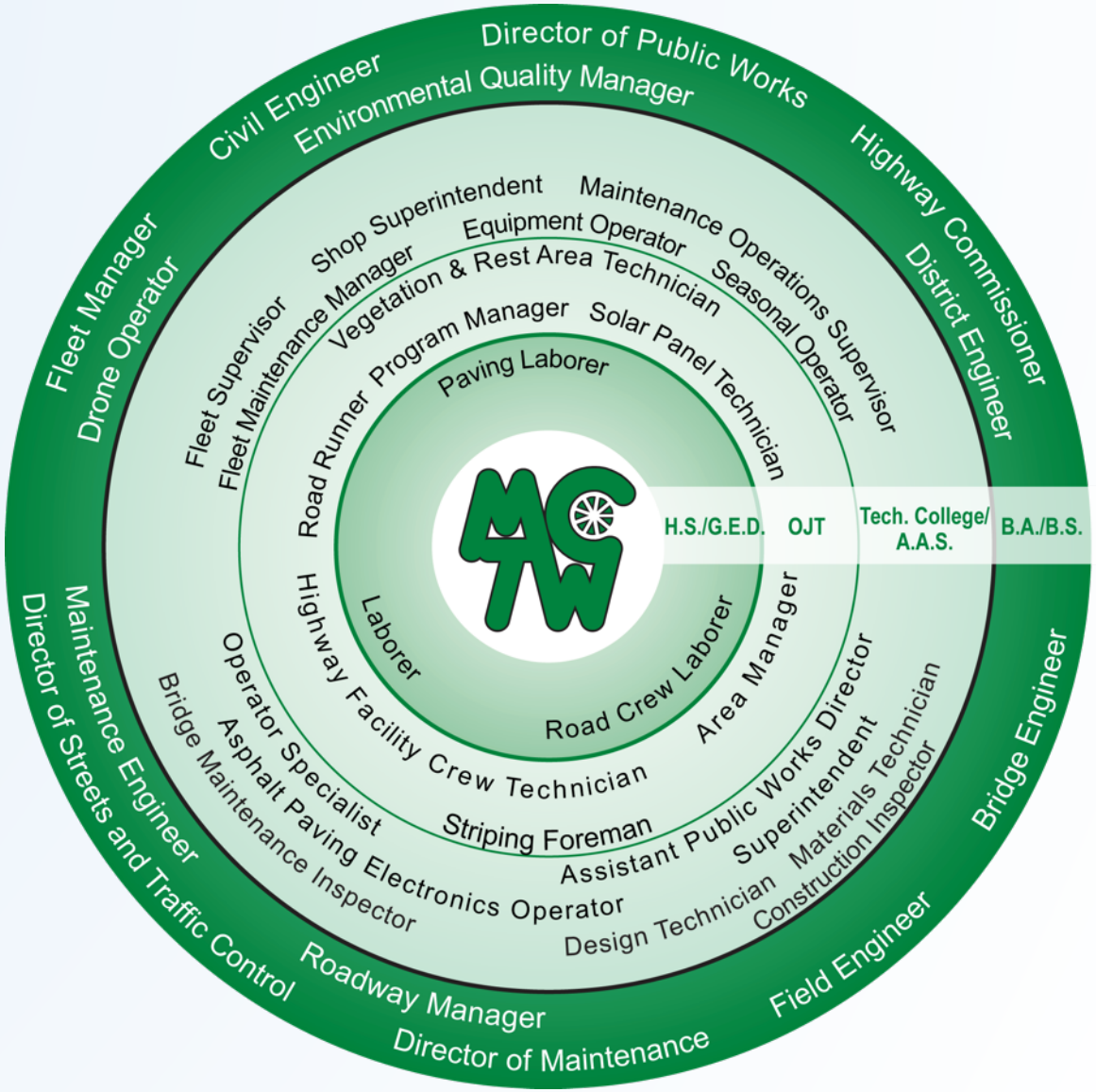
TRANSPORTATION ENGINEERING/MAINTENANCE

The Implementation Plans

TRANSPORTATION ENGINEERING/MAINTENANCE

Who are Highway Maintenance workers?

- Functional Scope – **Design**, **Construction**, or **Maintenance** of highway infrastructure
- Priority occupations are not adequately represented in **Job Discovery** systems
- Lack of credentialed pathways for “middle-skill” occupations

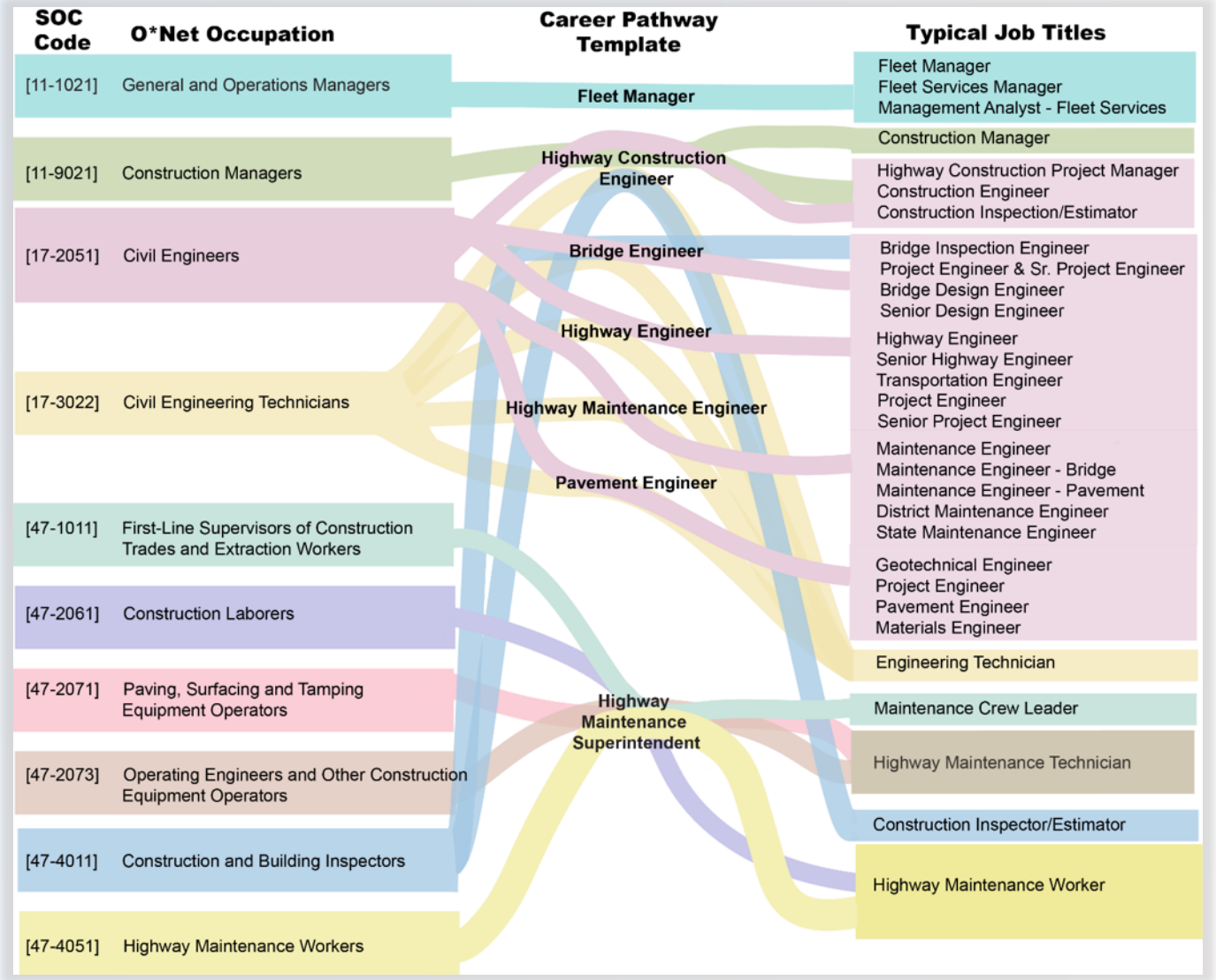


The Implementation Plans

TRANSPORTATION ENGINEERING/MAINTENANCE

- Highway Maintenance Engineer
- Highway Engineer
- Bridge Engineer
- Pavement Engineer
- Highway Construction Engineer
- Highway Maint. Superintendent
- Fleet Manager

Priority Occupations

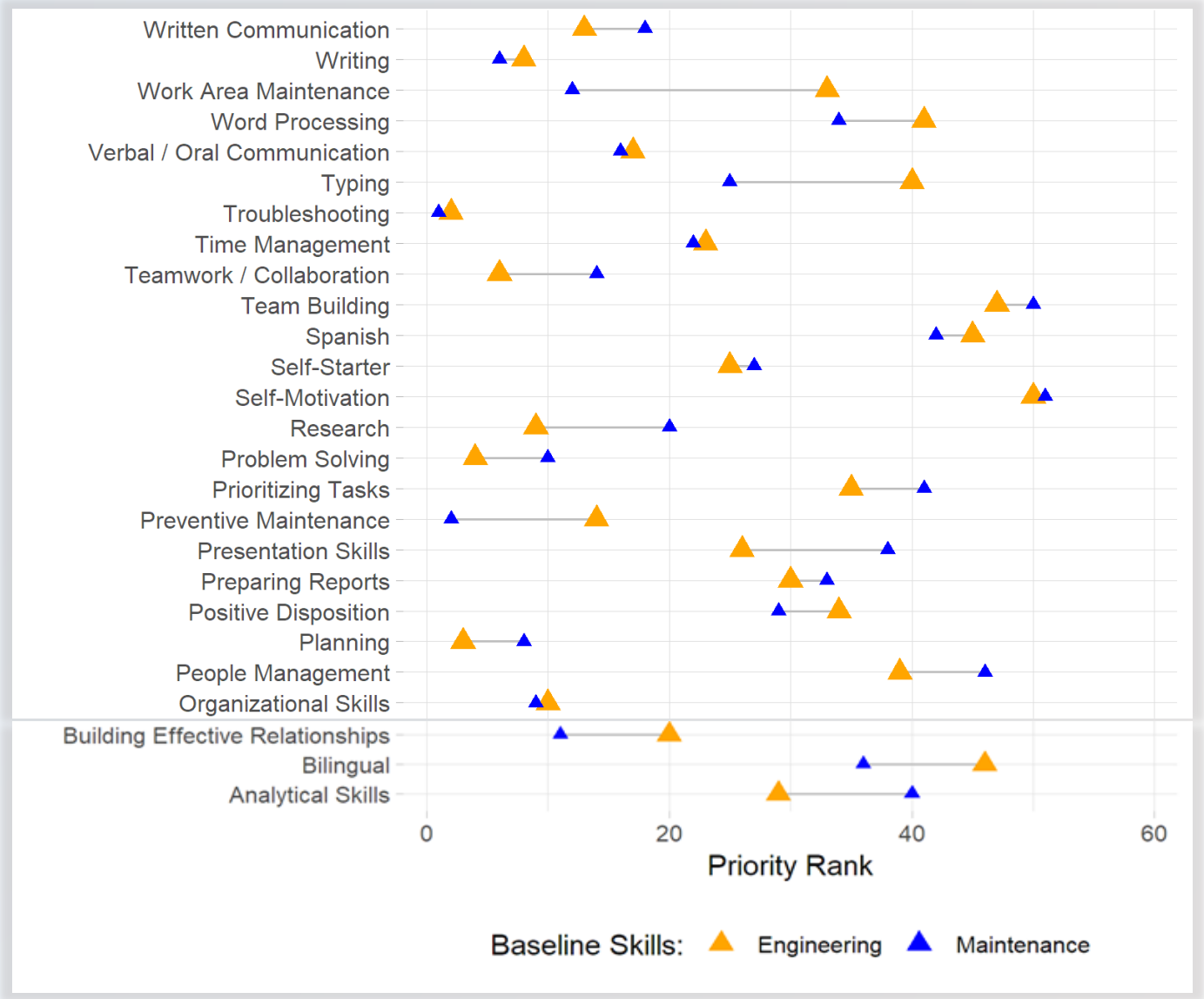


The Implementation Plans

TRANSPORTATION ENGINEERING/MAINTENANCE

- "Most-requested" baseline skills, software skills, and specialty skills
- Assessment for each pathway occupation (by title, i.e., Bridge Engineer)
- Prep for Implementation Project:
  - Identified common career skills for Engineering, Engineer Tech, and Maintenance Tech positions.
  - Investigate benchmarks to assess achievement of skills outcomes.

Critical Job Competencies



The Implementation Plans

TRANSPORTATION ENGINEERING/MAINTENANCE

Gaps in Workforce Preparation

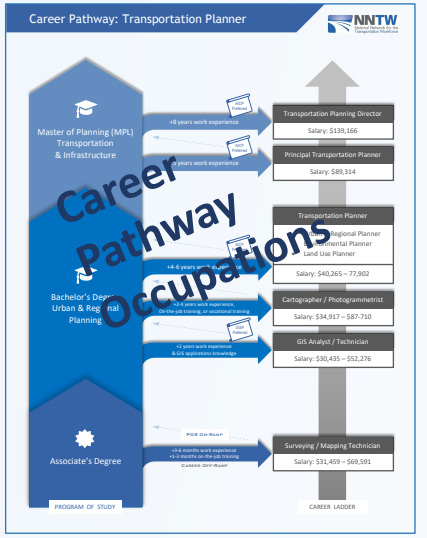
- Career websites for secondary students often have outdated or mis-information in these areas.
- Academic program advisors tend not to inform students/parents about transportation infrastructure engineering and maintenance careers.
- FHWA should encourage the credit articulation of professional training on asset management/maintenance.
- No links to innovative learning methods to advance technical skills.

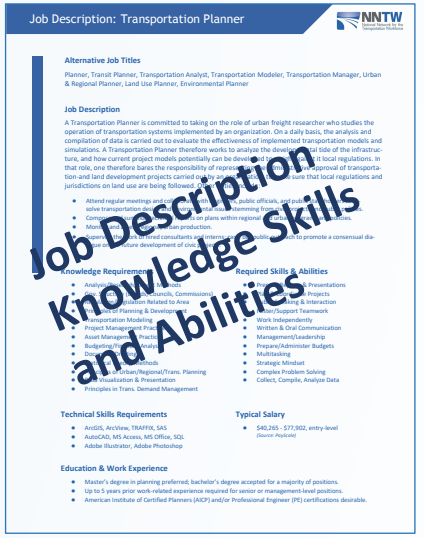
The Implementation Plans

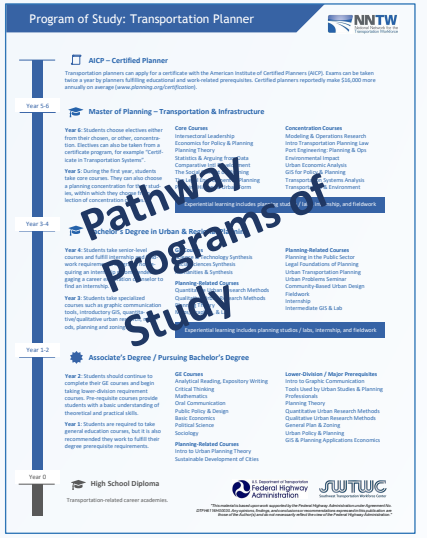
TRANSPORTATION ENGINEERING/MAINTENANCE

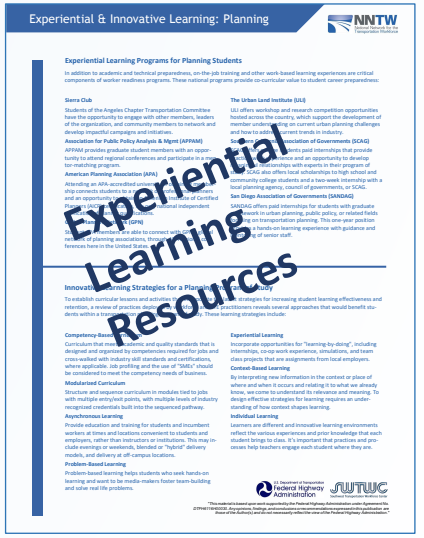
- Highway Maintenance Engineer
- Highway Engineer
- Bridge Engineer
- Pavement Engineer
- Highway Construction Engineer
- Highway Maintenance Superintendent
- Fleet Manager

Documenting the Pathway









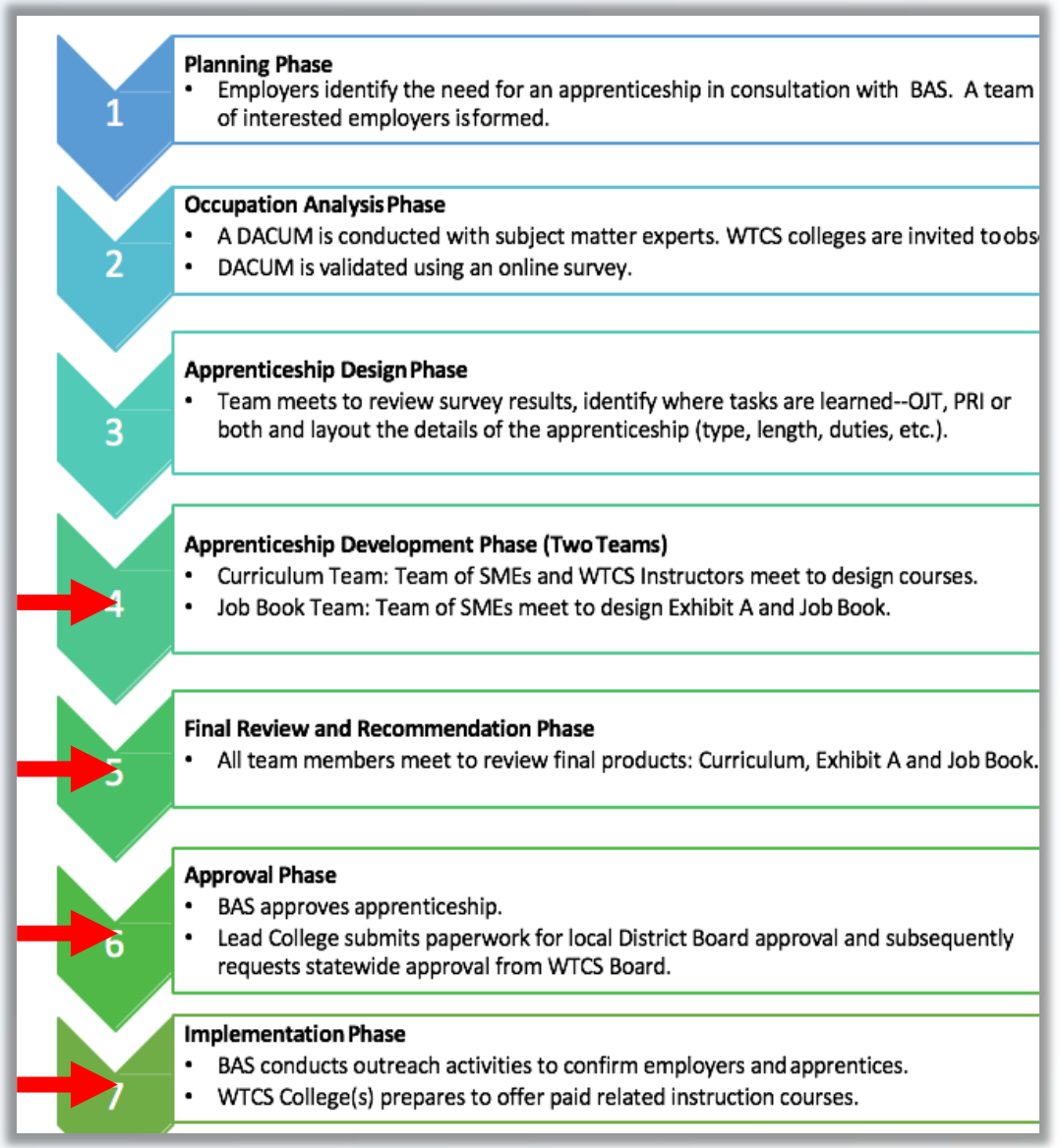
The Implementation Plans

TRANSPORTATION ENGINEERING/MAINTENANCE

Highway Maintenance Apprenticeship: An Entry to the Highway Maintenance Career Pathway

- Apprenticeship development (Steps 4-7).
- Prepare for implementation/scale-up.
- Document employer experience.
- Establish Community of Practice.
- Address critical barriers to success:
  (institutional, market, curriculum revisions, recruitment)
- Create a Registered Apprenticeship

The Implementation Plan: Year 1



The Implementation Plan: Years 2-3

Articulation

- Registered Apprenticeship College Consortium (RACC).
- Civil Engineering Technology AAS Degree, WI Technical College System.
- AAS Degree in Highway Maintenance Management, Front Range College.

Job Discovery Systems

- Highway Engineering and Maintenance career pathway profiles.
- Career Cruising, WorkNet, etc.

Highschool Students

- Partner with Project Lead the Way
- Highway Engineering and Maintenance
- Youth engineering apprenticeships and civil engineering K-12 programs.

Disseminate/Scale

- Employer Community of Practice
- Workshops at conferences
- Midwest Urban Strategy Cities
- State DOT HR Directors meetings

Committed Partnerships

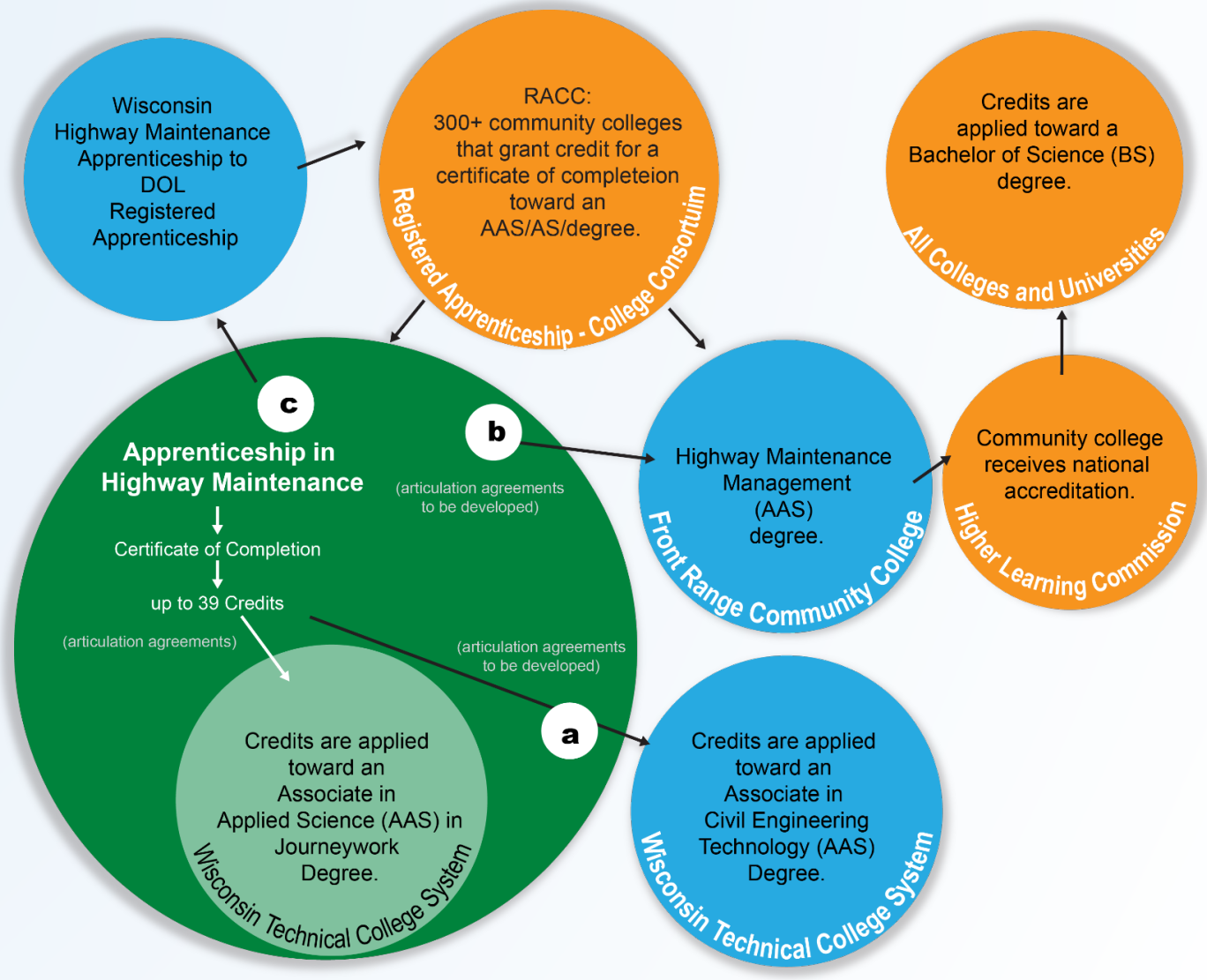
- Academic Partners:
  - U of W at Madison, WI Technical College System, Front Range Community College
- "System" Partners:
  - Career Cruising, Project Lead the Way, CTE, Job Centers (DOL), BLS K-12 Career Guide, Military Career Guide, Student Career Info, DOL Registered Apprenticeship
- Industry Partners
  - WI Counties & Municipalities, AASHTO HR Directors, DBI, Jorgensen, Midwest Urban Strategy

The Implementation Plans

TRANSPORTATION ENGINEERING/MAINTENANCE

Plan Outcomes & Impacts

- New DOL Registered Apprenticeship.
- Articulation to Associate's degree in Journeyworks (up to 39 units).
- Comprehensive guide for replication; documented best practices.
- Participants can advance toward an engineering tech or degree program.



The Implementation Plans

TRANSPORTATION ENGINEERING/MAINTENANCE

Key Product & Broader Impact

- New apprenticeship connects to civil engineering technician and highway maintenance management programs.

Highway Maintenance Community Achieves Vision

- Nation's highway corridors managed by a credentialed workforce.
- Provides well-defined pathway to Highway Maintenance careers.
- Highway maintenance careers are rich with innovative tech, encourages diversity, values sustainability/environment, recognizes role of first-responders, contributes to safety/welfare of community.

The Implementation Plans

TRANSPORTATION ENGINEERING/MAINTENANCE

Barriers to Deployment

Partner Alignment

- Unique challenge: Multiple employers ↔ single apprenticeship program.
- Subject Matter Panel and Community of Practice for mentoring apprentices.
- Working with State-wide Community College Systems and state DOL.
- Deployment partners: Urban Strategies Cities and AASHTO HR director groups.

Funding

- Employer investment and ROI.
- US DOL grants for apprenticeships.
- Wrap around services for students.
- Scholarships and other support for students from professional associations.

Credit for Prior Learning

The Implementation Plans

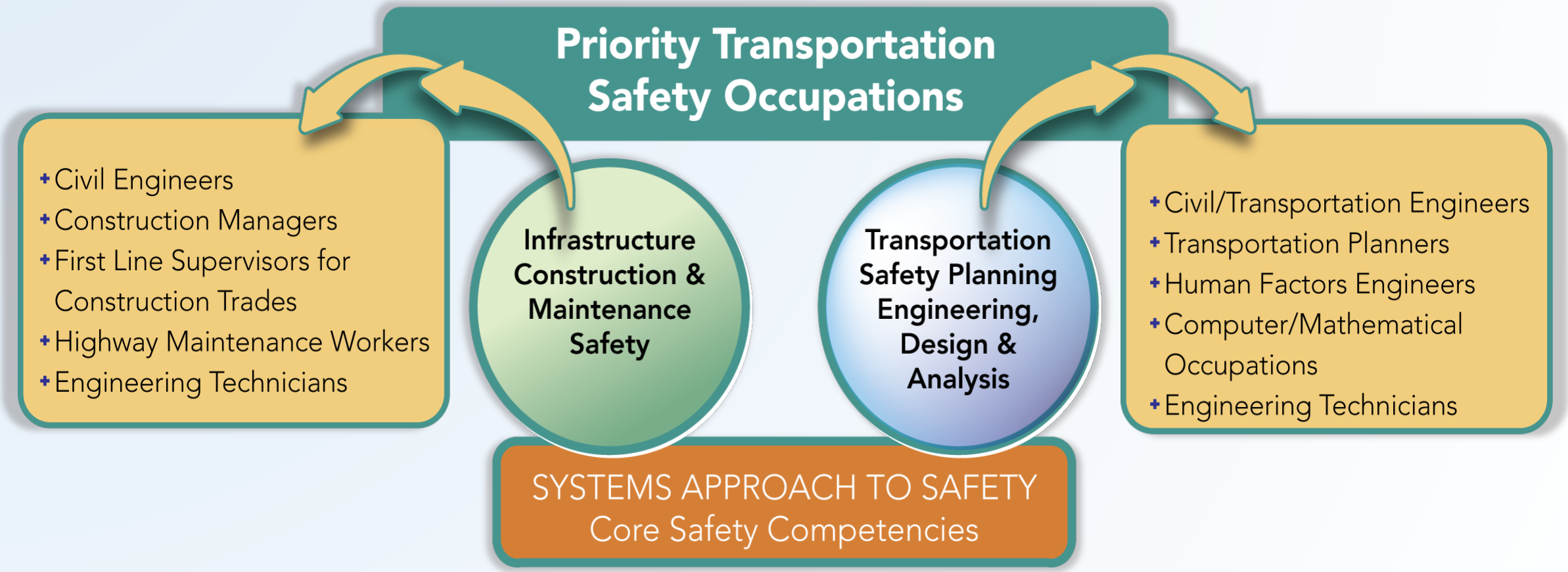
TRANSPORTATION SAFETY

National Center for Rural Road Safety

Workforce Characteristics

- *"Road safety professionals must understand the complex interactions between system components –vehicles, system users, infrastructure—and utilize and develop analytical tools and techniques to minimize system risk."* (FHWA)
- No road safety degree programs. Few "safety" titled occupations. Lack of visibility as a career path.
- Emerging technologies will require additional cross-disciplinary skillsets in the workforce related to data management, manipulation, visualization, modeling and analysis.
- Need to infuse safety competencies across multiple occupations with job responsibilities that impact road safety (safety is everyone's responsibility).
- Lack of demonstrated demand for safety competencies from employers in job specifications, required KSAs, incentives, or other employee recognition mechanisms.

Priority Occupations



The Implementation Plans

TRANSPORTATION SAFETY

Priority Occupations

SOC CODE	OCCUPATION TITLE	CURRENT # EMPLOYEES, 2016	PROJECTED # EMPLOYEES, 2026	PERCENT CHANGE	2016 MEDIAN ANNUAL WAGE
11-9021	Construction Managers	403,800	448,600	11.1%	$89,300
15-0000	Computer & Mathematical Occupations	4,419,000	5,026,500	13.7%	$82,830
17-2051	Civil/Transportation Engineers	303,500	335,700	10.6%	$83,540
17-2112	Human Factors Engineers	257,900	283,000	9.7%	$84,310
17-3022	Civil Engineering Technicians	74,500	81,100	8.8%	$49,980
19-3051	Urban and Regional Planners	36,000	40,600	12.8%	$70,020
47-1011	First-Line Supervisors of Construction Trades	602,500	678,300	12.6%	$62,980
47-4051	Highway Maintenance Workers	149,900	160,200	6.9%	$38,130

The Implementation Plans

TRANSPORTATION SAFETY

CORE COMPETENCIES FOR TRANSPORTATION SAFETY PROFESSIONALS

Awareness of the importance of safety and ability to communicate importance to a broader audience in a manner that fosters greater organizational, employee, and/or public safety culture.

Understanding of safety management principles and the safety planning process.

Ability to identify and apply regulatory requirements.

Knowledge of, or ability to locate, use, and interpret various data and information sources and analytical tools to:

1. Identify and assess safety risks.
2. Identify appropriate countermeasures to mitigate risks (including prioritization of multiple options using a data-based decision-making process).
3. Assess effectiveness of safety measures.

Ability to effectively develop and/or implement a safety plan.

Ability to communicate and collaborate with multiple stakeholders and to lead and navigate change.

Ability to recognize the capabilities and limitations of different road users in terms of behavior choices, reactions to transportation systems, and the capacity to survive a crash.

Safety Competencies

Transportation Safety Planner applies safety KSAs to:

-Explicitly incorporate safety and safety outcome measures into transportation planning and decision-making processes.

-Assess demographic trends and how they impact safety decision-making processes for the purposes of transportation planning.

-Use appropriate data systems to identify and target high-risk groups in order to plan effective safety programs.

Gaps in Workforce Preparation

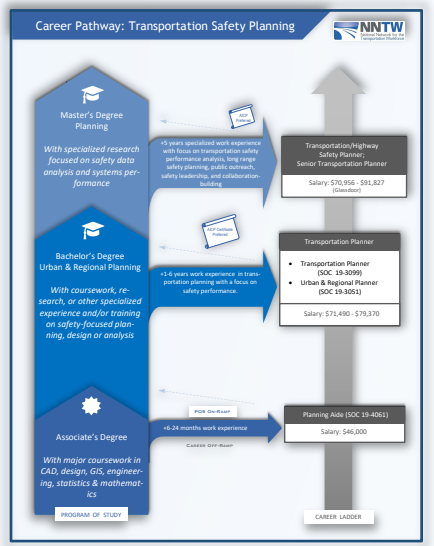
- No degree programs; few stand-alone courses in road safety. Institutional barriers in creating new programs or courses.
- Training for incumbent workers offered on ad hoc basis. No comprehensive curriculum or training roadmap for road safety.
- Little industry engagement with universities to provide real-world safety project experience to students.

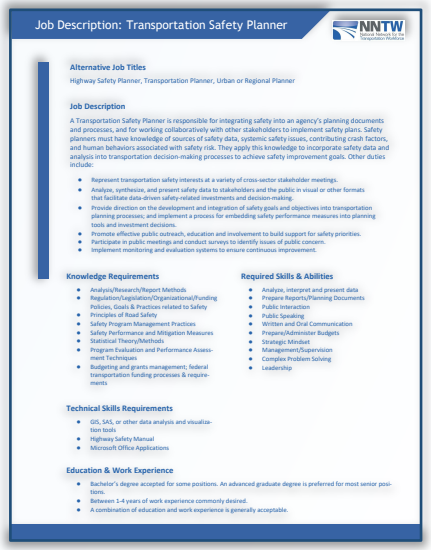
The Implementation Plans

TRANSPORTATION SAFETY

- Highlights opportunities to obtain safety KSAs within traditional academic degree programs or through professional development/training.
- Highlights cross-disciplinary safety coursework.
- Jobs specs focus on safety KSAs and application of competencies to safety-specific job functions.
- Highlights opportunities to enhance experiential learning in safety topics.

Documenting the Pathway





Integrating Safety Competencies into Transportation Training, Education, and Career Pathway Streams

- Integrate safety competencies into transportation training, education, and career pathway streams.
- Create/package/pilot a comprehensive safety curriculum for incumbent transportation staff.
- Develop university-agency partnerships to integrate safety projects into multidisciplinary courses.
- Measure system change and assess pilot outcomes.
- Align program development to facilitate professional credentialing opportunities; and articulation agreements for credit-bearing programs.

Implementation Approach: Safety Training

Local Roads Safety Recognition Program

Mission

Promote road safety through professional development of local road officials through a comprehensive safety educational initiative.

Objective

Provide baseline core safety competencies for local road officials to begin functioning effectively in the road safety field.

CORE MODULES

1. Introduction to Safety
2. Anatomy of a Crash – Understanding Human Factors
3. Introduction to Safety Culture
4. Manual of Uniform Traffic Control Devices (MUTCD) - Safety
5. Reading the Road & Introduction to Safety Analysis Process

Construction & Maintenance

1. Take Action Now – Maintaining Safety
2. Work Zones
3. Identification of Roadway Safety Hazards
4. Maintenance Countermeasures for Safety

The Implementation Plans

TRANSPORTATION SAFETY

Implementation Approach: University-Based Experiential Learning Enhancement

Transportation Agency

Real-World Safety Projects & Processes

Problem statement; Data

Quality Control; Set outcomes

Expose/attract emerging workforce to safety occupations

Create pool of new recruits with safety expertise

Add agency capacity (person hours/available disciplines)

Low-cost/high-reward program meeting both agency & educators' needs

Education Institution

Project Scoping – Match to course objectives

Faculty Mentors; Student Engagement

Products that advance the state of the practice

University/Agency Project Collaborations

Committed Partnerships

- Project Partners (Local Roads Safety Recognition Program):
  - Montana LTAP
  - National Center for Rural Road Safety
  - National Association of County Engineers (NACE)
  - Front Range Community College
- Project Partners (University-Agency Partnerships):
  - State and Local DOTs, EPIC-N

Plan Outcomes & Impact

- Pilot demonstration of Safety Recognition Program to train up to 125 transportation staff.
- Pilot demonstration of industry-engaged project-based learning to expose multidisciplinary students at two universities (minimum of 50).
- Establish credit articulation with academic program partners.
- Outreach/marketing materials and assessment tools developed.
- Pilot program evaluation.
- Resources/guides produced for national implementation/expansion.

Barriers to Deployment

- Difficult to add new degree programs or implement new courses at academic institutions.
- Scheduling and coordination challenges between transportation agencies and universities.
- Lack of flexibility in public sector hiring and promotion policies and procedures; no incentive provided to staff for safety competency development.
- Staff capacity issues limit ability of transportation organizations to initiate new programs, mentor students, or dedicate staff time to training.

Summary & Open Discussion

FHWA FEEDBACK

Feedback & Debrief

- Important Takeaways & Lessons Learned
- Presentation Feedback: Impressions, Comments, Suggestions?
- Beyond the Initiative: What's Next for NNTW
- FHWA's Broader Workforce Goals
- Closeout