New Jersey DOT 2025 Research Peer Exchange

FINAL REPORT

Submitted to:

New Jersey Department of Transportation
Peer Exchange Host Agency

and

Vermont Agency of Transportation
Lead Agency, Northeast Transportation
 Research Consortium (NTRC)
Transportation Pooled Fund Study
 TPF-5(549)

Submitted by:

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New Jersey Department of Transportation

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Pulaski Skyway Bridge, Jersey City
(Source: New Jersey Department of Transportation)

Princeton Battle Monument near Route 27, Princeton
(CC BY-SA 2.0 Ken Lund)

Delaware River Scenic Byway
(Source: New Jersey Department of State)

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16. Abstract New Jersey Department of Transportation, in collaboration with the Northeast Transportation Research Consortium (NTRC), hosted a peer exchange on June 24, 25, and 26, 2025, in Princeton, New Jersey. The publication of this report fulfills the agencies' obligations to conduct a periodic peer exchange as part of the federal State Planning & Research program. The event focused on three topics: research and innovation, in-house research, and adapting to federal and Transportation Research Board (TRB) changes. Participants of the two and a half-day event included the staff from the NTRC members (the state DOTs of Connecticut, Maine, Maryland, Massachusetts, New Jersey, New York, Pennsylvania, and lead state Vermont). Based on presentations and group discussions, participants shared what they saw as the strengths, challenges, and opportunities for the host agency in the areas discussed, and takeaways for their home agencies.				
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Host Agency: New Jersey Department of Transportation (NJDOT).

Participating Agencies: Connecticut Department of Transportation (CTDOT), Maine Department of Transportation (MaineDOT), Maryland Department of Transportation, State Highway Administration (MDOT SHA), Massachusetts Department of Transportation (MassDOT), New York State Department of Transportation (NYSDOT), Pennsylvania Department of Transportation (PennDOT), and Vermont Agency of Transportation (Vermont AOT).

PEER EXCHANGE TOPICS

Research and Innovation: In this first session, participants described how research and innovation functions are managed at their agencies, the extent of program overlap and how definitions, goals and activities associated with each are distinct. Promoting or showcasing innovation, best practices, and challenges were highlighted.

In-House Research: Attendees discussed which business areas within their agencies conduct in-house research and the associated range of activities. Member states described research processes, levels of coordination with research programs, challenges, and strategies to better manage in-house research across the agencies.

Adapting to Federal and Transportation Research Board (TRB) Changes: Research staff members discussed how their programs and agencies are responding and adapting to changes occurring within Federal Highway Administration (FHWA) and TRB.

TOP FINDINGS AND TAKEAWAYS

Research and Innovation

- Understand **where research and innovation programs fall within overall agency strategies** to help prioritize research and innovation efforts and communicate with agency leadership.

- A **separate innovation officer, coordinator or steering committee** can promote a robust, agency-wide innovation program and ensure ongoing integration with research efforts.

- **Proactively solicit research and innovation ideas** from executive staff, bureau directors, and agency staff using **standardized forms or processes** to increase quality and quantity of viable and innovative ideas.

- A **blind submission process for universities and other external stakeholders** can generate a broader base of objective ideas and support unbiased evaluation.

- **Standardized evaluation methods, forms and intra-agency advisory committees** promote objectivity in analyzing and selecting research and pilot projects.

- **Simplify and enhance project funding**:

    o Us**e basic agreements** with one or more universities.

- o **Understand distinctions** between and possibilities to maximize **State Planning and Research (SPR) Subparts A and B** funding streams.

- o E**xplore funding partners** such as Metropolitan Planning Organizations (MPOs).

- Enhance **research contracting requirements** or provisions by including:

  - o **Technical editor** resources for final reports

  - o **DOT branding** and **review periods** prior to principal investigators (PIs) presenting or publishing research

  - o Clarification that the **project sponsor owns the project data**

  - o **Project tracking** and **reporting requirements**

- **Formalize project close-out process** and **track project implementation, benefits** and **successes** with checklists, surveys, and follow-up meetings in 12 – 18 months with technical leads.

- Research, innovation and implementation **showcases, contests,** and **awards** can foster an agency-wide culture of innovation. Consider involving State Transportation Innovation Councils (STICs), PIs, and DOT Districts.

- Require **project fact sheets** and **PI involvement in outreach events**.

- Be **creative with tech transfer products** and methods, such as:

  - o Vermont AOT's Symposium booklet

  - o *Lunch and Learns* or recorded interviews with subject matter experts (SMEs)

  - o Maryland DOT's CLICK'D Lunch and Learn Series

  - o PennDOT's Innovations Challenge for high school student teams

In-House Research

- **Maintain constant communication and collaboration with SMEs** from other areas in the agency to help research programs stay informed.

- **Broaden the scope of in-house research** by considering a range of activities such as literature reviews, surveys, and Excel and GIS tools, in addition to data collection, analysis, and pilot projects.

- **Investigate Transportation Pooled Fund Study [TPF-5(467)]: *Research Project Tracking System*,** to determine applicability to research project tracking needs. New Jersey DOT and Vermont AOT **are members of this study.**

- Consider whether a **project reporting and tracking system** should include **both in-house** and **contract research**, and the **level of access for various stakeholders**.

Adapting to Federal and TRB Changes

- A **complete restructuring at the TRB** resulted in combining some of former committee topics and the elimination of others. With the dissolution of the Research Innovation Implementation Management Committee, member agencies want to **ensure state transportation research is supported** in the new structure.

- State DOTs can focus on identifying how to **maximize the value of the National Cooperative Highway Research Program (NCHRP)**. NCHRP panels continue to provide staff **education** and **networking opportunities** to state DOT staff.

- Federal changes have had **limited impact on the transportation pooled fund study program.** Consortium agencies should continue to share—both within agencies and among states—**opportunities, concerns,** and **transportation trends, technologies,** and **tools** associated with pooled fund studies.

- Member states are generally experiencing **business as usual with minimal impact** on day-to-day planning. **Agencies are willing to remain flexible** and **accommodate changes as much as possible**. Member states appreciate **direction and guidance** from FHWA.

- Additional topics of discussion included **staffing** at FHWA national and district offices, transportation research **funding streams**, and state and national **messaging**.

Notable Quotes

At the meeting's conclusion, participants highlighted several memorable quotes and concepts:

> *Research programs are flowing rivers, not stagnant waters.*
>
> > — New Jersey DOT

> *Failing counts as implementation—and prevents waste.*
>
> > — Vermont AOT

> *Research staff should work in areas they are passionate about.*
>
> > — New Jersey DOT

> *In-house research is good for staff morale and for research program visibility.*
>
> > — MaineDOT

> *Maryland DOT's First Responder Bag is a classic innovation—simple and not overly expensive. It shows the benefits and ease of an innovation program. No idea is too small.*
>
> > — Pennsylvania DOT

MEETING INTRODUCTION AND OVERVIEW

NJDOT, in collaboration with the Northeast Transportation Research Consortium (NTRC) hosted a peer exchange on June 24, 25, and 26, 2025 in Princeton, New Jersey. The publication of this report fulfills the agencies' obligations to conduct a periodic peer exchange as part of the federal State Planning & Research program. The peer exchange was funded by the NTRC pooled fund.

In addition to a round table discussion on state research programs, the peer exchange focused on three topics:

- Research and Innovation
- In-House Research
- Adapting to Federal and TRB Changes

For each topic, participants shared their own agency's experiences and noted the host agencies' strengths and opportunities for enhancement.

PEER EXCHANGE PARTICIPANTS

The peer exchange included representatives from across the northeast region of the United States to represent a variety of interests and perspectives. Participants included CTDOT, MaineDOT, MDOT SHA, MassDOT, NJDOT, NYSDOT, PennDOT, and Vermont AOT.

The following individuals participated in one or more of the sessions.

Host State DOT

New Jersey Department of Transportation
Pragna Shah, Manager, Bureau of Research, Innovation and Information Transfer
Giri Venkiteela, Research Scientist
Priscilla Ukpah, Principal Engineer
Devyn Cordero, Program Specialist
Kamal Patel, Assistant Engineer

Participating NTRC State DOT Research Programs

Connecticut Department of Transportation
Mauricio Garcia-Theran, Research Unit Supervisor
Craig Babowicz, Transportation Assistant Planning Director

Maine Department of Transportation
Jeffrey Pulver, Director, Research and Innovation
Ulrich Amoussou-Guenou, Transportation Engineer

Maryland Department of Transportation
  Sharon Hawkins, Office of Policy and Research Division Chief (remote)
  Sophie-ann Ridge, Research Project Manager
  Steve Wyatt, Research Project Manager

Massachusetts Department of Transportation
  Anil Gurcan, Transportation Program Planner

New York State Department of Transportation
  Lisa Cataldo, State Planning & Research Program Administrator
  Salma Sultana, Assistant Engineer, Transportation Research

Pennsylvania Department of Transportation
  Tony Sansone, Transportation Planning Specialist 2
  Brian Wall, Research Division Manager

Vermont Agency of Transportation
  Emily Parkany, Research Manager
  Ashlie Mercado, Research Engineer

Staff from consulting firm CTC & Associates coordinated, facilitated, and documented the peer exchange.

FORMAT

Participants (Figure 1) attended the in-person peer exchange at New Jersey Hospital Association Conference and Events Center in Princeton, New Jersey. The meeting agenda for the two and a half-day event is included as Appendix A to this report.

Figure 1. Meeting participants

From left to right: Ulrich Amoussou-Guenou, Sophie-ann Ridge, Priscilla Ukpah, Devyn Cordero, Lisa Cataldo, Salma Sultana, Giri Venkiteela, Anthony Sansone, Anil Gurcan, Emily Parkany, Jeffrey Pulver, Mauricio Garcia-Theran, Pragna Shah, Craig Babowicz, Ashlie Mercado, Kamal Patel, Brian Wall, and Steve Wyatt.

ROUND TABLE DISCUSSION: STATE DOT RESEARCH PROGRAMS

Prior to the in-person peer exchange, participants completed an online survey, *New Jersey DOT Peer Exchange – NTRC Member Research Program Overviews*, through the SurveyMonkey platform. The survey included questions regarding program organization, responsibilities, and processes. Complete survey responses are included in a PDF and attached as Appendix B.

Attendees discussed survey responses and provided observations before asking follow-up questions and generally discussing strengths and challenges.

TOPIC DISCUSSIONS

Participants discussed research-related topics of specific interest to the host agency. Each session included prepared presentations from the hosts, as well as additional presentations from participating states.

Topic 1: Research and Innovation

Topic 2: In-House Research

Topic 3: Adapting to Federal and TRB Changes

PEER EXCHANGE TOPIC 1—RESEARCH AND INNOVATION

OVERVIEW

On the first day of the peer exchange, participants focused on the agencies' research and innovation functions, including where the two functions overlap and how they are distinct. Attendees discussed where the research and innovation programs reside within the agency structure and how they are managed and funded. Lastly, participants shared strategies to promote and showcase innovations and other best practices and challenges.

PRESENTATIONS AND MATERIALS

The host state, NJDOT, and five participating states presented overviews of their research and innovation programs, which are included as the following appendices:

Appendix C. New Jersey DOT – Research and Innovation Presentation, Pragna Shah, NJDOT

Appendix D. Maryland DOT State Highway Administration – Research and Innovation, Sophie-ann Ridge and Steve T. Wyatt, MDOT SHA

Appendix E. Massachusetts DOT – Research and Innovation, Anil Gurcan, MassDOT

Appendix F. Pennsylvania DOT – Research and Innovation, Brian Wall, PennDOT

Appendix G. Vermont Agency of Transportation – Research and Innovation, Ashlie Mercado, Vermont AOT

Other materials related to the presentations and discussions attached as appendices include:

Appendix H. New Jersey DOT – University Basic Agreement Template

Appendix I. New Jersey DOT – Guidelines for Preparing NJDOT Research Final Reports and Tech Briefs

Appendix J. New Jersey DOT – Research At a Glance - Technical Brief Template

Appendix K. Maryland DOT State Highway Administration – PM Research Project Completion/Closeout Checklist

Appendix L. Maryland DOT State Highway Administration – Research Idea Form

Appendix M. Maryland DOT State Highway Administration – Proposal Evaluation Form

Appendix N. Maryland DOT State Highway Administration – CLICK'D Intranet Landing Page

DISCUSSIONS AND FINDINGS

Attendees discussed highlights from member state presentations on research and innovation programs including current innovation challenges, potential strategies, and best practices.

Below are the best practices, challenges, and strategies. **TOP IDEAS** are those that were highlighted by several participants in group discussions and in report-out forms that participants completed and submitted after the session. Highlights from New Jersey are featured in [Strengths and Opportunities for Host State: New Jersey DOT](#).

Practices, Challenges, and Strategies

- Maryland DOT-SHA

    o The research program solicits research needs through an idea form sent to all departments, evaluates proposals with a standardized evaluation form, and selects research projects.

    o Though cross-departmental sharing of innovation is a challenge, the research program:

        ▪ Works with leadership to Support a culture of experimentation and collaboration
        ▪ Promotes innovation across the agency
        ▪ Facilitates sharing platforms such as the CLICK'D Lunch and Learn Series, presented by the agency's Knowledge Management Division (Appendix N). "CLICK'D" stands for:
            - Communication
            - Learning
            - Information
            - Clarification
            - Knowledge
            - Driven

    o An innovation example is the First Responder Bag developed by a District 4 team for fast, organized emergency response in the field. The easily accessible portable bag has a high-visibility lighting system and contains triage supplies and an AED (Figure 2).

Figure 2. Steve Wyatt, MDOT SHA, modeling the First Responder Bag

- Massachusetts DOT

    o MassDOT's research and technology transfer program has access to an affiliated network of approximately 140 researchers from both in-state and out-of-state institutes to conduct research projects, including tech transfer components.

    o Although MassDOT has no separate innovation group and does not explicitly distinguish between research and innovation, the agency hosts an innovation conference organized by the University of Massachusetts Transportation Center.

    o The research program produces a quarterly research newsletter highlighting projects, news and events, and research resources; and comprehensive Research Annual Reports which are available on the program webpage.

    o Research implementation and measuring project benefits has been a challenge for the program.

    o Recent innovations include a salt spreader controller program using machine-sensed roadway weather parameters and exploring 3D printing applications for highway infrastructure construction and maintenance.

- Pennsylvania DOT

  - PennDOT's research program focuses on research, implementation, and numerous other efforts including LTAP, new products for low-volume roads and policy support.

  - A separate bureau (Strategic Business Operations) coordinates innovation at PennDOT and is supported by entities and activities such as:

    - [Pennsylvania STIC](), recognized as a national model of successful innovation deployment and includes 28 organizations including state agencies, planning partners, universities, contractors and local governments
    - PennDOT Innovations Challenge for high schoolers
    - [Focus on Innovation]() publication
    - Internal initiatives that encourage innovations among employees across the agency
    - Regional and District Innovation Days

  - PennDOT's research and innovation programs partner on the Research and Innovation Showcase.

  - PennDOT is a member agency of the Impactful Resilient Infrastructure Science and Engineering (IRISE) consortium, hosted at the University of Pittsburg and focusing on brainstorming, risk assessments, and a rigorous quantification of the benefits of highway infrastructure research. IRISE has completed 23 projects to date.

- Vermont AOT

  - The research program falls under the Policy, Planning and Intermodal Development Division, while Innovation is within the Finance and Administration Division. A cross-cutting Innovation Strategic Workforce Committee focusses on developing and promoting an innovation culture at AOT.

  - Integration between the programs could improve by increasing common definitions of important terms. The innovation program currently defines innovation in five categories and Knowledge, Science and Research is one category.

  - The Innovation Strategic Workforce Committee is working to redefine innovation, potentially using the *DRIVE* acronym:

    - Develop
    - Revolutionize
    - Inspire
    - Value
    - Enact
    - Spark

  - The research program organizes and promotes the Vermont AOT Research and Innovation Symposium which includes AOT Research-funded, STIC, and other Vermont-related projects. The research program produces the [Symposium booklet]() (Figure 3).
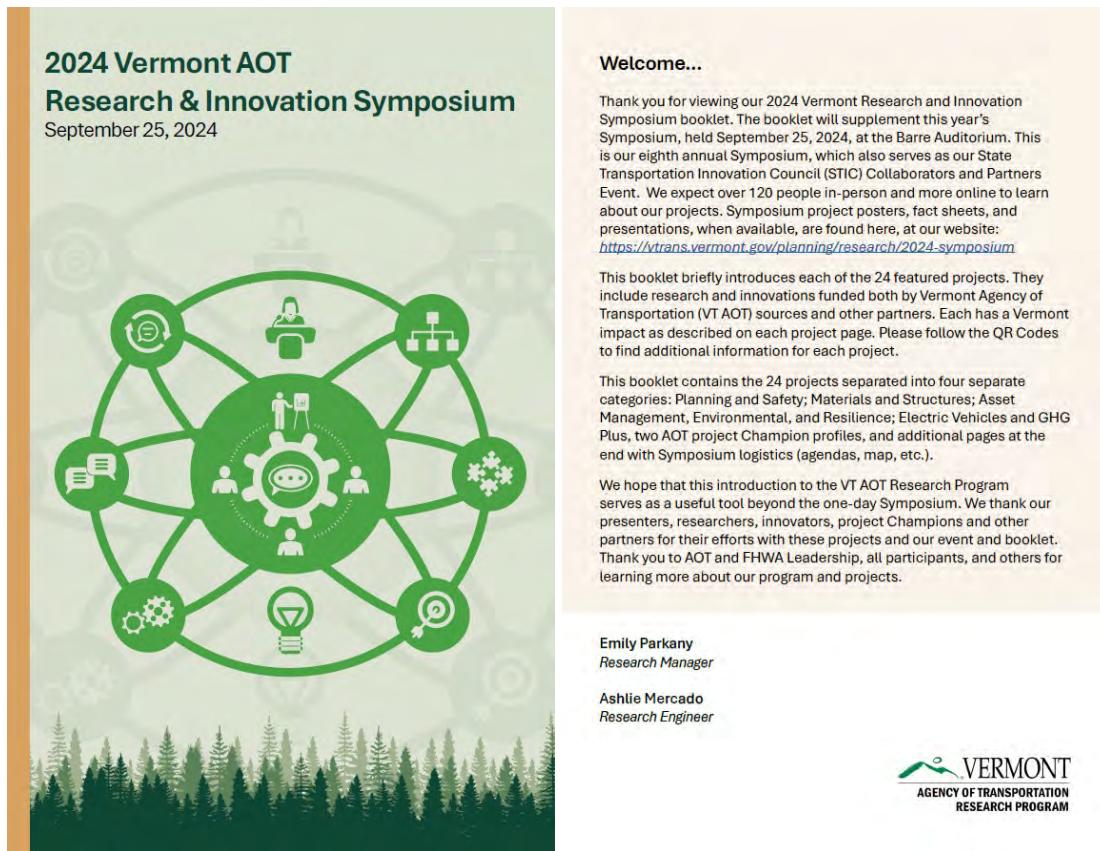
Figure 3. Vermont AOT 2024 Vermont Symposium booklet front matter

TOP IDEAS:

- *Programmatic Considerations*

  o Understand **where research and innovation programs fall within overall agency strategies** to help prioritize research and innovation efforts and communicate with agency leadership.

  o A **separate innovation officer, coordinator or steering committee** can promote a robust, agency-wide innovation program and ensure ongoing integration with research efforts.

- *Projects: Ideas to Implementation*

  o **Proactively solicit research and innovation ideas** from executive staff, bureau directors, and agency staff using **standardized forms or processes** to increase the quality and quantity of viable and innovative ideas.

  o A **blind submission process for universities and other external stakeholders** can generate a broader base of objective ideas and support unbiased evaluation.

  o **Standardized evaluation methods, forms and intra-agency advisory committees** promote objectivity in analyzing and selecting research and pilot projects.

- o **Simplify and enhance project funding**:

  - ▪ Use basic agreements with one or more universities.

  - ▪ Understand distinctions between and possibilities to maximize State Planning and Research (SPR) Subparts A and B funding streams.

  - ▪ Explore funding partners such as Metropolitan Planning Organizations (MPOs).

- o Enhance **research contracting requirements** or provisions by including:

  - ▪ Technical editor resources for final reports

  - ▪ DOT branding and review periods prior to principal investigators (PIs) presenting or publishing research

  - ▪ Clarification that project sponsor owns data

  - ▪ Project tracking and reporting requirements

- o **Formalize project close-out process** and **track project implementation, benefits** and **successes** with checklists, surveys, and follow-up meetings in 12 – 18 months with technical leads.

- ● *Technology Transfer and Innovation Promotion*

  - o Research, innovation and implementation **showcases, contests,** and **awards** foster an agency-wide culture of innovation. Consider involving STICs, PIs, and DOT Districts.

  - o Require **project fact sheets** and **PI involvement in outreach events**.

  - o Be **creative with tech transfer products** and methods, such as:

    - ▪ Vermont AOT's Symposium booklet

    - ▪ *Lunch and Learns* or recorded interviews with subject matter experts (SMEs)

    - ▪ Maryland DOT's CLICK'D Lunch and Learn Series

    - ▪ PennDOT's [Innovations Challenge](#) for high school student teams

PEER EXCHANGE TOPIC 2—IN-HOUSE RESEARCH

OVERVIEW

The second topic of the peer exchange focused on how in-house research is defined and carried out at member agencies. The discussion included what programs or areas within the agencies engage in research and the roles of the research programs in these processes. Finally, participants highlighted communication or collaboration challenges and strategies.

PRESENTATIONS

To kick off discussion on best practices for in-house research, the host state and three participating states presented on their agencies' in-house research practices. Presentations are reproduced as appendices to this report.

Appendix O. New Jersey DOT – In-House Research, Giri Venitkeela, NJDOT

Appendix P. Connecticut DOT – In-House Research, Mauricio Garcia-Theran, CTDOT

Appendix Q. Maine DOT – In-House Research, Jeff Pulver and Ulrich Amoussou-Guenou, MaineDOT

Appendix R. New York State DOT – In-House Research, Salma Sultana, NYSDOT

DISCUSSION AND FINDINGS

Attendees discussed the scope and management of in-house research practices, challenges, and strategies related to communication, coordination and collaboration.

Below are the best practices, challenges, and strategies. **TOP IDEAS** are those that were highlighted by several participants in group discussions and in report-out forms that participants completed and submitted after the session. Highlights from New Jersey are featured in Strengths and Opportunities for Host State: New Jersey DOT.

Practices, Challenges, and Strategies

- Connecticut DOT

    o Research program staff conduct literature reviews to support offices across the agency but lack the staff to conduct "traditional" research projects. Other agency groups, such as the Traffic Signal Lab, Pavement and Materials, and other planning groups perform certain research tasks.

    o In-house research for Complete Streets, for example, included literature reviews, needs identification, data collection and analysis, documentation, and recommendations.

    o CTDOT also uses a combined approach with external in-house participation, including these examples:

- ▪ Highway bridge inventory project, involving CTDOT's Cultural Resources Unit and the state Historic Preservation Office

  - ▪ Mobile Asset Verification and Roadway Inventory Collection (MAVRIC) including CTDOT Enterprise GIS, University of Connecticut (UConn), and a geospatial company

  - ▪ Pavement research conducted by the Connecticut Advanced Pavement lab at the University of Connecticut.

- ● Maine DOT

  - o Many DOT program areas conduct in-house research, and the research program strives to strike a balance between staying informed and supportive of SME needs but not slowing innovation with extra oversight.

    - ▪ Quick turnaround and limited administrative burdens are benefits of in-house research, however lack of communication can be a challenge. The research program has responded by:
    - ▪ Promoting an innovation program with representatives across the agency and a planned 2026 Research and Innovation Showcase
    - ▪ Conducting "share and tell" during meetings
    - ▪ Funding small pilot projects

  - o The research program conducts in-house research activities such as literature reviews, surveys, and field measurements.

    - ▪ Benefits include staff knowledge growth and satisfaction, and program visibility to leadership and other agency staff.
    - ▪ Challenges include staff resources and capacities. Skill building such as advanced Excel and GIS training are quick and can advance learning and capabilities.
    - ▪ Projects include Kinetic Energy Network Safety Screening, Mapping Pedestrian Volume Data, and Interstate Rutting Data Analysis.

- ● New York State DOT

  - o The research program is within the Materials Bureau and includes three engineers who do in-house research, including product evaluation. Other DOT programs across bureaus also conduct research and research program staff assist other staff research within the Materials Bureau.

  - o NYSDOT's planning group coordinates contract research, with research program staff or SMEs acting as project managers (PMs).

  - o Besides literature reviews, in-house research activities include statistical consultation, specification updates, and data collection and experiments.

  - o Research program challenges with in-house research include staff time constraints, shifting priorities, and a lack of standardized project documentation.

TOP IDEAS:

- **Maintain constant communication and collaboration with SMEs** from other areas in your agency to help research programs stay informed.

- **Broaden the scope of in-house research** by considering a range of activities such as literature reviews, surveys, and Excel and GIS tools, in addition to data collection, analyses, and pilot projects.

- **Investigate [Transportation Pooled Fund Study (TP5-467): *Research Project Tracking System*](),** to determine applicability to research project tracking needs. Currently, New Jersey DOT and Vermont AOT are participating.

- Consider whether a **project reporting and tracking system** should include **both in-house** and **contract research**, and the **level of access for various stakeholders**.

PEER EXCHANGE TOPIC 3—ADAPTING TO FEDERAL AND TRB CHANGES

OVERVIEW

New Jersey DOT and participating states had a roundtable discussion about how recent changes at the national level may be impacting state transportation research programs. There were no presentations for this topic.

DISCUSSION AND FINDINGS

Attendees shared reactions to recent changes at TRB and FHWA. Participants shared thoughts and identified opportunities moving forward. General consortium comments were collected during group discussion and in report-out forms that participants completed and submitted after the session. Below are perspectives that several participants highlighted.

Perspectives

- A **complete restructuring at the TRB** resulted in combining some of former committee topics and the elimination of others. With the dissolution of the Research Innovation Implementation Management Committee, member agencies want to **ensure state transportation research is supported** in the new structure.

- State DOTs can focus on identifying how to **maximize the value of the National Cooperative Highway Research Program (NCHRP)**. NCHRP panels continue to provide staff **education** and **networking opportunities** to state DOT staff.

- Federal changes have had **limited impact on the transportation pooled fund study program.** Consortium agencies should continue to share—both within agencies and among states— **opportunities, concerns,** and **transportation trends, technologies,** and **tools** associated with pooled fund studies.

- Member states are generally experiencing **business as usual with minimal impact** on day-to-day planning. **Agencies are willing to remain flexible** and **accommodate changes as much as possible**. Member states appreciate **direction and guidance** from FHWA.

- Additional topics of discussion included **staffing** at FHWA national and district offices, transportation research **funding streams**, and state and national **messaging**.

STRENGTHS AND OPPORTUNITIES FOR HOST STATE: NEW JERSEY DOT

A measure of a successful peer exchange is how the host state learns from others and identify the tools and practices that may solve their problems and help grow their program. Throughout the peer exchange and in submitted report-out forms, attendees praised the many impressive achievements of New Jersey DOT's Bureau of Research, Innovation & Information Transfer and highlighted strategies to address the challenges that New Jersey DOT presented.

New Jersey's Strengths

Attendees noted the many ways that NJDOT's research program excels:

- New Jersey DOT has a **well-organized research program.**

  o Innovation and research programs function to align agency innovation objectives: innovation provides the ideas, and research provides the methods to evaluate and implement the ideas. The programs are integrated, yet scopes and activities are clearly delineated, including what constitutes in-house research.

  o Efforts to champion innovation are strong, such as funding for innovation projects and the planned innovation grant program.

  o Research staff are passionate and possess a range of skill sets to provide strong research and project management capabilities. Opportunities for in-house research, including publishing findings, are impressive.

  o Project tracking, contracting standard operating procedures such as a basic agreements with universities, documentation, and research product templates improve communications and process efficiencies.

- New Jersey DOT's **outreach and technology transfer activities** are highly effective.

  o The NJDOT Technology Transfer website is comprehensive and contains news articles, research updates, events, and noteworthy initiatives.

  o In addition to research staff indicating interest in using the Vermont AOT Symposium booklet model, innovation promotion includes:

    - Flyers, videos, Tech Talks, and social media
    - Build a Better Mousetrap
    - Innovation Spotlight
    - Research Showcase and awards
    - Innovation Day and awards (in development)

- New Jersey DOT's research program is developing an **innovation grant program** to support individuals contributing innovations and to supplement state planning and research funds, state funds, and STIC Incentive Grants.

Attendees offered suggestions to enhance NJDOT's research program:

- To demonstrate the value of research and ensure NJDOT leadership support, the research program might consider **several strategies to improve leadership outreach**:

  o Participate in forums including the executive team and get to know executive assistants.

  o Better understand strategic goals and leadership priorities.

  o Further involve leadership in research development and selection.

    ▪ Senior leadership is already included in the review of ideas submissions. NJDOT research could invite leadership to research decision meetings or involve them in Symposiums and other innovation activities.

- To **strengthen intra-agency collaboration, decrease silos** and **effectively track research and innovation activities** across the agency, NJDOT research program could:

  o Schedule quarterly coordination meetings with all silo groups together and maintain regular communication to understand needs, constraints and opportunities with other units and five SPR-funded resource centers:

    ▪ Bridge
    ▪ Pavement
    ▪ Intelligent Transportation
    ▪ Bicycle and Pedestrian Safety
    ▪ Geo Technical

  o Provide an agency-wide innovation platform and framework.

APPENDIX A. NJDOT 2025 MEETING AND PEER EXCHANGE AGENDA

New Jersey DOT 2025 Research Peer Exchange — Agenda

NJHA Conference & Events Center – Room C

Updated June 18, 2025

All times are Eastern – Breaks will be taken as needed

Day 1: Tuesday, June 24, 2025

Morning Session

8:30 a.m. **Welcome, Meeting Goals and Agenda Review**

- Pragna Shah, New Jersey DOT
- Emily Parkany, Vermont AOT, NTRC Lead State
- Kirsten Seeber, CTC & Associates

8:45 a.m. **Introductions**

- Name, Agency, Role
- What you hope to learn at this peer exchange?
- Ice breakers/Get-to-know-you question

9:15 a.m. **State Research Programs**

Round Table — All participants

- Discussion of pre-meeting survey results
- For each state:
  - Observations and follow-up questions form peer states
  - Thoughts on two questions:
    1. *What is the single biggest challenge currently for your research program?*
    2. *What is one thing your research program does particularly well?*

12:00 p.m. Group Discussion – Working Lunch

New Jersey DOT 2025 Research Peer Exchange — Agenda

NJHA Conference & Events Center – Room C

Updated June 18, 2025

All times are Eastern – Breaks will be taken as needed

Afternoon Session

1:00 p.m.   **Topic 1. Research and Innovation**

- o *How are research and innovation definitions, goals, and activities related? Where do they overlap, and how are they distinct?*
- o *Where do both your research office and innovation office appear in your organizational chart? How does your agency manage and coordinate research and innovation?*
- o *How does your agency fund innovation?*
- o *How does your agency promote and showcase innovations?*
- o *What are your agency's challenges and best practices related to innovation?*

Presentations (15 minutes each plus Q-and-A)

- New Jersey (Pragna Shah)
- Maryland (TBD), Massachusetts (Anil Gurcan), Pennsylvania (Brian Wall), Vermont (Ashlie Mercado)

Discussion

- Group Q&A and round table discussion

4:15 p.m.   **Complete Day 1 Report-Out Worksheet**

4:30 p.m.   Adjourn afternoon session

New Jersey DOT 2025 Research Peer Exchange — Agenda

NJHA Conference & Events Center – Room C

Updated June 18, 2025

All times are Eastern – Breaks will be taken as needed

Day 2: Wednesday, June 25, 2025

Morning Session

8:30 a.m.   **Review of Peer Exchange to Date and Goals**

8:45 a.m.   **Topic 2. In-House Research**

- *Which business areas within your DOT conduct in-house research outside of the traditional research program channels?*
  - *Is research conducted by employees or outsourced? Are only certain tasks outsourced?*
  - *How are the projects funded? How are expenses like software licenses approved?*
  - *How are these projects initiated?*
  - *How regularly does such research happen?*
- *What constitutes in-house research?*
  - *Data collection, experimental features, approved products, and quick-turnaround desk research (review of published research, literature searches, syntheses)?*
  - *Typical areas? (Traffic data — could include testing and analysis; materials; others)*
- *Is the research office regularly informed of such research? What role, if any, does your research office play in such research: Scoping, managing, communicating, collaborating intra-agency among other business areas, funding, and supporting implementation?*
- *What are the challenges of this additional research taking place outside your research office? What steps has your research office taken to improve communication, coordination, and collaboration?*

Presentations (15 minutes each plus Q-and-A)

- New Jersey (Giri Venitkeela)
- Connecticut (Mauricio Garcia-Theran), Maine (Jeff Pulver and Ulrich Amoussou-Guenou), New York State (Salma Sultana)

Discussion

- Group Q&A and round table discussion

12:00 p.m.   Group Discussion – Working Lunch

New Jersey DOT 2025 Research Peer Exchange — Agenda

NJHA Conference & Events Center – Room C

Updated June 18, 2025

All times are Eastern – Breaks will be taken as needed

Afternoon Session

1:00 p.m. **Topic 3 – Adapting to Federal and TRB Changes**
- o *Round-table discussion — no prepared presentations, but questions for consideration regarding how changes at the federal level are impacting state research program activities:*
  - ▪ *How is your research program reacting and adapting?*
  - ▪ *What direction is your research program receiving from leadership?*
  - ▪ *What action is your research program taking proactively?*
  - ▪ *How does your agency deal with conflicts among individuals and FHWA?*
- o *Volunteers might potentially lead parts of discussion.*
- o *Document positives, questions, and concerns.*

2:30 p.m. Break

2:45 p.m. **Continuing Topic 3 Discussion**

4:15 p.m. **Complete Day 2 Report-Out Worksheet**

4:30 p.m. Adjourn afternoon session

New Jersey DOT 2025 Research Peer Exchange — Agenda

NJHA Conference & Events Center – Room C

Updated June 18, 2025

All times are Eastern – Breaks will be taken as needed

Day 3: Thursday, June 26, 2025

Morning Session

8:30 a.m.   **Review of Day 1 and Day 2 of Peer Exchange and Plans for Final Day**

8:45 a.m.   **Discussion of Parking Lot / High Priority Topics**

10:00 a.m.   **New Jersey**

- What are we doing well
- Opportunities for improvements
- Great ideas from peers

Peer Agencies

- Where New Jersey excels
- Where New Jersey can grow
- "Aha moments" and ideas to take home

11:30 a.m.   **Complete Day 3 Report-Out Worksheet**

12:00 pm   Adjourn meeting

APPENDIX B. NEW JERSEY NTRC MEMBER RESEARCH PROGRAM OVERVIEWS – DOT PEER EXCHANGE SURVEY RESPONSES

#1

Page 1: New Jersey DOT Peer Exchange - NTRC Member Research Program Overviews

Q1

(Required) Please provide your contact information.

Respondent Name(s):	**Mauricio Garcia-Theran**
Agency:	**Connecticut DOT**

Q2

1. Where does the research program appear within your agency's organization (e.g., within materials or engineering divisions, under executive management, etc.)?

The Research Program appears within the Bureau of Policy and Planning. The Research Program is within the Office of Strategic Planning and Projects which has 4 units, Research being one of them. The Research Supervisor reports to an Assistant Planning Director who oversees the 4 units.

Q3

2. How many full-time employees does your research program have? How many part-time?

The Organization chat shows 3 including the Research Supervisor

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Q4

3. In a typical year, how many new research projects does your research program initiate?

For the most part, our Research Program runs typically on a biannual basis for the SPR B funded projects. I do not have a historical background of the unit, but last year 9 new projects were included in the SPR B program. Others were continuing projects. There are currently 15 active SPR-B projects. We do not typically initiate new projects in the second year of the program, but this does not mean we could not.
There are a couple of additional projects initiated every year through a state funded program.

Q5

4. How many pooled fund studies does your agency lead? How many does it participate in?

Currently not leading any. Participating in 18

Q6

5. What is the approximate annual budget for your agency's research program?

3 millions

Q7

6. Please break down your program's annual budget by percentage spent in the following areas. Please round to the nearest whole number, and estimate as needed.

• Traditional research projects **62**
• Pooled fund studies **17**
• AASHTO Technical Service **1**
Programs
• Internal activities (staff **20**
hours)

Q8

If you assigned a value to "Other" in Question 6, please describe.

Respondent skipped this question

Q9

7. What your program's average cost per research project?

300,000

Q10

8. Please describe funds used for research other than SP&R funds.

Connecticut Cooperative Transportation Research Program. This program has been established between the Department and The University of Connecticut since the late 1950's. Level of funding has decreased over the years, and it currently allows 1-2 projects per year. 100% state funds.

Q11

9. How are potential research projects identified within your agency?

I have not gone through a full cycle of this yet, but this is what I know how it typically works:
-The Department opens a solicitation every two years for the Universities to submit research ideas/partial proposals.
-The Research Unit then distributes them across the agency for input, review, and potential. This is how most of the research projects are initiated.
- Research Unit also requests ideas from different Units/Offices within the Department using a form. The Research Unit tries to identify a Principal Investigator within the Universities with expertise in the specific topic.

Q12

10. And then how are research projects selected for funding?

For SPR-B Projects:
-Research Unit collects and ranks all proposals taking into consideration input from the Department, priorities and other set criteria as specified in a rubric.
-Based on the funding availability, and the number of applications. The best ones are invited to provide full proposals to refine scope of work with Subject Matter Experts within the Department.
-Once the scope of work is refined, the proposal is included in the Proposed Research Work Program, and the Department seeks approval from FHWA.

For Connecticut Cooperative Transportation Research Program:
- Project Selection is made by an established standing committee made up of 8 voting members (4 from CT DOT, and 4 from UCONN). The Research Supervisor at CT DOT is the Chairperson of the Committee.
-Research ideas are collected and ranked during the Spring
-The best ones are invited for full proposal, and presentations to the standing committee
-Standing Committee votes which one is selected after each presentation

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Q13

11. Please describe any general categories of research projects eligible for funding.

I consider our current research program very broad. As long as eligible per FHWA guidelines, any category/topic beneficial to the Department is eligible for funding. Currently there are topics related to pavement, workforce development, TOD, stormwater infrastructure, bridges, retaining walls, Microtransit, pedestrian safety, etc.
I believe in our case is heavily driven by current Department needs, if there is a Subject Matter Expert willing to be involved during the execution of the project, and I perceive trying to distribute funds across different offices.

Q14   **No**

12. Does your research program have any special considerations or processes for addressing emerging issues through research?

Q15   **No**

13. Does your research program have any special considerations, processes or set-asides for addressing special topics/programs?

Q16

14. Does your research program use external partners to help carry out research program functions?

Yes (Please briefly describe external partners and their roles.):
Yes, most of the Research Program relies on Universities to conduct the Research Projects. Our Research Unit is mainly focused on administration and where all the research projects are centralized. The research function that are done in house are mainly literature reviews to assist other units, NCHRP process reviews, track projects progress, coordinate with SMEs, preparation of contracts, review invoices, pooled funds, preparation reports for federal requirements and other administration tasks.

Q17

15. Does your research program host any regular events or showcases sharing project results?

No

Q18

16. Research Administration

I guess nothing out of the norm. A lot of agreement preparations, and amendments.

Q19

17. Research Procurement

In the past I believe most of the Research was performed in house and the University of Connecticut. Then, most of it was done through the UCONN only. However, in recent years the Department has opened opportunities to other universities in the State. This is good but it has brought differences in types of contracts, agreements, overheads, etc.

Q20

18. Research Implementation

Respondent skipped this question

Q21

19. Innovation

Innovation is not a direct function of the Research Unit at CTDOT. To the best of my knowledge so far, there is no innovation office or dedicated person to it. This does not mean the Department is not proactively seeking into it. It is just not centralized as in other states. STIC projects are typically handled at the Commissioner Level, Chief Engineer, Engineering Administrator, and obviously FHWA.

Q22

20. Strategic Planning

Respondent skipped this question

Q23

21. Program Management Tools

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Respondent skipped this question

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Q24

22. Working with Leadership

Since the Research Unit is within the Bureau of Policy and Planning. I believe working closely with leadership is essential to avoid silos across the agency.

Q25

23. Working with Agency SMEs

Some challenges with some. But it is improving once you set up expectations and educate them about what their function is and why they are important in order for the research project to be successful. In some instances, they perceive the project may be an additional workload. Typically, the Research Unit facilitates the conversation between SMEs and Investigators. It really depends on the SME, and the conditions on how the project was selected to begin with.

Q26

24. Working with Investigators

So far it's been good. Some challenges with the new investigators who are not familiar with what to do if the proposals need modification, rebudget, how the solicitation cycle works, etc. But this is part of our role in the Research Unit. Some proposals may have not been correctly budgeted especially during the first year of the project.

Q27

25. What else would you like to share with fellow peer exchange participants in advance of the meeting?

Most of us in the Research Unit are fairly new in our Role including management. This is going to be an evolving unit, and we are open to change looking for improvements. For now, the focus has been in catching up and solving challenges with current and past projects.

#2

Q1

(Required) Please provide your contact information.

Respondent Name(s):	**Pragna Shah**
Agency:	**NJDOT**

Q2

1. Where does the research program appear within your agency's organization (e.g., within materials or engineering divisions, under executive management, etc.)?

NJDOT's research program resides in the Division of Statewide Planning

Q3

2. How many full-time employees does your research program have? How many part-time?

7 full-time employees: Manager, management assistant, contract administrator and 4research project managers. 1 part-time and 1 subconsultant overseeing the Research Library

Q4

3. In a typical year, how many new research projects does your research program initiate?

10-12

Q5

4. How many pooled fund studies does your agency lead? How many does it participate in?

We are not leading any pooled fund studies at the moment. However, we currently are participating in 17 pooled fund studies.

Q6

5. What is the approximate annual budget for your agency's research program?

$8.5 million (Federal funds including salary) and $2M State funds.

Q7

6. Please break down your program's annual budget by percentage spent in the following areas. Please round to the nearest whole number, and estimate as needed.

• Traditional research projects	**54**
• Pooled fund studies	**6**
• AASHTO Technical Service Programs	**1**
• Travel	**1**
• Internal activities (staff hours)	**21**
• Other - Please detail below	**17**

Q8

If you assigned a value to "Other" in Question 6, please describe.

TRB contributions 3%
NCHRP 14%

Q9

7. What your program's average cost per research project?

$250,000

Q10

8. Please describe funds used for research other than SP&R funds.

State funds, LTAP Federal Funds ($210K), STIC Incentive Funds

Q11

9. How are potential research projects identified within your agency?

Potential research projects are identified through research outreach to senior leadership and call for Ideas via Tech Transfer efforts.

Q12

10. And then how are research projects selected for funding?

Research ideas are vetted through Research Oversight Committee (includes directors, managers and SMEs) unless direct ideas are submitted by senior leadership and based on the Bureau's funding availability.

Q13

11. Please describe any general categories of research projects eligible for funding.

Pavement, Materials, Construction, Bridge, Maintenance, Safety, Planning, AI and Human Resources

Q14

12. Does your research program have any special considerations or processes for addressing emerging issues through research?

Yes (Please briefly describe how your research program addresses emerging issues.):
The Bureau meets with the customer for buyin. Pilot projects are conducted to evaluate the emerging topic.

Q15

13. Does your research program have any special considerations, processes or set-asides for addressing special topics/programs?

Yes (Please briefly describe the topics/programs.):
Develop framework, stakeholder engagement and final deployment of program. NJDOT has an Innovation Program, Technology Transfer program and Annual Research Showcase.

Q16

14. Does your research program use external partners to help carry out research program functions?

Yes (Please briefly describe external partners and their roles.):
The Bureau works with the Universities to conduct research. For quick turnaround research, we have on-call consultants.

Q17

15. Does your research program host any regular events or showcases sharing project results?

Yes (Please describe the event or showcases sharing project results.):
The Technology Transfer program hosts quarterly lunchtime tech talks to promote research projects. Videos are produced to promote these projects, as well as Build a Better Mousetrap awardees. Articles about the research are featured on the Tech Transfer website, and newsletters are sent via email. The Bureau hosts an annual research showcase where PIs can present their research. We are currently working to host Innovation Day next year.

Q18

16. Research Administration

Standardized templates have been developed for kickoff and quarterly meetings to ensure consistency and clearly communicate expectations. The Bureau's and Tech Transfer's websites are regularly reviewed and updated. We have appointed a dedicated contact person to assist universities with any accounting or invoicing questions. Research leads technical teams for special grants and topics. Disseminate results of our research projects through various channels, including conferences, journals, tech talks, webinars, newsletters, videos, and articles. Maintain a Research Library. Standard Operating Procedures (SOPs) have been established for contract administration to support other units.

Q19

17. Research Procurement

Initiate an outreach program to engage Senior Leadership and their staff, encouraging them to submit ideas and emphasizing the potential value these research ideas could bring to their unit and department. The Bureau has a dedicated employee to manage and draft RFPs ensuring quality, expertise, project budget cap, and consistency. We have a dedicated webpage for posting RFPs and a separate Technology Transfer webpage. The Bureau works with in-state public universities only.

Q20

18. Research Implementation

Capture implementation on the Bureau's Annual Implementation Report. Produce implementation videos. Recognition of the best implemented research project at the Bureau's Annual Research Showcase. As part of the proposal requirements, the Principal Investigators must submit their implementation plan. The Bureau has dedicated funding for implementation set aside.

Q21

19. Innovation

We have tried to capture innovation in our research projects and promote it through our Technology Transfer program. We have an Innovation Program this year. The goal of this program is to promote innovation culture at NJDOT and have dedicated funding for innovation pilots. We hope to host Innovation Day at NJDOT on an annual basis. A dedicated employee has been assigned to be the Innovation Officer responsible for the oversight and management of this program.

Q22

20. Strategic Planning

We are in the process of updating our Strategic work plan.

Q23

21. Program Management Tools

Currently, we have a program management tool created by a university. We are participating in the pooled fund for Research Project Tracking System.

Q24

22. Working with Leadership

Initiate an outreach program to engage with Senior Leadership for research ideas and evaluation. Also, request senior leadership to participate in a panel discussion at the Annual Research Showcase aligning with the theme.

Q25

23. Working with Agency SMEs

The Bureau requires at least 3 SMEs/Technical Advisory Panel members to be part of the research project. Responsible for ensuring research is being conducted within the scope and also aligning with NJDOT needs.   SMEs are asked to participate in a panel discussion at the Annual Research Showcase aligning with the theme. Recognize SME's contributions for their work on research projects at the Annual Research Showcase (Best Customer Award and HVR recognition also)

Q26

24. Working with Investigators

Opportunity to present their research at our lunchtime tech talks, videos, articles, TRB annual meeting, other conferences and Research Showcase. Submit their work for HVR. Recognition for Implementation and HVR (if any) at our Annual Research Showcase.

Q27

25. What else would you like to share with fellow peer exchange participants in advance of the meeting?

How to evaluate the effects of inhouse research silos on the Bureau of Research. Question to the group, how can we demonstrate the value and significance of the Research program to senior leadership within the Department? And how do you have senior leadership promote the Research program?

#3

Q1

(Required) Please provide your contact information.

Respondent Name(s):	**Brian Wall**
Agency:	**PennDOT**

Q2

1. Where does the research program appear within your agency's organization (e.g., within materials or engineering divisions, under executive management, etc.)?

PennDOT Office of Planning in the Bureau of Planning and Research

Q3

2. How many full-time employees does your research program have? How many part-time?

6.5 fulltime equivalents.

Q4

3. In a typical year, how many new research projects does your research program initiate?

10-15

Q5

4. How many pooled fund studies does your agency lead? How many does it participate in?

0, 38

Q6

5. What is the approximate annual budget for your agency's research program?

~$9 million.

Q7

6. Please break down your program's annual budget by percentage spent in the following areas. Please round to the nearest whole number, and estimate as needed.

- Traditional research projects **43**
- Pooled fund studies **5**
- AASHTO Technical Service Programs **0**
- Travel **0**
- Internal activities (staff hours) **7**
- Other - Please detail below **45**

Q8

If you assigned a value to "Other" in Question 6, please describe.

LTAP: $1,750,000, NCHRP: $2,224,659, TRB: $313,183

Q9

7. What your program's average cost per research project?

$338,272.95

Q10

8. Please describe funds used for research other than SP&R funds.

Toll credits and state funding for matching.

Q11

9. How are potential research projects identified within your agency?

SPR work program is usually everyone year. We solicit projects annually and amend the work program as necessary.

Q12

10. And then how are research projects selected for funding?

Research projects are vetted through TRID searches, PennDOT leadership to ensure they are consistent with the current direction of the Department, FHWA Division Office reviews for funding applicability, and the final list of projects are approved by the PennDOT Program Managment Committee.

Q13

11. Please describe any general categories of research projects eligible for funding.

Policy studies, design and testing, construction, materials and new products, environmental, maintenance, safety, planning, and modal research.

Q14

12. Does your research program have any special considerations or processes for addressing emerging issues through research?

Yes (Please briefly describe how your research program addresses emerging issues.):
Amendment to the SPR Work Program. If a project were identified outside of our normal solicitation period, we would follow the same process for the single research project. Amendment to the SPR Work Program.

Q15

13. Does your research program have any special considerations, processes or set-asides for addressing special topics/programs?

No

Q16

14. Does your research program use external partners to help carry out research program functions?

Yes (Please briefly describe external partners and their roles.):
We have 37 prequalified vendors including 7 universities and 30 private sector partners.

Q17

15. Does your research program host any regular events or showcases sharing project results?

No

Q18

16. Research Administration

We have 3.5 full time equivalents for program/project managers. 1.25 fulltime equivalents for implementation. 1.25 fulltime equivalents for tech transfer, national programs, and TPF.

Q19

17. Research Procurement

We use an Invitation to Qualify (ITQ) to pre-qualify vendors. Project are release for competitive bids using our RFQ process.

Q20

18. Research Implementation

1.25 full-time equivalents. Two five-year open-end contracts totaling 3.5 million.

Q21

19. Innovation

Innovation is handled be a separate Bureau. Bureau of Strategic Business Operations handles the Departments innovation programs including the STIC.

Q22

20. Strategic Planning

We don't not currently have a strategic plan in place for research.

Q23

21. Program Management Tools

PennDOT uses a web-based research program management system that tracks project information, project tasks, invoices, project budgets, project funding, project initiation, vendors, communications, project close outs, implementation, tech transfer, transportation pooled fund, and reporting.

Q24

22. Working with Leadership

Annual approvals of work program, bi-annual reporting to our Program Management Committee and a quarterly Research and Implementation Advisory Committee will consists of our PennDOT Central Office Bureau Directors and Research Program and Implementation staff are currently being developed.

Q25

23. Working with Agency SMEs

Monthly project management meetings are conducted with agency SMEs and PIs.

Q26

24. Working with Investigators

Monthly project management meetings are conducted with PIs and agency SMEs.

Q27

25. What else would you like to share with fellow peer exchange participants in advance of the meeting?

PennDOT participates in the Impactful Resilient Infrastructure Science and Engineering (IRISE) Consortium. IRISE was established in the Civil and Environmental Engineering Department at the University of Pittsburgh Swanson School of Engineering in the Fall of 2018 to develop innovative solutions that address the durability and resiliency challenges associated with aging highway infrastructure.

IRISE is guided by two main principles:

Innovative solutions to highway infrastructure problems are best achieved through a collaboration between the public agencies that own and operate the infrastructure and the private companies that design and build it.

Highway infrastructure research must aim to provide implementable solutions that meet the needs of these agencies and companies.

#4

Page 1: New Jersey DOT Peer Exchange - NTRC Member Research Program Overviews

Q1

(Required) Please provide your contact information.

Respondent Name(s):   **Jeff Pulver**

Agency: **MaineDOT**

Q2

1. Where does the research program appear within your agency's organization (e.g., within materials or engineering divisions, under executive management, etc.)?

Our Research and Innovation Office is under executive management reporting directly to the Chief Engineer.

Q3

2. How many full-time employees does your research program have? How many part-time?

We have three full-time employees and one summer intern. Only two of our full-time employees focus on research.

Q4

3. In a typical year, how many new research projects does your research program initiate?

On average about 5 new projects per year, though it varies.

Q5

4. How many pooled fund studies does your agency lead? How many does it participate in?

We lead one pooled fund which is ending (NETC). We may lead another one soon. We currently participate in 12 TPFs led by others.

Q6

5. What is the approximate annual budget for your agency's research program?

We receive about $1.17 million in federal SPR funds per year. Our overall managed budget is $1.74 million. This includes state funding, STIC grant funding, and some other surface transportation funds.

Q7

6. Please break down your program's annual budget by percentage spent in the following areas. Please round to the nearest whole number, and estimate as needed.

• Traditional research projects	**15**
• Pooled fund studies	**30**
• AASHTO Technical Service Programs	**13**
• Travel	**1**
• Internal activities (staff hours)	**25**
• Other - Please detail below	**16**

Q8

If you assigned a value to "Other" in Question 6, please describe.

We use some SPR funds for product evaluation which is about 40% of the hours for one of our employees. We manage/administer the STIC grants, and we have some money set aside for internal innovation pilot projects.

Note - our Pooled Fund percentage is 21% TRB and NCHRP and 9% other TPFs.

Q9

7. What your program's average cost per research project?

Over the last 4-5 years the average cost is $89,000 but that has increased. The average cost of projects starting over the last year is $144,000. We have some very low-cost projects as low as $10k and a couple recent project with high costs of $300k and $513k.

Q10

8. Please describe funds used for research other than SP&R funds.

We manage STIC Incentive Grants which is separate funding. We manage our contributions to the many AASHTO TSPs as well as the AASHTO annual membership fee. This AASHTO funding comes from another surface transportation source. We also have $60k per year for innovation pilot projects which comes from a different surface transportation source. We are able to use SPR funds for some innovation activities depending on the scope. Our leadership will kick in state only funding if it becomes necessary.

Q11

9. How are potential research projects identified within your agency?

We have a project idea submittal form but that is rarely used. We are involved in a lot of discussions about problems staff is facing and rollouts of new processes and initiatives. Many of our proejcts come up naturally in conversation or email based on our participation in those meetings.

We also allow projects from universities, but in those cases, we need an enthusiastic MaineDOT technical champion who wants to be involved in the project.

Additionally, we do some internal research projects which are often based on front office / leadership requests.

Q12

10. And then how are research projects selected for funding?

We have a research advisory committee of four people at the Program Manager or Office Director level of the organization. We will be increasing the size of our RAC from four to seven very soon.

We will also be requiring more detailed cost estimates / cost proposals going into the RAC process moving forward. We had situations where we committed a certain amount of money which was not based on a thoughtful evaluation of project tasks and expenditures.

Q13

11. Please describe any general categories of research projects eligible for funding.

We do not have formal categories or separate funding silos for them. We fund projects in safety, traffic operations, bridge/structures, pavement design / pavement management / materials, environmental, planning, etc.

| **Q14** | **No** |
| 12. Does your research program have any special considerations or processes for addressing emerging issues through research? | |

| **Q15** | **No** |
| 13. Does your research program have any special considerations, processes or set-asides for addressing special topics/programs? | |

| **Q16** | Yes (Please briefly describe external partners and their roles.): |
| 14. Does your research program use external partners to help carry out research program functions? | Not for regular tasks, but we rely on UMaine staff and resources for activities such as structural bridge member testing and vehicle simulator studies because we do not have the equipment in-house. |

| **Q17** | Yes (Please describe the event or showcases sharing project results.): |
| 15. Does your research program host any regular events or showcases sharing project results? | We are planning to host our first Research and Innovation Showcase in 2026. I (director) am also a co-chair of the large Maine Transportation Conference and UMaine's TIDC Conference. Both of these often show topics we have been involved with in research. |

Q18

16. Research Administration

Our office was very disorganized and lacked structure or reasonable financial management and reporting a few years ago. We have been working on that and making improvements.

Q19

17. Research Procurement

We just changed our procurement process with UMaine. We used a Multi-PIN Assignment Letter process with them when I started. This is not an appropriate method because each project was so different from the other. This contract process also required UMaine to submit a lot of supporting documentation showing hours worked. We found out that UMaine and many other universities do not formally track hours worked on projects. They keep track of "Percent of Effort" over a long period such as per semester or per quarter. As such, we have switched to a lump sum per deliverable contracting method. It takes more time to start projects but we will have required documentation and invoicing will be much easier.

Keep this in mind if you work with universities who cannot track time the way consultants do.

Q20

18. Research Implementation

We take an active role in implementation on a regular basis. We really want to see our work implemented if it is helpful to SMEs. On our recent speed and context project we worked on implementation during research. This was really effective, but also complicated and it cannot be done on every project.

Innovation and STIC programs can be used to implement research results if the research shows or "proves" the value added or effectiveness.

Q21

19. Innovation

We recently rolled out a department-wide MaineDOT Innovated Council with about 25 people who meet quarterly. The people on this council represent many offices of MaineDOT and varying levels of experience / seniority. We started this in October and the last two meetings have been great.

We are working to re-engage with Maintenance staff outside of HQ. We are rolling out new initiatives such as a showcase, a StoryMap web Page, a new publicly accessible innovation form, and engagement resources distributed to regions/camps. Our Innovation coordinator will be working with Superintendents and Camp/Crew Supervisors to roll out initiatives and get help opening lines of communication. We have leadership support to make changes which is great. We are likely also getting innovation awards and (potentially) funding that can be added to divisions who win team innovation awards.

Q22

20. Strategic Planning

Our office plays a role in strategic planning for the department, especially envisioning needs 5-10 years away and completing projects which align with those future needs.

Q23

21. Program Management Tools

We had very minimal program management tools until recently. We have requested access to Microsoft Project but have not made advancements there. For now, we have established project Gantt charts and progress / expenditure monitoring in a more manual process with Excel templates. We are also starting to create project SharePoint Pages to share files more easily. We would like to tie these projects together to monitor projects and activities in our program in one place.

We also have some helpful financial dashboard tools to monitor spending.

Q24

22. Working with Leadership

We work with leadership frequently. As a direct report, I have weekly one-on-one meetings with our Chief Engineer. I am also the Secretary of our Engineering Council Steering Committee which is chaired by our Chief Engineer and is made up of engineers in senior leadership around the department. At these meetings I learn about issues engineers are facing as well as new initiatives and guidelines developed throughout the department.

Leadership tasks our office with rolling out new technical initiatives and helping to solve major problems which involve mulitple offices / units. They see this as one of our primary functions in the organization. As a result, Urlich and I are on a lot of short-term committees / charters to provide an unbiased "fresh look" perspective.

Q25

23. Working with Agency SMEs

We work closely with our SMEs through the NCHRP process. This year we met in-person with 8 technical groups to review NCHRP problem statements and discuss them. This work fantastic and we gained significantly more meaningful feedback through conversation. We had detailed comments on almost every problem statement, and we got to hear which projects they really think are important.

We also work with SMEs through the Engineering Council, Product Evaluation Committees, in our MaineDOT Innovates Council, and sometimes in our STIC working groups.

Q26

24. Working with Investigators

We have pretty good relationships with our PIs. For some of our new projects we are going to meet monthly which maintains consistent communication. For UMaine projects we tend to meet less frequently. We used to have some projects with little to no communication which will not happen anymore.

UMaine has a Senior Program Manager for Transportation Research who I usually speak with every other week. Through these communications we have been able to find mutual interest projects between UMaine's UTC and our state program. This allows us to have proejcts which are funded 75% by other sources. We often contribute $50k to $100k toward projects with total cost between $300k and $500k. Joint projects increase the portfolio of our research program far beyond what we could complete without this collaboration.

Q27

25. What else would you like to share with fellow peer exchange participants in advance of the meeting?

Try to establish some internal research activities. You can accomplish a lot with advanced Excel skills for tool development and data analysis. GIS skills can help too. Not every problem needs an advanced statistical model and a 2-year study to aid decisions. Literature reviews and surveys can also be done with in-house resources at a faster rate and lower-cost.

Collaborate with a UTC or university to find mutually beneficial projects. The trick is having these conversations between PI and SME before work programs are finalized by either party.

#5

Q1

(Required) Please provide your contact information.

Respondent Name(s):	**Ashlie Mercado, Emily Parkany**
Agency:	**Vermont Agency of Transportation**

Q2

1. Where does the research program appear within your agency's organization (e.g., within materials or engineering divisions, under executive management, etc.)?

Research is part of the Policy, Planning, and Research Bureau within the Policy, Planning, and Intermodal Development Division

Q3

2. How many full-time employees does your research program have? How many part-time?

2 full-time, 0 part-time

Q4

3. In a typical year, how many new research projects does your research program initiate?

3-4

Q5

4. How many pooled fund studies does your agency lead? How many does it participate in?

Currently leading one; participate in 8

Q6

5. What is the approximate annual budget for your agency's research program?

$1.267M Federal, $1.430M total

Q7

6. Please break down your program's annual budget by percentage spent in the following areas. Please round to the nearest whole number, and estimate as needed.

• Traditional research projects	**30**
• Pooled fund studies	**29**
• AASHTO Technical Service Programs	**7**
• Travel	**1**
• Internal activities (staff hours)	**21**
• Other - Please detail below	**12**

Q8

If you assigned a value to "Other" in Question 6, please describe.

Other: Tech Transfer (Symposium and Communications) (6%) and 6% on mostly Symposium costs

Q9

7. What your program's average cost per research project?

$125,000

Q10

8. Please describe funds used for research other than SP&R funds.

$0

Q11

9. How are potential research projects identified within your agency?

Anyone can submit an idea, ideas are matched to VT AOT Champions, research problem statements are submitted to all organizations on the Qualified Researcher List, Champions select from Letters of Interest, one research team per potential project submits 10-page proposal, Champions present to External Research Project Decisionmakers. We have a small External Research Project evaluation starting now (expected completion Sept 30, 2025).

There is a form to fill out on our Research website: https://vtrans.vermont.gov/planning/research/research-ideas.

Q12

10. And then how are research projects selected for funding?

Champions present to External Research Project Decisionmakers. Currently no formal selection criteria. There are about 10 Decisionmakers (Bureau Directors and Deputy Division Directors).

Our External Research Process is provided in this Fact Sheet. Decisionmakers select projects in an April decision-meeting. https://vtrans.vermont.gov/sites/aot/files/Research/External%20Research%20Process%20(generic%20timeline)%20-%20Final%20Handout%2011.9.23.pdf

Q13

11. Please describe any general categories of research projects eligible for funding.

Anything eligible for SPR-B funding. We have a wide variety of funded projects impacting all four VT AOT Divisions.

Q14

12. Does your research program have any special considerations or processes for addressing emerging issues through research?

No

Q15

13. Does your research program have any special considerations, processes or set-asides for addressing special topics/programs?

No

Q16

14. Does your research program use external partners to help carry out research program functions?

No

Q17

15. Does your research program host any regular events or showcases sharing project results?

Yes (Please describe the event or showcases sharing project results.):
We have had an annual Research and Innovation September Symposium since 2017.
https://vtrans.vermont.gov/planning/research/learn

Q18

16. Research Administration

Respondent skipped this question

Q19

17. Research Procurement

No, but grants and agreements related to External Research projects take a while (4-8 weeks), but Research can get Simplified Bid contracts processed in days.

Q20

18. Research Implementation

We have had a Benefits and Implementation survey since 2022. Here is a Fact Sheet, note the AI enhanced image of implementation as a bridge between research and practice.
https://vtrans.vermont.gov/sites/aot/files/Research/Benefits%20and%20Implementation%20Survey%20Handout.pdfAsking about implementation barriers has led to fruitful discussions.

Q21

19. Innovation

Symposium since 2017 has been Research and Innovation Symposium, but integration with Agency Innovation Team has been limited. We plan to describe more during Peer Exchange presentation. VT AOT Innovation has good definitions of innovation.

Q22   **Respondent skipped this question**

20. Strategic Planning

Q23

21. Program Management Tools

Curious to see how Pooled Fund Research Project Tracking System may be useful to our small program. We do utilize SurveyMonkey and Mentimeter as appropriate.

Q24

22. Working with Leadership

Bureau Directors and Deputy Division Directors make up our Decisionmakers for our annual April project selection meeting. We also have Exec Leadership support for the Welcome session at our Symposium. Our 2022 virtual Peer Exchange was shared with leaders in a summary session.

Q25

23. Working with Agency SMEs

Here is our Fact Sheet on Engaging with Research:https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fvtrans.vermont.gov%2Fsites%2Faot%2Ffiles%2FResearch%2FEngaging%2520with%2520AOT%2520Research%2520-%2520Final%2520Handout%252011.9.23.docx&wdOrigin=BROWSELINK

Q26

24. Working with Investigators

VT AOT Research funded projects have to participate as Presenters in the September Symposium.

Q27

25. What else would you like to share with fellow peer exchange participants in advance of the meeting?

We look forward to interacting with everyone!

#6

Q1

(Required) Please provide your contact information.

Respondent Name(s):	**Steve T. Wyatt**
Agency:	**Maryland DOT - SHA**

Q2

1. Where does the research program appear within your agency's organization (e.g., within materials or engineering divisions, under executive management, etc.)?

Our office, Office of Policy and Research, falls under the Chief of Staff.

Q3

2. How many full-time employees does your research program have? How many part-time?

Five.

Q4

3. In a typical year, how many new research projects does your research program initiate?

Approximately 10.

Q5

4. How many pooled fund studies does your agency lead? How many does it participate in?

We do not lead pooled-fund studies at this time, but we are participating in 20 pooled-fund studies.

Q6

5. What is the approximate annual budget for your agency's research program?

Approximately $4,400,000.00 (based on FFY 2024).

Q7

6. Please break down your program's annual budget by percentage spent in the following areas. Please round to the nearest whole number, and estimate as needed.

- Traditional research projects **69**
- Pooled fund studies **9**
- AASHTO Technical Service Programs **5**
- Travel **3**
- Internal activities (staff hours) **8**
- Other - Please detail below **6**

Q8

If you assigned a value to "Other" in Question 6, please describe.

Contractor/Consultant.

Q9

7. What your program's average cost per research project?

Approximately $175,000.

Q10

8. Please describe funds used for research other than SP&R funds.

$800,000 state funds per year to match the UTC center.

Q11

9. How are potential research projects identified within your agency?

We solicit from various offices in our agency to determine if they have any ideas for research.

Q12

10. And then how are research projects selected for funding?

We hold team meetings and rank the problem statements based on their priority of the administration. The executive leadership makes the final selection.

Q13

11. Please describe any general categories of research projects eligible for funding.

Traffic & Safety, Managing Resources and Information, Maintenance and Preservation, Materials and Pavement, National Research, Traffic Management, Planning and Program Development. Complete Streets, Connected and Automated Vehicles (CAV), Environmental.

Q14

12. Does your research program have any special considerations or processes for addressing emerging issues through research?

Yes (Please briefly describe how your research program addresses emerging issues.):
We do support urgent strategic research topics that are new/linked to emerging issues in our agency.

Q15

13. Does your research program have any special considerations, processes or set-asides for addressing special topics/programs?

Yes (Please briefly describe the topics/programs.):
We use the technology transfer/implementation program ($100,000) to support special topics programs.

Q16

14. Does your research program use external partners to help carry out research program functions?

Yes (Please briefly describe external partners and their roles.):
We partner with local state universities.

Q17

15. Does your research program host any regular events or showcases sharing project results?

Yes (Please describe the event or showcases sharing project results.):
When any project is completed we try to promote it thorough the available channels to the employees (i.e., email blasts, intranet, SHA Newsletter, and other media outlets throughout the agency).

Q18

16. Research Administration

N/A.

Q19

17. Research Procurement

Establish open-ended agreements with State Institutions, and individual projects are put under those agreements as task orders. This helps to expedite our procurement process.

Q20

18. Research Implementation

Starting with FFY2025 projects, we have requested implementation information (potential and impact) when collecting research ideas from technical offices. We plan to require a draft implementation plan with all newly awarded projects (RFP drafts are being developed right now). This plan will be reviewed during quarterly progress meetings throughout the life of the project and will be finalized prior to project completion. It will be the internal project technical lead who will follow the implementation plan to implement the research results for the benefit of SHA.

Q21

19. Innovation

SHA would like to implement tethered drones for traffic management and emergency response on Emergency Response Unit (ERU) vehicles. The tethered drone capability will enhance the existing capabilities by elevating the visual line of sight and increasing situational awareness during roadway incidents for all connected, responding agencies.

Q22

20. Strategic Planning

In early 2024, the Maryland State Highway Administration kicked off an employee-driven and grassroots focused strategic planning effort to reimagine how we can most effectively meet the needs of our internal and external customers. Northbound 2.0 represents the best of SHA and our team's commitment to our employees, communities, and customers that depend on us to deliver safe, reliable, and accessible transportation facilities. This plan was developed to reflect the dynamic opportunities, goals, and objectives we will pursue everyday to position our team to navigate the modern-day challenges we will face in all areas of the organization.

Q23

21. Program Management Tools

Microsoft 365.

Q24

22. Working with Leadership

The executive leadership makes the final selection in research program decisions.

Q25

23. Working with Agency SMEs

We actively engage with members of academia, and other organizations such as TRB, to learn new strategies, techniques and tools to improve our existing research program.

Q26

24. Working with Investigators

We maintain great relationships with our local university research partners alongside SHA technical expertise.

Q27

25. What else would you like to share with fellow peer exchange participants in advance of the meeting?

Nothing else at this time.

#7

Page 1: New Jersey DOT Peer Exchange - NTRC Member Research Program Overviews

Q1

(Required) Please provide your contact information.

Respondent Name(s):   **Anil Gurcan**

Agency: **MassDOT**

Q2

1. Where does the research program appear within your agency's organization (e.g., within materials or engineering divisions, under executive management, etc.)?

under executive management Office of Transportation Planning.

Q3

2. How many full-time employees does your research program have? How many part-time?

6 employees in total

Q4

3. In a typical year, how many new research projects does your research program initiate?

somewhere between 5 to 10

Q5

4. How many pooled fund studies does your agency lead? How many does it participate in?

0 leading
7 participate

Q6

5. What is the approximate annual budget for your agency's research program?

approximately 7 million

Q7

6. Please break down your program's annual budget by percentage spent in the following areas. Please round to the nearest whole number, and estimate as needed.

• Traditional research projects	**20**
• Pooled fund studies	**10**
• AASHTO Technical Service Programs	**3**
• Travel	**0**
• Internal activities (staff hours)	**7**
• Other - Please detail below	**60**

Q8

If you assigned a value to "Other" in Question 6, please describe.

Technical trainings and conferences. Outsourced project management and administration

Q9

7. What your program's average cost per research project?

$150,000 to $200,000

Q10

8. Please describe funds used for research other than SP&R funds.

Q11

9. How are potential research projects identified within your agency?

Project Champions employed at MassDOT submit projects during procurement period

Q12

10. And then how are research projects selected for funding?

Leaders at various MassDOT agencies select projects for funding

Q13

11. Please describe any general categories of research projects eligible for funding.

Asphalt or cement mixtures, bridge and highway repair, snow and salt application related projects and various other transit policy related projects, data collections

Q14

12. Does your research program have any special considerations or processes for addressing emerging issues through research?

Respondent skipped this question

Q15

13. Does your research program have any special considerations, processes or set-asides for addressing special topics/programs?

No

Q16

14. Does your research program use external partners to help carry out research program functions?

Yes (Please briefly describe external partners and their roles.):
State University partners conduct research project.
MassDOT also has outsource contract to conduct partial project management and administration

---

Q17

15. Does your research program host any regular events or showcases sharing project results?

Yes (Please describe the event or showcases sharing project results.):
MassDOT Innovations conference in spring MassDOT Moving Together conference in fall

---

Q18

16. Research Administration

Respondent skipped this question

Q19

17. Research Procurement

Respondent skipped this question

Q20

18. Research Implementation

Respondent skipped this question

Q21

19. Innovation

Respondent skipped this question

Q22

20. Strategic Planning

Respondent skipped this question

Q23

21. Program Management Tools

Respondent skipped this question

Q24

22. Working with Leadership

Respondent skipped this question

Q25

23. Working with Agency SMEs

Respondent skipped this question


Q26

24. Working with Investigators

Respondent skipped this question

Q27

25. What else would you like to share with fellow peer exchange participants in advance of the meeting?

Respondent skipped this question

#8

Page 1: New Jersey DOT Peer Exchange - NTRC Member Research Program Overviews

Q1

(Required) Please provide your contact information.

Respondent Name(s): **Lisa Cataldo**

Agency: **NYSDOT**

Q2

1. Where does the research program appear within your agency's organization (e.g., within materials or engineering divisions, under executive management, etc.)?

The NYSDOT Office of Policy, Planning and Performance (OPPP) of the Policy and Planning Division is responsible for overall management and administration of the SPR Program and for managing the In-House Planning, Consultant Planning, and Contract Research portions of the Program. The Engineering Division (ED) is responsible for managing the In-House Technical Research portion of the Program. Staff in each section coordinates closely on both project and administrative matters and also works with staff in various Offices in the Operations, Asset Management, and Administrative Services Divisions and Regional Offices.

Q3

2. How many full-time employees does your research program have? How many part-time?

6 full-time employees

Q4

3. In a typical year, how many new research projects does your research program initiate?

Three

Q5

4. How many pooled fund studies does your agency lead? How many does it participate in?

Approximately 24

Q6

5. What is the approximate annual budget for your agency's research program?

Approximately $12M

Q7

6. Please break down your program's annual budget by percentage spent in the following areas. Please round to the nearest whole number, and estimate as needed.

- Traditional research projects **66**
- Pooled fund studies **22**
- AASHTO Technical Service **2** Programs
- Internal activities (staff **10** hours)

Q8

If you assigned a value to "Other" in Question 6, please describe.

Respondent skipped this question

Q9

7. What your program's average cost per research project?

Varies

Q10

8. Please describe funds used for research other than SP&R funds.

NYS matching funds

Q11

9. How are potential research projects identified within your agency?

Problem statements and funding applications are produced and reviewed.

Q12

10. And then how are research projects selected for funding?

Problem statements and funding applications are reviewed, and project selection decisions are made based on NYSDOT's transportation goals and strategic direction.

Q13

11. Please describe any general categories of research projects eligible for funding.

All are considered.

Q14

12. Does your research program have any special considerations or processes for addressing emerging issues through research?

No

Q15

13. Does your research program have any special considerations, processes or set-asides for addressing special topics/programs?

No

Q16

14. Does your research program use external partners to help carry out research program functions?

Yes (Please briefly describe external partners and their roles.):
NYSDOT has research partnership contracts with University Transportation Centers.

Q17

15. Does your research program host any regular events or showcases sharing project results?

Yes (Please describe the event or showcases sharing project results.):
Project results have been showcased in NCHRP implementation workshops and conferences held for NYS employees.

Q18

16. Research Administration

Respondent skipped this question

Q19

17. Research Procurement

Respondent skipped this question

Q20

18. Research Implementation

Respondent skipped this question

Q21

19. Innovation

Respondent skipped this question

Q22

20. Strategic Planning

Respondent skipped this question

Q23

21. Program Management Tools

Respondent skipped this question

Q24

22. Working with Leadership

Respondent skipped this question

Q25

23. Working with Agency SMEs

Respondent skipped this question

Q26

24. Working with Investigators

Respondent skipped this question

Q27

25. What else would you like to share with fellow peer exchange participants in advance of the meeting?

Respondent skipped this question

APPENDIX C. NJDOT – NTRC NEW JERSEY DOT 2025 RESEARCH PEER EXCHANGE

NTRC New Jersey DOT 2025 Research Peer Exchange
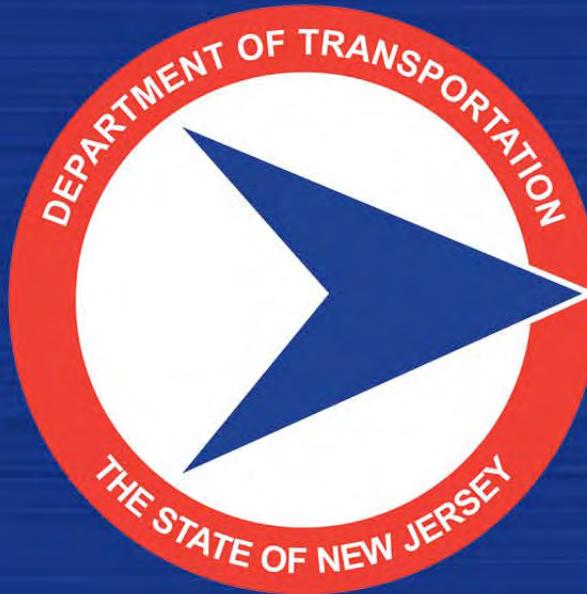
Research and Innovation Presentation
Pragna Shah

NEW JERSEY DEPARTMENT OF TRANSPORTATION

Research

Definition

- Finding solutions to improve the safety, mobility and accessibility of New Jersey's residents, workers, visitors and businesses.

Goals

- To enhance the quality and cost effectiveness of the policies, practices, standards and specifications that are used in planning, building and maintaining New Jersey's transportation infrastructure.

Activities

- Discovery of new materials
- Improvement of processes
- Refinement of systems
- Generation of innovative ideas that increase the durability and efficiency of our transportation infrastructure

Innovation

Definition

- Introduce proven products original or new to NJDOT

Goals

- To gather and evaluate new ideas while implementing and rapidly deploying proven innovative products, systems, policies, standards, specifications, procedures, and technologies that create valued outcomes.

Activities

- Promote culture of innovation
- Pilot latest technologies and innovations
- Allow for experimentation
- Foster a safe to fail environment
- Provide opportunities to collaborate to broaden the impact of innovation
- Lead and administer STIC Program

Research & Innovation Related

- R & I goals are related in that they align innovation objectives with NJDOT's transportation mission statement.

- Activities serve as a pipeline from identifying problems to deploying solutions

- Innovation can provide the ideas while Research provides the method to evaluate and implement them.

Research develops new solutions

Innovation applies research

Innovation can create opportunity for new research
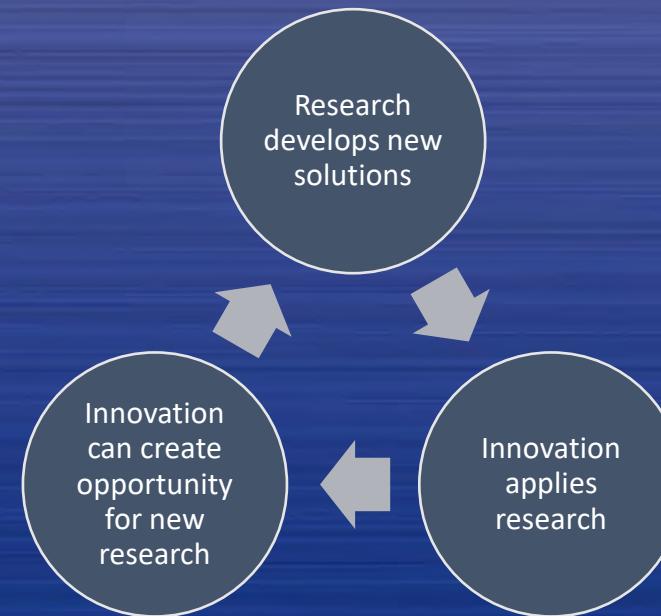
R & I Overlap

- Align with focus on improvement to transportation
- Regular Communication with Senior Leadership
- Buyin by SMEs & Champions
- Solicitation of Ideas
- Risk-taking
- Project Management
- Creativity

R & I Distinct

- Methodology to evaluate
- Implementation process
- Intellectual property
- Life cycle of research/Duration

NJDOT Commissioner

Assistant Commissioner
Statewide Planning,
Safety & Capital
Investment

Division of Statewide
Planning

Bureau of Research,
Innovation & Information
Transfer

- Our agency has dedicated unit (BRIIT) and its staff to manage R & I.

- BRIIT systematically evaluates the agency's R&I needs and periodically develops Requests for Proposals (RFPs) to foster research and innovation. In collaboration with universities and consultants, BRIIT spearheads cutting-edge R & I projects.

- Through its technology transfer program, BRIIT actively promotes its R & I outcomes and the latest technological advancements.

- Moreover, BRIIT participates in various State and Federal transportation R & I activities, including those organized by NJ STIC, pooled fund studies, AASHTO RAC, and TRB committees, ensuring our agency remains at the forefront of industry developments.

- State Planning & Research Funds – Innovation Program
  - Universities
  - Consultants
- State Funds
- STIC Incentive Grants

Promote and Showcase Innovations

BUREAU OF RESEARCH, INNOVATION & INFORMATION TRANSFER

NJDOT Innovation Program

The NJDOT Innovation Program seeks to foster a culture that encourages risk-taking, experimentation, and learning from failure.

Program Objectives
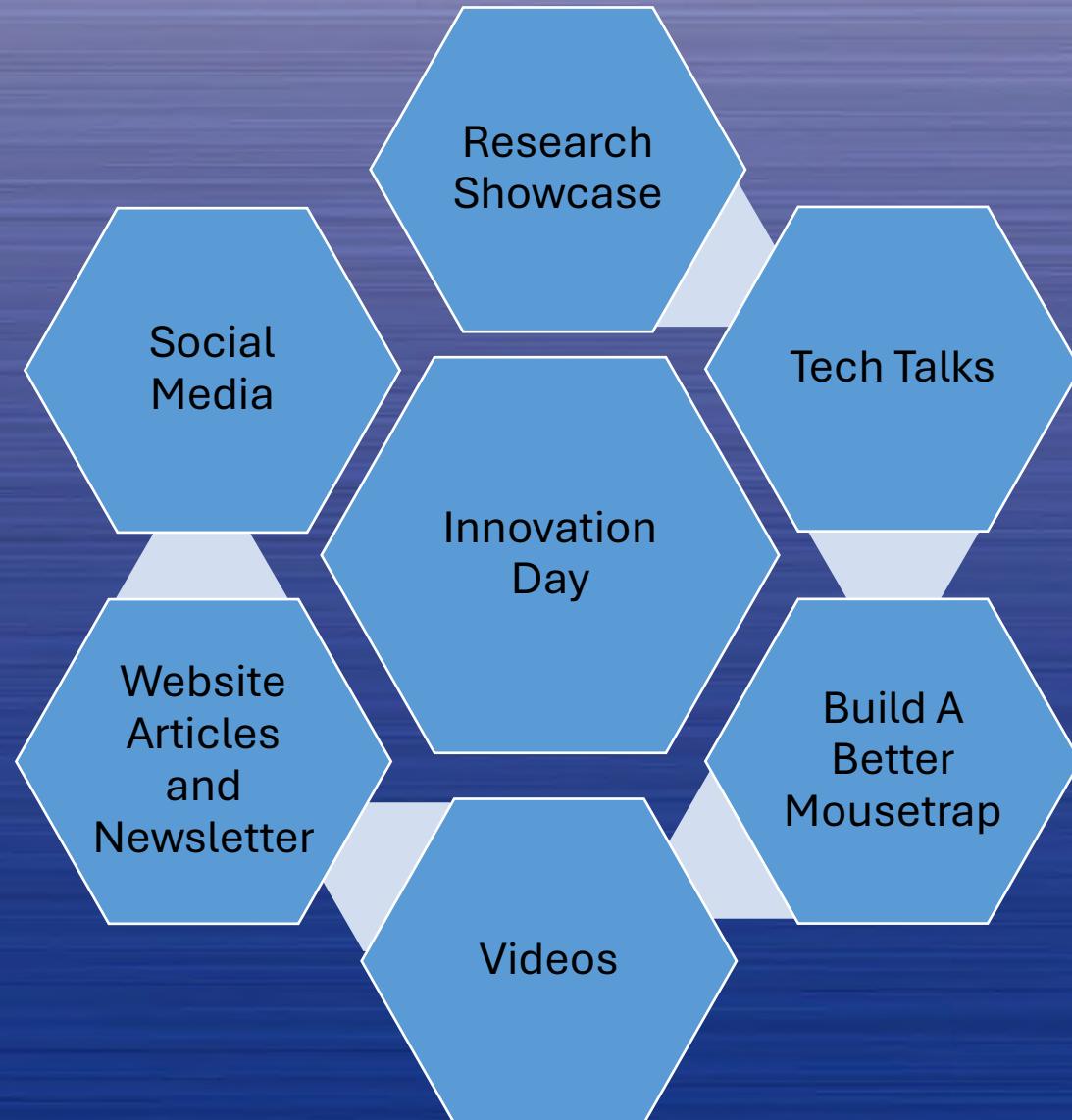
- Promote **Innovation Culture** within NJDOT.
- Lead and administer **innovation communication and outreach activities**.
- Implement, identify, apply for, manage, and oversee the administration of **innovative special grants.**
- Evaluate **new and emerging technologies & products,** and provide financial support to NJDOT for testing and demonstration.
- **Innovation Project Management**.
- Lead and administer the **NJ Statewide Transportation Innovation Council** (NJ STIC) Program.

Contact: DOT-BRIIT.InnovationProgram@dot.nj.gov

Communication & Outreach

Establish and manage initiatives such as task forces, working groups, special interest groups, newsletters, articles, and social media posts. These efforts will promote collaboration across NJDOT divisions and units, encourage knowledge sharing, and inspire staff to think critically and creatively to enhance an efficient, safe, and sustainable transportation system.

Innovation Day

An annual event featuring activities such as an innovation showcase, idea pitch competition, and technology demonstrations—highlighting creativity and progress across NJDOT.

Grant Program

BRIIT will develop a grant program to empower individuals to contribute innovative ideas and solutions addressing transportation challenges. The program will promote out-of-the-box thinking and support novel approaches to meet both current and future transportation needs.
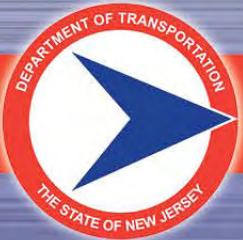
Innovation Day - Awards

- **NJDOT Choice** - NJDOT employees attending the innovation showcase vote for their favorite innovation

- **Innovator of the Year** - Recognize a NJDOT employee(s) with a forward-thinking vision for the future of transportation through their innovations and implementation efforts

Challenges & Best Practices Related to Innovation

The biggest challenge we face in innovation is *overcoming silos* and effectively tracking overall agency R&I activities to align them with national-level research efforts.

To address this:

- We implement best practices such as providing a robust platform and framework for NJDOT employees to engage in innovative activities.

- We also planning to host annual innovation events to showcase ideas, gather ideas and pilot new projects.

- Maintaining constant communication between BRIIT and various units within the agency is essential to bridging gaps and fostering collaboration, ensuring a cohesive approach to innovation.

APPENDIX D. MDOT SHA – RESEARCH AND INNOVATION

Agenda

- Introductions
- Research and Innovation Defined
- Office of Policy and Research (OPR)
- SHA and OPR Org Chart
- OPR Research Process
- Research Idea and RFP Evaluation Forms
- Funding Innovation at SHA
- Promoting and Showcasing Innovation
- SHA's Innovation Challenges and Best Practices
- Safety Innovation

Research and Innovation Defined

- The Office of Policy and Research (OPR) supports the mission of SHA by managing the research program and leads Maryland's involvement in the AASHTO Transportation and Civil Engineering (TRAC) and Roadways in Developing Elementary Students (RIDES) programs, fostering educational outreach in transportation careers.

- SOP on Innovative Concepts to formalize our innovation process.

- State Transportation Innovation Council (STIC) Program enhances our Innovative practices at SHA.

Office of Policy and Research (OPR)

Annual Budget

➤Approximately $4.4M yearly (FY 2025)

➤Approximately $3.9M in Federal funds

➤Approximately $500K in State matching funds

Oversight Roles

➤FHWA – Federal Requirements

➤SHA Chiefs and Deputies – Agency needs

➤Director of Policy and Research – Supervisory Role

Research and SHA organization Chart
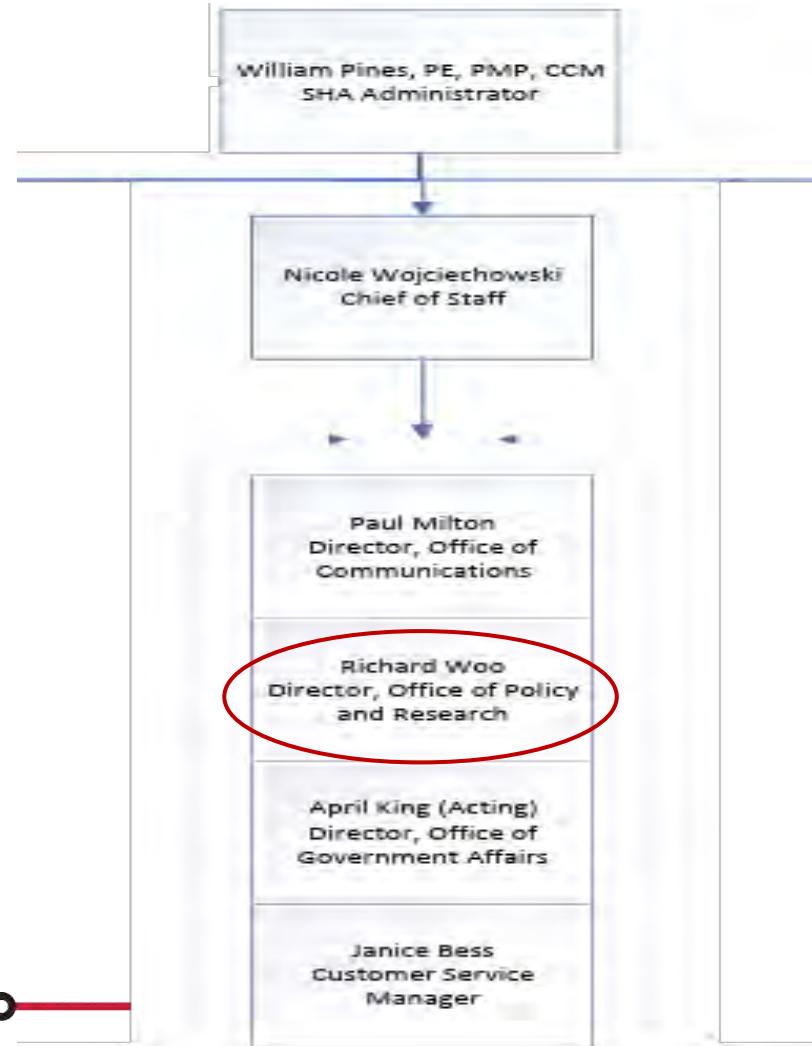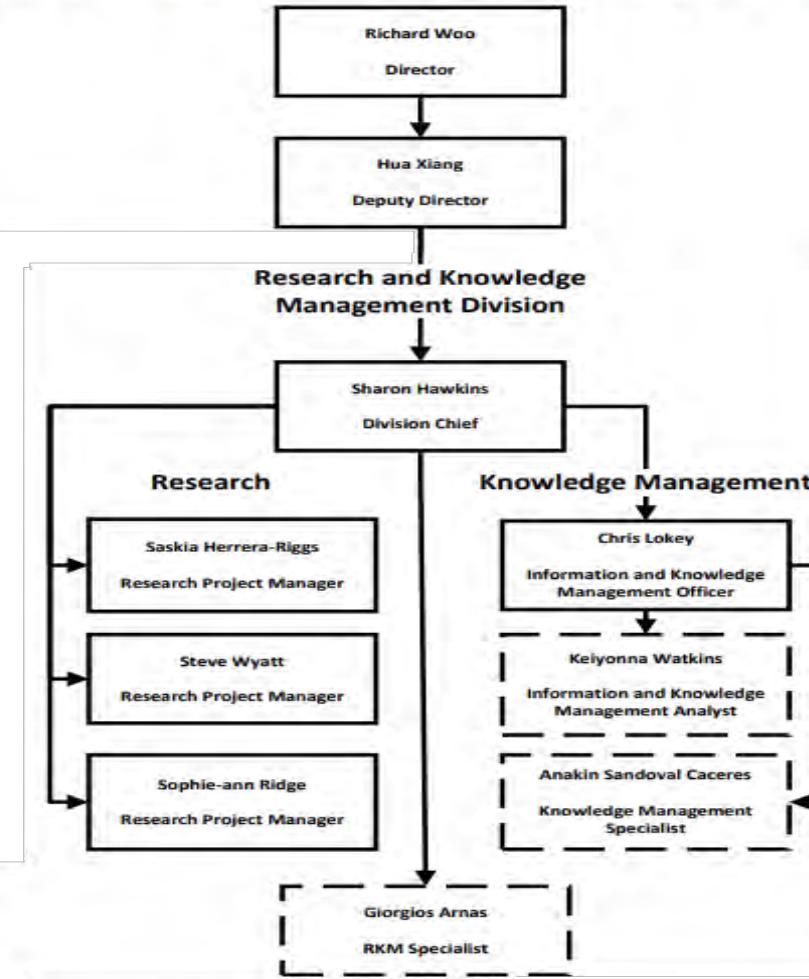
OPR Research Process
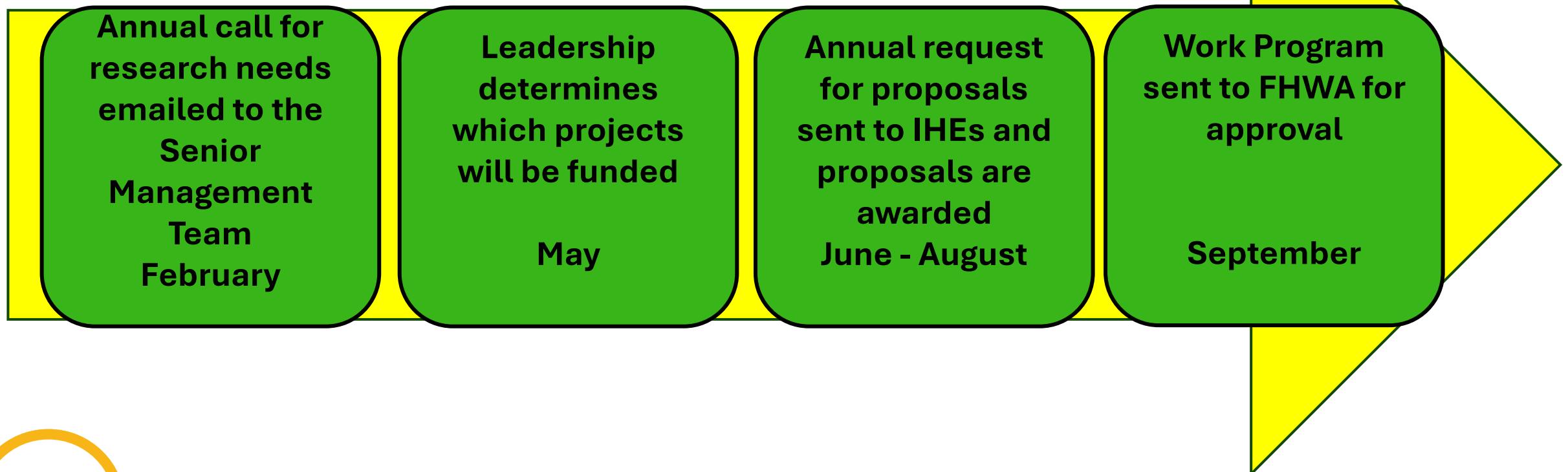
Research Idea Form & RFP Evaluation Form
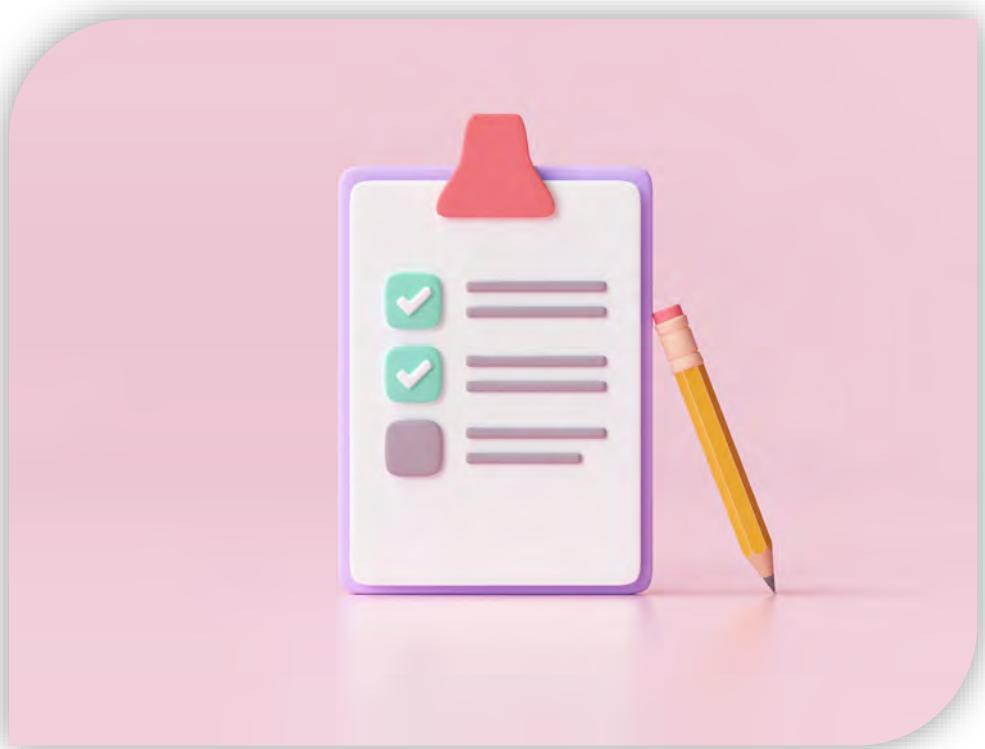
Link to Research Idea Form:
- https://forms.office.com/g/9qyQpY7WDn

- RFP Evaluation Form

Funding Innovation at SHA

- SHA hosts an annual *Innovation Showcase* to highlight and share employee-driven innovations.
- The showcase, now in its third year, was initiated under former Administrator: Tim Smith.
- While there is no dedicated budget for this initiative, SHA continues to provide support through internal resourcefulness and encourages cross-department collaboration.

Promoting and Showcasing Innovation at SHA

SHA's 2025 Innovation Showcase

The showcase is a celebration of the ingenuity and creativity that defines who we are at SHA. It's an opportunity to come together, recognize outstanding achievements, and learn about the innovative ideas and solutions developed by colleagues across our agency.

2025 Innovation Showcase Winners pictured with SHA Administrator Will Pines

SHA's Innovation Challenges and Best Practices

Challenges include limited cross-department sharing of innovations and hesitation to participate in the Showcase due to uncertainty or lack of confidence.
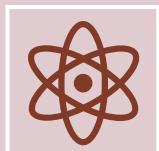
We are working with leadership to increase awareness, clarify participation criteria, and promote a culture that supports experimentation and Collaboration.

Safety Innovation: First Responder Bag

Our District 4 team developed a customized First Responder Bag to address the need for faster, more organized emergency response in the field.

Previously, first aid materials, AEDs, and new bleed control supplies were separated across different locations, slowing response time during critical incidents.

Through collaboration with contracted partners, they designed a portable, easy-to-clean bag that consolidates all life-saving supplies into one system.

The bag features segmented, Velcro-removable compartments for organized, rapid access based on emergency type 4.

¿Questions?

SLOW DOWN

EMERGENCY PATROL

MDOT
MARYLAND DEPARTMENT
OF TRANSPORTATION

traffic.maryland.gov

EMERGENCY PATROL

MDOT
MARYLAND DEPARTMENT
OF TRANSPORTATION
STATE HIGHWAY
ADMINISTRATION

Thank you!

APPENDIX E. MASSDOT – RESEARCH AND INNOVATION

Research and Innovation

Welcome!

- Research Section, Office of Transportation Planning, MassDOT
  - 10 Park Plaza, Suite 4150
- Who are we?
  - Research Manager – Hao Yin (Hao.m.yin@dot.state.ma.us)
  - Transportation Planners
    - Nicholas Zavolas (Nicholas.zavolas@dot.state.ma.us)
    - Patrick McMahon (Patrick.mcmahon@dot.state.ma.us)
    - Mike Flanary (Michael.flanary@dot.state.ma.us)
    - Anil Gurcan (Anil.S.Gurcan@dot.state.ma.us)
    - Austin Sanders (Austion.R.Sanders@dot.state.ma.us)
  - OTP department leadership
    - David Mohler, Executive Director of OTP
    - Steve Woelfel, Deputy Director of Planning

MassDOT Research

- The MassDOT Research and Technology Transfer consists of one manager and five staff. The section is responsible for organizing and managing MassDOT research activities, identifying research needs, and supporting technical trainings. The MassDOT research program has access to an affiliated network of approximately 140 researchers from both in-state and out-of-state institutes.

- MassDOT's Transportation Research and Technology Transfer Section (Research Section) is located in the Office of Transportation Planning (OTP) and oversees MassDOT's transportation research program. It organizes and conducts research in the areas of policy, management, safety, environment, planning, engineering, construction, operations, and maintenance.

SPR II Funding Eligibility

- **23 U.S. Code § 505 - State planning and research**
  - **Research, development and tech transfer activities necessary in connection with the planning, design, construction, management and maintenance of highway, public transportation and intermodal transportation systems**
  - **Study, research and training on the engineering standards and construction materials for transportation systems described above, including evaluation and accreditation of inspection, testing and the regulation and taxation of their use**

Technology Transfer

- **Research projects require tech transfer as part of implementation plan**
- **AASHTO, TRB, UTC**
- **Announcements and Publication of research products**
- **Quarterly Research Newsletter and Research Annual Report**
- **Innovation and Moving Together Conferences**
- **Trainings for Massachusetts municipalities and MassDOT Highway Division**

Research

1. Solicit and Select Research Problem Statements

2. Research Consultant/Contract Procurement

3. Develop the Scope of Work (SOW)

4. Research Contract Award and Execution

5. Conduct Research Investigation

6. Produce Deliverables and Final Report

7. Implement Research Results

8. Track and Measure Research Benefits

Development of a Salt Spreader Controller Program Using Machine-Sensed Roadway Weather Parameters.

- The salt rate prediction model simulation revealed an approximately 18% decrease in salt usage compared to auto grip mode.

- The salt rate prediction model demonstrated efficient performance through cumulative results analysis, particularly during use under moderate to heavy weather conditions and sleet mixed snow weather conditions.

Feasibility of 3D Printing Applications for Highway Infrastructure Construction and Maintenance

- key finding is the swift and precise deposition possibilities that cold-spray can offer in practice.

- MassDOT that will allow use of future AM technologies for structural repair.

National and Regional Collaboration Resources

- Transportation Research Board
    - TRID: literature search
    - TRB publications, webinars
    - Create a mytrb account
- American Association of State Highway and Transportation Officials
    - Research Advisory Committee
    - Nationally recognized Highway standards and specs
    - Web-based training are free – need to create an account
    - Many publications are free, the ones with a cost can be accessed by the using MassDOT AASHTO Library Account
- Transportation Pooled Fund Program
    - Northeast Transportation Research Consortium (NTRC)

APPENDIX F. PENNDOT – NEW JERSEY PEER EXCHANGE – PENNDOT RESEARCH AND INNOVATION

PENNDOT BY THE NUMBERS

40,000 Miles of Roadway

25,400 Bridges

Pennsylvania Department of Transportation

$2.9 Billion Annual Construction Contracts Anticipated For Bid in '25

11,731 Employees 7,095 Maintenance Employees

52 Transit Systems

65 Operating Railroads

3 Ports

120 Public Use Airports

10.2 Million Licensed Drivers & ID Holders

11.8 Million Registered Vehicles

$12 Billion Budget

100.2 Billion Annual Vehicle Miles Traveled*

2,440 Miles of BicyclePA Routes

LB (4 -25)

*Total miles on all PA roadways

Pennsylvania **Department of Transportation**

WHY IT MATTERS?

- Advance the State of the Practice
- Enhance Safety
- Improve Efficiency and Effectiveness
- Address Emerging Challenges
- Inform Decision-Making

- Bureau of Strategic Business Operations

- Focus Areas
  - Continuous Process Improvement and Business Transformation
  - Strategic Planning
  - Policy Development and Review
  - Process Analysis and Improvement Projects
  - Data Analysis and Recommendations
  - Customer Experience Enhancement
  - Support for Innovation Initiatives
  - Foster a Culture of Innovation

INNOVATION AT PENNDOT

- State Transportation Innovations Council (STIC)
- PennDOT Innovations Challenge
- Focus On Innovations Publication
- Internal Initiatives
- Partnerships

- Every Day Counts
  - Launched by FHWA in 2009
  - Supports Innovation To:
    - Reduce Highway Project Delivery Time
    - Enhance Safety
    - Protect the Environment

- # Pennsylvania STIC

  - Created in 2012 to foster ownership and pride in establishing a process in which innovative techniques, products and processes could be evaluated and implemented quickly.

  - PA STIC is co-chaired by PennDOT's Secretary and FHWA's Division Administrator

  - The PA STIC is represented by 28 organizations. This includes state agencies, planning partners, universities, consulting and contractor associations, and local government representatives.

FOCUS ON STIC III

https://www.youtube.com/watch?v=LMOkpsHgQoc

FOCUS ON STIC IV

Development Team Structure
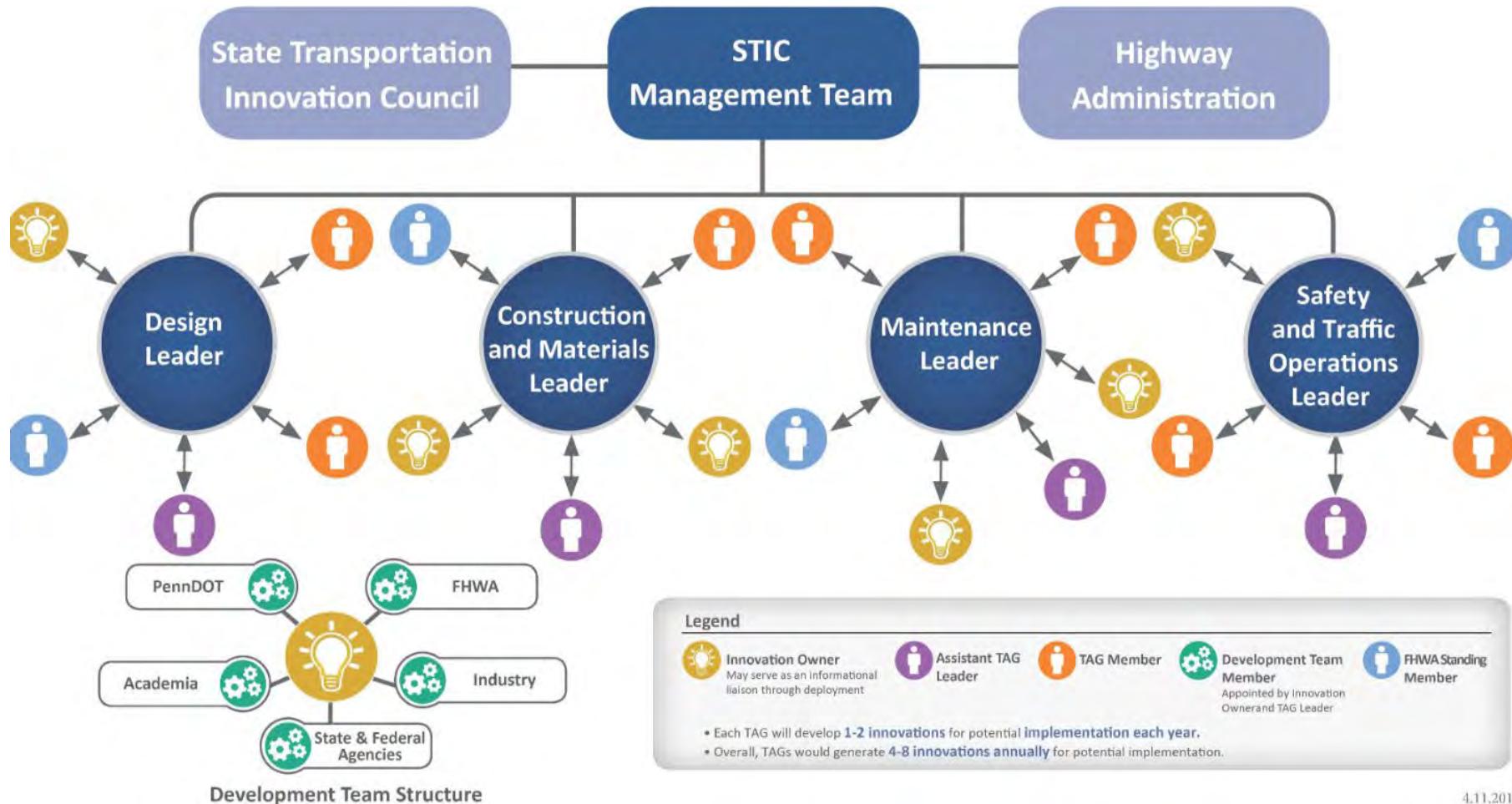
- STIC Outreach Events
  - Regional Innovation Days
  - District Innovation Days
  - Safety Symposiums
  - Local Government Safety Seminar
  - PennDOT Virtual Innovation Days
  - Innovation in Motion Webinars

- Bureau of Planning and Research

- Focus Areas
  - Research and Implementation
  - Data Collection and Analysis
  - Geographic Information Systems
  - Local Technical Assistance Program
  - PennDOT Connects
  - New Products for Lower Volume and Local Roads
  - Policy Support

- Pitt IRISE
  - Impactful Resilient Infrastructure Science and Engineering
- Membership
- Dues

FOCUS ON IRISE II

- Brainstorming
- Scope Preparation
- Member Review and Comment
- Steering Committee Approval
- Project Panels

- Risk Assessments
- Quantifying the Benefits of Highway Infrastructure Research
  - Literature Review
  - Detail Project Examination
  - Impact Areas
  - Benefit Quantification
- Speed to Implementation "?"
- 23 Projects Completed
- Supported 47 Graduate Students

FOLLOW PENNDOT

🌐 www.pa.gov/penndot   🌐 www.pa.gov/dmv

f PennsylvaniaDepartmentofTransportation

𝕏 PennDOTNews   📷 PennsylvaniaDOT

f PennDOTSec   in /company/PennDOT

𝕏 PennDOTSec   ▶ PennsylvaniaDOT

Pennsylvania
Department of Transportation

APPENDIX G. VT AOT – RESEARCH AND INNOVATION

Research and Innovation

NTRC Peer Exchange

June 2025

Where is research and innovation at AOT?

- Research falls under the Policy and Planning & Research Bureau within the Policy, Planning, and Intermodal Development Division
- Innovation is part of the Bureau of Innovation, Learning, & Development (BuILD) within the Finance and Administration Division
  - Continuous Improvement (CI) team within BuILD focuses most on innovation

VERMONT
AGENCY OF TRANSPORTATION
RESEARCH PROGRAM

Innovation Strategic Workforce Committee (SWC)

- New Strategic Workforce Committee at AOT; one of five
- Three subgroups: Framework, Definition, and Learning & Engagement
  - Framework subgroup: developing an approach for moving ideas forward and creating a model for innovation management within AOT
  - Definition subgroup: create a plain language innovation definition that aligns with CI's definition, ensuring clarity and consistency
  - Learning & Engagement subgroup: develop ways to gather and share innovation efforts across AOT

Definitions of Innovation – Continuous Improvement

- Continuous Improvement has a "5 buckets" definition that they are sharing throughout the agency

- Research is just a small part of this definition

Common Language

WHAT IS INNOVATION?

- Knowledge, Science, Research
- Customer Needs
- Invention- Bright new ideas
- Technology
- Radical and Incremental Change
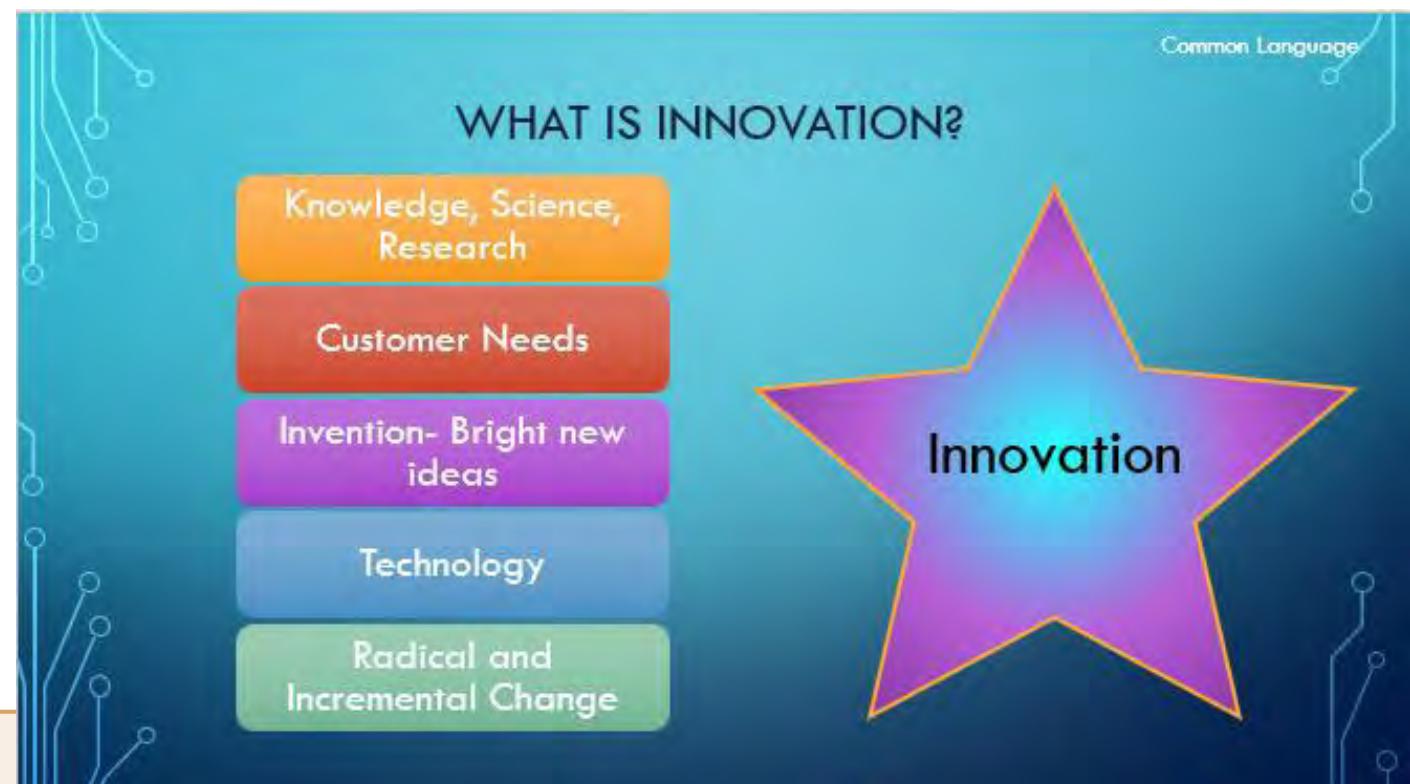
Innovation

Definitions of Innovation – Innovation Strategic Workforce Committee

- The Innovation Strategic Workforce Committee has been focusing on redefining innovation using DRIVES

AOT CULTURE OF INNOVATION

VERMONT
AGENCY OF TRANSPORTATION

D — **DEVELOP** — We cultivate forward-thinking solutions to driver progress and enhance transportation for all Vermonters

R — **Revolutionize** — We breathe new life into our infrastructure and processes, fostering sustainable and modernized systems

I — **INSPIRE** — We empower our teams and communities by sharing bold visions and embracing creative ideas

V — **VALUE** — We uphold the worth of collaboration, inclusivity, and innovation in every step we take

E — **ENACT** — We transform concepts into action, turning potential into impactful, tangible change

S — **SPARK** — We embrace bold ideas, risks, and failures as stepping stones toward sustainable growth and transformative change

VERMONT
AGENCY OF TRANSPORTATION
RESEARCH PROGRAM

Innovation within Research

- There have been 9 years of the VT AOT Research and Innovation Symposium
  - But this is not a joint effort with the BuILD or Continuous Improvement teams

- Research temporarily maintained an Innovation webpage, but this is now outdated
  - We now direct to the State Transportation Innovation Council (STIC) webpage

State Transportation Innovation Council (STIC)

- Research used to manage most STIC projects
- Now Continuous Improvement/Innovation "Chairs" STIC, but the Division Office still reaches Chair and Emily
- We want/need STIC support of annual Research and Innovation Symposium
  - We generally have good support, but requires persistent effort and asking
  - We want their help advertising, soliciting presenters, and sharing innovations

VERMONT
AGENCY OF TRANSPORTATION
RESEARCH PROGRAM

Funding Innovation

- STIC Incentive Awards
- BuILD salaries and budget are part of the Finance and Administrative Division's support of all AOT
- Research salaries are SPR B
  - All Research and Innovation Symposium costs are part of Tech Transfer in our SPR B annual work program (currently $73,000; we have raided this line item for other activities)

VERMONT
AGENCY OF TRANSPORTATION
RESEARCH PROGRAM

Promoting and Showcasing Innovations: Research

- Annual September Research and Innovation Symposium!

- Research is in charge – we spend a lot of time during the year planning

- Current AOT Research funded projects, other Vermont-related projects, STIC projects

- Attendees are typically AOT staff, consultants, universities, etc.

- Posters, technical sessions, plenary session, demos, Symposium Booklet

Promoting and Showcasing Innovation: BuILD

- Solicited front line innovations similar to CO, ID, CA (fancy platform) but limited success with anyone filling out the desired forms
- Now Innovation Strategic Workforce Committee tasked with this
- Innovation is part of Agency culture: SPICE
- New *Building Innovation Culture for Supervisors* training

Best Practices

- Since Research is just a team of two, we're able to move fast and put new ideas into action

- Symposium Booklet was a big innovation last year
  - Idea taken from High Value Research booklet at 2024 Summer RAC Meeting

- Using Utah and Minnesota award categories as Symposium award categories (spark, upgrade, flow)

Innovation of the Year
Recognizes an innovation that *significantly* advances safety, saves costs, advances equity, champions sustainability, and/or improves public service.

Award Categories

Spark Award for Inventive Innovation
Recognizes creativity in developing *novel* processes, tools, or technologies to solve problems and make improvements.

Upgrade Award for Adaptive Innovation
Honors ingenuity, adoption, adaptation, or resourceful problem-solving *using available resources*.

Flow Award for Process Improvement
Recognizes the implementation of a *new or redesigned process* that achieves excellent results.

People's Choice
Innovation nomination that was the most voted on.

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Challenges

- Research and the Continuous Improvement/Innovation team should be more integrated, but they feel separated

- Each group may be defining innovation differently and focusing on different types of innovation

- For example, Symposium could be a joint effort, but it is mainly Research's event

APPENDIX H. NJDOT – UNIVERSITY BASIC AGREEMENT TEMPLATE

BASIC AGREEMENT NO. ==2025XX==

BASIC AGREEMENT

BETWEEN

University Name

AND

THE STATE OF NEW JERSEY

THIS BASIC AGREEMENT ("Basic Agreement") is made as of the_____day

of_____, Two Thousand Twenty-Five, between ==Name of University== located at

==University Address==, and the State of New Jersey, acting through the New Jersey Department of

Transportation ("NJDOT"), located at 1035 Parkway Avenue, Trenton, New Jersey 08625

(collectively the "Parties").

WHEREAS, NJDOT has determined that the tasks or services called for hereunder

will be advantageous to NJDOT and that the existing resources of NJDOT are not available to

perform such services; and

WHEREAS NJDOT is permitted to enter into this Basic Agreement in accordance

with the provisions of N.J.S.A. 27:7-21 and N.J.S.A. 52:34-8 through 11, and New Jersey

Department of Treasury Circular 05-15-OMB; and

WHEREAS the proposals to perform specific tasks and provide specific services

which are submitted by the UNIVERSITY are deemed fair and equitable by NJDOT; and

WHEREAS, the UNIVERSITY is qualified to perform the tasks and provide the

services in said proposals.

NOW, THEREFORE, in consideration of the mutual covenants, terms conditions,

promises and obligations contained herein, which the Parties acknowledge to be good and

sufficient consideration to support this Basic Agreement and bind and obligate the Parties hereto,

the Parties hereto agree as follows:

I. GENERAL PROVISIONS

 A. The attached "General Provisions for Basic Agreement No. 2025XX between University Name and the State of New Jersey, Department of Transportation", (hereinafter referred to as "General Provisions"), are incorporated and made part of this Basic Agreement as if more fully set forth herein.

 B. The UNIVERSITY agrees to furnish the necessary personnel, facilities, and services to such projects as may be set forth in accordance with the General Provisions.

 C. The provisions of this Basic Agreement and the General Provisions attached hereto have been agreed upon by the UNIVERSITY and NJDOT and shall apply to all negotiated Task Orders executed on or after the date of this Basic Agreement, and prior to the termination date of this Basic Agreement. It is further agreed that the provisions of this Basic Agreement and the General Provisions shall be incorporated by reference in each Task Order executed by the UNIVERSITY and NJDOT, and that together, the Basic Agreement, General Provisions, and Task Order shall constitute an agreement to perform such work.

 D. All correspondence with respect to this Basic Agreement shall be directed to the Office of Sponsored Programs at the UNIVERSITY and to the Bureau of Research, Innovation & Information Transfer, Division of Statewide Planning at NJDOT.

II. TASK ORDERS

 A. Task Orders shall be based upon NJDOT initiative and issued in writing by NJDOT. Each Task Order shall be signed by duly authorized representatives of the UNIVERSITY and NJDOT, and shall contain, at a minimum, the following

information:

1. Task Order Number and UNIVERSITY assigned number;

2. Title of Task Order;

3. Description of the Project with complete Statement of Work attached (a copy of the Request for Proposal of NJDOT and the Proposal from the UNIVERSITY shall ordinarily constitute the Statement of Work described herein);

4. Proposed Task Order budget with appropriate Facilities and Administration costs (F&A) and cost ceiling;

5. Method of Payment;

6. Project Account Number and Title;

7. Assistance Listing Number (formerly CFDA Number);

8. Start and completion date for the Task Order;

9. Name and address of the Task Order Project Manager at the UNIVERSITY and the Research Project Manager at NJDOT; and

10. Specific reporting and meeting requirements.

B. The obligations of NJDOT here under are limited to tasks or services which have been negotiated with the UNIVERSITY and have resulted in a Task Order. Both Parties reserve the right to enter into Basic Agreements with other parties for similar services at any time.

C. The NJDOT Bureau of Research, Innovation & Information Transfer shall control and manage the issuance of TaskOrders.

III.   METHOD OF PAYMENT

   A.   NJDOT agrees to reimburse the UNIVERSITY for the performance of each Task Order executed here under on a cost reimbursement or fixed price basis with appropriate Facilities and Administration costs, which shall be specified within the applicable Task Order.

   B.   An application for reimbursement of expenses incurred shall be submitted no more frequently than on a monthly basis and will be prepared and submitted on a State of New Jersey Payment Voucher form ("Vendor Invoice"). Payment shall be limited to the costs specified in the applicable Task Order, or a properly executed modification thereto.

IV.   DISSEMINATION OF INFORMATION

NJDOT desires widespread dissemination of the results of any funded transportation projects under this Basic Agreement and any applicable Task Order. Unless otherwise specified, the UNIVERSITY may therefore publish its research results in professional journals, books, trade publications, or other appropriate media, subject to the General Provisions.

V.   AMENDMENTS AND TERMINATION

   A.   This Basic Agreement shall continue in full force and effect for a period of five (5) years from the date of execution.

   B.   Amendment(s) may be made only in writing and by mutual consent of the parties, except that if the parties fail to agree upon any deletion, amendment, or addition to this Basic Agreement which is required by statute or executive order, this Basic Agreement shall immediately become null and void.

C.	This Basic Agreement may be terminated by either party upon sixty (30) days written notice to the other party.

D.	No deletion, modification, addition, or termination shall affect any agreement previously entered between the parties in which this Basic Agreement, or a portion thereof, has been incorporated by reference.

VI.	AGREEMENT LIMITATIONS

It is understood and agreed by the parties that the execution of this Basic Agreement shall not in any manner provide for or imply any obligation on the part of the UNIVERSITY to accept any specific number of Task Orders, nor does this Basic Agreement provide for or imply any intent on the part of NJDOT to assign any specific number of Task Orders to the UNIVERSITY.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, the parties have caused their duly authorized representatives to execute

this Basic Agreement on their behalf on the year and date designated below.

By submitting this Amendment with electronic signatures, the UNIVERSITY acknowledges that the NJDOT and UNIVERSITY will accept and submit electronic signatures in connection with the submission of this Basic Agreement. Both parties acknowledge the right to opt-out of this arrangement and can request hard copies of the applicable documents to sign and review upon thirty (30) days written notice to the other party. The UNIVERSITY agrees that the NJDOT reserves the right to refuse to conduct other transactions by means of electronic signatures

.   **UNIVERSITY NAME**

                                                      By: _____

                                                              Name:
                                                              Title: Associate Director, Research and
                                                              Sponsored Programs

                                                      DATED: _____

                                                      By: _____

                                                              Name:
                                                              Title:

                                                      DATED: _____

Attest/Witness/Affix Seal: **NJ DEPARTMENT OF TRANSPORTATION**

_____   By: _____
Name   Name
Secretary   Assistant Commissioner
NJ Department of Transportation   Statewide Planning, Safety and Capital Invt

                                                      DATED: _____

Approved as to form only:

Name
ATTORNEY GENERAL OF NEW JERSEY

By: _____
        Name
        Deputy Attorney General

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GENERAL PROVISIONS

FOR

BASIC AGREEMENT NO.

BETWEEN

University

AND

STATE OF NEW JERSEY

DEPARTMENT OF TRANSPORTATION

I. DEFINITIONS

As used in this Agreement, the following terms are defined in the manner indicated below:

A. "Basic Agreement" is the executed agreement between NJDOT and the UNIVERSITY, which shall include these General Provisions, and all modifications and amendments thereto.

B. "Proposal" is a UNIVERSITY'S written response to the Department's solicitation for research services which demonstrates why they believe their UNIVERSITY is the most qualified UNIVERSITY to achieve the Department's objectives. The Proposal includes but is not limited to: qualifications and experience of the key staff; value of research; methodology; task description, duration, schedule, and deliverables; and implementation and training plan.

C. "Task Order" is a supplement to the Basic Agreement authorizing the UNIVERSITY to incur costs for mutually agreed work programs up to the maximum amount specified therein.

D. "Agreement" is the Basic Agreement and any or all Task Orders issued in furtherance thereof.

II.   WARRANTIES

   A.   The UNIVERSITY represents that all persons performing any services under this Agreement shall not, at any time during the period of the Agreement, be an employee of NJDOT.

   B.   The UNIVERSITY represents that it will perform its obligations under this Agreement with the understanding that NJDOT has the right to review all work performed by the UNIVERSITY under the Agreement, and that final acceptance of the work will be based on a review by NJDOT in a timely manner.

   C.   The UNIVERSITY represents that no fee or consideration was given to any person to secure this Agreement, and that none of the key personnel working on the Agreement for the UNIVERSITY were instrumental in developing the Agreement while working for NJDOT.

III.   NON-ASSIGNABILITY

This Agreement may not be assigned, except upon the written consent of the Commissioner of Transportation, or a designee of the Commissioner, on behalf of NJDOT. Any purported transfer or assignment of obligation to this Agreement shall be void without written approval or consent by NJDOT of such transfer.

IV.   SUBCONTRACTORS

   A.   The UNIVERSITY shall be solely responsible for any and all work subcontracted by the UNIVERSITY under this Agreement. The UNIVERSITY shall review the work performed and pay its subcontractors for any work acceptable to the UNIVERSITY. The UNIVERSITY shall submit to NJDOT all subcontracted work and such subcontracted work is to be subject to all legal requirements of this

Agreement including, but not limited to, FAR, 48 CFR Part 31, Subpart 31.2, Contracts with Commercial Organizations; 2 CFR 200, Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards.

B. <u>To the extent permitted by law</u>, the UNIVERSITY agrees to cause its subcontractors to indemnify, defend, and hold harmless both Parties and their employees from and against any and all claims, suits, losses, judgments, costs, and expenses for loss of life, property damage, or bodily injury of any persons whatsoever, which claims shall arise out of, or result from, the work performed by the UNIVERSITY's subcontractors and from negligent acts, errors, or omissions of the UNIVERSITY's subcontractors, or their agents, servants, and employees in the performance of any services in furtherance of the UNIVERSITY's obligations under this Agreement.

C. To the extent permitted by law, the UNIVERSITY shall cause its subcontractors to secure and maintain in full force and effect, during and at least one (1) year after the completion of the services performed, liability insurance as follows:

The UNIVERSITY shall cause its subcontractors to maintain a Commercial General Liability policy as broad as the standard form currently in use in the State of New Jersey, which shall not be circumscribed by any endorsements limiting breadth of coverage. The policy must include endorsements of contractual liability. Commercial General Liability shall be in the amounts of $2,000,000 per occurrence and $5,000,000 in aggregate. UNIVERSITY shall also cause its subcontractors to provide $5,000,000 in umbrella coverage for each occurrence and in aggregate, and Professional Liability not be less than $2,000,000 per claim and $3 million in aggregate. The

UNIVERSITY shall cause its subcontractor to name the NJDOT and UNIVERSITY as an additional insured under all said policies.

1. The UNIVERSITY shall cause its subcontractors to maintain a Comprehensive Automobile Liability policy covering all owned, non-owned, and hired vehicles, with minimum limits of $500,000 per person and $1 million per occurrence for bodily image liability, and $100,000 per occurrence for property damage liability.

2. The UNIVERSITY shall cause its subcontractors to maintain Worker's Compensation Insurance in accordance with applicable laws of the State of New Jersey, and Employers' Liability Insurance shall be maintained with a limit of not less than $1,000,000.

3. The UNIVERSITY shall cause its subcontractors to carry Errors and Omissions, Professional Liability Insurance and/or Professional Malpractice Insurance sufficient to protect the NJDOT and/or the UNIVERSITY from any liability out of professional obligations performed in furtherance of the UNIVERSITY's obligations under this Agreement. This insurance shall be in the amount of $2,000,000 per claim and $3,000,000 in aggregate and in such policy form as prescribed by the New Jersey Department of Banking and Insurance. Should the subcontractor change carriers during the term of this Agreement, the UNIVERSITY shall cause its subcontractor to obtain from its new carrier Errors and Omissions, Professional Liability Insurance and/or Professional Malpractice Insurance carrier an endorsement for retroactive coverage.

4. The UNIVERSITY shall provide to the NJDOT copies of current certificates of insurance for all coverages maintained by its subcontractors, and renewals thereof, which renewed certificates must contain a provision that the insurance renewal shall not be cancelled except after thirty (30) days written notice to NJDOT.

5. In the event the UNIVERSITY fails or refuses to cause its subcontractor to renew any of its insurance policies, or any policy is canceled, terminated, or modified so that the insurance does not meet the requirements of this Agreement, the NJDOT may refuse to make payment of any further monies due under this Agreement or refuse to make payment of monies due or coming due under other agreements between the UNIVERSITY and the NJDOT. During any period when the required insurance is not in effect, the NJDOT may, at its option, either suspend work under this Agreement, or proceed to terminate this Agreement.

D. The UNIVERSITY shall furnish to each subcontractor at least one (1) copy of this Agreement and Scope of Work from the Proposal.

E. The UNIVERSITY agrees that the following clause shall be inserted and made part of all subcontracts related to this Agreement:

> "All applicable provisions of the Agreement between NJDOT and the University shall be incorporated and made part of this subcontract."

F.   The Parties agree that NJDOT shall pay to the UNIVERSITY for expenditures incurred after the execution of a Task Order, in accordance with the provisions of Article X, Terms of Payment, for subcontract that are included in the proposal and accepted by NJDOT. Expenditures for subcontracts shall not exceed theamount shown for subcontractor expenses in the Proposal unless mutually agreed to in writing by NJDOT and UNIVERSITY.

G.   The Parties agree that, for those subcontracts which have been identified in the Proposal, but which have not been accepted by NJDOT prior to the effective date of a Task Order, NJDOT shall pay the UNIVERSITY for eligible expenditures incurred after the effective date of the subcontract. Expenditures for subcontracts shall not exceed the amount specified for subcontractor expenses in the Proposal.

H.   The Parties agree that, should it become necessary to subcontract a portion of the services contained in this Agreement after the execution of a particular Task Order, NJDOT shall decide whether the work performed under such subcontract will be considered Additional Work or Extra Work, subject to the conditions stated herein.

I.   NJDOT will not honor claims made by the UNIVERSITY for the reimbursement of expenditures which were incurred for work performed by a subcontractor prior to the effective date of the subcontract.

J.   The purchase of expendable materials and supplies is not considered a subcontract under this provision. Such purchases are addressed under Article X.D. of these General Provisions.

V.   LAWS

    A.   The Parties agree that this Agreement shall be governed by all relevant laws, rules, and regulations of the United States and the State of New Jersey including, but not limited to, the New Jersey Tort Claims Act, N.J.S.A. 59:1-1 to 12-3., and the New Jersey Contractual Liability Act, N.J.S.A. 59:13-1 to-10.

    B.   The UNIVERSITY agrees that any work performed under this Agreement shall comply with N.J.S.A. 52:32-1 and N.J.S.A. 53:33-1 to 33-4, which, except as expressly provided therein, provides that NJDOT shall make provisions in the specifications for all agreements for which NJDOT pays any part of the cost that only manufactured and farm products of the United States, whenever available, shall be used in such work.

    C.   Regulations of the USDOT relative to nondiscrimination in Federally assisted projects of the USDOT (49 CFR Part 21) are made part of this Agreement by reference.

    D.   The New Jersey Department of Transportation Code of Ethics for Vendors is made part of this Agreement by reference.

    E.   Lobbying Restrictions are made part of this Agreement by reference.

    F.   FAR, 48 CFR Part 31, Subpart 31.2, Contracts with Commercial Organizations, is made part of this Agreement by reference.

    G.   2 CFR 200, Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards

    H.   State of New Jersey, Department of Treasury Circular 15-08-OMB, Single Audit Policy for Recipients of Federal Grants, State Grants, and State Aid, is made part of this Agreement by reference.

VI.   REVIEWS

    A.   The UNIVERSITY shall periodically and at reasonable times allow representatives of NJDOT to visit the offices of the UNIVERSITY to monitor the work performed under this Agreement for the duration thereof.

    B.   NJDOT shall, within a reasonable time, review and act upon all working documents that are submitted by the UNIVERSITY as required by this Agreement.

VII.   MODIFICATION

    A.   The Parties agree that any modification to the scope of work, cost, or any other change to the Basic Agreement shall be negotiated and written in a proposal by the UNIVERSITY and documented by a modification to the Basic Agreement on NJDOT's Form DC-45A, which will be issued by NJDOT.

    B.   The Parties agree that the Basic Agreement may be terminated by either party after thirty (30) calendar days' written notice to the other party. If either NJDOT or the UNIVERSITY terminates the Agreement, NJDOT agrees to reimburse the UNIVERSITY for costs incurred as set forth under Article X, Terms of Payment.

    C.   The UNIVERSITY shall not begin work on a Task Order modification until it receives an executed copy of the Form DC-45A from NJDOT.

    D.   NJDOT shall pay the UNIVERSITY in accordance with the provisions of Article X, Terms of Payment, for accepted Task Order modifications. Task Order modifications may be issued for any of the following:

        1.   ADDITIONAL WORK. Any additional work or services arising from any or all of the following:

            a.   Services negotiated by the UNIVERSITY and NJDOT which were not anticipated at the time the Basic Agreement was first executed.

b. Items of work appearing in the Proposal which require an increase in quantity of service only; or

c. Items of work which were delineated in the Proposal but could not be estimated at the onset of the Basic Agreement.

2. EXTRA WORK. Work performed outside the original scope or limits of project work but connected with the project. Extra Work modifications provide funding for new studies or services, not for more work on existing studies or services.

3. OVERRUN. Any additional cost incurred under the Basic Agreement by the UNIVERSITY beyond the ceiling amount. The additional cost was neither defined in the Proposal, nor negotiated between the UNIVERSITY and NJDOT, nor accepted by NJDOT. NJDOT shall neither accept or pay for overruns.

4. REDUCTION. A decrease of work mutually negotiated by the UNIVERSITY and NJDOT in the work or services appearing in the Proposal.

5. TERMINATION. The mutual discontinuance of the work or services appearing in the Proposal after which payment shall cease.

VIII. PAYMENT VOUCHERS

A. The UNIVERSITY shall prepare all Payment Vouchers for payment of services performed under the Basic Agreement on State Payment Voucher forms that will be supplied by NJDOT.

B. Each Payment Voucher shall conform to the approved accounting and billing system described in the Request for Proposal, and shall contain at a minimum the

following:

1. A project identification number and, when applicable, the Agreement Modification number;

2. The Task Order number and name;

3. The billing period covered by the Payment Voucher;

4. A Statement of Expenditures that includes detailed information relating to:

   a. Salary expenses;

   b. Fringe Benefit percentages and amounts;

   c. Other Direct Expenses, including Non-Salary Direct Expenses and Subcontractor Expenses; and

   d. Facilities and Administrative Costs (Indirect Expenses).

5. The total accepted cost of the Task Order; and

6. An Account Summary Report, along with a budget status report, to document personnel and other direct expenses authorized under the Task Order. All direct expense receipts shall be and retained at the UNIVERSITY for review and audit persons.

C. The Final Payment Voucher shall be prepared in accordance with the provisions of Article XV, Final Payment Voucher.

IX. WAGE RATES

The wage rates and titles delineated in the Proposal for UNIVERSITY staff working directly on the Basic Agreement, and any Task Order issued in furtherance thereof, shall be used for all invoices and payments, whether for approved EXTRA WORK, ADDITIONAL WORK, approved Overtime, straight time services, or otherwise, and shall be subject to review and approval by NJDOT. In the case of rates for either new staff or

increases beyond the ranges previously approved in the Proposal for a specific classification, other than annual cost of living and merit increases which are granted under UNIVERSITY labor bargaining agreements, the UNIVERSITY shall obtain NJDOT acceptance in advance of billing those new rates.

X.   TERMS OF PAYMENT

A.   Consideration – Both Parties agree that the negotiated amounts in any Task Order, excluding any amounts for modifications, are as stated in the approved Proposal. The actual costs of the Agreement, both direct and indirect, shall be those which are allowable under the provisions of 2 CFR 200, Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards, and as may be further governed by the policies and practices of the State of New Jersey which pertain to the payment of contracts. When a commercial organization is used as a subcontractor, their actualcosts shall be determined in accordance with FAR, 48 CFR Part 31, subpart 31.2, Contracts with Commercial Organizations.

B.   Personal Services – NJDOT agrees to reimburse the UNIVERSITY for costs incurred for personal services which the UNIVERSITY has performed, and which are in accordance with the provisions of the Proposal. NJDOT agrees to make such payments:

1.   Up to the amount agreed in the approved Proposal;

2.   No more frequently than on a monthly basis or less frequently than on a quarterly basis;

3.   Subject to audit;

4.   Within a reasonable time of receipt of payment vouchers properly drawn; and

5. For the portion of Payroll, Fringe Benefit, and Facilities and Administrative Costs (Indirect Costs) as follows:

    a. Direct actual straight time compensation (including tuition)provided to staff for time expended during the billing period will bepaid at a rate not to exceed that in the approved Proposal, other than annual cost of living and merit increases which are granted under UNIVERSITY labor bargaining agreements.

    b. Premium wages will be paid to the staff for time expended during the billing period, for overtime authorized by NJDOT, at a rate not to exceed one-half (1/2) of the accepted proposal wage rates, provided that the UNIVERSITY pays such premium to these staff personnel.

    c. An amount to cover the cost of Fringe Benefit and Facilities and Administrative (Indirect Costs) for interim billing is to be calculated by using the present actual rate, applied to the appropriate bases, and upon final audit, adjusted to either the present actual rate, or, in lieu of actual rates, the final negotiated rates approved by the cognizant federal agency.

C. Retainage – The Parties agree that retainage shall not be withheld under the provisions of this Agreement.

D. Travel Reimbursement - The UNIVERSITY shall submit for reimbursement of travel expenses in accordance with 2 CFR 200 or in accordance with all State and Federal laws. The NJDOT agrees to pay such expenses as allowed by the laws applicable to this Agreement.

E.   Other Direct Expenses – NJDOT agrees to pay to the UNIVERSITY those expenses incurred which are chargeable and peculiar to the Agreement and specifically included in the approved Proposal. NJDOT agrees to make such payments:

1.   For items such as Non-Salary Direct Expenses and expenses related to State-approved subcontracts;

2.   No more frequently than on a monthly basis or less frequently than on a quarterly basis;

3.   Up to the amount specified in the Proposal;

4.   At the cost incurred and not subject to retainage; and

5.   Within a reasonable time of receipt of Payment Vouchers properly drawn.

F.   Modifications – When authorized in writing, NJDOT agrees to pay the UNIVERSITY for ADDITIONAL WORK, EXTRA WORK, WORK REDUCTION, or WORK TERMINATION modifications:

1.   Up to the amount stated on NJDOT Form DC-45A.
2.   No more frequently than on a monthly basis or less frequently than on a quarterly basis.

3.   Within a reasonable time of receipt of Payment Vouchers properly drawn.

XI.   RECORDS

A.   The UNIVERSITY shall maintain all records relating to negotiations, preparation, and costs incurred during the performance of the Agreement. Such records shall include, but are not limited to, forms, papers, accounting records, and any other evidence pertaining to costs, and shall be available at the offices of the UNIVERSITY at all reasonable times for inspection by any authorized representative of the Federal Government or NJDOT. Copies of such records shall

be furnished, if requested. Following the passage of three (3) years from the payment of the Final Payment Voucher for a specific Task Order, the UNIVERSITY shall notify NJDOT of its intention to dispose of such Task Order records. NJDOT shall either concur with the disposal request or direct that the Task Order records be forwarded to NJDOT for storage.

B.   Documents prepared under the Agreement, including basic notes, sketches, and other pertinent data, except as noted in XI.A. above, shall, at the request of NJDOT, be delivered to and become the property of NJDOT without restriction to their further use. The UNIVERSITY shall not be responsible for the use of these documents or data on any project other than that which is defined in the Agreement. The documents requested shall be provided to NJDOT prior to the payment of the Final Payment Voucher. The UNIVERSITY may retain and use copies of all such documents and data.

C.   All technical data in regard to the Agreement, whether existing in the offices of the UNIVERSITY or existing in the offices of the NJDOT, shall be made available to either Party to the Agreement without expense to the other party.

XII.   <u>TIME OF THE ESSENCE</u>

All time limits stated in this Agreement are of the essence.

XIII. <u>WORK DELAYS</u>

In the event that any Party is delayed or hindered in or prevented from the performance of any act required hereunder by reason of strikes, lockouts, labor troubles, unavailability or excessive price of fuel, power failure, riots, insurrection, war, terrorist activities, chemical explosions, hazardous conditions, fire, weather, pandemic, epidemic, acts of government or acts of God, or by reason of any other cause beyond the exclusive and reasonable control of

the Party delayed in performing work or doing acts required under the terms of this Agreement, then performance of any such act shall be extended for a period equivalent to the period of such delay.

XIV. COMPLETION

    A.   Completion of the Agreement shall be represented by acceptance of a Final Project Report by NJDOT and, where applicable, the supporting Federal agency.

    B.   The UNIVERSITY shall deliver the final draft project report a minimum of ninety (90) calendar days prior to the completion date specified in the Agreement. NJDOT shall accept or reject the draft final project report a minimum of thirty (30) calendar days prior to the completion date specified in the Agreement. If not accepted, NJDOT shall cite the reason(s) for disagreement at the time.

    C.   Upon acceptance of the draft final project report, NJDOT shall notify the UNIVERSITY in writing that NJDOT shall either perform an audit of the costs previously incurred or defer audit or later scheduling. If the audit is deferred for later scheduling, NJDOT shall, in writing, authorize the UNIVERSITY to submit a Final Payment Voucher for processing and payment.

    D.   The UNIVERSITY shall, when it appears that a specified completion date cannot be met, request, in writing, an extension of the Agreement completion date not less than two months prior to the scheduled completion date.

    E.   NJDOT shall not compensate the UNIVERSITY for work performed after an Agreement completion date unless the UNIVERSITY has been given an approved time extension on an NJDOT Form DC-45A.

XV. AUDITS

A. The UNIVERSITY shall provide NJDOT with a copy of the fiscal year, organization-wide Single Annual Audit that has been conducted in accordance with the requirements of OMB Circular A-133.

B. NJDOT, or designated agents of NJDOT, shall be entitled to perform Agreement audits:

1. At any reasonable time prior to, during, or at the completion of the Agreement.

2. During a period of up to three (3) years after either date of payment of the Final Payment Voucher, or a date mutually agreed beyond that point of time.

C. Both Parties agree that changes in payments due to the UNIVERSITY resulting from Agreement audits performed by NJDOT shall be made as follows:

1. In the event an overpayment is received by the UNIVERSITY, the UNIVERSITY shall refund the amount of any such overpayment within thirty (30) days of the request by NJDOT. NJDOT may elect to deduct such overpayment amounts from the monies due the UNIVERSITY under the terms of the Agreement to which the overpayment applies.

2. In the event of underpayment by NJDOT, NJDOT shall pay to the UNIVERSITY sufficient funds to correct the underpayment.

D. Both Parties agree that the actual costs of the Agreement, both direct and indirect, shall be those which are allowed by the provisions of 2 CFR 200, Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards and as may be further governed by the policies and practices of the State of

New Jersey which pertain to payments ofcontracts. When a commercial organization is

used as a subcontractor, their actualcosts shall be determined in accordance with FAR 48

CFR Part 31, Subpart 31.2, <u>Contracts with Commercial Organizations</u>.

XVI.   <u>FINAL PAYMENT VOUCHER</u>

A.   A Final Payment Voucher shall be submitted by the UNIVERSITY within 90 days

after termination of the applicable Task Order and the UNIVERSITY will expect

payment of its final payment voucher with the provision that the UNIVERSITY

would be responsible to refund any amounts subsequently disallowed by any audit

performed on behalf of NJDOT.

B.   The UNIVERSITY shall include on the Final Payment Voucher the following

clause:

> "In consideration of the requested payment of this Final
> Payment Voucher, the UNIVERSITY hereby releases the
> State of New Jersey Commissioner of Transportation and
> his/her agents from all claims and liability for work done or
> services performed by the UNIVERSITY under Agreement
> No. 2025RU, Task Order No.___."

C.   The payment of the Final Payment Voucher to the UNIVERSITY for services

rendered under the terms of the Agreement does not waive either the right of

NJDOT to establish adjustments or collect overpayments which are disclosed by

agreement audits performed subsequent to payment of the Final Payment Voucher,

or the right of the UNIVERSITY to collect underpayments based on adjustments

disclosed by said agreement audits, subject to the Agreement ceiling limitations.

XVII.   <u>PROPRIETARY RIGHTS</u>

All rights accruing from patentable discoveries or inventions resulting from research

described by the Agreement and referenced documents shall be reserved exclusively to the

UNIVERSITY. Notwithstanding this reservation of rights, the UNIVERSITY hereby

grants to NJDOT, to all State Highway and Transportation Departments, and to the United

States Government an irrevocable, non-exclusive, non-transferable, and royalty-free

license to practice such inventions and to manufacture, use, and dispose of any article or

material, and to use any method that may be developed as a part of the work under the

Agreement.

XVIII. <u>PATENT COSTS</u>

The UNIVERSITY shall bear both the costs of preparing disclosures, reports, and other

documents that may be required in the performance of searching the art to the extent

necessary to make such invention disclosures, and the costs of preparing documents

relating to patents and any other patent costs, in connection with the filing of patent

applications.

XIX. <u>EQUIPMENT AND INSTRUMENTATION</u>

A.   The UNIVERSITY certifies that non-expendable equipment items in excess of

$10,000.00 per acquisition costs will not be included in the Facilities and

Administrative (Indirect Costs) that are approved by the Agreement.

B.   Title to such equipment and instrumentation shall be in accordance with 2 CFR

200.313 (c), (d), (e)

XX. <u>DISSEMINATION OF INFORMATION</u>

A.   The UNIVERSITY shall bear all costs of publication beyond the identified

requirements of the Agreement and such costs shall not be charged to NJDOT under

this or any other agreement. Any copy of material published under this clause must

contain the following: an acknowledgment of the sponsorship of the research efforts

by NJDOT; a disclaimer stating that the published material represents the position

of the author(s) and not necessarily that of NJDOT; and that the report does not

constitute a standard, specification, or regulation.

B.   Since one of the primary objectives of a university is the dissemination of knowledge, the UNIVERSITY cannot accept grants or contracts for researchwhich, under any nomenclature, preclude open disclosure of research results. The source of sponsorship and the purpose of all projects must be of such nature that they can be publicly announced and described. A sponsor may not determine the contents of any publication reporting the results of research.

C.   The UNIVERSITY will not enter into any agreement with a research sponsor that restricts the faculty's or staff's right to publish research results, with the following exceptions:

1.   If requested, the UNIVERSITY will agree to neither disclose nor publish, without the sponsor's approval, any confidential information furnished by the sponsor. The UNIVERSITY will also not reveal to others specific applications of theresults of research and operations of the sponsor.

2.   If requested, the UNIVERSITY will agree to provide the sponsor with a copy of any report or manuscript containing research results, when first available and prior to publication but not for the purposes of prior review.

3.   If requested, the UNIVERSITY will agree to delay publication of information concerning an invention for a period of not more than 90 days from the date the principal investigator submits the material intended for publication to the sponsor, or until a U.S. Patent application has been filed, whichever is the shorter interval of time. In the case of governmental sponsors, publications may be delayed for a period of six months for reasons of public policy. It is understood that a sponsor may waive a previously

agreed-upon delay period and permit immediate publication. The submission and cataloging of any thesis or dissertation prepared by a graduate student in fulfillment of an academic degree requirement shall ordinarily be exempt from any delay or review requirements requested by the sponsor.

XXI. <u>KEY PERSONNEL</u>

A.   The personnel specified in the Proposal as Key Personnel are considered to be essential to the work proposed.

B.   The list of Key Personnel, as shown in the Proposal, may, with the written consent of the NJDOT, be amended during the course of the Agreement to either add or delete personnel, as appropriate. Prior to replacing any of the Key Personnel working on the Agreement, the UNIVERSITY shall notify the NJDOT Research Project Manager sufficiently in advance, and submit justification indicating proposed substitutions, accompanied by resumes and other background material to the same degree of detail as provided in the original Proposal, so as to permit an adequate evaluation of the impact on the Agreement. No replacement of Key Personnel shall be made by the UNIVERSITY without prior written consent of NJDOT.

XXII. <u>REPORTING</u>

A.   One copy of the monthly or quarterly progress report will be furnished to the Research Project Manager by the UNIVERSITY no later than the fifteenth day of the month following the end of the reported period. Each progress report shall contain, at a minimum, the following information:

1.   Title and number of Task Order.

2.   Date ending period being reported.

3.   Name, title, and address of the UNIVERSITY Program Manager.

4.   Name, title, and address of the NJDOT Research Project Manager.

5.   Progress made during the reporting period.

6.   Problems encountered which could adversely affect the performance of the work.

7.   Estimate of the percentage of the total work completed.

8.   Estimate of costs incurred with respect to the following categories:

     a.   Salary charges for the period.

     b.   Non-Salary Direct Expenses for the period.

     c.   Total of a. and b.

     d.   Accumulated total of a. and b. since the beginning of work.

B.   Unless otherwise specified, an original and three (3) copies of the Final Project Report shall be submitted to the NJDOT Research Project Manager. However, a Task Order may contain different publication requirements depending on the specific work assignment. The Final Project Report shall contain, at a minimum, the following information:

1.   Front cover with title, author(s), organization, date, and a statement that recognizes the funding agencies.

2.   Technical Report Standard Title Page.

3.   Appropriate disclaimer statements.

4.   Table of Contents, List of Figures, and List of Tables.

5.   Texts and Appendices.

6.   Acknowledgments, as appropriate.

7.   Footnote References.

8. Back Cover.

XXIII. <u>MISCELLANEOUS</u>

    A.   <u>NOTICES</u>. Unless otherwise provided, whenever written notice is required under

this Agreement, it shall be directed as follows:

> If to the NJDOT:
> New Jersey Department of Transportation
> 1035 Parkway Avenue
> Trenton, NJ 08625
> <u>Attn</u>: Manager, Bureau of Research,
> Research.Bureau@dot.nj.gov

> If to the UNIVERSITY:

> Contact
> Address

With Copy to:

> Name
> Address
> Contact Information

    B.   <u>CAPTIONS</u>. The captions appearing in this Agreement are inserted and included

solely for convenience and shall not be considered or given effect in construing this

Agreement or its provisions, or in connection with the duties, obligations, or

liabilities of the Parties, or in ascertaining intent if a question of intent arises.

    C.   <u>ENTIRETY OF AGREEMENT.</u> This Agreement represents the entire and

integrated agreement between the Parties and supersedes all prior negotiations,

representations, and agreements, whether written or oral. The doctrine that a

document is to be construed against its preparer does not apply to this Agreement and cannot be utilized with reference to any claim or dispute arising out of or relating to this Agreement.

D.   SUBJECT TO FUNDING. All payment obligations of the NJDOT under this Agreement are subject to appropriations and the availability of funds, including the NJDOT's discretionary allocation thereof.

E.   NO THIRD-PARTY BENEFICIARIES. This Agreement does not create in any individual or entity the status of third-party beneficiary, and this Agreement shall not be construed to create such status. The rights, duties, and obligations contained in this Agreement shall operate only between the Parties and shall insure solely to the benefit of the Parties. The provisions of this Agreement are intended only to assist the Parties in determining and performing their obligations under this Agreement. The Parties intend and expressly agree that only the Parties shall have any legal or equitable right to seek to enforce this Agreement or to seek any remedy arising out of a Party's performance or failure to perform any term or condition of this Agreement.

F.   NO PERSONAL LIABILITY. No official, employee, agent, consultant, contractor, or subcontractor of the NJDOT shall be personally liable to the UNIVERSITY and/or its employees, agents, contractors, or subcontractors under any term or provision of this Agreement or because of its execution or attempted execution or because of any breach or attempted or alleged breach of this Agreement.

G.   GOVERNING LAW. This Agreement and the rights and obligations of the Parties shall be interpreted, construed, and enforced in accordance with the laws of the State of New Jersey including, but not limited to, the New Jersey Contractual

Liability Act, N.J.S.A. 59:13-1 to-10. and the New Jersey Tort Claims Act, N.J.S.A. 59:1-1 to- 12- 3.

H.   DISPUTE RESOLUTION. If there are disagreements or disputes between the Parties concerning this Agreement, the Parties' agency heads or their duly authorized representatives agree to confer to resolve the disagreement or dispute. A "duly authorized representative" for the purpose of this Agreement is defined as a person who has been designated in writing by a Party as having actual authority to sign documents on behalf of the Party.

I.   PRESS CONFERENCES. The Parties agree that if either Party deems it advisable to hold a press conference concerning the work in progress or accomplished, the other Party shall be notified in advance and shall have the right to participate in such press conference or, where reasonably appropriate, request that such press conference not be held.

J.   SEVERABILITY.   Should any term or provision of this Agreement, or any application thereof to, be judicially determined to be invalid or unenforceable to any extent, the remainder of this Agreement shall not be affected thereby, and the balance of the terms and provisions of this Agreement shall be valid and enforceable to the fullest extent permitted by law. The Parties may renegotiate the terms affected by the severance.

K.   AUTHORITY. By execution of this Agreement, the Parties represent that they are duly authorized and empowered to enter into this Agreement and to perform all duties and responsibilities established in this Agreement.

L. COUNTERPARTS. This Agreement may be executed as duplicate original counterparts, with one (1) original counterpart being retained by each Party, and all such counterparts shall together constitute but one and the same instrument.

M. USE OF ELECTRONIC SIGNATURES. By submitting this Agreement with electronic signatures, the UNIVERSITY acknowledges that the NJDOT and the UNIVERSITY will accept and submit electronic signatures in connection with the submission of this Agreement, including any amendment or Task Order in connection therewith. Both Parties acknowledge the right to opt-out of this arrangement and can request hard copies of the applicable documents to sign and review upon thirty (30) days written notice to the other Party. The UNIVERSITY agrees that the NJDOT reserves the right to refuse to conduct other transactions by means of electronic signatures.

N. EFFECTIVE DATE. This Agreement shall become binding upon the Parties hereto on the date of execution by the Commissioner of Transportation, or his duly appointed representative.

APPENDIX I. NJDOT – GUIDELINES FOR PREPARING NJDOT RESEARCH FINAL REPORTS AND TECH BRIEFS

FHWA-NJ-20XX-00X

BUREAU OF RESEARCH, INNOVATION & INFORMATION TRANSFER

**Guidelines for Preparing
NJDOT Research Final Reports and Tech Briefs
FINAL REPORT**

February 2023

Submitted by

Jane Doe Ph.D.
Professor of Engineering
XYZ University

John Doe Ph.D.
Professor of Engineering
XYZ University

Bob Doe Ph.D.
Professor of Engineering
XYZ University

NJDOT Research Project Manager
Name

In cooperation with

New Jersey
Department of Transportation
Bureau of Research
And
U. S. Department of Transportation
Federal Highway Administration

DISCLAIMER STATEMENT

"The contents of this report reflect the views of the author(s) who is (are) responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the New Jersey Department of Transportation or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation. "

All font on this page, except for the title, shall be Arial 12 point, normal spacing, non-bold with full page justification.
The title shall be Arial 12 point font, all capitals, bold and centered on page.

For projects being done for NJDOT this statement can be used verbatim.
For projects being done for NJ Transit or NJ Motor Vehicles Commission the language must be adjusted accordingly.

No page number

Please use template supplied by NJDOT

TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. FHWA NJ-20XX-0XX	2. Government Accession No. *Leave Blank*	3. Recipient's Catalog No. *Leave Blank*
4. Title and Subtitle **FINAL REPORT** Enter title and subtitle (use mixed case with initial caps for first word in title and subtitle) with volume and part numbers, if applicable.		5. Report Date Enter same date as report cover, month and full year: January 2017
		6. Performing Organization Code Enter any/all unique numbers assigned to the performing organization, if applicable.
7. Author(s) Enter name(s) of person(s) responsible for writing the report, performing the research, or credited with the content of the report. Form of entry is first name, middle initial (if applicable), last name, and any additional qualifiers. Primary author is listed first.		8. Performing Organization Report No. Enter any/all unique alphanumeric report numbers assigned by the performing organization, if applicable.
9. Performing Organization Name and Address Enter the name and address of the organization(s) performing the research.		10. Work Unit No. *Leave Blank*
		11. Contract or Grant No. NJDOT Contract ID Number
12. Sponsoring Agency Name and Address Federal Highway Administration (SPR) 1200 New Jersey Avenue, SE Washington, DC 20590 New Jersey Department of Transportation (SPR) 1035 Parkway Avenue, P.O. Box 600 Trenton, NJ 08625.0600		13. Type of Report and Period Covered Final Report, Month Year – Month Year
		14. Sponsoring Agency Code FHWA, NJDOT
15. Supplementary Notes Conducted in cooperation with the U.S. Department of Transportation, Federal Highway Administration. Please provide Transportation Research Center information and volume information (subtitles, volume #, etc.), if applicable.		
16. Abstract Enter a brief factual summary of the most significant information, including the purpose, methods, results, and conclusions of the work. When appropriate, the abstract should include advice on how the results of the research can be used. For guidance, please see ANSI/NISO Z39.14-1997 (R2015) Guidelines for Abstracts (http://www.niso.org/apps/group_public/project/details.php?project_id=124). **For this page only, use 12 point font. Utilize 250 words or less for the abstract.** In **box 21. No. of Pages:** Please provide the total number of pages of the entire document including cover, front matter, body, references and appendix.		
17. Key Words Enter words, terms, or phrases that identify important topics in the report. When possible, terms should be selected from the Transportation Research Thesaurus (TRT) (http://trt.trb.org) in addition to terms not found in the TRT.	18. Distribution Statement No restrictions.	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages #	22. Price Leave blank

Form DOT F 1700.7 (8-72)   Reproduction of completed page authorized

Page number **i** not shown

ACKNOWLEDGEMENTS

The author(s) wish to acknowledge the customer(s), *list their name(s) here*, without whom this project would not have been possible.

All font on this page, except for the title, shall be Arial 12 point, normal spacing, non-bold with full page justification.
The title shall be Arial 12 point font, all capitals, bold and centered on page.

The acknowledgement may also include the names of students, other agencies, members of the Technical Advisory Panel (TAP) members, managers of stakeholder bureaus, and FHWA

Center page number 0.5" from bottom and use Arial 12 point font, non-bold. Please use lower case Roman numerals for page numbering materials prefatory to the beginning of the main body of the report.

TABLE OF CONTENTS

FIRST-LEVEL HEADING (all capitals, boldfaced)
    Second-Level Heading (initial capitals, boldfaced) *
        Third-Level Headings (initial capitals, boldfaced, italic)
            Fourth-Level Heading (initial capitals)
                Fifth-Level Heading (initial capitals, italic)

* Indent 0.3" or 3 spaces for each level of header

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

The pages within this final report example, provide guidelines, for the creation of a NJDOT Research Final Report, Form DOT F 1700.7 (8-72) Technical Report Document Page (includes abstract) and Tech Brief. This guide provides consistence of style to the final reports and tech briefs that appear on the Research web site and are distributed throughout the State and across the Nation.

According to the principles of scientific or technical writing, the report must tell a story that summarizes the research effort. The Research Final report body should contain the following:

- **Executive Summary** – Complete, concise summation of the Background (problem), Objectives, Research Approach, Summary of work performed, data collected, and analyses performed and the distilled results, and Conclusions and Recommendations
- **Background** – A summary of the problem or reasons for conducting the research
- **Objectives** - the criteria of "success" for this particular research study
- **Introduction** – The research approach to the problem
- **Summary of the Literature Review** – what lessons from the review of the literature affected the research approach
- **Summary of the work performed** - data collected, analyses performed, and the distilled results or findings,
- **Conclusions and Recommendations** based on the work conducted, the results determined, and in support of the study objectives.
- **Implementation and Training** - conducted or recommended

The report must be concise. Get to the point quickly. The report must be crafted to take the reader the shortest time to understand the work performed and the results obtained. Time is valuable - report pertinent information that supports the conclusions. Move supporting information to the appendices. Avoid duplication of information.

All research projects are successful. They may not reach the desired results, but if the work is done according to proper scientific principles, the effort provides valuable information that was not known before the research was conducted.

Internal and external reviews of the report are important. The researcher may be too close to the work to be objective. A critical review by colleagues for technical content and by a technical writer or editor for grammar and style will enhance the final report, the research effort, and the researcher.

INTRODUCTION

The final project deliverables will be prepared in accordance with the **Guidelines for Preparing Research Final Reports and Tech Briefs** and must include the following:

- The PI shall submit 3 hard copies of the final report to the RPM for recordkeeping.
- The PI shall also send an electronic copy in PDF and MS Word format to the Bureau Management Assistant. The customer will be given an electronic copy of the Final Report and any additional hard copy has a maximum limit of 3.
- All electronic files (quarterly progress report and final report package elements) must include *only* the following document properties:
    - Title: NJDOT Bureau of Research
    - Author: full name of the Principal Investigator(s)
    - Subject: task or purchase order agreement project title, type of document, date(s)
    - Keywords: task or purchase order agreement project title, type of document, date(s), RFP **or** purchase order number and job number, task order number
    - All electronic files (quarterly progress report and final report package elements) must include the following naming conventions:
        - Quarterly progress reports: University/Consultant Abbreviated Name_YEAR_q#_abbreviated project name.file ext
        - Final Report: FHWA or NJ-Report Number.file ext
        - Tech Brief: FHWA or NJ-Report Number-TB.file ext

Files that are included must be in the programs of origin, such as PowerPoint, Word, Excel, etc., so that these files can be modified or corrected and re-imported into the full-text file. Art must be produced in a program that can export an interchange file format that can be imported into the full text. Photos provided must be in TIF or JPEG format.

The draft final reports are due no later than three months prior to the project completion end date. The Research Project Manager (RPM) and Principal Investigator (PI) will formulate the schedule of section review with the Technical Advisory Panel (TAP) members. The draft sections of the final report and tech brief will be provided in electronic format so that the changes can be tracked.

Final Report Package Length, Format, Fonts and Elements

The length of the final report, including cover, front matter, body, references, and appendices, shall not exceed 250 pages in a single volume. When the final report exceeds 125 pages, the submission must be double sided. All final reports shall have clear plastic front presentation cover with rounded corners, black card stock back cover with rounded corners and use a 19 ring comb binding spine (compatible with comb-style binding machines). The tech brief shall be one page double-sided in length.

Reports using single line spacing shall have single spacing between paragraphs. If one-and-one-half line spacing is used, please use double spacing between paragraphs.

Margins must be at least one inch on all sides, including those pages containing figures and/or tables.

Arial 12 point normal spacing font is to be used for all text contained in the Final Report, except on Form DOT F 1700.7 (8-72) Technical Report Documentation Page.

Right-hand margins should be justified. Color may be used in the hard copy and electronic version of the final Report and tech Brief.

Widows and orphans are to be avoided by not leaving a single line of text at the top or bottom of a page. Avoid breaking pages mid-sentence.

Pagination

Use lower case Roman numerals (e.g. ii, iii, iv, etc.) starting with page ii for the Acknowledgements page and continuing through the pages containing the Table of Contents, List of Figures, and List of Tables. The Technical Report Documentation Page (Form DOT F 1700.7 (8-72)) is always unnumbered page i.

The cover page will not show a page number, but shall be counted in the total number of pages of the report.

Front matter of the report includes the following pages: cover page, Disclaimer Statement page, Form DOT F 1700.7 (8-72) Technical Report Standard Title Page, Acknowledgements page, Table of Contents, List of Figures, and List of Tables.

The report body shall use Arabic page numbers (only one series), which shall be centered 0.5 in from the bottom edge of the page, use 12 point Arial non-bolded font and stand alone with no dash on either side of the number. Decimal numbers, hyphenated numbers, or numbers combined with letters for sections, or subsections are not permitted as page numbers.

Title pages for individual sections, appendices, etc., may be used and all appendices must include a page number.

The total page count, listed in block 21 of the Technical Report Standard Title Page Form DOT F 1700.7 (8-72), must include front matter, body of the report, references, and appendices.

Do not use number designations for appendices name. Please use one series of capitalized letters (e.g. APPENDIX A, APPENDIX B, APPENDIX C, etc.)

Headings and Subheadings

Headings and Subheadings are to be typed as follows:

FIRST-LEVEL HEADINGS (all capitals, boldfaced, on a separate line**)**
Second-Level Headings (initial capitals, boldfaced, on a separate line)
Third-Level Headings (initial capitals, boldfaced, italics, on a separate line
Fourth-Level Headings (initial capitals, on a separate line)
Fifth-Level Headings (initial capitals, italics, on a separate line)
Note: Do not indent the first line of any paragraph.

Volume Format

"Volume" designates an individually bound report. When a report exceeds 250 pages of reproduction copy, including front material, body, figures, tables, references and appendices, it should be divided into two or more volumes, each to be designated by a separate report number, and by an upper case Roman numeral (example: Volume I, Volume II, etc.) as part of the subtitle. Volume information should be listed in box 15 on the Technical Report Documentation Page (Form DOT F 1700.7 (8-72)) for all volumes.

Tables of contents, lists of figures, and lists of tables in multi-volume reports should cover the contents of all volumes with volume number designations for each part (i.e. TOC (Volume #), List of Figures (Volume #), and List of Tables (Volume #) listed in volume order. If previous volumes have already been published, later volumes should follow the same practice of a comprehensive table of contents listing, including page numbers, project objectives or executive summary section.

Table of Contents

A table of contents is useful in most reports of more than 10 pages and is required in all reports of 10 or more pages.

Do not list front matter. List only the body of the report from page 1 through appendices. Font styles for the headings in the table of contents must match those used in the report. Each level of subordination must consistently use the particular font style used in the heading, such as all capitals, bold, etc. Wording and punctuation must also be the same in the table as in the body of the report.

Lists of figures and tables are required in reports of 10 pages or more containing any figures or tables. Entries in the lists of figures and tables must match the captions exactly in terms of capitalization, punctuation, and font style. Put the lists of figures and tables on the same page if both fit completely.

Figures and Tables

The following caption illustrates the standard style for figure and table captions.
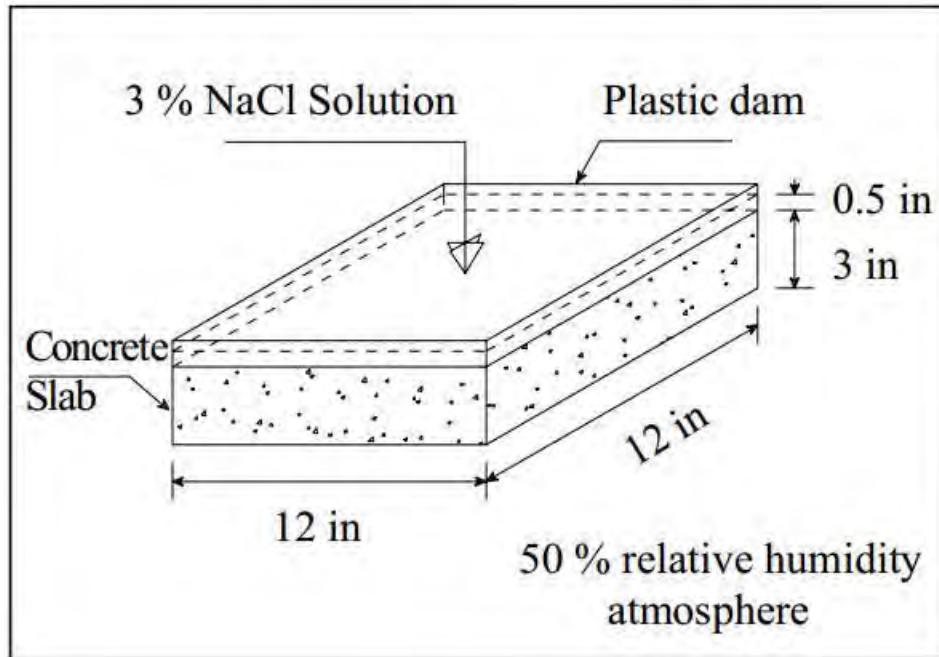
Figure 1. This is the correct form for punctuating, capitalizing, and centering for figure captions

Every figure must have a unique caption centered at the bottom. All captions must be in the same type style and size.

Table 1 - This is the correct form for punctuating, capitalizing, and centering for table captions

Font *		

* Fonts in tables may be adjusted to fit the information in a legible manner (8 point or larger).

Every table must have a unique caption centered at the top. All captions must be in the same type style and size.

All figures and tables must be numbered in a single sequence from the beginning of the volume through the appendices.

All illustrations and tabular materials must be numbered and captioned as figures or tables. Place each after its first callout within the text.

Lists

Lists should be bulleted unless the sequence of items is critical, in which case numerals followed by periods may be substituted for bullets.

Use a colon at the end of the preceding text sentence.

Use parallel rhetorical and grammatical structure in which each entry begins with a verb.

Begin each entry with a capital letter.

End each entry with a period.

Numbers

Numbers from one through nine, used within the text, are spelled out. Use numerals for numbers 10 and above. However, if a number 10 or above is in the same sentence with a lower number, use numerals for all.

Units of money, measurement, and time (actual or implied) are expressed in numerals. These do not affect, and are unaffected by other numbers in a sentence.

Abbreviations, Acronyms, and Symbols

Establish each abbreviation and acronym by spelling out the term the first time it is used followed by the acronym in parentheses, such as Federal Highway Administration (FHWA). In addition, if the report has many acronyms, a list of abbreviations may be included after the list of tables.

Use these abbreviations for units of measurement. Abbreviations used for units of measurement are the same for both singular and plural. Examples of some commonly used units follow:

> mi for mile(s)
> mi^2 for square mile(s)
> mi/h for miles per hour (not mph)
> km/h for kilometers per hour
> in for inch(es)
> in^3 for cubic inch(es)
> m for meter(s)
> ft for foot (feet)
> ft^3 for cubic foot (feet)
> lb for pound(s)
> lbf/in^2 (not psi)
> in^2 for square inch(es)
> ft/s for square foot (feet) per second
> s for second(s)

Do not use periods after these abbreviations.

"Percent" should be spelled out in the text. However, the percent symbol "%" may be used in figures and tables.

Footnotes

Use superscript figures without parentheses or brackets for footnote references.

Text footnotes begin with 1 in each section.

Footnotes must begin on the page carrying the footnote number. Avoid breaking a footnote between pages.

Footnotes should be single spaced. Indent the first line four spaces.

Footnotes to tables or figures begin with 1 for each table or figure. Use superscript numbers.

Asterisks may be used only when a numeral in a table or figure might cause confusion, such as being mistaken for an exponent.

Punctuation

Use a hyphen between the elements of compound numbers from twenty-one to ninety-nine (when they must be spell out) and in compound adjectives with a numerical first element. For example:

    24-in ruler
    8- by 12-in page
    3-m-wide screen
    four-lane highway
    3- to-1 ratio
    1/2-in diameter pipe

When parentheses or brackets are used to enclose an independent sentence, the period falls inside. (See reference 1.) If the enclosed matter is part of a sentence, the period falls outside (when the enclosed matter completes the sense of the sentence).

Periods and commas should be placed inside quotation marks; semicolons fall outside quotation marks.

Use a comma after each member within a series of three or more words, phrases, letters, or figures used with "and," "or," or "nor."

Use semicolons to separate groups of items only when commas are already used within each group. For example, "He checked the streets, highways, and lanes; the subways, bus routes, and airlines; and the theaters, museums, and art galleries." In other instances in which intervening commas are used and confusion may result, use semicolons to separate elements containing commas.

Equations

Number equations with a single series of Arabic numerals through the appendices. Enclose each number in parentheses at the right margin on the last line of the equation. For example:

    A = b + c   (1)

All variables and/or constants in the equation must be identified or explained.

Other

Common nouns such as table 1, section 2, sample A, reference 4, appendix A, etc., should not be capitalized within the text.

The word "State" should be capitalized when referring to a geographic or governmental entity.

The words "Federal" and "Government" are capitalized, whether they appear together or alone, when referring to the Federal Government. The word "Nation" is capitalized when used as a synonym for the United States.

The prefixes and suffixes listed below generally do not require a hyphen when joined with other words:

> multi
> super
> pre
> micro
> under
> re
> like
> semi
> post

However, use a hyphen with the following in all cases in which they are used as reflexive prefixes: ex-, self-, and quasi-.

Keep numbers and units of measurement or words that depend on each other for meaning together on the same line of type. (For example: chapter 5, 25 percent, 31 mm.)

References

Reference numbers should be superscript numbers enclosed in parentheses. Place them after end punctuation. If there is more than one reference, separate them with commas, but no spaces. Example: Xxxxxxxx. [2,3,9] For more than three reference numbers, use a separate sentence in parentheses. [See references 1, 5, 7, and 18.]

Use a single series of Arabic numbers beginning with 1 and continuing through the appendices.

Each reference should be cited within the main text. Materials not specifically cited may be listed in a bibliography placed at the end of the volume on the page(s) following the references. If a reference is cited more than one time in the text, repeat the number first assigned to the reference.

References must be consistent in punctuation and in the order of elements and with the same sequence numbers.

Examples of References

TRB Publication

V. Zahavi and J.M. Ryan. "**Stability of Travel Over Time**." In *Transportation Research Report* 750, TRB, National Research Council, Washington, D.C., 1980, pp. 70-75.

Book

D. Shinar, *Psychology on the Road: The Human Factor in Traffic Safety*. John Wiley and Sons, Inc., New York, 1978.

Periodical

J. K. Jolliffe and T.P. Hutchinson. "A Behavioral Explanation of the Association Between Bus and Passenger Arrivals at a Bus Stop" (in Japanese) *Transportation Science*, Vol. 9 No. 3, (May 1975), pp 248-282.

Government Reports

B.J. Dempsey. *Climatic Effects of Airport Pavement Systems: State of the Art*. Report DOT2DRD-75-196. FHWA, U.S. Department of Transportation, 1976.

ORDER OF ELEMENTS FOR FINAL REPORTS

Not all elements, from the following table, are necessarily used in all reports.

Section	Page #	Element
Front Matter	n/a	Front Cover
	n/a	Disclaimer Statement
	i	Technical Report Documentation Page, Form DOT F 1700.7 (8-72) **Counted as page i, but not shown on page.**
	ii	Acknowledgments
	iii	Table of Contents
	≥ iii	List of Figures
	≥ iii	List of Tables
	≥ iii	List of Abbreviations and Symbols
Body of Report	1	**Executive Summary**: complete, concise summary of the background, objectives, research approach, summary of work performed, data collected, and analyses performed and the distilled results, and Conclusions and Recommendations
	≥ 1	**Background**: reasons for conducting the Research
	≥ 1	**Objectives**: criteria of "success" for this particular research study
	≥ 1	**Introduction:** the research approach to the problem
	> 1	**Summary of the Literature Review:** what lessons from the review of the literature affected the research approach
	> 1	**Summary of the Work Performed:** data collected, analyses performed and the distilled results or findings
	> 1	**Conclusions and Recommendations:** based on the work conducted, the results determined and in support of the study objectives
	> 1	**Implementation and Training:** conducted or recommended
References	> 1	References
	> 1	Bibliography
Appendix	> 1	Appendix (optional)

APPENDIX J. NJDOT – RESEARCH AT A GLANCE – TECHNICAL BRIEF TEMPLATE

Research at a Glance

Technical Brief

Principal Investigator

Name

XYZ University

**BUREAU OF
RESEARCH, INNOVATION
& INFORMATION TRANSFER**

Title of Research Project

[Summary of project background]

Research Problem Statement

[Summary of project objectives]

Research Objectives

[Summary of project objectives]

Methodology

[Summary of Methodology]

Research Project Manager

Name

Bureau of Research, Innovation & Information Transfer

New Jersey Department of Transportation

Trenton, NJ

Results

[Summary of Results]
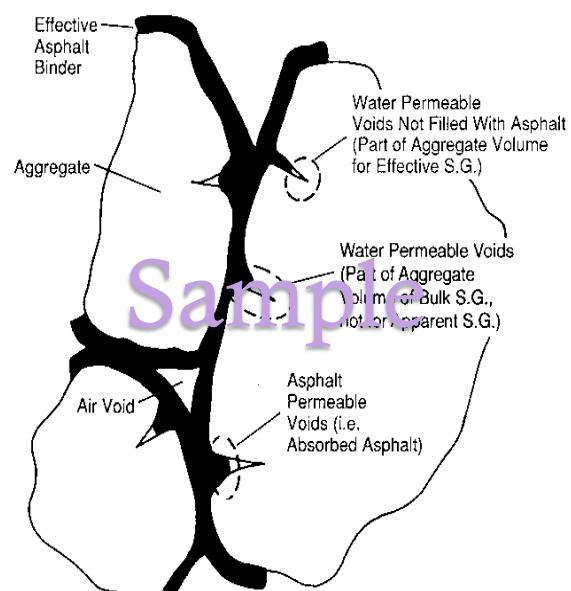
This brief summarizes FHWA-NJ-20xx-xx, "Title of Project", produced through the New Jersey Department of Transportation Bureau of Research, Innovation & Information Transfer, 1035 Parkway Avenue, P.O. Box 600, Ewing, NJ 08625 in cooperation with the U.S. Department of Transportation Federal Highway Administration.

APPENDIX K. MDOT SHA – PM RESEARCH PROJECT COMPLETION/CLOSEOUT CHECKLIST

PM Research Project Completion / Closeout Checklist

The research project completion-closeout checklist assists the Research Project Manager in efficiently concluding the project. It verifies the Technical Lead's receipt of all deliverables, assesses their satisfaction with project outcomes and support, and ensures the final product is publication-ready. Additionally, it confirms the submission of all invoices and reports and updates to online project-related databases, streamlining the closure process for success.

Has the "Research Project Completion/ Closeout Report" been completed by the TL? (This report must be received prior to completing this form and closing the project)	☐YES ☐NO	
Financial	**YES**	**NO**
1. Did the project stay within (under or over) budget? Please explain: *(for estimating purposes)*		
2. The final invoice was received, approved by TL and sent to OOF for payment?		
3. Was any equipment over $500 purchased as a part of this project?		
4. If yes, has MDOT SHA received/inventoried the equipment? If your answer is no, when can SHA expect to receive this equipment?		
5. It is the TL's opinion; the project number can be closed in FMIS?		
6. Have all invoices been verified for payment prior to notification to OOF to close charge #?		
7. Has OOF been notified to close the charge # in FMIS?		
Program Requirements	**YES**	**NO**
8. Has the project folder been updated and marked as completed? (N drive)		
9. Has the task order record on the intranet been updated and the project status has been changed from "Active" to "Complete"?		
10. Has the Research Master Tracking Sheet been updated?		
11. Has the Project Charter/ Summary been updated?		
12. Has the SPR Research Summary Sheet Active Projects been updated?		
13. Has the project been published and disseminated?		
14. Has the project been updated in the RiP and TRID Databases?		
15. Has the 3- month survey for the implementation plan been scheduled?		
16. Have you set reminders in your schedule for the 8 and 12-month implementation plan follow-ups?		
17. Is the project a potential candidate for HVR nomination? If yes, move summary to N:\OPR\4-Research-Program\Marketing-Materials_Presentations\High-Value-Research-Projects , and select active year. Start gathering required information for submission.		
18. Is the project a potential candidate for NCHRP Implementation Funding?		
Additional Project Comments/Notes		

- **The principal investigator and MDOT SHA have met all contractual and financial obligations for this project:**

Research Project Manager: _____   **Date:** _____

OPR Research Program Manager: _____   **Date:** _____

APPENDIX L. MDOT SHA – RESEARCH IDEA FORM

Research Idea Form

Sponsored by SHA Office of Policy and Research (OPR)

What qualifies as a Research Idea? A **research idea** refers to a **specific topic or question** that someone wants to explore through **systematic inquiry.** It involves carefully considering and investigating a particular concern or problem using scientific methods.

Have a Research Idea? Please use this form to submit your idea to be considered for a research project in the current federal fiscal year Research Work Program. All research ideas should originate internally from SHA, as our research partners' primary role is to develop a proposal in response to SHA's Research Ideas. Do not include ideas that are your intellectual property. Content from selected research ideas will be posted in a competitive request for proposal (RFP) to Maryland research partners.

Should your research idea be selected, the Research Team at OPR will schedule a meeting to work with your office and technical lead to further clarify your idea to be included in the RFP.

Research idea forms will be accepted for consideration from February through April 15th of the current calendar year.

Please be advised that even though the form doesn't have a time limit, you can only complete the form in one sitting.

Hi, STEVE. When you submit this form, the owner will see your name and email address.

* Required

SHA Contact Information

1. Requesting office or district.

   Note: The office and district names are in alphabetical order *

     Office of Policy and Research

2. Requesting office point of contact (please provide name and division). *

Research Idea Form

Research Idea

3. Proposed research title *

   Enter your answer

4. Under what subject area does your proposed research fall? Select all that apply. *
   - ☐ Safety
   - ☐ Environmental Stewardship
   - ☐ System Preservation/Maintenance
   - ☐ Administrative
   - ☐ Human Factors
   - ☐ Mobility/Traffic
     Management/Congestion Relief
   - ☐ Structures
   - ☐ Hydraulics
   - ☐ Hydrology
   - ☐ Geotechnical
   - ☐ Materials
   - ☐ Intelligent Transportation Systems (ITS)
   - ☐ Artificial Intelligence (AI)/Machine Learning
   - ☐ Complete Streets
   - ☐ Highway Design
   - ☐ Planning
   - ☐ Connected and Automated Vehicles (CAV)
   - ☐ Other

5. What is the problem to be addressed? Use the bullet points below to describe your research idea: *

   - Provide some background on what prompted you to identify this research idea
   - Describe the problem and why this topic is/should be important to SHA

Research Idea Form

Enter your answer

6. Research objectives*

- What are the expected outcomes for this research?
- How will the successful research benefit SHA?
- How the research will be implemented, if applicable

Enter your answer

7. Affected offices (please provide Office name(s))
Please note - If your project involves software, hardware, electronic equipment, or technology services, including maintenance, please include OIT in your affected office section. *

Enter your answer

8. Anticipated duration (estimated time to complete the proposed project) *

☐ 6-12 months

☐ 12-18 months

☐ 18-24 months

Research Idea Form

9. Impact

If research is successfully completed, what benefits, both quantitatively and qualitatively, will SHA gain?

- Discuss how the potential research can be used to inform policy and/or practice.
- Discuss how potential research can be used to educate the public and/or stakeholders.
- Discuss the impact of the potential research for SHA.
- Discuss implementation potential within SHA.

Here is an example of the impact and implementation potential of a transportation research project on a Complete Streets project:

Implementing a research project focused on Complete Streets within the Maryland State Highway Administration (SHA) holds the promise of a wide range of benefits, spanning reduced traffic incidents, improved accessibility, policy refinement, heightened public engagement, increased economic efficiency, and enhanced community living standards. Research indicates a concerning 46% increase in annual pedestrian fatalities from 2009 (4,109) to 2016 (5,987) but implementing Complete Streets policies effectively could reverse this trend. Thoughtfully designed complete streets have the potential to yield a notable 40% decrease in pedestrian fatalities, while prioritizing active transportation modes such as walking and cycling. Additionally, the integration of traffic calming measures holds promise for up to a 15% reduction in traffic congestion, thereby potentially decreasing commute times. These findings are anticipated to galvanize public and stakeholder support, emphasizing the concrete benefits that Complete Streets can deliver. Integrating these insights into SHA's existing guidelines ensures that Complete Streets principles become a cornerstone of Maryland's transportation planning and development, fostering safer, more inclusive, and accessible urban environments across the state. *

Enter your answer

Research Idea Form

10. Urgency Ranking (1-3) *

Note: 1=Moderate, 2=High, 3=Critical

1. **Moderate:** Moderately urgent and should be addressed in a timely manner
2. **High:** Highly urgent and requires prompt attention and action
3. **Critical:** Extremely urgent and demands immediate and top-priority action

    1   2   3

Thank you for completing the form.

The Research Team at OPR will contact you if there are any questions about the proposed research project.

The completed form will be provided to one of your senior managers to confirm urgency and potential implementation of this research need.

APPENDIX M. MDOT SHA – PROPOSAL EVALUATION FORM

Please answer the following questions. Provide comments as appropriate and be sure to indicate any modifications that should be made to the proposal before a notice-to-proceed is issued. **Comments are required for all NO responses. If PARTIALLY is selected, indicate in the comments if additional information is needed**. The scores assigned to each section will be added together to provide an overall score for the submission. Submit completed review forms to research@mdot.maryland.gov. *Please do not submit handwritten forms*.

Reviewer Name(s)	Reviewer Office(s)	Reviewer Phone Number(s)

Proposal Information		
Project Title	RFP #	Proposal ID

			1. Does the proposal contain a clear and concise description of the problem to be solved?
			2. Does the proposal demonstrate a good understanding of the problem and provide possible solutions?
			3. Does the proposal demonstrate the researcher's knowledge of the topic?
Internal Comments:			**Feedback for Researcher:**

			1. Does the proposal clearly identify the technical objectives upon which the research team will focus?
			2. Are the goals of the research clearly defined?
Internal Comments:			**Feedback for Researcher:**

Yes	Partially	No	Research Plan
			1. Is the research methodology described in sufficient detail to determine the probability of achieving the objectives?
			2. Is the scope of work commensurate with the expectations of the problem statement?
			3. Does the proposal describe the findings of preliminary literature searches?
			4. Is the current state of practice clearly described in the proposal?

			5. Does the work plan include tasks/data to be performed or supplied by MDOT SHA?
			    a. If yes, will MDOT SHA be able to provide the noted assistance? If so, provide the name(s) and phone number(s) of the individual(s) who can provide the assistance.
			    b. Will MDOT SHA incur costs that need to be funded as a result of these tasks (i.e., MoT, soil borings, etc.)?

			Name 1: Assistance type:
			Phone 1: Assistance type:

			6. Does the proposal describe the division of work between the prime contractor and the subcontractor(s)?
Internal Comments:			**Feedback for Researcher:**

Yes	Partially	No	Implementation and Training Plan
			1. Does the proposal provide a preliminary discussion on how MDOT SHA may implement the results of the research?
			2. Is the potential application realistic and appropriate for the scope of work proposed? Please explain in the comments section.
			3. Is the anticipated result in-line with the proposed research plan?
Internal Comments:			**Feedback for Researcher:**

Yes	Partially	No	Deliverables
			1. Does the proposal list all expected products and reports that will be provided to MDOT SHA during and at the conclusion of the research?
Internal Comments:			**Feedback for Researcher:**

Yes	Partially	No	Project Schedule
			1. Is the project schedule complete and reasonable? Identify concerns in the comments.
			2. Is a graphical representation of the scheduling included?
Internal Comments:			**Feedback for Researcher:**

Yes	Partially	No	Itemized Budget
			1. Is the proposed budget reasonable and correct for the scope of work as defined in the proposal? List any needed modifications below.
			Suggested Modifications:
Internal Comments:			**Feedback for Researcher:**

Yes	Partially	No	Equipment & Facilities
			1. Does the proposal demonstrate that the researcher has access to facilities and equipment required to complete this work?
			2. If it is absolutely necessary to purchase equipment using project funds, a. Is the itemized cost information included in the budget? b. Is a justification provided?

Internal Comments:	Feedback for Researcher:

Yes	Partially	No	Research Team
			1. Does the proposal demonstrate that the research team has the capability to successfully perform this research?
			2. Does the proposal explain each team member's role on the project?
			3. Based on your knowledge of the PI's existing project commitments, are you confident that the PI has enough time available for this project?
Internal Comments:			Feedback for Researcher:

The following chart depicts evaluation weights, as applied to the proposal from a holistic evaluation perspective.

Category:	Rating 1-10	Weight
Problem Statement & Background - indication of a good understanding of the scope of work		20%
Objectives & Research Plan - consider consistency with the objectives described in the problem statement and the scientific and practical aspects of the research methodology		30%
Implementation and Training Plan - - a realistic appraisal of the prospects for successful implementation of project objectives		5%
Deliverables & Schedule – a complete list of deliverables and a reasonable schedule		5%
Budget - total estimated cost of the project is reasonable for the work described		15%
Facilities & Equipment - research agency has necessary equipment and facilities to complete the project		5%
Research Team (Qualification & Availability) - researchers have demonstrated experience in the subject area, are qualified to perform the work required, and have enough time available for the project.		10%
Proposer's Past Performance - researchers have demonstrated good performance on past projects with MDOT SHA (see the last page for a list). Use neutral rating (5) for proposers who have never worked with SHA before.		10%
TOTAL		**100%**

Yes	No	GENERAL RECOMMENDATION
		1. **Do you recommend this proposal for funding?** If Yes, go to next section. If No, provide explanation for your decision below. This feedback will be provided to the researcher as explanation for non-selection.
		Explanation for Non Selection:

GENERAL RECOMMENDATION FOR SELECTED PROPOSAL		
	The proposal is acceptable as is. No modifications are needed.	
	The proposal is acceptable with modifications as explained in the Feedback for Researcher sections above.	
Internal Comments not noted above:		**Additional Feedback for Researcher not noted above:**

APPENDIX N. MDOT SHA – CLICK'D LUNCH & LEARN INTRANET LANDING PAGE

CLICK'D Main Landing Page

Welcome!
The Knowledge Management Division is proud to present SHA's CLICK'D Lunch & Learn Series! Here we have educational and informative sessions that enrich knowledge both professionally and personally.

Ever have a moment where something wasn't quite clear, and then with a bit more context or information, it "clicks"? That's what we aim to do here!

'CLICK'D' Stands for:
C - Communication: We're effectively communicating our topics.
L - Learning: Participants are learning something new about the agency.
I - Information: The information is valuable to you either professionally, personally, or both!
C - Clarification: We encourage participants to ask questions, so things are clear.
K - Knowledge: Participants gain & retain knowledge about a process or office.
D - Driven: Our team is driven to ensure the above goals are achieved!

Join us to learn something new, gain additional knowledge about other SHA offices & processes, and enjoy your lunch while doing it!

The next Lunch & Learn series will be held: TBD

Featured Lunch & Learns for 2025:

In case you missed the meeting, check out the recordings below!:

FAP Recorded Video 3/6/25
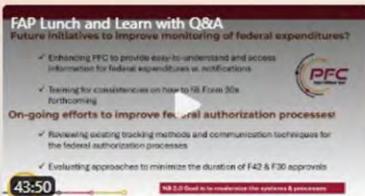
Lunch & Learn Flyers:

Federal Aid Program L&L 3/6/25

PowerPoint Slides / Q&A from Lunch & Learns:

Spring Clean Event - Records Disposal L&L 5/7/25

Spring Cleaning Event - Records Disposal PowerPoint

Season 1 of our Lunch & Learn Series:

APPENDIX O. NJDOT – IN-HOUSE RESEARCH

In-House Research

Giri Venkiteela, PhD

BRIIT, NJDOT
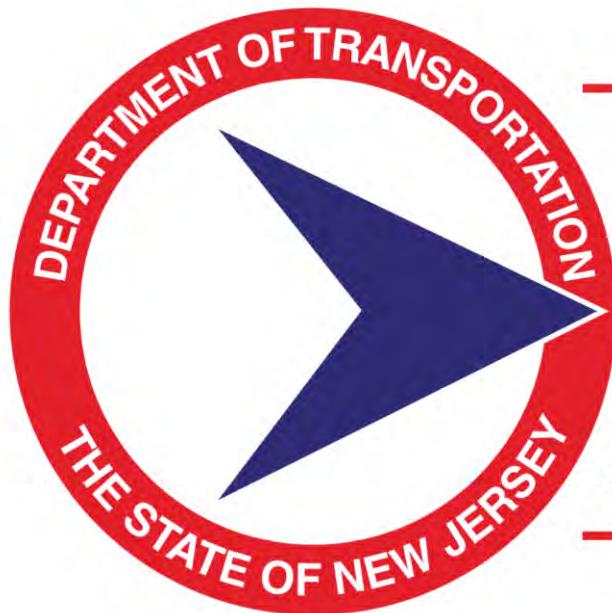
Outline

❑ **What is In-House Research for DOTs?**

❑ **NJDOT In-House Research**

❑ **NJDOT Challenges and Solutions**

❑ **Conclusions**

What is In-House Research for DOTs?

Type of in-house research for DOTs:

1. Infrastructure Design and Maintenance
2. Traffic Management and Optimization
3. Safety Research
4. Pavement and Materials Research
5. Environmental Impact and Sustainability
6. Transportation Systems
7. Economic Impact Studies
8. Policy and Regulatory Compliance
9. Technology Integration
10. Disaster Preparedness and Emergency Response
11. Bicycle and Pedestrian Infrastructure
12. Freight and Logistics Research
13. Community Engagement and Equity

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In-House Research –Pros and Cons

In-house research pros:

1. Control Over Research Process
2. Protection of Intellectual Property
3. Customization and Alignment with Organizational Goals
4. Quick Iteration and implementation
5. Direct Communication and Collaboration
6. Confidentiality and Security

Cost Benefits

- Initial perception of lower costs
- Utilization of existing staff
- No external agency fees

Internal Knowledge

- Deep understanding of DOT processes
- Familiarity with stakeholders
- Direct data access

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& INFORMATION TRANSFER

In-House Research –Pros and Cons

In-house research cons?

1. Limited Resources and Expertise
2. Potential for Bias
3. Slower Speed to Innovation
4. Risk of Tunnel Vision
5. Challenges in Keeping Pace with Industry Advances
6. Overhead and Administrative Burden

Hidden Costs
- Staff time diversion
- Training expenses
- Platform maintenance
- Analysis infrastructure

Quality Concerns
- Potential bias
- Limited expertise
- Data quality risks
- Reduced credibility

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NJDOT
In-House Research

❑ **BRIIT In-house research includes:**

- Preliminary literature searches

- Basic analysis

- Support funding for internal staff to perform research

- STIC- internal DOT innovation

- Leadership special assignments

- Publishing journals/articles

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& INFORMATION TRANSFER

Challenges for us

❑ **In-house research silos:**

- Dilemma in allocating funds for certain projects and
- Lack of research and innovation ideas

❑ **SPR resource centers:**

- o Bridge
- o Pavement
- o ITSRC
- o Bicycle and Pedestrian Safety
- o Geo Technical
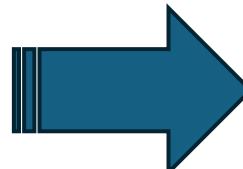
Multi year /SPR funds

Getting low responses on research and innovation ideas request calls

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RESEARCH, INNOVATION
& INFORMATION TRANSFER

Sample RFP for resource centers
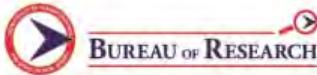
BUREAU of RESEARCH

c. Evaluate and recommend best practices for performing Load rating on superstructure members, substructure members and Riveted/Bolted and Welded Gusset Plates.

d. Refine and finalize draft of Load Rating Manual for Bridges.

    i. The Principal Investigator and his/her team should have the enough experience in developing the load rating Manual in LFR/ASR and LRFR. Principal Investigator needs to document team's previous experience in developing the load rating manual in the proposal.

3. **Innovative Material and Technology**

a. Review, test and pilot study of new products and technologies in the areas of structural engineering, bridge design and bridge preservation to enhance performance and constructability.

b. Assist in the development of related design guidance, construction specifications and quality assurance test procedures to aid in the successful implementation of new methods and technologies.

4. **On-Call Services**

a. Rapidly respond to NJDOT's needs for advanced bridge engineering tools and services to address ongoing bridge design, construction field issues, or maintenance issues. Perform in-depth structural inspection and evaluation using innovative testing technology to investigate structural emergencies due to unforeseen and/or special events for individual structures as well as any other structures within the corridor and provide recommendations.

    (The Principal Investigator (PI) will respond to the request within one day and develop an appropriate work plan to supply the needed support and respond to NJDOT's request within 3 days).

b. Assist in investigating the applicability of new AASHTO, TRB/NCHRP and other industry guidelines to NJDOT Standards and Specifications specifically; recommend changes to NJDOT standards, specifications, and existing policies; develop guidelines as required.

5. **Technology Transfer**

a. Provide technology transfer and training to NJDOT's Division Bridge Engineering & Infrastructure Management staff on topics pertaining to but not limited to new products, policy guidelines and research products for Bridge design, construction, maintenance and preservation.

b. Provide Ethics course for renewal of Professional Engineer license to NJDOT & FHWA staff annually.

Solutions we found

- Close monitoring of scope and budgets of resource centers

- Participation in progress meetings

- Annual research and innovation report

- Support tech transfer activities

- Offering Implementation support

New language included in the RPFs

1.3 Special Instructions

1.3.1 Progress Meetings and Annual Reporting

Progress Meetings: Bureau of Research, Innovation and Information Transfer (BRIIT) shall be included in Bridge Resource Program-1 progress and programmatic review meetings.

Annual Reporting: Bridge Resource Program-1 shall submit an annual 10–15-page summary report of complete and ongoing activities to BRIIT. A sample template specific to all NJDOT resource centers/support programs will be provided.

1.3.2 Pilot, Testing, and Demo Projects

BRIIT staff shall serve as an extended branch of Bridge Resource Program-1 staff by providing funding and/or management of any identified pilot/testing projects. BRIIT can assist in applying for and managing special grants that would be beneficial to Bridge Resource Program-1 efforts

1.3.3 Build on BRIIT's Technology Transfer Program

1. Bridge Resource Program-1 & BRIIT shall work together to identify topics and content
2. BRIIT Tech Transfer program, including but not limited
   A. Articles
   B. Promotional Videos
   C. Tech Talks
3. Cross posting between NJDOT Tech Transfer and Bridge Resource Program-1 webpage

Conclusions

❑ **We recommend hybrid strategy for successful research projects**

❑ **In-house:**

  ➢ Routine data collection/analysis

  ➢ Some publications

  ➢ Quick assessments

  ➢ Quick Implementation projects

❑ **External partnership:**

  ➢ Complex projects

  ➢ Benchmarking

  ➢ Independent validation

  ➢ Advanced analytics

If you have a research silos like us – collaboration and constant interaction with SMEs will help a lot

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& INFORMATION TRANSFER

Thank you
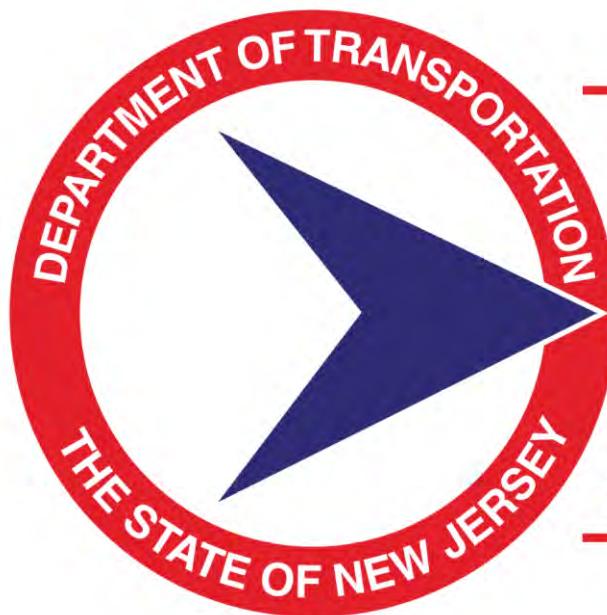
APPENDIX P. CTDOT – IN-HOUSE RESEARCH

In-House Research

Mauricio Garcia-Theran
Research Unit Supervisor
Connecticut Department of Transportation
New Jersey DOT Peer Exchange
June 25, 2025

What is Research?

ChatGPT Definition:

- A systematic process of investigating and studying materials, sources, or data to discover new information, reach new conclusions, or solve problems

- It involves critical thinking, careful observation, and structured methods to gather, analyze and interpret information

CTDOT

In-House Research at CTDOT

- Currently no dedicated staff conducting "traditional" research projects

- Research Office Used to have around 20 Research Engineers in the past
  - One in-house Research Project remains active
  - Monitoring of Cathodic Protection Systems on Structures

- To some extent, other groups may be performing certain research tasks
  - Traffic Signal Lab
  - Enterprise GIS, Analytics and Data Management
  - Roadway Inventory and Traffic Monitoring
  - Pavement and Materials
  - Other Planning Groups

Active Transportation Planning – Complete Streets

CT State Routes with High Likelihood for Pedestrian and Cycling use

Pedestrian Demand Model

Bike Demand Model
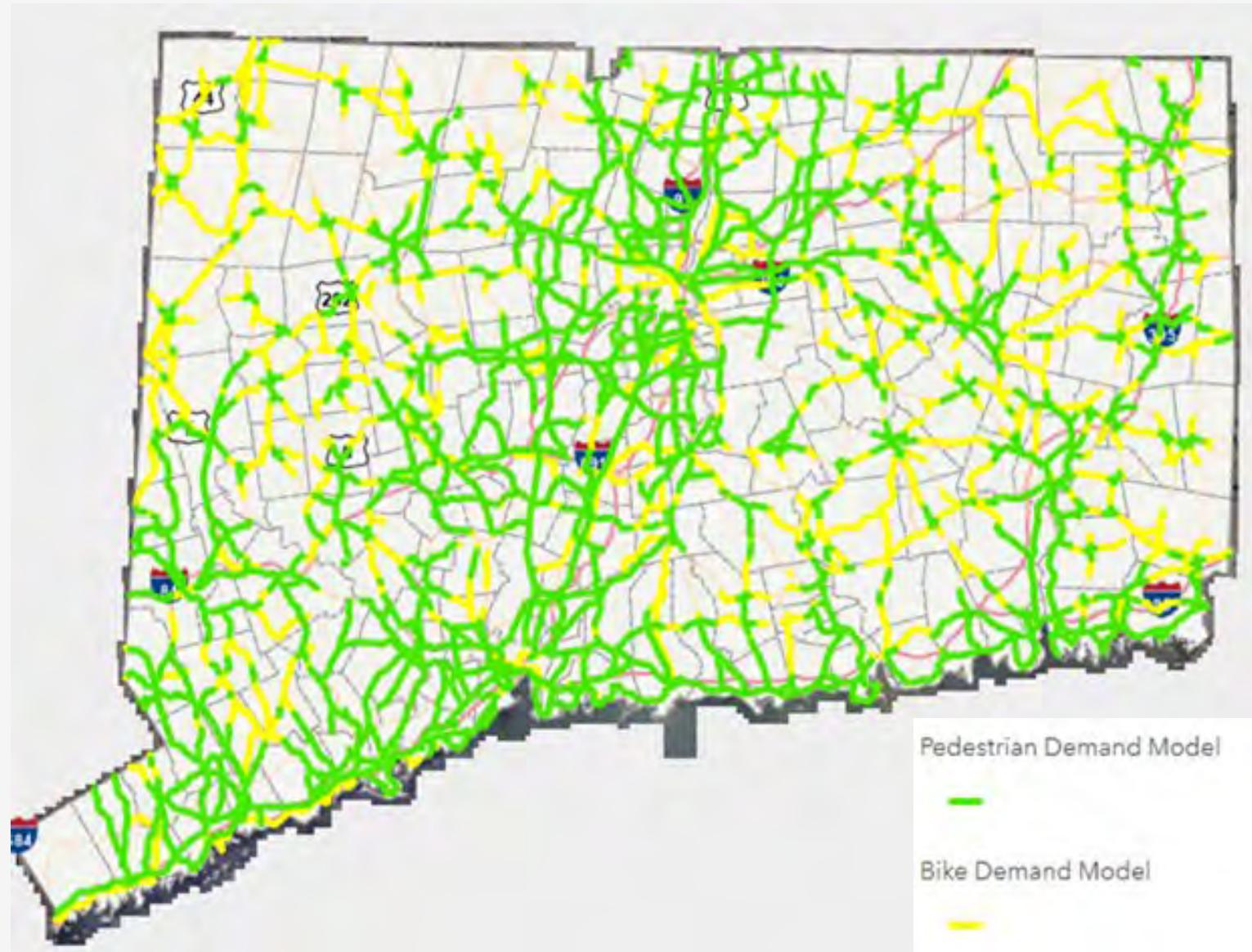
Pedestrian Demand for Project Prioritization

Pedestrian Demand Rank Viewer

DEMANDRANK FILTER

Min: 10

Max: 88

INFRASTRUCTURE

☐ Sidewalk Gaps
☐ Remove Ramps

☐ Pedestrian Feasible Only
☐ Near High Usage Bus Stop
☐ High Employment Density

ABOUT

This app shows the DemandRank for milepoints on state routes in Connecticut.

Search for locations in Connecti...

DemandRank

- 10
- 30
- 50
- 70
- 88
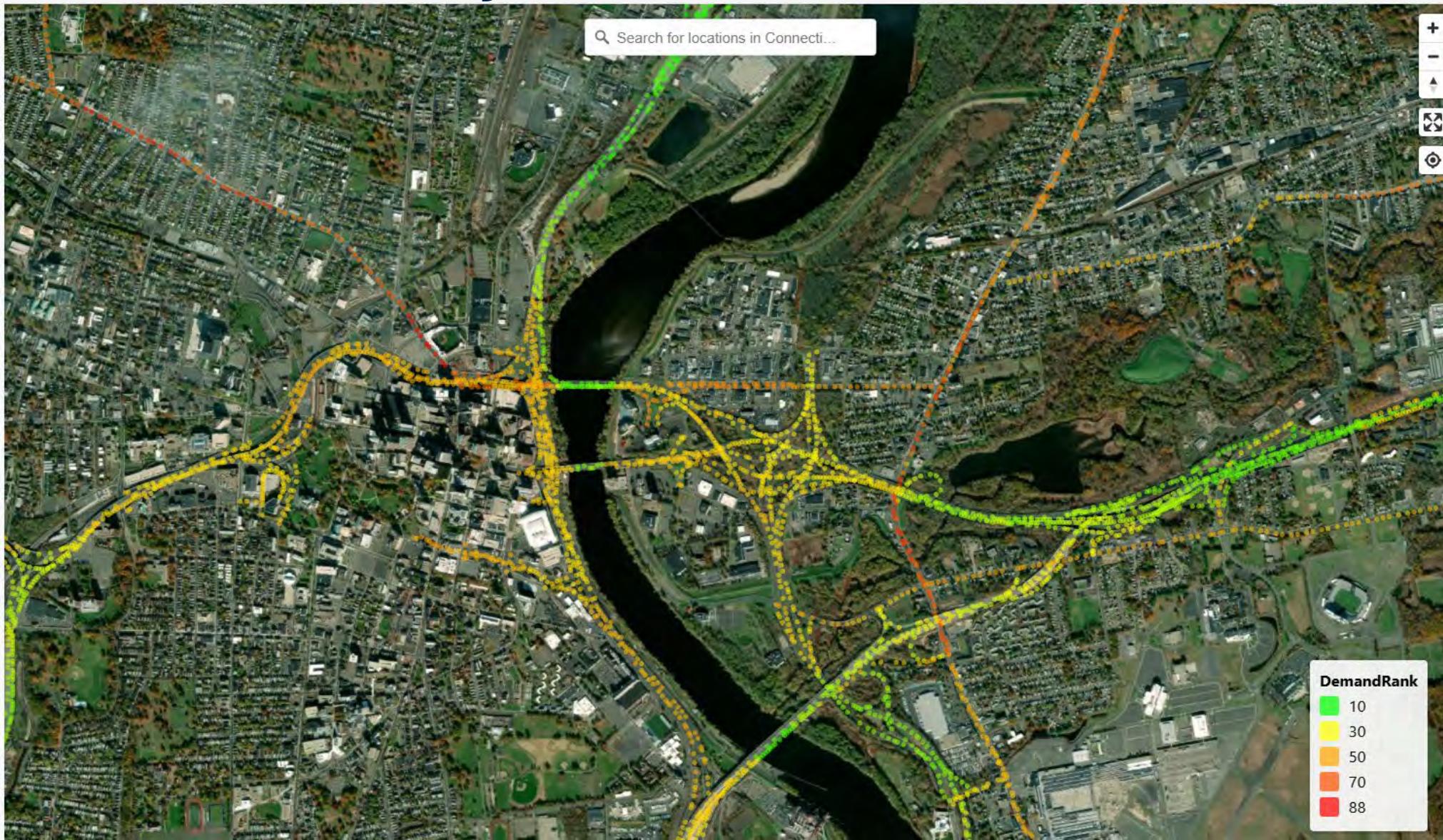
In-House Research at CTDOT (Cont.)

- Is the previous type of project considered Research?
  - Did literature reviews and searched for best practices
  - Identified a need/gap for Connecticut DOT
  - Collected CT data (e.g. demographics, road attributes, context, etc.)
  - Conducted GIS analysis and parametric analysis
  - Documented their methodology and made recommendations

- What is missing?
  - Prepared a formal research report, paper and present at a conference?

- Difference between Engineering and Planning Research?

In-House Research at CTDOT (Cont)

- Combined Effort (External and In-House)
  - SPR Part B may fund a portion of the project
  - Project may continue In-House outside the Research Unit
  - Continuing Project/Program - Pavement Group

- Literature Reviews
  - Conducted by the Research Unit to assist other offices
  - Depends on current research staff's ability, skills and availability
  - May lead to quick implementation ideas (modified chip seal treatment for bicycle routes)

CTDOT

Historic Bridge Inventory Project

Washington Bridge – Route 1 Milford – Stratford

- SPR Part B Funds
- Office of Environmental Planning-Cultural Resources Unit
- Update Inventory within CTDOT ROW
- Streamline Section 106 process of the National Historic Preservation Act
- Provide guidance on treatments that would avoid adverse effects
- Significant effort in-house analyzing past reports, collecting data and writing report
- SHPO participation

CTDOT

MAVRIC (Mobile Asset Verification and Roadway Inventory Collection)

- Collaboration between CTDOT Enterprise GIS, UConn, and Rizing

- Aims to collect field data of roadway geometry and asset information, and integrate this data with the Linear Referencing System

- Utilizes SPR part B funds for task 1 (Software Customization for CTDOT)

- Task 2 to be performed in-house by Roadway Inventory Office

- Measure effectiveness in data collection processes (current versus MAVRIC)
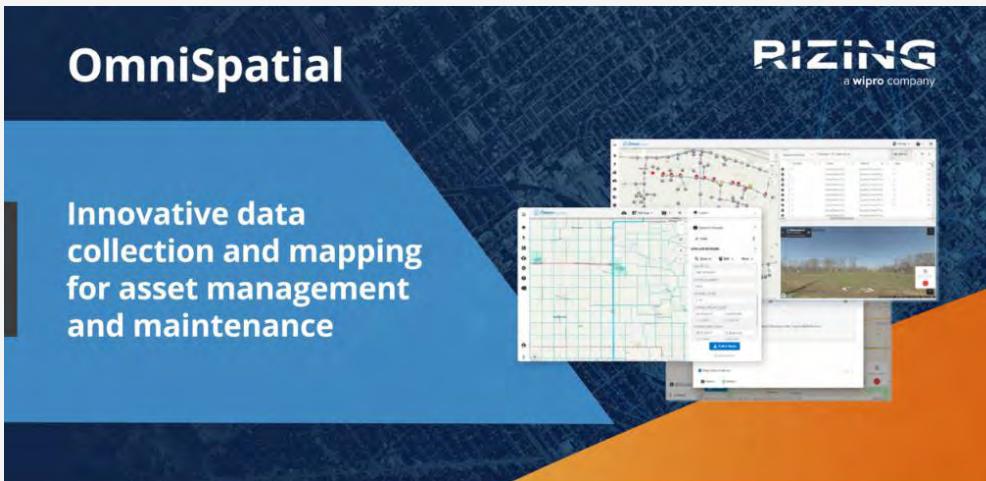
Source: OmniSpatial - Rizing
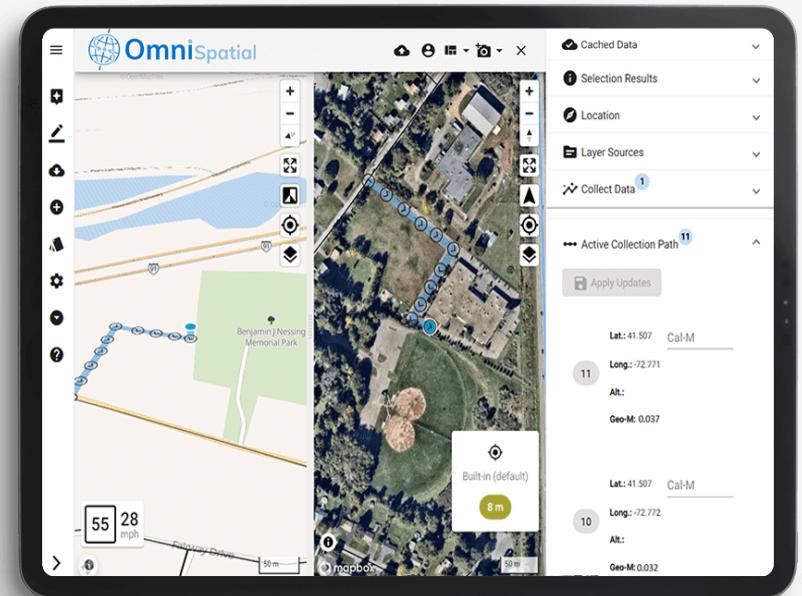
Analyzing NPMRDS Using Advanced Machine Learning to Enhance System Performance

- SPR-B funds and conducted by a University

- Expected completion date September 2025

- Extract National Performance Management Research Data Set (e.g. travel time) using AI and ML techniques

- Gain insights and forecasting of various aspects of systems performance such as safety, speed, travel time reliability, congestion, public health

- **Limitation: Isolated highway segments were considered (Framework)**

- A network of interconnected road segments is critical for practice

- Expected to continue in-house (Qualified staff currently available)

CTDOT

Pavement Research

Photolog Unit

- Annual State Network surveys performed with Automatic Road Analyzer (ARAN) vans

- Photolog is responsible for collection and QC

- CTDOT has been performing photolog surveys of the State network since 1985

- Pavement Management is responsible for quality acceptance of pavement data

Pavement Research (Cont.)

Collaborative effort involving 4 CTDOT groups and the Connecticut Advanced Pavement (CAP) lab
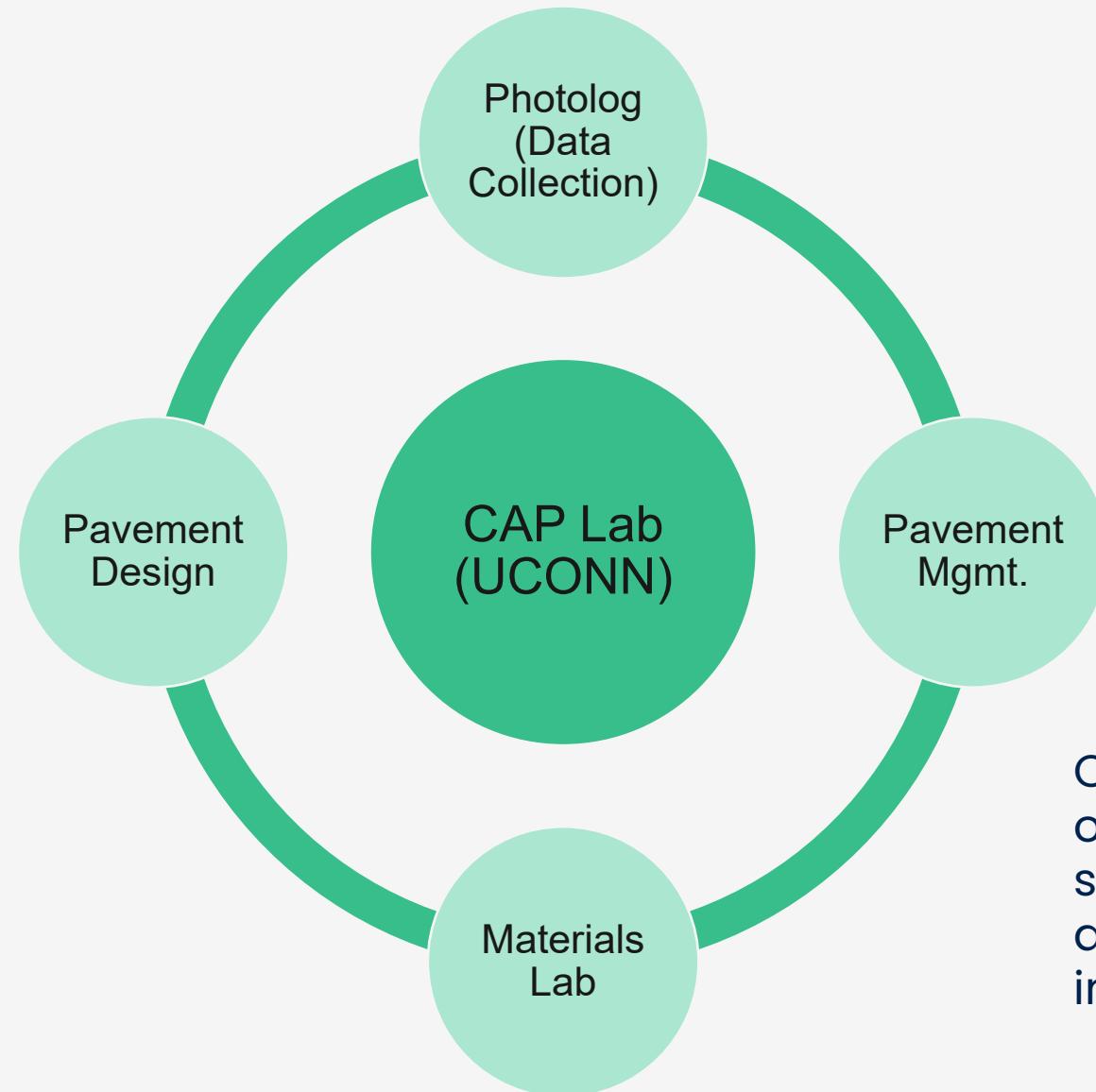
CAP Lab may rely on data from the supporting units and conduct more in-depth research

Literature Reviews (Research Unit)

Working groups at CTDOT request a synthesis report

- Bridge strike prevention – Traffic Engineering
- Native dual-language signage – Traffic Engineering
- Park and ride signage – Public Transportation
- Vehicle-to-X infrastructure – Policy and Planning management
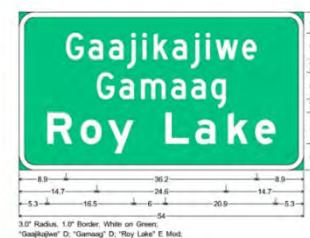
Complete Streets Screening for Resurfacing Projects

How can we expand cycle and pedestrian facilities, and improve road safety in a cost-effective manner with our existing programs?

- Road diets

- Buffered shoulders/bicycle lanes

What roadways contexts are appropriate for these counter-measures? (AADT, posted speed, land use)

Can these features be incorporated into the existing roadway width?

Research established a data-driven process to answer these questions

Best Practices – Complete Streets Directive

Source: FHWA, Walkways
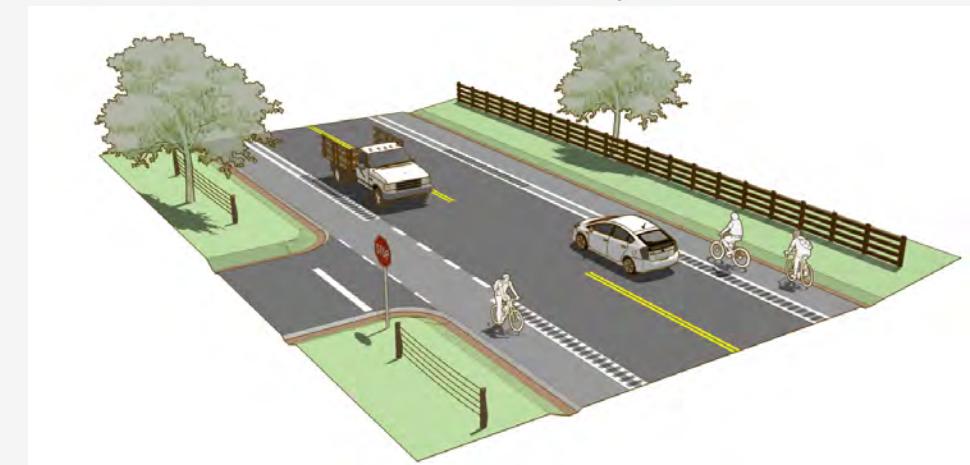
Source :Small Town and Rural Multimodal Network Guide (2016)

- ADA Compliance?
- Maintenance Responsibilities
- Logical Termini
- Where buffered shoulders?

Summary

- Full in-house research projects are not currently conducted at CT DOT

- Other groups outside the Research Unit may be conducting research tasks even if their role is not officially defined as "Research"

- A combined effort approach (External and In-House) has been used by certain groups to conduct projects using research funds

- In-house literature reviews can be conducted in the Research Unit as requested by other offices

- Literature reviews should be considered research, and can be a very good way to support other offices across the agency

Thank you!

APPENDIX Q. MAINEDOT – NTRC RESEARCH PEER EXCHANGE – TOPIC 2: IN-HOUSE RESEARCH

NTRC RESEARCH PEER EXCHANGE
TOPIC 2: IN-HOUSE RESEARCH

June 25, 2024

Maine Presentation

– Jeff Pulver and Ulrich Amoussou-Guenou

IN-HOUSE RESEARCH <u>OUTSIDE</u> OF RESEARCH PROGRAM

WHICH BUSINESS AREAS WITHIN YOUR DOT CONDUCT IN-HOUSE RESEARCH OUTSIDE OF THE TRADITIONAL RESEARCH PROGRAM CHANNELS?

- Materials Testing and Exploration

- Fabrication and Bridge

- Traffic Engineering

- Safety

- Highway Management / Results and Information Office

- Planning

- Environmental Office

IN-HOUSE RESEARCH <u>OUTSIDE</u> OF RESEARCH PROGRAM

WHAT ARE THE CHALLENGES OF THIS ADDITIONAL RESEARCH TAKING PLACE OUTSIDE YOUR RESEARCH OFFICE?

We do not want to stop or slow innovation or add extra process requiring our involvement or oversight.

We want to know about these activities as a central point for research and innovation.

Staying informed helps us support SME needs, connect them with peers solving similar issues, and highlight the work they are doing.

IN-HOUSE RESEARCH <u>OUTSIDE</u> OF RESEARCH PROGRAM

HOW REGULARLY DOES SUCH RESEARCH HAPPEN?

MTEx in winter when paving stops.

Safety and Results and Information can happen any time of the year.

More likely in the winter after projects have been submitted to the Work Plan.

Traffic tries new things every summer.

Other offices these efforts are more intermittent on a case-by-case situation.

IN-HOUSE RESEARCH <u>OUTSIDE</u> OF RESEARCH PROGRAM

IS THE RESEARCH OFFICE REGULARLY INFORMED OF SUCH RESEARCH?

Some projects done by others, we are informed about but not in a formal / required way.

Sometimes we can have a problem with lack of communication, and we don't even know this research by other groups is happening.
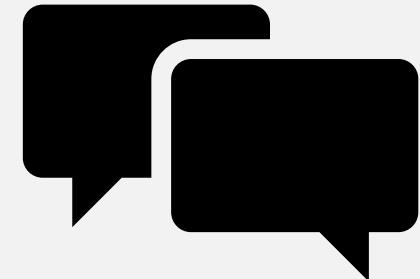
We have a few strategies to improve this coordination.

IN-HOUSE RESEARCH <u>OUTSIDE</u> OF RESEARCH PROGRAM

WHAT STEPS HAS YOUR RESEARCH OFFICE TAKEN TO IMPROVE COMMUNICATION, COORDINATION, AND COLLABORATION?

- Department-wide Innovation program.

- "Share and tells" during meetings.

- Opportunities to fund small pilot projects.

- Research and Innovation Showcase in 2026.
  - Will feature some activities from TPFs

WHAT CONSTITUTES IN-HOUSE RESEARCH?

- We consider in-house research to be any research which we can do completely (or mostly) with MaineDOT staff.

Activities can include:

- Literature reviews
- Surveys
- Pilot projects
- Before and after studies
- Data analysis
(outside of normal workflows)

- Excel tool development
- GIS data visualizations
- Observation and documentation of new methods
- Field measurements / data collection, etc.

BENEFITS OF IN-HOUSE RESEARCH?

Conducting in-house research allows staff to practice problem solving and technical skills, making <u>work more interesting and more satisfying.</u>

Leadership and other staff see you and your team members directly contributing and solving problems.

HOW TO GET STARTED WITH IN-HOUSE RESEARCH

Start with data analysis and basic GIS skills

- Advanced Excel Skills
  - A lot can be learned in one afternoon.
- Get an ArcGIS Online user license from your GIS group.

Share with others that your office can complete literature reviews and surveys to other states as a service.

HOW TO GET STARTED WITH IN-HOUSE RESEARCH

Some skills are not difficult to pick up, but other staff has never learned.

Staff is caught up in the day-to-day. They do not have time to think about or work on big picture ideas and improvements.

EXAMPLES ON IN-HOUSE RESEARCH IN MAINE

MaineDOT Speed Limit Setting Tool - Evaluation

Speed Limit Impact / Messages

Speed Limit Process Assignment

Enter the Federal Fuctional Classification	Principal arterial
Enter the Context Classification	Rural
Link to the Most Recent Version of the MaineDOT Roadway Context Classifcation Map	
Speed limit process	Mobility
Max postable speed limit based on context & FFC (mph)	55

Speed Data

85th-percentile speed (mph)	42
50th-percentile speed (mph)	35
Upper Limit of Pace (mph)	45
Lower Limit of Pace (mph)	35
Existing Speed Limit (mph)	40

Site Characteristics

Segment length (mi)	1.3
AADT (two-way total) (veh/d)	3,200
Number of lanes (two-way total)	2
Median type	Undivided
Number of access points (total of both directions)	26
Number of all-way stops and roundabouts	0

Lane Departure Risk Added - 2

Rounded-Down 85th

Guidance | Evaluation | Decision Tables | References | Acknowledgements

Speed Limit Setting Tool

Statewide Context Map
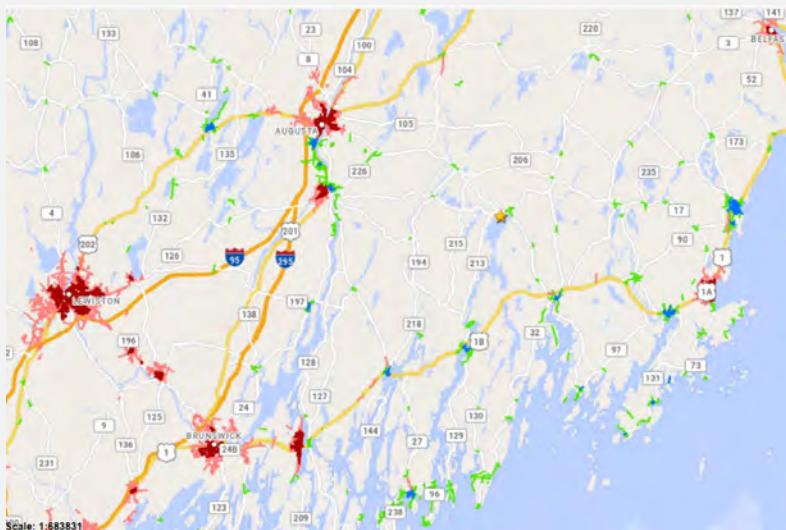
Crash Severity Comparison Tool

Kinetic Energy Network Safety Screening

Intersection KA Potential Dashboard 2024

Intersection KA Potential Rankings 2024

K_A_Potential
- > 1.48 - 3.208
- > 0.659 - 1.48
- > 0.446 - 0.659
- > 0.261 - 0.446
- > 0 - 0.261
- 0.000 - 0.000

Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, USFWS, NRCan, Parks Canada   Powered by Esri

Ranking	Node	Town_Name	Description	Primary_Route	K_A_Potential	Crash_Pattern_Poten
1	3497	AUBURN	Int of BEECH HILL RD DANVILLE CORNER RD N WASHINGTON ST S WASHINGTON ST	0202X	3.21	
2	21038	JAY	Int of CHESTERVILLE RD DEPOT ST FRANKLIN RD	0133X	2.87	
3	55829	SANFORD	Int of ALFRED RD ALUMNI BLVD JAGGER MILL RD	0004X	2.69	

MaineDOT Crash Severity Comparison Tool

Applicability: Results are only accurate when comparing crashes at intersections
Intructions: Add data from dropdown list wherever a red **O** is indicated. Unnecessary questions are colored black. These questions may uncover and become visible based on data entered in other fields.

Crash A		Crash B	
Crash A Input (Choose From Dropdown List)		**Crash B Input (Choose From Dropdown List)**	
Intersection Control	Traffic Signal	Intersection Control	All Other Intersection Controls
Primary Road Speed Limit	35	Primary Road Speed Limit	50
Crash Type	Pedestrian	Crash Type	Intersection Movement
		Collision Angle	Right Angle (Frontal Impact)
		Did the frontal imact occur on the driver side?	Yes - Driver Side
Crash A Calculated Values		**Crash B Calculated Values**	
Fatal and Serious Injury Probability	19.71%	Estimated Fatal and Serious Injury Probability	11.23%
Average Crash Cost Per Crash	$467,622.99	Crash Cost Per Crash	$382,701.45

Crash Severity Comparison

K+A Probability Comparison	Crash A is 75% more likely to lead to a fatal or serious injury crash.
Theoretical Kinetic Energy Comparison	The kinetic energy for Crash B is 2 times higher.
Crash Cost Comparison	The crash cost for Crash A is 22% higher.

Notes:
Use engineering judgement to adjust the speed limit used based on observed speeds.
Example: Increase the speed limit used for calculations by 5 MPH when the 50th percentile speed is 10 MPH or more above the speed limit.
Kinetic Enegy Assumptions: Non-Frontal Impact assumes a 30 degree collision. A speed of 15 MPH is assumed or intersection movement crashes at all-way stops where neither driver runs the stop sign.

MaineDOT Speed Management Toolbox (Draft)

|	
Enter the Target Speed Limit	25
Enter the Existing 85th Percentile Speed	34
Select the Context	Rural town
Select the Federal Functional Classification of the Road	Principal arterial
Do you want to use advanced filters?	

**Please see a list of appropriate speed management strategies below.**

Traffic Calming Category	Traffic Calming Feature	Effectiveness	Cost Range	Seasonal/ Permanent	Possible a or Demon Pilo
Bump Outs / Curb Extensions	Chokers	Effective	Medium	Either	Ye
Vertical Defections	Speed Cushions	Effective	Medium	Either	Ye
Vertical Defections	Speed Tables	Effective	Medium	Permanent	Ye
Continuous Road Narrowings	Removing Pavement (to 13 ft in each direction)	Effective	Medium	Permanent	No
Bump Outs / Curb Extensions	Pedestrian Crossing Bump Outs	Effective	High	Permanent	Ye
Chichanes	Chichanes (No Directional Restrictions With Median)	Effective	High	Permanent	No
Vertical Defections	Raised Crosswalks	Effective	High	Permanent	No
Chichanes	Chichanes (No Directional Restrictions Without Median)	Effective	High	Permanent	No
Continuous Road Narrowings	Narrowing with Curb (to 13 ft in each direction)	Effective	Very High	Permanent	Ye
Roundabouts/Traffic Circles	Full Modern Roundabouts	Effective	Very High	Permanent	No
Sidewalks	Install Sidewalk on Both Sides	Effective	Very High	Permanent	No
Other Pavement Markings	Optical Speed Bars	Somewhat	Very Low	Permanent	Ye
Vertical Elements Within the Clear Zone (In Road)	In-Street Pedestrian Crossing Signage	Somewhat	Very Low	Seasonal	Ye

Mapping Pedestrian Volume Data

Interstate Rutting Data Analysis

Interactive Speed Management Toolbox

- Analyzing the effectiveness of new paving initiatives.
  - HMA with Hydrated lime (Stripping & Rutting)
    1% hydrated lime added to the drum at the same time as the mineral filler.
  - Use of FORTA FI fiber in HMA (rutting & cracking)
  - WMA vs HMA (Emissions & fuel usage reduction)
  - UTBWC (faster and cheaper compared to HMA)

Hydrated Lime's silo

- Documenting experience with new strategies, materials, and technologies
  - ULFGA
  - Modular Expansion Device
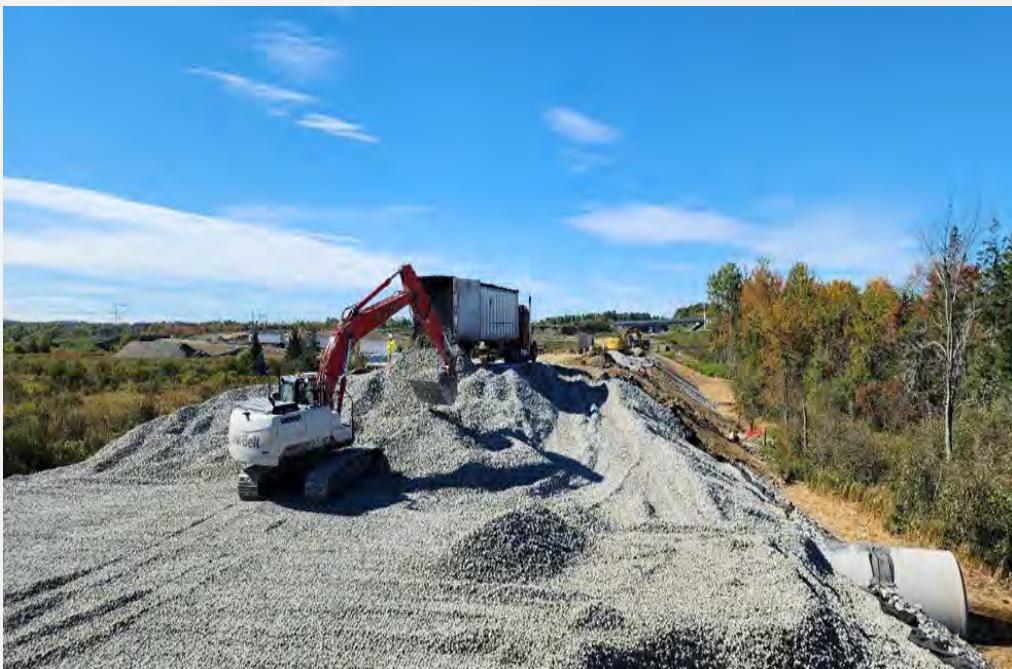
Delivery, Placement and Compaction of ULFGA
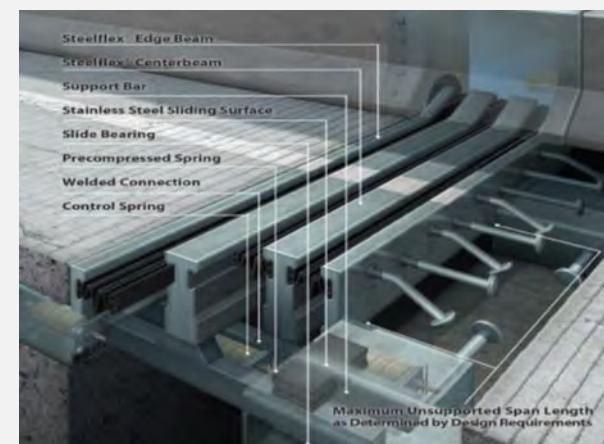
Steelflex Modular Expansion Joint

- Product Evaluation Investigations
- Assist with piloting new tech, evaluating the data as needed.

Scanning using DPS

Blue Hill Falls Bridge picture using a drone

Drone pilot training

IR-SCANNER PRINCIPLE
- Scan lines of single measurements
- Pattern (25x25cm)
- Results in Thermal Profile
- Width up to 13m possible
- Flexible width adjustment
- High precision, calibrated sensor

Scanning using PMTP

- Leading experimentation with pavement intelligent construction and related data analysis.
  - Density Profiling System
  - Paver-Mounted Thermal Profiling
  - Intelligent Compaction

- Guardrail end treatment evaluations
  - Piloting new inspection process.
  - Conducting in-service performance evaluations.

Characteristics	2018 data		2019 data		2020 data		2022 data		2023 data	
	No	Pct.	No	Pct.	No	Pct.	No	Pct.	No	Pct.
No Issue	0	0%	18	38%	7	44%	4	50%	5	22%
1 Issue	10	53%			5	31%	3	38%	4	17%
2 Issues	4	21%			2	13%	0	0%	1	4%
3 Issues	1	5%			1	6%	1	13%	3	13%
4 Issues	2	11%	30	63%	1	6%	0	0%	5	22%
5 Issues	0	0%				0%	0	0%	3	13%
At least 6 Issues	2	11%				0%	0	0%	2	9%
Total	19	100%	48	100%	16	100%	8	100%	23	100%

At least one issue	100%		63%		56%		50%		78%	

MSKT - Results Statistics from 2018 to 2023
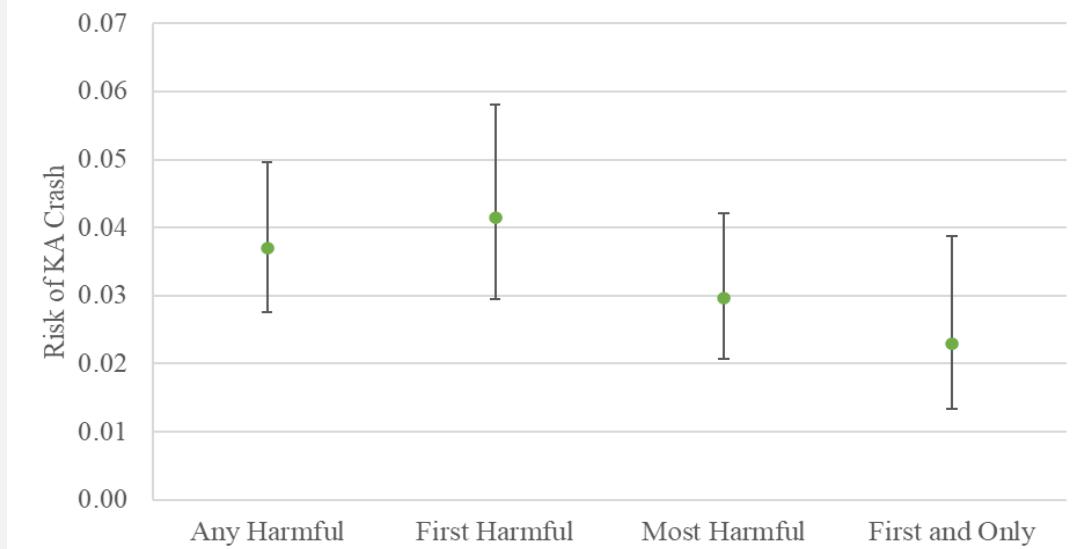
Proportion of KA crashes in various phases of the SOE

Crash Information	
Year	Cases
2015	32,889
2016	33,343
2017	35,003
2018	35,235
2019	35,245

Data Reduction

Intent/Codes Removed	Year	Cases Remaining
Identified Cases with Safety Feature(s): Retain cases having values of 25 and 26 in harmful events field 1-4.	2015	120
	2016	119
	2017	127
	2018	137
	2019	150

Asset Inventory

Safety Feature Identification Method(s)

ISPE Dataset

KEY

◁ Data Reduction Step
◯ Data Files

Dataset Assemblage and Reduction

UPCOMING IN-HOUSE RESEARCH IN MAINE

- Identifying trends and creating visualizations of WIM and vehicle classification data
- Documenting the "history of the interstate"
  - Compiling project history in an improved interface
  - Conducting knowledge management interviews and mapping results.
- Reviewing bridge condition data to update service life estimates
- Literature reviews and survey about UTBWC and interstate paving treatments
- Out of state travel knowledge capture process

# APPENDIX R. NYSDOT – IN-HOUSE RESEARCH

NYSDOT In-House Research

New Jersey DOT Research Peer Exchange 2025

Princeton, NJ

Salma Sultana
Assistant Engineer
Materials Bureau – Transportation Research Section

June 25, 2025

Where are we?
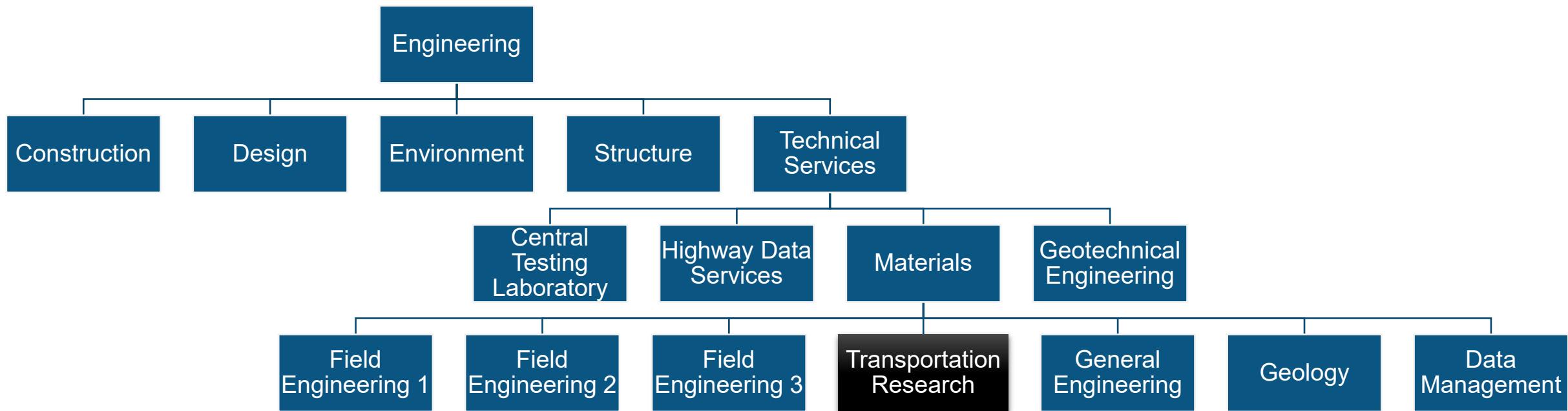
What do we do?

- NYSDOT's Library
- Local and Technical Assistance Program (LTAP)
- Transportation Pooled Fund
- NYSDOT's AASTHO Technical Service Programs
- Research Advisory Committee (RAC) at AASHTO Research and Innovation (R&I) committee
- TRB and NCHRP
- STIC and EDC
- New Product Evaluation
- In-house Research

Who are we?


```
                    Transportation
                      Research
```

Wes Yang	Gail Carpenter	Sue Rahn	Alexander Friedman	Salma Sultana	Tahj-Michael Gibbons
Professional Engineer 2	Office Assistant 3	Senior Librarian	Assistant Engineer	Assistant Engineer	Engineer Trainee
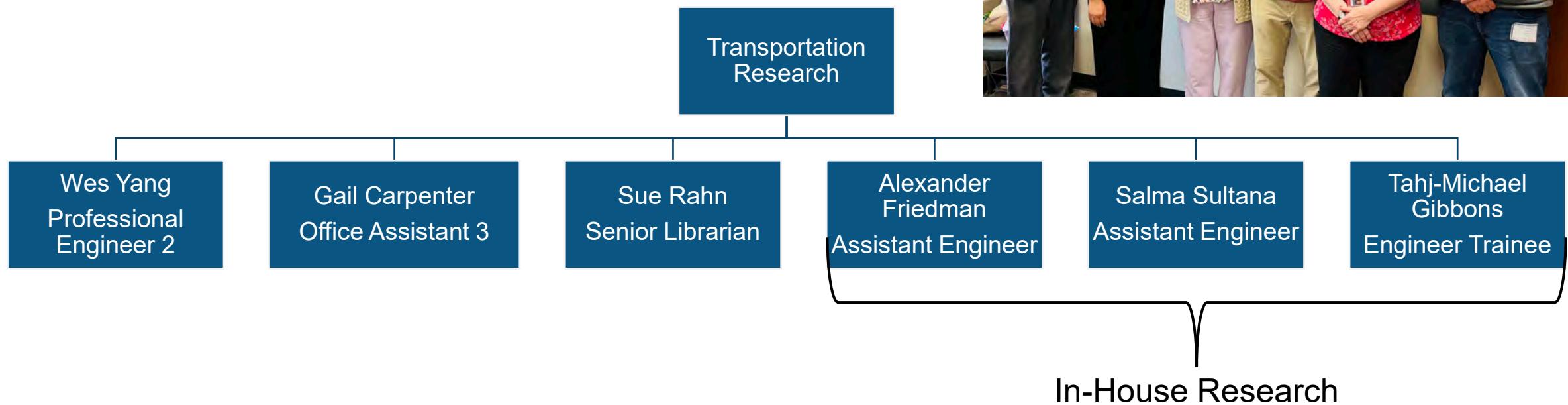
In-House Research

In-House Research at Materials Bureau: Introduction

- All program areas do some in-house research. The focus of this presentation is on in-house research done at the Materials Bureau.

- If anything is initiated within different program areas that affects specifications (materials methods, materials procedures), Transportation Research gets involved (on behalf of the Materials Bureau).

In-House Research at Materials Bureau: Background

- Transportation Research conducts the research in collaboration with other Materials Bureau sections.
- Typically, different Materials Bureau sections will approach with their problem or interest, and a research project is initiated.
- A kickoff meeting is held, and the scope and a work plan will be decided. Most of the time, the projects don't have any solid deadlines.
- Staff hours are funded through the SPR-B fund.
- If research-specific software or other relevant things (equipment, materials, etc.) are needed, the funds allocated to the Transportation Research section can fund them.
- The projects can be initiated anytime they're needed.

In-House Research at Materials Bureau: Function

- Statistical consultation
- Specification updates
- Data collection
- Experiments
- New product evaluation
- Review of published research
- Synthesis of literature review

In-House Research at Materials Bureau: Challenge

- Time constraints and shifting priorities often push documentation to the back burner, causing valuable insights and methods to be forgotten or siloed.

- Lack of standardized documentation practices leads to inconsistent records that are hard to reference or build upon.

- Sometimes, skills needed to advance projects are typically within the program area, but the in-house research staff is responsible for advancing the research project.

Questions?

Thank You