
SHRP2 Capacity Solutions Retrospective Workshop Report

Report Overview

This report summarizes the SHRP2 Capacity Solutions Workshop, held in conjunction with the 2019 AASHTO Spring Meeting, on May 20-21, 2019 in Park City, Utah. The goals of the workshop were to engage agencies involved in SHRP2 implementation activities; discuss experiences and opinions regarding the SHRP2 Program, Capacity Focus Area products, and current disposition of the products; and identify potential next steps. This report summarizes the information shared at the meeting through presentations, break out group discussions, white papers, close out reports, meeting materials, product resources, and meeting evaluation forms. While this report does not represent official guidance or recommendations, it captures feedback recorded from the workshop participants and is provided as a resource to FHWA and AASHTO to consider for similar programs in the future. The report is organized in the following sections:

- Overview of the SHRP2 Program
- Overview of the Capacity Focus Area
- Overview of the Capacity Solution Products
- Overview of Lessons Learned
- Roadmap for the Future
- Conclusion

Appendices include the following:

- Appendix A – Capacity Area Meeting Agenda and Meeting Materials
- Appendix B – Meeting Evaluation Report Results
- Appendix C – Attendee List
- Appendix D – Break Out Group Notes
- Appendix E – Roadmap for the Future

Overview of the SHRP2 Program

The Second Strategic Highway Research Program (SHRP2) is recognized as a complex program with \$232 million dollars dedicated across a nine-year endeavor, involving over 100 research projects and more than 300 research contractors. Its inception was in the form of a congressional request from the Transportation Research Board (TRB), who via FHWA funding was ultimately responsible for research oversight. SHRP2 research produced 63 implementable solutions that help solve various transportation challenges identified by state DOTs, in four focus areas of Safety, Reliability, Capacity, and Renewal. Beginning in 2013, the SHRP2 Implementation Assistance Program (IAP) provided implementation assistance through 7 rounds. Transportation agencies have implemented the SHRP2 products on more than 430 projects across the country, in all four focus areas.

SHRP2 implementation was federally funded and state-supported with a total budget of just over \$170 million. A total of \$155 million has been allocated through the IAP, in the form of financial and technical assistance. States provided dedicated staff to implement the products, attended training and peer exchanges, participated in technical assistance visits, and developed reports. It is estimated that for every \$1 invested by a state DOT in SHRP2 implementation, there is an average of a \$2 return on their investment in the form of project cost savings, direct funding, and technical assistance. Technical assistance included one-on-one subject matter expert training provided to DOT staff, classroom training, peer exchanges, workshops, webinars, summary reports, and other assistance in the application or implementation of a SHRP2 Solution. Over 300,000 individuals have been engaged in the program. Through more than 12,000 outreach activities, SHRP2 showcased the benefits of implementing new and innovative solutions within the field of transportation. In addition to these outreach activities, over

16,000 hours of technical assistance was provided to transportation agencies, largely in the form of consultant support and subject matter expertise.

At this workshop, the participants most familiar with the Capacity Focus Area products, shared their experiences with the SHRP2 Program as a whole. They identified opportunities for continued improvement, collaboration, and support. Their responses are summarized below.

Appendixes A-C include the workshop agenda, materials, attendee list and meeting evaluation responses.

Themes on the Overall SHRP2 Program:

- Overall, the SHRP2 program was successful.
- SHRP2 provided critical funding and support to address transportation challenges that would not have been addressed otherwise and empowered self-sufficiency among state DOTs and MPOs. Participants noted that research might not have happened without the collective funds dedicated to these solutions.
- SHRP2 program success should be measured by how these products continue to be implemented in the future, in the absence of additional incentives and funding.
- SHRP2 products varied in terms of market readiness, particularly the technical products, and there was a need to conduct technological assessments to determine market readiness before implementation could begin. Technical products were more complex, required more customization and were dependent on staff with technical expertise at the agencies implementing the product.
- Timing of the research completion varied by product, with some products taking longer than expected.
- The SHRP2 program was expansive and included a large amount of information, tools, and resources. At times it was overwhelming and somewhat challenging for participants to process all the activity and locate appropriate tools and information.
- Participants felt it was imperative to engage executive leadership and identify champions within agencies to support the implementation of SHRP2 products.
- In the future, potential “quick hit” research and implementation programs must strive to keep pace with rapidly advancing technology.

While SHRP2 success varied across different locations and contexts, participants identified the key factors to success: providing incentive funds; providing technical expertise; creating champions within agencies to support implementation; and strengthening partnerships among FHWA, AASHTO, MPOs and state DOTs. The SHRP2 program reduced risk for state DOTs and other public agencies by providing incentive funding and encouraged engagement among peer IAP agencies. FHWA staff, in their role as the lead federal agency, were essential to reducing institutional barriers to success among participants. Some participants could not confidently deem the SHRP2 program a success, as they continue to face challenges with the “we’ve always done it this way, if it ain’t broke don’t fix it” engrained culture; there is a continued need to break down cultural and procedural barriers to implementation. The overall success of SHRP2 Program will, in part, be measured by the extent that the products, tools, and resources developed during the program continue to be utilized, especially without dedicated implementation funding.

In addition to providing feedback on the overall SHRP2 program, the workshop participants shared their experiences with the research and implementation aspects of the program. Their responses are summarized below.

Themes on SHRP2 Program Research and Implementation:

- There may be a need to identify opportunities to expedite the research phase; there were many external technological advances over the course of the SHRP2 research program, and some of them eclipsed the products and resources being developed within the program.
- There wasn’t always a clear path between research and implementation – at times the research phase did not adequately consider how products would be implemented. Implementation should be considered earlier in the process to inform development of research objectives. (Note – this is an observation from a

transportation agency that may not have been involved in the early stages of SHRP2 research. In fact, implementation was considered, and a report developed on this topic early in the program. The real question may be whether or not the report findings were acted upon adequately or early enough).

- SHRP2 implementation was more successful when agencies had a product champion, adequate staff with necessary expertise, and support of senior leadership. Influential internal champions are critical to long-term implementation.
- Market-readiness of products varied among the focus areas, and even among products within a particular focus area. This was due to inconsistent expectations and unclear objectives (Note – this is strictly an after the fact observation or may even be speculation). Technological assessments should be included in the program to ensure more products are market-ready earlier in the process.
- There are opportunities to increase the quantity of communications materials and outreach about the program, focus areas, and products. One state participant emphasized a significant need for increased program marketing.
- There may be a need for continued FHWA/AASHTO support to sustain many of the SHRP2 products.

Participants acknowledged that despite competition from other FHWA programs like Every Day Counts, and NCHRP activities, the eight years of SHRP2 implementation were well spent to achieve implementation of the research products. Participants indicated that in some instances the research program process took longer than was ideal to support implementation. They did not consider research results out-of-date but noted that some of SHRP2 products have been superseded over time by off-the-shelf products. They felt some research questions were outpaced by technological advancements and expressed appreciation for FHWA's flexibility in allowing states to shape the scope of their implementation project to ensure a more useful outcome.

The participants of this workshop were asked if they felt the Capacity Focus Area products from SHRP2 were well developed and "market ready." Nearly all participants indicated that most products were not initially "market ready," but agreed that through implementation and state participation the products were refined and eventually became "market ready." EconWorks was enhanced by state DOT use, but additional case studies may be needed for it to continue to be relevant. PlanWorks was retooled during the SHRP2 implementation phase and is now "market ready," however, it may lose its relevance if not updated and refreshed.

When asked what they would do differently if they had the opportunity to launch the SHRP2 research program all over again, they suggested a larger outreach effort to create buy-in from all states and MPOs. The participants felt that while a handful of states and MPOs were actively involved in the SHRP2 research efforts, other states were not involved at all. In terms of the "Works" products, the participants recommended more robust outreach to universities and younger audiences to obtain strategies to distribute results. Outreach to the next generation was emphasized later in the SHRP2 implementation program as the Education Connection. Participants also stated that the research period needed to have a shorter cycle, as it was difficult to sustain its momentum over 10 years. It was noted that the transportation industry is changing rapidly, and perhaps over the course of the SHRP2 program research did not account for evolving technology.

Overview of the Capacity Focus Area

On the second day of this workshop (May 21st) the breakout session concentrated specifically on the Capacity products themselves. Participants identified the following key themes and takeaways. Appendix D contains detailed notes from all the breakout sessions, including the Capacity product specific discussions.

The SHRP2 Capacity focus area provided planning tools and resources to streamline planning and environmental processes. Capacity products with off-the-shelf value supported accelerated project delivery, provided the recipient possessed the right staff, sufficient data, and access to software. Participants expressed that even when a product was not fully functional, the implementation effort proved worthwhile by producing valuable lessons

learned and better agency knowledge of the capacity issues addressed. Using these tools helped to improve the core competencies within participating agencies, a valuable activity state DOTs want to continue. The products, and the training to use them, enabled data exchange among multiple agencies, which improved overall planning activities and helped to streamline environmental processes. These tools and resources varied in effectiveness based on the context in which they were implemented, but several achieved measurable benefits.

The ability to conduct an accurate needs assessment using Eco-Logical convinced one state DOT to replicate the Eco-Logical implementation throughout the entire state and ensured an additional \$2 million committed by the state to fund mitigation. Federal partners supported this effort by directing stakeholders to their environmental data web page created through SHRP2 funds.

The SHRP2 Capacity focus area implementation included a significant number of projects spanning many years. The amount of information contained within the Capacity Focus Area products was overwhelming for some, even just within the PlanWorks suite. Due to staff turnover and missing links, it was possible to overlook synthesized research connections.

Themes on the Capacity Focus Area:

- The SHRP2 Capacity program was relevant and helpful.
- The tools developed for DOTs and MPOs worked to make them more self-sufficient and less reliant on consultants.
- SHRP2 Capacity IAP offerings and awards created a buzz that drew stakeholders and potential users of the tools to the table. The IAP provided a forum for implementation of the SHRP2 products.
- SHRP2 Capacity products measured results, but also exposed issues needing further development as well as the importance of complete and accurate data collection to fully engage the tools.
- The search for economic benefits leads to creative tools and processes. For example, PlanWorks emphasizes performance-based planning and the modules steer transportation practitioners to match solutions to criteria and goals.
- By providing agencies with tools to ask more meaningful questions, transportation professionals can produce deliverables that better align with community goals and deliver context appropriate solutions.
- There is now broader, national support for Ecological, EconWorks, and Freight Demand Modeling implementation.
- Products must have a home for continued support once the formal SHRP2 implementation efforts end.
- Process tools were more easily implemented than technical tools.
- New programs should consider workforce capabilities and turnover rates.

Overview of the Capacity Solution Products

SHRP2 Capacity products presented and discussed in this workshop included the following:

- PlanWorks (C01) and Planning Process Bundle (C02/C08/C09/C12/C15)
- EconWorks (C03/C11)
- TravelWorks (C04/C05/C10/C16)
- Ecological (C06)
- Freight Demand Modeling and Data Improvement (C20)
- Expediting Project Delivery (C19)

Discussions of each Capacity product included an agency testimonial outlining their experiences using the product.

PlanWorks and the Planning Process Bundle

PlanWorks (C01), currently hosted by FHWA, was designed to support a broad range of planning projects and intended for use by state DOTs and MPOs. PlanWorks houses research results and/or products from nine additional SHRP2 products including:

- Performance Measures for Highway Capacity Decision Making (C02)
- Integration of Conservation, Highway Planning, and Environmental Permitting (C06)
- Transportation Visioning for Communities (C08)
- Incorporating Greenhouse Gas Emissions into the Collaborative Decision-Making Framework (C09)
- Guide to Public-Private Partnerships and Non-Standard Procurements (C12)
- Integrating Freight Considerations into the Highway Capacity Planning Process (C15)
- The Effect of Smart Growth Policies on Travel Demand (C16)
- Expediting Project Delivery (C19)
- Integrating Planning and Operations (L17)

For the Implementation Assistance awards, FHWA chose a subset of SHRP2 related work that is housed in PlanWorks. The “Planning Process Bundle” (C02/C08/C09/C12/C15) projects were developed to focus on the topics submitted in their Round 5 solicitations. The PlanWorks software suite was designed to facilitate collaboration and broad stakeholder support to ensure a more successful planning process. During the implementation phase it was used in developing long-range plans as well as corridor specific plans, and a variety of environmental clearance documents.

The current PlanWorks disposition, led by FHWA includes the following:

- A review and update of the entire software suite content to identify and address outdated information
- Content enhancement to reflect changes related to the passage of both MAP-21 and the FAST Act
- Updating all existing reference links and adding new links
- Revision of introductory material content and format
- Minor adjustments to Home Page to make new resources visible to the user
- Subject area expert review of all topic-specific information to verify accuracy and completeness
- Two new applications: (1) Bicycles and Pedestrians and (2) Health in Transportation
- On-line training videos and resources

Meeting participants identified several benefits of PlanWorks, including flexibility to support a variety of planning goals; streamlining project processes; creating collaborative partnerships with stakeholders and partners; and integrating emerging topics. PlanWorks is a useful educational tool for new planners and a diagnostic tool that provides access to a wide range of resources. It illustrates how the planning process works and how to integrate emerging topics into planning decisions.

EconWorks

EconWorks, now moving forward as a state led pooled fund, with support from AASHTO and a funding contribution from FHWA. It addresses a need for evidence-based information regarding the costs and benefits of proposed projects and provides planners with the resources to make well-informed decisions and investments. EconWorks incorporates supplemental tools that produce broader benefit analysis, including before and after case studies that demonstrate economic returns on investments; tools for evaluation; webinars to train and educate; and the Wider Economic Benefit tools, which predict changes in transportation factors that affect economic productivity.

Caltrans discussed their experience with the EconWorks tools. Significant funds were left after completion of the SHRP2 implementation project and FHWA allowed them to use a consultant to work with California's own in-house tools: the CalB and CalC models. Caltrans uses the Wider Economic Benefits of Transportation Analysis Tools (WEB tools), SHRP2 C11 product, to complement CalB and CalC results. By factoring in reliability, the benefit-cost ratio for some projects can increase by tenths of a point. This may impact projects that are on the cusp of being funded, or in some instances, a project could be ranked higher than another. Caltrans uses the WEB tool to complement its CalB and CalC results as part of the benefit-cost federal grant application requirements.

Caltrans noted some limitations of the Connectivity, Market Access, and Accounting tools, including a need for increased transparency regarding scoring assumptions within the Connectivity tool; simplifying data requirements for the Market Access tool; and correcting the Accounting tool so that formula-based cells are not hard coded.

TravelWorks

The 4 tools within TravelWorks, now moving forward as a FHWA pooled fund, were presented and discussed.

C04 – Highway Congestion, Reliability, and Pricing tool includes travel demand models with three levels of guidance. San Diego Association of Governments (SANDAG) applied the tool on behavioral sensitivity to highway congestion and pricing. This example was used to show observed toll road demand more effectively than existing methods.

C05 – Highway Capacity Needs provides guidance on quantifying capacity benefits of operations, design, and technology improvements at the network level. Non-recurring congestion represents a significant portion of the delay experienced by travelers and has a significant impact on travel time and travel time reliability. Yet, traditional operational models do not account for its effects. Additional research is needed to identify strategies to account for the effects of non-recurring congestion.

C10 – Integrated Dynamic Travel Model improves urban-scale modeling and network procedures to address operations or spot improvements that affect travel time, route, mode, reliability, or emissions. It links travel behavior choices, such as departure time or route, with congested network conditions to more accurately reflect real-world dynamics. Agencies found that computational requirements exceeded reasonable expectations for run times, and in some cases, this impeded the ability to calibrate, validate or apply the models. Operational supply and demand models have been tested in several places and have demonstrated value but are not yet market-ready.

C16 – Rapid Policy Assessment (RPAT) is an integrated transportation investment decision-making tool that includes land development and growth management policies. It supports and informs scenario planning and provides insight on the effects of potential transportation policies. The first strategic model is now referred to as VisionEval. VisionEval tools are exploratory and useful for looking at thousands of scenarios. The RPAT scenario analysis dashboard is an interactive tool and these models help to better understand uncertain futures. FHWA and Volpe are hosting a pooled fund for VisionEval that includes 10 State DOTs and MPOs. The primary objectives are to maintain the tool and ensure that it remains modular and customizable for users.

Eco-Logical

The Eco-Logical approach organizes current methods for addressing natural resource identification, avoidance, minimization and mitigation into a systematic, step-wise process that starts at the beginning of the transportation planning process and concludes with establishing programmatic approaches to recurring natural resource issues that are implemented at the project level. Utilizing the Eco-Logical approach can assist in fostering collaboration between transportation agencies, resource and regulatory agencies, other partners, and stakeholders. The benefits of using Eco-Logical include expedited project delivery, improved partnerships, and improved environmental outcomes. Limitations include lack of support and challenges obtaining quantifiable benefits.

The current disposition, led by FHWA, includes integrating Eco-Logical into complementary programs, training, and outreach (e.g., PEL, EDC); engaging agency leadership to educate and promote Eco-Logical; and developing a

strategy that focuses on expediting project delivery and supports agency requirements, such as One Federal Decision.

Maine DOT used Eco-Logical to develop a programmatic Endangered Species Act consultation for Atlantic salmon. Through this, Maine DOT streamlined processes and gained the trust of environmental agencies and resource agency partners, saving about \$250K in paperwork alone. As they developed the Biological Assessment (BA), SHRP2 provided exceptional technical assistance, specifically helping the DOT move forward with the U.S. Fish and Wildlife Service (USFWS). FHWA filled in when USFWS didn't have available staff. Maine DOT drafted the BA, everyone signed it, and the entire process was expedited. The success exceeded expectations and FEMA used this as a model for their own work. Currently, Maine DOT is leading an In-Lieu Fee on the effects to Atlantic Salmon and contracted with the Conservation Fund to develop the Atlantic Salmon Restoration and Conservation Program (ASRCP). Currently, the in-lieu fee structure is not economical, but they are actively trying to adjust so that it will be used more.

Freight Demand Modeling and Data Improvement

The SHRP2 C20 Freight Demand Modeling and Data Improvement initiative, currently led by FHWA, assesses the state of practice of freight demand modeling and freight data as related to highway capacity planning and programming. For a number of years, passenger travel modeling is moving toward, activity-based modeling techniques. SHRP2 C20 advanced the development of behavioral/agent-based freight demand models that consider supply chain and delivery systems. In addition to modeling, advances in information technology have greatly improved how transportation planners access freight data. The SHRP2 C20 program developed an analytic approach to serve as the foundation for a land use and freight framework and related models. SHRP2 also advanced research on behavior/agent-based supply chain modeling that will allow state DOTs and MPOs to better understand freight travel behavior as it relates to industry decision-making processes used for logistics and freight movement.

The SHRP2 Implementation Assistance Program (IAP) funded pilot projects in 11 States to develop state-of-the-art tools for freight modeling and data analysis. This included four behavior-based freight models and seven innovations in local freight data. Modeling projects looked to develop forecasting methods and tools that can address decision-making needs. Local freight data projects advanced the collection and use of freight data at the sub-regional levels. These IAP pilots developed of behavior/agent-based supply chain models; methods for understanding freight delivery patterns in urban areas; technologies to collect data on freight traffic; interactive mapping and visualization of freight data; platforms for sharing data on a regional level; and tools for greater insight into the linkage between industry and infrastructure needs.

Each IAP pilot faced its own issues, the understanding of which will be helpful to those agencies that would like to incorporate these practices in their own freight planning activities. Some key lessons are summarized below:

Methods for Collaboration Between the Public and Private Sector

- Conduct outreach activities to build relationships with the freight community.
- Create a regional freight stakeholder group and use their expertise to the greatest extent possible.
- Obtain agreements with partner organizations to get advice on potential data sources and benefit from shared experience.
- Use the freight stakeholder group to help design surveys for ease of use and maximum response rate.
- Establish relationships with local businesses and organizations to improve survey response.

Methods for Data Collection

- New data sources are time-intensive to develop. Do not underestimate the level of effort to work with large datasets.
- Prioritize the sources that are easiest to develop and most versatile in analyses.

- Identifying sources and beginning the process of acquiring the data early is important.
- Publicly available data sources can be used as inputs into the transportation planning process.
- Explore alternative data sources and/or alternative data to obtain desired data.
- Conduct a comprehensive scan of other research with respect to data sources, methods of extracting and using the data, data limitations and proxy data sources.
- Identify and include strategies for integrating data from disparate sources and in varying formats during the planning stages.
- Combine transportation and other datasets to reveal new relationships between transportation and economic activity.
- GPS data, driver surveys with Smartphone can be useful for data collection.
- With continued improvements, video image processing and license plate recognition are promising technologies to support data collection.
- Use in-person freight facility visits to identify and correct errors.

Forecasting Models and Tools to Address Decision-Making Needs.

- New models can provide insight into supply chain decisions, including distribution channels, models, and shipment sizes.
- New models improve depiction of trucks on the network by including a component focusing on service vehicles, separate from typical freight vehicles.
- Illustrative decision support tools allow exploration of “what if” scenarios using modeling estimates.
- Having an open source product results in the creation of new data sets, users, and uses for the data.
- Even off-the-shelf model solutions require significant time to customize for the region.
- Adapt the model development approach as early as possible to the expected types of data to prevent issues with scope and schedule.
- Benchmark new models against existing models and techniques to evaluate their effectiveness.
- The majority of the work accomplished was not region-specific and could be replicated by other agencies with comparable data access and resources.
- Agencies can replicate the activities completed within this project to tailor and implement a similar behavior-based freight demand model.

FHWA and AASHTO also held 10 SHRP2 C20 workshops in 2016 and 2017. Each workshop convened freight data decision makers, practitioners, analysts, researchers, and others representing State and regional/local agencies, private industry, universities, and other organizations. The workshops featured robust discussion on freight data and regional collaboration opportunities and needs related to: 1) communication, coordination, and capacity building; 2) data resource needs; and 3) the planning and decision-making process. Participants stressed the importance of collaborating with partners to leverage datasets. They also recommended mechanisms to better integrate freight data and criteria into existing planning, operations, and decision-making processes. The highest-priority action items that emerged from the workshops were: building and strengthening public and private sector partnerships as well as regional partnerships; enhancing training and technical capacity-building opportunities; and improving freight data quality at all levels of government. An outcome of the workshops was the development of a Freight Data Guide.

Expediting Project Delivery

The current disposition of Expediting Project Delivery is being supported by FHWA and includes integrating strategies into complementary programs, training, and outreach (e.g., PEL, EDC); engaging agency leadership to educate and market the product; and developing a strategy that focuses on expediting project delivery and supports agency requirements, such as One Federal Decision.

Statewide Initiatives Enhancements since Self-Assessment / Audit

- Commitment tracker module with companion statewide training (FDOT)
- Internal projects initiation form developed to track projects (Arkansas DOT)
- Scope of Services Tool (MassDOT)
- New Project File and Records Management chapter in the PD&E Manual (Florida DOT)
- Expanding inventory of computer-based training (Multiple IAP States)
- Manual for Local Public Agencies conducting Federal-Aid highway program delivery (Arizona DOT)
- Improved public involvement process for bridge projects (VTrans)

The product improved projects and environmental outcomes; improved internal/external relationships; enabled a holistic approach to transportation project development and delivery, which is often challenging given time and budget constraints; and contributed to time savings by allowing agencies to anticipate and reduce project delays. Participants identified limitations in the product's strength as no one size fits all.

Next steps will include identifying ways to advance utilizing the Expediting Project Delivery concepts prior to NEPA and involving the right people once NEPA is initiated. Early coordination is very valuable to gain consensus upfront before beginning a NEPA study. Providing these resources to field workers and maintaining consistent staff from design through the NEPA process provides a new level of project efficiency.

Overview of Lessons Learned

The workshop participants were asked to consider future efforts to implement a set of technical products coming out of research and what they might do the same or differently in terms of their SHRP2 experience.

Assessment of Market Readiness

- Participants suggested an interim step between research and implementation where the product is assessed by states for market readiness.
- Market readiness should consider the technical capability of agencies to use tools, products, and resources.
- Future work needs to keep pace with technological advances even as research is being conducted to ensure products are technologically current upon completion. Consider streamlining research and implementation processes so that they are accomplished over a shorter period of time.

Knowledge Management

- States identified a need to improve information sharing between agencies. For example, a digital platform could be established and managed by AASHTO to house reference materials, and continually promoted during webinars, training, etc.
- States suggested consideration of how information and outcomes could be shared with users earlier in the process.
- States identified a need to improve documentation to ensure continuity of implementation across staffing changes.
- States suggested more product peer exchanges to support greater knowledge transfer among state DOTs and MPOs.
- General indications included that states appreciated providing input at the implementation planning workshops conducted at the beginning of the implementation phase. They generally felt it was important to tailor the product implementation specifically for DOT practitioners.

- Stakeholders and practitioners would like to work more with researchers in a collaborative process earlier in the research phase. Research would be refined in consultation with practitioners throughout the development phase and would therefore be more responsive to problems identified by practitioners.

Implementation Assistance Program

- States were enthusiastic about the ease of application, the amount of funding and the flexibility working with FHWA to adapt their scopes to obtain practical results.
- States indicated that process-based tools were easier to implement than more technical products. In some instances, agency staff did not have adequate skills or expertise to fully utilize technical products, especially those that involved modeling. While technical assistance was offered for most products, it was not always utilized to its fullest capacity.
- In general, the award model supported implementation because it encouraged communication and coordination between FHWA, State DOTs, and MPOs. Some States suggested that implementation through AMPO or NACTO may have been easier for some products.
- Ultimately, successful implementation is dependent upon identifying a staff champion to ensure the product is used within the agency.

Implementation of the Product with Technical Assistance

- States appreciated technical support.
- States indicated that more staff training, skill building, and peer exchanges would round out the technical assistance efforts.

Adoption as Routine Practice

- Having FHWA, AASHTO, and TRB promoting this effort gave needed credibility to practitioners with leadership, although cultural shifts in institutions can remain cumbersome.
- States suggested identifying senior level champions and conducting succession planning to support institutionalization of products within agencies.
- It will take time, additional outreach, and training to assess how well the products are adopted into routine practice.
- Participants suggested that agencies could require consultants and contractors to use these tools by referencing them in RFPs.

Marketing and Communication

- Additional outreach is necessary to promote products. It is important to communicate the value of the SHRP2 products and tools.
- Some SHRP2 product websites (e.g. PlanWorks) were overwhelming and difficult to navigate. Consider creating more concise and streamlined websites that are easier for users to navigate.
- Participants suggested increasing awareness by providing related problem statements to NCHRP and TRB for continued development of SHRP2 products and tools.
- Participants suggested additional peer exchanges, webinars, workshops, presentations at local and regional conferences, and training and education through other avenues such as NHI and university curriculums.

Roadmap for the Future

This section identifies the lead agency, recommended actions, and next steps in furthering each of the SHRP2 Capacity products below. Additional notes from the meeting are detailed in Appendix E.

PlanWorks

Lead Agency

PlanWorks will continue to be hosted by FHWA, who will be the sole funder for the time being. As the needs of transportation practitioners continue to change, FHWA will continue to update and adapt PlanWorks to remain relevant and useful. FHWA recently updated the website (<https://fhwaapps.fhwa.dot.gov/planworks/Home>) and a series of peer exchanges and workshops are being conducted/planned. On the horizon are newly developed marketing and outreach materials and new case studies that will enhance PlanWorks' presence and relevance. As the first major update in several years, the content on the PlanWorks website was recently refreshed by removing outdated items and identifying new content that reflects the latest thinking on individual topics. FHWA relied upon the PlanWorks Expert Task Group to provide vital input on these content changes. The updates will reinforce that PlanWorks is a resource for collaboration during all phases of transportation decision making.

Recommended Actions

Participants recommended the following actions:

- Keep content updated, especially by incorporating emerging topics, such as connected and automated vehicles (CAVs), resiliency, and Mobility as a Service (MaaS).
- Develop outreach plans in coordination with users.
- Develop core messaging that focuses on engaging existing and identifying new champions.
- Continue to actively provide training or education to state DOTs and MPOs on how PlanWorks can support collaborative decision-making.
- Establish national programs for training, education and exposure to engage more states.

Next Steps

Through incorporating the recommendations above, PlanWorks will provide a useful educational resource for new planners that provides access to a wide range of resources. The product will continue to be a resource for transportation practitioners to integrate new and emerging topics into decision-making, help overcome roadblocks, and streamline decisions throughout the planning process.

EconWorks

Lead Agency

EconWorks has now moved to a state led pooled fund, supported by AASHTO staff, with a significant funding contribution from FHWA. There is currently \$300,000 in state and federal funding already committed with total costs expected to be \$640,000 over the five-year period. The scope of work over the next 5 years includes:

- Develop new case studies and add them to the database
- Provide technical assistance to users
- Provide webinars and outreach on the benefits of EconWorks
- Ensure EconWorks tools are operational for all users
- Provide oversight, management and ongoing support of the EconWorks website.

Recommended Actions

Participants recommended the following actions:

- Consolidate Tools for Assessing Wider Economic Benefits of Transportation (C11) with other travel time reliability methodologies.
- Unlock the Connectivity tool to be transparent and allow users to adjust facility assumptions.
- Simplify data requirements to run the Market Access tool.
- Ensure the Accounting tool can integrate other tool outcomes and that it is running correctly.
- Continue to establish peer-to-peer review requirements.
- Increase the number of case studies so that there can be more cases within the existing categories of project type, size, region and setting.
- Enhance case study usefulness for validation and research studies by adding more pre/post traffic data to existing cases, to show how observed economic impacts follow from observed changes in volumes and speeds (or travel times).
- Enhance Tools for Assessing Wider Economic Benefits of Transportation (C11) by enabling it to be more versatile as a planning tool, without requiring it to be fine-tuned to a specific road design (that may not yet be determined in the planning and programming process).
- Rather than proliferate more variations of the market access tools and connectivity tool for different uses, develop generic prototypes with instructions for customization by state DOTs.
- Establish national programs for training, education and exposure to engage more states.

Next Steps

The EconWorks web-based tools will help planners incorporate economic analysis into early project decision making. Notably, a more robust and updated case study database will allow planners to compare proposed transportation projects to similar completed projects to assess potential economic impacts on employment, income, economic output, etc.

TravelWorks

Lead Agency

TravelWorks will become part of the VisionEval product maintained by the FHWA pooled fund. The goal is to maintain benefits of the tool but keep it at a modular level to allow for plug and play and for it to be scalable to the metropolitan level.

C04 – Highway Congestion, Reliability, and Pricing This research will likely continue as extensions of the SANDAG lead adopter work, as other MPOs are considering implementing the methods.

C05 – Highway Capacity Needs There are no plans at this time to continue with this line of research. FHWA will look for opportunities with other disciplines, notably Operations.

C16 – Rapid Policy Assessment (RPAT) has been integrated into the VisionEval product (<https://visioneval.org>) and will be maintained by a pooled fund led by FHWA with seven state DOTs (CA, MD, NC, OH, OR, VA, WA) and four MPOs (Atlanta, Houston, Las Vegas and Philadelphia). Pooled fund information is available here:

<https://www.pooledfund.org/Details/Study/621>. The current VisionEval pooled fund will operate through 2020, with a possible extension, and FHWA expects a reincarnated pooled fund will continue the work beyond that.

C10 – Integrated Dynamic Travel Model Work will continue to fill in the gaps identified through the pilot projects, with a focus on developing network data specifications; continuing applied research on agent-based model concepts; developing faster dynamic network model concepts suitable for metropolitan scale applications; and developing of data sets suitable for testing dynamic travel model capabilities.

Recommended Actions

Participants recommended the following actions:

- C04
 - Develop additional case studies; they can provide a variety of useful contexts for users to apply the methods.
 - Investigate the use of big data to help understand congestion, reliability, and pricing.
 - Synthesize model applications for congested or priced corridors.
 - Establish national programs for training, education and exposure to engage more states.
- C05 (Although there are no plans to continue research for this product, meeting participants recommended the following.)
 - Conduct research on the effects of non-recurring congestion.
 - Develop case studies to help users understand how the research is applied in a real-world context.
 - Make DynaSmart-P available to users.
 - Establish national programs for training, education and exposure to engage more states.
- C10
 - Prepare synthesis of integrated models.
 - Develop prototype and implement.
 - Survey users to understand what the best applications are and how they can be more practical.
 - Establish national programs for training, education and exposure to engage more states.
- C16
 - Combine strategic planning tools into a single product.
 - Incorporate NCRHP 20-102(9) research on CAVs.
 - Calibrate VisionEval model components with national data.
 - Establish national programs for training, education and exposure to engage more states.

Next Steps

The VisionEval project embraces more than just RPAT, and it provides a comprehensive framework for strategic analysis of a wide range of policy options that will continue to include the land use elements that were the singular contribution of C16.

Eco-Logical

Lead Agency

Overall, participants indicated the Eco-Logical tools were very helpful and should be advanced for future implementation efforts. The FHWA Office of Environment, Planning, and Realty is now leading the Eco-Logical efforts and resources are located on FHWA's website:

https://www.environment.fhwa.dot.gov/env_initiatives/eco-logical.aspx).

Recommended Actions

Participants recommended the following actions:

- Identify data/information needs early for uses that can be gathered during the early planning stages.
- Dedicate additional resources to the later steps of Eco-Logical.
- Provide continued technical support.
- Identify additional funding sources. Funding sources could be additional monies from FHWA or state DOTs through Pooled Funds.
- Coordinate and engage with other agencies to streamline the process and connect to PlanWorks.
- Identify opportunities to engage national, regional, state, and local-level staff about Eco-Logical, such as online classes, in order to build awareness and ensure consistent information is provided to stakeholders.
- Communicate the value and importance of products to a wider audience.
- Incorporate into college curriculums for planning and environmental studies
- Engage other professional groups (e.g., WTS, APA) as well as consultants.
- Provide additional support in the form of peer exchanges and webinars.
- Develop additional case studies to provide greater context and continue to update the content.
- Investigate challenges in obtaining buy-in for Eco-Logical from local agencies that implement projects and share effective practices in overcoming these challenges.
- Further support agencies in adopting quantifiable performance measures and tracking progress over time.
- Use a set of consistent questions or tracking methods to evaluate the progress of recipients from year to year.

Next Steps

Following the recommendations above will ensure wise, efficient, and environmentally sound planning and design and help expedite permitting processes across the board.

Freight Demand Modeling & Data Improvement

Lead Agency

The FHWA Office of Freight Management and Operations (FHWA-HOFM) is now leading this effort and resources are located on FHWA's website: https://ops.fhwa.dot.gov/freight/freight_analysis/fdmdi/index.htm.

There is no specific funding for C20 for the time being; FHWA has been integrating the product into its day-to-day work, such as the updated QRFM, freight planning guidance, TMIP, talking freight webinars, etc.

Recommended Actions

Participants recommended the following actions:

- Continue Regional Freight Forums/Workshops.
- Leverage existing FHWA funding opportunities and grants, particularly those that develop agency competencies and support planning initiatives.
- Increase awareness of the SHRP2 freight data guide by turning it into a web guide, providing webinars, and engaging AASHTO Freight/Economic Development Task Force, AMPO, NLC, and NACO.
- Establish national programs for training, education and exposure to engage more states.
- Add freight projects in EconWorks as case studies.
- Incorporate into the EconWorks and PlanWorks tools to include multimodal freight type projects.
- Continue efforts to support a national freight database.

Next Steps

Freight Demand Modeling will continue to promote the analytic approach to become the foundation for an effective land use and freight framework and related models and work toward a full functioning freight model. As this research on behavior/agent-based supply chain modeling advances it will allow state DOTs and MPOs to better understand freight travel behavior as it relates to industry decision-making processes used for logistics and freight movement.

Expediting Project Delivery

Lead Agency

The FHWA Office of Environment, Planning and Realty is now leading this effort and resources are located on FHWA's website: https://www.environment.fhwa.dot.gov/env_initiatives/SHRP2.aspx.

Recommended Actions

Participants recommended the following actions:

- Identify ways to advance this process prior to NEPA and ensure the right people are involved when NEPA is initiated. Early coordination is very valuable to get consensus upfront before beginning a NEPA study.
- Integrate strategies into complementary programs, training, and outreach (e.g., PEL, EDC)
- Engage agency leadership to educate and market the product.
- Establish national programs for training, education and exposure to engage more states.
- Develop a strategy that focuses on expediting project delivery and supports agency requirements, such as One Federal Decision.
- Involve other resource agencies in developing best practices.

Next Steps

By following the recommended actions, providing these resources to field workers, and maintaining consistent staff from design through NEPA, a new level of project efficiency will be achieved.

Conclusion

The workshop successfully engaged state DOTs and MPOs involved in SHRP2 implementation activities and yielded key takeaways regarding the SHRP2 program; Capacity Focus Area products; current disposition of the products; and next steps. While the process of implementing SHRP2 and its success varied across different locations and contexts, the SHRP2 program and Capacity products were overall successful in helping state DOTs and MPOs address important transportation related challenges.

The success of SHRP2 will in part be measured by the extent that the products, tools, and resources developed during the program continue to be utilized. Although SHRP2 funding is no longer available to support the implementation of the Capacity products, the products with the greatest value to state DOTs and other agencies will continue to be supported and utilized. FHWA, AASHTO, and TRB successfully collaborated to support SHRP2, and the lessons learned, and recommended actions gathered from this workshop will be used to support and develop future initiatives.

Appendix A – Focus Area Meeting Agenda and Meeting Materials



Photos courtesy: MDOT, Maine DOT

SHRP2 Capacity Solutions Retrospective Workshop Monday-Tuesday, May 20 – 21, 2019 Final Agenda

Committee on Planning Strategic Planning Session

Please join us to discuss outcomes and thoughts on the research and implementation of SHRP2 Capacity Products along with next steps for future development.

**Silverado Hotel – Silverado Room
2669 Canyons Resort Drive, Park City, UT**

Monday, May 20, 2019

Time	Topic	Invited Speakers
8:00 am	WELCOME AND INTRODUCTIONS	
8:30 am	SHRP2 OVERVIEW	Matt Hardy, AASHTO Ann Brach, TRB Brian Gardner, FHWA
	<ul style="list-style-type: none"> • High-level overview of all the SHRP2 Capacity products including: <ul style="list-style-type: none"> ○ Background of why they were developed ○ Goals of the implementation research ○ Results of the pilot efforts and where we are today • Introduce Product Panels 	
9:00 am	PRODUCT PANELS	
	<ul style="list-style-type: none"> • C03/C11 EconWorks (30 mins) <ul style="list-style-type: none"> ○ SME: Glen Weisbrod, EDR Group ○ Testimonial: Coco Briseno, CALTRANS • TravelWorks (30 mins) <ul style="list-style-type: none"> ○ SME: Maren Outwater, RSG ○ Testimonial: Tara Weidner, Oregon DOT (By Phone) • C20/Freight (30 min) <ul style="list-style-type: none"> ○ SME: Jeff Purdy, FHWA ○ Testimonial: Brian Ryder, Baltimore Metro Council 	
10:30 am	BREAK	
11:00 am	<ul style="list-style-type: none"> • PlanWorks and Planning Process Bundle (45 mins) <ul style="list-style-type: none"> ○ SMEs: Reena Mathews, FHWA, and Janet D'Ignazio ○ Testimonials: John Miller, VDOT, and John Orr, ARC • C19 Expedited Project Delivery (30 mins) <ul style="list-style-type: none"> ○ SME: David Williams, FHWA ○ Testimonial: Steven Braun, FDOT • C06 Ecological (30 mins) <ul style="list-style-type: none"> ○ SME: David Williams, FHWA ○ Testimonial: Eric Ham, Maine DOT 	

12:45 pm	WORKING LUNCH	
	COP Subcommittee Meetings with lunch	
2:00 pm	BREAKOUTS – SMALL GROUP DISCUSSIONS	
	<p>For potential future research efforts, we want to document what worked well and what could be improved.</p> <ul style="list-style-type: none"> • Was the SHRP2 research program successful? If yes, why? If not, why not? • If you were going to document the key takeaways from the SHRP2 research program what would they be? • If we could launch this research program over again, what would you do differently? 	
2:20 pm	REPORT OUT	
2:40 pm	BREAK	
3:00 pm	BREAKOUTS – SMALL GROUP DISCUSSIONS	
	<p>How successful was the implementation aspects of the SHRP2 research program?</p> <ul style="list-style-type: none"> • Participants will break into 4 groups (likely 15-20 per group) There will be a dedicated note taker at each “station” <p>Each station will pose the following questions: For potential future implementation efforts, we want to document what worked well and what could be improved.</p> <ul style="list-style-type: none"> • Was the implementation of SHRP2 research program successful? If yes, why? If not, why not? • If you were going to document the key takeaways from the SHRP2 implementation efforts, what would they be? • From an implementation perspective, is there a need for any of these products or other products in the SHRP2 program to have greater national penetration? If so, which ones? How would you go about supporting that? • Was the SHRP2 program easy to implement within your state? Was it well integrated into DOT/MPO planning and decision-making processes? Is it part of the way you do business? • If we could launch this program over again, what would you do differently in terms of implementation? 	
4:00 pm	REPORT OUT	
4:30 pm	DAY ONE WRAP UP	Matt Hardy, AASHTO
Evening	Dinner with other colleagues to discuss the workshop outcomes	



Tuesday, May 21		
8:00 am	REVIEW DAY 1 MEETING OUTCOMES	Matt Hardy
	<ul style="list-style-type: none"> Review yesterday’s overview of the capacity products Uses and lessons learned for the SHRP2 research program Recommended lessons learned and future potential work to carry forward 	
8:15 am	MEETING OBJECTIVES AND PURPOSE	Matt Hardy
	<ul style="list-style-type: none"> Which capacity projects you want to continue to use? How do we accomplish that? 	
8:30 am	BREAKOUTS – SMALL GROUP DISCUSSIONS	
	<p>Participants will break into 4 groups (likely 15-20 per group) There will be a dedicated note taker at each “station” where the 4 topics will be discussed. Each topic will be discussed for 25 minutes each – then rotate. The four topics are:</p> <ul style="list-style-type: none"> Economic Modeling Freight Data and Models Travel demand forecasting Decision-Making Support Tools <p>Each station will pose the following questions:</p> <ul style="list-style-type: none"> What do we want to keep using? What else is needed (or is what we have good enough)? How do we accomplish this and ensure that the products are relevant? What are the recommended next steps? 	
10:15 am	BREAK	
10:45 am	REPORT OUT	
10:45 am	<p>Each note taker will condense and consolidate the main themes of the discussion and will report on each one:</p> <ul style="list-style-type: none"> Economic Modeling Freight Data and Models Travel demand forecasting Decision-Making Support Tools 	
11:15 am	OVERARCHING CONNECTIONS	
	Work through products as a group to illustrate connections between tools through the larger context of the planning process	
11:45 am	MORNING WRAP UP	Matt Hardy, AASHTO Gloria Shephard, FHWA, invited Neil Pedersen, TRB
Lunch	COP Subcommittee Meetings with lunch	
PM	COP Strategic Planning Session: What’s Next?	

Flash Drive Contents

Please find on this flash drive the following documents listed on charts by product and additionally:

- The SHRP2 2018 End of Year Report
- The SHRP2 IAP Brochure listing all products and participants by state and by product
- The slides from this Capacity Focus Workshop
- White papers per product as provided for the workshop
- The fact sheets created per Capacity product in 2017.

PlanWorks/(C10/C04/C05/C16)

Materials	Copies	Website Location
1. PlanWorks Brochure	Copy on flash drive	
Library of PlanWorks Documents		https://fhwaapps.fhwa.dot.gov/planworks/Reference/Library
2. IPW report	Copy on flash drive	

C03/C11 EconWorks/C01 C02/C08/C09/C12/C15)

Materials	Copies	Website Location
1. EconWorks Brochure	Copy on flash drive	http://shrp2.transportation.org/Pages/Capacity.aspx
2. EconWorks/TravelWorks/PlanWorks Postcard	Copy on flash drive	https://planningtools.transportation.org/
3. White Paper	Copy on flash drive	
4. IPW report 2014		

TravelWorks

Materials	Copies	Website Location
1. TCAPP Assessment Report	Copy on flash drive	
2. IPW report	Copy on flash drive	
3. C04 White Paper	Copy on flash drive	
4. C05 White Paper	Copy on flash drive	
5. C10 White Paper	Copy on flash drive	
6. C16 White Paper	Copy on flash drive	

C06 Eco-Logical Materials

Materials	Copies	Website Location
1. Eco-Logical Annual report	Copy on flash drive	https://www.environment.fhwa.dot.gov/env_initiatives/eco-logical/annualReports/2015-2016_Eco-Logical_Annual_Report.pdf
2. Eco-Logical Pocket Guide	Copy on flash drive	https://www.environment.fhwa.dot.gov/env_initiatives/eco-logical/Documents/Eco-Logical_Pocket_Guide.pdf
3. Eco-Logical Practitioners Guide	Copy on flash drive	https://environment.transportation.org/pdf/programs/ph16-1%20v7%20press.pdf

4. AASHTO Eco-Logical Brochure	Copy on flash drive	https://www.environment.fhwa.dot.gov/env_initiatives/eco-logical/Documents/Brochure_Implementing_Eco-Logical.pdf
5. Eco-Logical Reaffirmation	Copy on flash drive	https://www.environment.fhwa.dot.gov/env_initiatives/eco-logical/Documents/Brochure_Implementing_Eco-Logical.pdf
Eco-Logical YouTube Video	Copy on Flash drive	https://www.youtube.com/watch?v=yZlFY-kdWmg
Starter Kit	Copy on flash drive	
6. Eco-Logical Close-out Report	Available as handout Used during Presentation Copy on flash drive	
7. Eco-Logical IPW report	Copy on flash drive	
8. Turner Fairbanks Evaluation 2018	Copy on flash drive	

C19 Expediting Project Delivery Materials

Materials	Copies	Website location
1. C19 Brochure	Copy on the flash drive	https://www.environment.fhwa.dot.gov/env_initiatives/shrp2/docs/brochure_Expediting_Project_Delivery.pdf
2. VT case study	Copy on the flash drive	https://www.environment.fhwa.dot.gov/env_initiatives/shrp2/docs/VTrans_10-2017.pdf
3. FDOT case study	Copy on the flash drive	https://www.environment.fhwa.dot.gov/env_initiatives/shrp2/caseStudies/FDOT_12-2016.pdf
4. MA case study	Copy on the flash drive	https://www.environment.fhwa.dot.gov/env_initiatives/shrp2/docs/MassDOT_10-2017.pdf
5. Expediting Project Delivery Workbook	Copy on the flash drive Dave has hard 15 copies	https://www.environment.fhwa.dot.gov/env_initiatives/shrp2/docs/Expediting_Project_Delivery_Self_Assessment_Workbook.pdf
6. C19 IPW Report	Copy on flash drive	
7. C19 Close-out Report	Draft Copy on flash drive	At Public Affairs

Appendix B – Evaluation Results from Capacity Retrospective Workshop Attendees

Rating	Overall Overall Content Effectiveness	Presentation Effectiveness	Expectations Met	Presenters Delivered Clear Information
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	1	1	0
6	0	0	0	0
7	2	1	5	3
8	10	11	5	7
9	8	7	6	10
10	4	4	7	4
strongly disagree (1-2)	0	0	0	0
moderately disagree (3-5)	0	1	1	0
moderately agree (6-8)	12	12	10	10
strongly agree (9-10)	12	11	13	14
sum	24	24	24	24
% strongly disagree	0%	0%	0%	0%
% moderately disagree	0%	4%	4%	0%
% moderately agree	50%	50%	42%	42%
% strongly agree	50%	46%	54%	58%

<p>Most important ideas you learned from the showcase?</p>	<ul style="list-style-type: none"> -I got some good ideas about how to move forward with and refine our use of planning tools. Our staff is currently NOT using these tools. I have already discussed with staff and plan to use it in the future. -Options for future implementation of products. Also learned a little more about tools and resources. -The question about PlanWorks gave me a chance to put down on paper some modest tangible ideas for PlanWorks. I received an idea that I can incorporate into our current work with PlanWorks. -Our role to move forward with sharing examples with the industry for implementation. -I came to learn more, and I did. I'm excited to bring a lot of information and resources back to my colleagues to improve the way we work. -Improved process to support project prioritization. -A "playbook" for new partners to use to become familiar with the planning process. -Need for "champions" within an agency to incorporate applicable tools that will be effective for their organization. -A responsibility to help inform and share experiences with the tools. -TravelWorks. -Linkages between products and the need to have a champion to continue. -Continue support both internally and externally for PlanWorks tools for integration into future MPO planning process.Great tools and ideas exist. -PlanWorks tools. -I wanted to learn more about VisionEval/RPAT as this is a tool we want to use for the next LRP(?) -Increased awareness of initiatives-Best ways to keep the successful (process) moving forward. -Areas for improvement. Knowing the commitment to mature the tools. -What worked and what did not work as well as overall history and presentation. -The freight portion of SHRP2 seems to be a bit unorganized compared to some of the other planning and environmental applications. It was nice to see my workgroup wanted to fix that. -How the works suite brings so many planners aspects together. -How unknown the Works suite is among the engineering and planning communities. <p>I will be working on how to take advantage of PlanWorks, thinking about how this effort may inform future research.Knowledge of all the works tools. I will be able to use much of this in my job.</p>
<p>Are there questions or issues you wished the showcase had addressed?</p>	<ul style="list-style-type: none"> -Cost (total) of SHRP and implementation. -Connection between travel demand modeling and freight model. -Is it possible to organize all of these products (EconWorks, TravelWorks, etc) in a manner that clearly defines how they do/don't interrelate? -All questions addressed. -I was hoping to get some suggestions on how to use our freight model from other freight model users. It seems there was a shortage of C20 users. Nevertheless, I am encouraged to keep working on implementing the C20 product and this workshop re-energized that drive. -Explain the intended role of the projects a bit more. There seemed to be confusion about states/MPO roles in implementation. I took it to mean that states were responsible to use the

	<p>resources and implement, not that FHWA was going to implement for us. Others seemed to feel that the program fell short on implementation.</p> <ul style="list-style-type: none"> -Demonstration of the various works tools as part of the individual presentations.
<p>What else could FHWA do to support you?</p>	<ul style="list-style-type: none"> -Additional grand funding even if a relatively token amount (like \$100,000). This makes efforts to continue the work "not just my idea" and raises my agency's profile which senior leadership likes. -Partnering with other modal units of USDOT. Planning is broad, so impacts other capacity programs. -Integrate EocnWorks benefit-cost ideas into PlanWorks. Continue to provide technical support. Peer exchange; funding. -Fold them into other outreach and education efforts, to make it easier to access and learn about these resources. -Continue to maintain and expand where necessary the tools. -Continued training opportunities. -In states where FHWA Reps visit with Commissioners have them bring up this topic. The information given to Commissioners is highly filtered by agency staff. -Webinars/TrainingPeer/mentorships with others that have faced similar issues. -Marketing of these tools (presentations/booths) at APA, AMPO Conferences. -Additional rounds. -Provide flexibility and incentive funding to participate. -Contact me for freight issues, workshops or meetings. -Continued customized education. -Partner with state DOT or region to explain applicable products. -Solicit more case studies; and simplify the solicitation process with tiered submittal forms. Perhaps bring presentations and instruction in use of tools out to the states? Many of our MPOs and DOT planners do not send planners to AASHTO or TRB meetings.
<p>What might AASHTO do to support you?</p>	<ul style="list-style-type: none"> -Help facilitate and engage transportation partners. -Peer to peer opportunities at technical and policy levels. -Fold them into other outreach and education efforts, to make it easier to access and learn about these resources. -Inform and educate state DOTs on the availability of the tools. -Technical support for VisionEval. -Formalize guidance. -Market and focus on this in all the relevant AASHTO committees as well as feature it with AMPO and TRB. -Contact me for freight issues, workshops or meetings. -Continued customized education. Partner with state DOT or region to explain applicable products. -Continue to involve MPOs in your strategic planning initiatives. -Look for successful MPO/State DOT partnerships and identify as best practices. -Sponsored workshops, training and peer exchanges built around the tools. -Information about the tools, demonstrations, marketing. Generally, the capacity tools are underutilized in my agency.

<p>Comments, feedback, ideas?</p>	<ul style="list-style-type: none">-The VDOT was strong storytelling that was easy to follow. Some of the others weren't easy to follow as I was unfamiliar with the product.-Great team of facilitators. Good approach to figure out what comes next.-Very good job. I have participated in TRB but never AASHTO, so this was a neat overlap.-Thank you for this opportunity! Great workshop!-I found this very informative, but I felt the toolbox was ?? in other words, clearly define how the ?? small groups were to solicit different types of info feedback.-Very good discussion and thank you!-As an AASHTO newbie this was a great introduction.-Thank you for hosting this. My agency is working on implementing C20 products and this helped me get some more direction in doing that.-Thank you for the opportunity. I hope Maine DOT's testimonial aided in demonstrating the value of the project. Please use our example whenever it helps.-Little larger room!-Well done. Well done. Well done.
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Appendix C – Attendee List

SHRP2 Capacity Retrospective Workshop
May 20-21, 2019

First	Last	Agency	Email
Stuart	Anderson	Iowa DOT	stuart.anderson@iowadot.us
Ann	Brach	TRB	abrach@nas.edu
Steven	Braun	Florida DOT	steve.braun@dot.state.fl.us
Coco	Briseno	Caltrans	coco.briseno@dot.ca.gov
Mara	Campbell	Jacobs	mara.campbell@jacobs.com
Janet	D'Ignazio	ICF	janet.dignazio@icf.com
Brian	Gardner	FHWA	brian.gardner@dot.gov
Charla	Glendening	Arizona DOT	clendening@azdot.gov
Eric	Ham	Maine DOT	eric.ham@maine.gov
Matt	Hardy	AASHTO	mhardy@ashto.org
Bob	Hazlett	Arizona MAG	bhazlett@azmag.gov
Pam	Hutton	AASHTO	phutton@ashto.org
Brooke	Jordan	Jacobs	brooke.jordan@jacobs.com
Ken	Kanownik	Idaho DOT	ken.kanownik@itd.idaho.gov
Reena	Matthews	FHWA	reena.mathews@dot.gov
Larry	McGoogin	Tennessee DOT	larry.mcgoogin@tn.gov
Tom	McQueen	Georgia DOT	tmcqueen@dot.ga.gov
Karen	Miller	Missouri DOT	karen.miller@modot.mo.gov
John	Miller	Virginia DOT	john.miller@vdot.virginia.gov
Carl	Miller	COMPASS	cmiller@compassidaho.org
Nick	Morrison	TJPDC	nmorrison@tjpd.org
Mark	Nelson	Minnesota DOT	mark.b.nelson@state.mn.us
Elan	Nyer	Nexar	elan@getnexar.com
John	Orr	Atlanta Regional Commission	jorr@atlantaregional.com
Alex	Oster	Volpe	alexandra.oster@dot.gov
Maren	Outwater	RSG	maren.outwater@rsginc.com
Luisa	Paiewonsky	Volpe	luisa.paiewonsky@dot.gov
Neil	Peterson	TRB	npedersen@nas.edu
Jeff	Purdy	FHWA	jeffrey.purdy@dot.gov

Brent	Rewis	South Carolina DOT	rewisbl@scdot.org
Sondra	Rosenberg	Nevada DOT	srosenberg@dot.nv.gov
Brian	Ryder	Baltimore Metro Council	bryder@baltometro.org
Elizabeth	Sall	Sole Proprietor	easall@gmail.com
Sam	Shea	Iowa DOT	sam.shea@iowadot.us
Paul	Sittig	New Mexico DOT	paul.sittig@state.nm.us
Jen	Smoker	Jacobs	jennifer.smoker@jacobs.com
Wu	Sun	SANDAG	wsu@sandag.org
Matthew	Swift	Oklahoma DOT	mswift@odot.org
Paul	Tanner	Georgia DOT	ptanner@dot.ga.gov
Mike	Vanderhoof	Illinois DOT	michael.vanderhoof@illinois.gov
Chuck	Wade	Wisconsin DOT	charles.wade@dot.wi.gov
Tara	Weidner	Oregon DOT	tara.j.weidner@odot.state.or.us
Glen	Weisbrod	EDR Group	gweisbrod@edrgroup.com
Dave	Williams	FHWA	david.williams@dot.gov
Mark	Wingate	Wyoming DOT	mark.wingate@wyo.gov
Jessi	Yu	Eco Interactive	jyu@ecointeractive.com
Kate	Zielke	North Central Texas COG	kzielke@nctcog.org

Appendix D – Break Out Group Notes

May 20, 2019

Summary of 4 Breakout Groups

1. Was implementation of SHRP2 successful?

- SHRP2 provided money to the states and national attention to key focus areas. It resulted in more structured, more realistic goals, more sizeable problems for incremental successes.
- The program brought together policy from leadership and practitioners and strengthened relationships with partners (FHWA, MPOs, State DOTs).
- It provided a structured collaboration instead of ad-hock efforts and FHWA support helped overcome internal roadblocks.
- It developed tools that people used and provided more exposure to tools and applications and led to better flexibility at various levels of planning process.
- SHRP2 exposed practitioners to new tools and involved them in both the efforts and the process. State DOTs and MPOs piloted and used tools while SHRP2 provided funding and mitigated risks in implementation.
- Success varies by product, programmatically it is necessary to close the gaps to assess overall success.
- It may be too early to answer if we fundamentally changed practice and we need to wait 5-10 years. Success will be measured by how these products are implemented and used going forward without incentives.
- The program did not completely break down cultural barriers in stagnant agencies resistant to change.
- Wisconsin DOT: SHRP2 was helpful in shifting the state of the practice to more effective strategies. It was less effective in meeting specific freight modeling needs.
- Georgia DOT: The SHRP2 message was diluted by the concurrent rollout of FAST Act requirements and the simultaneous programs deployed via NHCRP and NCFRP.
- SHRP2 was more of a “slow burn” program while NCHRP and NCFRP deployed more nimbly.
- Marketing and training efforts should consider the high turnover rate among state DOT and MPO staff.
- The Dynamic Traffic Assignment tool was not quite ready for implementation and need more work.
- TravelWorks, especially in the reliability area, was very successful.
- Many of the process-based tools were institutionalized, while the modeling products required extensive customization.

2. What were the key takeaways from the SHRP2 Program?

- Some products were ready to be used right away, some not ready for implementation, and others needed customization. It’s important to clarify the need for professional judgement on how to move individual applications forward and clearly define benefits of applications.
- PlanWorks was a useful tool but needed to focus on how to sustain it* over the long run.
- Staff turnover was a factor in its delayed implementation in some areas.
- Some products were complex and there needs to be more focus on how much training will be required of newer employees and tailor products to work with minimal technical staff. (C19)
- Products need internal champions to be sustainable over the long run.
- Future programs should also consider the transferability of projects from one region to another.
- More exposure as part of college curriculum whether planning or engineering would be helpful to introduce and train future staff.
- Future marketing and outreach efforts should manage state DOT expectations about which products need further field testing and which are ready for immediate deployment.

3. Which products need greater national penetration?

- Freight is a national issue. Freight will need more work, but this is a great start. It is a promising model (instead of combining other cities and transferring to us). Pursuing a National Freight Database, partnering with other state agencies, discussing supply chain model and fostering good collaboration.
- If we can keep the products sustainable, moving forward, and relevant.
- C02 Highway Capacity would be a good candidate for broader implementation. The rest of the country would benefit from its systematic approach.
- PEL is useful and easy to understand.
- C16, according to some (but not all) participants, could replace the models of most MPOs across the nation.
- More case studies are helpful but need to be updated regularly.
- Eco-Logical provides a good framework and has something for everyone nationally. In terms of scale it is applicable as scale data is collected.
- PlanWorks would be useful in many areas but is more than some states need. There should not be a one-size-fits-all approach to SHRP2 product deployment.
- There may be a need for SHRP2-supported time for structured reflection on how the program went and how the most effective products could be institutionalized over time.
- Easier to communicate the value of Eco-Logical and Expediting Project Delivery among broader agency staff.
- The process tools were more easily implemented than the technical tools.
- The modeling tools, including C10, were too broad and complex. Smaller products with more discrete, smaller goals would work better in future programs.
- National penetration can be achieved with continued training, peer exchanges, and future NHI curriculum. State Conferences should be leverage for presentations and training.
- Project Prioritization tools
- There are opportunity costs for projects that don't apply.

4. Was SHRP2 easy to implement?

- Ease of implementation was mixed, with the technical tools requiring more staff, training, funding and customization.
- Implementation funds went to State DOTs and MPOs. Including both made it easier to implement.
- Sometimes it was not easy to implement but it was worth it. States found it hard to apply some tools but thought smaller agencies may have more flexibility. It wasn't always clear which product would solve which problem. There was a perception that PlanWorks as a new federal regulation.
- Institutionalization depended on the level and influence of the product champion. Senior leadership buy-in and support made a major difference in the likelihood of effective and lasting implementation. Tools need to be embraced by right people in agency and need different champions at different levels.
- A crosswalk between issues and tools would be helpful to clarify by cross referencing issues and solutions and which modules or tools apply.
- Consultants should know the variety of tools available.
- Barriers to institutionalization: funding, staff, staff turnover, ability to manage consultants, traditional weakness of government in developing software.
- The grant process was helpful and strong relationships were helpful.
- The timing of PlanWorks and Map 21 regulations caused confusion.
- EconWorks was presented to one state where staff thought it was interesting but not terribly useful in an order of magnitude and didn't treat it as data. This state didn't use it during implementation but is interested in the pooled fund study.
- Federal Level Literature Review – research documents are way undervalued.

- Peer Exchanges, incorporating into curriculum. PlanWorks could be a week in our schools training. Continue to get training and peer exchanges to keep agencies using the products and sharing their value. Peer exchange represents 50 different labs dealing with the same national laws.
 - Would like to develop internal training courses for planners especially new hires and those from other divisions and together work to find time to implement.
 - Planning conferences, engineering conferences, and environmental conferences could present the suite of products and examples. Webinars were not enough.
 - Consider how NHI can incorporate these into the Transportation Planner Academy.

5. How would a SHRP3 differ from SHRP2?

- Stakeholders and practitioners would work with researchers in a collaborative process earlier in the research phase.
 - Research would be refined in consultation with practitioners throughout the development phase.
 - Research would be responsive to problems identified by practitioners.
- Interim products would conduct technical readiness before implementation and be subject to pilot testing and reality checks midway through the research phase.
- There would be more clarification on the transition from research to implementation.
- Trying with implementation to improve process. Utilize research along with TRB, NCHRP, and have a clearer demarcation when it becomes implementation.
- Implementation would have an execution plan in place prior to its completion. Research and implementation phases would explicitly consider what will be the ultimate “home” for the products.
- Staffing turnover, workforce readiness, and succession planning and technical skills would be considered during the development of marketing, deployment, and succession plans.
- Connections would be clarified between PlanWorks and other products, tools, and processes. New modeling products would be smaller and less ambitious in scope.
- AMPO and NACTO would be involved early on where applicable. MPOs would increase as partners to maintain products and help increase awareness.
- Frequent communication would be provided between the federal and state participants to ensure that research and its implementation strike a balance between current and future needs. Primary stakeholders and jurisdictions would be supported with more information.
- ‘Professional Capacity Development’ or some other label could be considered in place of labeling this a research effort. ‘Research’ may not have the right connotation in the implementation phase. Let the research side do the research.
- A list of top 10 commodities could be suggested to provide them information and when applicable have the private sector weigh in on assessment of products.
- There would be more consideration as to how the products are affected by TRB and AASHTO committees and how they relate considering next iterations. A good cross-referencing exercise would be to ask how well it all comes together. The best possible needs’ statements would be considered recognizing what went unanswered and where gaps exist.
- Up to date topics would be address and modeling would be more practical.
- Execution plans would vary by topic and project type
- Future homes would be anticipated for products after implementation.
- References in RFPs would require consultants to use the tools.
- There would be more communication illustrating the value and time savings of the tools with specific examples.

Key Themes

May 21, 2019

Summary of 4 Breakout Groups

- Travel Demand Forecasting
- Economic Modeling
- Freight Data and Models
- Decision-Making Support Tools

Travel Demand Forecasting Tools

1. What do we want to keep using?

- C02 Strategic planning model least complex
- C04 mid-level impact on useful but needs a consultant for use.
- C10 Most agencies who did pilots were most interested in data, travel micro simulators and transit modeling but not in this product's modeling process and it was recommended not continuing C10 or just using the Dynamic Travel Mode. It is only as good as funding put into it and dependent on the quality of data available.
 - Computational burden is high
 - Required significant investment of funds to adjust model to fit local conditions
 - Data provided was the most valuable part of the tool
- C16 – VisionEval, most promising product with network component, has useful policy sensitivity
 - COMPASS (Boise ID) will use VisionEval going forward but would not have used it without SHRP2.
 - C16 concept originally began with Oregon DOT, but SHRP2 “super-charged it” and made it much more usable.
 - C16 is very good for “what-if” planning.
- General comment: models that are less precise can still be very useful

2. What else is needed?

- Pairing a scenario planning tool (VisionEval) with framework for how to optimize based on certain goals. VisionEval has no network evaluation components so adding a simple one is useful.
- Multimodal planning and modeling tool for bicycles, pedestrians, etc. COMPASS would like to have a tool that performed sketch-level planning for bicycle and pedestrian project ranking.
- Statewide modeling tool applicable no matter the size of the state.
- Simple, non-complex, flexible tools are better so small MPOs can utilize it, however more complex models are needed for some state DOTs and larger MPOs.
- Smaller regions could use simpler tools but even larger MPOs with more complex and sophisticated tools also need simpler tools to more rapidly assess large numbers of projects. One example would be evaluating emissions reduction among a large number of projects. Different problems require different tools of varying complexity. Even very simple tools can be highly valuable to practitioners.
- Wyoming is developing a statewide model and benefits from the use of supercomputers at nearby universities.

3. How do we ensure that the products are relevant?

- Consider how future technologies impact the tools including artificial intelligence.

4. What are the recommended next steps?

- Address barriers such as workforce training limitations, brain drain, difficulty in attracting and retaining highly qualified modelers.

- Increasing the pay scale would be helpful as it would ensure that qualified staff could make the updates needed to ensure that the products remain relevant.
- Fellowships and internships may be an effective means of attracting talented staff who could be trained in advanced modeling.
- Figure out how to make time for staff to use these tools among other competing priorities; perhaps through intern programs, firewalling those employees.
- Manage expectations of what's going to come out of the model – leadership needs to understand the limits. Results may not meet expectations and it's not the fault of the model but what was put into it. Recognize the future will have CV/AV and micro mobility so models need to accommodate those (but we don't have data, just assumptions)
- The products still need champions to lead and attract support from agency managers. The SHRP2 program gives the products credibility that they otherwise may not have.
- Another challenge is the need to manage staff and management expectations. Policies drive the models, not the other way around.
- There is a need for more observed data so that subsequent research can help set assumptions regarding automated vehicles, micro-mobility, and data governance.
- CAV is focused on testing but there is a need to focus more on modeling.
- There is a need to standardize modeling approaches for connected and automated vehicles.
- Urban areas receive a great deal of data but need guidance in how to use it for modeling to support decision-making.
- There needs to be a reevaluation of policies and requirements for long range plans. Some of the modeling requirements are excessive. We don't need models for everything.
- Develop mentoring and peer programs for modelers to teach and learn from one another.
- Support and recruit from more data science programs – these skills will be increasingly needed in coming years.
- Use Tennessee DOT model of creating internal data governance committee.
- Support more pooled fund studies to advance the state of modeling, make more people aware of the need for experienced modelers.

Freight Demand Modeling and Data Improvement

1. What do we want to keep using?

- Works: Data Guides are a good tool.
- Keep the Clearinghouse/portals updated.
- Continue Regional Freight Forums structured but informal.
 - Need to consider geographic spread of forums and how to best engage stakeholders.
 - Could do 4 forums per year and have them focus on one topic like truck parking or freight planning/land use or each one having a different focus.
 - Pool of resources -status/regions apply for assistance
 - Visualization/Maps – for policy makers/decision makers
 - Data collection? – best practices are helpful
 - Institutionalize collaboration between planning, ITS, TSMO, Operations, for sharing of data
 - Build upon existing processes – A resource center with workshops on truck issues
- Freight tools and models may not apply to all states and MPO's but grants for case studies were helpful to build best practices.

2. What else is needed?

- Real diversity of freight players, stakeholders and data – committees of various forms, more work is to be done putting up a clearing house or unifying source of data out there.

- AASHTO model for asset management plans with TAM portal -this could be a good model. Searches based on freight components covered.

3. How do we ensure that the products are relevant?

- Leverage existing programs with focuses on EconWorks/PlanWorks freight components – particularly planning with private sector.
- Common theme of partnership with MPOs and roles in freight planning with land use challenges.
- EconWorks has some freight related case studies.

4. What are the recommended next steps?

- FHWA Capacity Building Grant Funds – expand regional freight workshops and dialogues. Other than freight data - perhaps planning and operations, truck parking, etc.
- Potential to provide funding to incentivize more freight planning – TIGER planning grants could incentivize collaboration – put freight planning into freight projects.
- Need to increase awareness on Freight Data Guide.
 - Perhaps a web based like PlanWorks.
 - Provide webinars talking freight,
 - Start a freight planning task force,
 - Engage AMPO, NLC, NACO
- Freight projects in EconWorks as case studies
- Better integration into PlanWorks
- Need to get into the owners of freight data – proprietary private sector data. Confidentiality agreements, third party data (university holds data as a fire wall) Winston Salem product has survey data from companies who use their sites – could use this model.

Decision-Making Support Tools

1. What do we want to keep using?

- With regards to the three decision support tools (EconWorks, TravelWorks and the PlanWorks bundle) participants felt all three should continue but stressed the need to show in various ways how the three sets of tools fit together. Nationally, there is a lack of broad understanding of the tools and how they fit together.
- Participants agreed they liked receiving 100% Federal funds with a 1-page application and no strings attached.
- Eco-Logical should continue - connection between PELs, Eco-Logical and PlanWorks.
- Natural resource surveys ETM's in Florida, seed money to help build data that will help expedite project delivery. Continued technical support -resource centers come to teach. More technical help.
- Continue grant opportunities. Increased awareness of products, online classes,

2. What else is needed?

- Promote more internal champions.
- Expediting project delivery needs more understanding among staff.
- PlanWorks needs a bit more sophistication of the tool – maybe embedding case studies, evaluation criteria, more examples would be helpful.
 - University level of more curriculum teaching PlanWorks and more environmental aspects.
 - Continue workshops.
 - Training and awareness of the resource – Let people know about it.
 - Have a contact or resource to answer questions
 - Link PlanWorks to other tools such as Project Prioritization

- Build training programs or primer for PlanWorks – i.e. addressing GHG
- Workshops are a great way to introduce and educate people on the tool
- Challenges with how to integrate into project development and planning.
- Add more detail to steps in the resource – provide more specific examples and maintain flexibility.
- Could link detailed case studies in steps
- Could help add more detail and context
- Link tools (i.e. EconWorks) in this resource
- Link Eco-Logical/PEL into PlanWorks
- Incorporate case studies and recommendations into PlanWorks and create linkages
- Increasing broader awareness of the tools and their value
- Standardize the vocabulary.

3. How do we ensure that the products are relevant?

- Updates
- More Case Studies

4. What are the recommended next steps?

- Need a Cross Pollination of what makes sense to apply to what problems.
- Freight needs to be woven into EconWorks and PlanWorks – more multi-modal freight projects as case studies.
- Plan/Exp/Eco-Logical – one federal decision. Trying to look at what can we apply on a project and apply over time to show actual benefit and show what we've learned/ accomplished.
- Weaving these resources into NHI Courses - like on Planning. Integrating CrossWalks – what can we do and weave into other resources.
- All tools are helping to make decisions – maybe label all under one name similar to DecisionWorks? Link it all together under one umbrella? Look at it in terms of how decisions are made. Others are offshoots of PlanWorks. Especially at the program level.
- Consider something modeled like AASHTOWare. Consider if it fits there.

Economic Modeling

1. What do we want to keep using?

- Tools but with less required data. Create a default to use if the requested data isn't available such as Incident frequency or duration which for some states is too specific. People are afraid of defaults due to liability. For people who don't work with this – 80% of what is needed is a quick sketch answer to pass to a decision maker that we are reasonably confident is in the realm of possibility. People respect your professionalism and ability to judge if the results are reasonable or not.
- Elected officials don't get into the weeds. Mayors aren't that sophisticated – they want a yes/no answer. This is the beauty of EconWorks: an answer, but not precision data.
- If we get the Works into the mainstream it can help with consultant management as hopefully consultants will get onboard with this and also work on a standardized process.

2. What else is needed?

- The ability to use more global factors as defaults to assess basic prioritization issues. EconWorks allows this but NEPA documents require more details. These are two applications of the tools that require different levels of details.
- Consider separate versions of tools for separate needs -Sketch EconWorks vs. Professional EconWorks.

- Adjust or modify existing state tools.
- Create a National list of Defaults – keep revisiting them to be fresh. Update at least every 2 years. It’s also on the user to understand the analysis.
- Treat the Works the same as the Highway Capacity Tables which are updated every 2 years on better data (Florida).
 - Have TRB possibly update EconWorks like the HCM (as a NCHRP report).
- Tell users where to start – they don’t want to recreate the wheel. They know their audience, they don’t know how to get the message out. Use it in steps: 1.) Findings 2.) Decision to proceed 3.) Presenting to the public 4.) next steps forward.
- Find a way to document and support knowledge management. Don’t have to start from scratch. Help us know where to start and offset staff turnover.
- How do you make it, so case studies can be shared? Currently the formatting is challenging for standardizing. Help engage practitioners with a simple methodology to translate the data to a case study. This is for all the works. The case study’s keep this fresh. The person who starts entering case study data is rarely the one who ends the project.
- The pooled fund study needs to help define and improve the WEB.

3. How do we ensure that the products are relevant?

- Identify if the modules are answering the key decisions we are making now? Are the keys still the keys? Particularly WEB tools – is there new thinking in economics that needs to be incorporated now. The equity lens is very important -perhaps this could work in the tools?
- Consider these on the same level as the Green Book, HCM, and others. They are in place to set standards – making everyone play on the same playing field. Planning is organic – grassroots, and never quite sure how everything will come together. Not sure there is a book that can capture this. No guide to how to best plan.
- It’s a complicated process now, if EconWorks is the place to go, a guidance document “the guidance document” or a standard then it is a resource/reference.
- Most DOTs are organized in the traditional way and sometimes don’t fully support planning and other groups. There is a need to recognize planning is just as important as capacity and other traditional processes. Elevate these tools nationally to the same level as other established guidance and provide a similar way to keep them updated.
- Tools need to remain flexible enough to tailor to each state’s needs. If it’s a reference manual for EconWorks that becomes a standard, it raises the level of professionalism. Engineers live in black and white, so the guidance is comfortable.
- Combine more conformity as national guidance. Needs to be guidance and not so much standards.

4. What are the recommended next steps?

- House the decision tools in one place and allow users to submit a request for guidance to which tool to use.
 - Provide an Ombudsman or central Point of Contact through FHWA, a University Library or TRB
 - If Federal than which Federal entity? It’s more than highway related so involve FRA, FTA, US Department of Commerce, Dept of Labor, Health, etc.
 - Consider this part of a national transportation plan.
 - Consider the US Office of the Secretary to fund it. Policy driven location – when administrations change so does policy.
 - Consider TRB because it crosses all modes. AMPO, NACTO, AASHTO all have roles. It could start in a TRB committee to make sure they have the broad, neutral unbiased panel makeup – then it moves into a guidance manual.

- Consider TRB ADA 30 – Developing online tool called Planning Research Digest – quickly scan current and previous research. This is an example that is committed to being updated and current.
- Model similar to the Center for Environmental Excellence – research and how-to data.
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- Start this in a committee – figuring out an update process first. Leverage TRB committees to fill out case studies.
- How do you roll it out? Marketing.

Overarching Connections

- Weave Freight into EconWorks and PlanWorks
 - Have more multimodal freight type projects within these products
- Tie PlanWorks, Expediting Project Delivery and EconWorks together. How to get to 1 Federal decision?
- Connect SHRP2 Capacity with other resources (i.e. NHI)
- More crosswalks between tools and resources.
- Combine under 1 umbrella – DecisionWorks?
 - Frame it around how you make decisions for plans, projects and programs
 - Modeled around AASHTOware?
- Benefits/Costs from EconWorks to Project Prioritization
- Pooled fund for TravelWorks & EconWorks – how does this work from a governance perspective? How can we coordinate these efforts?
- Reach out to other DOTs/MPOs who haven't previously been included.

Appendix E – Roadmap for the Future

Overall Program Future Steps

- Stakeholders and practitioners would work with researchers in a collaborative process earlier in the research phase.
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- Benefits/Costs from EconWorks to Project Prioritization
- Pooled fund for TravelWorks & EconWorks – how does this work from a governance perspective? How can we coordinate these efforts?
- Reach out to other DOTs/MPOs who haven't previously been included.
- The following steps could be taken to identify which capacity products should be promoted for continued use:
 - Outline a strategy to support identified capacity products
 - Develop implementation strategies
 - Identify supportive or sponsor organizations
 - Identify roles and responsibilities moving forward