Institutionalizing New Practices Using Lean Methodologies

WA-RD 895.2

Paul Houle

June 2019

Washington State Department of Transportation

Office of Research & Library Services

WSDOT Research Report

WSDOT Practical Solutions Accelerated Innovation Deployment Project

Institutionalizing New Practices Using Lean Methodologies

Prepared for:

The FHWA AID Demonstration Program Project:

Deploying Practical Solutions using Lean Techniques and Knowledge Management

Prepared by:

Lean Transformation Services, Department of Enterprise Services
Knowledge Services, Development Division, Washington State Department of Transportation

June 30, 2019

Deploying Practical Solutions Using Lean Techniques and Knowledge Management (PS AID Project)

Project Management Staffing

Leni Oman, Knowledge Strategist, WSDOT
Steve Hanson, Project Control Manager, WSDOT
Riley Woodward-Pratt, Information Specialist, WSDOT
Paul Houle, Senior Lean Consultant, Washington State Department of Enterprise Services
Frances Harrison, Spy Pond Partners, LLC
Denise Bedford, Georgetown University

PS AID Project Lean Team

Paul Houle, Senior Lean Consultant, Washington State Department of Enterprise Services (DES)
Renee Smith Nyberg, Lean Transformation Services Director, DES
Darrell Damron, Assistant Director, Lean Transformation Services, DES
Jean Denslow, Lean Administrator, WSDOT
Anna St. Martin, Lean Capacity Development Manager, WSDOT
Cassandra Parlee, Lean Capacity Development Manager, WSDOT
Russell Burgess, Lean Administrator, WSDOT
Sam Wilson, Lean Manager, WSDOT
Amber Sander, Lean Manager, WSDOT
Steve Hanson, Project Control Manager, WSDOT Knowledge Services
Leni Oman, WSDOT Knowledge Strategist, Development Division

Acknowledgements

The work described in this report was conducted as part of the project titled *Deploying Practical Solutions using Lean Techniques and Knowledge Management.* As the Project Manager, I am grateful for the support, knowledge and contributions of: the Federal Highway Administration's Accelerated Innovation Deployment demonstration program for their financial assistance; Renee Smith Nyberg and Darrell Damron for their enthusiastic support, insight, and advice; Paul Houle for his expertise, guidance and patience; Jean Denslow, Russell Burgess, Anna St Martin, Cassandra Parlee, Sam Wilson, and Amber Sander for their partnership and participation; Faris Al-Memar, Andrew Beagle, John Donahue, Matt Neeley, Craig McDaniel, Greg Selstead, Ted Bailey; Mike Frucci, Barb De Ste Croix, Mustafa Mohamedali, and Mark Gabel for their advice, input and support throughout the project; Nancy Boyd for her vision and advocacy; Steve Hanson, for his project management and logistical support; and Roger Millar, Linea Laird, and Mike North for their support at key events; and, all the WSDOT employees that engaged in activities over the life of this project for their knowledge, critical thinking, inspiration, and willingness to explore new approaches.

1. Report No. WA-RD 895.2	**2. Government Accession No.**	**3. Recipient's Catalog No.**
4. Title and Subtitle Institutionalizing New Practices Using Lean Methodologies		**5. Report Date** June 30, 2019 **6. Performing Organization Code**
7. Author(s) Paul Houle, Washington Department of Enterprise Services		**8. Performing Organization Report No.**
9. Performing Organization Name and Address Lean Transformation Office Department of Enterprise Services 1500 Jefferson Street SE Olympia, WA 98501		**10. Work Unit No.** **11. Contract or Grant No.** K992 FHWA Program code M37A (Delphi Code 15X0445060)
12. Sponsoring Agency Name and Address Federal Highway Administration 1200 New Jersey Avenue, SE Washington, DC 20590		**13. Type of Report and Period Covered** Final Research Report, December 2016 through July 2018 **14. Sponsoring Agency Code**
15. Supplementary Notes Conducted in cooperation with the U.S. Department of Transportation, Federal Highway Administration and Accelerating Innovation Deployment Program through the grant award titled *Deploying Practical Solutions using Lean Techniques and Knowledge Management*		
16. Abstract This document summarizes lean activities conducted through the Washington State Department of Transportation's (WSDOT) Accelerated Innovation Deployment (AID) project, "Deploying Practical Solutions with Lean Techniques and Knowledge Management" (PS AID Project). This report provides a summary of the processes used to map a high-level business process for Practical Solutions, capture information on challenges and opportunities, subsequent activities to improve select processes, and recommendations for using lean methodologies to support the deployment of Practical Solutions at WSDOT.		
17. Key Words Lean, Practical Solutions, voice of customer, value stream, lean transformation, business process	**18. Distribution Statement** No restrictions. This document is available through the National Technical Information Service, Springfield, VA 22161.	

19. Security Classif. (of this report) None	**20. Security Classif. (of this page)** None	**21. No. of Pages** 61	**22. Price**

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

Disclaimer

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Washington State Department of Transportation or Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

Table of Contents

Executive Summary 1
Background 1
Lean approach 1
Major Performance Opportunities Identified 3
Benefits and Results 3
Recommendations 4
Conclusions 4
Introduction 5
What is Lean? 6
The Lean Government Framework and Corresponding Tools 6
Applying Lean 8
Assessment 8
Project Context 9
Products of the Assessment 10
Applying Lean Government Framework to Implement Practical Solutions 10
Developing the Business Process Map 10
Integrated Workshop 14
Integrated Workshop Products 14
Integrated Workshop Lessons Learned 15
Workshop Products 18
Prioritizing Improvements and establishing systems to support their implementation 18
Lean Phase 2 Improvement Results 20
The Relationship of Lean and Practical Solutions 26
Deploying Lean: Lessons from the Practical Solutions AID Project 27
Challenges and limitations for the Practical Solutions Approach 29
Challenges and limitations for Lean deployment 30
Progress in Lean Transformation 31
Strategies for Strengthening Lean Practices 36
Completing the process integration 36
Clarifying value and performance 36
Establishing feedback loops to inform learning 37
Leading 38

Transforming culture 38
Conclusions 39
APPENDIX A: Table of Lean approaches used and their rationale 40
APPENDIX B. Practical Solutions Business Process A3 43
APPENDIX C. Business Process Map 44
APPENDIX D: Improvement Focus Areas 45
APPENDIX E. Corridor Sketch 48
APPENDIX F. SR527 Bus Rapid Transit 49
APPENDIX G. Process review for Intersection Justification Reports, National Environmental Policy Act, and Value Engineering 51
References 53

List of Figures

Figure 1. Lean Government Framework 6
Figure 2. Lean Government Framework Methods and Tools 7
Figure 3. Review of WSDOT's business practices that support management and development of Washington State's multimodal transportation system. 8
Figure 4. 2014 Vision for Practical Solutions 12
Figure 5. Influences on Transportation System Performance 13
Figure 6. DRAFT integrated business process developed at workshop 17
Figure 7. Corridor Sketch Process 21

List of Tables

Table 1. Comparison of Lean and Practical Solutions 28

Executive Summary

Background

In 2014, the Washington State Department of Transportation (WSDOT) initiated a new approach to the management and development of the multimodal transportation system. The new approach, called Practical Solutions, is a data-driven, multidisciplinary approach for making system stewardship and development decisions that focus on performance objectives and gaps, the context of the locale, the users of the system, and low cost effective solutions. Operations and transportation demand management (TDM) strategies are considered before a capital project is advanced.

WSDOT has used community input, considered low cost solutions, and strengthened multidisciplinary engagement for many years. Historically, this work has been conducted independently by modes and types of solutions. The Practical Solutions approach uses this experience and broadens the application to more formally consider the community and environmental context, and multimodal and lower cost solutions.

To support the evolution and deployment of this practice, WSDOT applied for and received a grant award from the Federal Highway Administration (FHWA) Accelerated Innovation Deployment (AID) demonstration program for a project titled *Deploying Practical Solutions with Lean Techniques and Knowledge Management* (PS AID Project). The goals of the project were to employ lean methodology to streamline processes and knowledge management practices to disseminate and institutionalize new practices. The Practical Solutions approach involves several business areas within WSDOT. This project took a broad view of the practice in order to assess the clarity and effectiveness of handoffs between functional stages.

WSDOT contracted with the Washington State Department of Enterprise Services (DES) to apply Lean approaches to support deployment of Practical Solutions across its agency-wide business processes. Washington State has been a national leader in the implementation of Lean methodology in government performance for the past decade and state efforts are led by the DES. As this project was initiated, state agencies, including WSDOT, were beginning to develop in-house programs to support Lean practice and projects. The PS AID Project Manager worked with the WSDOT Lean Office to plan and conduct activities that would help develop awareness, capabilities, and practice of a lean culture and techniques.

DES Lean Transformation Services worked with WSDOT to prepare a high level value stream for transportation system management and development, and to identify and develop specific performance improvement efforts using established lean methodology to streamline processes and to disseminate and institutionalize new practices. As with most Lean performance improvement initiatives, intended outcomes targeted improved efficiency, productivity and cost reduction.

Lean approach

This project was conducted in two phases. Phase 1 developed a high-level business process map or value stream. Phase 2 used lean techniques to address selected process improvements that surfaced in Phase 1.

A simple stepwise process improvement approach was applied: 1) Listen to customers, 2) Develop a shared understanding of the current state, 3) Set a target (future state/direction), 4) Identify gaps (between current and future), and 5) begin the work of closing those gaps. Washington's Lean

Government Framework presented added opportunities to support growth in capability development, culture-development, and management system responsiveness.

Phase 1

Initially, an integrated agency-wide transportation business process map did not exist, though some individual departments had segments of the development processes mapped out. The agency had also downsized and reorganized which resulted in changes to the existing business processes.

Capturing Current State Practices

Representatives from headquarters and regional modal and functional areas involved in the management and improvement of the multimodal transportation system met to discuss and map the current state business process for seven functional areas: Policy Development, Planning, Programming, Development, Construction, Maintenance and Preservation, and Operations. Participants provided information on suppliers, inputs, processes, outputs and customers (SIPOC) for each functional area. Feedback was also collected regarding the questions, challenges and opportunities in the delivery of Practical Solutions.

Through this process we discovered that functional area practices varied by business unit (mode, region, headquarters). The SIPOC was used to represent current state business processes.

Developing an Integrated Business Process Map

Following the SIPOC meetings, a three day workshop was held with approximately 100 employees to review and refine the current state maps, discuss gaps, and define and outline an integrated future-state business process map. Functional area representatives conducted a "gallery walk" to review and provide feedback on each functional areas, helping to improve the connections between functions. A draft future state business process map was developed, reviewed, and accepted as a working draft by workshop participants. The draft was subsequently reviewed by the Practical Solutions AID Project Steering Committee and functional leads. It was labelled to correspond with the performance framework that was simultaneously in development and improved through several rounds of review. Dubbed WSDOTs "Practical solutions performance framework-based business process map" this high-level process flow was reviewed, validated, and subsequently refined and adopted by agency leadership as a working model of the Practical Solutions lifecycle.

Phase 2

The project team analyzed the feedback received and identified major gaps in process flow including:

1) Need to clarify the performance objectives for multimodal system management.
2) Strengthening the handoff between assessing alternative strategies to refining solutions (also known as the handoff from planning to programming) and clarifying how scoping decisions would be made.
3) Clarifying the how to integrate preservation activities into the Practical Solutions lifecycle.
4) Clarifying the relationship of system plans to improve the clarity, alignment, efficiency and distribution of system improvement plans.
5) Aligning agency resources with the work requirements of the Practical Solutions lifecycle.

Due to the amount of effort needed to address these issues and the workload of essential participants, further work on these items was deferred. Specific opportunities to improve flow and integration were

identified within some business areas and recommended for early attention. The projects selected for Phase 2 included:

1) Clarifying Corridor Sketch products needed by Regional Planners.
2) State Route 527 Bus Rapid Transit Gap Analysis is a case study in coordinating and communicating with constituents and customers across developing practical solutions
3) Assessing the Interchange Justification Reports (IJR), Value Engineering (VE), and National Environmental Protection Act (NEPA) processes to identify opportunities to reduce rework, cost, and timing delays.

Major Performance Opportunities Identified

1) Processes are not consistently documented, or synchronized across functions. This results in rework that adds cost and time, and can inadvertently negatively impact customers and WSDOT's reputation.
2) WSDOT has extensive capability in application of the scientific method, grasp-Plan-Do-Check-Act (gPDCA), in their Design and TDM Operations. However, PDCA has not been applied in their business processes or administrative functions, and cross-functional problem-solving was not visible. This resulted in deferring to and unnecessarily and inadvertently over-burdening senior leaders with lower-level problem-solving.
3) Historic capital funding sources, systems, and timelines drive silo-orientation across agency functions. This inhibits an integrated systems view, development and improvement of the WSDOT performance system.
4) Systemic agency-wide gPDCA loops and improvement systems are not visibly present (performance gaps are not easily identifiable, and do not inform next round improvement efforts).
5) Establishing and ensuring greater continuity of 'customer voice'/'customer-engagement' through the life cycle of WSDOT's transportation system management and improvement processes

Benefits and Results

As a result of applying Lean methods and tools to foster stronger leadership engagement, WSDOT has improved practices to transform their organization in the following realms:

- Improved strategic alignment: Practical Solutions implementation has been elevated to the top priority for the WSDOT and is expected to achieve long-term improvements in cost, efficiency, and productivity. Systemic issues are being legitimately discussed, some for the first time.
- Improved processes: A comprehensive integrated agency-wide process (performance framework) has been developed and serves as an overarching reference for the myriad agency functional processes. Consistent recognition of the importance of upstream planning (corridor sketch) and the integration and improvement processes (e.g. IJR/NEPA/VE) should significantly reduce downstream rework loops saving significant project cost and time which holds potential to strengthen agency's reputation as responsive/reliable/conscientious.
- Building Capability: Organization-wide training for Practical Solutions and Lean is improving employee's understanding of their role and contribution to the Practical Solutions performance

framework. The Lean Office training and outreach have improved employee problem-solving ability and use of lean tools and methods.

- Improved Management Systems: Infrastructure was developed to support agency-wide implementation of Practical Solutions, including a steering body, work plan, and communications.
- Stronger Customer Focus: A more comprehensive and integrated alignment with customers and constituents from the early Identification of needs (defining customer value), to clarity and alignment of performance discussions across agencies and within WSDOT processes, has helped shift WSDOTs language to meet its increasing 'multimodal' demands.
- Mindset shifts: Through conducting these workflow assessments, process mapping exercises, and improvement workshops necessary cultural shifts began, enhancing the engagement and confidence of leaders and team members in addressing integrated performance management across the agency. In concert with executive consultative support from Athena group and knowledge management consultation from Spy Pond Partners, LLC this high-engagement approach has helped initiate culture shifts in the organization, and helped initiate a different pattern of engagement amongst senior managers to support shared work.
- Improvement capability: Through Lean training and work on this project, the department began to explore opportunities to apply the gPDCA practice beyond simple traffic and design adjustments to tackling administrative, organizational, and strategic problems.

Recommendations

- Continue to refine the business process map with a focus on the major gaps identified in Phase 2.
- Establish systemic performance objectives that reflect customer value and multimodal practices. Clarify the programs responsible for decisions and those accountable for activities and inputs for each objective.
- Establish practices to charter change initiatives that identify change priorities, clarify milestones, and align resource needs and commitments with strategic priorities.
- Identify key feedback loops and integrate them into procedures and digital resources to enable performance management and continuous improvement of processes.
- Foster a learning culture to encourage open sharing of process gaps and improvement ideas.
- Work with WSDOTs Lean Office to align, prioritize, and support the organization's largest strategic initiatives.

Conclusions

As a result of using Lean transformation tools and methods to implement Practical Solutions, WSDOT has launched a long-range journey of improvement. The agency is poised to implement strategic and innovative breakthroughs that can impact safety, reliability, quality, project cycle time and cost. Lean methodologies enabled clarification of agency processes (especially those shared or handed off between functions) which lays the groundwork for effective implementation of the Practical Solutions approach.

Introduction

Imagine leaving one's home to commute to work. What mode do you take? Car? Train? Bike? Some combination of these and others? How do you decide? Which gets you there fastest? Which costs the least to make the trip? Which is the safest? Which is the most reliable? Which one will be the most aesthetically enjoyable to do? Are connections possible and timely? Can you take pets, luggage, or shopping bags? Which will be least impactful on the natural environment? Do you just do what you've always done? How will you go about deciding? How will your decision impact others (commuters, family, coworkers)? What expectations do you, the travelling public, have of WSDOT to inform you in your decision-process, to support you in your journey, and to consider when they make system improvement decisions?

As transportation agency budgets tighten, infrastructure ages, population growth increases demand, and lifestyle changes alter expectations – it is critical to thoroughly explore, understand, and grapple with these fundamental questions in order to create the greatest value for transportation system customers and use their resources effectively.

The WSDOT Practical Solutions approach is rooted in community engagement, multimodal integration, and data driven decision-making in order to better understand customer interests and critical context. While this approach builds on evolving practice, it requires broader look at the agency culture and practice in order to assess current capabilities and identify improvement opportunities.

This initiative sought to utilize foundational Lean performance improvement approaches and the scientific method to explore, understand, guide, and improve WSDOT's efforts to deploy "Practical Solutions", which is the use of performance-based, data-driven decision making and early community involvement –more thoroughly understanding customer needs- to unlock improved, productivity, and cost savings during the development and delivery of transportation investments.

To support the evolution and deployment of this practice, WSDOT applied for and received a grant award from the Federal Highway Administration (FHWA) Accelerated Innovation Deployment (AID) demonstration program for a project titled *Deploying Practical Solutions with Lean Techniques and Knowledge Management* (PS AID Project). The goals of the project were to employ lean methodology to streamline processes and knowledge management practices to disseminate and institutionalize new practices.

Washington State has been a national leader in the implementation of Lean methodology in government performance for the past decade and state efforts are led by the Department of Enterprise Services. Since 2011, Governor Gregoire and Governor Inslee have made the application of proven private sector Lean practices, tools, and management systems a priority for their administrations and agencies. Agencies, including WSDOT, have developed programs, support systems, and supplementary activities for process improvement capability development and specific improvement projects to achieve Washington State's goals for world class education; healthy and safe communities; sustainable energy and a clean environment; a prosperous economy; and an effective, efficient, and accountable government. WSDOT activities specifically address the state's environment, economy, and accountable government goals and the transportation policy goals set by the Washington State Legislature for economic vitality, preservation, safety, mobility, the environment, and stewardship.

WSDOT contracted with the Washington Department of Enterprise Services (DES) to apply Lean approaches to support deployment across its agency-wide business processes with the objective to

achieve long-term improvements in cost, efficiency, and productivity. As this project was initiated, state agencies, including WSDOT, were beginning to develop in-house programs to support Lean practice and projects. The PS AID Project Manager and DES Lean Transformation Services and WSDOT's new Lean Office worked in partnership so that the PS AID Project would support the broader lean transformation in the agency by conducting activities to help develop awareness, capabilities, and practice of a lean culture and techniques. Appendix A. provides a summary of lean techniques.

What is Lean?

The Lean Government Framework and Corresponding Tools

Lean is best known for techniques used to improve process flow but the practice actually addresses a broad array of management activities. When used to its full capacity, a Lean organization employs lean to foster the lean organizational mindset, clarify an organization's purpose, develop lean capabilities in the workforce, improve process efficiency, and support informed and effective management. The DES Lean Transformation Services team summarize the Lean techniques that support these five elements in Figures 1. and 2.

Figure 1. Lean Government Framework

Figure 2. Lean Government Framework Methods and Tools

Specific Lean tools and methods enabled WSDOT to identify and address gaps where Practical Solutions could be implemented with higher success rates. Using all components of the Lean Government Framework, the PS AID Project focused both concurrent and sequenced efforts to improve the following:

Purpose: Increased clarity about the problems WSDOT constituencies need solved, and the role each team member has in solving it, both strategically and operationally at each level.

Process: Improved clarity about the work that needs to be done to accomplish WSDOT's purpose. Increase problems' visibility in the work and ensure the workers are clear about how to solve problems and improve the work. This was accomplished through applying improvement tools such as Go-See's, SIPOC, process mapping, current and future state process flows, value-stream mapping, identification of key performance indicators, voice-of-customer assessments, PDCA (plan-do-check-adjust) problem solving approaches, and process improvement workshops.

Capability: Identifying capabilities WSDOT workers need to do the work or processes. Building Lean capability includes practicing scientific-method based problem-solving, A3 thinking, daily management skills that strengthen individual contributions to the enterprise.

Management Systems: Better understanding leadership behaviors required to support the development of people to perform WSDOT processes and deliver value to constituents. This includes integrated systems with performance measures defined, real-time or near-real-time visual

depictions of that performance, resultant Key Performance Indicators (KPIs), and direct connections to their overarching strategic context.

Mindset: Improved clarity about the values and beliefs that have expression in ways of interacting which support and mentor problem-solving (PDCA) thinking, creating safety by inviting problem-exposure rather than shunning it or promoting fault-finding, and improving transparency.

Applying Lean

Assessment

Lean begins with 'grasping the situation' and in order to determine which methodologies could best support deployment of Practical Solutions. An initial "go-see" or gemba walk through the agency's operational/business processes was undertaken by reviewing WSDOTs history, structure, annual reports, organizational structure, mission and vision; internal and external website resources, and strategic plan. Figure 3. captures the project team's assessment of the agency's operational/business processes.

Figure 3. Review of WSDOT's business practices that support management and development of Washington State's multimodal transportation system.

This review provided a basis from which an organizational understanding of its 'value-stream' could be assessed.

- The 100+ year old organization has a history of pioneering improvements in process efficiency and cost accountability.
- Lack of consistent methods to hear the voice of the customer, and customer-based performance objectives and measures have distanced WSDOT from gauging its performance on its primary value stream.
- The culture often appears to constituents to be conservative, plodding, and target-avoidant – often road-centric, capital-process-bound, policy bound, and at times discriminatory in how it approaches contemporary transportation challenges of integrated multi-modal systems, customer-informed/aligned purpose development, and in how it applies performance management.

- Interpretation and application of agency practices varied across business areas. There were opportunities for more focused, shared organizational goals and disciplined integrated management systems and processes designed to support implementation and oversight of the practices that would achieve the goals.
- Annual performance measures largely focused on reporting activities (e.g. “miles paved”) rather than the quality of processes outcomes (e.g., “project’s individual and/or cumulative impacts on person throughput/flow”).
- An organizational structure in which departments optimized their individual performance but largely did not see nor share inter-departmental system performance (e.g. ‘whole-project’ costs and quality measures across the project life).
- Presence of some individual functional process maps but the lack of a comprehensive agency-wide process map that showed a documented value stream, cross-functional handoffs, and specific and quantifiable functional contributions to the whole. This series of disparate maps inhibits visibility and understanding of the actual value contributions and transformations occurring across the WSDOT enterprise – foundational to systemic problem solving.
- A capital-investment (capital solutions) focused organization that was versed at applying scientific method within some sub-processes (design and traffic) but did not at apply that same problem-solving method between processes.
- Maintenance and operations functions that lacked systemic feedback systems (e.g. comprehensive life-cycle cost implications) to inform future investment and development decisions.
- Lack of perceived clarity around agency priorities and specific performance targets (in flow, cost, delivery/timeliness, quality, and safety). A more comprehensive understanding, by all staff, of ‘system performance’ could lead to greater contribution to and delivery of value for the system.

Project Context

At the time the PS AID Project was initiated WSDOT was in transition.

- The country’s economic downturn coincided with the sun-setting of two transportation tax packages. As a result, the agency work force was reduced by approximately 1100 hundred employees and many of the reductions were in the engineering disciplines. Knowledge and development invested in these employees walked out the door and resulted in less resilience in institutional knowledge.
- The agency reorganized to address staffing changes. Least cost planning and practical design were rolling out in WSDOT at the time of this initiative. The new organization disrupted old patterns of communication. Business process maps had not been updated and disciplines had not aligned practices across the state. This meant there were process variations and little clarity about what those variations were.
- Baby Boomers were retiring resulting in more institutional knowledge loss.
- The Secretary of Transportation was hired from another state and was of a younger generation, bringing new approaches and perspectives to the department.

- The Washington State Legislature funds specific projects rather than providing funding for policy objectives that are managed through WSDOT's prioritization methods. This changed longer-term patterns of investment the department had established.
- The agency had established practices for evaluating and integrating project context into project design for highway capital projects and the draft update to incorporate Practical Design into the Design Manual was underway.
- Least cost planning had been initiated and successful practices were discussed and being shared across headquarters and the Regions. The Corridor Sketch initiative was in discussion but had not yet been initiated.
- A peer review of WSDOT's Transportation System Management and Operations practices was underway.
- The agency had developed a graphic to describe the Practical Solutions approach (Figure 4). The graphic had limited acceptance and identified the need for more process clarity.

Products of the Assessment

- An infographic map of both internal and external influences faced by WSDOT was developed to aid understanding and provide visual context for a fundamental agency value-stream that does transformative work aimed at serving travellers experiencing and utilizing the transport system (Figure 5.). This helped identify activities in which WSDOT can have the most impact, where WSDOT can develop sustainable practices, and also helped scope the level of effort needed for activities.
- From this work, an A3 was developed for the Lean Phase 1 portion of the PS AID Project (Appendix B).

Applying Lean Government Framework to Implement Practical Solutions

Through the assessment, it became apparent that the effort would benefit from more than simple transactional Lean tool usage. Instead, a much deeper, robust application of the Lean Government Framework would yield greater value for WSDOT's intended long-term implementation of Practical Solutions. A plan was developed to conduct the project in two phases:

1. Develop a high level business process map of the whole value stream
2. Develop tasks to address high priority needs.

Developing the Business Process Map

In the grant proposal, WSDOT identified the lean tool "Value-Stream mapping" as the approach that would be used to develop the business process map. In light of the organizational context and the lack of shared systemic processes and performance measures, it was determined that a more cursory functional mapping activity was needed first.

SIPOCs (Suppliers Inputs, Process, Outputs, Customers) are an interactive visual tool for documenting a business process from beginning to end. They are used, in part, to aid operations ability to see 'what they received', 'from whom they received it', 'what they did with it', 'what resulted', and 'who it served'. Major functional segments of WSDOT's business process were identified and are listed below. A point of contact was identified to help scope each workshop and address follow up needs.

1. Goal Setting/Needs determination(s)
2. Planning
3. Programming
4. Design/development
5. Construction
6. Operation (of the transport system)
7. Maintenance

Representatives from Headquarter, Regions, and Modes were invited for each of these business functions as well as select process supplier and customer representatives met to develop SIPOCs. Each functional segment was convened for a half-day mapping exercise that walked participants through and captured data on each of the SIPOC elements. Each session captured visuals (Maps), documentation inventories, and post-session syntheses were developed as summaries.

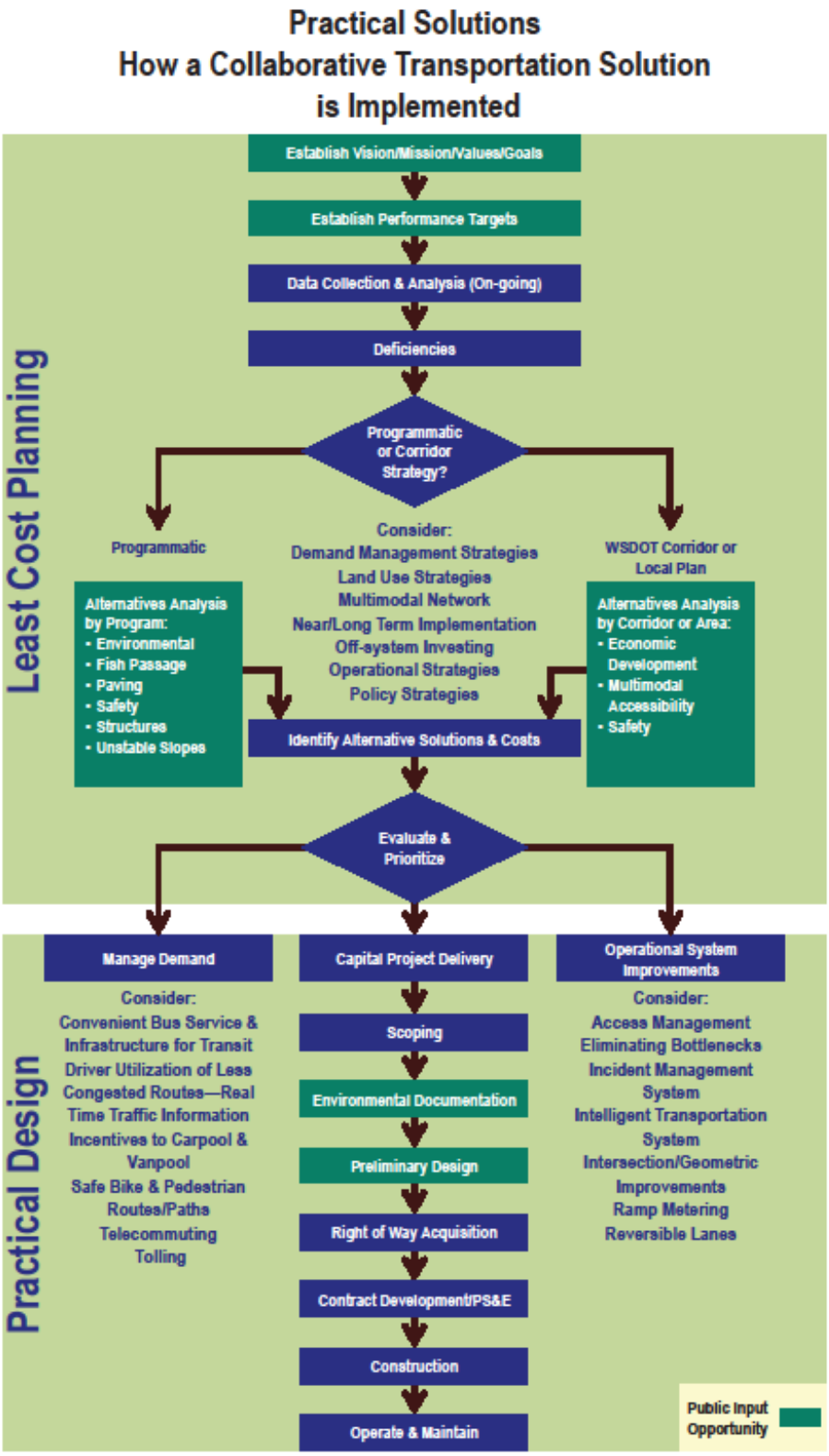


Figure 4. 2014 Vision for Practical Solutions

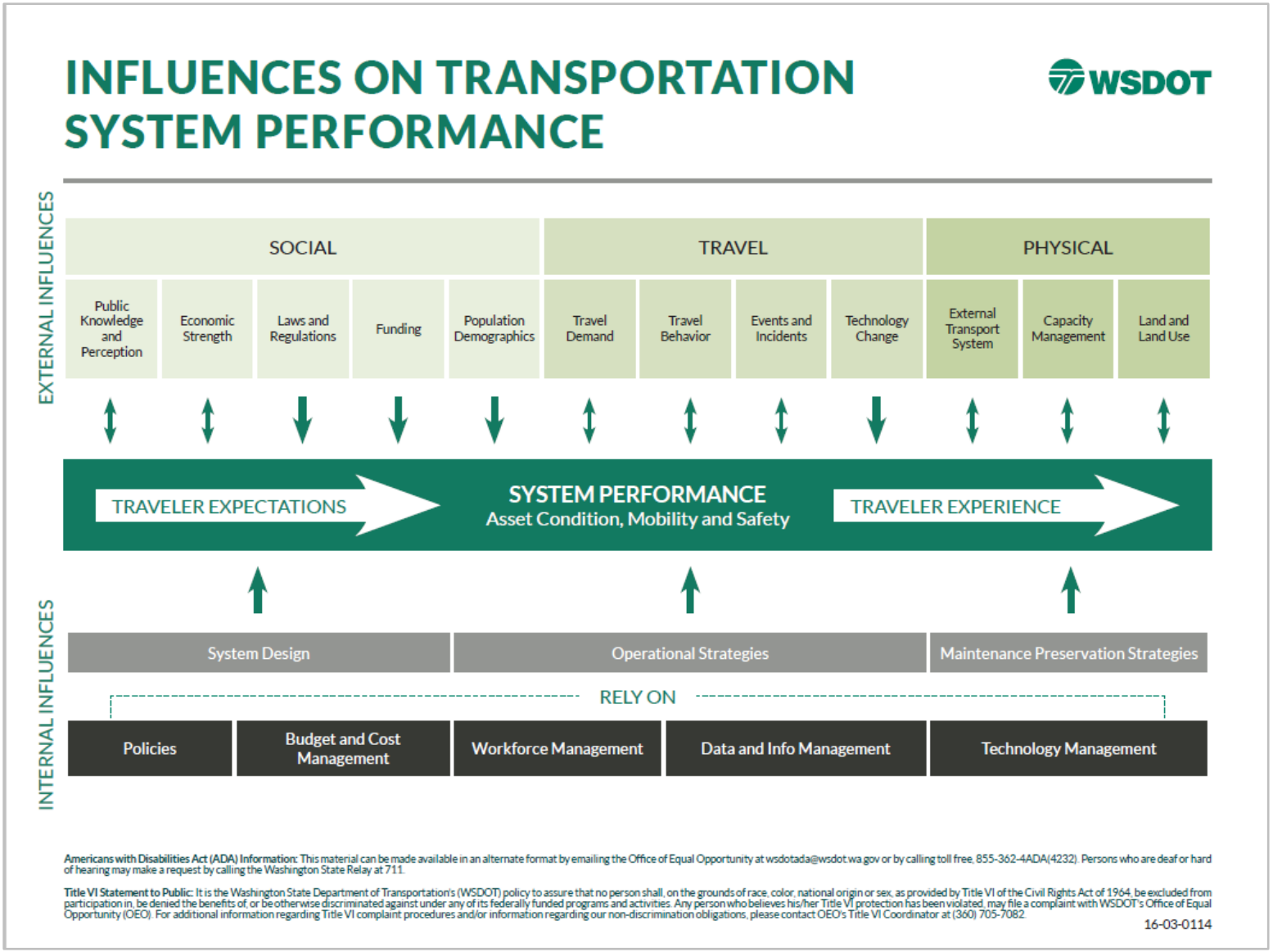


Figure 5. Influences on Transportation System Performance

These intentional awareness-building sessions helped establish a shared understanding for the functional area and revealed key learnings and gaps within and across departments. The shared vision often included a better understanding of activities that lacked clarity. The approach proved a soft-start to open participants up to their contribution and connection to WSDOT's systemic processes and collective performance. The products of these meetings provided a clearer context for the PS AID Project and enabled better understanding of current state and development needs.

Data capture included identification of gaps, inadequacies, and improvement opportunities within and between the functional segments at WSDOT. Summaries were prepared following each SIPOC and reviewed by participants before being finalized.

Integrated Workshop

A review of the data, mappings, and learnings from SIPOC sessions was facilitated by functional leads in a large three-day workshop where over 100 WSDOT representatives from all primary organizational functions, along with regions, executives and operations convened. The group informed the data further, expanding it, identifying larger gaps and improvements, and discussing and engaging on prospective work process integrations. They also drafted a high-level future state process map for WSDOTs business process exploring common processes or systems deemed most important and effective to deliver transport system improvements and practical solutions into the future while reducing waste and rework. Mapping the 'whole' of WSDOTs process helped identify current state process with strong or weak connections, and opportunities to integrate improvements in support of the Practical Solutions approach and define the define the future state. Establishing a shared vision of the future state also enabled further identification and clarification of specific gaps (current state vs future-state). Making these gaps visible subequently informed prioritization and alignment of improvement work needed. Post-workshop the intent was for a core team to steward the work forward around refining and veting the future state workflow direction, prioritizing needed innovations and improvements, and sponsoring the work in the coming quarters. WSDOT's Lean office who had familiarity with improvement workshops and would then partner with the external consultant to support advancing the priorities.

Integrated Workshop Products

The Initial SIPOC workflow mappings and integrated workshop surfaced an inventory of over 600 issues, questions and opportunities associated with the department-based processes. These inputs were collated and organized into the following categories of improvements:

1. Engagement
2. Coordination/ Integration
3. Feedback process
4. Metrics/ Measurement
5. Roles and Responsibilities
6. Resources
7. Asset Management
8. Handoffs

9. Data and Information
10. Process clarification/ streamlining
11. Goal Setting/ Priorities
12. Performance Management
13. Implementation strategies
14. Analytical tools
15. Training and Change Management

The future-state process map developed from the seven segmented functional workflows contained eight integrated process flow steps listed below and illustrated in Figure 6:

- Policy Direction
- Manage Assets
- Identify Needs
- Develop Alternative Strategies
- Refine Solutions
- Assign Resources
- Refine Projects
- Build Projects

This represented an overarching shift and maturation of WSDOTs business process.

Integrated Workshop Lessons Learned

Some shared lessons were revealed by bringing the business areas together to discuss the integrated work flow. These lessons included:

- While some individual WSDOT functional processes had been mapped WSDOT System's business process wasn't jointly understood, shared, or contiguous. There was a lack of cross program awareness and understanding.
- Current handoffs between processes weren't clear and additional review revealed downstream rework and ill-timed process chronology.
- Performance expectations for the multimodal transportation system were not clear or shared across business units and modes
- Upstream planning was inadequate (not timely or comprehensive enough) for (downsteam) funding decisions and design workflows. This resulted redundant planning work and quality check steps.
    - Capital project-centric processes and resourcing inhibit integrated solutions and workflows. TDM and operations opportunities to facilitate improvements in the process were largely secondary
    - Multiple process paths are independently driven by funding source (limiting integration of maintain vs improve)
    - The handoff from planning to programming did not provide the input needed for programming. Roles of the two organizations were not clearly defined.

- The agency lacked awareness of near term and long term objectives for Practical Solutions. It was unclear how multi-modal integration was being developed. Participants lacked a shared Vision and intent, near term milestones and clear roles and responsibilities.
- Planning timelines were not synchronized across the agency. Modal and the 2 year, 6 year, and 20 year highway system planning cycles all progress in parallel but without integrative consistency.

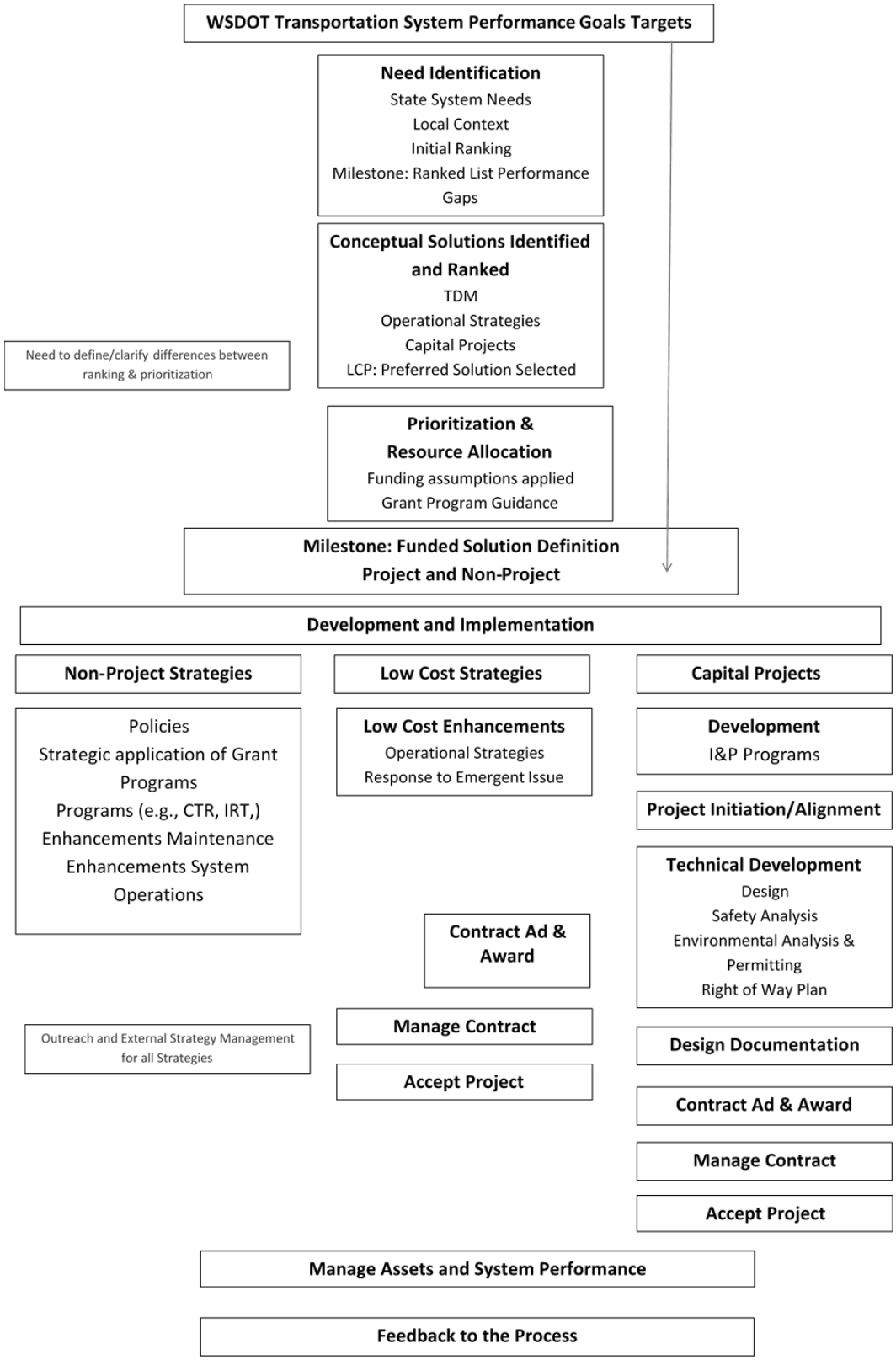


Figure 6. DRAFT integrated business process developed at workshop

- Projects and direction are agency-centric with inadequate Voice of Customer (solicitation and engagement systems).
    - There are intermittent touch-points with customers/external partners/stakeholders (RTPO/MPO/FHWA) and customers (municipalities/ travelling public) but the agency lacks a mechanism to document and retain decisions and commitments across business functions.
- Maintenance and operations were under-invested and had no integrated feedback systems to inform planning and capital investment

Workshop Products

The integrated workshop produced:

- A high-level future-state agency-wide transportation system development workflow (Figure 6.). This later evolved into the WSDOT Performance Management Framework (Appendix C).
- A list of issues, opportunities and questions impacting integration of Practical Solutions, including some input on priorities. (Available in the SIPOC Technical Memo)
- A list of terms that need to be clarified.

Prioritizing Improvements and establishing systems to support their implementation

The products of the workshop were used as reference resources in activities to prioritize and establish systems to further pursue Practical Solutions and solidify agency business processes. Examples of these activities include development of the following:

- Shortly after the workshop, the business process map was aligned with a performance framework that was in development and became the "Performance Framework-based Business Process Map". (Appendix C) The business process map continuesto be refined with input from the Practical Solutions AID Project Steering Committee and WSDOT executives.
- Workshop feedback was compiled and used in the following ways:
    - Shared with workshop participants
    - Synthesized to identify common interests and 26 improvement focus areas (Appendix D).
- The focus areas were used to identify possible improvement projects.
- Improvement project recommendations were reviewed with functional area leads and the Practical Solutions AID Project Steering Committee to ensure strategic alignment based on WSDOT needs. The resulting recommendations were prioritized.
- Information was shared with other active WSDOT initiatives
- Already in-motion agency activities that would contribute to gap closures. Employees engaged in the Practical Solutions AID Project also began to use the input to improve work activities (Lean 'just do it' practices). For example, the Multimodal Planning and Development Divisions discussed the information needed from planning to complete the Basis of Design document.
- Products of the workshop were used by for other initiatives:

- Spy Pond Partners, LLC, used these finding for their work to develop the knowledge and information architecture to support Practical Solutions.
- The Athena Group for their work with Executive Leadership to review and update WSDOT's priority objectives. The discussions and products of the Practical Solutions AID project provided a current state view of the shared understanding and improvements needed. This helps inform the development of the Practical Solutions committee structure, vision, transition plan, and work plan.

The issues identified in the workshop were prioritized using a PICK chart based on the following:

- Whether the activity was a leverage point to help expedite delivery of Practical Solutions. The strongest leverage points identified were:
    - Establishing a performance framework
    - Clarifying the handoff point and product(s) between 'assessing alternative strategies' to refining solutions (i.e., planning to programming)
    - Understanding the relationship and timing of modal and other plans
    - Developing a strategy to plan investments across multiple funding types (capital investments, grants, and low cost enhancements)
    - Addressing resourcing imbalances.
    - Developing feedback loops
- Whether it was a prerequisite for other efforts
- Those that could be accomplished with little effort.

Based on this, the top four improvement focus areas selected were:

1. Handoff processes from 'assess alternative strategies' to 'refine solutions'
2. Clarify Feedback Loops

Two other tasks were added:

3. Retrospective of a Public Transportation Project: The objective of this task is to strengthen collaboration with customers and constituents in order to ensure consistency in processes, milestones, and messaging on improvements. This specific task focused on engagement and decisions between Community Transit and WSDOT for the SR 527 Bus Rapid Transit project.
4. Process Alignment: Concerns about redundant processes were discussed in the development of the business process map. This task focused on three processes: National Environmental Policy Act (NEPA), Intersection Justification Reports (IJR), and Value Engineering (VE). This task examined opportunities improve alignment of the processes, streamlining information collection, and clarify decision-making responsibilities between the processes. The objective is to tightening process alignment to streamline projects cost and time and improve agency reputation

Lean Phase 2 Improvement Results

Based on the workshop outputs, syntheses and recommendations, improvement work commenced in 2016 and this work is described below.

Handoff processes from 'assess alternative strategies' to 'refine solutions'

Project Need and Planning

There is a need to clarify the responsibilities of planning and programming to ensure adequacy of products handed off and efficiency of work flow. In addition, the relationship of plans and their intended uses is unclear for process partners. This makes it difficult to know how to productively engage in plan development activities. Clarifying how plans align across the lifecycle will optimize state transportation system engagement and evaluation.

A meeting was held with Multimodal Planning and Capital Program Development and Management Division Directors to scope a potential project on this handoff from planning to programming. The discussion focused on the limitations of the budget structure and the need for Washington State Legislature acceptance of the Practical Solutions vision in order to affect change. This work was considered to be beyond the scope of the Practical Solutions AID Project. A work team external to the Practical Solutions AID project was established to address this need.

This project was replaced with a project to help inform Corridor Sketch Phase 2.

Corridor Sketch Phase 2 Products

The Corridor Sketch process is in development. Historically, the Corridor Sketches were an element of the Highway System Plan and used to describe the vision, goals, performance gaps, and strategies for the highway system in alignment with Results WSDOT. The Corridor Sketch project sought to update the plans by describing the corridor context and more broadly considering non-capital strategies for mobility that could help close the performance gap at that location. A conceptual outline of the Corridor Sketch process is provided in Figure 7.

Multimodal multidisciplinary (M3) teams convene were initiated in Corridor Sketch Phase 1 and met on a recurrent basis to create a corridor sketches that's informed by constituents and the broader transport system context to insure complete and accurate corridor info is accumulated and the data lives for downstream decision-making and future steps in system improvement funding and development.

This project was developed to define role of planning (and scope of plans) in adequately defining and informing downstream steps on the System/Corridor needs. This project focused on the products needed from Corridor Sketch Phase 2.

What was done?

At the time of this project, Corridor Sketch Phase 1 was nearing completion. Lean practitioners worked with the lead for WSDOT's Corridor Sketch process and Regional Planning Managers to develop a problem statement and scope of work that would describe the Corridor Sketch product needed by Regional Planning staff and process partners. Customer interviews were conducted with Region Planning Managers and staff as well as representatives from functions that use the products from Planning.

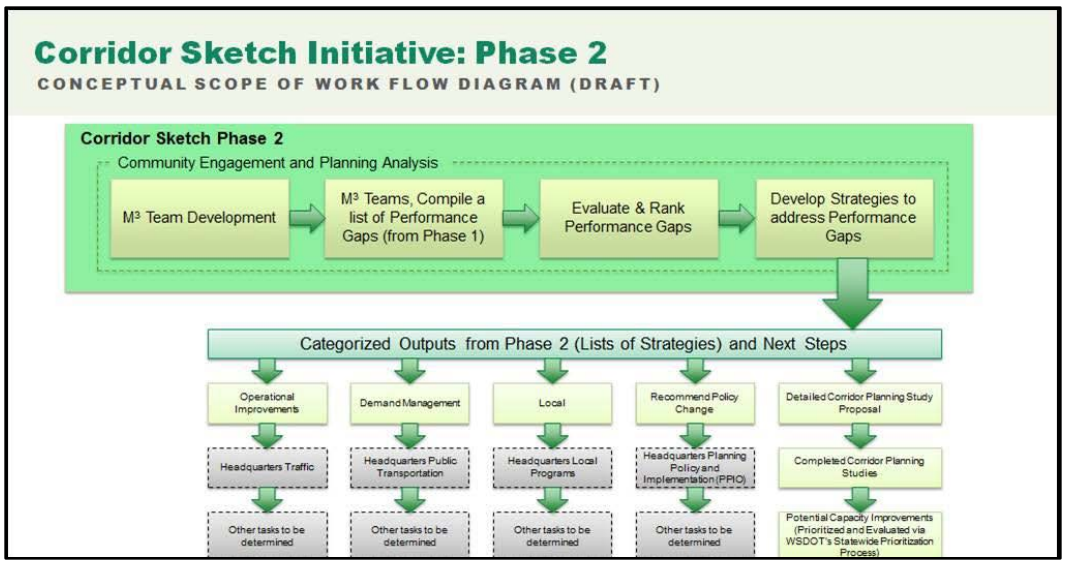


Figure 7. Corridor Sketch Process

Results

The task objective was to adequately define which elements of a corridor sketch inventory were essential (e.g. purpose and need) for constituents and downstream process partners (like programming/funding and design). One Division Director summarized the Corridor Sketch as Partnerships, Performance, and Strategies (investment).

Appendix E. provides the A3 summary that describes the problem and summary of customer interviews. This resulted into the following input for Corridor Sketch Phase 2. Findings are organized into the seven categories listed below.

1. Purpose
    a. To incorporate transportation demand management (TDM) and operational approaches into strategies
    b. To identify, coordinate, and constrain investments
    c. To identify low cost, mid cost, and higher cost investments
    d. To engage internal and external partners in a collaborative process that develop trust and a shared understanding of needs and agreement on strategies
    e. To integrate plans and right size the planning process
2. Plan inputs
    a. CPDM provides asset condition and needs to MMP
    b. Traffic Operations is developing field assessments for operational strategies and intend to also incorporate TDM in the future.
    c. Performance objectives
    d. Land use and access management

3. Products/outputs needed
    a. A list of ranked conceptual solutions for the Highway System Plan
    b. A summary of what we've learned from Corridor Sketch Phase 1
    c. Examples of strategies that have address asset condition without adding capacity
    d. A 'book version' of the Corridor Sketch
    e. Management of 'book versions'
4. Engagement
    a. To have the hard conversation about performance gaps and affordable solutions
    b. To develop and sustain relationships with partner organizations
5. Points needing clarification
    a. How do we develop a common view of needs
    b. Not sure how well performance objectives tie to performance targets and across modes – particularly across modes and for economic vitality and mobility
    c. What are the goals we are aiming for?
    d. How are assets tied to the performance objectives and how does this affect asset management plans?
    e. The framework for decision-making
6. Challenges
    a. Lack of a clear performance framework
    b. Limited data on the impact of transit on mobility
    c. Data integration is challenging with the quality of the data
    d. Few tools for data analytics
    e. Sustaining information in the Corridor Sketch database
    f. Resources/ workload to support and conduct the Corridor Sketch
7. Skills needed for this work
    a. Communication
    b. Negotiation
    c. Dealing with different styles and having difficult conversations

This information was helpful for the continued evolution of the Corridor Sketch process and products

Clarify Feedback Loops

Project Need and Planning

Feedback loops do not currently from throughout the business process are incomplete or don't exist to ensure that lessons learned are captured and outcomes are delivered/sustained to inform evaluations, need identification, and other process improvements. Feedback processes should track project

performance; measure and ensure adequate information is captured and performance gaps closed to inform future work.

What was done?

This work was not been formally initiated. It was determined that broader understanding and acceptance of the Performance-Based Practical Solutions Lifecycle is needed before engaging stakeholders in this discussion.

Retrospective of a Public Transportation Project

Project Need and Planning

The Public Transportation Division provided an opportunity to engage in a case study Bus Rapid Transit project. Recent discussions had highlighted communication gaps over project's planning and development lifecycle. Community Transit and WSDOT agreed to use this as an opportunity to discuss decision making practices, documentation, and engagement along the Practical Solutions Lifecycle. This project was led by the Public Transportation Division and Rita Brogan, PRR, Inc.

What was done?

A task team developed a problem statement for this task. A workshop was developed by PRR to address to problem statement. Representatives from WSDOT, DES, and Community Transit staff met to discuss the decision history and timeline of the SR 527 Bus Rapid Transit project. Case review focused on Community Transit's Bus Rapid Transit initiative and time and cost overruns experienced that were rooted in differing/ disparate WSDOT processes and messages (lacking internal process consistency and continuity).

Results

The workshop revealed a gaps in continuity of information and decisions over the lifetime of this project. Community Transit is a smaller organization and this project was core to their system plan. As a result, they were familiar with the project plan, timeline, and decisions made. Decisions made with WSDOT early in the project timeline were not known or readily accessible for employees engaged in downstream processes. As a result, Community Transit experienced revisiting decisions and delay.

WSDOT decisions and products are managed within organizational business units and not easily accessible to employees in other business units making it challenging to find previous decisions and products. This was exacerbated by employee turnover and lack of clear expectations and staff availability for multidisciplinary engagement throughout the process. As a result, WSDOT employees were not consistently aware of WSDOT's previous decisions and commitments. The lack of multi-disciplinary engagement resulted in new questions being raised at downstream points in the business process.

Deeper review revealed that, in an effort to the advance project, options requiring an intersection justification report were not pursued, potentially sacrificing reliability to avoid long-term policy driven implementation delays. Community transit sought external consultant guidance which advised them to avoid approaching WSDOT for an IJR and just accommodate the flow and reliability impacts of crossing an interstate with BRT service (i.e. 'buffer' as best you can the impacts on your riders). This resulted in a much less reliable ride-time for passengers. (15min+ in ride-time variations vs an estimated 2minute ride had they pursued an IJR to modify the interchange).

Overall, the retrospective review demonstrated a need to strengthen decision capture, information flow and inter-jurisdictional coordination.

Further work is needed to identify the critical information points and ensuring adequate communications and consistency in processes, milestones, and messaging with constituents on improvements. More details on this project can be found in Appendix F.

Process Alignment

Project Need and Planning

During the Project Development SIPOC, questions were raised about the opportunity to streamline or better align the intersection justification report (IJR), National Environmental Policy Act (NEPA), and value engineering processes. These processes use several similar inputs and the order in which the work is conducted vary across projects. There was interest in opportunities to streamline information collection, clarify process objectives and their interrelationships, and practices to improve customer engagement.

Improvements are anticipated to reduce rework and frustration, streamline projects cost and time and improve agency reputation.

What was done?

A task group developed a problem statement, project plan, and examples of project schedules. A summary document was prepared that described the three processes under review. The processes and their purpose are listed below.

- National Environmental Policy Act (NEPA): To understand the environmental and community context and the potential impacts of transportation projects
- Interchange Justification Report (IJR): To evaluate the feasibility and determine the impacts of an interchange modification on the Interstate and state highways.
- Value Engineering (VE): To analyze and select the most cost effective design to meet the required performance.

A project team was formed to develop a project and workshop plan. The team included representatives from headquarters and regional organizations with responsibilities for these processes. The problems identified by the team are listed below.

- WSDOT's processes to determine projects' 'purpose and need' and to 'assess alternatives' are repeated within multiple processes and projects within the agency. This can and often leads to:
    - duplicative and reworked process loops
    - added costs; extended project lead-times
    - significant frustration for the project team(s) and external stakeholders
    - a decline in WSDOTs reputation. Ensuring a predictable interconnected process that can be understood both internally and external to WSDOT is vital
- The processes are done sequentially and independently
    - Often result in changing decisions made previously/upstream.
    - At minimum this rework is inefficient, at worst it can result in different project solutions, and soured relationships with partners and stakeholders
    - This is exacerbated when different decision drivers are used and/or long time-gaps exist between the three analyses/recommendations.

Institutionalizing New Practices using Lean Methodologies

A workshop was conducted with representatives from FHWA and WSDOT headquarters and regional organizations involved with these processes. Interviews were also conducted with external stakeholders. While quantitative performance and impacts of these was difficult to roll-up, consensus held that ensuring a predictable interconnected process that can be understood both internally and external to WSDOT was vital. The workshop included a review of the decision frameworks and discussion on opportunities to improve alignment. See Appendix G. for more details on this project.

Results

The workshop included a review of the processes, current challenges, and partner feedback.

<u>Feedback from External Partners</u>

Lean advisors for the project interviewed external partners for six projects including:

- SR18/Auburn West Olympia Access
- La Center/Mellen Street
- Lacey/Martin Way-Marvin Road
- Harvard Road
- Joint Base Lewis McCord
- I-90

The partners identified the following impacts of these processes on their projects:

- Delay
- Increased costs
- Long-term strategic impact: we design for a project and miss future optimization opportunities.
- Reputation: we all look bad when there are delays; when outcomes are significantly different than what was discussed.
- Context changes: we waste time and money if we don't monitor contextual changes over the life of the project.

Partners also identified practices that are helpful including:

- Multiagency, Interdisciplinary and Stakeholder Advisory Teams (MAISA)
- Engaged partnerships and shared understanding of methods and assumptions
- Local sponsorship and initial funding
- A desire for support for local jurisdictions planning efforts and accommodating concurrency requirements: if GMA plans forecast impacts to local transport systems, help them plan for varied mobility needs and how to ensure sustainable connections between state and local.

They also identified opportunities for improvement:

- Alignment of objectives up front. Get broad agreement on the big stuff first including
    - Consistency of purpose and need
    - Scope, expectations and deliverables up front

- Data and information sharing
- Help address concurrency during planning
- Focus on sustainability of the system and the continuum of needs

  (Don't paint all with the same broad brush)
- Provide consistent updates – even if it's bad news
  - Sustain two way communication
  - Review the models and inputs with partners.
    - Not all have the resources and capabilities to do modeling
    - Review inputs for currency/accuracy
  - Consider doing some of this work earlier in the process
  - Help locals engage with FHWA

Workshop

A workshop was held with over 40 representatives from FHWA and WSDOT's Region and Headquarters business offices involved with these three processes. Participants further worked the Plan Do Check Act (PDCA) problem solving lifecycle, refine the root-cause analyses, and developed countermeasures.

Three primary root-cause/countermeasure activities were identify for action and are listed below:

- Clarify the definition, responsibilities and uses of 'purpose and need' across the three processes. A briefing paper has been drafted for this task.
- Map and describe the relationship of the three processes. A visual was developed to show the connections between process (*Folio in attachments)
- Identify resourcing gaps. Many organizations support planning and development of capital projects. These 'utility' players are finding it difficult to provide quality input to all processes that require their input. Resourcing needs will be reviewed after the relationship and responsibilities of these three processes is defined.

The Relationship of Lean and Practical Solutions

During the project, employees periodically asked about the relationship of Lean and Practical Solutions. Some managers have stated that streamlining work in any area of the department is a Practical Solution where others have applied Practical Solutions to transportation system operations and management. Both practices are relatively new to the department and the application of practice is evolving. This project did not seek to resolve the use of the terms, instead, the Project Team met with department leads for Practical Solutions and Lean to discuss the relationship of these two practices. The following information summarizes that conversation.

The Lean culture and Practical Solutions approach are complimentary. The Practical Solutions approach describes how we manage and improve the multimodal transportation system to increase value for our customers. Like the Lean culture, Practical Solutions employs structured problem solving to clarify a project's business need (performance gap) and evaluates options in order to minimize cost and waste.

Both practices rely on collaborative engagement and encourage innovation to continually improve practices.

While there are many similarities, the language we use to discuss Practical Solutions and Lean practice vary. For example, the Practical Solutions approach prefers to identify 'needs' whereas lean seeks to clarify the 'problem'. Table 1. illustrates the variation in language for similar activities.

As these practices continue to evolve, WSDOT may find it is helpful to clarify the uses of these terms in order to avoid confusion about expectations and improve consistency in messaging and reporting.

Deploying Lean: Lessons from the Practical Solutions AID Project

The objective of the FHWA AID Demonstration Program is to accelerate implementation of innovative practices and Lean is one of the practices this project focused on. At the time the grant was awarded, WSDOT was just beginning to develop Lean capabilities.

The initial premise of Lean is that customers experience gaps (needs) in services and/or products, and that organizations create valuable products and/or services for their customers which fulfill those needs (close those gaps). The primary dimensions of 'value' important to the customer are: safety, quality, delivery (timeliness), and cost. Organizations create and deliver this value for their customers through a series of transformative process steps and continuous improvements can be made within and between these steps in order to add more value, reduce waste (non-value-added work), and create a better flow of transforming that value as it moves through the organization to the customer(s).

The term "Waste" is often categorized in such forms as over-processing, over production, defects, waiting (time), inventory, motion, and underutilized resources. Impacts or symptoms of this waste can appear as rework, completed work that goes unutilized, delays, customer upsets, cost overruns, unused or excess inventory, and underutilized human or organizational resources.

Rooted in the scientific method/gPDCA, lean problem solving focuses on seeing/understanding the flow of the transformative work. By making processes and their performance visible, organizations can consciously and intentionally focus on reducing the waste of excess or redundant process steps, and subsequently focus on continuously improving the transformation into value. This effort of revealing wastes and increasing value is often initiated through mapping the flow of value, digging into the work processes and identifying gaps between current state and desired future state. Once made visible, gaps can often be quantified, prioritized, assessed to determine root causes, and corresponding countermeasures or improvements can be initiated to address the roots, close gaps, and improve value to customers. The Practical Solutions approach itself is similar to the simple definition of lean: creating more timely value for customers with fewer resources.

Lean Culture Language	Practical Solutions Language
Applies to all business improvements	Applies specifically to transportation system improvements

Lean Culture Language	Practical Solutions Language
Clear problem definition	Clear needs identification
Uses the scientific method to assess root causes and identify relevant countermeasures that are then tested to determine their effectiveness	Assesses context and relevant alternative strategies
Minimizes waste and delivers the maximum value for the customer	Promotes least cost solution and lowest lifecycle cost
Engages customers, stakeholders and those who do the work to solve the problem Uses an interdisciplinary approach involving those who perform the work and those affected by the results collectively solve the problem	Engages community and multidisciplinary participation
Promotes standardization of core enterprise practices along with documentation and accessibility of practices	Updating practice to align with multimodal, multi-solution decision-making
Encourages creativity and continual improvement	Encourages context-based, creative solutions
Focused on delivering value defined by the customer	Focused on performance of the transportation system users
Seeks consistent, predictable methods of doing things …	Employs a common lifecycle and sizes solutions to meet the performance gap
Promotes transparent decision-making at the lowest appropriate level	Promotes reuse of relevant information and transparency of practices and decision-making
Builds the capacity of teams to solve problems at the appropriate level, and of managers and leaders to coach employees in solving problems	Builds collaboration with partners, stakeholders, to improve the multimodal transportation system

Table 1. Comparison of Lean and Practical Solutions

Lean improvements are built on the foundation of standardized work, which is itself built on the foundation of 'stability'. Stability means having essential capability, availability, and flexibility in the 4Ms -- manpower, machines, materials, and methods. Instability is often rooted in "an inadequate understanding of customer needs". In WSDOT's business the 4Ms can be described as:

- Resource capability -Having the combined capable manpower whether within and outside the agency to do the work in the allotted time with quality. This could include impacts of changes in local and state policy direction or key staff turnover.
- Process capacity - Having adequate system and structure to meet timing and quality demands.
- Materials - This includes things such as physical materials, equipment, data, or services needed to get the work done in the required time.
- Methods - Having consistency and shared understanding of processes to achieve the objective.

Reviewing the Practical Solutions lifecycle and handoffs between functions revealed opportunities to improve the stability of the 4Ms.

Without stability, any standards - seen in infrastructure like standard processes (e.g., policies and manuals) or standard measures of performance/KPIs - would be futile, and without standards there isn't a way to 'show' (i.e. document) actual improvement, beyond subjective opinion. Most commonly, successful Lean initiatives design experiments to address quantifiable gaps and measurable outcomes (components of a standard). Lean thinking can be used to address business improvements that are not readily quantifiable including such broad, multifaceted activities as Practical Solutions deployment.

The Practical Solutions AID Project began in June 2015 when The Practical Solutions initiative was in the early stage of development and the vision, scope and processes were not yet developed. At the same time, the Practical Solutions approach builds on previous efforts to improve community engagement and context sensitivity in project development. These previous improvements were largely within a single business area or coordinated between a limited number of business units. The Practical Solutions approach requires more extensive cross functional collaboration and decision-making. The Practical Solutions AID Project applied the broader view of Lean. The premise was to understand the connections between functional areas and identify high leverage points for change to help expedite deployment of the Practical Solutions approach and realize the benefit David Mann describes in the following excerpt.

> "Lean thinking changes the focus of management from optimizing separate technologies, assets, and vertical departments to optimizing the flow of products and services through entire value streams that flow horizontally across technologies, assets, and departments to customers.
>
> Eliminating waste along entire value streams, instead of at isolated points, creates processes that need less human effort, less space, less capital, and less time to make products and services at far lower costs and with much fewer defects, compared with traditional business systems. [Organizations] are able to respond to changing customer desires with high variety, high quality, low cost, and with very fast throughput times. Also, information management becomes much simpler and more accurate."
>
> David Mann, *Creating Lean Culture, pg114-116*

Challenges and limitations for the Practical Solutions Approach

- Changes in executive leadership: During the initial phases of this project there were several changes in executive leadership including the Secretary of Transportation and two of the three Assistant Secretaries that selected this Practical Solutions project for submittal to the FHWA AID demonstration program. The changing leadership reduced advocacy for the Practical Solutions AID

project and caused some delay in the evolution of practice as management sought to determine the commitment to and focus for Practical Solutions under the new leadership.

- Lack of cross organizational handoffs and collaboration: The initial assessment and SIPOCs revealed a lack of documented work processes to support the cross functional collaboration and coordination needed to implement the Practical Solutions approach. WSDOT's business areas have developed measures to address federal, state, and agency goals and document the performance of their business units with a high degree of independence. As a result, at the enterprise level, the performance framework lacks coherence and that lack of coherence complicates collaboration across the department.
- Lack of a common language: The SIPOC meetings exposed the variations in language use between disciplines and modes. The department lacks a common glossary to help navigate the variations in term uses. This adds complexity to collaboration.
- Lack of a change management plan and project management practices for organizational change: During this project, a number of initiatives were underway to advance the Practical Solutions approach. Examples of initiatives included Corridor Sketch Phase 1, Moving Washington Forward, performance-based design, transportation system management and operations, community engagement, and Puget Sound Vision. Each project was developed and managed separately. Some efforts were made coordinate activities. The lack of problem statements for each initiative and lack of a common process for chartering and managing projects made it difficult to evaluate scope connections and synchronize schedules. Implementing a common change management and project management practices would help clarify project objectives, evaluation potential interdependencies, organize resource needs, and schedule participant involvement.
- Lack of shared agency performance objectives: While there is general understanding of federal and state transportation goals, the agency lacks clear organizational performance targets and milestones leaving each business area to interpret "success" on their own. A Lean culture relies on clear, quantifiable business measures or targets upon which to base improvement efforts across the enterprise. Without baseline process performance measures any attempts at 'improvement' could be considered subjective, and could readily result in frustration and inadequate assumptions about their efficacy. Therefore, establishing a shared enterprise understanding of the policy framework and establishing standard performance objectives and targets are critical to identify priority improvement needs and measure progress in implementation of the Practical Solutions approach.

Developing the Performance-Based Practical Solutions Lifecycle is a first step toward a shared policy framework. The SIPOCs, workshop and other meetings surfaced improvements needed to strengthen the organizational infrastructure for delivery of Practical Solutions.

Challenges and limitations for Lean deployment

Several factors hampered the ability to comprehensively conduct the lean support for Practical Solutions deployment over the life of this project including:

- Reticence to define agency-level performance metrics and targets for Practical Solutions. The lack of clarity about success contributed to a guarded climate and fear of repercussions or failing to hit targets. The guarded climate works against lean, transparency, and 'improvement-target-setting'.

- Lack of structure for developing and operationalizing improvement work including: sponsorship, prioritization, consensus/buy-in from critical partners, consistent leadership, and resourcing. Project sponsors are critical to change initiatives; they help clarify expectations, promote accountability, and can often address barriers to progress. Despite the initial selection by three Assistant Secretaries, this project lacked ongoing advocacy from management, slowing progress and adoption. A stronger change management practice and practices development and strengthen sponsorship will help future efforts be more successful and timely.
- Lack of a common baseline made is difficult to assess the value of countermeasures. The department lacked consistent application of standardized processes making it difficult to document a current statewide business process. This is due, in part, to downsizing, reorganization, lack of training, and frustration with time-consuming business processes.
- The challenge of organizing and aligning/syncing countermeasures across multiple varying planning cycle-times. While the scale of the project help identify strengths and weaknesses of organizational flow and handoffs, the high-level review did not provide adequate detail to assess impacts and improvements.
- The termination of the Secretary of Transportation that established and championed the Practical Solutions approach created a delay in Practical Solutions development pending the confirmation of the new Secretary of Transportation and his priorities for Practical Solutions.

Progress in Lean Transformation

The following section associates these improvement activities conducted in through the Practical Solutions AID Project with the five dimensions of the Lean Government Framework. Some gaps had closure work initiated (✓) others were just acknowledged (○).

1) Purpose: This dimension is about an organization gaining clarity about the problems they are trying to solve for their customers and the role each team member has in solving them:

- ✓ Recognized the great opportunity to leverage 'customer-experiences' to inform improved future 'alignments' (WSDOT and partner agencies) and outcomes.
- ✓ Identified term definitions that need organizational clarity and began to develop consensus.
- ✓ Catalyzed the 'integrated multimodal' conversation through the development of the integrated business process and influenced the agency emphasis area work plans by elevating improvements needed for multimodal process flows system.
- ✓ As a recurrent, systemic exercise, rolled-up M3 team information and feedback may also provide a doorway for customer voice adjustments to organizational purpose, strategic direction, and process improvements.
- o Developing unified definitions of 'purpose' and 'performance' between all of the WSDOT internal functions and their associated community stakeholders to effectively develop and improve the transportation system.
- o As transport system users and constituent service providers press for more real time predictive capability (e.g. hand-held real-time traffic analytics/predictors) pressures on WSDOT to develop and maintain infrastructures (in real-time system-usage data, autonomous support systems, and growth-projection-informed design/development) will increase.

2) Management Systems: This dimension supports an organizations development of a clear, visible cascade from its direction and performance (tracking and management) systems throughout the organization and processes. It also elucidates behaviors required to support the development of people that perform the processes and deliver value to customers):

- ✓ Creation of a Future State Business Process Map from which WSDOT can document, analyze, and initiate improvements in the flows of information and materials used to produce its services. This is also
  - A tool to effectively implement practical solutions and a framework for how the organization can operate and improve in the future (as a skeleton value-stream map).
  - The foundation of an effective 'performance framework' (a system that defines high-level performance outcomes and aligns work-efforts tightly to achieving that organizational performance).
- ✓ Corridor Sketch M3 teams provide a more robust means of engaging with communities and stakeholders in transport needs identification, project planning, and shepherding solution development communications across the life of development.
- ✓ Catalyzed difficult discussions among top leadership on agency-wide direction and targets/metrics.
- ✓ Increased awareness and understanding that the management system and processes are out of alignment with the Practical Solutions vision and that organizational and individual roles and responsibilities are unclear. Identified opportunities to improve performance tracking, performance management, and performance/process improvement and clarify contributors' impacts on the enterprise.

- o Begin to see the need for integrated performance targets across the basic performance categories Safety, Quality, Delivery, Cost, and Morale (SQDCM) – without which the organization can be left floundering, perceiving itself as serving many different, oft conflicting needs.
- o Agency performance measures and targets to support the management system are unclear or inadequate for:
  - Delivery –e.g. timeliness of project delivery, or operational performance delivery (70% posted speed target is clear for highway operations but performance to target reporting isn't visible).
  - Quality - myriad potential quality measures of WSDOTs functional performance could be considered [e.g. asset degradation status: projected life, enviro-impacted, road aesthetics] but again, no clear articulation nor visible dashboards are present/available for staff to see good/not-good.
  - Cost(s) - maintenance cost, class-of-asset, system operational or maintenance cost/mile(asset unit), cost/'movement-mile' safety=clear (target zero)
- o Performance targets aren't available or visible at each level in the organization. WSDOT policy goals don't cascade to performance targets that readily inform the work of "operating", "maintaining", or "improving" the transportation system. The result is that actual performance of functions or staff is not clear or specific enough to evaluate work against: Are they meeting

targets or not? Are they contributing to goal-achievement or not? Lean management systems consistently unveil, explore, and address these questions.

- ✓ Increased awareness about the absence of feedback systems needed to confirm the efficacy of myriad transportation improvement countermeasures. Transport improvement efforts are largely one directional (i.e. don't come with post-project assessments of impacts on initial problems/gaps that can feed cycles of learning informing next-round improvements).
    - Maintenance is a prime example and looks to largely stand alone in the business system. No Audit or Feedback (learning) systems are visible (i.e. Do the interventions/ countermeasures executed to 'improve' the transportation system actually achieve desired/anticipated impacts? And what can we learn from prior test/intervention/project that can inform future strategic and operational approaches? Were anticipated post-implementation maintenance costs forecasted accurately? What are the impacts on WSDOT? What info should flow back upstream to planning, scoping, design, and construction? What standard processes can ensure that information flow?
- ✓ Assumptions exist that integrated planning underlies investment decisions. However, inadequate planning (non-integrated, under-resourced, and incomplete corridor sketch planning processes) limited the agency's ability to get in front of the transportation systems' costly improvements cycles. This results in improvements with long cycle-times vying with one another creating unknown or conflagrated impacts imparted on actual transport system performance. Unclear concomitant targets leave improvements portending impacts without accountability (e.g. improve flow by X but sustain safety at Y and economic impacts at Z –did we achieve X? did we sustain Y and Z? How do we know?). This gap informed Corridor Sketch 2.
- ✓ Capital funding centric processes and timelines tended to drive the system and reinforce silo orientations that inhibit an integrated systems-views, approaches, and understanding within the agency.

- o Inadequate long-range transport system planning hadn't attended to synchronization of timelines which results in an inability to adequately assess multiple simultaneous improvements' impacts on the system. Each improvement – whether 2, 6, or 20 year in the making is/was intended to have some positive impact(s) on the systems performance. When they geographically and/or functionally overlap with each other, over time, combined with other unanticipated external factors, it becomes increasingly difficult to assess their efficacy and learn which is having what impacts.
- o Anathema to a learning system. Integration of, and consistency in performance targetting hypotheses and how they interrelate can contribute to more learning about which investments (individually and in concert) are most effective in delivering value (i.e. better assessors of agency business effectiveness).

- ✓ Concurrency reference from IJR/VE/NEPA work surfaced the challenge and opportunity faced by transport planners locally and state-wide to be in sync (in content and timing) with growth planning and development. WSDOT has considerable resources and knowledge that could aid development of more integrated plans that could benefit both the local jurisdiction and WSDOT.
- ✓ System planning and improvement work have Information needs that are closer to real-time than the current (long-cycle-time) analytics and disparate data sets are delivering. As M3 teams convene to develop and refine corridor sketch planning with constituents, as

design/development digs into the detail, as funders get faced with politically charged prioritization decisions, they'll need adequate and accurate data at each step along the journey to effectively apply practical solutions and make good decisions (e.g. accounting for such things as implications of changes in local Growth plans, degree of autonomous saturation and flow impacts, multimodal integration infrastructure, or safety-based policy shifts).

- ✓ Additional questions surfaced based on the future-state-performance-framework visual;
  - What are the agency performance targets and who should set them?
  - When and how should we connect /collaborate with customers and stakeholders through the course of the agency's business process?
  - How will information from planning inform and be used downstream?
  - How will we reduce or eliminate down-stream rework (i.e. engender upstream 'trust'?)
  - How can maintenance and operations provide feedback (info on systems) that can adequately inform investment? How can they be funded at appropriate levels when seemingly all existing strategic shifts in capital are 'project' specific (vs agency infrastructure-focused)?
- ✓ Clarifying roles (what's leaders role vs. subordinates)
- ✓ Acknowledging the need for and chartering work to establish new/improved processes

<u>3) Mindsets and Behaviors (Lean Culture)</u>: This dimension supports leader coaching, systems thinking, and problem-solving. It is about challenging assumptions that hinder the culture and mindsets and includes emphases on dialogue, bringing purpose and values to life in the work.

- ✓ Increased cross organizational understanding through meetings and workshops. Functional components of the enterprise opened meaningful engagement with each other about the work to improve; the value to customers; the experiences of process partners and stakeholders. WSDOT Staff is beginning to 'own' the contributions and improvements of their functions. Preliminary assessment showed a marked shift in mindset and language regarding their work, from department-based work silos to shared understanding of integrated function-based performance system. This ownership is a foundation of a transformation and key to sustained success.
- ✓ The recommendations for implementing lean and knowledge management sets a roadmap for success (continuous improvement and supportive/integrating infrastructure).
- ✓ Opened a path for a deeper level of agency management engagement –a foothold for a cultural transformation at WSDOT that is much more customer focused, multimodal conscious, unafraid of questions, ever more aware of their role in the WSDOT value stream (the between-ness within the agencies functions), and is attendant to improvement and its contribution to long-term sustained success.
- ✓ Challenged the component parts (through intensive engagement) to recognize their connection to the whole and increased systems visibility.
- ✓ Surfaced the epiphanies, opportunities, and improvements born from the 'parts' seeing the 'whole'- seeing how one's function supports the overarching agency direction and performance in developing a SQDCM environment, creating a fertile ground for culture change and customer-centric transformation

- o Engendered leadership awareness, support and commitment that is crucial for successfully conducting experiments.
- ✓ Facilitated improvement work creates safety to have conversations on 'between-ness'

4) Process (Value-stream): ADD DESCRIPTION

- ✓ Enabled organizational leaders to see how the 'parts' (of the system) connect to the 'whole' (system) - essential to effectively managing, changing, and improving it.
- ✓ Establishing a picture of the interconnected processes conducted at WSDOT to serve as a reference used to clarify the primary work processes and to see how and where they connect.
- ✓ Establish a common framework (BPM) from which organization can reference and conduct its work
- ✓ Identification of major gaps in processes and initiating work to tackle closing these gaps
- ✓ Informed and supported the initiation of more robust and comprehensive planning activities; re-defining the 'what' (content) and how (process) of up-front planning (corridor-sketch 2).
- ✓ Supported and informed improved customer connection examining a bus rapid transit initiative on SR527 (a learning Charrette) that similarly exposed gaps in internal WSDOT processes that impact customers and transportation partners.
- ✓ Created internal process alignments for IJR/NEPA/VE mega-project studies that can lead to significant reductions in rework, overall project cycle-time, and costs.
- o The business process hadn't been fully mapped out to see just where value-transformation occurred and/or broke down. Value-stream maps with defined and documented quality, delivery, and cost-based performance measures for each major step, and then the entire process, can challenge this awareness, expose opportunities, and provide the roadmap for the improvement system.
- o Aligning the work of environmental, interstate, and Project-Management/engineering functions to reduce cycle-time/rework and improve customer satisfaction and agency reputation is ongoing. Completing the alignment of IJR, NEPA, and VE processes –modifying communications, tools, and training- is demonstrating the effectiveness and speed process improvements can take

5) Capability: This dimension is about developing problem solving thinking flor all, developing coaching skills for leaders, and about strengthening the organizations orientation to perpetually learn and improve.

During the Practical Solution AID Project, WSDOT established a position for knowledge management and the Lean Office. The Lean Office initiated lean training for department employees, developed a network of lean practitioners embedded in organizations throughout the department, and conducted several process improvement activities both in partnership with and separate from the Practical Solutions AID Project. During this time, there was also turnover in all staff in the Lean Office. That said, fundamental Lean approaches that were further embedded into WSDOT practice included:

- ✓ Using a customer-centric value definition versus viewing process partners as customers.
- ✓ Soliciting Voice-of-customer for value definition and as a primary improvement trigger.
- ✓ gPDCA at multiple levels to strengthen the agency's problem-solving capability.
- ✓ Strategy deployment such as using the Hoshin planning system to align strategic and operational foci.
- ✓ Seeing waste (Process improvement)

- ✓ Lean culture (listening/engaging staff and delegating problem solving)
- ✓ Lean Management systems (pushing for more transparent performance at all levels)
- ✓ Functional areas developing further in their abilities to;
    - Critically assess 'inputs'
    - Listen/further understand customers desired (outputs)
    - Learning to communicate/interact between areas
    - Understand where they fit in the Agency's business process
    - Identify significant unasked/unanswered questions (begin to see gaps in process)

During the PS AID Project, WSDOT developed and began providing training for Practical Solutions to describe the approach. The training provided examples for practitioners to work through and also served as a forum to discuss experiences. Ideally, this information will be used as feedback to support additional capacity development and process improvement activities.

Strategies for Strengthening Lean Practices

Based on experiences and lessons learned from the Practical Solutions lean activities, the following strategies will be beneficial in strengthening lean practices at WSDOT and further support deployment of the Practical Solutions approach.

Completing the process integration

- Completing and sanctioning the Performance-based Practical Solutions Lifecycle map to provide a visual and value-stream view of the high level business process. This is foundational work to increase employee understanding of organizational process and expectations.
- Additionally, completing the improvement activities that more strongly stitch together disparate components of their value stream will be essential. They consist of:
    - Solidifying the corridor sketch initiative and baseline inventory. This includes adequately planning and resourcing completion (within a reasonable timeframe) of the state-wide baseline corridor sketch data – a foundation, upon which comparable and relative prioritization decisions and investment strategies can be made.
    - Completing the countermeasures supporting the integration of processes associated with IJR, NEPA, and VE studies for megaprojects.
    - Addressing the multimodal, multi-solution 'planning-to-programming (funding)' process flow integration and role clarification work to tighten up the center of the agency's business process and performance framework.

Clarifying value and performance

- Establishing, refining, and iterating mechanisms that solicit voice-of-customer inputs to gain clarity on "What is Value?", when it comes to our transportation system, will be paramount.
- On a macro-level, the opportunity WSDOT has to liaise and clarify the connection between public service and the pubic itself is unique. As providers of tangible services, DOTs can exercise business and organizational skills to engage in and clarify customer value like almost no other public-service agency. Engaging intensively with policy-makers and constituents, around improving comprehensive integrated

long-range transportation infrastructure planning, growth management and land-use planning, and economic development planning is vital. DOTs are uniquely positioned to facilitate a deeper understanding amongst stakeholders around this.

- On a day-to-day level, establishing and sustaining iteratively clearer definitions of "Value" for the myriad stakeholders and utilizers of the transportation systems across the fundamental dimensions of performance awaits. This entails robust performance measures, targets, and an accountability system attending to the realms of:
    - Safety clarifying if is it just 'deaths', 'accidents', 'near misses', 'impacts to BP', or something else. What represents 'safety' for travelers/users?
    - Quality such as ride smoothness, aesthetics, enviro impacts to water/air, ease of modal transition, navigation, system information, other? What are the dimensions of 'Quality' that travelers/users of transport systems most care about? How might they prioritize or weight them? And then how could they independently and collectively be measured/assessed for current and desired performance?
    - Delivery/Timeliness (is the 'congestion' metric -about % max throughput speed- adequate or representative of customer need? What targets would they desire? What other delivery performance might they value (e.g. ETA forecast accuracy, reliability of real-time navigation/information-adjustments, autonomous vehicle infrastructure placement).
    - Cost (what is the cost per mile, per trip, per-duration-of-time of the various modalities. What are the costs travelers most care about? What about the Integration of these?
    - Morale (of those developing and maintaining the system)
    - Finally, the integration of these in the measurement and performance tracking will be necessary for DOTs to effectively measure their performance. Travelers make daily decisions about which mode(s) of transport to utilize based on more than one of these realms (cost vs time, environmental impact vs ease of use, etc.). Additionally, they're currently largely unaware of some of the systems impacts/costs on them (e.g. sustained impacts of congestion or infrequent pavement renovation on brakes or suspension-systems; neurological impacts of chronic stresses imparted by congestion). Increasing resources to help simply explain the complexity of transportation system management and development can help engage customers in a more customer-centric approach to transportation management.

Once established, customer-informed performance targets can form the foundational baseline for the agencies work actual development and/or improvement work would then be sponsored/sanctioned based on the tangible priority improvement needs (across SQDCM).

Establishing feedback loops to inform learning

- Ensuring the results of actions taken to impact/improve the transportation system are assessed for efficacy in addressing stated performance objectives for the project and organization. This is essential to inform performance management and future iterations of investments.
- Establishing feedback loops for process implementation. This is essential to ensure that handoff products meet user needs, that duplication and rework are avoided, and to target process improvements and organization resource investments on critical needs.

- These feedback-loop systems should be visible, transparent components of standard work providing an inventory of knowledge readily accessible for future use.

Leading

- Strengthening resource utilization by applying scientific management will free up leadership. Moving from fire-fighting to developing improvement capability and creating systemic change focused on; grasping current state, targeting future state, and working on key gaps experienced by customers - one at a time.
- Creating safety empowers and enables learning. Listening creates safety. Leadership presence where work occurs provides the forum for listening. Visibility (of self, of systems, and of performance) creates the ground/foundation for listening, reduces (inaccurate) stories, and releases positive energy to solve organizational problems.

Transforming culture

- To make a Lean "transformation", it is important to attend to 'Lean culture', and 'management systems'. Culture change is greatly assisted when organizational leadership demonstrates the change by speaking about expectations, checking in, and showing how they are integrating the change in their own practices. Management systems include clarifying and synchronizing/aligning performance measures and targets at all levels of the organization. It is enhanced when Leadership and all staff own responsibility for improving and achieving them.
- Recognize the role of learning through engagement to better understand and transform organizations. Institutionalize practices to help understand:
    - Voice of Customer
    - Current performance
    - Current process
    - Current process (and Value) flow (through your operation)
    - Current gaps

    To strengthen the agency's ability to accurately:

    - Diagnose root causes
    - Effectively strategize and execute countermeasures to improve on/close the gaps
        - see performance and deviations from it
        - see and support level-loading work
        - removing waste
        - increasing satisfaction (of customers/stakeholders)
        - adding value
        - solidifying sustained org (SCDCM) success
    - Strengthen
        - performance target (setting)
        - performance transparency

- process transparency
- prioritization clarity and transparency

These changes are anticipated to increase timeliness of improvements, promote agility in department practice, improve resilience, and provide the organizational awareness to counter unproductive influences.

Conclusions

Lean is largely about learning to see and creating deep staff engagement to surface problems and address them. The real challenge and current leading-edge realm for organizations attempting to make a lean transformation is in creating a lean culture by bringing about behavior change that engages all levels to better grasp and improve their own work, to harmonize support-systems and processes up and down their value-stream, and to be catalysts for positive change. The prize is meaningful work for the individual, and sustained success for the organization.

This innovative effort at applying lean to practical solutions resulted in an opportunity to apply lean approaches in a systems view of the business functions that management and improvement of the multimodal transportation system. This provides a foundation for prioritization and meaningful improvements as WSDOT continues the evolution of Practical Solutions. WSDOT's lean capability will help strengthen and expedite this work.

Market driven factors are modifying expectations of transportation agencies. Shifts in revenue sources, smart cities, the sharing culture, seamless connections between modes, connected vehicles, energy-generating infrastructure, and other emergent trends are increasing the need for WSDOT to continually evolve. Agile application of practical solutions, a healthy customer-relationship, strong problem-solving capability, and a solid management system are foundations that support WSDOT's ability to deliver on this. Lean approaches to transforming high-performing organizations can propel significant movement in solidifying each of these foundations.

APPENDIX A: Table of Lean approaches used and their rationale

Identified need	Traditional approach	Lean methodology applied	Rationale/ intended impact
Grasping and mapping process detail- current state, connections, and gaps	Basic process mapping with a few experts/process owner-leaders utilizing document policy and process steps.	Value-stream mapping (postponed in this case due to discrepant system-wide processes and metrics). High-involvement Staff-informed SIPOC (Suppliers, Inputs, Process, Outputs, Customers) mapping sessions exposing what really occurs and real gaps experienced across SIPOC	Get real/actual workflow info (not just policy). Expose all to seeing the whole and how each connects. Begin the process of small/easy improvements immediately.
Clarifying customer and constituents needs (value) and mechanisms and frequency of soliciting them.	Occasional Web/ paper surveys of customers, with specific (internally framed) questions, data analysis, and interpretation. Formalized constituent meetings.	Direct voice-of-customer interviews. Focused questions that solicit deeper explorations into further customer 'value' definitions. Further understanding of motives and interests that underlie constituents' positions.	Understand where WSDOT customer's and constituent definitions of 'value' may not be fully met. (where shared rationale exist and where further opportunities for alignment lie)
Surfacing and solving problems	Identify and contain symptoms	Full PDCA; Get data, explore root causes, identify countermeasures and test hypotheses.	Share non-engineering applications of PDCA in administrative/process problems at work.
Improving problem definitions	Scope and charter templates and standard processes	A3 thinking; use of iteratively deeper problem exploration	Move from recycling problems to actual sustained resolutions
To expose and discuss real issues and problems existing between functions across the development process	Leaders and experts define issues and task other leaders and small groups to resolve. Recurrent meetings calendared for it.	High-engagement, intensive facilitated exercises (SIPOC sessions, integrated session, IJR workshop) get many reps in room to surface/ shine light and problem solve	Quick exposure, more info shared/revealed about the problem(s) and causes. Consensus and committed countermeasure launching point (solicit any reservations/concerns and address/offset them immediately)

Identified need	Traditional approach	Lean methodology applied	Rationale/ intended impact
Clear future state organizational performance framework (target)	Leader defined (oft expert or best-practice informed) end-point.	Convene those who will be owning the framework once implemented …to develop it.	Consensus, commitment, energy and support for the co-created product/ direction can better anticipate local concerns and can design to address them. This always trumps 'because we were told to do this'. Reduced rework/redesign.
Make a plan to get to future state; includes prioritizing which to do first	Leader reviews and decides	Use of: steering team, prioritization criteria development, prioritization matrices	Broad/shared input to future state and consensus priorities.
To close the gap/solve the problem	Resolve the problem via containment (aka symptomatic treatment). Usually created or informed by expert consultants in concert w/leader and rolled out	Utilize gPDCA –scientific method problem solving (and innovation) that begins with clear VOC, explores (from those doing the work) the current state and why it exists and exposes roots (to be addressed/transformed via countermeasures)	Containment (or symptom-treatment) kicks the can down the road – committing the organization to rework when it rear up again. Real PDCA gets at roots, solves problems and allows for exposure of new and deeper problems and ultimately increased value to customers.
Scope and launch the top priority work	Utilize formal project charter document, format, and processes with steering teams et al	Utilize mother and baby A3 formats (living improvement story)	Reduce over processing, save time, continue to iterate improvement (adapting to ever-changing context). See (visually) PDCA and where we're at in its progression
Effective facilitation to; Advance the work Engage staff Engender commitment Create energy; for the work, org, and person	Staff follow. Leader or external consultant presents PowerPoints. Group is told. Some solicitation of inputs (in limited/ contained realms) Leaders decide.	High-engagement exercise; with many functional reps bringing components, physical motion/ movement, visuals, subgroup work w/ roll-up, space for concerns and 'make-it-better' exercises, multi-voting, group-created products	Contribution engenders investment, co-creation engenders commitment (in session and after) and openness to iterative improvement. Concerns and risks get openly exposed (not 'surprises' to be vetoed later). Leader/sponsors see and support united front.
Tie work to org purpose	Leader sponsors, charters and delegates a piece of design or improvement work. Taken in isolation it is conducted per spec and returned to leader. Initial "Why" may or may not be stated. Work progresses to address "How".	Establish and maintain context for work (connection to org purpose) throughout. E.g. A3 background and context. "Why always in sight", "How" varies to best meet need of "Why"	Staff energized to see how their work connects and pursue delivering on the "Why" – result usually meets the "Why" (often using a different 'how' than may have been traditionally prescribed. Strengthens staff loyalty to org purpose and strengthens innovative capability.

This page left intentionally blank

Title: WS DOT 'Practical Solutions' Value Stream Mapping

Owner/Presenter: Leni Oman Reviewer/Sponsor: Nancy Boyd
Process owner(s): Multiple HQ & Region Date: 5/7/15

Background-Why are we talking about this? *(includes step 1 –rough problem statement)*

Least Cost planning & Practical Design ("Practical Solutions") has been rolling out in the WSDOT, and has unearthed the need for more process clarity, robust infrastructure, & process standards in the prioritization & implementation of Transport system projects.
An FHWA Grant to streamline processes & knowledge management practices to disseminate & institutionalize new practices in support of 'Practical Solutions' was awarded in Jan. 2015 & is slated to initiate in July 2015. Products include a 'current state' high level business process/Value Stream Map (VSM) for project development, a knowledge architecture, an information architecture, & a 'knowledge book'. A full cross-agency understanding of the current steps & connections in the planning & design processes (in support of the Practical Solutions) is lacking.

Current State - Where are we today and how do we know? *(step 2)*

A comprehensive picture of the design & planning process across all of WSDOT (HQ/Regional/local & across dimensions) has yet to be created. Subsequently, NO picture of the biggest process gaps (improvement needs), where they are, & what they impact, exists either.

>12+ yr old maps sub-sets of the processes.
>Data gathering is ongoing from 'steering' & key operational process leaders to validate; What process maps do we have? What are the biggest gaps/problems?

Goal - What is the gap between current state and goal state? *(step 3)*

A comprehensive map of the project development process (from voice-of-customer; to initial planning; to program development; to stakeholder input; to practical-solutions vetting/refinement) should be known, understood, & visible to all of the major stakeholders/process-partners involved in the process.

Problem Statement *(step 4)*

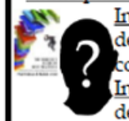
Currently the steps & connections in the WSDOT Project development processes (from planning to design) are known & understood by 0% of WSDOTs process partners* compared to our target of 100% (of process partners knowing & understanding the plan>development processes), which we want to reach by 8/31/15.

*'process partners' = those playing any substantive role in any significant part of the process

Problem Breakdown – Root Cause Analysis *(step 5a)*

- Inefficient/Incomplete/unknown process (planning & design algorithm across DOT departments)
- Lack of 'best-practice' inventory (for planning, design, & project prioritizations.)
- Lack of infrastructure (knowledge architecture/info architecture/book-of-knowledge) to support best practice application & continuous improvement.

Inadequate system (standards + processes) of planning



Inadequate standard(s): At times 'unclear' Prioritization criteria & definitions (eg what 'multimodal' means & how it's applied to 'lowest-cost' assessments & to prioritizations)
Inadequate process(es): unknown & circuitous process flow in determining & executing priorities

Countermeasures (What will you try to remove/reduce root cause?) *(step 5b)*

Develop a full-process value-stream map to identify where biggest variations in process & failure points exist. Then use the VSM to conduct successive improvement workshops around the biggest variations & failure points to reach a stable best-practice foundation (set of standards) upon which WS DOT can build it's improvement system.

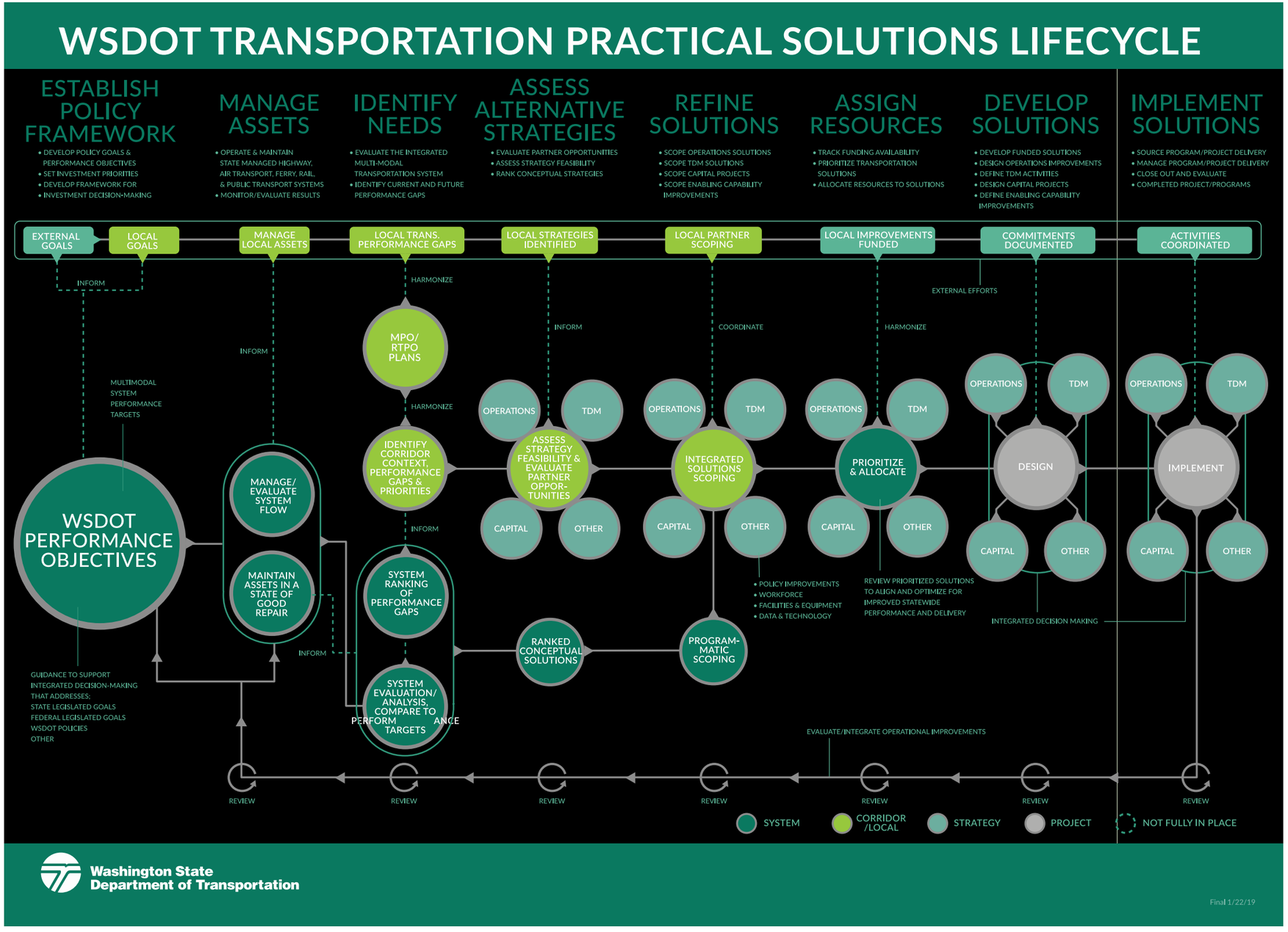
Plan – Who will do What by When? (to test the countermeasure) *(step 6)*

What	Who	When	Do √ (step 7)
Scope & plan VS exercises	Paul/Leni/Jean	May	
Data collection & pre-workshop Prep	Paul / Jean	June	
VSM session(s)	Paul/Leni/Jean/team	July	
Big VSM session & improvement foci identification (priority gaps to close)	Leni/Jean/Team	Aug	
Gap closure work(shops)	Jean / tbd	Aug '15 > Dec '16	

Check/Measure -completion & performance of 'countermeasure/test' *(step 8)*

Evaluate /Adjust/ Follow Up (Standardize/sustain new Current State) *(step 9)*

APPENDIX C. Business Process Map



APPENDIX D: Improvement Focus Areas

Feedback from the function SIPOCs and business process workshop was organized into the 26 improvement focus areas listed below.

Goals

1) **Asset management; Inadequate system of 'inputs' to goal setting** – Need to clarify our role (inclusive of and in additional to federally mandated asset management role), and solidify the cycle cost points). These are foundational inputs to adequately informing tradeoffs and priorities understanding (cost-basis) of our assets (including the tools of total cost analysis and lowest life- when setting goals/targets/performance measures. *[non AID business process improvement opportunity]*

2) **Goal setting/identification; Inadequate process of aligning and prioritizing** – Alignment between WSDOT goals and Local/regional, Federal, and Legislative goals (including clarifying Mobility and Economic development targets) is paramount and foundational to successfully carrying out our business process. Adequate alignment would ensure clear prioritization algorithms and visibility of decision processes and would aid communication of direction for WSDOT partners and customers, it would also provide the foundation from which performance measurement can be tracked and managed across the business process. –Goal Group 1 doing some work here now *[non AID business process improvement opportunity]*

3) **Engagement / measurement; Inadequate communication of our measures and goals**, our focus, and our plans with our customers, staff, and stakeholders may overwhelm them with and/or cloak them from, important information about our performance and direction, which results in key gaps in their understanding, planning, and support. *[non AID business process improvement opportunity]*

Planning

4) **The role and value of 'planning' to 'practical solutions' within the business process needs clarifying.** – The desired inputs (goals/targets) [including integrated multimodal goals] are unclear and targets need to be clarified through the detailed 'planning processes. This could be initially assessed via a Value-stream Map - to understand how planning contributes to the entire business process, and how the desired goals/targets are informed/achieved through the process. Include key parameters (/decisions) tracked through the steps.

5) **The need to define how they (the outputs) connect –** Inadequate output of planning; programming needs ranked deficiencies, and ranked (feasible) conceptual solutions with anticipated impacts (for prioritization assessments that occur downstream) and to inform the actual process of prioritization.

6) **Data needs and information management and support needs –** There's an inadequate system to ensure data and information support for planning. This includes/incorporates; maintenance inputs; multimodal impacts; data reliability; and acceptable levels of data variability.

7) **Planning inputs and methods and connections are inadequate;** It's unclear how the sketch process incorporates system context, how performance targets and measures live and are incorporated throughout the planning and business process, and how trade-offs are evaluated across the multimodal system. (Of note; how are countermeasures developed attendant to the 3 lean/throughput levers; increase capacity, decrease demand, increase throughput [cycle-time]?) This question (or point in a 'solution development algorithm' would be a critical decision point, early on, based on demand data and existing performance data. Failure to be clear in the type (experiment/hypothesis test) of any given countermeasure would leave the potential for confounding impacts and eliminate the ability [scientifically/statistically] to assess/attribute a countermeasures' efficacy).

Programming

8) **The process of prioritizing and making trade-offs across goal types within the business process needs clarifying.** – The desired goals/targets [including integrated multimodal goals] can conflict in practice yet it is unclear how these conflicts are assessed and reconciled.

9) **There's an inadequate process of addressing non-capitalized deficiencies**- 'dealing' with (i.e. managing) that which was not funded via the capital route. What processes and communications are needed to inform locals and other impacted stakeholders of the unfunded? What processes and standards are needed to ensure subsequent local agreements and accountabilities are developed, defined, and fulfilled? What assessments and communications implications are needed to close-out the 'not done' list (with a solid understanding of their implications)?

10) **Inadequate system of refining the output of planning.** There's a need to ensure a consensus direction (between programming, operations, budget, policy, and prospective non-cap funders) on the process and outcome(s) of Q/A check planning work (aka 'scoping and evaluating solutions'). Recommend value-stream mapping this. Also need to ensure that the anticipated benefit (of the initiative) is quantified in such a way that the improvement's performance can be tracked over time and actual performance-to-target feedback be provided to assess the efficacy of the action(s), and inform the next/future rounds of counter-measure refinement/development/decision making.

Development

11) **Inadequate handoff from planning/programming to design.** Lack of clear 'project definition' and context. (Addressed in VSM of #4 above).

12) **Inadequate system (standard and process) for shepherding performance expectations through the steps in the business process including design/development.** – The absence of desired performance measures, and means to track them, leave initiatives non-assessed, non-cap cost analyzed and, in absence of baseline performance info, unable to be 'improved upon'.

13) **Inadequate specialty group (e.g. TDM Ops) involvement with scoping -** need to resource collaboration from the outset; brining specialty representative voices/eyes to determine, from

the outset, which elements are requirements and highest priorities to anchor in the design, and construction.

Construction

14) **Inadequate adherence to standard asset management documentation –** Need for an 'owner's manual' of assets-includes maintenance; enviro permitting, as-builts (Standard work development).

15) **Inadequate process of change-order management and approvals;** ensure technical experts and operations buy-offs. Root-cause and improvement cycle (provide upstream feedback loop for high-frequency change order types) to reduce # of change orders.

Operations

16) **Inadequate representation of operations in upstream process steps (planning, design). –**

17) **Inadequate performance system for modal-based performance.** Lack of mobility performance measures and tools to analyze results. How is 'multi-modal' and highway operations aligned around performance? *Mobility performance group*

18) Consider revisiting the 'operations' SIPOC (for operating the system exclusively) – what gaps exist (beyond resourcing the workload) in ops?

Maintenance and Preservation

19) **Need for a comprehensive asset list/inventory –** Incomplete and outdated info.

20) **Inadequate definition of 'categories' of (asset) management -** need for an 'owner's manual' (see #14)

21) **Inadequate process for managing** (of assets) – includes 'life cycle costs' track (#1), integrated data, TPM process,

22) **Inadequate commitment to resource maintenance of assets when they're brought on-line. –** inadequate system to communicate needs, expectations, and impacts (inadequate decision algorithm)

Combined (integrated business process)….gaps;

23) **Inadequate statewide perspective on planning –** held in corridors but lacking in 'state-wide/integrated view'.

24) **Clarity on customer(s) –**clear and agreed-upon 'customer(s)' defined across WSDOT.

25) **How do we engage more intensely (for improvement) across/with the extended value stream?**

26) **Reconcile gaps between Legislative intent and WSDOT long-range targets**

APPENDIX E. Corridor Sketch A3

Title: Practical Solutions –Corridor Sketch Phase 2 outputs **To: Practical Solutions Core/Implementation team** **From: Faris** **Date: 6/8/2016 DRAFT**

Background: In late 2015 WSDOT's Future State business process mapping identified priority process details that needed to be developed. The Practical Solutions (PS) Implementation Team is overseeing development and completion of a work plan aimed, in part, at bringing major components of this future state map into being. Specific areas identified for process improvement/development work included; Clarifying 'community connections' in the 'identify needs' phase, Defining the specific outcome of 'feasible solutions'/ Corridor Sketch, developing the 'evaluating processes' for asset performance gap ranking, defining & integrating feedback loops across the business process to ensure learning & performance gap closures are occurring, and integrating modal plans to ensure WSDOT goal delivery occurs. The first sanctioned implementation initiative was to define the detailed elements & form of 'alternative strategies' aka Corridor Sketch phase 2 (CS2) that emerge from this phase of WSDOTs business process, to be utilized by the next 'refine solutions' phase. The Planning office has made significant progress in completing preliminary specifications of each corridor's needs via Corridor Sketch phase 1 (CS1). Concurrently they are receiving 'work plans' from Regions in support of CS2 which is scheduled to be brought 'online' (i.e. initiate production of 'detailed needs' per corridor) beginning in July of 2016 to meet requirements of a supplemental legislative proviso.

Current State:

- We have not fully developed the CS2 handoff process from planning to; scoping; programming, Transportation Demand Management (TDM), Operations, & other solution refiners. This reinforces functional silos inhibiting the multidisciplinary engagement needed for stakeholders to efficiently & effectively contribute across planning activities.

Context (where we are right now) that informs this work:

- Practical Solutions Core team is developing a 'vivid description' for Practical solutions.
- Language/definitions aren't shared & may not 'scale' (e.g. 'strategy' & 'scoping').
- Conceptual strategy rankings & refined solution prioritizations are unclear, as are constraints and tradeoff processes across and between modes and economic vitality.
- Major projects iterate through strategy & solution development over long cycle times
- It is unclear how strategies (& actions) are distinguished & constrained across long-range aspirational goals & near-term goals.
- Performance expectations that inform the 'alternative strategies' & 'refine solutions' phases and the corridor sketch processes lack department-level clarity, have myriad sources (are disparate), and don't provide an integrated expectation set for strategy developers and solution refiners to work from.
- A programmatic approach to tackle the worst performance (biggest difficulties), developed across functional/modal performance gaps, does not exist.
- Feedback loops informing learning & attributable performance gap closures don't exist

Specific gaps:

- The key products/specific outputs required & preferred by the solution refiners in; content, format, sequence, & timing, are not defined.
- The detailed process steps from 'CS2' through 'scoping' are unclear, as are roles.
- Some redundant ranking of strategies occurs in planning, and then again in scoping.
- CS1, while complete in principle still need some data-element validation.

Goal(s)/Outcome(s):

- Downstream process partners' needs/outcomes from CS2 (i.e. the context and format(s) of the strategies coming out of the 'Assess alternative strategies' phase) are identified, defined, & built into the workflow. Consensus on clear handoff processes and roles is achieved.
- Where & when 'ranking' of strategies' occurs gets established.
- CS1 data elements get validated.

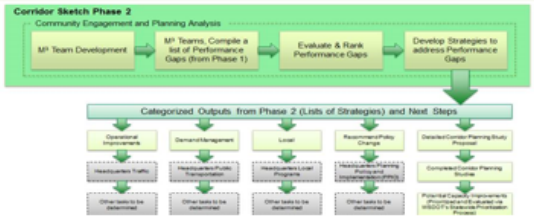
Proposal: This is an extension of the existing practical solutions implementation that involves birthing a component of the future state business process which entails developing a new, currently non-existent process and is not a candidate for a traditional lean problem-solving workshop approach. New process and work design necessitates; a thorough and iterative grasping of customer need; a consensual set of criteria to evaluate 'complete & accurate' within and across process steps; designing-out waste from the start; brainstorming, testing, & analyzing alternatives that meet customer needs; and a process and space to iterate tests of the new design. This will be undertaken through the following steps;

- Compiling background info on currently collected CS1 data elements & downstream needs, along with a conceptual draft of the CS2 process (below), and making these available to select representatives from Planning, TDM, Operations, Capital Program Development & Management (CPDM), Policy, & Design who do, or will be doing, the work of 'refining solutions' (attendant to the agency emphasis on inclusion –this engages those doing the work rather than the leaders of those functions).
- Then conducting interviews soliciting their specific needs/desired outcomes of CS2.
- Then convening those representatives in a workshop/forum to develop a consensus understanding of the detailed elements & formats of 'alternative strategies' (aka CS2) that will emerge from this phase of WSDOTs business process.
- Then launching CS2 with those defined elements and formats of 'alternative strategies' as a 'trial' for thd months.
- After which the group would be reconvened to check & adjust the elements and formants.
- Specific tasks & outcomes include;

Task	Outcome
Isolate & complete the collection of key inputs needed by the solution refiners/next process step owners; Capital, TDM, Operations, & policy	CS 2 data elements identified
Validate Corridor Sketch phase 1 elements	CS1 elements validated
Clearly define outputs (detailed components) & the format of 'alternative strategies' developed in CS2	CS 2 data elements and handoff processes defined
Evaluate for potential reduction or elimination of rework by process owners.	Plans drafted for rework reductions
Sustain visibility to & achievement of the performance gap closure(s) needed - across the business process.	Gap tracking tool & process implemented

Corridor Sketch Initiative: Phase 2

CONCEPTUAL SCOPE OF WORK FLOW DIAGRAM (DRAFT)



1 - Each Region Planning Office to establish a multidisciplinary, multiagency, multimodal (M3) team

2 - Each Region Planning Office will lead their respective M3 Team, using information in the Corridor Sketch Database including findings from regional plan (what's working well and what needs to change from Phase I of the Corridor Sketch) to compile a list of Mobility and Economic Vitality Performance Gaps (needs)

3 - Each Region Planning Office will lead the M3 team to evaluate and rank Mobility and Economic Vitality Performance Gaps (needs)

4 - Each Region Planning Office will lead their respective M3 Team to Develop lists of Strategies to address ranked Mobility and Economic Vitality Performance Gaps (needs)

Requires: Traffic Analysis, Development of Cost Estimates, and Calculation of Proposed Benefits

Action Plan

Ref #	Action	Lead	Due Date	Comments
1	Compile relevant background info. Develop, vet, and distribute interview questions.	Paul/Leni	6/15	Sources; Spy Pond's work on inputs and outputs, including the deep dive on scoping and design; Faris' summary material from corridor sketch 1; The elements in the Corridor Sketch database; and Cassandra's summary report on the inputs needed for the basis of design.
	Conduct interviews on CSII outputs.	Paul/ Cassandra	6/21>7/7	Operations: Steve Kim, Harold White, Monica Harwood; Maintenance: Gary Brown, Greg Selstead, Rico Barona; Local Programs: Kyle McKeon; TDM: Evan Olson, Stan Suchan; CPDM: Matt Neeley, Jeanne Ring; Policy/detailed studies: Carol Lee Roalkvam, Karena Houser; Region: Todd Carlson, Charlene Kay, Mike Frucci, Dan Sadler; Design: Brian Walsh.
	Brief Leadership	? Faris/Leni	6/21	Need to know/Leadership list: (Operations) Ted Baily, John Nisbet; (GIS) Alan Smith; (Capital/CPDM) Jay Alexander; (Planning) Keri Woehler; (TDM) Brian Lagerberg; (Planning) Elizabeth Robbins; (Design) John Donahue
	Conduct workshop/forum.	Paul/ Cassandra/ Faris	7/7-15	Set context (business process), park conflicting ownerships, establish 'representation'/zoom-out capability, solicit required inputs & ping for other significant/contrary peer perspectives (if needed).
2	Determine follow-up-timing for a 'learning review & Check-adjust to refine data elements & processes	Cassandra/ Paul	Close of initial forum	Determine adequate number of CS2 application iterations &/or trial time needed, and set a 'Round 2' reconvene point

Unresolved issues/Potential risks to achieving complete success in this effort: No system-wide integrated set of performance targets has been established. 'Performance' definitions for each step & 'how to track and sustain their achievement' across the business process remain unclear.

APPENDIX F. SR527 Bus Rapid Transit

Facilitation of Case Study Charrette for SR527 Swift BRT Project

Summary

A half-day charrette is proposed to generate the information necessary to develop a Case Study for the SR527 Swift BRT Project. The charrette would be facilitated by Rita Brogan. She will also prepare the first draft of the case study. Participants will be chosen and recruited by the WSDOT Public Transportation Division.

Case Study Goals

1) Identify how WSDOT can work with partners to increase agency engagement around multimodal projects.
2) Evaluate the Swift 2 project timeline and relate to how and when WSDOT should have identified this project.
3) Determine how WSDOT should incorporate this project into the Corridor Sketch process.
4) Identify opportunities for engagement across agencies with the objective of creating a complete system and meeting performance objectives
5) Identify how the corridor context changes on SR527 and how that change may affect the multimodal system performance on different segments.
6) Establish an engagement process that provides both agencies with clarity on who to engage and when on their own project, the partner agency project, or a performance gap.
7) Clarify expectations for agency staff while attending partner meetings.
8) Differentiate jurisdictional responsibility for different modal facilities (both existing and proposed) and relate to balancing performance objectives.
9) Critique community engagement process with respect to partner participation and jurisdictional responsibility
10) Construct a partner coordination timeline and relate to SR527 BRT project timeline as well as design policy requirements (particularly around need, context and design control decisions).

The case study was conducted by PRR, Inc. A technical memo summarizing the findings is available upon request.

This page left intentionally blank

APPENDIX G. Intersection Justification Reports, National Environmental Policy Act, and Value Engineering A3

NEPA/IJR/VE Process Alignment – Problem Solving A3

Development Division

Sponsor: Jeff Carpenter	Lowest-level leader with oversight/decision authority over; IJR, NEPA, Feasibility & VE.	(signature) 5/18/2017
Operational Owner/Team: Enviro/VE//Design/Project Engineers	Mike Frucci, Chris Regan, Mark Gable, Russell Burgess, Barb De Ste Croix, Faris Al-Memar, Leni Oman, Mustafa Mohamedali	(initials)

1. Identify the Problem *(Describe the concern and why it matters)* WSDOT's processes to determine projects' 'purpose and need' and to 'assess alternatives' are repeated within multiple processes and projects within the agency. This can and often leads to:

- duplicative and reworked process loops
- added costs; extended project lead-times;
- significant frustration for the project team(s) and external stakeholders;
- a decline in WSDOTs reputation.

Ensuring a predictable interconnected process that can be understood both internally and external to WSDOT is vital.

2. Observe and Measure the Current State/ Background *(Show and describe what is actually happening- what we see and what facts we know; try to explain the who, what, when, and where using visuals)*

- Transportation elements of GMA need to be aligned w/'Purpose and Need' determinations for large WSDOT projects.
- Once determined, 'purpose and need' lack visibility throughout the process and can be diluted or shifted prior to completion.
- For projects that utilize Feasibility studies/Interchange Justification Report (IJR), National Environmental Policy Act (NEPA), and Value Engineering (VE) studies- these are conducted independent of each other and at different times in the project's life. The oft-disparate studies then exhibit redundancies in: information needs; processes; analyses; decisions; stakeholders; and, even team-members.
- Projects can have both 'contextual needs' informed by stakeholders (e.g., environmental or modal priorities, expansion caps) and 'baseline needs' (e.g., reduce congestion) clarified in planning.
- VE utilizes tools to evaluate 'designs' and recommend the 'best transportation solution' options. Optimally done early in the process (shortly after planning and community engagement efforts have identified the transportation problems). VE can reduce cost and limit downstream over-processing. Often however, VE studies enter the picture after project design is complete and are seen as 'recommended options'.
- An Interchange Justification Report (IJR) is required for projects involving access to/from an Interstate or a limited access highway. IJRs can involve new stakeholders who do not agree with or trust the prior work/analysis. IJRs are not *final (considered approved)* w/o NEPA.
- Done sequentially, ***these independent processes often result in changing decisions made previously/upstream. At minimum this rework is inefficient, at worst it can result in different project solutions, significant stakeholder upsets, PR recovery work and soured relationships with partners and stakeholders -as WSDOT appears unable to make and 'stick' to a decision.*** This is exacerbated when different levers are used and/or long time-gaps exist between the three analyses/recommendations.
- NEPA analyses also come in after projects hit certain thresholds and the design is largely cast. A change in design, or rework through other processes often results in NEPA re-evaluation and rework. However, ninety-eight percent (98%) of NEPA reviews meet 'categorical exclusion' criteria and proceed, when larger documents require supplemental documentation, the added NEPA process impacts schedule and budget.
- Practical Solutions guidance has informed refinements to the "Basis of Design" in WSDOTS's Design Manual and the assumptions that underlie these may need tighter alignment.
- Process maps and descriptions exist in WSDOT manuals; IJR (5.50), NEPA (EM 6.4), VE (DM 3.1 and (11.00-11.06)

Prospective "Quantifiable" problem/gaps and 'impacts' data include:

- re-work loops experienced (JBLM, Amphitheater, Harvard Rd, others?)
- lead time additions (JBLM=1yr, Harvard Rd=~10 years, others?)
- Cost additions (JBLM=+$2M, Harvard= +$? M, others?)
- Agency Reputation -as measured by ___?___(SR527/CT sacrifices customer/system reliability to avoid an IJR, others?)

3. Set a Target *(Describe where we want to be and by when. Use measures for safety, cost, quality, timeliness, customer satisfaction, and/or employee engagement to frame your target)* -TBD (by team) based on current state data

- We want to reduce # or % of rework loops by __?__ (e.g. 50%)
- Decrease lead time by_?_
- Reduce (IJR/VE/NEPA) project costs by _?_
- **Improve 'agency reputation'/'project acceptance' by ___?___**<Biggest impact, Continue to pursue (quantify if we can)

4. Write a Problem Statement *(State precisely what you want to achieve & by when. No 'hows', 'why's' or 'who's')*

"Currently projects involving IJR, VE, & NEPA studies result in rework loops of (X), added costs of (Y), and acceptance rates of (Z) compared to our target(s) of (xx),(yy), & (zz), which we aim to achieve by (analyses, gaps & roots identified by: 4/31/2017, with full countermeasure implementation by: June 2017. Out of scope = changing the actual IJR, NEPA processes themselves.

Stakeholders to inform Analysis/Rootcause/Countermeasures (Who was engaged in 'analyzing the gap'?)

Participants: Core team (see above), Barb Abarle, Bart Gerobart, Bill Elliot, Bill Saucol, Brian Walsh, Brian White, Carl Greer, Carol Lee Roalkvam, Cathy George, Dick Gersib, Don Peterson, Elizabeth Robbins, Hung Huynh, Jim Mahugh, John Donohue, Lei Lu, LisaRene Schilperoort, Mike Williams, Mosstafa Sadia, Randy Giles, Ricky Bhalla , Rico Barrera, Ron Landon, Scott Zeller, Sharon Love, Todd Carlson

Facilitator: Sam Wilson **Leaders/reps:** Jeff Carpenter, Karri Woehler, Megan White,

5a) Analyze the Gap *(Why does the gap exist? Show the causes & root cause(s) of the gap)*

Fishbone or Ishikawa is a first-pass map of causal factors contributing to the gap(s).

People

- Lack of continuity (worker turn-over)
- "Back-dooring"
- BITWWADI
- Lack of Trust

Structure

- 3 Divisions each tasked to study different facets
- Inadequate resourcing of 'planning' stage SME's)
- Inadequate quality- Basis of Design
- IJR is prescriptive
- This studies not cross-walked w/community engagement plan
- Non-WSDOT sponsored processes

Processes

- Analyses occur at Different times in business life cycle
- Decision points not shared
- 3 silo's w/#3 processes, unclear roles & points of connection
- Unclear project 'acceptance' points
- Lack of continuity in public comments

Policy

- TPA funded required silo-based-analysis?
- FHWA defines
- No 'Problem Clarity'
- "Purpose" & "Need" definitions unclear/not shared
- 'P&N' not solid from get-go
- Land use planning /GMA mis alignment
- FHWA, WSDOT, & communities 'purposes' Not the same
- Inadequate shared training (on 'purpose & need') across programs

Why? Why? Why? Why? Why?

Rework loops? Or Added Costs? OR Lead time? Or WSDOT reputation?

After conducting a fishbone top direct causes were selected for deeper-dive analyses utilizing '5-why' analyses &/or issue-trees that focus on revealing the root causes. Root causes usually represent inadequate standards, processes, systems (combinations of standards AND processes), or a lack of adherence to standards or processes. From these roots most countermeasures are often self-evident & can be developed.

1) NO ESTABLISHED OR CONSISTENT PURPOSE AND NEED

- Each process is independently defined and not integrated
  - NEPA, IJR, and VE all have different purpose and needs
  - *Lack of clear guidance, policies, procedures, and training contributes.*
- Lack of Clear Need
  - Within each category, the overall need of the project is *not clearly defined*
  - Perceived project *need is not consistent* from one study to the next on any given project
- Lack of Communication between Handoffs
  - Staff turnover here and at local governments lack continuity and clarity
  - Handoffs could be between agencies, departments, outgoing and incoming employees, etc. (Inadequate systems of ensuring *relevant info*: Purpose & need/project progression *is handed off*)

- Review Design Manual Chapter 1101
- Identify an existing or convene a group to discuss improvements
- Discuss if/how purpose & need vary over the development lifecycle

2) INTEGRATING THE 3 PROCESSES: IJR, NEPA,

- Need to (but *don't) visually show the functional relationships of the three*
  - This visual needs to depict scalability (esp. w/ IJR). Is IJR for state routes too restrictive? What guidance do we need? Who should develop it? Example: small project PEL?
  - Include committed purpose and need from the outset. It is critical to commit to a clarified, united "need" that can be sustained through the project
  - Needs to be *simple and clear* enough for anyone in agency to understand.
  - We have visual depictions now, but they are isolated. We need a depiction that *shows handoffs, sequence, relationships, duration*
- Decisions are made independently by each study (*shouldn't be independent of each other*)
  - These decisions sometimes contradict each other
  - They aren't shared in a timely way between studies
  - Duplication of effort. Rework.
- This topic of Integration is closely connected to the above topic of Purpose & Need

- Update integrated process maps with the changes received
- Look for near term opportunities to create links between current process descriptions in manuals and training courses
- Identify existing groups or processes to continue to develop the draft alignment of processes OR convene a team to do so.

3) Inadequate resourcing of 'planning' stage

- Lack of understanding of the value in planning
  - *Planning effectiveness is not measured*, so people aren't paying as much attention to it
  - Planning value is intangible, not concrete, and hard to measure
  - Tenure of elected/appointed positions shorter than outcome value (they aren't there long enough to realize the value of planning and invest)
  - *Need metrics for planning*
- Knowledge loss due to attrition is complicated by:
  - Cap on FTEs (from legislature)
  - Cumbersome hiring process
  - Salary compared to private
  - Inadequate training
- Budgets exist in Silos
  - *Budgets tied to capital projects* (one type of silo)
  - Legislature wants to track funds and hold accountable to individual categories in order to report to tax payers where $$ is going
- Inability to surface resource needs (WSDOT, Leg.)
- Need to deliver CW package (workload)
- We're not deploying resources strategically
- Planning stage *not funded adequately*
- Need to *clarify cross organization expectations*
  - Concept of "utility players" who can do multiple things
- *Tools / Data don't support lifecycle* decisions
- *External partners* also lack resources for *early engagement*.

- Communicate process connections in existing training programs
- Identify existing groups or processes to review resourcing after the alignment discussion

A3 Problem Solving | NEPA/IJR/VE Process Alignment -pg.2

Insert Date Here
Insert Title, Division Here

Background (See above)

5b) Identify Countermeasures *(Show the countermeasures developed to address the root cause(s))*

Root Cause	Possible Countermeasure components	Difficulty	Impact	Notes/connects to other work
1 –Establish purpose and need	Clarify any variations in Purpose and Need (P&N) Review (and adjust if necessary) processes to ensure continuity (of P&N) across development lifecycle Review and adjust any references (Manuals) and trainings associated with these processes to incorporate the adjustments			
2– integrate processes	Develop easily understandable visual(s) that simply and clearly show the relationships of the 3 studies with each other, and their context Define what "adequately integrating the processes" encompasses and proceed to tackle their subsequent integration(s); >one or multiple inter-connected process maps and linkages (showing sequences, durations, handoffs, and relationships where needed) >one or multiple resources to conduct the processes (including role-clarifications where needed)			
3 – Resource Planning	Define what "adequately resourcing the planning processes" means and encompasses, and launch recommendation developments that address it Determine what measures best represent "planning effectiveness" and develop plans to begin capturing their baselines			

6. Plan to Test Countermeasures *(Once Set- Who'll do what, & when in order to test countermeasures.*

ID#	Problem to be solved	Strategy/Approach	Task(s)	Lead	Due date	Expected Outcome

7 & 8. Do & Check Results of Countermeasures *(What was learned from testing this countermeasure. Was the hypothesis proven?)*

ID#	Problem to be shared	Strategy/Approach	Task(s) to support Strategy	Lead	Status	Due	Expected Outcome	Actual Outcome Measured

9. Adjust the Plan *(Explain what's next to continuously improve: pilot elsewhere, refine/adjust this countermeasure, or try a new countermeasure?)*

ID#	Problem to be shared	Strategy/Approach	Task(s) to support Strategy	Lead	Status	Due	Expected Outcome	Partner Agency

Parking lot (parking lot concerns that arose DURING development of this A3 – for hand off to sponsor(s)/Senior leaders AFTER):

- External stakeholder downstream impacts of changes (e.g. environmental orgs)
- viability of VE; is it effective? Feds are changing the VE requirements (to >$50M)…but WSDOT has yet to change ours.
- Early address need for a 'reflection' function that assess & problem-solves non-funded projects rework & lost productivity
- Tools/Data don't support 'managing the lifecycle' decision-making. What do we need/how should we approach?
- External partners lack resources for early engagement. Can/should WSDOT play a role in their better prep?
- Is 'budgets' tied to 'capital projects' a systemically & sustainably viable approach in the future? / how to tackle?

TBD

References

- Mann, David. *Creating a Lean Culture*. 3rd edition, October 24, 2014, Routledge.
- Shook, John, Managing to Learn: Using the A3 management process to solve problems, gain agreement, mentor, and lead. 2008
- Results Washington goal councils
- Hart, Crystal, Personal Kanban: *Effective Visual Management for Everyone.* November 4-5, 2015. 2015 Training Conference and Tradeshow, Efficient, Effective, and Accountable Government, hosted by the Washington State Department of Enterprise Services. References the Lean Transformation Model developed by John Shook, Lean Enterprise Institute. Related to the results model illustrated on page 6 of this report.

Americans with Disabilities Act (ADA) Information:
This material can be made available in an alternate format by emailing the Office of Equal Opportunity at wsdotada@wsdot.wa.gov or by calling toll free, 855-362-4ADA(4232). Persons who are deaf or hard of hearing may make a request by calling the Washington State Relay at 711.

Title VI Statement to Public:
It is the Washington State Department of Transportation's (WSDOT) policy to assure that no person shall, on the grounds of race, color, national origin or sex, as provided by Title VI of the Civil Rights Act of 1964, be excluded from participation in, be denied the benefits of, or be otherwise discriminated against under any of its federally funded programs and activities. Any person who believes his/her Title VI protection has been violated, may file a complaint with WSDOT's Office of Equal Opportunity (OEO). For additional information regarding Title VI complaint procedures and/or information regarding our non-discrimination obligations, please contact OEO's Title VI Coordinator at (360) 705-7082.