

2010

# Alaska DOT & Public Facilities Transportation Asset Management Assessment

May 3-7, 2010

**Report prepared by:**  
Office of Asset Management  
Federal Highway Administration



U.S. Department  
of Transportation  
**Federal Highway  
Administration**



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## Executive Summary

The purpose of this report is to document the observations and recommendations made to the Alaska Department of Transportation and Public Facilities (AKDOT&PF) during a Transportation Asset Management (TAM) Assessment. This Assessment was conducted by the Federal Highway Administration's (FHWA) Office of Asset Management at the request of the AKDOT&PF. Participants included FHWA officials from the Office of Asset Management and Resource Center, along with the staff of the AKDOT&PF.

The TAM Team, (Appendix C) first met with the AKDOT&PF on the afternoon of May 3, to discuss the objectives of the Assessment, review the Self-Assessment results and to discuss the key TAM elements already in place at AKDOT&PF. Specific questions related to each Division in the agency were provided to AKDOT&PF beforehand (Appendix D). In addition to the interviews conducted on site, information and data was also obtained through research on the AKDOT&PF's official web site at: <http://www.dot.state.ak.us/>.

AKDOT&PF's interest in applying TAM is based on wanting to achieve the following objectives, as identified in a letter to the leadership team dated February 4, 2010:

1. Improve their performance and cost effectiveness including policy goals and objectives; lower long-term costs for infrastructure preservation; improve performance and service to customers; and improve use of available resources.
2. Improve communication, accountability, and credibility including better communication within the organization and with customers; and improve accountability and credibility in their decisionmaking.<sup>1</sup>



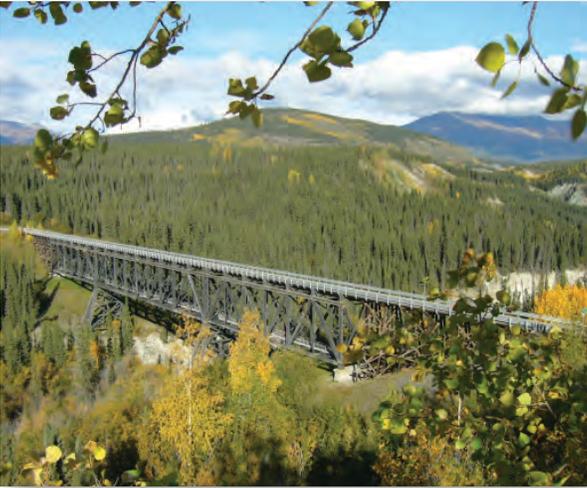
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<sup>1</sup> Letter dated February 4, 2010, to all leadership team: Subject: Transportation Asset Management Assessment.



## Introduction

The Alaska Department of Transportation and Public Facilities (AKDOT&PF), through the FHWA Alaska Division Office, contacted the Office of Asset Management in August 2009 requesting an overview presentation on what Asset Management was and why it should be important to the AKDOT&PF. In September 2009, Butch Wlaschin, Director, Office of Asset Management and Francine Shaw Whitson, Transportation Manager, Office of Asset Management, conducted the requested Transportation Asset Management (TAM) Overview with the FHWA Alaska Division Office and Mr. Mike Coffey, Director of Maintenance, AKDOT&PF via telephone. As a result of the overview, Ms. Shaw Whitson met with the AKDOT&PF Commissioners at their November meeting for a second presentation on TAM and the available tools that could be used in its implementation. The Commissioners were very attentive to the presentation, asked in-depth questions and later voted to move forward with a TAM Assessment. Working with the FHWA AK Division Office and the AKDOT&PF, a team was identified to visit Alaska and conduct the TAM Assessment May 2-6, 2010.



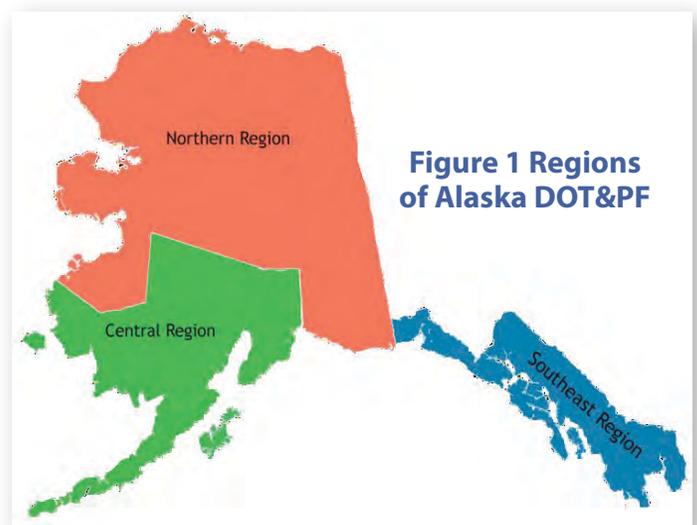
During the TAM Assessment, the FHWA team visited the three regional offices and Headquarters sites in Alaska: (Northern) Fairbanks, (Central) Anchorage, and (Southeastern and Headquarters) Juneau. The results of the TAM Assessment are the basis of this report. This report documents the results of the TAM Assessment as well as recommendations for future actions the AKDOT&PF can take to further implement TAM in their organization. Under the current leadership, there is a renewed focus on TAM ensuring that the citizens of Alaska are receiving the best return on their transportation investments.

## Background Information

The AKDOT&PF designs, constructs, operates, and maintains the State's transportation infrastructure systems, buildings, and other facilities used by Alaskans and visitors. These include more than 5,000 miles of paved and gravel highways; more than 300 aviation facilities, including 260 airports; 43 small harbors; and a ferry system covering 3,500 nautical miles serving 33 coastal communities.

The Department is administratively divided into three regions. The Northern Region, headquartered in Fairbanks, is the largest, most geographically diverse, and maintains more centerline miles of highway, including all of the Alaska, Richardson, Taylor, Denali, and Dalton Highways and portions of the Parks and Glenn Highways.

The Central Region, headquartered in Anchorage, includes the State's most urban areas, as well as some of the most remote villages on the Kuskokwim delta, the Alaska Peninsula, and the Aleutian Chain. Central Region maintains the Seward and Sterling Highways, as well as parts of the Parks and Glenn Highways.



## Let's Get Moving 2030 Strategies and Actions

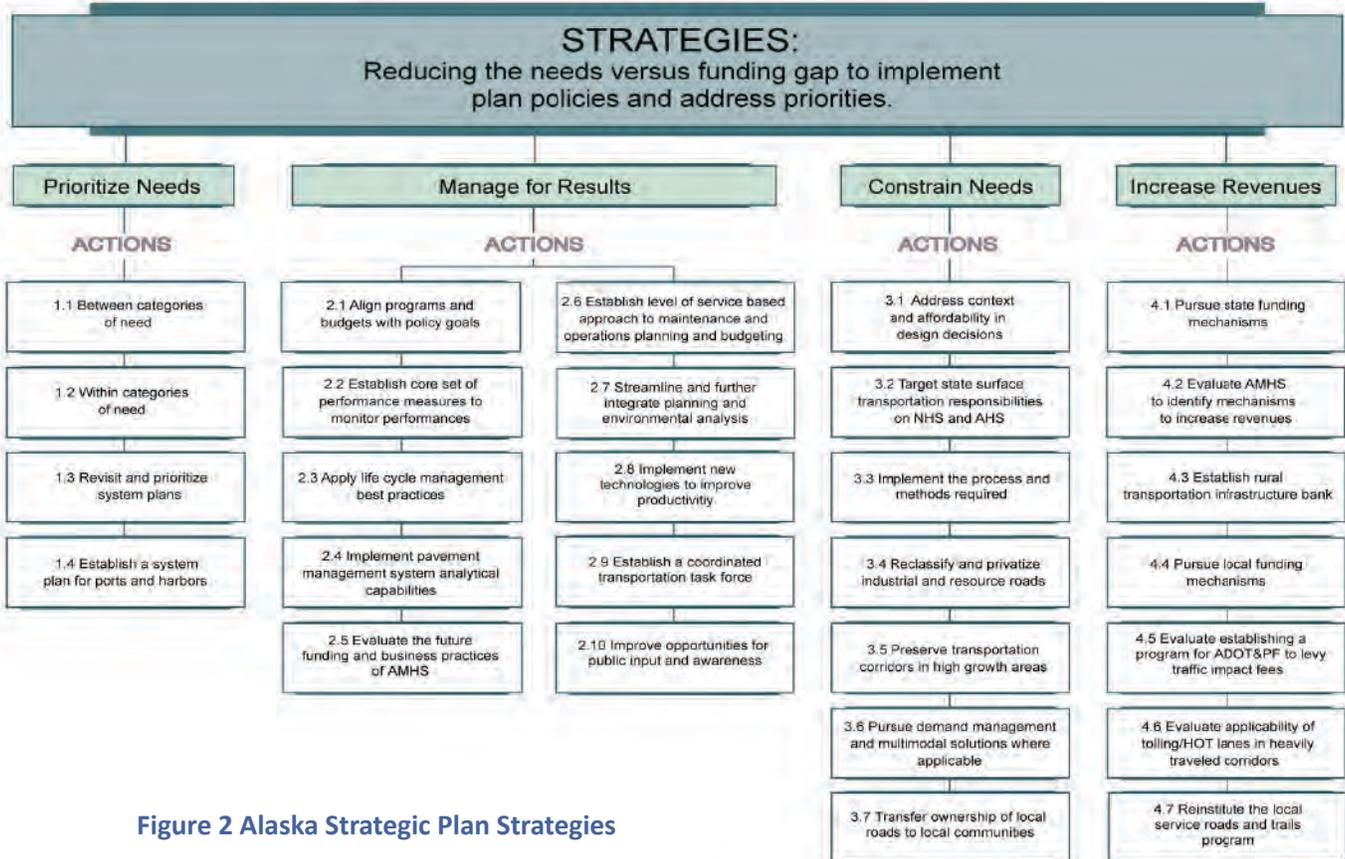


Figure 2 Alaska Strategic Plan Strategies

An approved component of the Alaska Statewide Transportation Plan Adopted February 29, 2008

The Southeast Region, headquartered in Juneau, serves a coastal population of 70,000 hardy residents of the Alexander Archipelago. Currently, only three Southeast communities are connected by road to the outside world – Skagway, Haines, and Hyder.

The Alaska Marine Highway System (AMHS) is headquartered in Ketchikan. From there, AMHS management directs the operation and maintenance of their fleet of eleven vessels, ranging in size from the 181 ft. M/V Lituya to the 418 ft. M/V Columbia.<sup>2</sup>

The transportation system in Alaska is not complete and there are many plans for its further development into a more integrated network. This is very different from the rest of the country, where the system is complete and most new construction is to address congested bottlenecks and corridors.

Alaska's long transportation range plan, "Let's Get Moving 2030" provides a comprehensive analysis of Alaska's transportation baseline and future needs that include all modes. A key objective for the analysis was to evaluate the different types of needs that AKDOT&PF must address for transportation facilities and services. This technical analysis provided a comprehensive fact-based assessment from which they can set priorities and plan for the future, and presents a sound foundation for ongoing policy development.

<sup>2</sup> AKDOT&PF Web site: <http://www.dot.state.ak.us/comm/about/about.shtml>



The models and decision-support framework that were developed allow for monitoring the performance of the transportation system and determining how to allocate funds to best meet desired outcomes.<sup>3</sup>

Alaska has many transportation plans that provide bold, ambitious goals for the development of the transportation system. Together these plans provide a well-defined blueprint for the future. Implementing these plans will cost many billions of dollars, and absent large amounts of new funding, they cannot all move toward implementation in the next 10 to 20 years. The technical analyses, stakeholder input, and stakeholder discussions conducted to develop *Let's Get Moving 2030* identified a pressing need for this plan to provide a framework for setting statewide priorities and balancing different needs. Such a framework provides a way to address the transportation challenges that confront Alaska today and that must be addressed in any plan for the future.<sup>4</sup>

The AKDOT&PF has collaboratively identified strategies and actions that are believed to be helping in reducing the needs amid the major funding gap. The Figure 2 illustrates these strategies and actions.

These strategies and actions are in line with the principles of TAM and will help move the AKDOT&PF forward in its quest to comprehensively apply TAM principles in its management and operation of its organization.

## **AKDOT&PF Self Assessment**

In January 2010, the leadership of AKDOT&PF decided to conduct the TAM Self-Assessment contained in the *Transportation Asset Management Guide*. This self assessment allows an agency to identify where it is as an organization in the United States that would have fully implemented TAM. The purpose of the Self-Assessment is not to try to translate results into a precise measure. Rather, the results are an approximate indicator of how an organization's managers (see Figure 3) see their agency's performance of each function or capability described in the statements. A copy of the Self-Assessment AKDOT&PF completed is included as *Appendix A*. The Self Assessment, along with the TAM Assessment conducted, will serve to assist the AKDOT&PF in fully implementing TAM in their organization.

TAM is a process used for managing transportation infrastructure with the objective of improved decision-making for resource allocation. Another way of saying this is, which programs/projects should the DOT spend/invest their funding for the best long-term benefit. TAM aides in making 'informed decisions' about managing your network over the whole life-cycle considering network performance, economics, and engineering. Its focus is on improved decision-making for resource allocation to manage the various transportation assets and their performance such as pavements, bridges, congestion, safety, etc. Management Systems for pavements, bridges, congestion, safety, etc., are sub-elements necessary to provide sound information and data to support Asset Management decision-making.

AKDOT&PF's interest in applying TAM is based on wanting to achieve the following objectives, as identified during the TAM Assessment opening meeting on April 14:

2. Improve their performance and cost effectiveness including policy goals and objectives; lower long-term costs for infrastructure preservation; improve performance and service to customers; and improve use of available resources.
3. Improve communication, accountability, and credibility including better communication within the organization and with customers; and improve accountability and credibility in their decisionmaking.<sup>5</sup>

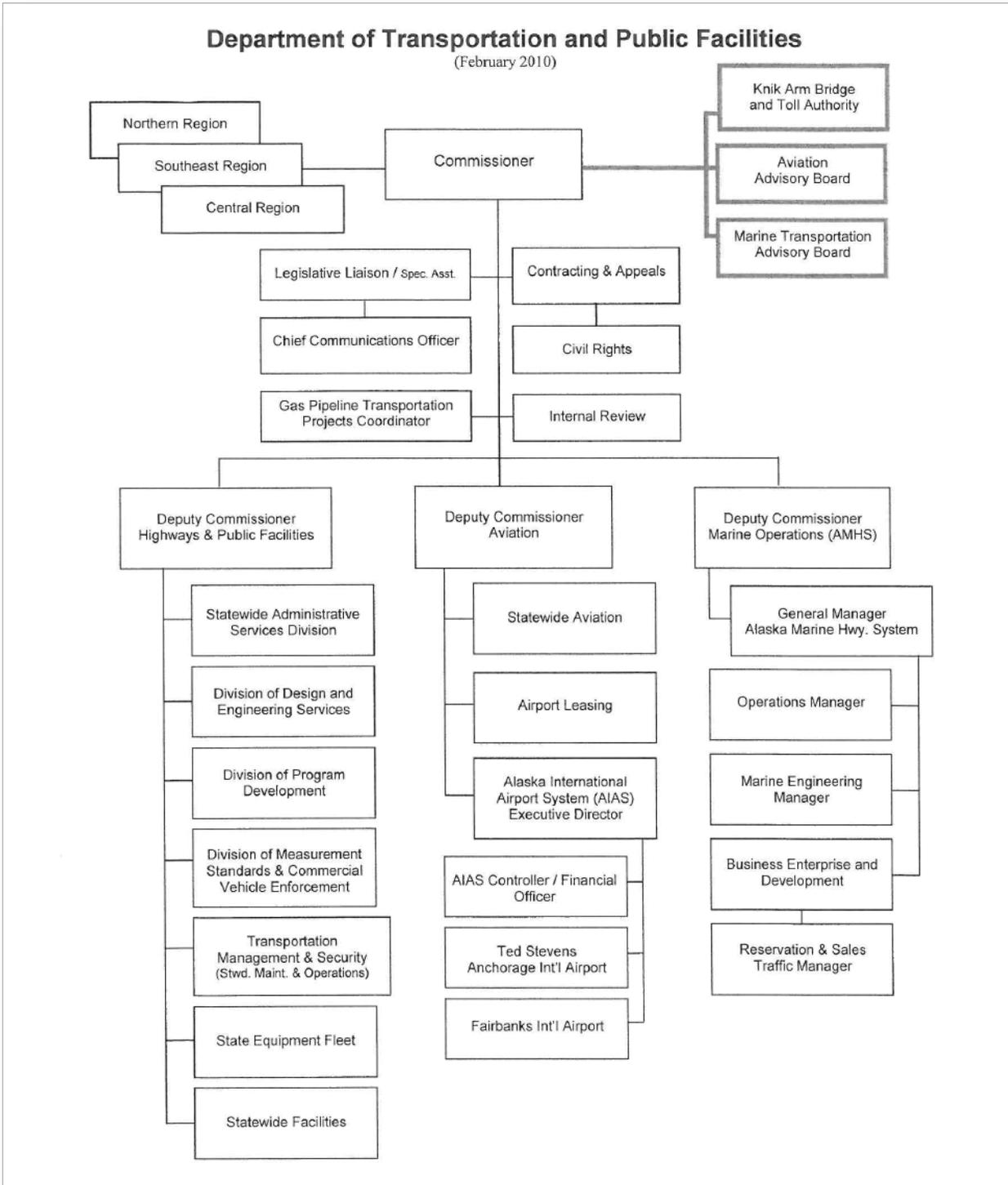
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<sup>3</sup> Alaska Long Range Plan, "Let's Get Moving 2030."

<sup>4</sup> Ibid.

<sup>5</sup> Letter dated February 4, 2010, to all leadership team: Subject: Transportation Asset Management Assessment.

The TAM Assessment included both large and small group discussions. The agenda and attendance sheets are included in *Appendix B*. At the conclusion of the Assessment, the large group assembled and prioritized the findings and recommendations as shown in *Appendix C*. The remainder of this report discusses the specific observations and recommendations broadly based on the focus areas utilized during the TAM Assessment. Sub-areas and related topics have been broken out to ensure clarity and understanding.



**Figure 3: Alaska DOT&PF Organization Chart**



## Results from the Assessment

AKDOT&PF showed evidence of various stages of TAM throughout its organization. For example, the Data Group has already begun transition from a legacy data system to an enterprise geo-database environment. Once this transition is complete, it will house all asset related data and information to provide support for resource allocation and investment decision making. Data required for TAM implementation usually exists in separate files and database systems. However, the forward thinking of the AKDOT&PF puts them well on their way to making more comprehensive and optimal infrastructure investment decisions in the future. Other key observations include:

1. The organizational TAM Champion has not been officially designated and therefore staff and is therefore not recognized by the staff.
2. Roles and responsibilities for TAM implementation have been defined from a program perspective.
3. The organization has taken proactive steps to maintain its corporate knowledge. This is a very important step and other DOTs across the country can learn from AKDOT&PF.
4. The Management Reporting Systems captures a lot of information on actual expenditures and accomplishments for the organization and could be used to get a clearer picture on how infrastructure investments are being used to achieve strategic goals for the organization.

After the TAM Assessment, discussions with the AKDOT&PF confirmed that they are more committed than ever to implementing TAM in their organization. However, they plan to phase-in recommendations and wanted to ensure that recommendations were addressed strategically to allow the organization to gauge its progress and make adjustments to their TAM Program as they moved forward. Some of the challenges identified by staff to implementation include:

1. Selling the concept to everyone that TAM will be fair – “Buy-in” and the “What’s in it for me?” perspectives.
2. Concerned about TAM being data-driven: What data is needed and how much? Getting data into a useful format.
3. Getting people to use the data and information to make decisions.
4. Making data valuable to employees so they will use it.
5. Overcoming the fear of change with employees. (Currently working on change management training for employees)
6. Documenting existing practices.
7. Prioritizing needs according to staff time and workload.
8. Managing expectations of employees and legislature concerning TAM.

These challenges are normal to any organization that is undergoing major change to improve itself – and the AKDOT&PF is not immune. However, with the strategic focus of the leadership team, we are confident these challenges can and will be overcome.

The FHWA appreciate the opportunity to have assisted the AKDOT&PF in identifying the next steps towards implementation of its TAM Program and stand ready to assist when called upon.

## Key Results from Assessment

<u>Observation</u>	<u>Recommendation</u>
<b>Policies and Procedures</b>	
1. The organizational TAM Champion has not been designated and is not recognized by the staff.	Officially designate the organizational TAM champion and notify staff.
2. There is no steering committee to assist in the formal implementation of TAM in the organization.	Establish a formal steering committee that can assist in establishing standards of operation for the implementation of TAM for the organization.
3. Roles and responsibilities have been defined from a program perspective for the implementation of TAM.	No recommendation
4. The organization has taken proactive steps to maintain corporate knowledge.	A. Continue to establish programs that will allow the organization to maintain its corporate knowledge as staff retire and/or resign.  B. Training and skill plans should be developed to maintain skill level of staff.  C. The succession planning and knowledge management programs should be tied and coordinated together for consistency.
5. A formal communication and marketing plan is needed to inform staff, public, and elected officials of TAM implementation efforts.	Prepare both a formal communication plan and marketing plan for informing staff of progress of TAM implementation and to obtain buy-in of the implementation at various levels of the organization.
6. Staff isn't sure what TAM is and how it affects the organization.	Train all staff on what TAM is and how it will affect operations at the organization. The focus should be on the management of the State's assets.
7. The Department has begun instituting a system to monitor and track progress on its goals and initiatives-Performance Electronic Tracking System (PETS)	Continue to provide support for PETS and its development. Use it to assist with future planning efforts in the Department but from a project planning standpoint as well as strategically.
8. The DOT conducts customer surveys every 2 years and holds regional town hall meetings annually to identify the public needs.	These are commendable activities and should be continued.
9. AKDOT& PF management staff has great knowledge and experience in their respective areas of responsibility. However, it appears that some units don't have written operating procedures in place on how to perform their various administrative activities.	We recommend that Facilities (project selection) and Bridge Section have written operating procedures as they relate to data entry, coordination, and sharing that will facilitate continuity of basic operations.

<p>10. The AKDOT &amp; PF has various management systems and databases that are very effective on managing each individual asset in the State. However, the information generated and maintained by these management systems or databases are not integrated or linked so they can be effectively used by various units within the department.</p>	<p>AKDOT should develop an integrated/centralized database or information management system that will allow sharing and querying of asset information across units.</p>
<p><b>Finance Group</b></p>	
<p>11. The Management Reporting System (MRS) captures a lot of information on actual expenditures and accomplishments for the organization.</p>	<p>Information in MRS should be analyzed to identify how investments in the infrastructure are helping to achieve strategic goals for the organization. This information is reported to the staff and legislature.</p>
<p>12. The Federal Management Information System (FMIS) system has ability to identify what work activities are being performed that contribute Long Range Plan (LRP).</p>	<p>Fully utilize accounting system to support TAM.</p>
<p>13. The Department may not be obtaining all benefits from financing efforts.</p>	<p>Explore all financing options for obtaining funds for proposed projects, i.e. innovative financing.</p>
<p><b>Right of Way</b></p>	
<p>14. The Right-of-Way (ROW) Division has no specific performance objectives for asset management. Their primary emphasis is on project delivery, getting projects certified, and some level of maintenance of their assets.</p>	<p>The ROW Division should consider developing a strategic plan with defined goals and performance measures for managing the Department’s real estate assets. Key goals might include developing an electronic inventory of their real estate assets; integration of the data in their “E-Permits” and “E-Parcels” databases; and, creation of an internal Quality Control review process. Key performance measures for such goals might include the number or percentage of properties added to the inventory annually; a schedule for implementing a data integration system; and, the number of Quality Control reviews performed annually.</p>
<p>15. The ROW Division has \$20 Million in funding to do advanced acquisition of property for future projects.</p>	<p>In order to ensure the eligibility of Federal funding in future projects which use some of this real estate that is acquired under advanced acquisition, the ROW Division is encouraged to work with the FHWA Division Office on this proposed program.</p>

<p>16. The Regions are responsible for identifying and clearing encroachments within their geographic jurisdictions. A process for handling encroachments is addressed in the <i>ROW Manual</i>. There are challenges to carrying out a comprehensive program to address encroachments, including the uncertainty of the ROW limits along certain corridors and the costs necessary to identify both the ROW limits and the encroachments situated within those limits.</p>	<p>The ROW Division is encouraged to develop a strategic plan with both short- and long-term targets to identify ROW limits where they are not currently known; and, to identify encroachments within those ROW limits.</p>
<p>17. The ROW Division has integrated their visual ROW mapping with Google Earth, which functions as a useful planning tool for ROW activities.</p>	<p>This innovative technique should be shared with other State DOTs.</p>
<p>18. The ROW Division’s “E-Parcels” database has a pre-audit set of checklists for every transaction. These checklists not only facilitate data entry, but they function as a review mechanism to ensure the files are properly documented to support all transactions.</p>	<p>This is a “best practice” and the AKDOT’s ROW Division is commended for its use of this process.</p>
<p>19. The DOT does not have an access control policy or a corridor management plan.</p>	<p>Develop an access control policy and corridor management plan.</p>
<b>Planning, Programming and Design</b>	
<p>20. The DOT has robust management systems but the program selection process isn’t tied to using regional or statewide performance goals.</p>	<p>Establish regional and statewide performance goals for the selection of projects in Statewide Transportation Improvement Program (STIP).</p>
<p>21. The full capabilities of the management systems are not utilized during planning and programming.</p>	<p>Link the capabilities of the various management systems so that project identification and selection may consider analytical results like Life Cycle Cost Analysis (LCCA) and performance optimization.</p>
<p>22. Community “SCORE” process of selecting projects has a logical framework for selecting projects that assess various performance objectives (e.g., cost per mile of detours, accident measures, etc.)</p>	<p>Consider using this process for the entire STIP.</p>
<p>23. The State DOT has good public relations with the communities for public involvement purposes and information purposes.</p>	<p>This is commendable and should be expanded DOT-wide.</p>

<p>24. The statewide LRP does a good job of identifying needs and presenting a vision and goals for the system.</p>	<p>Link the programming to those goals in the LRP through project selection criteria.</p>
<p>25. The general public and elected officials are not aware of asset management principles and how they inform DOTs' planning and programming process.</p>	<p>Buy-in and effective communications are needed between the legislation and DOT leadership on the DOT's goals and objectives.</p>
<p>26. Many road assets are not covered by management systems. 118E allows Federal funds on these facilities and there is a disconnect on these program activities.</p>	<p>Define measurements and manage them accordingly.</p>
<p>27. There is a strong linkage between DOT and the State Patrols, which contributes to the State's Highway Safety initiatives.</p>	<p>Keep up the good work and share with others throughout the State.</p>
<p>28. Projects are designed without early on-site field reviews.</p>	<p>Conduct a multi-discipline field review during the early design stage.</p>
<p>29. The Management Reporting System (MRS) updating into Oracle database needs to be completed soon.</p>	<p>This will allow other units to also use the MRS.</p>
<p>30. The southeast (SE) region is the source of marine engineering for the entire state as well as being responsible for roads and airport operations. There appears to be a comprehensive approach to addressing the needs of the marine highway system (e.g., proactive deterioration counter measures) that is driven by regulations defined by various Federal agencies. However, the highway system focuses on corrective actions rather than preservation activities.</p>	<p>The SE Region should implement a preservation program for assets.</p>
<p>31. The SE region does not fully utilize the pavement management system and bridge management system to select and plan highway projects. Reports from the pavement management system and bridge management system are generated and sent to the SE regions by HQ. These reports simply identify condition of assets listed in order of worse first.</p>	<p>The SE region should fully utilize the Pavement Management System (PMS) and the Bridge Management System (BMS) to select bridge and pavement activities.</p>

<p>32. Alaska receives funds from various federal sources. The requirements of the various agencies often conflict with each other. The SE region has found it simpler to transfers FHWA funds to other organizations because of ease. The other agencies requirements are typically more stringent than FHWA's.</p>	<p>The Alaska Stewardship Agreement should identify a process for specific funding for specific activities.</p>
<p>33. Agency has robust management systems that have the ability to identify transportation investment candidates for pavements and bridges. However, the regions don't always take advantage of these capabilities.</p>	<p>Provide training and end user technical support (e.g. customized reporting or screens) that promote better use of management system information in programming projects to achieve performance goals.</p>
<p>34. Programming recommendations that HQ receives from regions address immediate needs as well as community desires.</p>	<p>A. Coordinate a Regional approach to recommending projects that address immediate needs but with a preservation first focus.</p> <p>B. Educate communities on how the state of the transportation system, performance goals, and how their projects "move the numbers" scoring schema should have a performance component.</p>
<p>35. AKDOT appears to have some valuable linkages as a part of their data collection processes. One good example provided is the close linkage between AKDOT&amp;PF and the State Patrol in the collection and dissemination of timely accident data.</p>	<p>This can be shared with other States as a "best practice."</p>
<p><b>Data Integration and Information Technology</b></p>	
<p>36. The team observed that the data group has been transitioning from the legacy database system (Highway Analysis System) to an enterprise geo-database environment. Since the complete transition requires a substantial amount of resources and efforts, the Agency still heavily relies on the legacy database system. The use of the legacy database system hampers complete data integration putting various asset management systems' data and information in disconnect.</p>	<p>Transition and migrate data from the legacy database system to the enterprise-level geo-database so that all asset related data and information are completely integrated by using a common linear referencing system to provide effective and efficient support for better resource allocation and investment decisions.</p>

<p>37. The team observed that the developed Web-based data portal could play a critical role in supporting data collection planning, planning and programming, operations, etc. The current data portal could be more valuable to the Agency by providing more asset related data.</p>	<p>Provide capabilities of mapping asset locations/ conditions and proposed and previous project limits/information and other pertinent information in serving wider customers. In addition, make electronic version of construction as-built plans and construction reports accessible through Geographic Information System (GIS) links.</p>
<p>38. The team observed that a tremendous amount of data are stored and collected, but there are no formalized uniform data standards or metadata standards in the Agency.</p>	<p>Provide data group the authority and resources to develop data standards and metadata standards for the entire Agency to have consistent, unified, and well-documented data.</p>
<p>39. As-built plans and construction reports are extremely valuable to various asset managers, design engineers, and maintenance and operational personnel. However, the team observed that paper-based plans and reports are currently stored in the regions making the valuable information difficult to access to the various functions within the Agency.</p>	<p>Make electronic version of construction as-built plans and construction reports accessible and easily searchable through GIS links.</p>
<p><b>Bridge</b></p>	
<p>40. Bridge currently has one performance goals; decreasing deficient deck area. This performance goal addresses advanced deterioration.</p>	<p>Develop performance goals that cost effectively delay advance deterioration of bridges.</p>
<p>41. HQ Bridge Office implemented PONTIS in 1992 and has maintained and updated it continuously. HQ Bridge Office is in the process of using PONTIS to assist in prioritizing bridge activities. Currently use customized algorithm that is based on detour, National Bridge Inspection (NBI) condition rating, etc.</p>	<p>Utilize PONTIS to identify and prioritize bridge activities that support long term performance goals.</p>
<p>42. The HQ Bridge Office generates a regionally prioritized list of bridge projects and provides the list to the regions. The prioritized list is not implemented by the regions.</p>	<p>Establish better coordination between HQ Bridge Office and regions in selecting bridge projects.</p>
<p>43. HQ Bridge Office currently programs rehabilitation and replacement projects as well as projects to address instances of advanced deterioration.</p>	<p>A comprehensive bridge preservation campaign should be developed with the identification of additional Federal funding categories allowable for preservation.</p>

<b>Construction</b>	
44. AKDOT is staffed with dedicated and knowledgeable management staff that is anxious to apply an asset management approach to their field with limited resources.	AKDOT should establish an Asset Management Coordinator/Unit that could coordinate all TAM related activities and provide the necessary support for various units to implement or enhance their operations.
45. There is no common referencing system used by all the management systems or databases in the AKDOT&PF.	A common referencing system should be established for all the management systems or databases in the AKDOT.
46. Northern Region's "lessons learned" database is a good practice.	Expand the "lessons learned" database statewide.
47. The pilot of <i>Site Manager</i> by Northern Region is a good practice.	Evaluate the pilot effort and provide resources to apply the use of <i>Site Manager</i> statewide.
48. The team observed that as-built plans and construction reports are in a paper format, and the documents are stored in the regions. Paper format documents stored in the regions make it hard to use the valuable information. The documents are extremely valuable to the asset managers and designers	Using <i>Site Manager</i> , convert the as-built plans and construction reports to electronic format and facilitate the documents access (linkable through GIS) to the community of interest.
49. Turnover is a major issue in Construction and Maintenance.	Staffing needs to be determined.
50. There is a perceived need for training.	Core (minimum training) requirements are needed.
51. Construction process/information documents are in paper form.	Implement electronic tools such as <i>Site Manager</i> .
52. There is a limited method of doing constructability reviews and the State is not getting as much use out of these as they could.	Put greater attention and resources into the constructability reviews and involve industry in the process.
53. Statewide missions and measures conflict.	We commend the Northern Region for developing an effective strategic and performance management system. The DOT should consider adopting this system for implementation on a statewide scale.
<b>Maintenance</b>	
54. Data transfer from PMS to the Maintenance Management System (MMS) works; however, data transfer from MMS to PMS is perceived as not compatible due to the larger inspection section length of PMS. MMS to BMS is not done directly because the Bridge Office's preference is to field data verify through inspection in lieu of direct import from MMS for maintenance work done.	Resolve this issue of lack of integration between PMS, BMS and MMS.

55. The team observed that the Construction Office is actively involved with Plans, Specifications & Estimate (PS&E) development. Maintenance & Operation (M&O) Section would like to get involved in PS&E review for maintainability.	Provide the M&O Section the opportunity to get involved with PS&E development (i.e. internal certification).
56. The Northern Region M&O is to be commended for developing its Quality Assurance Inventory effort.	Consider implementing a similar program statewide. Also, increase connectivity to MMS so the programs can work together to tie budget and performance.
<b>Facilities Management</b>	
57. Currently, only the DOT Building has a full time “maintenance worker.” Other buildings do not have a designated “custodian.”	Appoint building custodians. This can be a collateral duty that does not involve many person hours per year. This person will be the Facilities work request person as well as have some responsibilities for conducting an annual “facilities condition report.”
58. The DOT has to manage facilities for other agencies but is not allowed to charge for services or occupancy use.	The Facilities operating budget for DOT does not represent the actual cost of DOT facilities only. A system similar to the equipment accounting system needs to be developed or purchased off the shelf. True agency operating costs are not being reflected due to the “free rent” DOT is providing.
<b>State Equipment Fleet</b>	
59. The Equipment Management System (EMS) is a good system but needs to integrate will all other AKDOT&PF data systems. This will allow integration into a common asset management system.	Integrate the EMS into a common access management system.
60. The EMS is a good system for accounting for costs but could be used to predict actual useful life. As an example, a truck under certain agency drivers has a different life under a different group of agency drivers.	Extend the use of the current data base to be an asset management tool as well as a cost accounting type tool.
<b>Geotechnical Assets</b>	
61. Currently, there is no geotechnical asset inventory system.	Consider implementing a geotechnical asset inventory system to keep track of the Agency’s extensive geotechnical assets.
62. A program does not exist for an annual or a bi-annual “condition” assessment.	Initiate a program for conducting an annual or a bi-annual “condition” assessment.
<b>Pavement Management</b>	
63. PM Group does not have a Quality Assurance/ Quality Control Plan (QA/AC) in place for pavement data collection.	Develop a QA/QC to ensure PMS analysis is based on quality data.

64. DOT owns a robust PMS; however, the system is not being used at its full capacity to allow for goal setting, evaluation of various investment alternatives, etc.	Increase the use of PMS in developing statewide and regional goals and policies and investment decision-making.
65. There are no goals for pavement performance.	Establish statewide and regional pavement performance goals.
66. The current pavement data collection program does not include cracking which is an HPMS requirement.	Include cracking in PMS data collection program. Include cracking in calculating overall pavement condition for statewide and regional network.
67. There is no electronic link between MMS and PMS to allow for integration of maintenance activities into PMS.	Work with the IT Section to allow for State integration.
<b>Research</b>	
68. Research and Technology has a close relationship with the University of Alaska for implementing research projects that benefit the Department. They also are very active in indentifying and addressing training needs statewide.	The DOT is commended for the effectiveness of these programs and should continue their capabilities to help implement asset management.



## **Focus Area: General Policies and Procedures**

The policies and procedures are the driving force when implementing an asset management approach. It is important that an organization's policies and goals are aligned with the strategic direction of the Department of Transportation's (DOT) vision. These same policies and goals also need to have performance targets attached to them to enable the measuring of progress towards meeting the goals and objectives.

It is also important to have a structure in place that allows for organizational roles and responsibilities to enable the goal and objectives of the DOT. The AKDOT&PF has taken a proactive approach to implementing TAM in their organization by actively having TAM Champions at various levels in the organization.

The TAM Assessment Team was broadly focused because in addition to the budget and finance areas, it also covered organizational issues such as strategic planning, corporate knowledge, training, and resource management. They also discussed the challenges that could potentially derail ADOT&PF's efforts to comprehensively implement TAM within their organization.

### **General Policies and Procedures**

***Observation #1:*** An Organizational TAM Champion has not been officially designated by the AKDOT&PF leadership.

***Recommendation:*** Identify the Organizational TAM Champion and give this person opportunities to talk about AM, its benefits, and successes to staff, local officials, and FHWA.

***Discussion:*** Recognizing that TAM is a philosophy, the principles and practices should be continually reinforced whenever possible. The AKDOT&PF staff recognizes TAM efforts occurring within the organization but really isn't sure who is leading this effort. Most of the organization identifies the organizational TAM Champion as Michael Coffey. Other staff identifies the Champion as Roger Healy and yet a third group identified Frank Richards. Having clearly identified leadership will help to coordinate and solidify the TAM efforts occurring within the organization.

***Observation #2:*** AKDOT&PF currently has an informal approach to implementing TAM.

***Recommendation:*** Formalize and organize the TAM implementation efforts under the TAM Champion and communicate mission, goals, objectives, etc. down through the chain of command at AKDOT&PF, FHWA, MPO's, local officials, and other agencies.

***Discussion:*** Having a formal steering committee would help ADOT&PF to implement the recommendations from the TAM Assessment and track overall progress in becoming a TAM Organization. AKDOT&PF is doing a lot of things right and the steering committee can help the TAM Champion be aware of these successes and market them.

### **Corporate Knowledge and Training**

***Observation #3:*** Management is expecting a large exodus of staff with greater than 20 years to retire within the next 2 years taking with them institutional knowledge.

***Recommendation:*** Develop opportunities for staff to cross-train to help reduce the loss of institutional knowledge.



**Discussion:** In the Fall 2008, the AKDOT&PF recognized that the upcoming and pending retirements would present challenges to their staffing actions. As a result, they have begun to do some informal succession planning activities, projected their workforce needs for 5 years into the future and inputted retirement and position information into their Performance Measurement Electronic Tracking System (PETS). PETS is designed to help keep the management informed about upcoming retirements, mentoring opportunities, training, and rotational assignments.

**Observation #4:** There are no dedicated Human Resources (HR) staffs assigned to the AKDOT&PF to do the HR work required. Work is performed by administrative staff that may not have the appropriate knowledge and skills to understand and perform the necessary duties.

**Recommendation:** Consider hiring and training staff in appropriate HR procedures and processes. This will help management in their succession planning and identifying appropriate staff to fill vacancies.

**Discussion:** During interviews, the staff talked about the difficulties they were having related to HR matters. Without the proper training, they are completing work assignments in a “hit and miss” fashion. In addition, they feel that filling vacancies is difficult when they are required to cap relocation pay to \$5,000 and have to “jump through hoops” to recruit outside the State of Alaska.

## **Communication**

**Observation #5:** The Deputy Commissioners do regular “Road Tours” to get out and talk with community leaders about the needs of the various regions.

**Recommendation:** In addition to meeting with community leaders, consider holding regular roundtable meetings with AKDOT&PF regional staff to discuss their needs and to receive feedback from staff.

**Observation #6:** Staff seems to be well aware of AKDOT&PF’s efforts to implement TAM.

**Recommendation:** Keep up the conversations to ensure that the staff recognizes the importance of their support in AKDOT&PF TAM efforts.

**Observation #7:** The AKDOT&PF is unaware of expectations from elected officials on managing the performance of transportation system.

**Recommendation:** Meet with elected officials to identify their goals and targets for system performance.

**Discussion:** This is a tough one. However, the sooner the AKDOT&PF knows what system performance goals the elected officials expect, the sooner they can work to achieve those goals. This accountability could open up conversations about how resources are being utilized and what outcomes are expected from these resources. Recognizing that this could be a two-edged sword, such as resources being reduced for not achieving targets, resources could also be increased when the elected officials realize that insufficient resources have been allocated to meet system performance goals.

**Discussion:** Educate elected officials on what TAM is, its benefits and how implementing a comprehensive program helps AKDOT&PF achieve system performance goals and meet their expectations. Provide these officials with examples of how other DOTs have excelled by applying TAM principles and practices (e.g., Washington DOT, Ohio DOT, and Utah DOT).



## **Focus Area: Data Integration & Information Technology Group**

**Background:** The AKDOT&PF fully recognizes that quality data and data integration are fundamental components of TAM. The Agency has been proactively developing a common and consolidated set of data to draw information to enhance its ability to make better decisions in resource allocation, programming, and management decisions. More specifically, the Data and IT Group play critical roles in implementing asset management by providing data/information tools and services to their customers. The Data and IT Group's significant accomplishments toward supporting TAM include developing a long-range data management plan and establishing a common linear referencing method. The group is also in the process of migrating the legacy database system (Highway Analysis System) to an enterprise-environment GIS database, aligning and supporting various management systems (eDOCs System, Performance Measure Tracking System, Pavement, Bridge, and Maintenance Management Systems, etc.), and developing a Web-based data portal. As part of this TAM assessment, the FHWA made observations and provided recommendations for advancing already well-established data and information management efforts in the organization.

***Observation #1:*** The migration from the legacy database system (Highway Analysis System) to an enterprise-environment GIS database is an on-going effort.

***Recommendation:*** Consider complete migration from the legacy database system to the enterprise-environment GIS database as a high priority and dedicate sufficient resources for the implementation.

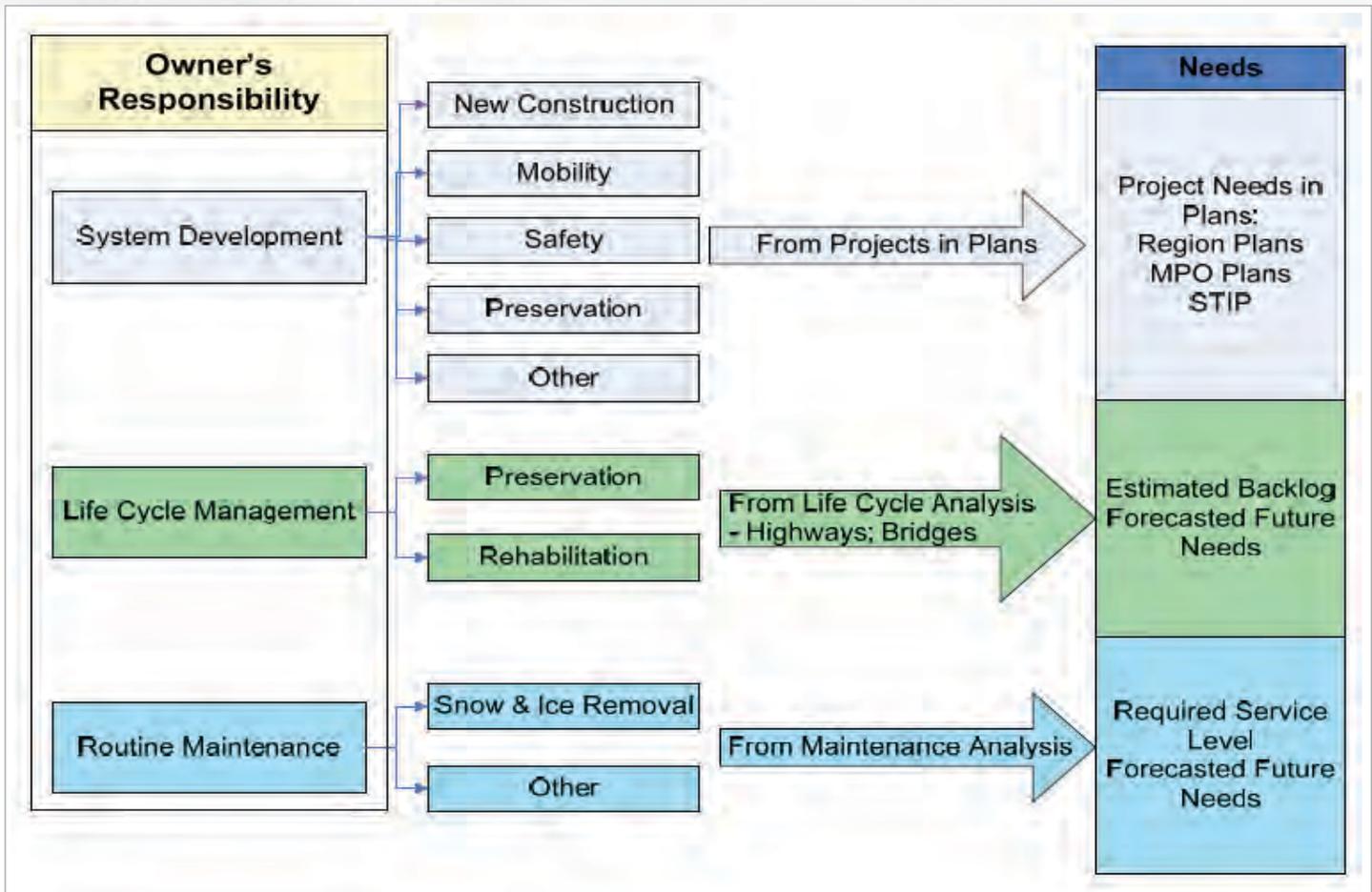
***Discussion:*** Since the complete transition and migration requires a substantial amount of resources and efforts, the agency still heavily relies on the legacy database system. The use of the legacy database system hampers complete data integration causing a disconnect in the existing data and management systems; and therefore, making comprehensive resource allocation and investment decisionmaking difficult. Additionally, the complete migration will facilitate an effective and efficient integration of new and future inventory, management, and reporting systems (e.g., Performance Electronic Tracking System, E-DOCS, HPMS Reassessment, etc.) with the enterprise-environment GIS database system. Thus, the migration will be a critical step for complete data integration in the Agency, and the complete integration will make information rich to better support comprehensive resource allocation and investment decisions and efficient reporting capabilities.

***Observation #2:*** The current Web-based data portal has the ability to query, retrieve, and map some of the asset-related data and information. However, not all available data within the Agency is accessible through the tool to make better decisions in developing program, project delivery, asset maintenance, etc. Presently, this tool appears to serve only selected groups in the agency.

***Recommendation:*** Provide capabilities of mapping asset locations/conditions and proposed and previous project limits/information and other pertinent asset management information to serve a wider range of customers (e.g., design, planning & programming, maintenance & operation, etc.). Extend outreach efforts to various functions within the headquarters offices and the regions and engage those potential customers in enhancing the Web-portal tool for better data/information access. As related to *Observation #1*, the discrepancies in the asset locations need to be reconciled (if not done) as part of enhancing the Web-based tool.

***Discussion:*** The current data portal tool has tremendous capability to retrieve/query data and information. This tool could make an even greater impact on enhancing the Agency's ability to make better decisions and improve the asset management program by making this tool the "one-stop shop data query/retrieval and mapping tool" for the entire Agency.

***Observation #3:*** There are no formalized uniform data standards and metadata standards in the Agency.



**Figure 4 AKDOT&PF's Responsibilities as Owner**

**Recommendation:** Provide data group the authority and resources to develop data standards and metadata standards for the entire Agency to have consistent, unified, and well-documented data.

**Discussion:** Data link and seamless flow of data could only be achieved through uniform, consistent and well-documented data. The team observed that a tremendous amount of data are stored and collected, but there are no formalized uniform data and metadata standards in the Agency, which potentially, could hinder data link and integration efforts. The data group in Headquarters currently is the governing unit to maintain and reconcile linear referencing system, and their authority should be extended to developing data and metadata standards.

**Observation #4:** The paper-based as-built plans and reports are currently stored in the regions making the valuable information difficult to access by the various functions within the Agency.

**Recommendation:** Make electronic versions of construction as-built plans and construction reports accessible and easily searchable through GIS links.

**Discussion:** As-built plans and construction reports are extremely valuable to various asset managers, design engineers, and maintenance and operational personnel. This essential information about highway assets, which are in paper format (e.g., construction as-built plans, construction reports, bridge inspection reports, etc.) need to be in electronic format so that the documents can be linked to GIS for easy information access for various functions in the Agency.



## Focus Area: Planning and Programming

AKDOT&PF produces a statewide long range multimodal transportation plan that was last updated in 2008. Each region also produces a long-range plan that serves as input to the statewide plan. The regional plans are project-based while the statewide plan is a policy plan. The regional plans reflect the needs identified by the various management systems including the pavement, bridge, safety, and maintenance management systems. The Highway Performance Monitoring System (HPMS) and Accident Locator Records System are also referenced. Metropolitan Planning Organization (MPO) long-range plans are coordinated with and incorporated into the Regional plans. Figure 4 summarizes the needs analysis approach used in the statewide long-range plan:

*The overall policy of the statewide plan is to fund routine maintenance and life cycle management needs first and implement system expansion to the extent possible with any remaining funding. There is also an explicit strategy of avoiding “worst first” when selecting life cycle management or preservation projects, as this is generally less cost effective than keeping facilities in a good state of repair.*

*Projects are programmed in the State Transportation Improvement Program (STIP). Projects are divided into four major categories: National Highway System (NHS – including the Alaska Marine Highway System), Alaska State Highway System (ASHS), Community Transportation Program (CTP), and Trails and Recreation Access for Alaska (TRAAK). The AKDOT&PF uses an internal process for selecting projects for the NHS and ASHS. A public process that includes nominations from many sources that are scored against published criteria is used for the CTP and TRAAK categories. MPO Transportation Improvement Programs (TIPs) are incorporated into the STIP unchanged per Federal law.*

The regions develop a prioritized program of projects in the NHS and ASHS categories that are submitted to the Central Office where they are integrated into a STIP. The regions develop their needs lists based on the output of the various management systems, nominations from local governments and tribes, and input from the maintenance division. Projects nominated for the CTP and TRAAK programs are scored against published selection criteria first at the regional level and then at the statewide level by a Project Evaluation Board (PEB) composed of the Department’s senior management. Each member of the PEB scores each project. The resulting scores are weighted and then averaged to determine how each project fares compared to other projects considered and scored within that program. The list of top scoring projects in the CTP and TRAAK program are then used to program the STIP within the funding allocated to each program.

**Observation #1:** Alaska’s Statewide Long Range Transportation Plan uses input from the Department’s management systems and clearly describes the State’s long range needs. The linkage between the goals and policies in the Statewide Plan and the selection process for STIP can be strengthened.

**Recommendation #1:** Increase the use of meaningful and measurable performance goals in the Statewide Long Range Plan. Update the STIP project selection criteria to reflect the policies and performance goals contained in the Statewide Long Range Plan.

**Discussion:** Performance measures can be the bridge between the strategic goals of the long-range plan and the criteria used to program projects in the STIP. AKDOT&PF does have performance measures established as part of the State Government-wide system. Several of the people interviewed, however, did not see the connection between some of these measures and the condition and performance of the Department’s assets, even viewing some of the measures as counterproductive. For instance, the goal of reducing overhead cost would sometimes discourage managers from sending employees for needed training as it would count against their overhead ratio.

**Observation #2:** The Long Range Plan and STIP have conceptual performance goals that do not influence regional project selection to improve network performance.

**Recommendation:** Develop hard performance goals for individual assets. These goals can have a regional approach that build up to a statewide measure.

**Discussion:** None

**Observation #3:** The process for selecting NHS and ASHS projects from the regional needs lists for inclusion in the STIP is neither apparent to the regions nor transparent to the public.

**Recommendation:** Extend the use of published project selection criteria to all STIP projects including NHS and ASHS.

**Discussion:** Several regional personnel observed that they did not know how the prioritized list of projects they recommended for the STIP were integrated with lists from the other two regions to produce the STIP projects for the NHS and ASHS categories. The use of scoring criteria for these two categories would help to clarify how statewide priorities are assigned to the STIP and would assist regional leadership in establishing priorities.

**Observation #4:** Managers in the design and construction sections found it difficult to use the STIP as a document to help them plan their workload.

**Recommendation:** Consider adding a “scoping” or “study and development” phase to the STIP.

**Discussion:** It was pointed out that the descriptions of STIP projects were often quite general when they are handed off from planning to design. This is especially true of projects that come from outside the AKDOT&PF. These require some amount of scoping or feasibility study before design can begin. This sometimes leads to projects not being ready to let for construction as scheduled in the STIP. Several States have a scoping line item in the STIP that allows them to further refine proposed projects so that a better cost estimate and more realistic schedule can be established for programming in the STIP. Projects advance from this line item via administrative modification or amendment as appropriate.

**Observation #5:** Project selection and programming that HQ receives from regions address immediate needs as well as community desires.

**Recommendations:**

- a. Coordinate a regional approach to selecting and programming projects that address immediate needs but with a preservation first focus.
- b. Educate communities on the state of the transportation system, performance goals, and how their projects “move the numbers.” Scoring schema should have a performance component.

**Discussion:** None

**Observation #6:** AKDOT appears to have some valuable linkages as part of their data collection processes. One good example provided is the close linkage between AKDOT&PF and the State Patrol in the collection and dissemination of timely accident data.

**Recommendation:** This can be shared with other States as a “best practice.”



**Discussion:** The sharing of best practices among DOTs help to eliminate the duplication of effort on new initiatives. Many DOTs have attempted to develop this linkage and have been unsuccessful. AKDOT&PF's model will help other DOTs be successful in this area.

**Observation #7:** Community "SCORE" process of selecting projects has a logical framework for selecting projects that assess various performance objectives (e.g. cost per mile of detours, accident measures, etc.)

**Recommendation:** Consider using this process for the entire STIP.

## **Focus Area: Management Systems**

**Background:** Many State Departments of Transportation are integrating electronic databases and software applications to achieve efficiencies and to meet their performance goals through the use of management systems. Management systems include methods of analyzing condition and performance from data and exploring the relationship between various treatments for maintenance, preservation, rehabilitation and reconstruction – all based on the data in the management systems and its analysis.

**Observation #1:** The AKDOT&PF has management systems that have the ability to identify transportation investment candidates for pavements and bridges. However, decisions on which activities, assets, and/or projects to program are left to the regions.

**Recommendation:** Provide training and end user technical support (e.g., customized reporting or screens) that promote better use of management system information in programming projects to achieve performance goals.

**Discussion:** Regional decisions are not typically driven by information from the management systems. There was an example of work needed on bridges on critical links that were not addressed on numerous funding cycles that caused HQ to supersede regions autonomy with respect to bridges.

**Observation #2:** The AKDOT has various management systems and databases that are very effective on managing each individual asset in the state. However the information generated and maintained by these management systems or databases is not integrated or linked so they can be effectively used by various units within the department.

### **Recommendations:**

1. AKDOT&PF should develop an integrated/centralized database or information management system that will allow sharing and querying of asset information across units.
2. AKDOT&PF should establish an Asset Management Coordinator/Unit that could coordinate all TAM related activities and provide the necessary support for various units to implement or enhance their operations.

**Observation #3:** AKDOT is staffed with dedicated and knowledgeable management staff that is anxious to apply an asset management approach to their field with limited resources. However, it appears that some units don't have written operating procedures in place on how to perform their various administrative activities.

**Recommendation:** We recommend that each unit have written operating procedures as they relate to data entry, coordination, and sharing that will facilitate continuity of basic operations.

**Observation #4:** There is not common referencing system used by all the management systems or databases in the AKDOT.

**Recommendation:** There is not a common referencing system used by all the management systems or databases at AKDOT&PF. This makes it difficult to integrate or cross-reference functions between the various Agency units.

## **Focus Area: Design and Pre-Construction**

**Background:** Design and other project development activities are conducted in the regions in accordance with statewide policies, procedures, and specifications. In order to program a project in the STIP, planning provides a scope, budget, and schedule. This initial estimate is developed with input from the design section.

Once a project is programmed, the design section assigns a Project Manager. An initial scoping meeting is held which includes representatives from right-of-way (ROW), utilities, and construction. A project management plan is developed, the estimate is updated, and the class of environmental action is determined. Design begins with as-built plans, input from the maintenance section, and a field visit when practical. A design study report is produced detailing the design alternative selected (i.e., roundabout vs. signalized intersection using the SIDRA software).

When design of a project reaches the 50 percent milestone, a project “walk over” field review is conducted when practicable. This review includes environment, construction, and maintenance. A constructability review is also conducted when possible. Many of these are done in-house by the Regional Quality Engineer.

The Plans, Specifications, and Estimate (PS&E) are then developed as design continues with ongoing review and comment from the appropriate sections. A project file is maintained throughout the process that includes all comments and their disposition. In the Northern Region, this review process and file is maintained electronically.

**Observation #1:** Life cycle cost and/or benefit cost analysis are not used in the selection of alternatives during the design process as a matter of course. Such considerations are evaluated only on large projects or during corridor type studies.

**Recommendation:** AKDOT&PF should consider using readily available software tools to conduct life cycle cost and benefit cost analyses on as many projects as possible. The level of effort and degree of detail would be commensurate with the size and perceived impact of the project.

**Observation #2:** The online review system for the design process in the Northern Region is a best practice. The system enables all concerned to have immediate access to project status and to review comments and their resolutions. It also enables a new Project Manager to come up to speed more quickly should the original personnel turnover.

**Recommendation:** Adapt and extend the Northern Region design online review system Statewide.

**Discussion:** AKDOT&PF is facing some of the same issues in the design process that many other State DOTs are facing, namely high turnover among design personnel and the attendant loss of institutional memory. Succession planning, more training, and the automation of processes can ameliorate some of these issues.



## Focus Area: Pavements

The AKDOT&PF collects data on approximately 4000 centerline miles of paved roads. The State DOT has a contract with *Dynatest* for pavement data collection. Currently, their pavement condition survey program consists of collecting pavement smoothness and rutting data using automated equipment. The AKDOT&PF is also planning to have *Dynatest* start to incorporate the FWD network level testing results into the pavement management system. At this point, the State DOT does not collect cracking data at the network level; however, pavement cracking data is collected for selected roadway segments using windshield survey.

The AKDOT&PF uses *Dynatest's Performance Economic Reporting System (PERS)* PMS software. Using PERS, a Pavement Serviceability Rating (PSR) is calculated for each pavement section based on IRI and rutting; in addition, pavement remaining service life is estimated. PSR is used to establish candidate projects for preventive maintenance, corrective actions, and minor and major rehab. PERS has the capabilities of performing cost-effectiveness analysis of pavement preservation or rehabilitation strategies. However, this capability is not been used by the AKDOT PM Program. PERS produces a list of prioritized projects using a worst-first approach showing the appropriate treatments which will be forwarded to the Planning Office for incorporation into STIP. Cracking is not included in the PMS analysis. Due to the extensive frost heaves, the State has a separate funding category dedicated for treating cracks assuming that there is one longitudinal cracking every 50 feet. The AKDOT&PF has not established performance goals for highway pavements.

In addition to the highways AKDOT&PF is also responsible for collecting pavement data on 52 of the 55 paved airports in Alaska. They use the Army Corps of Engineers Micro-Paver system to analyze pavement performance for the airports. Unlike the highway system, performance goals have been established for the airports.

Pavement Management is staffed with one person who is responsible for data analysis and reporting for both highways and airports. At this point, no special reports are produced to inform the decisionmakers of the future pavement needs or consequences of inadequate investments on future pavement performance.

The PMS uses GPS coordinates as its roadway referencing system. However, the pavement condition data is reported using a mile-point in order to match the referencing system use by the AKDOT Coordinated Data System or CDS.

The AKDOT&PF is in the process of building GIS layers and links to display PMS data, project data (i.e., planning, design, construction), and other data sets using Google Earth. This project will enable users to have access to design, construction, the pavement data, and the condition of highways. Currently preconstruction and construction history information is input manually into the PMS.

According to Mr. Jim Horn, the major needs of the AKDOT&PF PM Program are:

- Integrating the Pavement Preservation Program into the Pavement Management System.
- Additional staffing that could handle Quality Control/Quality Assurance (QA/QC) of the pavement condition collection program.
- Information on Pavement Management Best Practices through peer exchanges and training.

**Observation #1:** There is no QA/QC program in place for pavement data collection. The primary concern with data collection is the lack of a quality control and quality assurance (QC/QA) program. Currently, the AKDOT&PF has a calibration site before data collection begins, but quality of data is not checked during production.



***Recommendation:*** Develop a QA/QC to ensure PMS analysis is based on quality data. Accurate data is the foundation for performance modeling and projecting future decisions on funding and work plans. Normally, the contractor who performs the data collection is responsible for QC, and the Agency is responsible for QA. To ensure the quality of data, the AKDOT&PF should employ a blind testing program; i.e., check the data for pre-selected test sites without the knowledge of the data collector. The AKDOT&PF should also ask the contractor to develop a QC plan. The QC plan should include specifications on how to detect errors, how to report errors, and specify when checks should be made.

***Observation #2:*** It appears that the AKDOT&PF owns a good pavement management system, but the PMS is not being used at its full capacity to influence decisionmaking. Pavement management can support a transportation asset management program in many ways such as providing the information needed to establish goals, illustrating the consequences associated with various investment levels, and providing the information needed for better decisionmaking (such as the consequences of what-if scenarios), etc. However, at this point, the above activities are not undertaken by the Agency.

***Recommendation:*** Increase the use of PMS in developing statewide and regional goals and policies and investment decisionmaking. Allow for more advanced uses of pavement management systems. Explore how various types of analyses and reporting schemes could influence decisionmakers. Explore the role of pavement management in transportation agencies that have implemented a pavement management program that can communicate with the decisionmakers effectively. The NHI course 131116A (*Pavement Management: Characteristics of an Effective Program*) is strongly recommended since it covers effective use of PMS and strategies employed by other AKDOT&PF's to influence decisionmaking.

***Observation #3:*** Alaska's climate causes extensive cracking. Because cracking is covered by separate funding, the AKDOT&PF feels that there is no need to include cracking in its current network level data collection program. As a result, the PSR which is based on IRI and rutting is missing a significant contributor, and does not reflect the true condition of the highway network.

***Recommendation:*** Include cracking in the PMS data collection program. Include cracking in calculating overall pavement condition for statewide and regional networks. For a more reliable PMS analysis, it is recommended that the agency consider adding this data element to its data collection program. PMS analysis cannot illustrate the true condition of the network without cracking data. In addition, cracking is one of the Highway Performance Monitoring System (HPMS 2010) data requirements. Alaska will not be able to meet the HPMS requirements if this data type is not collected.

***Observation #4:*** There is no link between MMS and PMS to allow for the integration of maintenance activities into PMS; however, maintenance data is manually added to the pavement management system to update the system.

***Recommendation:*** Traditionally, there have not been strong links between pavement management and maintenance within transportation agencies. Typically, maintenance data has not been collected in a format that is useful to pavement management because information about repairs is reported on segments that do not match pavement management. However, as maintenance management systems are being implemented in State Highway Agencies, there is more of an emphasis on establishing these links. One way of becoming more successful at integrating preventive maintenance treatments into a pavement management program is to establish better links with Maintenance and Operations (M&O). This is important to ensure that funding is being used as economically as possible, and to enable pavement management to obtain performance and other data it needs on preventive maintenance treatments. This requires a common referencing and data reporting system.

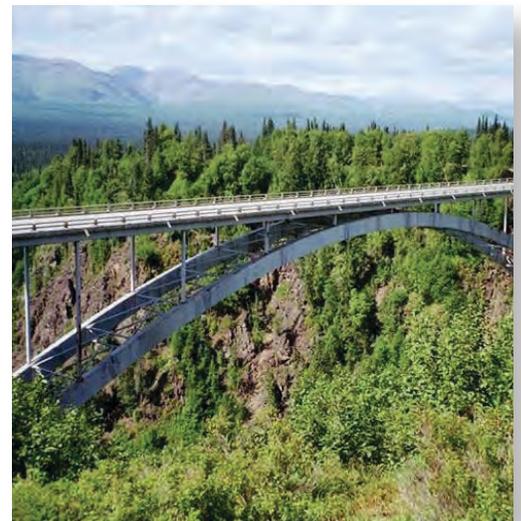
## Focus Area: Bridges

The AKDOT&PF Bridge Design Section provides design services and consultant oversight for new bridge and bridge rehabilitation construction projects as well as a broad range of services associated with the existing inventory of the State's 958 public highway bridges. Services associated with the existing inventory of bridges include: performing biennial bridge safety inspections; developing repair recommendations for existing bridges; working with M&O staff to prioritize bridge repairs and designing repairs for M&O staff among other responsibilities. With the knowledge that a single road may connect isolated communities with the rest of the world, bridge projects are often high profile projects. Lengthy or no available detours prevent the closing of bridges for work projects in many cases. The Chief Bridge Engineer stated, "Everything we do is accelerated bridge projects." The PONTIS Bridge Management System was implemented in the 1990s and is in the process of being re-implemented after a period of non-use for decisionmaking. The Bridge Section utilizes a custom priority equation to rank bridges requiring corrective actions.

**Observation #1:** The team observed that the Bridge currently has one stated performance goal, decreasing deficient deck area. This performance goal addresses advanced deterioration.

**Recommendation:** Develop performance goals that cost effectively delay advance deterioration of bridges while logically addressing advanced deterioration needs simultaneously.

**Discussion:** Preservation can be defined as a planned strategy of cost-effective treatments applied at the proper time to preserve and extend the useful life of a bridge. Some of the minor preservation activities provide the biggest benefit for the smallest level of investment.



**Observation #2:** The HQ Bridge Office implemented PONTIS in 1992 and has loaded data into it continuously. They are in the process of using PONTIS to assist in prioritizing Bridge activities. They currently use customized algorithm that is based on detour, NBI condition rating, etc.

**Recommendation:** Utilize PONTIS to identify and prioritize bridge activities that support long term performance goals.

**Discussion:** PONTIS provides a systematic procedure for the allocation of resources to the preservation and improvement of the bridges in a network. It accomplishes this by considering both the costs and effects of improving the observed condition of the bridge based on maintenance policies versus investments in major improvements or replacements. The Bridge Office can utilize statewide or regional goals from different scenario runs using PONTIS.

**Observation #3:** The HQ Bridge Office generates a regionally prioritized list of bridge projects and provides the list to the regions. The prioritized list is not implemented by the regions.

**Recommendation:** Establish better coordination between the HQ Bridge Office and regions in selecting bridge projects.

**Discussion:** The Southeast Region expressed uncertainty about how to manage their bridges strategically. Engineers in the Bridge Section personally inspect all 982 bridges in the State and



determine required countermeasures. Communicating performance goals and identifying a plan for the regions may reduce long term costs. There were comments that this is the direction that the Bridge Office is heading.

### **Focus Area: Right of Way**

The Right-of-Way (ROW) Division of the AKDOT & PF is a largely decentralized organization. The Division Chief is situated in Anchorage. The rest of the ROW staff is located in the three regional offices (Anchorage, Fairbanks, and Juneau) and is under the direction of the regional leadership. The day-to-day activities of the Division, including those activities related to the management of AKDOT & PF's real estate assets, are carried out by the regional offices. The major emphasis of the Division is on project delivery and to support their in-house staff, the Division does use ROW consultants from time to time. ROW personnel are assigned by function(e.g., appraiser, negotiator, relocation agent, property manager). Generally, the management of the Department's real estate assets is carried out by the property management staff located in the three regional offices.

***Observation #1:*** The ROW Division has no specific performance objectives for asset management. Their primary emphasis is on project delivery, getting projects certified, and some level of maintenance of their assets.

***Recommendation:*** The ROW Division should consider developing a strategic plan with defined goals and performance measures for managing the Department's real estate assets. Key goals might include developing an electronic inventory of their real estate assets; integration of the data in their "E-Permits" and "E-Parcels" databases; and, creation of an internal QC review process. Key performance measures for such goals might include the number or percentage of properties added to the inventory annually; a schedule for implementing a data integration system; and, the number of QC reviews performed annually.

***Discussion:*** The ROW Division has not established performance objectives for managing their real estate assets because their time and resources are more focused on project delivery and property management. Since this is a decentralized organization, each region is assigned specific projects for which they are responsible for the full scope of ROW activities(i.e., appraisal, land acquisition, relocation assistance, and property management). There is not a centralized staff that sets statewide performance objectives for ROW; the HQ ROW Manager is a single-person staff. Since performance measures related to asset management would cross region lines and have more of a statewide focus, it could be cost-prohibitive for each region to work independently on the tools and processes necessary to manage their real estate assets. The recommendations offered might best be accomplished under centralized leadership and with the joint participation of all regions.

***Observation # 2:*** The ROW Division has \$20 million in funding to do advanced acquisition of property for future projects.

***Recommendation:*** In order to ensure the eligibility of Federal funding in future projects which use some of this real estate that is acquired under advanced acquisition, the ROW Division is encouraged to work with the FHWA Division Office on this proposed program.

***Discussion:*** The ROW Division previously requested that the State set aside funds to do early (advanced) acquisition on future projects. Those funds have not yet been spent and are still available for acquiring parcels in advance of National Environmental Protection Act clearance. The value in doing early acquisition is that it enables the project time frame to be shortened fewer (and in some



cases, no) acquisitions would be required after the NEPA document is signed off and the project could proceed to construction more quickly. There are risks involved in doing early acquisition, so the prudent use of these funds would require some risk management.

**Observation # 3:** The regions are responsible for identifying and clearing encroachments within their geographic jurisdictions. A process for handling encroachments is addressed in the ROW Manual. There are challenges to carrying out a comprehensive program to address encroachments, including the uncertainty of the ROW limits along certain corridors and the costs necessary to identify both the ROW limits and the encroachments situated within those limits.

**Recommendation:** The ROW Division is encouraged to develop a strategic plan with both short- and long-term targets to identify ROW limits where they are not currently known; and to identify encroachments within those ROW limits.

**Discussion:** A major challenge for AKDOT&PF is that under a Public Land Order (PLO) before statehood, large amounts of land were deeded to the State from the Federal Government along existing highway corridors. While the specifications in the PLO generally defined the ROW widths for the lands being transferred, much of that land has not been surveyed, so that the actual location of the ROW lines is undetermined. Over time, adjacent property owners have encroached on that ROW with various types of improvements, such as buildings, parking lots, etc. However, in order to clear those encroachments in accordance with Federal regulations, the AKDOT&PF must establish the limits of its ownership.

**Observation # 4:** The ROW Division has integrated their visual ROW mapping with Google Earth, which functions as a useful planning tool for ROW activities.

**Recommendation:** This innovative technique should be shared with other State DOTs.

**Discussion:** This was brought up during the discussion on asset condition. This affords the Regions an opportunity to view, from a macro-scale, certain of their real estate assets.

**Observation # 5:** The ROW Division's "E-Parcels" database has a pre-audit set of checklists for every transaction. These checklists not only facilitate data entry, but they function as a review mechanism to ensure the files are properly documented to support all transactions.

**Recommendation:** This is a "best practice" and the AKDOT's ROW Division is commended for its use of this process.

**Discussion:** During our discussion of the IT tools and resources available to the ROW Division, the Division Chief gave a description of their "E-Parcels" database. This is the database system they use to keep track of parcel activities and transactions. He explained that this system affords a built-in pre-audit checklist process that assists users in knowing what data needs to be entered and maintained. Since the ROW Division does not have a formal Quality Assurance Review program, this pre-audit affords some measure of protection to ensure that appropriate parcel data is being tracked. If the ROW Division develops a Quality Assurance Review program in the future, this pre-audit process may assist in helping them construct a review format.



## **Focus Area: Construction**

**Background:** Construction program in this region is approximately \$200,000,000 per year. There are approximately 150 construction employees. Approximately 46% of the Construction Engineering (CE) work is conducted by consultants. The DOT uses Western Alliance for Quality Transportation Construction (WAQTC) for materials testing certifications. The Materials office employees conduct many of the materials testing functions; however, the construction employees also have WAQTC qualifications.

The Project Manager manages Project Engineers who manages the inspectors of the projects. AKDOT&PF uses formal partnering on several of their construction projects. AKDOT&PF prefers to use Liquidated Damages but rarely uses Incentive/Disincentive (I/D) clauses. Change orders are tracked by “category”, however it appeared only 4 categories were used.

The cost increase from letting amount (\$) to final paid off amount averages approximately 13%. AKDOT&PF tries to put graduate engineer “new hires” through two winters in design as a part of their construction orientation.

**Observation #1:** High turnover rate is a major issue both in Construction and Maintenance & Operations.

**Recommendation:** Conduct a study to determine the staffing needs.

**Discussion:** As with the rest of the agency, the Construction and Maintenance & Operations Divisions face the challenge of high turnover rate. In addition, asset management critical positions (e.g. Pavement Management Engineer) appear to have lack of staff and succession planning. The agency already allocated tremendous amount of resources and dedicated funding to development program areas and skills in the asset management. However, lack of staff and judicious succession planning could jeopardize the stability and the success of the existing programs.

**Observation #2:** The AKDOT has recently struggled to find applicants for entry-level construction positions, despite recruiting and other training efforts provided.

**Recommendation:** Knowledgeable staff is critical to construction quality and long-term system performance. The AKDOT should complete its succession planning efforts and focus attention for replacing staff that are expected to retire in the next few years.

**Observation #3:** The Northern Region has created a Lessons Learned Database, helping relate design activities and concerns to construction and maintenance issues, fostering dialogue, sharing information with the Director and improving relationships between the DOT functions. This helps to identify needed changes in specifications and procedures (instead of just leaving it to Project Engineers to work around faulty specifications).

**Recommendation:** The DOT is to be commended for the establishment and upkeep of this useful tool. The Information Technology should be expanded to apply statewide, and to communicate with the plan review tracking system.



**Observation #4:** There are no written procedures for assigning staff to projects. Regular communication among managers and leadership has generally allowed for distribution of manpower where needed. Staff are routinely lent or borrowed by regions depending on needed experience or expertise.

**Recommendation:** The Department is to be commended for its ability to share and coordinate staff placement according to needs. Systems are in place in other States to facilitate movement of staff to areas of short-or long-term need (example, Texas winter maintenance system). The DOT should consider adapting such a system to its operations for improved efficiency of staff forecasting, placement, and tracking expenses.

**Observation #5:** The AKDOT is to be commended for its efforts, partnerships, and products related to construction and maintenance training. The WAQTC has been a valuable asset to western States in sharing test methods and supporting qualification programs. The DOT has provided course materials to the Transportation Curriculum Coordination Council for adaptation to national-level training, and has also made good use of free online training available through NHI.

**Recommendation:** The AKDOT should continue to support regional and national training partnerships. The TCCC continues to produce free online training for DOT construction and maintenance staff. Provision of adequate computers and internet connection can better enable DOT staff to take advantage of these opportunities.

**Observation #6:** Consideration of construction concerns in the project development/design process was perceived as hit-or-miss. The Construction bureau doesn't have sign-off on final contract documents or addenda, creating a sense that "the designer works in a vacuum." Constructability reviews are occasionally done, but limited resources are available to perform such reviews on widespread projects.

**Recommendation:** Procedures should be strengthened for Construction and Maintenance (C&M) review of plans, especially for projects that have been taken off the shelf after some time. Conditions change, and the perspectives of C&M can be particularly valuable. The DOT should consider a broader application of constructability reviews and track their effect in the Lessons Learned Database or CMS (e.g., depending upon the success of the SiteManager pilot) so that the reviews' cost effectiveness can be assessed.

**Observation #7:** Maintenance & Operation (M&O) Division has limited involvement in Plans, Specifications, and Estimates (PS&E) development for upcoming construction projects.

**Recommendation:** Provide the M&O Division the opportunity to provide comment(s) at the local review, plan-in-hand and PS&E review phases. Also, the AKDOT&PF should consider implementing internal certification for M&O.

**Discussion:** The M&O Division has the responsibility of maintaining the newly constructed or upgraded highway assets upon completion of construction projects. Thus, their input related to maintainability of designed assets and their knowledge of asset performance is critical during the PS&E development thereby improving the quality of design. In addition, the upcoming construction projects involve upgrading highway assets and/or constructing new highway assets. This asset improvement/construction information is essential in the various management systems in updating asset inventory and condition and condition prediction model development. The upcoming project information will also help in a better coordination of asset condition inspection schedule, traffic operation of the network, etc.



**Observation #8:** The as-built plans, construction reports, and other construction information documents are in a paper format and those documents are stored in the regions.

**Recommendation:** Convert the construct documents to electronic format to facilitate the documents access throughout the agency. Consider implementing electronic documentation tools such as Site Manager.

**Discussion:** Construction documents are extremely valuable to various asset managers, design engineers, maintenance and operational personnel. This essential information about highway assets, which is in paper format need to be in electronic format so that the documents can be linked to GIS for easy information access for various functions in the agency. The agency should treat the construction documents as data (an asset) and should facilitate easy access for re-use.

**Observation #9:** Related data are not interoperable between the management systems.

**Recommendation:** Consider using (or upgrading) the dynamic segmentation of sections based on collected and import data to eliminate fixed length segmentation and incorporate MMS data in the PMS. Consider upgrading the BMS to batch load MMS improvement data or implement intermediate queries to exclude the improved components from being programmed projects.

**Discussion:** Currently, pavement rutting and ride quality (IRI) data are collected and summarized at 1-mile segments and stored in the PMS. The MMS stores collected pavement cracking data at 0.1-mile segments. The MMS can import pavement rutting and ride quality (IRI) data, but cracking data from the MMS cannot be imported to the PMS because of its longer segment lengths. Unable to import and use the cracking data in the PMS may hinder making comprehensive and appropriate pavement improvement decisions based on all pavement distresses.

The records of the work performed by maintenance field personnel on bridges are inputted into the MMS, but the input of the improvement data to the BMS is not automated. Thus, the bridge work done by the maintenance personnel is not captured until the subsequent inspection cycle. The time-lagging data update may hamper the coordination between project programming/planning and maintenance work.

**Observation #10:** There is a perceived need for training.

**Recommendation:** Core (minimum training) requirements, which are closely linked to minimum qualifications, are needed.

**Discussion:** As technology improves and the agency's priorities shift, the workforce needs to be adequately trained so that they can perform their duties competently. There seems to be a lack of clear core training requirements which are tied to the positions' qualifications.

## **Focus Area: Maintenance**

**Background:** The Central Region is divided into four maintenance districts. There are approximately 5,000 lane miles of which there are 900 airport runway miles. There are 1,000 pieces of equipment in the maintenance inventory. The budget for the Central Region is \$20 million. Work falls into these categories: pothole repair, sweeping, sign maintenance, lighting, rock removal, striping, and bridge inspection.

Bridges are inspected every two years. The bridge inspection data is electronically stored using the PONTIS bridge software. Approximately \$1,000,000 is budgeted for bridge inspection. The budget for runway maintenance is \$500,000 per year.

There are four primary repair methods used on the pavements: crack seal, mill and fill, total reclaim with repaving, and thin overlay. The regional maintenance personnel ride every road with their District superintendent each year. Upcoming repair projects are discussed as well as the durability of previous year's repairs. Each year approximately \$ 2 – \$3 million is used for force account work.

The MMS uses "mile posts" as its referencing system. There are two Information Technology employees that maintain the MMS database in Juneau. A sign inventory system is used and based in Anchorage. Reflectivity is checked every year.

**Observation:** The MMS is geared toward inputting and tracking expenditures and is not firmly tied to performance. The system is strong on labor rates, okay on equipment, less so on materials.

**Recommendation:** Improve MMS capabilities to relate expenditures to performance, so that the effectiveness of maintenance budget and activities can be better known. The system should be upgraded so that personnel can input data via tablet computers in the field, thus saving on data entry time.



## **Focus Area: Facilities Management System (FMS)**

**Background:** The DOT is responsible for maintaining all State agency facilities. The greatest facility expense is roofs, then building envelopes, then building mechanical including heating, air conditioning, and pumps. There are 28 personnel assigned to the region's facilities office. Three are administrative and 25 are trades related. There are 255 facilities on the region's facilities list. Of these, 200 are in remote locations.

Any building occupant can request a maintenance work item. This is done verbally and then turned into a work request. When a work request is estimated to cost more than \$25,000 a separate list is generated. This is called the deferred maintenance list. There is currently \$1,800,000 of work on the deferred maintenance list. The annual budget for the deferred maintenance list is \$450,000. When work is estimated to cost more than \$100,000, a more formal "request to bid" is generated.

The written request is entered into a database called "MAXIMO." Each work order is classified with a "priority." The MAXIMO system includes a database of basic information for the 255 facilities. As work is performed on a work order the labor hours and materials are recorded in the MAXIMO system.

**Observation #1:** Currently, only the DOT Building has a full time "maintenance worker." Other buildings do not have a designated "custodian."

**Recommendation:** Appoint building custodians. This can be a collateral duty that does not involve many person hours per year. This person will be the facilities work request person as well as have some responsibilities for conducting an annual "facilities condition report."



**Observation #2:** The DOT has to manage facilities for other agencies but is not allowed to charge for services or occupancy use.

**Recommendation:** The facilities operating budget for DOT does not represent the actual cost of DOT facilities only. A system similar to the equipment accounting system needs to be developed or purchased off the shelf. True agency operating costs are not being reflected due to the “free rent” DOT is providing.

### **Focus Area: Geotechnical Assets**

**Background:** Currently, there is no geotechnical asset inventory system. A program does not exist for an annual or a bi-annual “condition” assessment.

**Observation #1:** Currently, there is no geotechnical asset inventory system. \_

**Recommendation:** Implement a geotechnical asset inventory system. \_

**Observation #2:** A program does not exist for an annual or a bi-annual “condition” assessment.

**Recommendation:** Initiate a program for conducting an annual or a bi-annual “condition” assessment.

### **Focus Area: State Equipment Management Program**

**Observation #1:** The Equipment Management System (EMS) is a good system but needs to integrate with all other AKDOT&PF data systems. This will allow integration into a common asset management system.

**Recommendation:** Integrate the EMS into a common asset management system.

**Observation #2:** The EMS is a good system for accounting of costs but could be used to predict actual useful life. As an example, a truck under certain agency drivers has a different life under a different group of agency drivers.

**Recommendation:** Extend the use of the current database to be an asset management tool as well as a cost accounting type tool.

### **Focus Area: Alaska Marine Highways**

**Background:** The Southeast Region of Alaska is a narrow strip of coastal land located adjacent to British Columbia. The transportation system utilized by the public in this region is heavily dependent on marine and air transportation. The hilly landscape and isolated communities makes travel difficult. The low populations in the isolated communities are supported by mostly local road networks. Many communities are not accessible by land routes. Travel between these communities and larger cities are limited to boats and airplanes. The most economical means of travel is by the ships of the Alaska Marine Highway. This has led the Managers of the transportation assets in the Southeast Region to focus much of their efforts on the Marine Highways with their second priority being on the airports.

**Observation:** The southeast region is the source of management of marine assets for the entire state as well as being responsible for southeast region highways and airports. A comprehensive asset



management approach to Marine Assets has been implemented and found to be successful. This Marine Asset Management strategy has served to decrease life-cycle costs of the AKDOT&PF Marine Assets.

***Recommendation:*** The Southeast Region should look to the management of its Marine Highways for lessons learned on implementing asset management practices for managing highway assets.

***Discussion:*** There is a comprehensive approach to addressing the needs of the marine highway system (e.g., proactive preservation activities) that is driven by regulations defined by various federal agencies. Those

Federal Agencies provide resources to facilitate the fulfillment of applicable regulations such as vessel inspectors and annual audits. Similar activities have not been implemented in the Southeast Region with respect to highways. The management of the highway system focuses on corrective actions rather than preservation activities. Reactive management of highway assets increases life-cycle costs. The strained state resources preclude full implementation of preservation oversight from being a top priority for its marine highways.





## Conclusions

The AKDOT&PF is in various stages in their application of TAM to their decisionmaking process. They should be applauded for the progress they have made so far to implement and deploy the principles and practices of a comprehensive TAM program within their organization.

The TAM Self-Assessment helped Alaska to identify where their strengths and weaknesses were in the implementation process. The TAM Assessment, conducted by the FHWA Team, provided detailed areas where improvements could be made to further deploy TAM within AKDOT&PF. In subsequent conversations, the AKDOT&PF has decided on actions it will take to further its journey for TAM implementation:

1. Officially designate the Organizational TAM champion for the Department and ensure that the duties are not “other duties as assigned”.
2. Establish a Policy Team and a Technical Team to provide general strategic policy direction and technical assistance in the evaluation and probable implementation of TAM in the Department.

As with most DOTs today, Alaska’s resources are limited and it will be important that they allocate them in the most strategic manner to further their TAM program. In addition, they plan to incorporate TAM practices and procedures into their decisionmaking process in a proactive manner –meaning that TAM will be actively considered as part of their thinking process.

An area where AKDOT&PF may wish to consider starting is in their planning process. AKDOT&PF has a well defined planning process that takes into account facility needs as identified by asset management systems. The Statewide Long Range Plan makes good use of data and identifies long range system needs. It establishes a vision and goals for the Department’s assets. The Department seems to have a good working relationship with the Metropolitan Planning Organizations and goes to great effort to consult with local and tribal officials and the public. This linkage between planning and programming can be strengthened by the use of performance goals and project selection criteria that reflect them.

An area where the AKDOT&PF can obtain TAM lessons learned would be in their own Alaska Marine Highway. The success and spirit of cooperation between the southeast region and various Federal Agencies for the oversight of Marine Assets can be emulated throughout other regions in Alaska. The southeast region manages the marine assets for the entire state as well as being responsible for southeast region highways and airports. A comprehensive asset management approach to Marine Assets has been implemented and found to be successful. This Marine Asset Management strategy has served to decrease life-cycle costs of the AKDOT&PF Marine Assets. It is recommended that lessons learned be extracted and applied to other assets in the AKDOT&PF.

We understand change within the AKDOT&PF will not happen overnight. There will be challenges to moving forward with an emphasis on transportation asset management. During the TAM Assessment, the following challenges were identified by the AKDOT&PF:

1. Selling the concept – to everyone that TAM will be fair – “Buy-in” and the “What’s in it for me?” perspectives.
2. Concerned about TAM being data-driven: What data is needed and how much? Getting data into a useful format.
3. Getting people to use the data and information to make decisions.

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4. Making data valuable to employees so they will use it.
  5. Overcoming the fear of change with employees.
  6. Completing the documentation of existing practices.
  7. Prioritizing needs according to staff time and workload.
  8. Managing expectations of employees and legislature concerning TAM.

The incorporation of asset management practices into the AKDOT&PF's transportation program will lead to decisionmaking that maximizes the benefits of the available funding. The enterprise geo-database will prove to be an enormous asset as the leadership works towards aligning its decisionmaking process with the asset management. As a result, AKDOT&PF's transportation program will be more effective, credible, and defensible.

The FHWA is available to assist the Alaska Department of Transportation and Public Facilities in its efforts to advance the state of practice within the organization. We thank you for the opportunity to have been of assistance to you and we look forward to working with you on future projects.



# Appendix A: AKDOT&PF Self Assessment Results

## SELF-ASSESSMENT EXERCISE

### PART A. POLICY GUIDANCE

*How Does Policy Guidance Benefit from Improved Asset Management Practice?*

		Strongly Disagree			Strongly Agree
<b>POLICY GUIDANCE BENEFITTING FROM GOOD ASSET MANAGEMENT PRACTICE</b>					
A1.	Policy guidance supports preservation of existing infrastructure assets.	1	2	3	4
A2.	Policy guidance encourages resource allocation and project selection based on cost-effectiveness or benefit/cost analysis.	1	2	3	4
A3.	Policies support a long-term, life-cycle approach to evaluating investment benefits and costs.	1	2	3	4
A4	Policy guidance considers customer perceptions and expectations.	1	2	3	4
A5	Our customers contribute to the process that formulates policy goals and objectives.	1	2	3	4
<b>STRONG FRAMEWORK FOR PERFORMANCE-BASED RESOURCE ALLOCATION</b>					
A6.	Policy guidance on resource allocation allows our agency sufficient flexibility to pursue a performance-based approach.	1	2	3	4
A7.	Our agency has a business plan or strategic plan with comprehensive, well-defined goals and objectives to guide resource allocation.	1	2	3	4
A8.	Our agency's goals and objectives are linked to specific performance measures and evaluation criteria for resource allocation.	1	2	3	4
<b>PROACTIVE ROLE IN POLICY FORMULATION</b>					
A9.	Our agency estimates the resources needed to accomplish particular objectives as part of policy development.	1	2	3	4
A10.	Our agency regularly communicates to customers and other stakeholders our accomplishments in meeting policy objectives.	1	2	3	4
A11.	Our agency works with political leaders and other stakeholders to present funding options and consequences as part of our budget proposal.	1	2	3	4

*Do Resource Allocation Decisions Reflect Good Practice in Asset Management?*

	Strongly Disagree			Strongly Agree
<b>CONSIDERATION OF ALTERNATIVES IN PLANNING AND PROGRAMMING</b>				
B1. Our agency's long-range plan includes an evaluation of capital, operational, and modal alternatives to meet system deficiencies.	1	2	3	4
B2. Capital versus maintenance expenditure tradeoffs are explicitly considered in the preservation of assets like pavements and bridges.	1	2	3	4
B3. Capital versus operations tradeoffs are explicitly considered in seeking to improve traffic movement.	1	2	3	4
<b>PERFORMANCE-BASED PLANNING AND A CLEAR LINKAGE AMONG POLICY, PLANNING, AND PROGRAMMING</b>				
B4. Our agency's long-range plan is consistent with currently established policy goals and objectives.	1	2	3	4
B5. Our agency's long-range plan includes strategies that are consistent with plausible projections of future revenues.	1	2	3	4
B6. Our agency's long-range plan provides clear and specific guidance for the capital program development process.	1	2	3	4
B7. Our agency periodically updates its planning and programming methods to keep abreast of current policy guidance, customer expectations, and critical performance criteria.	1	2	3	4
<b>PERFORMANCE-BASED PROGRAMMING PROCESS</b>				
B8. Criteria used to set program priorities, select projects, and allocate resources are consistent with stated policy objectives and defined performance measures.	1	2	3	4
B9. Our agency's programs are consistent with realistic projections of future revenues.	1	2	3	4
B10. Our agency's programs are based on realistic estimates of costs, benefits, and impacts on system performance.	1	2	3	4
B11. Project selection is based primarily on an objective assessment of relative merits and the ability to meet performance targets.	1	2	3	4
B12. The preservation program budget is based upon analyses of least-life-cycle cost rather than exclusive reliance on worst-first strategies.	1	2	3	4
B13. A maintenance quality assurance study has been implemented to define levels of service for transportation system maintenance.	1	2	3	4

**PART C. PROGRAM DELIVERY**

*Are Appropriate Program Delivery Processes that Reflect Industry Good Practices Being Implemented?*

		Strongly Disagree		Strongly Agree	
<b>CONSIDERATION OF ALTERNATIVE PROJECT DELIVERY MECHANISMS</b>					
C1.	Our agency periodically evaluates the use of alternative delivery options such as maintenance outsourcing, intergovernmental agreements, design-build, design-build-maintain, and similar options.	1	2	3	4
C2.	Our agency has an incentive program for recognizing or rewarding outstanding performance in improving upon schedule, quality, and cost objectives.	1	2	3	4
<b>EFFECTIVE PROGRAM MANAGEMENT</b>					
C3.	Our agency solicits input from all affected parties to ensure that project scope is consistent with objectives of the project.	1	2	3	4
C4.	Our agency uses well-defined program delivery measures to track adherence to project scope, schedule, and budget.	1	2	3	4
C5.	Our agency has a well-established and functioning process to approve project changes and program adjustments.	1	2	3	4
C6.	When adding projects or changing project schedules, our agency considers effects on the delivery of other projects in the program.	1	2	3	4
C7.	Projects with significant changes to scope, schedule, or cost are reprioritized to ensure that they are still competitive in cost and performance.	1	2	3	4
C8.	Agency executives and program managers are regularly kept informed of program delivery status.	1	2	3	4
C9.	External stakeholders and policy-makers feel that they are sufficiently updated on program delivery status.	1	2	3	4
<b>COST TRACKING AND ESTIMATING</b>					
C10.	Our agency maintains and uses information on the full unit costs of construction activities.	1	2	3	4
C11.	Our agency maintains and uses information on the full unit costs of maintenance activities.	1	2	3	4

**PART D. INFORMATION AND ANALYSIS**

*Do Information Resources Effectively Support Asset Management Policies and Decisions?*

	Strongly Disagree			Strongly Agree
<b>EFFECTIVE AND EFFICIENT DATA COLLECTION</b>				
D1. Our agency has a complete and up-to-date inventory of our major assets.	1	2	3	4
D2. Our agency regularly collects information on the condition of our assets.	1	2	3	4
D3. Our agency regularly collects information on the performance of our assets (e.g., serviceability, ride quality, capacity, operations, and safety improvements).	1	2	3	4
D4. Our agency regularly collects customer perceptions of asset condition and performance.	1	2	3	4
D5. Our agency continually seeks to improve the efficiency of data collection (e.g., through sampling techniques, use of automated equipment, other methods appropriate to our transportation system).	1	2	3	4
<b>INFORMATION INTEGRATION AND ACCESS</b>				
D6. Agency managers and staff at different levels can quickly and conveniently obtain information they need about asset characteristics, location, usage, condition, or performance.	1	2	3	4
D7. Our agency has established standards for geographic referencing that allow us to bring together information for different asset classes.	1	2	3	4
D8. Our agency can easily produce map displays showing needs/deficiencies for different asset classes and planned/programmed projects.	1	2	3	4
D9. Our agency has established data standards to promote consistent treatment of existing asset-related data and guide development of future applications.	1	2	3	4
<b>USE OF DECISION-SUPPORT TOOLS</b>				
D10. Information on actual work accomplishments and costs is used to improve the cost-projection capabilities of our asset management systems.	1	2	3	4
D11. Information on changes in asset condition over time is used to improve forecasts of asset life and deterioration in our asset management systems.	1	2	3	4

**PART D. INFORMATION AND ANALYSIS (CONTINUED)**

*Do Information Resources Effectively Support Asset Management Policies and Decisions?*

	Strongly Disagree			Strongly Agree
<b>USE OF DECISION-SUPPORT TOOLS (CONTINUED)</b>				
Our agency uses asset management decision-support tools to:				
D12. Calculate and report actual system performance;	1	2	3	4
D13. Identify system deficiencies or needs;	1	2	3	4
D14. Rank candidate projects for the capital program;	1	2	3	4
D15. Forecast future system performance given a proposed program of projects; and	1	2	3	4
D16. Forecast future system performance under different mixes of investment levels by program category.	1	2	3	4
<b>SYSTEM MONITORING AND FEEDBACK</b>				
D17. Our agency monitors actual system performance and compares these values to targets projected for its capital preservation program.	<del>1</del>	2	3	4
D18. Our agency monitors actual system performance and compares these values to targets projected for its capital improvement program.	1	2	3	4
D19. Our agency monitors actual system performance and compares these values to targets projected for its maintenance and operations program.	1	2	3	4
D20. We periodically distribute reports of performance measures relevant to customer/stakeholder satisfaction with transportation system and services.	1	2	3	4

## SCORING GUIDELINES (OPTIONAL)

### A. POLICY GOALS AND OBJECTIVES

POLICY GUIDANCE BENEFITING FROM GOOD ASSET MANAGEMENT

$$(A1+A2+A3+A4+A5)/5 = 3.6$$

STRONG FRAMEWORK FOR PERFORMANCE-BASED RESOURCE ALLOCATION

$$(A6+A7+A8)/3 = 3.3$$

PROACTIVE ROLE IN POLICY FORMULATION

$$(A9+A10+A11)/3 = 3.7$$

### B. PLANNING AND PROGRAMMING

CONSIDERATION OF ALTERNATIVES IN PLANNING AND PROGRAMMING

$$(B1+B2+B3)/3 = 2.7$$

PERFORMANCE-BASED PLANNING AND CLEAR LINKAGE AMONG POLICY, PLANNING, AND PROGRAMMING

$$(B4+B5+B6+B7)/4 = 3$$

PERFORMANCE-BASED PROGRAMMING PROCESS

$$(B8+B9+B10+B11+B12+B13)/6 = 2.6$$

### C. PROGRAM DELIVERY

CONSIDERATION OF ALTERNATIVE PROJECT DELIVERY MECHANISMS

$$(C1 + C2)/2 = 3$$

EFFECTIVE PROGRAM MANAGEMENT

$$(C3+C4+C5+C6+C7+C8+C9)/7 = 3.4$$

COST TRACKING AND ESTIMATING

$$(C10+C11)/2 = 4$$

### D. INFORMATION AND ANALYSIS

EFFECTIVE AND EFFICIENT DATA COLLECTION

$$(D1+D2+D3+D4+D5)/5 = 3.6$$

INFORMATION INTEGRATION AND ACCESS

$$(D6+D7+D8+D9)/4 = 4$$

USE OF DECISION-SUPPORT TOOLS

$$(D10+D11+D12+D13+D14+D15+D16)/7 = 3.7$$

SYSTEM MONITORING AND FEEDBACK

$$(D17+D18+D19+D20)/4 = 2.3$$





## **Appendix B: TAM Assessment Agenda**



# Transportation Asset Management Assessment Program

Final Agenda for Alaska DOT&F TAM Assessment

May 3-6, 2010

## Monday, May 3

### **8: 30 am Meet with FHWA Division Office at Staff Meeting**

- Overview of TAM Assessment and its Objectives
- Review Charge for the Groups

### **10:00 am Meet with DOT Leadership Team and the FHWA Division Office at DOT Facility**

- Overview of TAM Assessment and its Objectives
- Overview of Alaska DOT&F Organizational Structure
- Review of Self-Assessment
- Identification of Alaska DOT&F TAM Elements
- Review Charge for the Groups

**12:00 pm – 1:00 pm LUNCH**

### **BEGIN TAM ASSESSMENT**

**1:00 pm Prepare for meeting with AK Northeast Region for Planning, Program and Design and for Construction and Maintenance Groups**

**2:00 pm Meeting with Southeast Region- All Teams- Concurrent Groups**

- Planning, Program and Design
- Construction and Maintenance

**5:00 pm Adjourn for the day - Northern and Central Teams travel begin**

## Tuesday and Wednesday, May 4-5: See Specific Schedule on Excel Worksheets

- **Individual TAM Discussion Groups begin Regional approach**
  - Northern Region– Fairbanks (Chris Newman, Ralph Rizzo and John Lohrey)
    - Research Group – 1 hour
    - Signs – 1-2 hours

- 
- Planning/Programming and Design – 3-4 hours
  - Construction, Maintenance - 6 hours needed
  - Central Region– Anchorage (Nastaran Saadatmand, Luis Rodriguez, Douglas Townes and Chris Riley)
    - Construction, Maintenance - 6 hours
    - Planning/Programming and Design -3 hours
    - Pavement- (Geotech-included) – 2-3 hours
    - Facilities – 1 hour
    - State Equipment Fleet – 1 hour
  - Southeast Region– Juneau (Shaw Whitson, Coley, Leighow, Chang, and Fletcher – joined by Central and Northern Teams on Monday afternoon)- Concurrent Groups
    - Planning/Programming and Design
    - Construction and Maintenance
  - Headquarters– Juneau (Francine Shaw Whitson, Nat Coley, Chris Chang, David Leighow and Al Fletcher)- Will begin on Tuesday Morning-Concurrent Groups
    - Data and Information Technology
    - Planning/Programming and Design
    - Bridges
    - Right of Way
    - Construction and Maintenance
    - General Policies and Procedures
    - Finance Group
  - **Individual Group Documentation of Findings and other Observations**
  - **All TAM Assessment Teams Assemble:**
    - Identify linkages
    - Identify gaps
  - **Anchorage and Fairbanks Team return to Juneau**

## Thursday, May 6 – All Teams in Juneau

**8:00 am Meeting to Review and Assemble TAM Findings and Recommendations and Identify TAM Short-Term and Long-Term Actions**

**12:00 pm LUNCH**

**1:00 pm Final preparation of Draft Action Plan by Assessment Team**

**2:00 pm Closeout meeting with Alaska DOT&F and FHWA Division Office**

- Next steps/follow-up
- FHWA Available Technical Assistance

**4:00 pm Adjourn – begin return trips home**

<u>FHWA Team:</u> Chris Newman– HQ Office of Asset Management Ralph Rizzo – Resource Center John Lohrey – Alaska Division Office	
<b><u>Monday, May 3</u></b> 2 pm - 5 pm	Southeast Region - Juneau Planning, Program and Design Group
<b><u>Tuesday May 4</u></b> 8am - 9am 9am - 10am 10am - 11am 11am - 12pm 12pm - 1pm 1pm - 2pm 2pm - 3pm 3pm - 4pm 4pm - 5pm	Northern Region- Director's Conference Room and Planning Conference Room  Construction Maintenance  LUNCH  Construction Maintenance
<b><u>Wednesday May 5</u></b> 8am - 9am 9am - 10am 10am - 11am 11am - 12pm 12pm - 1pm 1pm - 2pm 2pm - 3pm 3pm - 4pm 4pm - 5pm	Northern Region Planning/Programming and Design  LUNCH Signs Research Group

**FHWA TAMS Interview Schedule**  
Commissioners Conference Room

**FHWA Team:**

Francine Shaw Whitson	HQ Office of Asset Management
Nat Coley	HQ Office of Asset Management
Chris Chang	HQ Office of Asset Management
David Leighow	HQ Office of Planning, Environment and Realty
Al Fletcher	Alaska FHWA Division Office

**Meeting Time**

8am - 9am  
9am - 10am  
10am - 11am  
11am - 12pm  
12pm - 1pm  
1pm - 2pm  
2pm - 3pm  
3pm - 4pm  
4pm - 5pm

**Commissioner's Conference Room**

**Tuesday May 4**

Construction Maintenance  
Chang and Fletcher

LUNCH

Right of Way  
Leighow and Fletcher

**Wednesday May 5**

Bridges  
Coley and Fletcher

LUNCH

**Commissioner's Office**

**Tuesday May 4**

Planning/Programming and Design  
Coley and Leighow

LUNCH

Data and Information Technology  
Chang and Coley

**Wednesday May 5**

General Policies and Procedures  
Shaw Whitson and Chang

Finance Group

Shaw Whitson, Coley and Fletcher

LUNCH

**FHWA Team:**

Francine Shaw Whitson	HQ Office of Asset Management
Nat Coley	HQ Office of Asset Management
Chris Chang	HQ Office of Asset Management
David Leighow	HQ Office of Planning, Environment and Realty
Al Fletcher	Alaska FHWA Division Office
Nastaran Saadatmand	HQ Office of Asset Management
Luis Rodriguez	Resource Center
Douglas Townes	Resource Center
Chris Riley	Alaska FHWA Division Office
Chris Newman	HQ Office of Asset Management
Ralph Rizzo	Resource Center
John Lohrey	Alaska FHWA Division Office

**Monday, May 3**

Southeast Region - Juneau

2 pm - 5 pm

**Construction and Maintenance**

Nastaran Saadatmand  
Luis Rodriguez  
Douglas Townes  
Chris Riley

**Planning, Program and Design Group**

Francine Shaw Whitson  
Nat Coley  
Chris Chang  
David Leighow  
Al Fletcher



**FHWA Team:**

Nastaran Saadatmand – HQ Office of Asset Management  
 Luis Rodriguez – Resource Center - Anchorage TAM Assessment Team Leader  
 Douglas Townes – Resource Center  
 Chris Riley – Alaska Division Office

**Monday, May 3**

2 pm - 3 pm  
 3 pm - 4 pm  
 4 pm - 5 pm

Southeast Region  
 Construction and Maintenance

**Tuesday, May 4**

8:00 - 8:30 am  
 8:30 - 10:00 am  
 10:00 - 10:30 am  
 10:30 - 12:00 noon  
 12:00 - 1:00 pm  
 1:00 pm - 2:30 pm  
 2:30 pm - 3:00 pm  
 3:00 pm - 4:30 pm

Central Region - Planning Conference Room  
**Team Introduction and Overview of TAM Assessment Objectives**  
 Design  
 Break  
**Construction**  
 Lunch  
**Pavements**  
 Break  
**Geotech**

**Wednesday, May 5**

8:00 - 9:30 am  
 9:30 - 10:00 am  
 10:00 - 11:30 am  
 11:30 - 12:30 pm  
 12:30 pm - 2:00 pm  
 2:00 pm - 2:30 pm  
 2:30 pm - 4:00 pm  
 4:00 pm - 4:30 pm

Central Region  
**Maintenance**  
 Break  
**Facilities**  
 Lunch  
**State Equipment Fleet**  
 Break  
**Planning and Programming**  
**Closeout Meeting**



## **Appendix C: Attendance Rosters**

DOT/PF Meeting  
10:00am

Attendance Sheet for TAM Assessment Meetings

5/3/2010

Page 1 of 3

Name	Office	Email Address	Telephone
CHRIS NEWMAN	FHWA HQ	christopher.newman@dot.gov	(202) 366-2023
Luis Rodriguez	FHWA RC	luis.rodriguez@dot.gov	404.562.3681
Roger Healy	ADOT/ PF	roger.healy@alaska.gov	(907) 465-6929
BUTCH WLASCHIN	FHWA - Assesment	butch.wlaschin@dot.gov	(907) 465-6948
MARK NEIDHOLD	DOT/ PF - Design/Const. Sps.	mark.neidhold@alaska.gov	
Mike Coffey	DOT/ PF Statewide M+O	Mike.Coffey@Alaska.gov	
MARY SIROKY	DOT/ PF Spc. Asst to Comish	mary.siroky@alaska.gov	
Al Fletcher	FHWA	Al.Fletcher@dot.gov	907 596 7245
Jeff Ottesen	DOT/ PF Planning Director	jeff.ottesen@alaska.gov	907 465-1471
MARK LEWIS	DOT/ PF HQ BUDGET	Mark.Lewis@alaska.gov	465-8986
Kristi Peel	DOT/ PF Admin Svcs.	kristi.peel@alaska.gov	465-2889
CHRISTOPHER CHANG	FHWA - HQ	christopher.chang@dot.gov	202-366-4657 404 949-0784
DOUGLAS TOWNES	FHWA-RESOURCE CENTER	douglas.townes@fhwa.dot.gov	
DAVE LEIGHOW	FHWA-HQ Real Estate	David.leighow@dot.gov	503-587-4734
Nathaniel Coley	FHWA-HQ	ncoley@dot.gov	202 366 2171
Ralph Rizzo	FHWA-RC	Ralph.J.Rizzo@dot.gov	401-528-4548
Nastaran Sandulmond	FHWA-HQ Workforce Dev.	nastaran.sandulmond@dot.gov	202-366-1337 907-465-8815
Amanda Holland	DOT/ PF	amanda.holland@alaska.gov	
GARY L. DAVIS	S.E. REGION ADOT/ PF	GARY.DAVIS@ALASKA.GOV	907-465-1763
FRANCINE SHAW-WILSON	FHWA-Assesment	francine.shaw-wilson@dot.gov	202-366-0392
By Phone:	Northern Region, Steve Titus, Jeff Patsou, Dave Blom		
	Central Region, Lance Wilber		

# Data and Information Technology

Attendance Sheet for TAM Assessment Meetings

5/4/2010

Page 1 of 3

ne	Office	Email Address	Telephone
Ocie Adams	DOT/AF	ocie.adams@alaska.gov	(907) 465-6940
CHRISTOPHER CHANG	FHWA - HQ	christopher.chang@dot	202-366-4657 907-465-6998
Jack Stickel	DOT Program Dev	JACK.STICKEL@ALASKA.GOV	
Sean Jordan	DOT Prog Dev	sean.jordan@alaska.gov	465-8950
KERRY S KIRKPATRICK	DOT / Program Dev	Kerry.Kirkpatrick@alaska.gov	465-8957
Jill Sullivan	DOT / Program Dev	jillesullivan@alaska.gov	465-8592
Nat Coley	FHWA - HQ	ncoley@dot.gov	202 366 2171
Jeff Ottesen	Alaska DOT	jeff.ottesen@alaska.gov	907 465 6971
Mike Coffey	DOT/PI	Mike.Coffey@Alaska.gov	907-465-3504
Francine Snow White	FHWA HQ	fwlutser@dot.gov	202-366-8028
<del>George Crowder</del>			
George Crowder	DOT/PI	george.crowder@alaska.gov	465.6992
Brian J Idzik	"	brian.idzik@alaska.gov	465-8964

Construction and Maintenance - HR  
 Attendance Sheet for TAM Assessment Meetings

5/4/2010

Page 1 of 3

Name	Office	Email Address	Telephone
Francine Shaw White	Office of AM FHWA	fwhite@dot.gov	(202) 366-8228
Al Fletcher	FHWA	Al.Fletcher@doh.gov	(907) 586-7245
Ocie Adams	AK DOT/PPF	ocie.adams@alaska.gov	(907) 465-6948
Mike Scott	DOT/PPF	mike.scott@alaska.gov	907-465-6973
CHRISTOPHER CHANG	FHWA-HQ	christopher.chang@dot.gov	202-366-4657
MARK NEIDHOLD	DOT/PPF DECS	mark.neidhold@alaska.gov	907 465-6948
James Green	DOT/PE DECS	jim.green@alaska.gov	907-465-1112

General Policies and Procedures

Attendance Sheet for TAM Assessment Meetings

5/5/2010

Page 1 of 3

Name	Office	Email Address	Telephone
Francine Shaw White	FHWA HQ	fwhite@dot.gov	(202) 366-8228
Michael Vigue	ADOT Program Development	mike.vigue@alaska.gov	(907) 465-2065
Peter Christensen	" "	peter.christensen@alaska.gov	(907) 465-6988
MARK NEIDHOLD	ADOT/PPF DECS	mark.neidhold "	465-6948
Roger Healy	ADOT/PPF DECS	roger.healy@alaska.gov	465-6958
CHRISTOPHER CHANG	FHWA-HQ	christopher.chang@dot.gov	202 366-4657

AKDOT SER Maintenance & Construction TAM Assessment Attendance Sheet

5/3/10

NAME	OFFICE	EMAIL	TELEPHONE
Luis Rodriguez	FHWA-RC-Atlanta	luis.rodriguez@dot.gov	404-562-3681
GARY DAVIS	ADOT/PE S.E. REGION	GARY.DAVIS@ALASKA.GOV	907-465-1763
Nastaran Saadatmand	FHWA - HQ	nastaran.Saadatmand	202-366-1337
DOUGLAS TOWNES	FHWA - RC-ATLANTA	douglas.townes@fhwa.gov	(404) 562-3914
Al Fletcher	FHWA - Alaska	Al.Fletcher@dot.gov	(907) 586-7245
Mike Coffey	DOT M&O	Mike.Coffey@alaska.gov	907 465-3806
Gary Franzen	SER DOT M&O	gary.franzen@alaska.gov	907 465 4512
CHUCK CORREA	SE REGION DOT- CONSTRUCTION	chuck.correa@alaska.gov	(907) 465-1795
GIRIS NEWMAN	FHWA HQ ASSET MGT	christopher.newman@dot.gov	(202) 366 2023

AKDOT CR TAM Assessment TAM Assessment Attendance Sheet

5/4/10

NAME	OFFICE	EMAIL	TELEPHONE
Luis Rodriguez	FHWA-Resource Center	luis.rodriguez@dot.gov	404-562-3681
DOUGLAS TOWNES	FHWA " "	douglas.townes@fhwa.dot.gov	404-949-0784
Rob Campbell	DOT	rob.campbell@alaska.gov	907-269-0780
CHRIS RILEY	FHWA	CHRIS.W.RILEY@DOT.GOV	907-586-2974
Kim Rice	DOT	KKIM.RICE@alaska.gov	907-269-0588
DAVE STANLEY	DOT- Statewide Mat'ls	dave.stanley@alaska.gov	907-269-6236
Nastaran Saadatmand	FHWA - HQ	nastaran.Saadatmand@dot.gov	202-366-1337
Jennifer Witt	DOT/PE	jennifer.witt@alaska.gov	907 269 0520
SCOTT GARTIN	DOT Statewide Mat'ls	scott.gartin@alaska.gov	907-269-6244
Steve Sabourjian	DOT - STUD. MATLS.	steve.sabourjian@alaska.gov	269-6214
Mr. Grimm	DOT Con'tn	Mr. Grimm@alaska.gov	907 269 0850
MIKE SAN ANGELO	HQ STUD MATERIALS	michael.sanangelo@alaska.gov	907-269-6234
NEWTON BINGHAM	Reg'l MATL DOT	newton.bingham@alaska.gov	
JIM HORN	PAVEMENT MANAGEMENT	jim.horn@alaska.gov	(907) 269-6237



### TAM Assessment Attendance Sheet

AKDOT CR TAM Assessment

5/5/10

NAME	OFFICE	EMAIL	TELEPHONE
RANDY VANDERWOOD	MAINTENANCE CHIEF	randy.vanderwood@alaska.gov	907.269.6756
Joel S. Aubin	STATEWIDE PUBLIC FAC	joel.staubing@alaska.gov	907-269-0923
Al Gilbert	M+O Facilities	al.gilbert@alaska.gov	907-441-4853
Diana Rotkis	State Equip Fleet	diana.rotkis@alaska.gov	907.269.0787



## Appendix D: Questionnaires



## Questions for TAM Assessment Team

### Group A – Data Integration, Information Technology and Management Systems Group

#### Questions (Francine and Tom)

1. Are the agency's management systems designed and applied to yield meaningful information on policy choices and consequences?
2. Describe how your information systems are integrated?
3. What linear referencing system do you use to locate your assets?
4. Is financial system linked to your asset life cycle records?
5. What data parameters from the Management Systems make the most sense for the cross-asset comparisons?
6. Is there a way to improve data collection/management/quality assurance to achieve more "collect data once and use it by many"?

#### Questions based on the AM Guide

1. Does the agency maintain an inventory of assets that is a complete, accurate, and current description of infrastructure for which the agency is responsible or in which it has a statewide transportation interest?
2. Are asset condition data (including data that affect condition, such as usage, environment, etc.) updated on a predetermined schedule sufficient to provide timely and accurate information on status and performance?
3. Is information on customer perceptions updated regularly through surveys, focus groups, complaint tracking, or other means, to gauge public perception of asset condition and agency performance, and to respond thereto?
4. Is information on actual costs and accomplishments by project, program, network, asset category, work type, and location maintained in a form that can be used to track program delivery?
5. Are performance measures or levels of service defined and regularly applied to quantify the impacts of program decisions and actions?
6. Is progress toward stated transportation system performance targets measured and reported regularly for each program?
7. Do performance measures provide feedback for future planning and program priorities, or consideration of adjustments in policy objectives?
8. Does the agency apply the appropriate mix of data collection technology (e.g., visual, automated, remote sensing) to ensure high quality data and to provide cost-effective coverage needed to maintain the quality information base discussed above?

- 
9. Is the sampling methodology demonstrated to be appropriate in terms of network coverage, sample size, and frequency, and in the training and team assignments needed to ensure objectivity, consistency, and repeatability?
  10. Has the agency's single-asset management systems and databases been updated and integrated to enable consistent information on all asset categories to be accessible to multiple applications, and to provide managers at various organizational levels the information and tools needed for effective asset management?
  11. Are information requirements and/or standards for asset management in place to ensure that future system and database development efforts within the agency will integrate with existing systems and meet asset management information and analysis improvement needs?
  12. Are systems and information based upon a common geographic referencing system and a common map-based interface for analysis, display, and reporting?
  13. Does the agency have decision-support tools that facilitate exploration of capital versus maintenance tradeoffs for different asset classes?
  14. Does the agency have tools that support consistent analysis of project costs and impacts, using a life-cycle cost perspective?
  15. Does the agency have tools that provide an understanding of the system performance implications of a proposed program of projects?
  16. Does the agency have tools to help explore the system performance implications of different levels or mixes of investments across program categories or subcategories?
  17. Does the agency report the value and condition of its transportation capital assets in a manner that conforms to the modified approach specified in GASB standards?
  18. Is information on asset condition and the level of expenditure needed to meet target condition available from the agency's asset management systems?



## Group B - Planning/Programming, Design and Economic Analysis Group

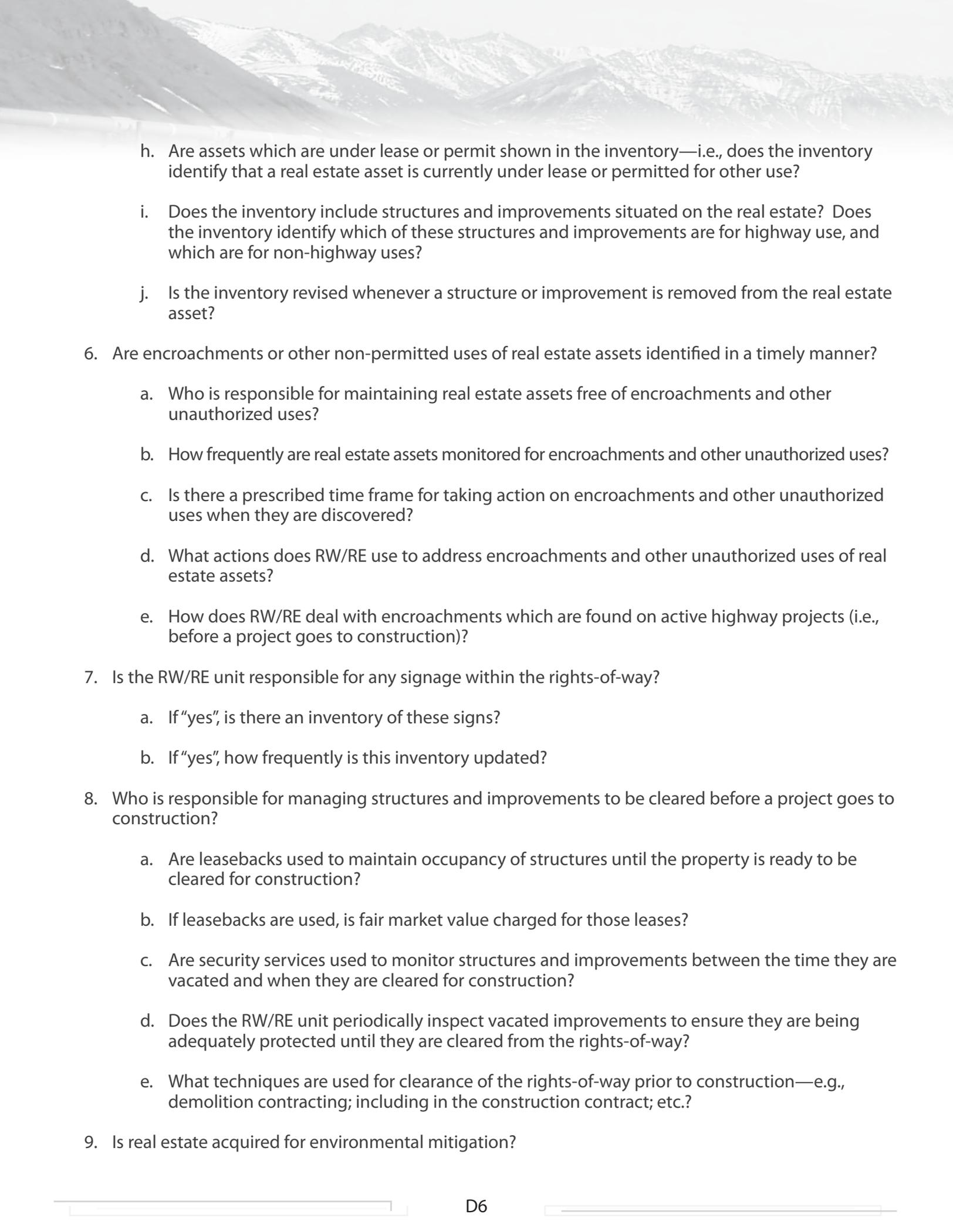
1. How does your agency analyze tradeoffs between capital improvements (e.g. replacement, reconstruction etc) and preservation?
2. Are impacts to the environment, including roadway users (i.e. user costs), considered in your programming decisions?
3. Describe how your long range plans reflect the goals or performance targets outlined by your agency.
4. Describe how you ensure that your State Transportation Improvement Plan (STIP) is fiscally constrained.
5. Describe how your long-range plan provides clear and specific guidance for the capital program development process.
6. Describe how your performance measures outlined in your agency goals are used to set program priorities, select projects, and allocate resources.
7. How does your agency ensure that programmed projects reflect revenue projections?
8. How are life-cycle benefits, costs, or performance of projects evaluated? How are they used in project selection?
9. What innovative contracting techniques do you employ?
10. Describe how responsible offices such as construction, maintenance, bridge, pavement, etc; contribute to planning and programming decisions.
11. How do actual construction costs and activities contribute to influence programming decisions?
12. Describe your network level optimization strategy for programming projects.
13. Describe your project level optimization strategy for project selection.
14. Describe how your Management systems support planning, programming, and design decisions.
15. Describe how responsible offices such as construction, maintenance, bridge, pavement, etc; contribute to planning and programming decisions.
16. How are estimates of the cost to operate and maintain the system developed for use in the STIP financial plan?
17. How is it determined that the projected level of expenditure in planning and programming documents will adequately to maintain the system?
18. Describe how you account for the inherent uncertainty in design and construction cost estimates.



## Group C – Real Estate Questions

### Asset Management Questions for Right-of-Way/Real Estate (RW/RE):

1. Describe the real estate assets for which RW/RE is responsible?
2. Is reliable information on asset condition, and public perceptions thereof, accounted for in RW/RE policy objectives?
3. Staffing levels:
  - a. Does the RW/RE have the correct staff for their workload? Is the staff balanced for the workload in the districts?
  - b. Has a study ever been conducted to determine the RW/RE staffing needs? If so, are copies available?
  - c. Are there any statewide or district-wide constraints on RW/RE staffing? If so, what are the sources of these constraints?
  - d. How are staffing projections determined for upcoming project and program workloads? Are there any guidelines or standards available that you use?
  - e. How are personnel assigned to projects? Are written procedures, guidelines, etc. used to determine and assign the minimum/optimum numbers of staff?
  - f. How does the State oversee federally funded local projects as it relates to staffing?
4. What IT tools and resources does RW/RE use to management real estate assets?
  - a. What data quality issues, if any, does RW/RE have?
  - b. Are data/IT resources adequate for the management of real estate assets?
5. Does RW/RE maintain an inventory of real estate assets?
  - a. Is the inventory in an electronic database?
  - b. Is the inventory complete?
  - c. If the inventory is not complete, what are the plans for completing it?
  - d. How often is the inventory checked in the field?
  - e. Does the inventory describe the type of interest in each asset (i.e., fee ownership, easement, lease, etc.)?
  - f. Is there a prescribed time frame for entering new real estate assets into the database?
  - g. When assets are disposed of, is the inventory revised to either delete that inventory item or to mark it as disposed from the inventory?

- 
- h. Are assets which are under lease or permit shown in the inventory—i.e., does the inventory identify that a real estate asset is currently under lease or permitted for other use?
      - i. Does the inventory include structures and improvements situated on the real estate? Does the inventory identify which of these structures and improvements are for highway use, and which are for non-highway uses?
      - j. Is the inventory revised whenever a structure or improvement is removed from the real estate asset?
  6. Are encroachments or other non-permitted uses of real estate assets identified in a timely manner?
    - a. Who is responsible for maintaining real estate assets free of encroachments and other unauthorized uses?
    - b. How frequently are real estate assets monitored for encroachments and other unauthorized uses?
    - c. Is there a prescribed time frame for taking action on encroachments and other unauthorized uses when they are discovered?
    - d. What actions does RW/RE use to address encroachments and other unauthorized uses of real estate assets?
    - e. How does RW/RE deal with encroachments which are found on active highway projects (i.e., before a project goes to construction)?
  7. Is the RW/RE unit responsible for any signage within the rights-of-way?
    - a. If “yes”, is there an inventory of these signs?
    - b. If “yes”, how frequently is this inventory updated?
  8. Who is responsible for managing structures and improvements to be cleared before a project goes to construction?
    - a. Are leasebacks used to maintain occupancy of structures until the property is ready to be cleared for construction?
    - b. If leasebacks are used, is fair market value charged for those leases?
    - c. Are security services used to monitor structures and improvements between the time they are vacated and when they are cleared for construction?
    - d. Does the RW/RE unit periodically inspect vacated improvements to ensure they are being adequately protected until they are cleared from the rights-of-way?
    - e. What techniques are used for clearance of the rights-of-way prior to construction—e.g., demolition contracting; including in the construction contract; etc.?
  9. Is real estate acquired for environmental mitigation?

- 
- a. If “yes”, are those properties included in the inventory of real estate assets?
  - b. Who is responsible for maintaining those assets?
  - c. If real estate is acquired for project-specific mitigation, or for inclusion in a mitigation bank, is it managed “in-house” or by contractors?
  - d. Does RW/RE coordinate with other units within AKDOT&PF (e.g., the Environmental unit) on the management of mitigation sites?
  - e. Are mitigation sites transferred to other state agencies? If so, do you have a Memorandum of Understanding (MOU) or a process to document that assignment to another agency?
10. Does RW/RE acquire and manage real estate that is transferred from the federal government via the Federal Land Transfer process?
- a. If “yes”, describe the process that is used for such transfers.
  - b. If “yes”, does RW/RE have a process for ensuring that the highway easement deed stipulations required by the federal land management agency are adhered to and maintained?
  - c. Does RW/RE have a process for activating the reversionary clause in a highway easement deed if the facility using the transferred land is no longer needed or is abandoned?
11. Does RW/RE have a management plan for its real estate assets?
- a. If “yes”, describe the elements of that plan, including short-term and long-term goals.
  - b. If “yes”, describe how the performance measures outlined in that plan are used to set program priorities, identify specific program activities (such as the protection of structures and improvements until demolition), and allocate resources.
12. How are funds received from the leasing and disposal of real estate assets accounted for?
- a. Does RW/RE maintain or input into an accounting system to ensure that funds received for leasing and disposals are used only for other Title 23 eligible projects?
  - b. Are periodic reviews performed to ensure that funds received from leasing and disposal are properly accounted for?
13. How are RW/RE records managed to ensure they are properly filed and maintained?
- a. What records does the RW/RE unit maintain and are they maintained in accordance with the unit’s operating procedures?
  - b. How is the completeness and timeliness of each type of record determined?
  - c. Do existing records meet all applicable reporting requirements, or are there current gaps in the records?
  - d. If there are existing gaps in the records, what is the RW/RE’s unit plan to resolve those gaps?



## Group D – Geotech and Asset Management

### Preliminary Questions

7. Is your management system designed and applied to yield meaningful information on policy choices and consequences?
8. Do you have an inventory of the assets that your Office is responsible for?
9. Does your inventory of assets provide a complete, accurate, and current description of infrastructure for which your office is responsible or in which it has a statewide transportation interest?
10. Are systems and information based upon a common geographic or linear referencing system and a common map-based interface for analysis, display, and reporting?
11. Management Areas: What geotechnical related assets/liabilities of the agency are currently managed systematically?
12. Management Areas: What other geotechnical areas has the agency has identified as worthwhile to manage? Where are development efforts currently in these areas?
13. Integration: How do the agency intents to prioritize these different aspects and integrate the decision making process as to where to best to place human and financial resources.
14. System Needs: What needs have to be met in order to make an integrated geotechnical management system effective?
15. Management Philosophies: For the various geotechnical assets/liabilities being or to be managed, what management philosophies are used in the management system(s) decision process, and how are they considered? E.g. cost, risks, cost/benefit, life cycle costs and analysis, etc.
16. Communication: What measures are in-place to ensure that system performance is communicated back to planning, design, construction and maintenance so that practices and considerations made during earlier stages can be adjusted?
17. Communication: What measures are in-place to ensure the roles and responsibilities for all discipline/ parties well understood.
18. Slope Management System: What failure mechanisms are accounted for in the slope management system? (E.g. rockfall, rock slope stability (kinematic, massive wedge/planar failures), colluvial/mud flow hazards, earth-slope stability (translational, rotational), etc.)

## Assets Condition Evaluation

Please answer the following questions to indicate what, when and how geotechnical related data is collected and incorporated into the agency geotechnical management system?

<b>Geotechnical Asset</b>	<b>Data is collected</b> (Yes/No)	<b>QA/QC is used</b> (Yes/No)	<b>Condition Evaluation Method</b>	<b>Condition Evaluation Frequency</b>	<b>Condition Evaluation Protocol/ Guidelines</b>	<b>Coverage</b> (sample, statewide, districtwide, other)	<b>Agent</b> (In-house, consultant, combination)
Slopes							
Embankments							
Prepared Subgrades for Roadways							
Retaining Walls							
Foundation Systems							
Geohazards							
<b>Other</b> _____							
<b>Other</b> _____							

1. What are the agency immediate needs in this area condition evaluation?
  - a. State is developing an independent QA check on distress data.
  - b. Construction History
  - c. Soil Data.

2. Is the following design and construction history data linked or incorporated into Geotechnical Management System (GMS)?

Factor	Yes or No
Geotechnical Installation Type	
Design Criteria	
Soil Type	
Construction Date	
Location	
Maintenance Activities and Frequency	
Other (specify)	

3. Is cost data linked or incorporated into the GMS?
4. Does your agency incorporate any other data (not listed above) into GMS?

### Analysis Tools

5. Below indicate the extent to which the GMS/process meets the factor listed below related to data analysis.
  - a. The system is used to predict future performance of the highway network and of individual roadway sections.
  - b. Prediction models are calibrated against actual performance data on a routine basis.
  - c. The system is used to perform trade-off analysis based on different funding strategies.
  - d. The system considers a wide range of alternatives such as pavement preservation, structural overlay, major rehab, and reconstruction.
  - e. The system is used to produce a list of recommended candidate projects or an investment strategy in which to base project selection.
  - f. The system is used to conduct multi-year analysis.
  - g. The system is used to track and analyze the benefits of applying different treatments to different types of pavements in different conditions.
  - h. The analysis considers cost/benefits as part of the basis for prioritization or optimization.
6. Are asset condition data (including data that affect condition, such as usage, environment, etc.) updated on a predetermined schedule sufficient to provide timely and accurate information on status and performance?

- 
7. Are performance measures or levels of service defined and regularly applied to quantify the impacts of program decisions and actions?
  8. Does the agency have tools that support consistent analysis of project costs and impacts, using a life-cycle cost perspective?
  9. Does your management system have tools that provide information that allows an easy understanding of the system performance implications of a proposed program of projects?
  10. Can the GMS support project level Life Cycle Cost Analysis (LCCA)?
  11. What are the agency immediate needs in the GMS area (data management, analysis tools, cost effectiveness analysis, design, reporting)?

### **GMS Effectiveness**

12. Please indicate the extent to which the GMS/process meets the factor listed below related to the effectiveness of the GMS.
  - a. GMS staff, agency personnel, FHWA Division staff, other government agencies and the public have some form of electronic access to GMS information.
  - b. The system has the ability to undertake a constraint analysis and forcing priorities (i.e. pre-scheduled projects) into the process.
  - c. The system is used to evaluate effectiveness of the system preservation program.
  - d. The system is used to provide information/services needed by top-level DOT decision makers.
  - e. DOT decision makers understand the benefit, have confidence in, and support the recommendations from the GMS. The geotechnical assets preservation program in the state compares and is in agreement with the recommendations from the GMS.
  - f. Recommendations from the GMS are integrated in the project PS&E.
13. Does the GMS use to conduct specialized engineering and analyses?
14. Does the GMS use to conduct specialized economic analyses of geotechnical assets?
15. Is there any information that the agency decision makers would like to have that is not currently available from GMS?
16. What are the agency needs to make GMS more effective?
  - a. Improving the reporting techniques to allow for an effective communication with the decision makers.
  - b. Improving the effectiveness of geotechnical assets design/preservation/ maintenance strategies.
  - c. Improving geotechnical assets performance predictions.

- d. Improving data sharing with other systems.
- e. Optimizing the use of available funds.
- f. Identifying the needs of the agency-wide customers and ensuring that the GMS provides products that meet those needs.

### System Integration

17. Please indicate the extent to which the geotechnical assets management system/process meets the factor listed below related to the integration of the GMS with other systems. Note: Use N/A if a state does not have one or more of the management systems.

#### The GMS is integrated with...

Management System	Options (Fully, Partially, Minimal, None, N/A)
Construction	
Maintenance	
Material	
Roadway or Bridge Design Database	
Cost Database	
Bridge	
Other _____	

- 18. Describe how your GMS is integrated with other management systems in your agency?
- 19. Is the GMS linked to the agency GPS?
- 20. Does the agency have a documented plan to enhance the GMS with short-term and long-term goals?
- 21. If the answer to the above question is yes, please list the short-term and long-term goals and the timeframe in which you expect implementation to be completed.
- 22. What are the needs relative to system integration?

### Workforce Capabilities

- 23. In the table below indicate the extent to which the pavement management system/process meets the factor listed below related to workforce capabilities.
  - a. Core competencies are identified for the key workforce involved with geotechnical management system.
  - b. The existing geotechnical management workforce is proficient in the established core competencies.



- c. A succession plan is in place for the geotechnical management workforce.
- d. To what extent are training, conferences, and/or seminars held for the geotechnical management workforce
- e. To what extent is training provided to the agency staff to make them familiar with GMS, its capabilities and advantages.

24. What are the future training needs for your agency over the next 1-3 years?

25. What future research areas would be helpful to support your geotechnical assets management activities?

26. Please share any other information that you may feel relevant.



## Group E - Construction, Maintenance and System Preservation Group

### Construction and Maintenance Staffing and Workforce Development

#### 1. Staffing Levels

- a. Does the State have the correct staff for their workload? Is the staff balanced for the workload in the districts?
- b. Has the State ever conducted a study to determine their staffing needs? If so, are copies available?
- c. Are there any statewide or district-wide constraints on construction staffing? If so, what are the sources of these constraints?
- d. How are staffing projections determined for upcoming construction seasons? Are there any guidelines or standards available that you use?
- e. How are personnel assigned to projects? Are written procedures, guidelines, etc. used to determine and assign the minimum/optimum numbers of staff?
- f. How does the State oversee federally funded local projects as it relates to staffing?

#### 2. Workforce Development

- a. How does the State ensure that adequate training opportunities are available to engineers and technicians?
- b. How does the State recruit engineers and technicians?
  - i. Does this include a formal internal State DOT training program for construction and maintenance personnel?
  - ii. Describe the steps taken to acquaint/train inspection personnel with regard to the project, in general and the quality assurance operations they will cover (e.g. office training sessions, checklists, close supervision and handouts).
  - iii. How much money per year is invested in training construction and maintenance personnel?
- c. Are career development programs available to engineers and technicians?
- d. How do you recruit engineers, technicians?

#### 3. Consultant Inspectors

- a. What construction engineering functions have been assigned to contractors? What else has the State done to shift construction engineering functions to contractors?
- b. Is the State considering the use of private consultants on future construction projects? If so, what type of projects will these services be used? Has the State developed procedures to administer the consultants to ensure that quality work is obtained?



c. Are consultant acquisition procedures documented and available?

4. Staff Resources

- a. Are inspectors provided with adequate transportation and other equipment? [Similar question to How does the State...stated previously]
- b. Does the State have any current staffing guidelines/standards available? Do these standards provide for staffing projects of different sizes, types and complexity?
- c. How do the guidelines/standards provide for staffing projects of different sizes, types and complexity?
- d. Does the State provide any Just-In-Time training (i.e. Post Tension training for inspectors soon to be deployed on a project or pre-cast yard requiring said competency)?
- e. Does the State provide training certifications or is that done by private companies or University?

## Construction Quality

### Pre-Construction

- 1. Project Development Process:
  - a. How are Construction and Maintenance concerns addressed during scoping?
- 2. Plan Development Phases:
  - a. Is there a multi-disciplined approach to plan development? Construction involvement? Maintenance involvement?
  - b. Is constructability evaluated for each alternative?
  - c. Is Value Engineering required? How is VE implemented? Recommendations Implemented and Tracked?
  - d. What quality control measures are used prior to issuance of the PS&E? Check squads? Constructibility Reviews?
  - e. How is the Construction Program involved with contract time determinations?

### Contract Administration

- 1. Does your State use Performance Measurements to assess the effectiveness of construction program management? If so, describe the measurements, and how they are used.
- 2. Describe how your State interacts with the construction industry to identify and resolve areas of mutual concern, such as risk mitigation, quality of contract documents, communications, consistency, financial trends, etc. Is this done on a program level, project level, or both? Is progress documented and reported on a regular basis?

- 
3. Does your State have a process for identifying re-occurring project issues that require contract modifications? Please describe process, and how the information is used to modify contract requirements for future projects.
  4. Describe your State's process for addressing contractor performance issues. What supporting documentation is required? Who is responsible for reviewing problems/complaints and what steps are included in the review process? Has the process resulted in reduction of contractor performance issues? Is the effectiveness measured? If so, please describe.
  5. Does your State have a process that Contractors use to provide feedback to the DOT on the effectiveness of DOT project engineers? Please describe? If so, how is the information used?
  6. Are you considering any changes to your procurement policies, contracting practices, or contract administration procedures to improve effectiveness and efficiency of your construction program management?

#### State Agency Management, Oversight, and Direction

1. Which of the State Agency units has overall responsibility for management and oversight of the Agency's Quality Assurance (QA) Program?
2. Does the State have a person (or persons) dedicated to quality management (such as "Quality Assurance Engineer" or similar title), or is quality management a collateral duty?
3. What is the organizational relationship between the district/project construction personnel and the central construction office?
4. Regarding field 'oversight', how often does the Senior Inspector / Resident Engineer / EIC visit the work operation(s) during the day. What guidance is typically provided?
5. What is the relation between the construction branch and the materials branch concerning quality assurance?
6. What type of oversight of field operations does the State have? (i.e., does the State do any type of process reviews for independent oversight? Has the Division Office or State done any process reviews? Does the State's current practices take into account the recommendations raised during past process reviews?
7. Is construction quality an emphasis area at the staff level? How is it emphasized?
8. Has the State or the local FHWA Division office conducted a risk assessment in the Construction Quality Assurance area? If so, what was the score? How did this rank with other activities?
9. Did the State/Division develop risk statements in the Quality Assurance area? If so, what are they?
10. Do project personnel feel that additional construction & materials staff are needed on this Project to ...?
11. In general, do the State project personnel feel that your staff are adequately trained and of sufficient quantity for contract administration and inspection activities and for ensuring quality of construction?
12. Explain any concerns with construction quality in your State.



## Project Performance

1. Does your State use performance measures/metrics to monitor the quality of construction work?
2. If so what types of measures?
  - a. General project related measures (project cost, %CE, contract growth, etc.)
  - b. Product/Project specific measures
3. Explain any concerns with the performance of construction projects in your State.
4. Have there been any recent changes or improvements that have impacted construction quality or product performance?
5. If you have premature failures, is there a formal means to address these failures and prevent their reoccurrence?
6. How does the interaction take place between the State and your local Division Office in the area of development and continuous reevaluation and refinement of construction quality initiatives?

## Contractor Quality Control (QC) – Process Control

1. Are formal QC Plans required? If they are required, what items are they applied to and how are they used? Are they approved by the State?
2. Does the State require other contractor QC submittals during project construction (e.g. control charts, etc.)? If so, how are these being used to monitor construction activity?
3. How are the contractor's QC activities verified? Are reviews and supervision of such work documented?
4. Do you require any type of quality management system from your contractors?
5. Does the State program identify specific attributes that need to be inspected by the contractor to insure quality of the finished product? (i.e. equipment, materials, environmental conditions, product workmanship)
6. Are contractor QC Reports submitted to the Agency in a timely manner? (source)
7. Does the QA Program require the following Contractor QC records to be maintained? (Describe requirements and provide reference in QA Program document(s))
8. Have there been issues/problems with QC? If yes, please describe.

## Inspection and Workmanship

1. What steps does the State take to ensure you are getting quality workmanship?
2. Does the State use quantified methods for measuring workmanship?
3. How does the Division Office determine that projects are adequately inspected?

- 
4. How do you determine levels of inspection needed? (by types of work, complexity of the work, dollar size of the project, etc.)
  5. Do the inspectors have proper equipment for quality assurance purposes (plans, proposal special notes, specification page, carpenter's ruler, thermometers, inspection forms / notebook, etc.). Assess whether items such as high-low thermometers, tachometers, scratch-boards, and straightedges have been supplied by the contractor, or slump cones, air meters, temperature gauges, sieves and sand cones by State DOT/consultant, when needed for quality assurance.
  6. Does the State program identify specific attributes that need to be inspected by the agency to insure quality of the finished product? (i.e. equipment, materials, environmental conditions, product workmanship)
  7. What types of inspection activities does your agency undertake for the following project produced materials?
    - a. Soils (e.g. Subgrade, Earthwork) \_\_\_\_\_
    - b. Aggregates (e.g. Subbase, Base, Backfill) \_\_\_\_\_
    - c. Hot-Mix Asphalt (HMA) \_\_\_\_\_
    - d. Portland Cement Concrete (PCC) \_\_\_\_\_
    - e. Geotechnical Items (e.g. Drilled Shafts) \_\_\_\_\_
    - f. Field Applied Structural Coatings \_\_\_\_\_
    - g. Pavement Markings \_\_\_\_\_

#### Consultant Inspection

1. What types of training programs does your agency use to training their construction personnel.
2. What types of training/knowledge are required of you consultant staff involved in construction activities?
3. What types of contractor personnel qualifications are required on your construction projects?

#### Personnel Qualification/Certification

1. Describe how personnel are qualified/certified, as required by the 23 CFR 637?
2. Does the State have training/qualification programs for construction technicians? What specific areas are addressed?

#### Construction Management Systems and Project Documentation

1. Describe the usage of computers in the State DOT's construction program?
2. Does your agency use a Construction Management System for electronic storage of the information? If yes, are there requirements for Contractors to enter QC data into the computer database system?

- 
3. Are all Project Records (Diary, IDRs, Materials Test Reports, Ledger, etc.) completed daily and maintained up to date?
  4. How is source documentation managed?
  5. Discuss the steps taken by the inspector when the contractor is not complying with the specifications (generally). For failing test results, such as for concrete slump or air content, what process does the inspector follow before rejecting the material?
  6. Is there a process to document if a project deviates from approved procedures?
  7. Have there been any incidences of fraudulent activities involving construction quality issues? (Such as falsification of data or certifications, bribery, gratuities, etc)

### Policies and Procedures

1. How are the QA Program requirements documented? (Agency Construction Manual, Materials Manual, other documents, etc.)
2. What process does the State use to promulgate construction directives?
3. When was the last formal approval of the State quality assurance program? Is this program approved in whole or by parts?
4. What was the form of the approval? (written letter, verbal, other)
5. Is a review/approval of the program conducted by your local Division Office and if so what period is used?
6. Does the State periodically amend the Program? Explain the amendment approval process.
7. In terms of how it manages quality, how does the State differentiate between:
  - a. State Oversight and FHWA Oversight projects?
  - b. NHS and non-NHS projects?
  - c. Federal-aid and non-Federal-Aid projects?
  - d. State administered and LPA administered projects?

### Support and Improvements

1. In the quality management/quality assurance area, are FHWA's requirements clear to you? If not, provide examples needing clarification.
2. Are there any additional resources that would be beneficial?
  - a. Regulations?
  - b. Technical advisories, checklists, and/or guidance?

- 
- c. Training opportunities?
  - d. Computer programs or other tools to assist in evaluating the State's program?
  3. What are the biggest challenges facing your organization in maintaining/improving quality of your highway construction projects?
  4. Lessons learned on different projects (to make sure they are not making the same mistakes)
  5. What guidance does the State use for quality related issues? How is this guidance used?

### Construction Process Improvement

1. What processes does the State have in place to continually improve their construction operations?
2. What types of internal feedback are used for communicating construction issues. (ex. Strategic planning with Project Development, Maintenance, and other branches, etc.)
3. Does the State utilize constructability reviews, post construction reviews, environmental mitigation, etc. Are they formal processes?
4. Does the State use any internal mechanisms for independent oversight of construction (independent process reviews by state personnel, etc.)
5. What types of tools does the State use for improving construction processes (CPM's, SiteManager, etc.)
6. Is the State receptive to the use of performance measures (in lieu of method specifications) and performance contracting for construction and maintenance?
7. How is Industry involved in specification development and other construction improvements?
8. What role does the Division Office play in the State's construction program?
9. Are innovative ideas, technologies, practices employed in the State? (ACTT and HfL uses?)
10. Does your state undertake Post Construction Evaluations or have a Construction Lessons Learned process? (A Lessons Learned process could for example be used for recognizing and retaining lessons learned and benefits of any process where experience plays an important role. Some states have developed Internet-based lessons learned systems that are an integral piece of their project delivery process. These systems are databases giving users the ability to store, search, and retrieve information quickly and easily. In addition, lesson information is tracked and evaluated for identification and possible implementation of best practices. The database used to collect lesson information is accessible from the Internet. All users can submit and browse lessons.) Provide a link if it is available.
  - a. How do you share lessons learned?
  - b. Is the information frequently accessed by users?
  - c. What benefits have occurred?
  - d. What problems have occurred?



## Group F - General Policies and Procedures and Innovative Finance Group

1. Who is your organizational champion for TAM?
2. What other roles and responsibilities have been defined for implementing TAM?
3. Are your agency's goals and objectives comprehensive, integrated with other statewide policy objectives, and supported by quantitative and measurable performance measures or criteria?
4. Are the principles of good asset management articulated in an agency business plan and clearly recognized throughout the agency as the driving force for resource allocation and utilization?
5. Do goals and objectives embody the perspective of lifecycle economic analyses of asset performance and cost, and encourage strategies with long-term benefits?
6. Do policy goals and objectives encourage a business-model, customer-oriented approach to asset management?
7. Is reliable information on asset condition and public perceptions thereof is accounted for in updating policy objectives?
8. Is system performance measured against policy goals and objectives?
9. Are political decisions on resource allocation among modes or programs strongly influenced by objective information on expected performance?
10. Does the agency make resource allocation decisions among programs and across geographic regions/districts based on expected performance rather than by historical splits or formulas that do not correlate with an objective indication of system condition?
11. Does the agency actively engage with political leaders and other policy-makers to define expectations of system performance, frame alternative approaches, and outline the consequences of decisions and courses of action relative to these expectations?
12. How do you manage corporate knowledge?
13. What specific programs are for training staff on TAM?
14. What is the process for setting and communicating organizational goals and objectives?
15. What do you believe are the challenges to implementing asset management in your organization? How can they be overcome?
16. Describe your process for capturing inflation pressures in your budget process.
17. Describe how you capture uncertainty/risks in your budgeting process.

### Maintenance Management Systems (MMS):

1. What is your department's policy on the frequency of road inspections to verify current pavement conditions? i.e., at least once a year.

- 
2. What about bridges/structures inspection?
  3. Are you using Maintenance Management Systems to manage your maintenance programs? If yes, which software?
  4. Was the software purchased or developed in house?
  5. What specific features of the MMS are being used to establish level of service desired by the agency for each highway asset? (performance targets or targeted level of service)

*Note: Performance targets can be established using a number of different approaches including customer surveys, or focus groups, historical trends, or input from experienced maintenance personnel.*

6. Are your data for MMS being collected by in-house forces, or contract forces? Methods (manual or automated or both)?
7. Does your MMS have the capabilities to interface with your existing systems?

### **Equipment Maintenance:**

1. Are you using a management system to support your equipment maintenance program?
2. If yes, how long ago have you been using it? Developed in house or purchased?
3. If no, do you think there is a need to develop one, not only for your agency but for others too?
4. At the recent TRB meeting, one of the equipment technical committees brought up the discussions about the possible introduction of life cycle cost analyses (LCCA) in the equipment fleet management. Would you be interested in learning the LCCA applications?



**For More Information, Contact:**

**Victor Winters, P.E.**

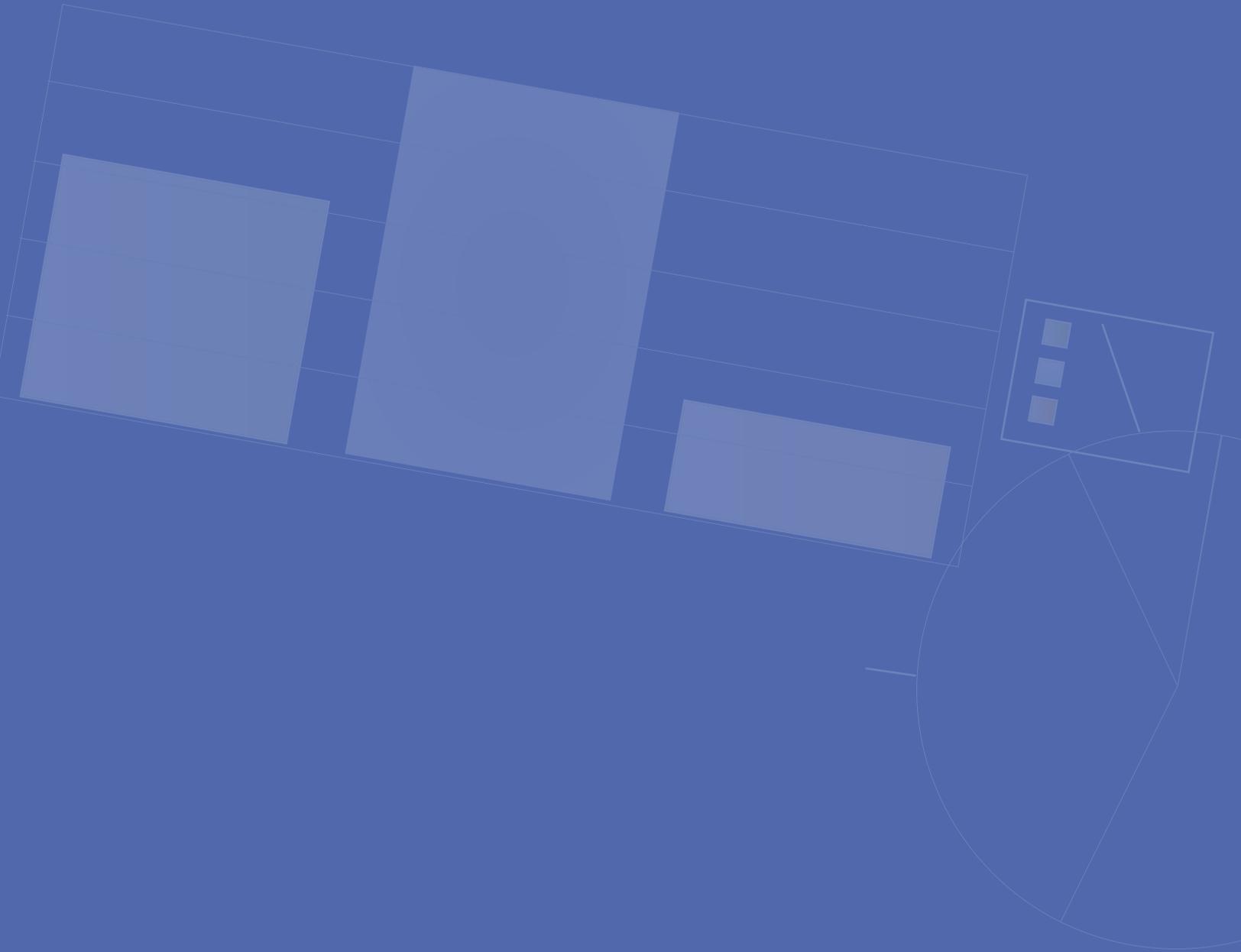
Transportation Asset Management Engineer  
Statewide Design & Engineering Services  
Alaska Department of Transportation & Public Facilities  
Telephone: 907-465-6954  
Email: [Vic.Winters@alaska.gov](mailto:Vic.Winters@alaska.gov)

**Francine Shaw Whitson**

Transportation Manager  
Office of Asset Management  
Federal Highway Administration  
Telephone: (202) 366-8028  
Email: [fwhitson@dot.gov](mailto:fwhitson@dot.gov)







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**Federal Highway  
Administration**