Transportation Commission of Colorado
Transportation Asset Management Committee
Meeting Agenda
Wednesday, May 15, 2013
4201 East Arkansas Avenue

Scott Richrath, Branch Manager
Transportation Performance Branch

Les Gruen
District 9, Colorado Springs

Kathy Connell
District 6, Steamboat Springs

Heather Barry
District 4, Westminster

Tim Harris
Chief Engineer

Debra Perkins-Smith, Director
Division of Transportation Development

All commissioners are invited to attend this Committee meeting.

1. **Report Out from Commissioner Gruen – 5 minutes**
2. **Approve February 20, 2013 Minutes – Commissioner Gruen**
3. **Surface Treatment List and Program – Tim Harris**
4. **Asset Management Updates – Scott Richrath**
    - **Risk-Based Asset Management Plan**
    - **Multi-Asset Management System Phase III**
    - **Policy Directive 14 Asset Management Goals and Targets**
    - **Asset Management Policy and/or Procedural Directive**
    - **Drivability Life**
    - **NHI Workshops**
    - **Roadway Surface – Surface Treatment**
    - **Fleet Management**

THE AGENDA MAY BE ALTERED AT THE CHAIR'S DISCRETION

ASSET MANAGEMENT COMMITTEE
DRAFT MINUTES

Date: February 20, 2013

Committee Members Attending: Commissioner Gruen, Commissioner Connell, Commissioner Barry

Others Attending: Commissioner Reiff, Commissioner Peterson, Commissioner Gilliland, Debra Perkins-Smith, Tim Harris, Scott Richrath, JoAnn Mattson, Scott McDaniel, Tony DeVito, Dave Wieder, Bill Schiebel, Ben Stein, Rich Sembrat, Roy Smith, Mark Nord, David Fox, Marcella Broussard, Ty Ortiz, Steve Rudy (DRCOG), Randy Jensen (FHWA), Vince Rogalski (STAC)

Minutes:

- Opening Discussion:

  Commissioner Gruen welcomed attendees to the Asset Management Committee meeting. He noted the memo he wrote to Scott Richrath thanking staff for their hard work, and he asked staff to take a moment and reflect on how asset management can assist with doing the job more effectively. Dave Wieder shared his appreciation for the advances in the fleet equipment management system. Tim Harris noted that asset management has helped to break down the cylinders of excellence at CDOT, and stated that asset management is becoming a way of life and not just part of the setting the FY14 budget.

  Commissioner Gruen thanked both for their comments and said that asset management is about getting the most for our dollars. The key now that we have started to use asset management is to now link it to project selection. Commissioner Connell noted that it's important to be able to show measureable change. Commissioner Gruen stated that although this is the last meeting of the committee for a while, staff must document the process and link asset management to project selection. Debra Perkins-Smith added that asset management is good business sense, and that as the work has been done a 'parking lot' of improvements to the analysis has been identified, so this work will continue to improve going forward.

  Commissioner Reiff requested a report back to the Commission on the linkages between asset management and project selection, to provide context to the decisions the Commissioners make, and a link between policy and outcomes. Commissioner Gilliland stated that the work done so far is valuable and we need to keep going. The work supports the hard decisions the Commission needs to make. Commissioner Connell noted that work should not stop because the committee is not meeting monthly, and suggested that the committee meet quarterly. Commissioner Peterson said that as chair of the Statewide Plan Committee the work done by the Asset Management committee has been invaluable.

  Scott Richrath shared that staff's work on asset management will continue for several reasons, including the MAP-21 requirement to develop a risk-based asset management plan. Staff is committed to having a strategy for developing the asset management plan in place by June 30, and will bring a draft of the strategy to the Asset Management committee at the next committee meeting, currently scheduled for May.

- Presentation:

  Scott R. presented staff's recommendation on the distribution of RAMP Asset Management dollars for FY14 among the various asset groups, coming out of a January 2nd workshop led by Executive

Director Hunt. Staff determined during the workshop which programs were eligible for RAMP funding, and then completed a few rounds of the Delphi technique to come to consensus. Scott R. reviewed the surface treatment, bridge, ITS and fleet equipment performance slides showing expected performance with and without RAMP funding. He then provided an overview of culverts, tunnels, rockfall mitigation and real estate (buildings), and Committee members were able to ask questions of the asset managers to clarify the benefits of additional funding.

Commissioner Gruen noted that when the Asset Management committee convened last fall buildings were considered and determined to be too much to take on initially, but that we need to get our arms around real estate next year. Commissioner Reiff noted that in government, buildings are not part of the mission and do not receive a lot of attention.

- Delphi Chart:

  This chart shows the staff recommendations from the January 2nd workshop:

	FY14 RAMP = $135 Million			FY14 RAMP = $160 Million		
Asset:	FY14 Budget	FY14 RAMP	FY14 Budget + RAMP	FY14 Budget	FY14 RAMP	FY14 Budget + RAMP
Surface Treatment	$150.6	$73.1	**$223.7**	$150.6	$88.2	**$238.8**
Structures						
Bridge & BE	$140.6	$29.0	**$169.6**	$140.6	$33.3	**$173.9**
Tunnels	$0.0	$6.6	**$6.6**	$0.0	$7.4	**$7.4**
Culverts	$5.6	$5.3	**$10.9**	$5.6	$5.9	**$11.5**
Walls	*$0.5 incl. in Brdg*	*$0.0*	***$0.0***	*$0.5 incl. in Brdg*	*$0.0*	***$0.0***
MLOS	$249.0	$0.0	**$249.0**	$249.0	$0.0	**$249.0**
Fleet	$14.1	$5.6	**$19.7**	$14.1	$6.8	**$20.9**
ITS (excludes new capital)	$11.2	$8.7	**$19.9**	$11.2	$10.3	**$21.5**
Rockfall	$5.2	$3.0	**$8.2**	$5.2	$3.8	**$9.0**
Buildings	$6.9	$3.8	**$10.7**	$6.9	$4.4	**$11.3**
Total	**$583.2**	**$135.0**	**$718.2**	**$583.2**	**$159.9**	**$743.1**

- Next meeting:

  Asset Management Committee is scheduled to next reconvene in May, 2013.

MEMORANDUM

DEPARTMENT OF TRANSPORTATION

4201 East Arkansas Avenue
Denver, Colorado 80222

TO: Colorado Transportation Commission

FROM: Scott Richrath, Transportation Performance Branch Manager

SUBJECT: May Asset Management Committee Meeting

DATE: May 15, 2013

Purpose

This memorandum summarizes the discussion planned for the May meeting of the Colorado Transportation Commission Asset Management Committee. There are four attachments in support of this meeting:

(1) the minutes from the February Committee meeting, and
(2) Surface Treatment Program, and
(3) CDOT Risk-Based Asset Management Plan (RB AMP) Development Strategy, and
(4) Asset Management Updates.

Action Requested

During the Committee meeting, staff will ask for input on the (attached) CDOT Risk-Based Asset Management Plan (RB AMP) Development Strategy document. The Division of Transportation Development is required to develop this strategy by June 30, 2013 as an FY13 CDOT Top Priority. If Commissioners wish to provide input after the May Committee meeting please send comments to Scott Richrath at Scott.Richrath@state.co.us by May 31, 2013.

The Asset Management Committee is asked to provide input to the Statewide Planning Committee on targets for three categories: pavement, bridge and maintenance levels of service. The Statewide Planning Committee is scheduled to meet the afternoon of May 15.

Background

The Transportation Commission Asset Management Committee held its first meeting in September and over the next several months developed recommendations to the Transportation Commission for the Fiscal Year (FY) 2014 budget that starts on July 1, 2013. It also developed funding allocations for FY14's Responsible Acceleration of Maintenance and Partnerships Program 1. How financial resources are allocated to the transportation assets has been based on direction from the Transportation Commission in the form of the goals and objectives specified in Policy Directive 14, currently under discussion in conjunction with the Statewide Plan and MAP-21.

Surface Treatment List and Program

As requested at the April Transportation Commission meeting, the surface treatment projects for FY 14 were reviewed and revised to be consistent with Commission direction. The statewide surface treatment projects for FY14, which include both baseline and RAMP projects, is attached and presented with information on the surface treatment type. For low volume roads, information on the justification for the type of treatment is also attached.

CDOT Risk-Based Asset Management Plan Development Strategy

MAP-21 requires all state DOTs to develop a risk-based asset management plan by April 1, 2015. Given the emphasis on asset management at CDOT staff has contracted with Cambridge Systematics and Redd Engineering to develop its initial plan by December 15, 2013, and make modifications after FHWA rules are promulgated. Cambridge Systematics is also FHWA's consultant working with three DOTs (Louisiana, Minnesota, New York) to develop their initial plans and provide guidance to other state DOTs. CDOT's plan will benefit from the work with these other states.

The RB AMP Development Strategy is included in this packet for Committee review. This document describes the content and schedule for the plan that staff and the consultants are developing over the next several months, and presenting to the Committee in December. If Commissioners wish to provide input after the May Committee meeting please send comments to Scott Richrath at Scott.Richrath@state.co.us by May 31, 2013.

The Asset Management Updates attachment includes some prototypes on how to quantify risk at CDOT.

Multi-Asset Management System

Staff uses the Multi-Asset Management System (MAMS) to provide the Asset Management Committee with investment scenarios. MAMS phases I and II incorporated data from pavement, bridge, maintenance levels of service (MLOS), fleet equipment and intelligent transportation systems (ITS).

Phase III will begin to integrate buildings, tunnels, culverts and rockfall mitigation. Staff will also make several enhancements to existing asset analysis including net present value (NPV) assessment for certain asset categories. The phase III project will kickoff May 14, 2013 and conclude March, 2014.

Asset Management in CDOT Policies

Staff is working with the Transportation Commission Statewide Planning Committee to revise Policy Directive 14 (PD14). PD14 will highlight three asset management categories: bridge, pavement, and MLOS. The Asset Management Committee is asked to provide input to the Statewide Planning Committee on targets for those three categories. The Statewide Planning Committee is scheduled to meet the afternoon of May 15.

Following a National Highway Institute workshop and in conversations with Senior Management, asset management staff is working with Government Relations staff to explore the benefits of policy and procedural directives specific to asset management. An excerpt from New Jersey's policy directive is provided in the Asset Management Updates attachment.

Other Asset Management Updates

Staff continues to move forward on asset management in a number of areas, highlighted in the Asset Management Updates attachment. These areas are:

- Drivability Life for Pavement
- National Highway Institute asset management workshops
- Roadway Surface – Surface Treatment project integration
- Fleet Management

The Transportation Commission Asset Management Committee invites all Commissioners to attend.

Statewide Surface Treatment Projects for FY2014 - All baseline and RAMP projects

Shading used to show highway segments grouped into one project
Shading used to show highways lost in the redistricting effort

5/2/2013

FY	Region	Highway	BMP	EMP	Description	Estimate	Treatment Type	Tier
2014	2	025A	50.0	59.0	25C INTERCHANGE TO JCT SH69 WALSENBURG NORTH	$12,257,499	2.5" mill and asphalt Overlay	Interstate
2014	***2***	***025A***	***109.0***	***119.3***	***Pinon North***	***$15,174,000***	***FY14 RAMP - 2.5" mill and aphalt overlay***	***Interstate***
2014	***3***	***070A***	***16.0***	***37.0***	***Loma to Clifton***	***$27,000,000***	***FY14 RAMP - 3" asphalt overlay***	***Interstate***
2014	***3***	***070A***	***86.5***	***97.0***	***I-70 Rifle Slab Replacement***	***$4,000,000***	***FY14 RAMP - concrete slab replacement***	***Interstate***
2014	3	070A	147.0	147.0	I-70 Eagle Interchange Improvements - Add to RPP project for paving only	$1,000,000	Add to RPP project for paving only	Interstate
2014	3	070A	178.7	185.0	I-70 West Vail Pass	$2,200,000	2" asphalt mill and asphalt overlay of east-bound drive lane only - 14 ft wide	Interstate
2014	***1***	***070A***	***203.9***	***213.5***	***I-70 EB Truck Lane***	***$2,000,000***	***FY 14 RAMP - 2" mill and asphalt overlay, right east-bound lane only***	***Interstate***
2014	1	070A	213.5	217.0	EJMT Resurfacing	$2,500,000	Mill and stone matrix asphalt overlay	Interstate
2014	4	076A	67.0	77.0	Slab replacements	$2,400,000	Concrete slab replacements, Advertised Accelerated project.	Interstate
2014	***4***	***076A***	***149.0***	***165.5***	***NE COLO - Next I-76 Segment***	***$25,000,000***	***RAMP FUNDING FY14 - Major rehab not reconstruction***	***Interstate***
					Interstate Baseline	***$20,357,499***		
					Interstate RAMP	***$73,174,000***		
2014	3	040A	129.9	131.7	US 40 Steamboat East and West		2" mill and and asphalt overlay (in town)	NHS - High Volume
2014	3	040A	132.6	139.1		$6,000,000	2" asphalt overlay with spot leveling east of town	NHS - High Volume
2014	6	040C	296.3	297.5	Colfax Ave., Federal to Speer	$2,000,000	2" mill and asphalt overlay	NHS - High Volume
2014	3	050A	42.2	46.3	US 50 Whitewater East	$2,600,000	1.5" asphalt overlay, paving railroad approaches on SH 141	NHS - High Volume
2014	2	050A	278.0	281.0	1ST ST TO Dozier Ave	$3,696,066	2.5" mill and modified asphalt overlay	NHS - High Volume
2014	2	050B	377.4	381.2	THROUGH LA JUNTA	$5,211,329	2.5" mill and modified asphalt overlay	NHS - High Volume
2014	6	088B	16.8	21.7	Arapahoe Rd., I-25 to Parker Rd	$9,000,000	2" mill and 2.5" stone matrix asphalt overlay	NHS - High Volume
2014	2	096A	55.4	59.0	ARKANSAS RIVER TO US 50B THROUGH PUEBLO	$5,493,784	4" mill and 2" asphalt overlay plus 2" modified asphalt top surface	NHS - High Volume
2014	4	119B	44.2	44.6	Partner w/ Boulder-East of 36(Iris)	$400,000	Local Agency project, partnership to perform resurfacing on our roadway	NHS - High Volume
2014	4	119C	59.7	63.6	Boulder/Weld CL East	$12,000,000	**Full Depth Reclamation and 9.5" Concrete** or 6" Cold-In-Place Recycle with 3" Asphalt Overlay (CE Determination)	NHS - High Volume
2014	6	121A	3.9	5.3	Wadsworth Blvd., Parkhill to Florida	$9,500,000	2" mill and 2 - 2.5" aphalt overlay	NHS - High Volume
2014	5	145A	0.0	9.3	SH 145 Cortez north to Dolores River Bridge	$8,500,000	Reconstruction south end and 1" asphalt leveling course plus 2" asphalt overlay north end	NHS - High Volume
2014	***5***	***160A***	***18.3***	***30.0***	***US 160/US 491 New Mexico to Towaoc (See 491A)***	***$16,708,000***	***RAMP FUNDING FY14 - Full depth Reclamation with asphalt overlay***	***NHS - High Volume***
2014	5	160A	71.0	81.3	US 160 Hesperus to Durango (west of Wildcat Canyon)	$9,000,000	Determined after scoping	NHS - High Volume
2014	4	287C	339.1	342.0	Harmony South	$4,200,000	3" mill and asphalt overlay	NHS - High Volume
2014	4	287C	347.7	348.3	Conifer to Willox	$1,000,000	Composite Asphalt over Concrete	NHS - High Volume
					NHS - High Volume Baseline	***$78,601,179***		
					NHS - High Volume RAMP	***$16,708,000***	***(see 491A below also under this project: $19.708M RAMP total)***	
2014	5	160A	273.5	278.6	US 160 La Veta Pass	$6,500,000	Leveling course and overlay (scoping underway)	NHS - Low Volume
2014	5	285A	5.2	6.3	US 285 in Antonito Reconstruction	$5,000,000	Concrete reconstruction	NHS - Low Volume
2014	5	285A	6.3	11.0	US 285 Antonito North	$4,500,000	Leveling course and overlay (scoping underway)	NHS - Low Volume
2014	***5***	***491A***	***0.0***	***6.4***	***US 160/US 491 New Mexico to Towaoc (See 160A)***	***$3,000,000***	***RAMP FUNDING FY14 - 1" Leveling course 2" overlay***	***NHS - Low Volume***
					NHS - Low Volume Baseline	***$16,000,000***		
					NHS - Low Volume RAMP	***$3,000,000***	***(This segment constructed on same project with 160A above)***	
2014	3	006E	163.1	170.2	US 6 Edwards E & W	$3,500,000	1.5" overlay; mill and overlay where curb & gutter exist	Other - High Volume
2014	4	014C	139.5	147.3	East of I-25 to WCR 23	$12,500,000	6" Cold-in-Place Recycle with 4.5" asphalt overlay or 2" Mill and 2.5" asphalt overlay (CE Determination)	Other - High Volume
2014	1	119A	5.7	6.3	Black Hawk	$1,000,000	asphalt overlay	Other - High Volume
2014	3	133A	66.0	68.2	SH 133 Carbondale: Added to RPP project for minor ml paving only	$750,000	added to RPP project for minor mainline paving only	Other - High Volume
2014	4	085L	279.8	301.0	Ault to Carr (Additional $4 million of FASTER funds for shoulders)	$9,500,000	Full Depth Reclamation with 3.25" asphalt overlay or 5" asphalt overlay (CE Determination)	Other - High Volume
					Other - High Volume Baseline	***$27,250,000***		
					Other - High Volume RAMP	***$0***		
2014	3	013A	79.0	88.6	SH 13 South of Craig	$7,400,000	2" mill and asphalt overlay	Other - High/Low Volume
2014	1	024A	253.6	263.0	Wilkerson Pass-East	$3,500,000	Thin asphalt overlay	Other - Low Volume
2014	1	036D	118.4	120.0	Jct SH 36 & Cabin Creek	$500,000	Overlay and patching as needed	Other - Low Volume
2014	3	064A	28.0	38.0	SH 64 East of Rangely	$4,200,000	1.5" asphalt overlay	Other - Low Volume
2014	1	103A	0.0	11.5	Jct I-70 - Jct SH 5	$5,000,000	Minimum of Mill and Asphalt Overlay	Other - High/Low Volume
2014	3	340A	1.0	7.2	SH 340 King's View Estates - Add to intersection improvements project	$1,250,000	Chip seal with machine patching.	Other - Low Volume
2014	5	SH62	0.0	10.0	SH 62 MP 0.0 to 10.0	$750,000	Preventative Maintenance - Chip Seal	Other - Low Volume
					Other - Low Volume Baseline	***$22,600,000***		
					Other - Low Volume RAMP	***$0***		
2014								Other - Very Low Volume
					Other - Low Volume Baseline	***$0***		
					Other - Low Volume RAMP	***$0***		
2014	3	70 Fr N	172.8	176.0	Vail Interstate Frontage Roads		1.5" asphalt overlay; mill and asphalt overlay at curb & gutters.	
2014	3	70 Fr S	172.2	180.0	Vail Interstate Frontage Roads	$4,600,000	1.5" asphalt overlay; mill and asphalt overlay at curb & gutters.	
					Interstate Frontage Road Baseline	***$4,600,000***		
					Interstate Frontage Road RAMP	***$0***		

FY 2014	**Statewide Baseline**	**$169,408,678**
	Statewide RAMP	**$92,882,000**
		$262,290,678

FY14 Surface Treatment Distribution (Base + RAMP) By

Statewide Classification Statistics			Treatment by Miles		
Highway Classification Subsystem	Total System CL Miles Statewide	Percent of Total System	CL Miles to be Treated in FY14	Percent of Total Miles to be Treated	Percent of Subsytem Treated with FY '14 Funds
Interstate	951	10.4%	90.2	34.1%	9.5%
NHS	2483	27.3%	86.6	32.7%	3.5%
Other	5671	62.3%	87.7	33.2%	1.5%
Statewide	**9105**	**100%**	**264.4**	**100.0%**	**2.9%**

* Interstate treatment per mile is less than NHS treatment per mile primarily due to 3 Interstate projects (rows 10, 11, 13 on attached

FY14 Surface Treatment Distribution (Base + F

Statewide Classification Statistics			Treatment by Miles		
Highway Classification	Total System CL Miles Statewide	Percent of Total System	CL Miles to be Treated in FY14	Percent of Total Miles to be Treated	Percent of Subsytem Treated with FY '14 Funds
Interstate	951	10.4%	90.2	34.1%	9.5%
High Volume	2453	26.9%	108.2	40.9%	4.4%
Low Volume	2895	31.8%	66.0	25.0%	2.3%
Very Low Volume	2806	30.8%	0.0	0.0%	0.0%
Statewide	**9105**	**100.0%**	**264.4**	**100.0%**	**2.9%**

Predicted Condition Impacts from FY14 Surface Treatment Projects and FY14 RA

	2012 (Current)		2013 Deterioration (No Projects)		2013 Predicted with Project Impacts		Commission Goals	
	Good/Fair	Poor	Good/Fair	Poor	Good/Fair	Poor	Good/Fair	Poor
Statewide	47%	53%	43%	57%	47%	53%	60%	40%
Interstate	59%	40%	53%	47%	62%	38%	85%	15%
NHS	65%	35%	60%	40%	64%	36%	70%	30%
Other	34%	66%	31%	69%	33%	67%	55%	45%

MP Projects

FY14 Surface Treatment Plan
Low Volume Project Justifications to the Chief Engineer

(Based on Commission direction in April, current plan reduced low volume work from 31.1% to 15.9%.)

Region 1

State Highway 103 (MP 0.0 to MP 11.5) – this low volume project is requested for the FY 14 plan with the following justification:

1. This project will fill in complete work on the segment between I-70 in Idaho Springs and the current ongoing SH 103 construction project between MP 13.35 to MP 22.5. Targeted milling and HMA overlay are proposed.
2. SH103 projects have been coordinated with the County and their road reconstruction beyond MP 22.5 including widening for improved bicycle use.
3. This section of SH 103 has a RSL = 0 and an age = 32
4. SH 103 is actually high volume (> 6200 AADT) at the beginning MP 0.0 in Idaho Springs for a short distance.
5. This section of SH 103 is the gateway to the Mt. Evans summit road (SH 5) from I-70. Mt. Evans is a popular tourist destination producing high peak traffic volumes in months when the Mt. Evans Road is open to the public.

U.S. Highway 36 (MP 118.4 to MP 120.0) – this low volume project is requested for the FY 14 plan with the following justification:

1. This 1.6-mile segment of U.S. 36 is east of Byers and is immediately west of High Plains Raceway where associated RV and truck volumes are anticipated to continue to grow. Targeted patching and HMA overlay are proposed.
2. The proposed work section last received a single 2-inch overlay in 1971 (age = 42 years).
3. With significant pavement fatigue cracking (cracking index of 58), this pavement is in the worst 5% of fatigued pavements in the network.
4. Current condition is Poor-0 (RSL = 0). Six miles of Good condition roadway (RSL = 14) lies adjacent to the west, and ten miles of Good condition roadway (RSL = 14) lies adjacent to the east. The requested project would make minor investment to bring this short severely deteriorated segment into safe, similar condition with adjacent highway segments.

U.S. Highway 24 (MP 253.6 to MP 263.0) – this low volume project is requested for the FY 14 plan with the following justification:

1. This project pavement is 15 years old with current RSL condition of Poor. It is surrounded by condition-Fair pavements. Thin maintenance HMA overlay (less than 1.5") is proposed.
2. With significant pavement fatigue cracking (cracking index of 63), this pavement is in the worst 6% of fatigued pavements in the network.
3. With low-cost thin maintenance overlay, the pavement deterioration will be slowed and drivable surface condition prolonged in this cold, wet, high elevation (9,500') location. Surface seal applications are much less successful under these climate and snow removal conditions.

Region 3

State Highway 13 (MP 79.0 to MP 88.6) – this low volume project is requested for the FY 14 plan with the following justification:

1. This pavement dates from the 1970s and 1980s (age 30+years) and is full-depth asphalt constructed on clay soils. Transverse cracks at 30' intervals have deteriorated significantly resulting large crack openings and pavement depressions. Pavement condition deterioration continues to accelerate due to water infiltration into very weak clay soils below the pavement and associated traffic damage to the surface pavement.
2. 3% of this project's length has high traffic volume above 4,000 ADT.
3. Ride quality has deteriorated to IRI values of 300 inches/mile in locations. Average ride condition puts this highway in the worst 11% for IRI in the state.
4. Region recommends 2" HMA mill and fill for 10-year pavement design under current design manual using life cycle cost analysis for final treatment selection. Proposed design manual and pavement management system changes may allow for crack sealing and thin surface sealing under revised statewide guidelines. Final scope of this project may prescribe thinner treatment options per pending guidelines.

State Highway 64 (MP 28.0 to MP 38.0) – this low volume project is requested for the FY 14 plan with the following justification:

1. This pavement was constructed in the 1950s with overlays placed in 1967 and in 1994 (age 20 years). Last treatment was a chip seal in 2000. Current pavement condition classified as Poor-0.
2. Significant heavy truck traffic and age have resulted in significant consistent rutting and fatigue cracking. Ruts between 0.5 and 1.0 inch exist throughout the project. Transverse cracking on this roadway puts it into the worst 5% of the network for this type of distress.
3. Due to the locally severe rutting, truck traffic and load associated visual distress we do not recommend a chip seal at this time. We do recommend that an overlay be placed on the entire 10 miles in both directions. The overlay shall consist of a thin 1.5" of HMA SX (75) layer, placed over the existing asphalt, with binder type PG 58-28.
4. Small portions of the project may require full depth patching for existing areas of complete structural failure. See report: PC-18887_EastOfRangely_MatRec_04-30-2013.pdf

State Highway 340 (MP 1.0 to MP 7.2) – this low volume project is requested for the FY 14 plan with the following justification:

1. This project recommends a chip seal for this low volume pavement. Scope was revised to reduce cost from $3.3M HMA overlay in prior version of FY14 plan. Revised scope now calls for targeted machine patching followed by chip seal for $1.25M.
2. This project will coordinate construction with adjacent intersection project.
3. The project has fatigue cracking throughout with minimal rutting. Minor machine patching will repair worst small sections.

Region 5

State Highway 62 (MP 0.0 to MP 10.0) – this low volume project is requested for the FY 14 plan with the following justification:

1. This project recommends a chip seal for this low volume pavement.
2. Pavement distress levels are currently low and this low cost treatment is being applied in accordance with preventive maintenance principles to ensure for long term performance of the existing pavement structure.

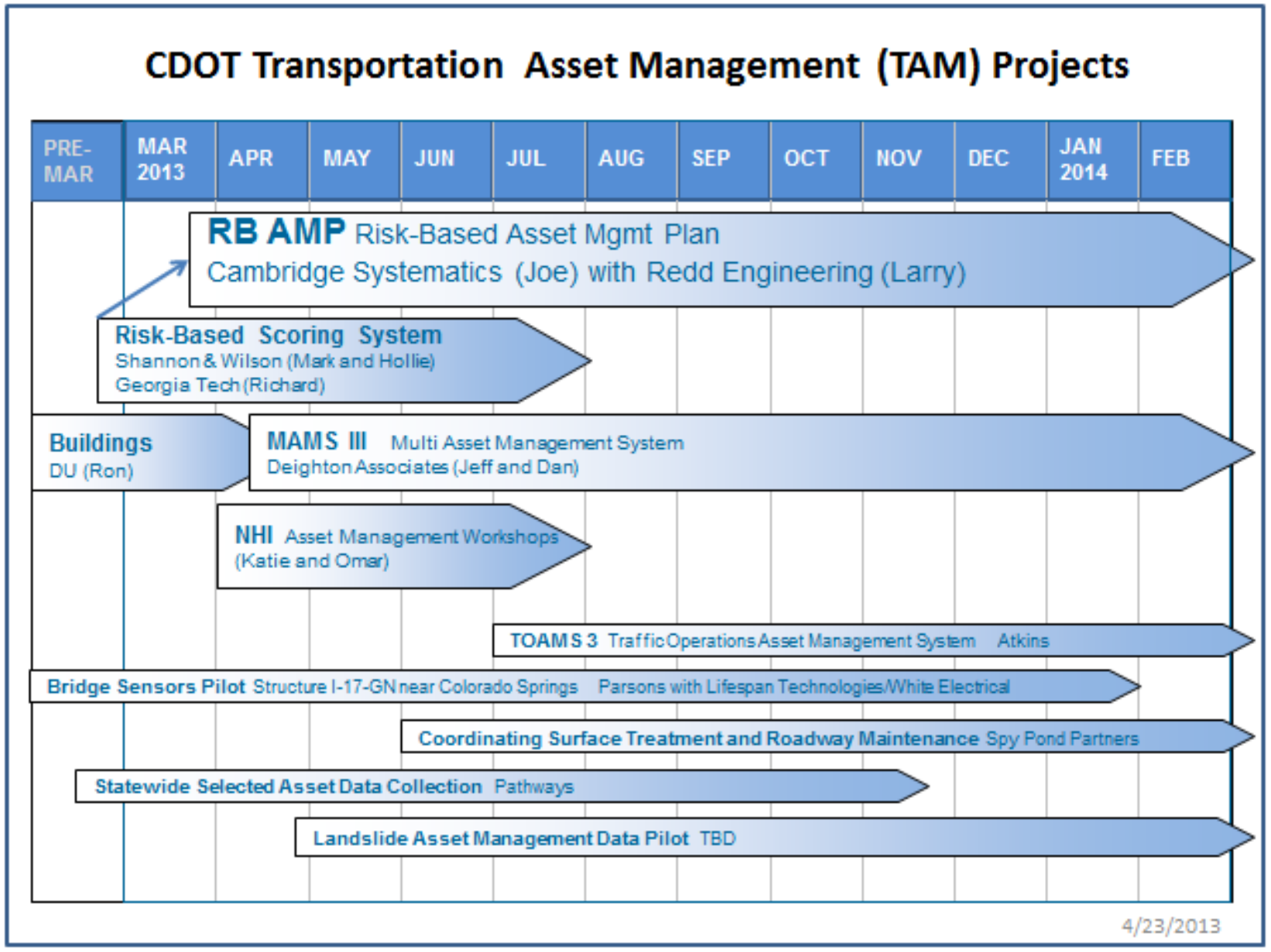
All National Highway System Projects – these low volume projects were requested for the FY 14 plan with the following justification:
CDOT has historically designed roadways on the National Highway System in accordance with the Federal-Aid Policy Guide and 23 CFR 626. A National Pavement Design Review was conducted by the FHWA and found that CDOT's established practices and procedures outlined in the Pavement Design Manual were acceptable. In 2008, research indicated that rehabilitated pavements were, on average, meeting their design life. With the growing importance of the NHS in MAP-21 programs and the increased national requirements for NHS condition reporting, CDOT intends to follow historic established design protocols until formal FHWA approval is given for the next version of CDOT's Pavement Design Manual (July 2013). At that time, full design criteria for new thin surface treatments and clear direction on the permitted use of those guidelines for NHS and Interstate pavements will be established.

Asset Management Updates

CDOT

May 15, 2013

Asset Management Overview



Risk-Based Asset Management

Risk Management: Defining Risk at CDOT

Comparative Risk Matrix

Likelihood		Consequence (Level/Descriptor)				
		1	2	3	4	5
Level	Descriptor	Negligible	Minor	Major	Critical	Catastrophic
1	Rare	1	2	3	4	5
2	Remote	2	4	6	8	10
3	Occasional	3	6	9	12	15
4	Probable	4	8	12	16	20
5	Frequent	5	10	15	20	25

Note: Draft, still in development

Risk-Based Asset Management

Risk Management: Defining Risk at CDOT

Consequence Terminology

Level	Descriptor	Consequence to				
		Public		Asset	Corridor / Region / Department	
		Safety	Conveyance		Financial Impact	Reputation Impact
1	Negligible	No safety hazard	Minimal delay	Minimal or cosmetic damage	Cost <$100K	None
2	Minor	Minimal safety hazard	Minor delay	Minor damage requiring repair	Cost $100K to $500K	None
3	Major	Potential minor Inuries	Major delay	Moderate damage requiring repair	Cost $500K to $2M	Minor
4	Critical	Potential major Injuries	Detour, moderate duration	Extensive damage requiring significant repair	Cost $1M to $10M	Moderate
5	Catastrophic	Potential fatalities and major Injuries	Detour, significant duration	Destroyed or large scale damage requiring	Cost > $10M	Severe

Likelihood Terminology

Level	Descriptor	Description	Nominal Annual Probability
1	Rare	Return period greater than 50 years (average of 50 years or more between events)	<2%
2	Remote	Return period approximately 20 to 50 years (average of 20 to 50 years between events)	2% to 5%
3	Occasional	Return period approximately 5 to 20 years (average of 5 to 20 years between events)	5% to 20%
4	Probable	Return period approximately 1 to 5 years (average of 1 to 5 years between events)	20% to 100%
5	Frequent	Return period less than or equal to 1 year (average of one to several events per year)	100%

Note: Draft, still in development

Multi Asset Management System

Schedule

Phase I: June-Sept 2010

Develop framework of budget scenario tool at CDOT, which became the Multi-Asset Management System (MAMS)

Phase II: July 2011 – Nov 2012

Incorporate Bridge, Pavement, MLOS, Fleet, ITS

Phase III: Kickoff May 14, 2013, runs until March, 2014

Incorporate Buildings, Tunnels, Culverts, Rockfall, and enhance analysis for current assets

Multi Asset Management System

Highlights

Pavement	Provide support for Drivability Life analysis
Bridge	Enhance to include individual structure analysis instead of overall deck area analysis
MLOS	Enhance to analyze to overall Average Grade analysis instead of MPA Grade Analysis
Fleet	Configure fleet NPV break-even analysis for large fleet equipment
ITS	Enhance to include provisions for system expansion
Buildings	Integrate CDOT's real property building assets
Tunnels	Integrate Colorado's 3 primary manned tunnels
Culverts	Integrate the 6,100 minor culverts and minor bridges
Rockfall	Develop a risk-based approach for modeling risk associated with rockfall

Asset Management in Draft PD14

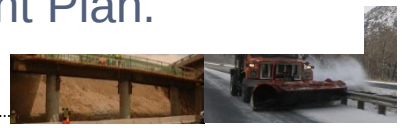
Bridge

MEASURES:

- Condition of on-system bridges.
- Condition of NHS on-system bridges.
- Condition of the total NHS bridges.
- Risk-Based Asset Management Plan Goals

OBJECTIVES:

- Maintain the percent of on-system total bridge deck area that is not structurally deficient at or above 90%.
- Maintain the percent of NHS on-system bridge total deck area that is not structurally deficient at or above 90%.
- Maintain the percent of NHS bridge total deck area that is not structurally deficient at or above 90%.
- Meet bridge goals in the Risk-Based Asset Management Plan.



Asset Management in Draft PD14

Highways

MEASURES:

- Pavement condition of the Interstate System.
- Pavement condition of the state highway NHS, excluding Interstates.
- Pavement condition on the total NHS (awaiting federal guidance).
- Pavement condition of state highway non-NHS roadways.
- Pavement condition of the state highway system.

OBJECTIVES:

- Maintain pavement condition level of ___ % Good and Fair Drivability Life for Interstates.
- Maintain pavement condition level of __% Good and Fair Drivability Life for state highway NHS, excluding Interstates.
- Maintain pavement condition level of___ % Good and Fair Drivability Life on the total NHS. (Placeholder; to be revised after federal guidance issued.)
- Maintain pavement condition level of __% Good and Fair Drivability Life for state highway non-NHS roadways.
- Maintain pavement condition level of __% Good and Fair Drivability Life for the state highway system.

Asset Management in Draft PD14

Maintenance

MEASURES:

- Level of Service (LOS) for snow and ice removal
- Overall Maintenance Level of Service (MLOS) for the state highway system

OBJECTIVES:

- Maintain an LOS B grade for snow and ice removal.
- Maintain an overall MLOS B- grade for the state highway system.

Asset Management Updates

Policy and Procedural Directives

Example: New Jersey DOT Asset Management Policy, 2008

SUBJECT:	Effective Date:	Commissioner Approval:
NJDOT Asset Management Policy	01-01-08	Sponsor Approval: Executive Director, Capital Investment Strategies Contact Telephone #: 609-530-5228

I. Purpose

The purpose of this policy is to adopt Transportation Asset Management as the official, institutional approach in managing infrastructure assets and making capital investment decisions at the New Jersey Department of Transportation (NJDOT).

This approach will serve to support and complement the 10 Year Capital Investment Strategy, the 10 Year Capital Transportation Improvement Program, the Annual Transportation Capital Program, and the Annual Study and Development Program.

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ormance Measures

Asset Management Updates

Drivability Life Analysis Update

Schedule:

- The mechanisms for drivability based condition assessment will be complete by May 15th.
- Tiered treatment type development will begin May 6th.
  e.g., system will direct chip seal and thin surfacing for lowest volume roadways
- Draft predictive analysis based upon DL and treatment tier priorities is scheduled for May 31st.
- Loading 2013 data and associated quality control efforts is scheduled for June and July
- Final 2013 condition maps and assessment reports in August.
- Full Drivability Life predictive analysis implemented in September.

Asset Management Updates

Drivability Life Analysis Update

- **Based upon the concept of Unacceptable Drivability**
  - Condition where vehicles must reduce speed to compensate for unsafe factors, navigate around potholes, or endure intolerably rough ride quality.
  - Not synonymous with “impassable”
- **Drivability Life is the number of years remaining before the *drivability* of a highway becomes *unacceptable*.**
- **Good/Fair/Poor definitions are as follows:**
  - **Good: >10 years Drivability Life**
  - **Fair: 6-10 years Drivability Life**
  - **Poor: <= 5 years Drivability Life**

Asset Management Updates

Drivability Life Analysis Update

- Still modifying the distress thresholds that define "Unacceptable Drivability." Currently finalizing the IRI (smoothness) thresholds.

2012 Good/Fair/Poor Distribution Based Upon Remaining Service Life

	GOOD	FAIR	POOR		RSL=0
Statewide	29%	18%	53%		34%
Interstate	36%	24%	40%		17%
NHS	41%	24%	35%		17%
Other	20%	14%	66%		49%

DRAFT 2012 Good/Fair/Poor Based Upon Drivability Life

	GOOD	FAIR	POOR		DL=0
Statewide	48%	34%	18%		4%
Interstate	46%	39%	15%		2%
NHS	53%	30%	17%		4%
Other	46%	35%	19%		4%

Note 1 : These condition results are preliminary based on system work to date.

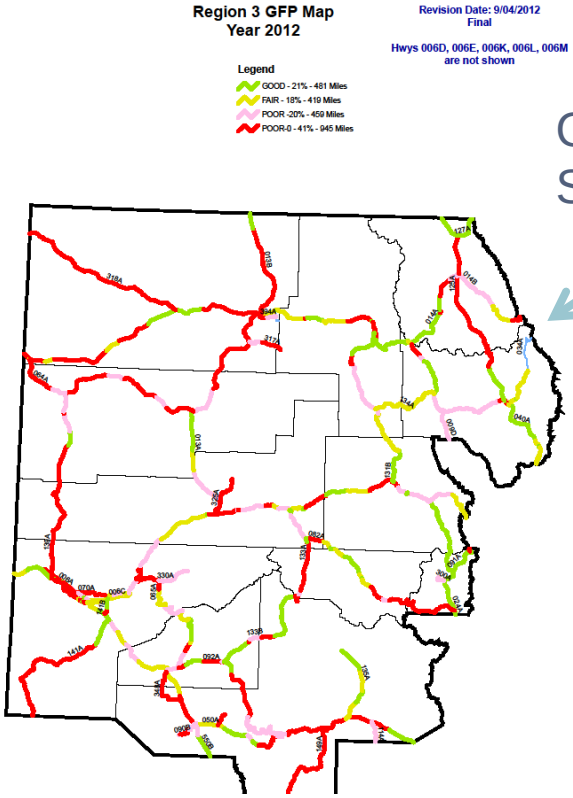
These DL=0 values identify the quantities of "Unacceptable Drivability"

Note 2 : As we refine the drivability criteria we expect the Good and Fair to decrease.

Asset Management Updates

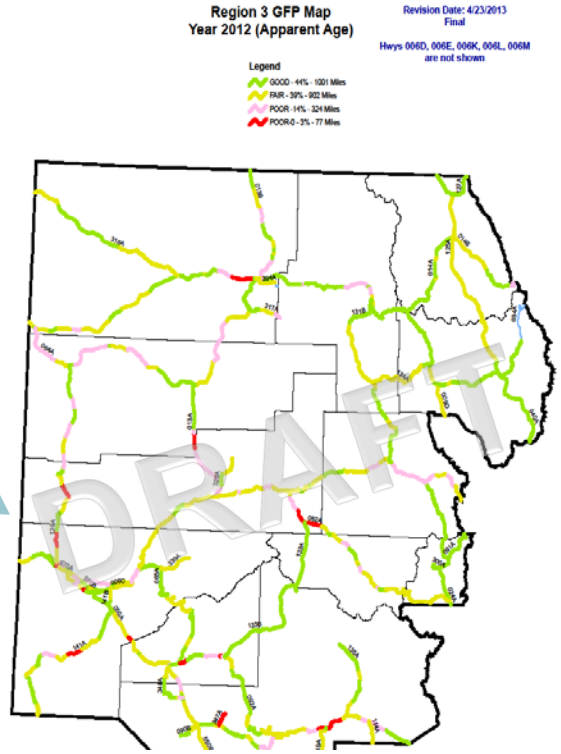
Drivability Life Analysis Update

- **Example Region 3 Good/Fair/Poor Maps**



Old Remaining Service Life Map

New Drivability Life Map



Asset Management Updates

National Highway Institute (NHI) Workshops

Workshop #1: April 3 & 4

Introduction to Transportation Asset Management

Attended by 26 staff from CDOT and FHWA

Workshop #2: July 9 & 10

Development of a Transportation Asset Management Plan

Asset Management Updates

Roadway Surface – Surface Treatment

- **Kickoff meeting May 21**
- **Goal:**
  - Document best alternatives for linking MLOS Roadway Surface maintenance activities with Surface Treatment Projects.
- **Anticipated benefits:**
  - Improved data collection,
  - Improved reporting and data storage, and
  - Improved evaluation of cost and performance for different pavement maintenance strategies.

Asset Management Updates

Fleet Management

- SAP enhancements have been implemented.
- Training work instructions are complete, and being refined for clarity.
- Maintenance staff are using new work orders, streamlined just for fleet equipment. Results: reduced computer time and improved accuracy and consistency.
- New reduced number of Preventative Maintenance Plans have been implemented.
- Maintenance Supervisors are able to pull new reports, use these reports to recommend replacements, look for trends in maintenance costs, and include projected repair cost in analysis.

Colorado DOT
Risk-Based Asset Management Plan (RB AMP) Development Strategy

Draft

April 30, 2013

Colorado DOT (CDOT) has engaged Cambridge Systematics and Larry Redd to develop its Risk-Based Asset Management Plan (RB AMP). CDOT has reviewed the requirements of the MAP-21 Federal Authorization in conjunction with the agency's current asset management efforts. The development of the CDOT asset management plan is anticipated to follow the outline set below, which incorporates federal recommendations to date and CDOT's asset management program. The initial asset management plan will be complete in December, 2013. It is expected that the plan will be updated periodically to comply with emerging MAP-21 rules and to reflect CDOT's growing maturity in asset management activities. This Strategy document provides the RB AMP outline, details regarding what information will be included in the plan, and the plan development schedule.

Table 1. Annotated RB AMP Outline

Section	This Section will…	Key Development Activities Required to Address Gaps
1. Executive summary	• Summarize highlights and key recommendations from the RB AMP.	
2. Introduction	• Define the objectives of the asset management program. • Summarize the contents of the RB AMP – which assets, which programs, time horizon (10 years), etc.	
3. Value to Citizens	• Present CDOT's Mission and Vision, and describe the role of asset management in achieving them. • Describe the role of the transportation system for the State. • Describe traffic growth and demand on the system. • Summarize items from CDOT customer surveys related to asset management.	
4. Asset Inventory and Condition	• Summarize inventory and condition of CDOT assets. • (See table 2 for specifics on which assets to include.)	• Develop templates for asset mgrs. to complete
5. Asset Management Measures and Targets	• Define performance measures (see table 2 for initial list). • Describe desired levels-of-service. • Define target values for the measures. • Illustrate the difference current performance levels and target levels.	• Develop targets for fleet and ITS equipment. • Determine how levels of service will be presented.

Section	This Section will…	Key Development Activities Required to Address Gaps
6. Performance Measurement and TAM Practices	• Document the asset management planning process, including – Strategic management process – "Plan, Do, Check, Act"; – Allocating funds across programs and setting targets; and – Recommending and selecting projects and asset treatments.	• Determine approach for merging CDOT's long-range planning approach and budgeting process with the asset management process ("Plan, Do, Check, Act"). • Define process for utilizing management system recommendations in the regions to inform project selection.
7. Life Cycle and Other Systems/Models	• Define "lifecycle costs" (LCC) and explain why they are important (e.g., moving away from "worst first"). • Describe the methodology used to address LCC in the RB AMP (e.g. incorporated into pavement model, and reflected in the selection of work strategies).	
8. Risk Management	• Describe CDOT's risk management efforts, and explain how they relate to the asset management process. • Provide a prioritized list of assets and risk types to include in CDOT's systematic risk evaluation (systematic risks are events that could affect the transportation system). • Provide an initial risk register that defines key programmatic risks (programmatic risks are events that could impede program delivery).	• Develop a framework for melding of risk and performance as part of the overall asset management processes. • Prioritize assets and risk types for further risk assessment. • Conduct initial programmatic risk workshop.
9. Financial Plan	• Summarize historical budget and spending levels for asset management. • Define the amount of funds expected to be available for asset management and describe where there funds will come from (funding sources such as HUTF). • Provide a summary of how future funds will be allocated among assets.	

Section	This Section will…	Key Development Activities Required to Address Gaps
10. Asset Management Strategies	• Describe key preventive maintenance activities, including typical timing and unit costs. • Define other priorities (e.g., risk mitigation activities) that influence asset management decisions.	• Determine the types of strategies to include in the RB AMP.
11. Implementation Plan for TAM Process Enhancements	• Define priorities for improving TAM beyond Initial Plan delivered in December 2013. • Present a schedule for the implementing these activities.	• Conduct gap assessment and interviews to identify and prioritize improvement activities. • Develop an implementation schedule based on CDOT priorities and logical dependencies between the activities
12. MAP-21	• Provide an annotated list of MAP-21 requirements and illustrate how the RB AMP will address them. Following is an initial mapping (chapter numbers are in parenthesis): – Summary listing of pavement and bridges on the NHS, including condition (Chapter 4) – Asset management measures and objectives (Chapters 2 and 5) – Performance gap identification (Chapter 5) – Financial plan (Chapter 9) – Life Cycle Cost management and risk management (Chapters 7 and 8) – Investment strategies (Chapter 10)	

Table 2. Information to be Included in RB AMP by Asset

Asset	Inventory	Primary Condition Metric	**Life Cycle and Other Systems/Models**	Programmatic Funding Level	10-year Performance Targets
Bridges	count and deck area	percent deck area classified as SD	Flagged as priority enhancement	from program distribution process	from PD 14 and program distribution process
Tunnels	count (could break down by manned and unmanned)	NA	NA	to be determined	to be determined
Culverts	count	percent in bad condition	NA	to be determined	to be determined
Pavements	length and lane miles	percent good/fair/poor based on remaining drivability life	Incorporated into PMS models	from program distribution process	from PD 14 and program distribution process
Maintenance features (signs, guardrail, sign lighting, signals, attenuators)	NA	LOS grades	NA	from program distribution process	from PD 14
Fleet	count	% useful life	Used to prioritize work	from program distribution process	use condition versus funding curves and funding from program distribution process
ITS	count	% useful life	Used to prioritize work	from program distribution process	use condition versus funding curves and funding from program distribution process
Buildings	count	condition rating	Flagged as priority enhancement	from program distribution process	NA
Rockfall Mitigation	count of sites	to be determined	to be determined	to be determined	to be determined

Figure 1. RB AMP Development Schedule