

Operational and Pavement Maintenance Considerations

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Transportation Evolution

Electrification of Transportation

- ▶ Autonomy
- ▶ Mobility as a service
- ▶ Ride share
- ▶ Other side benefits of electrification.
 - ▶ Energy Independence
 - ▶ Emergency resilience
 - ▶ Energy Management



Asset Management

- Assets in tier 1 management level are **highest value combined with highest risk of negative financial impact for poor management**. These are assets that are very important to the UDOT performance plan success and are recommended for a significant separate funding source.

Feature	Unit Cost	Count	Value (mil)
Pavement (yd ²)	\$140	172,045,914	\$ 24,000.00
Bridge (ft ²)	\$256	19,515,339	\$ 5,000.00
Walls (ft ²)	\$47	71,820,494	\$ 3,400.00
Culverts (ea)	\$22,727	44,000	\$ 1,000.00

Table 6 – Risk Analysis for Tier 1 and 2 Assets

Asset	Value	Financial Risk	Info. Risk	Operational Risk	Safety Risk	Ave. Risk	Tier
Pavement	\$24B	6	3	8	3	5	1
Bridges	\$ 5B	6	3	8	8	6	1
Pipe Culverts	\$ 1B*	6	8	6	3	6	1
Walls	\$ 3.4B	3	3	6	3	4	2
Barrier	\$450M	3	1	4	2	2.5	2
Signs	\$300M	7	5	3	3	4.5	2
Signal Systems	\$353M	2	4	5	3	3.5	2
Pvt. Markings	\$ 42M	2	1	2	5	2.5	2
Rumble Strips	\$ 6M	5	4	2	5	4	2
ATMS Devices	\$440M	1	4	4	5	3.5	2
ADA Ramps	\$ 20M	2	4	3	5	3.5	2

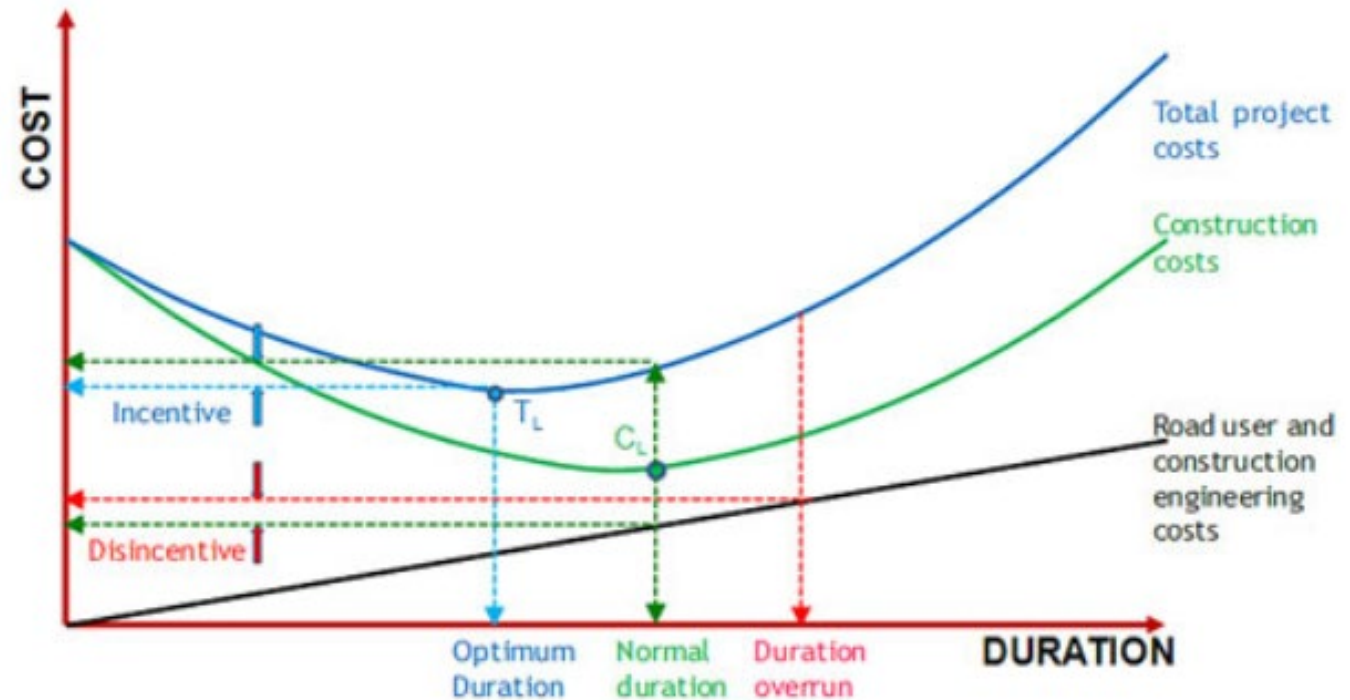
Lane Closure and User Costs



Work Zone Road User Costs
Concepts and Applications
December 2011

FHWA-HOP-12-005

U.S. Department of Transportation
Federal Highway Administration



Maintenance Operations

- ▶ Limited Funds
- ▶ Assets/Features must be highly robust and easily serviced
- ▶ Many competing sub surface utilities in urban areas



Feasibility Modeling and Alternatives

- ▶ What are the options for electrification?
 - ▶ Charging Lanes?
 - ▶ Single or multiple lanes and how frequent?
 - ▶ Note: I-15 near Cedar City Utah has an AADT of 26,000 vehicles and only 53 percent are passenger vehicles.
- ▶ What is the costs and where does the funding to construct and maintain the infrastructure come from?
- ▶ Can design be inspired by existing infrastructure?
- ▶ Will autonomy change the form factor of freight movement?

