DCT 270

Planning Level Estimate of Municipal Street Asset Maintenance

By

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Planning Level Estimate of Municipal Street Asset Maintenance

Each Delaware municipality is responsible for the maintenance of transportation-related assets. These assets include pavement, sidewalks, signs, etc. The Municipal Street Aid Fund exists to assist with maintaining these assets. A possible barrier to consistent and adequate funding may be that Legislators are unaware of the current valuation of these assets and the long-term demand for maintenance. If indeed it could be shown that the life cycle cost of assets (pavement, signage, sidewalks, curb ramps, curbs, drainage, lighting, etc.) demanded, say, an annual cost of $7 million, the Legislature would perhaps be more inclined to fund closer to that amount, rather than some arbitrary figure. At a minimum, the Legislature would have a clearer idea of the percentage of annual municipal costs the Fund could be expected to cover.

This project developed a planning level estimate of this annual cost. The limits of this estimate, particularly in terms of assumptions and unit costs, are significant and worthy of scrutiny, but this estimate can serve as the start of an examination as to whether the goals of the Legislature with respect to the Municipal Street Aid Fund are consistent with the current financial demands on the municipalities to fulfill their street maintenance obligations.

The Delaware T^2/LTAP Center has overseen the collection of GIS-based asset inventory data from some of the Delaware municipalities during the past nine years. This data and additional GIS data provided by DelDOT was used for the computations needed to develop this network-level assessment. DelDOT bid documents were used for the cost estimates.

Summary			
Planning Level Estimate of Municipal Street Maintenance/Replacement Costs - Annualized			
			Assumption
Pavement and Striping	$ 13,001,121		10 Year Life Cycle (pavement); 2 year Life Cycle Striping
Shoulders	$ 966,569		10 Year Life Cycle
Sidewalks	$ 14,385,551		20 Year Life Cycle; 4" Thickness; 48" Width
Curbs	$ 16,853,760		20 Year Life Cycle
Curb Ramps (ADA)	$ 5,908,500		20 Year Life Cycle
Signs	$ 574,560		10 Year Life Cycle
Subtotal	$ 51,690,062		
Mobilization, bonding, insurance, etc. - 15%	$ 7,667,325		Excludes signage line item
Surveying, ROW, Engineeering, etc. - 15%	$ 7,667,325		Excludes signage line item
Total Planning Level Estimate	$ 67,024,713		
Not included:	Drainage		
	Lighting		

The Delaware T^2/LTAP Center does not assert that the network level cost estimate to maintain municipal street assets itemized herein is, in fact, currently being collectively spent by Delaware's municipalities. Rather, this is the magnitude of cost that is consistent with the network and the municipal maintenance responsibilities.

Pavement:
According to the GIS data, there are 1,064 miles of roadway within Delaware municipal boundaries. Seventy -four percent are those are municipally-maintained roads. Over 25% is maintained by the state and about one percent is listed as "maintained by other." However, for those non municipally-maintained roadways, the municipalities remain responsible for most assets outside of the pavement itself. The DelDOT data contained data for 6,521 segments or road sections, including length and pavement width. These data were combined into pavement area. The Delaware municipalities are responsible for 13,084,125 square yards of paved roadway surfaces.

It was assumed that municipalities only perform mill and pave operations on their pavements (i.e., no pavement preservation program) and that two inches of pavement is milled at a cost of $0.75/SY-in (square yard inch). This results in a network cost of $19.6 million. For the subsequent paving operations, bituminous concrete (asphalt) with an in-place density of 153 pounds/cubic foot was assumed, which corresponds to just over 1,500,000 tons and at an assumed $68/ton, a network level cost of $102.1 million was estimated.

If a 10-year life cycle is assumed (milling and paving every 10 years), then this results in an annual cost of $12.2 million. If a 15-year cycle is used, then the annual cost is $8.1 million.

Pavement Striping:
Five inch wide lines were assumed for the 785 miles of roads the municipalities maintain. Because not all streets require striping at all, it was assumed that only 25% of streets would require striping, but a double center line and two edge lines was assumed (i.e., four lines per roadway); the result is the same as assuming one line for the entire 785 miles. At an assumed cost of $.40/FT, the estimated cost is $1.7 million. Lines are assumed to need replacing very two years for an annualized cost of $829,000.

Road shoulders:
The DelDOT data included information on roadway shoulders, including length, width and the shoulder material. Approximately 50% of the shoulders are unpaved but would require frequent maintenance. The remaining 50% are asphalt or concrete. Data did not exist for the maintenance costs of unpaved shoulders, so costs for 2-inch milling and paving were used for all shoulders. There are approximately 9.4 million square feet of road shoulder and network level cost of $8.1 million. The 10-year cycle cost is $966,000 and the 15-year cost is $644,000.

Sidewalks:
According to the DelDOT data, there are over 1,300 miles of sidewalks within municipal boundaries and are assumed to be the responsibility of the cities and towns. Calculations were made for sidewalk widths of 48" and 60" (reflective of the transition over time to the wider 60" standard, but the limitations of right of way in most situations) and thicknesses of 4" (typical sidewalk) and 6" (at commercial entrances). A removal cost of $31/SY was used and an installation/replacement cost of $7/SF. For 48" sidewalks with 4" thickness, a network cost of $192.8 million was estimated. With a 20-year estimated life, this results in an annualized cost of $14.4 million.

Curbing:
Curb has an estimated installation cost of $30/FT, and it was assumed the curbs exist along both sides of all municipal streets, resulting in a network cost of $337 million. Assuming a 20-year life, the annualized cost for curbing is $16.8 million.

ADA compliant Pedestrian Ramps:
The T^2/LTAP Center has inventoried significant pedestrian ramp networks in Bethany Beach and Delaware City. Bethany Beach averaged 36 ramps per mile of sidewalk, whereas Delaware City had 25 ramps per mile of sidewalk. For the 1,313 miles of sidewalk within Delaware municipalities, an average of 30 ramps per mile was assumed. With an estimated cost of $3,000 each, these ramps have a replacement cost of $118.2 million. Assuming the same 20-year life as sidewalks, ramps have an annualized network cost of $5.9 million.

Signs:
Generally, the municipalities are responsible for all roadway signage. The T^2/LTAP Center data for Bethany Beach, Delaware City and Newark was used for the statewide estimate. Bethany Beach has 35.9 regulatory signs per mile of road, Delaware City has 53.7 signs per mile, and Newark has 45 signs per mile. A value of 45 signs per mile was used as a statewide average.

To estimate the number of street blade signs in the community, it was assumed that there would be two street blades at each intersection. Bethany Beach has an average of 4.4 intersections per mile, Delaware City has 11.9 intersections per mile, and Newark has 4.7 intersections per mile. It was estimated that there are 4.5 intersections per mile or 4,788 intersections statewide.

This projects that there are 47,880 regulatory signs and 9,576 street blades in Delaware municipalities. At $100 per sign for manufacture and installation, the network level cost is $5.7 million. Assuming a 10-year life, the annualized cost is $574,000.

Non-Unit Costs:
In an effort to reflect non-unit costs associated with maintenance of municipal streets, mobilization and related costs were estimated at 15% of the cost of all network-wide items (except for signs, which generally don't require these efforts) and an additional 15% of the cost was assumed for surveying, right of way or easement acquisition, and engineering.

Excluded Costs:
Drainage (pipes, inlets, swales, stormwater treatment facilities, etc.) and lighting (fixtures, bulbs, electricity, etc.) were not included in this network-level estimate because of the lack of even basic data.

Summary:
With the assumptions and exclusions noted, the planning level, annualized network level cost for maintenance and life cycle replacement of these municipal assets is just approximately $67 million.

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