Alberta Municipal Benchmarking Initiative - Roadways

November 2017

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1 Introduction and Background

1.1 Introduction

Today's municipalities are challenged by an ever-increasing demand to deliver a greater variety and a higher level of public services while maintaining low taxes and user fees.

To meet this challenge, municipal governments are continually looking for new ways to improve performance, operationally and fiscally.

In the spring of 2012, a number of municipalities in Alberta expressed an interest in benchmarking their service delivery against leading practices as a way to improve service. At a workshop hosted by the Town of Banff in May 2012, participating municipalities discussed the benefits of benchmarking; developed a preliminary list of guiding principles; and identified considerations related to governance, scope, data collection, resources, and risks.

Subsequent to this workshop, the Town of Banff, on behalf of a group of 13 municipalities, successfully applied to the provincial government for a Regional Collaboration Grant to fund the development of a municipal service delivery benchmarking framework. With the support of the provincial government, the Alberta Municipal Benchmarking Initiative (ABMI) was launched in 2013.

1.2 Background

The Alberta Municipal Benchmarking Initiative is a collaboration of small and large-municipalities. Their objective is to develop and implement a framework that will enable a continuous, multi-year benchmarking process for participating municipalities. The initiative includes identifying and gathering comparable metrics and preparing benchmarking reports to prompt questions, start discussions, identify and share leading practices, and ultimately improve the municipal services provided to Albertans.

The ten service areas to be considered as part of this initiative are:

1. Drinking Water Supply (complete)
2. Wastewater Collection, Treatment and Disposal (complete)
3. Fire Protection (complete)
4. Residential Solid Waste Management (complete)
5. Police Protection, RCMP (complete) and Self-Run (complete)
6. Roadway Operations and Maintenance
7. Snow and Ice Control
8. Transit
9. Parks Provision and Maintenance
10. Recreation, Facility Booking and Maintenance

A method for collecting data to ensure it is comparable between communities and a database to hold the data and produce performance measure reports has been developed. The foundation of this method is a "User Manual" for each service area, containing:

- Definitions for cost and service data, and
- Definitions for the calculations of performance measures, for both efficiency and effectiveness.

To ensure an "apples to apples" comparison, participating municipalities are involved in the creation of the user manual.

1.3 Participating Municipalities

The municipalities currently participating in the Roadways section of the Project are the cities of Lethbridge, Medicine Hat, and Red Deer and the towns of Banff, Canmore, and Okotoks.

1.4 Governance Structure

To guide and drive the project, a model has been developed consisting of:

- A governance committee consisting of six municipal leaders
- A working committee with representatives from each of the participating municipalities
- A finance group with representatives from each of the participating municipalities
- A subject matter expert (SME) Group for each service area with representatives from each of the participating municipalities

Governance Committee - The governance committee was created to provide overall guidance and oversight, and to ensure that the work conducted is in the best interest of the group of municipalities as a whole as opposed to an individual municipality. The committee is: The committee is: Robert Earl (Chair), Town of Banff, Lisa de Soto, Town of Canmore, Corey Wight, City of Lethbridge, Brian Mastel, City of Medicine Hat and two vacant positions.

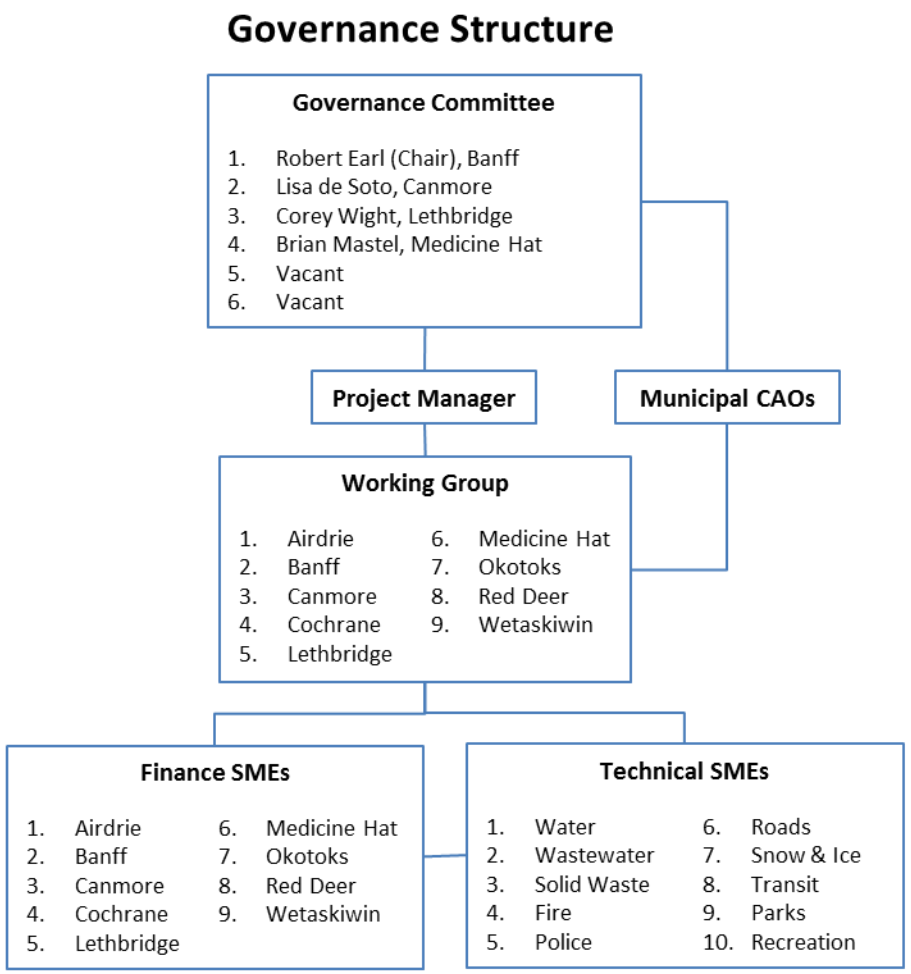
Working Committee - Each of the participating municipalities is represented on the working committee. Its members' primary role is liaising between the project manager and the respective municipality. They oversee the completion of activities within the municipality, support the identification of SMEs needed for the development of the Database User Manual, and assist with the gathering of relevant data.

Finance Group – The primary role and responsibility of the Finance Group is to collect and enter data for a calculation to allocate overhead to each service area, collect and enter data for amortization of assets in each service area, and assist service area SMEs on collection of cost data for each service area. The Finance Group also ensures all data is accurate by

confirming the financial data to the municipality's non-consolidated financial statements.

Subject Matter Expert Group (SME) – The primary role and responsibility of the SME groups is to provide subject matter expertise in the development of the service definitions, performance measures, and collection of data for the benchmarking pilot project.

The CAOs' Role – In addition to the governance committee, the CAOs from each of the participating municipalities were asked to confirm their commitment to this project, to be the executive sponsor for their respective municipality, to champion this pilot project within their municipality, and ensure that all participating municipalities are informed of the activities and outcomes.



1.5 Benefits of Benchmarking

The anticipated benefits from this benchmarking project are:

- Helps tell the municipal "performance story"
- A sound business practice used in the government and private sectors
- Sets the stage for sharing knowledge and best practices among the municipal sector
- Understanding of trends within each municipality
- Identification of opportunities for change to improve efficiency or effectiveness of municipal services
- Formation of objective evidence that shows the differentiation between municipalities and provides information for Municipal CAOs to address questions from Council, staff, and the community on service efficiency and effectiveness
- Encouragement of continuous improvement initiatives and a better understanding of the drivers that impact performance results
- Encourages continuous improvement, and
- Awareness of the value of collaboration between municipalities.
- Supports results-based accountability

1.6 Definitions

Efficiency – Efficiency is a measure of productivity based on dividing the quantity of output (measured in units of deliverables) by the quantity of resources input (usually measured in person hours or dollars).

Effectiveness – Effectiveness is a measure of the value or performance of a service relative to a goal, expressed as the actual change in the service. An effectiveness measure compares the output of a service to its intended contribution to a higher level goal.

Roadways System

Alberta Municipal Benchmarking Initiative

2 Roadways System

2.1 System Description

2.1.1 Municipal Roadways Services

Roads services provide affordable, well-managed and safe traffic flow for pedestrians, cyclists, drivers, public transit and commercial traffic. A municipality's transportation system affects the economic vitality and quality of life of residents by providing ease of access to other residences, and institutional, commercial, recreational and cultural facilities.

Transportation infrastructure generally includes roads, bridges, culverts, sidewalks, pathways, traffic control systems, signage, medians and boulevards. Roads services operations include repairing/replacing road surfaces, marking the road directional lane and other lines, clearing the transportation network of debris to keep it safe and convenient to use and keeping traffic signals and signage operational.

2.1.2 Factors Influencing Roadways Services

Age of Infrastructure: Age and condition of roadways system and frequency of maintenance.

Size of System: Number, size and complexity of the roadways in the transportation system.

Urban Density: Proximity of roadways to population may increase the cost for infrastructure repair and replacement.

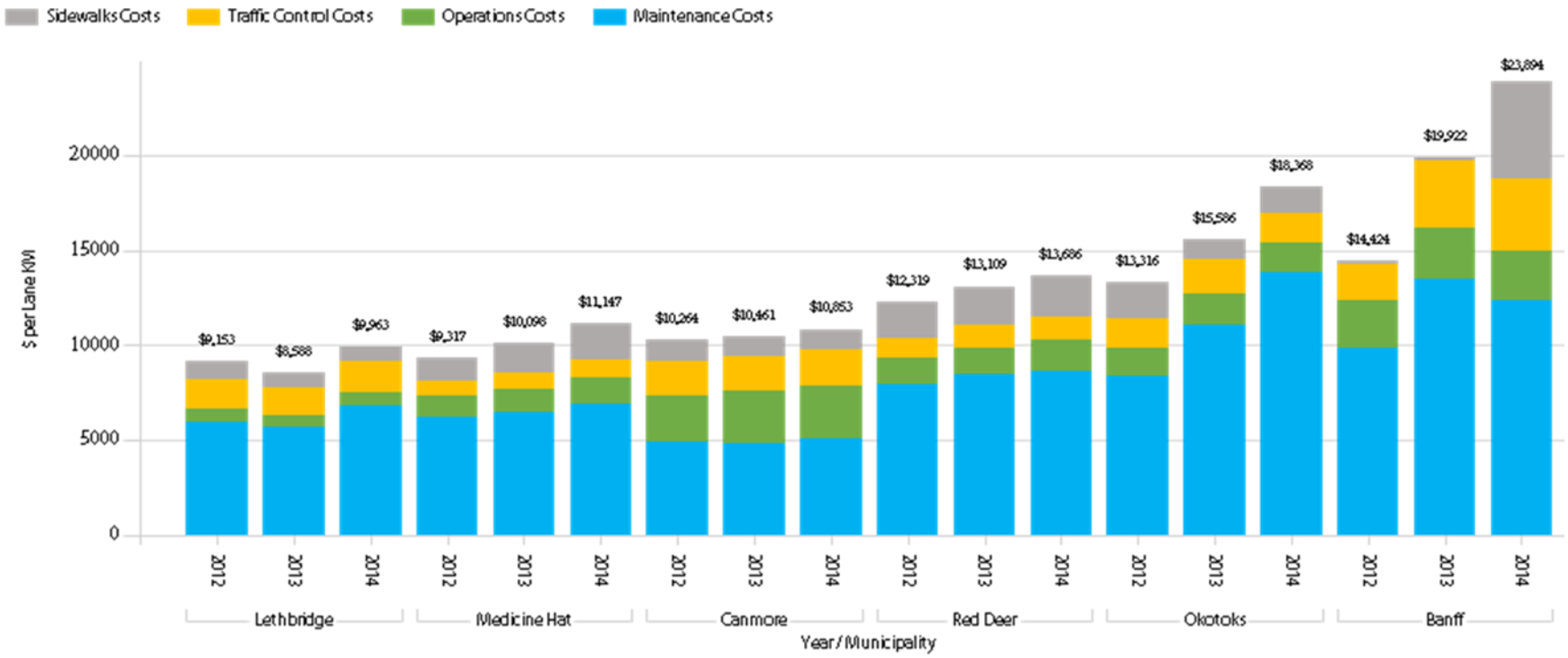
Urban Growth: High growth municipalities have newer infrastructure with higher amortization (depreciation) costs.

2.1.3 Transportation System Narrative Data (See Section 3 for definitions of each column heading)

Municipality	Year	Roads - Gravel (%)	Roads - Paved (%)	Sidewalks - Concrete (%)	Sidewalks - Paved (%)	Sidewalks - Paving Stone (%)
Banff	2012	0%	100%	94%	5%	1%
	2013	0%	100%	94%	5%	1%
	2014	0%	100%	94%	5%	1%
Canmore	2012	14%	86%	98%	2%	0%
	2013	14%	86%	98%	2%	0%
	2014	14%	86%	98%	2%	0%
Lethbridge	2012	5%	95%	95%	0%	5%
	2013	5%	95%	96%	0%	4%
	2014	5%	95%	97%	0%	4%
Medicine Hat	2012	11%	88%	97%	3%	0%
	2013	10%	90%	97%	3%	0%
	2014	10%	90%	97%	3%	0%
Okotoks	2012	19%	81%	100%	0%	0%
	2013	19%	81%	100%	0%	0%
	2014	18%	82%	100%	0%	0%
Red Deer	2012	0%	0%	0%	0%	0%
	2013	0%	0%	0%	0%	0%
	2014	0%	100%	95%	4%	1%

2.2 Total Transportation System Costs 1 ($/traffic lane KM) – Efficiency

This chart shows the total cost of the transportation system per traffic lane KM; maintaining roads and public parking lots owned by the municipality, keeping roads operational, maintaining traffic control signage and equipment, and maintaining sidewalks in the roadways right-of-way (ROW). A traffic lane KM is the centreline length of a road multiplied by the number of traffic lanes in that road, e.g. a 1 KM road with 4 traffic lanes is 4 lane KM. Municipalities are in order from lowest to highest cost based on the average of 2012, 2013, 2014 results.



2.2.1 Total Transportation Data 1 (See Section 3 for definitions of each column heading)

Municipality	Year	Maintenance Costs ($)	Operations Costs ($)	Traffic Control Costs ($)	Sidewalks Costs ($)	Total Costs ($)	Roadways Length (lane KM)	Cost per lane KM ($)
Banff	2012	$761,110	$193,199	$144,114	$12,211	$1,110,634	77	$14,424
	2013	$1,040,115	$203,714	$274,551	$15,650	$1,534,030	77	$19,922
	2014	$952,483	$200,454	$292,040	$394,824	$1,839,801	77	$23,894
Canmore	2012	$945,118	$468,889	$361,267	$205,590	$1,980,865	193	$10,264
	2013	$937,860	$527,939	$351,451	$201,769	$2,019,020	193	$10,461
	2014	$991,544	$536,222	$361,865	$204,982	$2,094,614	193	$10,853
Lethbridge	2012	$8,821,310	$1,051,165	$2,253,702	$1,402,590	$13,528,767	1,478	$9,153
	2013	$8,720,102	$909,444	$2,231,312	$1,227,702	$13,088,560	1,524	$8,588
	2014	$10,757,944	$1,089,507	$2,508,219	$1,296,309	$15,651,979	1,571	$9,963
Medicine Hat	2012	$6,864,663	$1,307,507	$861,275	$1,289,498	$10,322,943	1,108	$9,317
	2013	$7,189,933	$1,375,450	$942,410	$1,731,695	$11,239,488	1,113	$10,098
	2014	$7,829,881	$1,539,863	$1,013,213	$2,157,032	$12,539,989	1,125	$11,147
Okotoks	2012	$2,790,416	$476,719	$528,067	$612,262	$4,407,464	331	$13,316
	2013	$3,697,699	$550,686	$598,440	$358,996	$5,205,821	334	$15,586
	2014	$4,716,483	$520,409	$541,707	$466,583	$6,245,182	340	$18,368
Red Deer	2012	$11,344,202	$1,861,474	$1,524,611	$2,737,397	$17,467,685	1,418	$12,319
	2013	$12,157,731	$2,065,755	$1,683,431	$2,969,734	$18,876,651	1,440	$13,109
	2014	$12,606,895	$2,331,240	$1,827,445	$3,133,878	$19,899,457	1,454	$13,686

NOTES:

1. Roadways maintenance costs include costs to maintain traffic and parking lanes and municipally owned parking lots and parkades.

2. For this benchmarking Report, the definition of length of roads in lane KMs includes traffic lanes only and excludes parking lanes. In the future, the SMEs agreed to consider replacing traffic lane km with surface area of pavement maintained in order to capture the area of parking lanes and parking lots, e.g. normalize total cost to per square metre or per square KM.

3. "Back alley" lanes maintained are considered to be one lane regardless of width. How they are maintained differs;

- Most municipalities include back alleys in the regular maintenance program; gravel (grading), paved (pothole filling)
- Some municipalities maintain back alleys "on request" from residents, e.g. Lethbridge.

4. Okotoks had a rapid rise in roads maintenance costs 2012 – 2014 due to a decision to spend unused grant funds on improving the condition municipal roads. Banff had a rapid rise in roads maintenance costs 2012 – 2014 due to special projects funded out of capital reserves.

5. Smaller municipalities make more use of contractors than larger municipalities that have in-house roads departments for maintenance, operations and traffic control.

6. Municipalities are moving to asset management, a practice that can optimize the useful life of assets.

7. Public complaints about the transportation system are logged but don't drive the roadways activities/priorities.

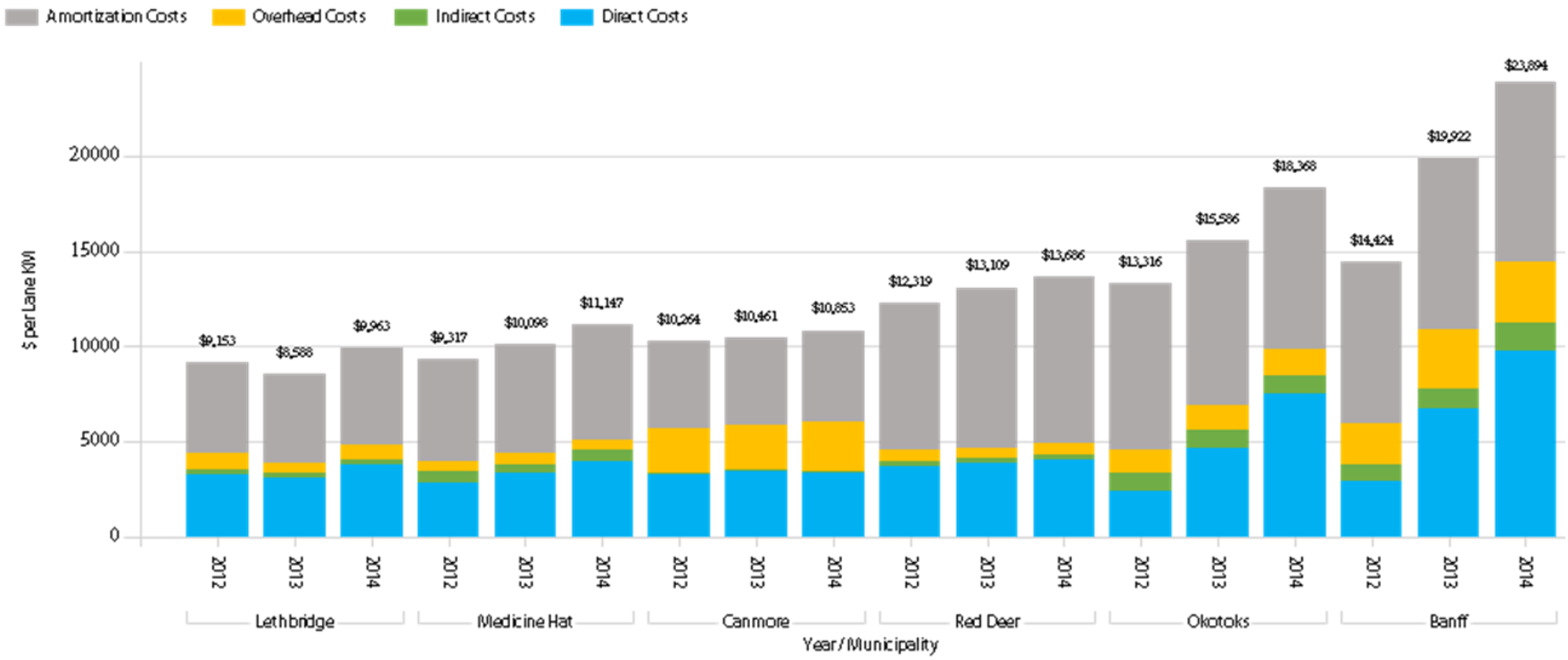
2.2.2 Lessons Learned

1. Roads operational costs per traffic lane KM are influenced by;
    - Decisions by Councils to do special projects, e.g. spending of accumulated grant funds, special project upgrades to important system assets (Banff sidewalks 2014)
    - Growth of the roads system; adding roads, sidewalks, e.g. new roads/sidewalks have low maintenance costs but high amortization costs

2. The data suggests economies of scale do apply, i.e. having more roads leads to less cost per traffic lane KM. While roads length increases 20 times in the sample group from 77 traffic lane KM to 1,571 for the group, the trend line shows costs per traffic lane KM decline 41% from about $17,000 per traffic lane KM to about $10,000. See chart below.

Total Transportation System Costs 2 ($/traffic lane KM) – Efficiency

This chart shows the total cost of the transportation system per traffic lane KM by cost type; direct costs are for day-to-day operation of the service, indirect costs are for management/support of the service, overhead cost is a calculated allocation of total overhead to this service, and amortization cost is the depreciation cost of all assets of the service. Municipalities are in order from lowest to highest cost based on the average of 2012, 2013, 2014 results.



2.2.3 Total Transportation System Data 2 (See Section 3 for definitions of each column heading)

Municipality	Year	Direct Costs ($)	Indirect Costs ($)	Overhead Costs ($)	Amortization Costs ($)	Total Costs ($)	Roadways Length (Lane KM)	Cost per Lane KM ($)
Banff	2012	$224,163	$68,765	$167,724	$649,982	$1,110,634	77	$14,424
	2013	$520,372	$76,088	$244,044	$693,526	$1,534,030	77	$19,922
	2014	$753,210	$114,385	$242,393	$729,813	$1,839,801	77	$23,894
Canmore	2012	$629,274	$24,910	$443,690	$882,991	$1,980,865	193	$10,264
	2013	$663,709	$23,157	$440,846	$891,308	$2,019,020	193	$10,461
	2014	$642,735	$23,270	$503,638	$924,971	$2,094,614	193	$10,853
Lethbridge	2012	$4,853,737	$424,658	$1,202,524	$7,047,848	$13,528,767	1,478	$9,153
	2013	$4,715,592	$387,492	$861,429	$7,124,047	$13,088,560	1,524	$8,588
	2014	$5,986,538	$448,282	$1,221,550	$7,995,609	$15,651,979	1,571	$9,963
Medicine Hat	2012	$3,185,523	$605,714	$592,881	$5,938,825	$10,322,943	1,108	$9,317
	2013	$3,728,611	$554,992	$610,133	$6,345,752	$11,239,488	1,113	$10,098
	2014	$4,472,506	$657,546	$623,061	$6,786,876	$12,539,989	1,125	$11,147
Okotoks	2012	$790,326	$324,219	$404,387	$2,888,532	$4,407,464	331	$13,316
	2013	$1,559,145	$324,219	$433,925	$2,888,532	$5,205,821	334	$15,586
	2014	$2,552,303	$324,219	$480,128	$2,888,532	$6,245,182	340	$18,368
Red Deer	2012	$5,312,213	$364,308	$859,900	$10,931,264	$17,467,685	1,418	$12,319
	2013	$5,615,895	$316,036	$834,185	$12,110,535	$18,876,651	1,440	$13,109
	2014	$5,876,031	$371,185	$887,361	$12,764,880	$19,899,457	1,454	$13,686

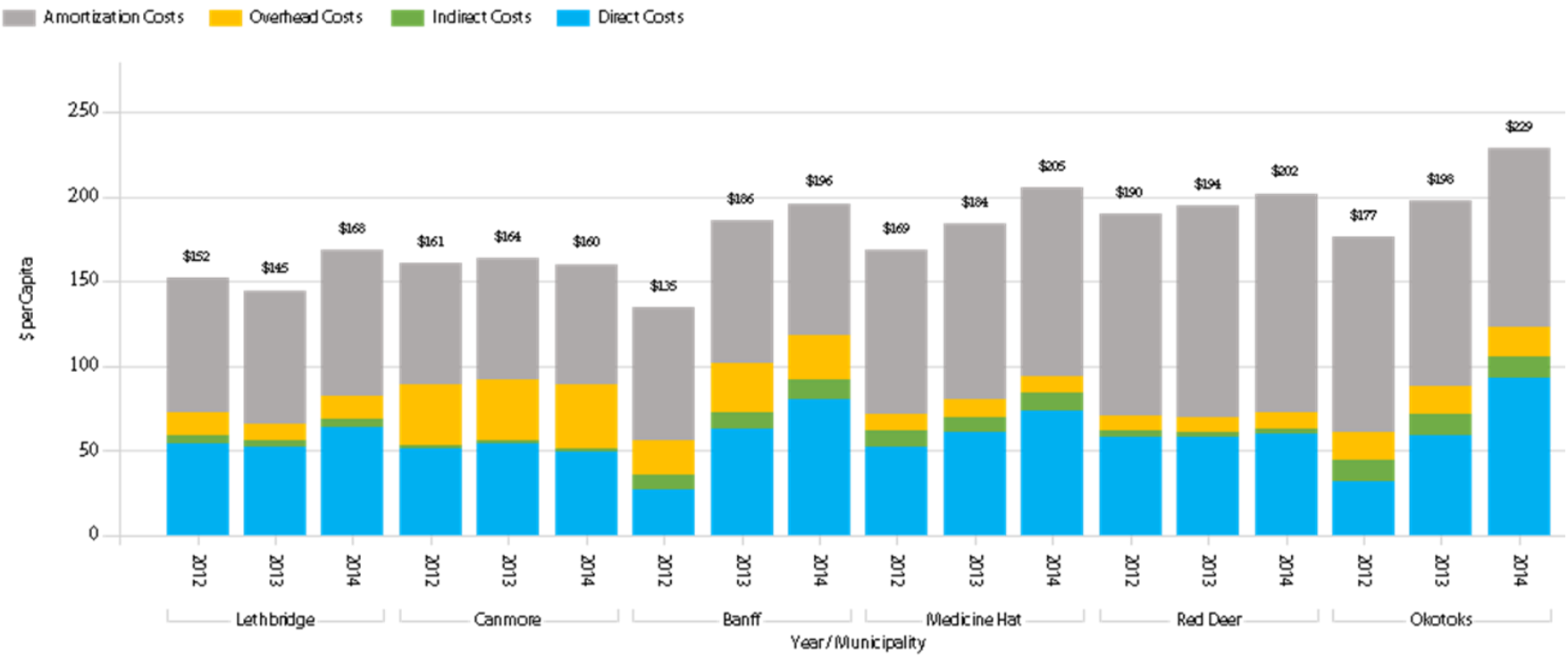
2.2.4 Lessons learned

1. The average total cost per traffic lane KM is $13,026 while the range is from $9,317 (Medicine Hat 2012) to $23,894 (Banff 2014).

2. The largest component of transportation system costs is amortization at an average of $6,850 per traffic lane KM. One factor contributing to this is growth of the roads system, e.g. infrastructure transfers from developers and municipally driven development. Growth increases the extent of roads ultimately to be replaced. Funding for roads replacement is unique for each municipality and future replacement can be an issue for some municipalities.

2.3 Total Transportation System Costs 3 ($/capita) – Efficiency

This chart shows the total cost of the transportation system per capita based on the municipal population. Municipalities are in order from lowest to highest cost based on the average of 2012, 2013, 2014 results.



2.3.1 Total Transportation Cost per Capita Data (See Section 3 for definitions of each column heading)

Municipality	Year	Direct Costs ($)	Indirect Costs ($)	Overhead Costs ($)	Amortization Costs ($)	Total Costs ($)	Municipal Population	Cost per Capita ($)
Banff	2012	$224,163	$68,765	$167,724	$649,982	$1,110,634	8,244	$135
	2013	$520,372	$76,088	$244,044	$693,526	$1,534,030	8,244	$186
	2014	$753,210	$114,385	$242,393	$729,813	$1,839,801	9,386	$196
Canmore	2012	$629,274	$24,910	$443,690	$882,991	$1,980,865	12,317	$161
	2013	$663,709	$23,157	$440,846	$891,308	$2,019,020	12,317	$164
	2014	$642,735	$23,270	$503,638	$924,971	$2,094,614	13,077	$160
Lethbridge	2012	$4,853,737	$424,658	$1,202,524	$7,047,848	$13,528,767	89,074	$152
	2013	$4,715,592	$387,492	$861,429	$7,124,047	$13,088,560	90,417	$145
	2014	$5,986,538	$448,282	$1,221,550	$7,995,609	$15,651,979	93,004	$168
Medicine Hat	2012	$3,185,523	$605,714	$592,881	$5,938,825	$10,322,943	61,180	$169
	2013	$3,728,611	$554,992	$610,133	$6,345,752	$11,239,488	61,180	$184
	2014	$4,472,506	$657,546	$623,061	$6,786,876	$12,539,989	61,180	$205
Okotoks	2012	$790,326	$324,219	$404,387	$2,888,532	$4,407,464	24,962	$177
	2013	$1,559,145	$324,219	$433,925	$2,888,532	$5,205,821	26,319	$198
	2014	$2,552,303	$324,219	$480,128	$2,888,532	$6,245,182	27,331	$229
Red Deer	2012	$5,312,213	$364,308	$859,900	$10,931,264	$17,467,685	91,877	$190
	2013	$5,615,895	$316,036	$834,185	$12,110,535	$18,876,651	97,109	$194
	2014	$5,876,031	$371,185	$887,361	$12,764,880	$19,899,457	98,585	$202

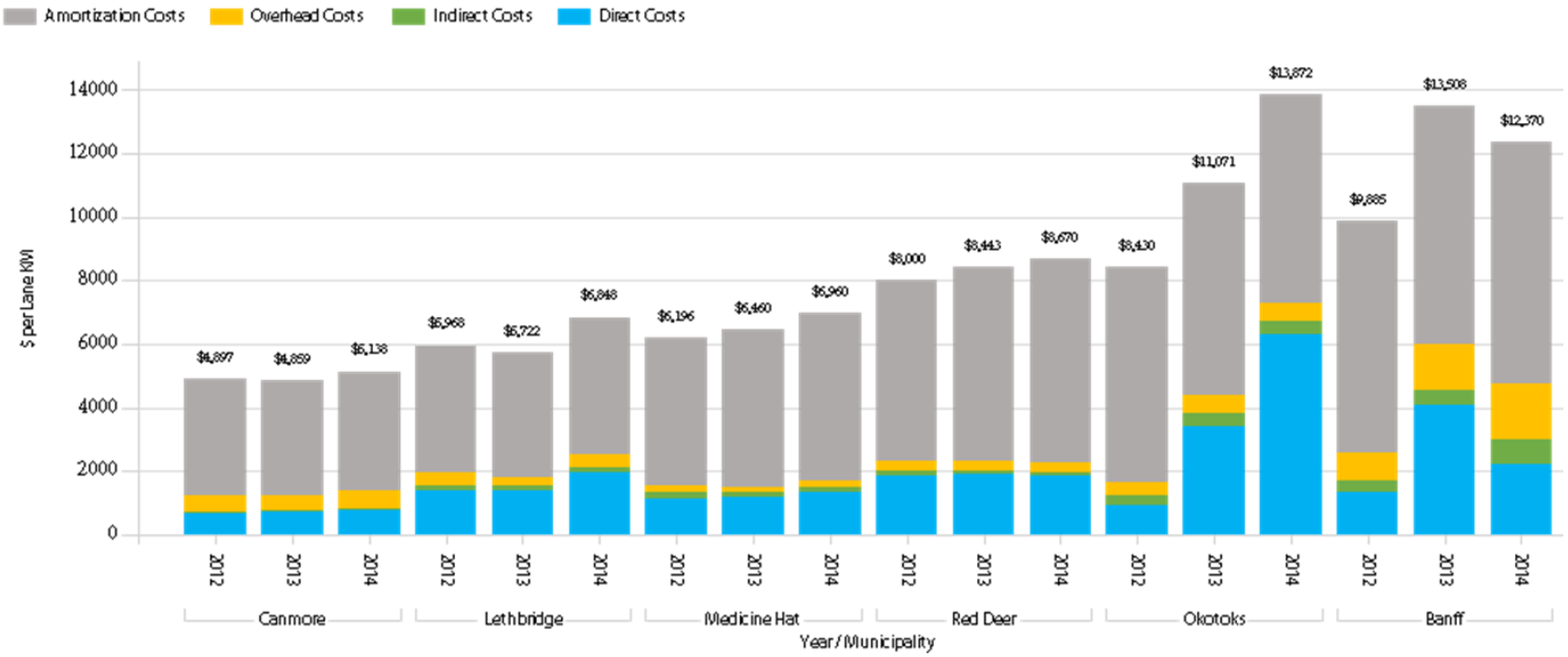
2.3.2 Lessons learned

1. The average cost per capita is $179, with a range from $135 (Banff 2012) to $229 (Okotoks 2014).

2. The transportation system total cost per capita is similar for the six municipalities versus more variation in the cost per traffic lane KM. The transportation subject matter experts (SMEs) recommend collecting data in the future to determine why this occurs.

2.4 Roadways and Parking Lots Maintenance Costs ($/traffic lane KM) - Efficiency

This chart shows the total cost for roadways and parking lots maintenance activities per traffic lane KM of roadways. Maintenance activities include inspection and repair of road assets, e.g. road surfaces, storm culverts and guardrails. Municipalities are in order from lowest to highest cost based on the average of 2012, 2013, 2014 results.



2.4.1 Roadways Maintenance Data (See Section 3 for definitions of each column heading)

Municipality	Year	Direct Costs ($)	Indirect Costs ($)	Overhead Costs ($)	Amortization Costs ($)	Total Costs ($)	Roadways Length (lane KM)	Cost per lane KM ($)
Banff	2012	$104,581	$27,497	$67,067	$561,966	$761,110	77	$9,885
	2013	$314,649	$34,852	$111,784	$578,829	$1,040,115	77	$13,508
	2014	$169,933	$62,595	$132,645	$587,310	$952,483	77	$12,370
Canmore	2012	$137,406	$5,154	$91,797	$710,762	$945,118	193	$4,897
	2013	$145,916	$4,875	$92,803	$694,267	$937,860	193	$4,859
	2014	$150,818	$5,254	$113,711	$721,761	$991,544	193	$5,138
Lethbridge	2012	$2,085,042	$218,046	$617,450	$5,900,772	$8,821,310	1,478	$5,968
	2013	$2,158,600	$192,010	$426,856	$5,942,635	$8,720,102	1,524	$5,722
	2014	$3,121,005	$231,422	$630,616	$6,774,901	$10,757,944	1,571	$6,848
Medicine Hat	2012	$1,258,167	$234,325	$229,360	$5,142,811	$6,864,663	1,108	$6,196
	2013	$1,293,434	$185,731	$204,184	$5,506,584	$7,189,933	1,113	$6,460
	2014	$1,486,276	$220,061	$208,520	$5,915,024	$7,829,881	1,125	$6,960
Okotoks	2012	$309,943	$107,702	$134,333	$2,238,439	$2,790,416	331	$8,430
	2013	$1,133,586	$139,274	$186,400	$2,238,439	$3,697,699	334	$11,071
	2014	$2,141,994	$135,456	$200,594	$2,238,439	$4,716,483	340	$13,872
Red Deer	2012	$2,630,479	$201,254	$475,033	$8,037,436	$11,344,202	1,418	$8,000
	2013	$2,746,596	$169,192	$446,588	$8,795,355	$12,157,731	1,440	$8,443
	2014	$2,702,979	$180,801	$432,226	$9,290,890	$12,606,895	1,454	$8,670

NOTES:

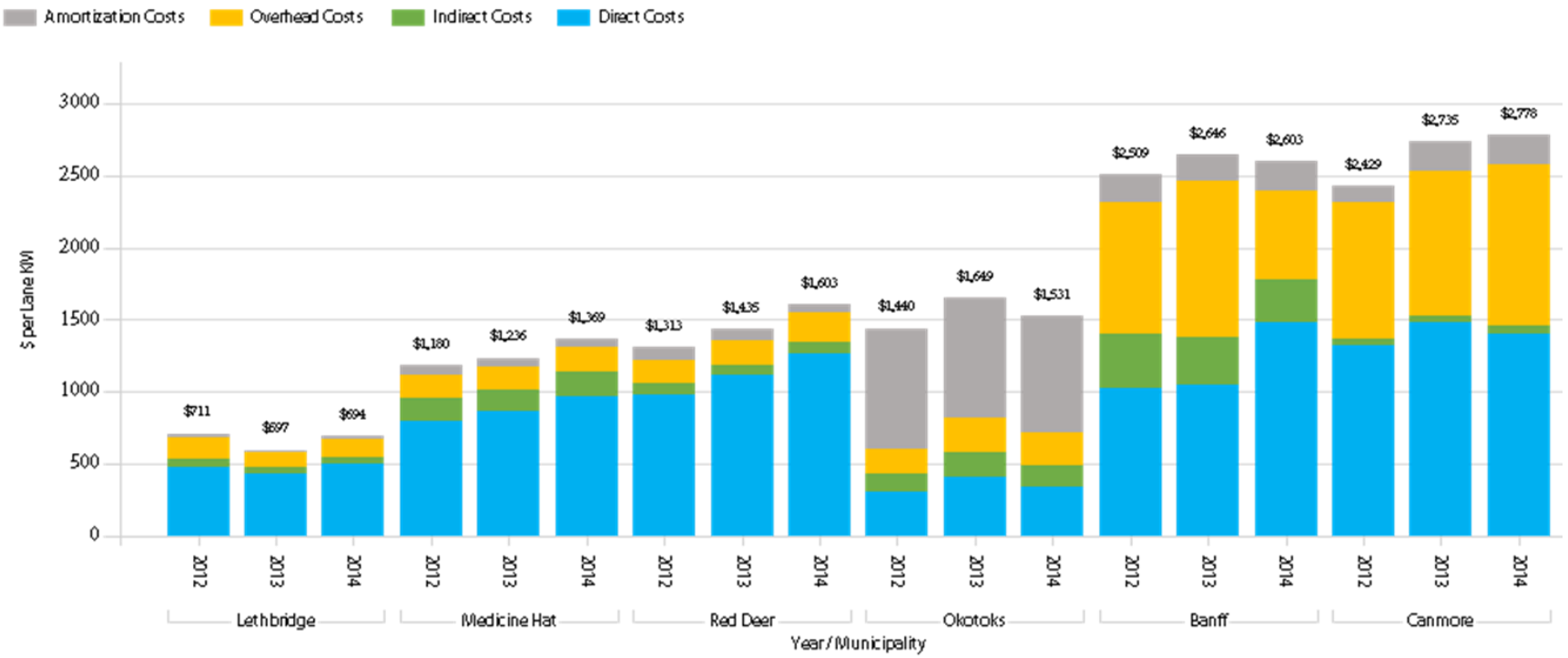
1. Roadways maintenance costs include costs to maintain parking lanes on roads and municipally owned parking lots but these are not included in the measure of lane KM.

2.4.2 Lessons Learned

1. The average total cost per traffic lane KM $8,183 while the range is $4,859 (Canmore 2013) to $13,872 (Okotoks 2014).

2.5 Roadways Operations Costs ($/traffic lane KM) - Efficiency

This chart shows the total cost for operations activities per traffic lane KM of roadways. Operations activities include cleaning, dust control and putting markings on the road surface. Municipalities are in order from lowest to highest cost based on the average of 2012, 2013, 2014 results.



2.5.1 Roadways Operations Data (See Section 3 for definitions of each column heading)

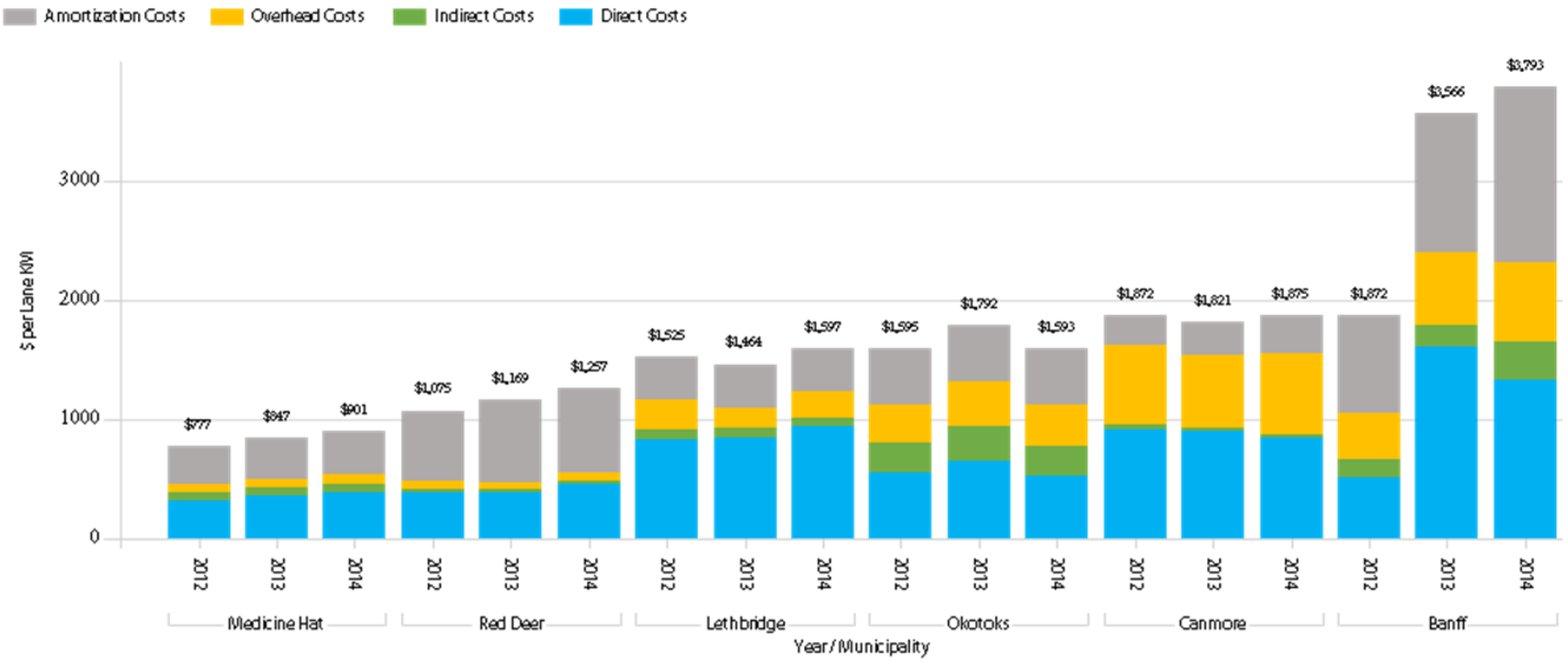
Municipality	Year	Direct Costs ($)	Indirect Costs ($)	Overhead Costs ($)	Amortization Costs ($)	Total Costs ($)	Roadways Length (Lane KM)	Cost per Lane KM ($)
Banff	2012	$79,100	$28,878	$70,435	$14,786	$193,199	77	$2,509
	2013	$80,444	$26,043	$83,531	$13,695	$203,714	77	$2,646
	2014	$113,852	$22,689	$48,081	$15,832	$200,454	77	$2,603
Canmore	2012	$254,459	$10,221	$182,046	$22,164	$468,889	193	$2,429
	2013	$285,506	$10,081	$191,908	$40,445	$527,939	193	$2,735
	2014	$271,647	$9,949	$215,326	$39,301	$536,222	193	$2,778
Lethbridge	2012	$715,232	$79,075	$223,921	$32,937	$1,051,165	1,478	$711
	2013	$666,282	$65,682	$146,017	$31,464	$909,444	1,524	$597
	2014	$792,541	$71,978	$196,138	$28,850	$1,089,507	1,571	$694
Medicine Hat	2012	$878,873	$178,756	$174,968	$74,910	$1,307,507	1,108	$1,180
	2013	$959,811	$165,434	$181,871	$68,333	$1,375,450	1,113	$1,236
	2014	$1,088,007	$197,961	$187,579	$66,316	$1,539,863	1,125	$1,369
Okotoks	2012	$99,997	$45,070	$56,215	$275,437	$476,719	331	$1,440
	2013	$136,516	$59,329	$79,404	$275,437	$550,686	334	$1,649
	2014	$114,402	$52,631	$77,939	$275,437	$520,409	340	$1,531
Red Deer	2012	$1,397,786	$100,450	$237,100	$126,138	$1,861,474	1,418	$1,313
	2013	$1,613,562	$95,254	$251,425	$105,515	$2,065,755	1,440	$1,435
	2014	$1,836,470	$121,052	$289,390	$84,328	$2,331,240	1,454	$1,603

2.5.2 Lessons Learned

1. The average operations total cost per traffic lane KM is $1,692 while the range is $597 (Lethbridge 2013) to $2,778 (Canmore 2014).

2.6 Roadways Traffic Control Costs ($/traffic lane KM) – Efficiency

This chart shows the total cost for traffic control activities per traffic lane KM of roadways. Traffic control includes signage and traffic signals. Municipalities are in order from lowest to highest cost based on the average of 2012, 2013, 2014 results.



2.6.1 Roadways Traffic Control Data (See Section 3 for definitions of each column heading)

Municipality	Year	Direct Costs ($)	Indirect Costs ($)	Overhead Costs ($)	Amortization Costs ($)	Total Costs ($)	Roadways Length (Lane KM)	Cost per Lane KM ($)
Banff	2012	$39,596	$12,031	$29,345	$63,142	$144,114	77	$1,872
	2013	$123,654	$14,630	$46,923	$89,344	$274,551	77	$3,566
	2014	$103,076	$24,112	$51,096	$113,756	$292,040	77	$3,793
Canmore	2012	$177,992	$7,149	$127,339	$48,787	$361,267	193	$1,872
	2013	$173,433	$6,124	$116,576	$55,318	$351,451	193	$1,821
	2014	$163,579	$5,991	$129,664	$62,631	$361,865	193	$1,875
Lethbridge	2012	$1,230,231	$126,257	$357,527	$539,688	$2,253,702	1,478	$1,525
	2013	$1,287,919	$120,766	$268,474	$554,153	$2,231,312	1,524	$1,464
	2014	$1,472,814	$127,566	$347,612	$560,227	$2,508,219	1,571	$1,597
Medicine Hat	2012	$353,231	$81,376	$79,652	$347,016	$861,275	1,108	$777
	2013	$395,991	$75,755	$83,282	$387,382	$942,410	1,113	$847
	2014	$428,843	$89,659	$84,957	$409,754	$1,013,213	1,125	$901
Okotoks	2012	$184,015	$82,939	$103,447	$157,666	$528,067	331	$1,595
	2013	$218,612	$95,007	$127,155	$157,666	$598,440	334	$1,792
	2014	$179,347	$82,509	$122,185	$157,666	$541,707	340	$1,593
Red Deer	2012	$552,744	$39,722	$93,759	$838,385	$1,524,611	1,418	$1,075
	2013	$561,007	$33,118	$87,416	$1,001,890	$1,683,431	1,440	$1,169
	2014	$655,486	$43,207	$103,291	$1,025,461	$1,827,445	1,454	$1,257

NOTES:

1. For Lethbridge, the cost of rail signals is included with traffic signals.

2. For Medicine Hat, rail signals are only a small part of traffic control costs.

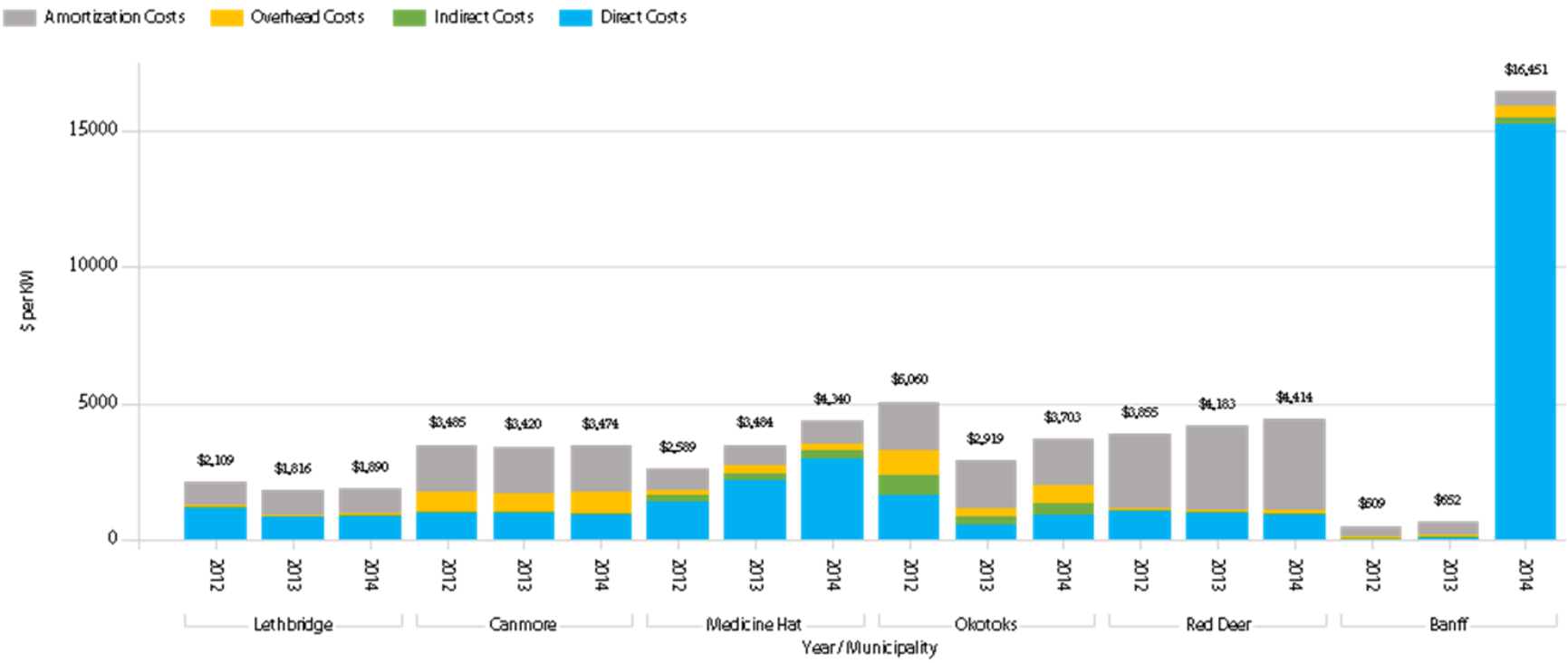
2.6.2 Lessons Learned

1. The average total cost per traffic lane KM $1,688 while the range is $777 (Medicine Hat 2012) to $3,793 (Banff 2014).

2. The data suggests economies of scale do apply, i.e. having more roads leads to less traffic control cost per traffic lane KM.

Roadways ROW Sidewalks Costs ($/KM) – Efficiency

This chart shows the total cost of maintenance activities for sidewalks in the roadways right of way (ROW) per KM of sidewalk. The ROW extends from the public-private boundary on one side of the road to the boundary on the other side. Municipalities are in order from lowest to highest cost based on the average of 2012, 2013, 2014 results.



2.6.3 Sidewalks Data (See Section 3 for definitions of each column heading)

Municipality	Year	Direct Costs ($)	Indirect Costs ($)	Overhead Costs ($)	Amortization Costs ($)	Total Costs ($)	Sidewalks Length (KM)	Cost per KM ($)
Banff	2012	$886	$360	$877	$10,088	$12,211	24	$509
	2013	$1,625	$563	$1,805	$11,658	$15,650	24	$652
	2014	$366,349	$4,989	$10,571	$12,915	$394,824	24	$16,451
Canmore	2012	$59,417	$2,387	$42,509	$101,278	$205,590	59	$3,485
	2013	$58,854	$2,078	$39,559	$101,278	$201,769	59	$3,420
	2014	$56,691	$2,076	$44,937	$101,278	$204,982	59	$3,474
Lethbridge	2012	$823,232	$1,281	$3,626	$574,451	$1,402,590	665	$2,109
	2013	$602,791	$9,034	$20,083	$595,795	$1,227,702	676	$1,816
	2014	$600,178	$17,316	$47,184	$631,631	$1,296,309	686	$1,890
Medicine Hat	2012	$695,252	$111,258	$108,900	$374,088	$1,289,498	498	$2,589
	2013	$1,079,375	$128,071	$140,796	$383,453	$1,731,695	497	$3,484
	2014	$1,469,380	$149,865	$142,005	$395,782	$2,157,032	497	$4,340
Okotoks	2012	$196,371	$88,508	$110,393	$216,990	$612,262	121	$5,060
	2013	$70,431	$30,609	$40,966	$216,990	$358,996	123	$2,919
	2014	$116,560	$53,623	$79,410	$216,990	$466,583	126	$3,703
Red Deer	2012	$731,204	$22,881	$54,007	$1,929,305	$2,737,397	710	$3,855
	2013	$694,730	$18,472	$48,760	$2,207,775	$2,969,736	710	$4,183
	2014	$681,096	$26,125	$62,447	$2,364,201	$3,133,869	710	$4,414

NOTES:

1. Banff had a major sidewalks maintenance and replacement program in 2014, which accounts for that year's $16,451 cost/KM.

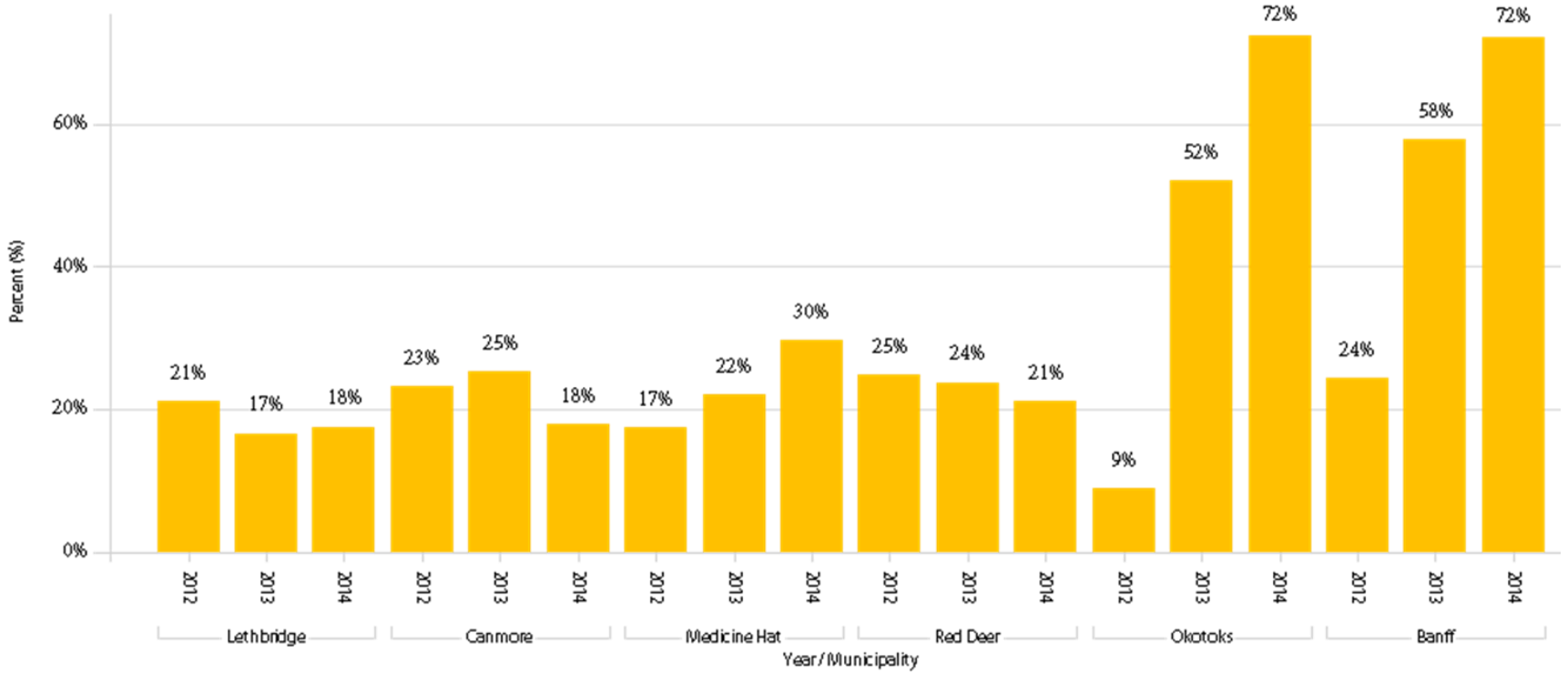
2.6.4 Lessons Learned

1. The Banff results are an outlier. Banff was doing minimal sidewalk maintenance, and then in 2014 undertook expenditures for a special project approved by Council. This differs from the continuous maintenance programs of other municipalities for the three year period. The average cost 2012 to 2014 for Banff is $5,871 per KM vs. the average cost for all others at $3,383 per KM.

2. The average total cost per KM is $3,797. Excluding Banff, the range in cost per KM is $1,816 (Lethbridge 2013) to $5,060 (Okotoks 2012).

2.7 Contracted Costs vs. Transportation System Direct Costs (%)

This chart shows what portion of total direct costs is contracted out to third parties. This illustrates how municipalities approach this service area; contract out or operate the service internally. Municipalities are in order from lowest to highest based on the average of 2012, 2013, 2014 results.



2.7.1 Contracted vs. Total Transportation Direct Costs (%) (See Section 3 for definitions of each column heading)

Municipality	Year	Contract Costs ($)	Total Direct Costs ($)	Percent (%)
Banff	2012	$54,730	$224,163	24%
	2013	$300,628	$520,372	58%
	2014	$543,474	$753,210	72%
Canmore	2012	$145,895	$629,274	23%
	2013	$168,004	$663,709	25%
	2014	$115,641	$642,735	18%
Lethbridge	2012	$1,024,721	$4,853,737	21%
	2013	$787,202	$4,715,592	17%
	2014	$1,054,154	$5,986,538	18%
Medicine Hat	2012	$556,283	$3,185,523	17%
	2013	$827,537	$3,728,611	22%
	2014	$1,327,434	$4,472,506	30%
Okotoks	2012	$70,987	$790,326	9%
	2013	$813,117	$1,559,145	52%
	2014	$1,847,556	$2,552,303	72%
Red Deer	2012	$1,321,176	$5,312,213	25%
	2013	$1,337,709	$5,615,895	24%
	2014	$1,249,380	$5,876,031	21%

NOTES:

1. In 2014 Okotoks had a year of high expenditures due to roads grants that required spending.

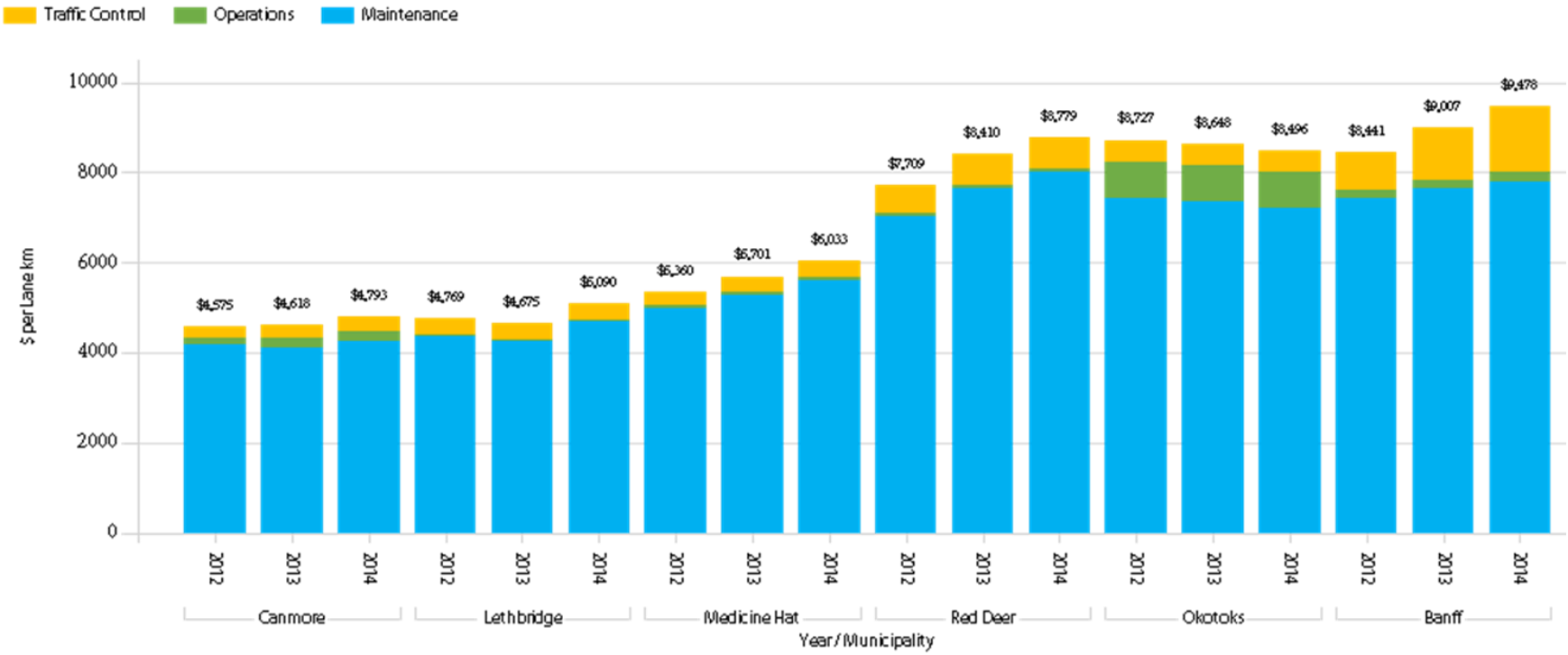
2.7.2 Lessons Learned

1. The average is 31% while the range is 9% (Okotoks 2012) to 72% (Banff and Okotoks 2014).

2. Smaller municipalities contract out maintenance projects due to a lack of internal capacity to do their own maintenance. Larger municipalities are able to minimize use of contractors because they have the equipment and staff capacity to do maintenance activities, e.g. the towns of Banff, Canmore and Okotoks average 39% contracted costs while the cities of Lethbridge and Medicine Hat and Red Deer average 22%.

2.8 Amortization Costs, Roadways Assets ($/traffic lane KM) – Efficiency

This chart shows the amortization (depreciation) cost of roadways assets per traffic lane KM of roads. Municipalities are in order from lowest to highest cost based on the average of 2012, 2013, 2014 results.



2.8.1 Amortization – Transportation Assets, Data (See Section 3 for definitions of each column heading)

Municipality	Year	Maintenance ($)	Operations ($)	Traffic Control ($)	Total Amortization Costs ($)	Roads Length (Lane KM)	Cost per Lane KM ($)
Banff	2012	$572,054	$14,786	$63,142	$649,982	77	$8,441
	2013	$590,487	$13,695	$89,344	$693,526	77	$9,007
	2014	$600,225	$15,832	$113,756	$729,813	77	$9,478
Canmore	2012	$812,040	$22,164	$48,787	$882,991	193	$4,575
	2013	$795,545	$40,445	$55,318	$891,308	193	$4,618
	2014	$823,039	$39,301	$62,631	$924,971	193	$4,793
Lethbridge	2012	$6,475,223	$32,937	$539,688	$7,047,848	1,478	$4,769
	2013	$6,538,430	$31,464	$554,153	$7,124,047	1,524	$4,675
	2014	$7,406,532	$28,850	$560,227	$7,995,609	1,571	$5,090
Medicine Hat	2012	$5,516,899	$74,910	$347,016	$5,938,825	1,108	$5,360
	2013	$5,890,037	$68,333	$387,382	$6,345,752	1,113	$5,701
	2014	$6,310,806	$66,316	$409,754	$6,786,876	1,125	$6,033
Okotoks	2012	$2,455,429	$275,437	$157,666	$2,888,532	331	$8,727
	2013	$2,455,429	$275,437	$157,666	$2,888,532	334	$8,648
	2014	$2,455,429	$275,437	$157,666	$2,888,532	340	$8,496
Red Deer	2012	$9,966,741	$126,138	$838,385	$10,931,264	1,418	$7,709
	2013	$11,003,130	$105,515	$1,001,890	$12,110,535	1,440	$8,410
	2014	$11,655,091	$84,328	$1,025,461	$12,764,880	1,454	$8,779

NOTES:

1. Amortization cost of parking lots and sidewalks are excluded as they are not measured in lane KM.
2. The average useful life for roads depends on the useful life of each layer, which can differ for each municipality. See section 2.12, Service Data, Part 2.

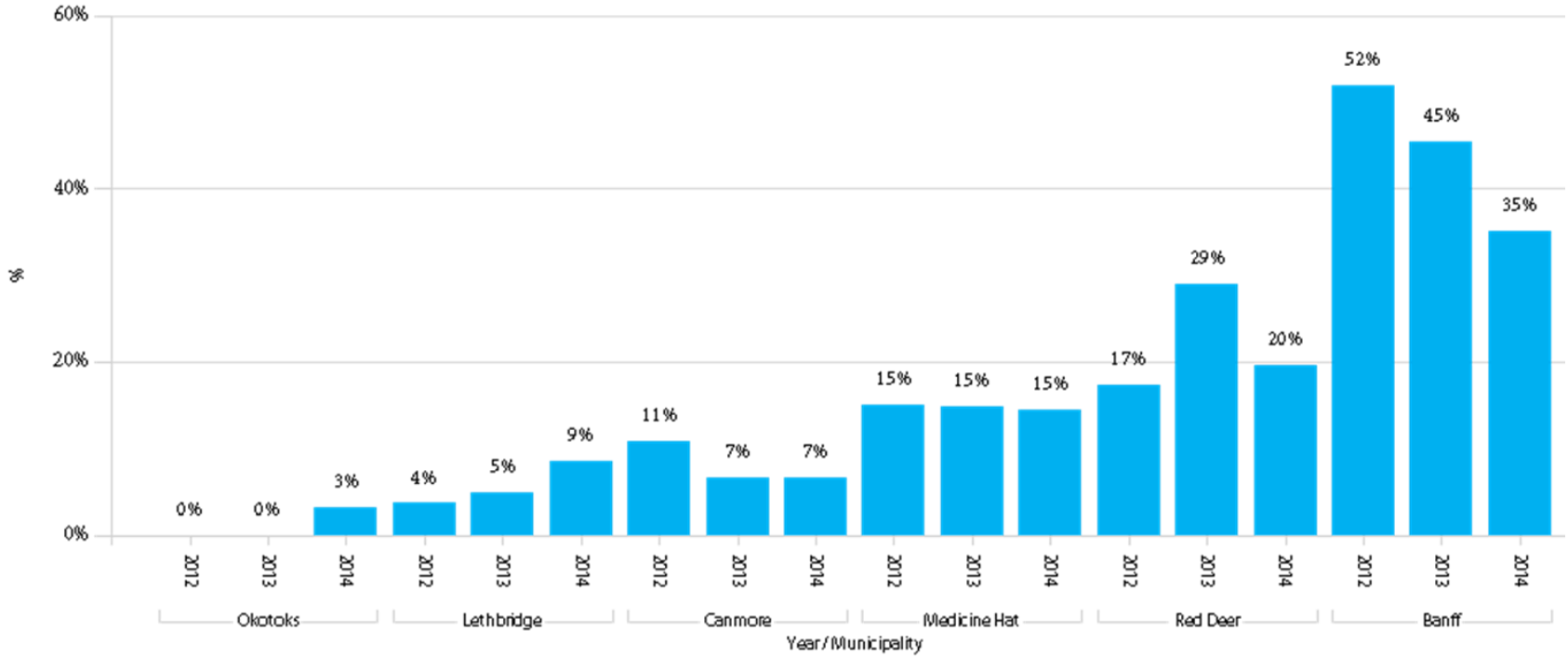
   A weighted average for the roads layers will be calculated in future reports, based on either net book value or historic cost.

2.8.2 Lessons Learned

1. The average amortization cost per traffic lane KM is $6,850 while the range is $4,575 (Canmore 2012) to $9,478 (Banff 2014)

2.9 Roadways in Poor Condition (%) – Effectiveness

This chart shows what percentage of paved roadways remains in poor condition each year. Roads condition is measured through Pavement Quality Index (PQI) survey assessments. PQI surveys may not be done each year and may not cover 100% of a roadways system when done. Municipalities are in order from lowest to highest based on the average of 2012, 2013, 2014 results.



2.9.1 Roadways in Poor Condition Data (%) (See Section 3 for definitions of each column heading)

Municipality	Year	Roadway Length Poor Condition (traffic lane KM)	Total Roadway Length (traffic lane KM)	Percent in Poor Condition (%)
Banff	2012	40	77	52%
	2013	35	77	45%
	2014	27	77	35%
Canmore	2012	21	193	11%
	2013	13	193	7%
	2014	13	193	7%
Lethbridge	2012	55	1,478	4%
	2013	76	1,524	5%
	2014	135	1,571	9%
Medicine Hat	2012	168	1,108	15%
	2013	165	1,113	15%
	2014	164	1,125	15%
Okotoks	2012	0	331	0%
	2013	0	334	0%
	2014	11	340	3%
Red Deer	2012	247	1,418	17%
	2013	418	1,440	29%
	2014	286	1,454	20%

NOTES:

1. Roads inspected for condition, e.g. PQI survey, includes only paved traffic lanes. Assessment of gravel roads or lanes is not included.

2. In the future, since not all municipalities inspect 100% of traffic lanes, municipalities will report the length of roads inspected to get a more accurate measure for roads in poor condition.

3. Okotoks conducted the first independent PQI survey in 2014.

2.9.2 Lessons Learned

1. The average length of roads in poor condition is 16%, while the range is 3% (Okotoks 2012 – 2014) to 52% (Banff 2012).

2.10 Transportation Service Data **(See Section 3 for definitions of each column heading)**

This data consolidates the information about the roadways for each municipality.

Part 1

Municipality	Year	Roadways Total Length (lane KM)	Roadways Poor Condition (KM)	Frequency of PQI Survey - Arterial (years)	Frequency of PQI Survey - Collector (years)	Frequency of PQI Survey - Local (years)	Parking Lots Area (square m)	Municipal Population (#)
Banff	2012	77	40	8	8	8	33,769	8,244
	2013	77	35	8	8	8	33,769	8,244
	2014	77	27	8	8	8	33,769	9,386
Canmore	2012	193	21	5	5	5	46,711	12,317
	2013	193	13	5	5	5	46,711	12,317
	2014	193	13	5	5	5	46,711	13,077
Lethbridge	2012	1,478	55	3	3	3	14,524	89,074
	2013	1,524	76	3	3	3	14,524	90,417
	2014	1,571	135	3	3	3	14,524	93,004
Medicine Hat	2012	1,108	168	3	3	3	14,560	61,180
	2013	1,113	165	3	3	3	14,560	61,180
	2014	1,125	164	3	3	3	14,560	61,180
Okotoks	2012	331	0	0	0	0	9,456	24,962
	2013	334	0	0	0	0	10,681	26,319
	2014	340	11	5	5	5	11,606	27,331
Red Deer	2012	1,418	247	3	3	3	30,689	91,877
	2013	1,440	418	3	3	3	30,689	97,109
	2014	1,454	286	3	3	3	30,689	98,585

NOTES:

1. Okotoks conducted the first independent PQI survey in 2014.

Part 2 Roadway Layers Useful Life

Municipality	Year	Useful Life Top Layer (years)	Useful Life Middle Layer (years)	Useful Life Base Layer (years)
Banff	2012	25	50	100
	2013	25	50	100
	2014	25	50	100
Canmore	2012	20	30	50
	2013	20	30	50
	2014	20	30	50
Lethbridge	2012	20	0	60
	2013	20	0	60
	2014	20	0	60
Medicine Hat	2012	20	0	40
	2013	20	0	40
	2014	20	0	40
Okotoks	2012	15	45	45
	2013	15	45	45
	2014	15	45	45
Red Deer	2012	22	0	38
	2013	21	0	38
	2014	21	0	38

2.11 Lessons Learned, General

1. For this benchmarking Report, the roads subject matter experts (SMEs) finalized the definition for lane KMs of roadways to include only traffic lanes and exclude parking lanes. In the future, the SMEs agreed to consider replacing lane KM with surface area of pavement maintained in order to capture the area of parking lanes and parking lots, e.g. normalize costs to per square metre or per square KM of pavement.

2. For future reports, add an assessment of sidewalks in poor condition. A process for this data collection is described in the definitions manual.

3. Collect data on total capital spending on roads per square KM to determine how capital replacement programs affect roads maintenance costs.

4. Generally, roads department staff time/cost on capital project activities is not captured in the cost of the capital project. Municipalities take different approaches;

   EITHER

   This cost is included in the cost of roads maintenance, operations or traffic control, e.g. Banff, Canmore

   OR

   This cost is excluded from the cost of roads maintenance, operations or traffic control and deemed Out of Scope, e.g. Lethbridge, Medicine Hat.

5. When engineering support for roads is a corporate-wide department (smaller municipalities), all costs of engineering support on roads activities (both operations projects and capital project management) are captured in overhead cost.

6. When engineering support for roads is within and dedicated to the roads department (larger municipalities), the time/cost is divided (by % or otherwise) into;
   1. Time/costs on operational projects that are added to indirect costs (supporting roads operations)
   2. Time/costs on capital projects (project management and, in some cases, design) that are added to out of scope costs

7. For this benchmarking report, the SMEs decided to limit the definition of average roads useful life to the simple average in years. In the future, the SMEs agreed to calculate a weighted average based on net book value or historic cost of the road layers, e.g. for

Banff, simple average useful life of all road layers is 58 years while the weighted average is 49 years. In the future, consider normalizing total amortization cost using weighted average of roads layers useful life rather than traffic lane KM.

Definitions Manual, Roadways

Alberta Municipal Benchmarking Initiative

3 Definitions Manual, Transportation

3.1 Municipal Transportation Systems

Roads services provide affordable, well-managed and safe traffic flow for pedestrians, cyclists, drivers, public transit and commercial traffic. A municipality's transportation system affects the economic vitality and quality of life of residents by providing ease of access to other residences, and institutional, commercial, recreational and cultural facilities.

Transportation infrastructure generally includes roads, bridges, culverts, sidewalks, pathways, traffic control systems, signage, medians and boulevards. Roads services maintains the system by repairing/replacing road surfaces, marking the road directional lane and other lines, keeping traffic signals and signage operational, and clearing the transportation network of debris to keep it safe and convenient to use.

3.2 Benchmark Data Definitions - Costs

All costs for Benchmarking are OPERATING COSTS ONLY. Capital costs are not to be included.

NOTE:

1. For the definitions below, replacement of sections of road or sidewalks, or traffic control assets, becomes a capital project when the project cost exceeds a minimum amount, e.g. Medicine Hat has a cost limit of $50,000 for a replacement project to be capitalized.

3.2.1 Maintenance Direct Costs ($/year)

All operating direct costs involved in maintenance activities to keep the roadways (traffic lanes and parking lanes) in acceptable condition.

Includes costs to;

1. Inspect roadways and determine traffic lanes pavement condition
2. Repair of pavement for traffic lanes, parking lanes and shoulders, e.g. surface or full/partial depth by overlay, crack filling, potholes/erosion filling, frost heaves removal, bump removal
3. Repair/replace/improve gravel surfaced roadways and back lanes
4. Repair/replace/improve curbs, gutters and solid (concrete) medians/boulevards
5. Inspection/repair/cleaning/replace surface storm water and drainage, e.g. drains and back slopes, ditches, culverts, catch basins, swales
6. Repair/replace/improve guardrails, e.g. crash attenuators, guardrail sections/ends, posts

7. Repair/replace/improve bridge road surfaces
8. Repair/replace/improve municipally owned parking lots

Excludes

1. Inspection repair/cleaning/ of bridge structures
2. Cleaning/sweeping/flushing, e.g. litter, debris, dead animal pick-up, graffiti removal
3. Control/ abatement of dust, e.g. sweeping
4. Marking pavement, e.g. line painting, delineators
5. Repair/cleaning/inspection storm water systems under roadway ROW surface
6. Maintenance of vegetated medians and boulevards e.g. trees & shrubs, grass & weeds, brush cutting, mowing, chemical spray management, care of shrubs/plants/trees (Parks)

Examples of direct maintenance costs;

1. Materials used, e.g. asphalt, concrete, gravel, sand
2. Consumables used, e.g. small equipment that is not capitalized for amortization
3. Labour, wages and benefits
4. Compulsory training for certified staff, including first-aid
5. Disposal; e.g. waste materials
6. Inspections, e.g. PQI (Pavement Quality Index)
7. Contract costs, 3rd party, e.g. maintenance, specialized repairs, inspections

3.2.2 Operations Direct Costs ($/year)

All direct costs involved in operations activities allowing roadways to continue to function.

Includes costs to;

1. Patrol/pick-up/cleaning/sweeping/flushing, e.g. litter, debris, dead animals, graffiti removal
2. Control/abatement of dust, e.g. sweeping
3. Pavement marking/marking removal, e.g. lines (road edge, centre, lanes), raised pavement marking, sidewalk corners, crosswalks, delineators

Examples of direct operations costs;

1. Inspections
2. Materials used, e.g. chemicals, paint
3. Consumables used, e.g. small equipment that is not capitalized for amortization
4. Labour, wages and benefits
5. Compulsory training for certified staff, including first-aid
6. Disposal, e.g. waste materials
7. Contract costs, 3rd party, e.g. specialized repairs, inspections

3.2.3 Traffic Control Cost ($/year)

All direct costs involved in activities to keep traffic control assets in acceptable condition and to continue to function.

Includes costs to;

1. Clean/repair/replace signs, e.g. regulatory traffic signage ground/overhead, support posts/structures, emergency signs, wayfinding signs
2. Clean/repair/replace traffic signals
3. Clean/repair/replace pedestrian signals
4. Clean/repair/replace rail signals
5. Operate/maintenance of a traffic control centre

Excludes

1. Traffic counting, e.g. permanent/ temporary counters
2. Street lighting (too many types for comparability)

Examples of direct traffic control costs;

1. Inspections
2. Materials used
3. Consumables used, e.g. small equipment that is not capitalized for amortization
4. Labour, wages and benefits
5. Compulsory training for certified staff, including first-aid
6. Disposal, e.g. waste materials
6. Contract costs, 3rd party, e.g. specialized repairs, inspections

3.2.4 Sidewalks Cost ($/year)

All direct costs involved in activities to keep sidewalk assets within the roadways ROW in acceptable condition.

Includes costs to;

1. Condition inspections, sidewalks and pathways
2. Repair/patch/grind sidewalk defects
3. Replace sidewalks sections

Excludes

1. Maintenance of pathways in the roadways ROW

Examples of direct sidewalk costs;

1. Inspections
2. Materials used, e.g. asphalt, concrete, gravel, sand
3. Labour, wages and benefits
4. Compulsory training for certified staff, including first-aid
5. Disposal, e.g. waste materials
6. Contract costs, 3rd party, e.g. specialized repairs, inspections

3.2.5 Parking Lots Direct Costs ($/year)

All direct costs involved in activities to keep parking lot assets in acceptable condition and to continue to function, e.g. surface lots both paid and free, parkades paid and free, smart parking equipment.

Includes costs to;

1. Inspect/repair pavement, e.g. surface or full/partial depth by overlay, cracks filling, potholes/erosion filling, frost heaves removal, bump removal
2. Repair/replace/improve curbs/gutters
3. Inspect/repair/cleaning/replacement of surface drainage, e.g. drains and back slopes, ditches, culverts, catch basins
4. Patrol/pick-up/cleaning/sweeping/flushing, e.g. litter, debris, dead animals, graffiti removal
5. Control/abatement, e.g. dust
6. Marking/removal on pavement, e.g. lines (slot markers, lanes), raised pavement marking, sidewalk corners, crosswalks, delineators
7. Repair/maintain smart parking equipment

Excludes

1. Maintenance/repair of parking lanes on roadways (included in roadways repair/maintenance)
2. Parking enforcement, fee collection, and meter maintenance (included in out of scope costs)

Examples of direct parking lot costs;

1. Inspections
2. Materials used, e.g. asphalt, concrete, gravel, sand
3. Labour, wages and benefits
4. Compulsory training for certified staff, including first-aid
5. Disposal; e.g. waste materials
6. Inspections
7. Contract costs, 3rd party, e.g. maintenance, specialized repairs, inspections

3.2.6 Labour Direct Costs ($/year)

Labour costs are all costs for the internal labour wages and benefits used for roadways maintenance, operations and traffic control, and for sidewalks and parking lots.

3.2.7 Contracted Costs ($/year)

Contracted costs are all costs of contracted services used for roadways maintenance, operations, traffic control, and for sidewalks and parking lots.

3.2.8 Indirect Costs ($/year)

Indirect costs are all costs for the activities to manage and support the roadways department.

Includes costs to;

1. Manage the operations for roadways and right of way assets, e.g. salaries/office costs for managers (may be a portion of the total cost, e.g. a public works manager who is also responsible for water and wastewater)
2. Training; soft-skills (if not covered by human resources budget) and other related training not separable between maintenance, operations and traffic control, and sidewalks/pathways and parking lots

3. Memberships in professional organizations not separable between the activities of the roadways department
4. Travel
5. Planning, e.g. for the activities of the roadways department
6. Internal Engineering: engineering staff time/costs for roads operations activities and capital projects;
    - When engineering is a corporate-wide department (smaller municipalities), all time/costs of engineering staff working on roads operations and capital projects are captured in Overhead Cost
    - When engineering staff are within/dedicated to the roads/SNIC department, (larger municipalities) the time/costs are divided (% or otherwise) into two categories;
        1. Time/costs on operational projects that are added to indirect costs (supporting roads operations)
        2. Time/costs on capital projects that are captured as out of scope, consistent with tangible capital assets (TCA) reporting
7. External engineering contracted for operational projects of the roadways department.
8. Insurance

Total indirect costs are prorated (allocated) separately to roads maintenance, operations, traffic control and parking lots, and sidewalks separately in the database based on the percentage the direct cost of each represents of total direct costs to operate the transportation system.

3.2.9 Amortization Costs – Maintenance Assets ($/year)

Amortization costs for maintenance capital assets.

Includes

1. Road layer assets; top lift, middle lift and base layer
2. Curb and gutter assets
3. Medians, solid, e.g. paved
4. Rolling assets not included in fleet overhead, e.g. paving machines, equipment dedicated to crack filling, spot repairs, pressure washing
5. Public parking lots owned by the municipality; surface lots (paved and unpaved), parkades (paid and unpaid), smart parking assets

3.2.10 Amortization Costs – Operations Assets ($/year)

Amortization costs for operations capital assets.

Includes

1. Rolling assets not included in fleet overhead, e.g. street sweepers and vehicles or trailers dedicated to animal pickup, dust control on gravel roads (water trucks), line marking/removal.

3.2.11 Amortization Costs – Traffic Control Assets ($/year)

Amortization costs for traffic control capital assets.

Includes

1. Signs, e.g. regulatory traffic signage ground/overhead, emergency signs, wayfinding signs
2. Signals, e.g. traffic, pedestrian and rail crossing control
3. Support posts/structures for signs and signals
4. Traffic control centre

Excludes

1. Street lighting

3.2.12 Amortization Costs – Sidewalk Assets ($/year)

Amortization costs for Sidewalk capital assets.

Includes

1 Sidewalk assets in roadways ROW

3.2.13 Overhead Costs ($/year)

Overhead costs are all operating costs of activities necessary for the continued functioning of the municipality but not directly associated with the services being offered.

Includes

Costs for municipal wide services, e.g. human resources, IT, security, engineering, planning, financial services, Council, administration, tax funded debt interest.

NOTE:

1. Total overhead costs are allocated to each service area using a calculation in the database. The calculation includes three factors;
    - Fleet – number and value of vehicles
    - Facilities – area, sq. ft.
    - All other overhead – service area total cost and number of FTEs.

2. Overhead allocation for the roadways service area is then prorated (allocated) separately in the database to roads maintenance, operations, traffic control and parking lots, and sidewalks activities based on the percentage the direct cost of each represents of total direct costs of the transportation system.

3.2.14 Out of Scope Costs ($/year)

Out of scope costs are all operating costs for activities not captured in the direct costs for roadways maintenance, operations, traffic control and parking lots, and sidewalks.

Includes

1. Information/advertising signs
2. Snow and ice control (a separate Service Area)
3. Roadway ROW tree pruning/cutting (Parks)
4. Roadway ROW furniture maintenance (Parks)
5. Parking enforcement, fee collection, and meter maintenance
6. Storm water systems under the roadways ROW (done by Water/Wastewater)
7. Repair of roadway ROW fences (too many types)
8. Sound attenuation assets maintenance
9. Land acquisitions
10. Provincial or federal highways maintenance
11. Standby charges (too variable)
12. Roadway lighting, streetlights, (too many types, and not all maintained by municipality)

The total of these costs will be used by Finance to ensure all operating costs for the Roadways service area accounted for as recorded in the municipality's annual Non-Consolidated Financial Statements.

3.3 Benchmarking Data Definitions - Service

3.3.1 Roadway, Right of Way (ROW)

A roadway ROW is the total area between the public/private property lines. A right-of-way can be any width, depending on the type of road to be constructed and the type of utilities and other features to be included in the ROW.

Includes

1. Paved surfaced vehicle travel/parking lanes
2. Gravel surfaced vehicle travel/parking lanes
3. Medians
4. Boulevard areas, which includes sidewalks, paths and landscaped area.

3.3.2 Roadways, Types

1 **Arterial**: Arterial roads are high-capacity urban roads between urban centres. The primary function of an arterial road is unimpeded high-speed movement between city centres and primary highways. Speed limits are typically between 50 and 80 km/h. The width of arterial roads can range from four lanes to ten or more. Some are divided at the center, while others share a common center lane, such as a central turning lane.

2 **Collector**: A collector road is a low-to-moderate-capacity road which serves to move traffic from local streets to arterial roads. Unlike arterials, collector roads are designed to provide access to residential areas. Speed limits are typically 30 to 60 km/hr. in built-up areas, depending on the degree of development.

3 **Local**: Local streets are quieter, often residential in use and character, and may be used for vehicle parking. Local streets can be one-way or two-way.
4 **Private:** Streets or lanes not in a ROW but maintained by a municipality.
5 **Lane**: A narrow lane or back alley, a passage way that runs between or behind buildings in towns and cities.
6 **Emergency Lane**: Lanes with locked gates accessed by emergency vehicles only.

3.3.3 Roadways Length (lane KM)

A roadway lane is defined as a lane in the roadway ROW travelable by a vehicle (a traffic lane) and maintained by the municipality.

Includes

1. Total centreline length of all roadways types multiplied by the number of traffic lanes in the roadways;
    - Arterial
    - Collector
    - Local
    - Private
    - Lanes, back alleys; paved or gravel, considered to be one lane regardless of width
    - Emergency
    - Bridge road surfaces, if not included in other roadways

Excludes

1. Parking lanes on roads
2. Railway crossings, if not included in other roadway
3. Sidewalks
4. Pathways
5. Medians
6. Boulevards

3.3.4 ROW Sidewalks (KM)

The length of sidewalks is the centreline length maintained by the municipality in the roadways ROW.

3.3.5 ROW Pathways (KM)

The length of pathways is the centreline length maintained by the municipality in the roadways ROW.

3.3.6 Parking Lots (m^2)

The area of parking lots maintained by the municipality is measured in square metres.

Excludes

1. Roadway parking lanes
2. Parking lots adjacent to and serving municipal services, e.g. recreation centre, that are maintained by the facility they serve

3.3.7 Roadways Pavement Condition (KM)

The pavement condition of roads is established by an evaluation/rating system that results in a Pavement Quality Index (PQI) from 1 to 10, with 10 being perfect. Each paved roadway type has a target PQI threshold. Once the road pavement reaches this value, or lower, is put on a list for future rehabilitation.

Includes

1. Paved road traffic lane length in lane KM, by road type, assessed in "poor condition" and remaining in need of surface rehabilitation maintenance; overlay, crack sealing and micro-surfacing/slurry seal
    - Arterial
    - Collector
    - Local
2. Condition assessment frequency, in years, by road type, e.g. 3 years
    - Arterial
    - Collector
    - Local

Excludes

1. Parking lanes on roads
2. Lanes (back lanes may not be serviced)
3. Capital projects for reconstruction/utility replacement

3.3.8 Sidewalk Condition (metres) – for future reports

Length of sidewalks in metres in the roadways ROW rated in poor condition. The performance measure (PM) for sidewalks condition, calculated in the benchmarking database, will be the length of sidewalks in poor condition as a percentage of total length of sidewalks, e.g. for 10,000m of sidewalks rated in poor condition for a system of 100km total length of sidewalks with, the measure of sidewalks in poor condition is 10%.

Includes (for Benchmarking)

1. A standard sidewalk defined as 1.2 to 1.5 m wide
2. Annual condition survey with the condition rating on a scale from 1 to 10; good (7 -10), fair (4-6), poor (1-3)
3. The total length of sidewalks and pathways rated in poor condition or presents a risk due to location, e.g. near a school or hospital, that has been prioritized for repair, will be the sum of;
    - Sidewalk sections, in metres, rated in poor condition
    - Repairs, that are normally recorded by counting defects to sidewalks, will be converted to length, e.g. a count of grinding and crack defects that are less than 1 metre in length = # defects X 1.5 metres per defect.

3.4 Benchmarking Performance Measures; Calculations

All calculations are made in the database system based on finalized data input from municipalities.

Efficiency

1. Total Transportation System Costs 1 ($/lane KM) – Components

$$\frac{Roads\ Maintenance\ and\ Parking\ Lots\ Costs + Roads\ Operations\ Costs + Roads\ Traffic\ Control\ Costs + Sidewalks\ Costs}{Traffic\ lane\ KM\ of\ Roadways}$$

2. Total Transportation System Costs 2 ($/lane KM) – Cost Type

$$\frac{Roadways\ and\ Parking\ Lots\ + Sidewalks\ Direct\ Costs + Indirect\ Costs + Overhead\ Costs + Amortization\ Total\ Costs}{Traffic\ lane\ KM\ of\ Roadways}$$

3. Total Transportation System Costs 3 ($/capita) – Cost Type

$$\frac{Roadways\ and\ Parking\ Lots\ +\ Sidewalks\ Direct\ Costs + Indirect\ Costs\ +\ Overhead\ Costs + Amortization\ Total\ Costs}{Municipal\ Population}$$

4. Roadways and Parking Lots, Maintenance Costs ($/lane KM)

$$\frac{Maintenance\ and\ Parking\ Lots\ Direct\ Costs\ + Prorated\ Indirect\ Costs + Prorated\ Overhead\ Costs + Amortization\ of\ Maintenace\ and\ Parking\ Lots\ Assets}{Traffic\ lane\ KM\ of\ Roadways}$$

5. Roadways Operations Costs ($/lane KM)

$$\frac{Operations\ Activities\ Direct\ Costs\ +\ Prorated\ Indirect\ Costs\ +\ Prorated\ Overhead\ Costs + Amortization\ of\ Operations\ Assets}{Traffic\ Lane\ KM\ of\ Roadways}$$

6. Roadways Traffic Control Costs ($/lane KM)

$$\frac{Traffic\ Control\ Activities\ Direct\ Costs\ +\ Prorated\ Indirect\ Costs\ +\ Prorated\ Overhead\ Costs + Amortization\ of\ Traffic\ Control\ Assets}{Traffic\ Lane\ KM\ of\ Roadways}$$

7. Roadways ROW Sidewalks Costs ($/KM)

$$\frac{Sidewalks\ Direct\ Costs + Prorated\ Indirect\ Costs\ +\ Prorated\ Overhead\ Costs\ +\ Amortization\ of\ Sidewalks\ Assets}{KM\ of\ Sidewalks}$$

8. Amortization – Roadways Assets ($/lane KM)

$$\frac{Amortization\ of\ Maintenance\ Assets + Amortization\ of\ Operations\ Assets + Amortization\ of\ Traffic\ Control\ Assets}{Traffic\ lane\ KM\ of\ Roadways}$$

9. Contracted vs. Total Direct Costs (%)

$$\frac{Contracted\ Costs}{Total\ Direct\ Costs}\ X\ 100$$

Effectiveness

10. Roadways Poor Condition vs. Total Lane KM (%)

$$\frac{Roadway\ traffic\ lane\ length\ remaining\ in\ poor\ condition\ from\ previous\ PQI\ Survey}{Traffic\ lane\ KM\ of\ Roadways} X\ 100$$