

STATUS ON BRIDGE AND STREET FUNDING NEEDS

Introduction:

This report is an attempt to determine a general level of maintenance and reconstruction funding needed to meet the needs of the existing street network in the City of Rapid City. For the purposes of this report, general assumptions and estimations are used for the street network as a whole. A detailed analysis on a street by street basis is outside the scope of this report. Actual funding needs would likely vary year by year based on the actual condition and age of individual street segments. Estimated costs are in 2017 dollars.

Bridge Funding:

Bridge / Large Box Culvert Inventory (Approximate):

- 35 Structures
- 17,950 SYD of bridge decking / culvert areas

Theoretical Bridge Maintenance & Reconstruction Interval:

1. Year 0 = New Construction
2. Year 25 = Epoxy Chip Seal @ \$200 / SYD
3. Year 40 = Railing Painting @ \$18,000 / Bridge
4. Year 50 = Low Slump Dense Concrete Overlay @ \$450 / SYD
5. Year 80 = Reconstruction @ \$2,000 / SYD (based on Creek Drive bridge with design and construction admin)

Total Maintenance Costs over the 80 Year structure life:

$17,950 \text{ SYD} * \$200 \text{ (Epoxy)} + 35 * \$18,000 \text{ (Railing Paint)} + 17,950 \text{ SYD} * \450 (LSDCO)

$\approx \$12,000,000$ over 80 years, or

$\approx \$150,000$ / Year

Total Reconstruction Costs over the 80 Year structure life:

$17,950 \text{ SYD} * \$2000 \text{ (Reconstruction Costs)}$

$\approx \$36,000,000$ over 80 years, or

$\approx \$450,000$ / Year

Total Bridge Funding Needs $\approx \$150,000 + \$450,000 \approx \$600,000$ / Year

Alley Funding:

Alley Inventory (Approximate):

- 23.8 miles gravel alleys (assumed to remain gravel and maintained by Street Dept. crews)
- 10.1 miles of paved alleys

Theoretical Reconstruction Interval of paved alleys (assuming no maintenance of alleys performed):

1. Year 0 = New Construction
2. Year 40 = Reconstruction @ \$100 / Ln Ft of Alley

Total Reconstruction Costs of paved alleys over the 40 Year pavement life:

53,000 Feet * \$100 / Ln Ft (Reconstruction Costs estimated at \$35k/block. At 400' \approx \$100 / Ln Ft)

\approx \$5,300,000 over 40 years, or

\approx \$130,000 / Year

Total Alley Funding Needs \approx \$130,000 / Year

Local/Residential Street Funding:

Local/Residential Street Inventory (Approximate):

- 14 miles +/- of gravel streets (Assumed paving of gravel streets is assessed. Maintenance of gravel streets assumed to be completed by Street Dept.)
- 253 miles +/- of paved streets (5 miles +/- of “downtown” streets included in “3-lane arterial” category as costs are similar).

Theoretical Maintenance & Reconstruction Interval of paved streets, assuming all local streets will be asphalt: 60 Year reconstruction interval based on existing condition and age of numerous neighborhoods. S. Robbinsdale≈60 years / Tomahawk area≈ 45 years / Baldwin≈60 years / Custer&College≈60 years / Wildwood≈50 years.

*Costs below are per linear foot of street.

1. Year 0 = New Construction
2. Year 14 = Crack Seal @ \$2.60 / Ft
3. Year 15 = Chip Seal @ \$15.00 / Ft
4. Year 25 = Mill / Overlay @ \$80.00 / Ft
5. Year 60 = Reconstruction @ \$ 650 / Ft

Total Maintenance Costs over the 60 Year pavement life:

$1,335,000 \text{ ft} * (\$2.60 \text{ (crack seal)} + \$15.00 \text{ (chip seal)} + \$80.00 \text{ (m/o)})$

≈ \$130,000,000 over 60 years, or

≈ \$2,200,000 / Year

Total Reconstruction Costs of paved streets over the 60 Year pavement life:

$1,335,000 \text{ Ft} * \$650$ (Estimated Reconstruction Costs, based on Baldwin, Maple/Nevada, Signal Drive, College/Custer...includes design and construction admin)

≈ \$867,800,000 over 60 years, or

≈ \$14,500,000 / Year

Total Residential/Local Street Funding Needs ≈ \$2,200,000 + \$14,500,000 ≈ \$16,700,000 / Year

Collector Street Funding:

Collector Street Inventory (Approximate):

- 55 miles +/- of paved streets. Assume all will be asphalt.

Theoretical Maintenance & Reconstruction Interval, assuming all collector streets will be asphalt:
60 Year reconstruction interval assumed to be same as residential.

*Costs below are per linear foot of street.

1. Year 0 = New Construction
2. Year 14 = Crack Seal @ \$3.00 / Ft
3. Year 15 = Chip Seal @ \$17.00 /Ft
4. Year 25 = Mill / Overlay @ \$90.00 / Ft
5. Year 60 = Reconstruction @ \$ 850.00 / Ft (Estimated Reconstruction Costs, assumed to be more than residential, less than 3-lane arterial)

Total Maintenance Costs over the 60 Year pavement life:

$290,000 \text{ ft} * (\$3.00 \text{ (crack seal)} + \$17.00 \text{ (chip seal)} + \$90.00 \text{ (m/o)})$

$\approx \$31,900,000$ over 60 years, or

$\approx \$500,000$ / Year

Total Reconstruction Costs over the 60 Year pavement life:

$290,000 \text{ Ft} * \$850.00$ (Estimated Reconstruction Costs, assumed to be more than residential, less than 3-lane arterial...includes design and construction admin)

$\approx \$247,000,000$ over 60 years, or

$\approx \$4,100,000$ / Year

Total Collector Street Funding Needs $\approx \$500,000 + \$4,100,000 \approx \$4,600,000$ / Year

Arterial Street Funding:

Arterial Street Inventory (Approximate):

- 45 miles of principle arterial streets (assume all will become concrete)
 - 35 miles estimated to be 5 lanes
 - 10 miles estimated to be 3 lane
- 29 miles of minor arterial (assume all will become concrete)
- 5 miles of “downtown streets”, costs similar to 3-lane arterial streets.

Theoretical Maintenance & Reconstruction Interval for 3-lane arterials:

*Costs below are per linear foot of street.

1. Year 0 = New Construction
2. Year 20 = Panel repair and joint resealing @ \$40.00 / Ft
3. Year 40 = Panel repair and joint resealing @ \$70.00 /Ft
4. Year 60 = Reconstruction @ \$ 1200.00 / Ft

Total Maintenance Costs of 3-lane arterials over the 60 Year pavement life:

232,000 ft * (\$40.00 (panel) + \$70.00 (panel))

≈ \$25,520,000 over 60 years, or

≈ \$425,000 / Year

Theoretical Maintenance & Reconstruction Interval for 5-lane arterials:

*Costs below are per linear foot of street.

1. Year 0 = New Construction
2. Year 20 = Panel repair and joint resealing @ \$55.00 / Ft
3. Year 40 = Panel repair and joint resealing @ \$85.00 /Ft
4. Year 60 = Reconstruction @ \$2400.00 / Ft

Total Maintenance Costs of 5-lane arterials over the 60 Year pavement life:

185,000 ft * (\$55.00 (panel) + \$85.00 (panel))

≈ \$25,900,000 over 60 years, or

≈ \$425,000 / Year

Total Maintenance Costs of all arterials ≈ \$425,000 + \$425,000 ≈ \$850,000 / Year

Total Reconstruction Costs for 3-lane arterials over the 60 Year pavement life:

232,000 Ft * \$1200.00 / Ft (Estimated Reconstruction Costs based on Seger Ph 1 & 2, Sheridan Lake Road...includes design and construction admin)

≈ \$278,400,000 over 60 years, or

≈ \$4,600,000 / Year

Total Reconstruction Costs for 5-lane arterials over the 60 Year pavement life:

185,000 Ft * \$2400.00 / Ft (Estimated Reconstruction Costs, Jackson Ph 2, E North Ph 2, MRR Ph.3...includes design and construction admin)

≈ \$444,000,000 over 60 years, or

≈ \$7,400,000 / Year

Total Reconstruction Costs of all arterials ≈ \$4,600,000 + \$7,400,000 ≈ 12,000,000 / Year

Total Arterial Street Funding Needs ≈ \$850,000 + \$12,000,000 ≈ \$12,850,000 / Year

Summary:

Total Bridge Funding Needs ≈ \$600,000 / yr

Total Alley Funding Needs ≈ \$130,000 / yr

Total Local Street Funding Needs ≈ \$16,700,000 / yr

Total Collector Street Funding Needs ≈ \$4,600,000 / yr

Total Arterial Street Funding Needs ≈ \$12,850,000 / yr

Assumed needs for capacity improvements, development work, right-of-way acquisitions, water quality elements, traffic signal/lights annual maintenance is ≈ 10%, or ≈ \$3,500,000 / yr

Total Required Bridge and Street Funding Needs ≈ \$38,500,000 / yr (rounded)

Actual Funding ≈ * \$13,000,000 / yr

*Assumes continuation of Utility Support Fund (.16 Fund) for street maintenance at \$1,500,000 / yr. Currently, this funding expires after 2020.

Note:

Each block of local/residential street added to inventory adds approximately \$5,000/yr in street funding needs. Collector streets and arterial streets add \$8,000/yr and \$12,000/yr respectively.