City of Milwaukee Department of Public Works

Sewer Maintenance Fund

Capital Improvement Committee (CIC)

May 4, 2011

2001-2011 Sewer Replacement

	Replaced	Lined	Total
Year	(miles)	(miles)	(miles)
2011 (est)	13.46	16.19	29.65
2010	10.51	12.82	23.33
2009	13.78	15.74	29.52
2008	14.65	2.75	17.40
2007	11.25	5.11	16.36
2006	7.61	3.49	11.10
2005	10.63	2.76	13.39
2004	8.82	1.99	10.81
2003	13.05	2.25	15.30
2002	13.70	0.66	14.36
2001	6.55	1.15	7.70
Average	11.27	5.90	17.17

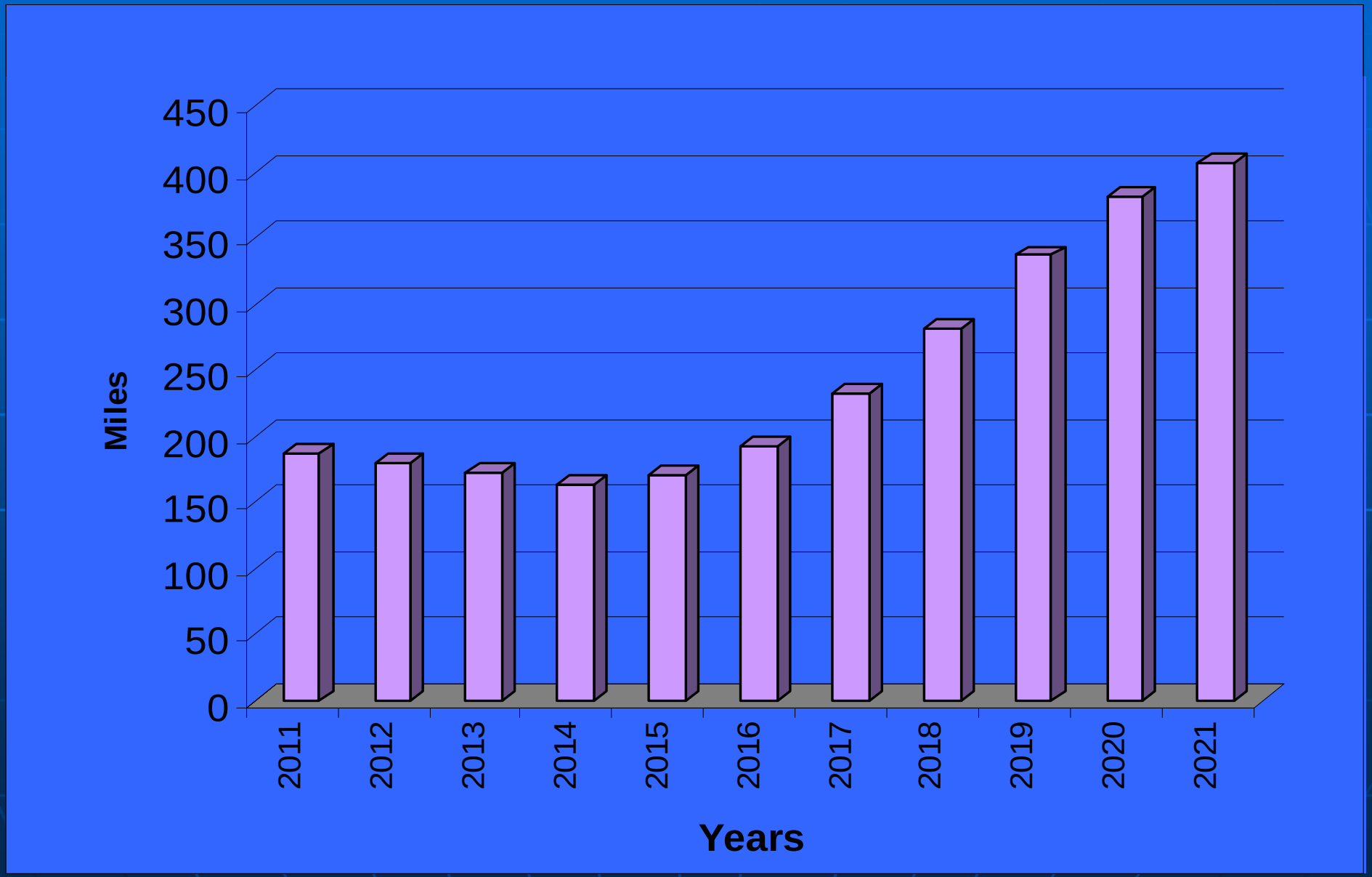
6 Year Capital Improvement Program

	Relay	Lining	Total	I/I Budget	R/R Budget	Total Budget
Year	(miles)	(miles)	(miles)	(million)	(million)	(million)
2011	13.46	16.19	29.65	$11.13	$24.00	$35.13
2012 (est)	15.00	14.10	29.10	$4.90	$29.00	$33.90
2013 (est)	15.15	14.24	29.39	$4.90	$30.00	$34.90
2014 (est)	15.30	14.38	29.68	$3.00	$31.00	$34.00
2015 (est)	15.45	14.53	29.98	$3.00	$31.00	$34.00
2016 (est)	15.61	14.67	30.28	$3.00	$32.00	$35.00
Average	15.00	14.69	29.68	$4.99	$29.50	$34.49

Total Sewer Mileage

Type of Sewer	Total	< = 21” Diameter	> 21" Diameter and < 48" Diameter	>= 48” Diameter and < 54” Diameter	=> 54” Diameter
	(miles)	(miles)	(miles)	(miles)	(miles)
Combined	547.0	311.1	149.4	17.9	68.6
Sanitary	940.4	928.5	11.4	0.4	0.0
Storm	960.6	641.9	215.9	25.0	77.9
Total	2,448.1	1,881.5	376.7	43.3	146.5

Future Sewer Lengths needed to be rehabilitated that are greater than 90-Years Old 2011-2021
(assuming an average replacement rate of 17.2 miles per year)



Age of Sewers

Type of Sewer	<26 Years	26 to 50 years	51 to 75 years	76 to 100 years	>100 Years	Total
	(miles)	(miles)	(miles)	(miles)	(miles)	(miles)
Combined	180.2	81.3	64.4	98.1	123.0	547.0
Sanitary	92.5	288.2	376.4	183.2	0.0	940.4
Storm	48.6	296.3	393.7	221.3	0.8	960.7
Total	321.3	665.8	834.5	502.6	123.8	2,448.1

Sewer Useful Life Information

City	Useful Life
City of Vancouver, Canada	90
Germany	75
Australia	95
Tacoma, Wash. USA	95
Seattle, Wash. USA	95

The expected useful life of a sewer is 90-years. A number of cities around the world have 80 to 100 years of useful life as a bench mark.

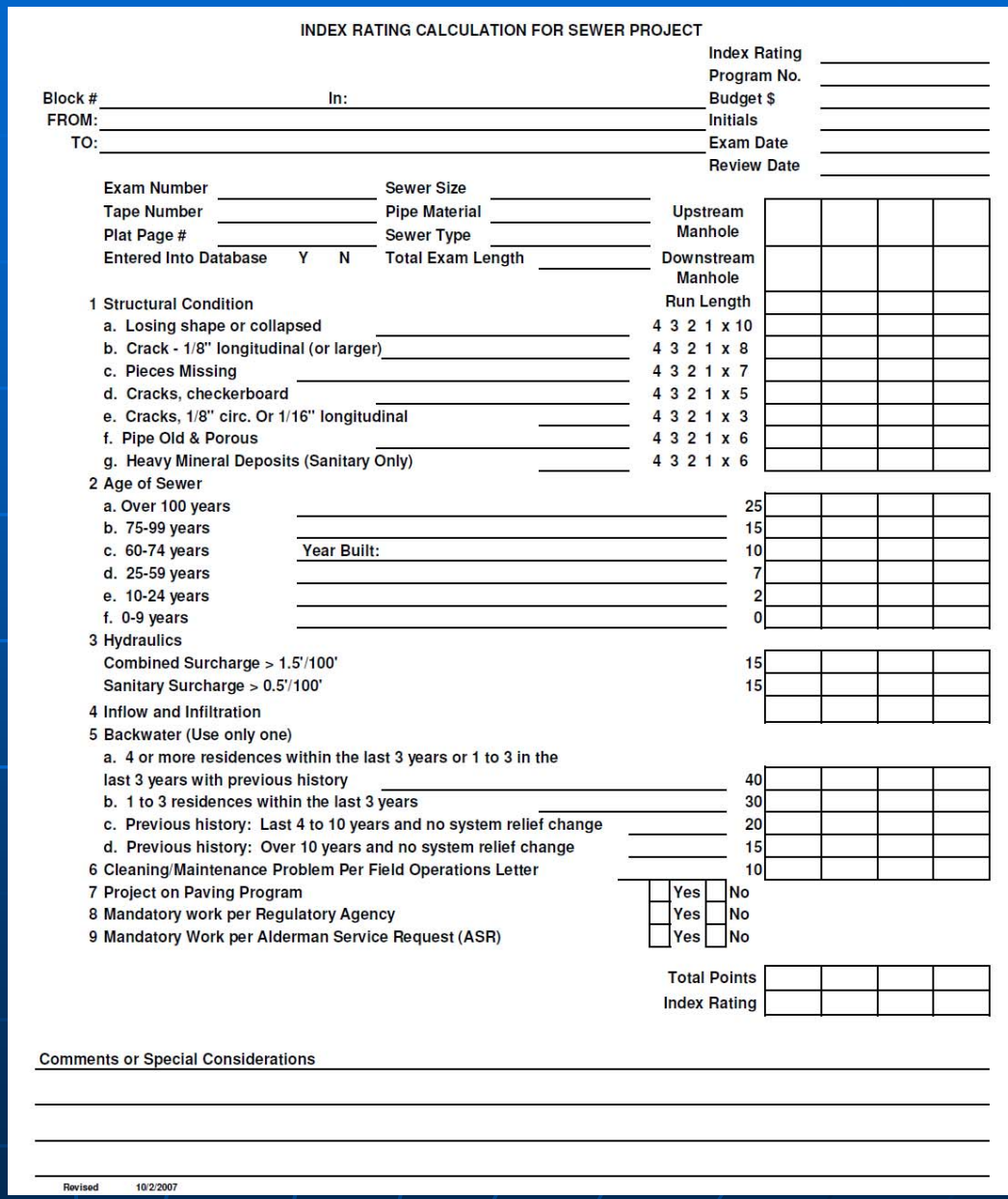
Sewer Replacement Program

On what basis are Sewer Mains selected for replacement?

- Index Rating based on Sewer Exams
- Existing Hydraulics – Backwater studies
- Paving Projects – Not part of Index Rating

Sewer Exam Rating Sheet

- Sewers are continually assessed by engineers based on their structural and hydraulic conditions. The physical condition of sewer is obtained through closed circuit television examination (CCTV) report of every sewer segment.
- The column labeled “Index Rating” contains a number between zero (0) and 100 and reflects the condition of the sewer.
- A new sewer would have an index rating of 100 and a sewer that has completely collapsed would be a 0.
- Sewers that have an Index Rating less than 65 are considered for replacement or rehabilitation and are scheduled depending on the amount of funds available.



INDEX RATING CALCULATION FOR SEWER PROJECT

Index Rating
Program No.
Budget $
Initials
Exam Date
Review Date

Block # In:
FROM:
TO:

Exam Number
Tape Number
Plat Page #
Entered Into Database Y N
Sewer Size
Pipe Material
Sewer Type
Total Exam Length

Upstream Manhole
Downstream Manhole
Run Length

1 Structural Condition
a. Losing shape or collapsed 4 3 2 1 x 10
b. Crack - 1/8" longitudinal (or larger) 4 3 2 1 x 8
c. Pieces Missing 4 3 2 1 x 7
d. Cracks, checkerboard 4 3 2 1 x 5
e. Cracks, 1/8" circ. Or 1/16" longitudinal 4 3 2 1 x 3
f. Pipe Old & Porous 4 3 2 1 x 6
g. Heavy Mineral Deposits (Sanitary Only) 4 3 2 1 x 6

2 Age of Sewer
a. Over 100 years 25
b. 75-99 years 15
c. 60-74 years 10
d. 25-59 years 7
e. 10-24 years 2
f. 0-9 years 0
Year Built:

3 Hydraulics
Combined Surcharge > 1.5'/100' 15
Sanitary Surcharge > 0.5'/100' 15

4 Inflow and Infiltration

5 Backwater (Use only one)
a. 4 or more residences within the last 3 years or 1 to 3 in the last 3 years with previous history 40
b. 1 to 3 residences within the last 3 years 30
c. Previous history: Last 4 to 10 years and no system relief change 20
d. Previous history: Over 10 years and no system relief change 15

6 Cleaning/Maintenance Problem Per Field Operations Letter 10

7 Project on Paving Program ☐ Yes ☐ No
8 Mandatory work per Regulatory Agency ☐ Yes ☐ No
9 Mandatory Work per Alderman Service Request (ASR) ☐ Yes ☐ No

Total Points
Index Rating

Comments or Special Considerations

Revised 10/2/2007

Sewer Replacement Information

- Currently there are 209 miles of City of Milwaukee sewers that are greater than 90-years old
- With 2,448 miles of sewer in the City and an annual replacement rate of 17.2 miles our current sewer replacement rate is once every 142 years
- With 2,448 miles of sewer in the City and a useful sewer life cycle of 90 years the replacement rate needed to meet the 90 year useful life cycle is 27 miles annually