



INCORPORATED 1855

TOWN OF WHITBY REPORT

RECOMMENDATION REPORT

REPORT TO: Operations Committee	REPORT NO: PW 12-11
DATE OF MEETING: June 20, 2011	FILE NO(S):
PREPARED BY: Public Works	LOCATION: All Wards
REPORT TITLE/SUBJECT:	SIDEWALKS ASSET MANAGEMENT

1.0 **RECOMMENDATION:**

1. That Public Works Report PW 12-11 be received as information.
2. That staff continue to refine the sidewalk analysis and assess various opportunities and measures to extend the life of sidewalks, including but not limited to: design standards, materials, maintenance, restoration requirements, and programming.

2.0 **EXECUTIVE SUMMARY:**

Sidewalks are a key element of our urban environment and are important for the safe movement of pedestrians. At present, the Town owns 469 km (assumed) of sidewalks with a replacement value of approximately 85 million dollars (\$175,000/km inclusive of engineering and contingencies). Note that the cost of building a new sidewalk can be greater than \$175,000/km depending on the scope of excavation requirements and site conditions, such as the number of properties and driveways affected.

In 2010, the Public Works Department initiated a comprehensive condition rating assessment of its existing (assumed) 469 km of sidewalks. The data compilation was recently completed in June 2011 and staff are in the process of auditing and performing quality control reviews on the data.

The purpose of this report is to present a status update on the work completed to date and next steps. This report is one in a series of reports that will be presented to Council over the next few years on the status and condition of assets maintained by Public Works, such as signs, bridges, culverts, guiderails, streetlights, fences, sewers, storm ponds and roads.

A thorough understanding of what we have, what condition it is in, when it needs repair, when it needs upgrading/expanding, and how much it will cost – are critical questions to be answered in ensuring the long term sustainability of our infrastructure. This understanding will help the Engineering and Operational Services Divisions of Public Works effectively assess maintenance requirements and priorities for the capital sidewalk repair/replacement program. Through a defined inspection program, staff will be able to identify risks and collect data for maintenance activities as well as capital budget forecasting and programming.

Based on our preliminary assessment of the field inspection data and in consideration of the age of the existing sidewalks, the following conditions in **Table 1** have been determined. Please refer to **Attachment A** for an illustration and description of the 5 categories that the sidewalks have been ranked.

As this is the first time such a comprehensive field assessment of the Town's sidewalks have been completed, staff are taking extra efforts in the process of auditing the data results and performing quality control to ensure reasonableness and accuracy. Given the dollar value and importance of this asset, performance of quality control audits is fundamental to ensure the database is defensible, future recommendations are sound, and that future data gathering processes are consistent and transferable between staff.

Condition Ranking	% (km) (TO BE VERIFIED)
Condition 5 – Excellent, no measureable problems	10 - 20% (47- 94 km)
Condition 4 – Good, very few problems	25 - 35% (117-164 km)
Condition 3 – Fair, beginning to show signs of distress	20 - 30% (94 -141 km)
Condition 2 – Poor, noticeable areas with deficiencies	10 - 20% (47- 94 km)
Condition 1 – Very Poor, several areas with deficiencies	5 - 15% (23-70 km)
Total	100 (469)
Note: Above is for Assumed Sidewalks only Unassumed sidewalks (46 km) have not been assessed	

In theory, concrete sidewalks have a life of 45 years. Based on a present removal and replacement cost of \$175,000/km, this equates to annual capital expenditure of \$1.9 million.

Our current annual capital maintenance envelope for sidewalks and road allowance multi-use paths is \$720,000 which is for removal and replacements. While the operating expenditures for maintenance is approximately \$65,000. Therefore, the present operating and capital maintenance effort is approximately \$800,000.

At present, we are achieving around a 30 year life with our sidewalks which with a 469 km inventory, equates to a capital cost of \$2.8 million per year.

In consideration of the preliminary findings, there is justification to further refine the sidewalk analysis and investigate and assess various opportunities and measures to extend the life of sidewalks, including but not limited to: refinement in design standards, type and compaction of materials, maintenance practices, restoration practices by others and requirements, optimization and priority programming. Opportunities for special funding, grants, etc. by other levels of government should also be pursued.

3.0 **ORIGIN:**

Report No. PW 12-11 originates from within the Public Works Department.

4.0 **BACKGROUND:**

4.1 **Asset Management 101**

While this report deals solely with sidewalks, the premise used in our approach is based on the following basic questioning and can be applied to any asset class. In particular, to be great stewards of public assets and to maximize the value for every tax dollar spent, the following fundamentals of **What, Where, How, Why, When, Who**, must be addressed:

- What do we have
- What condition is it in
- What is the value today
- What is the cost to repair
- What is the cost to replace

- Where do we need to do maintenance
- Where do we need to rehabilitate
- Where do we need to replace
- Where do we need to expand to adequately serve existing needs
- Where do we need to expand/protect to serve ultimate development (OP) needs

- How to we determine what we have (inventories, method, resources, funds, need)
- How do we determine the condition
- How we determine costing
- How do we determine what we need

- Why do we need to determine what we have, its value, condition and what we need – community safety and health, economics, risk management, government compliance, provincial legislation, etc.

- When do we need to determine what we have (and frequency)

- When do we need to determine repair and replacement cost
- When do we need to determine what we need

- Who will do inventories
- Who will do condition ratings
- Who will do cost estimating
- Who will do prioritization
- Who will pay (federal, provincial, local, capital funds, development charges)
- Who will lead

While we do not have all the answers yet for the above questions for each asset, staff are working through these processes and this report illustrates the progress to date for sidewalks.

5.0 DISCUSSION/OPTIONS:

5.1 Data Collection and Inspection

Sidewalks are an integral component of the municipality's transportation system and as the desire to move to more sustainable modes of mobility is promoted, it is recognized that there is a need for an Asset Management strategy for sidewalks which will maximize public safety and ensure regulatory compliance while maintaining fiscal responsibility.

A thorough (while streamlined) inventory of meaningful data will enable a comprehensive understanding of the condition of the assets and enable sound decision making in the programming of minor and major maintenance activities. Each data point gathered must have a use as there is often a tendency to gather too much and use only a portion. The standard inspection form is included in **Attachment B**.

For sidewalks, there are 2 primary components for the inspection, namely those completed to identify trip ledges and those inspections to identify more significant capital improvement requirements. We have established two categories as one must be reviewed yearly (legislation) and the other can be reviewed less frequent due to rate of concrete deterioration. The two components and methods are discussed below:

Trip Ledges

As per new amendments (dated February 2010) to Ontario Regulation 239/02 Minimum Maintenance Standards for Municipal Highways under the Municipal Act, 2001, sidewalks need to be inspected every year to check for vertical surface discontinuity. If a vertical surface discontinuity on a sidewalk exceeds two centimeters, the minimum standard is to treat the surface discontinuity within 14 days after becoming aware of the fact. The reason for eliminating trip ledges is for public safety. Reduction in trip ledges will reduce the risk exposure for the Town as well in terms of

insurance claims. The Asset Management Services Division in concert with staff from the Operations Division propose to conduct annual inspections and repairs to fulfill the current regulatory requirements.

In 2010, staff inspected all sidewalks within the Town for trip ledges and spent around \$60,000 in staff time checking and grinding 600 to 700 locations. In 2010, there were 143 sidewalk repair City Works requests and 6 insurance claims which take about 2 ½ days each for senior staff to deal with. The 2011 budget is in the order of \$65,000 for trip ledges.

Capital Programming

In 2010/2011, a comprehensive review of the entire Town's sidewalk inventory was undertaken. Once the database is finalized and audited through quality control verifications, it is planned that the Town's sidewalks from a capital repair/replacement perspective will only require major inspection every 4 years. That is, each year it is proposed to complete 25% of the Town's inventory. The information of course will be supplemented during the course of the year from any reports by Operations and Engineering staff as well as members of the public. The rationale for the 4 year interval is due to the rate of deterioration of concrete and that it is not felt that a full inspection every year is warranted. For roads, we typically inspect every other year unless there is a need for recalibrating the data if analysis parameters change.

The following information is collected for the sidewalk inventory:

- Street name
- To and from streets
- Length of sidewalk
- Sidewalk width
- Sidewalk material
- Position of sidewalk relative to road
- Number of Slabs
- Number of accessibility ramps
- Number of residential driveways
- Number of Commercial driveways
- Number of Industrial driveways
- Primary Users of Sidewalk
- Location (Residential, Commercial)
- Pedestrian Traffic (High, Medium, Low)
- Year Sidewalk constructed

A variety of distress types (**see Attachment C**) are identified for each of the sidewalk and curb sections and range from minor cracks to complete failure. Both the severity and density (i.e. frequency) of the condition are recorded.

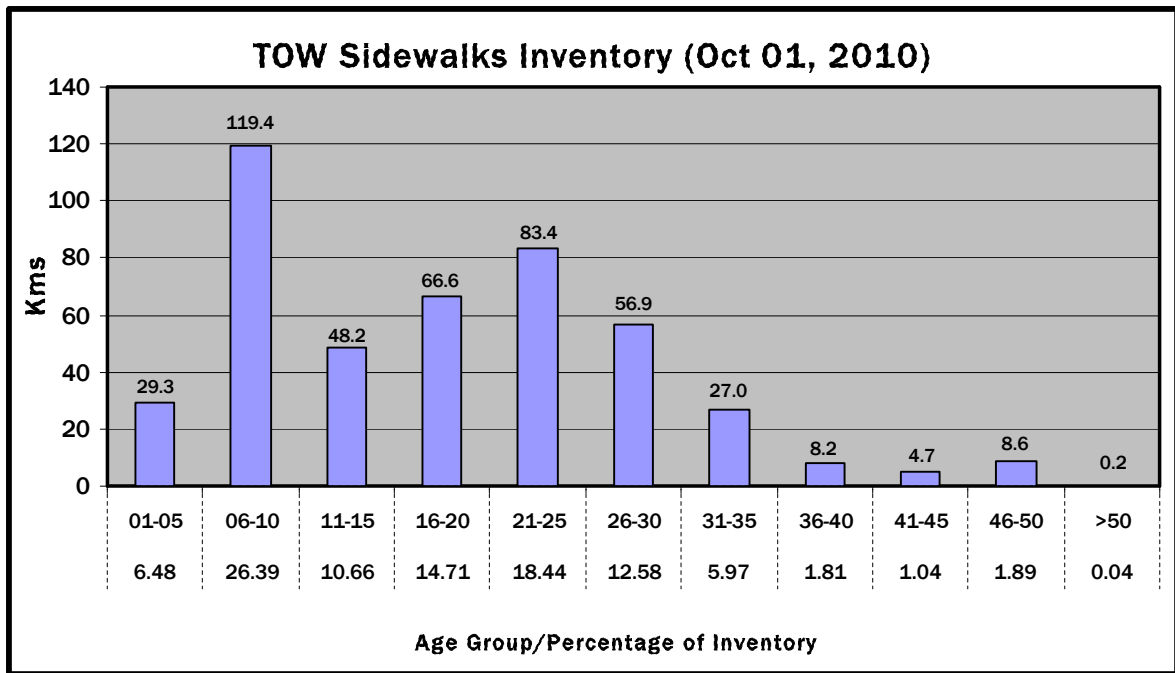
The condition of the sidewalks is analyzed on a segment basis and given a Present Serviceability Rating (PSR). PSR is an index of sidewalks condition, ranging from 1 to 5, where a score of 1 indicates the curb and sidewalk are completely deteriorated or do not exist; 5 indicates the curb and sidewalk appear to be brand new.

5.2 Condition and Age of Existing Sidewalks

The Town of Whitby (TOW) presently has 469 kilometers of sidewalks (assumed) which Public Works are responsible for. There is another 46 km of sidewalks that are anticipated to be assumed within the next 5 years.

The majority of sidewalks in the Town are made of concrete with approximately 2.5% being asphalt pathways and/or brick pavers. The theoretical life of a concrete sidewalk is estimated to be about 45 years and asphalt around 25 years. The actual life expectancy/replacement time frame experienced in the Town has been more in the order of 30 and 15 years respectively for the sidewalks and pathways.

The chart below highlights the km verse age of the existing assumed sidewalks.



Based on information to date, the average condition of the Town's sidewalks is in the good to fair rating. As over 55% of the sidewalks have been built in the past 20 years, this finding is not unexpected.

Over the next few months, staff will be refining the analysis of condition ratings, confirming the system adequacy, performing sensitivity tests on the data considering various importance weightings of distress type and working with Operations and Engineering on priority "hot spots" (e.g. locations with high pedestrian traffic) to aid in further developing the sidewalk preservation program.

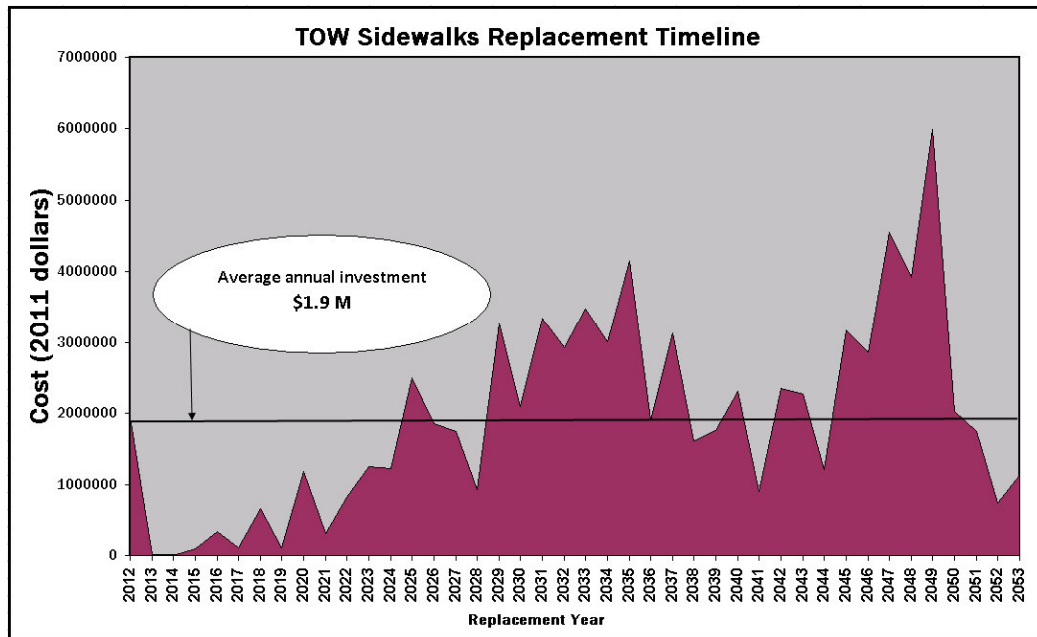
5.3 Maintenance Envelope

The replacement value of the sidewalk inventory based on actual tenders is in the order of \$175,000/km (2011 dollars) and represents the cost to remove and replace the existing sidewalk with a new sidewalk. This results of a total replacement value in the order of \$85 million (469 km x \$175,000/km).

Identified in the chart below is the estimated 45 year theoretical average annual capital budget requirement of \$1.9 million for sidewalk replacement. The current capital maintenance envelop is \$720,000 with an operating budget to repair trip ledges in the order of \$65,000 – total say \$800,000.

As we are currently replacing our sidewalks closer to a 30 year cycle, this translates into a 30 year capital cost need of \$2.8 million. Given that this far exceeds our current budget, staff in addition to assessing future funding needs, will also be investigating various opportunities to extend the life of the sidewalks such as in our design standards, materials, and maintenance practices.

It is recognized that with current fiscal realities and competing needs, it will not be possible to maintain all sidewalks in perfect condition. Industry practice for assets is to maintain the system at an adequacy of around 85 to 90% - this means no more than 10 to 15% of the system has a “now” replacement need. Over the next few months staff will be verifying the annual expenditure requirements to maintain an acceptable system adequacy over the short and longer term.



5.4 Next Steps

In addition to refining the sidewalk analysis, the following actions are planned to be undertaken by the Department:

Maintenance

The service life of a concrete sidewalk can often be extended when maintenance treatments are applied. It is believed that preventive and timely maintenance is a most cost effective measure to minimize the life cycle costs of sidewalks. The maintenance treatments may include providing good drainage across the sidewalk, pruning tree roots and repairing localized defects before they become a large problem. At present, limited preventative maintenance is undertaken with the exception of grinding of trip ledges. Applicable implementations of preventive maintenance programs will require further assessment by the Department as they represent new levels of service and could have operational budgetary impacts depending on their scope and involvement. Some treatments to review include, but are not limited to, concrete ramps at heave points, crack filling, and mud jacking.

Utilities

Often the sidewalk is compromised during its life when it is cut and/or impacted by service connections, repairs, watermain breaks, and so on. The Department has been/will continue to work on strengthening its road permitting and restoration requirements to mitigate the impacts of these occurrences.

Design

The useful life of a concrete sidewalk can be increased significantly if the appropriate sub-base of compacted granular material is placed between the sub-grade and the concrete slab. An inadequate sub-base can result in a reduction of tensile stresses and consequent sidewalk cracking. It is also important to ensure that the sub grade is properly compacted and quality of concrete and concrete placement and curing practices are adequate. Such modifications are being reviewed by the Department for inclusion, where applicable, into the engineering design standards.

Construction and Priority Programming:

Staff are continuing to review when and where replacements and repairs are undertaken in relation to both the Town's and Region's road program. Optimal timing to reduce mobilization costs and disturbances to residential driveways and properties are a few of the factors considered.

In addition, it is believed that certain user groups are more sensitive to sidewalk condition than others e.g. seniors, disabled persons, children etc. As such, the priority

review to confirm which sections are in immediate need of repair and/or replacement also needs to consider other factors in addition to the physical condition, such as pedestrian traffic, school routes, bus routes, seniors movement, and general safety.

6.0 PUBLIC COMMUNICATIONS/PLAN:

N/A

7.0 CONSIDERATIONS:

A. PUBLIC

N/A

B. FINANCIAL

N/A

C. IMPACT ON & INPUT FROM OTHER DEPARTMENTS/SOURCES

Ongoing coordination and communication between the various Public Works Divisions is fundamental in the successful completion of the data collection, transference of useful information, priority programming, design, updated details on improvements completed, and costing information.

D. CORPORATE AND/OR DEPARTMENT STRATEGIC PRIORITIES

The formalization of the sidewalk asset management procedure is supportive of the following strategic objectives:

- Develop a safe and healthy community
- Pursue excellence in local government
- Improve municipal and community infrastructure

8.0 SUMMARY AND CONCLUSION

1. That Public Works Report PW 12-11 be received as information.
2. That staff continue to refine the sidewalk analysis and investigate and assess various opportunities and measures to extend the life of sidewalks, including but not limited to: design standards, materials, maintenance, restoration requirements, and programming.

9.0 ATTACHMENTS

- Attachment A: Condition Rating Levels
- Attachment B: Sidewalk Inspection Forms
- Attachment C: Sidewalk and Curb Distress Types and Sample Inspections
- Attachment D: Inspection Examples

For further information contact:
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Sidewalk Condition Rating Levels

Rating-5 (Excellent)



Rating-4 (Good)



Rating-3 (Fair) Beginning to show signs of distress- Needs 6-10 Years



Rating-2 (Poor) Noticeable areas with deficiencies- Needs 0-5 Years



Rating-1 (Very Poor) Serious deficiencies throughout the segment- Needs "NOW"



Sidewalk Distresses and Examples

Surface Distress (Code: S1)



Cracking (Code: S2)



Deformation (Code: S3)



Uplifting/Heave (Code: S4)



Ponding (Code: S5)



Tree Uplift (Code: S6)



Vertical Displacement > 2Cm (Code: S7)



Curb Distresses and Examples

No Distress (Code: C1)



Low Fault (Code: C2)



High Fault (Code: C3)



Surface Distress (Code: C4)



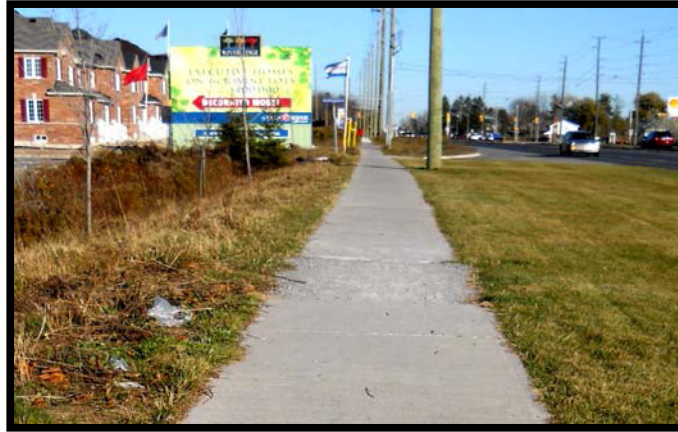
Loss of Curb (Code: C5)



Sidewalk Distresses and Examples

Surface Distress (Code: S1)
Taunton Rd E

PSR:3



Cracking (Code: S2)
Dryden Blvd

PSR: 3



Deformation (Code: S3)
Fallingbrook St

PSR:2



Uplifting/Heave (Code: S4)
Wellington St

PSR:4



Ponding (Code: S5)
Holiday Dr

PSR:3



Tree Uplift (Code: S6)
Bonacord Ave

PSR:3



Vertical Displ. > 2Cm (Code: S7)
Whitburn St

PSR:2

