



VITAL SERVICE Effective servicing of streets and sidewalks over the winter is vital to everything that depends on functional roads, streets and sidewalks to move people, vehicles and goods safely through extremes of weather.

Service seeks to maintain accessibility and safety by mitigating the combined effects of rain, freezing rain, ice pellets, snow, extremes of temperature, formation of ice, and runoff. The operations involved are similar in nature and approach to those involved in emergency management. There is a pre-planning and public education component, a service "response" to each weather event, and a "recovery" phase after the event. Effective communications with the public and public officials before, during, and after winter weather events is also a key.

POLICY NEED Winter snow and ice control is resource intensive and expensive, utilizing large and specialized pieces of equipment, operated by well trained staff. A ready supply of de-icing and abrasive materials is essential. A fundamental policy decision for every Canadian community is the level of winter service it needs, along with the funding required to support that level of service.

DEFINING LOS Level of service (LOS) for winter streets and sidewalks can be defined in a several ways; the most common being in terms of "time" – time taken to produce a "desired" result or to return the network to "accessibility" or "functionality" (e.g. time for a street to be cleared or plowed after a storm, a sidewalk to be opened, snow to be removed and hauled away).

Community expectations are often loosely tied to past experience. Besides time, the quality of result is also a factor – initial clearing, widening, surface condition. Consistency of response and recovery operations is a key consideration in managing public expectations.

Response involves much more than simply a measure of time. Winter weather in Saint John is highly variable – the intensity and duration of winter events, fluctuating temperatures, moisture content of snow, and winds are all factors that have a bearing on the "time" needed to produce results. A mid-winter snow storm of 60 cm on top of existing snow cover will take longer to deal with than one of 15 cm in early fall.

Compounding variations in weather and storm severity are the fact that storms begin and end at any time of the day or night. People are also affected differently depending on timing of storms – some are cleaned up by the morning "rush hour", others are just beginning. Roads could be slippery when traffic is heavy, or when there is little traffic. All these

factors have a bearing on public perception of service - when "time" or conditions are considered in isolation of other pertinent factors.

Service standards have to be set with some reference to time, but must also consider other factors such as severity of a storm, response of service providers against a defined standard, level of resources committed against a standard and the additional resources available to a community in extreme circumstances.

STORM TYPES

Ten storm categories, with associated response, are outlined below:

1. Snowfall < 8 centimetres; ambient temperature from -2°C to above 0°C; light winds; spreaders only, no full street plowing necessary
2. Freezing moisture on roads or frost coming out, with no accumulation; spreaders only, no plowing
3. Snowfall 8 < 16 centimetres; ambient temperature > -4°C; spreaders and full plowing necessary
4. Freezing rain and/or ice pellets < 2 centimetres, mild temperatures; spreaders only, no plowing
5. Snowfall 16 < 32 centimetres, ambient temperature -6°C < 0°C; spreaders and full plowing necessary
6. Snow, freezing rain and/or ice pellets > 2 centimetres; spreaders and full plowing to scrape inventory of streets
7. Snowfall 16 < 32 centimetres, with heavy winds, ambient temperature -6°C < 0°C; spreaders and full plowing necessary
8. Snowfall > 32 centimetres, ambient temperatures -6°C < 0°C; spreaders and full plowing necessary
9. Snowfall > 32 centimetres, with heavy winds, ambient temperatures -6°C < 0°C; spreaders and full plowing necessary
10. Snowfall > 20 centimetres, followed by freezing rain, then rain, then falling temperatures, ambient temperatures -12°C or below to +2°C and above; spreaders and full plowing necessary

PRIORITIES

The structure of priorities that forms the basis for service standards on both streets and sidewalks is organized as follows:

1. Arterial streets, highway connections, emergency routes (routes to critical community facilities such as hospitals and fire stations)
2. Major bus routes, schools, community centres, business districts
3. Collector streets, minor bus routes, industrial parks

4. Local or subdivision streets

Winter service has to be based on the relative priority of streets in the overall transportation network; not all can be serviced at the same time. Servicing must start at some point in the system and at some point in time, and then continue until completed at a later point in time. Priorities must be established for system components.

Winter service levels, in terms of time, will be different for different roads, streets and sidewalks, depending on their priority in the system. Higher priority components – arterial streets and traffic collectors or those connected to vital community facilities such as hospitals and fire stations – call for a higher level of service than others.

Winter service standards desired by the community have to be supported by policies and resources allocations (funding) necessary to carry out service expectations. The administration shall execute the standards sought by Common Council, with the adopted policies and resources made available to do so, subject to severity of conditions.

WINTER REALITY

In addition to "time" and "condition" as service indicators, it is also useful to think in terms of response or deployment of resources against defined reaction policies and planned deployment. Operational response is normally ramped up at the onset of winter weather and its severity, from street anti-icing activity in the early stages of a storm, to full plowing and de-icing of streets and sidewalks during and after a storm. Post plowing operations in the days following a storm include plowing push back, widening, sanding, and de-icing of streets and sidewalks, and snow blowing and removal (hauling) operations to widen narrowed streets and open major bus stops, areas around schools and sidewalks in high priority areas.

The level of service could be the degree to which the service plan(s) are executed – conditions in the transportation network can vary with severity of weather, regardless of how well operational plans may be executed. The actual surface condition produced may meet service standards in most storms but may not be the same for all storms.

To assure a minimum level of service, it is necessary to plan for some redundancy to account for equipment breakdowns or other delays.

Human, equipment and contracted resources have upper limits. Extraordinary winter weather conditions will exceed the capacity of planned resources to respond. Established service standards reflect a level of service for "normal" winter weather and more typical storm

events. As such, despite best efforts, the level of service possible may not be as identified in the in the *Winter Management Plan*.

GUIDELINES

Service guidelines for streets are outlined hereunder:

▶ PRIORITY 1 STREETS

- a. Anti-icing applied in every snow event prior to or within 2 hours of start of precipitation
- b. Remain open for emergency vehicles through all storm events
- c. Pushed back and widened 6 hours after end of a storm event
- d. Bare pavement of travel lanes 8 hours after the end of a storm and curb to curb within two days after end of the storm
- e. Snow removal before 20 centimetres accumulation or as soon as possible after a major storm
- f. Snow removal for sidewalks as determined necessary, in conjunction with street snow removal

▶ PRIORITY 2 STREETS

- a. Anti-icing applied within 4 hours of start of precipitation
- b. Remain open for emergency vehicles through all storm events
- c. Pushed back and widened with bare pavement centre line 8 hours after end of storm
- d. Snow removal before 30 centimetres accumulation or as soon as possible after a major storm
- e. Snow removal for sidewalks as determined necessary

▶ PRIORITY 3 STREETS

- a. Plowing begins within 4 hours after end of a storm event
- b. De-icing or sanding applied within 2 hours after plowing
- c. Pushed back and widened with bare pavement centre line 12 hours after end of a storm event
- d. Snow removal before 60 centimetres accumulation or as soon as possible after a major storm

▶ PRIORITY 4 STREETS

- a. Plowing begins within 4 hours after end of a storm event
- b. De-icing or sanding applied within 4 hours after plowing



- c. Pushed back, widened and accessible with snow pack 12 hours after end of storm
- d. Snow removal as determined by conditions