

Waukesha County Winter Highway Management Plan

Purpose: The purpose of this policy is to define and outline snow and ice control objectives and procedures as established by the Waukesha County Department of Public Works, Highway Operations Division. This policy supersedes any previously written documents and unwritten policies of the Waukesha County Department of Public Works, Highway Operations Division regarding snow and ice.

The responsible parties for the Winter Road Management Plan are:

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Background: The intent of establishing the Waukesha County Department of Public Works, Highway Operations Division's Snow and Ice Control Policy is to provide a uniform understanding of the priorities and procedures used to combat snow and ice related road conditions. Each storm has individual characteristics and must be dealt with accordingly. Therefore, exceptions to this policy may occasionally be necessary. The traveled portion of the roadway and/or bridges will, at times, have on it snow and/or ice in a slippery condition. The entire width of the roadway (including shoulders and ditches) may need clearing of snow, ice, compacted snow or ice, or frost. Snow may accumulate or be piled adjacent to the roadway from time to time. A motorist's sight distance in any direction may be greatly reduced or impaired by this.

It is assumed that motorists will have their vehicles properly equipped for winter travel and are aware of the weather and winter driving conditions before they travel. Motorists should limit their travel when hazardous conditions exist. Motorists shall drive their vehicles during these conditions with additional caution and watchfulness, especially with respect to reduced traction and/or visibility. They are advised to reduce their speed substantially below the posted speed limits during these periods of adverse conditions.

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The primary method of snow removal shall be by plowing. Salt or salt with other additives may be used to enhance snow/ice removal. It can be expected that snow will be plowed into cross streets and driveways as a normal part of snow removal operations. Snow shall not be plowed, pushed or thrown onto any county highway. The County is not responsible for snow or ice pushed or otherwise placed on the roadway or shoulders by others. During the course of the season, a certain amount of damage to County or private property may occur. The County will not be responsible for damage to turf in lawns or for the deposition of gravel in road ditches, unless there are extenuating circumstances. These areas may be repaired at the County's discretion, on a case-by-case basis. Any damage sustained due to salt brine or other de-icing chemicals placed on the roadway will not be treated or repaired by the County.

Anti-Icing Techniques: Anti-icing is a proactive snow and ice control strategy aimed at preventing the formation or the development of bonded snow and ice by the timely application of a freezing point depressant. The department will use a salt brine mixture of 23.3% if an anti-icing technique is utilized. In order to depress the freezing point of the salt brine mixture the county may choose to use additives to the salt brine solution. The current additives are a beet juice derivative (Geomelt) and calcium chloride 32% solutions. The typical ratio is 85% salt brine, 10% beet juice and 5% Calcium Chloride. Anti-icing should be done during normal, low traffic volume. If anti-icing techniques are utilized, it is conducted prior to forecasted frost, freezing fog, or black ice events on bridge decks and pavement trouble spots (such as hills, curves, shaded areas, or intersections) on an as needed basis. Anti-icing techniques may also be utilized prior to predicted light sleet and light or moderate snow event and to prevent a re-freeze situation. Pavement temperature is recommended to be at or above 23°F or the pavement temperatures are forecasted to rise and stay above 23°F.

Anti-icing techniques are not utilized prior to forecasted rain or freezing rain events, when winds are more than 15 m.p.h., and when they cause blowing or drifting snow to stick to the roadway, pavement temperature is below 20°F or forecasted to fall below 20°F, or snow packed roadway.

De-Icing Techniques: De-icing agents are used under appropriate winter maintenance conditions to prevent the formation of ice, prevent the formation of a bond between accumulated snow, ice, or slush and the pavement and keep the accumulation "plowable" and de-ice (melting of bonded ice or snow). Plowing, dry salt, and pre-wetting salt with a brine solution are the dominant de-icing technique the department will utilize. Applying the de-icing agents during the storm will prevent the bond of accumulated precipitation and to keep the snow in a plowable condition. The de-icing agents utilized for the storm event will depend on winds, temperatures of the pavement and air, and drifting conditions. Dry salt may be most effective during a rain and freezing rain event when the pavement temperatures are below 32 degrees. Pre-wetting of dry salt with salt brine may be appropriate to reduce the loss of de-icing materials that are blown or bounce off the pavement as a result of traffic or the act of dispensing the material from a moving truck. Salt brine will be applied on the trucks using a spray bar with controls at the salt shoot to provide uniform application which is calibrated annually or as needed.

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Waukesha County pre-wets all salt as it is spread. The only time pre-wetting of salt is not performed is as described above in a rain/freezing rain event. Waukesha County trucks are equipped with salt brine tanks ranging from 65 gallons to 500 gallons. Our typical truck sprays salt brine onto the salt at 8 gallons of salt brine per ton of salt. Our larger capacity trucks will spray 20-40 gallons of salt brine per ton of salt with the operator setting the application rate.

We have 3 units in our fleet that have variable spread speeds and liquid application rates. These trucks are able to spray 100% salt brine or 100% salt and every ratio in between. Our trials with the application rates shows us that a 70% salt to 30% brine mixture is the best ratio. These units use 20-35% less salt than our conventional units.

A piece of County snow removal equipment may damage a mailbox adjacent to the roadway. Highway Operations staff will repair mailboxes as soon as practicable after storm has ended and when weather conditions allow the permanent replacement (the division may elect to place a temporary). Special installations or decorative designs will be replaced with standard, conventional boxes or materials. When this occurs, the owner of the special installations or decorative designs may file a claim with the County as discussed below. The county shall make reasonable attempts in its methods to avoid or minimize such damage. A piece of County snow removal equipment may damage a fence or other appurtenance located in or immediately adjacent to the roadway and /or right of way. The county may repair/replace/reimburse personal property damaged by its equipment after the property owner files a claim with Waukesha County Clerk and Risk Management Division.

Under no circumstances will the County use one of its pieces of equipment to push, pull or tow a stranded, private vehicle from a roadway or ditch. In a life or health threatening situation, a County employee may give brief assistance or call for emergency response. Likewise, no County employee may use a County vehicle or piece of equipment to perform any snow or ice control operations on private or commercial property nor be allowed to use personal equipment for similar purposes during working hours.

Levels of Service: Waukesha County Department of Public Works, Highway Operations Division performs Snow and Ice control on over 2,050 lane miles of County and State Highways.

This work is provided using 63 Single and Tandem axle trucks and 5 Wheel Loaders.

The policy for snow and ice control is based on the principal to provide service to the highest priority highways, or those locations where the most benefit will be received by the most people. Therefore, the typical priority for a snow and ice control event is to provide the highest level of service to State highways, Major County Highways and then minor County Highways. One of the goals of winter maintenance is to achieve “passable highways” with the limitation imposed by climatological conditions, the availability of resources and environment concerns during a winter storm event.

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A “passable roadway” is defined as a roadway surface that is free from drifts, snow ridges and as much ice and snow pack as is practical and can be traveled safely at **reasonable speeds**. A passable roadway should not be confused with a “dry pavement” or “bare wet pavement”, which is essentially free of all ice, snow and any free moisture from shoulder to shoulder. This “dry/bare pavement” conditions may not exist until the weather conditions improve to the point where this pavement condition can be achieved. Each roadway within the County has a level of service definition attached to it. This is based on typical section (2 or 4 lanes) and average daily traffic. This definition also includes the time to reach “bare wet pavement” after a snow event has ended. See appendix A.

The definition of “**reasonable speed**” is considered a speed that a vehicle can travel without losing traction. During and immediately after a winter storm event, a reasonable speed will most likely be lower than the posted speed limit. Motorists can expect some inconvenience and will be expected to modify their driving practices to suit road conditions.

Weather Data: Weather data is provided by Iteris MDSS (Maintenance Decision Support System) and National and Local Weather Services.

The MDSS uses forecasting models based on the length, duration and forecast of the storm to give the County treatment recommendations for particular segments of state highways. The treatment recommendations are then communicated to the operators for setting the salt controllers.

The MDSS system uses real time temperature and salt spreading application rates from the trucks to tailor the application rates that we convey back to our operators. This is accomplished by the AVL/GPS system we have installed in the trucks. The GPS reports every two minutes on material usage, road temperature, plow and wing positions and liquid usage.

Event Information to Record: Monthly records shall be kept per use event for November 1st through March 31st include how much and which product was used, weather data including temperature ranges and precipitation amounts, hours worked, number of trucks in service, hours of post-event clean up, and other measurable data that is useful to the department to evaluate the program on a yearly basis. Waukesha County uses the Wisconsin Department of Transportation (WDOT) storm reporting system to track the above information as well as individual spreadsheets and payroll records to track storm information. See Appendix A for examples.

Truck Routes: Waukesha County has 24 County plow routes and 19 DOT plow routes. It is the department’s discretion to utilize the number of trucks required to deal with each event. The truck route maps are found in Appendix A. All trucks routes receive the same product applied for each type of event at the department’s discretion. At times, some trouble spots will receive additional treatment as conditions warrant.

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Dispatching Procedures: Crews are called out at the outset of a storm and a policy is established on what products are applied based on environment conditions. The Wisconsin Department of Transportation (DOT) has established priorities to make roadways passable and which roads receive higher priorities. The service to State Highways is based on their Category Level, for example the six lane sections of IH 94 in the eastern part of the County received a higher priority than the 2 lane sections of STH 67 in the southwest part of the county. The County Highway winter maintenance system follows a similar practice. Supervisors direct crews on what type of products to apply based on weather conditions. The plow operations generally consist of three phases: a) making roads passable, b) widening and deicing, and c) general clean up.

The County, to the best of its ability will try to maintain passable roadways during the course of snow intervals. Operations will be halted when it is deemed to hazardous for our operators and the public or if reasonable accomplishments are not being met. If snowfall stops during the night or early morning hours, plows will be dispatched between 2:00 AM and 6:00 AM. Weekend plowing will be handled in the same manner.

Emergency Situations:

Provisions must be made for situations involving emergencies; therefore, in the event the Waukesha County Department of Public Works, Highway Operations Division receives notification of an emergency situation, equipment necessary to handle the emergency will be dispatched immediately to assist until the emergency has been resolved.

Departure from Policy:

The Waukesha County Department of Public Works, Highway Operations Division recognizes that conditions may be so unusual or unexpected that a departure from the general policies should be authorized. Therefore, the Waukesha County Department of Public Works, Highway Operations Division, Highway Operations Manager or Patrol Superintendent may order a departure from these general rules when, in their opinion, conditions warrant such an action.

Other provisions: At any time when visibility declines to a point that it is hazardous to the driving public or snowplow operators to be on the roads, snowplowing or ice control operations may be suspended. Suspended operations will resume when visibility improves. Should it become necessary to close a road for any reason, the County Director of Public Works, Highway Operations Manager, Patrol Superintendent or designee shall notify the Waukesha County Sheriff's Department and the Wisconsin Department of Transportation of said closing. An attempt will also be made to notify the media.

All County and State Trunk Highways in Waukesha County are considered "Snow Routes." If abandoned vehicles are encountered on the above referenced highways, the Sheriff's Department will be contacted and requested to have the vehicle removed at the owner's

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expense. If a vehicle is blocking one or more lanes halting snow and ice control operations, it will be moved by whatever means are necessary to reopen the roadway. Any damage incurred in such a move shall be the owner's responsibility.

No Duty or Right Created: The purpose of this policy is to establish goals for the County Highway Operations Division employees regarding snow and ice control. It is not to be construed to create any duty to any individual or entity of the County of Waukesha. This policy does not provide any special protection or service to any particular individual or group. This policy may be affected in total or in part, as a result of acts of God, equipment breakdowns, weather conditions, inadequacy of equipment, state or federal regulations, shortages of personnel and any other unforeseen, uncontrolled or unanticipated acts.

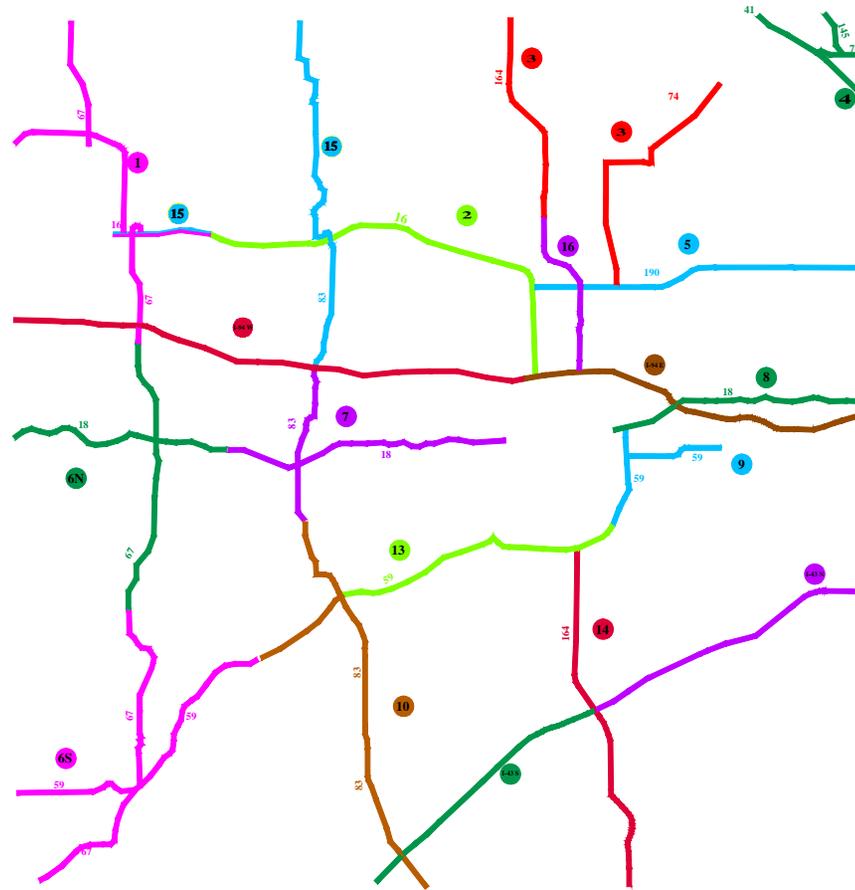
Appendix A
Level of Service Definitions

County Patrol	Section #	Highways	Lane Miles	# Patrol Workers Assigned	Category	Cycle Time during Storm	Time to Bare Pavement after Storm
	19	W, YY	43.91	1	3	2.5	2.5
	20	VV, MD, K	72.6	1	3	2.5	2.5
	21	Q, V, Y	43.1	1	3	2.5	2.5
	22	VV, K, YY	45.99	1	2	2	2
	23	Y, M	50.14	1	2	2	2
		F, SR, M, J, J					
	24	J, FT	69.1	2	2	2	2
	25	ES, O	41.68	1	2	2	2
	26	D, O	52.5	1	2	2	2
	27	I, O	27.66	1	3	2.5	2.5
		I, XX, ES, L,					
	28	U	70.2	1	4	3	3
	29	U, Y, I, ES	52.95	1	3	2.5	2.5
	30	Y, HH	51.46	1	4		
	31	L, OO	51.85	1	3	2.5	2.5
	32	X, H, D, TT, I	48.96	1	3	2.5	2.5
		ES, LO, NN,					
	33	I, E, EE	93.68	2	4	3	3
		CI, N, Z, S, N					
	34	N, LO, ZZ, E	41.6	1	4	3	3
		Z, D, ZC, C, Z					
	35	Z	43.58	1	5	4	4
	36			1			
	37	C, G, D, DE, E	45.84	1	4	3	3
	38	B, BB, Z, DR	45.14	1	4	3	3
	39	CW, P, K, Z	52.99	1	4	3	3
		Q, E, VV, KE,					
	40	K	42.75	1	4	3	3
	41	P, R, C, K	46.56	1	4	3	3

	KE,E,JJ,KC					
42	,JK,KF	47.2	1	4	3	3
	TT,SS,DR,					
43	T,G	62.9	1	3	2.5	2.5
Totals		1244.34	27			

Appendix B
Plow Route Maps for County and State
Highways

STATE



- | | |
|-------------------------|------------------------|
| 1 MERRYFIELD/SOM | 10 STEINKE |
| 2 BENNETT/GRULKE | 11 TORDIK |
| 3 GRENDEMAN/GLATCZAK | 12 MARTRONIS |
| 4 GILLIS/ARDELINE | 13 NISSEN |
| 5 CAPROON/FETER | 14 ARNOLD |
| 6 SHANKS | 15 E SLATER/KURTBIANKE |
| 7 DAN ROCKTEACHER | 16 W RUTLEDGE/MOUDRY |
| 8 BORKSMITH/FOR DENBERG | 17 HENRICH/OPEN? |
| 9 THOMASKASIAN | 18 S CSCHULTZ/LEINEN |

Appendix C
Category Level Definitions

Category 2

High volume four lane highways (ADT \geq 25,000) and some four lane highways (ADT \leq 25,000) and some six lane highways. i.e. CTH O Moorland Rd., CTH ES National Ave. in New Berlin, CTH Y Barker Rd. CTH M in Brookfield



Category 2

- 90% Bare Pavement



Category 3

- *All other four lane highways (ADT<25,000). CTH YY in Menomonee Falls, CTH L in Muskego, CTH X and CTH TT in Waukesha*



Category 3

- 90% Bare Pavement



Category 4

- *Most high volume two lane highways (ADT \geq 5,000) and some two lanes (ADT $<$ 5,000). CTH C in Genesse and Delafield. CTH VV in Town and Village of Merton*



Category 4

- 90% Bare Pavement



Category 5

- *All other two lane highways. CTH ZZ, ZC in Town of Ottawa, CTH S in Town of Eagle*



Category 5

- 90% Bare Pavement

