BILLINGS LOGAN INTERNATIONAL AIRPORT

SNOW AND ICE CONTROL PLAN

PREPARED BY
THE CITY OF BILLINGS
AVIATION AND TRANSIT DEPARTMENT
BILLINGS, MONTANA

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TABLE OF CONTENTS

PAGE

PART #1 PRE AND POST-WINTER SEASON TOPICS

1.1 Abbreviations, Terms, and Definitions 2
1.2 Airport Preparation 3
Airport Management Responsibilities 3
Personnel Training 3
Equipment 4
1.3 Snow and Ice Control Committee (SICC) 4
1.4 Post Event 5
1.5 Post Season 5

PART #2 WINTER STORM ACTIONS AND PROCEDURES

2.1 Responsible Personnel 7
2.2 Activating Snow Removal Personnel 7
Weather Forecasting 7
Chain of Command 8
Triggers for Initiating Snow Removal Operations 8
2.3 Snow Control Center (SCC) 8
2.4 Airfield Clearing Priorities 9
Group I Priorities 9
Group II Priorities 9
Group III Priorities 9
3.1 Airfield Clearance Times 10
3.2 Storage of Snow and Ice Control Equipment 10
4.1 Snow Removal Procedures 10
Ramp and Terminal 10
Runways and Taxiways – Open 11
Runways and Taxiways – Closed 11
NAVAIDs 14
4.2 Controlling Snow Drifts 16
4.3 Snow Disposal 16
4.4 Methods for Ice Control and Removal 16
Liquid Chemicals 16
Solid Chemicals 16
Sand 17

TABLE OF CONTENTS

PAGE

4.5 Surface Incident/Runway Incursion Mitigation Procedures 17
Radio Communication 18
Failed Radio Communication 18
Low Visibility Conditions 18
Equipment Operator Fatigue 18
5.1 Airport Surface Assessment Reporting Procedures 19
Inspections 19
Issuing an Airport Condition Report 19
Canceling an Airport Condition Report 20
5.2 Runway Condition Assessment Matrix (RCAM) 20
Conditions 20
When to Conduct 21
How to Conduct 21
RCAM Applicability 21
RCAM Assessment Reporting 21
5.3 Requirements for Runway Closures 22

ATTACHMENTS SECTION

Snow and Ice Control Equipment 24

Letter of Understanding – Effective January 1, 2018 26
Reporting Airport Conditions

Letter of Understanding – Effective November 01, 2018 27
NOTAM Issuance During Continuous Snow Removal Operations

Letter of Understanding – Effective March 6, 2012 28
Jurisdictional Responsibility of Movement and Non-Movement Areas

Airport Diagram 32

RCAM Flowchart 34

RCAM 36

PART #1

PRE AND POST-WINTER SEASON TOPICS

1.1 ABBREVIATIONS, TERMS, AND DEFINITIONS

BIL – Billings Logan International Airport

SICP – Snow and Ice Control Plan

SICC – Snow and Ice Control Committee

Contaminant – Any substance on a runway, for the purpose of this SICP, contaminant is snow, slush, ice, or standing water.

Dry Snow – Snow that has insufficient free water to cause cohesion between individual particles. If when making a snowball, it falls apart, the snow is considered dry.

Wet Snow – Snow that has grains coated with liquid water, which bonds the mass together, but that has no excess water in the pore spaces. A well-compacted, solid snowball can be made, but water will not squeeze out.

Compacted Snow – Snow that has been compressed into a solid mass that resists further compression and will hold together or break up into lumps if picked up.

Slush – Snow that has water content exceeding its freely drained condition such that it takes on fluid properties (e.g., flowing and splashing). Water will drain from slush when a handful is picked up.

Patchy – Contaminant conditions that cover 25% or less of the cleared, treated, and usable pavement surface.

Decelerometer – A devise used to calculate the friction value of a pavement surface.

ARFF/AFM – Aircraft Rescue Fire Fighter/Airfield Maintenance Worker

NOTAMs – Notice to Airmen

ASOS – Airport Surface Observation System

NOAA – National Oceanic and Atmospheric Administration

NAVAIDs – Aircraft Navigational Aids

TALPA – Takeoff and Landing Performance Assessment

RCAM – Runway Condition Assessment Matrix

RCC – Runway Condition Codes

PRE-SEASON ACTIONS

1.2 AIRPORT PREPARATION

Airport Management Responsibilities:
The City of Billings Aviation and Transit Department is responsible for snow removal of all aeronautical areas, public ramps, and non-leased paved surfaces on the Airport. Specifically, Airport Operations Supervisors are responsible for coordinating snow and ice control operations at Billings Logan International Airport (BIL) and updating the plan as needed. This responsibility includes all aircraft operating areas, roadways, Airport managed parking lots, and walkways.

Supervisors will typically initiate a meeting during the month of September to discuss the following: equipment and material inventory, repair needs, staffing, budget, training, previous year's issues, and any other topics associated with the Snow and Ice Control Plan (SICP). Airport Operations staff may be consulted and offer input depending on the persons experience and area of expertise. For example, mechanics will input on equipment and repair needs, vehicle operators may provide information on snow removal procedures, etc.

Personnel Training:
Airport Operations Supervisors coordinate initial, annual, and recurrent training for all of the following personnel in the Airport Operations Division:

14 ARFF/AFM Workers
2 ARFF/AFM Mechanics
1 Equipment Operator
1 AFM Electrician

Staff training consists of classroom presentations, hands-on equipment training and walk around demonstrations, general discussion, slideshows, and any/all other methods that provide benefit, including testing on subject matter. Topics include the following:

- Part 139 Snow Removal Requirements
- Group I Priorities
- Airport Familiarization and Proper Radio Communications
- SICP Requirements
- Equipment Operations and Maintenance
- Snow Removal Procedures
- Airport Condition Reporting – Issuing/Canceling NOTAMs
- Friction Testing, Mu Reports, RCAM, and TALPA
- Staffing Issues, Overtime and Standby Procedures
- Teamwork, Past Problems and/or New Procedures
- Others as Deemed Necessary

The Airport Operations Supervisors shall maintain all training records related to the personnel and topics listed above. Additionally, training sessions may be video recorded for record keeping and documentation purposes.

Equipment:
BIL utilizes FAA approved friction measuring devices, two (2) electronic decelerometers, specifically, a Bowmonk Airfield Friction Meter (AFM2), and a Vericom (RFM 4000). The Bowmonk friction measuring device is sent to the factory annually for calibration and re-certification as per the manufacturer's recommendations. The Vericom has a self-calibration feature that will notify the operator that a factory recalibration is necessary. If both friction meters should fail, a NOTAM will be issued until at least one is repaired and available.

Each Summer, usually beginning in July, the Airfield Maintenance Mechanics perform an annual service and inspection of all snow removal equipment. Replacement parts and supplies, as well as broom cores, snow plow cutting edges, deicing chemicals, and many other items are inventoried and ordered.

Additionally, the following occurs:

- Conduct a survey of the vehicles and equipment utilized in snow removal to ascertain operational status and make repairs as needed.
- Conduct an inventory of supplies, materials, and order spare parts.
- Conduct a final equipment readiness inspection by September 1.

1.3 SNOW AND ICE CONTROL COMMITTEE (SICC)

The Airport has developed a SICC to provide feedback and make recommendations on snow and ice removal operations. Airport staff and tenants primarily impacted by snow removal operations will meet prior to the onset of Winter, usually during the month of October, to brief all concerned parties of the planned snow and ice control operations for the upcoming Winter. The SICC is coordinated and managed by the Airport Operations Supervisors and includes the following organizations at the Billings Airport:

- City of Billings Aviation and Airport Operations Division
- Local Airline Managers
- Fixed Base Operators
- Billings Air Traffic Control Tower
- Billings FAA Airway Facilities
- Others as deemed necessary

An updated SICP is available, on the Airport's Website, to each tenant listed above and the following topics should be discussed:

- Introductions
- Updates to the SICP
- Areas Designated as Group I Priority
- Airfield Changes or New Infrastructure
- Overview of Snow Removal Operations
- Potentials for Pilot or Vehicular Runway Incursions or Incidents

- Staffing Updates, Requirements, and Training
- Triggering Events for Snow Removal Operations
- Issuing/Canceling NOTAMs to Ensure Timely Notification
- Tenant Snow Removal Procedures
- Equipment Updates and Inventory
- Snow Pile Locations Including Hauling/Disposing
- Contract Snow Removal Operations for Tenants
- Contact Phone Numbers for Snow Removal Requests
- Airline Snow Removal Operations Do's/Don'ts
- Airport Requirements for Friction Testing and Mu Reports
- Use of RCAM and TALPA
- Applying Approved Chemicals on the Ramp, Sanding, etc.
- Terminal Building Snow Removal Issues and Information

Coordination between Airport Operations and Air Traffic Control

- Proper Radio Communications
- Snow Removal Equipment Operating on/off Movement Surfaces
- Procedures for Closing Runways
- Monitoring and Updating of Runway Surface Conditions

Air Carrier Ground Deicing/Anti-Icing Programs

- Assess all Air Carrier Programs
- Maximize Efficiency of Operations During Icing Conditions by Identifying Locations for Airplane Deicing, Escorting Deice Trucks, Planning Taxi Routes to Minimize Ground Times and Verifying Communications
- Questions, Comments or Concerns
- Meeting Adjourned

1.4 POST EVENT

After selected events, Airport management may host a meeting or conduct a conference call with ATC to discuss and resolve any issues that have arisen.

All members of the SICC will be encouraged to provide feedback to Airport management before, during, or following each snow event. After a significant event or a challenging operation, a separate SICC meeting may be held if deemed necessary.

1.5 POST SEASON

After each snow season, a SICC meeting will be held, typically in May, to review the snow season issues and recommendations for changes. The same topics as pre-season should be reviewed.

PART #2

WINTER STORM ACTIONS AND PROCEDURES

SNOW REMOVAL ACTION CRITERIA

2.1 RESPONSIBLE PERSONNEL

Airport Operations Supervisors are ultimately responsible for coordinating snow and ice control operations at BIL. These individuals carry a cellular telephone in order to relay important and urgent information regarding snow removal issues. Please call in this order:

698-3237	Airport Operations Supervisor
671-5458	Airport Operations Supervisor
698-7729	Assistant Director of Aviation

Supervisors can delegate SICP oversight to a Lead ARFF/AFM Worker as needed. The Airport Operations Center is staffed at all times by at least one (1) ARFF/AFM Worker. This person is responsible for constantly monitoring weather conditions and initiating call-out procedures for snow removal crews.

While snow removal operations are in progress, all requests, NOTAM information, and any inquiries should be directed to the Airport Operations Center at 657-8496. The Airport Administration Office will be a central point of contact for air carrier information, customer service issues, and media inquiries at 657-8495.

2.2 ACTIVATING SNOW REMOVAL PERSONNEL

All Airport Operations personnel, specifically ARFF/AFM Workers, are committed to the task of performing snow removal operations at BIL. At the beginning of a snow event or prior to a snowstorm, a standby schedule is developed and posted identifying when each employee may work. All ARFF/AFM employees are on standby and available for call-out during the Winter months.

The determination as to when to initiate actual snow removal operations may vary somewhat depending upon the type and amount of precipitation, accumulation, etc. A special inspection takes place by on-duty Airport Operations personnel when weather is anticipated or present. Some form of snow removal will begin at BIL when equipment can successfully remove contaminant that is present on the pavement surfaces. The Lead ARFF/AFM Worker on shift is responsible for notifying personnel and initiating snow removal operations.

Weather Forecasting:

- All Airport Operations personnel including Supervisors are responsible for monitoring weather forecasts.
- The Airport utilizes NOAA, ASOS, local weather stations, and many internet sites for forecasting information.
- BIL also has surface sensors available on the primary air carrier runway, Runway 10L/28R, in order to constantly evaluate the pavement surface for contaminants such as ice.

Chain of Command:

- Airport Operations Supervisors, or a designated representative, shall determine when snow removal crews are called into work.
- The on-duty Lead ARFF/AFM Worker shall constantly monitor airfield conditions, and at a minimum of one time per hour physically inspect pavement surfaces.
- Snow removal crews will be called in via telephone or alerted by Airport pagers to report to work as per Departmental Orders.

Triggers for Initiating Snow and Ice Control:
When will snow removal operations commence:

Snow and ice control will commence as soon as practicable upon accumulation.

In order to provide the highest level of safety, we attempt to remove as much contaminant from the runway surface as expeditiously as possible, with the ultimate goal of maintaining pavement in a "no worse than wet" condition, and provide the best possible surface friction for air carriers operating at BIL.

2.3 SNOW CONTROL CENTER (SCC)

The snow desk is located on the second floor of the Airport Operations Center where you can see the airfield, observe snow removal operations, communicate via telephone or radios, issue/cancel NOTAMs, etc. Snow Control (SC) can also take place from inside a command vehicle operated by a Supervisor or Lead ARFF/AFM Worker. This vehicle is usually a pickup that has the friction meter mounted in it, the ability to remove snow, perform sanding operations, and coordinate communications.

The SC performs the following functions:

- Manages snow and ice control operations
- Serves as the prime contact of field reporting conditions
- Updates the RCAM as needed
- Verifies all NOTAMs are accurate and up-to-date
- Informs all Airport users of applicable Airport closures

- Monitors current weather conditions and forecasts
- Determine when snow removal crews are called in for duty, snow removal operations are initiated, and the priority for removal
- Schedule rest and meal breaks for snow crews
- Determine when a runway or taxiway is unsafe for operations and must be closed due to ice/snow conditions
- Inspect all operating surfaces prior to opening after snow removal has taken place

2.4 AIRFIELD CLEARING PRIORITIES

The standard procedure for snow removal will be to plow areas based on the following group priorities. In all cases, the air carrier ILS Runway 10L/28R, Taxiway A, and the air carrier ramp will receive first priority.

1. Group I Priorities

a. 10L/28R
b. Taxiway A
c. Taxiway C or E – depending on the direction of landing aircraft
d. Air Carrier Ramp
e. Terminal Building Streets
f. Taxiways J and G to Corporate Hangars
g. NAVAIDs
h. ARFF mutual aid access points to include roads, ramps, and gates
i. Terminal Baggage and Operations Areas

2. Group II Priorities

a. Taxiway A Interlinking Taxiways – the order for plowing will depend on the direction of landing aircraft
b. Executive Hangars and Fixed Base Operator Taxiways
c. Runup Area Adjacent to Taxiway A
d. Taxiway G
e. Taxiway H
f. Cargo Ramps

3. Group III Priorities

a. General Aviation Hangar Taxi Lanes
b. Airport Service Roads
c. Runway 10R/28L
d. Runway 7/25 – this runway will be moved to Group II priority if wind direction, speed, and level of GA operations indicate
e. Other requests (GA Hangars, RTR, ILS, Glide Slope Building Road, etc.)

3.1 AIRFIELD CLEARANCE TIMES

Table 1-1. Clearance Times for Commercial Service Airports

ANNUAL AIRPLANE OPERATIONS (Includes Cargo Operations)	CLEARANCE TIME[1] (Hour)
40,000 or more	*1/2*
10,000 – but less than 40,000	*1*
6,000 – but less than 10,000	*1 1/2*
Less than 6,000	*2*

General: Commercial Service Airport means a public use airport that the U.S. Secretary of Transportation determines has at least 2,500 passenger boardings each year and that receives scheduled passenger airplane service [reference Title 49 United States Code, Section 47102(7)].

[1]These airports should have sufficient equipment to clear 1 inch (2.54 cm) of falling snow weighing up to 25 lb/ft^3 (400 kg/m^3) from Priority 1 areas within the recommended clearance times.

3.2 STORAGE OF SNOW AND ICE EQUIPMENT

All snow and ice control equipment identified in the Attachment Section are located and maintained in the Airport Operations Center. This large, enclosed, heated building has parking locations for all equipment in addition to maintenance and repair facilities in order to prolong the useful life of the equipment and provide an immediate response. Some quick-connect attachments, i.e., buckets, ramp blades, and other miscellaneous items are stored outside in a staging area west of this building.

4.1 SNOW REMOVAL PROCEDURES

Ramp and Terminal:
All Fixed Base Operators and Executive Hangar tenants will be responsible for snow and ice control on their designated ramp areas. Snow shall be piled or spread out in such a way as not to interfere with the operation of aircraft until Airport snow removal crews can haul the plowed snow away. The Airport is responsible for all other public use ramp areas and conducts snow removal in these areas with Airport Operations personnel. The clearing objectives are to remove accumulations of snow, ice, and other contaminants in order to provide good traction and a safe corridor from/to the runway.

Snow removal operations will typically be initiated on the ramp when the snow depth reaches approximately two inches and additional accumulations are expected. The time and location for starting ramp snow removal will generally follow the Airlines' Operating Schedule and approved by the SCC. Sand is not normally used on the Terminal ramp, but will be used as required/requested by the airlines.

Runways and Taxiways (Open):
During light snow conditions or low to moderate snow accumulation, sweeping and/or snow plowing operations on Runway 10L/28R will be conducted while the runway is open. Plowing on the runway surface will be coordinated between aircraft operations as per ATC requirements, and a runway closure will not occur.

Snow removal procedures will be to broom and/or plow runways and taxiways with equipment in tandem, working parallel to the runway and taxiway centerlines by moving snow full width to both sides for removal by a high speed snow blower, as necessary. When wind conditions dictate, and on taxiways, it may be advantageous to plow snow in one direction by starting the plowing on the upwind side of the runway and plowing the snow to the downwind side of the runway.

At all times the condition of Runway 10L/28R will be kept under close surveillance. If the continuing snowfall necessitates replowing, work in other areas will be suspended and the plows and high speed blower will be diverted to replowing Runway 10L/28R as frequently as may be necessary to maintain safe operating conditions.

Caution will be exercised by all equipment operators to prevent damage to, or burying the runway and taxiway edge lights. Back plowing operations shall be accomplished using a snow plow to blade windrows away from runway and taxiway lights, followed by a high speed snow blower, which casts the snow out into the safety area. A second plow follows the snow blower pushing the remaining snow back to the edge line keeping the new windrow approximately 10 feet away from the lights. Back plowing shall not be conducted unless all three pieces of equipment are used. The back plowing equipment must be kept in close proximity to each other to ensure windrows are removed as completely as possible.

Drifted or piled snow will be promptly removed off usable runway, taxiway, and ramp surfaces. All snow will be positioned off runways and taxiways so that all aircraft propellers, engine pods, rotors, and wing tips will clear any snow drift and snow bank as the aircraft's outermost landing gear is on the edge of pavement, and so as not to obscure pavement lighting systems. Ridges of plowed snow at the approach end of the runway will be avoided. When unable to comply with this requirement, Airport Operations will issue the appropriate NOTAMs describing existing conditions.

Runways and Taxiways (Closed):
When snow and ice control operations begin, secondary or non-air carrier Runways 7/25 and 10R/28L are usually closed. BIL does not have staff or equipment to keep all three (3) Runways open; therefore, we focus on our primary air carrier Runway 10L/28R.

Moderate to heavy snow accumulation may require the closure of Runway 10L/28R. Airport Operations personnel will be responsible to contact ATC to inform them of closure times, if necessary, and the estimated time when the runway will reopen. Efforts will be made to give ATC as much advance notice of a closure as possible.

Prior to closing Runway 10L/28R, all snow removal equipment will be staged and ready at the end of the runway to immediately begin snow and/or ice control operations.

The length of closure will depend on weather conditions. Efforts will be made to keep closure times to 30-minute intervals or less. This estimated time is for planning, but will not restrict the time needed to complete snow removal or ice control to provide an acceptable runway surface. Airport Operations personnel will determine when the runway is available, clear of all equipment, and reopened.

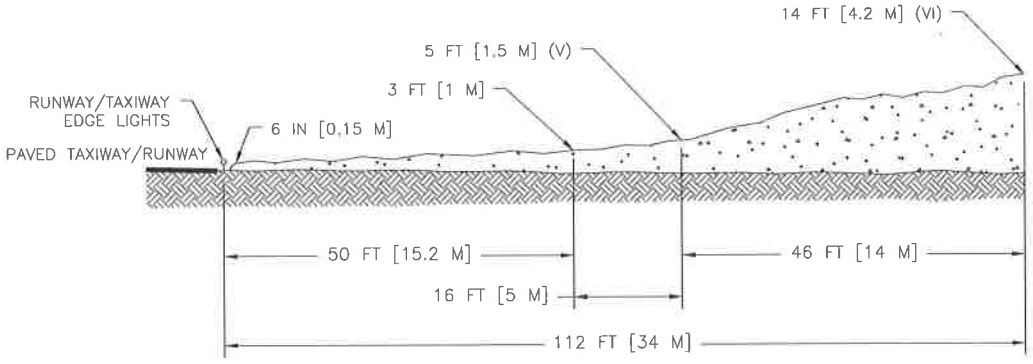
Airport Operations may close the runway immediately and without notice if any one of the following conditions exists:

- One half (1/2) inch of slush, wet snow, or standing water
- Two inches or more of dry snow
- NIL braking action

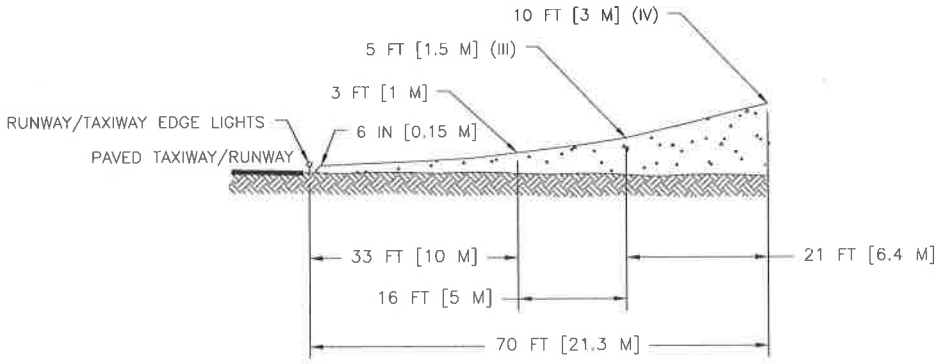
When/if a pilot notifies ATC of NIL braking conditions, the controller shall immediately report the condition to Airport Operations, as per the Letter of Understanding attached. The pavement surface in question will be closed by authorized Airport personnel until friction measurement tests are made, and the conditions improve.

SCC will monitor the progress, equipment breakdowns, and other problems. Prior to opening an area closed for snow removal, Airport Operations will conduct an inspection to ensure the area is safe for aircraft operations.

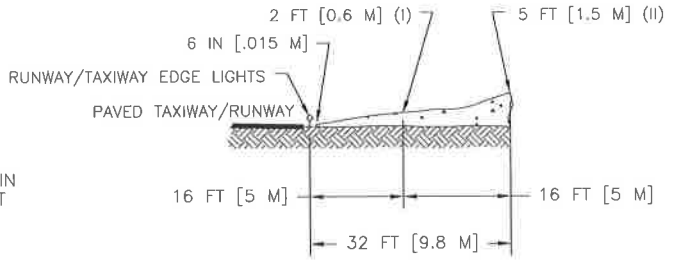
If an increased snow removal capability becomes necessary, SCC will call out additional personnel and equipment. If contractor support is required for snow removal in parking lots and streets, SCC shall determine the amount of support required.



DESIGN GROUP V AND VI



DESIGN GROUP III AND IV



DESIGN GROUP I AND II

NOTE: SNOWBANK HEIGHT AS SHOWN IN FIGURE 4.2 MUST ALSO BE MET FOR ALL THREE ILLUSTRATIONS.

Figure 4-1. Snow Bank Profile Limits Along Edges of Runways and Taxiways with the Airplane Wheels on Full Strength Pavement (see Figure 4-2. guidance)

NAVAIDs:
At the conclusion of each snow event, Airport Operations personnel will conduct an airfield inspection and evaluation. One item of this inspection will focus on verifying that all Airfield Navigational Aids are operating properly, free of snow/ice and within compliance requirements. NAVAIDs at BIL are maintained by the following:

FAA Personnel

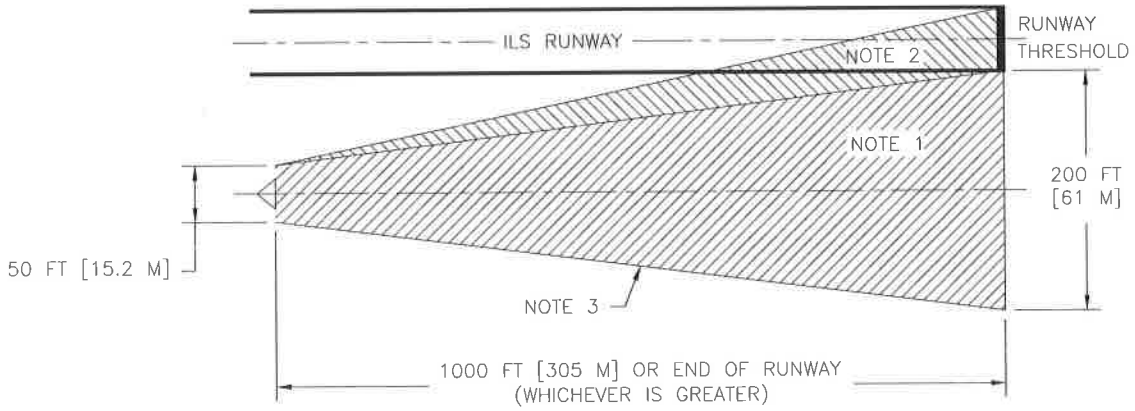
- Runway 28R ILS glide slope, localizer, and PAPI systems
- Runway 10L ILS glide slope, localizer, PAPI, MALSR, and RVR systems

Airport Personnel

- All airfield signs, runway/taxiway edge lighting, and paint markings
- Runway 28R REIL, and runway remaining signs
- Runway 25 REIL
- Runway 7, and 25 PAPI systems

Rotary snow plows and blowers will operate carefully in order to protect NAVAIDs and avoid damaging or creating obstructions to the equipment listed above. If any of the NAVAIDs are obscured during snow removal operations, it will be noted during a post event airfield inspection and the problem will be resolved. Personnel will utilize equipment; for example, front-end loaders to remove snow from around airfield signs, uncover runway/taxiway edge lighting, etc. The Airport Electrician will also conduct a lighting inspection and replace fixtures, lamps, re-aim PAPIs, etc. If for some reason a NAVAID is not within compliance requirements, cannot be replaced, or repaired, a NOTAM will issued.

As previously stated, Runway 10L/28R ILS equipment at BIL, including the glide slope, localizer, and antenna array are all maintained by FAA technicians. If FAA or ATC personnel suspect that snow may be interfering with the electronic signals to aircraft, Airport personnel will be notified and initiate snow removal as per Figure 4-2. related to CAT I snow clearance depth limitations, as outlined in the following graph:



NOTES:

1. CATEGORY I GLIDE SLOPE SNOW CLEARANCE AREA.
2. CATEGORY II AND III GLIDE SLOPE SNOW CLEARANCE AREA. THE AREA DEPICTED UNDER NOTE 1 SHALL ALSO BE CLEARED.
3. THE DEPTH OF SNOWBANKS ALONG THE EDGES OF THE CLEARED AREA SHALL BE LESS THEN 2 FEET.

ACTION TAKEN	SNOW DEPTH		
	SBR <6 IN [15 cm] NR. CEGS <18 IN [45 cm]	SBR 6 TO 8 IN [15 TO 20 cm] NR. CEGS 18 TO 24 IN [45 TO 60 cm]	SBR >8 IN [20 cm] NR. CEGS <24 IN [60 cm]
SNOW REMOVAL (SEE ABOVE FIGURE)	REMOVAL NOT REQUIRED RESTORE FULL SERVICE AND CATEGORY.	ILS CATEGORY I REMOVE SNOW 50 FT [15M] WIDE AT MAST WIDENING TO 200 FT [60M] WIDE AT 1000 FT [300M] OR END OF RUNWAY TOWARD MIDDLE AMRKER. ILS CATEGORIES II AND III AS ABOVE PLUS WIDEN THE AREA TO INCLUDE A LINE FROM THE MAST TO THE FAR EDGE OF RUNWAY THRESHOLD.	
NO SNOW REMOVAL	RESTORE FULL SERVICE AND CATEGORY.	ALL CATEGORIES RESTORE TO CATEGORY I SERVICE, CATEGORY D AIRCRAFT MINIMA RAISED TO LOCALIZER ONLY. TYPICAL NOTAM TEXT: "DUE TO SNOW ON THE IXXX (APPROPRIATE IDENTIFER) GLIDE SLOPE, MINIMA TEMPORARILRY RAISED TO LOCALIZER ONLY FOR CATEGORY D AIRCRAFT" IF APPLICABLE, "CATEGORY II NA"* OR "CATEGORY II/III NA".	ALL CATEGORIES APPROACH RESTRICTED TO LOCALIZER ONLY MINIMA. TYPICAL NOTAM TEXT: "DUE TO SNOW ON THE IXXX (APPROPRIATE IDENTIFER) GLIDE SLOPE, MINIMA TEMPORARILRY RAISED TO LOCALIZER ONLY.

* NA (NOT AUTHORIZED)

Figure 4-2. ILS CAT I and CAT II/III Snow Clearance Area Depth Limitations

4.2 CONTROLLING SNOW DRIFTS

BIL does not use fences or trenches to control snow drifting problems. The SCC references weather forecasts and attempts to predict when/if drifting will occur. Work schedules are coordinated so that personnel are available to remove drifts and ARFF/AFM Workers utilize high speed runway brooms or snow plows depending on which piece of equipment is more effective. Problem areas are constantly monitored and snow removal continues until the drifting problem is no longer present on the airfield.

4.3 SNOW DISPOSAL

Wherever possible the Airport moves snow into ridges or windrows alongside the pavement surface and uses a high speed blower to relocate the snow into the infield islands between pavement surfaces. In certain ramp areas this method of snow disposal is not possible, so piles are created in predetermined locations away from aircraft operations. Additionally, a NOTAM is published identifying details about the snow piles related to locations and size. At the conclusion of the snow event, loaders and dump trucks move these snow piles from the ramp areas and relocate them to other pre-designated locations outside of all safety and object free areas.

4.4 METHODS FOR ICE CONTROL AND REMOVAL

Three (3) front-mount dedicated high speed runway brooms and two (2) multi-use plow/broom combination vehicles are primarily used to prevent a bond from occurring between snow/ice and the pavement surface. If this method of removing contaminant from the pavement surface is not successful and runway friction values decrease, BIL has other resources available.

Note: The SCC will evaluate, authorize, and implement the following methods as the situation warrants.

Liquid Chemicals:
The Airport purchases FAA approved liquid deice/anti-ice fluids in bulk quantities and has a 5,000 gallon storage facility on site. BIL maintains a portable 1,800 gallon tank/skid system that is carried in a dump truck and capable of spraying chemicals onto runway surfaces. This vehicle is equipped with a state-of-the-art monitoring/metering system that applies the appropriate amount of fluid depending on deicing or anti-icing applications. The vehicle makes one (1) 50 foot pass on each side of the runway centerline in strategic spots, which are usually located in the touchdown zones.

Solid Chemicals:
The Airport purchases FAA approved solid deice/anti-ice pellets in one (1) metric ton quantities. Although these pellets can be mixed with sand and applied on runway and taxiways, they are primarily made available to airline employees who spread them on the air carrier ramp to remove ice and increase friction.

Sand:
BIL also purchases large quantities of sand that currently meets Table 4-3 criteria as per the following FAA specifications:

Table 4-2. Standard Gradation for Sand

SIEVE DESIGNATION	PERCENT BY WEIGHT PASSING
8	100
80	0-2

Table 4-3. Expanded Sand Gradation Standard

SIEVE DESIGNATION	PERCENT BY WEIGHT PASSING
8	100
30	20-50
80	0-2

If runway friction values decrease and high speed brooms are not improving conditions, the SCC has the authority to implement sanding operations. Stockpiles of sand are stored inside large heated bays at the Airport Operations Center. BIL has two (2) runway sanders, one is mounted directly to a plow truck, and one is mounted in a dump truck for sanding operations. A liquid chemical pre-wets the sand as it is distributed. The vehicle makes a full-length pass along each side of the runway centerline at a high rate of speed spreading sand approximately 50 feet in width.

4.5 SURFACE INCIDENT/RUNWAY INCURSION MITIGATION PROCEDURES

All personnel and equipment accessing the movement areas must have authorization to do so, and at a minimum, successfully complete the BIL Movement Area Driver Training Program. Snow removal crews are all employees of the Airport and are not contracted by another company; therefore, these individuals are extremely familiar with operating in this environment and receive ongoing training on how to avoid surface incidents and runway incursion mitigation procedures. If an incident does occur during snow removal operations, supervisors will conduct an investigation in coordination with ATC, review policies/procedures, and provide remedial employee training if needed.

As per FAA requirements, all snow removal equipment operating on movement areas will be marked and lighted in accordance with AC 150/2510-5, *Painting, Marking and Lighting of Vehicles Used on an Airport.*

Radio Communication:
Primarily, communications between equipment operators will take place on the 800 MHz radio system (AIR 2) frequency. At times, it may be necessary to utilize cellular telephones so that information can be relayed without causing disruption to routine communications that take place on the radio.

When equipment departs the Airport Operations Center to begin snow removal on the airfield, operators will contact the Air Traffic Control Tower (ATCT) on Ground or Local control frequency 121.9 MHz. Communications will take place on this frequency while operating on all ramps, taxiways, and closed runways, unless directed otherwise by the ATCT. Communications on the primary Runway 10L/28R will take place on Tower frequency 127.2 MHz, or as assigned by the ATCT. In order to minimize communications and coordinate activities on Runway 10L/28R, whenever possible, the snow control vehicle will be the primary radio contact.

Note: The BIL ATCT is a 24-hour operation, does not close, and is ultimately responsible for coordinating all communications on the airfield. Coordination on the airfield between ATC and snow/ice control equipment takes place as per the attached Letter of Understanding, Effective March 6, 2012 (Jurisdictional Responsibility of Movement and Non-Movement Areas), by identifying work areas 1–3, as per the Airport Diagram in the Attachment Section.

Failed Radio Communication:
Equipment operators are responsible for verifying that all radio systems in the snow removal equipment is functioning properly. If deficiencies are discovered during preventative maintenance inspections, they are assigned a high priority repair and immediately corrected. If a radio failure between a vehicle and ATC on the movement area occurs, the following will take place:

- All personnel are responsible for monitoring radio frequencies and assisting a crew member if communication problems are observed.
- ATC can contact an equipment operator via the 800 MHz radio system.
- Light gun protocols between ATC and the vehicle will be implemented.

Low Visibility Conditions:
When weather reduces visibility during snow removal operations, personnel operating equipment have been trained to slow down, increase communications, routinely identify their location, and improve overall situational awareness.

Equipment Operator Fatigue:
Snow removal crews are encouraged to maintain a healthy lifestyle by obtaining adequate sleep, eating healthy, and exercising frequently. Since equipment operators at BIL are on standby during the Winter months, supervisors routinely monitor the condition of all employees. Schedules are referenced and adjusted prior to each snow event so that drivers maintain consistency by either working dayshift or nightshift. Personnel are scheduled accordingly and work 12 hours on and 12 hours off, with breaks throughout the shift.

5.1 AIRPORT SURFACE ASSESSMENT REPORTING PROCEDURES

A surface condition report or NOTAM is disseminated to pilots whenever the pavement condition is worse than bare or dry. NOTAMs shall be issued by Airport Operations personnel as soon as possible whenever a movement area pavement surface has any type or form of contaminant on it in order to provide pilots with the best information available to ensure safe operations. Personnel will report surface conditions in terms of contaminant type, depth, Runway Condition Codes (RCC) and other details as listed in the RCAM.

BIL will carefully monitor present and forecasted weather conditions and evaluate airfield information. As weather and Airport surface conditions change, BIL Airport Operations personnel shall:

- Update and issue Airport Condition Report forms as necessary, and as outlined in 14 CFR Part 139.339, Airport Condition Reporting.
- Further assess and report runway conditions utilizing the RCAM and TALPA assessment tools.
- Inform the BIL ATCT of the current conditions.
- Ensure the airlines are adequately informed on the condition of operating surfaces by updating Airport Condition Reports as needed via the Electronic FAA Digital NOTAM Manager System.

Inspections:
Whenever meteorological conditions exist, two types of inspections will take place. As previously stated, the on-duty Lead ARFF/AFM Worker will monitor airfield conditions and at a minimum of one time per hour, physically inspect pavement surfaces as per the following criteria:

- A special inspection of facilities will occur when an unusual condition, such as weather is imminent or present.
- Continuous monitoring of surfaces during active snow events, rapidly changing conditions, air/pavement temperature changes, etc. This will occur by the SCC inspector who shall remain on the airfield and focus on monitoring and reporting conditions that may affect the safety of aircraft. The inspector is also responsible for conducting friction tests, updating and completing RCAMs, observing aircraft operations and pilot communications and issuing/canceling NOTAMs to ensure they remain current, accurate, and timely.

ISSUING an Airport Condition Report due to changes in airfield conditions use the following procedures:
When Airport conditions exist that require a NOTAM to be issued, Airport personnel will utilize a computer/Internet connection, access the FAA Digital NOTAM Manager Website, and electronically submit the information. Once personnel have reviewed and approved the NOTAM, they will generate a confirmation e-mail, which is sent to a preauthorized list of airport/airline employees at the Billings Airport. Additionally, this information is available and disseminated to all pilots via the National NOTAM System. ARFF/AFM personnel may also notify the FSS and/or Billings ATCT via telephone or radio in order to provide updated Airport condition information.

CANCELING an Airport Condition Report due to changes in airfield conditions use the following procedures:
When Airport conditions improve/change, Airport personnel will electronically resubmit the updated information to the FAA notifying them to cancel the NOTAM. An e-mail is generated and sent to airport/airline employees informing them that the NOTAM is no longer valid, the National NOTAM System is updated accordingly, and Billings ATCT is notified via telephone or radio.

Airlines:
The airlines are responsible to monitor snow conditions and determine if their operations are within the limitations of their own operating specifications. Additional runway condition information can also be obtained by calling the Airport Operations Center at 657-8496.

Billings Airport and Air Traffic Control Tower (ATCT):
The Airport and BIL ATCT have three current Letters of Understanding regarding:

- Reporting Airport Conditions
  (Effective: January 1, 2018)
- NOTAM Issuance During Continuous Snow Removal Operations
  (Effective: November 01, 2018)
- Jurisdictional Responsibility of Movement and Non-Movement Areas
  (Effective: March 6, 2012)

Please reference the Attachments Section for additional information.

5.2 RUNWAY CONDITION ASSESSMENT MATRIX

When a contaminant exists on a runway surface that could potentially impact an aircraft's Takeoff and Landing Performance (TALP), FAA approved friction measuring equipment may be used to help determine if snow/ice removal efforts are successful, in that it can show the trend of a runway as to increasing or decreasing friction. BIL currently utilizes an electronic decelerometer to measure the breaking coefficient of the pavement surface.

Conditions:
Friction equipment can be used when the runway surface is contaminated with the following:

- Ice
- Compacted snow at any depth
- Dry snow 1 inch or less
- Wet snow or slush 1/8 inch or less

When to Conduct:
RCAM and friction assessments should be conducted if any of the following occurs:

- When the central portion of the runway, centered longitudinally along the runway centerline, is contaminated over a distance of 500 feet or more.
- After anti-icing, deicing, or sanding operations.
- Immediately following any aircraft incident or accident on the runway.
- Prior to the first air carrier operation of the day or upon request.
- If a pilot reports braking that is significantly less than other recent reports, or does not match decelerometer readings.

How to Conduct:
Below are procedures that shall be followed when conducting runway friction measurements:

- Runway friction surveys should be conducted approximately 10 feet alternating either side of the runway centerline.
- Friction measuring equipment is operated in the same direction as landing aircraft.
- Friction tests shall be completed in one pass.
- Tests will be conducted on the runway beginning at touchdown, midpoint, and rollout with an average for each of the three zones.

RCAM Applicability:
Operating with an understanding of the RCAM, the Airport operator must first determine by utilizing the RCAM flowchart, whether the overall runway length and width coverage or cleared width (if not cleared from edge to edge) is contaminated greater than 25 percent. This step in the assessment process will dictate whether a RCC will be applicable and included in the reported runway conditions. When submitting runway condition information through the Federal NOTAM system, this calculation will be automatically conducted by the NOTAM system, based on the reported contaminants for each third of the runway.

- If 25 percent or less of the overall runway length and width coverage or cleared width is covered with contaminants, RCCs must not be applied, or reported. The Airport operator in this case will simply report the contaminant percentage, type, and depth for each third of the runway, including any associated treatments or improvements.
- If the overall runway length and width coverage or cleared width is greater than 25 percent, RCCs must be assigned, and reported informing airplane operators of the contaminant present and associated codes for each third of the runway. (The reported codes will serve as a trigger for all airplane operators to conduct a Takeoff and/or Landing Performance Assessment (TALPA).)

RCAM Assessment Reporting:
Friction measurements will be reported in Mu values and included in the RCAM assessment, and include the following:

- Airport Identifier and designation of active runway.

- Type of friction measuring equipment used.
- RCC for each third of the runway.
- With effect dates and times including all names and initials as required.
- Friction measurements will be included as part of the RCAM and TALPA tools as required and reported accordingly.

5.3 REQUIREMENTS FOR RUNWAY CLOSURES

As per the Letter of Understanding (LOU) in the Attachment Section, **Reporting Airport Conditions**, the ATCT will immediately notify Airport Operations if braking conditions deteriorate.

A runway receiving a POOR braking action report is evidence that surface conditions are deteriorating and an assessment of the surface should take place. If two consecutive poor reports are received, and continuous monitoring is occurring, then no change is needed. However, if the same two reports are received, and continuous monitoring is not in effect, then operations on that runway are suspended until an assessment is conducted. If/when this occurs, the on-duty Airport Operations Supervisor must be notified and will assume SCC command. Techniques, personnel, and equipment operations will be evaluated in order to improve the surface condition of the runway. Section 4.4 regarding **Methods for Ice Control and Removal** will most likely be implemented, continuous monitoring will continue and friction surveys conducted until conditions improve.

A runway receiving a NIL braking action report by a pilot or Airport operator is extremely unsafe for aircraft. If/when this occurs, the on-duty Airport Operations Supervisor must be notified and will assume SCC command. The runway will immediately close and techniques, personnel, and equipment operations will be evaluated in order to improve the surface condition of the runway. Section 4.4 **Methods for Ice Control and Removal** will be implemented.

Note: Please reference the most current FAA Advisory Circular 150/5200-30, Airport Field Condition Assessments and Winter Operations Safety, for additional information.

ATTACHMENTS

PAGE

Snow and Ice Control Equipment 24

Letter of Understanding – Effective: January 1, 2018 26
Reporting Airport Conditions

Letter of Understanding – Effective: November 01, 2018 27
NOTAM Issuance During Continuous Snow Removal Operations

Letter of Understanding – Effective: March 6, 2012 28
Jurisdictional Responsibility of Movement and Non-Movement Areas

Airport Diagram 32

RCAM Flowchart 34

RCAM 36

SNOW AND ICE CONTROL EQUIPMENT

DESIGNATION	DESCRIPTION
A–10	2003 John Deere 770CH Motor Grader
A–13	2003 Oshkosh 4X4 Snow Plow, 22' and Sand Spreader
A–14	2018 MB 4X4 Multipurpose Plow (20')/Broom (20') Vehicle
A–15	2018 MB 4X4 Multipurpose Plow (20')/Broom (20') Vehicle
A–16	2004 Oshkosh 4X4 Snow Plow, 22'
A–17	2003 Oshkosh 4X4 Rotary Snow Blower
A–18	2014 MB High Speed Rotary Snow Blower
A–19	2013 John Deere 644K – 3 Yard Loader/Ramp Blade/Cupping Plow
A–20	2005 John Deere 624J – 3 Yard Loader/Ramp Blade/Cupping Plow
A–21	2013 International 6X6 Dump Truck, 14' Plow Blade and 1,800 Gallon Runway Deicer
A–22	2003 International Dual Tandem Truck
A–23	2013 International 6X6 Dump Truck, 20' Plow Blade and Sand Spreader
Broom 1	2011 Oshkosh 20' M&B Broom
Broom 2	2004 Oshkosh 20' M&B Broom
Broom 3	2009 Oshkosh 20' M&B Broom
A–27	2007 John Deere Skid Steer Loader with Buckets/Blade/Broom
A–29	1988 Ford Flatbed Truck with Street Deice Unit
A–31	2002 Chevrolet Pickup with Snow Plow Blade and Electronic Decelerometer
A–35	2009 Ford F-350 4X4 Pickup/Sander with Snow Plow Blade and Electronic Decelerometer

LETTERS OF UNDERSTANDING

1. Effective: January 1, 2018
   Reporting Airport Conditions

2. Effective: November 1, 2018
   NOTAM Issuance During Continuous Snow Removal Operations

3. Effective: March 6, 2012
   Jurisdictional Responsibility of Movement and Non-Movement Areas

(See Next Seven Pages)

Billings FAA Airport Traffic Control Tower and City of Billings Aviation and Transit Department

LETTER OF UNDERSTANDING

EFFECTIVE: January 1, 2018

SUBJECT: Reporting Airport Conditions

1. PURPOSE: To establish procedures and define responsibilities for the exchange of Airport field conditions and runway braking action reports.

2. CANCELLATION: Letter of Understanding for Reporting Airport Conditions, dated October 05, 2016 is cancelled.

3. SCOPE: The responsibilities and procedures outlined herein apply to Billing Airport Traffic Control Tower (ATCT) and City of Billings Aviation and Transit department "Airport" for operational responsibilities pertaining to Airport Field condition and braking action reports at Billings Logan International Airport.

4. BACKGROUND: The Federal Aviation Administration (FAA) and other members of the aviation community have developed new standards to improve safety at U.S. airports during inclement weather. On October 1, 2016, U.S. airports, airline flight crews, dispatchers, general aviation pilots, and air traffic controllers will begin using new Takeoff and Landing Performance Assessment (TALPA) standards to reduce the risk of runway overrun accidents and incidents due to runway contamination caused by weather and other factors.

5. RESPONSIBILITIES: All signatories are responsible for ensuring compliance by personnel under their authority with the provisions of this agreement. Training, both initial and recurrent, of involved personnel is also the responsibility of the signatories.

6. PROCEDURES:

a. Billings ATCT must:

(1) Solicit braking action reports whenever weather conditions are conducive to deteriorating or rapidly changing runway conditions. When necessary, advise pilots to describe braking action as *"good," "good to medium," "medium," "medium to poor," "poor," or "nil."*

(2) Promptly advise the Airport Operations Division when runway braking action reports of *"good to medium," "medium," "medium to poor," "poor," or "nil."* have been received, or when conditions have improved to *"good."* When reporting, include type of aircraft from which the report is received, location, and time.

(3) When appropriate, include within the ATIS broadcast that Braking Action Advisories are in effect and the current Runway Condition Codes (RWY CC) when any one or more RWY CC's values are less than 6 as contained in Attachment 1.

JAN 25 2018

EXAMPLE-
"Runway two eight right condition code two, two, three at one zero one eight Zulu."

(4) When braking action reports of *"nil"* are received, cease operations on the runway(s) subject to the "nil" braking action and promptly advise the Airport.

b. Airport Operations Division must:

(1) Promptly notify Billings ATCT of any change in runway or taxiway conditions that could impact aircraft operations. These conditions will be documented in a Field Condition (FICON) Notice to Airmen (NOTAM). If conditions are deemed unsafe based on observations, and pilot reports for aircraft operations, the Airport will close those surfaces until the condition of the surface is deemed safe.

(2) Use FICON NOTAMs to identify the runway or taxiway, the time, and the runway condition code if applicable. RWY CC's are presented in thirds; touchdown, midpoint and roll out.

(3) Conduct a runway assessment upon receipt of two or more consecutive *"poor"* Braking Action Pilot Reports unless continuous monitoring procedures have been implemented.

(4) When braking action reports of *"nil"* are received, close the runway, and issue a NOTAM. The runway will remain closed until the Airport determines that the *"nil"* condition no longer exists.

(5) Advise Billings ATCT once it has determined that the *"nil"* condition no longer exists. The Airport will promptly advise Billings ATCT when the runway is open and cancel any NOTAMs.

7. **ATTACHMENT:** Runway Condition Assessment Matrix (RCAM)

Pete Schmitz
Air Traffic Manager
Billings Airport Traffic Control Tower

Kevin Ploehn
Director of Aviation and Transit Department
City of Billings Aviation and Transit Department

JAN 25 2018

Billings FAA Airport Traffic Control Tower and City of Billings Aviation and Transit Department

ATTACHMENT

Runway Condition Assessment Matrix (RCAM)

Assessment Criteria		Control/Braking Assessment Criteria	
Runway Condition Description	RwyCC	Deceleration or Directional Control Observation	Pilot Reported Braking Action
• Dry	6	---	---
• Frost • Wet (includes damp and 1/8 inch depth or less of water) *1/8 inch (3mm) depth or less of:* • Slush • Dry Snow • Wet Snow	5	Braking deceleration is normal for the wheel braking effort applied AND directional control is normal.	Good
-15°C and Colder outside air temperature: • Compacted Snow	4	Braking deceleration OR directional control is between Good and Medium.	Good to Medium
• Slippery When Wet (wet runway) • Dry Snow or Wet Snow (any depth) over Compacted Snow *Greater than 1/8 inch (3 mm) depth of:* • Dry Snow • Wet Snow *Warmer than -15°C outside air temperature:* • Compacted Snow	3	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced.	Medium
Greater than 1/8 inch(3 mm) depth of: • Water • Slush	2	Braking deceleration OR directional control is between Medium and Poor.	Medium to Poor
• Ice	1	Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced.	Poor
• Wet Ice • Slush over Ice • Water over Compacted Snow • Dry Snow or Wet Snow over Ice	0	Braking deceleration is minimal to non-existent for the wheel braking effort applied OR directional control is uncertain.	Nil

JAN 25 2018

BILLINGS AIRPORT TRAFFIC CONTROL TOWER and CITY OF BILLINGS AVIATION AND TRANSIT DEPARTMENT

LETTER OF UNDERSTANDING

EFFECTIVE: November 1, 2018

SUBJECT: NOTICE TO AIRMEN ISSUANCE DURING CONTINUOUS SNOW REMOVAL OPERATIONS

1. **PURPOSE:** To define notification procedures and establish use of a single Notice to Airmen (NOTAM) during continuous snow removal operations.

2. **CANCELLATION:** NOTAM Issuance During Continuous Snow Removal Operations, dated November 1, 2009.

3. **SCOPE:** The procedures contained herein are applicable when the City of Billings Airport Operations "City" will conduct continuous snow removal operations.

4. **RESPONSIBILITIES:** The City is responsible for NOTAM content and notification to Billings Airport Traffic Control Tower (BIL ATCT). BIL ATCT is responsible for NOTAM dissemination as required.

5. **PROCEDURES:**

   A. The City may issue a single NOTAM when continuous snow removal operations are expected, provided the following conditions are met:

   1) The BIL ATCT must be in operation for the entire duration of the NOTAM.

   2) Anticipated alternating closure time for each runway or taxiway is two hours or less.

   NOTE: Closure for more than two hours requires a separate NOTAM specifically for each affected runway or taxiway.

   3) BIL ATCT is notified prior to the start of the NOTAM, and notification is timely to allow coordination of air traffic. Notification should include the closing and reopening time for each runway and taxiway affected.

   4) The NOTAM is issued prior to commencing continuous snow removal operations, and canceled when operations are complete.

   B. The BIL ATCT must disseminate NOTAM information on the specific runway and taxiway closures as required.

Pete Schmitz
Air Traffic Manager
Billings Air Traffic Control Tower

Kevin Ploehn
Director of Aviation & Transit
City of Billings Logan International Airport

MAY 17 2019

LETTER OF UNDERSTANDING

EFFECTIVE: March 6, 2012

SUBJECT: JURISDICTIONAL RESPONSIBILITY OF MOVEMENT AND NON-MOVEMENT AREAS

1. **PURPOSE:** To define jurisdictional responsibilities for movement and non-movement areas at the Billings Logan International Airport.

2. **CANCELLATION:** Letter of Understanding between Billings FAA Airport Traffic Control Tower and City of Billings Aviation and Transit Department, dated July 1, 2010, is canceled.

3. **SCOPE:** This letter assigns control responsibility for movement and non-movement areas at Billings Logan International Airport.

4. **DEFINITIONS:**

   a. **Movement Area:** The runways and taxiways of the Airport, which are utilized for the taxiing, takeoff, and landing of aircraft, excluding loading ramps and parking areas. This area is delineated on the attached Area Map.

   b. **Non-Movement Area:** The areas on the Airport, which are designated by the Airport to be used for parking, loading, or unloading aircraft, and roads to be used only by authorized personnel and vehicles.

   c. **Operations Areas:** Defined portions of the movement area that allow vehicles to conduct wide scale operations while reducing frequency congestion. These areas are delineated on the attached Area Map and defined as follows:

      1) **Area 1:** Runway 10L/28R, and those portions of Runway 7/25, and Taxiways B and D north of Runway 10L/28R.

      2) **Area 2:** That portion of Runway 7/25 south of Runway 10L/28R, Runway 10R/28L, and those portions of Taxiways A, F, and H west of Runway 7/25.

      3) **Area 3:** All taxiways south of Runway 10L/28R and east of Runway 7/25.

   d. **Runway:** Refers to the runway pavement and its safety area, and extending to the HOLD LINES of all connector taxiways.

5. **RESPONSIBILITIES:**

   a. Billings Airport Traffic Control Tower (ATCT) is responsible for the control of aircraft and vehicle operations on the movement area.

   b. City of Billings Aviation and Transit Department is responsible for the control of aircraft and vehicle operations on the non-movement areas.

c. ATCT personnel and the City of Billings Aviation and Transit Department personnel shall adhere to the responsibilities outlined in this Letter of Understanding.

6. GENERAL PROCEDURES:

The City of Billings Aviation and Transit Department Shall:

a. Inform the users of their responsibilities when operating vehicles or aircraft within movement areas as contained in the Airport Rules and Regulations.

b. Request all large prop and turbojet aircraft operating within non-movement and ramp areas to advise Billings Ground Control of powerback, pushback, or engine starts. All information related to movements within non-movement and ramp areas is advisory in nature and does not imply control or separation responsibility.

Vehicle Operators Shall:

a. Give way to taxiing aircraft at all times.

b. Contact the ATCT and maintain a listening watch on the frequency prior to entering the movement area.

1) Between the hours of 0600L and 2200L, initial communications will take place on the Ground Control frequency 121.9.

2) Between the hours of 2200L and 0600L, initial communications will take place on the Local Control ("Tower") frequency 127.2.

3) When responding to an emergency, emergency equipment will operate in accordance with the ATCT/City of Billings Aviation and Transit Department Letter of Understanding concerning Airport Emergency Service.

4) When operating in tandem with other vehicles, one vehicle may be designated as the communications contact. Any clearances issued to this vehicle will apply to all vehicles in the identified group.

c. Advise Ground Control of the intended destination. Operators may request access to a specific operations area (see Paragraph 7, below) to accomplish large scale operations, i.e., airfield inspections, snow removal, mowing, etc.

7. OPERATIONS AREA PROCEDURES:

a. Vehicles may be authorized to operate simultaneously in Areas 2 and 3, only when snow removal operations are in progress and Runways 10R/28L and 7/25 are both closed; otherwise, an individual vehicle must not be authorized to operate in more than one area at a time.

LETTER OF UNDERSTANDING

SUBJECT: JURISDICTIONAL RESPONSIBILITY OF MOVEMENT AND NON-MOVEMENT AREAS

b. Area 1 and 2 operations.

1) If any portion of a runway in that area is open, vehicles operating in those areas will be on the Local Control ("Tower") frequency 127.2.

2) Area authorizations will include specific clearances regarding any runway in that area. This runway clearance only applies to that portion of the runway contained in the area.

PHRASEOLOGY EXAMPLE:

- *"AREA ONE OPERATIONS APPROVED, PROCEED ON RUNWAY 28R."*
- *"AREA TWO OPERATIONS APPROVED, PROCEED ON RUNWAY 25, HOLD SHORT RUNWAY 28L."*

3) If a runway is not addressed in the authorization, vehicles must hold short of that runway and request clarification (e.g., in the first example above, the vehicle must hold short Runway 25 until clarification is received).

c. A request for "turnarounds" at an area boundary will include the specific identification of the intersection. An authorization to conduct "turnarounds" at an area boundary is not an authorization to conduct widespread operations in that adjacent area.

d. The ATCT must immediately notify Airport Operations personnel when any foreign object debris (FOD) is observed or reported on or near the movement area. The ATCT will cease operations on the affected surface until Airport Operations has determined that the FOD is no longer a safety factor for aircraft.

Kirk D. Swanson
Air Traffic Manager,
Billings ATCT/TRACON

Thomas H. Binford, A.A.E.
Director of Aviation and Transit
City of Billings Aviation and Transit Department

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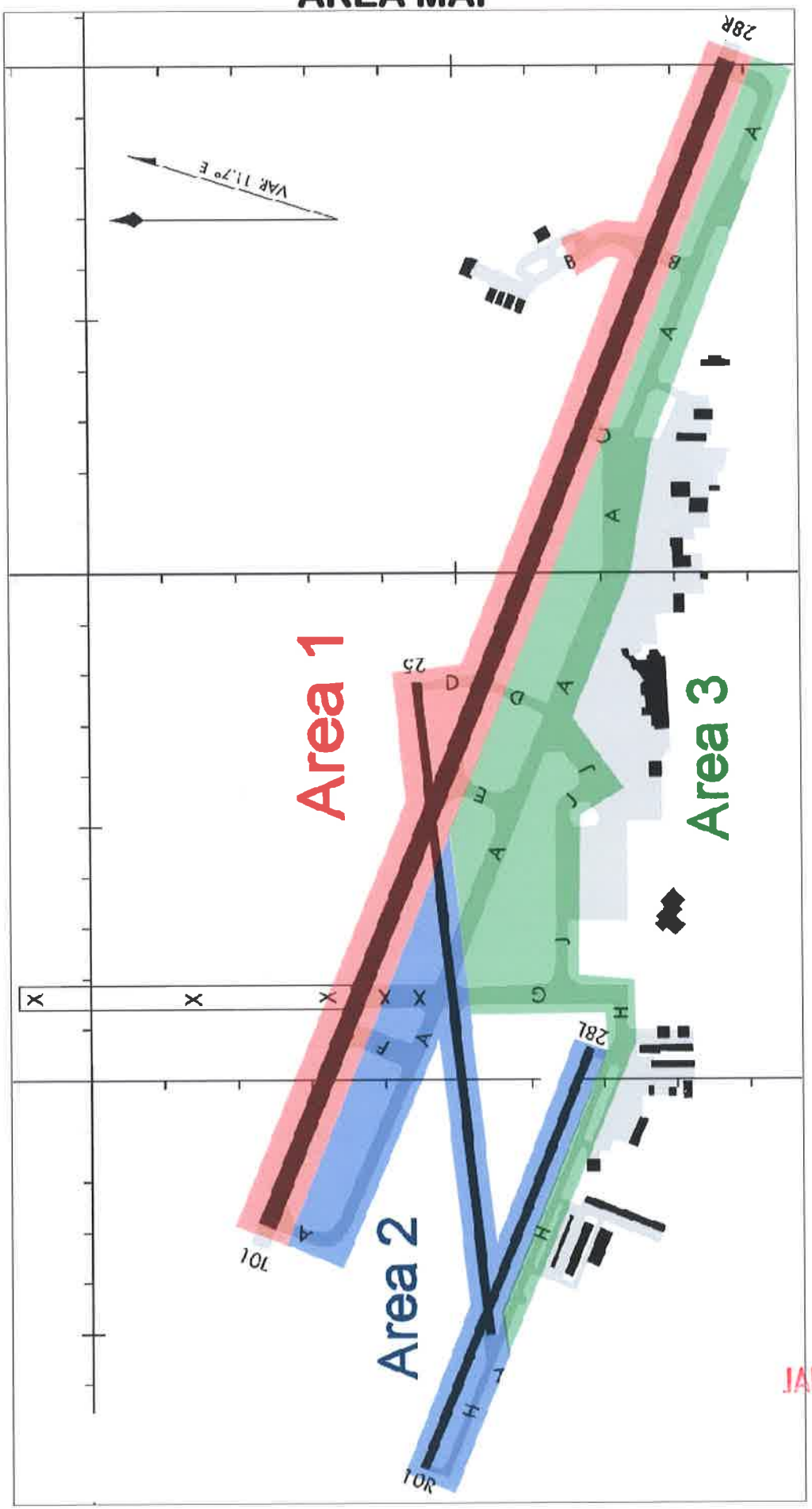
AIRPORT DIAGRAM

(See Next Page)

AREA MAP



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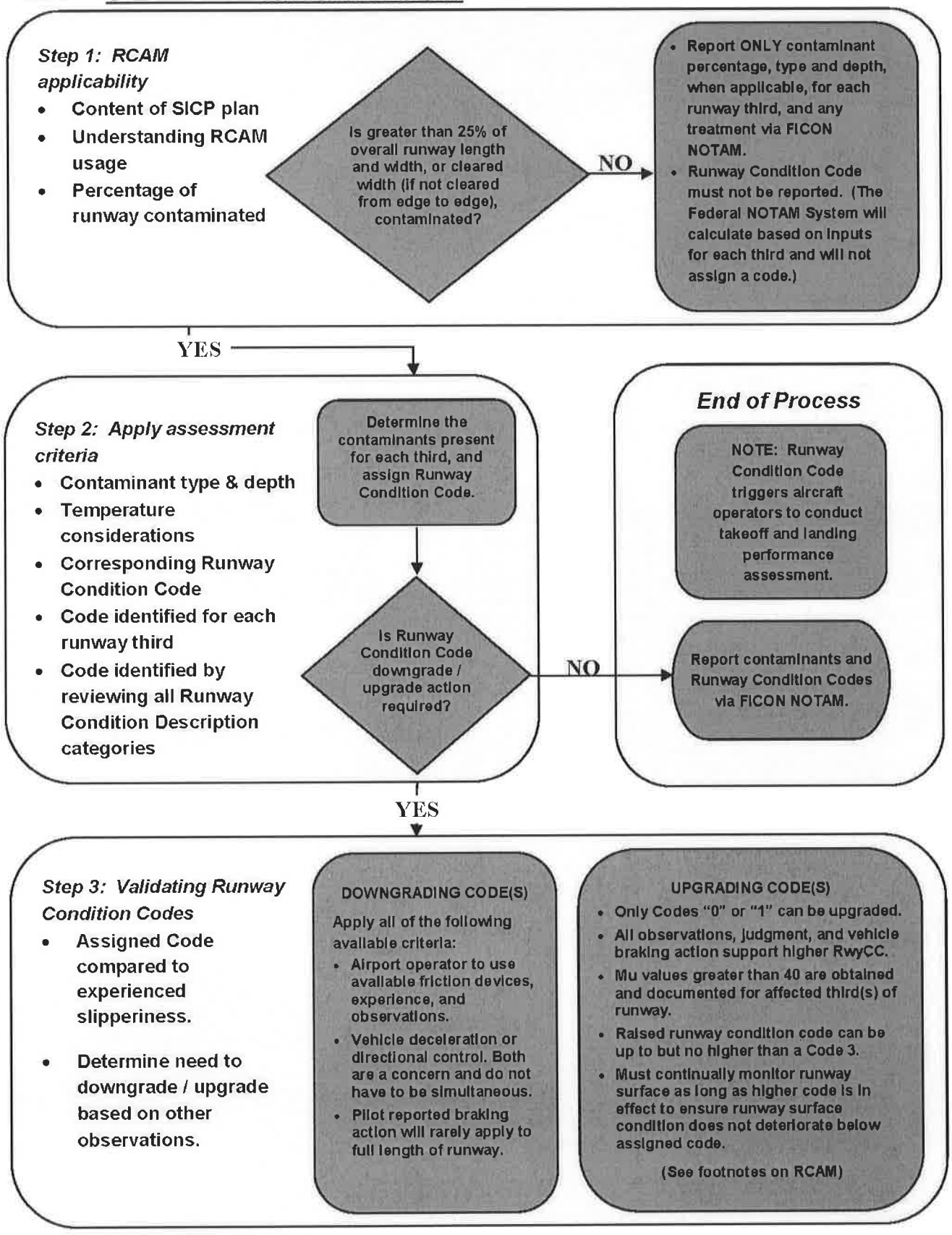
RCAM FLOWCHART

(See Next Page)

5.3.2 Overview of the Basic RCAM Process.



RCAM

(See Next Page)

Table 5-2. Runway Condition Assessment Matrix (RCAM) *(for Airport Operators' Use Only)*

Assessment Criteria		Downgrade Assessment Criteria		
Runway Condition Description	**Code**	**Mu (μ) [1]**	**Vehicle Deceleration or Directional Control Observation**	**Pilot Reported Braking Action**
• Dry	6	40 or Higher	---	---
• Frost • Wet (Includes Damp and 1/8 inch depth or less of water) ***1/8 inch (3mm) depth or less of:*** • Slush • Dry Snow • Wet Snow	5		Braking deceleration is normal for the wheel braking effort applied AND directional control is normal.	Good
5° F (-15°C) and Colder outside air temperature: • Compacted Snow	4	39 to 30	Braking deceleration OR directional control is between Good and Medium.	Good to Medium
• Slippery When Wet (wet runway) • Dry Snow or Wet Snow (Any depth) over Compacted Snow ***Greater than 1/8 inch (3mm) depth of:*** • Dry Snow • Wet Snow ***Warmer than 5° F (-15°C) outside air temperature:*** • Compacted Snow	3		Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced.	Medium
Greater than 1/8 (3mm) inch depth of: • Water • Slush	2	29 to 21	Braking deceleration OR directional control is between Medium and Poor.	Medium to Poor
• Ice [2]	1		Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced.	Poor
• Wet Ice [2] • Slush over Ice • Water over Compacted Snow [2] • Dry Snow or Wet Snow over Ice [2]	0	20 or Lower	Braking deceleration is minimal to non-existent for the wheel braking effort applied OR directional control is uncertain.	Nil

[1] The correlation of the Mu (μ) values with runway conditions and condition codes in the Matrix are only approximate ranges for a generic friction measuring device **and are intended to be used only to downgrade a runway condition code; with the exception of circumstances identified in Note 2.** Airport operators should use their best judgment when using friction measuring devices for downgrade assessments, including their experience with the specific measuring devices used.

[2] In some circumstances, these runway surface conditions may not be as slippery as the runway condition code assigned by the Matrix. The airport operator may issue a higher runway condition code (but no higher than code 3) for each third of the runway if the Mu value for that third of the runway is 40 or greater obtained by a properly operated and calibrated friction measuring device, **and all other observations, judgment, and vehicle braking action support the higher runway condition code. The decision to issue a higher runway condition code than would be called for by the Matrix cannot be based on Mu values alone; all available means of assessing runway slipperiness must be used and must support the higher runway condition code.** This ability to raise the reported runway condition code to a code 1, 2, or 3 can only be applied to those runway conditions listed under codes 0 and 1 in the Matrix.

The airport operator must also continually monitor the runway surface as long as the higher code is in effect to ensure that the runway surface condition does not deteriorate below the assigned code. The extent of monitoring must consider all variables that may affect the runway surface condition, including any precipitation conditions, changing temperatures, effects of wind, frequency of runway use, and type of aircraft using the runway. If sand or other approved runway treatments are used to satisfy the requirements for issuing this higher runway condition code, the continued monitoring program must confirm continued effectiveness of the treatment.

Caution: Temperatures near and above freezing (e.g., at 26.6° F (-3°C) and warmer) may cause contaminants to behave more slippery than indicated by the runway condition code given in the Matrix. At these temperatures, airport operators should exercise a heightened level of runway assessment, and should downgrade the runway condition code if appropriate.