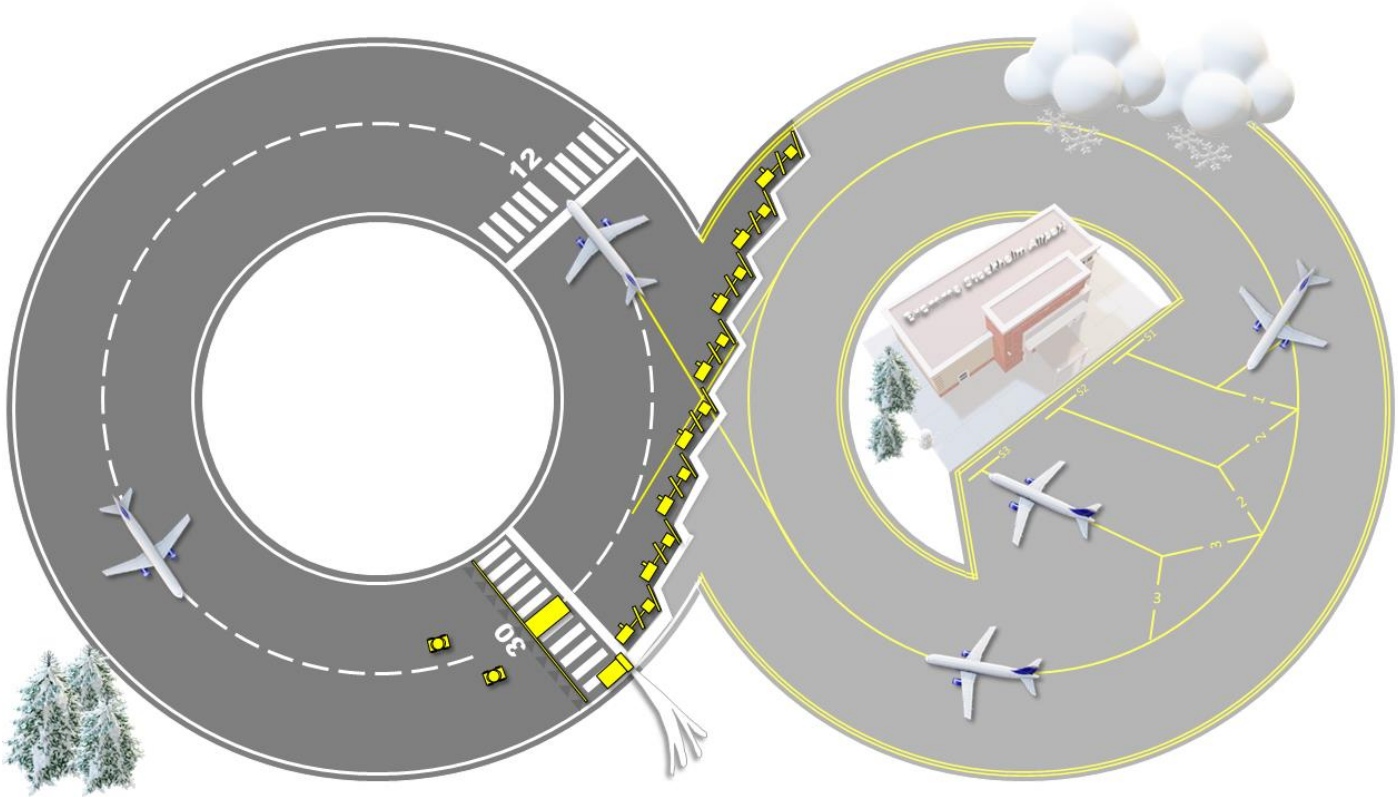
Swedavia Airports

Bromma Stockholm Airport

SNOW PLAN



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1. Bromma Stockholm Airport

1.1 General information

Stockholm Bromma Airport (IATA: BMA, ICAO: ESSB) is a Swedish domestic and minor international airport in Stockholm. It is located 4 NM (7.4 km; 4.6 mi) west-northwest of downtown Stockholm and is the closest airport to the city compared to the other commercial passenger airports in the area around Stockholm (Arlanda, Skavsta and Västerås).

Opened:	23 May, 1936
Operated by:	Swedavia AB
Elevation AMSL:	14 m / 47 ft
Coordinates:	59°21′16″N 017°56′23″E
Website:	www.swedavia.com/bromma

Runways direction:	12/30
Runways length:	1668 m / 5472 ft
Runways surface:	Asphalt

Swedavia International Airports:	ARN, BMA, GOT, MMX
Swedavia Regional Airports:	KRN, VBY, RBY, OSD, UME, LLA

1.2 Local winter conditions

Following statistics are based upon data gathered between 2018-2024 and shows the average percentage on site weather category.

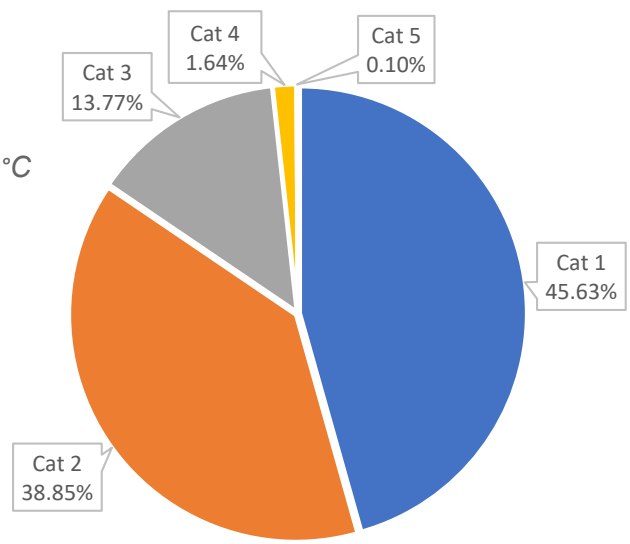
Category 1 – 45,63%
-Dry, wet, +°C ambient & ground

Category 2 – 38,85%
-Risk for freezing, frost etc. no precipitation, -°C

Category 3 – 13,77%
-Light snow, precipitation up to 1 cm/hour

Category 4 – 1,64%
- Intense snow, precipitation 1-4 cm/hour

Category 5 – 0,10%
-Extreme snow, precipitation >4cm/hour



2. Glossary

AIP	Aeronautical Information Publication
A/L	Airside/Landside
APOC	Airport Planning Operations Centre
AR	Airport Regulations
ATOS	Airport Technical and Operative Supervisor
ATC	Air Traffic Control
ATS	Air Traffic Service
BMA	Bromma Stockholm Airport
EASA	European Aviation Safety Agency
EUROCONTROL	Pan-European, civil-military organisation
FPC	Flight Planning Centre
GP	Glide Path Indicator
ICAO	International Civil Aviation Organisation
ILS	Instrument Landing System
LFV	Air Navigation Service Provider
NOTAM	A notice to air men (NOTAM) is a notice filed with an aviation authority to alert aircraft pilots of potential hazards and conditions
PAPI	Precision Approach Path Indicator
RCR	Runway Condition Report
RGL	Runway Guard Light
AWOS	Automated Weather Observation System
RWY	Runway
SNAP 2.0	A digital SNOWTAM/RCR reporting tool
SNOWTAM/RCR	A report describing live weather conditions of runways, taxiways and aprons at an aerodrome
TWR	Tower
UHF	Ultra High Frequency
VHF	Very High Frequency

3. Organization

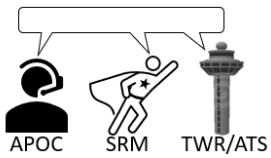
3.1 Organizational structure

Bromma Stockholm Airport belongs to the organization within Swedavia International Airports.

Swedavia International Airports:	ARN, BMA, GOT, MMX
Swedavia Regional Airports:	KRN, VBY, RBY, OSD, UME, LLA

3.2 Snow committee

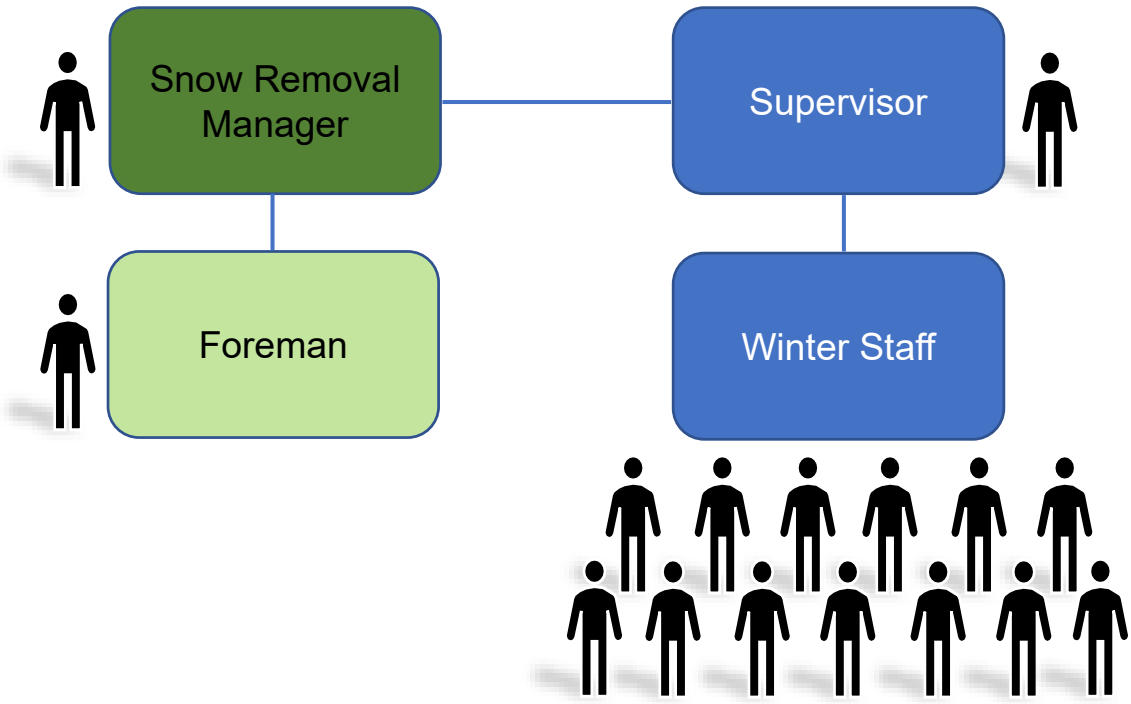
Unexpected changes in weather, resources, or limitations are discussed, planned and mitigated by the Snow removal manager (SRM), APOC and ATS. Together they make up the snow committee. Daily follow up is done by APOC.



3.3 Scheduled meetings

Traffic Tactical Forum	“TTF”	when necessary
Local Runway Safety Team	“LRST”	every quarter
Airside Safety Group	“ASSG”	every two months

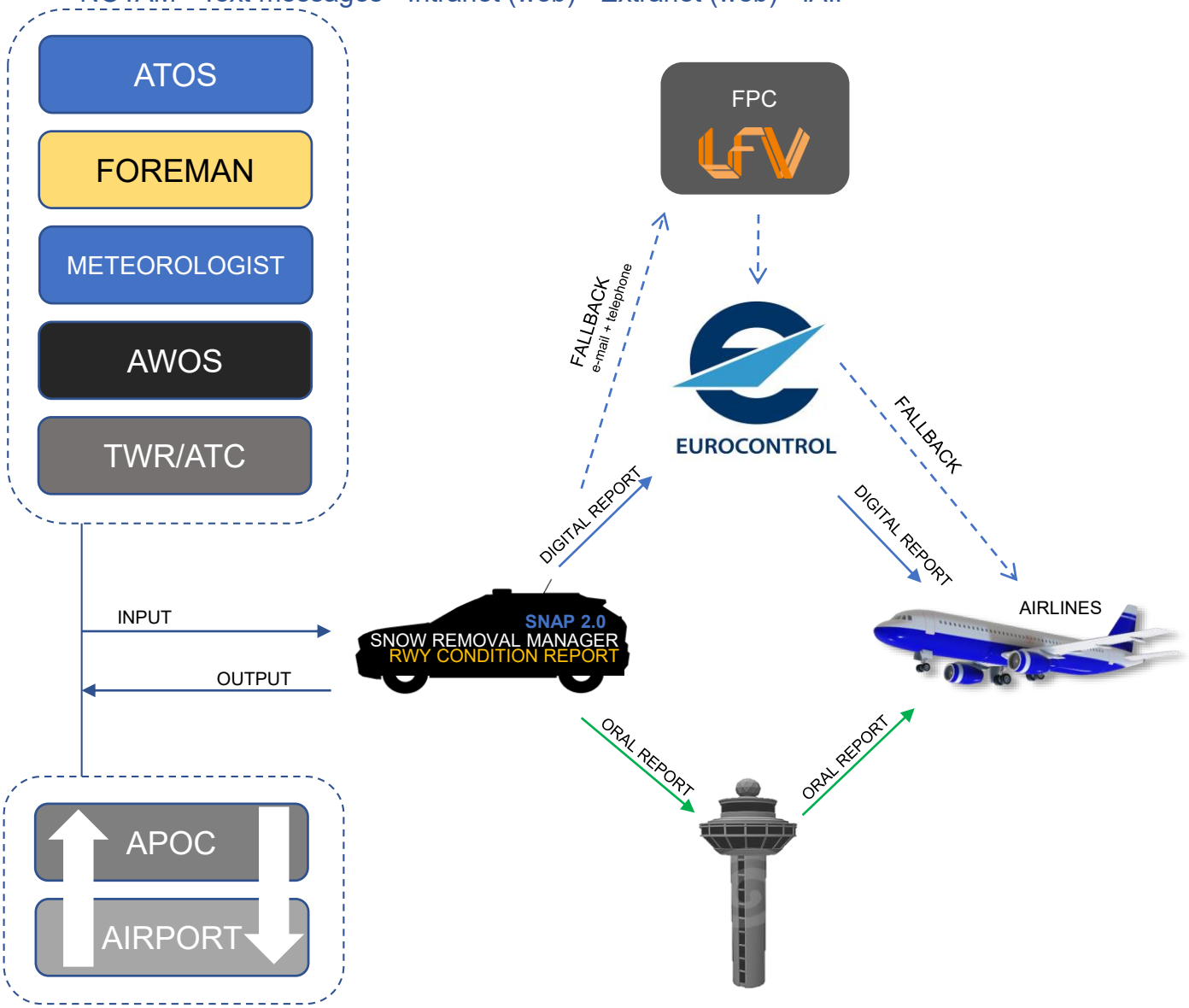
3.4 Chain of command



3.5 Methods of communication

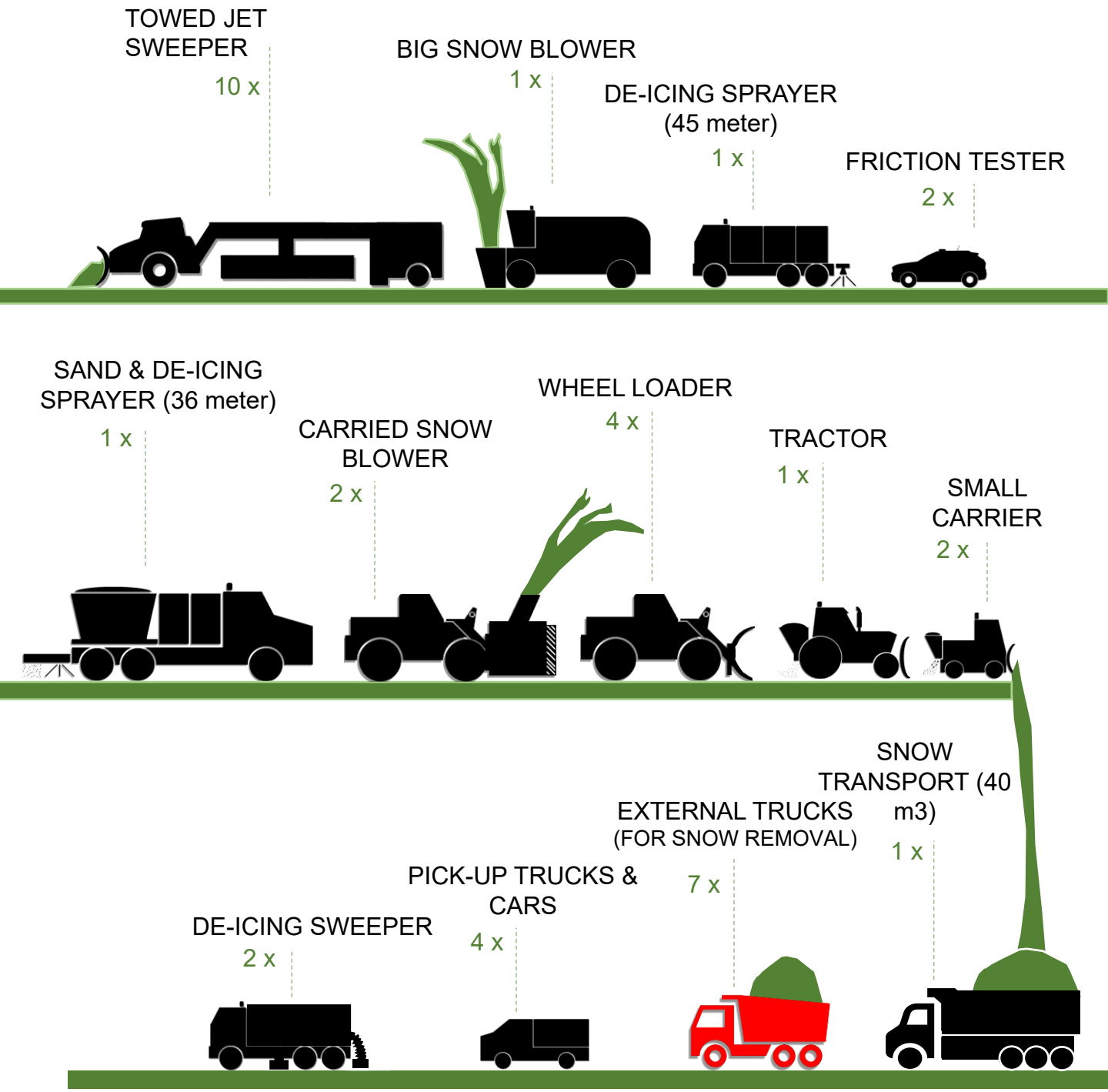
The Snow Removal Manager gathers relevant information through other systems and reports the runway, taxiways and apron status with a digital tool (SNAP) and sends the report directly from the mobile office. The Snowtam report goes from reporting tool to Eurocontrol and further on out to the airlines.
The Airport is obligated to send a new Snowtam or RCR report with every significant change in weather based on assessment of conditions according to RCAM (Runway Condition Assessment Matrix)

Other means of communication:
- VHF radio - UHF radio – Telephone - E-mail - AI (Airport Information)- SNOWTAM – NOTAM - Text messages - Intranet (web) - Extranet (web) - IAIP



4. Resources

4.1 Vehicles



4.2 Tools & Chemicals

WEATHER & FLIGHTPLANNING SYSTEMS

DIGITAL REPORTING TOOLS

GEOFENCED DE-ICING TECHNOLOGY

Automatic Weather Observing System (AWOS)

DAMMANN® Pflanzenschutztechnik Fahrzeugtechnik Airporttechnik

AWOS

RWY DE-ICING FORMATE
AVIFORM L50 LIQUID: 200 m³
AVIFORM S-SOLID: 15 tons

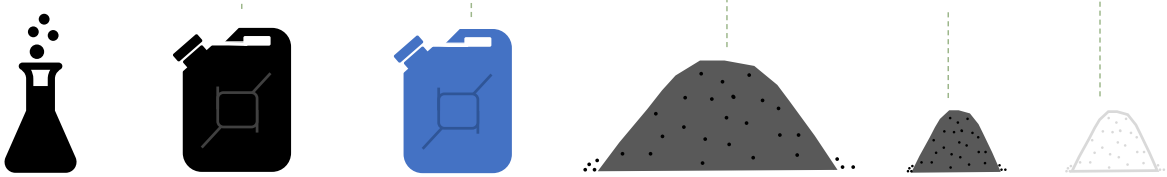
DIESEL
HVO100: 50 m³

AD-BLUE
2 m³

AIRSIDE GRIT
600 tons (< 4,75 mm)

LANDSIDE GRIT
50 tons (6-8 mm)

LANDSIDE SALT
20 tons



AIRCRAFT DE-ICING FLUID
TYPE I: 24 m³
TYPE I I: 24 m³

WE ONLY USE 100% FOSSIL FREE FUEL

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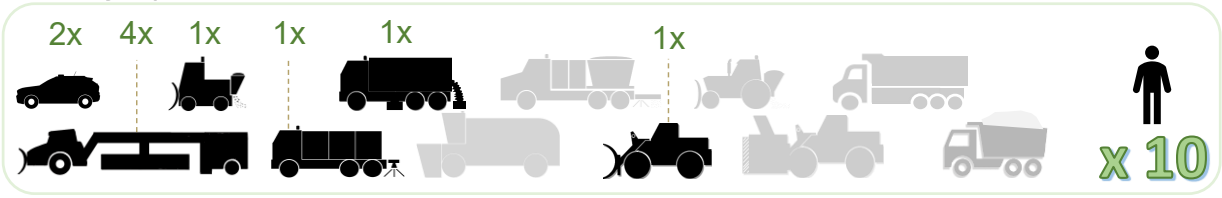
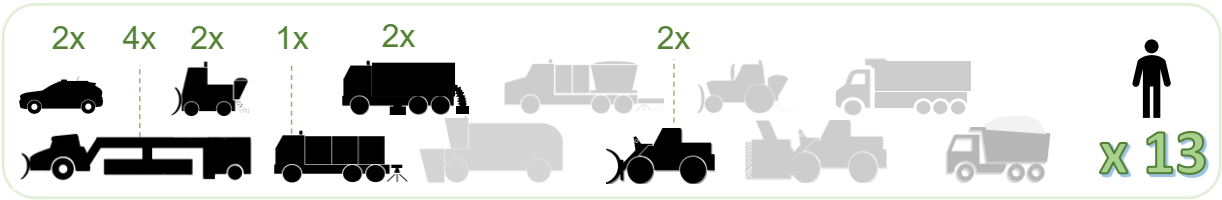
4.3 Manpower & resources in use

Standard manpower = 3 shifts x 16 resources.
On site workshop = 3 resources 7pm-16pm. (available on call after standard working hours)
Image below shows the minimum number of resources/shift needed to comply all operative surfaces during a specific weather category number.

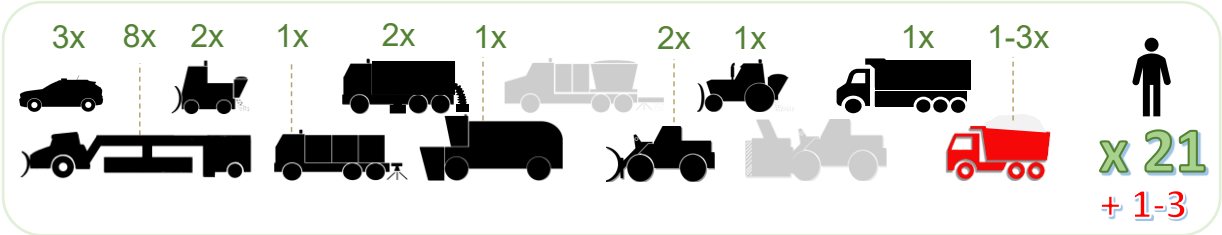
Category 1 – Plus degrees, no snow *(no restrictions)*



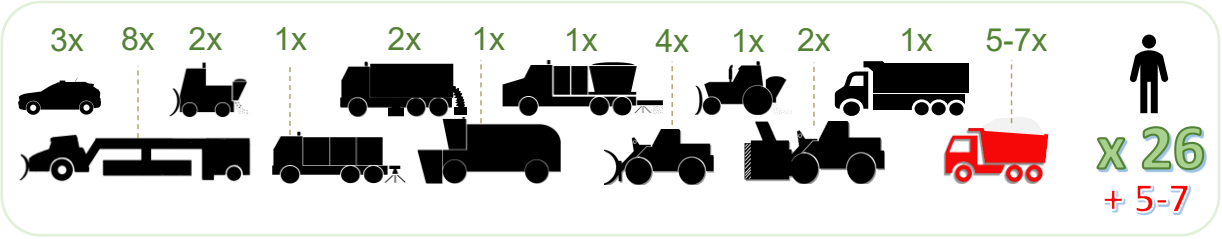
Category 2 – Frost/Ice, no snow *(no restrictions)*



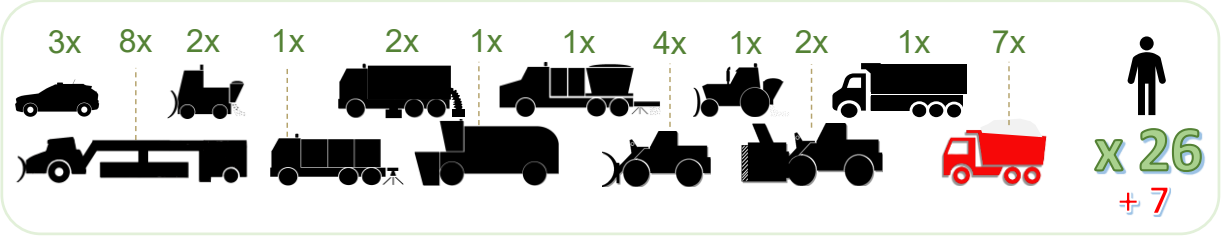
Category 3 – Light/medium *(8 min clearing – 22 min take off & landing)*



Category 4 – Intense *(8 min clearing – 16 min take off & landing)*



Category 5 – Extreme *(8 min clearing – 8 min take off & landing)*



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4.4 Planning of resources and machinery

BMA Airport plans the number of working resources based on weather categories.
The specific categories are based on weather data gathered over 10+ years and determines the manpower in use during that specific category.
Category and manpower equals the necessary amount of resources to ensure snow clearing of prioritized areas and safe take-off and landing.
The categories are provided by the weather service along with the weather forecast.
The Snow Removal Manager is responsible to ensure that the categorized number of resources are at the scene. The list (see 4.1) is an example of machines in use (type of machines in use varies during operating hours).
During category 4-5 closed TWY:s may occur due to clearing of visual aids and snow profiles.
BMA Airport field staff and BMA Vehicle workshop maintains and ensures that the vehicle fleet is operational.

The snow removal manager is responsible to ensure adeqate number of resources per category. APOC tracks status daily.

5. Operations

5.1 Priority of surfaces to be cleared

ESSB winter operations priorities clearing of the aerodrome areas in the following order:

During snowfall and clearing

1. Areas and aids necessary for take off and landing (landside, threshold, PAPI, ILS, signs)
2. Runway & emergency routes
3. Taxiways serving the runway
4. Aprons* & remote aprons (clear all markings visible, eventual emergency call-offs)

After snowfall and clearing

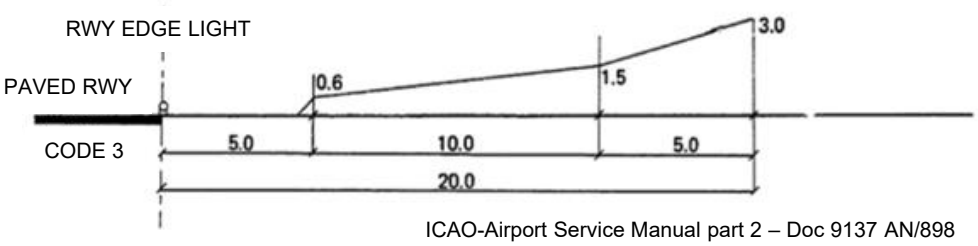
5. Measures designed to increase airport usability
6. Completion of runway and taxiways (*snow profiles)
7. Aircraft hangar and stand locations
8. Completion of aprons
9. Other relevant emergency routes (approach 12/30)
10. GP and Localizer areas
11. External requests (asap or within 2 hours)
12. Snow transportation from temporary spots to permanent locations

** Stands 7,14,15 and remote R5-R8 will not be prioritized during weather category 3-5*

1. 5.2 Clearance limit for aircrafts using the aerodrome

Image shows the general distance and height limits (metric scale) for adjacent snowbanks (snow profile) used on Bromma Stockholm Airport. Profiles around visual aids and ILS-equipment may vary due to equipment specifications.

For example: Glide Path indicator, PAPI, threshold lights etc.



ICAO-Airport Service Manual part 2 – Doc 9137 AN/898

5.3 Collection and dissemination of RCR

Snow removal manager

Assesses and determines contamination type and depth on RWY acc. to RCAM.
Adds assessed data in digital reporting tool from mobile office.
Sends oral report to ATS
Sends digital report to EUROCONTROL and FPC
Updates RCR/SNOWTAM report with every significant change on any of the obligated surfaces

Surface friction tester

The snow removal manager measures friction with a surface friction tester vehicle (SFT) to see the rate of change in surface status and to plan clearing actions and frequencies with ATS and to follow up clearing results.

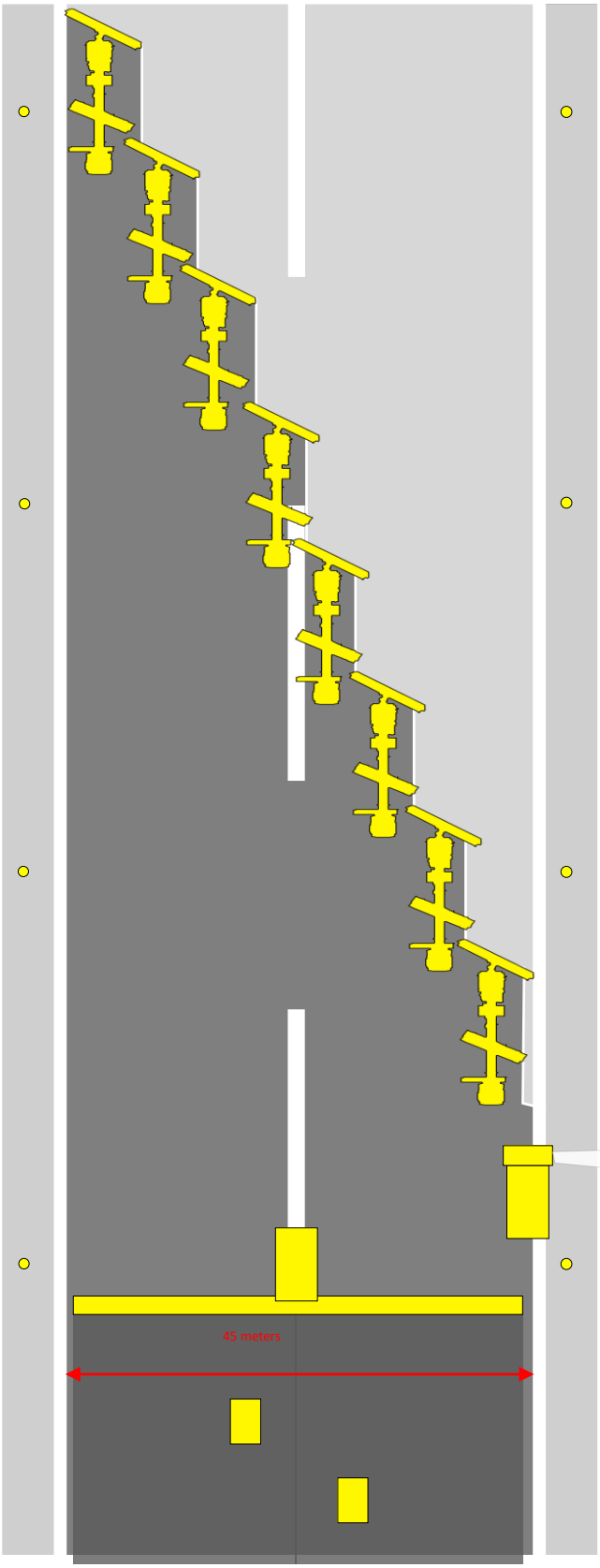
Note: NO friction readings/values will be reported on RCR/SNOWTAM
(but can be reason for up- or downgrading RCR code acc. RCAM)

Experience and training

Surface status is determined by the snow removal manager.
All reported depths of snow are measured with ruler or tool (metric).

The snow removal manager have received adequate training within all related fields.
It takes between 1-3 years of experience and training to become a fully trained Snow removal manager.

5.4 Clearing method of movement area - Standard



Standard method

The one sweep cycle is the standard snow clearing method on ESSB. This method allows us to clear the whole runway and taxiways in use during snowfall and ongoing traffic. Depending on the intensity of the actual weather and category we clear the runway in <8 minutes to ensure safe take off & landing for either 22, 16 or 8 minutes, then we repeat the cycle.
After completed cycle and during taxing, take off & landing, clearing of other prioritized areas are initiated and executed.

Areas covered

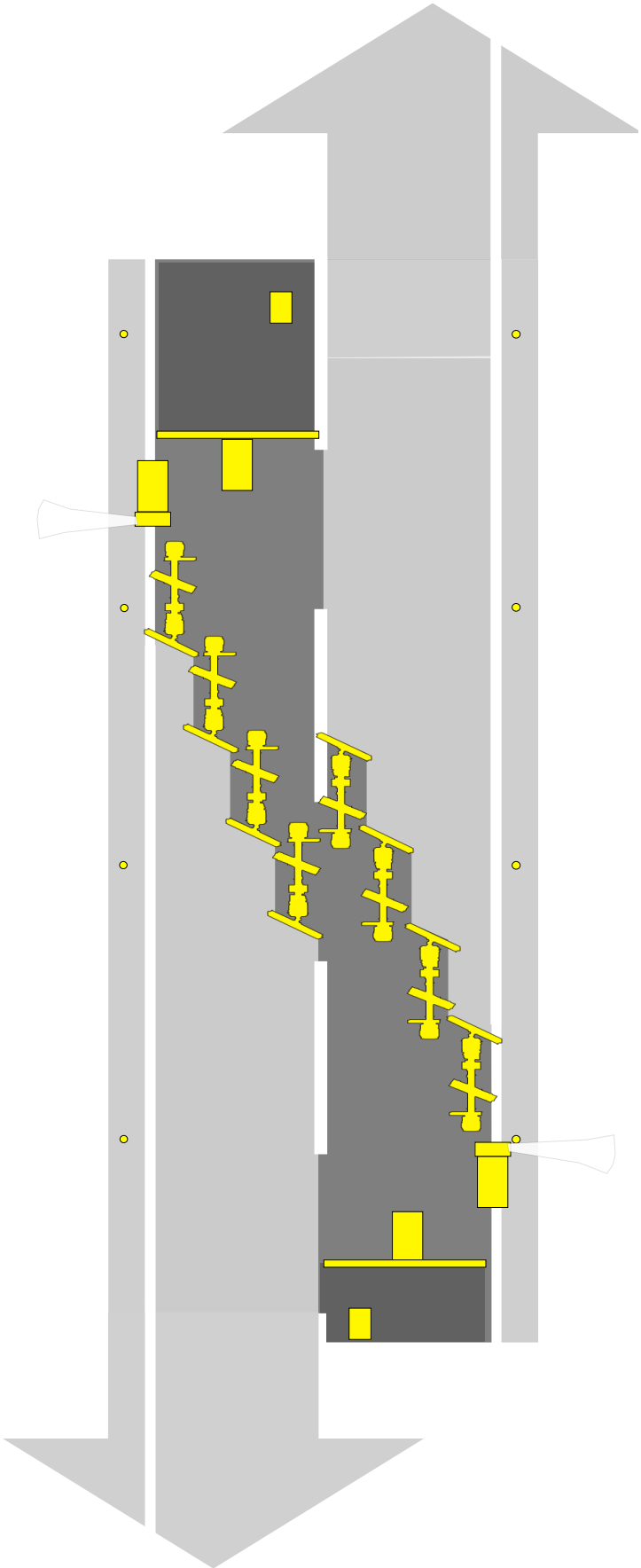
Runway:	12-30
Taxiways:	Y, Y1, Y2, Y5, YU, YW, T
Optional:	(Y3 or Y4)

Total cycle time:	<16 minutes
Time on RWY:	<8 minutes

Formation on runway

8 x	Towed Jet Sweepers
1 x	Big snowblower
1 x	45 m wide Sprayer
2 x	Surface friction tester

5.5 Clearing method of movement area– Fallback



Two Sweep Cycle

The two sweep cycle is a fallback snow clearing method on ESSB. This method is mainly used in snow fall if there is a loss of machines or resources.

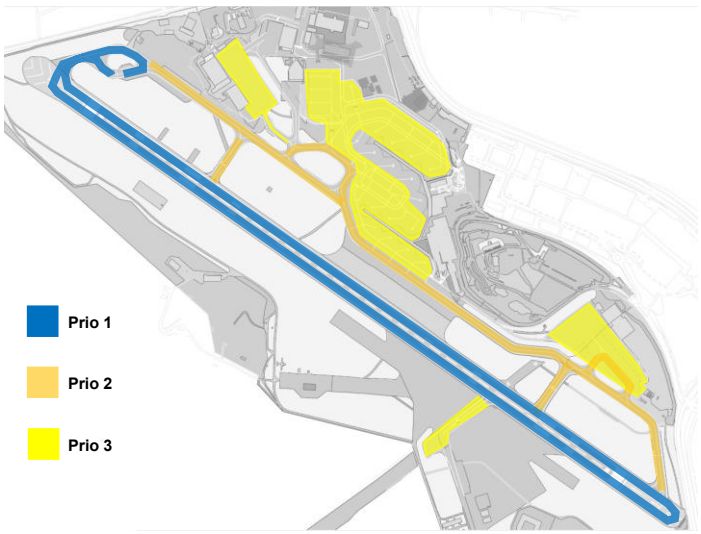
But can occasionally be used for light actions on the manoeuvring area whilst using resources on other prioritized areas during light weather. This method allows us to clear the runway in two sweeps.

If using this method during snowfall (category 3-5) limitations will occur in take off and landings due to blocking of runway and taxiways.

After completed cycle, clearing of other prioritized areas are initiated and executed.

Areas covered

Runway:	12-30
Taxiways:	Y1, Y2
Optional:	Y5, YU, YW, T



Formation on runway

4 x	Towed Jet Sweepers
1 x	Big snowblower
1 x	45 m wide Sprayer (folded to 24m)
1 x	Surface friction tester

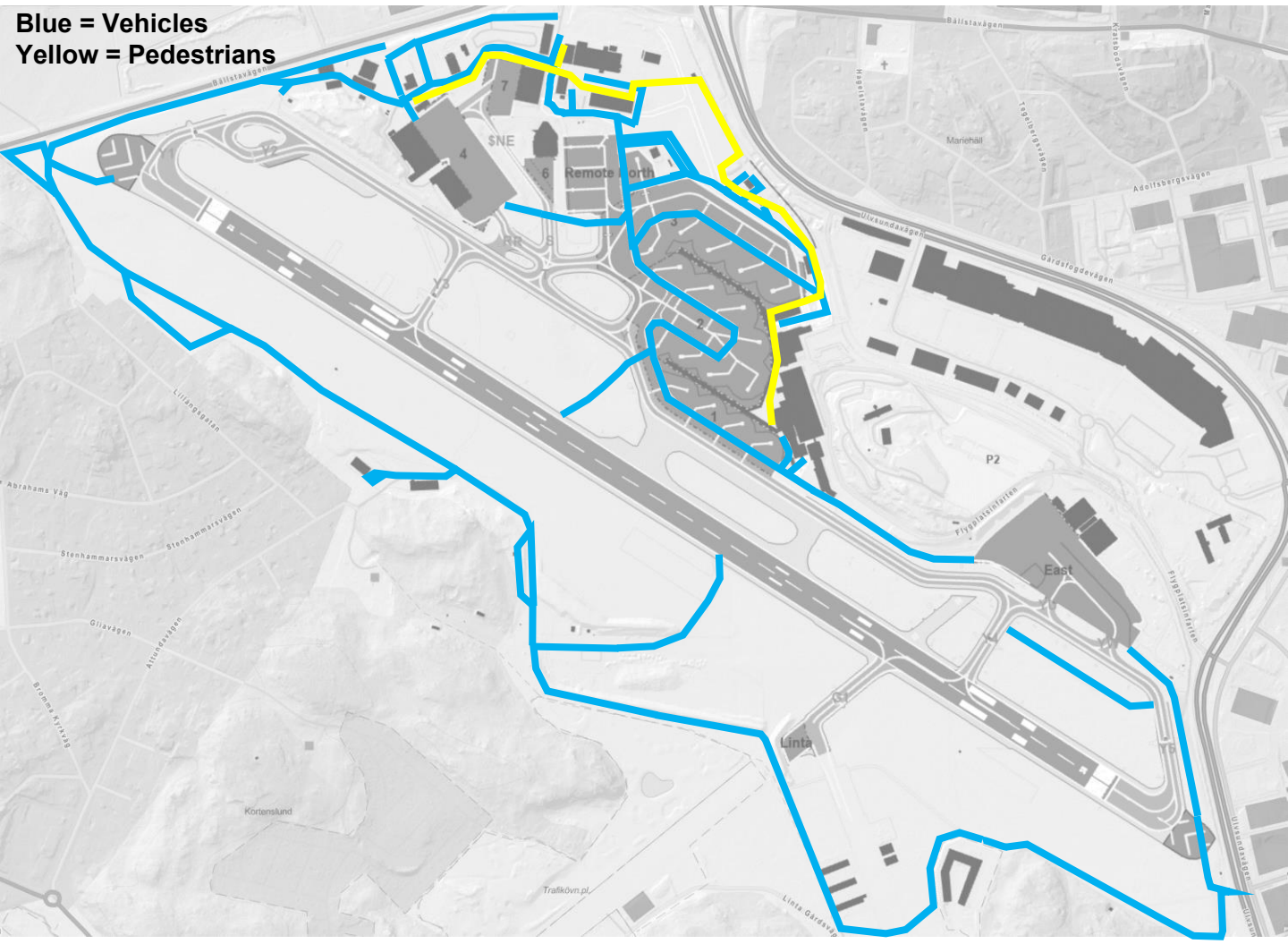
5.6 Clearing method of other airside surfaces

The other airside areas, surfaces and roads are being cleared simultaneously to the movement area. In short the airfield maintenance unit is divided into two groups, “runway unit” and the “apron unit”. The apron unit clear and handles all the other airside objects where the runway unit can’t reach or handle.

The main focus during snowfall is to make passable and de-iced tracks for vehicles and pedestrians and to support these tracks during the snowfall. After snowfall the focus switches to completely remove all areas from snow.

The apron unit supports the following areas and follows a specific clearing pattern during snowfall:

Note: Snow clearing and de-icing between gate and aircraft is performed by Swedavia Ground Handling



5.7 Closing the runway

Reasons to close RWY and closing procedure

If obstacle limitations, visual aids and/or ILS is affected by accumulated snow due to heavily sustained snow fall and any of the red marked areas are inaccessible we have a reason to close the RWY. The RWY in itself is usually not the issue for snow clearing, it is the visual aids and snow profiles that can't be maintained during a heavily sustained snow fall.

The Snow removal manager has the mandate to close the RWY. The snow removal manager means to forecast the time for closing 2 hours before due.
An eventual closing decision is always consulted with ATC/FPC for a proper moment to close.

During snowfall and clearing

1. Areas and aids necessary for take-off and landing *(landside, threshold, PAPI, ILS, signs)*
2. Runway & emergency routes
3. Taxiways serving the runway
4. Aprons* & remote aprons *(clear all markings visible, eventual emergency call-offs)*

After snowfall and clearing

5. Measures designed to increase airport usability
6. Completion of runway and taxiways (*snow profiles, (see 5.3))
7. Aircraft hangar and stand locations
8. Completion of aprons
9. Other relevant emergency routes (approach 12/30)
10. GP and Localizer areas
11. External requests (asap or within 2 hours)
12. Snow transportation from temporary spots to permanent locations

Opening procedure (when closed)

To clear all necessary snow profiles and visual aids to open up the RWY the time for clearing is:

- 3 hours (1,5 hours for each runway direction, we initiate both directions when closed)
- 3 hours (snow profiles)
- Clearing take place in parallel

Total time: 3 hours

Note: GP and Localizer areas are always cleared pro-actively and active objects cannot be assessed for clearing during opening hours due to blocking of signal.

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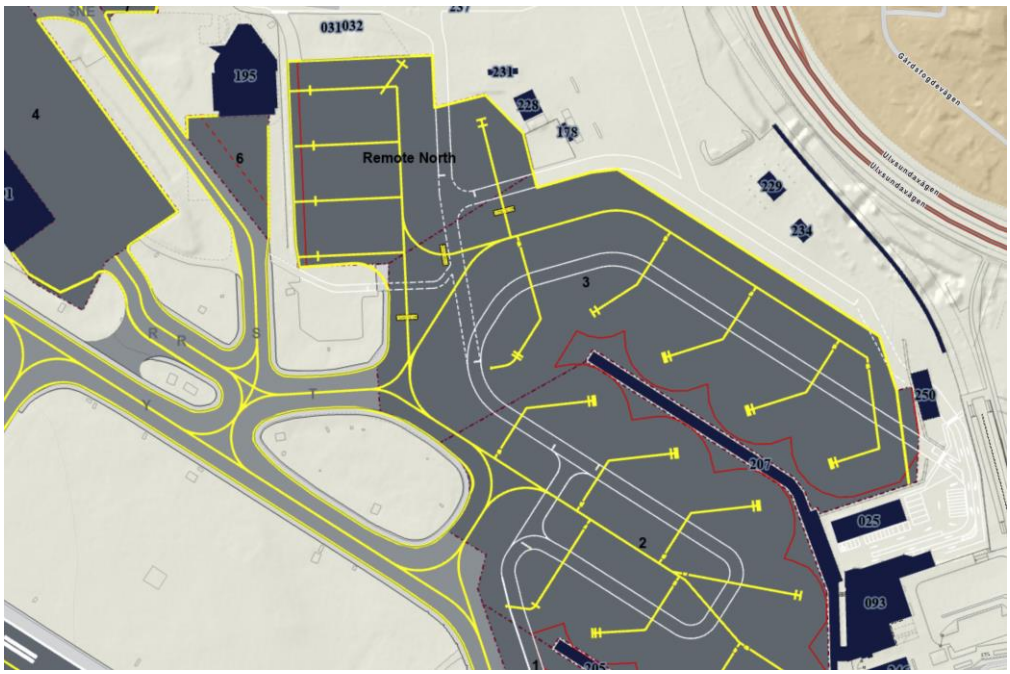
6. Temporary snow locations

The Aircraft Stand Parking Unit allocates aircraft according to the snow locations described below. The marked snow locations are temporary and are expected to be closed during current weather category.

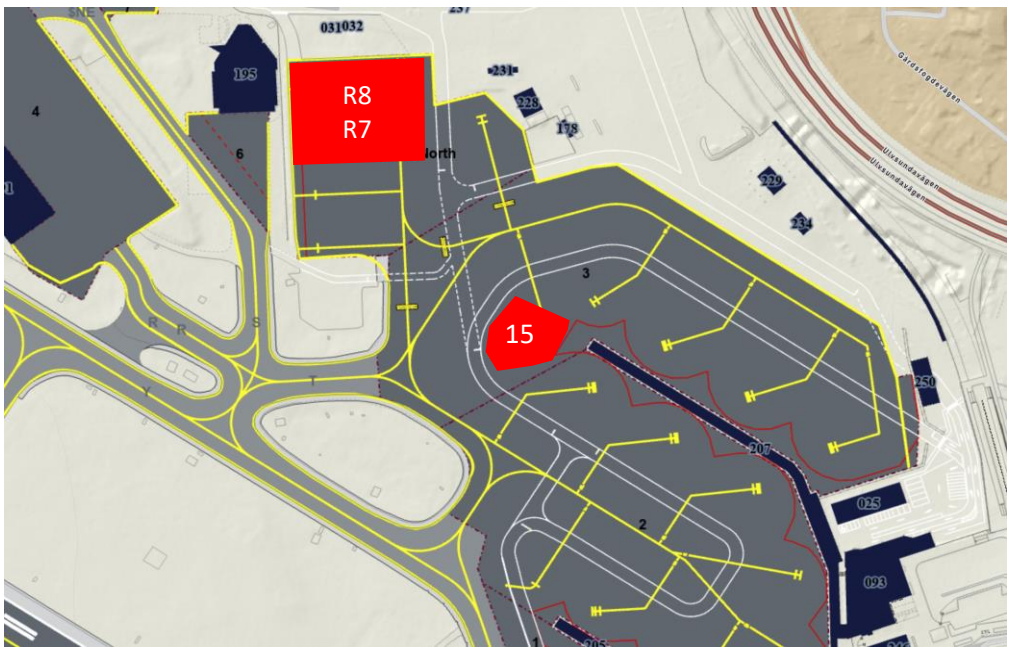
6.1 During weather category 1

No temporary locations expected.



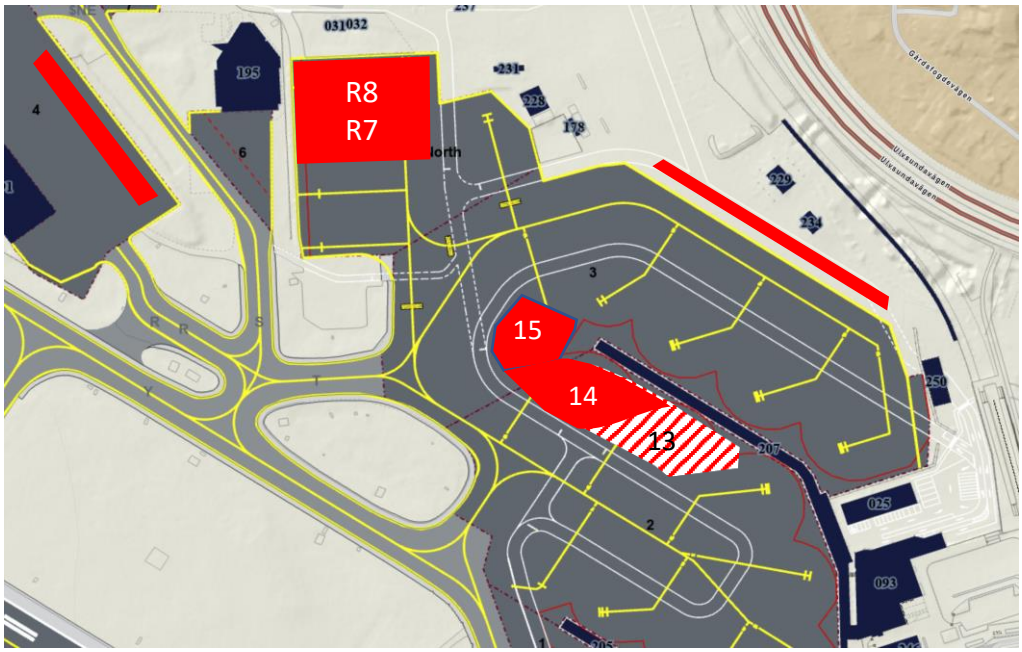
6.2 During weather category 2

Stand 15,
Remote 7, Remote 8



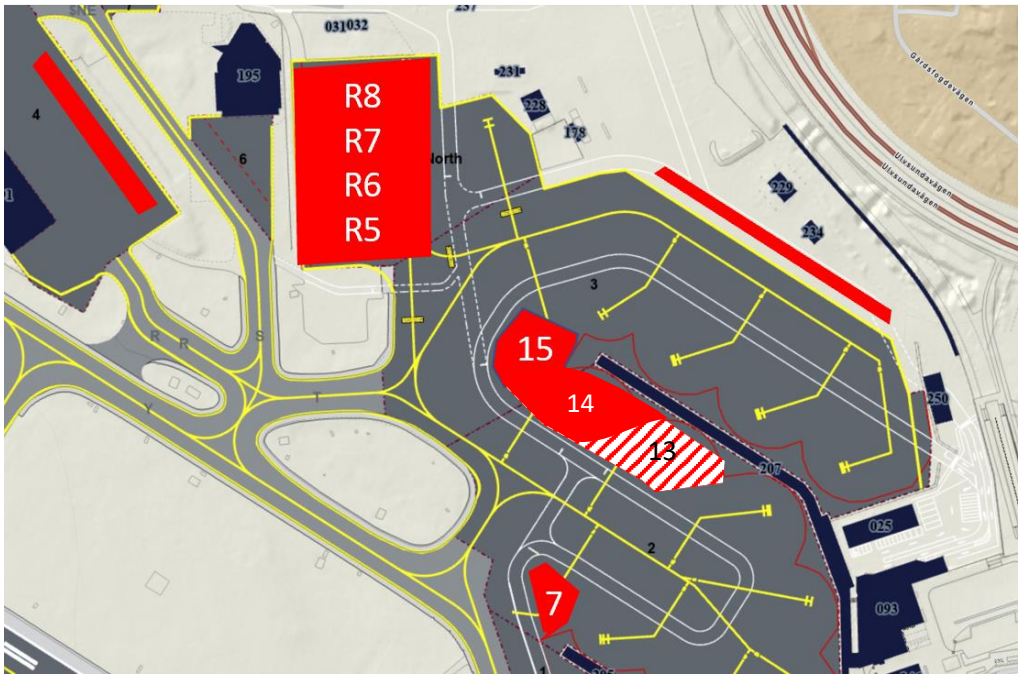
6.3 During 3weather category

Stand 13 (will be cleared of snow if required according to allocation needs), 14, 15
Remote 7, 8
Apron 3 (adjacent snow wall on outer road)
Apron 4 (snow wall towards apron 6 and 7)



6.4 During weather category 4 and 5

Stand 7, 13 (will be cleared of snow if required according to allocation needs), 14, 15
Remote 5, 6, 7, 8
Apron 3 (adjacent snow wall on outer road)
Apron 4 (snow wall towards apron 6 and 7)



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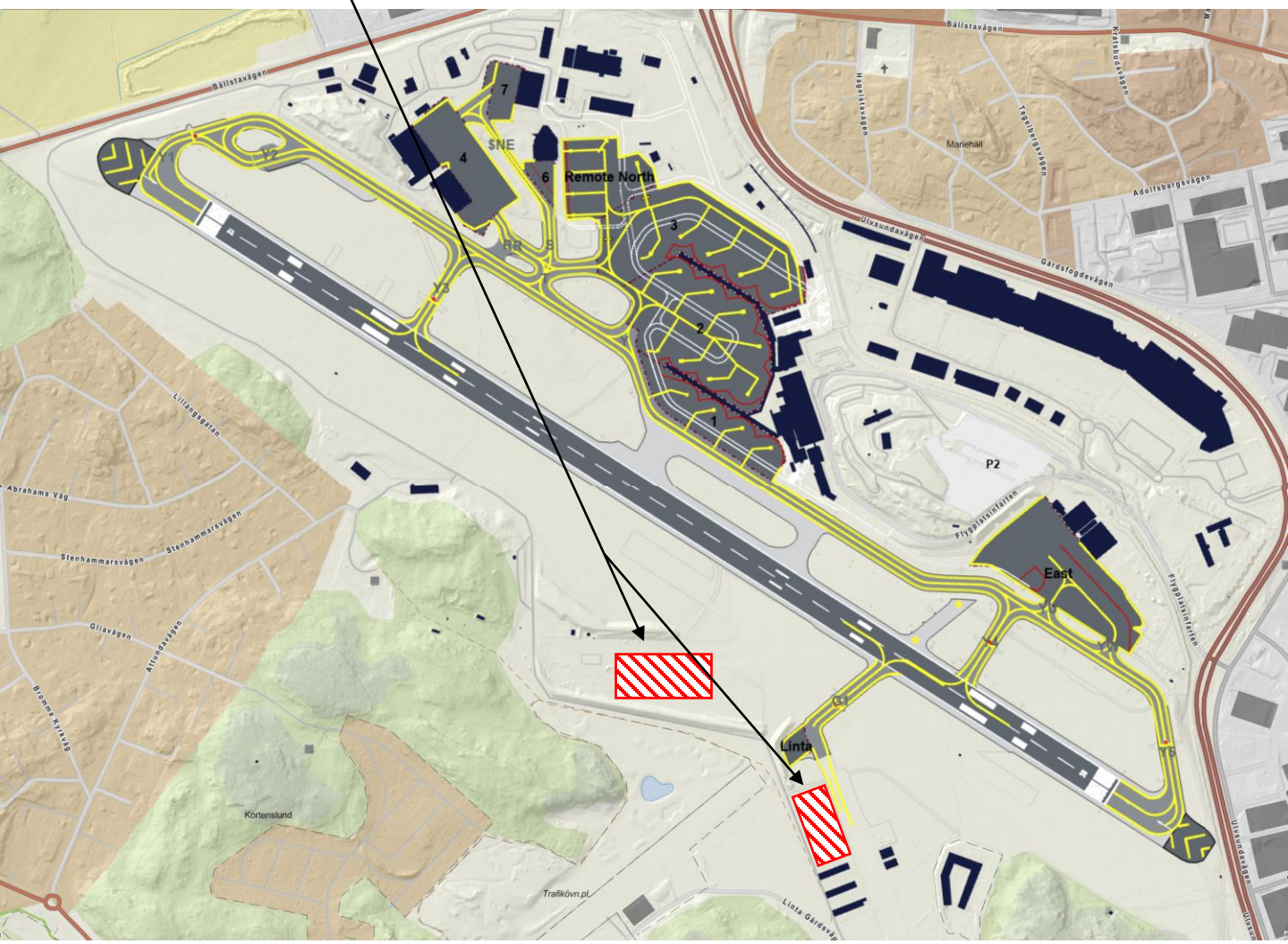
7. Permanent snow locations

Snow is transported from temporary snow locations after snowfall and clearing

7.1 After snowfall and clearing

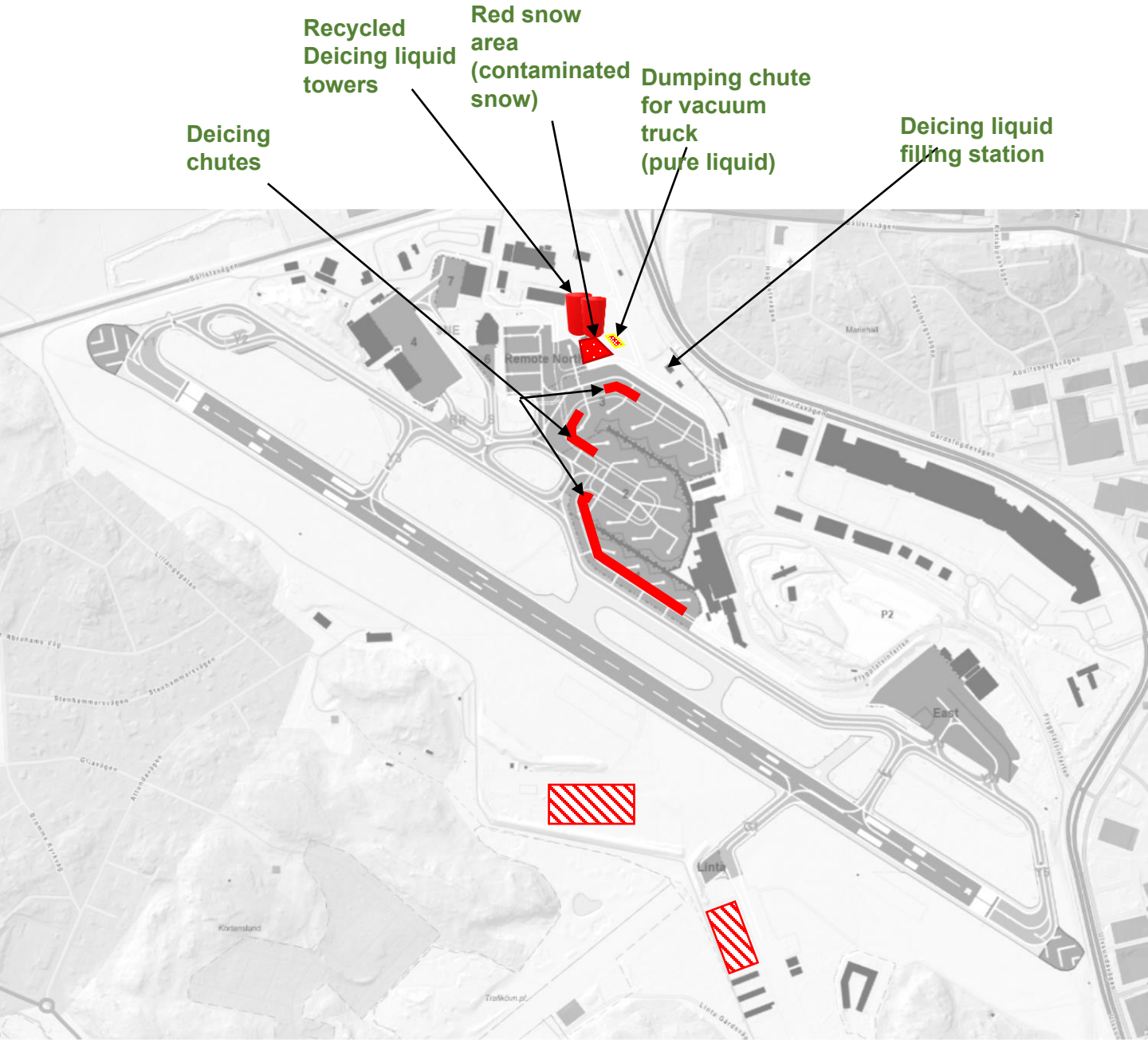
Permanent snow location on grass area



8. Deicing

8.1 Deicing

Deicing is performed at actual stand. Deicing liquids are recycled through deicing chutes on Aprons 1-3
and by vacuum trucks and is pumped into recycling towers.



Appendix A: Landside operations

Airfield maintenance prioritize Landside Terminal area according to the following order DURING Snowfall:

Small carrier (Belos TransPro)

Orange

1. Walkways from train to arrivals
2. Narrow strip taxi zone
3. Arrivals Square (by hand)
4. Bus connection
5. HCP slot terminal
6. Stairs up to parking lot (by hand)
7. Walkways along terminal
8. Unloading zone terminal
9. Stairs up to upper parking lot
10. Goods reception
11. Walkways towards Bromma Blocks
12. Walkway and stairs B20 (by hand)
13. Walkway from P1 to Car rental

Repeat…

Wheel loader (Volvo L60)

Blue and White

1. Main road
2. Taxi pick-up zone
3. Drop-off/pick-up zone
4. Bus zone
5. Taxi-bus strip on hill
6. TWR/B20
7. Parking lot terminal
8. Parking lot upper

Repeat…

The main focus during snowfall is to make passable and de-iced tracks for vehicles and pedestrians and to support these tracks during the snowfall. After snowfall the focus switches to completely remove all areas from snow.

- Tracks are de-iced with landside grit and salt (sodium formate 100 m before airside passage/gate)
- No salt, sodium formate or grit on walkways in front of departure terminal unless absolutely necessary.

Bromma Stockholm Airport
2024-2025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