

A-one+ Integrated Highway Services

Area14

SEVERE WEATHER PLAN

2013/2014

DOCUMENT CONTROL AND DISTRIBUTION

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1 INTRODUCTION

Severe Weather refers to any meteorological phenomena with the potential to endanger safe passage or cause disruption on the Area 14 Network and includes snow, ice, heavy rain, high winds, fog and high temperatures. As such year round planning is required to manage Severe Weather events in an appropriate manner.

Severe Weather Service comprises the operational and alert procedures, and actions necessary to ensure safe passage on the Area14 Network is not endangered by Severe Weather, as far as is reasonably practicable. Winter Service is the element of Severe Weather Service which focuses on the routine precautionary and reactive treatments required to keep lanes on the Area 14 Network free of ice and snow.

This section of the Severe Weather Plan outlines the scope of the services provided, responsibilities for provision of those services and details the extent of the Area 14 Network on which the service is provided. The definitions and abbreviations are provided in Appendix A.1.

This Severe Weather Plan for Area 14 describes the procedures and operational arrangements for the delivery of an effective Winter Service, to ensure safe passage for customers using the highway, and details the alert procedures and actions in the event of other Severe Weather. It is a mandatory requirement for the Service Provider to demonstrate their preparedness by developing this Severe Weather Plan. Instruction and contextual guidance to help the Service Provider compile the Severe Weather Plan is appended.

A-one+ will ensure the operational activities contained in this plan dovetail with other Highways Agency's Severe Weather Plans (e.g. Traffic Officer's Severe Weather Plan) and the Crisis Management Manual.

The document serves a number of specific purposes:

- Contract Document - The Severe Weather Plan outlines contractual responsibilities of the Highways Agency and their Service Provider.
- Quality Plan - The Severe Weather Plan forms part of Service Provider's quality or business management system.
- Contingency Plan - The Severe Weather Plan is linked with the Highways Agency's wider contingency arrangements.
- Operations Manual - The Severe Weather Plan describes the processes, procedures and operational arrangements for those responsible for delivering Winter Services and details the alert procedures and actions in the event of Severe Weather.
- Reference Document - The Severe Weather Plan is a comprehensive reference document.

1.1 Statement of service

A-one+ will endeavour to fulfil the Highways Agency's Severe Weather Requirement within Area 14 in an efficient and safe manner.

1.1.1 Risk periods

The year round weather service provided through HAWIS facilitates improved planning and warning for Severe Weather events. Certain weather types can be expected during particular risk periods, these are shown below for guidance. This does not absolve the Service Provider of the obligation to provide an appropriate service at any other time of the year if the need arises.

Weather Type	Risk Periods (months inclusive)
Snow, Ice and Freezing rain	October through to April
Heavy rain	January through to December
High winds (including Severe Gales and Storms)	September through to June
Fog	October through to January
High temperatures	June through to August

1.1.2 Service timetable

Key dates for the provision of reports and preparedness are summarised in the following table.

A checklist is provided in Appendix A.2.

Date	Who	Action
21 August	Service Provider	Submit Severe Weather Plan: <i>Stage Gate</i>
18 September	HA Service Manager HA National Winter & Severe Weather Team	Check and accept Severe Weather Plan
30 September		Operational Summer Period concludes
1 October		Operational Winter Period commences
Monthly from 15 October	Service Provider	Complete and submit Non warranty defect report spreadsheet
No later than end of October	Service Provider	Completion of Snow Desk exercises
No later than end of November	Service Provider	Completion of Severe Weather briefings
Between 1 December and 31 March	Service Provider	Include daily Vehicle Off Road (VOR) numbers on defect reports
by 18 December	Service Provider	Feedback and action planning from exercises and briefings
1 March	Service Provider	Review and update the Winter Service and Severe Weather infrastructure inventory database
30 April	Service Provider	Finalise list of lessons learnt (or update Severe Weather Action Plan (SWAP) to feed into the Operational Assessment Report
30 April		Operational Winter Period concludes
1 May		Operational Summer Period commences
May	Service Provider	Winter & Severe Weather review
31 May	Service Provider	Submit Salt Restocking Plan: <i>Stage Gate</i>
30 June	HA Service Manager HA National Winter & Severe Weather Team	Check and accept Salt Restocking Plan

June	Service Provider	Winter & Severe Weather report to HA (Operational Assessment Report)
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1.2 Contractual arrangements

Winter Service duties including precautionary treatment, reactive treatment and snow clearance are the responsibility of A-one+.

Severe Weather duties including operational considerations, alert procedures and actions are the responsibility of A-one+.

1.2.1 Liability

Where arrangements are made with other service providers or Highway Authorities for Winter Service provision and Severe Weather actions to be provided by them on the Area 14 Network, it is the responsibility of A-one+ to ensure such service has been carried out. Arrangements made do not absolve the Service Provider's obligations.

1.3 Area 14 Network

1.3.1 Description of Area14 Network

The Area 14 Network presents a significant challenge for the delivery of high quality and reliable winter services. The wide range in altitude coupled with the contrast between the urban and rural networks are critical factors. Winter treatments may begin in October and continue into May

To meet these challenges and manage the associated risks, A-one+ has pooled its substantial local knowledge and experience in managing and operating winter maintenance services in this region to deliver a comprehensive service solution with the sole aim of keeping the network free of ice and snow, whilst allowing safe passage for all road users. Our high performance team headed by the Network Manager, assisted by the Resilience and Winter Manager, will provide a flexible and responsive service

Motorway routes and the A1 Newcastle Western Bypass within MAC Area 14 have the highest priority for winter maintenance operations. The A66 west of Scotch Corner and the A1 strategic route take next priority with the A19 Tyne Tunnel and the A66 East routes coming next in the priority list.

The network carriageway length is approximately 320km of which approximately 34% consists of motorway.

The APTR network in the western parts experiences severe winter weather and specific resources are provided to deal with anticipated conditions on the A66 route west of Scotch Corner.

As well as the specific network issues regarding Winter Maintenance, the Area 14 Network also offer challenges in relation to Severe Weather. Exposed areas and certain low lying points within Area 14 bring additional difficulties in respect of high winds, fog, and flooding. These Severe Weather network features can be found in the table shown in Section 4.2.

The most significant areas of the network which are at risk of flooding is the A1 at Catterick South A1 Hackforth Area. These areas are at risk during prolonged periods of rain due to run off from adjacent farm land and raised water levels form Tunstall Beck.

The A-one+ Service Providers Contingency Plan has additional details of these specific network features and is to be used in conjunction with this Area 14 Service Provider Severe Weather Plan

to ensure a robust defence against dealing with Severe Weather incidents within the Area 14 Network.

1.3.2 Extent of Area Network

The extent of Area 14 Network covered by this plan is shown in the following table and also detailed in the Area Map at Appendix A.3. The key interfaces are defined in the interface drawings which are included within Appendix A.4.

Extent of Area 14 Network		
Road	Extent	Length (km)
A1 (South)	J49 A1(M) Dishforth to J56 A1(M) Barton J.C.	38(km)
A1 (North)	J65 A1(M) Washington (Portobello) Services to A1 Berwick upon Tweed	118(km)
A1(M)	J56 Barton to J65 A1(M) Washington (Portobello) Services	84(km)
A66 (West)	A1 Scotch Corner to Durham/Cumbria border	33(km)
A66(M)/A66(East)	J57 A1(M) to Teesside Park Stockton	32(km)
A19	A1 Seaton Burn Roundabout to A193 Howdon Interchange north of Tyne Tunnel	27km
A194(M)	J65 A1(M) to A184 White Mare Pool Roundabout	4.5(km)
A184	A194(M) White Mare Pool Roundabout to A19 Testos Roundabout	3.0(km)
A195(M)	J64 Vigo Interchange to Dunlop Roundabout	0.1(km)
A696	A1 Kenton Roundabout to Prestwick Roundabout Newcastle Airport	5.0(km)
A168 Link	A1 to Dishforth Roundabouts and A19 JV	0.2(km)

Sections of three lane or more carriageway		
Road	Extent	Number of lanes
A1(M)	North Bound and South Bound Dishforth(J49) to Leeming Bar(J51)	3
A1(M)	North Bound Between J60 and J61	3
A1(M)	North Bound & South Bound Between J61 and J62	3
A1(M)	North Bound From J63-J65	4
A1	North Bound & South Bound Between J65 and Eighton Lodge	3
A1(M)	North Bound & South Bound Dishforth to Leeming Bar	3
A1	North Bound & South Bound between Dunston and Metro Centre	3

Footway and cycle track routes				
Category	From	To	Route Description	Map ID
1	A66 Blackwell Round about	A66 Teesside Park	Single footway incorporating a 120m cycle track at Surtees Bridge Stockton	
4	All remaining sections of the Area 14 Network			

1.3.3 Area 14 Network Features

A-one+ has identified the following network features that require special consideration with regard to weather within the Area14 Network , and features that occur at boundary interfaces. Details of each Network Feature are contained in Appendix A.5.

1.3.4 Vulnerable locations

Certain locations on the network are particularly vulnerable to severe weather conditions. In addition there are a number of locations where although problems may not have actually occurred, due to a number of factors they may be at increased risk of suffering problems during a severe weather event. These vulnerable locations (or trouble spots) requiring special consideration and mitigation measures within the Area 14 Network include:

Following three successive severe winters it is apparent that certain locations on the network are particularly vulnerable to severe winter conditions. In addition there are a number of locations where although problems may not have actually occurred, due to a number of factors they may be at increased risk of suffering problems during a severe weather event. These vulnerable locations (or trouble spots) requiring special consideration and mitigation measures within the Area 14 Network include:

- The A66 Trans Pennine Route from Scotch Corner to the Cumbrian Border extends to a height of 300m above sea level. Additional winter fleet units are deployed during adverse weather to assist with winter operations. 3 snow blowers are also available to assist in extreme conditions. The route is susceptible to strong winds which could affect high sided vehicles. Plans exist within Police Forces and RCC to utilise VMS to give advanced warning to stakeholders of strong winds.
- There are no sections on the Area 14 Network which has been identified as being vulnerable to low temperature/low humidity and there for no special measures are required.
- sections of road of a gradient or road radii that may result in problems in certain conditions e.g. jack knifed lorries or HGV's failing to gain traction; There are several locations identified where there is potential issues due to the gradient of the carriageway:
 - A1 Gateshead - Eighton Lodge
 - A1 North Northumberland - Felton
 - A1 North Northumberland - Mousen Bends
- Areas commonly prone to climatic conditions such as strong cross winds that would result in snow drifting localised heavy snow patterns and overturned vehicles or flooding resulting in lane/road closures; Several locations on the Area 14 Network have been identified as possible locations for Strong winds, flooding.
- Areas that are prone to flooding are: - The A1 Catterick South Area in the vicinity of Tunstall Beck, A1 Hackforth South Bound (run of from adjacent farm land) A1 North Bound Exit Slip, There is off network flooding problems for which the Local Authority is responsible.

During heavy rain which causes flooding the exit slip is, on occasions, closed due to off network flooding.

- During strong wind the A66 Trans Pennine route is susceptible to strong winds. Durham Constabulary have a specific plan in place which covers the partial and full closure of the A66 during severe weather ;
- Low temperature, low humidity problem spots require mapping as these may require additional treatments; there are no specific locations identified within Area 14 which are susceptible to low humidity or low temperatures.
- Areas where, from experience, particular problems arise where the service provision can be hampered, including traffic calming areas; The A1 Western Bypass is prone to high traffic volumes during peak traffic times. Gritting times will be restricted (where possible) to outside the peak times. This allows the gritter to operate in a more efficient manner.

Newcastle Airport on the A696 is a main transport hub for the North East. Additional resources will be deployed to ensure lanes are maintained in line with contractual requirements and carriageway hierarchy within Area 14.

Other locations that require special consideration during winter period are works where contra flows have been established on the Network. Additional dedicated resources may be deployed when required to these locations. The deployment will depend on the works specific location on the Network. A-one+ will liaise with personnel on major works and managed works sites on the Area 14 Network to ensure winter maintenance activities are coordinates

- There are no specific high risk areas of the network which have been identified as prone to accidents

The following table shows the location and brief key word summary of the problem. Each is cross referenced to detailed individual site mitigation plans contained within Appendix A.20. These must be reviewed at a minimum annually.

Vulnerable Locations		
Location	Reference <i>To individual mitigation plan</i>	Problem (very brief summary)
A66 Bowes Moor	A66 Closure Plan (Durham Constabulary)	High level route with highest risk of snowfalls and prolonged sub-zero temperatures.
A1(M)		Exposed Motorway route with a risk of wind blowing snow and cross winds effecting high sided vehicles

2 GENERAL PLANNING

2.1 Operational planning

This section of the Severe Weather Plan contains A-one+ general operational procedures for delivery of Winter Service and details the alert procedures and actions in the event of Severe Weather on the Area 14 network and includes arrangements for liaison and co-operation with key stakeholders to promote delivery of a consistent and co-ordinated service.

A-one+ will endeavour to follow the guidance given in the Highways Agency memo AMM 51 with regard to "mutual aid".

A-one+ also recognise that co-operation and liaison with the emergency services, HA Traffic officers, adjacent authority agents and other relevant stakeholders is vital to ensure that an appropriate and consistent winter maintenance service is provided both within Area 14 and beyond the boundaries of the trunk road network

Operational procedures detailed in this Severe Weather Plan will be tested through a Severe Weather Desk exercise. A-one+ will plan and execute a Severe Weather Desk exercise prior to the Operational Winter Period to test the delivery and resilience of the Severe Weather Plan and identify areas for improvement. Planning for the exercise must be in consultation with the Service Manager, Emergency Planning Managers and the National Winter & Severe Weather Team to ensure critical and vulnerable points in the service are tested (Appendix B.1).

A-one+ will hold Severe Weather briefing sessions prior to the Operational Winter Period to ensure the relevant stakeholders are fully briefed. Feedback and actions will be reported to the National Winter and Severe Weather Team as per the service timetable (Section 1.1.2).

Operational procedures detailed in this Severe Weather Plan will be tested through a Severe Weather Desk exercise. A-one+ will plan and execute a Severe Weather Desk exercise prior to the Operational Winter Period to test the delivery and resilience of the Severe Weather Plan and identify areas for improvement. Planning for the exercise must be in consultation with the Service Manager, Emergency Planning Managers and the National Winter & Severe Weather Team to ensure critical and vulnerable points in the service are tested (Appendix B.1).

A-one+ will hold Severe Weather briefing sessions prior to the Operational Winter Period to ensure the relevant stakeholders are fully briefed. Feedback and actions will be reported to the National Winter and Severe Weather Team as per the service timetable (Section 1.1.2).

2.1.1 General arrangements

2.1.1.1 Process

The NCC is located in Area 7 offices in Mansfield (Core 27) Staff in the NCC carry out the function of WMO All staff involved in the WMO function have had Weather service provider and Met Office weather forecast training.

WMDM are all based within Area 14 and have extensive local Network Knowledge which is one factor which contributes to the final verification of treatments. WMDM's support the WMO's when making decisions.

When snow desk is activated it is operated and controlled from offices within Area 14. The coordination of all winter activities is the responsibility of the Duty Silver Manager (WMDS). The sending of treatment notification is carried out by NCC staff. 6-6 reports and other communications are handled by SWD personnel.

2.1.1.2 Decision Maker

The Winter Maintenance Decision Maker (WMDM) will be responsible for decision making in respect of winter maintenance operations from the 1st of October to the 30th of April or longer if required. The A-one+ Decision maker is the on duty NCC Steward who is located within the A-one+ Network Control Centre.

The key personnel responsible for delivery of the services defined within this document are detailed in Section 3.1.1.

2.1.1.3 Duty Rota

The Winter Maintenance Decision Maker (WMDM) will be responsible for decision making in respect of winter maintenance operations from the 1st of October to the 30th of April or longer if required. The A-one+ Decision maker is the on duty NCC Steward who is located within the A-one+ Network Control Centre.

The Decision Maker Duty Rota is included at Appendix A.6.

2.1.1.4 Salt management

A-one+ will develop and submit a Salt Restocking Plan (Service Timetable Section 1.1.2), providing evidence for supply arrangements, including the Reporting Threshold profile (with supporting evidence) in line with the Minimum Contractual Salt Stock Levels (Appendix B.3). A template for Service Providers to complete is contained in Appendix A.21.

Reporting Threshold Profile		
From	To	Reporting Threshold (days)
01 October 2012	31 October 2012	10
01 November 2012	30 November 2012	9
01 December 2012	28 February 2013	9
01 March 2013	31 March 2013	6
01 April 2013	30 April 2013	5

2.1.2 Liaison and arrangements

The management of the Area14 Network and the interface with other networks is essential to the consistent provision of Winter Service and actions in the event of Severe Weather. Liaison with Traffic Management Directorate (TMD) is also important to provide up to date customer-facing functions such as traffic information, active management of traffic flows and incident response.

2.1.2.1 Internal communication arrangements

A-one+ will provide and maintain an effective telecommunications system between the Service Manager, the Service Provider's supervisory staff and operational vehicles. Mobile telephone communication must not be relied upon since these can become over loaded particularly during extreme conditions, or in the event of an incident causing major congestion.

The communication system for all Winter Service Vehicles and the back-up communication system for all Winter Service Vehicles include. All of the Area14 gritting vehicles have hands free mobile phones fitted. This is the front line form of communication between drivers and supervisory staff.

Internal communication is by Land line/cellular telephone.

The arrangements for backup communications are Emergency Roadside Telephones, public telephone boxes and other landline telephone sites such as A-one+ depots at Alnwick, Carrville, Bradbury and Kneeton.

A comprehensive internal contact list can be found in Appendix A.7.

2.1.2.2 External communication arrangements

A-one+ has established clear lines of communication and agreed contact names and numbers to ensure communication is possible at all times.

The following table indicates the contacts of stakeholders who are important to A-one+ operational effectiveness.

Road	Location	Contact
A66	Cumbrian Border to Penrith	Area 13
A66	Snow Gates to Cumbrian Border	Durham County Council
A689	A1 to Newcastle Airport	Newcastle Airport Duty Manager
A1	Alnwick to Berwick	Northumberland County Council

A comprehensive external contact list can be found in Appendix A.8.

2.1.2.3 Liaison with major highway schemes

Road	Location (e.g. junction to junction)	Type of scheme	Contact
A1	Lobley Hill to Dunston	Additional Lane upgrade	TBA (contract to be awarded)
A1	Leeming Bar to Scotch Corner	Upgrade to 3 lane Motorway	Carillion Morgan Sindall
A19	Seton Burn	Pinch Point Scheme	A-one+
A66	Mainsgill Farm Access	A66 Mainsgill Farm S278	A-0ne+

2.1.2.4 Mutual aid agreements

Mutual aid is where one service provider may have a resource issue, a second or third (etc) service provider will assist in delivering the same goal. Mutual aid can be, from the sharing of resources such as salt, the sharing of facilities that may provide improved resilience of the Area 14 Network, or the provision of a full Winter Service to a particular part of another network. For example, there are local roads that service providers may treat to ensure their own operational effectiveness such as access routes to depots.

It can also be used to provide support to, or obtain support from, other network operators during times of stress, such as during Severe Weather, to the benefit of the road users. The provision of

support at such times and capabilities of provision should be discussed and contact details agreed.

A-one+ will document all requests for support from, or to, other operators and the subsequent decisions, with reasons, by completing the Mutual Aid Agreement forms. Completed forms can be found in Appendix A.9 A-one+ will submit signed copies of completed forms to the Service Manager for approval with additional copies issued to the provider/recipient of mutual aid. It is noted that mutual aid arrangements do not absolve A-one+ of their obligations.

2.1.2.5 Cross boundary agreements

A-one+ will ensure the cross boundary agreements are in place at the interface of the Area 14 Network and adjacent networks to ensure a consistent service that will not leave potentially important sections of either network untreated.

Given experiences from the last few severe winters, the critical need for clear and agreed cross boundary agreements has been highlighted.

A-one+ will ensure the cross boundary agreements are in place at the interface of the Area 14 Network and adjacent networks to ensure a consistent service that will not leave potentially important sections of either network untreated.

It has been agreed with Area 13 that in extreme conditions A-one+ will treat and plough to Stainmore as this is a natural turning point for gritters. A-one+ will also treat and plough to the junction with the M6 at Penrith. Area 13 have agreed to treat and plough in extreme conditions to Bowes Moor hotel and if required as far as the A1 at Scotch Corner. This is a long standing agreement between both Areas to ensure a consistent approach to severe weather on the A66.

It has been agreed with RMS , DBFO that they will carry out precautionary treatment o the A1(M) from the centre of J49 Dishforth to the end of the NB entry slip at J49. They will also treat the A1(M) from the start of South bound exit slip J49 to the centre of the interchange at J59. During extreme snow conditions A-one+ will plough between J49 and J48 to assist the DBFO when possible.

A-one+ have agreed boundary interfaces with all neighbouring authorities. There are no agreements to carry out precautionary treatments. Agreements are based around severe winter events when liaison and treatments will mirror boundary interface plans

2.1.2.6 Abandoned vehicle arrangements

Wherever possible the owners of abandoned vehicles will be contacted and requested to remove the vehicles, but where this is not possible, the specific details of the vehicles, its location and the reason why it needs to be moved will be provided to the Police / Traffic Officer / National Vehicle Recovery Manager (NVRM) and a log of all communications kept. The NVRM will provide an end-to-end vehicle recovery service. **A-one+ must only move vehicles once an instruction from a Police/Traffic Officer has been received for each vehicle.**

Where owners do leave their information, details will be obtained by A-one+ and lodged with the Severe Weather Desk, NTCC and RCC.

A-one+ have a Service Level Agreement through supply chain partner CF Recovery to move certain type vehicles from the A1 APTR Gateshead Western By-Pass at certain times of the day. Requests to remove vehicles can come from Northumbria Police or the Traffic Officer Service, as well as from within A-one+ and CF themselves.

All relevant Police authorities across the Area 14 Network have recovery schemes in place to remove abandoned vehicles from the network through the National Vehicle Recovery Scheme (NVRS).

Currently, A-one+ have no secondary response procedures or contracts in place to carry out any additional vehicle recovery services outside of CF Recovery scheme limits.

2.1.2.7 Incidents involving Winter Service Vehicles

Any incident involving the Highways Agency's own vehicles / any Winter Service Vehicle will be reported to the Service Manager and the National Winter Specialist. The report must be made on form HA 20001 and must be submitted as soon as possible but no later than before 0900 hours the following working day. Where the accident involves a fatality or serious injury the report must be made immediately.

2.1.2.8 Media liaison

In order to facilitate media liaison A-one+ must make available to the Service Manager and/or Highways Agency Press Officers such information as requested. Direct liaison with the media must only take place when directed by the Service Manager.

2.1.3 Highways Agency's Crisis Management Manual

The Crisis Management Manual (CMM) provides guidance on managing the Highways Agency's response to crises and emergencies. Severe weather events make up a significant proportion of the events that trigger the CMM escalation steps. The five stages of escalation are as follows:

Routine Operations – HA and service provider resources respond to incidents following standard procedures. Weather forecast and warning services would be continuously monitored and if anything shows up escalation would be considered. If service providers become aware of emerging resilience threats they should inform the Agency immediately.

Regional Alert (RA) – when a significant weather event is expected that potentially could cause disruption on the network a regional alert would be declared. Monitoring will be heightened and telephone conferences will take place to ensure we are as prepared as possible prior to the arrival of the forecast weather. Service providers will be required to provide information and to dial into telephone conferences in line with normal expectations. The regional alert process does not change responsibilities within each service type (i.e. service responders will remain fully responsible for managing and delivering their own service), but will act to better coordinate the individual responses to ensure a more effective combined response as well as to provide the most accurate information to road users.

Regional Crisis – if the SRN is severely affected where sections of the network are closed or road users have become trapped, and are likely to be so for some time or overnight, a Regional Crisis is likely to be declared. The profile of the event is thus raised, a more senior commander will be appointed and the event will be more visible both inside and outside the Agency. During this stage information reporting and the need to dial-in to or attend meetings will be similar to a RA although possibly at an increased frequency but still in line with normal expectations.

National Alert – when more than one region is at Regional Crisis or in advance of a widespread severe weather event the Agency is likely to declare a National Alert. This facilitates coordination across regions as well as providing an accurate national picture of network conditions to inform road users, DfT and maybe Ministers. Service provider activity would be the same as during a Regional Crisis which would still be operating in the region.

National Crisis – this is for the most extreme of events and incidents. As with a National Alert, service provider activity would be the same as during a Regional Crisis.

A key component in the success of any response is accurate and timely information. Service Providers must have appropriate processes to continuously monitor and manage the effectiveness of their severe weather service. During a severe weather event Service Providers must be able to provide real time network performance and service delivery intelligence and information to support the incident coordination process to enable informed appropriate decisions to be made by HA commander.

During a severe weather event conditions may deteriorate to a point where the continuous and safe operation of the network may be placed at risk. The CMM processes will facilitate an early identification of a potential interruption to the network operation with appropriate responses triggered. Any decision to close a route during severe weather should only be made by the identified HA commander at the time.

2.1.3.1 Severe Weather Desk establishment

The Severe Weather Desk must be established prior to the forecasted commencement of Severe Weather that could cause disruption to the Area 14 Network or as soon as possible in the event of un-forecast Severe Weather.

The Severe Weather Desk will be established at the Area 14 Network Head Office, Valley House, Valley Street North, Darlington DL1 1TJ, and will be situated within the Network Resilience Team office. In addition, Bradbury Motorway Maintenance Compound, J60 A1M, has Severe Weather Desk capability and can also be utilised as required.

The Severe Weather Desk/control room will have the ability to communicate directly with motoring organisations and local authorities and to listen to/watch local news/traffic media.

Where decisions, and their implications, require strategic oversight they will be referred to the Service Manager.

The Severe Weather Desk Duty Rota is included at Appendix A.10.

Silver commanders will operate the SWD assisted by additional A-one+ staff including but not restricted to supervisors. A-one+ have sufficient resources available for continuous SWD operation 24/7.

The SWD arrangements for preparation, establishment, and operation will follow the process for the establishment of the Tactical Management Room as detailed in the Service Providers Contingency Plan

2.1.3.2 Activation of Contingency Plan

The A-one+, Area 14 Contingency Plan must be activated when a staff member becomes aware of a major or critical incident taking place and they must immediately put in place the actions outline Management of the response is escalated when any of the incident objectives are threatened at the current level of management

When any member of A-one+ staff become aware of a critical incident as outlined in the A-one+ Contingency Plan, they will inform the NCC who will notify the WMV and Winter Manager.

A-one+ Service Providers Contingency Plan outlines how it will escalate its standard response from operational (Bronze) to tactical (Silver) and strategic (Gold) levels when necessary.

The A-one+ Service Providers Contingency Plan will interface at the various levels of escalation with the Regional Control Centre (RCC) and the Highways Agency Regional Crisis Management Team (RCMT). This allows the management of incident response to be escalated from A-one+ to the RCC and to the RCMT when circumstances require. Each plan explains how the organisation will escalate and manage its response to an incident when it has that responsibility and the functions it will perform when that responsibility lies elsewhere.

2.1.4 Health and Safety

The A-one+ H&S Policy statement is located in Appendix 11

Risk assessments must be undertaken by Service Providers to ensure the practices expected of operatives and other members of staff on the Network in conditions such as freezing rain are

adequately recognised. Completed risk assessments are included within Appendix A.11 for the benefit of others, e.g. Traffic Officer Service.

2.2 Reporting

2.2.1 Winter Reporting

A-one+ will notify the Highways Agency, Weather Service Provider, Police, adjacent Service Providers, NTCC Embedded Forecaster, Local Highway Authorities and NERCC of all proposed Winter Service treatments.

A-one+ will, as soon as practicable, notify the Highways Agency, Weather Service Provider, Police, adjacent Service Providers, NTCC Embedded Forecaster, Local Highway Authorities and NERCC of other actions including changes to proposed treatments.

The Winter Reporting Form (WRF1) system, provided by the Highways Agency, will be used throughout the Operational Winter Period for the above notifications and for confirmation of treatments. The WRF1 system must be kept up to date with plant, salt and fuel resilience to ensure a true and accurate representation of the current situation.

The internet based reporting system is at <http://winter.atkinsglobal.com/winter>. A backup service is available at <http://78.40.241.12/winter>. In case of failure of the internet based facilities standard forms at Appendix A.12 will be used to fax the reports to the back-up fax number (0121 678 8569).

All relevant A-one+ staff will have sufficient training on access and use of WRF1 as required. No additional training of staff has taken place for the forthcoming winter as there have been no significant updates to the WRF1 system. All users of WRF1 have had a minimum of three year's experience using the WRF1

WRF1 reporting will include as a minimum:

- Daily updates by 10:00 hours with salt stock capability, Area Operational Reserve Winter Service Vehicle levels, and fuel status, where there is a possibility of fuel disruption. Additional reports submitted in the event of a change to salt stock capability, status of fuel levels or in the event of an Area Operational Reserve vehicle being used or relocated.
- A "Full" or "No Action" report submitted by 1600 hours each day which details the proposed actions to be undertaken in the following 24 hour period. However, where a decision was made after 1600 hours or a previous decision was changed, the appropriate report must be submitted within 30 minutes of a decision, and no later than the proposed start time of the treatment.
- A "Previous Action" report to confirm all the actions undertaken since the submission of the last "Full" or "No Action" report. This daily report(s) must be submitted by 1000 hours on the following day, but, where possible, submitted within 30 minutes of the treatment being completed.
- An hourly update, when Severe Weather Desk is in operation.

A-one+ will monitor salt stocks (and stocks of other appropriate materials) regularly during the Operational Winter Period and report using the WRF1 electronic reporting system.

2.2.2 Severe Weather reporting

A-one+ will notify the Highways Agency, Weather service provider, police, adjacent Service Providers, NTCC Embedded Forecaster and local highway authorities NERCC of all proposed actions.

Where a Severe Weather Event is forecast A-one+ Integrated Highway Services will liaise with the Police and Traffic Officer Service and decide upon the need for a 'Severe Weather Desk' if it is decided that one is required it will be established as prescribed in previous paragraphs. The

Highways Agency and other relevant parties will be notified of the decision along with the time of activation and location of the desk, reports to the HA will be provided on an hourly basis until either the cessation of the event or it has reduced in severity to the extent that it is no longer problematical to the general travelling public

A-one+ Integrated Highway Services will report the number of Severe Weather events that required treatment/actions within the Area 14 Network.

A-one+ will provide enhanced SWD reporting by utilising the 6-6 reports held on the IBMS DS-WS-F33

A-one+ will report the number of Severe Weather events that required treatment/actions within the Area 14 Network.

2.2.3 Additional reporting

A-one+ will report on thermal mapping as required.

The report on thermal mapping to include any changes adjacent to and on the Area 14 Network which will affect the Highways Agency's thermal mapping information, review coverage of thermal maps, and identify areas of improvement.

A-one+ will submit details of all non warranty defects and maintenance for the Highways Agency's winter fleet vehicles for the previous calendar month by the 15th of each month. Submissions will be made using the spreadsheet available from the National Winter & Severe Weather Team.

A-one+ will submit vehicle off road (VOR) figures on defect reports for all HA owned winter fleets, to the National Winter & Severe Weather Team. Template spreadsheets are available from the National Winter & Severe Weather Team.

A-one+ will submit an Operational Assessment Report as stipulated in the Service Timetable in Section 1.1.2.

A comprehensive external contact list can be found in Appendix A.8.

Reports will be used for hot and cold de-briefs, as part of developing new research programmes, or identifying areas for review, as part of the lessons learnt process, therefore it is essential that the information is complete and accurate.

2.3 Records

Collection of good quality records covering decisions made together with reasons, and advice and information provided is fundamental especially to defend against liability claims made in respect of Winter Service and any actions taken in the case of Severe Weather.

- *Weather forecasts; 6 Years (Electronic)*
- *Actual weather conditions; 6 Years (Electronic)*
- *Reports received; 6 Years (Electronic)*
- *Decisions made; 6 Years (Electronic)*
- *Instructions made; 6 Years (Electronic)*
- *Actions taken; 6 Years (Electronic)*
- *Liaison and communications log;*
- *Telephone conversations including with forecast provider;*
- *Material usage; 6 Years (Electronic)*

- *Fleet breakdowns; 6 Years (electronic)*

Times taken to complete treatments/actions; This would include the archiving/saving of Service Provider Summary reports, HA Gritting Detailed reports, and HA Gritting Summary reports as generated by the Masternaut datalogging system. 6 Years (Electronic)

- *Use of additional resources (including reserve Winter Service Vehicles and mutual aid); 6 Years (Electronic)*
- *Road closures/blockages due to weather conditions; 6 Years (Electronic)*
- *Complaints received relating to conditions due to weather; 6 Years (Electronic)*
- *End of season records (e.g. accuracy of weather information, lessons learnt or Severe Weather Action Plan (SWAP). 6 Years (Electronic)*

Records to be available for inspection in accordance with individual contracts.

Some of the issues, and subsequent actions identified or taken and lessons learnt may be captured as part of a lessons learnt document or Severe Weather Action Plan (SWAP). These would be used as a key document to complete the review recorded below.

2.4 Review

Review Format	Frequency	Details
Action Plan Review	Daily	Network Resilience & Winter Manager (NRWM) reviews the decision to ensure correct action taken. Reviews 2 to 5 day Forecast to determine requirements for plant, labour, salt stocks and other materials. Reasons for any treatment time failures are also examined. Daily records also collated and questioned where necessary. Fuel supplies monitored & maintained. The aforementioned are all monitored in order to achieve the delivery of winter operations and continued improvement in the service
Fleet Reports	Weekly	Plant Manager (PM) provides report to NRWM Identify any actions and issues. These are monitored in order to achieve continued improvement in the delivery of winter operations
Performance Management Group Meeting & Report	Monthly	Provide report to determine compliance with contract and timeliness of treatment. WMM to identify any operational issues such as health and safety, communication, fleet, operatives and materials. These reports are contained within the PMG Report.
Trusted Evidence Deliverer (TED)	Monthly	NRWM reviews and scores 8 Aspects & sub processes relative to the delivery of the various elements of winter service

Review Format	Frequency	Details
The Way We Work	Monthly	NRWM meeting with HA Regional Winter Service personnel (Nick Adshead) to discuss and review depot/fleet issues. Also the TOS are invited to discuss operations on Network. This contributes to the continuous improvement of the system.
Mid Season Review	Yearly	Review Area 14 procedures for decision making, treatments, weather bureau service, WEATHER SERVICE PROVIDER service. Schedule on lead-up to Christmas and New Year period to allow time to identify any improvements or resource issues.
Weather service provider End of Season Review	Yearly	WEATHER SERVICE PROVIDER presents season performance figures and obtains feedback from NRWM.
Weather Bureau End of Season Review	Yearly	Weather bureau service presents performance and figures. NRWM presents feedback on season.
End of Season Review	Yearly	Review of Area 14 procedures from decision making to treatment to snow desk (if activated), fleet, operatives questionnaire, materials. Incorporate findings from review to identify improvements for the following season.

2.5 Weather information

The Highways Agency Weather Information Service (HAWIS) has been developed to provide weather forecasts, the continuous monitoring of actual conditions year round to facilitate winter service operations and support the resilient management of the network during severe weather events. HAWIS obtains environmental weather condition data from meteorological Environmental Sensor Stations (ESS) located on the Area 14 Network. The service is procured by the Highways Agency through the following contracts:

- Highways Agency Weather Central Service (HAWCS)
- Environmental Sensor Station Supply Framework (ESS Supply)
- Environmental Sensor Station Maintenance and Installation (TechMAC / Regional Technology Maintenance Contractor (RTMC))
- Environmental Sensor Station Communication (NRTS)
- National Weather Forecasts (National Forecast Provider)
- Service Provider Weather Forecasts (MAC/ASC)

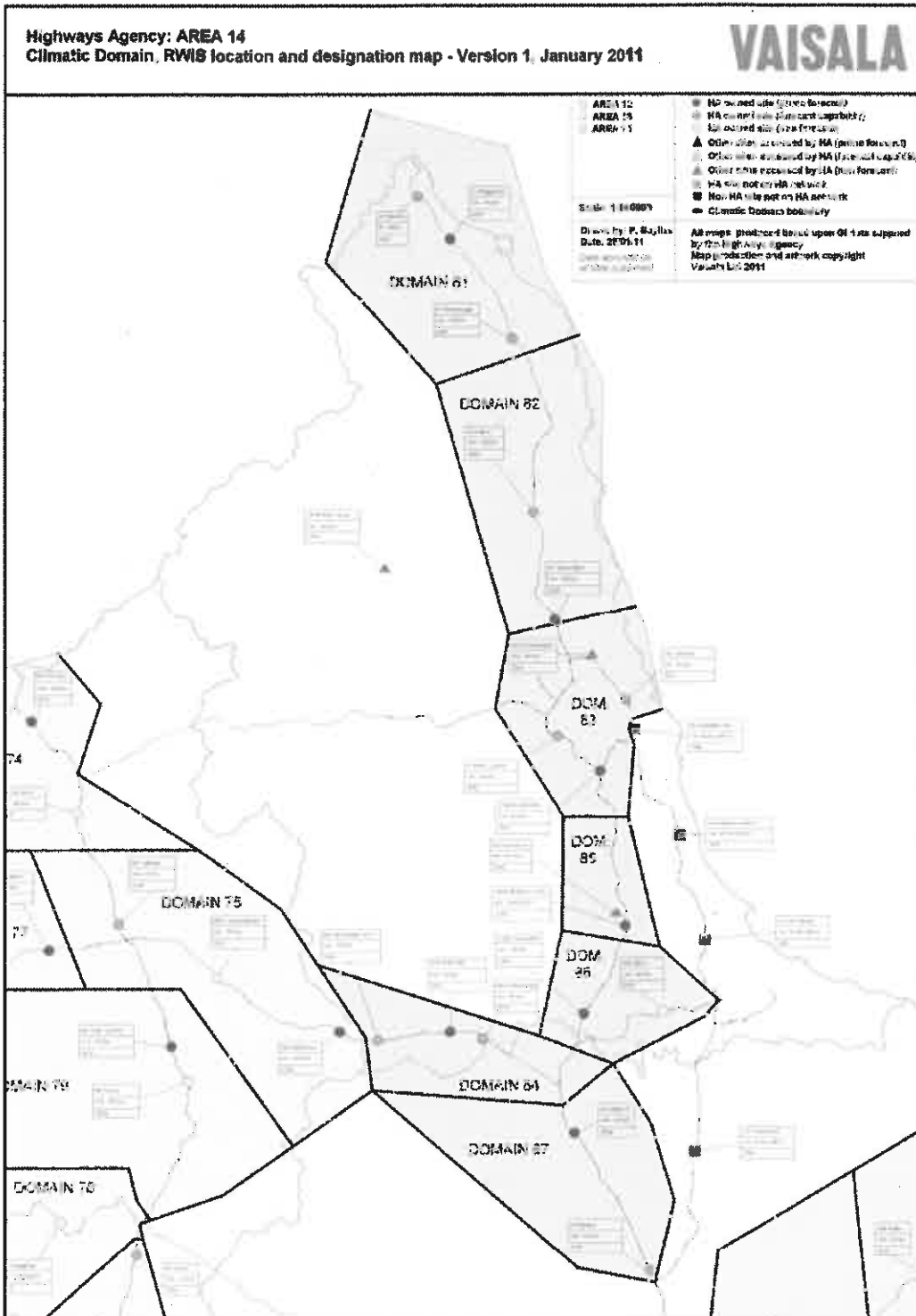
The HAWIS website can be accessed at <https://hawcs.dft.gov.uk>

A-one+ has appointed Weather service provider to provide the forecast requirement detailed in Appendix B.2.

Faults on HAWIS must be reported as soon as possible to the appropriate maintenance contractor. Contact details can be found in Appendix A.8.

2.5.1 National Domain Network of Environmental Sensor Stations

The domain map is shown below.



There are no current requirements to increase the number of ESS within Area14

2.5.1.1 Domain arrangements

Domain arrangements are described in the following table and detailed on the Area Map in Appendix A.3.

Domain	Outstations	Routes
81	Haggerston	A1
82	Felton	A1
82	Metro Centre	A1/A696
82	Stannington	A1
83	Wallsend	A19
83	Black Fell	A194(M)
85	Coniscliffe	A1(M)
86	Elton	A66
84	Hutton	A66
87	Catterick South	A1
87	Rainton	A1
84	North Bitts	A66
81	Rosebrough	A1
81	Berwick	A1
85	Bradbury	A1 (M)
84	Spittal Farm	A66

Road Condition Data is also available from the following locations		
1	Rosebrough	A1
1	Berwick	A1
3	Bradbury	A1 (M)
Area 13	Stainmore	A66

3 RESOURCES

This section of the Severe Weather Plan contains details of the resources available for delivery of a Severe Weather Service on the Area 14 Network including reserve / contingency arrangements.

The Highways Agency will make available compounds, vehicles, plant and equipment as appropriate to the form of contractual arrangement and may make available additional reserve resources if the Service Provider requires them due to breakdowns or operational difficulties.

A-one+ is responsible for providing the other resources including staff, materials, and brine production equipment and storage.

A-one+ is responsible for preparing and ensuring that all compounds, equipment and plant operate efficiently.

3.1 Human resources

3.1.1 Key personnel

The following table identifies the key personnel responsible for delivery of the services defined within this document.

Function	Title	Name
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3.1.1.1 Organogram

3.1.2 Staffing levels

A-one+ has qualified drivers front line drivers for Winter Service operations on the Area 14 network, which will meet the Highways Agency's AMOR requirement to provide an effective Winter Service.

Operatives are to be listed at Appendix A.13.

3.1.2.1 Training

All staff involved in the decision making/verification processes receive WEATHER SERVICE PROVIDER training.

Route training is undertaken (daytime) September of each year to familiarise drivers with routes and changes that have been made to make the system more efficient, any dummy runs will take place at night to minimise MIDAS being tripped, the NERCC to be advised.

Relevant staff has been trained in the fitting of ploughs plus this has been included when retraining for City & Guilds 6159 accreditation.

Driver training records are held by Human Resources at Darlington

All training is updated or refreshed as required and is monitored by the training department to ensure we have continuity of suitably qualified staff.

Training Records are detailed at Appendix A.14.

3.2 Compounds and facilities

An inventory relating to A-one+ compounds and the Area Operational Winter Service Vehicles (including Operational Reserve) plus National Reserve Winter Service Vehicles is stored on an MS Access database held by the Highways Agency. This inventory requires periodic updates to reflect any changes.

A-one+ will review and update the MS Access database inventory at intervals set out in the Service Timetable in Section 1.1.2.

3.2.1 Compounds

Details of compounds, depots and other facilities covering the Area 14 Network are provided in the compounds, depots and facilities schedule at Appendix A.15.

3.2.2 Fuel

The fuel type (including grade) and details of supply and storage arrangements including minimum stock levels and supply contingency and pump maintenance arrangements are detailed at Appendix A.16.

A-one+ will monitor fuel stock levels regularly during the Operational Winter Period and report using the WRF1 system as per requirements in Section 2.2.

3.3 Treatment materials

Contextual guidance on treatment materials including storage are contained in Appendix B.3.

A-one+ will utilise the following de-icing/anti-icing materials to deliver an effective Winter Service on the Area14 network.

- 6mm down salt to BS3247: 2011,
- *brine solution with an optimum and maximum sodium chloride concentration of 23% and no less than 20%,*
- *8-10 mm salt,*

A-one+ has considered alternative de-icing product.

3.3.1 Material storage and brine production

The storage and quantities of materials used in Area 14 are listed below and can also be found in A15.

Material (salt / brine /)			
Location	Type	Capacity (tonnes or litres)	Min (tonnes or litres)
Kneeton Corner Motorway Compound	<i>Closed Barn + Brine production</i>	3,500t + 15,00ltrs	1,000t
	<i>Magnesium Chloride</i>	90,000ltrs	
Bradbury Motorway Compound	<i>Closed Barn + Brine production</i>	4,500t + 15,000ltrs	800t
Carrville Motorway Compound	<i>Closed Barn + Brine production</i>	3,500t + 15,000ltrs	1,000t
Willowburn Trading Estate Alnwick	<i>Closed Barn + Brine production</i>	1,000t + 15,000ltrs	2038

A-one+ have no salt bins within Area 14 and there are no salt heaps situated on the Network.

3.3.2 Supply arrangements

A-one+ Integrated Highway Services in Area 14 have their supply chain partner for salt. This will be 6mm in size delivered in bulk.

A-one+ Integrated Highway Services also have another salt supply chain partner [REDACTED] within the A-one+ business group and we can obtain supplies internally via our sister MAC's. A-one+ Integrated Highway Services also arrange its own haulage provision via the supply chain to facilitate the movement of stocks between the A-one+ business group.

Stocks will be monitored on a daily basis utilising an active spread sheet and supplies re-ordered in accordance with threshold levels to ensure we do not fall below our minimum stock levels we will also move stock internally to ensure resilience at the smaller depots

3.3.3 Reserve / contingency arrangements

Agreements are in place with Durham County Council for them to replenish salt used by them from A-one+ depots during extreme conditions.

A-one+ are member of the Northern Region Salt User group which comprises of Local Highways Authorities in the North of England. The group's purchasing power can source additional salt from overseas if required.

A-one+ have access to its own strategic salt stock supplies and there is a process in place to allow access to this salt in extreme circumstances.

3.4 Vehicles and plant

A-one+ has in total 21 Area Operational Winter Service Vehicles (including Operational Reserve Vehicles) available for use of which 11 have been allocated as Operational Winter Service Vehicles to cover the planned precautionary Winter Service Routes. The remaining vehicles are designated as Operational Reserve Vehicles detailed in Section 3.4.1.

In addition to the Area Operational Winter Service Vehicles, a further 2 vehicles, which form part of the complement of Winter Service Vehicles within the Area are designated as National Reserve Vehicles. Special conditions, as set out in Appendix B.4, attach to their usage.

Snow Blowers, 3 in number are additional to the Area Operational Winter Service Vehicles. A-one+ shall adopt the procedures for Operational Reserve Vehicles in relation to their use.

The resources available to deal with snow clearance from footpaths will be drawn from operatives not engaged in driving gritters. Additional recourses can be called upon from the A-one+ JV parent companies.

The schedules of vehicles, plant and equipment are provided in Appendix A.17.

3.4.1 Area Operational Reserve Winter Service Vehicle and contingency arrangements

A-one+ can use the Area Operational Reserve Winter Service Vehicles allocated to their Area Network 14 without prior approval but must ensure the use is notified up to 19. National procedures for management of the both Area Operational Reserve Winter Service Vehicles and National Reserve Vehicles are in Appendix B.4.

The number of Area Operational Reserve Winter Service Vehicles and the agreed Reserve Threshold trigger level is provided in the table below.

Reserve Vehicles	Area 14
Number of Area Operational Reserve Vehicles	8
Reserve Threshold – Number utilised	8

3.4.2 Vehicle maintenance arrangements

A-one+ will maintain vehicles in accordance with MAC contract Annex 7.

A-one+ have dedicated Mechanics that have been trained to maintain the HA winter Fleet. The maintenance regime will be in line with Annex 7. Recording of maintenance checks and defects will be recorded in A-one+ maintenance management system. Monthly reports will also be sent to the HA winter team on the 15th of each month detailing maintenance carried out and any defects repairs carried out

Contact details for the mechanics can be found in (Appendices A.6 and A.7).

A-one+ will rotate use of Operational and Reserve Winter Service Vehicles to balance usage of Area Operational Winter Service Vehicles (including Operational Reserves).

A-one+ will rotate use of all Area Operational and Reserve Winter Service Vehicles to balance usage of Area Operational Winter Service Vehicles (including Operational Reserves).

3.4.2.1 Vehicle breakdown and recovery arrangements

An arrangement exists within A-one+ for callouts to attend to the HA gritter fleet.

A-one+ shall be responsible for ensuring that MAC vehicles and plant are maintained to a standard in order to comply with the requirements of the Contract.

A-one+ shall provide 24 hour contingency arrangements to deal with any vehicle or plant breakdown including replacement of immobilised vehicles using HA or A-one+ provided dedicated reserve plant located in compounds within Area 14.

A-one+ will also make arrangements with local plant specialists at key locations on the network to supply additional plant to deal with emergency snow clearing requirements.

3.4.2.2 Vehicle preparation

A-one+ shall be responsible for the maintenance and lubrication of the HA's plant in accordance with Volume 3, Appendix 28/6 of the Specification and also Annex 7 of the MAC Contract.

All plant and equipment will be checked and be in a state of readiness by 30th September each year. Notification that the fleet is prepared will be by a report from Transport Manager to WMM before 30th September each year.

Copies of routine servicing records as well as the schedule of operator information shall be provided within the vehicle cab.

The MAC shall ensure that hot water washing of vehicles and plant to remove all traces of salt shall be carried out on the first working day following a salting run, as stated in Annex 7 of the MAC Contract.

The HA fleet will be 'run' and washed on a fortnightly basis.

An arrangement exists within A-one+ for callouts to attend to the HA gritter fleet.

A-one+ shall be responsible for ensuring that MAC vehicles and plant are maintained to a standard in order to comply with the requirements of the Contract.

A-one+ shall provide 24 hour contingency arrangements to deal with any vehicle or plant breakdown including replacement of immobilised vehicles using HA or A-one+ provided dedicated reserve plant located in compounds within Area 14.

A-one+ will also make arrangements with local plant specialists at key locations on the network to supply additional plant to deal with emergency snow clearing requirements.

Prior to using alternative materials the Service Manager, ADT Team Manager and National Winter Team Specialist will be consulted prior to its use. The Method of notification will be verbally then via e-mail.

3.4.3 Arrangements with supply chain partners

All vehicle preparation is carried out by trained A-one+ Mechanics.

4 WINTER SERVICE ROUTE PLANNING

This section of the Severe Weather Plan contains details on A-one+ Winter Service Routes (WSR) for use in the delivery of Winter Service on the Area 14 Network.

A-one+ will plan, design and continually review the WSR to ensure they are optimised to be as efficient as possible in terms of treatment lengths and time to undertake treatment.

An effective Winter Service can respond to a change in the forecast in a timely manner. For this reason the initial response is defined as the maximum permitted time taken from the decision to treat until the Winter Service Vehicles are loaded, staffed and ready to leave the depot.

Initial response time is 1 hour

Precautionary treatment is most effective when carried in out advance of and as close to forecast freezing time (to minimise the loss of salt due to trafficking). Therefore, the precautionary treatment and turnaround time is defined as the maximum permitted time for the following cycle: leaving the depot, treating the route, returning to a depot and being ready to leave the depot for the next treatment.

AMOR Precautionary Treatment and Turnaround time is 3 hours

4.1 Winter Service Route design

A-one+ will liaise closely with adjacent Highway Authorities and other stakeholders when designing WSR for precautionary and reactive treatment to ensure consistency and continuity of Winter Service operations on all sections of the Area14 Network and with adjacent highway networks, including footways and cycle tracks.

For hard shoulder, carriageway marginal strips or emergency refuge areas anti-icing/de-icing material coverage should be 50% at the full rate of spread. The Service Provider should give consideration to the creation of a simple database of start and finish times to enable reports to be quickly generated and provided as required by the Service Manager. Designs of WSR for anti-icing/de-icing precautionary treatment, should allow for full coverage of the specified or instructed rate of spread of anti-icing/de-icing materials over the full width of all areas of carriageway, including LBS1 of a Managed Motorway.

A-one+ will take into consideration the impact from the following, where applicable, when designing the WSR (not exhaustive):

- Physical constraints such as tunnels, over bridges, operations near railways, solid vertical barriers, geometry and traffic calming areas;
- Potential need for different requirements on different lanes of the carriageway;
- Need for variation in anti-icing/de-icing material, application frequency, spread rates, spread patterns, free running and wastage factors;
- Major schemes;
- Route classification;
- Managed Motorways with hard shoulder running;
- Network Features;
- Vulnerable locations;
- Depot constraints
- Depot access problems due to localised congestion caused by severe weather;
- Variation in traffic flow;
- Poor weather conditions; and
- Carrying snowplough blades on precautionary treatment runs.

4.1.1 Precautionary treatment routes

A-one+ has designed WSR for planned precautionary treatments to meet the precautionary treatment requirement (detailed in the following table). The target treatment time for each route and turnaround time is stated on the route schedule and drawing (Appendix A.18). The precautionary treatment and turnaround time stated by the Service Provider (to include leaving the depot, treating the route, returning to a depot and being ready to leave the depot ready for the next treatment) will be used as a metric.

Precautionary treatment on Managed Motorways may be undertaken directly:

- from LBS1 when LBS1 open to traffic,
- asymmetrically from LBS2, or
- From LBS1, at reduced speed, when LBS1 closed to traffic..

Precautionary treatment requirement			
Route classification	Red	Amber	Green
Criteria	All lanes (including slip roads) to be kept clear of ice, as far as reasonably practicable		

4.1.2 Snow clearance routes

Snow clearance can take longer than precautionary treatment, therefore snow routes have been designed to achieve the clearance requirement detailed in the following table and mitigate excessive driver hours. The snow clearance plan should be coordinated with the RCC and care taken to ensure consistency across boundaries between Service Providers.

Snow clearance requirement							
Route classification	Red		Amber		Green		Slip and link roads
Number of existing lanes	1 or 2	3 or more	1 or 2	3 or more	1 or 2	3 or more	Not applicable
Criteria	minimum number of lanes to be kept clear of snow, as far as reasonably practicable						
Between the hours of 06:00 - 20:00	1	2	1	2	1	1	1
Between the hours of 20:00 - 06:00	1	2	1	1	1	1	1
Following the cessation of snow all lanes are to be clear of snow within	12 hours		18 hours		24 hours		In accordance with route classification

4.2 Winter Service Route summary

Summary of WSR for carriageways, footways, cycle tracks and other such areas used by pedestrians and cyclists is provided in the following table.

Winter Service Route Summary

* Delete as applicable

The detailed schedules for each WSR including drawings are provided in Appendix A.18.

The times for each route detailed are based on an average treatment time from last winter season. Following the acceptance of the departure from standard in relation to AMOR 3hr treatment/turnaround times etc. The routes were designed then implemented during the winter season 2012-2013.

5 ACTIONS FOR WEATHER CONDITIONS

This section of the Severe Weather Plan contains decision and treatment matrices and A-one+ detailed operational procedures for Winter Service and alert procedures and actions in the event of other Severe Weather on the Area 14 Network.

5.1 Winter decision and treatment matrices

Decisions are made in the interest of service delivery and continuity, and takes account of weather conditions informed by the HAWIS and decision information, where applicable, from adjacent Service Providers and relevant Local Highway Authorities.

All decisions will be subject to continuous monitoring, recording and review.

All Winter Service decisions are evidence based and will be made in accordance with the guidance contained within the following decision and treatment matrices:

During periods of forecast severe weather A-one+ must remain in contact with Weather service provider and should also take account of information from staff out on the Area 14 Network, Traffic Officer Service and CCTV when making decisions.

5.1.1 Decision Matrix

		Predicted Road Conditions		
Road Surface Temperature	Precipitation etc.	Wet	Wet Patches	Dry
May fall below 1°C	No rain No hoar frost No fog	Salt before frost	Salt before frost (see note 1)	No action likely, monitor weather (see note 1)
Expected to fall below 1°C (see note D)	No rain No hoar frost No fog		Salt before frost (see note 2)	Salt before frost (see note 2)
	Expected hoar frost Expected fog			
	Expected rain BEFORE freezing	Salt after rain stops		
	Expected rain DURING freezing	Salt before frost and after rain stops (see note 3)		
	Possible rain Possible hoar frost Possible fog	Salt before frost		Monitor weather conditions
Expected snow		Salt before snow fall (see note 4)		
Freezing Rain	Before rain	Salt before rainfall (see notes 3 and 4)		
	During rain	Salt during rainfall (see notes 3 and 4)		
	After rain	Salt after rainfall (see notes 3 and 4)		
<i>The decision to undertake precautionary treatments should, if appropriate, be adjusted to take account of residual salt or surface moisture.</i>				
Notes				
1) Particular attention should be given to any possibility of water running across carriageways and such locations should be monitored and treated as required.				

- 2) When a weather warning contains reference to expected hoarfrost considerable deposits of frost are likely to occur and close monitoring will be required. Particular attention should be given to the timing of precautionary treatments due to the possibility that salt deposited on a dry road may be dispersed before it can become effective.
- 3) Under these circumstances rain will freeze on contact with surfaces and full pre-treatment should be provided even on dry roads. This is a most serious condition and should be monitored closely and continuously throughout the danger period.
- 4) The effectiveness of salt decreases as temperatures fall and effective treatments may not be guaranteed with salt towards the lower end of the temperature band. The use of alternative treatment materials must be considered when spreading at (the lower of air or road surface) temperatures below -7°C or below -5°C in low humidity conditions (relative humidity <80%).

5.1.2 Guidance for repeat treatments for road surface temperatures expected to fall below 1°C

Possible need for repeat treatment(s)	Key information	Predicted conditions	Treatment guidance
<p>Rain after treatment but before freezing</p>	<p>The current spread rates assume that little water is likely to be present on road surfaces in winter conditions, and this is normally the case (See Note 1)</p> <p>Water on the surface will reduce the effectiveness of salt by:</p> <ul style="list-style-type: none"> • Dilution of any brine solution formed • Causing salt wash off <p>As a guide, greater than 2mm will result in salt wash off and require retreatment. Use rainfall radar to determine and treat only effected areas where possible</p>	<p>More than 1mm of rain based on weather station data or radar or forecast</p>	<p>Make repeat treatment after rain stops, allowing as much delay as practicable for water to be dispersed by drainage and traffic before freezing. Table 5.1.2 provides guidance only. All treatment decisions will be based upon the specific requires of the Decision Matrix in Section 5.1.1, Treat Matrices in section 5.1.3 to 5.1.6 and relevant other sections of this plan</p>
		<p>Less than 1mm of rain based on weather station data or radar or forecast</p>	<p>Monitor and carry out repeat treatment after rain stops if required and allowing for water to disperse when practicable.</p> <p>Road sensors can be used after rainfall to determine whether the freezing point of water on the road surface is low enough for the forecast minimum RSTs.</p> <p>Make repeat treatment as soon as practicable where roads are wetter than allowed for in current spread rates (see Note 1)</p> <p>Table 5.1.2 provides guidance only. All treatment decisions will be based upon the specific requires of the Decision Matrix in Section 5.1.1, Treat Matrices in section 5.1.3 to 5.1.6 and relevant other sections of this plan</p>
<p>Rain just before freezing</p>	<p>See Appendix B5 of the Severe Weather Plan template for information on effectiveness of salt after rain</p> <p>Traffic aids the dispersal of</p>	<p>Freezing just after rain (<1 hour)</p>	<p>Make repeat treatment if freezing is forecast just after rainfall and roads are wetter than allowed for in current spread rates (See Note 1)</p> <p>Table 5.1.2 provides guidance only. All</p>

Possible need for repeat treatment(s)	Key information	Predicted conditions	Treatment guidance
	<p>water. If a road surface is well drained and has been trafficked for an hour or so after rainfall, relatively little water will be present at the road surface</p> <p>There is a lower rate of loss when salt is in solution than in solid form. Salt will enter solution rapidly when road surfaces are wet</p>	<p>Freezing delay after rain (>1 hour but < 3 hours)</p>	<p>treatment decisions will be based upon the specific requires of the Decision Matrix in Section 5.1.1, Treat Matrices in section 5.1.3 to 5.1.6 and relevant other sections of this plan</p> <p>Delay initial treatment as long as practically possible after rainfall to enable trafficking to disperse surface water so spray is minimal.</p> <p>Repeat treatment should be considered in poorly drained areas, where there is run-off and where (and when) there is little trafficking (e.g. lightly trafficked areas of slip roads, lightly trafficked roads on Sunday mornings) (See Note 1) Table 5.1.2 provides guidance only. All treatment decisions will be based upon the specific requires of the Decision Matrix in Section 5.1.1, Treat Matrices in section 5.1.3 to 5.1.6 and relevant other sections of this plan</p>
<p>Road wetter than allowed for in current spread rates, heavy hoar frost, freezing fog (See Note 1)</p>	<p>Higher spread rates or repeat treatments are required when more water (and/or less residual salt) is likely to be present than allowed for in the current rates</p>	<p>Heavy rainfall before treatment Inadequate drainage or run-off Heavy hoar frost Freezing fog Lightly trafficked roads</p>	<p>Increase initial spread rate (e.g. to the rate for the next temperature band) or consider making initial treatment at the specified rate and repeat treatment(s) at the same rate.</p> <p>Conditions that are most likely to require repeat treatment(s) include: Poorly drained surfacing or open textured surfacing after heavy rainfall Lightly trafficked surfaces (e.g. lightly trafficked areas of slip roads, lightly trafficked roads on Sunday mornings, bank holidays etc) Dew point above the road surface temperature:</p>

Possible need for repeat treatment(s)	Key information	Predicted conditions	Treatment guidance
			<p>by several degrees for a long period e.g. over long winter nights from late November to mid-January when there is a light breeze that maintains moist air at the road surface</p> <p>Table 5.1.2 provides guidance only. All treatment decisions will be based upon the specific requires of the Decision Matrix in Section 5.1.1, Treat Matrices in section 5.1.3 to 5.1.6 and relevant other sections of this plan</p>
<p>Change in forecast to more severe weather</p>	<p>A repeat treatment will be required when there is a decrease in the forecast road surface temperature and/or the forecast road surface state is wetter than was assumed for the initial treatment</p>	<p>Change in forecast to colder road surface temperatures or wetter road surfaces</p>	<p>Make a top-up treatment if the spread rate for the changed forecast conditions is higher than the spread rate for the initial treatment</p> <p>Table 5.1.2 provides guidance only. All treatment decisions will be based upon the specific requires of the Decision Matrix in Section 5.1.1, Treat Matrices in section 5.1.3 to 5.1.6 and relevant other sections of this plan</p>
<p>Temperatures below freezing spanning at most one peak period</p>	<p>The current spread rates assume a certain percentage loss of salt from road surfaces after spreading. The rates do not allow for loss over long periods.</p>	<p>Freezing occurring after one peak period and for duration less than 12 hours with no precipitation</p>	<p>Monitor conditions and only treat again before next peak traffic period if necessary.</p> <p>Delay initial treatment as long as possible to reduce salt loss before freezing but without compromising dissolution of salt by trafficking etc.</p> <p>Conditions that are most likely to required repeat treatment include when:</p> <ul style="list-style-type: none"> • Road surface is wet • RST below -5°C • Heavy hoar frost forecast • When forecast has changed following initial treatment • Reports of ice on roads or hard shoulders (from

Possible need for repeat treatment(s)	Key information	Predicted conditions	Treatment guidance
			<p>patrols/Police/TSO)</p> <p>Table 5.1.2 provides guidance only. All treatment decisions will be based upon the specific requires of the Decision Matrix in Section 5.1.1, Treat Matrices in section 5.1.3 to 5.1.6 and relevant other sections of this plan</p>
<p>Temperatures below freezing over up to 2 peak periods</p>	<p>The current spread rates assume a certain percentage loss of salt from road surfaces after spreading. The rates do not allow for loss over long periods.</p> <p>In general it should be assumed that a repeat treatment is required if an initial treatment is made just before (or during) one peak traffic period and temperatures will still be below freezing from just before to after the next peak period</p>	<p>Freezing from one peak period to just before or after another peak period, with no precipitation in the intervening period</p>	<p>Make repeat treatment before second peak traffic period and within 12 hours of the initial treatment.</p> <p>Consider using a spread rate for the initial treatment for the road conditions forecast up to the time the repeat treatment has been completed.</p> <p>Where possible, time repeat treatments to avoid spreading when the road surface temperature is less than -5°C</p> <p>It may be possible to either carry out the repeat treatment at reduced rate, or omit the repeat treatment when</p> <p>A number of treatments have been made over two or more days in dry weather and measured residual salt levels are high.</p> <p>The humidity is such that the road surface is drying, e.g. changing from wet to damp or dry (but see below) and no increase in humidity or precipitation is forecast for the period of the treatments effectiveness</p> <p>The minimum road surface temperature in the morning is at least one temperature band less than temperature band for the treatment made in the evening.</p> <p>Table 5.1.2 provides guidance only. All treatment decisions will be based upon the</p>

Possible need for repeat treatment(s)	Key information	Predicted conditions	Treatment guidance
			specific requires of the Decision Matrix in Section 5.1.1, Treat Matrices in section 5.1.3 to 5.1.6 and relevant other sections of this plan
Sustained freezing (i.e. temperatures below freezing spanning at least 3 peak periods	<p>Repeat treatments may be required when below freezing conditions are sustained over long periods.</p> <p>Road surfaces can be essentially dry in periods of sustained freezing because of a lack of precipitation and low humidity conditions. In such conditions, repeat treatments may not be required when residual salt levels have built up and/or the road is dry such that the risk of ice formation endangering road users is low.</p> <p>Treatments should be delayed if the salt that is spread will not enter solution.</p> <p>Accumulations of undissolved salt in sustained freezing can significantly increase chloride levels in water courses when they are dissolved during subsequent rainfall.</p>	Freezing spanning at least 3 peak periods, with no precipitation in the intervening period.	<p>Normally make treatments between each peak period so that the time between treatments is no more than 12 hours.</p> <p>Where possible, time repeat treatments to avoid spreading when the road surface temperature is less than -5°C</p> <p>Monitor the dryness/wetness of the road surface and consider reduced rate treatments or treatments more than every 12 hours when residual salt levels are high and/or the road surface is essentially dry.</p> <p>Table 5.1.2 provides guidance only. All treatment decisions will be based upon the specific requires of the Decision Matrix in Section 5.1.1, Treat Matrices in section 5.1.3 to 5.1.6 and relevant other sections of this plan</p>

Note 1. To calculate spread rates, it was assumed a wet road is one where minimal spray is evident and there is no water flowing across the surface. The maximum water film thickness for a well-trafficked road is 0.05mm and for a lightly trafficked road 0.1mm. Where road sensors indicate a wet road this indicates that more water is present than the maximum water film thickness allowed for in current spread rates and the treatment effectiveness will be less than stated in the treatment matrix guide.

5.1.3 Treatment Matrix Guide

	Weather Conditions Road Surface Conditions Road Surface Temperature (RST)	Air Temp	Treatment	
			Dry Salting (g/m ²)	Pre-wetted Salting (g/m ²) (see Note 1)
1.	Frost or forecast frost RST at or above -2°C (irrespective of dry, damp or wet conditions)		8	8
2.	Frost or forecast frost RST below -2°C and above -5°C and dry or damp road conditions		10	9
3.	Frost or forecast frost RST below -2°C and above -5°C and wet road conditions (see Note 4 if lightly trafficked)		16	15
4.	Frost or forecast frost RST at or below -5°C and above -10°C and dry or damp road conditions (see Note 4 if damp and lightly trafficked and Note 6)		18	18
5.	Frost or forecast frost RST at or below -5°C and above -10°C and wet road conditions (existing or anticipated) (see Note 4 if lightly trafficked and Note 6)		2 x 15	2 x 15
6.	Light snow forecast <10 mm		20	18
7.	Medium/heavy snow or freezing rain forecast (see Note 5)		2 x 20	2 x 18
8.	Freezing rain falling		20 (successive)	See Note 3 below
9.	After freezing rain		20	See Note 3 below
10.	Ice formed (minor accumulations)	above -5°C	20	See Note 3 below
11.	Ice formed	at or below -5°C	2 x 20	See Note 3 below
12.	Hard packed snow/ice	above -8°C	20 (successive)	See Note 3 below
13.	Hard packed snow/ice	at or below -8°C	salt/abrasive (successive)	See Note 3 below
<p>The rate of spread for precautionary treatments may, if appropriate, be adjusted to take account of residual salt or surface moisture.</p> <p>It has been assumed that two treatments are required to achieve spread rates at or exceeding 30g/m².</p> <p>Notes:</p> <ol style="list-style-type: none"> 1) Spread rates for pre-wetted salt is the combined weight of dry rock salt and brine combined at 70:30 proportions by weight respectively with a maximum brine concentration of 23% salt. 2) Pre-wetted salt should always be the preferred treatment for all precautionary treatments whenever possible, including before snowfall. 3) When ice has formed or snow is lying dry salting is the preferred treatment unless the road is closed to traffic when pre-wetted salting may be used. Pre-wetted salting is the preferred treatment in advance of such conditions. 4) Treatments should be carried out, whenever possible, after traffic has dispersed standing water. 				

Successive half rate treatments (for both pre-wet and dry salt operations) should be considered for lightly trafficked roads. or on more heavily trafficked roads at times of low traffic e.g. Sunday mornings, at the lower end of temperature bands indicated.

- 5) For snow covering forecast to exceed 30mm ploughing should be conducted early enough to ensure snow accumulations do not exceed 10mm. The rates in the table are for precautionary salt treatment prior to snowfall which is essential to form a debonding layer and aid snow clearance.
- 6) The effectiveness of salt decreases as temperatures fall and effective treatments may not be guaranteed with salt towards the lower end of the temperature band. The use of alternative treatment materials must be considered when spreading at (the lower of air or road surface) temperatures below -7°C or below -5°C in low humidity conditions (relative humidity <80%).
- 7) The spread rates are not applicable to very wet roads, when there is standing water or spray generated, or for very heavy hoar frosts. In these conditions roads should be closely monitored and consideration given to increasing the spread rate, making successive treatments or both.

5.1.4 Precautionary Treatment Matrix Guide - Treatments, including alternative materials, when spreading in extreme cold

Alternative treatments when RST below -7°C at time of spreading (or, especially for dry salt spreading, when RST below -5°C at time of spreading for low humidity conditions)							
Conditions: Frost or Forecast Frost							
Dry rock salt component (% by weight)		Rock Salt (70%)	Rock salt (70%)	Rock Salt (70%)	Rock Salt (70%)	Rock Salt (96%)	Rock Salt (100%)
Liquid component (% by weight)		Magnesium chloride brine (30%)	Calcium chloride brine (30%)	ABP Brine [2] (30%)	Sodium chloride brine (30%)	Alternative liquid [3] added before loading (4%)	
Weather Conditions Road Surface Temperature (RST)	Road Surface Conditions	PRE-WET SPREADING [1] (g/m ²)				DRY SPREADING (g/m ²)	
RST at or below -5°C and above -7°C (Only for low humidity conditions <80%)	Dry or damp road	11	11	10	13	14	14
	Wet road	18	19	17	21	22	22
RST at or below -7°C and above -10°C	Dry or damp road	16	17	16	21	20	22
	Wet road	27	28	26	35	34	37
RST at or below -10°C and above -12°C	Dry or damp road	21	22	20	29	26	30
	Wet road	35	36	34	49	43	50
RST at or below -12°C	Dry or damp road	27	29	27	41	33	41
	Wet road	46	48	45	68	56	68

Notes:

- ▶ Higher spread rates may require more than one pass to achieve, which Service Providers should make allowance for.
- ▶ A follow up treatment of 50% of the recommended spread rate should be considered in lightly trafficked areas at the lower end of the temperature bands indicated.
- ▶ To take account of residual salt during periods of sustained freezing, when surfaces are well drained and there is no melt water or ice present, rates of spread for treatments carried out within 6 hours of previous treatments may be 50% of the rates in the table.

1) Spread rates for pre-wet spreading are the weight of the dry salt and brine combined in the ratio 70% dry salt to 30% liquid component.

2) For definition of ABP Brine see Appendix B.3

3) Alternative liquid means either: magnesium chloride brine; calcium chloride brine; ABP Brine or;

magnesium chloride brine plus ABP liquid. See definitions at Appendix B.3.

5.1.5 Precautionary Treatment Matrix Guide - Treatments, including alternative materials, before snow and freezing rain when spreading in extreme cold

Alternative treatments when RST below -7°C at time of spreading (or, especially for dry salt spreading, when RST below -5°C at time of spreading for low humidity conditions)

Conditions: Forecast Light Snow or Moderate / Heavy Snow and Freezing Rain ^[1]

Dry rock salt component (% by weight)	Rock Salt (70%)	Rock salt (70%)	Rock Salt (70%)	Rock Salt (70%)	Rock Salt (96%)	Rock Salt (100%)
Liquid component (% by weight)	Magnesium chloride brine (30%)	Calcium chloride brine (30%)	ABP Brine ^[3] (30%)	Sodium chloride brine (30%)	Alternative liquid ^[4] added before loading (4%)	
Weather Conditions Road Surface Temperature (RST)	PRE-WET SPREADING ^[2] (g/m ²)				DRY SPREADING (g/m ²)	
RST at or below -5°C and above -7°C (Only for low humidity conditions <80%)	23	24	22	28	28	28
RST at or below -7°C and above -10°C	33	35	32	40	40	43
RST at or below -10°C and above -12°C	39	41	38	47	47	52
RST at or below -12°C	47	50	47	58	58	70

Notes:

- ▶ Higher spread rates may require more than one pass to achieve, which Service Providers should make allowance for.
- 1) Treatments for moderate / heavy snow and freezing rain are as for light snow plus a follow-up treatment at half the recommended spread rates when no treatments in previous six hours.
- 2) Spread rates for pre-wet spreading are the weight of the dry salt and brine combined in the ratio 70% dry salt to 30% liquid component.
- 3) For definition of ABP Brine see Appendix B.3.
- 4) Alternative liquid means either: magnesium chloride brine; calcium chloride brine; ABP Brine or; magnesium chloride brine plus ABP liquid. See definitions at Appendix B.3.

5.1.6 Reactive Treatment Matrix Guide - Treatments, including alternative materials, for compacted snow or ice when spread in extreme cold

Alternative treatments when RST below -7°C at time of spreading (or, especially for dry salt spreading, when RST below -5°C at time of spreading for low humidity conditions)							
Conditions: Compacted Snow or Ice							
Dry rock salt component (% by weight)		Rock Salt (70%)	Rock salt (70%)	Rock Salt (70%)	Rock Salt (70%)	Rock Salt (96%)	Rock Salt (100%)
Liquid component (% by weight)	Magnesium chloride brine plus ABP (100%)	Magnesium chloride brine (30%)	Calcium chloride brine (30%)	ABP Brine ^[3] (30%)	Sodium chloride brine (30%)	Alternative liquid ^[4] added before loading (4%)	
Weather Conditions Road Surface Temperature (RST)	LIQUID SPREADING ^[1] (g/m ²)	PRE-WET SPREADING ^[2] (g/m ²)				DRY SPREADING (g/m ²)	
RST at or below -5°C and above -7°C (Only for low humidity conditions <80%)	24	28	29	27	34	28	28
RST at or below -7°C and above -10°C	24	40	42	38	48	40	43
RST at or below -10°C and above -12°C	30	46	49	46	56	47	52
RST at or below -12°C	36	56	61	56	76	58	70

Notes:

- ▶ Higher spread rates may require more than one pass to achieve, which Service Providers should make allowance for.
- ▶ As much material as possible should be removed by ploughing before applying de-icers.
- ▶ It may not be possible to treat and de-bond from the road surface ice / compacted snow layers exceeding 20mm thickness. Abrasives should be used until conditions become more favourable for de-icing.
- ▶ Frequent patrols should be made to determine the effectiveness of treatments and when further follow-up treatments are required.
- ▶ If the surface melts and becomes slippery an initial treatment of abrasives should be applied at a rate of 40g/m² and successive treatments at 20g/m² until an acceptable level of friction is restored. Care should be taken to make further applications where ice or snow melts and refreezes later leaving abrasives beneath the ice surface and therefore ineffective.
- ▶ The use of alternative de-icers can provide effective treatments in a shorter time scale than dry salt and salt pre-wetted with sodium chloride brine.

- 1) Liquid only treatments identified in this table must only be spread from a dribble bar in discrete lines across the carriageway. This treatment may also be used in conjunction with rock salt spread at 20g/m².
- 2) Spread rates for pre-wet spreading are the weight of the dry salt and brine combined in the ratio 70% dry salt to 30% liquid component.
- 3) For definition of ABP Brine see Appendix B.3.
- 4) Alternative liquid means either: magnesium chloride brine; calcium chloride brine; ABP Brine or.

magnesium chloride brine plus ABP liquid. See definitions at Appendix B.3.

5.1.7 Footway and cycle track treatment snow clearance

Category (see 1.3.2)	Overnight Frost Conditions	Daytime Frost Conditions	Extended Frost Conditions	Snow Events
	<i>overnight forecast temperatures below zero but not extending beyond 8am</i>	<i>overnight forecast temperatures below zero extending beyond 8am</i>	<i>forecast temperatures remaining below zero throughout daylight hours</i>	
1a	Precautionary treatment		Monitor and further treatment as required	Snow removal must commence when resources come available from carriageway treatments. Endeavours must be made to complete clearance within 12 hours of cessation of snowfall, subject to availability of resources
1	No treatment	Reactive treatment (by 8am of that same day)	Monitor and further treatment as required	Snow removal must commence when resources come available from carriageway treatments. Endeavours must be made to complete clearance within 24 hours of cessation of snowfall, subject to availability of resources
2	No treatment	Reactive treatment (by 8am of that same day)	Monitor and further treatment as required	Snow removal must commence when resources come available from carriageway treatments. Endeavours must be made to complete clearance within 48 hours of cessation of snowfall, subject to availability of resources
3	No treatment	No treatment	Reactive treatment (by noon of that same day)	Snow removal must commence when resources come available from carriageway treatments. Endeavours must be made to complete clearance within 5 days of cessation of snowfall, subject to availability of resources
4	No treatment	No treatment	Reactive treatment not normally undertaken other than in response to specific circumstances	Snow removal must commence when resources come available from carriageway treatments. Endeavours must be made to complete clearance within 5 days of cessation of snowfall, subject to availability of resources

5.2 Treatment/Actions

5.2.1 Precautionary treatment

The effectiveness of precautionary treatments can be significantly affected by how the treatment is applied. The following sections cover A-one+ procedures for precautionary treatment using the appropriate treatment material for each part of the Area 14 Network.

Routes used by spreading vehicles will follow the appropriate WSR in Appendix A.18. A-one+ will aim to apply treatment as close, as is practicable, to the forecast time of freezing, while allowing

sufficient time for the salt to form brine. In particular applying treatments during the early evening, to protect against a forecast of ice forming in the early hours of the following morning, will be avoided. Where treatment is required the most appropriate treatment type and spreading techniques will be used.

5.2.1.1 Treatment type

The Highways Agency's preferred treatment is pre-wetted salt, though other materials may be appropriate for specific conditions or circumstances.

The use of pre-wetted salt provides the following advantages over dry salting:

- Better salt distribution across and along the carriageway
- Lower salt loss during spreading and due to trafficking after spreading
- Increased dissolution, in particular for colder temperatures

For treatments on very wet roads and when precipitation has occurred after spreading, repeat treatments are required and spreading dry salt in these circumstances will not prevent the need for these repeat treatments.

A-one+ will select the most appropriate material suitable for use across the Area 14 Network taking into consideration the location and forecasted weather condition to maximise the effectiveness of the precautionary treatment as detailed below.

A-one+ will select the most appropriate material suitable for use across the Area 14 Network taking into consideration the location and forecasted weather condition to maximise the effectiveness of the precautionary treatment as detailed below.

A-one+ will carry out treatments by the use of either pre-wetted or dry 6-10mm rock salt to BS 3247: 1991, the route of application is given by A-one+ quality promise which can only be altered with agreement through the Network Board for Area 14.

The initial treatment will be pre-wetted unless there are overriding factors that prevent this from taking place. Also refer to Appendix A18 for route plans and schedules that will identify any hazards that require additional mitigation. Also refer to Section 3.3 where appropriate.

Sand will be added to salt to act as abrasives to assist in breaking up ice during freezing rain events.

Footpaths will be treated utilising pickups to carry salt. Operatives will then apply salt to footpaths using hand techniques

5.2.1.2 Spreading techniques and operational considerations

Spreading rate of salt will be carried out by purpose built winter maintenance vehicles; these vehicles help control the rate of spread of salt and give a uniform spread pattern across paved areas.

Spreading vehicles will be single manned for pre-cautionary treatments of the network. In severe weather the use of a 'drivers mate' will be considered especially in relation to the A66 Trans Pennine route due to potential for extreme conditions.

Salt spreading shall be carried out in such a manner as to avoid damage to vehicles, pedestrians and property. Spread width will take into account type of carriageway i.e. single carriageway, dual carriageway or motorway network.

Due consideration will be given to traffic conditions and salting operation in heavy or peak traffic, if unavoidable A-one+ will look to seek Police or Traffic Officer assistance coupled with use of motorway matrix signals on the network.

Care and consideration will be given within traffic management on the network. The Resilience and Winter Manager will discuss and agree treatment requirements for any traffic management that will cause or prevent normal treatments being carried out on the network.

A-one+ will, where feasible, treat only targeted areas of the Area 14 Network based on where ice formation is forecast.

Appendix A9 and section 2.1.2.5 gives details on how cross border arrangements work in times of severe weather or if an adjacent area is experiencing difficulties.

Guidance on working in close proximity to railways can be found in Circular ROADS no 18/77

Those sections of the motorway network with 4 lanes will be run twice to ensure that all parts of the carriageway are adequately treated, section 1.3.2 provides details of the 4 lane locations and see also the schematic 'No. of lanes' within Appendix A3 that provides a visual overview of all carriageway configurations across the Area 14 Network.

Effectiveness of salt after rain;

A-one+ Integrated Highways Services will take on board the advice shown in Appendix B5 and table B1 undertaking precautionary treatments using the most appropriate substance to address the current prevailing or forecast conditions.

Low temperature combined with low humidity conditions;

A-one+ Integrated Highway Services must give special consideration to precautionary treatments during low humidity conditions and must take account of the information contained in Appendix B5.

Following the introduction of the new pre-wet capable fleet into each area, pre-wet treatment where possible, will be used as the Service Providers' default precautionary treatment in the absence of any sound justification for using an alternative. See also Treatment Matrix Guide at 5.1.2.

Refer to Incident maps in Appendix A3 for the different weather related occurrences.

Where temperatures fall below those shown in the treatment matrix at 5.1.2 then pre-wetted applications will be more appropriate with the product going into solution more readily and at extreme low temperatures a 'brine only' application should be considered. A-one+ Integrated Highway Services would also give consideration to adding sharp sand to the dry salt to act as a cutting agent. See also information relative to this in Appendix B5

Freezing Rain;

A-one+ Integrated Highway Services must give special consideration to the treatments required before during and after freezing rain and must take account of the important information/guidance contained in Appendix B5 relative to this weather phenomenon. Contact with Weather service provider both in advance of forecasted Freezing Rain and during the event is essential in order to plan and minimise the effect this will have on the road surface and the travelling public.

Following research undertaken further guidance in conjunction with the NWSRG will be issued shortly to clarify the Service Providers procedures for dealing with Freezing Rain.

Freezing rain can be split into two categories:

- Super-cooled freezing rain (most hazardous of all weather types)
- Non-super-cooled freezing rain

Super-cooled Freezing Rain;

Normally air temperatures decrease with height, sometimes temperature inversions can occur where the lowest layers of air are much colder than the layers of air above. When this occurs, rain drops which are falling from warm air and will reach sub-zero air as it approaches the ground. This will lead to the raindrop becoming super-cooled and instantly freezing on contact with all objects as it hits the ground, i.e. the carriageway. This can build up very quickly and cover the whole surface because freezing on contact does not allow run-off.

This situation tends to occur at the end of a frost period when an area of high pressure has dominated the weather situation and successive nights of long cooling periods have reduced the deep temperature and allowed a deep layer of sub-freezing air to accumulate near the surface. As this layer of air is dense and stagnant when the high pressure begins to decline and warmer moist air moves in, it is pushed up over the cold dense layers of air.

This is a very serious hazard as drivers do not expect widespread ice whilst it is raining.

Non Super-cooled Freezing Rain;

Occasionally freezing rain occurs even though the air temperature is above zero. For example, after several clear frosty nights the deep temperature becomes very low. The next night starts clear and frosty but then rain pushes in quickly from the west. The rain is accompanied by warmer and thicker cloud rising the air temperature above zero. However, due to the deep temperature being very low the surface temperature is slower to rise and can still be below zero when the rain begins to fall, thus leading to icy roads.

These phenomena cannot be anticipated other than taking guidance from the weather forecast provider.

FREEZING RAIN SHALL BE TREATED THE SAME AS SNOW.

The A1(M) has alternative methods which involves the proactive deployment of lane one closures. This operation slows vehicles down which reduces the risk to vehicles being blown over in strong winds.

Refer to Appendix 3 Schematic, cross wind locations for network information. A-one+ have details of 'High Wind' protocols that are in place relevant to A66 Trans Pennine Route and sections of the Area 14 Network which have no specific protocol in place but which have been

identified as 'hot spots'. Copies of the protocol, and a schematic plan showing affected Local Problem Areas and network features are included within Appendix A3. Refer also to guidance at Appendix B5 as the presence of winds may have an effect on the treatment that may necessitate further consideration of additional applications.

Negatively textured surfacing;

This is now more commonplace than HRA as it reduces traffic noise but the voids in the surface texture hold both water and salt, however caution should be applied when considering the levels of any residual salt from previous treatments. See also Appendix B5.

Areas susceptible to run off with the potential to re-freeze & Vulnerable sites;

Refer to Appendix A3, Schematic, Local Problem Area's for locations specific to Area 14 where there is a problem with water draining off adjacent land and advice in Appendix B5

A-one+ will, where feasible, treat only targeted areas of the Area 14 Network based on where ice formation is forecast.

The A66 Trans Pennine is an east to west route that is popular with heavy haulage. This route is vulnerable to adverse weather specifically snow and windy conditions as it is both high with an open and rural aspect. It is provided with snow fencing however along with others through Durham and Cumbria Districts it has a tendency to succumb when severe winter conditions prevail and be closed by the Police in the interest of safety.

A-one+ will liaise closely with Area 13 to ensure a consistent approach is taken to ensure the A66 is cleared of snow. A-one+ assist in the clearance of the A66 across to the M6 if requested to do so by Area 13 subject to the availability of resources and action to not impact on Area 14.

Precautionary treatments where possible will be avoided at peak times so as not to impact on the free flow of traffic, however where it becomes necessary A-one+ will look to seek Police or Traffic Officer assistance, coupled with use of motorway matrix signals on the network.

Roadworks on the Area 14 Network during the winter season are required to have a specific plan using form NS-DS-F44 in place and agreed with the Resilience and Winter Manager to ensure that all sections of the network are treated prior to any point closure being removed for traffic use.

Continued monitoring of known problem areas (will be monitored throughout the winter period or during Severe Weather Amber Alert by utilisation of TIRT's, Winter Maintenance operatives, Winter Maintenance Officers, Duty Supervisors and Traffic Officers (if applicable). Stake holder feedback through the Watchman Cards will form part of this process.

5.2.2 Reactionary treatment for snow and ice

The effectiveness of treatments of snow and ice can be significantly affected by the method of application of the treatment. The following sections cover A-one+ operational techniques for the removal of snow and ice. The techniques include ploughing, blowing, the use of snow fences and snow gates together with changes to the methods of application of treatment materials when snow or ice is already present on the paved area. Guidance is provided in Appendix B.6.

It is important that all routes are cleared, in accordance with the snow clearance requirement provided within section 4.1.2, and that no area is abandoned for the sake of concentrating resources to one or two problem areas. Any decision for route closure or abandonment can only

be made by the HA incident commander, to be advised within the improved coordination process. In all cases therefore the defined treatment routes will be adhered to, and where conditions demand a more intensive treatment in specific areas, this will be achieved by calling out Area Operational Reserve Winter Service Vehicles for those areas.

The following sections should be developed taking into consideration the information in Appendices B.2, B.3, B.5 and B.6.

5.2.2.1 Ploughing and snow clearance techniques which is shown below.

All HA Gritters can be fitted with variable angle ploughs to enable ploughing to both the left and right. Ploughs shall be fitted to the vehicles following receipt of a snow forecast. They shall be fitted prior to the pre-snow action.

Snow ploughing should commence in time to prevent accumulations exceeding 10mm in any lane and supplemented by salt spread at 20g/m² to prevent snow compacting and aid dispersal by traffic and subsequent ploughing.

During prolonged snow falls, ploughing should be continuous and supplemented by simultaneous salting at a rate of 20g/m² - 40g/m².

If snow depths reach 120mm, when tackling drifts, or working on gradients the salt shall be used as payload to assist vehicle traction and salting suspended.

The specified procedures for snow ploughing on single and dual carriageway roads must be maintained.

Route priorities for snow ploughing action shall be carried out under the MAC's instruction.

Careful consideration shall be given before ploughing in built up areas if practical difficulties such as snow deposited on footways and at road junctions are to be avoided.

Accumulations of snow due to drifting or ploughing may require the use of snow blowers at locations where snow can be safely discharged onto verges or other areas and snow clearing plant may need to be employed to maintain access to side roads or dual carriageway central reserve crossovers.

Particular attention shall be given to ensure free flow of vehicles at interchanges and slip roads where the bulk removal of snow may be required.

The decision on when to activate the Snow Blowers will be taken by the Winter Maintenance Officer who will take advice from WEATHER SERVICE PROVIDER as to what weather conditions will be expected to prevail and also consult with the regional HA winter coordinator.

Ploughing techniques will take reference from Appendix B6. See also relevant schematic in Appendix A3.

It is important that all the defined routes are cleared and that no area is abandoned for the sake of concentrating resources to one or two problem areas. In all cases therefore the defined treatment routes will be adhered to, and where conditions demand a more intensive treatment in specific areas, this will be achieved by calling out a reserve vehicle for those areas.

In prolonged, heavy snowfall the priority will be to maintain two lanes open. In the majority of cases this will be the more heavily trafficked nearside lanes. The first operation will be to plough the snow from lane 1 to the hard shoulder, with clearance of other lanes continuing as conditions improve. This shall be lane 2 into lane 3; lane 3 into central reserve; hard shoulder to verge. See schematics in Appendix A3

Slip roads and interchanges;

It is important to maintain the free flow of vehicles at interchanges. At least one lane of each slip road shall be cleared as soon as possible together with the adjoining roundabout.

Dual Carriageways without hard shoulders;

Ploughing should commence on lane 1 ploughing to the nearside, subsequently lane 2 ploughing to the central reservation.

Snow Fencing;

The A66 Trans Pennine Route passing through the Durham and Cumbria Districts, due to its altitude and open aspect, is prone to the effects of both wind and snow which when combined in the winter season can cause problems for the travelling public. The A66 over the tops does have the provision of snow fencing the integrity of which needs to be checked prior to the onset of winter and maintained throughout the season in order to minimise the effects of drifting. Additional lengths to be considered as appropriate.

Solid Vertical Barrier (SVB);

A-one+'s clearance plan for each SVB location given in Appendix A.19. This schedule should also be cross referenced to Appendix A.18 – Winter Service route schedules and drawings.

Numerous major maintenance schemes require the installation of lengths of vertical concrete/other solid barrier throughout the motorway and trunk road network which can pose problems regarding snow clearance. No guidance is included in Appendix B of this plan but AMM 89/07 does relate to the issue.

Having considered a number of options available, the method to be adopted is to plough lane one to the hard shoulder while maintaining access and egress. Plough lane two to lane three and lane three to the solid central reserve. In heavy snow conditions lane three shall be sacrificed and used as a stacking lane for snow from lane two and part of lane three. This operation will continue until snow conditions ease. The deployment of pVMS has been considered but as the display screens do not have heating elements their use has been discounted as snow would obscure any message and be a potential hazard to traffic.

Snow cannot be allowed to remain in lane three after the cessation of ploughing operations. There is a legal duty to remove snow and while it is in lane three it is a hazard to the public from either collision or melted water re-freezing as it runs across the carriageway. For these reasons it is essential to remove this stacked snow at the earliest opportunity.

A-one+ have produced a schedule identifying the locations of vertical concrete/other solid barrier on their network and a clearance plan for each location is included within the Severe Weather Plan at Appendix A.19. This schedule is cross referenced to Appendix A.3 - route drawings and schedules.

A-one+ should consider whether any lanes may need to be abandoned during periods of prolonged heavy snowfall due to the problems associated with ploughing adjacent to vertical concrete barriers.

A-one+ Integrated Highway services have identified locations on the Area 14 Network where snow can be stored in bulk and these are shown at Appendix A3. There is now a substantial section of SVB in the central reservation and in many cases is accompanied by 'V' channel. Removal of all stockpiling would be facilitated after the cessation of snowfall, or where conditions permitted thereafter.

Snow will not generally be allowed to build up across any bridge due to the additional pressures the weight may exert on the structure; any build up will be removed by using ploughs in echelon taking the snow to the nearside beyond the structure limits, if necessary bulk snow will be removed by means of heavy transport and a loading shovel under a lane 1 closure.

ECP's are also maintained by the barrier team in accordance with their routine maintenance programme. Liaison with our Abnormal loads officer will also take place to ensure that he is aware of network conditions in order that he can advise hauliers as necessary. See Appendix A7.

Snow drifts and build up of snow;

A-one+ will deploy snow blowers to strategic locations on the network when advised in advance by WEATHER SERVICE PROVIDER or Met Office Severe Weather Warning that there is potential of heavy snow fall on the network. A-one+ will deploy additional gritters to areas at risk of heavy snow to back up front line gritters. All gritters will have ploughs attached in advance of any risk of heavy snow on the network

Traffic calming areas;

A-one+ have no traffic calming measure on the Area 14 Network

A-one+ clearance plan for each SVB location given in Appendix A.19. This schedule should also be cross referenced to Appendix A.18 – Winter Service route schedules and drawings.

5.2.2.2 Spreading techniques

The preferred method of de-icing by A-one+ Integrated Highway Services is Pre-Wetted salt and this will be used in the first instance unless there are overriding factors preventing this taking place, subsequent treatments will be dry salt or pre-wetted subject to the availability of brine which takes approximately 4 hours to produce. Pre-wetted or dry salt is suitable for use across the entire Area 14 Network. Refer to 5.2.1.2 plus Appendix A18 and B5 for site/special conditions.

During precautionary treatments on motorways no more than 3 lanes are to be treated in any one pass by the gritter. Additional passes will be made on sections of motorway that have more than 3 lanes. On APRT single carriageway only the lane that the gritter is travelling in will be treated, with the bi-directional lane treated in the opposite direction when the gritter is on the return journey. On dual carriageway APTR both lanes are treated in one pass by the gritter.

During snow clearing only the lane that is being ploughed will be treated with salt. Additional lanes may also be treated on passing, in certain conditions.

5.2.2.3 Aftercare and follow up treatments

A-one+ will divert resources as they become available for follow up and after care treatments of bus lay-bys, general lay-bys, side roads giving priority to bell mouths at junctions interfacing with the local authority network etc. Special consideration will be required to ensuring all 'V' channels are cleared to facilitate surface drainage and prevent melt running across the carriageway.

5.2.2.4 Arrangements for use of blowers

A-one+ can use snow blowers allocated to their Area 14 Network without prior approval but must ensure the use is notified up to 2.A-one+ have three supply chain partners available who operate low loaders. Low loaders will be used to transport snow blowers to the required location(s) on the

Area 14 Network. National procedures for management of the both Area Operational Reserve Winter Service Vehicles and National Reserve Vehicles are in Appendix B.4.

Where the equipment is to be brought in from another area the Service Delivery Manager will liaise, as necessary, with the National Winter Specialist and other relevant parties.

A-one+ has 6 operatives qualified to operate snow blowers as detailed at Appendix A.13.

5.2.3 Freezing rain / rain falling on extremely cold surfaces

5.2.3.1 Operational considerations

Please refer to Section 5.2.1 of this Severe Weather Plan which describes the operational considerations and Freezing Rain Flowchart in detail.

Service Provider to outline operational arrangements giving full consideration to the potential impact of freezing rain/ rain falling on extremely cold surfaces on the Area 14 Network by taking account of:

- The nature of the terrain involved, e.g. gradients or difficult alignments, and where the phenomenon could be more likely;
- The volume of traffic likely to be on the [Area Network / Network / Project Road];
- The hazards that would be generated;
- The use of VMS;
- Ongoing monitoring of the situation; and
- The mitigating measures that could be adopted.

5.2.3.2 Hazard mitigation

The nature of freezing rain means that treatments will have virtually no effect initially and ice will form on the carriageway. Rain falling on extremely cold surfaces can produce similar effects. Mitigation of the hazard is therefore a significant aspect of the actions taken in response to freezing rain or rain falling on extremely cold surfaces. The main action is to inform road users of the hazard where available fixed or mobile Variable Message Signs (VMS) will be used as detailed in Appendix B.5.

A-one+ will liaise with Police Control Offices (PCOs) and / or RCCs to provide advance warning to recovery companies when any incidents occur as a result of the freezing rain or rain falling on extremely cold surfaces. Consideration could be given to escort vehicles slowly on the network by means of a rolling road block by Traffic Officers or Police. Consideration should be given to stopping traffic. These measures rely on the powers of Traffic Officers and police

5.2.4 High winds (including Severe Gales and Storms)

High winds/severe gales can occur at any time of year but are most likely from September through to June.

5.2.4.1 Operational Considerations

The Area 14 network presents a significant challenge to severe weather operations in respect of High Winds/Gales due to the geographical layout and topography of our Motorways and Trunk Roads. Wide exposed sections of carriageway due to altitude or open rural aspects can provide minimal cover leading to vulnerable points within the Area 14 network.

In the event of a High Wind Severe Weather Warning being received from the NTCC or the Highways Agency Area Team, operational co-operation with relevant Stakeholders is paramount to enable A-one+ to deliver safe and controlled assistance to High Wind severe weather. An initial emergency meeting between the Police, the Traffic Officer Service and ourselves will be held to discuss the severe weather warning.

Please refer to the table within Section 4.2 of this document for open areas susceptible to high wind severe weather within the Area 14 network.

The following points will be acted upon, in advance of, and maintained during any High Wind Severe Weather Warning Amber Alert;

- MS3 Scotch Corner to be switched on when wind threshold is exceeded on the A66(T), this is as per normal operating procedures. Please refer to the Area 14 Service Providers Contingency Plan, Section 14.4, Durham Constabulary A66 Road Closure Protocol for further information.
- mVMS to show " HIGH WINDS SLOW DOWN" in various locations across the Area 14 network.
- Electronic wind sock signs on A1(M) close to junction 61 to be switched on.
- A-one's forecast provider WEATHER SERVICE PROVIDER to provide detailed information on the severity and timing of any severe weather.
- A-one+ nominated personnel to contact A19 Autolink, to discuss implications of possible diverted traffic and/or Mutual Aid.
- A-one+ Supply Chain Partners placed on operational standby to deal with fallen tree debris and possible road closure incidents.
- Handheld anemometers are available for site specific readings where Vaisala weather stations are not available.
- A-one+ nominated personnel to forward weather reports to Durham Constabulary, Northumbria Police, North Yorkshire Police & Cleveland Police.
- Lane closures to be established at high risk areas (A1M south of junction 60 & 61) if wind speeds exceed 45mph.
- Traffic Officer Service has four vehicles available.
- Durham Constabulary has four vehicles available in the South of their area and four in the North.
- A-one+ have two Tactical Incident Response vehicles available, as well as various Network Team staff & vehicles.
- All agencies have a command structure that has been implemented.
- Briefing of all operatives with regards to picking up of carriageway debris.
- Inform Traffic Management dept, and also local traffic management companies.
- Inform any TSCO relating to Major Works Scheme.
- Inform Network Team to make ready for additional resource provision if required.

The Vaisala weather stations will be monitored throughout and again all information will be fed back to all involved. Please refer to Appendix A2 of this document for a location plan depicting the stations within the Area 14 network.

If Area 14 experiences multiple widespread incidents on the network, the area is then divided into sub areas, with two number, bronze commanders controlling each area, feeding all information to the NCC, or in the event of severe weather desk, feeding it back to the Tactical Management Room at Darlington.

The A-one+ Service Providers Contingency Plan has additional details of these specific network features contained within Section 14.6.18 within the Box of Reference, and is to be used in

conjunction with this Area 14 Service Provider Severe Weather Plan to ensure a robust defence against dealing with High Wind Severe Weather incidents within the Area 14 Network.

A-one+ has seen the list of actions above become a very well rehearsed and effective contingency measure against High Wind Severe Weather. These measures are frequently used due to the increased number of High Wind Severe Weather Amber alerts experienced over recent times.

5.2.5 Heavy rain

5.2.5.1 Pumping, jetting and clearance techniques

The Area 14 network presents a significant challenge to severe weather operations in respect of Flooding due to the geographical layout and topography of our Motorways and Trunk Roads. Low level sections of carriageway and exposed areas can provide minimal cover leading to vulnerable points within the Area 14 network.

In the event of a Flooding Severe Weather Warning being received from the NTCC or the Highways Agency Area Team, operational co-operation and good communication with relevant Stakeholders is paramount to enable A-one+ to deliver a safe and controlled service on the network. The contingency measures listed below explain the arrangements in place within Area 14.

Contingency Arrangements for Flooding on Network

The following is an overview of the process for identification and treatment of non-recurrent flooding problems occurring on the network that give rise to a safety risk to the travelling public.

Recurrent flooding problems are resolved by identifying renewal or improvement schemes and securing funding either from the Non Lump Sum Routine Maintenance budget or through the Roads Renewal budget where proposals need to go through the value management process.

5.2.5.2 Operational considerations

Operational TIRT teams will travel the network in times of actual heavy rain or when heavy rain is forecast to identify and endeavour to mitigate against areas of flooding and standing water, reporting back to the Stewardship Team.

Safety Inspections are undertaken in all weathers and some identification of actual or potential flooding of the carriageway would result for these inspections.

Calls from HAIL, highway users, Police and Traffic Officers would also identify areas of flooding; these are generally routed through the Regional Control Centre and the A-one+ Network Control Centre.

Primary Response;

The Network Control Centre upon receiving a reported call relating to potential flooding of the carriageway would despatch a TIR Team to the scene to validate and assess the problem.

The TIR Team will undertake the immediate action locally around the affected site with the aim of making it safe for the travelling public. They will endeavour to mitigate and alleviate the flooding either by removing the thatching across a blocked gully or headwall grille. They also have facilities, albeit limited, to provide sand bags to channel the water away from the carriageway to a point of egress, or locally excavating or scraping drainage grips through the verge.

The TIR Team carry flood warning signs which they are able to deploy immediately.

The TIR Team carry emergency traffic management to enable them to cordon off a localised area when/if required.

If the TIR Team cannot remedy the entire situation themselves they can call for support from additional network team resources and a variety of supply chain partners.

Secondary Response;

Should the TIR Team require additional resource support the Network Team can provide this through practical assistance. Items such as sand bags or Fluvial Barrier can be deployed to generate a more substantial water barrier, guiding water away from the highway or preventing properties from flooding.

Sub Contractors can be called to deploy pumps to pump away excessive water, although this has limited effect if the depth of standing water is shallow. It is important for the pumps to have somewhere to discharge that does not cause a secondary flooding problem. The pumps can also be utilised to unblock a pipe and remove silt and debris from a catchpit, gully or pipe.

Jetting can be considered if for example the blockage is along a carrier pipe

If the flooding is a pollutant then specialist environmental contractors are called to scene to pump or control the pollutant from entering the watercourse or damaging the network asset.

When the scene needs traffic management to be established to make the site safe for traffic to pass or prevent traffic from entering an unsafe area this will be set up. Where Traffic Officer or Police support is required then this is requested by the TIR Team calling the Network Control Centre.

Escalation;

For serious flooding incidents reducing lane capacity and likely to create journey time delay the TIR Team (if they are in primary control of the scene) will notify the Network Control Centre so they can advise NILO.

Where a route becomes impassable or congested then under instruction from the Police the TIR Team will activate the relevant symbol signed diversion route until notified by the police or Traffic Officers that it can be reopened.

Severe Weather events should normally be managed by each respective area team and RCMT contingency plan arrangements must only be enacted if the planned response is insufficient to cope with exceptional weather conditions, if procedures fail, or if an incident is compounded by a series of further incidents.

Severe Weather Warning – Heavy Rainfall Forecast;

In the event that the Met Office/Environment Agency issue a **severe** weather warning through the NTCC forecasting heavy rainfall, the following actions are put in place.

Ahead of the rain, inspectors and TIR Teams will review the network and in particular the high flood risk 'hotspots' to ascertain if any removal of thatching, debris clearance, localised scalping, etc can be done in advance to the predicted rainfall to alleviate the potential for flooding.

The operations team will make arrangements to hire in pumps, sweepers, jetting units etc and have these on standby in the depots.

The Watchman and/or Network Manager will be called to advise them of the state of readiness.

Duty Rota team are placed on high standby alert with the Duty Manager being available to attend the Network Control Centre or Tactical Management Room when the severe weather actually hits the area.

During rainfall Inspectors, TIR Teams, operatives and maintenance teams will be driving and patrolling their routes and be extra vigilant to report any locations where heavy rain is falling and also report observations of excessive standing water and flooding.

Where flooding occurs and is a danger to the public the TIR Teams will erect flood warning boards and any traffic management and endeavour to clear blockages or undertake remedial works where these are feasible.

Non Immediate Problem Resolution;

If the resolution of the flooding cause is not achieved by the above methods then further pumping, pipe proving or outfall cleaning or investigation is undertaken. The Stewardship Team investigate the cause of the problem; if minimal or responsive work is determined this is undertaken under routine works.

If a more detailed or planned solution is required HA are appraised and a study, investigation and scheme is promoted. If the proposal is typically under £100K then this can be presented to HA for consideration for funding from the non lump sum maintenance budget. This is suitable for the low cost solutions that can be delivered relatively quickly and will have an immediate impact and prevent an early recurrence of flooding.

For the larger, more expensive proposals, the scheme will be evaluated in the formal manner and bid for funding via the value management process.

A daily review of incidents is undertaken by the Network and Programme Development Teams' to identify any areas of flooding that occurred in the previous 24 hours and the action taken, there is a weekly, monthly, six monthly and yearly review of incidents to determine any trends. Trends identified are investigated and remedial works are promoted where and as appropriate.

5.2.5.3 After care and follow up treatments

A-one+ will divert resources as they become available for follow up and after care treatments of footways, cycle tracks, lay bys, side roads etc. This includes collection of all deployed flooding related signage and traffic management once the Area 14 Network has returned to full normality

5.2.6 Fog

A-one+ will undertake the following specific measures as appropriate to mitigate the hazard:

- Where available fixed or mobile VMS should be used to warn road users of the hazard. The existing established procedures for requesting VMS settings to be made should be followed

well in advance. The following legend is currently the most appropriate to use – 'FOG SLOW DOWN'. This will require arrangements and protocols to be established with the appropriate RCC.

- National Incident Liaison Officer (NILO) and/or Highways Agency Press Officer should be contacted in order that the local media can be advised as necessary.
- Where available use of variable mandatory speed limits should be considered. This will require arrangements and protocols to be established with the appropriate Police Control office or RCC as part of the advance planning procedures.

5.2.7 High temperatures

In the event of high temperatures where vehicles and occupants are static on the motorways and trunk roads for long periods of time, A-one+ will provide support and assistance to the RCC and the Police as requested.

The following table displays the Threshold Temperatures in relation to a Heat wave;

Threshold Temperatures	
30 – 32° C reached or exceeded for at least 2 continuous days in a row.	
Level 2 - Alert	Triggered when heat wave temperatures are predicted in at least one region
Level 3 - Heat wave	Triggered when threshold temperatures have been reached in at least one region
Level 4 - Emergency	Where the heat wave is classed as severe and prolonged

A-one+ will endeavour to treat heat affected sections of the network by the use of Winter Maintenance Spreader vehicle, and the spreading of a Grit/Sharp type sand to absorb heat and attempt to arrest the surface deterioration within a heat affected area. Were it to become necessary, on safety grounds, then a decision would have to be made to either close a lane or carriageway and divert traffic via an alternative route. Once conditions have cooled down then a detailed inspection would be made to ascertain the integrity of the surface and carry out any immediate remedial measures necessary or programme repairs for a later date.

When such conditions prevail then the welfare of our staff is paramount A-one+ will ensure that staff are not left vulnerable to such conditions. Staff should be aware of what precautions to take to avoid succumbing to the heat and the long term effects of the sun, to that end sun block factor 30 has been issued to operatives

