

Area 2

Severe Weather Plan

2013/2014

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SKANSKA
AREA 2
SEVERE WEATHER PLAN
2013/2014

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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 2 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 Area 2 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 2 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 2 Network on which the service is provided. The definitions and abbreviations are provided in Appendix A.1.

This Severe Weather Plan for Area 2 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.

Skanska 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

Skanska will endeavour to fulfil the Highways Agency's Severe Weather Requirement within Area 2 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 (hold point)
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 monthly 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 hold point
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)

1.2 Contractual arrangements

Winter Service duties including precautionary treatment, reactive treatment and snow clearance are the responsibility of Skanska.

Severe Weather duties including operational considerations, alert procedures and actions are the responsibility of Skanska.

The Traffic Officer Service must have no input into the decision making process other than providing information on Area Network issues, including recovery of abandoned vehicles to the Service Provider via the Regional Control Centre (RCC) and National Traffic Control Centre (NTCC)

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 2 Network, it is the responsibility of Skanska to ensure such service has been carried out. Arrangements made do not absolve the Service Provider's obligations.

1.3 Area 2 Network

1.3.1 Description of the Area 2 Network

Area 2 consists of Motorways and Trunk Roads that for operational purposes accumulate to a treated length of approximately 1106 carriageway kilometres. This includes the Severn River Crossing and Toll Booth areas on the M4 and M48. Previous liaison with adjacent Agents and Local Authorities has clarified interests at the various interfaces and agreed arrangements have been incorporated in the individual route cards and plans.

1.3.2 Extent of Area Network

The extent of Area 2 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 the Area 2 Network		
Road	Extent	Length (km)
A36	M27 Jct 2 (incl roundabout) through Salisbury to Bath City boundary	89.3
A303/A30	The eastern end of Honiton Bypass to the maintenance boundary at Parkhouse Junction near Hampshire/Wiltshire boundary	124.3
A4	Avonmouth relief roads / M5 Jct 18	4.6
A4	Batheaston Bypass (London Rd interchange to Bathford rbt)	1.6
A40	M5 Jct 11 to the Gloucestershire/Herefordshire Border	25.2
A46	M4 Jct 18 to London Rd interchange, Batheaston	13.2
A417	At junction with M5 Jct 11A (Zoons Court Rbt to Business Park rdt)	6.6
M4	Junction 15 (A419) to Second Severn Crossing Toll Plaza (Winter Maintenance is undertaken on Second Severn Crossing and the Toll Plaza)	82.1
M5	Jct 9 to Jct 31	191.9
M32	M4 Jct 19 to end of motorway adjacent to jct 3	6.2
M48	M4 Jct 21 to Jct 1 (Winter Maintenance is undertaken on the Severn Bridge and Wye Viaduct)	9.8
M49	M5 Jct 18A to M4 Jct 22	8.5

Skanska has liaised with Area 32 and Devon County Council to clarify precautionary treatments around M5 J29. Skanska will precautionary treat part of the A30 near the junction with the M5, this covers the separated single lane carriageway turning approaches to the NB Entry Slip road and additionally part of the the Vantage Park entrance link loop road. An interface diagram of M5 J29 is included within Appendix A.4.

The table below details the locations where 3 lane or more dual carriageways exist. It does not include slip roads or circularly carriageways.

Sections of three lane or more carriageway		
Road	Extent	Number of lanes
M4	EB and WB main carriageway between Junction 15 and Junction 20 apart from sections listed below	3
M4	EB MP171/9 to 169/6	4
M4	WB approach to J20	4 and 5
M4	EB MP186/0 to 185/3	4
M4	EB Junction 21 to Junction 20	3
M4	EB and WB Junction 22 to Toll Plaza	3
M4	Toll Plaza	13 Toll Booths
M5	SB and NB main carriageway between Junction 9 to Junction 15, Junction 16 to Junction 18, Junction 19 to Junction 29 and Junction 30 to Junction 31 apart from sections listed below	3
M5	NB MP 139/1 to 137/3	4
M5	SB Junction 18 (S/08 to S/14)	3
M5	NB Junction 18 and Junction 18A	4
M5	Junction 18 Link road (U/03 to U/06 and V/06 to V/08)	4
M5	SB and NB between Junctions 18 and 19	4
M5	SB MP 145/7 to 148/6	4
M5	NB Junction 20 to MP 152/5	4
M5	SB Junction 29 to Junction 30	4
M32	M4 (Junction 19) to Junction 1	3
M32	SB and NB Junction 2 to Junction 3	3
M48	Toll Plaza	8 Toll Booths

During the winter period, where improvement schemes or major roadworks are being undertaken, there are likely to be road closures and the implementation of appropriate diversions. Due account will be taken of those diversions and measures will be agreed with the relevant agents and/or local authorities to ensure treatment of those routes.

Skanska's operational responsibility on the Severn Bridges is limited to the carriageways. Severn River Crossing PLC has plans in place to address non-carriageway areas open to the public and the effects of severe weather on the integrity of the structures and the safety of its users. Should the need arise for closure of both Severn River Crossings then "Operation Dragon" will be initiated by the SWRCC and covers all incidents involving the closure of both Crossings including the issue of "Falling ice". In the event of Operation Dragon being called refer to the Area 2 Contingency Plan.

The following table includes details of all footways and cycle tracks categorised as 1a, 1, 2, 3 and 4 within Area 2 that may require special consideration.

Route	Location	FW / CW	Section	Length	Width	Area	Priority 1	Priority 2	Priority 3	Priority 4	Frost Conditions	Snowfall Clearance Criteria	Number of Saltbins	Local Authority policy
		FW	1	300	1	300				300	Not normally required	5 days cessation of snowfall	1	DCC only treat after snow
		FW	1&2	1000	1.6	1600				1600	Not normally required	5 days cessation of snowfall	2	DCC only treat after snow
		FW	3	100	1	100				100	Not normally required	5 days cessation of snowfall	1	SCC only treat after snow
		FW	4	300	1	300				300	Not normally required	5 days cessation of snowfall	1	SCC only treat after snow
		FW	5	1000	1.6	1600				1600	Not normally required	5 days cessation of snowfall	2	WCC only treat after snow
		FW	6	1000	1.6	1600				1600	Not normally required	5 days cessation of snowfall	2	WCC only treat after snow
		FW	7	1300	1.6	2080				2080	Not normally required	5 days cessation of snowfall	2	WCC only treat after snow
		FW	8	1300	1.6	2080				2080	Not normally required	5 days cessation of snowfall	2	WCC only treat after snow
		FW	1	1000	1.6	1600				1600	Not normally required	5 days cessation of snowfall	2	BANES do not treat rural footways
		FW	2	3300	1.6	5280				5280	Not normally required	5 days cessation of snowfall	5	BANES do not treat rural footways WCC only treat after snow
		FW	4	500	1.6	800				800	Not normally required	5 days cessation of snowfall	1	SCC only treat after snow

Route	Location	FW / CW Section	Length	Width	Area	Priority 1	Priority 2	Priority 3	Priority 4	Frost Conditions	Snowfall Clearance Criteria	Number of Saltbins	Local Authority policy
		FW	360	1.6	576				576	Not normally required	5 days cessation of snowfall	1	WCC only treat after snow
		FW	360	1.6	576				576	Not normally required	5 days cessation of snowfall	1	WCC only treat after snow
		FW	50	1.5	75				75	Not normally required	5 days cessation of snowfall	1	WCC only treat after snow
		FW	740	1.6	1184				1184	Not normally required	5 days cessation of snowfall	1	WCC only treat after snow
		FW	4900	1.6	7840				7840	Not normally required	5 days cessation of snowfall	2	WCC only treat after snow
		FW	900	1.6	1440				1440	Not normally required	5 days cessation of snowfall	1	WCC only treat after snow
		FW	500	1.6	800				800	Not normally required	5 days cessation of snowfall	1	WCC only treat after snow
		FW/CW	1100	1.6	1760				1760	Not normally required	5 days cessation of snowfall	2	WCC only treat after snow
		FW	1000	1.5	1500				1500	Not normally required	5 days cessation of snowfall	2	WCC only treat after snow
		FW/CW	4000	1.6	6400				6400	Not normally required	5 days cessation of snowfall	8	HCC only treat after snow
		FW	1000	1.6	1600				1600	Not normally required	5 days cessation of snowfall	2	HCC only treat after snow
		FW	500	1.6	800				800	Not normally required	5 days cessation of snowfall	1	WCC only treat after snow

Route	Location	FW / CW	Section	Length	Width	Area	Priority 1	Priority 2	Priority 3	Priority 4	Frost Conditions	Snowfall Clearance Criteria	Number of Saibins	Local Authority policy
		FW	21,34 & 36	2900	1.6	4640				4640	Not normally required	5 days cessation of snowfall	6	WCC only treat after snow
		FW/CW	23	1500	1.5	2250				2250	Not normally required	5 days cessation of snowfall	3	WCC only treat after snow
		FW	24	1500	1.5	2250				2250	Not normally required	5 days cessation of snowfall	3	WCC only treat after snow
		FW	25-26	4000	1.6	6400				6400	Not normally required	5 days cessation of snowfall	7	WCC only treat after snow
		FW	27-29	2400	1.6	3840				3840	Not normally required	5 days cessation of snowfall	1	WCC only treat after snow
		FW	30	200	1.6	320				320	Not normally required	5 days cessation of snowfall	1	WCC only treat after snow
		FW/CW	35,41,46	540	1.6	864				864	Not normally required	5 days cessation of snowfall	1	WCC only treat after snow
		FW	37-40	1090	1.6	1744				1744	Not normally required	5 days cessation of snowfall	2	WCC only treat after snow
		FW	43-44	270	1.8	486				486	Not normally required	5 days cessation of snowfall	1	WCC only treat after snow
		FW	45-42	1440	1.6	2304				2304	Not normally required	5 days cessation of snowfall	2	WCC only treat after snow
		FW/CW	51-54	1800	1.6	2880				2880	Not normally required	5 days cessation of snowfall	3	WCC only treat after snow
		FW/CW	55-60	1040	1.8	1872				1872	Not normally required	5 days cessation of snowfall	2	WCC only treat after snow
		FW/CW	61-63	995	1.8	1791				1791	Not normally required	5 days cessation of snowfall	1	WCC only treat after snow

Route	Location	FW/ CW	Section	Length	Width	Area	Priority 1	Priority 2	Priority 3	Priority 4	Frost Conditions	Snowfall Clearance Criteria	Number of Saltbins	Local Authority policy
		FW	A'mouth	1000	3	3000				3000	Not normally required	5 days cessation of snowfall	2	Bristol CC only treat after snow
		FW		228	1.7	388				388	Not normally required	5 days cessation of snowfall		GCC do not treat rural road footways
		FW		50	2	100				100	Not normally required	5 days cessation of snowfall		GCC do not treat rural road footways
		CW		2567	3	7701				7701	Not normally required	5 days cessation of snowfall		GCC do not treat rural road footways
		FW		3096	1.8	5572				5573	Not normally required	5 days cessation of snowfall		GCC do not treat rural road footways
		FW	1	250	1.8	450				450	Not normally required	5 days cessation of snowfall	1	S Glos CC do not treat rural footways
		FW	2	307	0.8	246				246	Not normally required	5 days cessation of snowfall		GCC do not treat rural road footways
		FW	3	500	1.8	900				900	Not normally required	5 days cessation of snowfall	1	BANES do not treat rural footways
		FW	4	1100	1.8	1980				1980	Not normally required	5 days cessation of snowfall	1	S Glos CC do not treat rural footways
		FW	5	50	1.8	90				90	Not normally required	5 days cessation of snowfall	1	S Glos do not treat rural footways
			6	2000	1.8	3600				3600	Not normally required	5 days cessation of snowfall	2	BANES do not treat rural footways

Route	Location	FW / CW	Section	Length	Width	Area	Priority 1	Priority 2	Priority 3	Priority 4	Frost Conditions	Snowfall Clearance Criteria	Number of Saltbins	Local Authority policy
		CW	1	3400	2.5	8500	8500				Daytime reactive by 8m		Special	
		FW	3	200	3	600				600	Not Normally Required	5 days cessation of snowfall		GCC do not treat rural road footways
			1	3000	3	9000		9000			Dealt with by SRC	Dealt with by SRC	Dealt with by SRC	
				65,873		116,957	8,500	9,000	0	99,458				

1.3.3 Area 2 Network Features

Skanska has identified the following network features that require special consideration with regard to weather within the Area 2 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 2 Network include:

- parts of the network at high altitude;
- areas prone to low temperature/low humidity conditions where special measures may be required;
- sections of road of a gradient or road radii that may result in problems in certain conditions e.g. jack knifed lorries or HGVs failing to gain traction;
- areas commonly prone to climatic conditions such as strong cross winds that would result in snow drifting, localised heavy snow patterns and overturned vehicles;
- parts of the network at risk of flooding resulting in lane/road closures;
- any structures where differential treatments or special measures may be required;
- low temperature, low humidity problem spots require mapping as these may require additional treatments;
- areas where, from experience, particular problems arise where the service provision can be hampered, including traffic calming areas;
- major transport hubs e.g. Heathrow Airport, Port of Dover etc; (This inclusion is mandatory, with a requirement to identify all major transport hubs and any special measures to be implemented during severe weather).

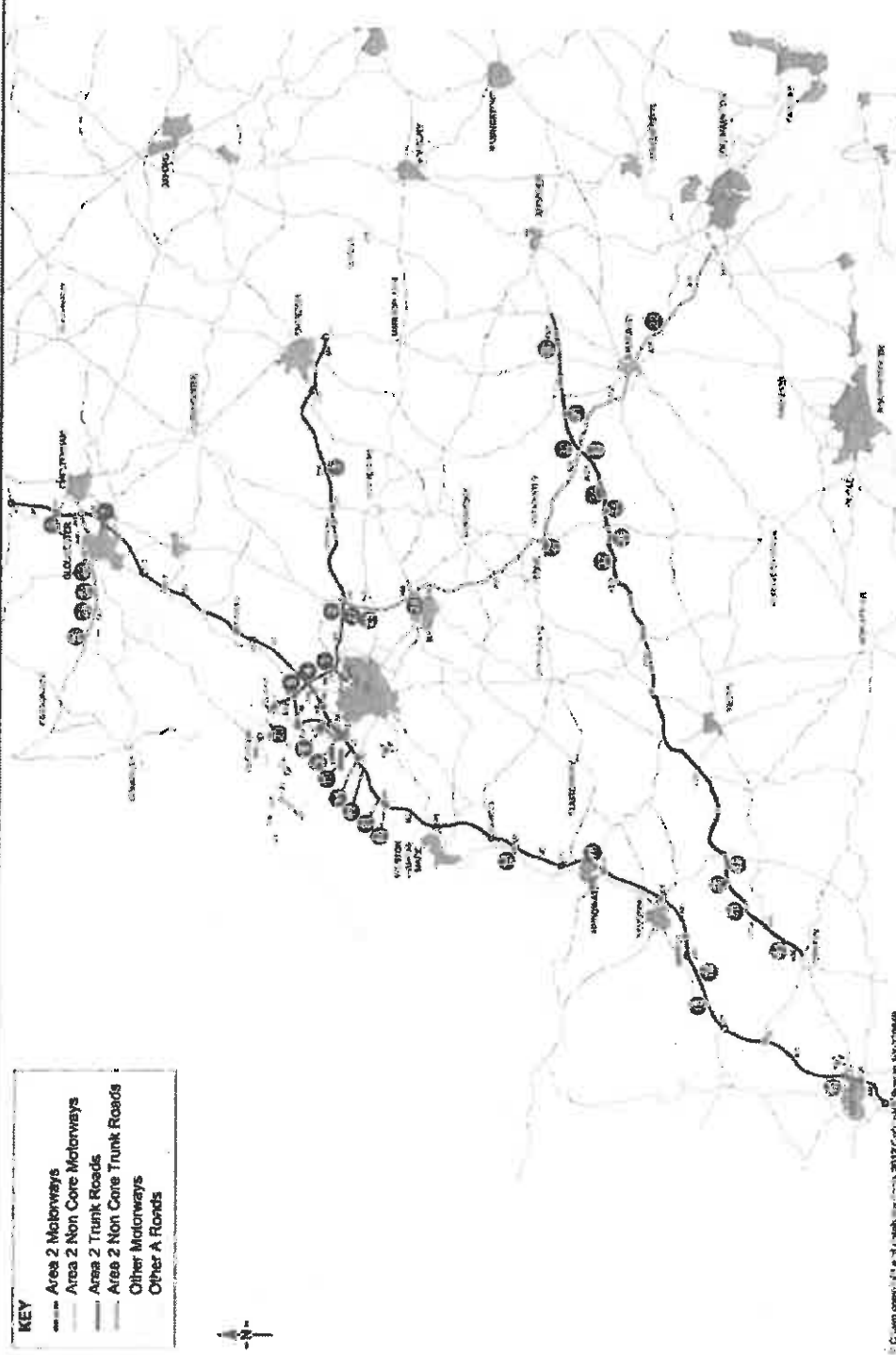
The following table shows the location and brief key word summary of the problem. Each is cross referenced to detailed individual site mitigation plans contained within Appendix A.20. These must be reviewed at a minimum annually

Vulnerable Locations		
Location	Reference <i>To individual mitigation plan</i>	Problem (very brief summary)
M4 MP149/4	1	River Avon Bridge susceptible to ice/area susceptible to fog
M4 J18	2	Ground over 150m susceptible to snow and high winds and extensive gradient on M4
M4 J19	3	Tight radii
M4 J20/ M5 J15	4	Risk of drifting and tight radii

M4 J21 to 20	5	Extensive gradient (Catherines Hill)
M5 J10	6	Tight radii
M5 J11A	7	Tight radii
M5 J18 to 17	8	Extensive gradient (Hallens Bank)
M5 J18	9	Tight radii and access to Avonmouth Docks
M5 Avonmouth Bridge	10	Bridge susceptible to high winds, hoar frost and fog
M5 J19	11	Access to Portbury Docks
M5 J19 to 20	12	Extensive gradient (Naish Hill)
M5 J20 to 19	13	Extensive gradient (Tickenham Hill)
M5 J20	14	Area susceptible to high winds and fog
M5 J22	15	Tight radii
M5 Huntworth Bridge	16	Bridge susceptible to hoar frost and ice
M5 J26 to 27	17	Ground over 150m susceptible to snow and high winds
M5 J27 to 26	18	Extensive gradient (Maidendown to Upcott)
M5 J29	19	Tight radii and access to Exeter Airport
M4 and M48 Severn Bridges	20	Area susceptible to high winds, hoar frost and ice
A36 Warminster Bypass	21	Ground over 150m susceptible to snow
A36 Pepperbox Hill	22	Extensive gradient
A40 Over Rdbt	23	Susceptible to high surface water
A40 Highnam Woods	24	Susceptible to run off
A40 Huntley Manor to Dursley Cross	25	Susceptible to run off
A40 Boxbush	26	Susceptible to run off
A46 south of Tormarton	27	Ground over 150m susceptible to snow
A46 Dyrham to Pennsylvania	28	Risk of drifting
A46 Junction with A4 underpass (Batheaston Bypass)	29	Risk of water seepage through retaining wall
A303 Solstice Park to Cholderton	30	Extensive gradient
A303 Winterbourne Stoke to Yarnbury	31	Risk of Drifting
A303 Deptford to Berwick Down	32	Extensive gradient

A303 Deptford to Stockton Woods	33	Extensive gradient
A303 Woodbine Hill	34	Extensive gradient
A303 Chicklade	35	Ground over 150m susceptible to snow
A303 Chaddenwick Hill and Furzehedge	36	Risk of drifting
A303 Charnage/ Chaddenwick Hill	37	Extensive gradient
A303 Horton to Eagle Tavern	38	Extensive gradient
A303 Ilminster to Honiton	39	Ground over 150m susceptible to snow
A303 Marsh and Stopgate	40	Extensive gradient
A303 Rawridge Hill	41	Extensive gradient

DO NOT SCALE



KEY

- - - - - Area 2 Motorways
- Area 2 Non Core Motorways
- Area 2 Trunk Roads
- Area 2 Non Core Trunk Roads
- Other Motorways
- Other A Roads



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		Area 2 - Asset Support Contract	
		AREA 2 WINTER MAINTENANCE VULNERABLE AREAS	
PROJECT NO: 5114136-SWS-002		NTS: 4837001	
DATE: 26/09/13		SHEET: 1 OF 10	
SCALE: 1:50,000		AREA: A	

2 GENERAL PLANNING

2.1 Operational planning

This section of the Severe Weather Plan contains Skanska general operational procedures for delivery of Winter Service and details the alert procedures and actions in the event of Severe Weather on the Area 2 network and includes arrangements for liaison and co-operation with key stakeholders to promote delivery of a consistent and co-ordinated service.

Operational procedures detailed in this Severe Weather Plan will be tested for a Severe Weather Desk exercise. Skanska's Asset Needs Manager 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).

Skanska's Asset Needs Manager 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).

Treatment of the network is delivered from 7 depots with a further 5 salt storage only depots, full details of depots and compounds can be found in Appendix A.15.

Area 2 Principal Winter Service Management is located at the Highways Agency Regional Control Centre (SWRCC), St Brendan's Court, Bristow Broadway, Avonmouth, BS11 9FB.

Throughout the winter period the Senior Network Manager is responsible for obtaining weather forecasts, making the winter decision and issuing instruction to the Supervisors under the overall direction of the Asset Delivery Manager.

All Skanska staff involved in severe weather operations will be fully acquainted with and have access to copies of this document.

2.1.1 General arrangements

2.1.1.1 Process

Skanska use the 24/7/365 Senior Network Manager role to provide the overall management of any severe weather event on the network as well as the routine winter service.

During the operational winter period it is the Network Manager's responsibility to remain up to date with forecast and actual weather conditions. As part of the shift handover any key weather information will be passed between the Network Managers.

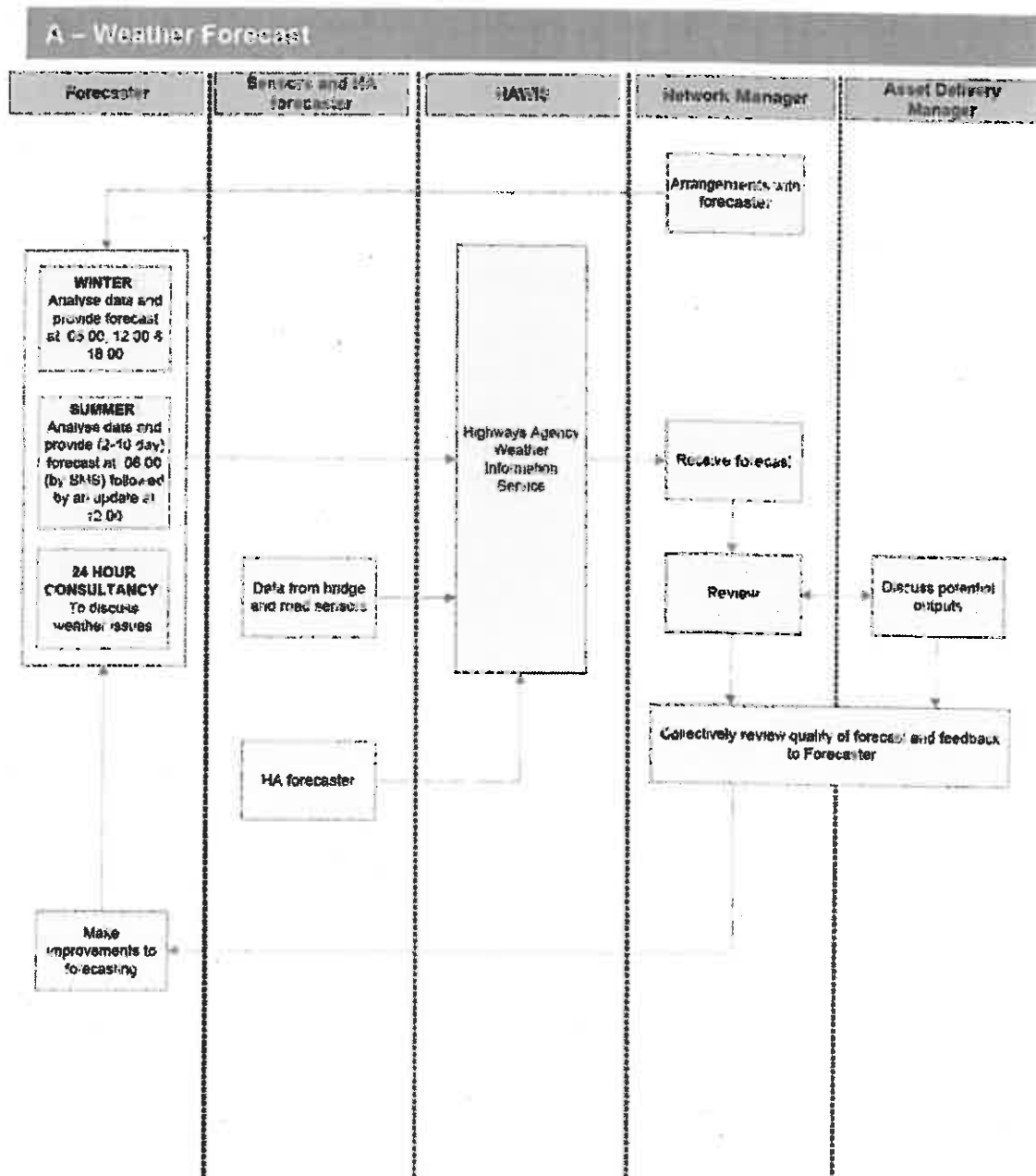
At approximately 06:00 the morning forecast will be available via HAWIS allowing an initial winter decision to be made by the Network Manager. The decision will primarily given an early warning to the Asset Delivery Managers / Route Watchmen in terms of any potential winter action in the next 24 hours. This will allow efficient planning of resources.

Prior to 10:00 each day the Network Manager will ensure that the Previous Action Report is filed with the WRF1 system. In addition salt stock levels will be updated on the WRF1.

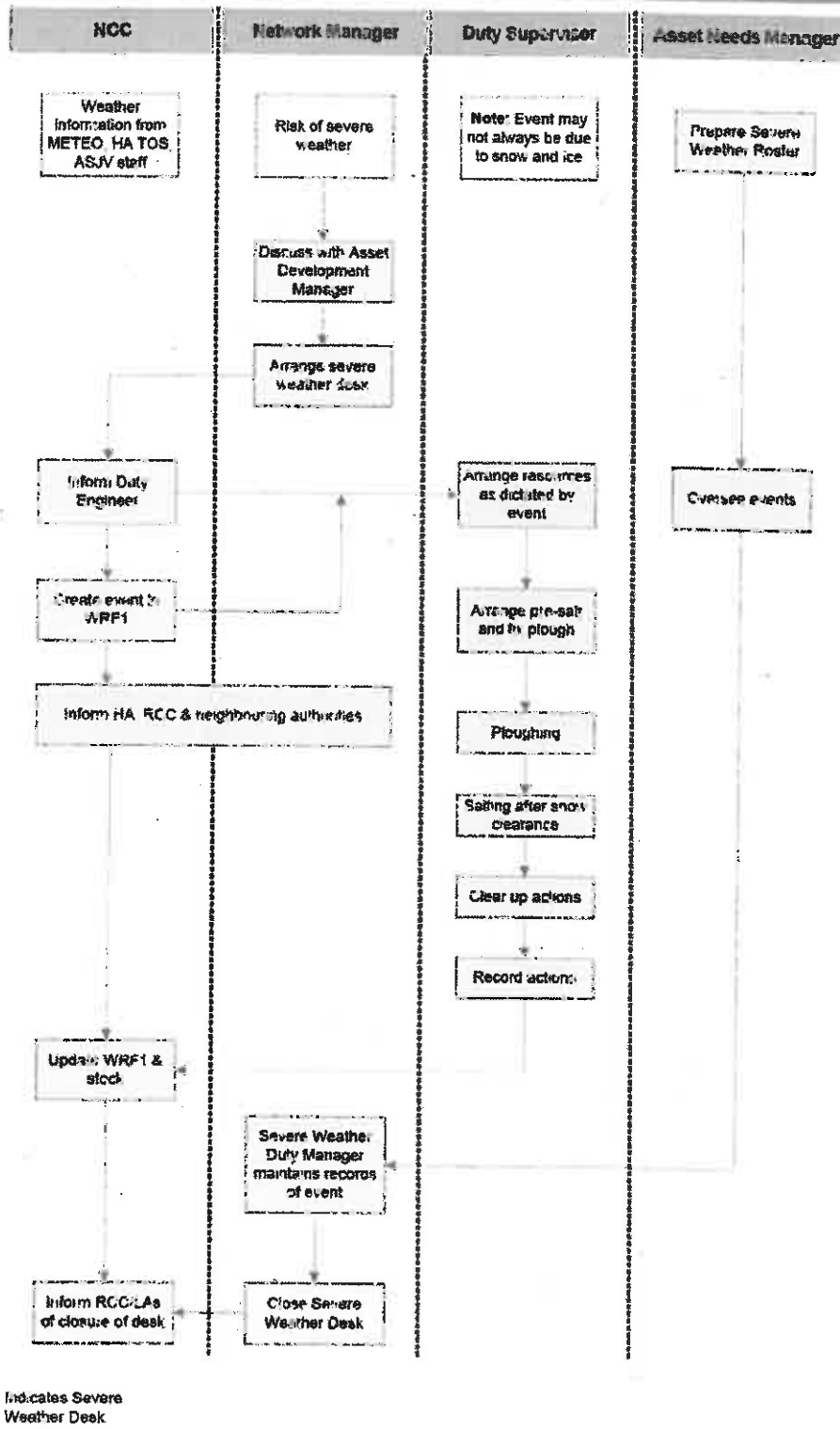
Shortly after 12:00 the lunchtime weather forecast information should be made available via HAWIS. This will allow the full winter daily decision to be made in accordance with the guidance contained within the Severe Weather Plan. The decision (including a decision to defer decision and monitor) will be verified by an Asset Delivery Manger or in their absence the Asset Needs Manager. Once agreed the decision will be input to the WRF1 system, Route Watchmen will be telephoned and text alerts will be used to alert other key staff and stakeholders.

Should the Network Manager and Asset Delivery Manager not reach a consensus regarding the winter decision then the decision will be escalated to the Asset Needs Manager.

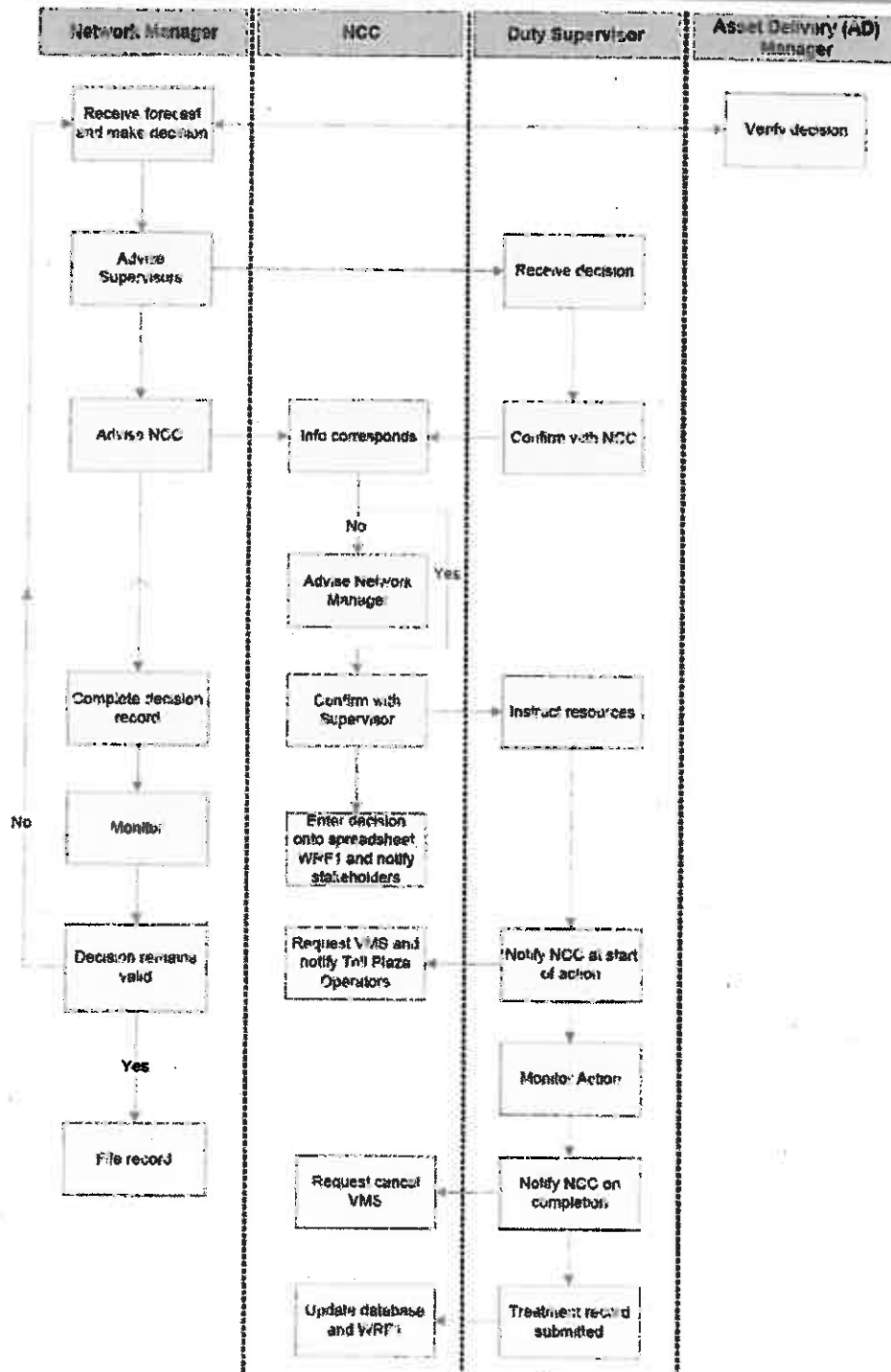
Monitoring will be undertaken by the Network Manager using HAWIS. This will allow comparison of forecast and actual conditions. If conditions vary significantly to that forecast the Network Manager will consult with the Duty Weather Forecaster at MeteoGroup. If necessary the Network Manager will amend the treatment instruction following verification with an Asset Delivery Manager.



B – Severe Weather Desk



C – Make and Distribute Weather Action Decision



2.1.1.2 Roles and Responsibilities

The key staff roles within the severe weather service are listed with their service specific roles:

Severe Weather Key Roles	
Role	Role and Responsibilities
Asset Needs Manager	<ul style="list-style-type: none"> • Overall responsibility for the service • Compilation of the Severe Weather Plan • Verification of winter service decision on a daily basis and agree to release stage gate in accordance with the process. • Confirm and support the initiation of Severe Weather Desk
Network Manager	<ul style="list-style-type: none"> • Monitor long term forecasts to identify any severe weather threats • Obtain forecasts, make daily winter service decision and monitor conditions • Liaison with ongoing schemes / roadworks with respect of winter service treatments • Confirm treatment decision with the Asset Delivery Manager • Instruct Supervisors regarding treatments required and advise stakeholders • Update WRF1 reporting system as required • Initiate Severe Weather Desk and ensure it is adequately resourced • Maintain records of winter service decisions and actions
Asset Delivery Manager	<ul style="list-style-type: none"> • Verification of winter service decision on a daily basis and agree to release stage gate in accordance with the process.
Route Watchman, Network safety Officer or Supervisor	<ul style="list-style-type: none"> • Management of local resources (plant, labour and materials) to ensure sufficient available to deliver service • Coordination of winter service on the network at an operational level • Informs Network Manager of any failures of service or resource issues • Collates confirmation of treatments and updates Network Manager
SMART Operative	<ul style="list-style-type: none"> • Preparing spreaders for action including loading, fuelling and inspections • Driving winter service spreaders in accordance with the route cards • Washdown and preparation for future operations • Reporting of vehicle faults to the Supervisor
NCC Operator	<ul style="list-style-type: none"> • Support to the Network Manager to deliver winter service

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

2.1.1.4 Salt management

Skanska 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 Contracted Sal Stock Levels (Appendix B.3). A template for Service Providers to complete is contained in Appendix A.21

Stock levels will be monitored on a weekly basis, daily during periods of high usage, to ensure adequate stock levels are maintained throughout the season.

Skanska will adopt a reporting threshold for salt of 5 days throughout the winter maintenance period this ensures adequate stock levels are maintained throughout the season.

2.1.2 Liaison and arrangements

The management of the Area 2 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

Skanska 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 systems for all Winter Service Vehicles include Land Line, Mobile Phone Network, Airwave and Satellite Phones.

Internal communication is generally to be undertaken by telephone using a standard land lines. This is the primary method of communication between all Skanska locations. All key personnel have been issued with mobile phones to be used as a secondary form of communication.

All treatment vehicles will be allocated a mobile phone and this is the primary method of communication between the operators and the supervisors.

The arrangements for backup communications are through the use of Emergency Roadside Telephones and payphones. On treatment routes where Emergency Roadside Telephones and payphones are not at suitable intervals, spare Airwave sets (should permission be granted) and Satellite Phones will be available.

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

2.1.2.2 External communication arrangements

Skanska 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 Skanska operational effectiveness.

Road	Location	Contact
M5	Exeter (Area 1)	[REDACTED]
M4	Swindon (Area 3)	[REDACTED]
M5	Tewksbury (Area 9)	[REDACTED]
M5 and M4	M5 Brockworth and M4 Swindon (Area 31)	[REDACTED]
A30/A35	A30 near Honiton (Area 32)	[REDACTED]
M4 and M48	Severn River Crossings (SRC)	[REDACTED]
A36	Bath and North East Somerset	[REDACTED]
M5, M32, M49 and A4	City of Bristol	[REDACTED]
M5, A30 and A303	Devon	[REDACTED]
A303	Dorset	[REDACTED]
M5 and A40	Gloucestershire	[REDACTED]
A36	Hampshire	[REDACTED]
M5	North Somerset	[REDACTED]
M5, A36 and A303	Somerset	[REDACTED]
M5, M4, M32, M48, M49 and A46	South Gloucestershire	[REDACTED]
M4	Swindon	[REDACTED]
M4, A36 and A303	Wiltshire	[REDACTED]

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

2.1.2.3 Liaison with major highway schemes

~~By 15:30 each weekday the Network Manager will consult the NCC Operators regarding any planned closures or restrictions to the network that may affect any treatments.~~

Should any restrictions be in place on the Area 2 Network effecting treatments the Network Manager will liaise via the NCC with scheme managers and also with the Supervisor to ensure that any traffic management alterations have been considered when instructing the action. Communication between the Network Manager, Supervisor and the NCC shall take place should any closures/restrictions change at short notice which may affect any planned treatment actions.

The below list contains the known significant schemes however this is not necessarily definitive and reference should be made to the road booking system via the NCC

Road	Location (e.g. junction to junction)	Type of scheme	Contact
M4	Junction 15 to Junction 16 inc. J16 Entry Slip	Geotechnical repair	[REDACTED]
M5	Junction 21	Installation of traffic lights and dedicated lane	[REDACTED]
M5	Junction 11a to Junction 12	Drainage works	[REDACTED]
M5	Junction 21 to Junction 22	Concrete VRS	[REDACTED]
M5	Junction 11a Romeo Slip	Resurfacing	[REDACTED]
M5	Junction 14 to Junction 15	Resurfacing	[REDACTED]
M5	Junction 10 to Junction 12	Structures Maintenance	[REDACTED]
M5	Junction 19 to Junction 20	Expansion joint replacements	[REDACTED]
M5	Junction 24 to Junction 26	Resurfacing	[REDACTED]
M5	Junction 17 to Junction 18	Resurfacing	[REDACTED]
M5	Junction 14 to Junction 15	Resurfacing	[REDACTED]
M5	Junction 13 to Junction 14	Structures repair	[REDACTED]
M5	Junction 25	Joint works	[REDACTED]
M5	Junction 24	Viaduct waterproofing	[REDACTED]
M5	Junction 29 to Junction 31	Parapet works	[REDACTED]
M5	Junction 11a to Junction 12	Resurfacing	[REDACTED]
M32	Junction 1 Slips	Installation of Toucan crossing	[REDACTED]
M49	M4 to M5	Bridge works	[REDACTED]
A30	Rawridge Hill	Geotech works	[REDACTED]
A30	Devonshire house to Monkton	Resurfacing	[REDACTED]
A36	Stoford to Chilhampton	Drainage works	[REDACTED]
A36	Cotley Hill to Deptford	Resurfacing	[REDACTED]
A36	Claverton to Dundas	Geotech	[REDACTED]
A36	Claverton	Resurfacing	[REDACTED]
A36	Churchill Way, Salisbury	Expansion joint works	[REDACTED]
A40	Highnam	Geotech	[REDACTED]
A40	Huntley	Drainage Scheme	[REDACTED]
A40	Huntley to Lea	Resurfacing	[REDACTED]
A40	Golden Valley	Resurfacing	[REDACTED]
A303	Hazelgrove to Podimore	Resurfacing	[REDACTED]
A303	Furzehedge to Deptford	Resurfacing	[REDACTED]

Road	Location (e.g. junction to junction)	Type of scheme	Contact
A303	Stockton Wood to Deptford	Resurfacing	[REDACTED]
A303	Newcott	Drainage works	[REDACTED]

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 2 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.

Skanska has entered into an agreement with Area 1 and Area 31 (A417/A419 DBFO) over the pooling of resources in severe weather. With agreement between the Highways Agency Area Service Manager this arrangement may require vehicles from Area 2 to treat sections of carriageway outside of the Area 2 network under a temporary boundary change.

Skanska has entered into an agreement with Gloucestershire Highways to base up to 3 of its winter maintenance treatment routes within the Bamfurlong depot.

Details of these arrangements can be found in the Appendix A.9.

Skanska 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.

Skanska 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 Skanska obligations.

2.1.2.5 Cross boundary agreements

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

Skanska will ensure the cross boundary agreements are in place at the interface of the Area 2 Network and adjacent networks to ensure a consistent service that will not leave potentially important sections of either network untreated.

As in previous winter seasons Skanska will continue to treat the slip roads on the A303 within the Wiltshire Country boundary.

Skanska has agreed to treat the M5 Junction 11a southbound exit road as far as the Brockworth Road overbridge to maintain treatment continuity with Area 31 (A417/A419 DBFO).

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, their location and the reason why they need to be moved will be provided to the Traffic Officer Service. The NVRM will provide an end-to-end vehicle recovery service.

Where owners do leave their information, details will be obtained by Skanska and lodged with the Severe Weather Desk and SWRCC.

The relevant police authority or Traffic Officer Service for the area in question carries out arrangements for the removal of vehicles within Area 2.

2.1.2.7 Road traffic collisions involving HA vehicles

Any collision involving the Highways Agency's own vehicles or 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 Skanska 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 Escalation arrangements

Contingency plan arrangements will be enacted if the planned response is insufficient to cope with Severe Weather conditions, if procedures fail or if an incident is compounded by a series of further incidents. Emergency customer welfare (ECW) arrangements should be detailed within the contingency plan and must be in line with the Highways Agency's policy for provision of ECW. Service Providers must liaise with their respective Highways Agency's Regional Emergency Planning Manager to discuss ECW provision.

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. It is expected that the implementation of the new coordination process will facilitate an early identification of a potential interruption to the network operation with appropriate responses triggered. Groups or individuals will be tasked with key decisions through a 'rising tide' incident. The new process will 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. Any decision to close a route during severe weather should only be made within the new coordination process by the appropriate bronze, silver or gold commander, depending on the escalation level at the decision point. Service Providers must have appropriate process to 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 the incident commander.

The decision to open any section of the Area 2 Network that has been compromised by a severe weather event will be made by the lead organisation such as the Police or Traffic Officer Service in consultation with Skanska.

In the event that the Severe Weather Desk team consider the planned responses to be ineffective and that conditions on the network are deteriorating and likely to threaten any of the following "Incident Objectives":

- Protecting the health & safety of personnel / Safeguarding the environment
- Protecting property / providing the public with timely information
- Containing the emergency – limiting its spread / Maintaining critical services / Maintaining normal services at an appropriate level
- Saving & protecting life / Relieving suffering

- Promoting self help & recovery / Restoring normality as soon as possible

then the Network Manager will consider instigating the Area 2 Contingency Plan.

2.1.3.1 Severe Weather Desk establishment

The Network Manager maintains a monitoring function such that potential severe weather conditions are identified as early as practicable. Should severe conditions be forecast within the next 2-10 days the Network Manager will consider issuing a Network Bulletin to key staff to raise awareness of the forecasted conditions. As the event becomes more likely more actions will be taken such that the following aim is met:

"The Severe Weather Desk must be established prior to the forecasted commencement of Severe Weather that could cause disruption to the Area 2 Network or as soon as possible in the event of un-forecast Severe Weather."

The Severe Weather Desk will be established at the Highways Agency Regional Control Centre (SW), St Brendan's Court, Bristow Broadway, Avonmouth, BS11 9FB.

The decision to mobilise a Severe Weather Desk will be taken by the Network Manager with agreement from the Asset Needs/Delivery Manager. Once the decision is taken to mobilise the below actions will occur. Should there be a threat to any of these actions being achieved the Network Manager shall escalate to the Asset Needs Manager for support.

- Instruct and confirm with Supervisors that all preparations for severe weather conditions are in place and that sufficient resources are available to cope with the likely duration of conditions.
- Assess and mobilise the sufficient resources to carry out the functions of the Severe Weather Desk given the forecast conditions.
- Ensure space at the SWRCC is available and the required equipment is present
- Ensure measures are in place to ensure staff welfare is maintained throughout
- Update WRF1 to show Area 2 is now in Severe Weather Desk mode and commence hourly updates.

The key resources expected to be present at the Severe Weather Desk are

- Network Manager
- Admin Assistant

Should the Severe Weather Desk run continuously for more than three days the Asset Needs Manager will allocate a suitable person to pay particular attention to issues such as staffing levels, transport, overseeing drivers' hours and the reporting of stock levels.

The Severe Weather Desk will have the ability to communicate directly with external organisations, including 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 Asset Needs Manager or in their absence, the General Manager.

Should very marginal conditions be forecasted or either side of a Severe Weather Desk Skanska will establish an enhanced monitoring desk at the Highways Agency Regional Control Centre (SW). This will contain a Network Manager and a Decision Maker as a minimum. This monitoring level provides Skanska with a foundation for a full Severe Weather desk and prepared should a sudden change in weather conditions occur.

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

2.1.3.2 Activation of Contingency Plan

This Area 2 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 outlined within the contingency plan.

The standard process for any incident will be followed whereby the incident is reported to the NCC and a TIRP is created. The TIRP Process is the initial assessment of the incident. The incident will be escalated from standard operations into the Contingency Plan.

2.1.4 Health and Safety

Skanska has completed a Risk Assessment on Severe Weather and Winter Maintenance operations, details of which can be obtained from the Skanska Health and Safety sharepoint.

Driver/operators shall take all possible precautions to protect their own safety and that of other road users at all times. This will include the use of flashing beacons to inform road users of the operations in progress.

All operatives shall wear high visibility clothing incorporating retro-reflective markings at all times while on duty both in and out of the vehicles.

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 and Guidance are available through Skanska systems.

2.2 Reporting

2.2.1 Winter Reporting

Skanska will notify the Highways Agency, MeteoGroup, Police, adjacent Service Providers, NTOC Embedded Forecaster and local highway authorities of all proposed Winter Service treatments.

Skanska will, as soon as practicable, notify the Highways Agency, SWRCC, MeteoGroup, Police, adjacent Service Providers, NTOC Embedded Forecaster and local highway authorities 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 8510).

Skanska will ensure all personnel that use the WRF1 system are suitably trained to ensure the requirements of AMOR are met. This includes the Asset Needs Manager, Asset Delivery Managers, Network Managers and NCC Operators.

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.

Skanska 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

Skanska will notify the Highways Agency, SWRCC, MeteoGroup, Police, adjacent Service Providers, NTOC Embedded Forecaster and local highway authorities of all proposed actions.

During every Severe Weather Desk Skanska will report hourly using the WRF1 reporting system and will include the following as a minimum:

- A brief summary of the weather conditions experienced and also expected
- The current road conditions, status and details of any critical incidents
- Completed, ongoing and planned operations
- Contact details of the Severe Weather desk

Salt stock levels will also be monitored and reported at regular intervals throughout any Severe Weather event.

Skanska will report the number of Severe Weather events that required treatment/actions within the Area 2 Network.

2.2.3 Additional reporting

Skanska will report on thermal mapping as appropriate.

The report on thermal mapping to include any changes adjacent to and on the Area 2 Network which will affect the Highways Agency's thermal mapping information, review coverage of thermal maps, and identify areas of improvement.

Skanska 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.

Skanska 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 for the National Winter & Severe Weather Team.

Skanska 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.

Skanska will retain records for the winter period for the duration of the contract by way of CD or hard copy. All forecasts and actual ESS readings are archived via HAWIS. The WRF1 maintains records of all treatments and winter fleet movement records are maintained by [REDACTED]

The table below demonstrates the detailed record information that Skanska will maintain.

Information	Record Content	Format	Storage Media
Weather Forecast	24hr forecast, 2-5 day forecast, Thermal Map, Evening update	Electronic	Electronically archived by HAWIS
Actual Weather Conditions	Morning Summary, Actual Site specific details	Electronic	Electronically archived by HAWIS
Reports received	Adjacent Service Providers, Local Authority decisions/plans	Electronic / Paper	File servers with off site backup/Archived
Decisions made	All details relating to treatment decisions	Paper	Archived
Instructions made	All instructions note on decision record	Electronic / Paper	Archived plus on WRF1
Actions Taken	Treatment details	Electronic / Paper	File servers with off site backup
Liaison and communications log	All liaison details noted on decision record	Paper	Archived
All telephone conversations including with forecast provider	Discussions noted on decision record/log completed	Paper	Archived
Material usage	De-icing material usage, deliveries and movements	Electronic	File servers with off site backup
Fleet Breakdowns	Treatment record, Calibration Cert, Brake Test Cert Servicing Record and Tachograph details	Electronic / Paper	File servers with off site backup/Archived
Times taken to complete treatments	All timings records on treatment report	Electronic / Paper	File servers with off site backup/Archived
Use of additional resources (including reserve fleet and mutual aid)	Conversations logged on decision record	Electronic / Paper	Archived, WRF1 archived by Atkins
Road closures/Blockages due to weather conditions	Locations, weather conditions, duration, works	Electronic / Paper	Archived, WRF1 archived by Atkins
Complaints received relating to conditions due to weather	Log maintained of all communications	Electronic	File servers with off site backup
Vehicle movement details	Winter vehicle fleet monitoring information	Electronic	3 months available on Cybit/Masternaut. Older CSV data (HA Gritting and HA Summary) reports archived by Skanska

2.4 Review

The Asset Needs Manager shall be responsible for initiating a review of the Severe Weather Plan at the following times

- Immediately following a non-conformance in delivering the Service.
- In every case following the mobilisation of a severe weather desk.
- Post season

The review process will follow a structured debrief approach whereby each area of the service is questioned and areas of good practice and also lessons learned identified.

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 2 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 (ASC)

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

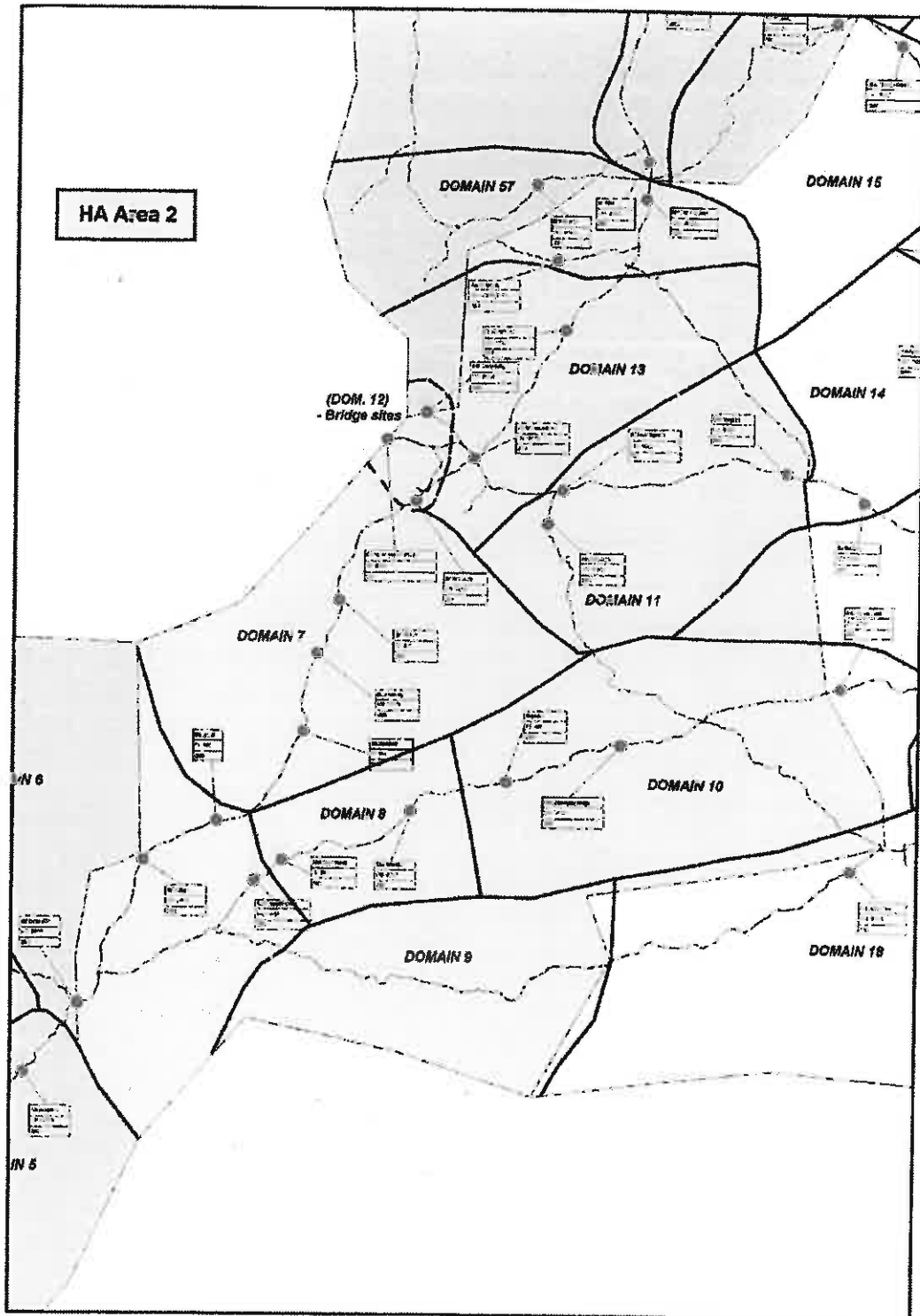
Skanska has appointed [REDACTED] provide the forecast requirement detailed in Appendix B.2.

Skanska will also monitor the weather advisory notices from the Met Office NTOC advisor, early warnings notices from the National Severe Weather Warning Service (NSWWS). All of this will be used along with regular forecasts from MeteoGroup to provide early warning of Severe Weather for the Area 2 Network.

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

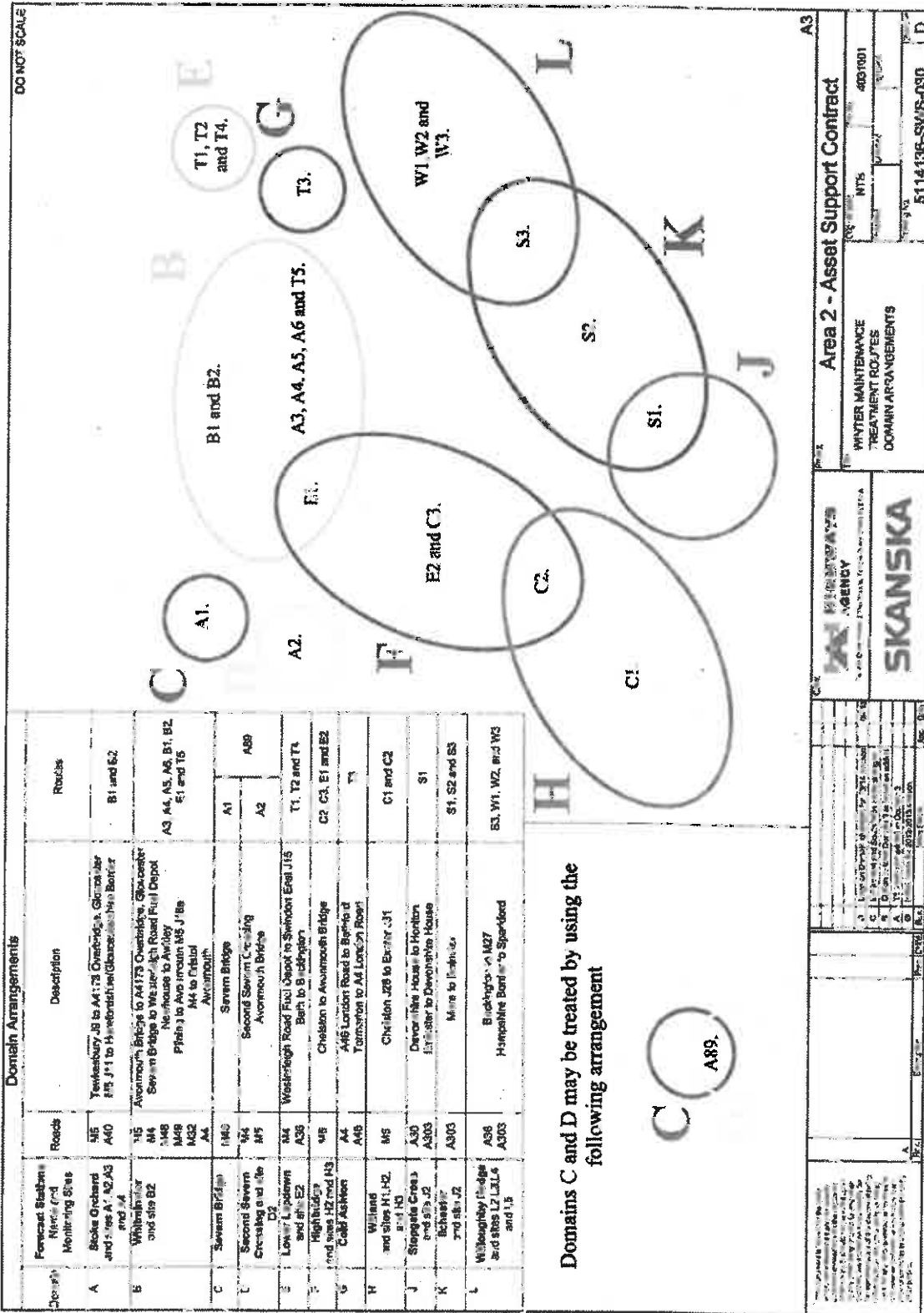
2.5.1 National Domain Network of Environmental Sensor Stations

The domain map is shown below.



2.5.1.1 Domain arrangements

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



Domains C and D may be treated by using the following arrangement



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 2 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.

Skanska is responsible for providing the other resources including staff, materials, and brine production equipment and storage.

Skanska is responsible for preparing and ensuring that all compounds, equipment and plant operate efficiently.

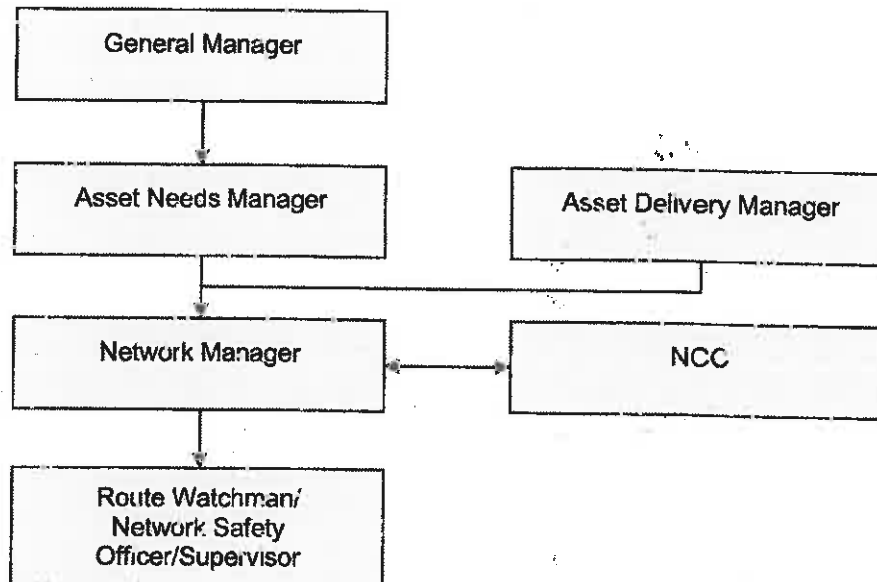
3.1 Human resources

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
Winter Manager	Asset Needs Manager	[REDACTED]
Decision Maker	Network Managers Network Officer VFM Engineer Route Safety Officer	[REDACTED]
NCC Operator	NCC Operators	[REDACTED]
Winter Delivery	Route Watchman Network Safety Officer Supervisor	[REDACTED]
Verification Officer	Asset Delivery Manager Asset Delivery Team	[REDACTED]
Spreader / Loader Operator	SMART Operatives	See appendix A.13 for operative list

3.1.1.1 Organogram



3.1.2 Staffing levels

Skanska has qualified drivers for Winter Service operations on the Area 2 network, which will meet the Highways Agency's requirement to provide an effective Winter Service. With precautionary routes this means there are drivers per route and in severe conditions routes.

Skanska has a pool of decision makers which are considered suitably qualified and experienced as winter decision makers. Should this prove to be insufficient due to widespread illness or similar then Skanska can draw upon additional experienced decision makers from within Skanska, other similar contracts.

Normally a shift pattern of 3 x 8 hour shifts will be in place therefore keeping within both drivers hours and working time regulations. Should staffing become an issue then shifts will be extended to ensure continued cover.

A list of operatives are detailed at Appendix A.13.

3.1.2.1 Training

All staff and operatives involved in the management and implementation of winter service operations will receive appropriate instruction and training. This will cover familiarisation with this plan, winter weather forecasting, effective decision-making and severe weather desk training. All staff involved in the decision making process have attended a basic road meteorology course as a minimum. Operatives involved in the use of spreaders will receive the appropriate training and include all other associated winter maintenance plant.

Training Records are detailed at Appendix A.14.

3.2 Compounds and facilities

An inventory relating to Skanska 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.

Skanska 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 2 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.

Skanska 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. Skanska will utilise the following de-icing/anti-icing materials to deliver an effective Winter Service on the Area 2 network.

- 6mm Salt to BS3247: 2011
- Brine solution with an optimum and maximum sodium chloride concentration of 23% and no less than 20%
- Marine Salt
- Potassium Acetate (Isomex)
- Abrasives: Crushed rock fines
- Calcium Chloride

Skanska preferred de-icer is pre-wet salt and it is used for cost, environmental and sustainability reasons but should not be used on any major structures within Area 2. Dry salt is used as a reserve spreading option and where saturators are unavailable. Should the availability of rock salt become limited marine salt may be considered. To overcome infrastructure corrosion concerns on the major structures in Area 2, Skanska use Isomex (Potassium Acetate). In circumstances of extreme cold where salt may not provide an effective treatment alternative de-icers may be considered in the form of Calcium Chloride.

3.3.1 Material storage and brine production

Material – salt						
Depot	Type	Maximum Stock	Opening Stock as at 01/10/13	Stock Reorder level (up to 28/02/14)	Stock Reorder level (up to 31/03/14)	Stock Order level (up to 30/04/14)
Almondsbury	Barn	TBC	TBC	TBC	TBC	TBC
Badbury	Barn	1600	1600	Spare Stock	Spare Stock	Spare Stock
Bamfurlong	Barn	2400	2400	1800	1200	600
Chelston	Barn	2000	2000	1500	1000	500
Clevedon	Barn	1800	1800	Spare Stock	Spare Stock	Spare Stock
Eastington	Dome	2200	2200	Spare Stock	Spare Stock	Spare Stock
Edithmead	Barn	2100	2100	1500	1000	500
Huntworth	Barn	1900	1900	Spare Stock	Spare Stock	Spare Stock
Southfields	Open	2000	2000	1500	1000	500
Stanton	Barn	2000	2000	Spare Stock	Spare Stock	Spare Stock
Tormarton	Dome	2500	2500	1800	1200	600
Wylve	Open	400	400	Weekly usage to maintain level	Weekly usage to maintain level	Weekly usage to maintain level
Totals		20,900	20,900			

Almondsbury salt stock levels will be confirmed following remedial works to barn.

Stock levels at Wylve will be reviewed on a weekly basis to ensure adequate quantities of stock are available. Stocks will be moved to Wylve from other depots as required to supplement stocks should resupply be unavailable.

Material – Potassium Acetate (Isomex)						
Depot	Type	Maximum Stock	Opening Stock as at 01/10/13	Stock Reorder level (up to 28/02/14)	Stock Reorder level (up to 31/03/14)	Stock Order level (up to 30/04/14)
Almondsbury (Isomex)	Tank	80,000 Litres	80,000 Litres	60,000 Litres	50,000 Litres	40,000 Litres

Isomex is delivered by 20,000 litre tankers and will be ordered as soon as space becomes available.

Potassium Acetate (Isomex) will be stored in specialist facilities housed at Almondsbury Depot.

Material – Brine Storage				
Location	Type (saturators/storage only)	Capacity (L)	Min (L)	Recharge rate (L/hr)
Badbury	Peacocks Multisol	15,000	0	1,000
Bamfurlong	Peacocks Multisol	15,000	0	1,000
Chelston	Peacocks Multisol	15,000	0	1,000
Edithmead	Peacocks Multisol	15,000	0	1,000
Southfields	Peacocks Multisol	15,000	0	1,000
Stanton	Peacocks Multisol	15,000	0	1,000
Tormarton	Peacocks Multisol	20,000	0	1,000
Wylve	Peacocks Multisol	15,000	0	1,000

Brine saturators are currently only installed in Badbury, Bamfurlong, Chelston, Edithmead, Southfields, Stanton, Tormarton and Wylve depots with a production rate of each system of a between 1,000 to 3,000 litres of Brine each hour.

A brine saturator is due to be commissioned at Almondsbury in line with the depot improvements programme.

Salt bins and salt heaps are not generally provided on the network except in connection with the provision of the winter service to footways and cycleways, where they have been placed on the A36 through Salisbury, A40 and other locations.

A series of self help salt bins have been strategically placed along the A40. Checks on the integrity of salt bins will be undertaken prior to the start of the winter season and at regular intervals throughout the season and following significant snow fall.

Details of storage locations and facilities (including brine production) can be found Appendix A.15

3.3.2 Supply arrangements

Depot salt storage will be filled close to capacity prior to the start of the winter maintenance season by [REDACTED]

Stock level profiles are defined in section 3.3.1 and form the basis for reordering stock.

Stock levels throughout the winter season will be monitored on a weekly basis (daily during periods of extreme weather conditions) and stock re-ordered when minimum levels are likely to be reached. Delivery will be normally within 5 working days of the order being placed.

In order to provide resilience Skanska has entered an agreement with Salt Union as front line supplier and Irish Salt Sales as a secondary salt supplier to reduce the dependency on Salt Union as our salt supplier.

A salt re-stocking plan which includes salt supply arrangements can be found in Appendix A.21.

3.3.3 Reserve / contingency arrangements

Salt stocks are maintained to provide sufficient stock to permit normal winter maintenance activities. The salt storage only depots enable Skanska to draw on stock should weather conditions require exceptional spreading regimes.

Details of Mutual Aid and Winter Pooling arrangements can be found in section 2.1.2.4.

A re-stocking plan including reserve and contingency salt supply arrangements can be found in Appendix A.21.

3.4 Vehicles and plant

Skanska has in total 39 Area Operational Winter Service Vehicles (including Operational Reserve Vehicles) available for use of which 23 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, in number 2, are additional to the Area Operational Winter Service Vehicles. Skanska shall adopt the procedures for Operational Reserve Vehicles in relation to their use.

Skanska has 23 Operational Winter Service precautionary treatment routes and, during an area wide snow event, Skanska will utilise up to 33 Operational Winter Service Vehicles to restore lanes as detailed in the snow clearance requirement table in section 4.1.2.

Avonmouth cycleway will be treated using a specialist sprayer vehicle and maintenance for this vehicle will be through Imperial Commercials.

Hand spreaders are available at main depots to assist clearance of footways and cycle tracks as listed in section 1.3.2.

There are no loading hoppers in any of the Area 2 compounds and no directly maintained weighbridges.

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

3.4.1 Operational Reserve Winter Service Vehicle and contingency arrangements

Skanska can use the Operational Reserve Winter Service Vehicles allocated to the Area 2 Network without prior approval but must ensure their use is notified. National procedures for management of the both Operational Reserve Winter Service Vehicles and National Reserve Vehicles are in Appendix B.4.

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

Reserve Vehicles	Area 2
Number of Operational Reserve Vehicles	17
Reserve Threshold – Number utilised	13

3.4.2 Vehicle maintenance arrangements

Skanska will maintain vehicles in accordance with Annex 7 and our Maintenance schedule.

Skanska will ensure wash down arrangements are completed in accordance with the driver tasks listed in Appendix D and the painting regime in section 7.3.10 of Annex 7 will be followed.

Skanska currently have a vehicle service and repair contract with [REDACTED] who are a registered Foden, MAN and Schmidt service agent. This agreement covers Inspections, Maintenance, Servicing, Repair, Modifications and Painting of both MAN and Volvo vehicles, Call out and recovery and calibrations.

Driver/operators will complete the vehicle log and defect sheet before commencement of every treatment, any defects encountered are passed to Imperial Commercials as soon as possible.

Contact details for [REDACTED] can be found in Appendix A.8

Skanska will rotate use of Operational and Reserve Winter Service Vehicles to balance usage of Area Operational Winter Service Vehicles (including Operational Reserves).

3.4.2 [REDACTED] vehicle breakdown and recovery arrangements

[REDACTED] will initially send a fitter to attempt an on road repair however if this is not possible they will recover the vehicle to their workshop via their supply chain partners.

Contact details for [REDACTED] can be found in Appendix A.8

3.4.2.2 Vehicle preparation

Planned periodic maintenance carried out by [REDACTED] includes: A, B and C Services, Safety Inspection, Full Inspection, Brake Test, Tachograph and Spreader calibrations.

A full programme of Servicing and Inspections is available via the Asset Delivery Managers.

3.4.3 Arrangements with supply chain partners

Details of vehicles obtained from supply chain partners can be found in Appendix A.17 with additional loaders and vehicles available from [REDACTED]

Further details of salt suppliers can be found in section 3.3.2.

[REDACTED] are to maintain the stock of Potassium Acetate (Isomex) and also Calcium Chloride should extreme low temperatures be encountered as detailed in section 5.2.1.2.

4 WINTER SERVICE ROUTE PLANNING

This section of the Severe Weather Plan contains details on Skanska Winter Service Routes (WSR) for use in the delivery of Winter Service on the Area 2 Network.

Skanska 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, manned 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 preparing for the next treatment. For the Area 2 ASC contract this time is 3 hours.

4.1 Winter Service Route design

Skanska 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 Area 2 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.

Skanska 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 access problems due to localised congestion caused by severe weather; and
- Variation in traffic flow and poor weather conditions.

In consultation with the Traffic Officer Service a depot access continuity plan ('operation breakout') has been designed to enable access to and from depots that may be encountering queuing traffic around its access points. Skanska also have a series of other depots that can be utilised should a depots facilities or its allocated fleet become unavailable.

Further details of 'operation breakout' can be found in Appendix A.23.

4.1.1 Precautionary treatment routes

Skanska has designed WSR for planned precautionary treatment to meet the precautionary treatment requirement (detailed in the following table). The target treatment time for each route (excluding the turnaround time) is stated on the route schedule and drawing (Appendix A.18).

Precautionary treatment on Managed Motorways will normally be undertaken asymmetrically from LBS2. Skanska has designed additional routes for treating LBS1 and LBS2 sections of the M4, M5 and parts of Almondsbury Interchange that have Dynamic Hardshoulder Running and will be used as a top up treatment prior to the commencement of Hardshoulder Running when necessary.

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 where appropriate 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

[REDACTED]		
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]

Skanska will maintain the precautionary treatment routes as the primary snow routes. As required additional vehicle will be deployed to provide additional effort where needed. In the event of an area wide snow event Skanska will mobilise additional vehicles to assist in any snow clearance, all other operational vehicles assigned to routes will continue to tour their precautionary route area. Feedback from staff on the network, including TOS and police patrols will be important in identifying these locations.

Sections of the M4, M5 and parts of Almondsbury Interchange that have Dynamic Hardshoulder Running will be classified as traditional motorway sections during severe weather events. Clearance of the hardshoulder within these sections will commence when suitable resources become available and prior the remaining network without Dynamic Hardshoulder Running.

Snow clearance routes can be found in the following table.

Area wide snow event vehicles guidance					
Vehicle route	Plough Zones	Area	Route Colour	Precautionary Routes	Additional Vehicles
1	1 and 2	[REDACTED]	[REDACTED]	[REDACTED]	1
2	3 and 5	[REDACTED]	[REDACTED]	[REDACTED]	1
3	7	[REDACTED]	[REDACTED]	[REDACTED]	0
4	6, 8 and 9	[REDACTED]	[REDACTED]	[REDACTED]	1
5	10 and 11	[REDACTED]	[REDACTED]	[REDACTED]	1
6	9, 12 and 13	[REDACTED]	[REDACTED]	[REDACTED]	1
-	4	[REDACTED]	[REDACTED]	[REDACTED]	0
7	13 and 14	[REDACTED]	[REDACTED]	[REDACTED]	1
8	17, 18 and 19	[REDACTED]	[REDACTED]	[REDACTED]	1
-	15 and 16	[REDACTED]	[REDACTED]	[REDACTED]	0
9	20 and 21	[REDACTED]	[REDACTED]	[REDACTED]	1
10	22 and 23	[REDACTED]	[REDACTED]	[REDACTED]	1

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.

5 ACTIONS FOR WEATHER CONDITIONS

This section of the Severe Weather Plan contains decision and treatment matrices and Skanska detailed operational procedures for Winter Service and alert procedures and actions in the event of other Severe Weather on the Area 2 Network.

All Skanska staff involved in the tactical management of the severe weather service will be fully acquainted with and have access to copies of the Area 2 Contingency Plan which details the incident escalation process. This process will be implemented when the Standard Incident Response Procedures are unable to contain an incident or its effect, to the extent that the Incident Objectives are threatened.

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 Skanska staff will remain in regular contact with MeteoGroup and should also take account of information from staff out on the Area 2 Network, Traffic Officer Service and CCTV when making decisions.

Potassium Acetate (Isomex) is a liquid treatment with a general spread rate of 18g/m² (14ml).

5.1.1 Decision Matrix

Road Surface Temperature	Precipitation etc.	Predicted Road Conditions		
		Wet	Wet Patches	Dry
May fall below 1°C	<u>No</u> rain <u>No</u> hoar frost <u>No</u> fog	Salt before frost	Salt before frost (see note 1)	No action likely, monitor weather (see note 1)
Expected to fall below 1°C	<u>No</u> rain <u>No</u> hoar frost <u>No</u> fog		Salt before frost (see note 2)	Salt before frost (see note 2)
	<u>Expected</u> hoar frost <u>Expected</u> fog			
	<u>Expected</u> rain <u>BEFORE</u> freezing	Salt after rain stops		
	<u>Expected</u> rain <u>DURING</u> freezing	Salt before frost and after rain stops (see note 3)		
	<u>Possible</u> rain <u>Possible</u> hoar frost <u>Possible</u> fog	Salt before frost	Monitor weather conditions	
<u>Expected</u> snow		Salt before snow fall (see note 4)		
Freezing Rain	Before rain	Salt before rainfall (see note 3 and 4)		
	During rain	Salt during rainfall (see note 3 and 4)		
	After rain	Salt after rainfall (see note 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				
<ol style="list-style-type: none"> 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 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)	Isomex (g/m ²)
1	Frost or forecast frost RST at or above -2°C (irrespective of dry, damp or wet conditions)		8	8	18
2	Frost or forecast frost RST below -2°C and above -5°C and dry or damp road conditions (see Note 3 if damp and lightly trafficked)		10	9	18
3	Frost or forecast frost RST below -2°C and above -5°C and wet road conditions (see Note 3 if lightly trafficked)		16	15	18
4	Frost or forecast frost RST at or below -5°C and above -10°C and dry or damp road conditions (see Note 3 if damp and lightly trafficked and Note 5)		18	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 3 if lightly trafficked and Note 5)		2 x 15	2 x 15	18
6	Light snow forecast <10 mm		20	18	2 x 18
7	Medium/heavy snow or freezing rain forecast (see Note 5)		2 x 20	2 x 18	2 x 18
8	Freezing rain falling		20 (successive)	See Note 3 below	18 (successive)
9	After freezing rain		20	See Note 3 below	18
10	Ice formed (minor accumulations)	above -5°C	20	See Note 3 below	18
11	Ice formed	at or below -5°C	2 x 20	See Note 3 below	18
12	Hard packed snow/ice	above -8°C	20 (successive)	See Note 3 below	26
13	Hard packed snow/ice	at or below -8°C	salt/abrasive (successive)	See Note 3 below	26
<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> <p>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.</p> <p>2) Pre-wetted salt should always be the preferred treatment for all precautionary treatments whenever</p>					

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 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.

5.1.3 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 <60%)	Dry or damp road	11	11	10	13
	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.

5.1.4 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.

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

Alternative treatments <u>when RST</u> 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

5.1.6 Footway and cycle track treatment snow clearance

Category (see 1.3.2)	Overnight Frost Conditions <i>overnight forecast temperatures below zero but not extending beyond 8am</i>	Daytime Frost Conditions <i>overnight forecast temperatures below zero extending beyond 8am</i>	Extended Frost Conditions <i>forecast temperatures remaining below zero throughout daylight hours</i>	Snow Events
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 Skanska procedures for precautionary treatment using the appropriate treatment material for each part of the Area 2 Network.

Routes used by spreading vehicles will follow the appropriate WSR in Appendix A.18. Skanska 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.

Skanska will select the most appropriate material suitable for use across the Area 2 Network taking into consideration the location and forecasted weather condition to maximise the effectiveness of the precautionary treatment as detailed below.

Precautionary treatments of carriageways in the Area 2 Network shall be undertaken using 6mm Salt, the specification and locations of stocks can be found in section 3.3 Precautionary route schedules and drawings can be found in Appendix.A18. Where available the salt will be pre-wetted with a brine solution.

For the major structures of the M4 Second Severn Crossing, M48 Severn Bridge and M5 Avonmouth Bridge, the specially adapted Foden 2000, Schmidt D1 or Schmidt Combi will be used to spread Potassium Acetate (Isomex) as a one-part solution with a general spread rate of 18g/m² (14ml), this rate can be increased to 26g/m² should the road surface conditions indicate hard packed snow or ice.

The combined footway / cycleway across the Avonmouth Bridge and the link through to the limit of the Highway Agency responsibility will be treated with Isomex, this will be spread using specialist equipment.

5.2.1.2 Spreading techniques and operational considerations

Precautionary treatments to carriageways will be by mechanical spreaders.

Skanska has 24 standard primary treatment routes and each route has been designed to ensure the treatment for up to 18g/m² pre-wetted precautionary treatment that will not exceed the treatment time.

Higher spread rates may require more than one pass to achieve and treatment vehicles may reload at any depot during a treatment route. Any vehicle that requires reloading during its treatment, the supervisor will log the route variation in the treatment route form as spot coverage ensuring that salt usage data is recorded and all areas requiring treatment receive the appropriate spread rate.

Operational treatment vehicles and drivers will be assigned a specific route to promote route ownership, but will have knowledge of other routes in their area in case of breakdown, closures or extreme winter conditions compromising the routes or depots. The drivers will be members of SMART gangs therefore will have an in depth knowledge of their network area.

Wherever possible precautionary treatment during peak traffic flow will be avoided, for early forecasts of frost it may be necessary for an afternoon treatment prior to the evening peak and a second treatment during the night to ensure salt levels are maintained throughout the risk period.

The route design has taken into account the multi lane approaches to the tollbooths on the M4 and M48, the four lane carriageways of the Avonmouth Bridge and climbing lanes at Catherine's Hill, Tormarton, Hallen Bank and Naish Hill. Additionally, the link roads in the vicinity of Jct 18a of the M5 and Almondsbury Interchange have also been considered.

The treatment time for each route is detailed in section 4.2 and on each individual route card.

There is no porous asphalt or level crossings in Area 2.

Reactive treatments to footways and cycle tracks will be by manual spreaders.

Where long-term roadworks have been established on the network a programme of traffic management installations will be sought so as to ensure that all lanes open to traffic are treated.

Thin wearing course systems have been used extensively throughout the Area 2 Network during major and routine resurfacing works. So as to deliver a uniformed treatment regime, the whole of the Area 2 Network will be treated as having Thin Wearing Course.

Skanska will give special consideration to precautionary treatments during low humidity conditions and will closely monitor the network using the Highways Agency's HAWIS system and if slippery conditions are reported a treatment of pre-wetted salt or Isomex (Potassium Acetate) will be applied. Currently Skanska has three treatment vehicles specifically designed for spreading Isomex (two Schmidt D1 and one Foden 2000) with an additional vehicle with Isomex spreading capability (Schmidt Combi). A Brine only treatment may also be considered as a supplementary measure on previously treated routes.

Under normal conditions Isomex is currently only stored in Almondsbury depot, should the vehicles not based in Almondsbury be required to spread a considerable amount of Isomex, arrangements will be made to replenish the stock carried by these vehicles by swapping spreaders between depots or returning the vehicle to Almondsbury to reload stock.

In circumstances of extreme cold where salt may not provide an effective treatment, alternative de-icers may be considered; this may be in the form of Isomex or Calcium Chloride.

Details of treatment for freezing rain can be found in section 5.2.3.

Additional spot treatments may be required where crosswinds affect the spread pattern of the winter service vehicles.

Skanska will, where feasible, treat only targeted areas of the Area 2 Network based on where ice formation is forecast.

Details of any vulnerable sites can be found in section 1.3.4 and Appendix A.20.

Further information and special considerations can be found in Appendix B.5.

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 Skanska 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 Operational Reserve Winter Service Vehicles for those areas.

5.2.2.1 Ploughing and snow clearance techniques

If snow is forecast with a depth greater than 30mm, precautionary salting shall be carried out using the rates of spread detailed in the Treatment Matrix Guide in advance of the snowfall.

During an area wide snow event Skanska will utilise up to 32 Operational Winter Service Vehicles to restore lanes as detailed in the snow clearance requirement table in section 4.1.2.

Ploughs should be fitted to vehicles at a point not to delay precautionary salting but in sufficient time to ensure they are ready for commencement of snowfall. The Network Manager will instruct the fitting of ploughs but it is up to the Network Delivery Manager to ensure that they are fitted prior to the time given by the Network Manager. When snow is reported as settling on the carriageway simultaneous salting (18g/m² pre-wet) and ploughing will start. The ploughs provided by the Highways Agency are designed to operate at zero height setting.

Ploughing when possible will be carried out on the basis of 'ploughing by lanes' with 'echelon ploughing'. In all ploughing conditions care will be taken wherever possible to ensure that the resulting furrows do not obstruct slip roads or the flow of water to highway drainage outlets. At grade separated interchanges clearance methods shall not result in a reduction of lanes between entry and exit slips on the main carriageway.

Snow blowing may be instructed to clear blockages and accumulations of snow, however consideration should be given to ensure that cleared snow does not obstruct other traffic lanes or create problems for neighbouring properties.

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.

Other equipment such as snow blowers may be used on the Severn River Crossings as agreed with the Government's Representative for the crossing.

In anticipation of problems arising during periods of heavy or prolonged snowfalls, consideration has been given to the methods of dealing with the accumulations at places where difficulty may be encountered. The appropriate plans have been formulated for the following locations and these are illustrated in Appendix A.4: Severn Bridge, Second Severn Crossing, Toll Booths, Avonmouth Bridge, Wynhol Viaduct, M32 Eastville Viaduct and the routes through Salisbury.

There is some limited use of snow fencing on the network, mainly in the vicinity of Almondsbury Interchange. It was agreed that this fencing would be established using wicket fencing and that it would not be economical to remove it at the end of one season and erect it prior to the next. Hence this fencing remains permanently in place. Checks on its integrity will be undertaken prior to the start of the winter season and following significant snow fall once sufficient resources are available.

Abnormal load movements through the network may need to be interrupted in the event of adverse conditions of ice and snow until such times as the network is considered safe for such movements. The Network Manager will discuss those movements he is aware of with the appropriate police control to request cooperation with the hauliers.

Illustrations showing ploughing techniques can be found in Appendix A.18.

Skanska clearance plan for each solid vehicle barrier (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 concrete/other solid barrier throughout the motorway and trunk road network which can pose problems regarding snow clearance. New guidance provided in Area Management Memo No. 89 Snow Clearance Adjacent to Solid Vertical Barriers, provides the relevant information for dealing with snowfall in circumstances where traditional ploughing techniques may not be applicable due to the presence of solid vertical barrier.

When conditions dictate snow will be removed using echelon ploughing to verge or centre reservation.

Consideration will be given to the profile of the carriageway to avoid water from melted snow running across lanes available for traffic freezing.

Variable Message Signs and Mobile Variable Message Signs will be utilised to inform motorists if lanes are not available for use and will be set by the SWRCC with guidance from the Network Manager.

A snow blower may be utilised for bulk clearance where there is a large amount of snow to remove near to concrete/solid vertical barriers.

Further information on ploughing techniques can be found in Appendix B.6.

During periods of heavy or prolonged snowfall Skanska has identified storage locations for temporary stockpiling of snow near the Severn Bridge tollbooths.

Network features such as locations of solid vertical barrier, snow fencing and temporary snow storage can be found in Appendix A.5

5.2.2.2 Spreading techniques

Pre-wet salt spreading is the Skanska preferred reactionary treatment of snow and ice with Isomex used on the structures.

Ploughing and spreading techniques for the Severn Bridge Tolls can be found in Appendix A.18.

Details of spreading techniques and special considerations used during de-icing operations can be found in sections 5.2.1.2 and 5.2.2.1.

5.2.2.3 Aftercare and follow up treatments

Once all carriageway running lanes are free from snow and ice, ploughing shall commence on hard shoulders and laybys.

Clearance of side roads will be carried out in conjunction with local authorities as soon as resources become available to ensure safe entry and exit to the Area 2 Network.

SMART teams will inspect and clear drainage channels to remove any detritus materials and ensure they are kept clear to aid the removal of water run off from thawing snow. After periods of snow and ploughing, arrangements will be made to inspect the roads for damage and where necessary carry out asset repairs.

5.2.2.4 Arrangements for use of blowers

Skanska can use snow blowers allocated to their Area 2 Network without prior approval but must ensure the use is notified via the WRF1 website. National procedures for management of the both 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.

Skanska has 4 operatives qualified to operate snow blowers as detailed at Appendix A.13.

Transportation of snow blowers can be arranged by the Supervisors using supply chain partners.

5.2.3 Freezing rain / rain falling on extremely cold surfaces

5.2.3.1 Operational considerations

In circumstances where freezing rain is forecast Skanska will implement the guidance indicated in the Decision Matrix Guide. Treatment in advance of and during the event, and immediately

following freezing rain will be implemented as per the guidance indicated in the Treatment Matrix Guide.

Information regarding the timing and location of the freezing rain will be via the established communication links, as will any ongoing updates. Should the condition of the network due to freezing rain reach a point that either partial or full closures are required the Network Manager will liaise with the appropriate Police Authority, SWRCC, the Highways Agency Service Manager and NILO via the Network Control Centre. It should be noted that Skanska does not have the authority to close a road.

Further information on Freezing Rain can be found in Appendix B.5.

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.

Skanska will liaise with the Police Control Offices (PCO's) 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. All communication with the PCO's will be through the SWRCC.

Upon receipt of a forecast of freezing rain the Network Manager will issue a Network Bulletin. This will inform all internal and key external stakeholders of the potential hazard. It is envisaged that this will prompt the SWRCC to consider placing staff and suppliers (National Vehicle Recovery Service) on alert.

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

Skanska receive a wind forecast for the each domain, this forecast includes a 2-5 day outlook, to give an indication of likely weather trends for the coming days, detailing average wind speed, wind direction and maximum gusts.

Wind related closures of the M48 Severn Bridge are managed by the Traffic Officer Service, Skanska only involvement is the provision of Traffic Management (using pre placed equipment) to close the M48 at Junction 1.

Severe weather operations on the Avonmouth Bridge and the Severn Crossings are controlled in accordance with the relevant bridge procedures manuals.

5.2.5 Heavy rain

5.2.5.1 Pumping, jetting and clearance techniques

When a forecast of heavy rain is received that poses a significant threat to the safe operation of the network the Network Manager will issue a Network Bulletin. This Bulletin will alert staff and key stakeholders to the risk. If the risk is high enough then the Network Manager will request the Route Watchmen and Asset Delivery Managers ensure the network is prepared for the conditions. This would include checking known flooding areas to ensure drainage is clear and consulting the supply chain to secure additional resource if needed.

No areas have been identified where floodwater can be pumped and any incident encountered on the Area 2 Network will be dealt with as an individual incident.

Areas susceptible to flooding can be found in section 1.3.4 and Appendix A.18.

Skanska maintains 19 pumping stations around the Area 2 Network, including several located in pedestrian underpasses. These stations are remotely monitored from the NCC using the Telemetry system and should a fault be encountered, such as a power cut or flooding of the wet wells, Mawdsley's will be contacted to attend site and investigate any faults.

5.2.5.2 Operational considerations

Aside of known flooding locations which will be checked prior to the onset of conditions, flooding will be dealt with reactively. When flooding is reported to Skanska, a TIRP will be raised and any required actions determined by the Network Manager.

Areas subject to susceptible to flooding can be found in section 1.3.4 with mitigations plans in Appendix A.20.

5.2.5.3 After care and follow up treatments

Skanska will note the areas where flooding was reported to determine if there is an underlying issue at the site or simply that the flow of water exceeded the drainage capacity. This information will be used to inform the drainage maintenance and scheme programmers.

5.2.6 Fog

Skanska 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 setting 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.

Skanska will liaise closely with the SWRCC who are able to set signs and signals.

When a forecast of fog is received that poses a significant threat to the safe operation of the network, the Network Manager will issue a Network Bulletin. This will ensure internal and key external stakeholders are alerted to the potential hazard. There is little positive action that Skanska can take to mitigate the risks associated with fog.

Where available VMS should be used to warn road users of the hazard. The SWRCC is responsible for setting these signs, however if staff on the network observe fog causing a hazard on the network it is to be reported to the NCC.

Measures have been put in place on some susceptible areas; these include reducing the distance between road studs/cats eyes.

5.2.7 High temperatures

High temperatures will normally build up over a number of days. It should be remembered that the perception of temperature will depend on other factors such as breeze, humidity and also the surrounding topography. Roads heat up in the sun and therefore the temperatures can be higher on road than in the general area. There are the following risks associated with high temperatures

High temperatures will normally coincide with high UV levels meaning those outside can rapidly suffer sunburn. Staff should be warned of the hazard and should ensure that they protect their skin

appropriately. There is also a risk of dehydration so it is important staff carry sufficient water to maintain a suitable level of hydration.

In the event of high temperatures where vehicles and occupants are static on the motorways and trunk roads for long periods of time there is a risk to both human (members of the public) and animal (in transit) welfare, Skanska will provide support and assistance to the RCC and the Police as requested.

In very high temperatures bitumen surfaces may start to become viscous and under these conditions the surfaces can become stuck to vehicles and damaged. If sections of the network are identified as starting to melt then crushed limestone dust or sand will be spread.

APPENDICES & SCHEDULES

NOTE:

To reduce the size of the Severe Weather Plan, the Service Provider may include certain appendices within a box of reference and not append these directly to the plan. Where this is applicable a note has been added at the start of the Appendix. The Service Provider must agree an acceptable approach with the Service Manager and confirm the location of the box of reference.