

## HIGH WIND STRATEGY AND NATIONAL WIND MANAGEMENT GUIDELINES



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## **CONTENTS**

SECTION 1 – TRANSPORT SCOTLAND’S HIGH WIND STRATEGY	1
SECTION 2 – NATIONAL WIND GUIDELINES	3
SECTION 3 – TEN STEP PROCESS	7
SECTION 4 – EXAMPLE PROCEDURAL PLAN	14
SECTION 5 – SUMMARY	18

## **APPENDICES**

APPENDIX A – EXAMPLE PROCEDURAL FLOWCHART	20
APPENDIX B – TRANSPORT SCOTLAND PROCEDURES	22
APPENDIX C – TRUNK ROAD NETWORK PROCEDURES – ERSKINE BRIDGE	28
APPENDIX D – TRANSPORT SCOTLAND/MET OFFICE WIND ANALYSIS RESULTS	37
APPENDIX E – ROLES AND RESPONSIBILITIES	39

## **SECTION 1 – TRANSPORT SCOTLAND’S HIGH WIND STRATEGY**

The incidences of high wind on exposed sections of any road network can result in severe disruption and danger to road users. There are a number of locations throughout Scotland where the effect of high wind has had adverse consequences on congestion, the safety of the travelling public, journey time reliability and on the economies of the affected area and the country as a whole.

Transport Scotland, the national transport authority and an agency of the Scottish Government, has developed robust and proportionate wind management procedures with its Operating Companies and the local police forces for a number of sections of the trunk road network. However, it is recognised that the severe disruption and inherent danger to road users caused by high wind can occur anywhere on the Scottish road network. Indeed, the two existing Scottish non-trunk bridge boards (Tay Road Bridge Joint Board and the Forth Estuary Transport Authority) operate site specific procedures to manage the impact of high wind on their associated structures.

As part of its commitment to improving journey time reliability by reducing congestion and increasing safety, Transport Scotland is implementing its strategy for managing the impacts of high winds on the trunk road network. Through analysis of meteorological and incident data, coupled with stakeholder consultation, the agency will undertake regular reviews of the network to identify locations where they determine that wind management procedures require to be developed in accordance with the guidelines detailed within this document.

To assist in this process, Transport Scotland has commissioned the Met Office to prepare a set of model results which identify the comparative mean wind speeds and gusts speeds for the whole of the motorway and trunk road network and also the A-class local authority roads. This analysis is based upon various wind speed and gust analyses using historical wind data from 1971 to 2000. Transport Scotland can then use this information to assist in identifying other parts of the network where procedures may be required. These model results will be made available to all local

authorities in Scotland as information for their consideration (see Appendix D of this document).

Additionally, to address the issue of differing procedures in Scotland, Transport Scotland has established the 'Scottish High Wind Strategy Forum'. This group includes representation from the Association of Chief Police Officers in Scotland (ACPOS), individual police forces and the aforementioned bridge boards. The aim of this group is to examine the current procedures and operational requirements to identify opportunities for improvement and development of commonality, both in terms of monitoring and response.

By undertaking the above actions and continuing to tackle the issues of incident management and climate change, Transport Scotland believes that this strategy robustly and proportionately addresses the issue of managing the impact of high winds on the Scottish trunk road network.

## **SECTION 2 – NATIONAL WIND GUIDELINES**

### **National Guidelines – Context**

This document has been prepared by Transport Scotland as a guidance document for use by road authorities and stakeholders involved in the management of high wind on all classes of road throughout the Scottish road network. The aim is that road authorities can use these guidelines to develop a robust and proportionate set of procedures to manage the impact of high wind on their network and, in turn, address the issues of congestion on the network and safety of road users both leading to improved journey time reliability and benefits to the economy as a whole.

Prior to Transport Scotland developing wind management procedures, the then Scottish Executive undertook a review of existing policies and procedures adopted for the management of high wind across the trunk road network in both Scotland and the rest of the UK. The aim of the study was to advise on the requirement, or otherwise, for the production of a National Wind Guideline document. The full scope of the original study is detailed below:

- Identify areas of the trunk road network where high winds are problematic;
- Review current practice;
- Identify current methodologies adopted by key organisations in managing/ limiting the impact of high winds;
- Identify organisational responsibilities and strategies currently in place within Scotland and the legal authority under which they are applied;
- Review best practice in the rest of the UK and worldwide;
- Investigate integration issues with existing wind warning systems;
- Make recommendations as to whether or not there is a need to change the locally developed practices; and
- Recommend whether or not a national guideline would be appropriate.

The outcome of the study identified that, although there were a number of existing wind monitoring and wind warning systems located across the road network in Scotland, there was no specific national guideline/management strategy. As a result, differing approaches and procedures were adopted in various sites across Scotland.

This led to an inconsistent structure to the approach taken regarding the management of wind impact across the country. It was noted that information dissemination (in relation to the incidence of high wind and the restrictions in place) between the various road maintenance organisations, local authorities, bridge boards, police forces, and in the case of the trunk road network, the Traffic Scotland control centre, lacked structure and cohesion.

The study outcome detailed that a guideline should be established to provide an overall framework for managing of the impact of high wind on the Scottish road network and be made available to all authorities. In essence, this would present a holistic approach to the management of high wind with guidance on the policies and procedures, based upon best practice identified within the review. Additionally, it also recommended that the guidelines should outline roles and responsibilities for both pre-planning and adoption during wind incidents.

### **Relevance to the entire Road Network**

The impacts of high wind are not restricted to motorways, the trunk road network and bridges. Transport Scotland has prepared this guideline document with the intention that it embodies good practice which can be employed by road authorities across Scotland.

It is recognised that a key focus of any future strategy is the requirement for improved data exchange and information dissemination. Currently, the Traffic Scotland control centre assumes responsibility for dissemination of information across the trunk road network by intelligent means such as variable message signs (VMS) or the Traffic Scotland and Freight Scotland websites ([www.trafficscotland.org](http://www.trafficscotland.org) and [www.freightscotland.org](http://www.freightscotland.org)). It is also noted that there is a requirement to ensure that this data is exchanged with those authorities responsible for local roads. This cross-boundary exchange is essential in order to minimise the adverse effects on the local roads of diversions to and from the trunk road network as well as local network diversions.



The importance of the appropriate scale of information dissemination to the local network is also a key priority since there may be less opportunity to disseminate information by 'intelligent' means such as variable message signs (VMS), website etc. at the local level. In these circumstances, the established liaison between the trunk road maintenance organisations, the local police forces and the local authorities can be adopted into procedures.

Should wind management procedures not be in place for a particular location, management of such an event should be operated in line with existing cross-agency incident management procedures.

### **Purpose of the National Guidelines**

The ethos of these guidelines is to develop a common national framework within which the incidences of high wind across the entire Scottish road network can be effectively managed. This not only focuses on the roles and responsibilities of the stakeholders involved but also concentrates on the elements of wind management procedures to be adopted and agreed to help reduce congestion, provide greater journey time reliability and positively influence the safety of travellers and road users in the event of a wind related incident.

These national guidelines will not seek to replace existing procedures at the local level, unless there is good reason to do so. The guidelines shall build on existing local procedures, organisational relationships, existing systems and be used to develop a common approach to the management of the impact of high wind on the Scottish road network.

### **Application of the National Guidelines**

The production of these national guidelines provides an opportunity to describe a framework whereby the organisational arrangements, wind monitoring requirements, roles and responsibilities for decision making and information dissemination can be clearly defined and understood for all sections of the network under consideration.

The Scottish motorway and trunk road network provides the most important long distance links between Scotland's cities and towns, ferry terminals, the English trunk road network and the international ferry ports. The network comprises almost 3,500km and some 1900 bridges. Although this represents only 6% of Scottish roads, it carries almost one-third of the total traffic volume and approximately two-thirds of heavy commercial vehicle traffic.

The statutory responsibility for the network of local roads and bridges lies with individual local authorities. Councils are therefore responsible for the management, maintenance and improvement of all public roads in their areas which do not form part of the trunk road network. This represents around 94% of Scotland's roads and over 11,000 bridges maintained by local authorities in Scotland.

These guidelines are intended for use by all relevant bodies involved with, and impacting on, the operation of all roads across the Scottish road network. This includes local authorities, bridge boards, trunk road maintenance organisations and the police forces.

It should be noted, however, that it remains the responsibility of the driver to drive safely and in accordance with the prevailing conditions. Rule 146 of the *Highway Code* states that the driver should adapt his/her driving to the appropriate type and condition of road and, in particular, take the road and traffic conditions into account.

## **Structure of the Document**

This document sets out the principles to be followed for successful management of wind impact and the associated roles and responsibilities of parties involved. The remainder of this document is set out as follows:

- Section 3 – Ten Steps to Procedure Development;
- Section 4 – Example of a two-Stage Procedure (a hypothetical example of managing a wind related incident on an at risk section of road network);
- Section 5 – Summary; and
- Appendices with supporting information.

## **SECTION 3 – TEN STEP PROCESS**

### **The Ten Steps Required for Successful High Wind Management**

Management of the impact of high wind on the road network within Scotland is currently undertaken by a variety of organisations through localised site specific agreements. Though these agreements vary from location to location as a result of site specifics and the authorities involved, each location shares the common requirement to have the impact of high wind managed effectively and safely.

The management of high wind across the Scottish road network encompasses the process of pre-planning through to active management of the wind incident. The following section defines the key steps required to successfully mitigate the impact of high wind on the road network.

#### **Step 1 – Risk Identification**

The basis of effective management depends upon the identification of exposed locations/sections of the road network susceptible to the impact of wind. Existing bridge crossings are obvious locations where high wind could impact on the operational effectiveness of the network. It is also necessary to consider other 'exposed' locations on the road network where driver safety can be compromised as a result of high wind.

Each road authority is responsible for reviewing sections of their network with regards to high wind and deciding on which of these sections wind management procedures should be developed for. This review could include stakeholder consultation and a review of wind related accident statistics as well as using specialist services to undertake wind profiling, climate trend analysis etc. with the aim of identifying all potential risk areas.

Risk identification acts as the initial foundation from which successful high wind management can commence.

## Step 2 – Organisational Agreements

Having identified ‘key’ locations across the network, the next phase is to develop organisational arrangements to clarify the role and responsibilities of each stakeholder prior to, during and after an incident for that ‘key’ section of road. These agreements should be developed between, where appropriate, the local authority, the bridge boards, the road maintenance organisation, the police and any public information dissemination organisation involved. Although local agreements and formalities will vary from location to location, they should provide the universal function of identifying the role and responsibility of each organisation in managing high wind incidents. As part of these agreements, the decision making process and critical path for information dissemination should also be identified.

## Step 3 – Diversion Route Planning

Step 3 of this process is to identify the requirement for diversion routes for extended restrictions or closures for each site and agree with stakeholders as appropriate, e.g. police, road authorities. Diversion route plans will vary in complexity dependent on the level of restriction required for each specific ‘key’ location. Diversion route plans should consider the following:

- Identification of alternative routes for traffic where existing routes could be closed or subject to restriction;
- Efficient diversion management to ensure drivers are made aware of alternative routes well in advance to allow them to divert to appropriate routes where applicable; and
- Effective information dissemination to allow travellers to make informed travel choices in advance, ranging from safety warnings and/or diversions to delaying travelling (this is discussed later in this section).

It is essential that any identified alternative routes have been assessed for high wind impact and that these are continually monitored during a high wind incident to ensure they are not experiencing similar effects to the problem site. Additionally the safety concerns of drivers on the affected part of the network and the proposed diversion should be addressed at this stage. Diversion routes should be developed (usually by

the road maintenance organisations) and agreed as appropriate between the relevant road authorities, police force, and bridge boards.

Where alternative routes are not available, temporary parking of affected (wind susceptible) vehicles in safe holding areas may be an option.

It should be noted that the decision to implement a particular diversion route rests with the local police force (who may wish to consult with the relevant road authorities). Consideration in making this decision should be given to the time required to implement the diversion and to travel along it. These times should be compared to the expected duration of the restriction or closure before deciding to implement a diversion.

#### Step 4 – Monitoring

Monitoring the strength and direction of wind is an integral component of high wind management. In order to effectively monitor wind, the organisation responsible for each 'key' location should undertake two processes. The first is to set up links/agreements with meteorological forecasters to obtain severe weather forecast warnings in advance of high winds occurring. This will enable the organisation to adopt a 'state of alert' to high winds and provides a window of opportunity within which the organisation can prepare for the impact of wind.

The second process is to monitor the real time wind speed, and direction as appropriate, from meteorological equipment located on the road network in the proximity of the site to allow the implementation of specific actions according to developed procedures once predetermined thresholds have been reached.

The responsible organisation should liaise with the relevant road authority to identify any existing meteorological sites available within its area and how to monitor and review this data. Where existing meteorological sites are not currently in place at the required location or are not at the optimum position, the road authority should consider a more appropriate location for a new meteorological site. Consideration should be given to the implementation of similar monitoring sites on the agreed alternative routes where these may be susceptible to high wind impacts.

## Step 5 – Define High Wind Level Thresholds

In order to ascertain the level of restriction applied to each site, pre-determined threshold values of wind speed, and direction as appropriate, should be identified. This should also include threshold values at which restrictions can be removed. The level of restriction applied to each site will be dependent on site specific criteria such as road orientation or height/exposure.

The organisation responsible for each site should, through discussions with the police, road maintenance organisation and the road authority as required, identify the wind speed/direction threshold levels that will instigate agreed traffic management/diversion procedures. Definition of these levels which will cause difficulties to traffic may require the assistance of specialist consultants to advise the authorities.

## Step 6 – Develop the Levels of Restriction

Following on from the definition of wind speed/direction thresholds, the level of restriction to be applied, and the management of this, should be defined through agreement with the police, road maintenance organisation and the road authority.

Restrictions will vary dependent on wind speed, direction, geographic location and local topography. They will encompass restrictions or prohibition of certain classes of vehicles through to possible full bridge/road closure. Although organisational agreements should be established, it is essential that the organisation responsible for each site agree the restriction implementation procedures with the police as well as any affected road authorities to inform them of a proposed restriction prior to its implementation.

## Step 7 – Enforcement

A key area when applying restrictions, prohibition of certain vehicle classes or complete road closures, is the requirement for enforcement. This should be agreed between, where appropriate, the police, the road authority, bridge boards and road maintenance organisations. It should be noted that appropriate signage to provide advanced warning can be used to assist in the application of restrictions.

## Step 8 – Implementation of Traffic Management

Adequate traffic management is required to ensure restrictions are implemented effectively. Local traffic management procedures should therefore be agreed between the road maintenance organisation, the road authority and each relevant police force to ensure implementation of restrictions in a quick and efficient manner.

The traffic management procedures should include, where appropriate, pre-agreed alternative routes. The road maintenance organisation should, in consultation with the roads authorities, check the capacity of these alternative routes to accept the anticipated level, height and weight of diverted traffic and, during an event where diversions are required, assess the alternative route for roadworks and other incidents affecting the route. It should also provide agreed feedback on the conditions of the route to the road authority and police. This feedback should be provided prior to, during, and for an agreed period after, the restriction and associated diversion have been implemented and subsequently removed. Consideration should also be given by the road maintenance organisation to ensuring that the movement of abnormal loads is not affected.

Where alternative routes are not available, temporary parking of affected (wind susceptible) vehicles in safe holding areas may be an option.

## Step 9 – Information Dissemination

A real time knowledge exchange of high wind incidents and the restrictions in place is invaluable in order to enable drivers to plan their journey effectively. The mitigation of the impact of high wind is dependent on a timely knowledge exchange between the authorities involved in managing the road, in order that response plans and procedures can be implemented successfully. As part of Step 2 (Organisational Agreements) the critical path for information dissemination should be identified. The responsibilities of each organisation for 'alerting' others of the incident and the time span when this should be undertaken requires to be identified at an early stage. The processes and mechanisms for undertaking information dissemination also require to be defined and agreed.

The organisation responsible for the procedures should, where possible, not only issue updates of restrictions to neighbouring road authorities, the road maintenance organisations, bridge boards etc. but should also alert the media and, where it is deemed that the wind impact and associated restriction will affect the operation of the trunk road network, the Traffic Scotland control centre. The quicker the information is disseminated to the travelling public, the greater the opportunity to minimise the impact of the restriction on the operation of the Scottish road network.

In the event of the incident being trunk road network related, the Traffic Scotland control centre and the Operating Companies will monitor and manage the status of the trunk road network. The Traffic Scotland control centre primary focus will be on the strategic trunk road network and those roads that in turn have an impact on it. Ensuring that this control centre is fully enfranchised in the decision making process and provided with timely information will enable it to distribute information to the travelling public both quickly and efficiently.

There is an obvious inter-dependency on all classes of road across Scotland. Where an incident occurs on any one key section of the network, it will have a knock-on effect on the other road links to and from that road, whether trunk or non-trunk. As such, interaction between the trunk road network and non-trunk road network agencies is clearly required to manage such incidents and return the overall network to its optimum efficiency as quickly as possible. Close liaison between road maintenance organisations, bridge boards and local authorities is necessary to facilitate this.

Full consultation, agreed involvement and interaction are therefore vital for the successful management of the impact of high wind affecting these locations and the road network linking them.

#### Step 10 – Relaxation of Restrictions and Information Dissemination

The decision-making process regarding the relaxation of restrictions requires to be clearly defined for all stages of a wind management event. Any relaxation will be determined by a combination of meteorological forecasts and observed real time wind speed and direction.



It is essential that the organisation responsible for relaxation of the restrictions liaises with the police, the road authority and the maintenance organisation to confirm acceptance of this relaxation prior to the removal of restrictions.

Any relaxation of restriction must be communicated to the travelling public to allow the network to return to its normal operating conditions as quickly as possible.

## SECTION 4 – EXAMPLE PROCEDURAL PLAN

This section describes a hypothetical example of managing a wind related incident on an ‘at-risk’ section of road. The purpose of this section of the Guideline is to identify the key stages in the wind management procedure through the use of a timeline example.

The following table presents the individual tasks which should be undertaken as part of best practice when managing a wind incident. The example is based upon a two-stage process where two threshold levels are used (the process can easily be extended to include an earlier stage using the same principles, i.e. ‘CAUTION HIGH WINDS’). The stages are:

Stage 1 – Closed to High-sided Vehicles and

Stage 2 – Closed to All Vehicles.

Process	Tasks Undertaken
Risk Identification/ State of Alert	<p>Alert (via email/phone/text) sent to the Road Maintenance Organisation (RMO) by the weather service provider warning of the risk of severe gales this afternoon and early evening.</p> <p>The RMO activates real time wind speed data collection from meteorological monitoring sites within the area.</p> <p>The RMO informs the local police and the Road Authority Control Centre (RACC) of the risk of severe gales later this afternoon and early evening.</p> <p>Local police open an incident within their local command and control centre related to the area of the potential severe weather warning.</p> <p>The RMO confirms the capacity of the pre-agreed diversion route(s), where appropriate.</p>
Monitoring	<p>The RMO commences monitoring of real time wind speed data obtained from sites located within high risk exposed sections of the road.</p> <p>Real time wind speeds displayed on the RMO’s wind monitoring and information control system are approaching levels which require Stage 1 actions to be carried out, in accordance with the wind management procedures.</p> <p>RMO receives an automatic alert informing that the wind speed has exceeded the pre-determined threshold.</p>
Implementation of Restrictions	<p>RMO advises the local police that the Stage 1 threshold has been breached. Police, using their powers, decide to confirm a Stage 1 response as per the agreed procedures.</p> <p>RMO informs the RACC and local authority that the police have implemented a Stage 1 restriction.</p>

	<p>Police to attend on site as appropriate and in line with the procedures to enforce the high-sided vehicle restriction. Generally, signage and implementation of (pre-planned) diversionary routes will be the responsibility of the road maintenance organisation.</p> <p>RACC sets the variable message signs (VMS) to inform of the high-sided vehicle restriction.</p> <p>The RMO instructs the traffic management (TM) crew to attend the site, setting out the TM that has been pre-agreed in the development of the procedures.</p> <p>RMO ensures, through discussions with the local authority and police, that the agreed diversion route(s) is problem-free and not suffering any similar wind impacts.</p> <p>The RMO provides regular feedback to the RACC and the police on the capacity of the agreed diversion route(s), where appropriate.</p>
Information Dissemination	<p>RACC populates the website and provides incident related data to Value Added Service Providers (VASPS) and other media.</p> <p>RACC operator sets strategic VMS to use the specified alternative route and delay times if known.</p>
Strategic Management	<p>RACC operator commences monitoring of strategic traffic flows in the vicinity of the wind related incident.</p>
Monitoring	<p>Weather service provider advises RMO that the risk of the severe gales has increased.</p> <p>RMO receives an automatic alert from the wind monitoring and information control system informing that the winds have increased beyond the Stage 2 threshold.</p>
Implementation of Road Closure	<p>RMO advises the local police that the Stage 2 threshold has been breached. Police, using their powers, decide to confirm a Stage 2 response as per the agreed procedures.</p> <p>RMO informs the RACC and local authority that the police have implemented a Stage 2 closure.</p> <p>Police to attend on site as appropriate and in line with the procedures to enforce the closure. Generally signage and implementation of (pre-planned) diversionary routes will be the responsibility of the RMO.</p> <p>RACC sets the VMS signs to inform of the full closure.</p> <p>The RMO instructs the traffic management (TM) crew to attend the site, setting out the TM that has been pre-agreed in the development of the procedures.</p> <p>RMO ensures, through discussions with the local authority and police, that the agreed diversion route(s) is problem-free and not suffering any similar wind impacts.</p> <p>The RMO provides regular feedback to the RACC and the police on the capacity of the agreed diversion route(s), where appropriate.</p>
Information Dissemination	<p>RACC populates the website and provides incident related data to Value Added Service Providers (VASPS) and other media.</p> <p>RACC operator sets strategic VMS to use specified alternative route and delay times if known.</p>

Strategic Management	RACC operator continues to monitor strategic traffic flows in the vicinity of the wind related incident.
Monitoring	<p>Weather service provider advises RMO that the risk of the severe gales has further reduced.</p> <p>RMO receives an automatic alert from the wind monitoring and information control system informing that the wind speed has fallen below the 2nd threshold and has remained below for an agreed period of time (e.g. 15 minutes).</p>
Information Dissemination	<p>RMO contacts the police command and control to recommend that the closure can be reduced to a Stage 1 restriction.</p> <p>Police command and control decide that the full closure should be reduced as appropriate.</p> <p>RMO advises RACC and local authority with updates.</p>
Reduction in Restrictions	<p>RACC operator receives confirmation of return to a Stage 1 restriction and revises the strategic information to relate to a high-sided vehicle closure, continuing to monitor the congestion on approach to the problem area.</p> <p>RMO reduces the restriction and opens the road/bridge to non-high-sided vehicles.</p> <p>RMO continues to provide regular feedback to the RACC and the police on the capacity of the agreed diversion route(s).</p>
Monitoring	<p>Weather service provider advises RMO that the risk of the severe gales has further reduced.</p> <p>RMO receives an automatic alert from the wind monitoring and information control system informing that the wind speed has fallen below the 1st threshold and has remained below for an agreed period of time (e.g. 15 minutes).</p>
Information Dissemination	<p>RMO contacts the police command and control to recommend that restrictions can be removed.</p> <p>Police command and control decide that the restrictions can be removed.</p> <p>RMO advises RACC and local authority with updates.</p>
Removal of Restrictions/State of Alert	<p>RMO removes the restriction and the police and traffic management crew are stood down.</p> <p>RACC receives confirmation of the restriction removal and removes the strategic information relating to the high-sided vehicle closure, continuing to monitor the congestion on approach to the problem area.</p> <p>Wind speeds have dropped below all thresholds and all warning signs have been switched off etc.</p> <p>RMO continues to provide regular feedback to the RACC and the police on the capacity of the agreed diversion route(s) for an agreed period after the restriction has been removed.</p>

## **Two-Stage Procedure Example Flowchart in Appendix A**

The flow chart in Appendix A presents the above individual tasks in graphical format identifying the processes and procedures undertaken by, and the interaction between, the various organisations involved in managing a high wind incident. The flow chart presents the levels of interaction at various stages in the process prior to, during and after the incident. As previously mentioned, although the flow-chart refers to a two-stage procedure, the process can be easily amended to cover a three-stage procedure beginning with a 'Caution High Wind' warning at Stage 1.

## SECTION 5 – SUMMARY

These guidelines are intended for use by all relevant bodies involved with the Scottish road network. Transport Scotland has prepared these guidelines with the intention that they be used as a best practice guide for all relevant bodies associated in managing the impact of high wind on the Scottish road network.

The key focus of these guidelines is ten basic steps to high wind management embracing pre-planning, incident management and information dissemination prior to, during and after a wind incident has occurred. The scope, complexity and effort required to manage each task will vary dependent on site specifics and the level of perceived risk and disruption at each location. A summary of these steps, which can be applied to all areas of the road network, is presented below:

### Step 1 – Risk Identification

The identification of locations/sections of the road network that are susceptible to the impact of high wind.

### Step 2 – Organisational Agreements

The development of organisational agreements to clarify the roles and responsibilities of each stakeholder prior to, during and after an incident for sections of road deemed to be at risk.

### Step 3 – Diversion Route Planning

The preparation of plans to agree the appropriate diversion routes, to safely manage the diversions and to provide efficient information dissemination.

### Step 4 – Monitoring

The facilitation of meteorological forecasts and real-time monitoring to obtain advanced warnings of high winds and measurable data prior to, during and after a high wind incident has occurred.

### Step 5 – Define High Wind Level Thresholds

The determination of threshold values for wind speed/direction to be associated with the application and removal of each level of restriction applied to that section of the road network.

### Step 6 – Develop the Levels of Restriction

The agreement of both the level and management of restrictions to be applied.

### Step 7 – Enforcement

The development of enforcement procedures to be applied for each level of restriction.

### Step 8 – Implementation of Traffic Management

The agreement of local traffic management procedures to ensure the implementation of restrictions in a quick and efficient manner.

### Step 9 – Information Dissemination

The agreement of communication procedures to ensure a timely exchange of knowledge between the authorities involved in managing the road in order that response plans, procedures and information dissemination to the travelling public can be implemented successfully.

### Step 10 – Relaxation of Restrictions and Information Dissemination

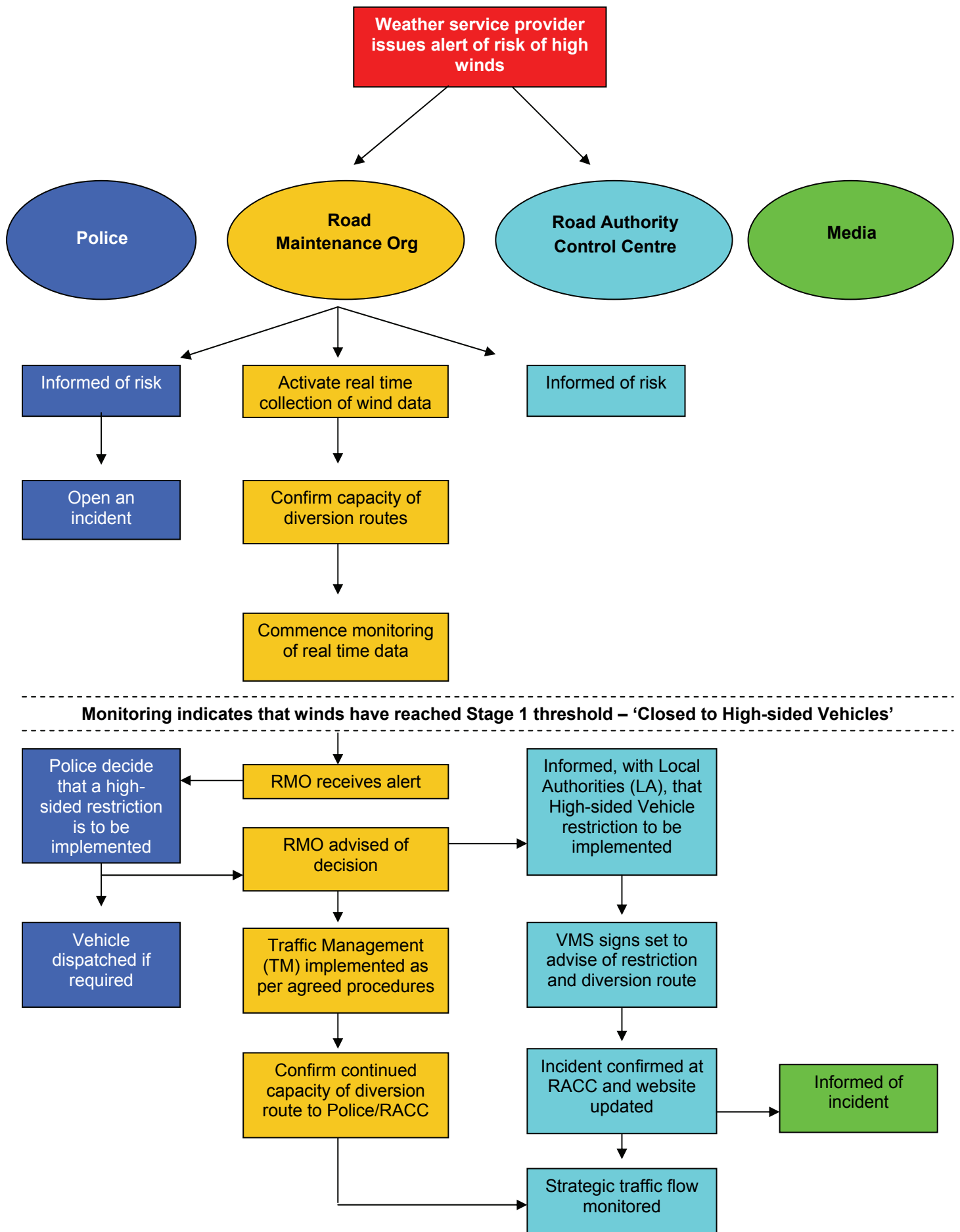
The agreement of the decision-making process regarding the relaxation of restrictions and any post-incident actions.

This document and its appendices have also presented an example of how Transport Scotland applies this to the motorway and trunk road network via the trunk road maintenance organisations, the local police forces and the Traffic Scotland control centre. Additionally, a worked example of the ten step solution shows the intended relationships between the principal stakeholders.

These guidelines can be applied on any part of the Scottish road network and indeed the principles of the ten step approach can be used to develop operational procedures for other incidents on the network, e.g. flooding.

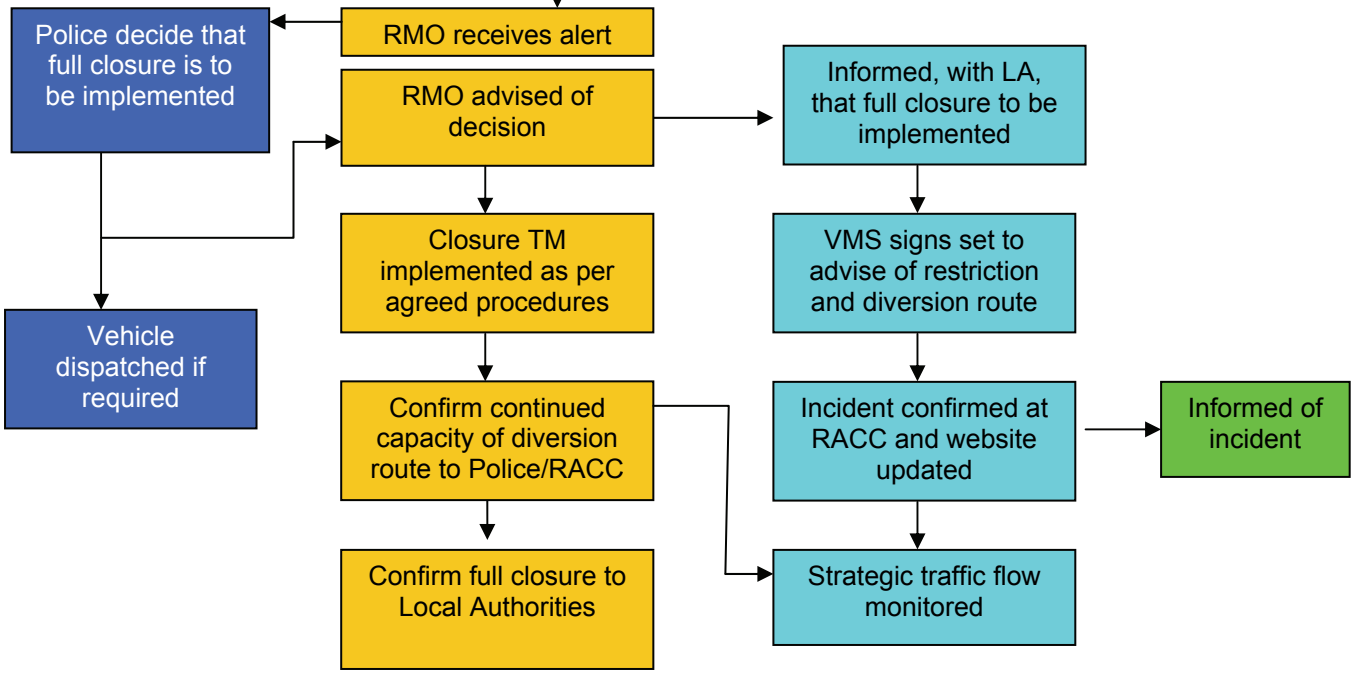
With regards to developing wind management procedures, the level of effort required to undertake the specific tasks is site specific and will largely depend on the individual characteristics of each location.

## APPENDIX A – EXAMPLE PROCEDURAL FLOWCHART

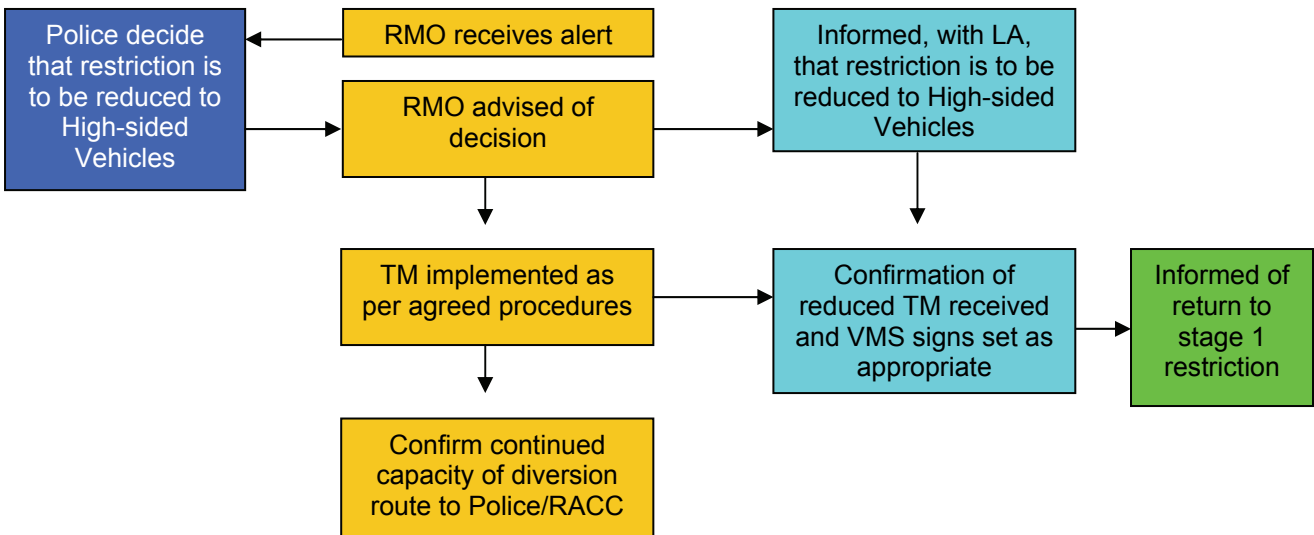




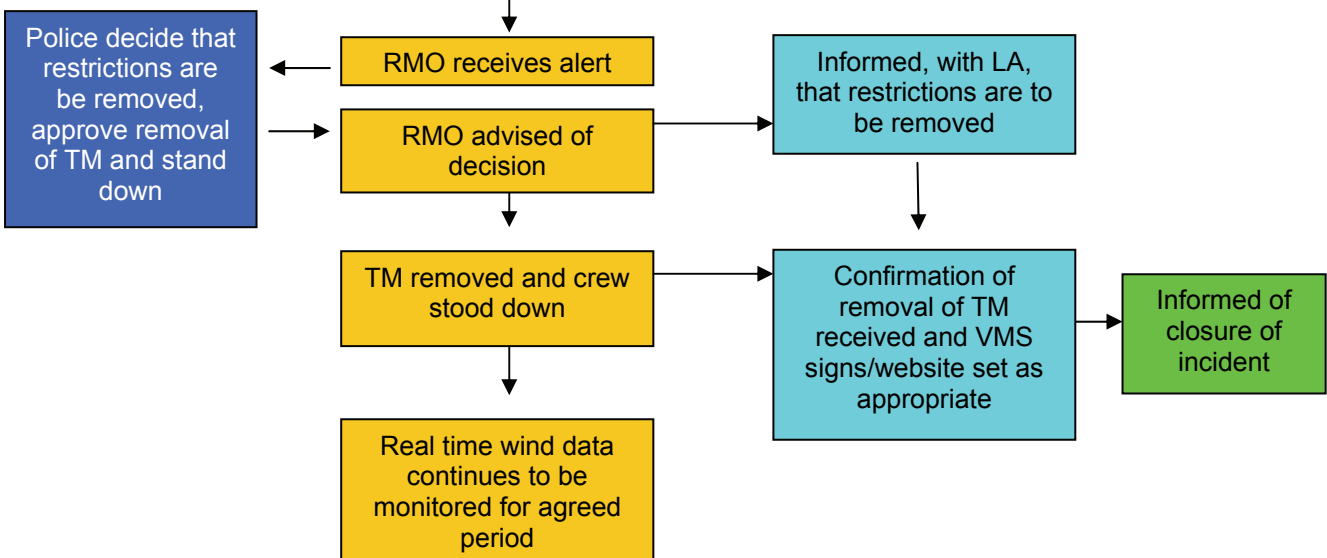
Monitoring indicates that winds have reached Stage 2 threshold – 'Implement Full Closure'



Monitoring indicates that winds have reduced below Stage 2 threshold



Monitoring indicates that winds have reduced below Stage 1 threshold



## **APPENDIX B – TRANSPORT SCOTLAND PROCEDURES**

### **TRUNK ROAD NETWORK**

#### **The Application of the National Guidelines to the Motorway and Trunk Road Network**

The purpose of this appendix is to provide an example of how the Transport Scotland will apply these guidelines to effectively manage instances of high wind on the Scottish motorway and trunk road network. This process will not only focus on the roles and responsibilities of the stakeholders involved, but also concentrate on the elements of pre-planning and the procedures to be adopted and pre-agreed to ensure the safety of travellers and road users in the event of an incident. The roles of the trunk road maintenance organisations, bridge boards, local authorities, the police and the Traffic Scotland control centre will be identified.

The remainder of the section details the approach taken by the Transport Scotland towards the implementation of the ten steps identified. It should be noted that the scope, complexity and level of effort required to manage each step will be site specific and will largely be dependent on the scale of the perceived problem at each location.

#### **Step 1 – Risk Identification**

Transport Scotland will undertake an initial review of the trunk road network to identify sections at risk from high wind. This review will include stakeholder consultation, review of accident statistics and other specialist services such as wind profiling and climate trend analysis to identify all potential risk areas.

#### **Step 2 – Organisational Arrangements**

Transport Scotland will encourage the development of organisational arrangements to clarify the role/responsibilities of each stakeholder prior to, during and after an incident for that 'key' section of road. For the trunk road network, Transport Scotland will require that the appropriate trunk road maintenance organisation be responsible for the initiation and maintenance of the organisational agreements. These

agreements will incorporate, where appropriate, the bridge boards, the relevant police force, local authorities and the Traffic Scotland control centre.

The local agreements will clarify the decision making process and critical path for information dissemination.

### Step 3 – Diversion Route Planning

Transport Scotland will make the trunk road maintenance organisation responsible for the preparation of diversion route plans for each site on the trunk road network.

The trunk road maintenance organisation will identify, where possible, alternative routes for the various classes of diverted traffic as a result of extended closures or restrictions. Where alternative routes are not available, the trunk road maintenance organisation will identify locations for parking of the traffic which cannot continue the journey during the high winds.

The trunk road maintenance organisation will ensure that effective information dissemination is built into the response plans. This is to ensure that the opportunity is given to allow travellers to make informed travel choices.

The trunk road maintenance organisation will assess the alternative routes for high wind impact before they are brought into use. During the high wind incident, the trunk road maintenance organisation, or other agency as agreed in the local wind management procedures (e.g. local authority), will monitor these routes to ensure they are not experiencing similar effects to the problem site.

Although the trunk road maintenance organisation is responsible for the preparation and management of any diversion routes, these will be developed, implemented and maintained with full consultation with the relevant police force, Transport Scotland, local authorities, bridge boards and the Traffic Scotland control centre.

It should be noted that the decision to implement a particular diversion route rests with the local police force (who should consult the relevant road authorities). Consideration in making this decision should be given to the time required to implement and travel to the diversion. These times should be compared to the

expected duration of the restriction or closure before deciding to implement a diversion.

#### Step 4 – Monitoring

For each location identified as being 'at risk', the trunk road maintenance organisation will be responsible for the predictive and active monitoring of the wind conditions during the lead up to, escalation of, and relaxation of, high wind incidents.

The trunk road maintenance organisation will set up agreements with meteorological forecasters to obtain severe weather warnings in advance of high winds occurring. This will permit them to adopt a 'state of alert' and prepare for the impact of wind and the restrictions to be implemented.

In order for the trunk road maintenance organisation to monitor effectively the real time wind conditions, they must identify if there is adequate meteorological equipment to provide the data. Meteorological sites located on the road network in the proximity of the site can be used to facilitate the implementation of specific actions, according to developed procedures, once predetermined thresholds have been reached.

The trunk road maintenance organisation will undertake a review of any existing meteorological equipment to ensure that it is adequate for the job. It may be that existing equipment may need to be relocated or upgraded. If no existing suitable meteorological equipment is available, the trunk road maintenance organisation will liaise with Transport Scotland with respect to the procurement of a suitable facility.

The trunk road maintenance organisation will review the alternative routes to determine if they are in turn susceptible to high wind. If such routes are, then the trunk road maintenance organisation, or local authority as appropriate, will consider the requirement for additional meteorological equipment on these routes.

## Step 5 – Define High Wind Level Thresholds

The trunk road maintenance organisation will identify the wind threshold conditions that will trigger the onset and removal of restrictions on the affected road. In order to choose the appropriate wind thresholds, the trunk road maintenance organisation may access specialist meteorological expertise. Such thresholds are to be agreed with Transport Scotland and the local police force.

The trunk road maintenance organisation will take into account the increasing or decreasing trends of the relevant wind conditions when determining what thresholds should trigger the implementation and relaxation of any restrictions.

## Step 6 – Develop the Levels of Restriction

The trunk road maintenance organisation will determine the level of restrictions through consultation with Transport Scotland and the local police force. When the level of restrictions has been agreed, the trunk road maintenance organisation will be responsible for deploying traffic management for the restrictions (but not enforcement, see Step 7). As such they will be required to liaise with the police and Traffic Scotland control centre, as well as any affected road authorities, to inform of a proposed restriction prior to its implementation.

## Step 7 – Enforcement

The responsibility for enforcement rests with the police forces. The trunk road maintenance organisation will ensure that traffic management for the restrictions to vehicle classes or complete road closures have been agreed with the police and that the statutory powers they require are in place. Close liaison with the Traffic Scotland control centre will be required to implement any strategic variable message sign setting to provide sufficient advance warning of restrictions. These actions can help reduce the demands on police resources during restrictions or closures.

## Step 8 – Implementation of Traffic Management

The trunk road maintenance organisation will be responsible for the implementation of the traffic management deemed necessary for the restrictions or closures. This will require agreement with and instruction from the local police force as appropriate.

The level of traffic management required and the procedures should also be agreed between the road maintenance organisation, the local road authority and Transport Scotland. The scale of traffic management required will be site specific and dependent on location.

Local traffic management procedures including alternative routes will be agreed in advance with all relevant bodies including the Traffic Scotland control centre. It is essential that the trunk road maintenance organisation ensure that the alternative route is suitable for the purposes, i.e. that it does not suffer the same problem and has sufficient capacity to accommodate the additional traffic. Procedures must also formalise the provision of feedback from the trunk road maintenance organisation to the Traffic Scotland control centre and the local police for all periods leading up to, during and after any restrictions.

## Step 9 – Information Dissemination

Building upon the critical path for information dissemination (identified in Step 2 – Organisational Agreements), Transport Scotland will require the trunk road maintenance organisation to implement formalised information dissemination procedures. As part of the procedures the Traffic Scotland control centre will issue updates of restrictions and closures to the trunk road maintenance organisations, bridge boards and affected local road authorities. In parallel, the Traffic Scotland control centre will also update other parties including local radio stations.

This step is key to successfully managing a high wind incident as it enables the Traffic Scotland control centre to monitor and manage the status of the trunk road on a nationwide basis with a focus upon the trunk road network and those roads that impact upon it. This will ensure that the Traffic Scotland control centre are best placed to inform the travelling public in the most efficient manner.

## Step 10 – Relaxation of Restrictions and Information Dissemination

The trunk road maintenance organisation will be responsible for the relaxation of any restrictions as agreed in the procedures from step 5 above. It is important to note that this task is as equally important as the initial implementation of restrictions, with the key element being the real time dissemination of information. Transport Scotland will require that the trunk road maintenance organisation prepares an agreed procedure to liaise with the police and the Traffic Scotland control centre to confirm acceptance of the relaxation. Similar to Step 9, timely involvement of the Traffic Scotland control centre will ensure that the travelling public can be promptly informed.

# APPENDIX C – TRUNK ROAD NETWORK PROCEDURES – ERSKINE BRIDGE

## INTRODUCTION

### **Purpose**

Erskine Bridge is an exposed structure and it is essential that traffic control is applied during high winds to ensure that vulnerable vehicles are not exposed and blown over or blown into the path of other vehicles. This equally applies to pedestrians and cyclists potentially using the relevant pathways on it.

This plan identifies the specific wind monitoring and operational procedures to be adopted in response to predicted and actual high winds in the proximity of the Bridge.

## HIGH WINDS

Taking cognisance of wind forecasting and warning information from the Meteorological Office and monitoring 'live' speeds provided by the wind data facility on the Erskine Bridge, graduated operational responses will be implemented to allow the majority of drivers continued use of the Bridge, until the final phase. These are as follows:

- Stage 1** A 'Warning' phase implemented for wind gusts in the 35 to 44 mph range;
- Stage 2** Procedures intended to advise of 'segregation' arrangements during 45 mph cross and 60 mph head/tail wind gusts, in order to divert high-sided vehicles; and
- Stage 3** Full closure of Erskine Bridge for wind gusts of 70 mph and above, irrespective of wind direction.



## WIND MONITORING

### **Wind Forecast**

Erskine Bridge is the subject of site-specific wind forecast/wind warning information provided by the Meteorological Office, as follows:

#### **(a) Daily 5-day Forecast**

This forecast is issued at approximately 0600 hrs each day and permits the Operating Company (OC) to plan and prepare for possible restrictions or closures. It is graduated and reflects rising wind speeds:

- **Green (G):** maximum gust speeds 30 mph and below;
- **Amber (A):** maximum gust speeds 31 to 44 mph;
- **Red (R):** maximum gust speeds 45 to 59 mph; and
- **Black (B):** maximum gust speeds 60 mph and over.

#### **(b) Detailed Daily 24-hour Forecast**

This forecast is also issued at approximately 0600 hrs daily and runs from 0700 hrs that morning to 0700 hrs the following morning.

#### **(c) 'Wind (Gale) Warning' or 'Wind (Storm) Warning'**

Issued, if during the next 6 hours the maximum gust is forecast to exceed 45 mph or 60 mph respectively.

### **Live Wind Data**

In addition, an ultrasonic wind anemometer is installed immediately above the centre bridge deck of Erskine Bridge and provides 'live' data and associated forecast information from the Met Office, on a web-based, large screen display within the OC Operational Control Room (OCR).

## **RESPONSIBILITIES**

### **(a) Strathclyde Police**

The police are empowered in terms of the Road Traffic Regulation Act 1984, Section 67(1) to close or instruct closure of a road in extraordinary circumstances, in order to mitigate potential danger. Consequently, in situations which raise concerns for safety, and with increasing wind velocities at the Erskine Bridge being within the recognised parameters, the Duty Engineer's findings must immediately be intimated to Strathclyde Police for the police to decide and confirm approval for the implementation of 'segregation' or 'full closure' arrangements.

### **(b) Duty Engineer (24/7)**

The OC Duty Engineer (D/E) will ensure that all wind related information for the Erskine Bridge is appropriately monitored and evaluated and, where appropriate, will instruct **OCR** staff to consult with the police, with a view to implementing procedures for either **Stage 2** – 'Segregation' or **Stage 3** – 'Full Closure'. The D/E will be responsible for liaising with the Met Office to confirm forecasts and projections.

### **(c) The Operational Control Room (OCR)**

The OCR will undertake continuous monitoring of wind data from the 'live' information feed on the web site, fully supporting the D/E in the wind management arrangements for Erskine Bridge and liaising with Strathclyde Police. They will coordinate with Traffic Scotland in the implementation of each of the relevant stages.

### **(d) Duty Officer**

In close liaison with the OCR, the OC Duty Officer (D/O) will be responsible for deploying all traffic management (TM) resources necessary to fulfil requirements to assist police in implementing the agreed stages' response and updating staff with the relevant progress of TM operations.

## (e) Traffic Scotland

Traffic Scotland will maintain close liaison with the OCR throughout the incident and will:

- Implement the pre-arranged variable message signs (VMS) Plan to reflect the parameters of the particular Stage notified;
- Undertake a cursory CCTV sweep of the visible bridge deck area for a 'Full Closure', in order to confirm an absence of vehicles to the OCR, after all TM operations have been completed;
- Updating information on both Traffic Scotland and Freight Scotland web sites; and
- At the completion of the incident, cancel associated VMS Plans **only** when a complete removal of all physical traffic management has been effected and when notified by the OCR.

### MOBILISATION PROCEDURES

<b><i>Stage / Wind Gust Speed</i></b>	<b><i>Actions</i></b>
<b><u>Stage 1</u></b> <b>Wind gusts over 35 mph and less than 45 mph</b>	<b><u>'Warning' Phase</u></b> <ul style="list-style-type: none"><li>• <b>OCR</b> to advise Strathclyde Police, with any additional information on potential restrictions or closure; and</li><li>• <b>OCR</b> to advise Traffic Scotland with request for implementation of VMS plan showing '<b>Caution High Winds</b>'.</li></ul>
<b><u>Stage 2</u></b> <b>Cross wind gusts of 45 mph or Head/Tail wind gusts of 60 mph</b>	<b><u>'Segregation' Phase</u></b> <ul style="list-style-type: none"><li>• <b>D/E</b> to direct <b>OCR</b> staff to advise Strathclyde Police of wind parameters. Strathclyde Police to decide to proceed with Stage 2 – 'Segregation';</li><li>• <b>OCR</b> to advise Traffic Scotland of need to implement VMS plan showing '<b>Erskine Bridge Closed To High Sided Vehicles</b>';</li></ul>

	<ul style="list-style-type: none"> <li>• <b>Incident support units (ISU) / TM Crews</b> to implement pre-positioned drop-down signs indicating, '<b>Erskine Bridge Closed to High Sided Vehicles</b>';</li> <li>• <b>OCR</b> to advise other Emergency Services;</li> <li>• <b>ISU / TM Crews</b> to implement closure of all gates on pedestrian/cycle paths on the Erskine Bridge, with the sign '<b>Cycle Track and Footpath CLOSED – Dangerous Conditions</b>' being opened on each gate;</li> <li>• <b>OCR and Traffic Scotland</b> to liaise regarding circulation of advice to other agencies; and</li> <li>• Where velocities subside rapidly, restrictions <b>must</b> remain in place for at least 30 minutes from implementation, to reduce the potential for confusion which may occur with a shorter timescale.</li> </ul>
<p><b><u>Stage 3</u></b></p> <p><b>Cross wind gusts and Head/Tail Wind gusts of 70 mph</b></p>	<p><b><u>'Full Closure' Phase</u></b></p> <ul style="list-style-type: none"> <li>• <b>D/E</b> to direct <b>OCR</b> staff to advise Strathclyde Police of wind parameters. Strathclyde Police to decide to proceed with Stage 3 – 'Full Closure';</li> <li>• <b>OCR</b> to advise Traffic Scotland and request that the VMS plan showing, '<b>Erskine Bridge Closed</b>', be implemented;</li> <li>• <b>ISU / TM Crews</b> to thereafter assist police in implementing the agreed response by deploying TM for the physical closure of all slip and access roads;</li> <li>• <b>OCR</b> to advise other emergency services;</li> <li>• Gates on pedestrian/cycle paths to remain <u>closed</u>;</li> <li>• <b>OCR and Traffic Scotland</b> to liaise regarding circulation of advice to other agencies; and</li> <li>• <b>Traffic Scotland</b> to check bridge CCTV to verify that no vehicles are present.</li> </ul> <p><b>Note:</b> The temporary drop-down signs currently utilised at Stage 2 <b>must</b> be left open until reduced wind speeds allow them to be closed safely.</p>
<p><b>Wind gusts of 80 mph or more</b></p>	<p><b><u>Structural Examination</u></b></p> <p>Where velocities of 80 mph or greater have been experienced, Erskine Bridge must be subjected to a structural survey as soon as reasonably practicable.</p>

## **Traffic Management – Stage 2 ('Segregation')**

Temporary drop-down signs intimating, '**Erskine Bridge Closed to High Sided Vehicles**' are pre-positioned at the following locations and will be deployed in support of the primary VMS signs:

- **M8 (E)** – On approach to the off-slip to M898;
- **M8 (W)** – On approach to the off-slip to M898;
- **A82 (N)** – On approach to the off-slip to A898 (Prior to advanced direction signs (ADS) at Auchentoshan Distillery);
- **A82 (S)** – On approach to the off-slip to A898;
- **B815 (E) at Erskine** – On approach to the roundabout giving access to the A898 northbound; and
- **A726 (W) at Erskine** – Between the spectacle roundabouts, prior to the access slip to the A898 northbound.

## **Traffic Management – Stage 3 ('Full Closure')**

The following actions to be undertaken by TM and ISU Crews to assist police in implementing the agreed response:

- Closure of the northbound M898 at its access point from the M8 westbound;
- Closure of the M898 from its merge point between the east and west bound off-slips from the M8, to the A726/B815 Bishopston/Erskine off-slip. This will physically compel all traffic to leave via the latter road;
- Closure of the A726/B815 northbound on-slip from the 'Spectacle' Roundabout onto the bridge; and
- Closure of the A82 westbound and eastbound on-slips onto the A898.

## **RE-OPENING PROCEDURES**

A decision to re-open Erskine Bridge from either a **Stage 2** ('Segregation') or a **Stage 3** ('Full Closure'), will be taken by the police on the advice of the D/E, who will have previously ascertained the following:

- Whether the forecast wind gust speeds are expected to remain below the relevant speed and the wind direction is not expected to change adversely or blow from a more critical direction;
- When reviewing a **Stage 2** ('Segregation') scenario, it is important that removal is not undertaken where it is anticipated that it will possibly require a re-imposition a relatively short time later; and
- Similarly, as a **Stage 3** ('Full Closure') may require more than 1 hour to re-open and perhaps 1½ to 2 hrs to close again, re-opening should not be considered where there is potential of further closure within a few hours.

### Sequence of Arrangements for Re-opening

The following Table lists the sequential removal of the relevant stages, listing associated procedures and responsibilities:

<b>Stage / Wind Gust Speed</b>	<b>Actions</b>
<p><b><u>Reduction from Stage 3</u></b></p> <p><b>Cross wind gusts and Head/Tail Wind gusts now reduced to less than 70 mph</b></p>	<p><b><u>Removal of 'Full Closure'</u></b></p> <ul style="list-style-type: none"> <li>• <b>D/E</b> to direct <b>OCR</b> staff to advise Strathclyde Police of wind parameters. Strathclyde Police to confirm to <b>OCR</b> approval for removing <b>Stage 3</b>;</li> <li>• <b>OCR</b> to advise Traffic Scotland of intention to lift closure. (VMS text will <b>not</b> be altered at this stage);</li> <li>• <b>ISU Crew or a Supervisor</b> to undertake a safety inspection of the carriageway and its environs for debris etc. (e.g. lighting fittings), prior to re-opening;</li> <li>• <b>TM Crews</b> to remove physical closures on all slip and access roads for the Erskine Bridge, on both the <u>South side</u> (M8/M898 and A726/B815) and the <u>North side</u> (A82/A898), as two separate and individual operations;</li> <li>• <b>TM Supervisor</b> to report the physical re-opening of closures to the <b>OCR</b> as each group is achieved and, where wind speeds still remain within the <b>Stage 2</b> banding, Traffic Scotland will be asked alter relevant VMS to indicate, '<b>Erskine Bridge Closed To High Sided Vehicles</b>';</li> </ul>

	<ul style="list-style-type: none"> <li>• Temporary drop-down signs which had previously been deployed in <b>Stage 2</b> of this operation and which will have been left open for safety reasons, will now be available to reflect and reinforce the message on the VMS;</li> <li>• Gates on pedestrian/cycle paths to remain <u>closed</u>;</li> <li>• <b>OCR</b> to confirm with Strathclyde Police that access roads are now open, although <b>Stage 2</b> restrictions still apply; and</li> <li>• <b>OCR and Traffic Scotland</b> to liaise regarding circulation of advice to other agencies including updating of VMS.</li> </ul>
<p><b><u>Reduction from Stage 2</u></b>  <b>Cross wind gusts now less than 45 mph or Head/ Tail wind gusts below 60 mph</b></p>	<p><b><u>Removal of ‘Segregation Arrangements’</u></b></p> <ul style="list-style-type: none"> <li>• <b>D/E</b> to direct <b>OCR</b> staff to advise Strathclyde Police of wind parameters. Strathclyde Police to confirm to <b>OCR</b> approval for removing <b>Stage 2</b>;</li> <li>• <b>OCR</b> to advise Traffic Scotland of intention to lift restrictions. (VMS text will <b>not</b> be altered at this stage);</li> <li>• <b>TM/ISU</b> Crews to close associated temporary drop-down signs for the Erskine Bridge on both the <u>South side</u> (M8/M898 and A726 / B815) and the <u>North side</u> (A82/A898), as two separate and individual operations;</li> <li>• <b>TM Supervisor</b> to advise completion to the <b>OCR</b> as each group is achieved and, where wind speeds still remain within the <b>Stage 1</b> banding, Traffic Scotland will be asked alter the relevant VMS signs to indicate, <b>‘Caution High Winds’</b> on each side of the Erskine Bridge, as each is concluded;</li> <li>• <b>TM/ISU</b> Crews to re-open gates on pedestrian footpath/cycle track and re-set the signs on each, having ensured no debris is present;</li> <li>• <b>OCR</b> to confirm with Strathclyde Police that <b>Stage 2</b> arrangements have now been lifted but with a <b>Stage 1</b> – ‘Warning’ still in place; and</li> <li>• <b>OCR and Traffic Scotland</b> to liaise regarding circulation of advice to other agencies including updating of VMS.</li> </ul>

**Reduction from  
Stage 1**

**Winds speed gusts  
now below 35 mph**

**Removal of 'Warning' Signs**

- **OCR** to monitor diminishing wind speeds and will advise Traffic Scotland when reduced sufficiently to remove warnings from VMS; and
- **OCR and Traffic Scotland** to liaise regarding circulation of advice to other agencies including updating of VMS.



## **APPENDIX D – TRANSPORT SCOTLAND/MET OFFICE WIND ANALYSIS RESULTS**

To assist in analysing the trunk road network for other locations where wind management procedures may require to be developed, Transport Scotland have engaged with the Met Office to prepare a set of model results which provide comparative wind speed data information across the whole of the trunk road network and the local authority A-roads. The results, using Met Office data from 1971 to 2000, are presented as a series of monthly maps (graded in a colour-coded basis) indicating the comparative results for various wind speed and gust analyses. An example of a resultant map can be found within this appendix.

To derive the wind climate across Scotland, the Met Office utilised a range of statistical techniques to produce a gridded dataset at 1km resolution. The underlying wind speed data was extracted from the Met Office climatological archive. In addition, numerical modelling techniques developed by the Met Office were used in the process. The distribution of wind measuring sites across Scotland is not uniform, with some relatively 'data sparse' areas. In some locations this had an impact on the distribution of wind speeds produced by the grid. When using the outputs from this project it should be recognised that wind direction was not included as an input to the gridding process. Therefore it should not be assumed that the highly localised impact of wind direction on local wind speed is represented within the output.

In developing the terms and conditions for this work, Transport Scotland have secured agreement with the Met Office that this information can be made available to the local authorities (as a sub-licensing agreement) to assist them in identifying parts of their network which may require wind management procedures. To request further information please write to the following address:

**Transport Scotland, Network Operations Branch, Buchanan House,  
Glasgow G4 0HF**



## APPENDIX E – ROLES AND RESPONSIBILITIES

### Roles and Responsibilities during a Trunk Road High Wind Incident

The following section defines the roles and responsibilities of the organisations involved in the management of high wind impact on the trunk road network and associated bridge structures. It is noted that the exact role and responsibility of each authority may vary slightly where the procedure is applied to the management of local roads.

#### Trunk Road Maintenance Organisations (Operating Companies)

##### Role:

- Support Transport Scotland's initial review to identify areas on the trunk road network at risk to high winds. To undertake subsequent reviews of 'at risk' locations; and
- Actively monitor the risk of high winds occurring using links with meteorological forecasters, real time data from meteorological sites and, if high winds occur, follow agreed procedures to manage the impact of wind related incidents.

##### Responsibilities:

- Assist Transport Scotland initial review of the trunk road network to identify sections at risk to high winds;
- Undertake when instructed, subsequent to Transport Scotland's initial review, regular reviews of the trunk road network to identify 'key' locations on the trunk road network susceptible to the impact of wind. These reviews may include stakeholder consultation, analysis of accident statistics and specialist services such as wind profiling and climate trend analysis;
- Develop organisational agreements with the Traffic Scotland control centre, the local authorities, bridge boards and local police forces to define the role and responsibilities of these authorities for each 'key' location and agree the

information dissemination procedures to be followed prior to, during and after an incident;

- Prepare procedures as required. These should consider alternative routes, efficient diversion management and information dissemination;
- Set up links with meteorological forecasters to obtain severe weather warnings in advance of high winds occurring;
- Define the wind speed thresholds and associated restrictions to be implemented during wind incidents;
- Monitor the real time wind speeds using weather sites within their area and on reaching predetermined thresholds, undertake specific actions according to the agreed procedures;
- When necessary and in accordance with procedures, keep the relevant authorities, e.g. local authorities, Traffic Scotland control centre and police, informed as to the progress of an incident;
- Activate any information systems under their control as necessary;
- Implement traffic management as required. This will require the initiation of agreements with the local police authority to assist in the implementation of restrictions and enforcement for each key location;
- Monitor and provide feedback on the status of agreed alternative routes prior to, during and for an agreed period after a restriction is in force; and
- Undertake the agreed procedures for relaxation of restrictions as required following consultation with Traffic Scotland control centre, local authorities and police.

## Traffic Scotland Operator (TSOp) and Control Centre (TSCC)

### Roles:

- Manage the strategic impact of any wind related incident on the trunk road network. This will comprise of setting the strategic VMS, updating the Traffic Scotland and Freight Scotland websites ([www.trafficscotland.org](http://www.trafficscotland.org) and [www.freightscotland.org](http://www.freightscotland.org)) and appropriate liaison throughout Scotland with police forces, bridge boards, trunk road maintenance organisations and Transport Scotland; and

- Inform the media and the wider general travelling public of the risk of high winds using, where appropriate, information provided/exchanged from the bridge boards, trunk road maintenance organisations, police, meteorological forecasters and local authorities.

Responsibilities:

- Receive and monitor information from police, meteorological forecasters, trunk road maintenance organisations, bridge boards and local authorities (via verbal communications or data exchange links) relating to wind incidents;
- Inform the media and the travelling public of the risk of high winds at specific locations and provide appropriate travel/safety advice (in accordance with agreed procedures) on required traffic management issues;
- Actively monitor the effects of any wind incidents and manage traffic appropriately across the trunk road network; and
- Liaise with relevant police forces, bridge boards, trunk road maintenance organisations, local authorities and Transport Scotland as necessary throughout the duration of any wind related incident.

Forth Estuary Transport Authority (FETA)/Tay Road Bridge Joint Board (TRBJB)

Role:

- FETA and TRBJB identify and actively monitor the risk of high winds occurring at their respective bridge structures using links with meteorological forecasters, real time data from meteorological sites and, if high winds occur, follow set procedures to manage the impact of wind related incidents.

Responsibilities are set by the Bridge Authority or Board, these are currently:

- Links are established with meteorological forecasters to obtain severe weather warnings in advance of high winds occurring;
- The wind speed thresholds are defined and associated restrictions are implemented during wind incidents;

- Real time wind speeds are monitored using weather sites within its area and, on reaching predetermined thresholds, undertake specific actions according to their own set procedures;
- The relevant authorities are kept informed as to the progress of an incident, e.g. local authorities, Traffic Scotland control centre, police;
- Information systems are activated under its control as necessary including the setting of strategic VMS by the Traffic Scotland control centre; and
- Traffic management is implemented where appropriate and, when required, the relevant local police authorities are informed to assist where necessary with the enforcement.

## Police Forces

### Role:

- Assist the bridge boards, trunk road maintenance organisations, Transport Scotland and Traffic Scotland control centre in identifying 'at risk' locations on the trunk road network and safely managing wind related incidents; and
- Enforce restrictions or closures as appropriate.

### Responsibilities:

- Provide information to Transport Scotland and trunk road maintenance organisations on what they believe to be 'at risk' sections of road. This may include locations where accidents have occurred as a result of high winds based on both local knowledge and attendance at previous incidents; and
- Assist (where applicable) bridge boards, local authorities, trunk road maintenance organisations and Transport Scotland in developing operational procedures for managing a wind incident, including diversion routes and traffic management planning.

## Local Authorities

### Role:

- Develop wind management procedures for their own network as they deem appropriate;
- Work with local and trunk road maintenance organisations, the police and Transport Scotland in agreeing appropriate diversion routes from and to the trunk road network; and
- Advise Transport Scotland and trunk road maintenance organisations on what the local authority believe to be 'at risk' sections of the local authority road network that impacts on the trunk road network. This may include locations where accidents have occurred as a result of high winds.

### Responsibilities:

- Develop organisational agreements with the trunk road maintenance organisations, Traffic Scotland control centre, bridge boards and police to define the role and responsibilities of these organisations for the local authority road network impacting on the trunk road network and agree the information dissemination procedures to be followed prior to, during and after an incident;
- When necessary and in accordance with agreed procedures, provide relevant organisations, e.g. Traffic Scotland control centre, police, trunk road maintenance organisations, with monitoring, condition and/or traffic reports on the local road network during a high wind incident; and
- Activate any information systems under their control and traffic management as per the appropriate response plan.

Further copies of this document are available, on request, in audio and large print formats and in community languages, please contact:

Aby otrzymać niniejszy dokument w innej wersji językowej, na kasecie lub w wersji z powiększonym drukiem, prosimy o kontakt:

اس دستاویز کی مزید کاپیاں آڈیو کیسٹ پر اور بڑے حروف کی چھپائی میں اور کیسٹوں کی زبانوں میں طلب کیے جانے پر دستیاب ہیں، برائے مہربانی اس پتہ پر رابطہ کریں:

এই ডকুমেন্ট-এর (দলিল) অতিরিক্ত কপি, অডিও এবং বড়ো ছাপার অক্ষর আকার এবং সম্প্রদায়িক ভাষায় অনুরোধের মাধ্যমে পাওয়া যাবে, অনুগ্রহ করে যোগাযোগ করুন:

Gheibhear lethbhreacan a bharrachd ann an cruth ris an èistear, ann an clò mòr agus ann an cànan coimhearsnachd. Cuir fios gu:

इस दस्तावेज़/कागज़ात की और प्रतियाँ, माँगे जाने पर, ऑडियो टेप पर और बड़े अक्षरों में तथा कम्यूनिटी भाषाओं में मिल सकती हैं, कृपया संपर्क करें:

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