

All hazards operational guidance: responding to climate disruption

Disclaimer

CIHT, the authors, and contributors who produced this document have endeavoured to ensure the accuracy of its contents. However, the advice and recommendations given should always be received by the reader “in light of the facts” of their specialist circumstances and specialist advice obtained as necessary. Any references to legislation discussed within this document should be considered in the light of current and any future legislation. The supervised use of artificial intelligence was used to process some of the findings of this report. No liability for negligence or otherwise in relation to this document and its contents can be accepted by CIHT, the members of the project group, its servants or agents, or the managing editors or contributors.



Published by the:

Chartered Institution of Highways & Transportation

119 Britannia Walk
London N1 7JE
t: +44 (0)20 7336 1555
e: info@ciht.org.uk
www.ciht.org.uk

Registered Charity in England No. 1136896

Registered Charity in Scotland No. SC040873

Registered Charity in Republic of Ireland No. 20103989

Published July 2026.

All rights reserved. No part of this publication shall be reproduced, stored in an electronic retrieval system, or transmitted without the written permission of the publishers.

For any inquiries, please email technical@ciht.org.uk

Contents

1. Summary for local authority leaders	4
2. Questions to ask before signing off the operational framework.....	5
3. Purpose, audience, and relationship to other guidance documents	6
4. Why does an LHA need an operational framework?	8
5. The four stages of operational response	9
6. Core operational principles	10
7. Core operational arrangements	11

1. Summary for local authority leaders

This document provides guidance to help local highway authorities (LHAs) design, implement, and test their operational response to disruption to their networks caused by extreme heat, flooding, wildfires, and other hazards.

The UK's changing climate is generating these extreme events at frequencies and intensities unprecedented in our recorded experience.

Leaders must ensure that an operational framework is in place that allows the authority to act quickly when faced with credible risks from such events, prioritise interventions where consequences for communities are greatest, and make available suitably qualified, experienced, and empowered professionals (SQEEP)

to take timely, defensible decisions under conditions of uncertainty.

The operational framework should facilitate coordinated action across the organisation and with partners, supported by "good enough" information, sound governance arrangements, and effective communication. It should also ensure that decisions are recorded and used after the event to inform future planning and investment.

Leadership commitment is critical to embedding this approach, maintaining the necessary capacity and capability to act, and ensuring that learning from incidents is translated into continuous improvement and better outcomes for communities.

2. Questions to ask before signing off the operational framework

These questions are intended to help leaders assess the robustness of the authority's operational response arrangements.

How clearly does the authority's framework shape what it would actually do during an incident?

The framework should help translate longer-term planning into practical action during an incident. It should be clear how teams will behave differently as a result, and how it will be used under pressure to structure response, support decision making, and coordinate activity across the highways service, wider authority, and with partners.

To what extent does it enable early, proportionate action based on credible risk?

The framework should provide a clear link between the exceedance of pre-agreed triggers or thresholds and subsequent action. It should support timely decision making before impacts escalate and give decision makers confidence to act with "good enough" information in conditions of uncertainty.

How effectively does it support prioritisation based on consequences?

The framework should direct the response effort to those locations where disruption has the greatest impact on the public, communities, services, and wider network. It should support consistent, defensible decisions about where to act, and where not to act.

Are leadership roles and decision making clear and workable in practice?

Roles, responsibilities, and decision authority should be clearly defined and consistently applied. The framework should support effective escalation, ensure SQEEP are available at all times, and maintain continuity of management and leadership during prolonged events.

How does it establish a shared and forward-looking understanding of the situation?

The framework should embed a consistent approach to situational awareness and rapid impact assessment (RIA). It should enable teams and partners to operate from a shared operational picture of impacts and consequences and support a clear view of how the situation may evolve and what should be prioritised next.

How realistic is the approach to situational understanding in terms of tools, systems, and information flows?

The framework should reflect the tools and systems that are available to the authority, including their limitations. It should provide for integration of information from multiple sources and include credible arrangements for maintaining situational awareness and communication if systems or connectivity fail.

How effectively does it support safe and reliable use of the network during response, stabilisation, and recovery?

The framework should enable timely, proportionate decisions and interventions to maintain safety and use across the network as conditions evolve. This includes the implementation of traffic management, safety measures, and engineering interventions, as well as the proactive protection of critical assets and routes. It should support a balanced approach that maintains access where it is safe to do so, while restricting or closing parts of the network where necessary.

How will it support sustained operations during prolonged incidents?

The framework should enable a response that can be maintained over time without loss of control, effectiveness, or safety. It should reflect the authority's real capacity and constraints, including workforce, contractors, and supply chain, and support continuity across multiple shifts. It should provide for the active management of fatigue and wellbeing, and ensure that leadership, coordination, and decision making remain effective throughout extended events.

How does it define when and how business as usual activity is suspended, reprioritised, and reinstated?

The framework should set out clear criteria and decision-making arrangements for suspending or reprioritising business as usual (BAU) activity during an incident, including how resources are redirected to support the response. It should also provide a controlled and realistic approach to reinstating normal operations as conditions stabilise, ensuring that risks associated with both suspension and return are understood and managed.

How does it support learning, cost capture, and future improvement?

The framework should ensure that decisions, actions, impacts, and costs are consistently recorded. It should link operational experience to programme, investment, and funding decisions, and support the translation of learning into tangible improvements in capability, planning, and future response.

Where is the framework most likely to come under strain?

Heads of service should consider where the framework may be least effective during a major or prolonged event, including potential gaps in leadership, capacity, systems, or coordination, and how these risks are understood and managed.

3. Purpose, audience, and relationship to other guidance documents

This guidance supports LHAs to establish an operational framework to structure their response to disruption to the road network caused by extreme weather and other climate-related hazards.

The operational framework establishes the leadership, governance, situational awareness, prioritisation, escalation, and learning arrangements required to support a consistent and defensible response to any climate hazard. Hazard-specific guidance is contained in the associated set of six operational checklists at: (insert link).

Production and maintenance of the framework will normally be the responsibility of the relevant head of service or assistant director within an LHA. They will need to involve maintenance, network, asset, and other managers across the service and wider council, including in-house, arm's length, and tier 1 delivery organisations.

The operational framework should build on and align with the authority's existing arrangements including winter service plans, business continuity arrangements, resilient network planning, asset management plans, and local resilience forum processes.

Once in place the framework should be reviewed at a minimum every 24 months and after any significant event. Names and contact details of key individuals in the chain of command should be checked quarterly.

The framework should also be a key input into the authority's emergency planning exercises and drills, and if necessary be updated to reflect learning from these exercises.

This framework forms part of a suite of documents.

How to Use these Documents

Document	Main Question	Purpose	Level
Suite (available from CIHT or Local Partnerships website)	How do the documents fit together and which ones should I use?	Explains the structure of the guidance suite, how the documents relate to each other and which documents are most relevant to different users.	User Guide
DfT Transport Hazard Summaries	What hazards may affect transport?	Provides national evidence on climate hazards and their potential impacts on transport systems.	National Evidence
Local Partnerships Hazard Response and Adaptation Summary	What do these hazards mean for our highway service?	Provides the overarching strategic resilience and adaptation framework for Local Highway Authorities. Explains how resilience should be embedded within service delivery, governance, asset management, adaptation, procurement and investment decisions.	Strategic Local Interpretation
Local Partnerships Hazard-Specific Strategic Guides	What does this hazard mean for our network, people and assets?	Explains the impacts, consequences, preparedness considerations and adaptation opportunities associated with individual hazards.	Strategic Hazard Application
CIHT All Hazards Operational Guidance	How should we organise and manage preparedness, response and recovery?	Provides an operational framework for preparing for, responding to, recovering from and learning from disruptive weather and climate-related events.	Operational Framework
CIHT Hazard-Specific Operational Checklists	What do we do before, during and after this event?	Supports operational planning and decision-making before, during and after specific hazard events.	Operational Application
Local Partnerships Capability Guides (SQEP, RIA, Situational Awareness, Triggers and Thresholds, Vulnerability and Criticality, Consequence-Led Decision Making, Learning and Adaptation, etc.)	What capabilities do we need to deliver effective resilience?	Explains the key resilience concepts, processes and capabilities that support preparedness, response, recovery and adaptation activities.	Supporting Capability Guides
Leadership Checks and Self-Assessment Tools (in all documents)	How do we know if we are doing enough and what good looks like?	Supports self-assessment, governance, continuous improvement and understanding of good resilience practice.	Assurance and Continuous Improvement

4. Why does an LHA need an operational framework?

The council as the LHA is the accountable body for the maintenance and management of the highway regardless of the level of outsourced activity in delivering the council's highways and transport service. As LHA, the council is solely and fully responsible for ensuring resilience and adaptation of the highway network, its assets, and operation.

As a designated Civil Contingencies Act Category 1 responder, the highways service is also accountable for ensuring an effective response to emergencies affecting the highways network.

The Local Partnerships Highways Strategic Adaptation & Resilience Guide provides advice on embedding climate risk consideration into the design of the

authority's highways service to ensure it has the capacity and capability to respond effectively to events.

An operational framework is needed to ensure that the benefits of this work are not lost amid the service pressures and competing demands of a live incident.

It should enable a shared understanding within the authority and with partners of how the response to an event will be organised, and it provides a stable foundation for defensible decision making, coordination, and handover.

The following sections support LHAs to develop a framework that is tailored to local conditions and resources.

5. The four stages of operational response

The operational response to climate hazards can be understood as consisting of four interrelated stages: anticipation, response, stabilisation, and recovery. Together, these stages provide a structure for organising activity before, during, and after a disruptive event.

Climate hazard events are however dynamic. Different parts of the network may be in different stages at the same time, and there may be movement back and forth between stages as conditions evolve. Authorities should therefore revisit priorities, resource requirements, and operational decisions throughout an incident.

Stage	Operational objective or focus
Anticipation	Position the authority to respond to credible emerging risks
Response	Safeguard community lifelines and manage immediate hazards
Stabilisation	Prevent further disruption, manage risk via interim controls, and create space to deliver an effective recovery
Recovery	Restore safe network performance and strengthen future resilience

5.1 Anticipation focuses on early mobilisation of resources in response to a credible and emerging risk. When pre-established trigger thresholds are exceeded, the authority should be ready to act quickly, safely, and proportionately.

The framework should support a transition from preparedness to live operations, focusing on clarifying leadership, situational awareness, resource readiness, and coordinated communication.

5.2 Response focuses on managing immediate hazards as they occur. Its objective is to maintain a level of network availability to safeguard community lifelines, protect critical assets, and ensure the safety of the public and the workforce responding to the event.

The framework should support coordinated, timely action to control impacts, maintain essential services, and prioritise intervention where risks and consequences for communities are greatest.

5.3 Stabilisation focuses on maintaining control following an incident once immediate hazards have been managed. The authority should act to improve public safety, limit further or future damage, and reduce secondary impacts, while creating the conditions for effective recovery.

The framework should support sustained control of affected areas until normal operation can safely resume. It should recognise that stabilisation may be required over extended periods and may be needed at both specific locations and across wider parts of the network.

5.4 Recovery focuses on restoring network performance and strengthening the resilience of services for the local community. The authority should work to return the network to a safe, known condition while embedding learning to improve future preparedness.

6. Core operational principles

The Local Partnerships Highways Strategic Adaptation & Resilience Guide helps authorities identify the hazards their highways service must be prepared to address. This operational framework describes how the authority should organise and manage its response when those risks materialise.

It should be built and applied in a way that supports proactive, proportionate, and defensible operational response to disruption caused by climate hazards.

The framework should support the authority to:

- ▶ **respond effectively under conditions of uncertainty**
- ▶ **prioritise operational activity and resource deployment**
- ▶ **demonstrate the rationale for decisions taken during incidents**
- ▶ **provide a shared situational awareness to responders and stakeholders**
- ▶ **support future preparedness and long-term adaptation through operational learning**

To support these objectives, the following operational principles should be embedded throughout the framework.

6.1 Acting on credible risk

Authorities should act proactively where there is a credible risk of significant disruption to communities, services, or critical routes. Certainty is not required to trigger an operational response.

In support of this principle the framework should establish how tools such as pre-established triggers and thresholds and RIA will be used to generate “good enough” information to support timely and proportionate decisions.

Triggers and thresholds for initiating activity should reflect local conditions, vulnerabilities, and operational

priorities. They provide a framework for consistent and defensible decision making but should be used to support and not replace professional judgement.

6.2 Prioritisation based on criticality and consequence

Loss of connectivity can isolate communities, restrict access to critical services, and disproportionately affect vulnerable groups. Community severance, including impacts on those with protected characteristics or limited mobility, must therefore be considered alongside physical asset failure.

Operational response should prioritise locations where vulnerability assessment has shown that disruption would have the greatest consequences for road users, communities, and critical services.

The framework should therefore support prioritisation based on a broad, risk-informed assessment of criticality that considers:

- ▶ **safety impacts for road users and responders**
- ▶ **the role of the route within the wider network**
- ▶ **impacts on communities and the local economy**
- ▶ **interdependencies with other infrastructure and services**

6.3 Decision making by SQEEP

The framework should define SQEEP roles within the organisation and set out arrangements to ensure that, throughout an incident, these roles are fulfilled by individuals with the necessary competence and experience, and with authority to act quickly in response to credible risk.

This will vary between authorities but in most cases should include the head of service and key roles such as asset manager, network manager, and duty officers during a response.

6.4 Common consequences and capabilities

Many climate hazards result in similar consequences, regardless of their source. These may include loss of access, asset failure, safety risks, and disruption to communities and services.

Where these consequences have been identified

through preparedness planning, the framework should ensure they trigger a consistent and adequate proportionate response.

In each case, the appropriate capabilities should be mobilised across the authority and its partners to manage impacts and maintain network function.

7. Core operational arrangements

An operational framework should define the core operational arrangements the authority must be able to activate, sustain, and coordinate during a response to climate hazards.

These arrangements provide the operational structure through which the authority:

- ▶ develops situational awareness
- ▶ prioritises action
- ▶ manages operational risk
- ▶ coordinates response activity
- ▶ sustains operations over time
- ▶ captures assurance and learning

Their application may vary by operational stage, but each arrangement should be clearly defined and consistently applied.

7.1 Leadership and decision making

Purpose of the arrangement

The operational framework should establish clear leadership and decision-making arrangements that enable the authority to respond proactively, consistently, and defensibly during disruption caused by climate hazards.

These arrangements should support timely decision making under conditions of uncertainty, maintain continuity of leadership during prolonged incidents, and ensure operational activity remains aligned with wider governance, legal, and political responsibilities.

Authorities should establish arrangements for exercising decision-making authority outside normal working hours, including where nominated decision makers are unavailable. Operational personnel should understand the scope of their delegated authority, escalation routes, and circumstances in which they are authorised to act in the interests of safety, network resilience, and continuity of service.

What the arrangement must enable

The framework should enable the authority to:

- ▶ establish and maintain clear operational command, accountability, and decision-making authority during all stages of response
- ▶ make timely and proportionate decisions in response to credible risk, including where conditions remain uncertain or evolving
- ▶ prioritise actions and resources based on criticality and consequence
- ▶ ensure operational personnel understand the scope of their delegated authority, including arrangements for exercising authority outside normal working hours

- ▶ escalate decisions appropriately where risks, impacts, or resource implications exceed delegated authority or require wider organisational involvement
- ▶ maintain continuity of leadership, decision-making authority, and situational understanding across operational periods and shift changes
- ▶ align operational decision making with wider organisational governance, assurance, and communications arrangements

Typical components of the arrangement

Command structure and leadership continuity

- ▶ Defined operational and executive leadership roles
- ▶ Named operational leads and deputies, including out of hours arrangements
- ▶ Integration with multi-agency command arrangements where required
- ▶ Rotas and structured handover arrangements between operational periods
- ▶ Arrangements to sustain leadership during prolonged incidents

Decision authority and escalation

- ▶ Clearly defined delegated authority for operational decisions
- ▶ Escalation routes where impacts or consequences exceed agreed thresholds
- ▶ Agreed processes for high-impact operational, financial, or legal decisions

Trigger-based mobilisation and prioritisation

- ▶ Use of pre-established triggers and thresholds to initiate early action
- ▶ Arrangements for prioritising actions and resources based on criticality
- ▶ Processes for balancing competing operational, safety, and community impacts

Alignment with the council's governance and assurance

- ▶ Alignment with finance, legal, communications, and risk management processes
- ▶ Communication of operational decisions and implications to senior leadership and stakeholders
- ▶ Arrangements for maintaining governance oversight during prolonged incidents

Business as usual suspension, reprioritisation, and reinstatement

- ▶ Criteria, authority, and process for suspension or reprioritisation of BAU activity
- ▶ Arrangements for phased reinstatement of BAU operations as conditions stabilise

Decision recording

- ▶ Arrangements for documenting significant decisions and rationale
- ▶ Recording decisions not to act and deviations from standard procedures or plans

7.2 Situational awareness and rapid impact assessment

Purpose of the arrangement

The operational framework should establish arrangements for developing, maintaining, and communicating situational awareness throughout the response.

These arrangements should enable the authority to understand current and emerging impacts, their network-level consequences for communities and critical services, and the potential for escalation, while supporting prioritisation of operational activity and defensible decision making under conditions of uncertainty.

During the acute phase of an incident, speed, consistency, and network-wide coverage of information are likely to be more operationally valuable than detailed technical assessment of a limited number of assets.

The framework should therefore support proportionate approaches to assessment that generate sufficiently reliable information for timely prioritisation and operational decision making.

The framework should distinguish between rapid network-wide assessment used to support operational prioritisation and more detailed technical assessment used to inform targeted engineering intervention and recovery activity.

During the acute phase of an incident, the operational priority is likely to be rapid triage across the network rather than detailed assessment of individual assets.

What the arrangement must enable

The framework should enable the authority to:

- ▶ interpret forecasts, warnings, and operational information in relation to local triggers, thresholds, and vulnerabilities
- ▶ rapidly triage at network level vulnerable locations and high-criticality routes and assets
- ▶ establish and maintain a shared operational picture of conditions across the network
- ▶ prioritise operational actions and resource deployment based on consequence for communities and critical services and evolving risk
- ▶ identify critical information gaps and refine understanding as conditions evolve
- ▶ communicate situational awareness consistently across operational teams, senior leadership, and external partners
- ▶ maintain situational awareness during prolonged or complex incidents, including where systems or information sources are degraded and personnel handover between shifts

Typical components of the arrangement

Initial situational awareness

- ▶ Interpretation and communication of forecasts or warnings
- ▶ Identification of vulnerable locations and previous hotspots

- ▶ Assessment of high-criticality routes and assets
- ▶ Anticipation of compound and cascading impacts
- ▶ Activation of pre-planned responses based on trigger exceedance

Rapid impact assessment

- ▶ Structured, consistent approach to investigating and recording impacts and actions at individual locations
- ▶ Structured process for developing a shared understanding of impacts across the network
- ▶ Arrangements for assessing:
 - what has happened
 - ▶ where impacts are occurring
 - ▶ which routes, assets, and services are most at risk
 - ▶ the consequences for communities and network operation
 - ▶ how conditions may evolve
- ▶ Processes for converting RIA into a consequence-ranked list of operational priorities

Managing uncertainty and information gaps

- ▶ Continuous refinement of situational awareness
- ▶ Identification and prioritisation of critical information gaps
- ▶ Use of proportionate and “good enough” information to support timely action

Tools, systems, and data

- ▶ Tools and systems for collecting, analysing, and sharing operational information, community reporting, and local intelligence
- ▶ Integration and verification of information from multiple sources
- ▶ Understanding of system capabilities and limitations
- ▶ Contingency arrangements for loss of systems, connectivity, or data access

7.3 Risk control and network management

Purpose of the arrangement

The operational framework should establish arrangements for implementing and sustaining proportionate controls to manage risk, protect safety, and maintain network operation during and immediately after events and disruption.

These arrangements should support timely intervention, adaptive management of evolving conditions, and protection of critical routes, assets, and community lifelines.

What the arrangement must enable

The framework should enable the authority to:

- ▶ implement and adapt operational controls proportionate to the level of risk
- ▶ protect public safety, workforce safety, and critical network functions
- ▶ maintain accessibility to critical routes and community lifelines where reasonably practicable
- ▶ deploy temporary engineering and operational measures to reduce immediate risk
- ▶ manage secondary and cascading impacts arising from both the hazard and the response
- ▶ transition safely from temporary measures to longer-term recovery and reinstatement
- ▶ maintain contractor and supply chain resilience during prolonged incidents

Typical components of the arrangement

Traffic and safety management

- ▶ Implementation and removal of:
 - ▶ road closures
 - ▶ speed restrictions
 - ▶ traffic management measures

- ▶ Protection of vulnerable assets and structures
- ▶ Management of access restrictions and diversion routes

Temporary and adaptive engineering measures

- ▶ Use of temporary repairs and physical protection measures
- ▶ Deployment of surface treatments or temporary stabilisation measures
- ▶ Maintenance and adjustment of temporary measures as conditions evolve
- ▶ Transition from temporary to permanent interventions

Management of secondary and cascading impacts

- ▶ Identification of risks arising from the hazard and operational response
- ▶ Management of pressure on diversion routes and unaffected parts of the network
- ▶ Consideration of interdependencies with utilities and other infrastructure
- ▶ Monitoring for unintended consequences of operational controls

7.4 Resource management and workforce resilience

Purpose of the arrangement

The operational framework should establish arrangements for sustaining workforce capability, operational capacity, and resource availability throughout all stages of response.

These arrangements should support safe working, operational continuity, and effective deployment of personnel, contractors, and resources during both short and prolonged incidents.

What the arrangement must enable

The framework should enable the authority to:

- ▶ confirm and sustain operational workforce and resource availability during incidents
- ▶ integrate contractors and mutual aid arrangements into operational response
- ▶ deploy and prioritise workforce and resources in line with operational priorities
- ▶ sustain operations across multiple operational periods and shift rotations
- ▶ maintain workforce welfare, resilience, and safe working practices
- ▶ manage fatigue, stress, and environmental exposure during prolonged incidents
- ▶ ensure continuity of a shared operational picture between teams and shifts

Typical components of the arrangement

Workforce and resource availability

- ▶ Verification of staff, contractor, and mutual aid availability
- ▶ Confirmation of equipment, materials, and operational readiness
- ▶ Integration of contractor and mutual aid capability into operational arrangements
- ▶ Pre-positioning of resources where appropriate
- ▶ Confirmation of public contact and call handling arrangements

Shift management and continuity

- ▶ Shift patterns and rotations to sustain operational capacity
- ▶ Structured handover arrangements between operational teams

- ▶ Arrangements for maintaining shared situational understanding across shifts

Welfare and safe working

- ▶ Management of fatigue and environmental exposure
- ▶ Provision of Personal Protective Equipment (PPE) and welfare arrangements compatible with the hazard and weather conditions
- ▶ Maintenance of safe working practices during response
- ▶ Arrangements supporting workforce wellbeing during stressful or distressing incidents

7.5 Communication and coordination

Purpose of the arrangement

The operational framework should establish arrangements for communication and coordination within the authority, with operational partners, and with the public during all stages of response.

These arrangements should support effective coordination, shared situational awareness, public confidence, and consistent operational messaging.

What the arrangement must enable

The framework should enable the authority to:

- ▶ communicate effectively across operational teams, senior leadership, and wider council functions
- ▶ coordinate activity and share situational awareness with external partners and responders
- ▶ provide timely, accurate, and consistent information to affected communities, network users, businesses, and the public
- ▶ support governance, decision making, and operational coordination through effective information sharing
- ▶ manage public expectations during prolonged disruption and recovery

Typical components of the arrangement

Internal communication

- ▶ Communication within highways teams and wider council functions
- ▶ Sharing situational awareness with executive and political leadership
- ▶ Communication arrangements with contractors and operational partners
- ▶ Confirmation of operational priorities, responsibilities, and expectations

External coordination

- ▶ Coordination with:
 - ▶ local resilience forums
 - ▶ emergency services
 - ▶ utilities
 - ▶ neighbouring authorities
 - ▶ other operational partners
- ▶ Arrangements for sharing situational awareness and operational priorities

Public and media communication

- ▶ Communication of risks, controls, disruption, and safety advice
- ▶ Warn and inform arrangements
- ▶ Communication during stabilisation and recovery regarding ongoing controls, disruption, and expected timescales
- ▶ Arrangements supporting consistent public messaging from operational staff and contractors

7.6 Recording and assurance

Purpose of the arrangement

The operational framework should establish arrangements for recording operational decisions, actions, expenditure, and rationale throughout all stages of response.

These arrangements should support governance, defensibility, audit, learning, cost recovery, and future planning. In particular they should enable expenditure and resource impacts associated with an incident to be identified and recorded from the point of escalation.

What the arrangement must enable

The framework should enable the authority to:

- ▶ maintain accurate and accessible records during all stages of response
- ▶ document the rationale for significant operational decisions, including decisions not to act
- ▶ record deviations from standard procedures or plans
- ▶ track operational expenditure and resource deployment
- ▶ maintain governance oversight during incidents
- ▶ support post-event review, audit, recovery funding claims, and future investment decisions

Typical components of the arrangement

Decision and action logging

- ▶ Processes and responsibilities for maintaining operational logs
- ▶ Recording of operational decisions, actions, and resource deployment

Rationale and justification

- ▶ Documentation of reasoning for significant decisions
- ▶ Recording departures from standard procedures or pre-agreed plans

Financial and resource tracking

- ▶ Tracking of expenditure and resource deployment
- ▶ Arrangements supporting cost recovery and future business cases
- ▶ Sufficiently granular data to support strategic planning and investment decisions

Governance and oversight

- ▶ Maintaining senior leadership awareness of operational activity and expenditure
- ▶ Arrangements supporting post-event audit and assurance processes

7.7 Learning and continuous improvement

Purpose of the arrangement

The operational framework should establish arrangements for capturing learning from incidents and embedding improvement into future preparedness, operational response, and long-term adaptation.

These arrangements should ensure that operational experience informs both immediate improvement and wider organisational resilience.

What the arrangement must enable

The framework should enable the authority to:

- ▶ capture operational insight during and after incidents
- ▶ evaluate the effectiveness of operational response and decision making
- ▶ identify improvements to operational arrangements, capability, and capacity
- ▶ integrate learning into future preparedness, training, and operational planning
- ▶ inform adaptation planning, investment prioritisation, and longer-term resilience activity
- ▶ identify potential resilience engineering measures to adapt assets
- ▶ assign ownership and track implementation of improvement actions

Typical components of the arrangement

Post-incident review

- ▶ Hot (immediately after the event) and cold (slower time analysis) debrief processes

- ▶ Review of operational response and recovery effectiveness
- ▶ Evaluation of operational framework performance and key decisions
- ▶ Capture of response and recovery costs where relevant

Operational improvement

Learning should be used to improve the authority's preparedness and response arrangements, including:

- ▶ identification of improvements to operational arrangements, capacity, and processes
- ▶ updating operational frameworks and procedures
- ▶ identification of training and development requirements

Strategic improvement

Learning should also inform longer-term planning and investment decisions, including:

- ▶ informing vulnerability assessments and adaptation planning, including identification of repeat issues and systemic weaknesses
- ▶ development of asset management, maintenance, and renewal programmes, including potential engineering adaptation of assets
- ▶ use of operational evidence to support funding requests and investment prioritisation

Implementation and tracking

- ▶ Assigning ownership of improvement actions
- ▶ Integration of actions into existing programmes and plans
- ▶ Tracking implementation and reviewing progress

About CIHT

CIHT provides strategic leadership and support to help our members develop, deliver, and maintain sustainable solutions for highways, transport infrastructure, and services that:

- ✔ **Address the challenges of climate change**
- ✔ **Support the economy**
- ✔ **Help address societal inequalities**
- ✔ **Reduce environmental degradation**
- ✔ **Respond to a changing world**

We bring members together to share, learn, and feel confident about addressing these challenges through the application of good practice, by embracing innovation and by acting with integrity. It is through this and the values that CIHT can demonstrate and deliver on thought leadership and shaping the highways and transportation sector for the public benefit.

Whether you are a student, apprentice, work in the private or public sectors or are a company director, CIHT has a place for you and a commitment to fulfilling your professional development needs throughout your career.

www.ciht.org.uk



Cold weather and winter disruption operational response checklist

Disclaimer

CIHT, the authors, and contributors who produced this document have endeavoured to ensure the accuracy of its contents. However, the advice and recommendations given should always be received by the reader “in light of the facts” of their specialist circumstances and specialist advice obtained as necessary. Any references to legislation discussed within this document should be considered in the light of current and any future legislation. The supervised use of artificial intelligence was used to process some of the findings of this report. No liability for negligence or otherwise in relation to this document and its contents can be accepted by CIHT, the members of the project group, its servants or agents, or the managing editors or contributors.



Published by the:

Chartered Institution of Highways & Transportation

119 Britannia Walk
London N1 7JE
t: +44 (0)20 7336 1555
e: info@ciht.org.uk
www.ciht.org.uk

Registered Charity in England No. 1136896

Registered Charity in Scotland No. SC040873

Registered Charity in Republic of Ireland No. 20103989

Published July 2026.

All rights reserved. No part of this publication shall be reproduced, stored in an electronic retrieval system, or transmitted without the written permission of the publishers.

For any inquiries, please email technical@ciht.org.uk

Contents

1. Purpose of this checklist	4
2. Operational context.....	5
3. Checklist for response stages.....	6
4. Other checklists in this suite	13

1. Purpose of this checklist

This checklist relates to the risks identified in the Department for Transport (DfT) Transport Hazard Summary "cold weather".

This checklist supports local highway authority teams to proactively manage disruption to their network caused by cold weather hazards.

It is designed to support suitably qualified, experienced, and empowered professionals (SQEEP) to apply their judgement consistently under the pressure of a live event. It does not replace the need to exercise professional judgement.

It also supports record keeping during an event.

Accurate and timely recording is an operational activity, not an administrative afterthought. Records support situational awareness, defensible decision making, justification of recovery funding, operational learning, and future investment decisions.

For ease of use, the checklists are presented as a sequence of activities associated with each stage of response. Climate hazard events are however dynamic and authorities should revisit the checklist throughout an incident, reviewing priorities, resource requirements, and operational decisions as conditions evolve.

2. Operational context

Nature of the hazard

Cold weather hazards include ice, frost, snow, freezing rain, hail, and the build-up of snow or ice. They generally occur when air, ground, or surface temperatures fall below freezing, but impacts can also arise from rapid changes in temperature, residual moisture, rain followed by freezing conditions, or thaw and refreeze cycles.

Cold weather events can:

- ▶ develop gradually through freezing conditions that have been forecast
- ▶ emerge rapidly where rain falls onto frozen surfaces
- ▶ affect wide areas or create localised hazardous patches
- ▶ persist over several days during prolonged sub-zero temperatures
- ▶ create repeated impacts through freeze–thaw cycles

In summary, cold weather can create dangerous and changeable surface conditions requiring ongoing reassessment throughout the incident.

Typical consequences

Impacts may include:

- ▶ roads becoming unsafe or impassable due to snow, ice, or frost
- ▶ increased braking distances and loss of tyre grip
- ▶ stranded vehicles
- ▶ risk of slips, trips, and falls for road users, pedestrians, and workers

- ▶ delayed emergency service access
- ▶ reduced visibility from snow, hail, fog, or freezing conditions
- ▶ vehicle and equipment performance issues
- ▶ freeze–thaw damage, potholes, and surface defects
- ▶ drainage issues caused by snow, ice, or rapid thaw
- ▶ pressure on salt stocks, fleet availability, and winter service capacity

Typical operational responses

Typical responses include:

- ▶ implementing winter service plans
- ▶ salting, gritting, and de-icing
- ▶ snow clearance
- ▶ prioritising treatment of critical routes
- ▶ managing closures, diversions, and access restrictions
- ▶ supporting emergency access and community lifelines
- ▶ monitoring treatment effectiveness and refreezing risk
- ▶ issuing public messaging on road conditions and travel advice

If the situation is sufficiently serious, the authority may need to suspend or reprioritise business as usual (BAU) operations to focus resources on the response. This should be treated as a formal, time-limited, and documented decision – see section 3.2 below.

3. Checklist for response stages

3.1 Anticipation

Triggers for mobilisation

Weather warnings, forecasts, and alerts reviewed against any pre-agreed triggers and thresholds

Early signs of cold weather disruption identified at known risk locations

Triggers may include:

- ▶ forecast road surface temperatures below pre-established treatment thresholds
- ▶ forecast snow accumulation
- ▶ prolonged sub-zero temperatures
- ▶ forecast freezing rain or fog
- ▶ forecast hail accumulation
- ▶ forecast thaw followed by refreeze

Leadership and command structure

Predefined plans initiated including:

SQEEP operational lead confirmed

Operational lead decision authority, out of hours arrangements, and escalation routes confirmed

Integration with multi-agency arrangements confirmed

Situational awareness

Shared understanding of forecasts, warnings, confidence levels, and consequences (access, safety, services, communities) established

Critical locations identified

Priority actions for council and other responders identified and communicated

Be alert to:

- ▶ priority gritting routes
- ▶ known ice spots
- ▶ steep gradients
- ▶ exposed rural routes
- ▶ shaded routes
- ▶ bridges and elevated sections
- ▶ underpasses and low-lying routes
- ▶ routes serving hospitals, emergency services, schools, depots, and isolated communities

Communications

Internal communication active (highways function and contractors, other council functions, senior leadership)

Partners briefed (local resilience forum, contractors, utilities, emergency planning)

Public messaging prepared

Backup communication arrangements confirmed where normal channels may be degraded

Resources and readiness

Inspection teams available and any limitations on activity understood

Contractors mobilised or on standby

Plant, equipment, and materials available and, if necessary, pre-positioned

Workforce welfare arrangements in place

Call handling capacity confirmed

Mutual aid arrangements confirmed and pre-alerted if required

Works teams mobilised

Cold weather readiness

Salt stocks confirmed

Gritters available and serviceable

Snow ploughs or snow clearance equipment available where required

De-icing materials available

Fuel availability confirmed

Driver availability confirmed

Treatment routes reviewed

Arrangements in place for prolonged operations

Recording

Decision log active and maintained, including considerations behind any decisions not to act in response to potential triggers or thresholds

Arrangements in place to capture expenditure, resource deployment, and programme impacts should escalation occur

End of shift or handover review – anticipation

- ▶ Based on available information, is early action justified, and is our rationale clear?
- ▶ Are leadership, authority, out of hours, and escalation arrangements clear, including integration with wider response structures outside the authority?
- ▶ Do we have a consistent understanding of what is happening, where the risks are greatest, and the consequences for the network and communities, and is this shared?
- ▶ Do we have clear communication arrangements in place internally, with partners and for the public?
- ▶ Do we have the people, equipment, and support systems in place to sustain an effective response?
- ▶ What is our forward action plan for the next shift?

3.2 Response

Situational awareness

Rapid impact assessment (RIA) locations triaged and high-consequence locations prioritised

RIA results validated and fed into ongoing situational awareness

Resources prioritised or reprioritised accordingly

Be alert to:

- ▶ ice forming on untreated or vulnerable routes
- ▶ snow accumulation
- ▶ drifting snow
- ▶ freezing rain creating rapidly developing surface hazards
- ▶ refreezing after partial thaw
- ▶ stranded vehicles
- ▶ access constraints for emergency services
- ▶ treatment wash-off after rain

Traffic and network management measures

Road closures implemented where conditions present a safety risk

Diversions implemented where required

Access restrictions in place at affected locations

Decisions and justifications communicated and recorded

Plans in place for managing congestion hotspots

Breakdown and incident response arrangements active

Plans in place for managing stranded vehicles and access constraints

Cold weather considerations:

- ▶ prioritise access to emergency services, hospitals, and critical facilities
- ▶ maintain priority treatment routes where possible
- ▶ consider whether diversion routes are safe and treatable
- ▶ manage access to isolated communities
- ▶ consider temporary closures where treatment is ineffective or conditions are unsafe

Temporary and adaptive engineering measures

Measures implemented to manage immediate risk

Plans in place for managing the effectiveness of interventions

Decisions and justifications communicated and recorded

Typical measures include:

- ▶ salting
- ▶ gritting
- ▶ snow clearance
- ▶ de-icing
- ▶ treatment of priority footways or pedestrian areas
- ▶ temporary repairs to potholes or surface defects where they create immediate safety risks

Capacity, capability, and safety

Workforce exposure to hazards monitored

Safe working practices and PPE enforced

Shift patterns adjusted as required

Call handling demand actively managed

Additional capacity mobilised if required (contractor, supply chain, mutual aid)

Arrangements in place to support evacuation and emergency access where required

Cold weather safety issues:

- ▶ manage exposure to low temperatures
- ▶ manage risk of slips, trips, and falls
- ▶ monitor fatigue during prolonged winter operations
- ▶ ensure safe vehicle operation
- ▶ consider risk from isolated working and night-time conditions

Coordination and communication

Public informed (closures, routes, safety advice)

Politicians briefed (portfolio holder, ward councillors)

Contractors and frontline staff briefed

Wider council awareness maintained

Escalation and suspension of business as usual

Pre-agreed triggers or thresholds for suspension of BAU exceeded

Options for mobilising additional resources considered: overtime, internal redeployment, mutual aid from contractors or other authorities

Authority for suspension confirmed in accordance with local arrangements

Scope of any suspension or reprioritisation defined (services, locations, duration, and review date)

All relevant parties inside and outside the authority notified of suspension of BAU

Potential recovery funding implications (including Bellwin eligibility where relevant) considered and expenditure tracking initiated

Recording

Decisions, actions, spending, service impacts, and rationale logged in real time

Significant decisions not to act, escalate, or implement controls recorded where appropriate

End of shift or handover review – response

- ▶ Do we know enough about what has happened, where impacts are occurring, which routes, assets, and services are most at risk, and how the situation may develop to prioritise action on the highest-consequence risks?
- ▶ Are traffic management measures appropriate, focused on highest-consequence locations, and clearly justified and communicated?
- ▶ Are interventions appropriate, effective, and clearly justified and recorded?
- ▶ Are workforce safety, operational capacity, and supporting systems sufficient to sustain the response?
- ▶ Are all relevant parties informed, and is messaging aligned and consistent?
- ▶ Have we recognised where escalation is required, acted on it appropriately, and are decision-making authority and escalation arrangements clear for the next operational period?
- ▶ Are key decisions, service impacts, expenditure implications, and the rationale for significant actions (or decisions not to act) being recorded sufficiently to support governance, recovery, and future learning?
- ▶ Do we know where our people and kit are currently operating and what the priorities are for their deployment in the next shift?

3.3 Stabilisation

Monitoring and inspection

Ongoing inspections of affected locations and assets underway

Tracking of conditions in high-risk locations underway

Cold weather monitoring considerations:

- ▶ treated route condition
- ▶ untreated route condition
- ▶ refreezing risk
- ▶ drifting snow
- ▶ meltwater
- ▶ shaded ice spots
- ▶ underpasses and low-lying areas
- ▶ salt effectiveness and wash-off

Traffic management controls and interventions

Closures, restrictions, and diversions reviewed for effectiveness

Controls adjusted as conditions change

Decisions and justifications communicated and recorded

Secondary and cascading impacts

Impacts on traffic patterns monitored

Secondary risks identified and managed

Coordination taking place with utilities and other parties carrying out work on the network

Be alert to:

- ▶ refreezing after thaw
- ▶ salt wash-off after rain
- ▶ freeze–thaw pothole formation
- ▶ risk of landslips or subsidence due to freeze–thaw cycles
- ▶ flash flooding due to melting snow
- ▶ blocked drainage from snow or ice
- ▶ stranded vehicles
- ▶ delayed emergency access
- ▶ pressure on salt stocks and winter fleet
- ▶ reduced electric vehicle (EV) or battery-powered equipment performance

Workforce and operational sustainability

Fatigue actively managed

Shift handovers maintained and staggered as required

Call handling and communications capacity maintained

Need for mutual aid reviewed

Contractor and supply chain support sustained

Communication and governance

- Plan for managing public expectations in place and effective
- Rationale for ongoing controls communicated
- Senior leadership kept informed
- Two-way communication maintained with wider responders during stabilisation

Recording

Decision logs and records maintained and updated

End of shift or handover review – stabilisation

- ▶ Do we understand current conditions, are our controls effective, and are secondary impacts being identified and managed?
- ▶ Have any new high-consequence impacts emerged that require reprioritisation of resources or activity?
- ▶ Are workforce, capacity, and supporting systems sufficient to sustain the response over time?
- ▶ Are we aware of the plans of utilities and other contributors to stabilisation?
- ▶ Are we managing public expectations effectively, communicating rationale clearly, and maintaining senior oversight?
- ▶ What is the forward plan for the next shift or period of the stabilisation process?

3.4 Recovery

Recovery extends beyond physical repairs and includes restoration of organisational capacity, review of impacts on programmes and services, and the controlled transition back to BAU.

Network assurance

- Plan in place to assure network condition can be confirmed safe and stable
- Affected areas inspected for residual hazards

Cold weather checks:

- ▶ potholes and surface defects
- ▶ damaged drainage
- ▶ damaged signs and street furniture
- ▶ residual slippery surfaces
- ▶ freeze–thaw damage
- ▶ snow or ice blocking drainage systems
- ▶ damage to priority routes and access roads
- ▶ risk of landslips or subsidence following freeze–thaw cycles

Restoration

- Drainage systems inspected, cleared, and restored
- Damaged assets repaired or made safe
- Traffic management systems restored and operational

Cold weather restoration:

- ▶ replenish salt stocks
- ▶ service winter fleet
- ▶ repair freeze–thaw damage
- ▶ review treatment route performance
- ▶ restore damaged assets
- ▶ review snow clearance and de-icing effectiveness

Learning

Hot debrief and cold debrief initiated

Effectiveness of triggers, thresholds, situational awareness, and key decisions reviewed

Vulnerabilities and repeat hotspots identified

Process in place to feed results into future planning for adaptation and response

Actions assigned to named individuals and tracked

Evidence captured to inform future asset management, adaptation, and investment decisions

Handover

Planned transition to BAU in place

Decision log and records signed off

During recovery consider:

- ▶ performance of winter service plan
- ▶ salt usage and availability
- ▶ treatment effectiveness
- ▶ access to equipment
- ▶ public messaging
- ▶ resilience of priority routes
- ▶ whether less frequent severe cold events risk loss of organisational capability over time

4. Other checklists in this suite

- ▶ Flooding and water-related disruption
- ▶ Ground and slope instability
- ▶ Heat, drought, wildfire, and air quality
- ▶ Major disruption to power, communications, navigation, or other critical systems
- ▶ Storms

About CIHT

CIHT provides strategic leadership and support to help our members develop, deliver, and maintain sustainable solutions for highways, transport infrastructure, and services that:

- ✔ **Address the challenges of climate change**
- ✔ **Support the economy**
- ✔ **Help address societal inequalities**
- ✔ **Reduce environmental degradation**
- ✔ **Respond to a changing world**

We bring members together to share, learn, and feel confident about addressing these challenges through the application of good practice, by embracing innovation and by acting with integrity. It is through this and the values that CIHT can demonstrate and deliver on thought leadership and shaping the highways and transportation sector for the public benefit.

Whether you are a student, apprentice, work in the private or public sectors or are a company director, CIHT has a place for you and a commitment to fulfilling your professional development needs throughout your career.

www.ciht.org.uk



Major disruption to critical systems including power, navigation and communications operational checklist

Disclaimer

CIHT, the authors, and contributors who produced this document have endeavoured to ensure the accuracy of its contents. However, the advice and recommendations given should always be received by the reader “in light of the facts” of their specialist circumstances and specialist advice obtained as necessary. Any references to legislation discussed within this document should be considered in the light of current and any future legislation. The supervised use of artificial intelligence was used to process some of the findings of this report. No liability for negligence or otherwise in relation to this document and its contents can be accepted by CIHT, the members of the project group, its servants or agents, or the managing editors or contributors.



Published by the:

Chartered Institution of Highways & Transportation

119 Britannia Walk
London N1 7JE
t: +44 (0)20 7336 1555
e: info@ciht.org.uk
www.ciht.org.uk

Registered Charity in England No. 1136896

Registered Charity in Scotland No. SC040873

Registered Charity in Republic of Ireland No. 20103989

Published July 2026.

All rights reserved. No part of this publication shall be reproduced, stored in an electronic retrieval system, or transmitted without the written permission of the publishers.

For any inquiries, please email technical@ciht.org.uk

Contents

1. Purpose of this checklist	4
2. Operational context.....	5
3. Checklist for response stages.....	7
4. Other checklists in this suite	14

1. Purpose of this checklist

This checklist relates to the risks identified in the Department for Transport (DfT) Transport Hazards Summaries "severe space weather" and "volcanic eruptions".

It is designed to support suitably qualified, experienced, and empowered professionals (SQEPP) to apply their judgement consistently under the pressure of a live event. It does not replace the need to exercise professional judgement.

It also supports record keeping during an event. Accurate and timely recording is an operational activity,

not an administrative afterthought. Records support situational awareness, defensible decision making, justification of recovery funding, operational learning, and future investment decisions.

For ease of use, the checklists are presented as a sequence of activities associated with each stage of response. Climate hazard events are however dynamic and authorities should revisit the checklist throughout an incident, reviewing priorities, resource requirements, and operational decisions as conditions evolve.

2. Operational context

Nature of the hazard

Major disruption to power, communications, navigation, or other critical systems can arise from hazards that are rare, uncertain, and largely outside the direct control of local highway authorities.

Severe space weather can disrupt global navigation satellite systems (GNSS), high-frequency communications, satellites, electrical power systems, and sensitive electronics. Impacts may occur with limited warning, may affect multiple sectors at once, and may coincide with other weather-related emergencies.

Volcanic eruptions outside the UK can affect UK transport through volcanic ash, gases, and particulates. The most significant direct impacts are usually on aviation, but disruption can create knock-on effects for roads, travel demand, and public communications. If ash, gases, or particles reach ground level, there may also be air quality, visibility, cleaning, and workforce safety implications. When mixed with water and then dried, ash can form solid blockages in drainage systems.

Air quality impacts may also arise from volcanic gases and particles, wildfire smoke, Saharan dust, or pollution episodes. These may reduce visibility, affect vulnerable road users and workers, increase maintenance needs, and require changes to working practices.

These hazards are challenging for authorities because they may:

- ▶ affect the systems that support operational response, including communications, navigation, power, traffic systems, call handling, and data access
- ▶ create uncertainty about the reliability of information, routing, asset monitoring, and digital systems
- ▶ generate cascading impacts across utilities, emergency response, public transport, logistics, and supply chains
- ▶ increase demand on the road network if other modes are disrupted
- ▶ require coordination with national agencies, local resilience forums, utilities, transport operators, and emergency planning partners
- ▶ persist for hours, days, or longer, with impacts changing as the hazard evolves

In summary, these hazards require authorities to focus on continuity of essential highways functions, manual fallbacks, critical route access, partner coordination, and clear public communication.

Typical consequences

Authorities should identify and address the impacts with most significant consequences for the integrity of the network, community lifelines, and the safety of road users and workers, irrespective of the specific source of disruption.

These impacts may include:

- ▶ loss or degradation of power, communications, GNSS, traffic systems, asset monitoring, or operational data
- ▶ reduced ability to coordinate inspections, works teams, contractors, and emergency response
- ▶ disruption to signals, variable message signs, traffic control centres, call handling, fleet tracking, or digital mapping
- ▶ increased pressure on the road network due to disruption to aviation, rail, ferries, or freight movement
- ▶ congestion around ports, airports, stations, strategic routes, and diversion corridors
- ▶ reduced visibility or poor air quality affecting road users, workers, and vulnerable groups

- ▶ increased cleaning, maintenance, or inspection requirements if ash, dust, or particles accumulate on roads, signs, signals, equipment, or vehicles
- ▶ cascading impacts from power outages, communications failures, supply chain disruption, or loss of supporting infrastructure

Typical operational responses

Typical responses include:

- ▶ implementing continuity arrangements for essential highways functions where digital, communications, navigation, or power systems are degraded
- ▶ confirming manual fallback arrangements for communications, routing, traffic management, inspection records, and decision logging
- ▶ prioritising critical routes, community lifelines, emergency access, and locations where failure of systems would have the greatest consequence

- ▶ coordinating with local resilience forums, utilities, emergency planning, transport operators, ports, airports, and neighbouring authorities
- ▶ managing traffic impacts arising from disruption to other modes, including pressure on diversion routes and key interchange locations
- ▶ reviewing workforce safety arrangements, including exposure to poor air quality, reduced visibility, fatigue, and lone working where communications are degraded
- ▶ issuing clear public information on route availability, travel disruption, safety advice, and any limitations in normal service

If the situation is sufficiently serious, the authority may need to suspend or reprioritise business as usual (BAU) operations to focus resources on the response. This should be treated as a formal, time-limited, and documented decision – see section 3.2 below.

3. Checklist for response stages

3.1 Anticipation

Triggers for mobilisation

National warnings, forecasts, and alerts reviewed against any pre-agreed triggers and thresholds for mobilising response

Early signs of disruption identified through partners, operational systems, public reports, or national agencies

Triggers related to different hazards can include:

- ▶ Severe space weather: Met Office space weather alerts; warnings of solar flares, geomagnetic storms, or solar radiation storms; reports of GNSS, communications, satellite, power, or control system disruption
- ▶ Volcanic eruption and volcanic ash: Met Office and London Volcanic Ash Advisory Centre information; aviation disruption; reports of ash, gases, or particles affecting UK airspace or ground-level air quality; significant passenger or freight displacement onto road, rail, or ferry networks
- ▶ Air quality and particles: Defra Daily Air Quality Index forecasts; pollution episodes; wildfire smoke; Saharan dust; volcanic gases or particles; local reports of reduced visibility, dust deposition, and workforce or public health concerns

Leadership and command structure

Predefined plans initiated including:

SQEEP operational lead confirmed

Operational lead decision authority, out of hours arrangements, and escalation routes confirmed

Integration with multi-agency arrangements confirmed

Situational awareness

Shared understanding of forecasts, warnings, confidence levels, and consequences (access, safety, services, communities) established

Critical locations identified

Priority actions for council and other responders identified and communicated

Critical systems and dependencies identified, including power, communications, GNSS, traffic systems, call handling, asset monitoring, and contractor systems

Potential impacts on ports, airports, rail interchanges, freight routes, emergency access, and community lifelines reviewed

Communications

Internal communication active (highways function and contractors, other council functions, senior leadership)

Partners briefed (local resilience forum, contractors, utilities, emergency planning)

Public messaging prepared

Backup communication arrangements confirmed where normal channels may be degraded

Resources and readiness

Inspection teams available and any limitations on activity due to system disruption, poor air quality, or reduced visibility understood

Contractors mobilised or on standby

Plant, equipment, and materials available and, if necessary, pre-positioned

Workforce welfare arrangements in place

Call handling capacity confirmed

Mutual aid arrangements confirmed and pre-alerted if required

Works teams mobilised

Manual fallback arrangements confirmed for routing, mapping, decision logs, work allocation, and operational records

Backup power, fuel, communications and access to key depots and control rooms reviewed

Recording

Decision log active and maintained, including considerations behind any decisions not to act in response to potential triggers or thresholds

Arrangements in place to capture expenditure, resource deployment, and programme impacts should escalation occur

End of shift or handover review – anticipation

- ▶ Based on available information, is early action justified, and is our rationale clear?
- ▶ Are leadership, authority, out of hours, and escalation arrangements clear, including integration with wider response structures outside the authority?
- ▶ Do we have a consistent understanding of what is happening, where the risks are greatest, and the consequences for the network and communities, and is this shared?
- ▶ Do we have clear communication arrangements in place internally, with partners, and for the public?
- ▶ Do we have the people, equipment, and support systems in place to sustain an effective response?
- ▶ What is our forward action plan for the next shift?

3.2 Response

Situational awareness

Rapid impact assessment (RIA) locations triaged and high-consequence locations prioritised

RIA results validated and fed into ongoing situational awareness

Resources prioritised or reprioritised accordingly

Reliability of operational systems, communications, power, GNSS, and traffic management data checked and kept under review

Be alert to:

- ▶ Severe space weather: loss or degradation of GNSS, communications, satellite services, power, traffic systems, digital mapping, asset monitoring, or control systems; potential for impacts to coincide with other emergencies
- ▶ Volcanic eruption and volcanic ash: aviation disruption creating knock-on pressure on roads, ports, ferries, rail, and freight routes; possible ash, gas, or particle impacts on air quality, visibility, and maintenance
- ▶ Air quality and particles: pollution episodes lasting several days; impact on vulnerable workers and road users; localised impacts near busy roads, enclosed spaces, depots, tunnels, or interchanges; visibility and cleaning implications

Traffic and network management measures

Road closures implemented where conditions present a safety risk

Diversions implemented where required

Access restrictions in place at affected locations

Decisions and justifications communicated and recorded

Plans in place for managing congestion hotspots

Breakdown and incident response arrangements active

Plans in place for managing stranded vehicles and access constraints

Be alert to:

- ▶ Severe space weather: traffic signal, VMS, CCTV, control centre, communications, or navigation failures; reduced reliability of satnav and fleet tracking; need for manual traffic management and clearly signed routes
- ▶ Volcanic eruption and volcanic ash: increased demand on roads from displaced aviation passengers or freight; congestion around airports, ports, stations, and strategic corridors; possible disruption to logistics and supply chains
- ▶ Air quality and particles: reduced visibility; need to consider vulnerable groups, workers, and users in congested or polluted locations

Temporary and adaptive engineering measures

Measures implemented to manage immediate risk

Plans in place for managing the effectiveness of interventions

Decisions and justifications communicated and recorded

Temporary and adaptive engineering measures associated with different hazards include:

- ▶ Severe space weather: deploying temporary signs, cones, manual control points, or physical traffic management where digital systems are unreliable; prioritising restoration of critical traffic systems; using paper maps and manual logs where required
- ▶ Volcanic eruption and volcanic ash: inspection and cleaning of signs, signals, lenses, solar panels, drainage inlets, depots, vehicles, and equipment where ash or dust deposition occurs; managing any slippery or abrasive surface contamination
- ▶ Air quality and particles: adjusting work methods to reduce exposure; limiting non-essential outdoor work during severe episodes; cleaning or maintaining filters, equipment, vehicles, signs, and solar-powered assets where particle build-up affects performance

Capacity, capability, and safety

Workforce exposure to operational hazards monitored

Safe working practices and PPE enforced

Shift patterns adjusted as required

Call handling demand actively managed

Additional capacity mobilised if required (contractor, supply chain, mutual aid)

Arrangements in place to support evacuation and emergency access where required

Workforce exposure to poor air quality, dust, ash, reduced visibility, degraded communications, and lone-working risks monitored

Critical staff briefed on manual fallback procedures where digital, GNSS, or communications systems are degraded

Coordination and communication

Public informed (closures, routes, safety advice)

Politicians (portfolio holder, ward councillors) briefed

Contractors and frontline staff briefed

Wider council awareness maintained

Utilities, transport operators, ports, airports, rail and ferry operators, and neighbouring authorities engaged where relevant

Public messaging reflects uncertainty and any limitations in normal systems or response capacity

Escalation and suspension of business as usual

Pre-agreed triggers or thresholds for suspension of BAU exceeded

Options for mobilising additional resources considered: overtime, internal redeployment, mutual aid from contractors or other authorities

Authority for suspension confirmed in accordance with local arrangements

Scope of any suspension or reprioritisation defined (services, locations, duration, and review date)

All relevant parties inside and outside the authority notified of suspension of BAU

Potential recovery funding implications (including Bellwin eligibility where relevant) considered and expenditure tracking initiated

Recording

Decisions, actions, spending, service impacts, and rationale logged in real time

Significant decisions not to act, escalate, or implement controls recorded where appropriate

End of shift or handover review – response

- ▶ Do we know enough about what has happened, where impacts are occurring, which routes, assets, and services are most at risk, and how the situation may develop to prioritise action on the highest-consequence risks?
- ▶ Are traffic management measures appropriate, focused on highest-consequence locations, and clearly justified and communicated?
- ▶ Are interventions appropriate, effective, and clearly justified and recorded?
- ▶ Are workforce safety, operational capacity, and supporting systems sufficient to sustain the response?
- ▶ Are all relevant parties informed, and is messaging aligned and consistent?
- ▶ Have we recognised where escalation is required, acted on it appropriately, and are decision-making authority and escalation arrangements clear for the next operational period?
- ▶ Are key decisions, service impacts, expenditure implications, and the rationale for significant actions (or decisions not to act) being recorded sufficiently to support governance, recovery, and future learning?
- ▶ Do we know where our people and kit are currently operating and what the priorities are for their deployment in the next shift?

3.3 Stabilisation

Monitoring and inspection

Ongoing inspections of affected locations and assets underway

Tracking of conditions in high-risk locations underway

Reliability of critical systems, communications, power, and data reviewed regularly

Traffic management controls and interventions

Closures, restrictions, and diversions reviewed for effectiveness

Controls adjusted as conditions change

Decisions and justifications communicated and recorded

Secondary and cascading impacts

Impacts on traffic patterns monitored

Secondary risks identified and managed

Coordination taking place with utilities and other parties carrying out work on the network

Be alert to:

- ▶ Severe space weather: cascading disruption from power outages, communications failure, GNSS degradation, unreliable traffic systems, fuel supply issues, payment system disruption, or loss of access to digital records
- ▶ Volcanic eruption and volcanic ash: continuing disruption to aviation and freight; sustained pressure on road, rail, ferry, and port networks; ash or dust build-up requiring cleaning; public anxiety and changing travel behaviour
- ▶ Air quality and particles: episodes lasting several days or longer; cumulative workforce exposure; increased cleaning and maintenance; reduced solar output affecting solar-powered assets; vulnerable groups affected by prolonged poor air quality

Workforce and operational sustainability

Fatigue actively managed

Shift handovers maintained and staggered as required

Call handling and communications capacity maintained

Need for mutual aid reviewed

Contractor and supply chain support sustained

Manual fallback arrangements reviewed and sustained where normal systems remain degraded

Communication and governance

Plan for managing public expectations in place and effective

Rationale for ongoing controls communicated

Senior leadership kept informed

Two-way communication maintained with wider responders during stabilisation

Recording

Decision logs and records maintained and updated

End of shift or handover review – stabilisation

- ▶ Do we understand current conditions, are our controls effective, and are secondary impacts being identified and managed?
- ▶ Have any new high-consequence impacts emerged that require reprioritisation of resources or activity?
- ▶ Are workforce, capacity, and supporting systems sufficient to sustain the response over time?
- ▶ Are we aware of the plans of utilities and other contributors to stabilisation?
- ▶ Are we managing public expectations effectively, communicating rationale clearly, and maintaining senior oversight?
- ▶ What is the forward plan for the next shift or period of the stabilisation process?

3.4 Recovery

Recovery extends beyond physical repairs and includes restoration of organisational capacity, review of impacts on programmes and services, and the controlled transition back to BAU.

Network assurance

Plan in place to assure network condition can be confirmed safe and stable

Affected systems, assets, and locations inspected for residual hazards

Restoration

Power, communications, navigation, and other critical systems restored or alternative arrangements established

Damaged assets repaired or made safe

Traffic management and operational systems restored and operational

Learning

Hot debrief and cold debrief initiated

Effectiveness of triggers, thresholds, situational awareness, and key decisions reviewed

Vulnerabilities and repeat hotspots identified

Process in place to feed results into future planning for adaptation and response

Actions assigned to named individuals and tracked

Evidence captured to inform future asset management, adaptation, and investment decisions

Handover

Planned transition to BAU in place

Decision log and records signed off

During recovery consider:

- ▶ Severe space weather: damage or faults in electrical, communications, traffic management, control, monitoring, or data systems; gaps in records caused by system outages; need to validate data captured during the event
- ▶ Volcanic eruption and volcanic ash: residual ash, dust, or particle contamination on signs, signals, drainage, solar panels, vehicles, depots, and equipment; increased maintenance requirements; continuing disruption to wider transport networks
- ▶ Air quality and particles: cleaning and filter replacement needs; continued workforce exposure; impacts on equipment performance and maintenance regimes
- ▶ Short- and medium-term weather forecasts

4. Other checklists in this suite

- ▶ Cold weather and winter disruption
- ▶ Flooding and water-related disruption
- ▶ Ground and slope instability
- ▶ Heat, drought, wildfire, and air quality
- ▶ Storms

About CIHT

CIHT provides strategic leadership and support to help our members develop, deliver, and maintain sustainable solutions for highways, transport infrastructure, and services that:

- ✔ Address the challenges of climate change
- ✔ Support the economy
- ✔ Help address societal inequalities
- ✔ Reduce environmental degradation
- ✔ Respond to a changing world

We bring members together to share, learn, and feel confident about addressing these challenges through the application of good practice, by embracing innovation and by acting with integrity. It is through this and the values that CIHT can demonstrate and deliver on thought leadership and shaping the highways and transportation sector for the public benefit.

Whether you are a student, apprentice, work in the private or public sectors or are a company director, CIHT has a place for you and a commitment to fulfilling your professional development needs throughout your career.

www.ciht.org.uk



Heat, drought, wildfire, and air quality operational response checklist

Disclaimer

CIHT, the authors, and contributors who produced this document have endeavoured to ensure the accuracy of its contents. However, the advice and recommendations given should always be received by the reader “in light of the facts” of their specialist circumstances and specialist advice obtained as necessary. Any references to legislation discussed within this document should be considered in the light of current and any future legislation. The supervised use of artificial intelligence was used to process some of the findings of this report. No liability for negligence or otherwise in relation to this document and its contents can be accepted by CIHT, the members of the project group, its servants or agents, or the managing editors or contributors.



Published by the:

Chartered Institution of Highways & Transportation

119 Britannia Walk
London N1 7JE
t: +44 (0)20 7336 1555
e: info@ciht.org.uk
www.ciht.org.uk

Registered Charity in England No. 1136896

Registered Charity in Scotland No. SC040873

Registered Charity in Republic of Ireland No. 20103989

Published July 2026.

All rights reserved. No part of this publication shall be reproduced, stored in an electronic retrieval system, or transmitted without the written permission of the publishers.

For any inquiries, please email technical@ciht.org.uk

Contents

1. Purpose of this checklist	4
2. Operational context.....	5
3. Checklist for response stages.....	7
4. Other checklists in this suite	14

1. Purpose of this checklist

This checklist relates to the risks identified in the Department for Transport (DfT) Transport Hazard Summaries, "extreme heat", "drought", "wildfires" and "air quality and pollution".

This checklist supports local highway authority teams to proactively manage disruption to their network caused by prolonged periods of hot and dry weather, including extreme heat, drought, and wildfire.

It is designed to support suitably qualified, experienced, and empowered professionals (SQEEP) to apply their judgement consistently under the pressure of a live event. It does not replace the need to exercise professional judgement.

It also supports record keeping during an event. Accurate and timely recording is an operational activity, not an administrative afterthought. Records support situational awareness, defensible decision making, justification of recovery funding, operational learning, and future investment decisions.

For ease of use, the checklists are presented as a sequence of activities associated with each stage of response. Climate hazard events are however dynamic and authorities should revisit the checklist throughout an incident, reviewing priorities, resource requirements, and operational decisions as conditions evolve.

2. Operational context

Nature of the hazard

Periods of prolonged hot and dry weather can generate a range of interconnected hazards including:

- ▶ **extreme heat impacts on infrastructure and workforce welfare**
- ▶ **drought-related degradation and water shortages**
- ▶ **increased risk of wildfire and smoke impacts**
- ▶ **air pollution and smoke impacts affecting visibility, health, and operational activity**

These hazards may occur individually or together, and conditions may evolve over days, weeks, or months.

Extreme heat is typically a progressive hazard, where impacts develop over time. Sustained high temperatures, particularly overnight, can reduce surface performance and lead to deformation, often beginning at known vulnerable locations. At an air temperature of 30°C, asphalt road surfaces can reach 40–50°C.

Drought is also generally progressive and may develop over extended periods of below-average rainfall. Its impacts may persist long after rainfall returns, including ongoing ground instability and degradation.

Wildfire differs from the above hazards in that it may escalate rapidly and create immediate risks to life, access, and infrastructure. While many wildfires are relatively localised, under extreme conditions they may spread quickly and require substantial multi-agency response. The response to wildfire will generally be led by the fire service with highways supporting.

These hazards are often interconnected. Prolonged heat and drought increase wildfire risk, while drying and shrinkage of soils may affect asset stability and increase the consequences of subsequent rainfall events.

Periods of prolonged heat and dry weather may also contribute to wider air pollution episodes. Hot, sunny,

and still conditions can increase levels of ground-level ozone, while drought and wildfire conditions may increase airborne particles and smoke. These impacts may extend well beyond the immediate area affected by wildfire and may persist for several days.

Typical consequences

Authorities should identify and address the impacts of hot and dry weather with most significant consequences for the integrity of the network, community lifelines, and the safety of road users and workers.

These impacts may include:

- ▶ **softening, rutting, or deformation of road surfaces**
- ▶ **reduced skid resistance due to bleeding or fattening of asphalt**
- ▶ **overheating or failure of traffic management, lighting, and communications equipment**
- ▶ **bridge expansion joint movement and localised structural hazards**
- ▶ **increased vehicle breakdowns and congestion**
- ▶ **restrictions on inspection, maintenance, and operational activity due to workforce heat exposure**
- ▶ **drying, cracking, or instability of soils and embankments**
- ▶ **increased wildfire risk near highways and infrastructure**
- ▶ **smoke reducing visibility and creating hazardous conditions for road users**
- ▶ **road closures and access restrictions caused by wildfire or emergency response activity**
- ▶ **smoke and air pollution reducing visibility and affecting safe operation of the network**

- ▶ respiratory impacts on staff, contractors, public, and vulnerable users
- ▶ increased exposure risks for staff working outdoors or near busy routes for prolonged periods
- ▶ particulate contamination affecting vehicles, equipment, signage, and other infrastructure

Hot and dry weather may also:

- ▶ increase pressure on diversion routes and the wider network
- ▶ impair emergency response and access
- ▶ damage carriageways, structures, and supporting groundworks (e.g. embankments)
- ▶ disrupt power, water, and communications infrastructure
- ▶ create additional risks to vulnerable users, staff, and contractors
- ▶ increase maintenance and cleaning requirements due to smoke, dust, and particulate deposits
- ▶ contribute to deterioration of exposed infrastructure and equipment over time

Where conditions persist or hazards combine, impacts may escalate to include:

- ▶ long-duration degradation of highways assets
- ▶ prolonged road closures or diversions and wider network disruption
- ▶ increased demand on network management and support systems

- ▶ sustained pressure on operational resources and contractors
- ▶ cumulative impacts on workforce welfare and resilience

Typical operational responses

Typical responses include:

- ▶ implementing predefined plans for speed restrictions, road closures, diversions, and access restrictions where conditions present a safety risk
- ▶ managing access to critical routes, services and communities, including congestion impacts
- ▶ applying temporary surface treatments or undertaking temporary repairs where this will reduce risk or improve network performance
- ▶ monitoring high-risk assets and structures (e.g. bridges, embankments, and heat-sensitive locations) and restricting access where necessary
- ▶ supporting emergency service response to wildfire incidents, including closures, access management, and public safety messaging
- ▶ monitoring smoke movement, visibility, and air quality forecasts where relevant
- ▶ adjusting operational activity and workforce exposure where smoke or poor air quality creates health or safety concerns

If the situation is sufficiently serious, the authority may need to suspend or reprioritise business as usual (BAU) operations to focus resources on the response. This should be treated as a formal, time-limited, and documented decision – see section 3.2 below.

3. Checklist for response stages

3.1 Anticipation

Triggers for mobilisation

Weather warnings, forecasts, and alerts reviewed against any pre-agreed triggers and thresholds

Early signs of heat, drought, or wildfire impacts identified at known risk locations

Triggers may include:

- ▶ Extreme heat: forecast or sustained high temperatures, or prolonged overnight heat
- ▶ Drought: extended dry conditions, water shortages, or visible ground cracking or drying
- ▶ Wildfire: very high or exceptional fire danger, active fires nearby, prolonged dry vegetation conditions, smoke reports, or deteriorating air quality

Leadership and command structure

Predefined plans initiated including:

SQEEP operational lead confirmed

Operational lead decision authority, out of hours arrangements, and escalation routes confirmed

Integration with multi-agency arrangements confirmed

Situational awareness

Shared understanding of forecasts, warnings, confidence levels, and consequences (access, safety, services, communities) established

Critical locations identified

Smoke movement, visibility impacts, and air quality information reviewed where relevant

Priority actions for council and partners identified and communicated

Communications

Internal communication active (highways function and contractors, other council functions, senior leadership)

Partners briefed (local resilience forum, contractors, utilities, emergency planning, fire and rescue where required)

Public messaging prepared

Public health and travel advice coordinated where smoke or poor air quality may affect users or staff

Resources and readiness

Inspection teams available and any limitations on activity understood

Contractors mobilised or on standby

Plant, equipment, and materials available and, if necessary, pre-positioned

Workforce welfare arrangements in place

Call handling capacity confirmed

Mutual aid arrangements confirmed and pre-alerted if required

Works teams mobilised

Recording

Decision log active and maintained, including considerations behind any decisions not to act in response to potential triggers or thresholds

Arrangements in place to capture expenditure, resource deployment, and programme impacts should escalation occur

End of shift or handover review – anticipation

- ▶ Based on available information, is early action justified, and is our rationale clear?
- ▶ Are leadership, authority, out of hours, and escalation arrangements clear, including integration with wider response structures outside the authority?
- ▶ Do we have a consistent understanding of what is happening, where the risks are greatest, and the consequences for the network and communities, and is this shared?
- ▶ Do we have clear communication arrangements in place internally, with partners and for the public?
- ▶ Do we have the people, equipment, and support systems in place to sustain an effective response?
- ▶ What is our forward action plan for the next shift?

3.2 Response

Situational awareness

Rapid impact assessment (RIA) locations triaged and high-consequence locations prioritised

RIA results validated and fed into ongoing situational awareness

Resources prioritised or reprioritised accordingly

Be alert to:

- ▶ Extreme heat: rapid deterioration at known hotspots and exposed locations
- ▶ Drought: ground cracking, shrinkage, drying, and emerging instability over time
- ▶ Wildfire: rapidly changing fire behaviour, smoke movement, visibility impacts, deteriorating air quality, and changing access constraints

Traffic and network management measures

Road closures implemented where conditions present a safety risk

Diversions implemented where required

Access restrictions in place at affected locations

Decisions and justifications communicated and recorded

Plans in place for managing congestion hotspots

Breakdown and incident response arrangements active

Plans in place for managing evacuation, smoke-related visibility impacts, and emergency access constraints where required

Smoke-related visibility and air quality impacts monitored and managed where required

Be alert to:

- ▶ Extreme heat: vehicle breakdowns, softened surfaces, and reduced skid resistance
- ▶ Drought: uneven surfaces, cracking, and longer-term degradation
- ▶ Wildfire: sudden loss of visibility, smoke-related driving hazards, rapidly changing conditions, and emergency service access requirements

Temporary and adaptive engineering measures

Measures implemented to manage immediate risk

Plans in place for managing the effectiveness of interventions

Decisions and justifications communicated and recorded

Temporary and adaptive engineering measures associated with different hazards include:

- ▶ Extreme heat: sand, grit, or chippings to reduce tackiness and improve skid resistance
- ▶ Drought: monitoring and management of ground movement, cracking, and localised instability
- ▶ Wildfire: removal of hazardous debris, protection of damaged infrastructure, and rapid inspection of affected assets

Capacity, capability, and safety

Workforce exposure to heat, smoke, dust, and air pollution risks monitored

Safe working practices and PPE enforced (including heat, smoke, and respiratory exposure where required)

Shift patterns adjusted as required

Call handling demand actively managed

Additional capacity mobilised if required (contractor, supply chain, mutual aid)

Arrangements in place to support evacuation and emergency access where required

Welfare arrangements reviewed where prolonged smoke or pollution exposure may affect operational activity

Coordination and communication

- Public informed (closures, routes, safety advice)
- Politicians (portfolio holder, ward councillors) briefed
- Contractors and frontline staff briefed
- Wider council awareness maintained

Escalation and suspension of business as usual

- Pre-agreed triggers or thresholds for suspension of BAU exceeded
- Options for mobilising additional resources considered: overtime, internal redeployment, mutual aid from contractors or other authorities
- Authority for suspension confirmed in accordance with local arrangements
- Scope of any suspension or reprioritisation defined (services, locations, duration, and review date)
- All relevant parties inside and outside the authority notified of suspension of BAU
- Potential recovery funding implications (including Bellwin eligibility where relevant) considered and expenditure tracking initiated

Recording

- Decisions, actions, spending, service impacts, and rationale logged in real time
- Significant decisions not to act, escalate, or implement controls recorded where appropriate

End of shift or handover review – response

- ▶ Do we know enough about what has happened, where impacts are occurring, which routes, assets, and services are most at risk, and how the situation may develop to prioritise action on the highest-consequence risks?
- ▶ Are traffic management measures appropriate, focused on highest-consequence locations, and clearly justified and communicated?
- ▶ Are interventions appropriate, effective, and clearly justified and recorded?
- ▶ Are workforce safety, operational capacity, and supporting systems sufficient to sustain the response?
- ▶ Are all relevant parties informed, and is messaging aligned and consistent?
- ▶ Have we recognised where escalation is required, acted on it appropriately, and are decision-making authority and escalation arrangements clear for the next operational period?
- ▶ Are key decisions, service impacts, expenditure implications, and the rationale for significant actions (or decisions not to act) being recorded sufficiently to support governance, recovery, and future learning?
- ▶ Do we know where our people and kit are currently operating and what the priorities are for their deployment in the next shift?

3.3 Stabilisation

Monitoring and inspection

- Ongoing inspections of affected locations and assets underway
- Tracking of conditions at known hotspots and vulnerable locations underway

Traffic management controls and interventions

- Closures, restrictions, and diversions reviewed for effectiveness
- Controls adjusted as conditions change
- Decisions and justifications communicated and recorded

Secondary and cascading impacts

- Impacts on traffic patterns monitored
- Secondary risks identified and managed
- Coordination taking place with utilities and other parties carrying out work on the network

Be alert to:

- ▶ Extreme heat: repeated deterioration at stressed locations and increased infrastructure failures
- ▶ Drought: long-term drying, instability, and increased vulnerability to later rainfall events
- ▶ Wildfire: damage to utilities and communications, erosion following vegetation loss, ongoing smoke impacts, and particulate contamination

Workforce and operational sustainability

- Fatigue actively managed
- Shift handovers maintained and staggered as required
- Call handling and communications capacity maintained
- Need for mutual aid reviewed
- Contractor and supply chain support sustained
- Ongoing workforce exposure to smoke and air pollution monitored and managed

Communication and governance

- Plan for managing public expectations in place and effective
- Rationale for ongoing controls communicated
- Senior leadership kept informed
- Two-way communication maintained with wider responders during stabilisation
- Ongoing public health and travel messaging reviewed and updated where required

Recording

Decision logs and records maintained and updated

End of shift or handover review – stabilisation

- ▶ Do we understand current conditions, are our controls effective, and are secondary impacts being identified and managed?
- ▶ Have any new high-consequence impacts emerged that require reprioritisation of resources or activity?
- ▶ Are workforce, capacity, and supporting systems sufficient to sustain the response over time?
- ▶ Are we aware of the plans of utilities and other contributors to stabilisation?
- ▶ Are we managing public expectations effectively, communicating rationale clearly, and maintaining senior oversight?
- ▶ What is the forward plan for the next shift or period of the stabilisation process?

3.4 Recovery

Recovery extends beyond physical repairs and includes restoration of organisational capacity, review of impacts on programmes and services, and the controlled transition back to BAU.

Network assurance

- Plan in place to assure network condition can be confirmed safe and stable
- Affected areas inspected for residual hazards

Restoration

- Temporary measures removed or replaced where appropriate
- Damaged assets repaired or made safe
- Traffic management systems restored and operational
- Smoke, dust, and particulate contamination cleaned or removed where required

Learning

Hot debrief and cold debrief initiated

Effectiveness of triggers, thresholds, situational awareness, and key decisions reviewed

Vulnerabilities and repeat hotspots identified

Process in place to feed results into future planning for adaptation and response

Actions assigned to named individuals and tracked

Evidence captured to inform future asset management, adaptation, and investment decisions

Handover

Planned transition to BAU in place

Decision log and records signed off

During recovery consider:

- ▶ Extreme heat: reviewing performance of road surfaces, structures, and heat-sensitive assets
- ▶ Drought: assessing ground stability, cracking, drainage performance, and long-term degradation
- ▶ Wildfire: inspecting fire-damaged assets, vegetation loss, erosion risks, smoke, or particulate contamination and resilience of affected routes
- ▶ Wildfire: inspecting indirectly affected assets – gullies, catchpits, and soakaways for ash; posts and columns for structural integrity; sign and signal faces for visibility obstruction due to ash
- ▶ Reprogramming of deferred heat-sensitive BAU works such as surface dressing

4. Other checklists in this suite

- ▶ Cold weather and winter disruption
- ▶ Flooding and water-related disruption
- ▶ Ground and slope instability
- ▶ Major disruption to power, communications, navigation, or other critical systems
- ▶ Storms

About CIHT

CIHT provides strategic leadership and support to help our members develop, deliver, and maintain sustainable solutions for highways, transport infrastructure, and services that:

- ✔ **Address the challenges of climate change**
- ✔ **Support the economy**
- ✔ **Help address societal inequalities**
- ✔ **Reduce environmental degradation**
- ✔ **Respond to a changing world**

We bring members together to share, learn, and feel confident about addressing these challenges through the application of good practice, by embracing innovation and by acting with integrity. It is through this and the values that CIHT can demonstrate and deliver on thought leadership and shaping the highways and transportation sector for the public benefit.

Whether you are a student, apprentice, work in the private or public sectors or are a company director, CIHT has a place for you and a commitment to fulfilling your professional development needs throughout your career.

www.ciht.org.uk



Flooding and water-related disruption operational response checklist

Disclaimer

CIHT, the authors, and contributors who produced this document have endeavoured to ensure the accuracy of its contents. However, the advice and recommendations given should always be received by the reader “in light of the facts” of their specialist circumstances and specialist advice obtained as necessary. Any references to legislation discussed within this document should be considered in the light of current and any future legislation. The supervised use of artificial intelligence was used to process some of the findings of this report. No liability for negligence or otherwise in relation to this document and its contents can be accepted by CIHT, the members of the project group, its servants or agents, or the managing editors or contributors.



Published by the:

Chartered Institution of Highways & Transportation

119 Britannia Walk
London N1 7JE
t: +44 (0)20 7336 1555
e: info@ciht.org.uk
www.ciht.org.uk

Registered Charity in England No. 1136896

Registered Charity in Scotland No. SC040873

Registered Charity in Republic of Ireland No. 20103989

Published July 2026.

All rights reserved. No part of this publication shall be reproduced, stored in an electronic retrieval system, or transmitted without the written permission of the publishers.

For any inquiries, please email technical@ciht.org.uk

Contents

1. Purpose of this checklist	4
2. Operational context.....	4
3. Checklist for response stages.....	6
4. Other checklists in this suite	13

1. Purpose of this checklist

This checklist relates to the risks identified in the Department for Transport Hazard Summaries, "surface water flooding", "coastal flooding and erosion", "river flooding", "groundwater flooding" and "reservoir dam collapse".

This checklist supports local highway authority teams to proactively manage disruption to their network caused by flooding.

It is designed to support suitably qualified, experienced, and empowered professionals (SQEPP) to apply their judgement consistently under the pressure of a live event. It does not replace the need to exercise professional judgement.

It also supports record keeping during an event. Accurate and timely recording is an operational activity, not an administrative afterthought. Records support situational awareness, defensible decision making, justification of recovery funding, operational learning, and future investment decisions.

For ease of use, the checklists are presented as a sequence of activities associated with each stage of response. Climate hazard events are however dynamic and authorities should revisit the checklist throughout an incident, reviewing priorities, resource requirements, and operational decisions as conditions evolve.

2. Operational context

Nature of the hazard

Flooding can occur from a range of sources, including surface water, rivers, groundwater, the sea (coastal flooding), and, in rare cases, reservoir dam failure or collapse. These may occur on their own or together, and impacts may change over time as conditions evolve.

Flooding is challenging for authorities as, depending on the nature and combination of the source(s) of the flood, events can:

- ▶ develop rapidly (e.g. intense rainfall leading to surface water flooding) or more slowly (e.g. rising river levels or groundwater)

- ▶ be highly localised or affect wide geographic areas
- ▶ persist for hours, days, or weeks, depending on the source and scale of the event

Flooding events are also often influenced by:

- ▶ prior conditions (e.g. saturated ground or high river levels)
- ▶ performance of drainage systems
- ▶ interactions between different sources of flooding (e.g. river and surface water, or coastal and river flooding in estuaries)

In summary, flooding can be extremely dynamic and uncertain, requiring ongoing reassessment throughout the incident.

Typical consequences

Authorities should identify and address the impacts of flooding with most significant consequences for the integrity of the network, community lifelines, and the safety of road users and workers, irrespective of their source.

Impacts may include:

- ▶ roads becoming impassable or unsafe due to water depth or flow
- ▶ vehicles becoming stuck, stranded, or at risk from moving water
- ▶ hidden hazards such as debris, displaced covers, or damaged surfaces
- ▶ loss of access to communities, services, and key infrastructure
- ▶ sudden and potentially catastrophic flooding with little warning downstream of a reservoir dam failure
- ▶ rapid erosion or undermining of roads, embankments, and structures caused by fast-moving water

Flooding may also:

- ▶ impair the functioning of traffic management and road safety infrastructure
- ▶ damage carriageways, structures, and supporting groundworks (e.g. embankments)
- ▶ overwhelm drainage systems and leave debris or contamination
- ▶ increase pressure on diversion routes and the wider network

- ▶ disrupt emergency response and access
- ▶ lead to unaffected routes becoming congested as traffic finds routes around flood locations

Where flooding persists or is repeated, impacts may escalate to include:

- ▶ structural weakening or erosion of highways assets
- ▶ prolonged road closures or diversions and wider network disruption
- ▶ increased demand on network management and support systems

Typical operational responses

Typical responses include:

- ▶ implementing pre-defined plans for road closures, diversions, and access restrictions where water presents a safety risk
- ▶ managing access to critical routes, services, and communities, including congestion impacts
- ▶ clearing drainage systems and removing debris where this will reduce risk or improve network performance
- ▶ using temporary measures to control or redirect water and undertaking pumping where feasible
- ▶ monitoring high-risk assets and structures (e.g. bridges, culverts, embankments), and restricting access where necessary

If the situation is sufficiently serious, the authority may need to suspend or reprioritise business as usual (BAU) operations to focus resources on the response. This should be treated as a formal, time-limited, and documented decision – see section 3.2 below.

3. Checklist for response stages

3.1 Anticipation

Triggers for mobilisation

Flood warnings, forecasts, and alerts reviewed against any pre-agreed triggers and thresholds for mobilising response

Early signs of flooding identified at known risk locations

Triggers related to different flooding sources can include:

- ▶ Surface water: intense rainfall forecast
- ▶ River: rising river levels, flood warnings, and alerts
- ▶ Groundwater: prolonged rainfall forecast, rising water table, visible seepage
- ▶ Coastal: tidal forecasts, storm surge warnings, wave and wind conditions
- ▶ Reservoir dam collapse: reports of structural instability, emergency drawdown, overtopping, spillway damage, or warnings from reservoir operators or emergency responders

Leadership and command structure

Predefined plans initiated including:

SQEEP operational lead confirmed

Operational lead decision authority, out of hours arrangements, and escalation routes confirmed

Integration with multi-agency arrangements confirmed

Situational awareness

Shared understanding of forecasts, warnings, confidence levels, and consequences (access, safety, services, communities) established

Critical locations identified

Reservoir flood maps and downstream consequence areas identified where relevant

Priority actions for council and partners identified and communicated

Communications

Internal communication active (highways function and contractors, other council functions, senior leadership)

Partners briefed (local resilience forum, contractors, utilities, emergency planning)

Public messaging prepared

Resources and readiness

Inspection teams available and any limitations on activity understood

Contractors mobilised or on standby

Plant, equipment, and materials available and, if necessary, pre-positioned

Workforce welfare arrangements in place

Call handling capacity confirmed

Mutual aid arrangements confirmed and pre-alerted if required

Works teams mobilised

Recording

Decision log active and maintained, including considerations behind any decisions not to act in response to potential triggers or thresholds

Arrangements in place to capture expenditure, resource deployment, and programme impacts should escalation occur

End of shift or handover review – anticipation

- ▶ Based on available information, is early action justified, and is our rationale clear?
- ▶ Are leadership, authority, out of hours, and escalation arrangements clear, including integration with wider response structures outside the authority?
- ▶ Do we have a consistent understanding of what is happening, where the risks are greatest, and the consequences for the network and communities, and is this shared?
- ▶ Do we have clear communication arrangements in place internally, with partners and for the public?
- ▶ Do we have the people, equipment, and support systems in place to sustain an effective response?
- ▶ What is our forward action plan for the next shift?

3.2 Response

Situational awareness

Rapid impact assessment (RIA) locations triaged and high-consequence locations prioritised

RIA results validated and fed into ongoing situational awareness

Resources prioritised or reprioritised accordingly

Be alert to:

- ▶ Surface water: conditions changing quickly in specific locations
- ▶ River: flooding spreading across a wider area over time
- ▶ Groundwater: conditions lasting longer and/or continuing to get worse
- ▶ Coastal: flood risk linked to timing of high tides and storm conditions
- ▶ Reservoir dam collapse: potential for sudden, fast-moving flooding with severe downstream consequences and very limited warning time

Traffic and network management measures

- Road closures implemented where conditions present a safety risk**
- Diversions implemented where required**
- Access restrictions in place at affected locations**
- Decisions and justifications communicated and recorded**
- Plans in place for managing congestion hotspots**
- Breakdown and incident response arrangements active**
- Plans in place for managing stranded vehicles and access constraints**

Be alert to:

- ▶ Surface water: hidden dangers beneath the water (e.g. debris, open drains, damaged road surfaces) and fast-moving water
- ▶ River: flooding closing roads in several locations, cutting off routes and limiting access to communities and services
- ▶ Groundwater: long-lasting road closures in areas prone to groundwater flooding (e.g. underpasses and low-lying routes)
- ▶ Coastal: closures linked to high tides and wave conditions
- ▶ Reservoir dam collapse: sudden loss of routes, structures, or access downstream of reservoirs, and need for rapid precautionary closures and evacuation support

Temporary and adaptive engineering measures

- Measures implemented to manage immediate risk**
- Plans in place for managing the effectiveness of interventions**
- Decisions and justifications communicated and recorded**

Temporary and adaptive engineering measures associated with different sources of flooding include:

- ▶ Surface water: drainage clearance, debris removal, temporary flow control
- ▶ River: monitoring of bridges, culverts, and blockages
- ▶ Groundwater: pumping and sustained water management
- ▶ Coastal: debris clearance, monitoring of defences, managing overtopping
- ▶ Reservoir dam collapse: monitoring and protection of downstream structures, debris management, and rapid inspection of erosion or undermining

Capacity, capability, and safety

- Workforce exposure to floodwater risks monitored**
- Safe working practices and PPE enforced (including traffic and water hazards)**
- Shift patterns adjusted as required**
- Call handling demand actively managed**
- Additional capacity mobilised if required (contractor, supply chain, mutual aid)**
- Arrangements in place to support evacuation and emergency access where required**

Coordination and communication

Public informed (closures, routes, safety advice)
Politicians (portfolio holder, ward councillors) briefed
Contractors and frontline staff briefed
Wider council awareness maintained

Escalation and suspension of business as usual

Pre-agreed triggers or thresholds for suspension of BAU exceeded
Options for mobilising additional resources considered: overtime, internal redeployment, mutual aid from contractors or other authorities
Authority for suspension confirmed in accordance with local arrangements
Scope of any suspension or reprioritisation defined (services, locations, duration, and review date)
All relevant parties inside and outside the authority notified of suspension of BAU
Potential recovery funding implications (including Bellwin eligibility where relevant) considered and expenditure tracking initiated

Recording

Decisions, actions, spending, service impacts, and rationale logged in real time
Significant decisions not to act, escalate, or implement controls recorded where appropriate

End of shift or handover review – response

- ▶ Do we know enough about what has happened, where impacts are occurring, which routes, assets, and services are most at risk, and how the situation may develop to prioritise action on the highest-consequence risks?
- ▶ Are traffic management measures appropriate, focused on highest-consequence locations, and clearly justified and communicated?
- ▶ Are interventions appropriate, effective, and clearly justified and recorded?
- ▶ Are workforce safety, operational capacity, and supporting systems sufficient to sustain the response?
- ▶ Are all relevant parties informed, and is messaging aligned and consistent?
- ▶ Have we recognised where escalation is required, acted on it appropriately, and are decision-making authority and escalation arrangements clear for the next operational period?
- ▶ Are key decisions, service impacts, expenditure implications, and the rationale for significant actions (or decisions not to act) being recorded sufficiently to support governance, recovery, and future learning?
- ▶ Do we know where our people and kit are currently operating and what the priorities are for their deployment in the next shift?

3.3 Stabilisation

Monitoring and inspection

- Ongoing inspections of affected locations and assets underway
- Tracking of conditions in flood-prone locations underway

Traffic management controls and interventions

- Closures, restrictions, and diversions reviewed for effectiveness
- Controls adjusted as conditions change
- Decisions and justifications communicated and recorded

Secondary and cascading impacts

- Impacts on traffic patterns monitored
- Secondary risks identified and managed
- Coordination taking place with utilities and other parties carrying out work on the network

Be alert to:

- ▶ Surface water: drains becoming blocked and water remaining on the surface in lower areas (e.g. underpasses)
- ▶ River: debris left behind, polluted water, and flooding lasting for extended periods
- ▶ Groundwater: ground staying waterlogged for extended periods and ongoing impacts below the surface
- ▶ Coastal: repeated flooding at high tides, erosion, and damage to roads and structures
- ▶ Reservoir dam collapse: long-duration route closures, debris impacts, erosion, and loss of supporting infrastructure such as power or communications

Workforce and operational sustainability

- Fatigue actively managed
- Shift handovers maintained and staggered as required
- Call handling and communications capacity maintained
- Need for mutual aid reviewed
- Contractor and supply chain support sustained

Communication and governance

Plan for managing public expectations in place and effective

Rationale for ongoing controls communicated

Senior leadership kept informed

Two-way communication maintained with wider responders during stabilisation

Recording

Decision logs and records maintained and updated

End of shift or handover review – stabilisation

- ▶ Do we understand current conditions, are our controls effective, and are secondary impacts being identified and managed?
- ▶ Have any new high-consequence impacts emerged that require reprioritisation of resources or activity?
- ▶ Are workforce, capacity, and supporting systems sufficient to sustain the response over time?
- ▶ Are we aware of the plans of utilities and other contributors to stabilisation?
- ▶ Are we managing public expectations effectively, communicating rationale clearly, and maintaining senior oversight?
- ▶ What is the forward plan for the next shift or period of the stabilisation process?

3.4 Recovery

Recovery extends beyond physical repairs and includes restoration of organisational capacity, review of impacts on programmes and services, and the controlled transition back to BAU.

Network assurance

Plan in place to assure network condition can be confirmed safe and stable

Flooded areas inspected for residual hazards

Restoration

Drainage systems inspected, cleared, and restored

Damaged assets repaired or made safe

Traffic management systems restored and operational

Learning

Hot debrief and cold debrief initiated

Effectiveness of triggers, thresholds, situational awareness, and key decisions reviewed

Vulnerabilities and repeat hotspots identified

Process in place to feed results into future planning for adaptation and response

Actions assigned to named individuals and tracked

Evidence captured to inform future asset management, adaptation, and investment decisions

Handover

Planned transition to BAU in place

Decision log and records signed off

During recovery consider:

- ▶ Surface water: reviewing performance of drainage
- ▶ River: structural inspections (bridges, embankments)
- ▶ Groundwater: assessing ground stability and underground assets
- ▶ Coastal: reviewing erosion, corrosion, and whether routes remain safe and practical to keep open over time
- ▶ Reservoir dam collapse: long-term structural inspection, erosion repair, reinstatement of washed-out assets, and review of diversion route resilience
- ▶ Short- and medium-term weather forecasts

4. Other checklists in this suite

- ▶ Cold weather and winter disruption
- ▶ Ground and slope instability
- ▶ Heat, drought, wildfire, and air quality
- ▶ Major disruption to power, communications, navigation, or other critical systems
- ▶ Storms

About CIHT

CIHT provides strategic leadership and support to help our members develop, deliver, and maintain sustainable solutions for highways, transport infrastructure, and services that:

- ✔ **Address the challenges of climate change**
- ✔ **Support the economy**
- ✔ **Help address societal inequalities**
- ✔ **Reduce environmental degradation**
- ✔ **Respond to a changing world**

We bring members together to share, learn, and feel confident about addressing these challenges through the application of good practice, by embracing innovation and by acting with integrity. It is through this and the values that CIHT can demonstrate and deliver on thought leadership and shaping the highways and transportation sector for the public benefit.

Whether you are a student, apprentice, work in the private or public sectors or are a company director, CIHT has a place for you and a commitment to fulfilling your professional development needs throughout your career.

www.ciht.org.uk



Ground and slope instability operational response checklist

Disclaimer

CIHT, the authors, and contributors who produced this document have endeavoured to ensure the accuracy of its contents. However, the advice and recommendations given should always be received by the reader “in light of the facts” of their specialist circumstances and specialist advice obtained as necessary. Any references to legislation discussed within this document should be considered in the light of current and any future legislation. The supervised use of artificial intelligence was used to process some of the findings of this report. No liability for negligence or otherwise in relation to this document and its contents can be accepted by CIHT, the members of the project group, its servants or agents, or the managing editors or contributors.



Published by the:

Chartered Institution of Highways & Transportation

119 Britannia Walk
London N1 7JE
t: +44 (0)20 7336 1555
e: info@ciht.org.uk
www.ciht.org.uk

Registered Charity in England No. 1136896

Registered Charity in Scotland No. SC040873

Registered Charity in Republic of Ireland No. 20103989

Published July 2026.

All rights reserved. No part of this publication shall be reproduced, stored in an electronic retrieval system, or transmitted without the written permission of the publishers.

For any inquiries, please email technical@ciht.org.uk

Contents

1. Purpose of this checklist	4
2. Operational context.....	4
3. Checklist for response stages.....	6
4. Other checklists in this suite	13

1. Purpose of this checklist

This checklist relates to the risks identified in the DfT Transport Hazards Summaries, "landslides & earthworks failures" and "subsidence and soil degradation".

This checklist supports local highway authority teams to proactively manage disruption to the network caused by ground instability, including landslides, earthwork failures, subsidence, and soil degradation.

It is designed to support suitably qualified, experienced, and empowered professionals (SQEPP) to apply their judgement consistently under the pressure of a live event. It does not replace the need to exercise professional judgement.

It also supports record keeping during an event.

Accurate and timely recording is an operational activity, not an administrative afterthought. Records support situational awareness, defensible decision making, justification of recovery funding, operational learning, and future investment decisions.

For ease of use, the checklists are presented as a sequence of activities associated with each stage of response. Climate hazard events are however dynamic and authorities should revisit the checklist throughout an incident, reviewing priorities, resource requirements, and operational decisions as conditions evolve.

2. Operational context

Nature of the hazard

Ground instability hazards occur where soil, rock, or engineered earthworks lose strength or move, affecting the safety and operation of the transport network.

This can include:

- ▶ landslides and rockfalls
- ▶ collapse or movement of embankments and cuttings
- ▶ subsidence and sinkholes
- ▶ erosion and degradation of supporting ground
- ▶ deformation or cracking of carriageways and structures

These hazards may occur individually or in combination, and conditions may evolve over hours, days, weeks, or longer periods.

Some events occur suddenly, for example after intense

rainfall or collapse of weakened ground. Others develop progressively, with warning signs such as cracking, movement, drainage problems, or repeated localised defects.

Ground instability is often associated with:

- ▶ prolonged or intense rainfall
- ▶ repeated wet and dry cycles
- ▶ drought and shrinkage of clay soils
- ▶ groundwater changes and saturation
- ▶ erosion and drainage failures
- ▶ freeze-thaw weathering
- ▶ wildfire-related vegetation loss
- ▶ ageing infrastructure and historic earthworks

Once ground movement has occurred, slopes and supporting ground may remain unstable for extended periods and be more susceptible to repeat failures.

Typical consequences

Authorities should identify and address the impacts of ground instability with the most significant consequences for network safety, access, and resilience.

Impacts may include:

- ▶ debris blocking carriageways or other transport routes
- ▶ cracking, distortion, or collapse of carriageways
- ▶ unstable embankments, cuttings, and retaining structures
- ▶ collapse or deformation of supporting ground beneath assets
- ▶ sinkholes or sudden ground collapse
- ▶ blocked or damaged drainage systems
- ▶ damage to bridges, retaining walls, and buried infrastructure
- ▶ road closures, speed restrictions, and diversions
- ▶ disruption to emergency access, freight, and public transport
- ▶ repeated or escalating failures at affected locations
- ▶ risks to staff working near unstable slopes or ground
- ▶ stranded vehicles or isolated communities

Ground instability may also:

- ▶ damage utilities and communications infrastructure
- ▶ increase flood risk due to blocked or broken drainage systems or erosion
- ▶ create long-duration restrictions and prolonged recovery periods
- ▶ increase demand for inspections, monitoring, and engineering interventions
- ▶ create uncertainty about the ongoing safety and stability of affected assets

Where conditions persist or hazards combine, impacts may escalate to include:

- ▶ repeated collapse or movement at affected sites
- ▶ progressive weakening of slopes or supporting ground
- ▶ widening areas of instability
- ▶ increasing maintenance and inspection requirements
- ▶ long-duration disruption to strategic routes and communities

Typical operational responses

Typical responses include:

- ▶ implementing speed restrictions, road closures, and diversions where conditions present a safety risk
- ▶ carrying out rapid inspections and geotechnical assessments
- ▶ monitoring unstable slopes, embankments, and structures
- ▶ establishing exclusion zones around unstable areas
- ▶ clearing debris and maintaining drainage systems
- ▶ implementing temporary stabilisation or protection measures
- ▶ restricting access to high-risk locations
- ▶ coordinating with utilities, emergency services, and specialist contractors
- ▶ monitoring evolving conditions and repeat failure risk over extended periods

If the situation is sufficiently serious, the authority may need to suspend or reprioritise business as usual (BAU) operations to focus resources on the response. This should be treated as a formal, time-limited, and documented decision – see section 3.2 below.

3. Checklist for response stages

3.1 Anticipation

Triggers for mobilisation

Weather warnings, forecasts, and alerts reviewed against any pre-agreed triggers and thresholds

Early signs of storm-related disruption identified at known risk locations

Triggers may include:

- ▶ Landslides and earthwork failures: forecast intense rainfall, prolonged wet weather, visible slope movement, debris, or drainage failures
- ▶ Subsidence: ground cracking, deformation, sinkholes, uneven surfaces, or repeated defects
- ▶ Soil degradation and erosion: measured loss of vegetation, erosion, saturated ground, or repeated surface run-off

Leadership and command structure

Predefined plans initiated including:

SQEEP operational lead confirmed

Operational lead decision authority, out of hours arrangements, and escalation routes confirmed

Integration with multi-agency arrangements confirmed

Situational awareness

Shared understanding of forecasts, warnings, confidence levels, and consequences established

Critical routes, assets, and known instability hotspots identified

Existing defects, inspection history, and previous failures reviewed where relevant

Priority actions for council and partners identified and communicated

Communications

Internal communication active (highways function and contractors, other council functions, senior leadership)

Partners briefed (utilities, emergency planning, rail operators, emergency services where required)

Public messaging prepared

Resources and readiness

Inspection teams and specialist support available

Contractors mobilised or on standby

Plant, equipment, and materials available and, if necessary, pre-positioned

Traffic management resources available

Workforce welfare arrangements in place

Call handling capacity confirmed

Mutual aid arrangements confirmed and pre-alerted if required

Works teams mobilised

Recording

Decision log active and maintained, including considerations behind any decisions not to act in response to potential triggers or thresholds

Arrangements in place to capture expenditure, resource deployment, and programme impacts should escalation occur

End of shift or handover review – anticipation

- ▶ Based on available information, is early action justified, and is our rationale clear?
- ▶ Are leadership, authority, out of hours, and escalation arrangements clear, including integration with wider response structures outside the authority?
- ▶ Do we have a consistent understanding of what is happening, where the risks are greatest, and the consequences for the network and communities, and is this shared?
- ▶ Do we have clear communication arrangements in place internally, with partners and for the public?
- ▶ Do we have the people, equipment, and support systems in place to sustain an effective response?
- ▶ What is our forward action plan for the next shift?

3.2 Response

Situational awareness

Rapid impact assessment (RIA) locations triaged and high-consequence locations prioritised

RIA results validated and fed into ongoing situational awareness

Resources prioritised or reprioritised accordingly

Be alert to:

- ▶ Landslides and earthwork failures: rapidly changing slope conditions, debris movement, and repeat failures
- ▶ Subsidence: progressive deformation, hidden voids, and instability beneath the surface
- ▶ Soil degradation and erosion: undermining of slopes, drainage systems, and supporting ground over time

Traffic and network management measures

Speed restrictions, road closures, and access restrictions implemented where conditions present a safety risk

Diversions implemented where required

Exclusion zones established where ground conditions remain uncertain or unstable

Decisions and justifications communicated and recorded

Plans in place for managing congestion hotspots

Emergency access arrangements reviewed

Be alert to:

- ▶ Landslides and earthwork failures: sudden debris movement, unstable slopes, and repeat collapse risk
- ▶ Subsidence: uneven surfaces, hidden voids, and progressive deterioration
- ▶ Soil degradation and erosion: loss of support beneath roads, drainage failures, and pooling

Temporary and adaptive engineering measures

Measures implemented to manage immediate risk

Drainage systems inspected and maintained where required

Temporary stabilisation or protection measures implemented where appropriate

Plans in place for monitoring the effectiveness of interventions

Decisions and justifications communicated and recorded

Temporary and adaptive engineering measures associated with different hazards include:

- ▶ Landslides and earthwork failures: slope stabilisation, debris clearance, and drainage management
- ▶ Subsidence: temporary surfacing repairs, barriers, and monitoring of ground movement
- ▶ Soil degradation and erosion: drainage repairs, erosion control, and localised strengthening measures

Capacity, capability, and safety

Workforce exposure to unstable ground and environmental hazards monitored

Safe working practices and PPE enforced

Access to unstable areas controlled and reviewed

Shift patterns adjusted as required

Call handling demand actively managed

Additional capacity mobilised if required (contractor, supply chain, mutual aid)

Arrangements in place to support evacuation and emergency access where required

Coordination and communication

- Public informed (closures, diversions, safety advice)
- Politicians (portfolio holder, ward councillors) briefed
- Contractors and frontline staff briefed
- Wider council awareness maintained
- Coordination maintained with utilities and infrastructure operators where required

Escalation and suspension of business as usual

- Pre-agreed triggers or thresholds for suspension of BAU exceeded
- Options for mobilising additional resources considered: overtime, internal redeployment, mutual aid from contractors or other authorities
- Authority for suspension confirmed in accordance with local arrangements
- Scope of any suspension or reprioritisation defined (services, locations, duration, and review date)
- All relevant parties inside and outside the authority notified of suspension of BAU
- Potential recovery funding implications (including Bellwin eligibility where relevant) considered and expenditure tracking initiated

Recording

- Decisions, actions, spending, service impacts, and rationale logged in real time
- Significant decisions not to act, escalate, or implement controls recorded where appropriate

End of shift or handover review – response

- ▶ Do we know enough about what has happened, where impacts are occurring, which routes, assets, and services are most at risk, and how the situation may develop to prioritise action on the highest-consequence risks?
- ▶ Are traffic management measures appropriate, focused on highest-consequence locations, and clearly justified and communicated?
- ▶ Are interventions appropriate, effective, and clearly justified and recorded?
- ▶ Are workforce safety, operational capacity, and supporting systems sufficient to sustain the response?
- ▶ Are all relevant parties informed, and is messaging aligned and consistent?
- ▶ Have we recognised where escalation is required, acted on it appropriately, and are decision-making authority and escalation arrangements clear for the next operational period?
- ▶ Are key decisions, service impacts, expenditure implications, and the rationale for significant actions (or decisions not to act) being recorded sufficiently to support governance, recovery, and future learning?
- ▶ Do we know where our people and kit are currently operating and what the priorities are for their deployment in the next shift?

3.3 Stabilisation

Monitoring and inspection

- Ongoing inspections of affected locations and assets underway
- Monitoring of unstable slopes, embankments, and ground conditions maintained
- Repeat failure risk actively reviewed

Traffic management controls and interventions

- Closures, restrictions, and diversions reviewed for effectiveness
- Controls adjusted as conditions change
- Decisions and justifications communicated and recorded

Temporary and adaptive engineering measures

- Measures implemented to manage risk
- Plans in place for monitoring the effectiveness of interventions
- Decisions and justifications communicated and recorded

Temporary and adaptive engineering measures associated with different hazards include:

- ▶ Landslides and earthwork failures: slope stabilisation, debris clearance, drainage management, temporary support to unstable slopes, and controlled removal of unstable material
- ▶ Subsidence: temporary surfacing repairs, barriers, exclusion zones, monitoring of ground movement, and infilling to protect the highway and adjacent assets
- ▶ Soil degradation and erosion: drainage repairs, erosion control measures, localised strengthening works, and protection of exposed or undermined assets

Secondary and cascading impacts

- Impacts on traffic patterns monitored
- Secondary risks identified and managed
- Coordination taking place with utilities and other parties carrying out work on the network

Be alert to:

- ▶ Landslides and earthwork failures: repeat collapse, blocked drainage, and widening instability
- ▶ Subsidence: damage to buried utilities, progressive ground movement, and increasing surface deformation
- ▶ Soil degradation and erosion: loss of drainage capacity, increased run-off, and deterioration during further rainfall

Workforce and operational sustainability

- Fatigue actively managed
- Shift handovers maintained and staggered as required
- Specialist inspection and engineering capacity sustained
- Need for mutual aid reviewed
- Contractor and supply chain support sustained

Communication and governance

- Plan for managing public expectations in place and effective
- Rationale for ongoing controls communicated
- Senior leadership kept informed
- Two-way communication maintained with wider responders during stabilisation

Recording

- Decision logs and records maintained and updated

End of shift or handover review – stabilisation

- ▶ Do we understand current conditions, are our controls effective, and are secondary impacts being identified and managed?
- ▶ Have any new high-consequence impacts emerged that require reprioritisation of resources or activity?
- ▶ Are workforce, capacity, and supporting systems sufficient to sustain the response over time?
- ▶ Are we aware of the plans of utilities and other contributors to stabilisation?
- ▶ Are we managing public expectations effectively, communicating rationale clearly, and maintaining senior oversight?
- ▶ What is the forward plan for the next shift or period of the stabilisation process?

3.4 Recovery

Recovery extends beyond physical repairs and includes restoration of organisational capacity, review of impacts on programmes and services, and the controlled transition back to BAU.

Network assurance

- Plan in place to assure network condition can be confirmed safe and stable
- Affected areas inspected for residual instability and hidden hazards
- Long-term monitoring requirements identified where necessary

Restoration

Temporary measures removed or replaced where appropriate

Drainage systems inspected, cleared, and restored

Damaged assets repaired or made safe

Debris and unstable material removed where required

Traffic management systems restored and operational

Learning

Hot debrief and cold debrief initiated

Effectiveness of triggers, thresholds, situational awareness, and key decisions reviewed

Vulnerabilities and repeat hotspots identified

Process in place to feed results into future planning for adaptation and response

Actions assigned to named individuals and tracked

Evidence captured to inform future asset management, adaptation, and investment decisions

Handover

Planned transition to BAU in place

Decision log and records signed off

During recovery consider:

- ▶ Landslides and earthwork failures: long-term slope stability, drainage performance, and repeat failure risk
- ▶ Subsidence: ongoing ground movement, buried utility impacts, and future monitoring requirements
- ▶ Soil degradation and erosion: restoration of drainage, vegetation, and erosion control measures

4. Other checklists in this suite

- ▶ Cold weather and winter disruption
- ▶ Flooding and water-related disruption
- ▶ Heat, drought, wildfire, and air quality
- ▶ Major disruption to power, communications, navigation, or other critical systems
- ▶ Storms

About CIHT

CIHT provides strategic leadership and support to help our members develop, deliver, and maintain sustainable solutions for highways, transport infrastructure, and services that:

- ✔ **Address the challenges of climate change**
- ✔ **Support the economy**
- ✔ **Help address societal inequalities**
- ✔ **Reduce environmental degradation**
- ✔ **Respond to a changing world**

We bring members together to share, learn, and feel confident about addressing these challenges through the application of good practice, by embracing innovation and by acting with integrity. It is through this and the values that CIHT can demonstrate and deliver on thought leadership and shaping the highways and transportation sector for the public benefit.

Whether you are a student, apprentice, work in the private or public sectors or are a company director, CIHT has a place for you and a commitment to fulfilling your professional development needs throughout your career.

www.ciht.org.uk



Storms operational response checklist

Disclaimer

CIHT, the authors, and contributors who produced this document have endeavoured to ensure the accuracy of its contents. However, the advice and recommendations given should always be received by the reader “in light of the facts” of their specialist circumstances and specialist advice obtained as necessary. Any references to legislation discussed within this document should be considered in the light of current and any future legislation. The supervised use of artificial intelligence was used to process some of the findings of this report. No liability for negligence or otherwise in relation to this document and its contents can be accepted by CIHT, the members of the project group, its servants or agents, or the managing editors or contributors.



Published by the:

Chartered Institution of Highways & Transportation

119 Britannia Walk
London N1 7JE
t: +44 (0)20 7336 1555
e: info@ciht.org.uk
www.ciht.org.uk

Registered Charity in England No. 1136896

Registered Charity in Scotland No. SC040873

Registered Charity in Republic of Ireland No. 20103989

Published July 2026.

All rights reserved. No part of this publication shall be reproduced, stored in an electronic retrieval system, or transmitted without the written permission of the publishers.

For any inquiries, please email technical@ciht.org.uk

Contents

1. Purpose of this checklist	4
2. Operational context.....	5
3. Checklist for response stages.....	6
4. Other checklists in this suite	13

1. Purpose of this checklist

This checklist relates to the risks identified in the Department for Transport (DfT) Transport Hazard Summary "storms".

This checklist supports local highway authority teams to proactively manage disruption to their network caused by storms.

It is designed to support suitably qualified, experienced, and empowered professionals (SQEEP) to apply their judgement consistently under the pressure of a live event. It does not replace the need to exercise professional judgement.

It also supports record keeping during an event.

Accurate and timely recording is an operational activity, not an administrative afterthought. Records support situational awareness, defensible decision making, justification of recovery funding, operational learning, and future investment decisions.

For ease of use, the checklists are presented as a sequence of activities associated with each stage of response. Climate hazard events are however dynamic and authorities should revisit the checklist throughout an incident, reviewing priorities, resource requirements, and operational decisions as conditions evolve.

2. Operational context

Nature of the hazard

Storms can bring strong winds, heavy rainfall, lightning, hail, storm surges, and, in some cases, associated flooding, landslides, coastal erosion, or cold weather hazards.

Storms can:

- ▶ develop rapidly, particularly thunderstorms
- ▶ affect wide geographic areas, particularly named windstorms
- ▶ create highly localised impacts, such as fallen trees, lightning damage, or surface water flooding
- ▶ occur in succession, limiting recovery time between events

In summary, storms can be dynamic and uncertain, requiring ongoing reassessment throughout the incident.

Typical consequences

Impacts may include:

- ▶ roads blocked by fallen trees, debris, or damaged structures
- ▶ high-sided vehicles at risk of toppling from strong winds
- ▶ exposed bridges or coastal routes requiring restrictions or closures
- ▶ reduced visibility from heavy rain or hail

- ▶ aquaplaning, skidding, and increased collision risk for drivers
- ▶ damage to signs, signals, lighting columns, and communications equipment
- ▶ power or communications failures affecting traffic signals and operational coordination
- ▶ disruption to emergency access and community lifelines
- ▶ localised flooding

Typical operational responses

Typical responses include:

- ▶ implementing road closures, diversions, and access restrictions
- ▶ restricting high-sided vehicles on exposed routes
- ▶ clearing fallen trees and debris
- ▶ inspecting exposed structures, bridges, trees, and vulnerable assets
- ▶ coordinating with emergency services, utilities, contractors, and neighbouring authorities
- ▶ issuing public messaging on closures, safety, and travel conditions

If the situation is sufficiently serious, the authority may need to suspend or reprioritise business as usual (BAU) operations to focus resources on the response. This should be treated as a formal, time-limited, and documented decision – see section 3.2 below.

3. Checklist for response stages

3.1 Anticipation

Triggers for mobilisation

Weather warnings, forecasts, and alerts reviewed against any pre-agreed triggers and thresholds

Early signs of storm-related disruption identified at known risk locations

Triggers may include:

- ▶ forecast high gust speeds
- ▶ Met Office announcement of a named storm
- ▶ thunderstorm warnings
- ▶ intense rainfall or hail warnings
- ▶ storm surge or coastal wave conditions warnings
- ▶ warnings affecting exposed bridges, coastal routes, or tree-lined corridors

Leadership and command structure

Predefined plans initiated including:

SQEEP operational lead confirmed

Operational lead decision authority, out of hours arrangements, and escalation routes confirmed

Integration with multi-agency arrangements confirmed

Situational awareness

Shared understanding of forecasts, warnings, confidence levels, and consequences established

Critical locations identified

Priority actions for council and other responders identified and communicated

Be alert to:

- ▶ exposed bridges and elevated routes
- ▶ coastal roads
- ▶ tree-lined routes
- ▶ routes vulnerable to debris
- ▶ locations dependent on power, signals, or communications
- ▶ routes with limited diversion options

Communications

Internal communication active

Partners briefed

Public messaging prepared

Resources and readiness

Inspection teams available and any limitations on activity understood

Contractors mobilised or on standby

Plant, equipment, and materials available and, if necessary, pre-positioned

Workforce welfare arrangements in place

Call handling capacity confirmed

Mutual aid arrangements confirmed and pre-alerted if required

Works teams mobilised

Storm-specific readiness

Tree teams or arboriculture support available

Chainsaw-capable crews available where required

Traffic management resources available

Temporary signage and barriers available

Signal, lighting, and electrical support available

Arrangements in place for working safely in high winds or lightning risk

Recording

Decision log active and maintained, including considerations behind any decisions not to act in response to potential triggers or thresholds

Arrangements in place to capture expenditure, resource deployment, and programme impacts should escalation occur

End of shift or handover review – anticipation

- ▶ Based on available information, is early action justified, and is our rationale clear?
- ▶ Are leadership, authority, out of hours, and escalation arrangements clear, including integration with wider response structures outside the authority?
- ▶ Do we have a consistent understanding of what is happening, where the risks are greatest, and the consequences for the network and communities, and is this shared?
- ▶ Do we have clear communication arrangements in place internally, with partners and for the public?
- ▶ Do we have the people, equipment, and support systems in place to sustain an effective response?
- ▶ What is our forward action plan for the next shift?

3.2 Response

Situational awareness

Rapid impact assessment (RIA) locations triaged and high-consequence locations prioritised

RIA results validated and fed into ongoing situational awareness

Resources prioritised or reprioritised accordingly

Be alert to:

- ▶ fallen trees
- ▶ flying debris
- ▶ unsafe structures, both highways and private
- ▶ damaged signs, lighting, or signals
- ▶ bridge exposure
- ▶ high-sided vehicle risk
- ▶ damage to communications and power infrastructure impeding the response
- ▶ power or communications failure
- ▶ associated flooding or landslides

Traffic and network management measures

Road closures implemented where conditions present a safety risk

Diversions implemented where required

Access restrictions in place at affected locations

Decisions and justifications communicated and recorded

Plans in place for managing congestion hotspots

Breakdown and incident response arrangements active

Plans in place for managing stranded vehicles and access constraints

Storm-specific considerations:

- ▶ precautionary closure of exposed bridges or coastal roads
- ▶ restrictions on high-sided vehicles
- ▶ closures where trees, debris, or unstable structures create danger
- ▶ ensuring diversion routes are not exposed to the same wind or debris risk

Temporary and adaptive engineering measures

Measures implemented to manage immediate risk

Plans in place for managing the effectiveness of interventions

Decisions and justifications communicated and recorded

Typical measures include:

- ▶ debris clearance
- ▶ tree removal
- ▶ temporary signing
- ▶ temporary traffic management
- ▶ signal repairs
- ▶ lighting or electrical repairs
- ▶ inspection of damaged structures
- ▶ temporary making safe of unstable assets

Capacity, capability, and safety

Workforce exposure to hazards monitored

Safe working practices and PPE enforced

Shift patterns adjusted as required

Call handling demand actively managed

Additional capacity mobilised if required (contractor, supply chain, mutual aid)

Arrangements in place to support evacuation and emergency access where required

Storm-specific safety issues:

- ▶ avoid exposing crews to unsafe wind conditions
- ▶ manage falling tree and debris risk
- ▶ manage lightning risk
- ▶ consider lone working and night-time visibility risks

Coordination and communication

Public informed

Politicians briefed

Contractors and frontline staff briefed

Wider council awareness maintained

Escalation and suspension of business as usual

Pre-agreed triggers or thresholds for suspension of BAU exceeded

Options for mobilising additional resources considered: overtime, internal redeployment, mutual aid from contractors or other authorities

Authority for suspension confirmed in accordance with local arrangements

Scope of any suspension or reprioritisation defined (services, locations, duration, and review date)

All relevant parties inside and outside the authority notified of suspension of BAU

Potential recovery funding implications (including Bellwin eligibility where relevant) considered and expenditure tracking initiated

Recording

Decisions, actions, spending, service impacts, and rationale logged in real time

Significant decisions not to act, escalate, or implement controls recorded where appropriate

End of shift or handover review – response

- ▶ Do we know enough about what has happened, where impacts are occurring, which routes, assets, and services are most at risk, and how the situation may develop to prioritise action on the highest-consequence risks?
- ▶ Are traffic management measures appropriate, focused on highest-consequence locations, and clearly justified and communicated?
- ▶ Are interventions appropriate, effective, and clearly justified and recorded?
- ▶ Are workforce safety, operational capacity, and supporting systems sufficient to sustain the response?
- ▶ Are all relevant parties informed, and is messaging aligned and consistent?
- ▶ Have we recognised where escalation is required, acted on it appropriately, and are decision-making authority and escalation arrangements clear for the next operational period?
- ▶ Are key decisions, service impacts, expenditure implications, and the rationale for significant actions (or decisions not to act) being recorded sufficiently to support governance, recovery, and future learning?
- ▶ Do we know where our people and kit are currently operating and what the priorities are for their deployment in the next shift?

3.3 Stabilisation

Monitoring and inspection

Ongoing inspections of affected locations and assets underway

Tracking of conditions in high-risk locations underway

Storm-specific monitoring:

- ▶ residual debris
- ▶ damaged or unstable trees
- ▶ weakened structures
- ▶ damaged signs, signals, and lighting
- ▶ power and communications disruption
- ▶ drainage blockages
- ▶ further impacts from successive storms

Traffic management controls and interventions

Closures, restrictions, and diversions reviewed for effectiveness

Controls adjusted as conditions change

Decisions and justifications communicated and recorded

Secondary and cascading impacts

Impacts on traffic patterns monitored

Secondary risks identified and managed

Coordination taking place with utilities and other parties carrying out work on the network

Be alert to:

- ▶ power outages
- ▶ communications failure
- ▶ signal failure
- ▶ repeated tree fall
- ▶ blocked routes
- ▶ flooding
- ▶ landslides
- ▶ coastal erosion
- ▶ reduced recovery capacity if further storms are forecast

Workforce and operational sustainability

Fatigue actively managed

Shift handovers maintained and staggered as required

Call handling and communications capacity maintained

Need for mutual aid reviewed

Contractor and supply chain support sustained

Communication and governance

- Plan for managing public expectations in place and effective
- Rationale for ongoing controls communicated
- Senior leadership kept informed
- Two-way communication maintained with wider responders during stabilisation

Recording

Decision logs and records maintained and updated

End of shift or handover review – stabilisation

- ▶ Do we understand current conditions, are our controls effective, and are secondary impacts being identified and managed?
- ▶ Have any new high-consequence impacts emerged that require reprioritisation of resources or activity?
- ▶ Are workforce, capacity, and supporting systems sufficient to sustain the response over time?
- ▶ Are we aware of the plans of utilities and other contributors to stabilisation?
- ▶ Are we managing public expectations effectively, communicating rationale clearly, and maintaining senior oversight?
- ▶ What is the forward plan for the next shift or period of the stabilisation process?

3.4 Recovery

Recovery extends beyond physical repairs and includes restoration of organisational capacity, review of impacts on programmes and services, and the controlled transition back to BAU.

Network assurance

- Plan in place to assure network condition can be confirmed safe and stable
- Affected areas inspected for residual hazards

Storm-specific checks:

- ▶ damaged trees
- ▶ unstable structures
- ▶ damaged signs, lighting, and signals
- ▶ damaged drainage
- ▶ embankment or verge damage
- ▶ debris left on carriageways or footways

Restoration

- Drainage systems inspected, cleared, and restored
- Damaged assets repaired or made safe
- Traffic management systems restored and operational

Storm-specific restoration:

- ▶ restore power-dependent systems
- ▶ repair traffic signals and communications equipment
- ▶ clear residual debris
- ▶ review tree and vegetation safety
- ▶ repair damaged street furniture and safety assets

Learning

Hot debrief and cold debrief initiated

Effectiveness of triggers, thresholds, situational awareness, and key decisions reviewed

Vulnerabilities and repeat hotspots identified

Process in place to feed results into future planning for adaptation and response

Actions assigned to named individuals and tracked

Evidence captured to inform future asset management, adaptation, and investment decisions

Handover

Planned transition to BAU in place

Decision log and records signed off

During recovery consider:

- ▶ performance of vegetation management
- ▶ bridge and high-sided vehicle restriction thresholds
- ▶ communications resilience
- ▶ impacts of successive storms

4. Other checklists in this suite

- ▶ Cold weather and winter disruption
- ▶ Flooding and water-related disruption
- ▶ Ground and slope instability
- ▶ Heat, drought, wildfire, and air quality
- ▶ Major disruption to power, communications, navigation, or other critical systems

About CIHT

CIHT provides strategic leadership and support to help our members develop, deliver, and maintain sustainable solutions for highways, transport infrastructure, and services that:

- ✔ Address the challenges of climate change
- ✔ Support the economy
- ✔ Help address societal inequalities
- ✔ Reduce environmental degradation
- ✔ Respond to a changing world

We bring members together to share, learn, and feel confident about addressing these challenges through the application of good practice, by embracing innovation and by acting with integrity. It is through this and the values that CIHT can demonstrate and deliver on thought leadership and shaping the highways and transportation sector for the public benefit.

Whether you are a student, apprentice, work in the private or public sectors or are a company director, CIHT has a place for you and a commitment to fulfilling your professional development needs throughout your career.

www.ciht.org.uk