

Roads Directorate
Transport Scotland

2nd Floor George House, 36 North Hanover Street, Glasgow G1 2AD
Direct Line: 11(2)
11(2) @transport.gov.scot



11(2) MSP
11(2) @parliament.scot

Your ref:

Our ref:
11(2)

Date:
23 December 2024

Dear 11(2)

Thank you for your email of 9 December on behalf of your constituent, regarding the temporary closure of Queensferry crossing on the 23rd of November.

As I manage the Queensferry Crossing for Transport Scotland, I have been asked to respond. My response to each question in your query is as follows:

1. Why did the crossing have to close? My understanding was that work had been carried out to prevent ice build-up on the cables. There has been very little cold weather before yesterday morning.

Transport Scotland has invested significantly in measures to predict and manage ice accretion on the Queensferry Crossing. Our advanced weather forecasting system had predicted a severe risk of ice accretion on the morning of 23 November. When such a risk is predicted, our Operating Company, BEAR Scotland, implements patrols on the bridge to check for ice accretion. On the morning of 23 November, conditions were such that ice was accreting to the cables and there was a risk to road users. Therefore, the decision to close the Queensferry Crossing and divert traffic to the Forth Road Bridge was taken at 10:15.

A study by Transport Scotland, BEAR Scotland and industry experts investigated a number of measures to mitigate ice accretion on the cables. Physical measures, such as heating the cables or mechanical removal of ice were discounted due to impracticality. Laboratory testing of hydrophobic coatings proved inconclusive but cleaning of cables was found to reduce ice accretion, as the smoother surface makes it more difficult for ice and snow to stick. Therefore, regular cleaning of the cables is now being undertaken.

While cleaning of cables will reduce the extent and severity of ice accretion, the measure cannot prevent it entirely and this was the case on 23 November.

It should be noted that closure of the Queensferry Crossing due to ice accretion is a relatively infrequent occurrence. The bridge has been closed to all traffic due to falling ice on three previous occasions since it opened in August 2017, and the 23 November incident is the first closure since 2021.

2. Why was the crossing still closed late on Saturday night when the temperature had risen considerably during the day?

Transport Scotland has invested in an automated barrier system, which can divert traffic quickly and safely over the Forth Road Bridge if the Queensferry Crossing has to close for any reason. Traffic was diverted via these barriers on 23 November. Once the diversion is in place, there is no traffic disruption over and above what is normally experienced at this location on the trunk road network. On 23 November, the risk from falling ice had passed by mid-afternoon. However, the procedure recommends and decision was taken to continue the diversion until the early hours of the following morning to minimise disruption to road users, as removing the diversion at a busy time would have increased congestion.

3. Is this going to be the default position of transport Scotland over the winter if there is bad weather?

Ice accretion on the Queensferry Crossing is only experienced under a very particular set of circumstances, and not during all instances of severe winter weather. Improved weather forecasting systems are in place to allow the Operating Company to predict when ice accretion is likely to occur. Our default position is that if ice accretion occurs on the Queensferry Crossing, the bridge will close and traffic will be diverted over the Forth Road Bridge via the automated barriers. Once the risk from falling ice has passed the diversion will be removed in the early hours of the following morning to minimise disruption and risk to road users.

I hope this is helpful.

Yours sincerely

11(2)

11(2)

Director of Roads

From: 11(2)
To: 11(2)
Cc: 11(2)
Subject: FW: Closure of Queensferry Crossing during bad weather
Date: 09 December 2024 14:20:43

Grateful if you can register this case and allocate to an AO.

Thanks

11(2)

From: 11(2) .msp@parliament.scot>

Sent: 09 December 2024 14:13

To: 11(2) @transport.gov.scot>

Cc: 11(2) @Parliament.scot>

Subject: Closure of Queensferry Crossing during bad weather

Good Afternoon,

I hope this finds you well. I am getting in touch on behalf of a constituent, with consent, who raised some questions about the temporary closure of Queensferry crossing on the 23rd of November during the snow. I have inserted their questions below:

"I have a few questions regarding the closure of the Queensferry crossing yesterday (23rd November).

- 1. Why did the crossing have to close? My understanding was that work had been carried out to prevent ice buildup on the cables. There has been very little cold weather before yesterday morning.*
- 2.*
- 3. Why was the crossing still closed late on Saturday night when the temperature had risen considerably during the day?*
- 4.*
- 5. Is this going to be the default position of transport Scotland over the winter if there is bad weather?"*

Grateful for any help or advice which I can relay to the constituent.

Best Wishes,

11(2)

11(2)

Member of the Scottish Parliament 11(2)

The Scottish Parliament | Edinburgh | EH99 1SP and 151 St John's Road | Edinburgh | EH12 7SD

11(2) [@parliament.scot](mailto:11(2)@parliament.scot)

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SCANCE CONTRIBUTION

Cleared contributions must be sent to Cabinet Secretariat by Private Office by 1 p.m. on Mondays, (unless an extension has been agreed). Private Office will have its own deadline ahead of this.

ACTION FOR PRIVATE OFFICE

MPO should indicate if this SCANCE note is to be included in (check relevant box):

Part 1 of the SCANCE paper

(This is for notes that your Minister wants to talk to in Cabinet and feels may need some discussion. This should be reserved for the most pressing, high-profile issues. A written and speaking note is required.)

Part 2 of the SCANCE paper

(This is for items to be noted by Cabinet and taken as read without any discussion. Ministers will not be invited to speak to these items in Cabinet but a speaking note should still be provided in addition to the written item in case questions are raised in Cabinet.)

ORAL item

(Oral items are not included in the written SCANCE paper issued to Cabinet on Monday afternoons. Oral items should only be used when the content will not be ready in time for inclusion in the SCANCE paper or where the topic is particularly sensitive. Only a speaking note is required for oral items.)

TOPIC HEADING: Queensferry Crossing Ice Accretion Incident

MINISTER: Cabinet Secretary for Transport Written Note

The Queensferry Crossing was closed at 10:15 am on Saturday 23 November 2024 due to reports of ice falling from above. It reopened at 0148hrs.

Weather forecasting in advance of Storm Bert had indicated a severe risk of ice accretion between 10:00 am and 12:00 pm on Saturday, with a high risk from 05:00 am to 1:00 pm.

As a precaution, and in line with our management procedures, visual patrols were implemented by our Operating Company, BEAR Scotland, from 04:00 am on Saturday morning. No signs of ice accretion or falling ice were noted.

However, after receiving a report of falling ice damaging a vehicle crossing the bridge, a decision to close the Queensferry Crossing was made at 10:15 am to maintain public safety. Traffic was then held and diverted to the Forth Road Bridge, which has tended not to be affected by ice accretion.

The Queensferry Crossing has been closed to all traffic due to falling ice on three previous occasions since it opened in August 2017. The first was between 10 and 12 February 2020; the second on 4 December 2020 (for 4 hours); and the third on the 21 January 2021 (for 6 hours).

On becoming aware of this emerging issue, research was undertaken, which led to enhanced management procedures being developed. Now, when there is a risk of falling ice, a 6-point plan is implemented by BEAR Scotland. The plan includes enhanced patrols; heightened focus on prevailing weather conditions; increased data & intelligence gathering; pre-laying of traffic management and enhanced stakeholder communications.

Investment has been made to improve our capability to predict ice accretion. For example, new ice and climate sensors were installed on the bridge in August 2020. These, together with improved bespoke weather forecasts, have helped deliver early warning of conditions conducive to ice accretion. In addition, infrastructure improvements have recently been completed, which will allow traffic to be diverted onto the Forth Road Bridge more quickly.

Trials have indicated that cleaning of the cables can help to reduce ice accretion, by presenting a smoother surface which snow and ice is less likely to adhere to. Whilst this measure cannot prevent ice build-up in all cases, it will reduce the extent and severity of occurrences. Regular cleaning of the cables is, therefore, being undertaken as a mitigation measure.

So far, these improvements have worked well and ensured an adequate response to public safety requirements. A debrief into Saturday's incident will be held to review what happened and determine if any further improvements are required.

Unfortunately, ice accretion is a problem for many bridge owners across the world

and none so far have identified a completely successful prevention or removal methodology, and in most cases, bridge closures are required to allow physical removal or natural melting of ice.

Ice on the cables was considered as a potential issue during the design of the Queensferry Crossing but was expected to be a relatively rare event in light of historical experience of other cable-stayed bridges in the UK. At the time of design, there was no proven system for prevention of ice accretion on cable-stayed bridges. That situation remains the case today.

During any emergency closure of the Queensferry Crossing a diversion route will be implemented using the Forth Road Bridge whenever possible.

The installation of the automatic barrier to divert traffic from Queensferry Crossing to Forth Road Bridge has reduced the time significantly. However, diverting traffic is a risk to drivers, operatives and Police Scotland staff. Therefore, once the risk of ice accretion has passed, the procedure recommends that diversion back to Queensferry Crossing is carried out overnight when traffic flows are significantly lower, between 2200hrs and 0500hrs. This procedure has been shared with Police Scotland and will be kept under review.

During the incident on 23 November 2024, the diversion was in place from 1015hrs to 0148hrs.

Speaking Note

(The text in the box below is for the Minister to use to introduce the item or respond to any questions about the item at Cabinet. It should provide additional detail to the written note)

A copy of this should be sent to Cabinet Secretariat when complete

Send to your Cabinet Secretary and Cabinet Secretariat Inbox

I am updating Cabinet following the closure of the Queensferry Crossing on Saturday morning due to reports of ice falling from the structure above and damaging a vehicle travelling below. It was reported that falling ice smashed the windscreen of a vehicle travelling across the bridge. Thankfully, nobody was hurt.

This is the fourth occasion of the Queensferry Crossing having to be closed due to reports of falling ice since it opened in August 2017. The first was between 10 and 12 February 2020; the second on 4 December 2020 (for 4 hours); and the third on the 21 January 2021 (for 6 hours).

Ice on the cables was considered as a potential issue during the design of the Queensferry Crossing but was expected to be a relatively rare event in light of historical experience of other cable-stayed bridges in the UK. At the time of design, there was no proven system for prevention of ice accretion on cable-stayed bridges. That situation remains the case today.

On becoming aware of this emerging issue, research was undertaken, which led to enhanced management procedures being developed. Now, when there is a risk of falling ice, a 6-point plan is implemented by our Operating Company BEAR Scotland. The plan includes enhanced patrols; heightened focus on prevailing weather conditions; increased data & intelligence gathering; pre-laying of traffic management and enhanced stakeholder communications.

Investment has been made to improve capability to predict ice accretion. For example, new ice and climate sensors were installed on the bridge in August 2020. These, together with improved bespoke weather forecasts, have helped deliver early warning of conditions conducive to ice accretion. In addition, infrastructure improvements have recently been completed, which will allow traffic to be diverted onto the Forth Road Bridge more quickly.

The diversion via Forth Road Bridge was implemented within 30 mins using the automated barrier. However, diverting traffic has risks and once the ice accretion period has passed, it is recommended that diversion back to Queensferry Crossing is carried out when flows are significantly lower, between 2200hrs and 0500hrs. On this occasion, the diversion was in place from 1015hrs to 0148hrs.

So far, these improvements have worked well and ensured a proportionate response to public safety requirements. A debrief into Saturday's incident will be held to review what happened and determine if any further improvements are required.

Links to further	
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information (if applicable)	
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QUEENSFERRY CROSSING – CLOSURE SATURDAY 23 NOVEMBER 2024

Priority and Purpose

1. **Immediate:** To update you on the closure of Queensferry Crossing on Saturday 23 November 2024 due to ice accretion and the measures that have been undertaken to minimise ice accretion on Queensferry Crossing.

Recommendation

2. Recommends that you: note the contents of this briefing.

Context and Issues

3. The Queensferry Crossing (QC) has been closed to all traffic due to falling ice on three occasions since it opened in August 2017. The first occasion was between 10 and 12 February 2020; the second on 4 December 2020 (*for 4 hours*) and the third on the 21 January 2021 (*for 6 hours*).
4. Weather forecasting in advance of Storm Bert indicated a severe risk of ice accretion between 10:00 and 12:00 on Saturday 23 November 2024 with high risk from 05:00 to 13:00.
5. Visual patrols were implemented from 04:00 on Saturday 23 November 2024. No signs of ice accretion or falling ice were noted.
6. QC was closed on Saturday 23 November 2024 at approximately 10:15am due to reports of a smashed windscreen on a vehicle.
7. QC will be opened once forecast conditions indicate that conditions have improved and there are no visual indications of areas of ice formation remaining. To minimise delays to traffic, re-opening is carried out overnight. This is planned to be carried out at midnight tonight to avoid planned events in Edinburgh.
8. A lessons learned exercise will be undertaken as soon as possible.

Options Considered and Advice

9. When there is a risk of falling ice, a 6-point plan is implemented by our Operating Company, BEAR Scotland. The plan includes enhanced patrols; heightened focus on prevailing weather conditions; increased data & intelligence gathering; pre-laying of traffic management and enhanced stakeholder communications. When ice accretion conditions are forecast as high or severe, patrols are implemented on the bridge to check for ice formation and inform decisions to close the bridge if necessary and

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divert over the Forth Road Bridge (FRB). Key stakeholders are informed (*including Emergency Services, Local Authorities, Traffic Scotland & Public Transport*) where there is a 'high' or 'severe' risk of ice accretion and members of the public are informed through social media.

Research and Peer Review

10. An Ice Accretion Working Group (IAWG) was established in 2020, following the bridge closure in February of that year, to manage future studies, research and physical mitigation measures in relation to ice accretion on QC.
11. The IAWG reviewed a number of methods for prevention of ice accretion and removal of ice after formation, including Thermodynamic (electrical and fluid heating of the cables), Mechanical methods of ice removal (external mesh, scrapers, vibration, expulsive de-icing, ice capture and energy wave), Omnophobic and icephobic coatings of the cable sheaths and towers and cleaning of cables.
12. A Peer Review Panel (PRP) of internationally recognised long-span bridge experts was established in 2022, to provide a sense-check on the ice accretion work undertaken, and to make any recommendations for future action. The PRP produced their final report in January 2023, which largely agreed with the approach taken by the IAWG and the work carried out. The PRP concluded that no thermodynamic, chemical or mechanical solutions would be suitable for use on the QC due to impracticality and excessive cost. Instead, work should focus on a risk-based approach to bridge closures, improving diversion times to Forth Road Bridge (FRB), better forecasting, cleaning of cables and research on ice shedding.
13. Cleaning of cables, while trials and test data had been inconclusive up to now, was thought to offer the best option for reduction of ice accretion. The QC cables were cleaned in 2021 and the intention is to continue this operation every five years.

Diversion to Forth Road Bridge

14. Key to managing potential QC closures efficiently was to improve the time taken to implement diversion to the Forth Road Bridge (FRB), which was previously around 5 hours. While this was being implemented, traffic was diverted via Kincardine Bridge. Therefore, BEAR engaged with specialist Dutch supplier SPIE, to design a system of fully automated moveable barriers.
15. The SPIE barrier was installed in 2023 with full automated capacity delayed until 2024 due to a shortage of electronic components. Trials were undertaken, firstly in November 2023 with semi-automatic opening, and with full automatic opening overnight on 9-10 November 2024. The second trial reduced the time to implement a diversion from QC to FRB to 14 minutes with the assistance of Police Scotland to enforce the red X overhead gantry signs.
16. Following the event on 23 November 2024, the diversion from QC to FRB was implemented from QC to FRB. The diversion was in place in 25 minutes.

Weather Forecasting

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17. The original weather forecasting system to assist operational decisions was Metdesk, hosted on the Mercury platform. The IAWG commissioned a trial of a bespoke forecasting system for the QC, via Arup and specialist Norwegian Consultant KVT, with the aim of achieving a more accurate site-specific forecast. The KVT model was trialled over the 2022/2023 winter and this indicated that the KVT system triggered fewer 'false alerts' than the Metdesk system. However, as there were no severe ice accretion alerts in 2022/23 and 2023/24 it was not conclusive and KVT has continued to be run in parallel with Metdesk.
18. The KVT system highlighted a severe risk for this event on 23 November 2024. Patrols were instigated overnight and throughout the day. The QC was closed at 10:15am following reports of a smashed windscreen. However, no visual signs of falling ice/wet snow from the cables or towers were seen by the patrols.

Assessment of Options

19. Weather forecasting via KVT on Friday 22 November 2024 highlighted high potential between 05:00 and 12:00 on Saturday 23 November 2024. This was updated this morning to severe ice accretion potential between 10:00 and 12:00. Patrols were, therefore, implemented from 04:00 on Saturday 23 November 2024.
20. Visual patrols did not note signs of accretion on the cables or towers. However, a report of a smashed windscreen on a vehicle resulted in the closure of the QC at approximately 10:15am with diversion via FRB using the new SPIE barrier. After reports of damage there was a significant change in the quantity of snow/sleet and patrols noted ice beginning to form and fall from the cables. The diversion via FRB was in place in 25-30 minutes and required the assistance of Police Scotland as vehicles did not stop at the overhead gantry red X signs.

Contribution to the Government's Four Priorities

21. The work to predict and mitigate ice accretion and divert traffic should an ice accretion event occurs, supports efforts to grow the economy and ensure high quality and sustainable public services.

Risks to Delivery

22. None

Verity House Agreement Implications

23. None.

New Deal for Business Implications

24. None.

Legal Considerations

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25. Any claim for damages to the vehicle will be handled by our Operating Company, Bear Scotland Ltd. There are no legal considerations.

Financial Considerations

26. Any claim for damages to the vehicle will be handled by our Operating Company.

Sensitivities

27. This is the first closure of QC due to ice accretion since January 2021. Research has been conducted into how to predict and prevent ice accretion and measures put in place to monitor conditions and divert traffic should an event occur. Despite best efforts, damage has been sustained to one vehicle. To avoid further damage, traffic has had to be diverted via FRB.

Quality Assurance

28. This briefing has been approved by 11(2)

Conclusion and next Steps

29. QC was closed at approximately 10:15am on Saturday 23 November 2024 following reports of damage to a vehicle from falling ice. Patrols were in place following forecast severe ice accretion potential during Storm Bert. No visual indications of ice accretion or falling ice were seen prior to the damage being reported to the vehicle. Traffic was diverted to FRB in 25 minutes using the new automated SPIE barrier.

30. The Operating Company, Bear Scotland Ltd, will implement their opening procedure once forecast conditions indicate that conditions have improved and there are no visual indications of areas of ice formation remaining. This is planned to be carried out at midnight tonight to avoid planned events in Edinburgh.

31. A lessons learned review will be undertaken as soon as possible.

11(2)

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Cabinet Secretaries and Ministers Copy List	For Action	For Information Portfolio interest	For Information Constituency interest	For Information General awareness
11(2)		X		
11(2)		X		

Officials Copy List
11(2)

- Dew Point and Air Temp between 0° C & 1° C;
- Relative Humidity 95% and above;
- Wind Speed 20 mph and above;

These are the conditions that are reported as severe risk using our prediction algorithm. While these are the conditions which have led to ice accretion in the past, we can't be 100% certain that ice will occur with these conditions. However, we continue to gather climate data in order to refine the trigger point for implementing patrols and closures of QC.

Ice formation happens on other cable stayed bridges around the world. However, the ice that forms on QC is wet snow/sleet accretion rather than solid ice. It forms very quickly when squally showers blow through and the air temperature drops markedly. It also sheds quickly from the cable stay sheaths when the shower has passed and the air temperature starts to rise. Therefore, there is very little time to react.

Other bridges, such as Port Mann bridge in Vancouver, form solid ice which can remain on the cables for several days. Here, the bridge has had cable de-icing chains retro-fitted which run down the cable under gravity to remove solid ice. This is completed under a road closure and the chains can damage the cable sheaths. This is one of the systems looked at for Queensferry but it is not suitable due to the time between accretion and shedding.

The Storebaelt and Oresund Bridges in Denmark have also had several ice accretion events. Their strategy is to close the bridges and wait until the ice melts. Again, this ice is different to that occurring at QC and is more solid in nature.

The M48 Severn Bridge and M4 Prince of Wales Bridge have had two incidents in 2009. On both occasions, snow/ice was seen falling from the cables and the bridges were closed.

I hope this helps. Happy to discuss on a call if that would be helpful.

Regards

11(2)

From: 11(2) Cabinet Secretary for Transport
Sent: Saturday, November 23, 2024 3:26 PM
To: 11(2) [@transport.gov.scot](mailto:11(2)@transport.gov.scot)
Cc: 11(2) [@gov.scot](mailto:11(2)@gov.scot); 11(2) [@gov.scot](mailto:11(2)@gov.scot); 11(2) [@transport.gov.scot](mailto:11(2)@transport.gov.scot); 11(2) [@transport.gov.scot](mailto:11(2)@transport.gov.scot); 11(2) [@transport.gov.scot](mailto:11(2)@transport.gov.scot); 11(2) [@transport.gov.scot](mailto:11(2)@transport.gov.scot); 11(2) [@transport.gov.scot](mailto:11(2)@transport.gov.scot); 11(2) [@transport.gov.scot](mailto:11(2)@transport.gov.scot); 11(2) [@transport.gov.scot](mailto:11(2)@transport.gov.scot); 11(2) [@transport.gov.scot](mailto:11(2)@transport.gov.scot); 11(2) [@transport.gov.scot](mailto:11(2)@transport.gov.scot); 11(2) [@transport.gov.scot](mailto:11(2)@transport.gov.scot); 11(2) [@transport.gov.scot](mailto:11(2)@transport.gov.scot); 11(2) [@transport.gov.scot](mailto:11(2)@transport.gov.scot)
Subject: RE: Queensferry Crossing - Ice Accretion Event 23 Nov 2024 - Briefing - For information - 23 Nov 2024

Hi 11(2)

11(2) has noted.

11(2) would be grateful for further information on not only what has happened today, but why? 11(2) needs to be able to answer why the bridge would be subject to ice formation and falling and what happened to bridges like this elsewhere?

I have cc'd in colleagues who are coordinating the briefing 11(2) ensure this is covered in Cab Sec's briefing pack.

, if you could work with them to

Many thanks,

11(2) **Deputy Private Secretary**
Cabinet Secretary for Rural Affairs, Land Reform and Islands – 11(2)
Mobile: 11(2)

MSP

Room 2N.08 | St. Andrew's House | Regent Road | Edinburgh | EH1 3DG

11(2) **box will close at 14:00 on Monday - Thursday and 12:00 on Fridays.**
You can find Ms Gougeon's updated preferences [HERE](#).

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Sent: 23 November 2024 14:01
To: 11(2) [@gov.scot](mailto:11(2)@gov.scot)>; 11(2) [@gov.scot](mailto:11(2)@gov.scot)>;
11(2) [@gov.scot](mailto:11(2)@gov.scot)>
Cc: 11(2) [@transport.gov.scot](mailto:11(2)@transport.gov.scot)>; 11(2)
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[@transport.gov.scot](mailto:11(2)@transport.gov.scot)>



Subject: Queensferry Crossing - Ice Accretion Event 23 Nov 2024 - Briefing - For information - 23 Nov 2024

Dear 11(2)

Please find attached a briefing on the ice accretion incident at Queensferry Crossing on Saturday 23 November 2024 for your information.

Regards

11(2)

 11(2)
Chief Bridge Engineer | Roads Directorate
2nd Floor | George House | 36 North Hanover Street | Glasgow | G1 2AD
11(2)
Working pattern – Monday to Thursday
transport.gov.scot


11(2)

From: 11(2)
Sent: 26 November 2024 11:29
To: 11(2) @bearsotland.co.uk
Cc: 11(2)
Subject: Queensferry Crossing - Ice Accretion Update Required - 26 November 2024

11(2)

Hope you are both well?

Could I ask if you are able to give us a detailed de-brief on what happened with the barrier during retraction, to enable the switch over back to the QC?

I have also asked Legal for their advise on the situation in relation to the existing claims and who pays for them.

Has Bear been able to find detailed records of the impacts to these vehicles? Do you also have the time the red Xs were deployed? 11(2) is of the opinion that if any damage incurred after the red Xs were showing, we should not be paying out for these claims as the driver broke the law and ignored key safety warnings.

I noted in one of the articles that the cable cleaning was discussed, I thought we had planned to do the cleaning every three years, can you advise where the snow/ice fell from was this the cleanest stay/fan?

Regards

11(2)

Major Bridges Manager Forth Road Bridge & Queensferry Crossing
Roads Directorate - Bridges Branch
11(2)

Transport Scotland//Còmhdhail Alba
2nd Floor, George House
36 North Hanover St
Glasgow
G1 2AD

Please note my change in working patterns, I no longer work Fridays



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Transport Scotland, the national transport agency
Còmhdhail Alba, buidheann nàiseanta na còmhdhail

11(2)

From: 11(2)
Sent: 23 November 2024 13:28
To: 11(2)
Subject: RE: QC - Closed - 23 November 2024

Thanks 11(2), that's really helpful.

11(2)

From: 11(2) @transport.gov.scot>
Sent: Saturday, November 23, 2024 1:19 PM
To: 11(2) @transport.gov.scot>; 11(2) @transport.gov.scot>
Subject: RE: QC - Closed - 23 November 2024

11(2)

Sorry I logged off and don't have a phone to receive these emails. Thought I would check back in case of a follow on email.

The SPIE VEVA barrier system was due to have been installed by June 2023. However, procurement and budget issues, together with extended lead times due to shortages of specialist components means that delivery of the system has been delayed. Electronic switchgear to allow full automation cannot be procured until April 2024. Intelligent road studs (IRS) are required for the fully automated system and cannot be supplied until January 2024.

As such this system was not officially in service until May/June 2024, February 2024 – road studs installed to enable RSA to be signed off and scheme to be completed.

We have conducted three trials to date.

4 - 5 November 2023 – manual push out of system.
20 - 21 April 2024 – one switch per barrier under temp power.
9-10 November 2024– single switch system under temp power.

Regards

11(2)

From: 11(2) @transport.gov.scot>
Sent: 23 November 2024 12:24
To: 11(2) @transport.gov.scot>; 11(2) @transport.gov.scot>
Subject: RE: QC - Closed - 23 November 2024

Another quick question about dates. Was the SPIE barrier installed in 2023, first trial manually April 24 and automatic Nov 24?

Thanks

11(2)

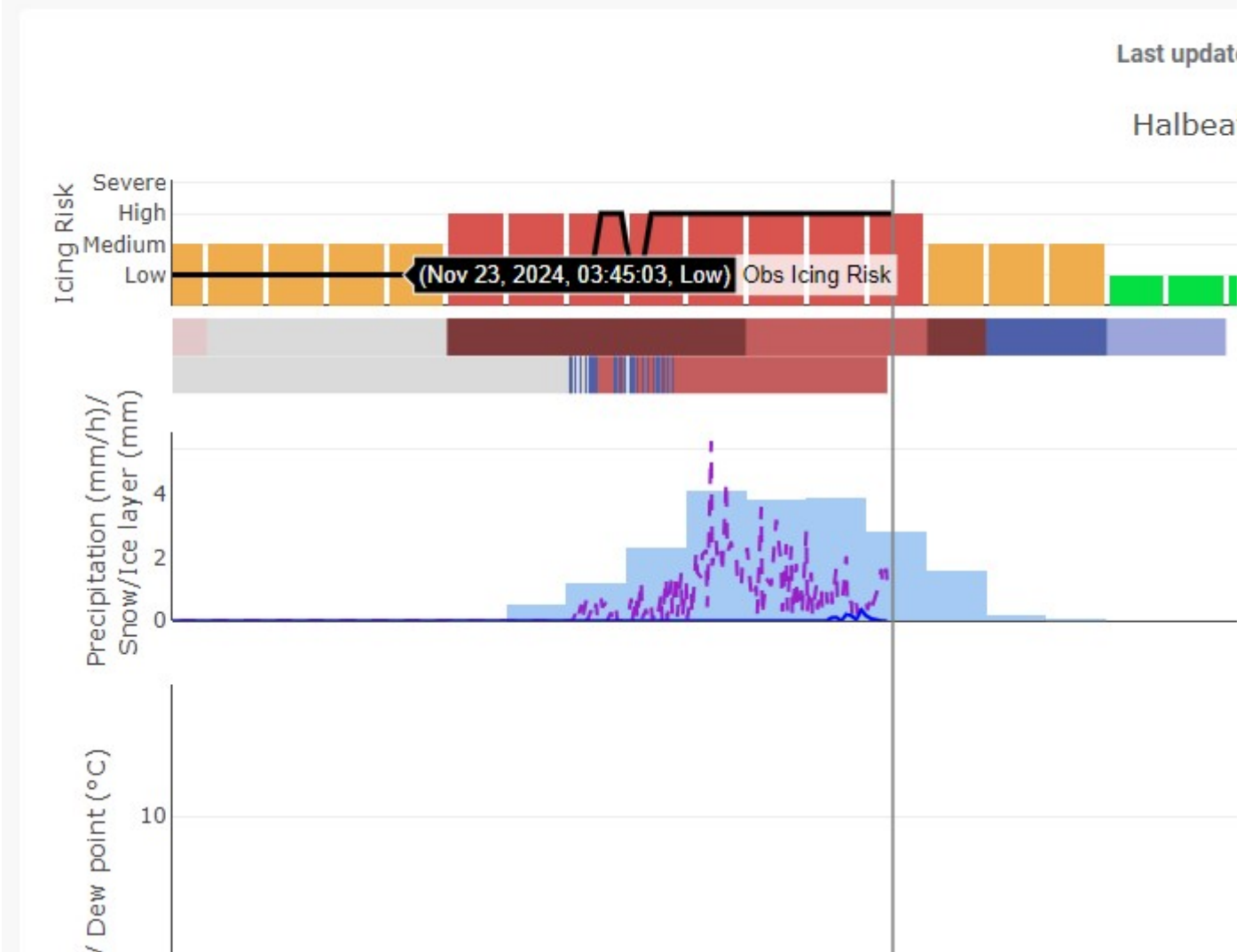
From: 11(2) @transport.gov.scot
Sent: Saturday, November 23, 2024 12:01 PM
To: 11(2) @transport.gov.scot; 11(2) @transport.gov.scot
Subject: RE: QC - Closed - 23 November 2024

Yes,

KVT states – Severe

Mercury states - High

ICING RISK - Summary Page





From: 11(2) [@transport.gov.scot](mailto:transport.gov.scot)>
Sent: 23 November 2024 11:59
To: 11(2) [@transport.gov.scot](mailto:transport.gov.scot)>; 11(2) [@transport.gov.scot](mailto:transport.gov.scot)>
Subject: RE: QC - Closed - 23 November 2024

11(2)

Thanks for keeping an eye on this. I've been asked by 11(2) to pull together briefing on what we've done asap as Cab Sec is on the Sunday show tomorrow.

Has anyone looked at the comparison KVT to Mercury?

11(2)

From: 11(2) [@transport.gov.scot](mailto:transport.gov.scot)>
Sent: Saturday, November 23, 2024 11:41 AM
To: 11(2) [@transport.gov.scot](mailto:transport.gov.scot)>; 11(2) [@transport.gov.scot](mailto:transport.gov.scot)>
Subject: Re: QC - Closed - 23 November 2024

Thanks 11(2) . I think that's not too bad a diversion time, given the conditions.

And yes, good to see KVT working as it should.

Regards,

11(2)

From: 11(2) [@transport.gov.scot](mailto:11(2)@transport.gov.scot)>
Sent: Saturday, November 23, 2024 11:33:26 AM
To: 11(2) [@transport.gov.scot](mailto:11(2)@transport.gov.scot)>; 11(2) [@transport.gov.scot](mailto:11(2)@transport.gov.scot)>
Subject: RE: QC - Closed - 23 November 2024

At least we know the KVT system works now.

Diversion took 25 min to implement, traffic diverted onto FRB. Bear will look to divert back later this evening.

11(2)

From: 11(2)
Sent: 23 November 2024 11:30
To: 11(2) [@transport.gov.scot](mailto:11(2)@transport.gov.scot)>; 11(2) [@transport.gov.scot](mailto:11(2)@transport.gov.scot)>
Subject: QC - Closed - 23 November 2024

11(2) .

Guessing you know but QC is closed.

KVT noted:



11(2)

Major Bridges Manager Forth Road Bridge & Queensferry Crossing

Roads Directorate - Bridges Branch

11(2)

11(2)

Transport Scotland//Còmhdhail Alba

2nd Floor, George House

36 North Hanover St

Glasgow

G1 2AD

Please note my change in working patterns, I no longer work Fridays



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11(2)

From: 11(2)
Sent: 25 November 2024 21:48
To: 11(2)
Subject: RE: QC - Ice Accretion Questions - 25 November 2024

Thanks 11(2) Short of wipers for the gantry, I'm not sure what else we can do.

A de-brief from Bear re the barrier will be helpful. On-site/local contacts would be better than paying for SPIE to be on call in the Netherlands.

11(2)

From: 11(2) @transport.gov.scot>
Sent: Monday, November 25, 2024 1:11 PM
To: 11(2) @transport.gov.scot>; 11(2) @transport.gov.scot>
Subject: QC - Ice Accretion Questions - 25 November 2024

11(2)

To follow on from your message on teams, I have issued the following responses below:

As you can imagine, lots of questions coming this morning. Criticism of the length of time the diversion was on and how long the ice incident lasted. The procedure is clear, re-divert when traffic flows are lower, between 10pm and 5am.

Agreed, however, 11(2) and I had a chat on Saturday and this was agreed based on the public and operatives safety, due to the traffic flows and accounting for the events taking place around Edinburgh. The proposed change back to the QC was implemented at 1:00am and the delay only effected late night traffic, which was minor so the QC was reopened at 2am.

We need to know what happened with the barrier re-engaging etc,

Bear are in the process of downloading the log of the barriers and this will be issued to Spie to allow them to review the issues. It could be a power issue which we need Scottish Power in some fashion to enable these works to get done ASAP. The barriers did still have power, as such they did not need to be manually moved, only the south barrier were not working and this included Viva 6 the longer of the barriers, the retraction of barrier were conducted within out any snow on the surface as these lift once they move. Spie can review remotely from Netherlands, the reason for the long delay was the procedure is for Bear to reset then try and retract the barrier if they stop working. If this still does not work Spie are then called, Bear then needed to go to the source and have a live chat with Spie this is why the closure was on longer then expected 50 mins. We will need Spie to be on call going forward, as we needed to get them out of their bed for help. A local resource could be used for the barrier, in the form of AF controls, but a NDA is to be agreed with Spie.

In respect to pushing the barrier by hand you will need to disconnect each barrier from the power source, some barriers need more cables to be disconnected before it can be pushed out manually,

as such it was agreed it would be easier to try and fix and the last resort is to disconnect then push out.

The red Xs were covered with snow on the gantries. This was caused by drifting snow and would have required a lane closure and access equipment to remove this snow that may come back anyways, we could look into an extendable pole to remove before the carriageway is reopened, does traffic Scotland have a procedure to manage this already? I'll email Bear with some questions and once they've had their review they'll hopefully come back to us.

Regards

11(2)

Major Bridges Manager Forth Road Bridge & Queensferry Crossing
Roads Directorate - Bridges Branch
11(2)

Transport Scotland//Còmhdhail Alba
2nd Floor, George House
36 North Hanover St
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G1 2AD

Please note my change in working patterns, I no longer work Fridays



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Còmhdhail Alba, buidheann nàiseanta na còmhdhail

11(2)

From: 11(2)
Sent: 24 November 2024 03:11
To: 11(2)
Subject: Re: QC - Ice Accretion Patrols)

Hi Everyone,

I will follow up tomorrow or Monday with a more robust summary but tonight's closure of the barrier system did not go as smoothly as other deployments. We commenced the operation at 0100 but due to some unanticipated technical issues we were not able to release all traffic until 0148hrs.

Everyone on site performed admirably to resolve the issues experienced. We will again look to learn from this and we have a good weather window to take stock and review.

Regards,

11(2)

Sent from Samsung Mobile on O2
Sent from [Outlook for Android](#)

From: 11(2)
Sent: Saturday, November 23, 2024 2:26:51 PM
To: 11(2)
Cc: 11(2))
Subject: RE: QC - Ice Accretion Patrols

 External email >

Thanks 11(2). The briefing has already gone. If they come back with any queries I'll add this in. Hopefully everyone can relax a bit now the risk has dropped.

11(2)

From: 11(2)
Sent: Saturday, November 23, 2024 2:06 PM
To: 11(2)
Cc: Jason 11(2)
Subject: RE: QC - Ice Accretion Patrols

Hi 11(2)

May be worth adding that the BBC picked-up on our release yesterday on likely condition for today and reported on the potential risk of ice on QC.

Regards

11(2)

Operating Company Representative | BEAR Scotland | South East Unit
Mobile: 11(2) | Visit us @ www.bearscot.com



experie

From: 11(2) >

Sent: 23 November 2024 13:58

To: 11(2) >

Cc: 11(2)

Subject: RE: QC - Ice Accretion Patrols

Thanks 11(2) I'll add that in,
11(2)

From: 11(2)

Sent: Saturday, November 23, 2024 1:56 PM

To: 11(2)

Cc: 11(2)

Subject: RE: QC - Ice Accretion Patrols

Hi 11(2),

In case 11(2) is tied up on other tasks right now, we plan to reopen at midnight tonight. This decision was taken on advice from the network team who advised several planned events in Edinburgh today that might be affected by the further disruption if we were to hold traffic earlier. The icing risk has returned to medium or low for the remainder of today and foreseeable.

11(2)

Major Bridges Manager (Queensferry Crossing & Kincardine Bridge)

BEAR Scotland | South East Unit

Telephone: 11(2) | Visit us @ www.bearscot.com



experie

From: 11(2) >

Sent: 23 November 2024 13:37

To: 11(2)

Cc: 11(2)

11(2)

Subject: RE: QC - Ice Accretion Patrols

11(2)

Many thanks for this. As in previous events it looks like the snow/sleet blew in very quickly. Squally showers?

One last question on the opening procedure. When the forecast indicates the risk has dropped below severe (or high?) and there's no visual indication of remaining accretion or falling ice, do you intend to re-open overnight between 10-5 or before this if possible?

11.0 → Reopening¶

¶

11.1 → Once the forecast indicates an improvement in conditions, and Ice Monitoring Teams confirm no remaining areas of ice formations exist, the Ice Accretion Duty Manager will instruct the removal phase of procedure 209SE to be instigated. To cause minimal delays to traffic the re-opening shall be carried out at night between 10pm and 5am. ¶

Thanks

11(2)

From: 11(2)

>

Sent: Saturday, November 23, 2024 1:33 PM

To: 11(2)

Cc: 11(2)

11(2)

>

Subject: Re: QC - Ice Accretion Patrols

Hi 11(2),

Please see some more details, happy to discuss on the below

- Did Police help with the red X for the barrier use? Yes Police were deployed quickly to both the north and south locations and implemented the closure. Members of the public did not stop at the red X.
- 25 mins for the barrier implementation? The time was between 25min to 30mins depending on direction and slip road.
- Did patrols see any ice accretion or falling ice before the smashed windscreen incident? Nothing was observed falling prior to the smashed windscreen, there was a significant change in quantity of sleet/snow and very quickly thereafter ice began falling.
- Have patrols seen any ice accretion or falling ice subsequently? Yes I was on site. The falling ice was quite infrequent but when I did observe it was in significant quantities. There was also reports of ice falling from the Forth Road Bridge towers which I also visited and risk assessed prior to implementation. I did observe small quantities of snow and slush falling from the FRB, however, the quantities of snow was an order of magnitude less.
- Any photos? In the rapid events we didnt. However vehicles have cameras so hoping to obtain some at a later stage.

Thanks,

11(2)

11(2)

South East Bridges Manager

BEAR Scotland | South East Unit

Mobile: 11(2)

| Visit us @ www.bearscot.com



experie

From: 11(2) >

Sent: 23 November 2024 12:57 PM

To: 11(2)

Cc: 11(2)

Subject: RE: QC - Ice Accretion Patrols

11(2)

A few questions please. I've been asked to put together a briefing for Cab Sec:

- Did Police help with the red X for the barrier use?
- 25 mins for the barrier implementation?
- Did patrols see any ice accretion or falling ice before the smashed windscreen incident?
- Have patrols seen any ice accretion or falling ice subsequently?
- Any photos?

Thanks

11(2)

From: 11(2) >

Sent: Saturday, November 23, 2024 7:39 AM

To: 11(2)

Cc: 11(2)

Subject: Re: QC - Ice Accretion Patrols

All,

Minor change to forecast for this morning.

There is a High and severe risk of Ice Accretion forecast due to **sleet and snow** for Queensferry Crossing today between until 13:00hrs.

The severe risk is shown between 10:00hrs and 12:00hrs.

Patrols shall remain in place as follows:-

23/11/2024: 0400hrs to 1400hrs

Regards,

11(2)

11(2)

South East Bridges Manager

BEAR Scotland | South East Unit

Mobile: 11(2)

| Visit us @ www.bearscot.com



From: 11(2) >

Sent: 22 November 2024 1:23 PM

To: 11(2)

Cc: '11(2)

Subject: QC - Ice Accretion Patrols

All,

There is a High risk of Ice Accretion forecast due to **sleet and snow** for Queensferry Crossing tomorrow between 05:00hrs until 12:00hrs.

We are planning for patrols to be in place as follows:-

23/11/2024: 0400hrs to 1300hrs

Regards,

11(2)

11(2)

South East Bridges Manager

BEAR Scotland | South East Unit

Mobile: 11(2)

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experie

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