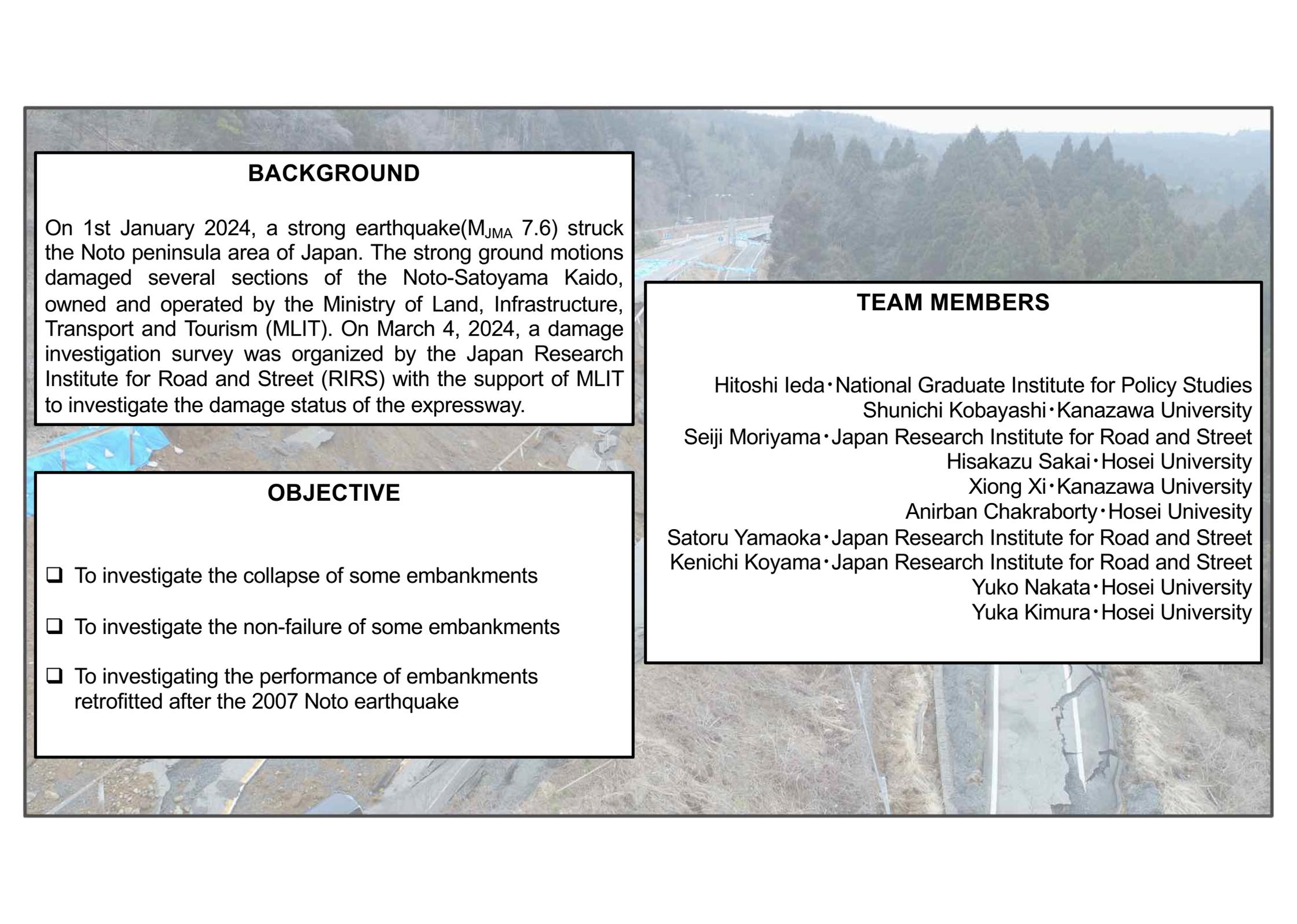


8 MARCH 2024

**PRELIMINARY REPORT ON EXPRESSWAY DAMAGE:
TWO MONTHS SINCE THE 2024 NOTO PENINSULA EARTHQUAKE**

CHAKRABORTY ANIRBAN • HOSEI UNIVERSITY
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BACKGROUND

On 1st January 2024, a strong earthquake (M_{JMA} 7.6) struck the Noto peninsula area of Japan. The strong ground motions damaged several sections of the Noto-Satoyama Kaido, owned and operated by the Ministry of Land, Infrastructure, Transport and Tourism (MLIT). On March 4, 2024, a damage investigation survey was organized by the Japan Research Institute for Road and Street (RIRS) with the support of MLIT to investigate the damage status of the expressway.

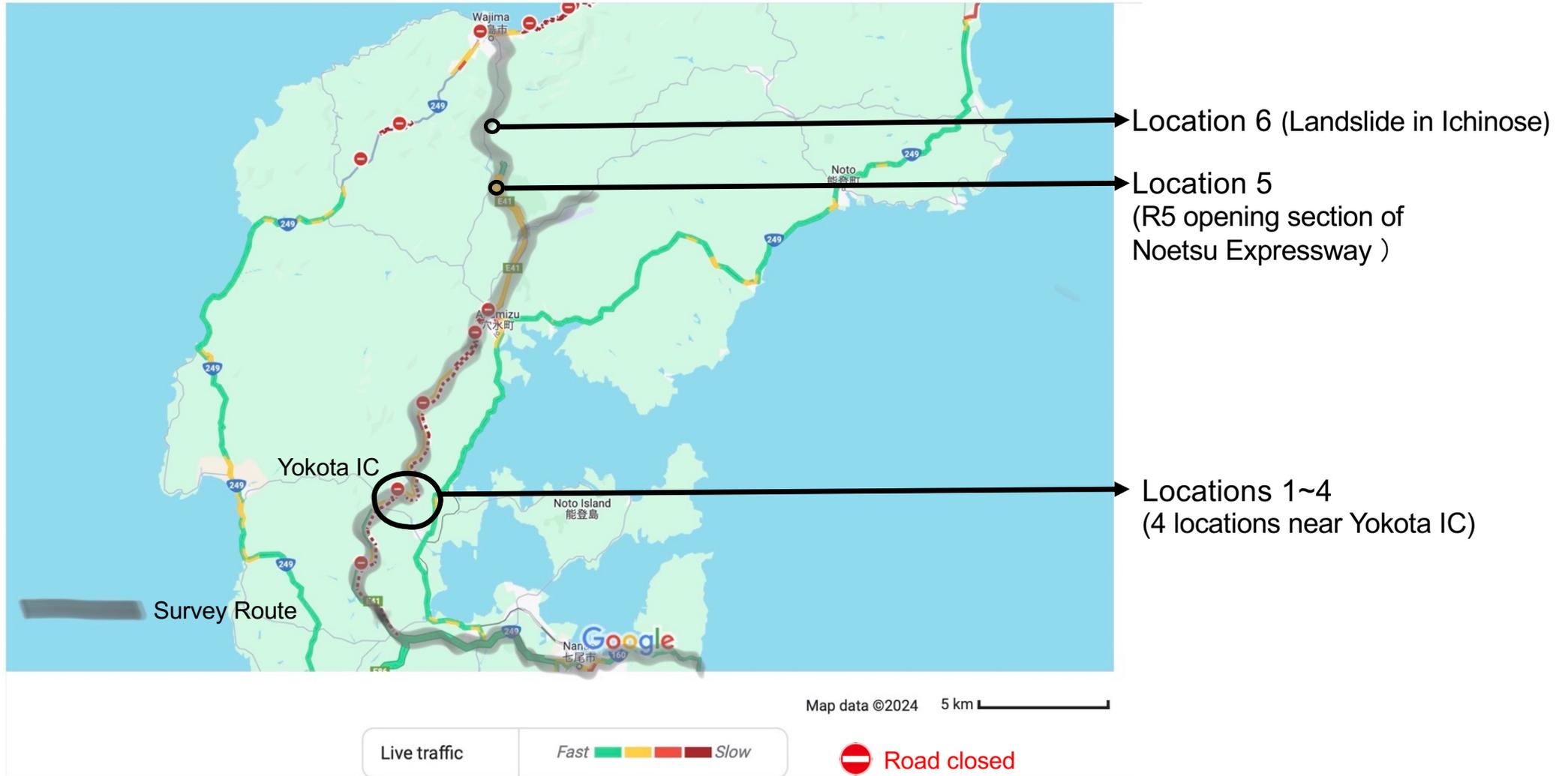
OBJECTIVE

- To investigate the collapse of some embankments
- To investigate the non-failure of some embankments
- To investigating the performance of embankments retrofitted after the 2007 Noto earthquake

TEAM MEMBERS

Hitoshi Ieda • National Graduate Institute for Policy Studies
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Yuka Kimura • Hosei University

SURVEY ROUTE AND INSPECTION LOCATIONS



The base Google map is from March 7, 2024

LOCATION 1



LOCATION 2



Large cracks were seen on the road surface in the yellow zone. There was no evidence of the embankment collapse.

The blue zone marks an area that was restored after the 2007 Noto peninsula earthquake (EQ). No damage was seen here during this 2024 earthquake.

LOCATION 3



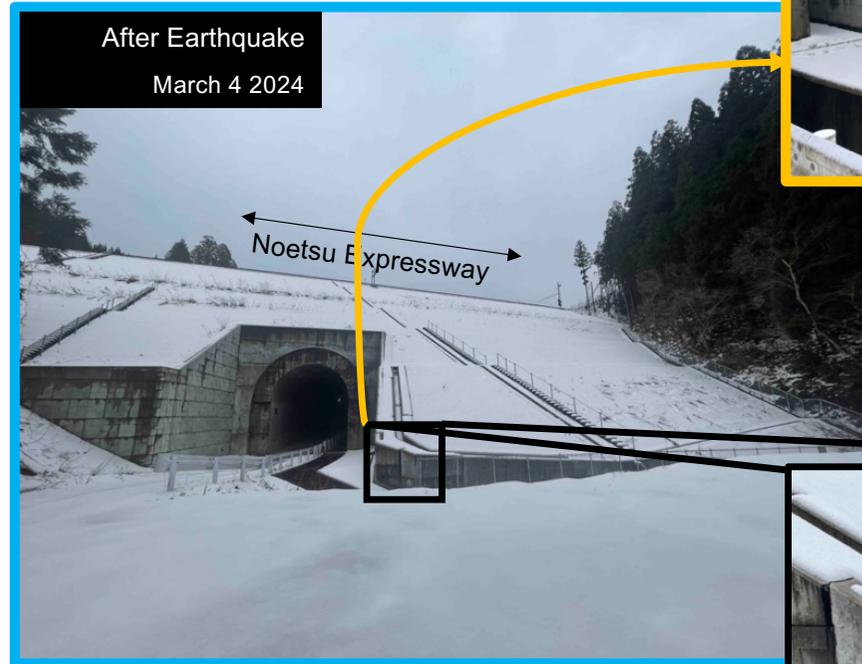
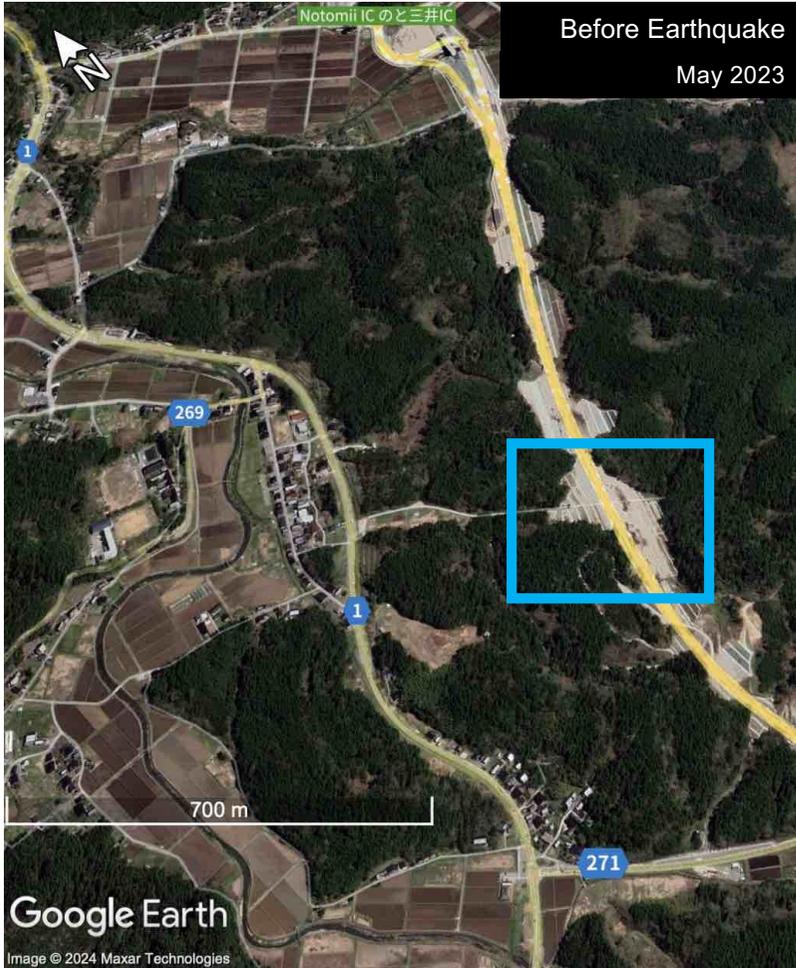
LOCATION 4



Exposed geotextile from after 2007 EQ retrofit

Collapse of the embankment was observed. However, the collapse area shares border with an area retrofitted with geotextiles after the 2007 Noto peninsula earthquake. The retrofitted area withstood the 2024 Noto peninsula earthquake, thus, limiting the extent of the collapse and preventing a large-scale disaster.

LOCATION 5

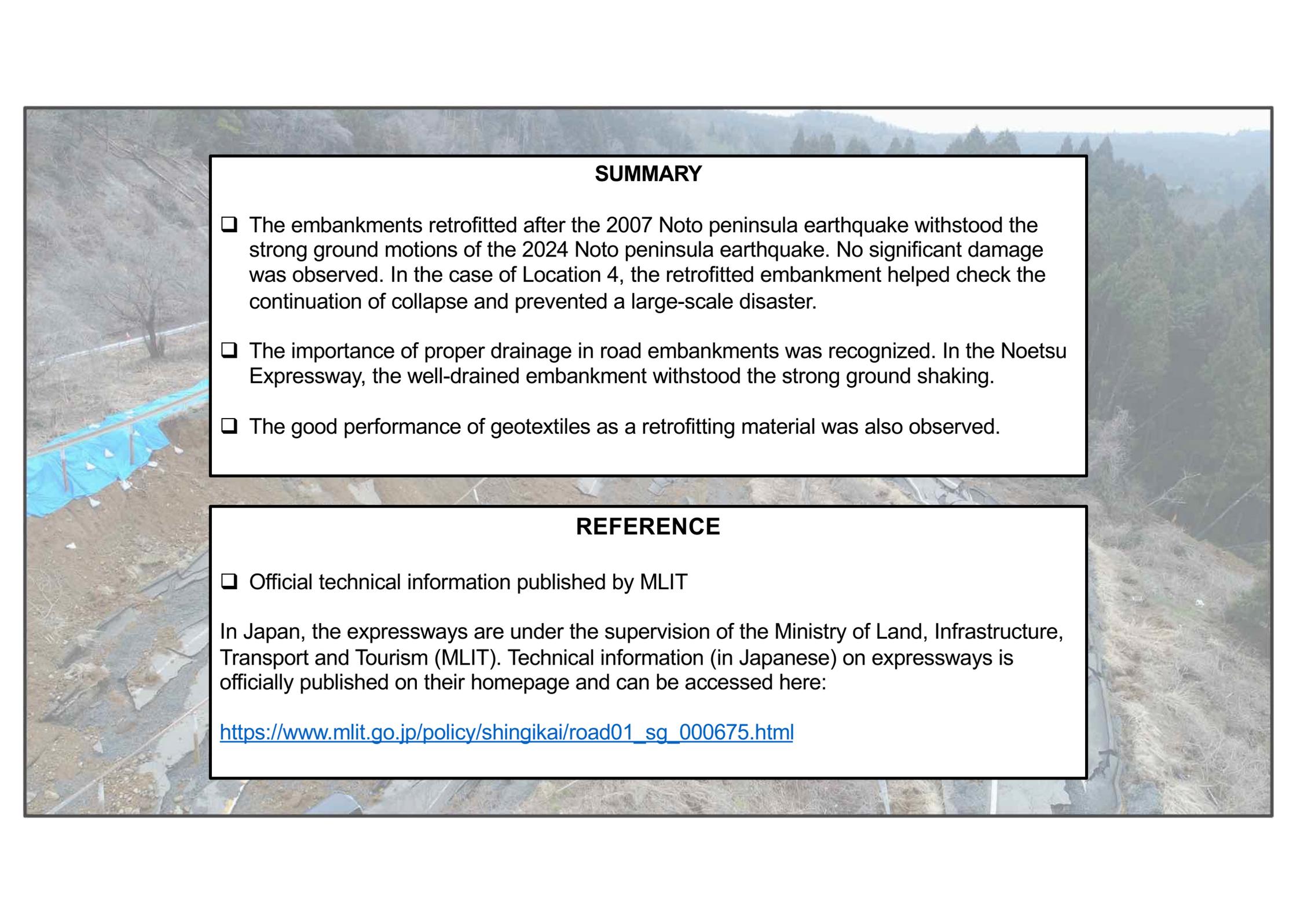


No collapse or major damage was observed in this embankment. Well-maintained drainage possibly helped in quick dissipation of excess pore water pressure created during excessive shaking.

LOCATION 6



Due to ongoing relief and restoration work, it was not possible to inspect the site up close.



SUMMARY

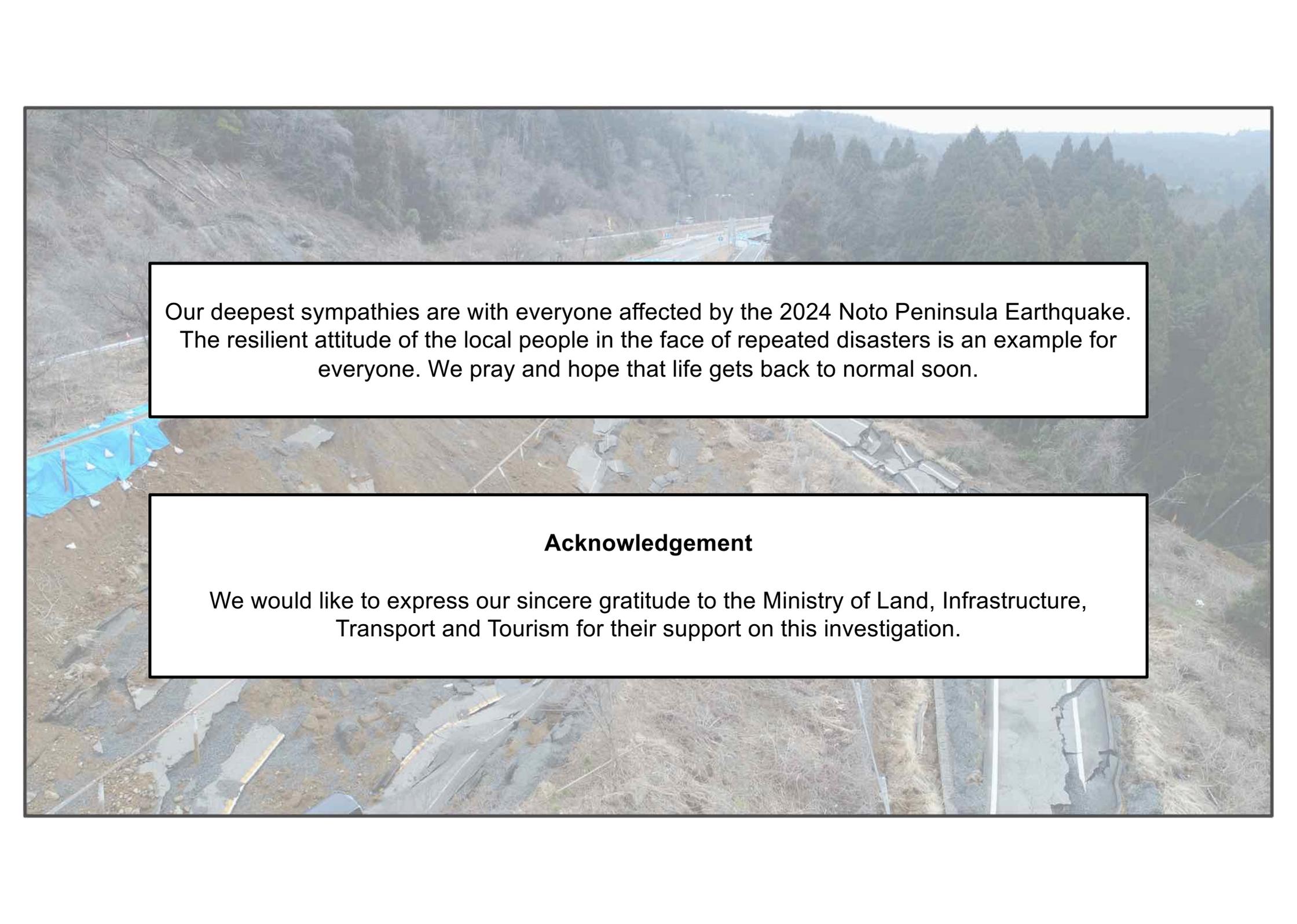
- The embankments retrofitted after the 2007 Noto peninsula earthquake withstood the strong ground motions of the 2024 Noto peninsula earthquake. No significant damage was observed. In the case of Location 4, the retrofitted embankment helped check the continuation of collapse and prevented a large-scale disaster.
- The importance of proper drainage in road embankments was recognized. In the Noetsu Expressway, the well-drained embankment withstood the strong ground shaking.
- The good performance of geotextiles as a retrofitting material was also observed.

REFERENCE

- Official technical information published by MLIT

In Japan, the expressways are under the supervision of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT). Technical information (in Japanese) on expressways is officially published on their homepage and can be accessed here:

https://www.mlit.go.jp/policy/shingikai/road01_sg_000675.html



Our deepest sympathies are with everyone affected by the 2024 Noto Peninsula Earthquake. The resilient attitude of the local people in the face of repeated disasters is an example for everyone. We pray and hope that life gets back to normal soon.

Acknowledgement

We would like to express our sincere gratitude to the Ministry of Land, Infrastructure, Transport and Tourism for their support on this investigation.