

McCrae landslides

Board of Inquiry (BOI) request for input by August 11, 2025

Landslide Causation Submission

11 August 2025

In response to the BOI request dated 15 July 2025 requesting submissions on

‘...the cause(s) of the McCrae landslide’...

The following submission is from the owners of the property at 10-12 View Point Road. We have included the November 2022 landslide in this submission as the pre-conditions and trigger for this event shed important light on the relevancy of the pre-conditions and trigger for the 2025 landslides.

As property owners in full time residency at 10-12 View Point Road since December 2020, our knowledge of the natural features of the property and the surrounding areas, and of the changes that were made by us and by others, is based on first-hand knowledge and facts and not speculation, suppositions and hypotheses.

November 2022 Landslide

Overview

With regard to sources of water and root causes, the BOI hearing on August 4 did not fully explore the critical pre-condition regarding the management of the spring that emanates from 7 Prospect Hill Road (PHR) and flows down View Point Road (VPR). The hearing and thrust of the SEW cross-examination in particular, focused on the burst water main at the corner of Coburn Avenue and PHR, and its potential contribution to the landslide.

The burst water main site was in PHR and was repaired in this area, not in Coburn Avenue where there was water breaching through the road surface. This fact was briefly discussed by the experts as the ‘offset’ between the burst pipe and the road location where water made its way to the surface. While there is a theory the burst water main (0.9ML) could have added to the hillside saturation via flow through the heavily saturated ground following extensive rainfall in November 2022, or along and down the PHR kerb that leads down to VPR, the critical pre-condition for the landslide was the decades of hillside saturation caused by the continuous spring water flow down the VPR cracked kerb. This has been assessed as the critical pre-condition by both the Civiltest and Geotesta geotechnical reports and was cited as a factor in both the Stantec and PSM geotechnical reports.

The numerous stormwater and sewer failures in the area of the McCrae scarp that have been discovered during the BOI investigation add further weight to the theory that pre-saturation of the hillside was caused by mis-management of the spring water and the undetected failures of mains water, sewer and stormwater infrastructure over many decades. The experts agree that the 'dispersive' soils in this area lead to shallow subsurface channeling, and that such channeling exists throughout the scarp area. Furthermore, proof of channeling was detected during the stormwater drain installation in VPR in May 2023, and by radar scans and steel rod probe testing conducted in the area following the landslide.

Critical pre-conditions

The land immediately above the landslide area has a sewer trench and numerous shallow channels leading from the kerb of VPR to the landslide site.

The landslide area never had any significant trees (since at least 2014, date of property purchase).

There were two seeps emanating approximately 6m down from the top of the hillside, either side of the timber staircase, that were most probably being supplied by the continuous spring water flowing down the cracked kerb on VPR for decades.

We observed that the seeps either side of the staircase appeared to be increasing in flow rate in the period prior to the 2022 landslide and led to the need to install the 'aggie drains' on the pathway. We also noted that other areas of the hillside were becoming increasingly saturated.

There was a 0.9ML water main burst on the corner of Coburn Ave and Prospect Hill Road repaired on or about November 13, 2022, however the period for which the burst had been flowing prior to the repair is unknown. This burst added a significant water load to an already saturated area, including the area of the landslide.

Trigger

There was a very heavy rainfall event on November 13, 2022.

This rainfall event, while significant, was not the highest recorded in the area, and no other failures/landslides occurred on our property or nearby properties, including the area of the 2025 landslide.

Disagreement with evidence provided by others

There was no de-vegetation in immediate the area of the landslide, and the area was being planted out with native trees and shrubs (*refer photo 6*).

There was no irrigation on this area. There was a 25mm 'blueline' water pipe leading to a tap and garden hose halfway down the hillside, in order to water the newly installed plants and shrubs.

Most of the trees identified as removed or heavily trimmed by PSM are outside of the landslide area.

While the experts agree that the blueline water pipe failure was severed by the initial landslide, the contribution from the failed water pipe to a potential secondary mud slide shortly after the initial event is not agreed by the experts. It cannot be argued that the blueline was a 'critical pre-condition' for the initial event landslide.

The seeps either side of the timber staircase dried up completely several months after the installation of the stormwater drain and new kerb on VPR. This is most likely because the continuous water flow down VPR was no longer able to leach into the soil and the hillside as the water was now contained.

Causation Summary

The landslide was triggered by a heavy rainfall event, however the long term water flow due to the leakage of water from a continuous spring, into the hillside, was a critical pre-condition for the landslide. Assuming the lower end flow rate of 5l/minute of continuous spring water flow down VPR via the cracked kerb, the annual water flow equates to 2.6ML (2,600 tonnes per year). Only a small fraction of this flow would have needed to percolate through the cracked kerb to have totally saturated the hillside. The Coburn Avenue burst water main event the day before the landslide would have only added to the water load flowing toward the landslide area.

January 2025 Landslides

Overview

There was very low rainfall in the Summer of 2024-2025 and there was no significant rainfall in the weeks prior to the January 5 landslide. The landslide occurred down the deep gully on the Eastern side of our property and exposed a significant water flow (estimated 17kl/day) emanating well below the foundations of the retaining wall, and generally across the freshly exposed scarp, which was approximately 5-7m downhill of the retaining wall.

The landslide volume was estimated to be 20-30 cubic meters and described as a translational mud flow (similar to the November 2022 landslide). The property at 3 Penny lane was damaged. Prior to this landslide, there was no visible evidence of water in this gully. The current and previous owners of 3 Penny Lane advise that the area under their house was dry. Photos taken under and along the base of the retaining wall between January 5 and 14 also show that the surface area was dry (ie: there was no surface water near the base of the retaining wall). The retaining wall was not failing due to overturning nor sliding and remained straight with no signs of distress (*refer photo 1 attached*).

Between January 5 and 14, the head scarp continued to recede uphill and was monitored by SEW and MPSC, and was inspected by CivilTest and PSM Geotechnical engineers. A proposal to stabilize the head scarp using rock bags was made by us. This was rejected by MPSC and their Geotech (PSM), with no alternate solutions suggested. In this period, we had repeatedly requested MPSC or SEW to dig a trench in VPR or install water extraction 'spears' to seek to intercept the water flow. These proposals were not agreed to, and no action was taken on our property except to 'monitor the situation and take water samples. The gradual recession of the head scarp is well documented. The water flow emanating from the receding head scarp remained constant through this period at approximately 17kl/day.

On January 14, the soil between 6 and 10-12 VPR suddenly gave way, and a video recording taken within the minute of the landslide shows deeply saturated soil falling adjacent 6 VPR and deep into the now failed gully (approximately 6m below the ground level of the retaining wall). The estimated soil loss was between 200 and 300 cubic meters. The house at 3 Penny Lane was destroyed. Water continued to emanate from the new scarp area, and over the following days began to abate.

The repairs to the burst water main in Bayview Road had just been completed and therefore there was no additional water flow charging the PHR area and the flow of water downhill towards the landslide area. The flow rate from the breaches around Coburn Ave and PHR, as well as the scarp proceeded to dry out over the following weeks. The flow from the scarp reduced to a very low level as it remains today, as natural seeps or water from failed infrastructure continues to follow a natural pathway towards the Bay.

The retaining wall failed mostly vertically into the receding head scarp, in a similar manner to how the large trees in the gully failed – their root structures were undermined.

The retaining wall did not topple over nor slide laterally, which is the ‘usual’ way a retaining wall would fail if poorly designed and suddenly overloaded from above and behind the wall. As the retaining wall had been both geotechnically and structurally engineered, and it falls into the category of retaining walls described in the PSM report as ‘high quality’ with a very low likelihood of failure as determined by historic analysis of domestic retaining wall failures. The retaining wall piers were founded in clayey sands, as determined by CivilTest during a site inspection to confirm the soil characteristics prior to the pouring of the concrete foundations. There is also strong evidence to suggest the retaining wall was ‘taken out’ by the soil collapsing from the property at 6 VPR, as evidence in the video recording taken immediately after the landslide suggests.

There is no dispute that a major, undetected water mains release of at least 40ML (equivalent to a 35m x 35m x 35m cube of water) had occurred undetected in Bayview road, and had reach properties in PHR. The estimated volume of water reaching PHR was 17 ML as determined by a specialist study commissioned by SEW. As there is a natural spring under 7 PHR that has been feeding water down the VPR area likely for millennia (the same spring cited in the 2022 landslide causation above), there exists a highly likely pathway to connect water reaching 7 PHR and the landslide area. There are also alternate pathways available for such a significant amount of water to reach the landslide area (trench flow through MPSC and SEW utilities, and via shallow aquifers and channeling in the dispersive soils).

January 5 landslide

Critical pre-conditions

A steep natural gully and natural watercourse with fill towards the top of the hillside.

A colluvium soil horizon approximately 6m below grade that is a permeable and a natural flow path for water to migrate towards the landslide area.

Evidence of rubbish below the fill (ie: the gully had been used as a tip) creating a man-made permeable pathway for water to migrate towards the landslide area.

Limited deep-rooted vegetation on the hillside to stabilize the steep slope.

Dispersive soils that are prone to shallow channeling, creating leakage flow paths downhill and towards the scarp.

Leaking and damaged infrastructure (sewer and stormwater) owned and maintained by SEW and MPSC, exacerbating any natural pre-saturation of the hillside. Notably, a broken sewer was repaired on the nature strip of 6 VPR in 2025.

Inadequate major water loss detection capability by SEW.

Numerous major utility trenches (sewers, stormwater, mains water, telecoms, NBN, power) that intersect the Arthurs Seat geographic contours and create flow paths between the Bayview Road area and the Bay via VPR.

Lack of enhanced, risk-based, development planning (overlays) and sewer, stormwater and mains water maintenance and leak detection at both MPSC and SEW, given the fragile nature of the environment.

Trigger

An undisputed 40+ML (40 thousand tonne) initially undetected water release 450m directly uphill of the landslide area, that occurred between August and December 2024.

17ML (17 thousand tonnes) of the above release arriving at 7 PHR, causing major road, nature strip and private garden breaches and saturation, within 120m of the landslide area, in the late 2024 timeframe, perfectly timed in relation to the January 5, 2025 landslide.

Disagreement with evidence provided by others

Source of water

SEW argue that a relatively small volume of water (2.5kl) could have triggered the 2025 landslide. However, if 2.5kl was sufficient to trigger the landslide, then the remnants of a 17ML release (6,800 times the 2.5kl amount) within 120m of the landslide area is a far more likely cause of the landslide, as no other ultimate destination for the 17ML has been provided. It also is apparent that there was never any water detected under 3 Penny Lane prior to the landslide, which would have been the case if the SEW hypothesis was correct. It is also noted that despite heavy rainfall events prior to 2025, this gully was not subject to any failure or distress, most notably the heavy rainfall event of November 2022 did not trigger a landslide in the (steeper) 2025 landslide area.

Retaining wall

The retaining wall could not have been a significant factor for the landslide as it did not fail and did not show any signs of distress or movement. If the PSM hypothesis were correct, there would have been signs of lateral movement or distress in the retaining wall as the soil shear plane beneath the pier foundations began to fail.

Causation Summary

The landslide was caused by a rapid increase in pore (water) pressure in the soil due to a sudden influx of water entering the gully. The water entering the gully came from the 40+ML release due to a ruptured mains water line in Bayview Road, that flowed down the hill via trench flow, natural ground saturation (or a combination thereof) towards the landslide area.

January 14 landslide

Critical pre- conditions

The January 5 landslide.

The fact that neither SEW nor MPSC took any intervention action to seek to intercept the water flowing through the head scarp.

The gradual recession of the head scarp removing support to the steep slope adjacent the house at 6 VPR and the retaining wall on 10-12 VPR.

Trigger

A point in time when the gradual recession of the head scarp undermined the soil adjacent 6 VPR, taking out the soil immediately below and in front of the retaining wall. This is evidenced in the January 14 video of the failing head scarp.

Disagreement with evidence provided by others

De-vegetation

There was very limited 'de-vegetation' by us. A tree and a large shrub were removed from the retaining wall area, however 12 large trees were put back in the same area, which is curiously not recognized in PSM's reports.

There was no de-vegetation conducted by us in the lower reaches of the 2025 landslide area, except for one pine tree on the boundary with 3 Penny Lane in the 2016 timeframe, as requested by the owners of 3 Penny Lane and in compliance with the bushfire overlay. This area is generally inaccessible, and there is no conceivable motivation as to why this area may have been de-vegetated (*refer photos 2 and 3, attached*).

We also note that PSM has gone to lengths to find trees that may have been trimmed or fallen due to natural events, most of these trees are in areas well outside of the landslide areas, and also downhill of the landslides, which makes no conceivable sense with regard to their contribution to the landslides, particularly when these trees are on a naturally draining slope.

Domestic Water Use

While the average water use at 10-12 VPR is relatively high, the reasons for this have been explained to the BOI previously. There was a sprinkler system in the retaining wall (veggie patch) area and sprayers to the fence line trees. Both areas were controlled by timers and it is inconceivable the volume of water used in these areas could have triggered a landslide, compared to the volume of water release by SEW and immediately uphill of the landslide area.

The video taken within the minute of the landslide (previously submitted to the BOI) clearly shows the deep-seated water flow well below the retaining wall area, emanating from the colluvium soil layer and below this horizon. It is not credible that any water usage at 10-12 VPR could have made its way this deep into the ground, and with the presence of clayey soils that the retaining wall piers were founded in.

Photos taken at the base of the retaining wall on January 13 show that the area under the retaining wall was dry and that the soil was falling away vertically.

Retaining wall

The PSM reports overstate the amount of fill behind the retaining wall (30m3). This can be proven by reviewing photos taken prior to the installation of the retaining walls, and by the photos taken from 6 VPR looking back to the remnants of the retaining wall (*refer photos 4 and 5*).

The retaining wall was designed by Rexicon structural engineers, and the bored piers were placed in clayey sands as confirmed on site by CivilTest prior to pouring the concrete. The retaining wall was properly designed and constructed, and consistent with PSM's own evidence on the performance of domestic retaining walls, was very unlikely to have failed under the normal conditions for which it was designed.

Photographic evidence taken between January 5 and 14 shows the soil around the concrete piers 'falling away' from the piers and that the piers remained in place, unmoved until a catastrophic failure. There was no evidence of water capture and pressure build up behind the well-drained retaining wall. Technically, the passive restraining capacity of the soil acting against the front and beneath the concrete piers was being reduced as the head scarp was falling away and receding back toward the retaining wall piers. Additionally, the shear strength of the soil below the piers had been dramatically reduced by the sudden increase in pore pressure, leading to a likely shear plane failure, which was exacerbated by the shortening of the shear plane as the head scarp receded. This is not the usual failure mechanism for a retaining wall, which would typically occur by starting to slide or overturn by being overloaded from behind and above.

What happened on January 14 was either a massive loss of soil adjacent 6 VPR that 'took out' the retaining wall, or a gradual recession of the head scarp got to a point where the restraining capability of the soil was eroded, and the retaining wall simply slid down the hillside.

To suggest the retaining wall was a significant precursory or causal factor in either the January 5 or 14 landslides would be akin to saying the World Trade Center in New York was a significant precursory or causal factor on the disaster of September 11, 2001.

Causation Summary

A key conclusion that can be made is there must be an underlying critical pre-condition relevant to both the 2022 and 2025 landslide events, which is most likely hillside pre-saturation.

The landslide was caused by a sudden failure of soil adjacent 6 VPR or immediately below the retaining wall, as the slowly receding head scarp continued to undermine the steep and saturated hillside.

The recession of the head scarp was caused by the sudden influx of water that caused the January 5 landslide, and continued to flow at a high rate leading to the January 14 landslide.



Photo 1: January 14, 2025 showing no distress in retaining wall while soil is dropping away vertically away from the concrete piers due to head scarp recession.



Photo 2: August 2021 from North East boundary of 3 Penny Lane and 10-12 View Point Road, looking West, showing natural vegetation and extent of inaccessibility (taken from red circle in photo 3)



Photo 3: Taken on boundary with 3 Penny Lane, looking East to property corner (marked by red circle) showing state of natural vegetation and degree of inaccessibility



Photo 4: Area of 2025 landslide prior to construction of retaining walls, showing natural profile before any fill.



Photo 5: Property boundary in veggie patch area prior to construction of retaining walls, showing natural soil profile. The tree in this photo remains in place today (post 2025 landslide).



Photo 6: Area of 2022 landslide showing natural vegetation and lack of significant trees. This area was being planted out with native trees and shrubs