

A890 Maman Hill

Annual Slope Inspection 2025

The Highland Council

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1. Introduction

1.1 General

AECOM Limited (AECOM) was appointed by The Highland Council (THC) on 29th April 2022 (THC letter ref. YEHAS6098) to undertake annual inspections of rock faces along part of the A890 in Wester Ross in the Scottish Highlands. The main site extends between the properties of Attadale and Ardnarff, known locally as the Strome ferry Bypass, but also includes rock slopes to the north of Attadale at Maman Hill that form the subject of this report. The works were commissioned under the Scotland Excel Framework for Engineering and Technical Consultancy Services: Ref. 0820 – A890 Strome ferry Bypass Rockworks, Job No: YEHAS6098, which runs until 2026.

AECOM (formerly URS) first undertook a detailed inspection of the slopes between Ardnarff and Attadale in May 2012. AECOM first undertook additional inspections of the slopes located alongside the A890 to the immediate north of Attadale (on Maman Hill) in April 2019 following discussions with THC on the potential risk associated with other rock slopes beyond the extents of the Attadale to Ardnarff section of the A890. It is not known if these rock slopes were subject to earlier inspections and/or risk assessments, although the localised presence of rock fall netting suggests a potential risk had been identified at this location in the past.

Applying the same risk assessment methodology as used on the Strome ferry Bypass between Attadale and Ardnarff, one very high risk level slope and one high risk slope were identified within the Maman Hill site in 2019. It was therefore recommended that a similar risk management approach to that currently in place for the slopes between Attadale and Ardnarff be adopted, including monthly inspections by THC and annual inspections by suitably qualified and experienced engineering geologists. The last annual inspection was carried out in April 2024 and reported in AECOM Report Ref. GLRP0009 'A890 Maman Hill, Annual Slope Inspection 2024, 31st May 2024.'

This report summarises the findings of the 2025 inspection. The report objectives are to:

- Provide a summary of any significant events (including remedial works) that have occurred at the site since the 2024 annual inspection;
- Present the findings of the 2025 inspection, including comment on the condition of the rock slopes and any existing remedial measures;
- Comment on the level of risk associated with the rock faces; and
- Provide recommendations for ongoing management and risk reduction, where appropriate.

1.2 Background

The site is located along the A890 between approximately 130 and 600 m north of Attadale Station (between National Grid References (NGRs) 192443 E 839288 N and 192616 E 839683 N. A site location plan is included in Appendix A.

Within the site extents the A890 is single carriageway and rises steeply from approximately 5 m above ordnance datum (AOD) in the south to approximately 55 m AOD in the north. The road is located on sidelong ground with a series of predominantly man-made rock slopes ranging in height from 2 to 20 m on the upslope (eastern) side of the road.

At the southern extent of the site the road runs adjacent to the railway, which continues around the coastline of Loch Carron as the road rises up the slopes of Maman Hill. The land between the road and the railway is undeveloped heath and woodland, whilst the land immediately upslope of the road comprises a commercial forestry plantation. No surface water or groundwater flows were observed within the site; however, it should be noted that groundwater levels may vary owing to seasonal or other effects.

The construction of the A890 in the 1960s and early 1970s involved the widening of an existing track/road at Maman Hill and the creation/widening of several rock slopes along the eastern (upslope) side of the road. It is considered that over-blasting during construction resulted in the rock cutting slopes being left in a fractured state

prone to rock falls. These conditions have also left the exposed rock mass susceptible to weathering, frost and root action.

Further details on the site history and geology are included in the 2019 inspection report. The site has no environmental or historical designations, and AECOM is not aware of any ecological constraints affecting the site. This should, however, be confirmed during the planning of any physical works.

1.3 Works Since the 2024 Inspection

1.3.1 THC Inspections

The ongoing management of the slopes alongside the A890, including at Maman Hill, involves the completion of daily 'drive through' inspections and more detailed monthly 'walk through' inspections by local THC personnel familiar with the site. Any new slope movements or hazards are reported directly to AECOM.

The THC inspections did not identify any significant changes to the slopes at Maman Hill between April 2024 and April 2025.

1.3.2 Maintenance/Remedial Works

Following a holistic review of the relative risk posed by slopes on the main Stromeferry Bypass (Ardnarff to Attadale) site and the Maman Hill site, and in discussion with THC, Maman Hill slopes M4 and M5 were prioritised for remediation. AECOM undertook the design of remedial measures to be installed at these slopes in 2023, with a view to THC appointing a specialist contractor to carry out the construction works during the financial year 2024-2025 where budget permitted. The remedial designs were reported in AECOM report ref. GLRP0005 ('A890 Stromeferry: Phase 13 Rock Works, Maman Hill Record of Design'), issued to THC on 27th November 2023.

During the 2024 annual inspection, and prior to the implementation of the remedial works, a recent rock fall originating from slope M5 was identified. Loose rocks remained on the slope in a precarious position and blocks within the verge introduced the potential for random bounce trajectories. Urgent maintenance works were recommended to remove loose rocks from the slope, clear rock fall debris from the verge / ditch and create a catch bund from site-won material to reduce the potential for further rock falls to reach the road. THC instructed specialist contractor Geo-rope Limited (Geo-rope) to carry out these works and they were completed in June 2024.

AECOM verified that the previously designed remedial works for slopes M4 and M5 remained appropriate and associated construction works (referred to as the Phase 13 Rock Works) were undertaken between 11th November 2024 and 8th January 2025 by Geo-rope Limited, under the part time direction of suitably experienced AECOM engineering geologists. Details of the remedial installations are included in the slope-specific Geotechnical Assessment Sheets presented in section 3.1.5 and 3.1.6 of this report with further details provided in the Geo-rope Limited 'as built' records (Stromeferry Phase 13 Health and Safety File. Geo-rope Limited, Rev.0 April 2025).

2. 2025 Inspection and Risk Assessment Methodology

A team of four AECOM geologists inspected the rock slopes at Maman Hill on the 28 April 2025 (two at ground level, two at height). The weather during the inspection was mild and cloudy. Spring 2025 was unusually warm and dry, with a 'false spring' leading to vegetation growth / leaf cover being higher than would typically be observed in late April and, in some areas, significantly restricted the view of the rock slopes and existing remedial installations.

During the 2019 inspection a local chainage system was established and the rock slope was divided into six zones of similar rock slope geometry, slope bearing, and rock mass structure, referenced Slopes M1 to M6. Chainage 000 (m) was positioned opposite the northern end of the layby at the top of the hill (NGR 192616 E 839683 N). The chainage system and the approximate location and extent of each rock slope zone are shown on Figure 2 in Appendix B.

Each zone of the rock slopes was inspected from road level with the aim of identifying significant changes and/or potential instability issues and changes since the 2024 inspection that would benefit from more detailed rope access inspections. In the absence of any specific newly observed hazards, the rope access inspections were restricted to the targeted inspection of the crest of the remedial installations within slopes M4 and M5, which were completed in January 2025 (Phase 13 works).

Traffic management was provided by Geo-rope for the duration of the inspection.

The risk assessment approach adopted to rank the relative rock fall risk presented by each slope to the road and its users is detailed below. This is the same methodology used to assess the slopes along the nearby Ardnarff to Attadale section of the Stromeferry Bypass. The relative risk level for each slope at Maman Hill is therefore directly comparable to those for the slopes between Ardnarff and Attadale, allowing for prioritisation of works across the site as a whole.

The risk assessment considers the size of a potential rock fall (the hazard), the potential likelihood of debris from the rock fall reaching the carriageway (the pathway) and the available sighting distance on the carriageway (the receptor). The ratings assigned to each of these criteria are multiplied together to give a risk rating. Further details are provided in Sections 2.1 to 2.4.

The potential consequence of a rock fall will clearly vary depending on the presence/absence of road users beneath or approaching the slope at the specific time. It must be appreciated that due to the number of variables involved this is impossible to predict. It should be recognised that the assigned level of risk takes a conservative approach and assumes the potential presence of road users beneath or approaching the slope at the time of rock fall. A more likely scenario is that a rock fall occurs when no road users are directly beneath and fallen blocks which have come to rest on the road present a hazard to road users after the event. To differentiate and risk rank the slopes, (e.g., to prioritise remedial works) sightlines and stopping distances are also factored into the assessment to recognise the higher potential for road users to interact with rock fall debris on the road at locations with poorer sightlines as opposed to straight sections of road (see Section 2.3).

Following the initial risk assessment the inspecting geologists reviewed the relative risk rankings and, where necessary, adjusted the scoring to reflect the overall setting and their professional judgement.

2.1 Hazard Rating

Four categories of hazard rating have been selected based on the main sizes of rock falls (and potential rock falls) identified at the site, as detailed in Table 2-1. During the risk assessment the hazard rating representative of the scale of observed or potential rock falls at each slope was selected.

Table 2-1. Hazard Rating

Hazard Rating	Description
1	Small ravelling type rock falls (typically up to 0.02 m ³).
2	Moderate rock falls (typically between 0.02 and 1 m ³).
3	Large rock falls (typically between 1 and 10 m ³).
4	Very large rock falls (typically greater than 10 m ³).

2.2 Pathway Rating

Each slope has been assigned a pathway rating (Table 2-2) based upon a qualitative inspection of the slope form (height, angle, profile/roughness, vegetation cover, and presence or absence and suitability of existing remedial measures) between the position of a potential rock fall and the road. The rating also takes into account an estimated termination location of fallen material. If debris from previous rock fall events was evident, the location of this was considered during this assessment.

Table 2-2. Pathway Rating

Pathway Rating	Description
1	No falling blocks are expected to reach the road (e.g., effective remedial measures and/or a wide verge or rock trap ditch).
2	Most falling blocks are not expected to reach the road (e.g., largely effective remedial measures/verge/rock trap ditch).
3	Approximately half of the falling blocks are expected to reach the road (e.g., partially effective remedial measures/verge/rock trap ditch).
4	Most falling blocks are expected to reach the road (e.g., no or ineffective remedial measures and/or narrow verge/shallow rock trap ditch).
5	All falling blocks are expected to reach the road (e.g., no or ineffective remedial measures and no verge or rock trap ditch – fallen blocks are likely to free fall or bounce directly onto the road).

2.3 Receptor Rating

For slopes with pathway ratings of greater than or equal to 2 (i.e., at least some blocks are expected to reach the road), a receptor rating is included in the assessment to reflect the potential of a vehicle coming into contact with, or having to take action to avoid, rock fall debris. The minimum sighting distance that a driver would have when driving adjacent to each of the slopes (in good weather conditions and during daylight hours) was estimated based on stopping distances from the Highway Code for cars travelling at 40 and 60 mph (36 and 73 m, respectively).

Table 2-3. Receptor Rating

Receptor Rating	Description
1.0	Sighting distance greater than 73 m
1.2	Sighting distance between 36 and 73 m
1.4	Sighting distance less than 36 m

2.4 Risk Rating

The ratings assigned to the hazard, pathway and receptor were multiplied to give a risk rating for each of the slopes. The relative risk levels are described in Table 2-4, along with the colour coding used to depict these.

Table 2-4. Risk Rating

Risk Rating	Relative Risk Level	Description
>5	Low	Small to moderate sized rock falls with a low probability of causing damage to or closure of the road and/or injuries to road users. Risk normally acceptable.
5 to <10	Moderate	Moderate sized rock falls with potential to cause moderate damage to road and short-term road closures (a few hours) but a low probability of causing injuries to road users. Risk likely to be tolerable but client needs to be made aware of hazards and monitor these.
10 to <15	High	Moderate to large sized rock falls with a higher probability of causing major damage to the road and/or road closures of a few days to a few weeks and potential of causing major injury or loss of life should road users be present beneath (or approaching) slope at time of rock fall. Risk likely to require remedial measures / risk management actions.
>15	Very High	Large to very large rock falls which have a high probability of causing significant damage to road and/or long-term road closures (weeks to months) and the potential of resulting in major injury or loss of life should road users be present beneath (or approaching) slope at time of rock fall. Risk likely to require remedial measures.

3. Summary of Findings

3.1 Geotechnical Assessment Sheets

A Geotechnical Assessment Sheet for each slope reference is provided within the following sections of this report. They include the inspection findings and a summary of the slope risk rating. Within the Geotechnical Assessment Sheets, photo references are provided for key observations identified during the inspection. Each photo has a unique reference number which relates to the slope reference; for example, photos of features from slope reference M1 are referenced as 'M1-1, M1-2, M1-3' etc. The photographs are provided after each assessment sheet.

3.1.1 Slope Ref. M1

GEOTECHNICAL ASSESSMENT SHEET					
Site: A890 Maman Hill	Slope Ref: M1	Chainage: 015 – 075	Start Grid Ref: NG 92612 39681	End Grid Ref: NG 92572 39636	Elevation: 50 – 55 m AOD

Photo at Start Chainage (looking west)	Photo at End Chainage (looking east)
	

Rock Slope Characteristics:															
Dip (°):	70	Azimuth (°):	310	Height (m):	7	Length (m):	60	Vegetation Cover:	30 to 50% of slope covered in heather and grass. Trees along crest.	Ditch Details:	Ch. 0 to 30 – Shallow ditch – 1 m wide by 0.3 to 0.5 m deep. Ch. 30 to 75 – No ditch.	Roughness:	Rough	Verge Width (m):	0.9 between Ch. 000 to 040 and 070 to 075 Very narrow between Ch. 040 and 070

Engineering Description of Rock:
Strong psammite.

Rope Access Inspections:		
Year of Rope Access Inspection	Location	Purpose
N/A		

THC Monthly Inspection Observations:		
Date	Location	Comments
N/A		

Existing netting or other remedial work details:				
Year of Works	Description of Works	Comments	2025 Inspection Observations	Photo Reference
Unknown. Pre-dates AECOM's first involvement in the A890 Stromeferry Bypass in 2012.	Localised chain-link drape netting between Ch 030 to 075.	Netting covers c.65% of slope (anchorages have not been inspected). The netting is highly corroded and locally damaged and should be considered ineffective.	No change noted during the 2025 inspection. Numerous visible tears to the netting, particularly across lower third. Significant proportion obscured by vegetation cover, including anchorages.	M1-1

Hazards Observed:			
Location	Description of Hazard(s) from Previous Inspections	2025 Inspection Observations	Photo Reference
Throughout M1	2019 Inspection: Small scale (<0.01 m ³) ravelling type rock falls likely as rock mass continues to weather.	No change noted during the 2025 inspection.	N/A

Hazards Observed:			
	2023 Inspection: There are a few dilated blocks behind the netting (between Ch. 030 to 070) which look keyed in – could benefit from scaling.		
Throughout M1	2019 Inspection: Semi-mature coniferous trees growing at crest have potential to cause root jacking (e.g. Ch. 018)	No change noted during the 2025 inspection.	N/A
Ch. 018	2022 Inspection: Trees at crest of slope presenting risk of root-jacking. Approx. 6 blocks c.2.0 x 0.1 x 0.1 m are in the verge.	No change noted during the 2025 inspection.	N/A
Ch. 023	2022 Inspection: Block (c.2.0 x 1.0 x 1.5 m) with dilated back fracture (low risk due to presence of verge)	No change noted during the 2025 inspection.	M1-2
Ch. 032	2024 Inspection: Tree root has rotated out from slope. Rock slope behind is clean and does not present a hazard.	No change noted during the 2025 inspection.	N/A
Ch. 053	2024 Inspection: Several small blocks present in the verge which have a source location 5 m high, at the crest of the slope. There is potential for more blocks to fall and land on the verge or edge of the road.	Source of rockfall is root jacking by a semi-mature tree at the crest of the slope. Several small blocks are loose and retained between the rockface and the netting c. 1 m below the tree.	M1-3
Ch. 072	N/A	Small accumulation of blocks up to 0.30 m (long axis) at the toe of the slope behind the netting. Source of rockfall 1.5 m above toe. Netting is considered to be ineffective due to excessive corrosion (numerous holes noted) and no ditch is present. The 0.9 m wide verge should prevent the majority of falling blocks from reaching the roadside; however, there is the potential for some small blocks to reach the road, particularly if debris build up creates the potential for random bounce trajectories.	M1-4

Other Comments
<p>No surface or groundwater flows.</p> <p>Rock mass generally in good condition, although dilated fractures noted locally. Potential for kinematic failure is low.</p> <p>Based on the current condition of the rock slope and the presence of a 0.9 m verge and localised ditch at the toe of the slope, the likelihood of debris from a rock fall landing on the road is considered to be relatively low, excluding between Ch. 040 and 070, where the verge is very narrow.</p>

RISK RATING		Comments
Hazard Rating =	2	Generally limited to small scale raveling although locally potential for larger block fall(s) associated with root jacking. Block size not expected to exceed 1 m ³ .
Pathway Rating =	2	Most rock fall debris likely to land in verge.
Receptor Rating =	1.2	Minimum sightline 45 m.
Risk Value =	4.8	
Risk Level =	Low	Between Ch. 030 and 075 the netting is completed corroded and is considered to be ineffective at retaining falling blocks; between Ch. 040 and 070 there is very little verge for falling blocks to land on. Taking cognisance of these factors, between Ch. 040 and 070, the Pathway Rating could locally be increased to 3 to reflect the increased likelihood of falling blocks reaching the roadside. However, in this slope sub-section the prevailing size of failure material is less than 0.02 m ³ and, as such, the Hazard Rating could be correspondingly reduced to 1. This would equate to an overall Risk Value of 3.6 (Low Risk Level) so no change has been made to the more conservative risk rating determined by consideration of the slope as a whole.

Recommended Remedial Works / Actions					
Large Scale Rock Fall Protection Works (Category 3)		Localised Targeted Rock Fall Protection Works (Category 2)		Ongoing Maintenance (Category 1)	
N/A		<ul style="list-style-type: none"> Consider replacement of existing ineffective drape netting between Ch. 030 and Ch. 075. 		<ul style="list-style-type: none"> Re-inspection by end of April 2026 Felling of trees along crest and de-vegetation of the slope Scaling of loose rock behind netting (between Ch. 030 to 075) 	
Assessed in field by:	MT/PLM/CR/SF	Date:	28/04/2025	Reviewed by:	MT
		Date:		Date:	03/06/2025



<p>M1-1</p>	<p>Localised chain-link drape netting between Ch 030 to 075.</p> <p>Netting covers c. 65% of slope (anchorages have not been inspected). The netting is highly corroded and locally damaged and should be considered ineffective.</p> <p>Numerous visible tears to the netting, particularly across lower third. Significant proportion obscured by vegetation cover, including anchorages.</p>	<p>Year First Observed:</p>	<p>2019</p>
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M1-2

Ch. 023: Block c. 2.0 x 1.0 x 1.5 m with dilated back fracture. Poses low risk to road due to presence of verge.

Year First Observed:

2022



<p>M1-3</p>	<p>Ch. 053: Several small blocks present in the verge which have a source location 5 m high, at the crest of the slope. There is potential for more blocks to fall and land on the verge or edge of the road.</p> <p>Source of rockfall is root jacking by a semi-mature tree at the crest of the slope. Several small blocks are loose and retained between the rockface and the netting c. 1 m below the tree.</p>	<p>Year First Observed:</p>	<p>2024</p>
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<p>M1-4</p>	<p>Ch. 072: Small accumulation of blocks up to 0.30 m (long axis) at the toe of the slope behind the netting. Source of rockfall 1.5 m above toe.</p> <p>Netting is considered to be ineffective due to excessive corrosion (numerous holes noted) and no ditch is present. The 0.9 m wide verge should prevent the majority of falling blocks from reaching the roadside; however, there is the potential for some blocks to reach the road, particularly if debris build up creates the potential for random bounce trajectories.</p>	<p>Year First Observed:</p>	<p>2025</p>
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3.1.2 Slope Ref. M2

GEOTECHNICAL ASSESSMENT SHEET						
Site: A890 Maman Hill	Slope Ref: M2	Chainage: 200 – 280	Start Grid Ref: NG 92536 39506	End Grid Ref: NG 92513 39431	Elevation: 30 – 35 m AOD	

Photo at Start Chainage (looking west)	Photo at End Chainage (looking east)
	

Rock Slope Characteristics:															
Dip (°):	60	Azimuth (°):	305	Height (m):	2	Length (m):	80	Vegetation Cover:	95% of slope covered in heather and grass and semi-mature trees.	Ditch Details:	0.5 m deep x 1.0 m wide	Roughness:	Rough	Verge Width (m):	1.0

Engineering Description of Rock:
Strong psammite.

Rope Access Inspections:		
Year of Rope Access Inspection	Location	Purpose
N/A		

THC Monthly Inspection Observations:		
Date	Location	Comments
N/A		

Existing netting or other remedial work details:				
Year of Works	Description of Works	Comments	2025 Inspection Observations	Photo Reference
N/A				

Hazards Observed:			
Location	Description of Hazard(s) from Previous Inspections	2025 Inspection Observations	Photo Reference
Throughout M2	2019 Inspection: Small scale (<0.02 m ³) ravelling / root jacking rock falls likely as rock mass continues to weather. However, ditch and verge at toe are considered effective and the associated likelihood of debris reaching the road is therefore low.	No change noted during the 2025 inspection.	N/A
Ch. 217	N/A	Surface water flow appears to have been diverted upslope in forestry area, with the water flowing down slope ~4.0 m up chainage from the location of the existing culvert.	M2-1
Ch. 226 to 235	2023 Inspection: Ditch has been locally damaged by vehicle going off road. Maintenance works not required as ditch is not below an area of significant rock fall hazard.	No change noted during the 2025 inspection.	N/A
Ch. 235	N/A	Minor soil slip/slump ~1.5 m high (4.0 to 5.0 m above road level) by 3.0 m wide. Slip/slump is set back from the road and the existing ditch would retain debris should it slip/slump further. Drainage capacity of ditch is impacted.	M2-2

Other Comments

Diversion of existing surface watercourse / water flow observed at Ch. 217; the flow has been diverted upslope, which may signify a blocked channel upslope which may break through in high rainfall conditions. Large verge and ditch should reduce the potential for debris to reach the road.

No groundwater flows.

Isolated low height (2 m max) rock exposures. Rock mass generally in good condition, although dilated fractures noted locally. Potential for kinematic failure is low.

No debris at toe or other evidence of previous rock falls at this location. Presence of effective ditch and verge.

RISK RATING		Comments
Hazard Rating =	1	Generally limited to small scale ravelling.
Pathway Rating =	1	Ditch considered effective.
Receptor Rating =	N/A	Receptor rating only applicable when pathway rating is ≥ 2 .
Risk Value =	1.0	
Risk Level =	Low	

Recommended Remedial Works / Actions

Large Scale Rock Fall Protection Works (Category 3)	Localised Targeted Rock Fall Protection Works (Category 2)	Ongoing Maintenance (Category 1)
N/A	N/A	<ul style="list-style-type: none"> Re-inspection by end of April 2026 De-vegetation of the slope Reinstatement of upslope drainage to original channel
Assessed in field by:	MT//PLM/CR/SF	Date: 28/04/2025
		Reviewed by: MT
		Date: 03/06/2025



<p>M2-1</p>	<p>Ch. 217: Surface water flow appears to have been diverted upslope, with the downslope length of the issue ~4.0 m up chainage from the location of the existing culvert.</p> <p>Yellow: Previous watercourse pathway. Blue: Current watercourse pathway.</p>	<p>Year First Observed:</p>	<p>2025</p>
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<p>M2-2</p>	<p>Minor soil slip/slump ~1.5 m high (4.0 to 5.0 m above road level) by 3.0 m wide. Slip/slump is set back from the road and the existing ditch would retain debris should it slip/slump further. Drainage capacity of ditch is impacted.</p> <p>Yellow: Approximate position of slip back scar.</p>	<p>Year First Observed:</p>	<p>2025</p>
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3.1.3 Slope Ref. M3

GEOTECHNICAL ASSESSMENT SHEET											
Site:	A890 Maman Hill	Slope Ref:	M3	Chainage:	280 – 330	Start Grid Ref:	NG 92513 39431	End Grid Ref:	NG 92493 39392	Elevation:	25 – 35 m AOD

Photo at Start Chainage (looking west)	Photo at End Chainage (looking east)
	

Rock Slope Characteristics:															
Dip (°):	65	Azimuth (°):	300	Height (m):	4 to 8	Length (m):	50	Vegetation Cover:	25% of slope covered in heather, grass and occasional small trees. Trees along crest.	Ditch Details:	0.4 to 0.75 m deep, minimum 1.2 m wide. Culvert at Ch. 288.	Roughness:	Rough	Verge Width (m):	1.0

Engineering Description of Rock:
Strong psammite.

Rope Access Inspections:		
Year of Rope Access Inspection	Location	Purpose
N/A		

THC Monthly Inspection Observations:		
Date	Location	Comments
N/A		

Existing netting or other remedial work details:				
Year of Works	Description of Works	Comments	2025 Inspection Observations	Photo Reference
December 2020	Tree felled by THC at Ch. 304	There was a large fir tree growing from crest of rock face. Risk of root-jacking and potential rock fall volume up to 0.5 m ³ .	No change noted during the 2025 inspection.	N/A

Hazards Observed:			
Location	Description of Hazard(s) from Previous Inspections	2025 Inspection Observations	Photo Reference
Throughout M3	2019 Inspection: Numerous small scale (<0.02 m ³) ravelling type rock falls observed, some of which were deemed to be imminent (i.e. readily dislodged by hand).	No change noted during the 2025 inspection.	N/A
Throughout M3	2019 Inspection: Localised overhangs with potential for rock fall of unsupported blocks. Individual block size typically <0.1 m ³ (e.g. at Ch. 311)	No change noted during the 2025 inspection.	M3-1
Ch. 280	N/A	Boulder at fence above rock slope (side length 0.50 m). Source unknown.	M3-2
Ch. 304	2023 Inspection: Rock mass beneath tree exhibiting root-jacking potential	No change noted during the 2025 inspection.	N/A
Ch. 311	2024 Inspection: A tree has fallen away from the slope. Possibly due to a vehicle leaving the road and entering the ditch (evidence of disturbed verge and vehicle debris). No significant hazard.	No change noted during the 2025 inspection.	N/A

Other Comments
<p>No surface or groundwater flows.</p> <p>Rock mass generally in good condition, although dilated fractures associated with blast damage and root jacking noted locally. Potential for kinematic failure is low but ravelling, root jacking and block falls from above overhangs possible. Maximum rock fall size 0.5 m³.</p> <p>Note the source of the observed 0.50 m scale boulder at fence line above slope has not been determined; given it has not burst through the deer fence, it is assumed to have had very low momentum on impact.</p> <p>Ditch and verge likely to retain debris from most small-scale rock falls. Occasional blocks observed at toe – typical dimensions 0.1 x 0.1 x 0.1 m.</p>

RISK RATING		Comments
Hazard Rating =	2	Generally limited to small scale ravelling although locally potential for larger block fall(s) associated with root jacking. Rock fall volume not expected to exceed 0.5 m ³ .
Pathway Rating =	2	Most rock fall debris likely to land in ditch verge.
Receptor Rating =	1.2	Minimum sightline 60 m.
Risk Value =	4.8	
Risk Level =	Low	

Recommended Remedial Works / Actions					
Large Scale Rock Fall Protection Works (Category 3)		Localised Targeted Rock Fall Protection Works (Category 2)		Ongoing Maintenance (Category 1)	
N/A		N/A		<ul style="list-style-type: none"> Re-inspection by end of April 2026 Felling of trees along crest and de-vegetation of the slope 	
Assessed in field by:	MT//PLM/CR/SF	Date:	28/04/2025	Reviewed by:	MT
		Date:		Date:	03/06/2025



M3-1	Throughout M3: Localised overhangs with potential for rock fall of unsupported blocks. Individual block size typically <math><0.1 \text{ m}^3</math>.	Year First Observed:	2019
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M3-2	Ch. 280: Boulder at fence above rock slope (side length 0.50 m) (circled in yellow). Source unknown.	Year First Observed:	2025
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3.1.4 Slope Ref. M4A

GEOTECHNICAL ASSESSMENT SHEET											
Site:	A890 Maman Hill	Slope Ref:	M4	Chainage:	330 – 353	Start Grid Ref:	NG 92493 39392	End Grid Ref:	NG 92480 39378	Elevation:	15 – 20 m AOD

Photo at Start Chainage (looking west)	Photo at End Chainage (looking east)
	

Rock Slope Characteristics:															
Dip (°):	80	Azimuth (°):	300	Height (m):	4 to 10	Length (m):	23	Vegetation Cover:	70 to 80% of slope covered in trees and heather.	Ditch Details:	1.5 m wide, 0.5 m deep	Roughness:	Rough	Verge Width (m):	1.0

Engineering Description of Rock:
Strong psammite.

Rope Access Inspections:		
Year of Rope Access Inspection	Location	Purpose
N/A		

THC Monthly Inspection Observations:		
Date	Location	Comments
N/A		

Existing netting or other remedial work details:				
Year of Works	Description of Works	Comments	2025 Inspection Observations	Photo Reference
N/A				

Hazards Observed:			
Location	Description of Hazard (s) from Previous Inspections	2025 Inspection Observations	Photo Reference
Throughout M4A	2019 Inspection: Numerous small scale (<0.02 m ³) ravelling type failures observed, some of which were deemed to be imminent (i.e. readily dislodged by hand).	No change noted during the 2025 inspection.	N/A
Throughout M4A	N/A	Significant vegetation cover present across the slope, including small trees and heather with root jacking potential. No specific hazards observed.	M4A-1

Other Comments
<p>New division of slope M4 into M4A and M4 based on the remedial measures installed between Ch. 353 and 395 (slope M4) in 2024 (Phase 13 works); no remedial works undertaken at slope M4A.</p> <p>No surface or groundwater flows.</p> <p>Rock mass largely obscured by vegetation cover; significant potential for small-scale block falls associated with root jacking. Some small-scale ravelling type failures were noted to be imminent with blocks readily dislodged by hand.</p> <p>Ditch and verge likely to retain debris from small-scale rock falls.</p>

RISK RATING		Comments
Hazard Rating =	1	Potential failure volumes expected to be limited to small raveling-type (i.e., up to 0.02 m ³).
Pathway Rating =	2	Combined width of the ditch and verge, plus the depth of the ditch, should be sufficient to prevent small raveling-type rock falls from reaching the road.
Receptor Rating =	1.2	Minimum sightline 60 m.
Risk Value =	2.4	
Risk Level =	Low	

Recommended Remedial Works / Actions					
Large Scale Rock Fall Protection Works (Category 3)		Localised Targeted Rock Fall Protection Works (Category 2)		Ongoing Maintenance (Category 1)	
N/A		N/A		<ul style="list-style-type: none"> Re-inspection by end of April 2026 Full de-vegetation of the slope face and, where required, light (hand) scaling. 	
Assessed in field by:	MT//PLM/CR/SF	Date:	28/04/2025	Reviewed by:	MT
		Date:			03/06/2025



M4A-1	Significant vegetation cover present across the slope, including small trees and heather with root jacking potential	Year First Observed:	2025
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3.1.5 Slope Ref. M4B

GEOTECHNICAL ASSESSMENT SHEET											
Site:	A890 Maman Hill	Slope Ref:	M4	Chainage:	353 – 395	Start Grid Ref:	NG 92480 39378	End Grid Ref:	NG 92452 39339	Elevation:	15 – 20 m AOD

Photo at Start Chainage (looking west)	Photo at End Chainage (looking east)
	

Rock Slope Characteristics:															
Dip (°):	80	Azimuth (°):	300	Height (m):	10 to 15	Length (m):	42	Vegetation Cover:	10% of slope covered in grass.	Ditch Details:	0.0 to 0.4 m deep, 0.0 to 1.0 m wide. 2.0 m wide after Ch. 380	Roughness:	Rough	Verge Width (m):	0.5 to 1.0

Engineering Description of Rock:
Strong psammite.

Rope Access Inspections:		
Year of Rope Access Inspection	Location	Purpose
2019	Ch. 370 to 380	Rope access inspection carried out to assess potential hazards identified from road level behind netting. Findings – A number of hazards were identified including: a significant overhang (1.6 m) c. 3 to 5 m below crest, a dilated sliding plane with 1.5 m high x 2.5 m wide x 1.5 m deep block c. 10 m above road level, a block with dilated back fracture c. 8 m above road level at Ch. 378 and areas of blast damaged rock mass. Additionally, the netting was confirmed to be plastic 'geogrid' and adjacent panels are not attached.
2021	Ch. 370	Rope access inspection carried out to re-assess previously identified hazards. Condition remains unchanged.
2021	Ch. 374	Rope access inspection carried out to assess overhang at crest. Findings - Overhang observed to be 1.0 to 1.3 m with a dilated fracture along the left-hand side. "Supporting block" on 58° sliding plane with dilated fracture. Root jacking potential from trees at crest. Two loose blocks were removed by hand during the rope access inspections to make safe. Total volume c. 0.25 m ³ .
2025	Ch. 353 to 395	Rope access inspection carried out to assess the installed remedial works (Phase 13) during the 12 month defect period. Findings: <ul style="list-style-type: none"> • Cut bar ends corroding – requires application of a protective seal/coating (i.e., Galvafruid); • Some cable grips are loose and missing nuts, in places there are less than the specified number of cable grips; • Cable end fixings around dowels are missing thimbles; • Profiling cables are slack (related in part to issues reported with the cable grips); • Some cables not fully clipped to netting; • Excess cable ends left very long and are fraying; • Some hemispherical nuts not within the female holes in spike plates; and • Cut branches are piled at the crest of the slope – risk of falling/blowing over the mesh. (The above issues were reported to THC Phase 13 Rock Works Project Manager via email and the contractor has been made aware they require to be rectified as soon as practicable; it is understood that, at the time of writing, remedial works are programmed to be completed in mid-June 2025.)

THC Monthly Inspection Observations:		
Date	Location	Comments

N/A		
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Existing netting or other remedial work details:				
Year of Works	Description of Works	Comments	2025 Inspection Observations	Photo Reference
Unknown. Pre-dates AECOM's first involvement in the A890 Stromeferry Bypass in 2012.	Chain-link netting installed between Ch. 360 to 375.	Netting is corroded and damaged and should be considered ineffective for the retention of anything but the smallest blocks (anchorages have not been inspected).	Removed prior to installation of Tecco netting system, (see details of Phase 13 works completed in 2024/2025).	N/A
Unknown. Pre-dates AECOM's first involvement in the A890 Stromeferry Bypass in 2012.	Plastic 'geo-grid' style netting between Ch. 375 to 385.	Individual panels un-joined and anchor points have not been inspected. This type of netting is not suitable for the retention of rock falls and should be considered ineffective.	Removed prior to installation of Tecco netting system, (see details of Phase 13 works completed in 2024/2025).	N/A
2024/2025 – Phase 13 Rock Works	Tecco drape netting installed between Ch. 353 and 360. Tecco anchored / profiled netting installed between Ch. 360 and 395.	Removal of pre-existing ineffective netting and light scaling undertaken prior to installation of the Tecco netting system.	Materials associated with Tecco netting system in good condition, however some corroding cut bar ends visible from road level (e.g. Ch. 370) and several snagging / defect issues identified during rope access inspection. See 2025 rope access inspection record for further details.	M4B-1, M4B-2, M4B-3, M4B-4, M4B-5, M4B-6, M4B-7, M4B-8, M4B-9

Hazards Observed:			
Location	Description of Hazard (s) from Previous Inspections	2025 Inspection Observations	Photo Reference
Throughout M4	2019 Inspection: Numerous small scale (<0.02 m ³) ravelling type failures observed, some of which were deemed to be imminent (i.e. readily dislodged by hand).	Loose blocks scales during 2024/2025 Phase 13 works. Ravelling potential remains but blocks expected to be retained by netting system.	N/A
Ch. 370	2019 Inspection: A dilated sliding plane at 50° and with a 1.5 m high x 2.5 m wide x 1.5 m deep block above was observed c. 10 m above road level. Loose rock noted along sliding plane. Risk of c. 5 m ³ plane failure. No ditch and narrow verge so rock fall debris likely to reach road. (Repeat rope access inspection completed in 2021 – no change)	Partially scaled during 2024/2025 Phase 13 works; hazard area now located within anchored / profiled (Tecco) netting system.	N/A
Ch. 370 to 380	2019 Inspection: A large overhang was observed c. 3 to 5 m below the crest of the rock face; however, joints were observed to be tight and no significant risk of rock fall identified.	Hazard area now located within anchored / profiled (Tecco) netting system.	N/A

Hazards Observed:			
Ch. 370 to 380	<p>2019 Inspection: Several areas of blast damage noted with dilated joints and loose rock observed. No ditch and only a narrow verge present beneath highest section of the rock slope. Debris noted along toe of slope in this area and potential for additional rock falls to occur.</p> <p>2024 Inspection: An accumulation of small blocks at toe of netting and in verge. Individual blocks up to 0.2 m in diameter and total volume of fallen blocks is approximately up to 0.75 m³. The source of the fallen blocks appears to be from possibly two locations. One location is 1 to 2 m above the toe of the slope and the other is 3 to 4 m above the toe of the slope. Both show areas of fresh surfaces and root jacking potential is present. Further root jacking potential is possible and another 0.5 to 0.75 m³ of blocks could fall. Given absence of verge at this location there is potential for blocks to reach the road.</p>	Hazard area now located within anchored / profiled (Tecco) netting system.	N/A
Ch. 374	<p>2019 Inspection: Overhang at crest (1.0 to 1.3 m) with dilated fracture along left hand side. "Supporting block" on 58° sliding plane. Root jacking potential. (Rope access completed in 2021).</p>	Hazard area now located within anchored / profiled (Tecco) netting system.	N/A
Ch. 378	<p>2019 Inspection: Dilated plane observed 8 m above road level. Slightly keyed in at left hand side but fractured rock mass c. 3.5 m wide x 0.5 m deep x 1 m high. Potential for rock fall exists and narrow verge below means this poses a risk to the road.</p>	Hazard area now located within anchored / profiled (Tecco) netting system.	N/A
Ch. 388	<p>2023 Inspection: 3no. new blocks in ditch up to 0.3 m side length.</p>	Blocks no longer evident (ditch re-profiled during Phase 13 works).	N/A

Other Comments
<p>No surface or groundwater flows.</p> <p>Rock mass in poor condition with frequent dilated fractures associated with blast damage, weathering and root jacking. Potential for planar failures as well as ravelling, root jacking, and block falls from above overhangs. Some small-scale ravelling type failures were noted to be imminent in previous years inspections, with blocks readily dislodged by hand; scaling prior to the installation of the Tecco netting system in 2024/2025 (Phase 13 works) removed the most hazardous blocks with the remainder now located within the Tecco netting system.</p> <p>Installed drape Tecco netting (passive system) designed to control the pathway of falling blocks and retain them at the toe of the slope. Anchored / profiled Tecco netting designed to prevent/limit movement of larger blocks and retain smaller blocks within the netting system.</p> <p>Note netting system snagging / defect issues identified during the 2025 rope access inspection. Although the system offers significant risk reduction in its current form, it will not be performing as designed until defects have been rectified.</p>

RISK RATING		Comments
Hazard Rating =	3	Potential failure volumes up to 5 m ³ identified.
Pathway Rating =	2	Reduced from 5 in 2024 following installation of the Phase 13 remedial works. Snagging / defect issues identified, and system cannot be considered fully effective until rectified. Pathway Rating of 2 (i.e., largely effective remedial measures) considered appropriate until snagging issues are rectified (at which point a reduction to 1 would be appropriate).
Receptor Rating =	1.2	Minimum sightline 60 m.
Risk Value =	7.2	
Risk Level =	Moderate	Reduced from Very High risk level in 2024 based on the remedial measures installed as part of the Phase 13 works. Expected to be reduced further to Low risk level following correction of identified defects / snagging. Note: these defects have been reported during the Phase 13 Rock Works 12 month defects period and reported to the relevant THC Project Manager. Corrective works should be undertaken as soon as practicable and are, at the time of writing, programmed to be completed in mid-June 2025.

Recommended Remedial Works / Actions					
Large Scale Rock Fall Protection Works (Category 3)		Localised Targeted Rock Fall Protection Works (Category 2)		Ongoing Maintenance (Category 1)	
N/A		<ul style="list-style-type: none"> Correction of issues noted during the 2025 rope access inspection, including: <ul style="list-style-type: none"> Application of protective seal/coating on cut bar ends Tightening of cable clamps and replacement of missing nuts Installation of thimbles on cable loops around dowels Tightening of cables where slack Correction of bar protrusion lengths Removal of excess lengths of cables and ensure correct re-termination of the ends to prevent fraying Removal of cut branches at the crest of the slope 		<ul style="list-style-type: none"> Re-inspection by end of April 2026 	
Assessed in field by:	MT//PLM/CR/SF	Date:	28/04/2025, 29/04/2025	Reviewed by:	MT
		Date:		Date:	03/06/2025



M4B-1	Tecco netting installed between Ch. 353 and 395; drape netting installed to Ch. 360; remainder of the face has been anchored and the netting profiled.	Year First Observed:	2025
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M4B-2

Ch. 370: Example of corroding cut bar end.

Year First Observed:

2025



M4B-3	Tecco netting installed between Ch. 353 and 395; drape netting installed to Ch. 360; remainder of the face has been anchored and the netting profiled.	Year First Observed:	2025
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M4B-4	Example of corroded cut bar end and hemispherical nut not resting in corresponding spike plate hole. Lack of thimble for cable loop around dowel.	Year First Observed:	2025
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M4B-5

Example of slack profiling cable.

Year First Observed:

2025



M4B-6

Example of missing cable grips.

Year First Observed:

2025



M4B-7

Example of cable not clipped to mesh.

Year First Observed:

2025



M4B-8

Example of corroding cut bar end and lack of thimble for cable loop around dowel.

Year First Observed:

2025



M4B-9

Example of excess wire rope with fraying end and lack of thimble for cable loop around dowel.

Year First Observed:

2025

3.1.6 Slope Ref. M5

GEOTECHNICAL ASSESSMENT SHEET						
Site: A890 Maman Hill	Slope Ref: M5	Chainage: 395 – 415	Start Grid Ref: NG 92452 39339	End Grid Ref: NG 92445 39309	Elevation: 10 – 15 m AOD	

Photo at Start Chainage (looking west)	Photo at End Chainage (looking east)
	

Rock Slope Characteristics:							
Dip (°):	80 to 90	Azimuth (°):	315	Height (m):	15 to 20	Length (m):	20
Vegetation Cover:	<10% of slope is vegetated. Localised heather and grass. Trees also present at crest.			Ditch Details:	Road to Bund: 0.4 m deep by 0.5 to 1 m wide Bund to Slope: 1.3 m deep by 2.5 m wide		Roughness: Rough
Verge Width (m):	5, including 3 m wide by 1.3 m high Bund						

Engineering Description of Rock:
Strong psammite.

Rope Access Inspections:		
Year of Rope Access Inspection	Location	Purpose
2019	Ch. 398	Rope access inspection carried out to assess potential hazards identified from road level. Findings: a detached block 2 x 2 x 0.7 m is open on left hand side and a dilated back release joint. Keyed in on right hand side but difficult to see how well keyed in.
2019	Ch. 405	Rope access inspection carried out to assess potential hazards identified from road level. Findings: c. 8 to 10 m above road level there is a dilated crack to rear of green lichen covered block. Keyed in below.
2021	Ch. 400	Rope access inspection of block at crest carried out. Findings: 10 to 50 cm wide release joint around overhanging block.
2021	Ch. 402	Rope access inspection of dilated block c. 10 m above toe of slope. Findings: Basal fracture dips into slope ("keyed in").
2024	Ch. 390	Rope access inspection to access the source location of the rock fall that had occurred since the 2023 inspection. Findings: source area of large blocks identified, with up to 400 mm wide blocks remaining loose on face. An additional 2 m ³ of blocks is protruding to the north of the slope which could potentially also fall. Dilated release joints present at an angle of 55 to 60°, daylighting at the base of an irregular plane.
2025	Ch. 398	Rope access inspection carried out at adjacent M4B to assess the installed remedial works (Phase 13) during the 12 month defect period. View across M5 identified that the wire ropes strapping the large block appeared slack. This issue was reported to THC Phase 13 Rock Works Project Manager via email and the contractor has been made aware it requires to be rectified as soon as practicable.

THC Monthly Inspection Observations:		
Date	Location	Comments
N/A		

Existing netting or other remedial work details:				
Year of Works	Description of Works	Comments	2025 Inspection Observations	Photo Reference
2024	Urgent scaling works and formation of bund carried out	Works completed in June 2024.	N/A	N/A

Existing netting or other remedial work details:				
	following rock fall (first observed during 2024 annual inspection).			
2024/2025 – Phase 13	<p>New anchored cable restraints installed across detached block at Ch. 398.</p> <p>New dowels installed into unsupported rock column at Ch. 407.</p>	<p>16 mm steel cable restraints anchored with 4no. anchors (4 m long 32 mm GEWI galvanised steel bars).</p> <p>8no. dowels (4 m long 32 mm GEWI galvanised steel bars) installed c. 8 to 11 m above slope toe.</p>	All elements of protection system appear to be in good condition, however, see 2025 rope access notes for identified defect (slack cables).	M5-1, M5-2

Hazards Observed:			
Location	Description of Hazard(s) from Previous Inspections	2025 Inspection Observations	Photo Reference
Throughout M5	2019 Inspection: Ongoing ravelling. Precarious blocks noted along crest.	Light scaling during Phase 13 rock works has removed precarious blocks.	N/A
Ch. 393	<p>2024 Inspection: A rock fall has occurred and there are numerous large and small blocks which have landed in the verge and roadside ditch. Source location approximately 15 m above road level at Ch. 396. The largest fallen block was 3.6 m from the edge of the tarmac and measured 1.3 x 1.1 x 0.7 m. Blocks behind this were 0.9 x 0.7 x 0.4 m; 0.6 x 0.45 x 0.35 m; 0.4 x 0.4 x 0.25 m; 0.75 x 0.45 x 0.3 m, plus c. 20no. blocks up to 0.3 m in size.</p> <p>Blocks also landed in the ditch 1.2 m from edge of tarmac. Largest block in ditch was 0.8 x 0.65 x 0.6 m. Plus 5 blocks up to 0.6 x 0.4 x 0.25 m in size. Approximately 2 to 3 m³ of blocks had fallen in total.</p> <p>Due to the verge now having numerous blocks contained within it, the risk for further rock falls is increased as other rocks could fall and hit the blocks sitting in the verge and potentially 'bounce' into the road. This could lead to a potential significant hazard.</p>	Urgent scaling works were undertaken to remove loose rock from source of rockfall in June 2024 and rock fall debris and scaled material was used to form a catch bund.	N/A
Ch. 398	2019 Inspection: Detached block c. 2 x 2 x 0.7 m. Open on left hand side and with a dilated back release joint. Keyed in on right hand side but difficult to see how well. Upper part of right-hand side has 70 mm dilated joint. Trajectory of block fall hard to predict so doweling may be required to protect road.	Detached block secured in place using cable restraints anchored to adjacent rock mass (Phase 13 remedial works).	N/A
Ch. 400	2019 Inspection: Overhanging block at crest with 10 to 50 cm wide dilated release joint.	No change noted during the 2025 inspection.	N/A

Hazards Observed:			
Ch. 402	2019 Inspection: Column of rock c. 4 to 8 m above road level. 1.5 m wide, 0.5 m deep. Potential for rock fall as unsupported but wide verge below likely to prevent debris reaching road.	No change noted during the 2025 inspection.	N/A
Ch. 407	2019 Inspection: Dilated crack to rear of lichen covered block 8 to 10 m above road level. Keyed in below.	Column secured with 8no. rock dowels (Phase 13 remedial works).	N/A

Other Comments
<p>No surface or groundwater flows.</p> <p>Rock slope set slightly back from road and appears to comprise natural crags rather than a man-made (blasted) rock slope. The slope is locally overhanging, and a cave feature is present at the northern end of the slope, possibly a former sea cave.</p> <p>Rock mass generally in good condition with tight fractures but occasionally noted to be very dilated suggesting historical movement. Ongoing ravelling of small blocks is evident, with several precarious blocks observed along the crest of the slope during previous inspections (removed during Phase 13 works). Localised potential for larger scale rock falls up to around 3 m³ observed (a rock fall of this scale occurred between the 2023 and 2024 inspections) however Phase 13 works have reduced potential for largest scale hazards to mobilise and wide verge with ditch and bund is likely to retain debris from smaller scale rock falls.</p> <p>Areas of concern identified during previous inspections have been addressed, with the verge cleared and debris used to create a bund; cables secured by anchors have been installed across the detached block at Ch. 398; and dowels have been installed to retain the column at Ch. 407 characterised by a dilated crack to the rear of the block. All remedial works elements appear to be in good condition, however, note 2025 rope access inspection observation regarding slack cables (Phase 13 rock works defect).</p>

RISK RATING		Comments
Hazard Rating =	3	Potential rock fall volumes up to 3 m ³ identified.
Pathway Rating =	2	Reduced from 4 to 2 following installation of the Phase 13 remedial works. Verge, bund, and ditch anticipated to prevent the majority of falling blocks from reaching the carriageway, while the installed dowels and cable restraints will minimise the potential for failure of the large potentially unstable blocks.
Receptor Rating =	1.2	Minimum sightline 60 m.
Risk Value =	7.2	Reduced from 14.4 to 7.2 following installation of the Phase 13 remedial works.
Risk Level =	Moderate	Reduced from Very High Risk level in 2024 based on the remedial works undertaken as part of the Phase 13 works.

Recommended Remedial Works / Actions		
Large Scale Rock Fall Protection Works (Category 3)	Localised Targeted Rock Fall Protection Works (Category 2)	Ongoing Maintenance (Category 1)
N/A	<ul style="list-style-type: none"> Correction of issues noted during the 2025 rope access inspection, including: 	<ul style="list-style-type: none"> Re-inspection by end of April 2026

Hazards Observed:							
			- Tightening of cables where slack.				
Assessed in field by:	MT//PLM/CR		Date:	28/04/2025	Reviewed by:	MT	Date: 03/06/2025



M5-1	Ch. 398 – Cable restraints with 4no. anchor points installed during Phase 13 works.	Year First Observed:	2025
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M5-2

Ch. 407 – 8no. rock dowels installed c. 8 to 11 m above slope toe during Phase 13 rock works.

Year First Observed:

2025

3.1.7 Slope Ref. M6

GEOTECHNICAL ASSESSMENT SHEET											
Site:	A890 Maman Hill	Slope Ref:	M6	Chainage:	415 – 460	Start Grid Ref:	NG 92445 39309	End Grid Ref:	NG 92450 39264	Elevation:	5 – 10 m AOD

Photo at Start Chainage (looking west)	Photo at End Chainage (looking east)
	

Rock Slope Characteristics:															
Dip (°):	80	Azimuth (°):	285	Height (m):	3 to 10	Length (m):	45	Vegetation Cover:	<15% vegetation cover – gorse, heater, and grass. Trees also present at crest.	Ditch Details:	No ditch	Roughness:	Smooth	Verge Width (m):	0.5 to 1.0

Engineering Description of Rock:
Strong psammite.

Rope Access Inspections:		
Year of Rope Access Inspection	Location	Purpose
N/A		

THC Monthly Inspection Observations:		
Date	Location	Comments
N/A		

Existing netting or other remedial work details:				
Year of Works	Description of Works	Comments	2025 Inspection Observations	Photo Reference
Unknown. Pre-dates AECOM's first involvement in the A890 Strome ferry Bypass in 2012.	Chain-link drape netting installed between Ch 415 to 435.	Corroded and locally damaged. Only effective for small scale ravelling type rock falls.	Completely corroded in places; drape netting considered to be ineffective due to the deteriorated condition of the netting. Holes present in the netting where blocks have fallen and burst through. Anchor points not known/inspected due to vegetation cover.	M6-1, M6-2

Hazards Observed:			
Location	Description of Hazard(s) from Previous Inspections	2025 Inspection Observations	Photo Reference
Throughout M6	2019 Inspection: Ongoing ravelling and root jacking, particularly along crest.	No change noted during the 2025 inspection.	M6-3, M6-4
Ch. 420	2019 Inspection: Potential toppling failure identified c. 6 m above road level. 0.5 to 1.0 m ³ . Dilated fractures.	No change noted during the 2025 inspection.	M6-5
Ch. 455	2022 Inspection: Fallen tree c. 3 m back from crest of slope. Tree has been cut (unsure when this was completed). Not posing risk to road.	No change noted during the 2025 inspection.	N/A
Ch. 455	2022 Inspection: Fresh surfaces at crest of slope indicating recent rock fall. Block not currently in ditch/verge so has been moved. Block anticipated to have been 0.3 x 0.2 m based upon fresh surface.	No change noted during the 2025 inspection.	N/A

Other Comments
<p>No surface or groundwater flows.</p> <p>Rock mass generally favourable with tight fractures but occasionally noted to be dilated where affected by blasting, weathering, and/or root jacking. Potential for kinematic failures is generally low, although localised toppling potential observed (up to 1 m³). Ongoing raveling and root jacking of small blocks from crest should also be anticipated.</p> <p>No ditch and only a narrow verge so there is potential for some small blocks to reach road.</p>

RISK RATING		Comments
Hazard Rating =	2	Potential rock fall volumes up to 1 m ³ identified.
Pathway Rating =	4	Increased from 3 to 4 following the 2025 annual inspection given that the chain link drape netting is considered to be completely ineffective at retaining rock fall debris. Debris from larger potential toppling failure at Ch. 420 may reach road.
Receptor Rating =	1.2	Minimum sightline 60 m.
Risk Value =	9.6	Increased from 7.2 to 9.6 due to the chain link drape netting being completely corroded and, thus, completely ineffective.
Risk Level =	Moderate	

Recommended Remedial Works / Actions					
Large Scale Rock Fall Protection Works (Category 3)		Localised Targeted Rock Fall Protection Works (Category 2)		Ongoing Maintenance (Category 1)	
<ul style="list-style-type: none"> Consider replacement of existing ineffective drape netting. 		N/A		<ul style="list-style-type: none"> Re-inspection by end of April 2026 Fell trees at crest of rock Scaling of loose rock 	
Assessed in field by:	MT//PLM/CR	Date:	28/04/2025	Reviewed by:	MT
		Date:		Date:	03/06/2025



<p>M6-1</p>	<p>Chain-link drape netting installed between Ch 415 to 435. Completely corroded in places; drape netting considered to be ineffective due to the deteriorated condition of the netting. Holes present in the netting where blocks have fallen and burst through. Anchor points not known/inspected.</p>	<p>Year First Observed:</p>	<p>2025</p>
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M6-2	Chain-link drape netting installed between Ch 415 to 435. Completely corroded in places; drape netting considered to be ineffective due to the deteriorated condition of the netting. Holes present in the netting where blocks have fallen and burst through. Anchor points not known/inspected.	Year First Observed:	2025
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M6-3	Ongoing ravelling and root jacking potential, particularly along crest.	Year First Observed:	2019
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M6-4	Ongoing ravelling and root jacking potential, particularly along crest.	Year First Observed:	2019
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M6-5	Ch. 420: Potential toppling failure identified c. 6 m above road level. 0.5 to 1.0 m ³ . Dilated fractures.	Year First Observed:	2019
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4. Discussion and Recommendations

The assessed risk levels associated with the rock slopes at Maman Hill are ranked from highest to lowest in Table 4-1. It is important to note that the risk ratings are relative and that a 'Low' risk level does not mean that a rock fall will not occur, but that it is considered that the likelihood and/or consequences of a rock fall is lower than at other locations.

Table 4-1. Relative Risk Level of Slopes

Risk Ranking	Slope Ref.	Hazard Rating	Pathway Rating	Receptor Rating	Risk Rating	Risk Level	Change in Risk Level
1	M6	2	4	1.2	9.6	Moderate	No change
	M4B ¹	3	2 ²	1.2	7.2 ²	Moderate ²	Reduced from Very High
	M5	3	2	1.2	7.2	Moderate	Reduced from Very High
2	M1	2	2	1.2	4.8	Low	No change
	M3	2	2	1.2	4.8	Low	No change
3	M4A ¹	1	2	1.2	2.4	Low	Reduced from Very High
4	M2	1	1	N/A	1.0	Low	No change

¹ – Slope M4 has been subdivided into Slopes M4A and M4B based on the remedial work undertaken between the 2024 and 2025 inspections.

² – Following the remediation of the defects noted with regards to the Phase 13 rock fall mitigation works completed in 2024/2025, understood to be programmed for mid-June 2025, the Pathway Rating could be reduced to 1 and, therefore, the Risk Rating would be reduced to 3.6 and the Risk Level to Low.

The inspection and assessment of the rock slopes at Maman Hill in April 2025 considered the installation of the Phase 13 remedial measures at slopes M4 and M5, which were undertaken to address the potential rock fall hazards identified during previous years' inspections. As remedial works were only undertaken on part of slope M4, the slope has been subdivided into slopes M4A, where no measures were installed, and slope M4B, where a rock fall netting system was installed. The potential for rock falls within the M4 and M5 slope sections is now assessed to be significantly lower than during the 2024 inspection and both sections have been assigned to the 'Moderate' risk level category (reduced from 'Very High'). Small-scale raveling-type failures should be anticipated along both slope sections as the rock mass continues to degrade through weathering, root action, etc.; however, the potential for large-scale failures and the likelihood of debris reaching the road is significantly reduced by the remedial measures installed. The newly 'created' slope section M4A has been assigned to the 'Low' risk category.

During the rope access inspections at slopes M4 and M5, and inspection of the recently installed Phase 13 works, a number of defects / snagging issues were identified. The identified issues included loose and missing wire rope grips, frayed and slack cables, and corroding bar ends. Defects have been reported to the THC Phase 13 Rock Works Project Manager. Although the system offers significant risk reduction in its current form, it will not be performing as designed until the defects have been rectified. Corrective works should be undertaken by the contractor as soon as practicable; at the time of writing, these works are programmed for mid-June 2025. Upon completion of these works, it is expected that the Pathway Rating at slope M4B specifically would be reduced to 1, which would equate to a Risk Rating of 3.6 and a 'Low' Risk Level.

Numerous slope sections were observed to be heavily vegetated during the 2025 inspection, with a 'false spring' having led to vegetation growth and leaf cover being higher than would typically be observed in late April. This locally obscured a significant proportion of the rock face and remedial installations from inspection. As well as reducing the efficacy of the inspection, the vegetation growth increases potential for rock falls associated with root jacking.

Although a form of drap netting is in place over slopes M1 and M6 of Maman Hill, it comprises highly (locally completely) corroded and damaged chain-link netting hung over the face, often with no connection between individual panels. i.e., it is not a product designed for rock fall control. It is not known when the netting was installed but based on the materials used it is likely to have been in place for at least 30 years. Although the netting may control the trajectory of very small blocks (up to cobble size) the chain-link netting does not offer sufficient risk reduction to the road from larger blocks.

Given the identified level of risk associated with the slopes at Maman Hill it is recommended that the risk management approach similar to that in place for the slopes between Ardnarff and Attadale be continued. This comprises:

Regular inspections by THC:

THC staff familiar with the site should undertake regular inspections of the rock slopes with the aim of identifying any rock falls / increased risk to the road. Elsewhere along the Stromeferry Bypass (between Ardnarff and Attadale) these inspections involve driving through the site each weekday morning and walking through the site on a monthly basis. Identified issues should be reported internally within THC and advice sought from a suitably qualified and experienced Engineering Geologist / Geotechnical Engineer where appropriate.

Annual inspection by suitably qualified and experienced Engineering Geologists / Geotechnical Engineers:

This should involve the roadside inspection of all slopes and targeted rope access inspections of selected higher risk slopes, particularly where potential hazards have been identified during previous inspections. The next inspection should be carried out in the Spring of 2026, when vegetation cover is at a minimum and rope access inspections are feasible.

Targeted remedial works at the highest risk slopes:

It is recognised that THC has a limited budget for remedial works and to achieve the maximum level of risk reduction; it is recommended that works are prioritised to address the highest risk rock faces and hazards in the first instance. AECOM is in regular discussions with THC in relation to the budget and timing of planned remedial works along the A890 such that an appropriate scope of remedial work can be selected.

Appendix A – Site Location Plan



SITE LOCATION



PROJECT
 A890 MAMAN HILL
 ROCK SLOPE INSPECTIONS
 CLIENT
 THE HIGHLAND COUNCIL

KEY:
 Approximate Site Boundary

PROJECT NUMBER
 60685712

SHEET TITLE
 Site Location Plan

SHEET NUMBER
 1 of 1

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Appendix B – Slope Location Plan



Imagery © Microsoft Bing Maps, 2019.

Client:	The Highland Council	Project:	A890 Maman Hill Rock Slope Inspections		Title:	Rock Slope Extents	
	AECOM Ltd. 2nd Floor, 177 Bothwell Street Glasgow G2 7ER	Drawn:	MT	Revision:	0	Figure No.:	2
		Designed:	MT				
		Checked:	PLM	Job Number:	60685712	Scale:	NOT TO SCALE
		Approved:	PLM				

