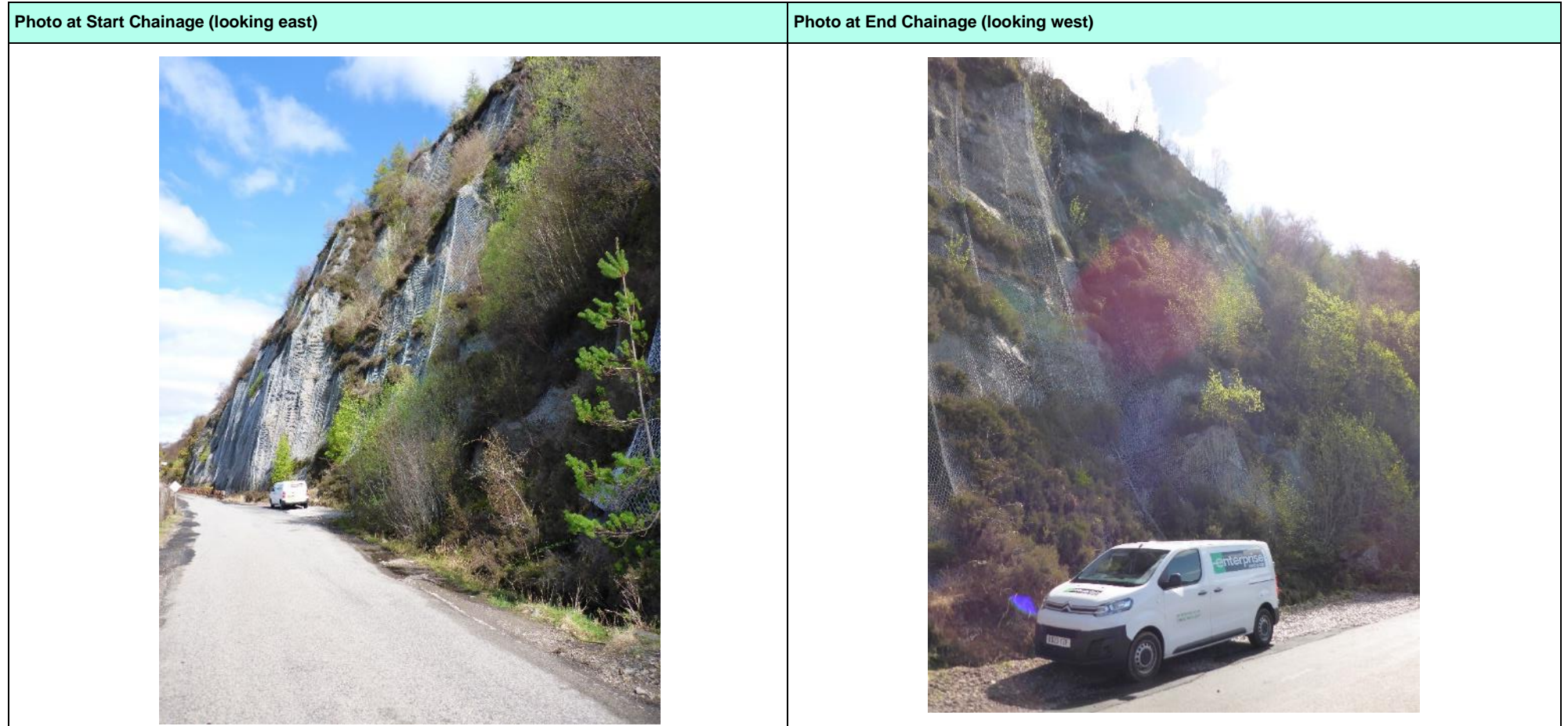


**5.2.36 Slope Ref. AA22A**

GEOTECHNICAL ASSESSMENT SHEET											
<b>Site:</b>	A890 Stromeferry Bypass	<b>Slope Ref:</b>	AA22A	<b>Chainage:</b>	3386- 3415	<b>Start Grid Ref:</b>	NG 91451 37842	<b>End Grid Ref:</b>	NG 91483 37882	<b>Elevation:</b>	17m AOD



Rock Slope Characteristics:															
Dip (°):	75-80	Azimuth (°):	310	Height (m):	30	Length (m):	29	Vegetation Cover:	Up to c.60% cover comprising heather and saplings.	Ditch Details:	Width 1.0m Depth 0.3m	Roughness:	Rough	Verge Width (m):	1

Engineering Description of Rock:
Very strong thinly to thickly foliated dark grey GNEISS with thin pink and white quartz bands.

Rope Access Inspections:		
Year of Rope Access Inspection	Location	Purpose
2017	Ch. 3390	To inspect overhanging blocks at crest. Findings - Rock mass noted to be particularly blast damaged (~8m wide, 1m deep, and 2-3m high) with large gap between mesh and rock slope. Recommendations - Installation of 8 No. 5m long dowels recommended.

THC Monthly Reports:			
Date	Location	Comments	Photo Reference
N/A			

Existing Netting Details or other remedial work details:			
Year of Works	Description of Works	Comments	2024 Inspection Observations
Before AECOM involvement (i.e. pre 2012)	Netting installed	Details of netting system include: <ul style="list-style-type: none"> <li>- PVC coated double twist</li> <li>- Top cable 12mm galvanised</li> <li>- c.5.5-10m anchor spacing and 25mm(?) stainless bars and occasional old 18mm machine threaded bars</li> <li>- Cable-anchor connection: stainless steel eye nuts (bar machined to M20 thread)</li> <li>- 3 cable clamps</li> <li>- Netting lap connections using 2 rows of cable twists every fourth aperture</li> <li>- No anchor laps</li> <li>- Vertical Reinforcing: 8mm cable at 1m spacing (3 cable clamps) in some areas</li> </ul>	No significant changes to netting observed in 2024.

Existing Netting Details or other remedial work details:			
Year of Works	Description of Works	Comments	2024 Inspection Observations
		Note: Western terminal anchor loose  <b>2016 Inspection:</b> Bottom anchors at a spacing of 10m. Bottom cable locally corroded (associated with water flow).	
2015 – Phase 8 works	Areas were de-vegetated. 11No. dowels were installed.		
2021 – Phase 12 works	Ditch/bund between Ch.3385 to 3425 has been cleared and reinstated.		No change – ditch remains effective in 2024 inspection.

Hazards Observed:			
Location	Description of Hazard (s) from Previous Inspections	2024 Inspection Observations	Photo Reference
Ch. 3388	<b>2019 Inspection:</b> A 0.3m x 0.3m x 0.1m block retained at base of netting 1.5m above road level.	No changes observed during 2024 inspection.	AA22A-1
Ch. 3390	<b>2016 Inspection:</b> Overhanging blocks noted within blast damaged area at crest (~8m wide, 1m deep, and 2-3m high). Large gap between mesh and rock slope at this location.	No changes observed during 2024 inspection.	
Across section	<b>2021 Inspection:</b> Vegetation obscuring large proportions of rock face and potential increasing failure potential through root jacking	No changes observed during 2024 inspection.	

RISK RATING		Comments
Overall Hazard Rating =	3	
Pathway Rating =	2	
Receptor Rating =	1	
Risk Value =	<b>6</b>	
Risk Level =	<b>Moderate</b>	

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	- Ch.3390- Install 8 No 5m dowels to secure overhanging blocks at crest.	- De-vegetation / coppicing (approx. 50% cover) and inspection of previously obscured rock mass. - Install additional bottom anchors.
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<b>Assessed in field by:</b>	MT/SB	<b>Date:</b>	17/04/2024	<b>Reviewed by:</b>	PLM	<b>Date:</b>	19/07/24
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Photograph: AA22A-1

Ch. 3388 - A 0.3m x 0.3m x 0.1m block retained at base of netting 1.5m above road level.

Year observation first noted: 2019

**5.2.37 Slope Ref. AA22B**

GEOTECHNICAL ASSESSMENT SHEET											
<b>Site:</b>	A890 Stromeferry Bypass	<b>Slope Ref:</b>	AA22B	<b>Chainage:</b>	3415- 3592	<b>Start Grid Ref:</b>	NG 91483 37882	<b>End Grid Ref:</b>	NG 91561 38016	<b>Elevation:</b>	11m AOD

Photo at Start Chainage (looking east)	Photo at End Chainage (looking west)
	
<b>Rock Slope Characteristics:</b>	

Dip (°): 85	Azimuth (°): 296	Height (m): 20	Length (m): 177	Vegetation Cover: 20% on main cutting face; 60% on upper third of slope. Comprising of heather and saplings.	Ditch Details: None but Armco barrier creates rock trap.	Roughness: Rough	Verge Width (m): Ch. 3415-3445 1.5m verge. 1m verge from 3445 (start of Armco)
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**Engineering Description of Rock:**

Extremely strong dark grey and white irregular narrow banding crystalline coarse grained GNEISS. Particularly massive along this section of road.

**Rope Access Inspections:**

Year of Rope Access Inspection	Location	Purpose	Photo Reference
2017 (and again in 2019)	Ch. 3465	To inspect overhang c. 7m above road level. Findings - overhanging rock mass ~7m above road with dilated fractures at rear with releasing block beneath overhang. Fractured rock mass is approximately 5m high, 5m wide with 1.8m overhanging from rock slope. Recommendations - Heavy scaling recommended (and completed in 2019)	
2017 (and again in 2019)	Ch. 3475	To inspect overhang c. 15m above road level. Findings - old chain link is present across slope and often burst with reinforcing (Maccaferri) mesh over chain link. Although rock mass is fractured, there are no obvious dilated joints.	
2017	Ch. 3500	To inspect column of blast damaged rock c.2.8m above road level. Findings - rock mass is fractured with visible dilated release joint visible at rear on the west side (~4m high, 3.5m wide, overhanging of 1.2m). Recommendations - Scaling is recommended. (TECCO netting installed in 2019 remediating risk)	
2017	Ch. 3510	To inspect large recess behind netting c.10-15 above road level. Findings - upper 8m of rock slope is highly fractured and overhanging. There is a large gap between netting and rock face at this location, which would allow falling blocks to gain energy and potentially burst through existing drape netting. Recommendations - It is recommended existing inadequate drape netting be removed over an 8m width. Scaling of upper 8m of slope required prior to installation of active netting system (e.g. Tecco), which should continue over lower half of rock face as a high strength drape. (Remedial works completed in 2019)	
2023	Ch. 3530	To inspect possible rotated block and overhang at crest.	

Rope Access Inspections:			
Year of Rope Access Inspection	Location	Purpose	Photo Reference
		Findings - The possible rotated block is in-situ. 1m deep x 0.3m wide x 1m high – protrudes at 45° to right. Gape in mesh. No sign of dilated fractures. Has not rotated out/hasn't moved. It is not considered a significant hazard. The overhang at crest has a slight dilated fracture but it is not fresh/new.	

THC Monthly Reports:			
Date	Location	Comments	Photo Reference
November 2020	Ch. 3530 - 5m NW of end of road barrier	Possible rotated block from overhang at crest behind mesh - not posing significant risk but recommend rope access inspection to confirm if loose or in situ. (Rope access completed in 2023)	

Existing Netting Details or other remedial work details:			
Year of Works	Description of Works	Comments	2024 Inspection Observations
Before AECOM involvement (i.e. pre 2012)	Netting system between Ch. 2415 to 3542	<p>Details of netting system include:</p> <ul style="list-style-type: none"> <li>- PVC coated double twist</li> <li>- Top cable 8 mm galvanised, later reinforced with a 12mm galvanised cable connected with cable clamps every 1 – 2m</li> <li>- c.5.5m anchor spacing and 25mm(?) stainless bars and occasional old 18mm machine threaded bars</li> <li>- Cable-anchor connection: stainless eye nuts (bar machined to M20 thread)</li> <li>- 3 cable clamps</li> <li>- Netting lap connections using 2 rows of cable twists every fourth aperture</li> <li>- No anchor laps</li> <li>- Vertical Reinforcing: 8mm cable at 1m spacing (3 cable clamps) in some areas</li> </ul> <p>Netting systems noted to be in poor condition: PVC coating cracked and brittle; limited number of bottom anchors; reinforcing cables slack, poorly attached and with corroded clamps; bottom cable corroded.</p>	No significant changes to netting observed during 2024 inspection.



Existing Netting Details or other remedial work details:			
Year of Works	Description of Works	Comments	2024 Inspection Observations
Before AECOM involvement (i.e. pre 2012)	Netting system between Ch. 3543 to 3497 and Ch. 3515 to 3567	<p>Details of netting system include:</p> <ul style="list-style-type: none"> <li>- PVC coated double twist</li> <li>- Top cable 12 mm galvanised</li> <li>- c.8m anchor spacing and 18mm machined threaded bars</li> <li>- Cable-anchor connection: D shackle (connected with locking nuts on one side only)</li> <li>- 2 cable clamps</li> <li>- Netting lap connections using 2 rows of cable twists every fourth aperture</li> <li>- No anchor laps or vertical reinforcing</li> </ul> <p>Netting systems noted to be in poor condition: PVC coating cracked and brittle; limited number of bottom anchors; reinforcing cables slack, poorly attached and with corroded clamps; bottom cable corroded.</p>	No significant changes to netting observed during 2024 inspection.
2013 – Phase 7 works	Heavy scaling of overhang at Ch. 3425		
2019 – Phase 11 works	<ul style="list-style-type: none"> <li>- Heavy scaling of overhanging rock mass at Ch. 3465</li> <li>- Replacement of Maccaferri drape netting with active TECCO netting system between Ch. 3497 to 3515.</li> </ul>	<ul style="list-style-type: none"> <li>- Overhang at Ch. 3465 was significantly reduced during heavy scaling works. Although a small overhang remains c.5m above road level, the presence of a rock trap below means the residual risk to the road is low.</li> </ul> <p><b>2022 Inspection:</b> Cut end bars as part of the TECCO netting system are corroded.</p>	No significant changes to netting observed during 2024 inspection.

Hazards Observed:			
Location	Description of Hazard (s) from Previous Inspections	2024 Inspection Observations	Photo Reference
Ch. 3425	<b>2021 Inspection:</b> Failure in 2021 originating c.6m above road level where blocks (c.0.25m <sup>3</sup> ) have slid along a steep release plane and have come to rest at toe of slope behind netting. Water seepage in the area gives potential for further rock fall. It is likely that this would be a volume of c.0.4m <sup>3</sup> and a maximum block size of c.0.3m x 0.3m x 0.3m. Any future failure likely to be within the design capacity of netting but accumulation of further debris at toe of slope should be monitored.	Location of previous rock fall re-inspected. Continuous water seepage but no additional rock fall observed behind netting. No other	AA22B-1

Hazards Observed:			
Location	Description of Hazard (s) from Previous Inspections	2024 Inspection Observations	Photo Reference
		changes observed during 2024 inspection.	
Ch.3434	N/A	Several small blocks behind toe of netting. Appear to originate from ca. 8m upslope. There is water seepage present along steeply inclined planes. Netting sits 2m away from rock slope. There is a ditch present with a small bund to road. Debris unlikely to reach road.	AA22B-2
Ch. 3454	<b>2022 Inspection:</b> Block (c.0.3m x 0.2mx 0.2m) positioned approx. 2m above ground level is being held by netting. Has fallen 5m to current position.	No changes observed during 2024 inspection.	
Ch. 3475	<b>2021 Inspection:</b> Minor rock fall with small blocks at base of netting system. Largest block c.0.4m x 0.1m x 0.1m. Seems to have originated from righthand-side base of previously observed overhang. No damage to netting. Fractured rock with dilated joints apparent along base of overhang indicating potential for further failures in this area. At this location there is a 2m wide ditch behind Armco barrier which is likely to act as an effective rock trap. Risk to road from this hazard is therefore considered to be low to moderate but should be kept under observation during future inspections.	No changes observed during 2024 inspection.	
Ch. 3483	N/A	Two blocks retained behind netting, along with numerous small blocks. Dimensions up to 0.5x0.5x0.5m. No significant damage to netting but there is a minor distortion 2m above the toe of the slope. Source of rock fall not immediately obvious and greater than 8m above the toe of the slope. There is a ditch present with a small bund to road. Debris unlikely to reach road.	AA22B-3
Ch. 3485	<b>2021 Inspection:</b> 3 to 4 cobble sized blocks sitting on ledge behind netting c.7m above road level. No damage to netting observed. Source likely to be overhanging blocks near crest.	No changes observed during 2024 inspection.	

RISK RATING		Comments
Overall Hazard Rating =	3	
Pathway Rating =	2	
Receptor Rating =	1	
Risk Value =	<b>6</b>	Re-assessed following completion of Phase 11 works and risk level reduced from high.
Risk Level =	<b>Moderate</b>	

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"> <li>- Replace corroded bottom anchors and install additional anchors to achieve maximum spacing of 5m.</li> <li>- Replace bottom cable between Ch. 3462 and 3500.</li> <li>- Replace corroded cable clamps on lateral and vertical reinforcing cables. Re-tension and install additional spenax rings.</li> <li>- Apply anti-corrosion paint on cut end bars as part of the TECCO netting system to prevent further corrosion.</li> </ul>

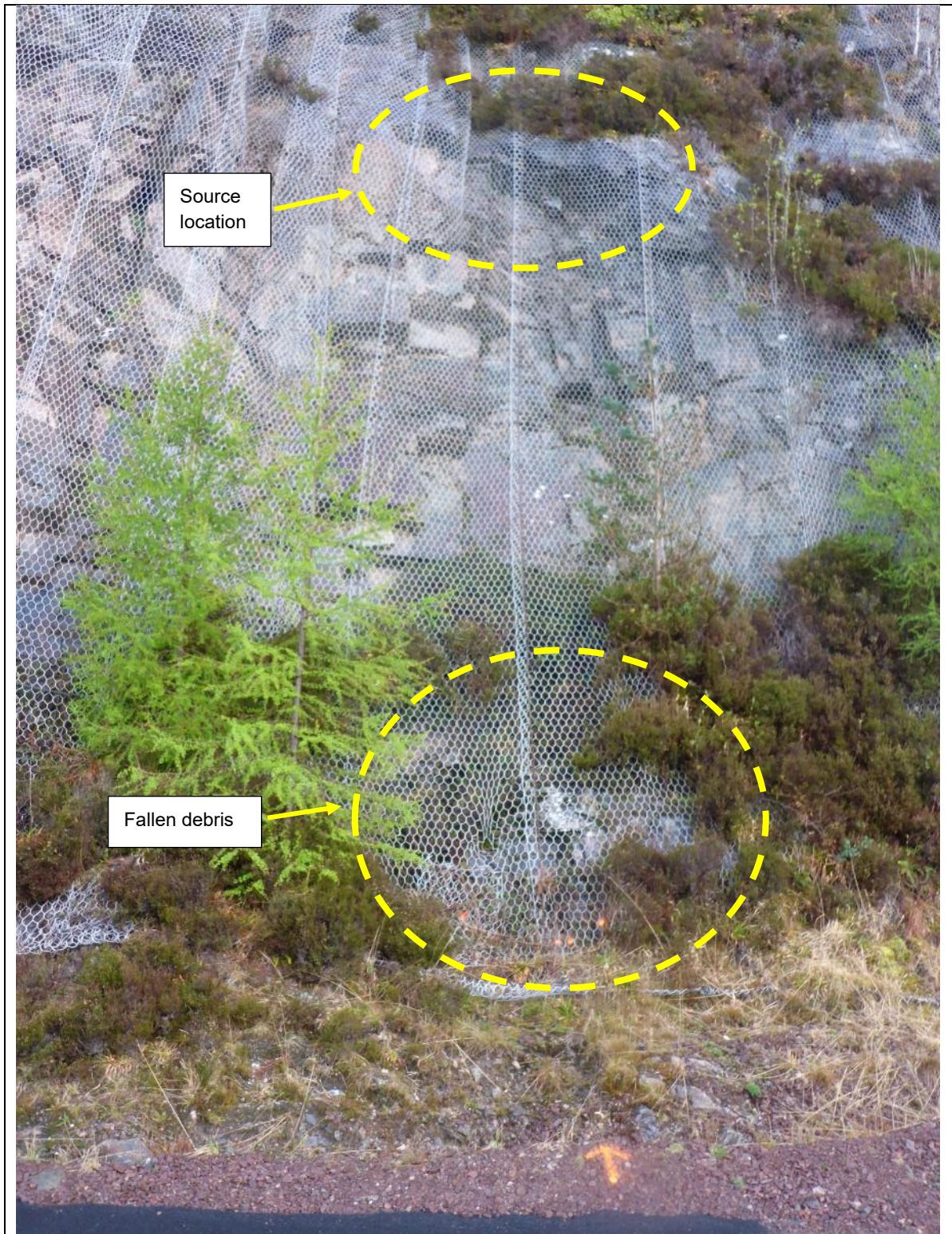
<b>Assessed in field by:</b>	MT/SB	<b>Date:</b>	17/04/2024	<b>Reviewed by:</b>	PLM	<b>Date:</b>	19/07/24
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Photograph:  
AA22B-1

Ch. 3425 - rock fall in 2021 originated c.6m above road level where blocks (c.0.25m<sup>3</sup>) have slid along a steep release plane and have come to rest at toe of slope behind netting. Source area circled.

Year observation first noted: 2021



Photograph:  
AA22B-2

Ch. 3434 – Several small blocks behind toe of netting.  
Appear to originate from overhang ca. 8m upslope.

Year observation first  
noted: 2024



Photograph:  
AA22B-3

Ch. 3480 – Two blocks retained behind netting with numerous small blocks also present.

Year observation first noted: 2024

**5.2.38 Slope Ref. AA23N**

GEOTECHNICAL ASSESSMENT SHEET											
<b>Site:</b>	A890 Stromeferry Bypass	<b>Slope Ref:</b>	AA23N	<b>Chainage:</b>	3640- 3690	<b>Start Grid Ref:</b>	NG 91589 38050	<b>End Grid Ref:</b>	NG 91626 38084	<b>Elevation:</b>	26m AOD

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

Rock Slope Characteristics:															
Dip	60	Azimuth	230	Height	6	Length	50	Vegetation	c.60% cover:	Ditch	1m wide,	Roughness:	Rough	Verge Width	0.5
(°):		(°):		(m):		(m):		Cover:	predominantly gorse	Details:	0.2m deep			(m):	

Engineering Description of Rock:
Very strong very thinly banded grey and white GNEISS.

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

THC Monthly Reports:			
Date	Location	Comments	Photo Reference
N/A			

Existing Netting Details or other remedial work details:			
Year of Works	Description of Works	Comments	2024 Inspection Observations
N/A			

Hazards Observed:			
Location	Description of Hazard (s) from Previous Inspections	2024 Inspection Observations	Photo Reference
Northern end of slope	<b>2017 Inspection:</b> Localised root jacking, however, small blocks will be retained by ditch.	No changes observed during 2024 inspection.	
Ch. 3669	<b>2022 Inspection:</b> Block fall c.0.4m x 0.4m x 0.3m has landed in the ditch. Block originated c.2m up rock slope.	No changes observed during 2024 inspection.	

RISK RATING		Comments
Overall Hazard Rating =	1	
Pathway Rating =	2	
Receptor Rating =	1.2	
Risk Value =	<b>2.4</b>	
Risk Level =	<b>Low</b>	



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	N/A

<b>Assessed in field by:</b>	MT/SB	<b>Date:</b>	17/04/2024	<b>Reviewed by:</b>	PLM	<b>Date:</b>	19/07/24
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**5.2.39 Slope Ref. AA23S**

GEOTECHNICAL ASSESSMENT SHEET											
Site:	A890 Stromeferry Bypass	Slope Ref:	AA23S	Chainage:	3630- 3708	Start Grid Ref:	NG 91586 38039	End Grid Ref:	NG 91643 38087	Elevation:	25m AOD



Rock Slope Characteristics:															
Dip (°):	70	Azimuth (°):	324	Height (m):	8	Length (m):	78	Vegetation Cover:	30-40% cover. Grass, gorse, saplings.	Ditch Details:	From Ch.3660:	Roughness:	Rough	Verge Width (m):	1

					Width 1.0m Depth 0.5m		
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**Engineering Description of Rock:**

Extremely strong very thinly banded grey and white GNEISS.

**Rope Access Inspections:**

Year of Rope Access Inspection	Location	Purpose
N/A		

**THC Monthly Reports:**

Date	Location	Comments	Photo Reference
N/A			

**Existing Netting Details or other remedial work details:**

Year of Works	Description of Works	Comments	2024 Inspection Observations
2021 – Phase 12 works	Debris cleared from ditch at Ch. 3691 and between Ch. 3630 to 3650.	During the Phase 12 works in late 2021, a rock fall occurred which on impacting the ditch fragmented into small blocks at Ch 3671. Block originated c.7m above toe of slope. Volume of material c.0.25m <sup>3</sup> . Material was cleared out from ditch during the Phase 12 works	No change – ditch remains effective.

**Hazards Observed:**

Location	Description of Hazard (s) from Previous Inspections	2024 Inspection Observations	Photo Reference
Ch. 3655 to 3672	<b>2016 Inspection:</b> Potential for small blocks (max 0.05m <sup>3</sup> ) to fail due to ravelling and root jacking. The verge here is flat and approx. 1.5m wide and should retain most blocks but some may reach road. There is no ditch here and no scope for adding one - buried drainage pipe and on corner (evidence of vehicles using verge). Placing some form of fence/barrier here would prevent debris reaching road. If this is not possible then passive rock fall netting will be required.	No changes observed during 2024 inspection.	AA23S-1
Ch. 3680	<b>2019 Inspection:</b> Boulders and cobbles weathering out of exposed soil slope and landing in ditch below.	No changes observed during 2024 inspection.	

Ch. 3681	N/A	Small block landed in ditch. No significant risk.	
Ch. 3697	N/A	Ditch is filled with debris over a 3m wide area. Not recent falls. This area would benefit from a clearance.	AA23S-2
Whole section	<b>2016 Inspection:</b> Presence of trees immediately above rock face may lead to root jacking / failures associated with uprooted trees.	No changes observed during 2024 inspection.	

RISK RATING		Comments
Overall Hazard Rating =	2	
Pathway Rating =	3	
Receptor Rating =	1.2	
Risk Value =	<b>7.2</b>	
Risk Level =	<b>Moderate</b>	

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"> <li>- Install fence/barriers on verge between Ch. 3665 to 3687 (e.g. concrete barriers currently stored at end of AA22B). If this is not feasible then install passive rock fall netting.</li> </ul>	<ul style="list-style-type: none"> <li>- De-vegetate and light scale rock face.</li> <li>- Coppice trees within 5m of crest of rock face.</li> <li>- Build-up of debris in ditch should be monitored and clearance works undertaken as required to maintain its capacity.</li> </ul>

Assessed in field by:	MT/JG	Date:	19/04/2023	Reviewed by:	PLM	Date:	19/07/24
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Photograph: AA23B-1

Between Ch. 3655 to 3672 – Potential for small blocks to fall due to ravelling and root jacking.

Year observation first noted: 2016



Photograph: AA23B-2

Ch. 3697 – ditch is filled with debris. Would benefit from clearance.

Year observation first noted: 2024

**5.2.40 Slope Ref. AA24**

GEOTECHNICAL ASSESSMENT SHEET											
<b>Site:</b>	A890 Stromeferry Bypass	<b>Slope Ref:</b>	AA24	<b>Chainage:</b>	3708- 3892	<b>Start Grid Ref:</b>	NG 91643 38087	<b>End Grid Ref:</b>	NG 91807 38166	<b>Elevation:</b>	32m AOD

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

**Rock Slope Characteristics:**

Dip (°): 80	Azimuth (°): 340	Height (m): 12	Length (m): 184	Vegetation Cover: 30% cover over highest rock slope, increasing to 80% cover towards N of section. Generally comprised grass, ferns and gorse.	Ditch Details: Typical width 0.5m, depth 0.3m From Ch.3790 2m wide, 0.6m deep.	Roughness: Rough	Verge Width (m): Typically 0.5m. From Ch.3790 1.5m
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**Engineering Description of Rock:**  
 Very strong very thinly banded grey and white GNEISS with occasional quartz foliation.

Rope Access Inspections:		
Year of Rope Access Inspection	Location	Purpose
2017	Ch. 3747 to 3755	To inspect rock mass at crest of slope (above Maccaferri netting). Findings - Rock mass is not considered to pose a risk to the road at this time but should remain under observation during future inspections.
2021	Ch. 3740	To inspect area around source location of the large block failure observed by THC in 2020. Findings - the block originated from the crest of the slope ca. 10m above road level, with evidence of root growth along the failure plane. The failure has left a small soil overhang at the crest, and a few small loose blocks may fall down behind the netting. However, overall there is no significant hazard.
2024	Ch. 3745	To inspect area of rock fall which has occurred and been caught by the netting. Netting is now under tension. Light scaling is recommended to take place

THC Monthly Reports:			
Date	Location	Comments	Photo Reference
October 2020	Ch. 3740	Large rock has fallen down behind netting and come to rest in verge. First observed 08/10/20. Small puncture in netting ca. 5m above road and tear in netting at toe. Source not obvious.	



Existing Netting Details or other remedial work details:				
Year of Works	Description of Works	Comments	2024 Inspection Observations	Photo Reference
Before AECOM involvement (i.e. pre 2012)	Netting (only present across highest area of the rock slope between Ch. 3720 to 3760)	<p>Details of netting system include:</p> <ul style="list-style-type: none"> <li>- PVC coated double twist</li> <li>- Top cable 8mm galvanised</li> <li>- c.5m anchor spacing and 18mm machine threaded bars (top anchors visibly corroded)</li> <li>- Cable-anchor connection: D shackle (connected on one side only)</li> <li>- 3 cable clamps</li> <li>- Netting lap connections using cable twists</li> <li>- No laps on anchors or vertical reinforcing</li> </ul> <p><b>2021 Inspection:</b> At Ch. 3730 - Three dowels numbered D07, D08 and D09 (dated 2002) located close to crest are supporting rock mass in front of clay filled / weathered rock joint (blast fracture). Not a significant hazard due to existing remedial measures.</p> <p>The top cable diameter is c.8mm; corrosion visible on top anchors; mesh secure with cable ties.</p>	<p>PVC coating is cracking and exposed wire is locally corroded.</p> <p>Maccaferri netting eastern terminal anchor and top rope is in good condition, no visible corrosion.</p> <p>Top cable has visible localised corrosion, but no fraying is noticeable.</p>	AA24-1
2015 – Phase 8 works	<ul style="list-style-type: none"> <li>- Netting panels re-connected with spenax rings</li> <li>- New top cable and anchors installed to pre-existing netting</li> </ul>			

Hazards Observed:			
Location	Description of Hazard (s) from Previous Inspections	2024 Inspection Observations	Photo Reference
Ch.3740 to 3745	<b>2021 Inspection:</b> Several blocks with dilated fractures and / or root jacking potential have been identified that are likely to fail in the future but should be contained by the Maccaferri netting.	No changes observed during 2024 inspection.	AA24-2
Ch. 3745	N/A	A rock fall has occurred which has been caught by the netting. Netting is now under tension but there is no damage to netting. Debris dimensions are 2x0.7x0.7m. The source of the rock fall is c. 5-6m above the toe of the slope from the base and side of	AA24-3

Hazards Observed:			
Location	Description of Hazard (s) from Previous Inspections	2024 Inspection Observations	Photo Reference
		an overhang. Recommend for light scaling to take place at the source and for the debris to be cleared.	
Ch. 3745 to 3755	N/A	The Maccaferri netting does not extend to the crest of the slope but stops at a small ledge c. 3-4m down from the crest. Rock exposures above netting inspected and no concerns over stability.	AA24-4
Ch. 3748	<b>2021 Inspection:</b> Small accumulation of debris at toe of slope behind netting c.1m x 0.4m x 0.2m. Source c.4m above toe. Material not loading net. Keep under observation.	No changes observed during 2024 inspection.	
Ch. 3762 to 3800	<b>2016 Inspection:</b> Trees at crest of slope could cause block fall associated with root jacking/ uprooted trees.	No changes observed during 2024 inspection.	
Ch. 3783 to 3792	<b>2016 Inspection:</b> Exposed soil slope 4m above road level with boulders in back scar of previous failure which could weather out and reach road. Slumping is also noted upslope from back scar.	No changes observed during 2024 inspection.	AA24-5
Ch. 3783 to 3892	<b>2017 Inspection:</b> Potential for ravelling of small blocks, however, ditch below sufficiently wide/deep to retain.	No changes observed during 2024 inspection.	
Ch. 3790	<b>2017 Inspection:</b> Broken rock at crest of slope. Likely to be caught by ditch but should remain under inspection.	No changes observed during 2024 inspection.	AA24-6
Ch. 3810	<b>2019 Inspection:</b> 0.4m x 0.3m x 0.2m block in ditch. Source not obvious but recent (no paint).	Not seen in 2024 inspection.	
Ch. 3870	<b>2017 Inspection:</b> Potential planar failure 3m above road. Small tabular blocks likely to be contained by ditch below.  <b>2023 Inspection:</b> A new block has landed in the ditch, confirming this ongoing planar failure mechanism.	No changes observed during 2024 inspection.	
Ch. 3892	N/A	Phone number on the sign by the road closure gates is starting to weather off.	AA24-7

RISK RATING		Comments
Overall Hazard Rating =	3	
Pathway Rating =	2	

Receptor Rating =	1.2	
Risk Value =	7.2	
Risk Level =	<b>Moderate</b>	

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"> <li>Ch.3783 - 3790: Re-profile vertical soil slope and install erosion control matting.</li> </ul>	<ul style="list-style-type: none"> <li>Coppice trees within 5m of crest of rock face between Ch. 3762 and 3800.</li> <li>Build-up of debris in ditch should be monitored and clearance works undertaken as required to maintain its capacity.</li> <li>At Ch. 3745 light scaling and debris clearance from rock fall recorded in 2024 inspection.</li> <li>Ch. 3892 - consider replacing the sign with phone number to call in case of a rock fall before it becomes illegible.</li> </ul>

<b>Assessed in field by:</b>	MT/SB	<b>Date:</b>	17/04/2024	<b>Reviewed by:</b>	PLM	<b>Date:</b>	19/07/24
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Photograph: AA24-1

Ch. 3429 Top cable has visible localised corrosion but no fraying is noticeable.

Year observation first noted: 2024



Photograph:  
AA24-2

Between 3740 to 3745 - Several blocks with dilated fractures and / or root jacking potential have been identified that are likely to fail in the future but should be contained by the Maccaferri netting.

Year observation first  
noted: 2021



<p>Photograph: AA24-3</p>	<p>Ch. 3745 - A rock fall has occurred which has been caught by the netting.</p>	<p>Year observation first noted: 2024</p>
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Photograph: AA24-4

Between Ch. 3745 to 3755 - The Maccaferri netting does not extend to the crest of the slope but stops at a small ledge c. 3-4m down from the crest.

Year observation first noted: 2024



Photograph: AA24-5

Between Ch. 3783 to 3792 - Exposed soil slope 4m above road level with boulders in back scar of previous failure which could weather out and reach road.

Year observation first noted: 2016





Photograph: AA24-6	Ch. 3790 – Broken rock at crest of slope.	Year observation first noted: 2016
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Photograph: AA24-7

Ch. 3892 - Phone number on the sign by the road closure gates is starting to weather off.

Year observation first noted: 2024

### 5.3 Summary of Findings: Risk Ratings

The relative rock fall risk associated with each of the slopes is summarised in Table 5-1 below, ranked from highest to lowest risk. It is important to note that the risk ratings are relative and that a risk of 'low' 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.

The 2024 inspection did not identify any hazards or features considered to pose an immediate risk of rock fall affecting the operation of the road nor did it identify any hazards or features considered to pose an immediate risk of failure affecting the operation of the road. However, the need for urgent maintenance works was identified at several locations. The scope of these works is discussed further in 6.2.2.

**Table 5-1: Relative Risk Level of Slopes**

Risk Ranking	Slope Ref.	Risk Rating	Relative Risk Level	Changes to 2023 Risk Rating
1	AA19 Upper	12.0*	Very High	None
2	AA2A	14.4	High	None
3	AA14 East	12.6	High	None
4	AA5	12.0	High	None
5	AA13 / 14 Upper	10.8	High	Not inspected in 2023 and 2024 other than review of drone survey imagery. Risk rating as per 2022 inspection.
	AA15 Upper	10.8	High	Not inspected in 2023 and 2024 other than review of drone survey imagery. Risk rating as per 2022 inspection.
	AA16-17-18 Upper	10.8	High	Not inspected in 2024 other than review of drone survey imagery. Risk rating as per 2023 inspection.
6	AA4	9.0	Moderate	None
	AA4 Upper	9.0	Moderate	None.
	AA10	9.0	Moderate	None
	AA21	9.0	Moderate	None
7	AA6A	8.0	Moderate	None
8	AA15	7.2	Moderate	None
	AA17	7.2	Moderate	None
	AA20	7.2	Moderate	None
	AA20 Upper	7.2	Moderate	None
	AA23S	7.2	Moderate	None
	AA24	7.2	Moderate	None
	AA5A	6.0	Moderate	None
9	AA9	6.0	Moderate	None
	AA16	6.0	Moderate	None
	AA22A	6.0	Moderate	None
	AA22B	6.0	Moderate	None
10	AA1	4.8	Low	Increased from 2.4 due to observed rock fall size.
	AA2	4.8	Low	None
	AA6B	4.8	Low	None
	AA7	4.8	Low	None
	AA11	4.8	Low	None
	AA3	4.0	Low	None

Risk Ranking	Slope Ref.	Risk Rating	Relative Risk Level	Changes to 2023 Risk Rating
11	AA8	4.0	Low	None
12	AA13	2.4	Low	None
	AA23N	2.4	Low	None
13	AA3A	2.0	Low	None
	AA6	2.0	Low	None
	AA12	2.0	Low	None
	AA14W	2.0	Low	None
	AA19	2.0	Low	None
14	AA18	1.0	Low	None
	AA18-19	1.0	Low	None

## 6. Debris Flow Risk

Debris flows as mass movements of soil or rock debris suspended in a liquid matrix. Debris flows are often channelised, but can also occur on open hillsides. They are high energy dynamic events generally characterised by high rainfall and rapid erosion, and can have long run out paths.

AECOM is aware of several occasions in the past where the road has been blocked / partially blocked by saturated soil and rock debris. Locations of previous debris flow events, which have also been referred to by THC as 'wash outs' or 'landslides' include Frenchman's Burn, the boundary between AA5 and AA5A, AA18-19, AA13, AA7 and AA2. The continued downslope movement of scree at AA18-19 is also considered to have a debris flow component, associated with overtopping of the adjacent hillside drainage channel.

Following the events at Frenchman's Burn and AA5/AA5A, which pre-date AECOM's involvement at the Strome ferry Bypass, targeted remedial works in the form of debris catch basins and improved slope drainage were installed respectively.

Recorded debris flow events along the Strome ferry Bypass have predominantly originated from existing watercourses or drainage channels, resulting in channelised debris flows that pose a short-lived or episodic risk to the road below, generally during or following periods of high rainfall. Although often thought of as seasonal in nature it is important to recognise that debris flows can occur at any time of year.

The potential for this type of geohazard is exacerbated by the presence of 'debris dams' within many of the watercourses and drainage channels on the slopes above the A890 (e.g. AA1, AA2, AA2A, AA7 and AA16/17 Upper). Debris dams are a result of loose debris collecting against fallen trees and/or branches and impede water flow. During high rainfall events the channels become inundated, and the combined weight of water and debris can result in the 'dam' bursting. As the saturated material moves down slope at speed, additional debris is stripped from the sidewalls of the watercourse.

The combination of water and high sediment loads in channelised debris flows has substantial erosive power and can cause significant damage to the slope and result in localised blockages at road level. The potential impact of a debris flow will clearly depend on its size and location, and whether a road user is located within the immediate vicinity at the time of the event. The size and condition of roadside ditches and culverts or channels beneath the road and railway is also of relevance. If ditches or culverts are of inadequate size or operating at reduced capacity due to debris accumulation, then the potential for debris over-topping increases.

To provide some context on the level of debris flow risk relative to that of rock falls (as discussed in Section 5) the rock fall risk assessment methodology outlined in Section 2.1 has been applied to debris flows. Carrying out a location by location risk assessment for debris flow is not considered practical or appropriate and instead, it is considered more helpful to consider the site as a whole. The resulting risk rating is high to very high, assuming a debris volume of volume  $>10\text{m}^3$  and that greater than half the debris is expected to reach the road.

Although a high to very high risk would generally require some form of risk reduction, the episodic and typically weather dependant nature of debris flows means the risk is often tolerated subject to appropriate management protocols and monitoring of channels and culverts. Debris accumulation on the road is relatively straightforward to remove and, additionally, once a channelised debris flow has occurred the risk at that location is usually reduced as the debris accumulation has cleared.

To reduce debris flow risk:

- The obstruction of existing downslope drainage channels and associated catch basins, ditches and culverts must be avoided. Culverts below the road (and railway) should be inspected on a regular basis (annually as a minimum) paying particular attention to debris accumulation or blockages on their upslope side. Debris clearance should be undertaken as required and where practical this should include clearance of debris from upslope channels.
- Consideration should be given to creating debris basins upslope of the road and / or railway where the topography allows. Enlarged catchments would retain water and entrained material in the event of drainage channels becoming overwhelmed.

## 7. Discussion and Recommendations

Whilst the annual inspections of the roadside and upper hillside slopes are carried out to identify and quantify risks to road users from falling materials, it should be recognised that given the size and terrain of the area that only limited locations and areas can be examined in detail. Furthermore the types of falls and wide range of contributing factors means that block falls and debris flows could occur at almost any location. The specific hazards and risks identified for the various slope sub-divisions should therefore be considered as indicative of the global risks associated with the site as a whole.

The Phase 6, 7, 8, 9, 10, 11 and 12 works, which were carried out in 2012, 2013, 2015, 2017, 2018, 2019 and 2021 respectively, have addressed a significant proportion of the rock fall hazards identified during AECOM's previous inspections. In particular, these remedial works have significantly reduced the risk associated with a number of formerly 'very high risk' and 'high risk' potential hazards following works including scaling and the installation of catch fences, restraining cables, spot dowels and active rock fall netting systems. Improvements to existing passive (draped) rock fall netting systems (e.g. replacing corroded elements and installing additional anchors) have also served to reduce the risk of relatively small scale rock falls reaching the road.

The most recent Phase 12 works were targeted to reduce the risk at two slopes formerly assessed as 'very high risk' (AA6A and AA20 Upper). Following these works the residual risk level for the road beneath slopes AA6A and AA20 Upper was assessed to be moderate.

The updated 2024 risk assessment identified one 'very high risk' slope at AA19 Upper and six slopes were assessed to pose a relatively high risk to road users. However, it should be noted that the risk of rock falls occurring throughout the site still remains. Additionally, the site-wide risk of debris flows (particularly channelised debris flows) affecting the road is assessed as high to very high.

The occurrence of small to moderate scale rock falls (e.g. a few brick to breeze block sized rocks landing on the road) potentially occurring every few months to years and large to very large scale rock falls (e.g. rock falls similar in scale to the Dec 2011/Jan 2012 rock fall at AA19) potentially occurring every few years to decades will be ongoing due to the degradation of the near-surface rock mass from weathering, root action, etc. Guidance on the management of risk is given in the following sections and should include regular inspection of the slopes, maintenance of existing remedial systems and, where appropriate and budget permits, the completion of remedial works.

### 7.1 Ongoing Risk Management

The following approach is recommended to manage the level of risk within the site.

*Continued weekday drive through of the site by THC:*

THC staff familiar with the site and inspection procedure should continue to drive along the road each weekday morning with the aim of identifying any rock falls or debris flows. Observations should be reported internally within THC, with specialist geotechnical advice sought where appropriate.

*Continued monthly inspections by THC:*

For the monthly inspections to continue to provide an appropriate management tool it is important they are carried out on by personnel with knowledge of the site (preferably by the same inspector) and an understanding of the aims and objectives of the inspections. AECOM briefed THC personnel involved in the inspections during a meeting which took place after the completion of the 2024 annual inspection on the 19th April 2024.

The main aims of the monthly inspections are to:

- Identify any new rock falls (including behind netting systems) and, where possible, mark associated blocks with spray paint. A record should be made of the size and location of rock falls (small rock falls can be a precursor to a larger rock falls and it is therefore important to record all newly identified blocks in the verge and ditch);
- Identify any new debris flows. Record location (road level and source where possible) and estimate volume of transported material;
- Identify any areas of the roadside ditch where debris build up has reduced capacity to less than 50%;

- Identify any significant accumulations of debris behind netting systems that may require clearance;
- Identify any damage to existing installations by rock falls, vehicles, theft of metal components, etc.

For this method of risk management to be effective, the records of the monthly inspections should be reviewed monthly by AECOM geologists with knowledge of the site to assess the significance of any findings and identify the requirement for emergency inspections. This is particularly important when THC has identified a new rock fall or debris flow.

*On-going annual inspections 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, and less accessible 'upper' rock faces and slopes that are not visible from the road. For maximum benefit, annual inspections should ideally be carried out in April, following the deleterious effects of winter and prior to the growth of vegetation.

## 7.2 Recommended Remedial Works

It is understood that THC is considering a new road scheme that will bypass the section of the A890 between Ardnarff and Attadale to permanently reduce the risk of ongoing rock falls and associated disruption to road operations.

THC should carefully consider whether the ongoing risk posed by rock falls and debris flows whilst the current road remains in use is acceptable, considering the potential for injury to road users and the potential disruption due to road closures. Consideration should also be given to the period of time that the current road will remain in use and that road users will continue to be exposed to the risk of rock falls and debris flows.

Taking cognisance of the above, AECOM recommends that THC continues to carry out scheduled remedial works on at least a biennial basis in addition to the monthly and annual inspections, to reduce the risk posed by rock falls and debris flows to an acceptable level while the current road remains in use.

Recommendations for remedial works are given in the Geotechnical Assessment Sheets in Section 5 of the report. The recommended remedial works have been split in to three categories as described below:

- Category 1 – Ongoing maintenance: Recommended maintenance work is recommended to maintain the current condition of the rock faces and slopes (including drainage) and existing rock fall protection installations. Examples of required maintenance include repair of damaged or corroded netting, clearing of existing ditches or drainage channels, and ongoing removal of loose rock and/or vegetation. Undertaking the maintenance work will not necessarily reduce the risk posed by the rock faces, but instead aims to prevent existing protection measures from deteriorating further and the risk increasing. Some of these works can be undertaken directly by THC (e.g. clearing out ditches – see Section 7.3), whilst others will require specialist contractors (e.g. replacing damaged or corroded elements or coppicing trees). These works are generally of low to moderate cost.
- Category 2 – Localised targeted rock fall and debris flow protection works: Targeted rock fall protection works are recommended to address the risk posed by individual hazards that have been identified during the inspections in the longer term. Examples of these works include dowelling/strapping/netting, removal of a small number of individual blocks or clearance of isolated debris dams within watercourses. These works will reduce the risk associated with the specific hazard but may not reduce the risk posed by the rock face or slope as a whole due to the presence of other hazards that have not been addressed. These works will involve specialist contractors and are generally of moderate cost.
- Category 3: Large scale rock fall and debris flow protection works: These are recommended to address the hazard posed by the entire rock face or slope in the long term. Examples of these works include installing new rock fall or debris flow barriers (catch fences), rock fall netting systems and associated spot dowels, cable strapping and areas of high strength netting. These works are generally high cost and will involve specialist contractors, but they would offer a significant level of risk reduction. Additional detailed inspection of the individual rock faces and slopes may be required to enable detailed design and pricing of Category 3 works.

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 slopes and hazards in the first instance

(typically Category 2 and 3 works). Where the budget allows, lower priority works focussing on upgrading and maintaining existing rock fall protection installations (typically Category 1 and 2 works) should be undertaken. On occasion, the prioritisation of Category 1 works may be appropriate to ensure existing remedial systems remain functional and continue to offer the desired level of risk reduction. The 2024 inspection identified a number of high priority Category 1 and 2 works – see Section 7.5 for further details.

AECOM is in regular discussions with THC in relation to the budget and timing of planned remedial works such that an appropriate scope of remedial work can be selected.

### 7.3 Maintenance of Roadside Rock Traps / Drainage Ditches

Roadside rock trap ditches are present along the toe of many of the slopes and these must remain clear of significant debris accumulations to offer a continued level of risk reduction to the road and road users from small to moderate scale rock falls originating from the slopes above. During the 2024 inspection debris was noted in the roadside ditches at several locations and it is recommended that these be cleared to re-establish their original capacity at the earliest opportunity. These are non-specialist works and can be undertaken from road level by THC or a standard civil engineering contractor. Blocked drainage gullies were also identified and these will also require to be cleared to maintain drainage beneath the road. The build-up of debris within the roadside ditches should be monitored during THC's monthly inspections and clearance works undertaken as required to maintain their capacity. As a guide, THC should allow for annual clearance works.

### 7.4 Debris Flow Risk Reduction

Many drainage channels leading to the road from the upper slopes were noted to contain debris (rock and trees). Clearance of these could be undertaken to prevent alteration to the hydrological regime and reduce the potential for channelised debris flows.

Consideration could also be given to creating debris basins upslope of the road and / or railway where the topography allows. Enlarged catchments would retain water and entrained material in the event of drainage channels becoming overwhelmed.

### 7.5 High Priority Category 1 and 2 Works

The following table provides a summary of high priority Category 1 (ongoing maintenance) and Category 2 (targeted rock fall / debris flow protection works) that were identified during the 2024 annual inspection. Consideration should be given to the completion of these works as soon as practicable, and ideally before the 2025 annual inspection.

**Table 7-1 High Priority Category 1 and 2 Works**

Slope Ref.	Chainage	Description of Works
AA2A	335-555	Drainage improvements along forest road above AA2A
AA2A	335	Clearance of roadside ditch and culvert.
AA2A	428	Clearance of roadside ditch and feeder pipe.
AA3A	726	Clearance of rock debris from deer fence and roadside ditch.
AA4	842	Clearance of roadside ditch.
AA5	1360	Scaling of fractured rock mass 10-15m above road level.
AA6A	1505	Clearance of rock debris from deer fence.
AA7	1820-1826	Clearance of granular debris accumulation from slope ca. 10m above road level and scaling of fractured rock mass ca. 18m above road level.
AA19U	3050 – 3157	Clearance of scree from slope above top of netting.
AA21	3380	Clearance of culvert.
AA23B	3697	Clear debris from roadside ditch.

### 7.6 Additional Recommendations

During inspections of the slopes, both in 2024 and in previous years, AECOM has identified several additional hazards that are not directly related to the condition of the roadside slopes. Considerations should be given to addressing these issues, which are summarised below:



- Trees on upper slopes - A plantation of mature coniferous trees is present on the steep hillside above slopes AA12 to AA22A. The superficial deposits on the slope are thin and the trees are consequently poorly anchored and prone to falling in high winds. A large percentage of the trees has already fallen and remains on the slope. These trees have generally come to rest against the remaining live trees or dead tree stumps. Numerous rocks dislodged when the trees fell have come to rest against these fallen trees which are acting as a natural catch feature. It is, however, known that rocks originating from the root balls of uprooted trees have occasionally rolled downslope and reached the road. The live trees that remain on the slope will continue to fall and there is a risk that dislodged rocks could roll downslope and reach the road or railway. Photographic drone surveys of the site were carried out in 2019, 2020, 2023 and 2024 allowing for a comparison to be undertaken to better quantify the risk associated with tree falls. An annual reduction in the number of standing trees of 0.9% to 3% has been identified over this time period, suggesting a relatively low rate of tree fall, however, it should be recognised that such events will be largely weather dependant and a single storm event could fell many trees. Ultimately it is recommended that remaining standing trees be felled, and all trees be removed. If removal is not deemed possible, consideration could be given to felling trees to fall along slope and leave stump 1-2m high to form barrier to down slope movement. It is recommended that a specialist in forestry clearance is consulted on potential clearance methods.
- Future drone surveys – the drone surveys carried out at the site between 2019 and 2024 have proved a useful tool in the remote inspection of the upper slopes of the site, allowing tactile inspections to be targeted towards areas of change or concern and reducing the need for access to areas of challenging terrain. It is therefore recommended that photographic drone surveys of the slopes to the east of Frenchman's burn continue to be carried out prior to annual inspections to aid planning. Drone surveys should be carried out in March / April, when vegetation cover is at a minimum.
- Culverts – the inspection of culverts crossing beneath the road and railway was outside AECOM's inspection scope, however, localised blockages were noted. Where considered to be associated with an increased potential for transported material to impact the road the clearance of blockages has been included in the high priority works detailed in Section 7.5. Periodic inspection of the culverts by THC is recommended, along with clearance of accumulated debris when required to maintain the flow capacity of culverts.
- Many of the chainage markers installed in 2017 were either obscured by vegetation or had been damaged by grass cutting equipment. It is recommended that the chainage markers be replaced with markers on higher posts prior to the 2025 inspection.
- Carry out repairs to the road closure gate post at Ardnarff (Ch.0), which appears to have been damaged by a vehicle strike.
- Replace the sign that provides the phone number to call in case of a rock fall at the Attadale end of the site (Ch. 3892) before it becomes illegible.

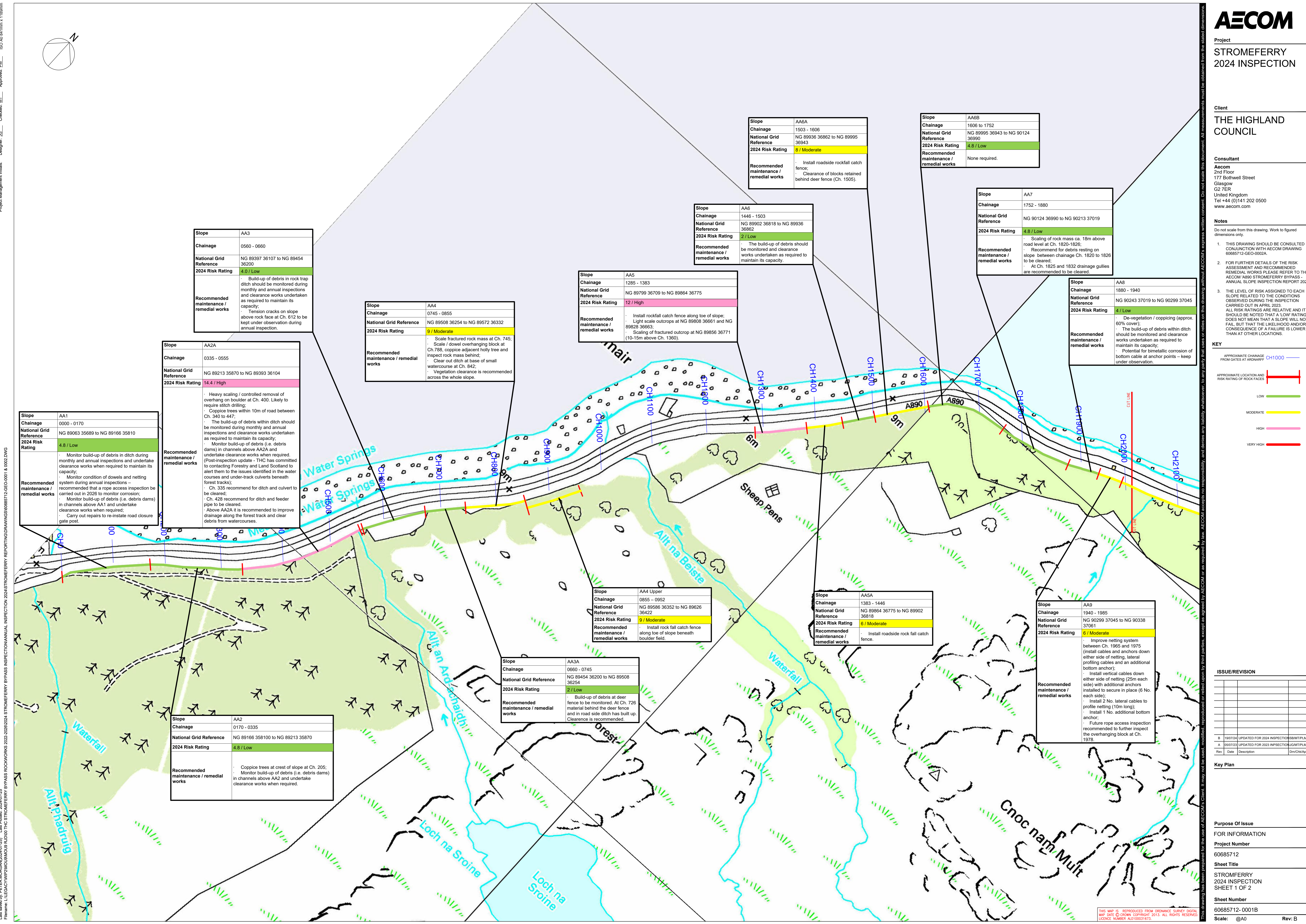
# Appendix A Location Plans

ISSUE/REVISION

Rev	Date	Description	Drw/Chg/APP
B	19/07/24	UPDATED FOR 2024 INSPECTION	DM/PLM
A	05/07/23	UPDATED FOR 2023 INSPECTION	DM/PLM

Key Plan

Purpose Of Issue  
FOR INFORMATION  
Project Number  
60685712  
Sheet Title  
STROME FERRY  
2024 INSPECTION  
SHEET 1 OF 2  
Sheet Number  
60685712-0001B  
Scale: @A0  
Rev: B



Project Management Initials: Designer: JG Checked: MT Approved: PM  
Last saved by: PETER MORGAN (2024.07.25) Last Picked: 2024.07.25  
Filename: L:\LEGACY\WIP2\MOU\9 RJ\000 THE STROME FERRY BYPASS ROCKWORKS 2022-2026\2024 STROME FERRY BYPASS INSPECTION\ANNUAL INSPECTION 2024\STROME FERRY REPORTING\DRAWINGS\60685712-GE0-0001 & 0002.DWG

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Slope	AA6A
Chainage	1503 - 1606
National Grid Reference	NG 89936 36862 to NG 89995 36943
2024 Risk Rating	8 / Moderate
Recommended maintenance / remedial works	<ul style="list-style-type: none"><li>Install roadside rockfall catch fence;</li><li>Clearance of blocks retained behind deer fence (Ch. 1505).</li></ul>

Slope	AA6B
Chainage	1606 to 1752
National Grid Reference	NG 89995 36943 to NG 90124 36990
2024 Risk Rating	4.8 / Low
Recommended maintenance / remedial works	None required.

Slope	AA7
Chainage	1752 - 1880
National Grid Reference	NG 90124 36990 to NG 90213 37019
2024 Risk Rating	4.8 / Low
Recommended maintenance / remedial works	<ul style="list-style-type: none"><li>Scaling of rock mass ca. 18m above road level at Ch. 1820-1826;</li><li>Recommend for debris resting on slope between chainage Ch. 1820 to 1826 to be cleared;</li><li>At Ch. 1825 and 1832 drainage gullies are recommended to be cleared.</li></ul>

Slope	AA8
Chainage	1880 - 1940
National Grid Reference	NG 90243 37019 to NG 90299 37045
2024 Risk Rating	4 / Low
Recommended maintenance / remedial works	<ul style="list-style-type: none"><li>De-vegetation / coppicing (approx. 60% cover);</li><li>The build-up of debris within ditch should be monitored and clearance works undertaken as required to maintain its capacity;</li><li>Potential for bimetallic corrosion of bottom cable at anchor points – keep under observation.</li></ul>

Slope	AA6
Chainage	1446 - 1503
National Grid Reference	NG 89902 36818 to NG 89936 36862
2024 Risk Rating	2 / Low
Recommended maintenance / remedial works	<ul style="list-style-type: none"><li>The build-up of debris should be monitored and clearance works undertaken as required to maintain its capacity.</li></ul>

Slope	AA5
Chainage	1285 - 1383
National Grid Reference	NG 89799 36709 to NG 89864 36775
2024 Risk Rating	12 / High
Recommended maintenance / remedial works	<ul style="list-style-type: none"><li>Install rockfall catch fence along toe of slope;</li><li>Light scale outcrops at NG 89808 36661 and NG 89828 36663;</li><li>Scaling of fractured outcrop at NG 89856 36771 (10-15m above Ch. 1360).</li></ul>

Slope	AA4
Chainage	0745 - 0855
National Grid Reference	NG 89508 36254 to NG 89572 36332
2024 Risk Rating	9 / Moderate
Recommended maintenance / remedial works	<ul style="list-style-type: none"><li>Scale fractured rock mass at Ch. 745;</li><li>Scale / dowl overhanging block at Ch.788, coppice adjacent holly tree and inspect rock mass behind;</li><li>Clear out ditch at base of small watercourse at Ch. 842;</li><li>Vegetation clearance is recommended across the whole slope.</li></ul>

Slope	AA3
Chainage	0560 - 0660
National Grid Reference	NG 89397 36107 to NG 89454 36200
2024 Risk Rating	4.0 / Low
Recommended maintenance / remedial works	<ul style="list-style-type: none"><li>Build-up of debris in rock trap ditch should be monitored during monthly and annual inspections and clearance works undertaken as required to maintain its capacity;</li><li>Tension cracks on slope above rock face at Ch. 612 to be kept under observation during annual inspection.</li></ul>

Slope	AA2A
Chainage	0335 - 0555
National Grid Reference	NG 89213 35870 to NG 89393 36104
2024 Risk Rating	14.4 / High
Recommended maintenance / remedial works	<ul style="list-style-type: none"><li>Heavy scaling / controlled removal of overhang on boulder at Ch. 400. Likely to require slitch drilling;</li><li>Coppice trees within 10m of road between Ch. 340 to 447;</li><li>The build-up of debris within ditch should be monitored during monthly and annual inspections and clearance works undertaken as required to maintain its capacity;</li><li>Monitor build-up of debris (i.e. debris dams) in channels above AA2A and undertake clearance works when required. (Post-inspection update - THC has committed to contacting Forestry and Land Scotland to alert them to the issues identified in the water courses and under-track culverts beneath forest tracks);</li><li>Ch. 335 recommend for ditch and culvert to be cleared;</li><li>Ch. 428 recommend for ditch and feeder pipe to be cleared;</li><li>Above AA2A it is recommended to improve drainage along the forest track and clear debris from watercourses.</li></ul>

Slope	AA1
Chainage	0000 - 0170
National Grid Reference	NG 89063 35689 to NG 89166 35810
2024 Risk Rating	4.8 / Low
Recommended maintenance / remedial works	<ul style="list-style-type: none"><li>Monitor build-up of debris in ditch during monthly and annual inspections and undertake clearance works when required to maintain its capacity;</li><li>Monitor condition of dowels and netting system during annual inspections – recommended that a rope access inspection be carried out in 2026 to monitor corrosion;</li><li>Monitor build-up of debris (i.e. debris dams) in channels above AA1 and undertake clearance works when required;</li><li>Carry out repairs to re-instate road closure gate post.</li></ul>

Slope	AA5A
Chainage	1383 - 1446
National Grid Reference	NG 89864 36775 to NG 89902 36818
2024 Risk Rating	6 / Moderate
Recommended maintenance / remedial works	<ul style="list-style-type: none"><li>Install roadside rock fall catch fence.</li></ul>

Slope	AA4 Upper
Chainage	0855 - 0952
National Grid Reference	NG 89586 36352 to NG 89626 36422
2024 Risk Rating	9 / Moderate
Recommended maintenance / remedial works	<ul style="list-style-type: none"><li>Install rock fall catch fence along toe of slope beneath boulder field.</li></ul>

Slope	AA3A
Chainage	0660 - 0745
National Grid Reference	NG 89454 36200 to NG 89508 36254
2024 Risk Rating	2 / Low
Recommended maintenance / remedial works	<ul style="list-style-type: none"><li>Build-up of debris at deer fence to be monitored. At Ch. 726 material behind the deer fence and in road side ditch has built up. Clearance is recommended.</li></ul>

Slope	AA9
Chainage	1940 - 1985
National Grid Reference	NG 90299 37045 to NG 90338 37061
2024 Risk Rating	6 / Moderate
Recommended maintenance / remedial works	<ul style="list-style-type: none"><li>Improve netting system between Ch. 1965 and 1975 (install cables and anchors down either side of netting, lateral profiling cables and an additional bottom anchor);</li><li>Install vertical cables down either side of netting (25m each side) with additional anchors installed to secure in place (6 No. each side);</li><li>Install 2 No. lateral cables to profile netting (10m long);</li><li>Install 1 No. additional bottom anchor;</li><li>Future rope access inspection recommended to further inspect the overhanging block at Ch. 1978.</li></ul>

Slope	AA2
Chainage	0170 - 0335
National Grid Reference	NG 89166 35810 to NG 89213 35870
2024 Risk Rating	4.8 / Low
Recommended maintenance / remedial works	<ul style="list-style-type: none"><li>Coppice trees at crest of slope at Ch. 205;</li><li>Monitor build-up of debris (i.e. debris dams) in channels above AA2 and undertake clearance works when required.</li></ul>

ISSUE/REVISION table with columns for Rev, Date, Description, and Drawn/Checked.

Key Plan

Purpose of Issue

FOR INFORMATION

Project Number

60685712

Sheet Title

STROME FERRY

2024 INSPECTION

SHEET 2 OF 2

Sheet Number

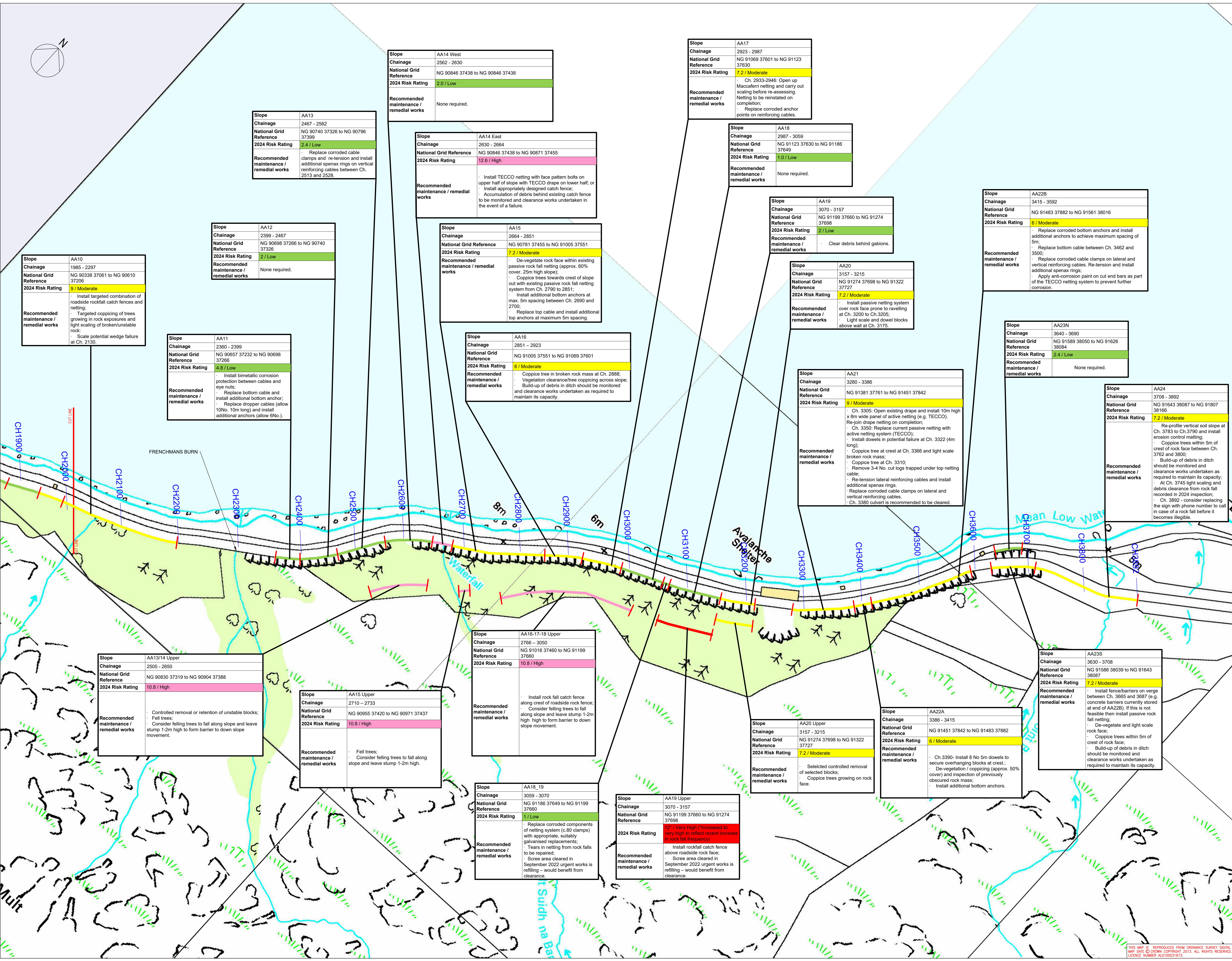
60685712-0002B

Scale: @AO

Rev: B

Vertical text on the left margin containing project details, drawing title, and revision information.

Vertical text on the right margin containing project details, drawing title, and revision information.



Slope AA14 West table with Chainage 2562-2630, National Grid Reference NG 90846 37438 to NG 90846 37438, and 2024 Risk Rating 2.0 / Low.

Slope AA17 table with Chainage 2923-2987, National Grid Reference NG 91069 37601 to NG 91123 37630, and 2024 Risk Rating 7.2 / Moderate.

Slope AA18 table with Chainage 2987-3059, National Grid Reference NG 91123 37630 to NG 91186 37649, and 2024 Risk Rating 1.0 / Low.

Slope AA22B table with Chainage 3415-3592, National Grid Reference NG 91483 37882 to NG 91561 38016, and 2024 Risk Rating 6 / Moderate.

Slope AA23N table with Chainage 3640-3690, National Grid Reference NG 91589 38050 to NG 91626 38084, and 2024 Risk Rating 2.4 / Low.

Slope AA24 table with Chainage 3708-3892, National Grid Reference NG 91643 38087 to NG 91807 38166, and 2024 Risk Rating 7.2 / Moderate.

Slope AA23S table with Chainage 3630-3708, National Grid Reference NG 91586 38039 to NG 91643 38087, and 2024 Risk Rating 7.2 / Moderate.

Slope AA22A table with Chainage 3386-3415, National Grid Reference NG 91451 37842 to NG 91483 37882, and 2024 Risk Rating 6 / Moderate.

Slope AA20 Upper table with Chainage 3157-3215, National Grid Reference NG 91274 37698 to NG 91322 37727, and 2024 Risk Rating 7.2 / Moderate.

Slope AA19 Upper table with Chainage 3070-3157, National Grid Reference NG 91199 37660 to NG 91274 37698, and 2024 Risk Rating 12+ / Very High (Increased to very high to reflect recent increase in rock fall frequency).

Slope AA18\_19 table with Chainage 3059-3070, National Grid Reference NG 91186 37649 to NG 91199 37660, and 2024 Risk Rating 1 / Low.

Slope AA16-17-18 Upper table with Chainage 2766-3050, National Grid Reference NG 91016 37460 to NG 91199 37660, and 2024 Risk Rating 10.8 / High.

Slope AA15 Upper table with Chainage 2710-2733, National Grid Reference NG 90955 37420 to NG 90971 37437, and 2024 Risk Rating 10.8 / High.

Slope AA13/14 Upper table with Chainage 2505-2650, National Grid Reference NG 90830 37319 to NG 90904 37388, and 2024 Risk Rating 10.8 / High.

Slope AA16 table with Chainage 2851-2923, National Grid Reference NG 91005 37551 to NG 91069 37601, and 2024 Risk Rating 6 / Moderate.

Slope AA15 table with Chainage 2664-2851, National Grid Reference NG 90781 37455 to NG 91005 37551, and 2024 Risk Rating 7.2 / Moderate.

Slope AA20 table with Chainage 3157-3215, National Grid Reference NG 91274 37698 to NG 91322 37727, and 2024 Risk Rating 7.2 / Moderate.

Slope AA19 table with Chainage 3070-3157, National Grid Reference NG 91199 37660 to NG 91274 37698, and 2024 Risk Rating 2 / Low.

Slope AA14 East table with Chainage 2630-2664, National Grid Reference NG 90846 37438 to NG 90871 37455, and 2024 Risk Rating 12.6 / High.

Slope AA13 table with Chainage 2467-2562, National Grid Reference NG 90740 37326 to NG 90796 37399, and 2024 Risk Rating 2.4 / Low.

Slope AA12 table with Chainage 2399-2467, National Grid Reference NG 90698 37266 to NG 90740 37326, and 2024 Risk Rating 2 / Low.

Slope AA11 table with Chainage 2360-2399, National Grid Reference NG 90657 37232 to NG 90698 37266, and 2024 Risk Rating 4.8 / Low.

Slope AA10 table with Chainage 1985-2297, National Grid Reference NG 90338 37061 to NG 90610 37206, and 2024 Risk Rating 9 / Moderate.

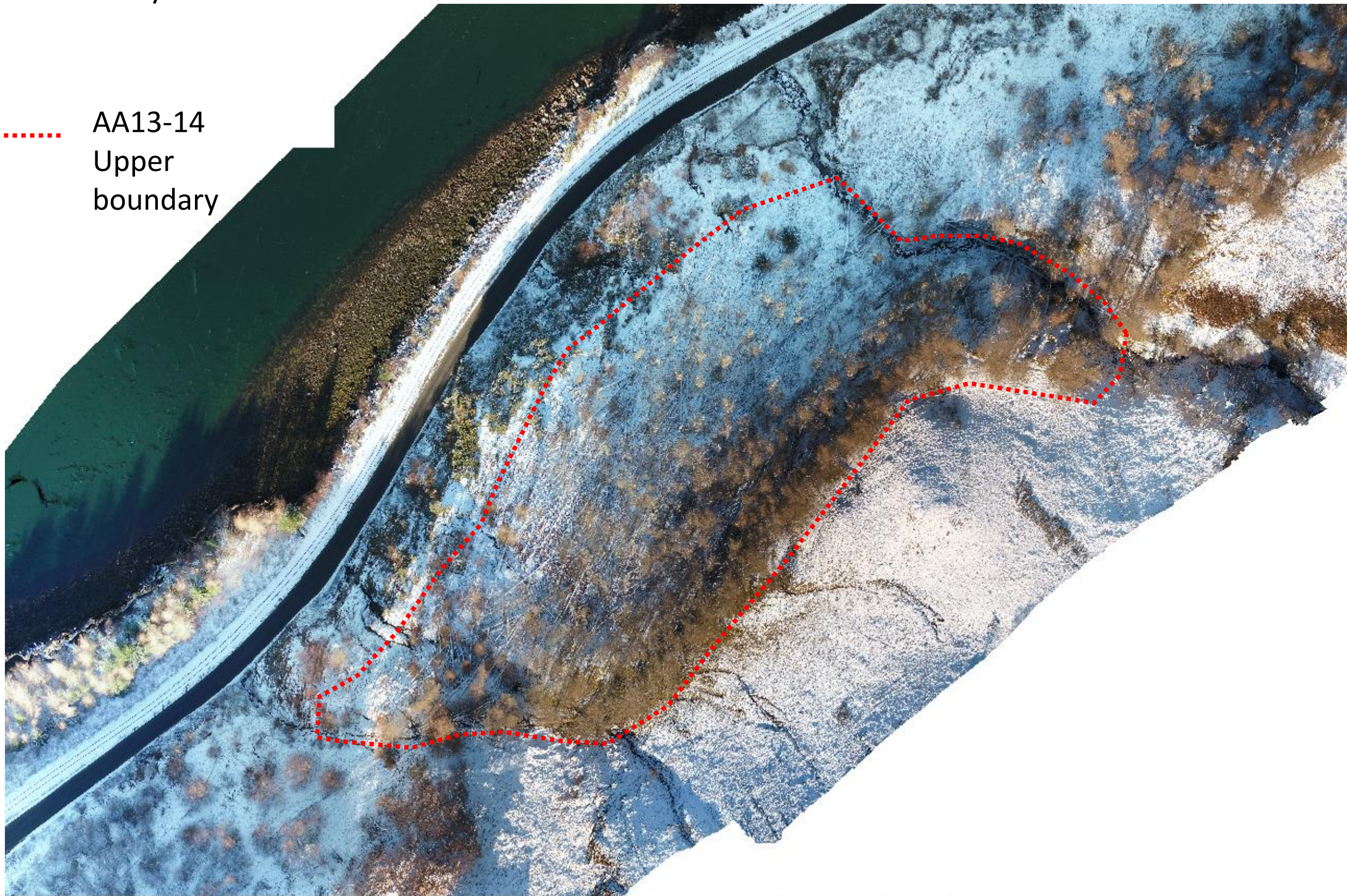
# Appendix B Drone Survey Tree Fall Review

# Stromeferry

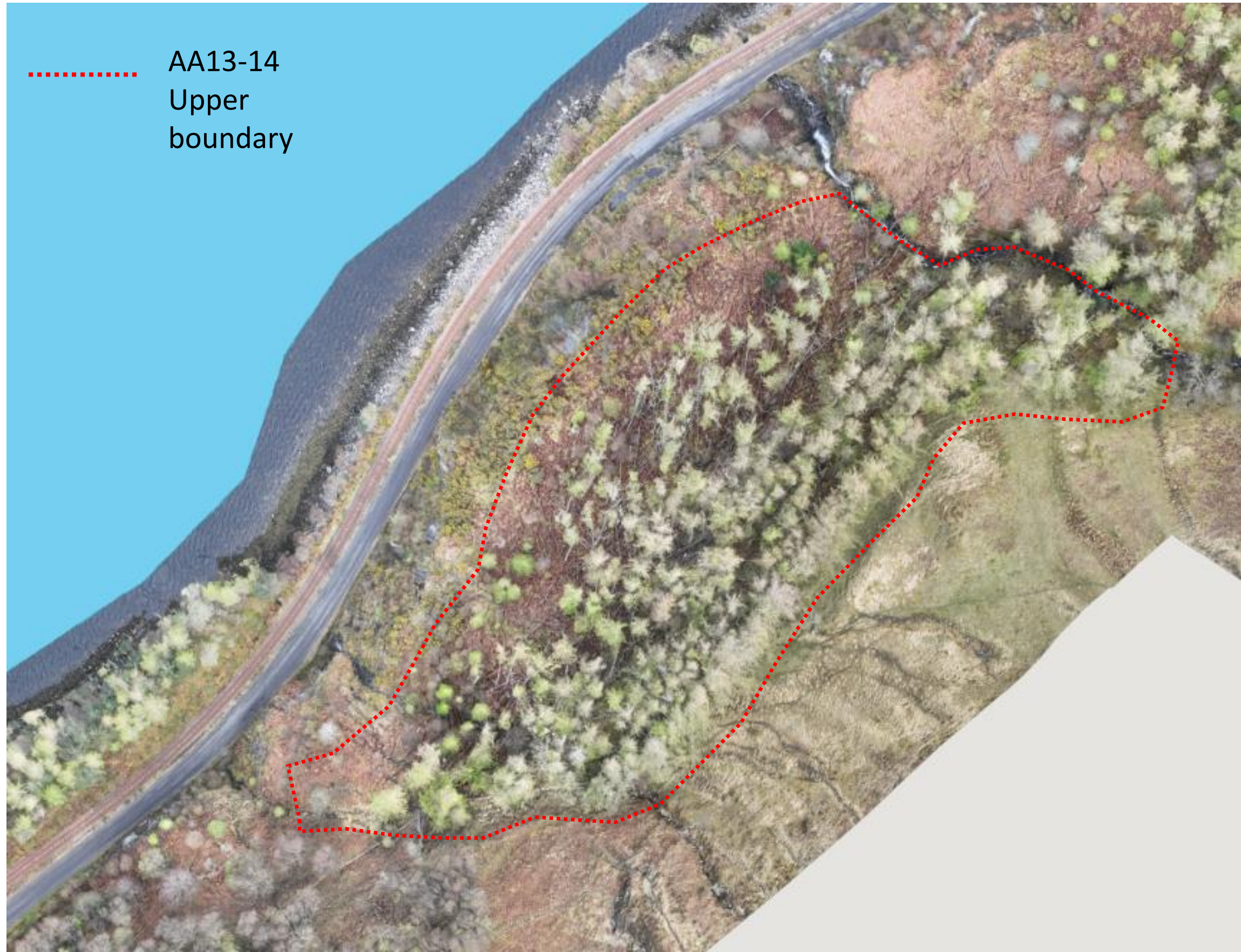
AA13-14 Upper - 2023:2024 Drone Survey Comparison

# 2023 Drone Survey

..... AA13-14  
Upper  
boundary



# 2024 Drone Survey



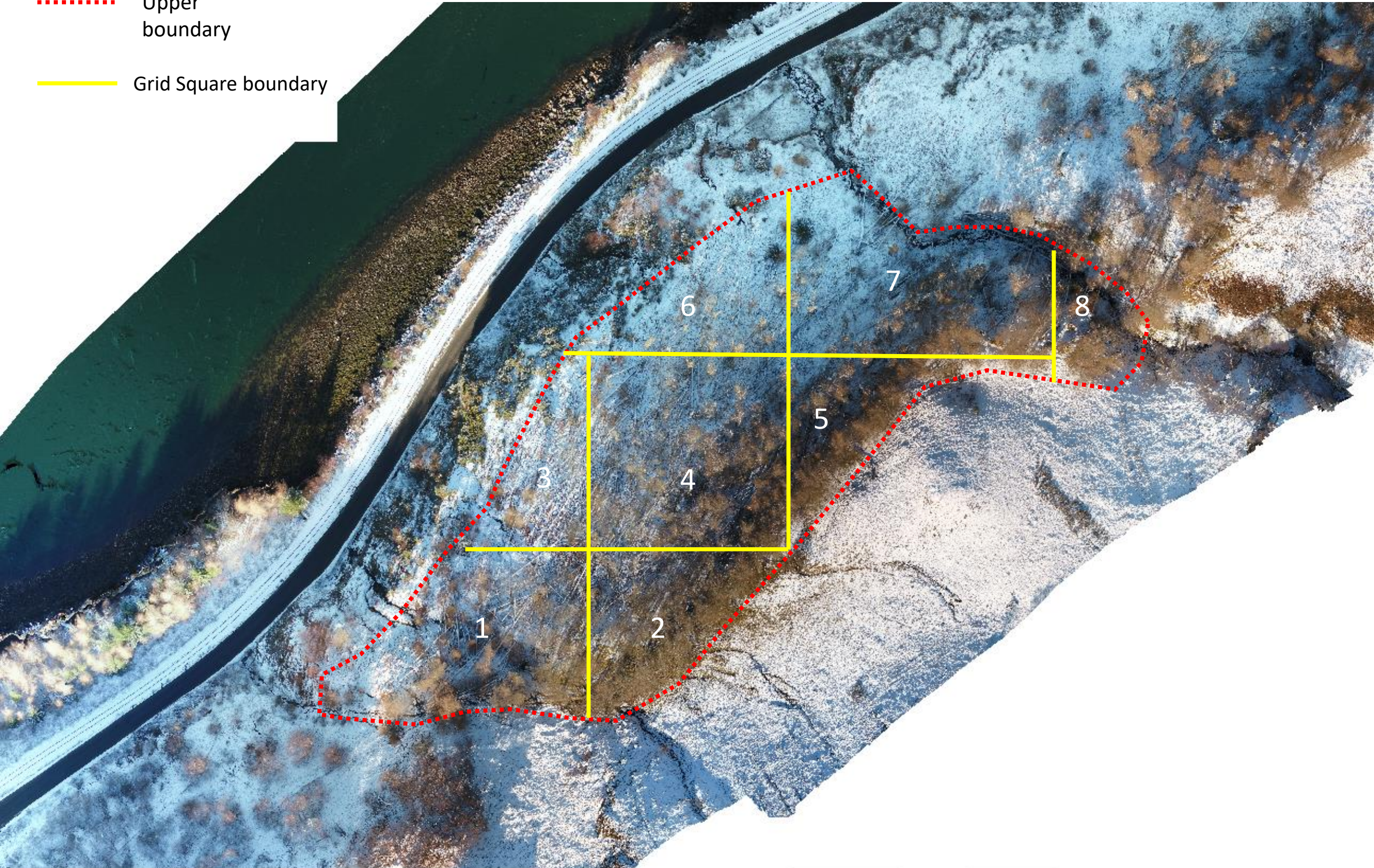
AA13-14  
Upper  
boundary



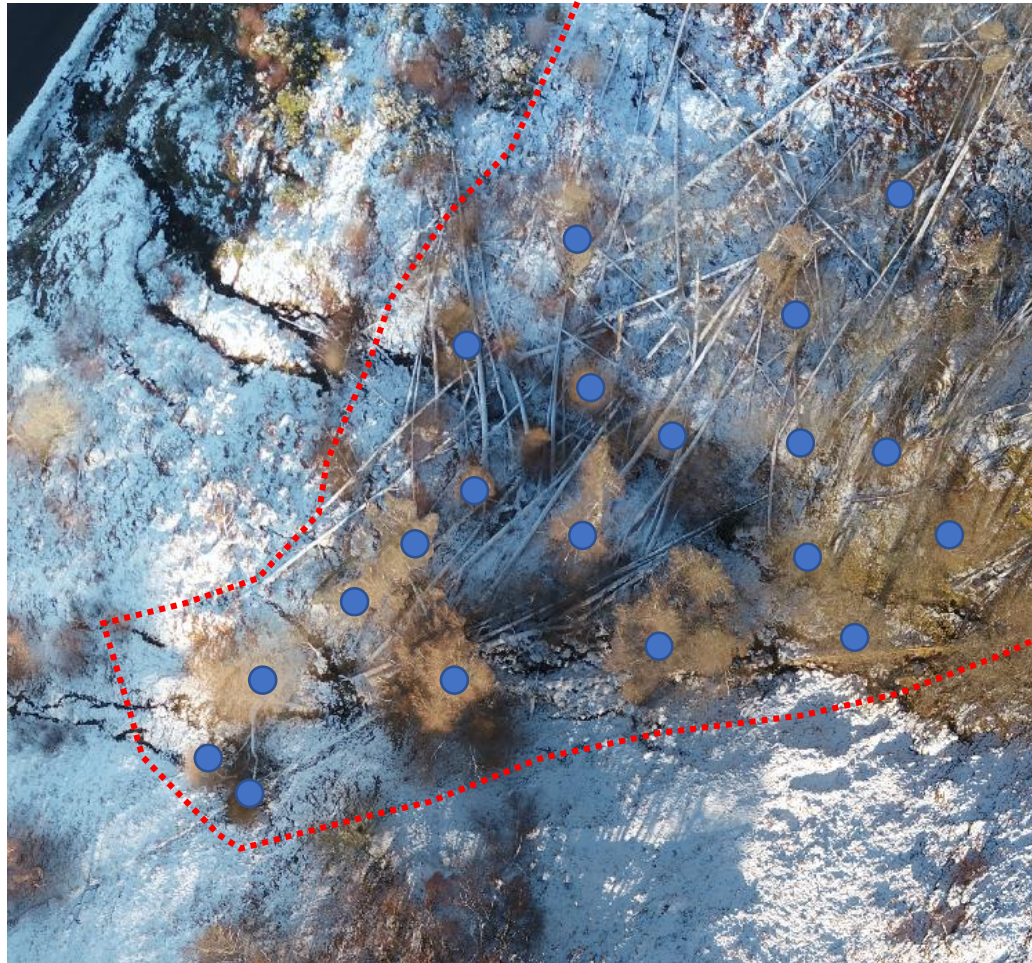
2023 Drone Survey

AA13-14  
Upper  
boundary

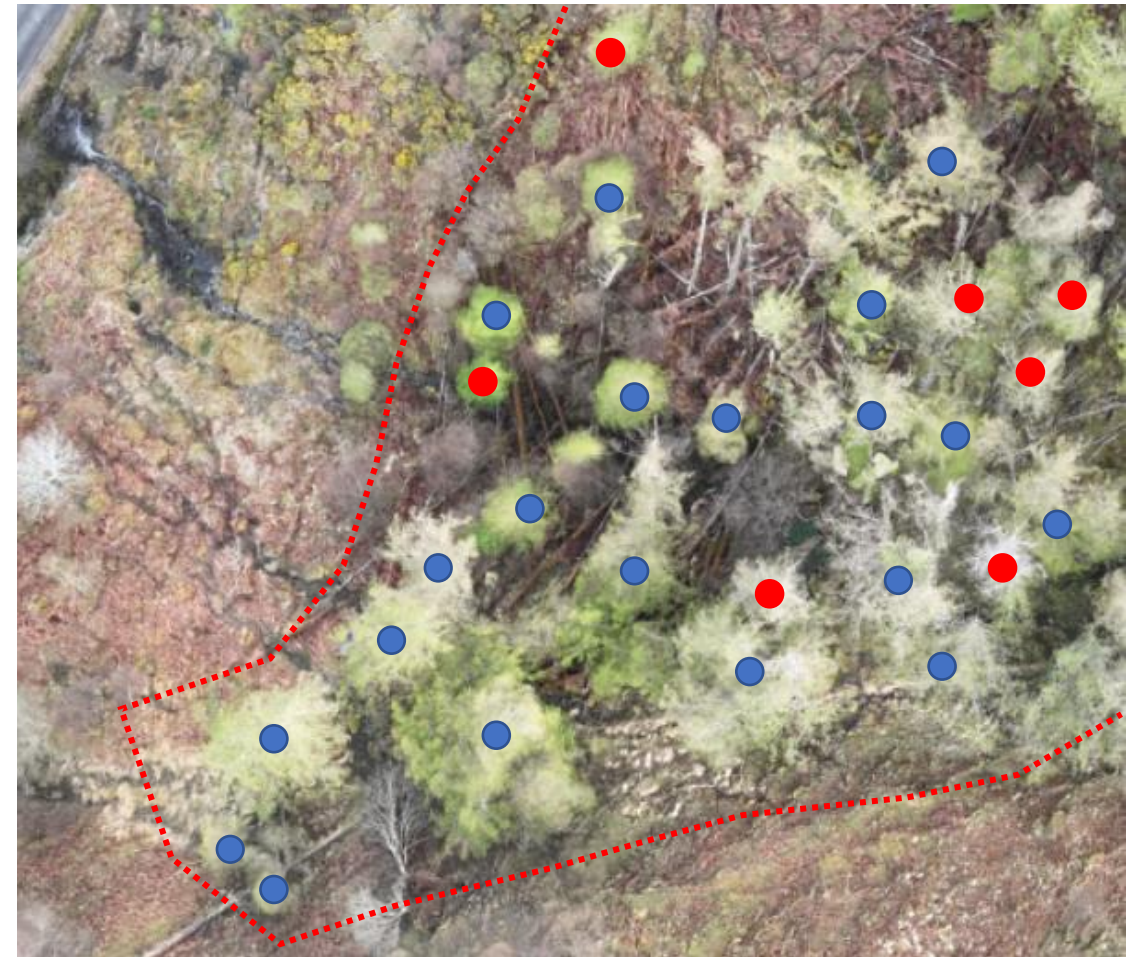
Grid Square boundary



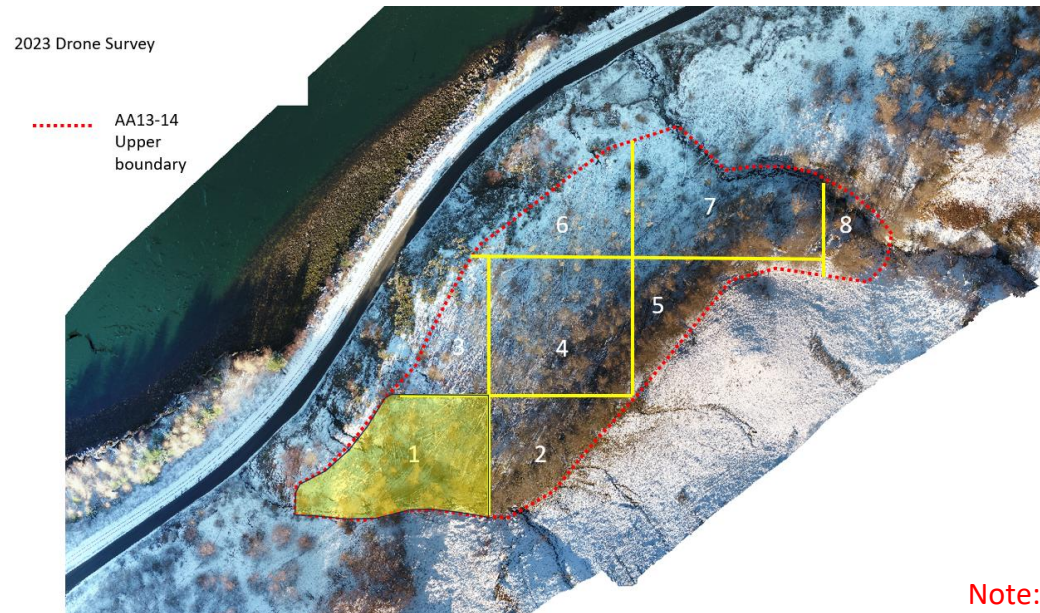
# 2023 Drone Survey



# 2024 Drone Survey



## Grid Square 1



● Tree

Approx. number of trees standing in 2023: **20**

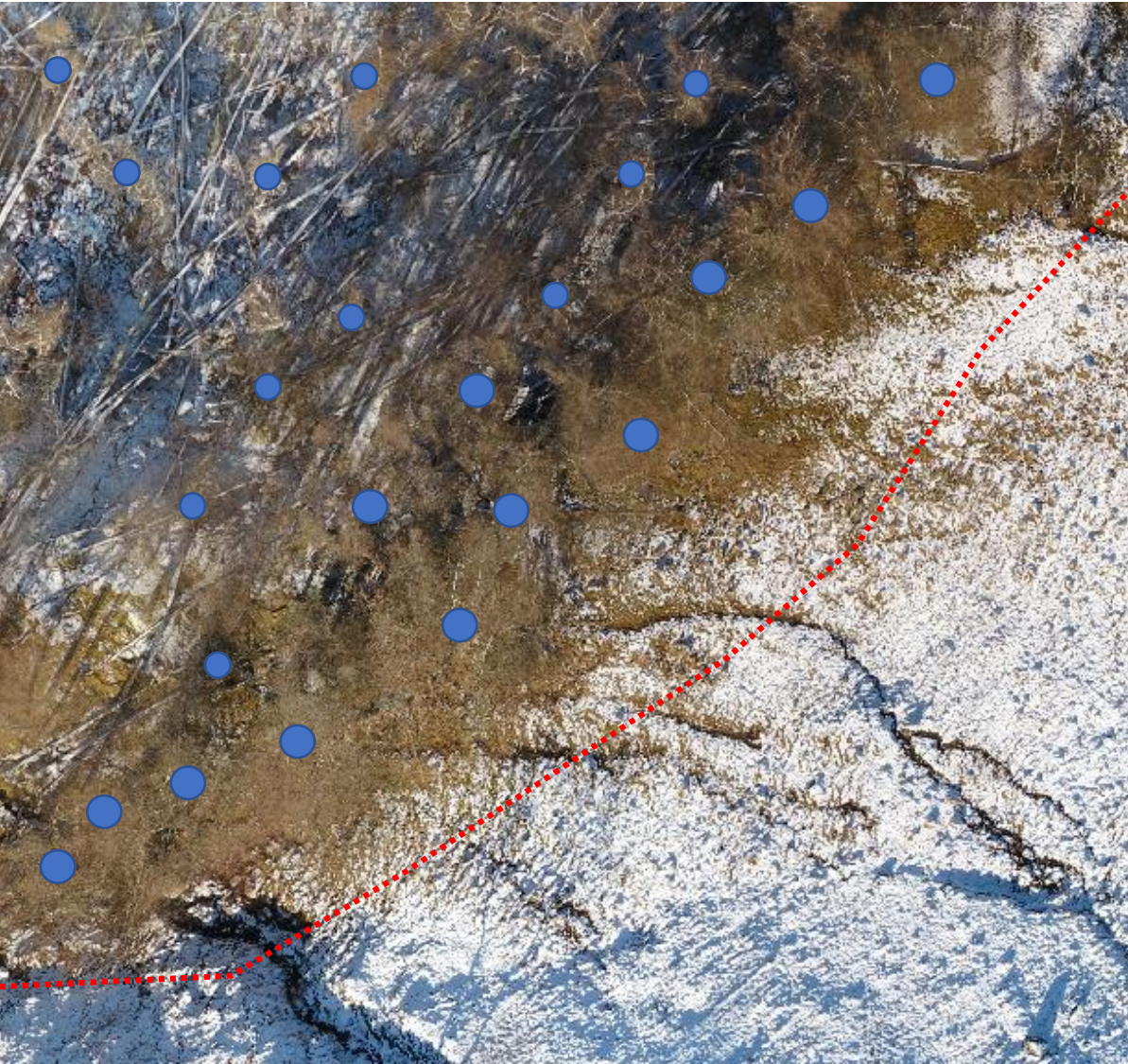
Approx. number of trees standing in 2024: **20**

Approx. number of fallen trees between 2023 to 2024: **0**

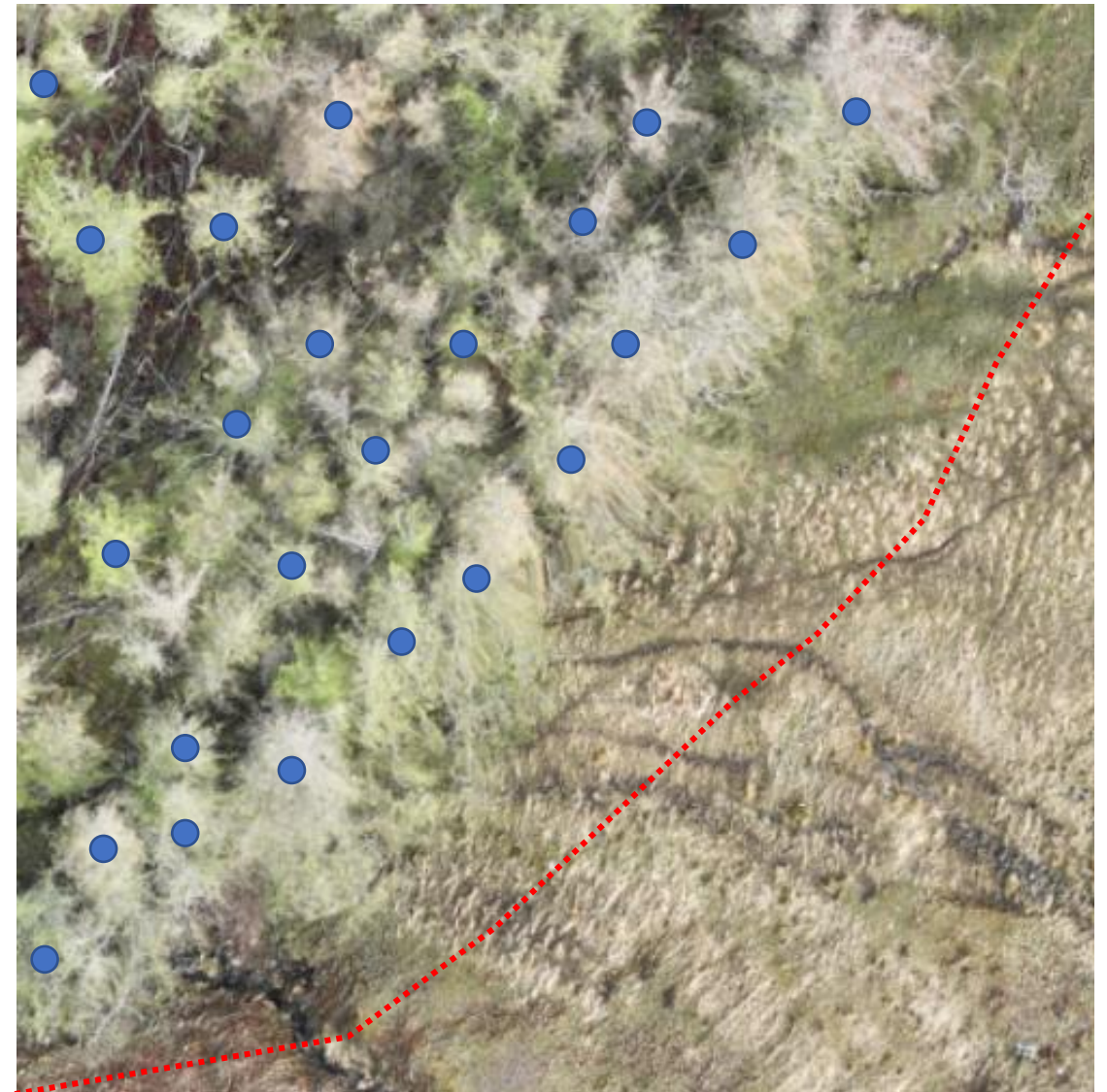
% of trees that have fallen: **0**

Note: red dots are 'new trees' noted in 2024 survey but not identified in 2023 survey. These have not been included in the summary information but have been highlighted to show they have not been missed out.

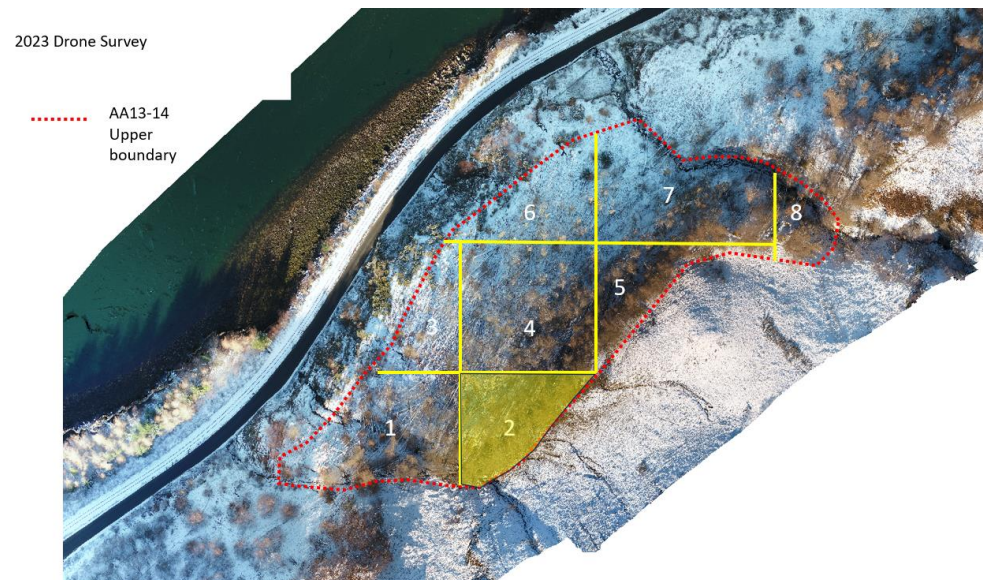
# 2023 Drone Survey



# 2024 Drone Survey



## Grid Square 2



● Tree

Approx. number of trees standing in 2023: **23**

Approx. number of trees standing in 2024: **23**

Approx. number of fallen trees between 2023 to 2024: **0**

% of trees that have fallen: **0**

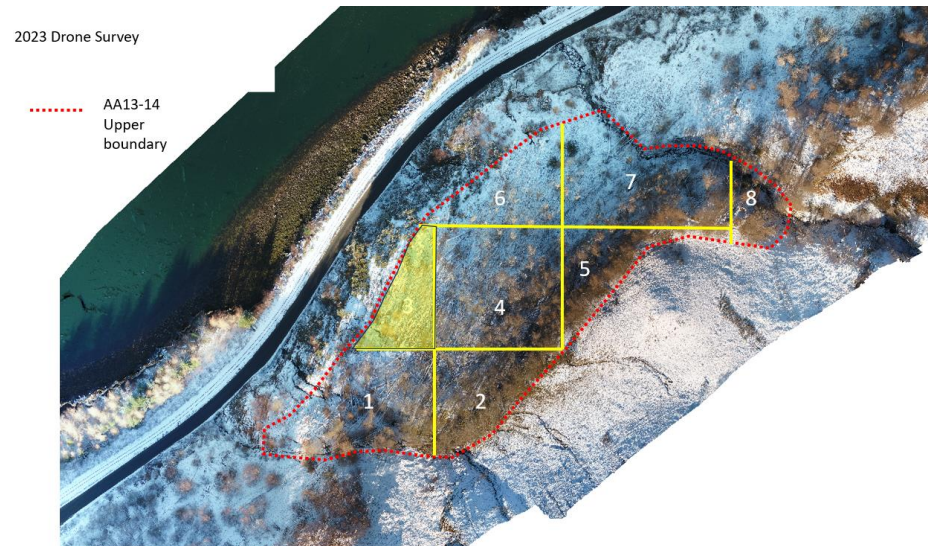
# 2023 Drone Survey



# 2024 Drone Survey



## Grid Square 3



● Tree

Approx. number of trees standing in 2023: **3**

Approx. number of trees standing in 2024: **3**

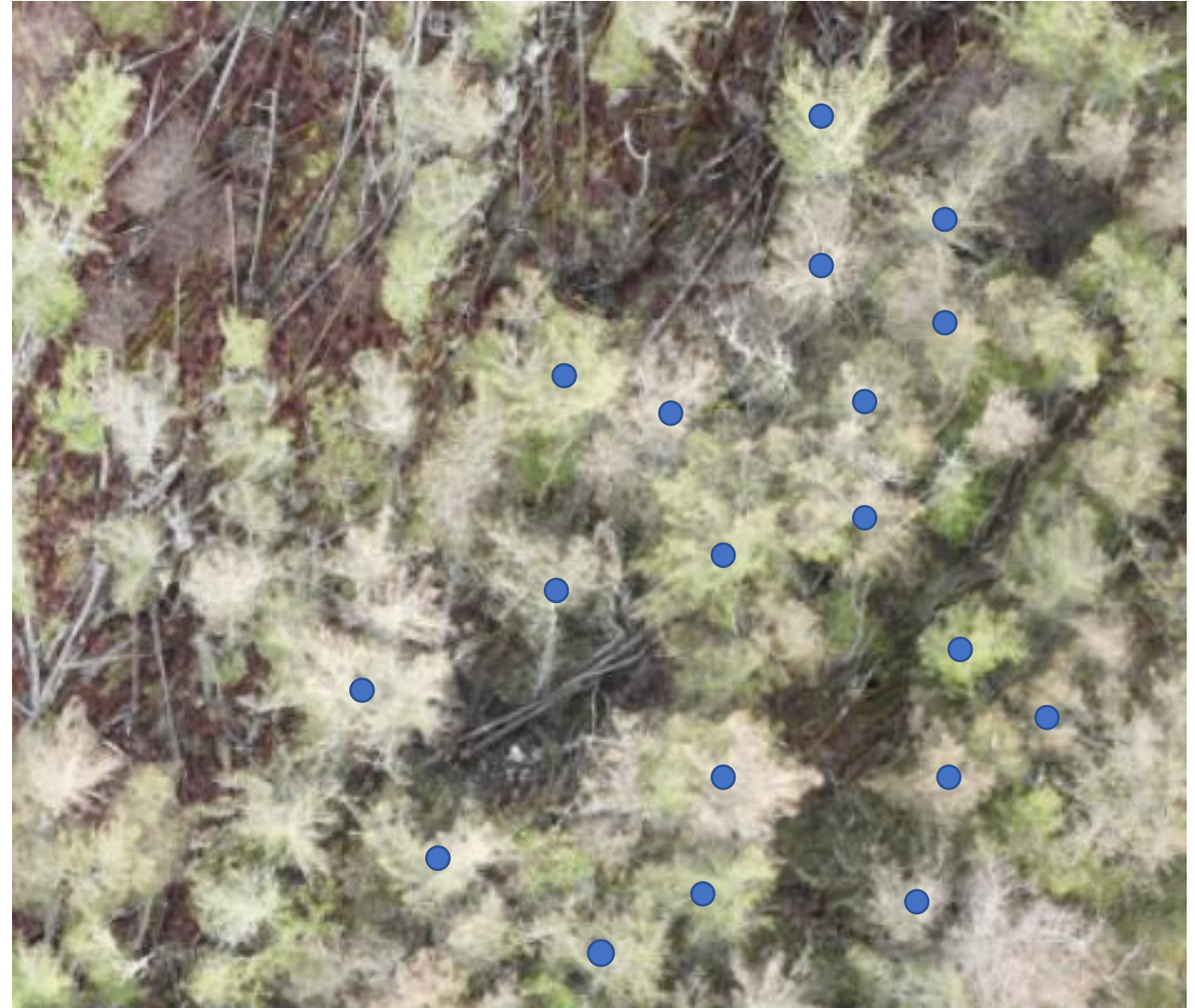
Approx. number of fallen trees between 2023 to 2024: **0**

% of trees that have fallen: **0**

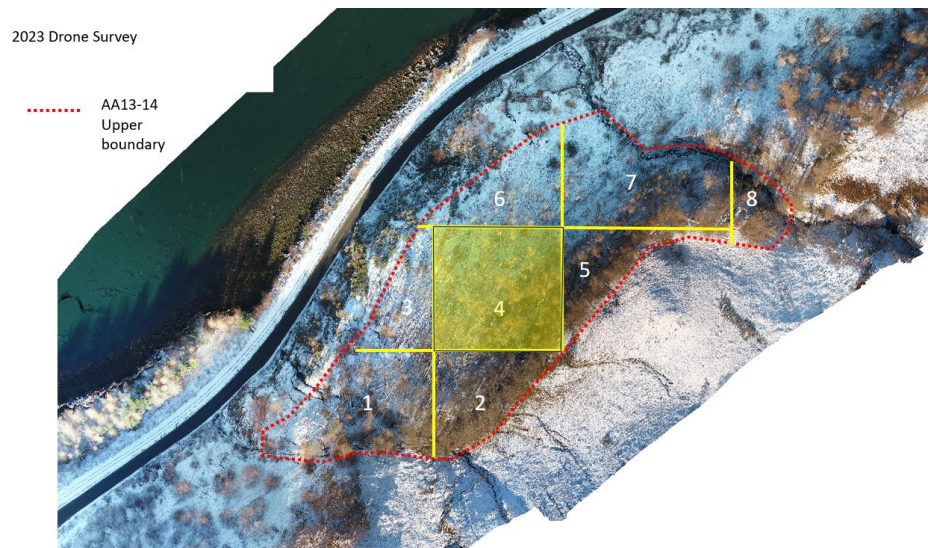
# 2023 Drone Survey



# 2024 Drone Survey



## Grid Square 4



● Tree

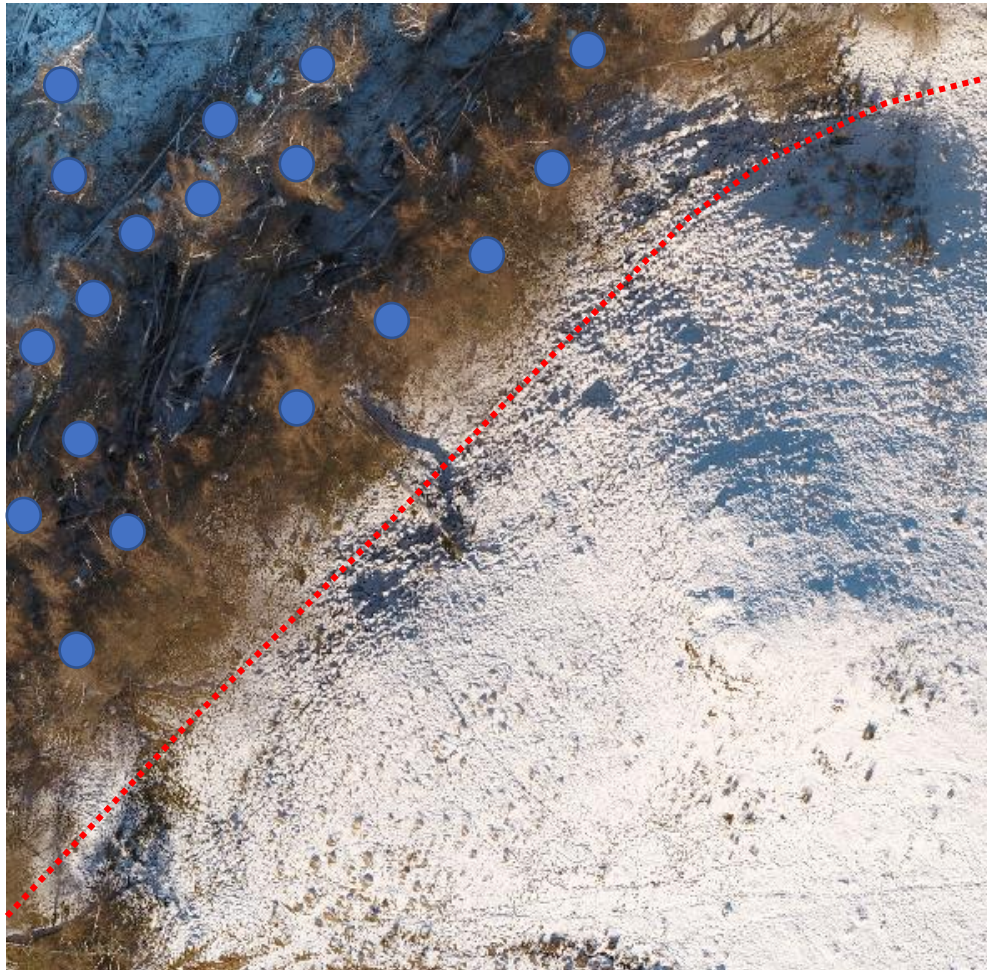
Approx. number of trees standing in 2023: **20**

Approx. number of trees standing in 2024: **19**

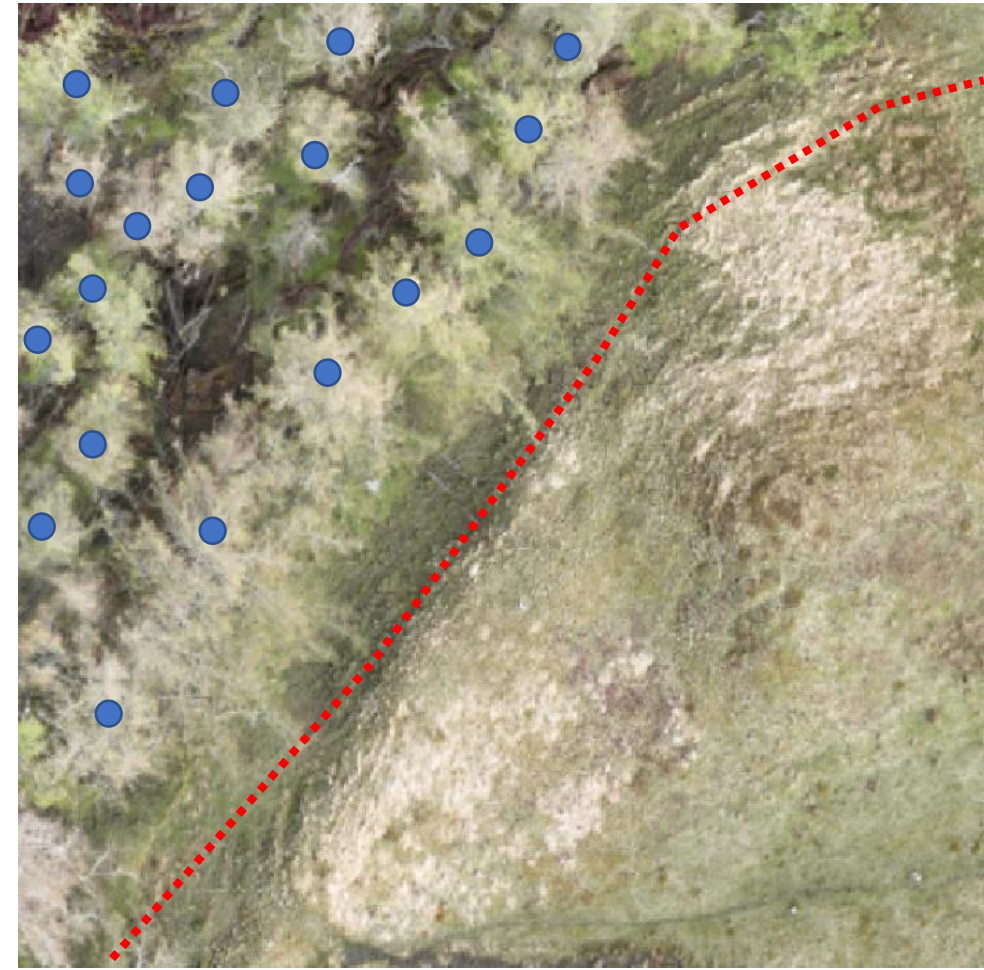
Approx. number of fallen trees between 2023 to 2024: **1**

% of trees that have fallen: **5%**

# 2023 Drone Survey



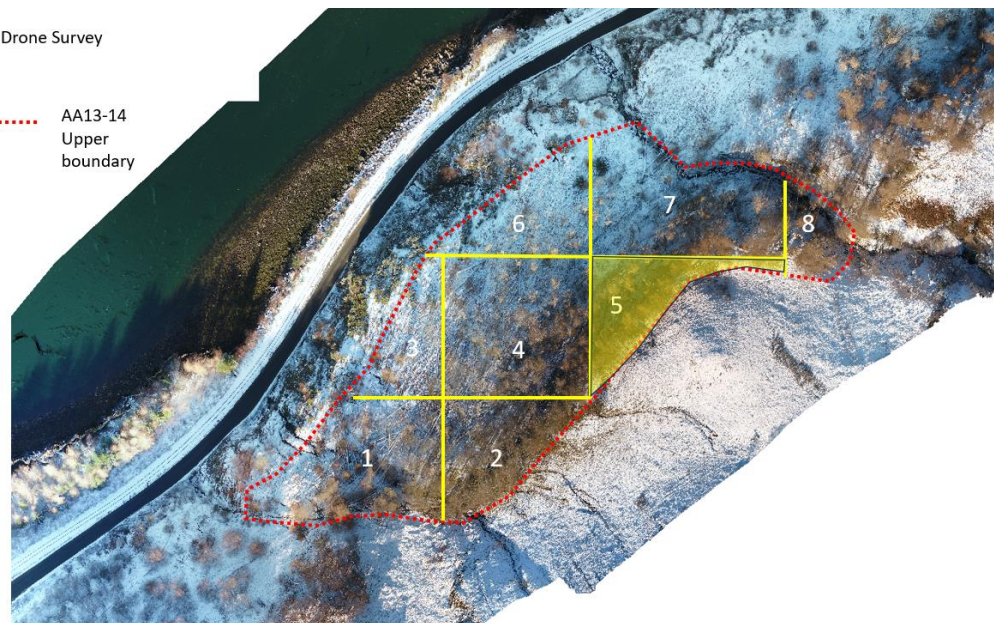
# 2024 Drone Survey



## Grid Square 5

2023 Drone Survey

..... AA13-14  
Upper  
boundary



● Tree

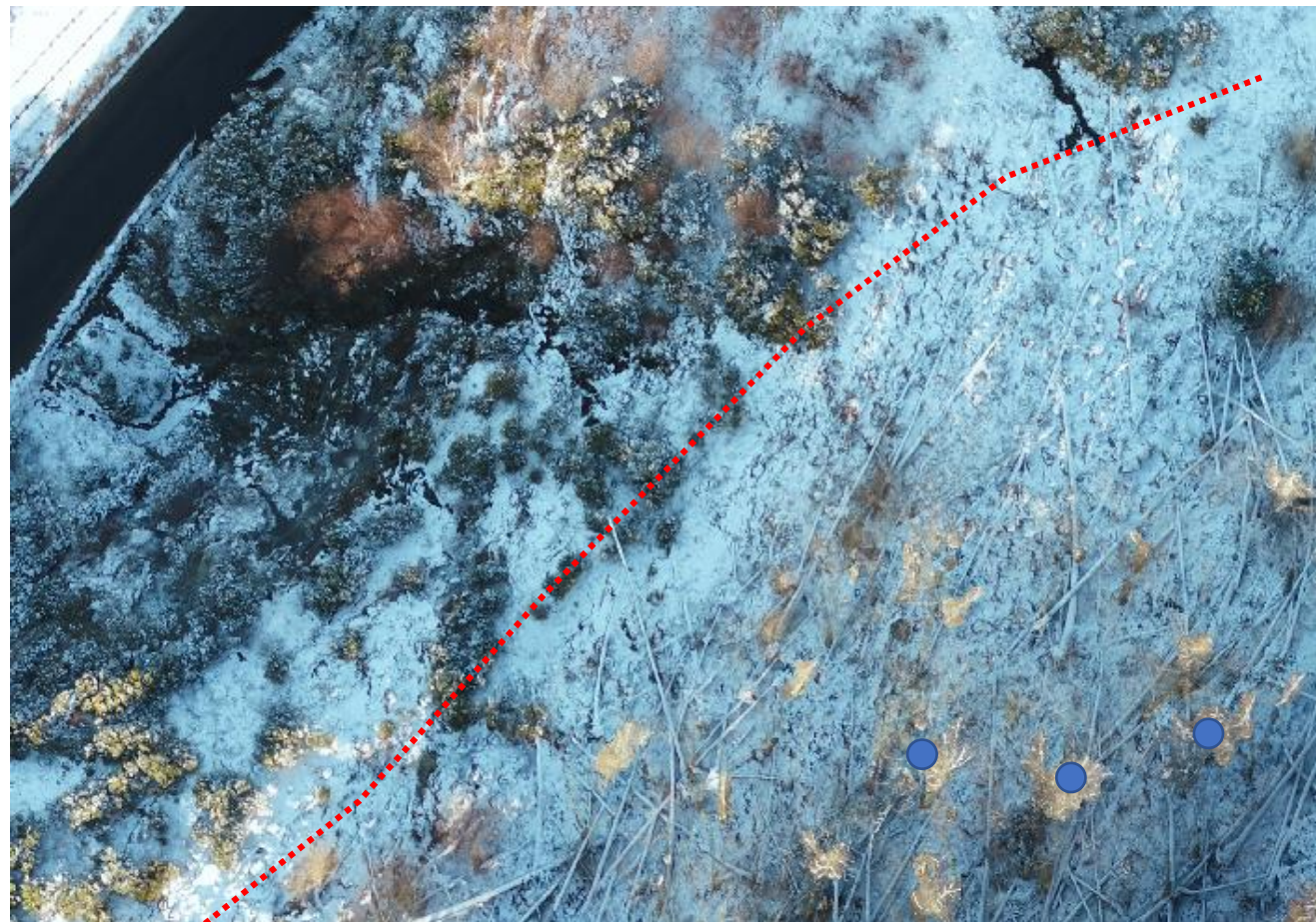
Approx. number of trees standing in 2023: **18**

Approx. number of trees standing in 2024: **18**

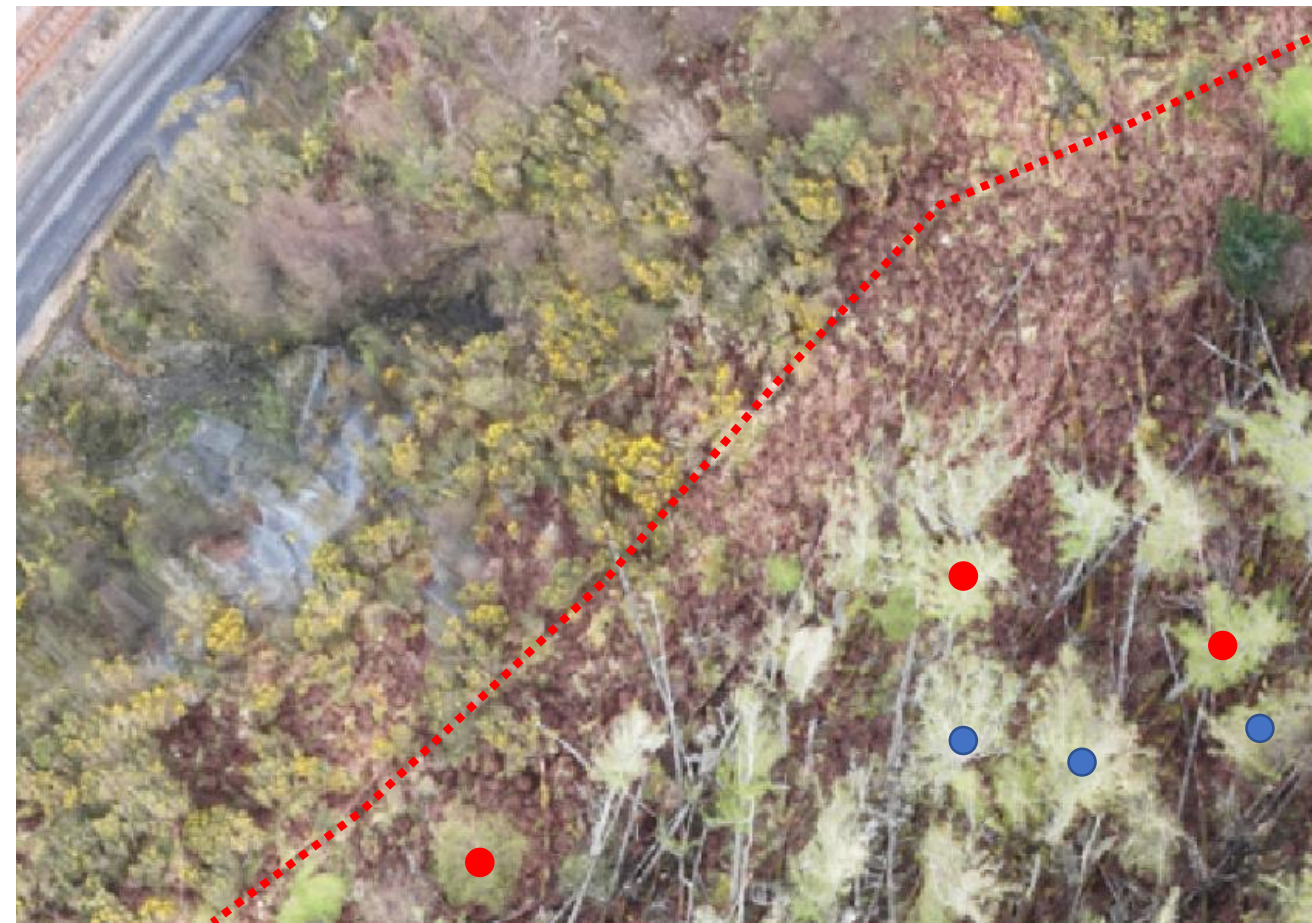
Approx. number of fallen trees between 2023 to 2024: **0**

% of trees that have fallen: **0**

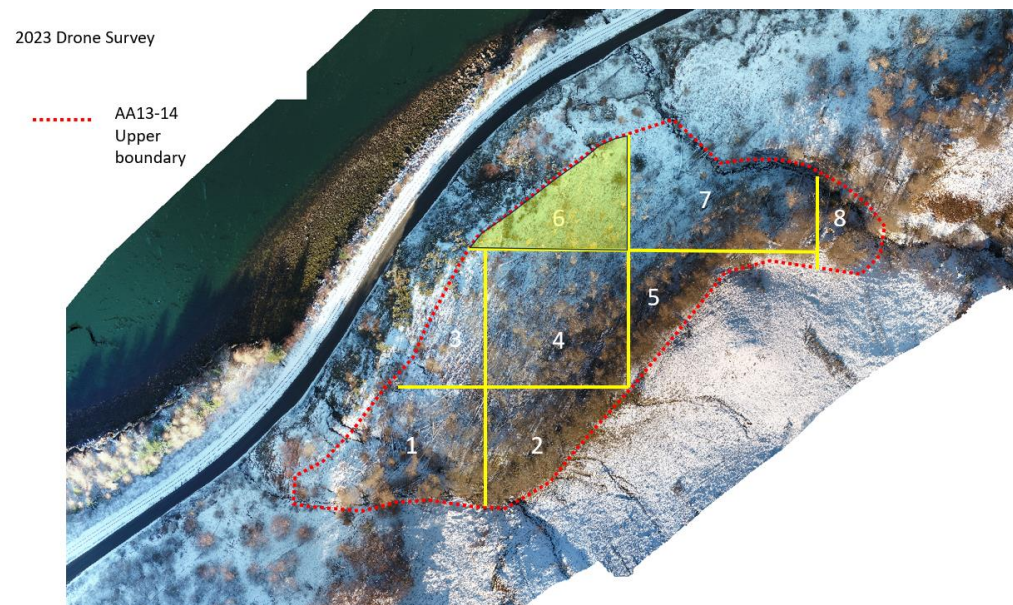
# 2023 Drone Survey



# 2024 Drone Survey



## Grid Square 6



● Tree

Approx. number of trees standing in 2023: **3**

Approx. number of trees standing in 2024: **3**

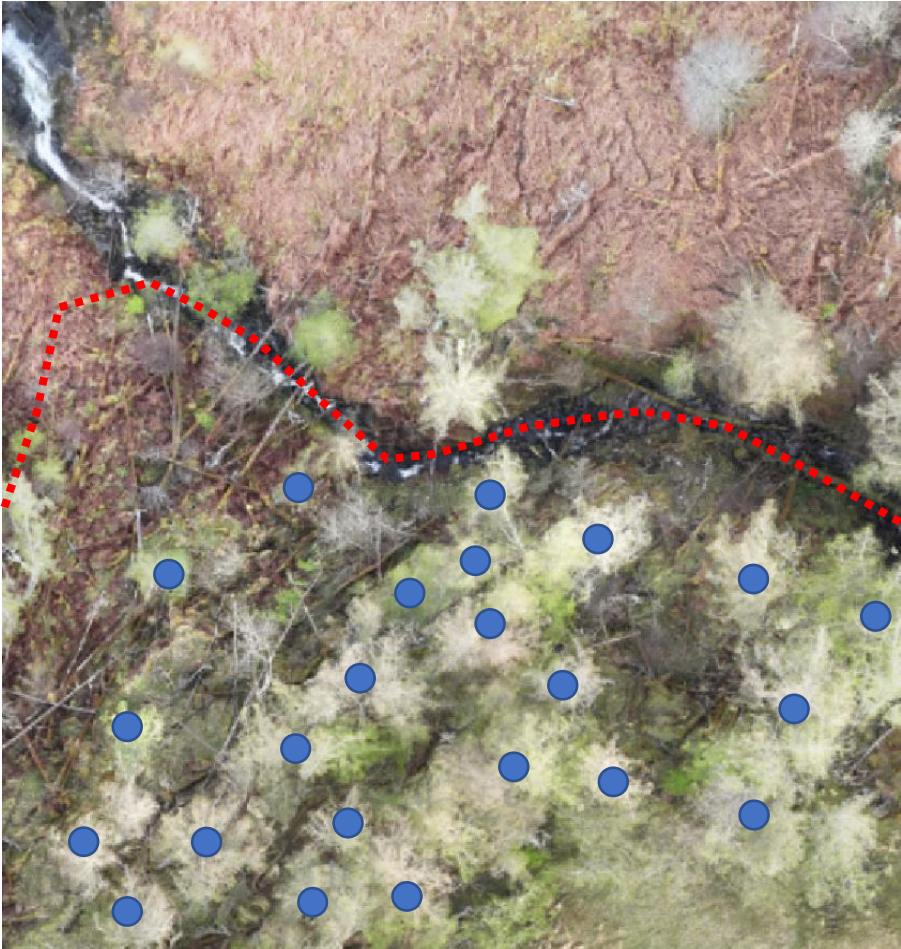
Approx. number of fallen trees between 2023 to 2024: **0**

% of trees that have fallen: **0**

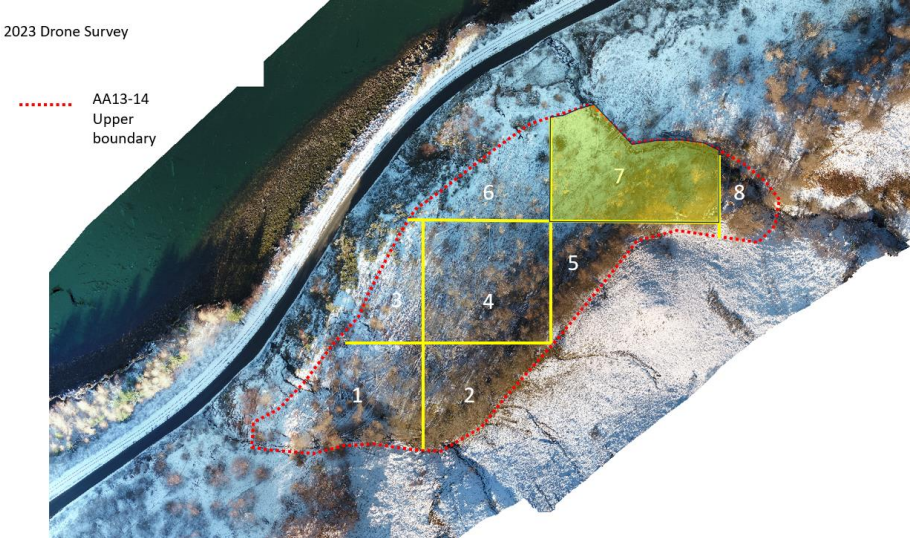
# 2023 Drone Survey



# 2024 Drone Survey



## Grid Square 7



● Tree

Approx. number of trees standing in 2023: **23**

Approx. number of trees standing in 2024: **23**

Approx. number of fallen trees between 2023 to 2024: **0**

% of trees that have fallen: **0**



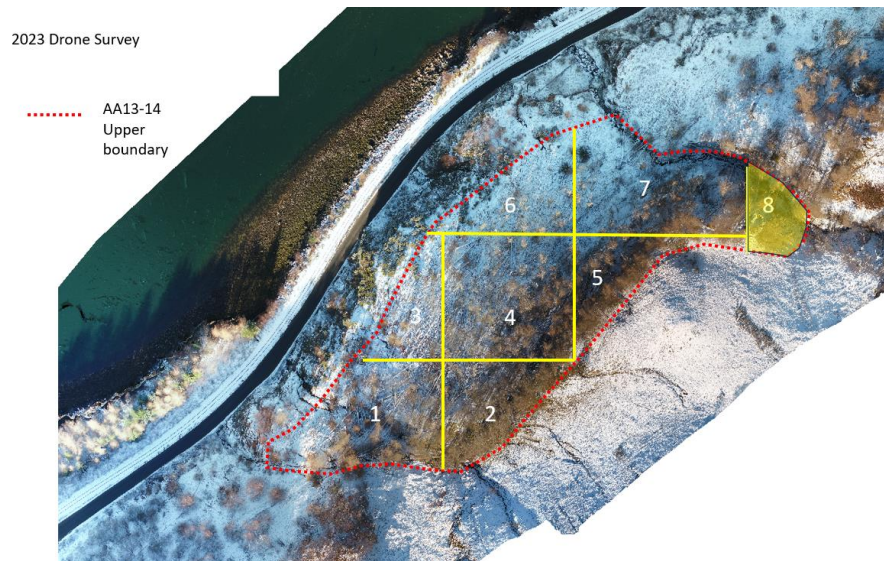
# 2023 Drone Survey



# 2024 Drone Survey



## Grid Square 8



● Tree

Approx. number of trees standing in 2023: **2**

Approx. number of trees standing in 2024: **2**

Approx. number of fallen trees between 2023 to 2024: **0**

% of trees that have fallen: **0**

# AA13-14 Upper Summary Table

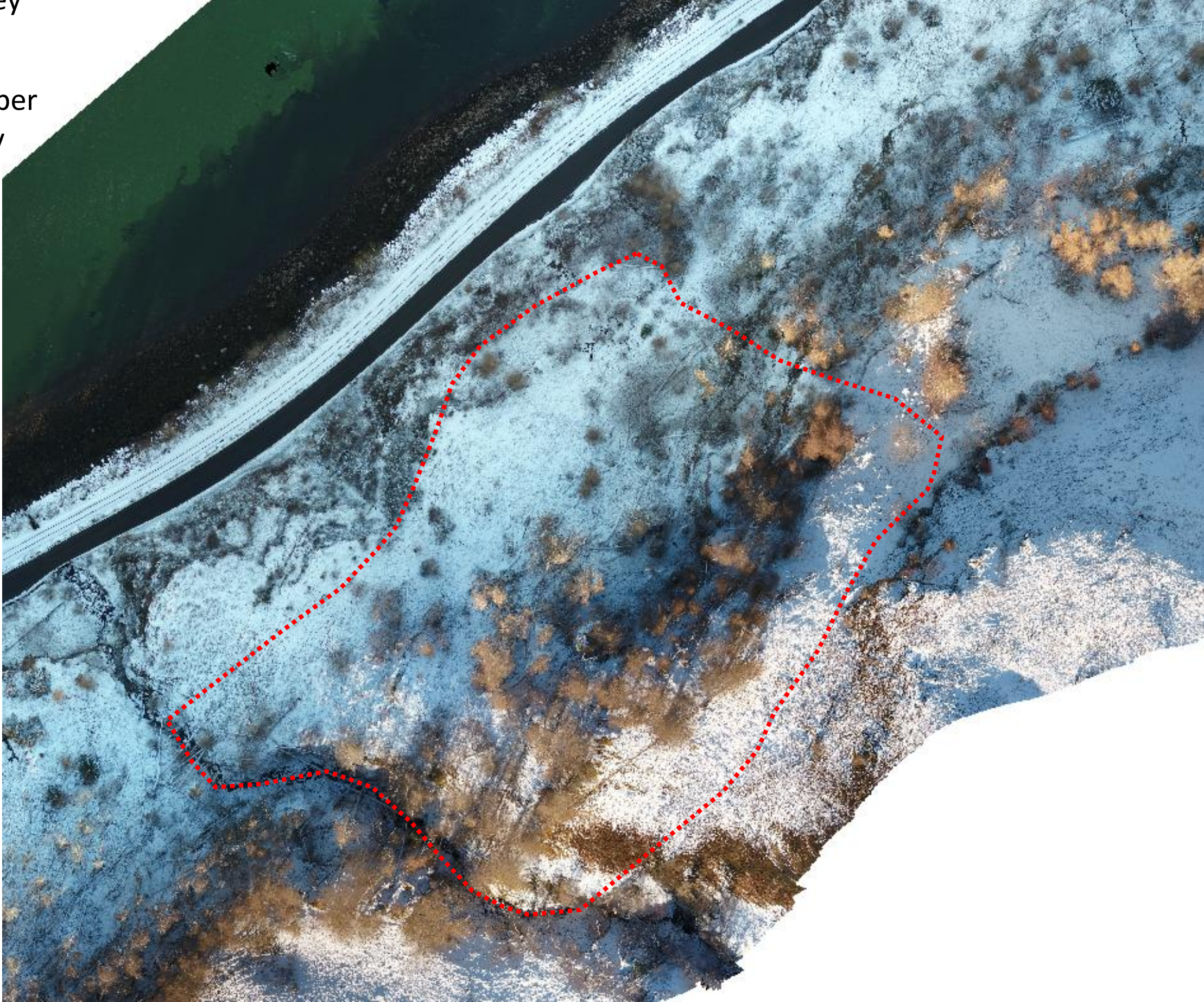
Grid Square	Approx. number of trees standing in 2023	Approx. number of trees standing in 2024	Approx. number of fallen trees between 2023 to 2024	% of trees that have fallen
1	20	20	0	0
2	23	23	0	0
3	3	3	0	0
4	20	19	1	5
5	18	18	0	0
6	3	3	0	0
7	23	23	0	0
8	2	2	0	0
<b>ALL (total)</b>	<b>112</b>	<b>111</b>	<b>1</b>	<b>0.9</b>

# Stromeferry

AA15 Upper - 2023:2024 Drone Survey Comparison

2023 Drone Survey

..... AA15 Upper boundary



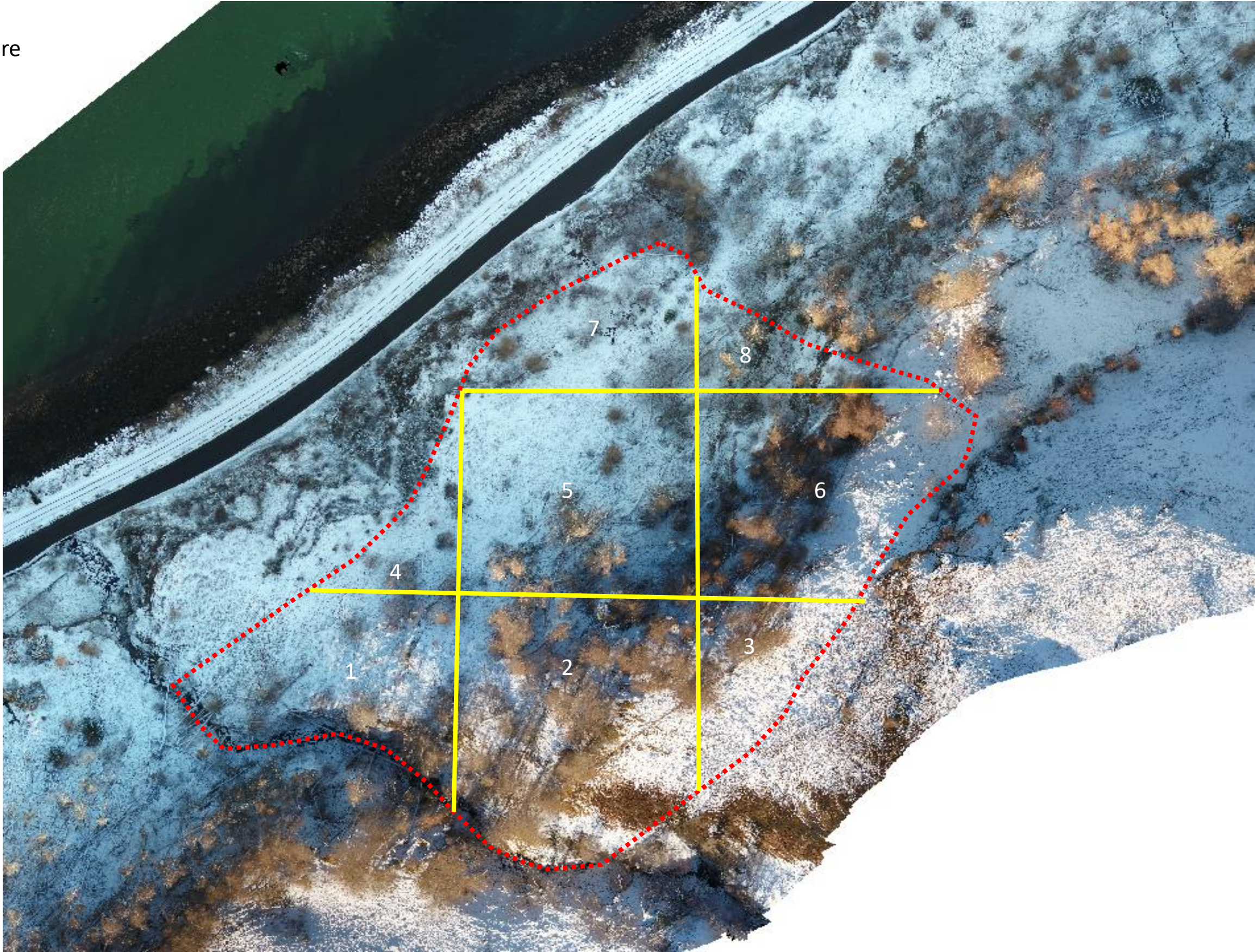
..... AA15 Upper boundary



# 2023 Drone Survey

..... AA15 Upper boundary

———— Grid Square boundary



1

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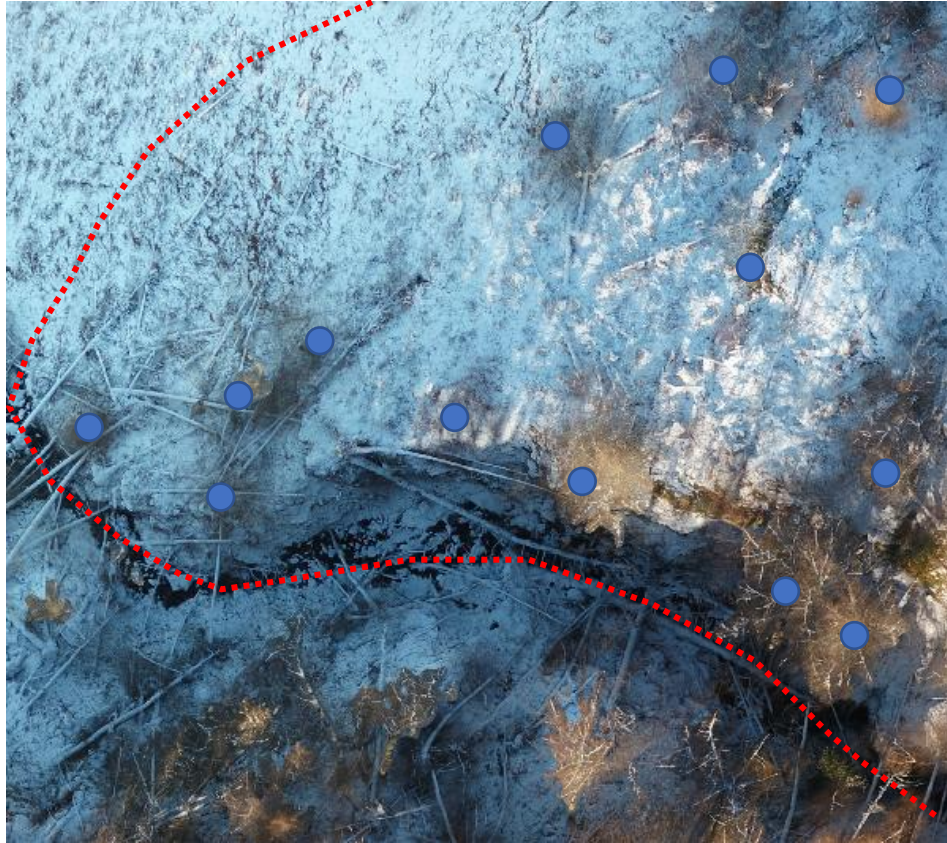
5

6

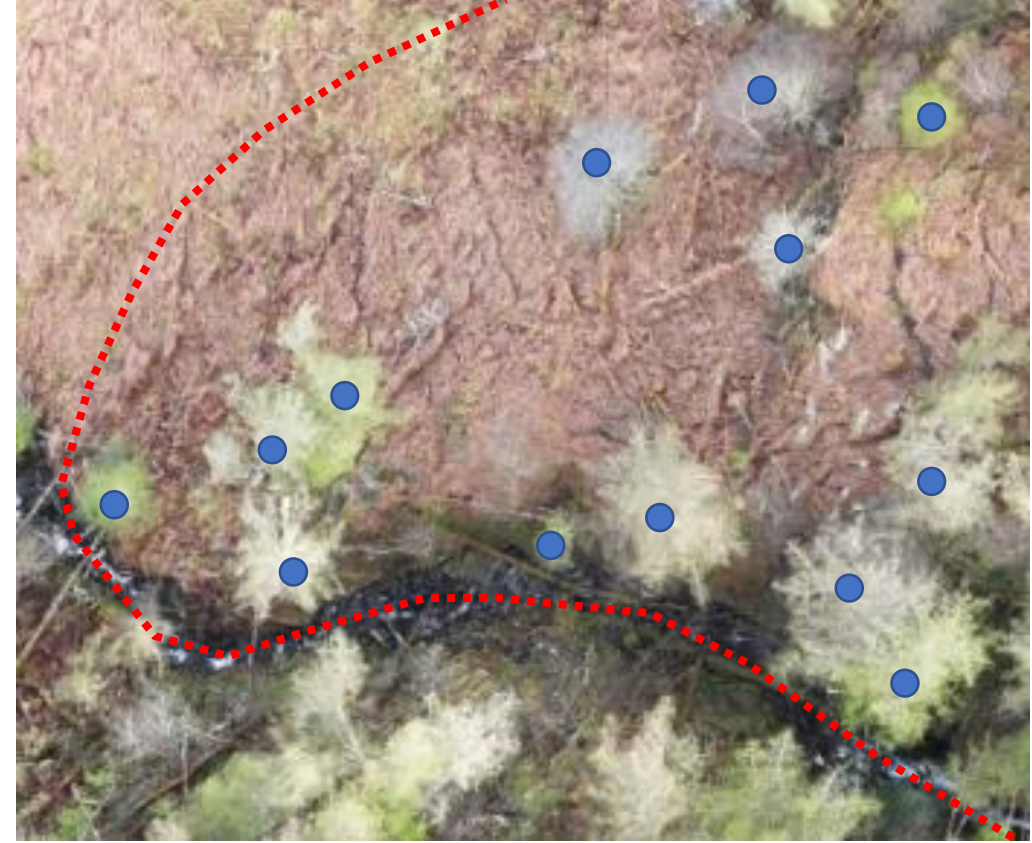
7

8

# 2023 Drone Survey



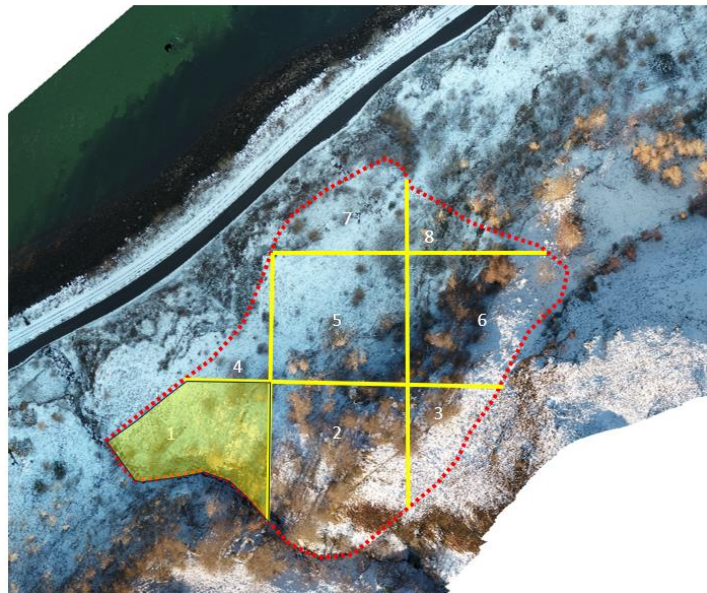
# 2024 Drone Survey



## Grid Square 1

2020 Drone Survey

- ..... AA15 Upper boundary
- Grid Square boundary



● Tree

Approx. number of trees standing in 2023: **13**

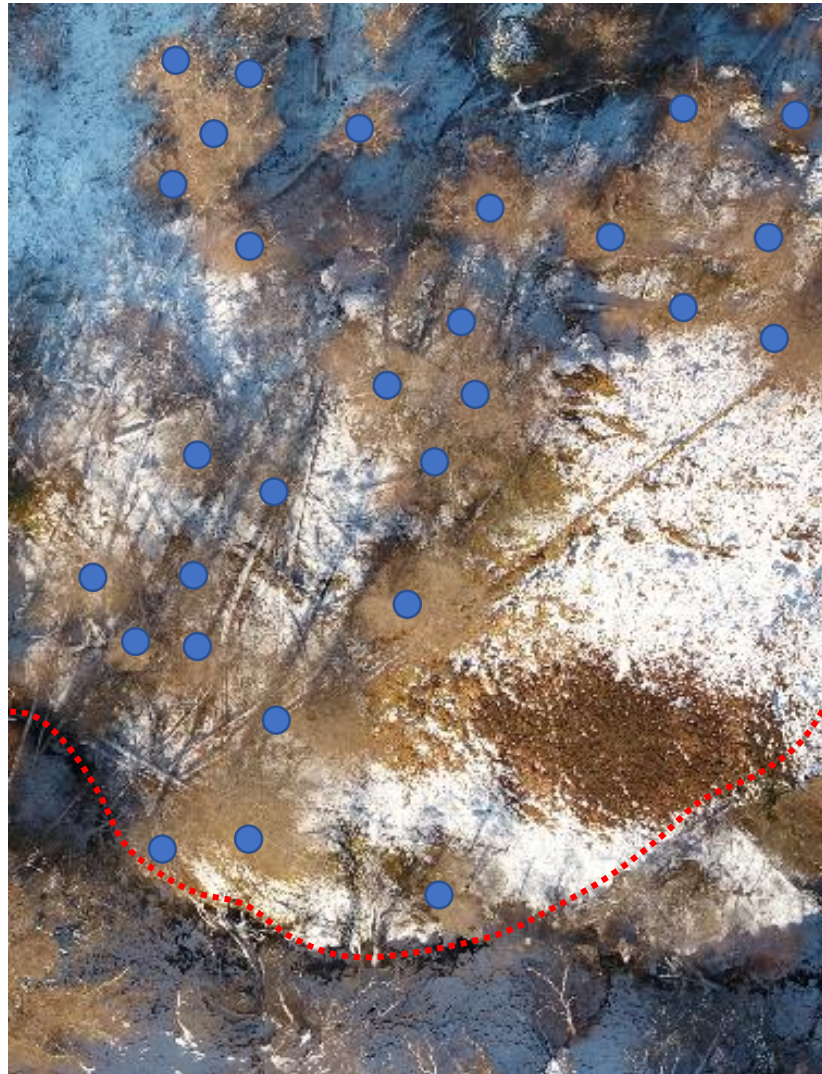
Approx. number of trees standing in 2024: **13**

Approx. number of fallen trees between 2023 to 2024: **0**

% of trees that have fallen: **0**

Note: red dots are 'new trees' noted in 2024 survey but not identified in 2023 survey. These have not been included in the summary information but have been highlighted to show they have not been missed out.

# 2023 Drone Survey

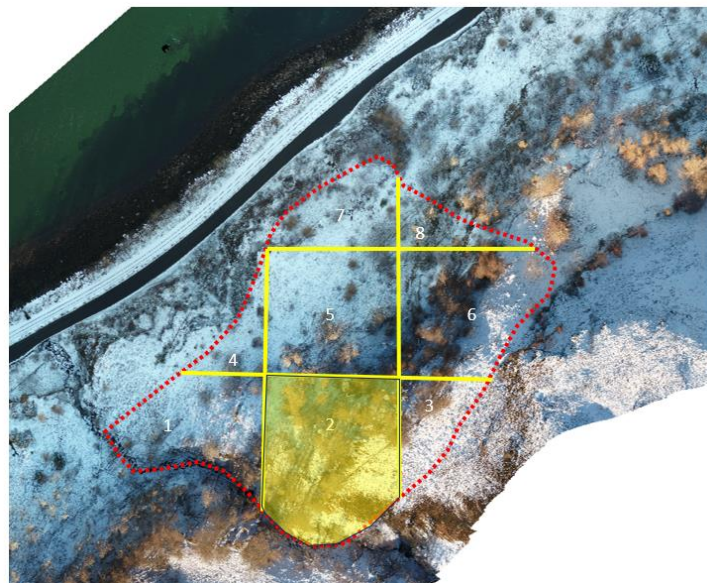


# 2024 Drone Survey



## Grid Square 2

- 2023 Drone Survey
- AA15 Upper boundary
- Grid Square boundary



● Tree

Approx. number of trees standing in 2023: **28**

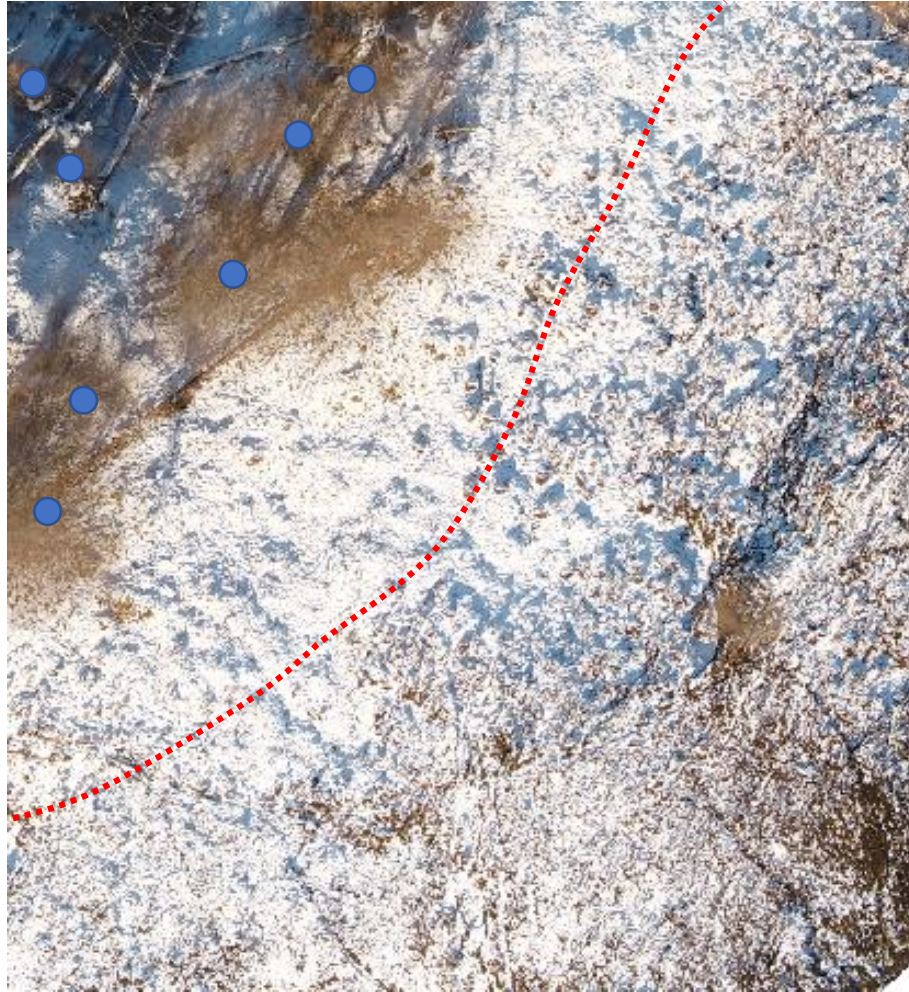
Approx. number of trees standing in 2024: **28**

Approx. number of fallen trees between 2023 to 2024: **0**

% of trees that have fallen: **0**



# 2023 Drone Survey



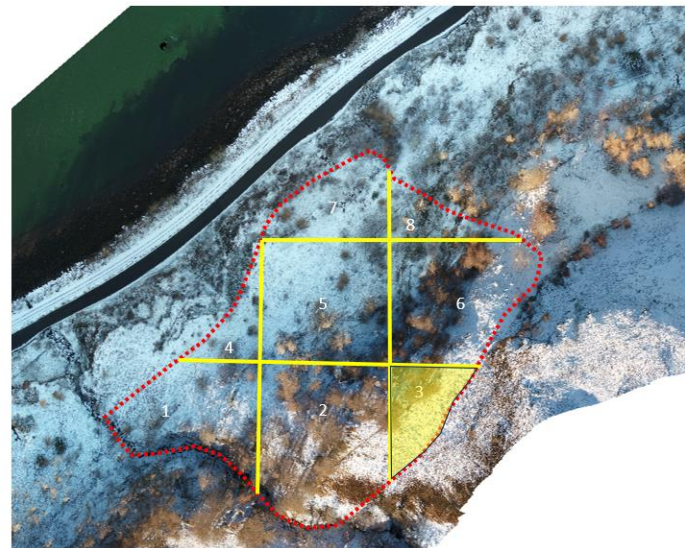
# 2024 Drone Survey



## Grid Square 3

2023 Drone Survey

- AA15 Upper boundary
- Grid Square boundary



- Tree

Approx. number of trees standing in 2023: **7**

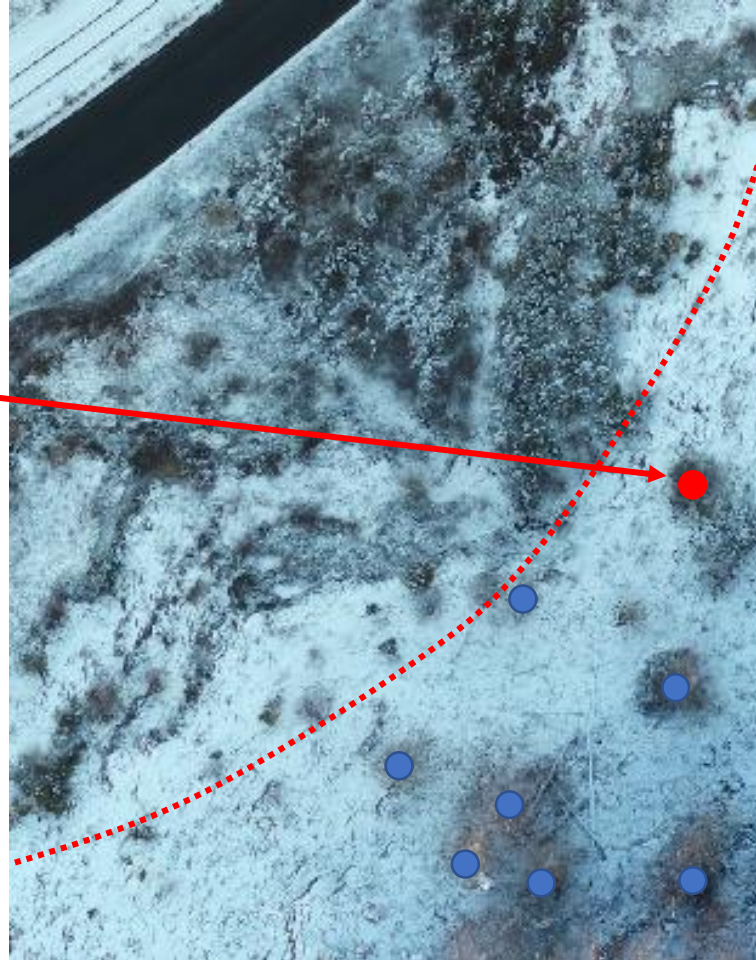
Approx. number of trees standing in 2024: **7**

Approx. number of fallen trees between 2023 to 2024: **0**

% of trees that have fallen: **0**

# 2023 Drone Survey

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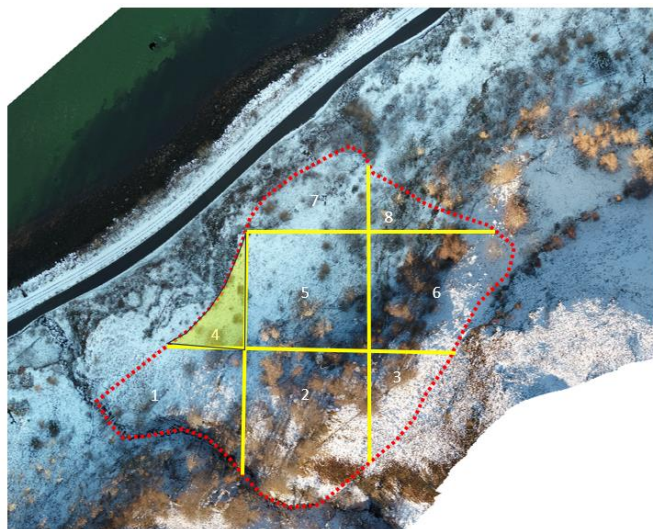


# 2024 Drone Survey



## Grid Square 4

2023 Drone Survey  
 ..... AA15 Upper boundary  
 ——— Grid Square boundary



● Tree

Approx. number of trees standing in 2023: **7\***

Approx. number of trees standing in 2023: **7**

Approx. number of fallen trees between 2023 to 2024: **0**

% of trees that have fallen: **0**

\*Note that the approx. number of trees standing was 8 in the 2023 report. This has been reduced to 7 as it is clear from the 2024 drone survey that it is gorse/shrubs rather than a tree.

# 2023 Drone Survey

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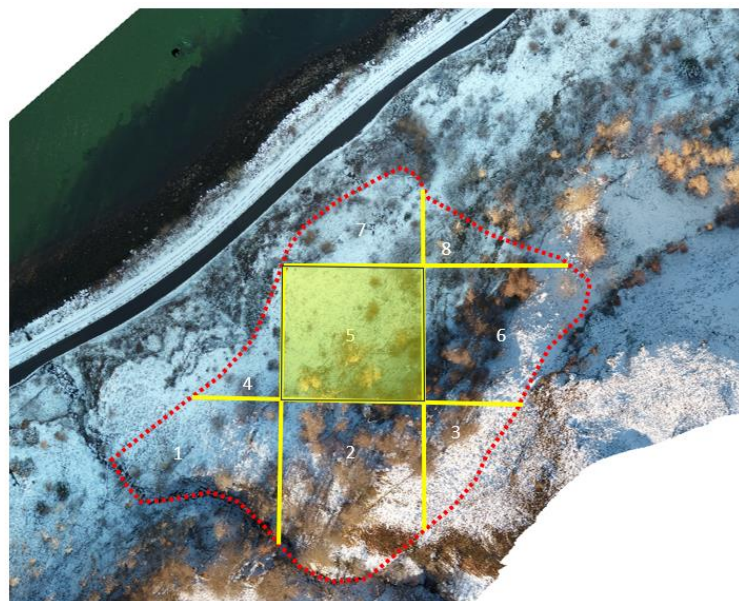
# 2024 Drone Survey



## Grid Square 5

2023 Drone Survey

- ⋯ AA15 Upper boundary
- Grid Square boundary



● Tree

Approx. number of trees standing in 2023: **21\***

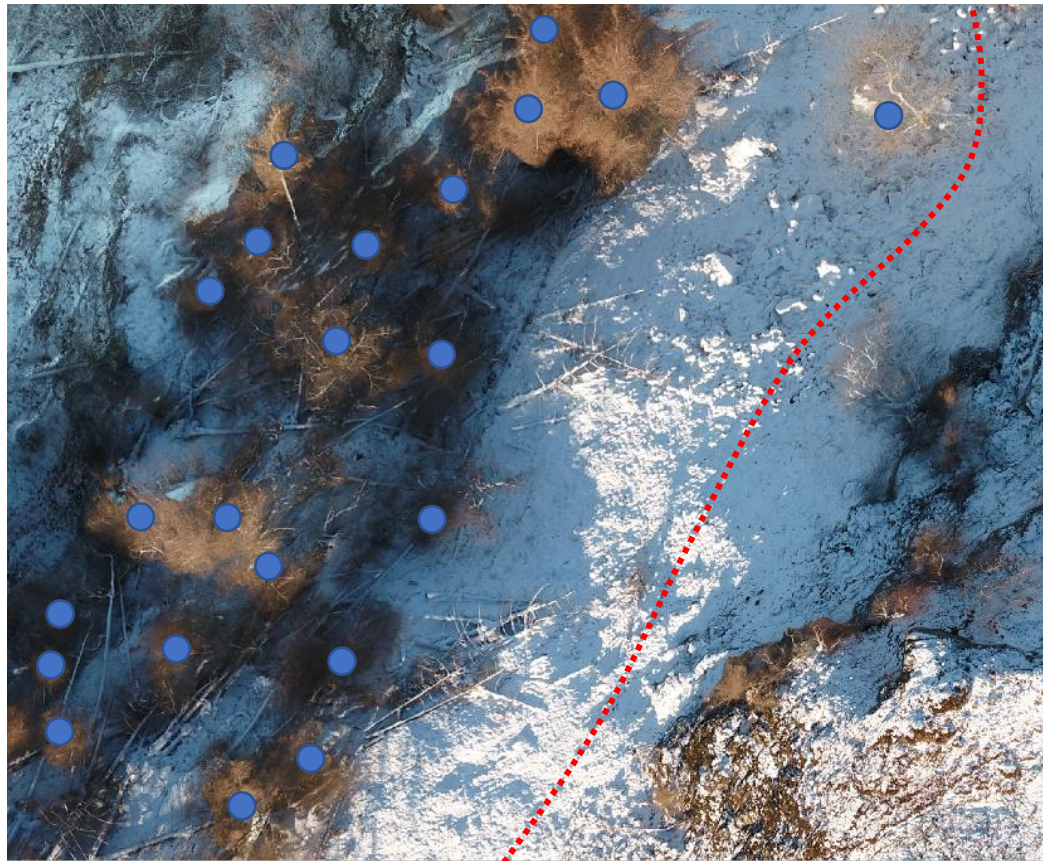
Approx. number of trees standing in 2024: **21**

Approx. number of fallen trees between 2023 to 2024: **0**

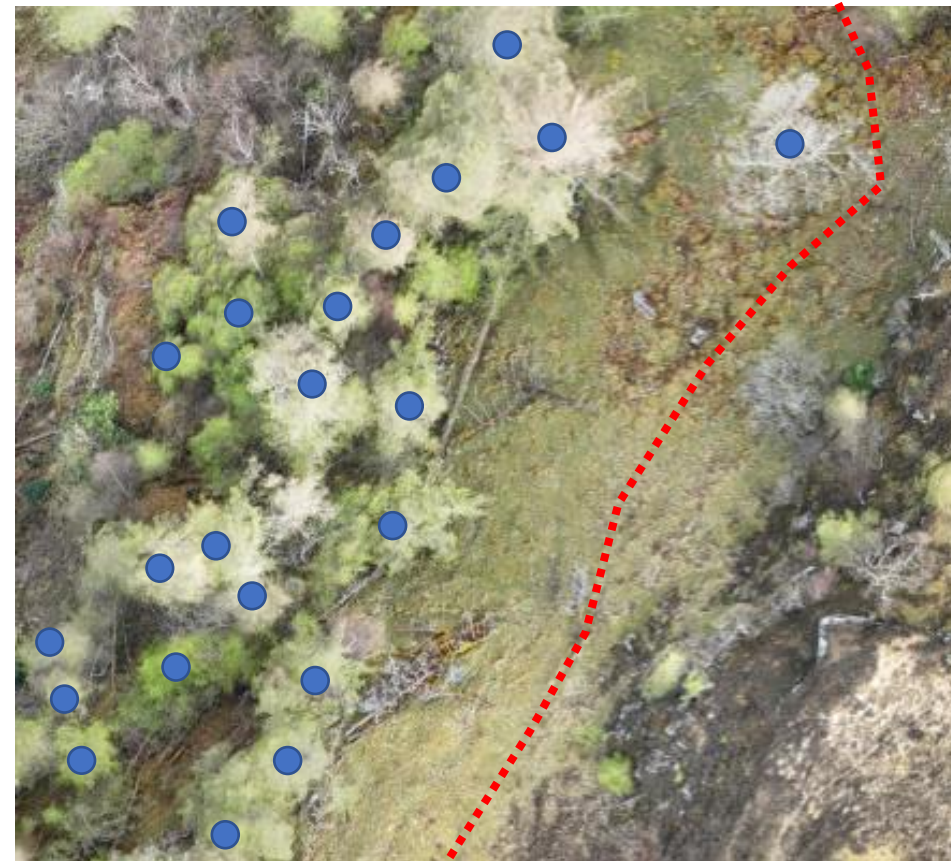
% of trees that have fallen: **0**

\*Note that the approx. number of trees standing was 22 in the 2023 report. This has been reduced to 21 as it is clear from the 2024 drone survey that it is gorse/shrubs rather than a tree.

# 2023 Drone Survey



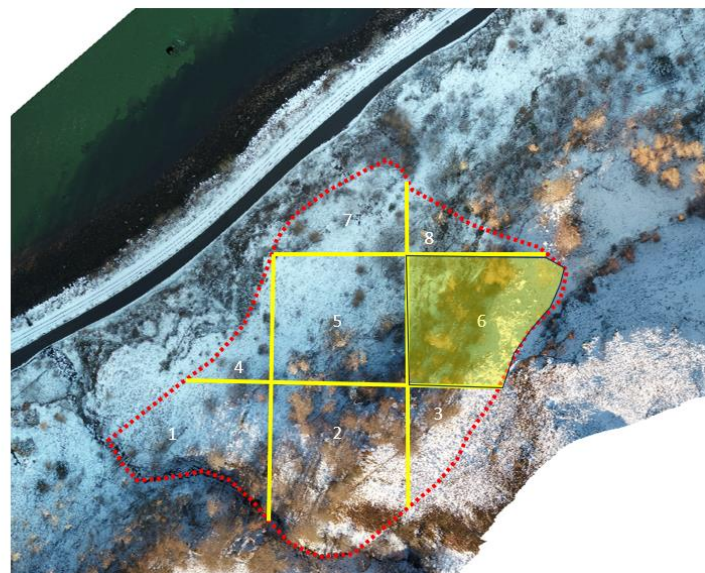
# 2024 Drone Survey



## Grid Square 6

2023 Drone Survey

..... AA15 Upper boundary  
—— Grid Square boundary



● Tree

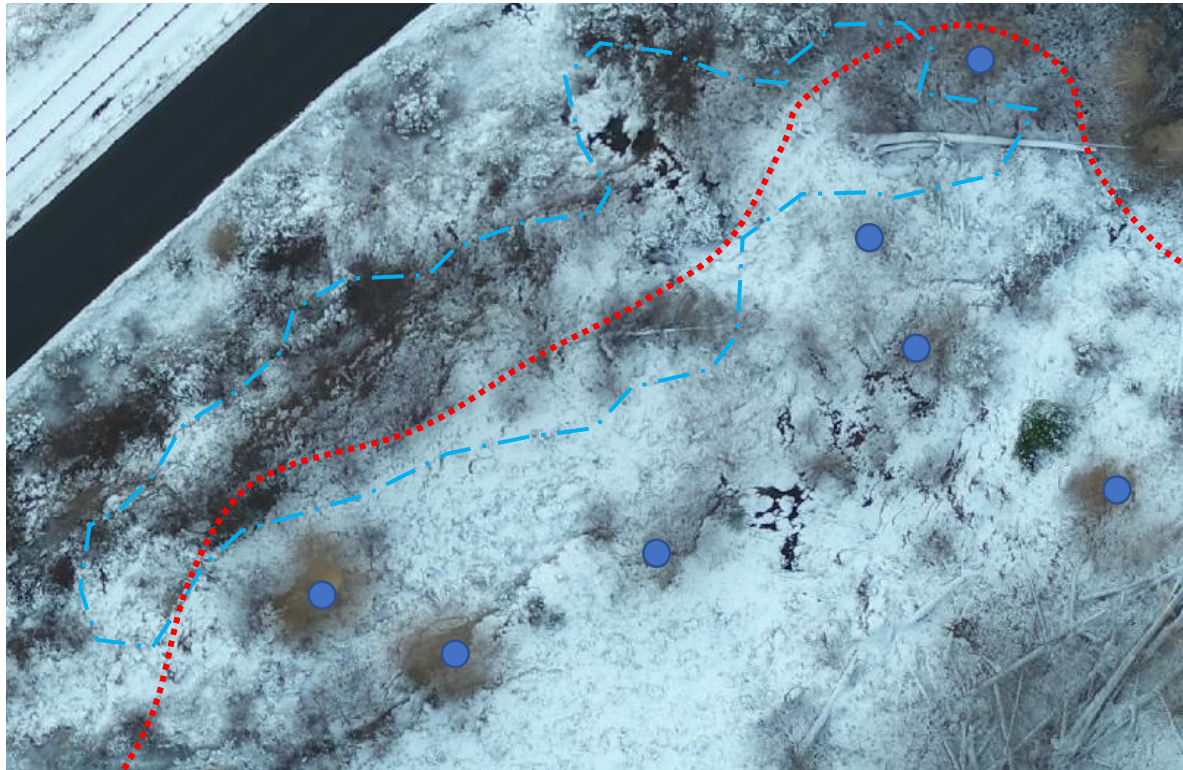
Approx. number of trees standing in 2023: **22**

Approx. number of trees standing in 2024: **22**

Approx. number of fallen trees between 2023 to 2024: **0**

% of trees that have fallen: **0**

# 2023 Drone Survey



# 2024 Drone Survey



Note: red dots noted in 2023 identified in 2024 not included in summary info highlighted for purposes only deleted once

----- Area boundary where there are many smaller trees on face of slope. Excluded from assessment.

● Tree

Approx. number of trees standing in 2023: 7

Approx. number of trees standing in 2024: 7

Approx. number of fallen trees between 2023 to 2024: 0

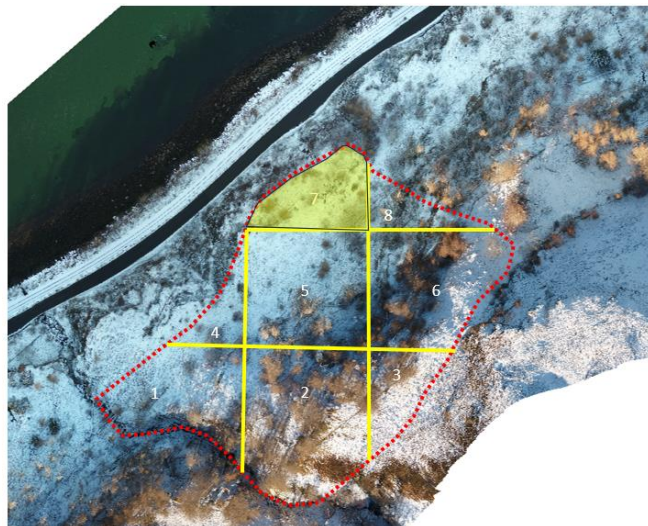
% of trees that have fallen: 0

## Grid Square 7

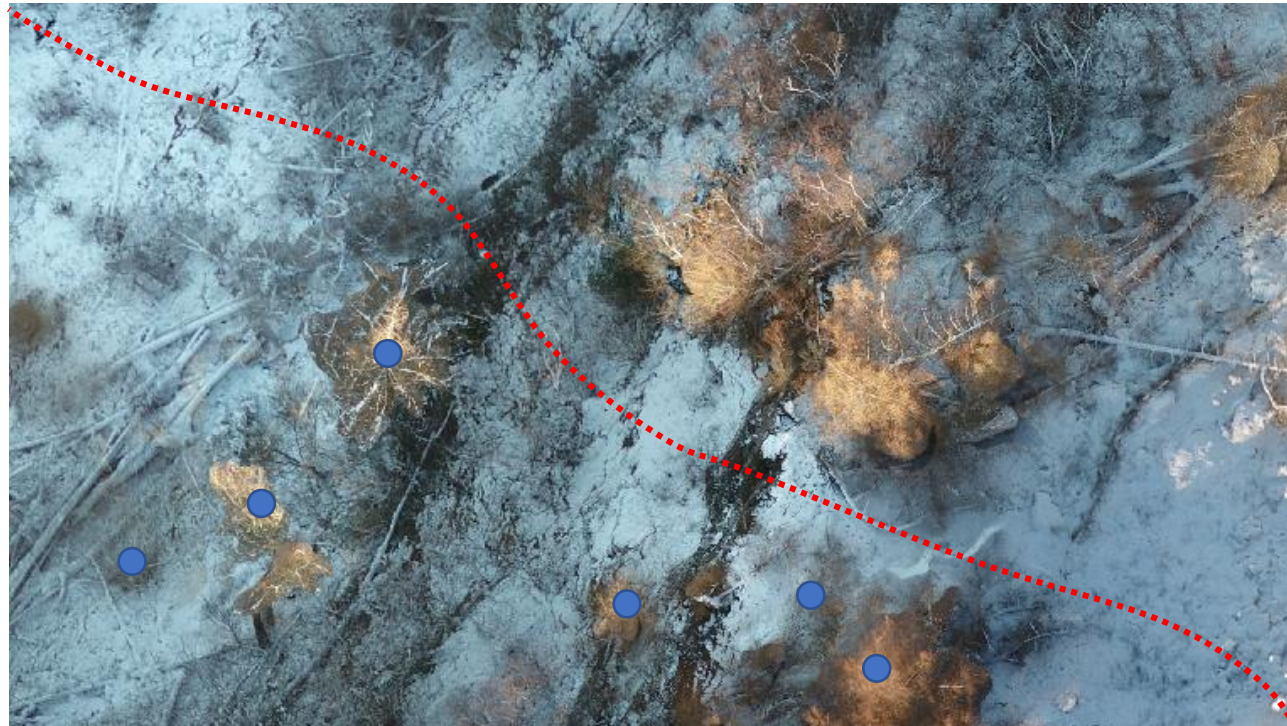
2023 Drone Survey

..... AA15 Upper boundary

--- Grid Square boundary



## 2023 Drone Survey



## 2024 Drone Survey

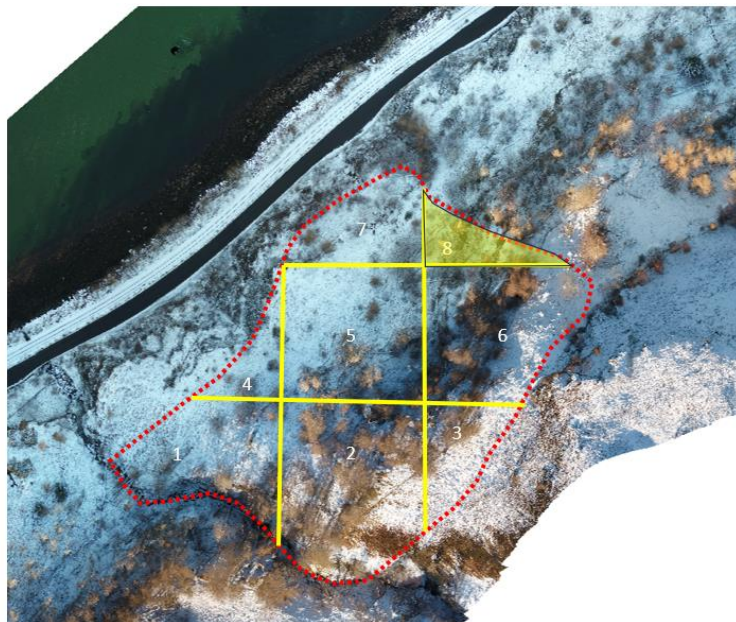


### Grid Square 8

2023 Drone Survey

..... AA15 Upper boundary

— Grid Square boundary



● Tree

Approx. number of trees standing in 2023: **6**

Approx. number of trees standing in 2024: **6**

Approx. number of fallen trees between 2023 to 2024: **0**

% of trees that have fallen: **0**

# AA15 Upper Summary Table

Grid Square	Approx. number of trees standing in 2023	Approx. number of trees standing in 2024	Approx. number of fallen trees between 2023 to 2024	% of trees that have fallen
1	13	13	0	0
2	28	28	0	0
3	7	7	0	0
4	7	7	0	0
5	21	21	0	0
6	22	22	0	0
7	7	7	0	0
8	6	6	0	0
<b>ALL (total)</b>	<b>111</b>	<b>111</b>	<b>0</b>	<b>0</b>

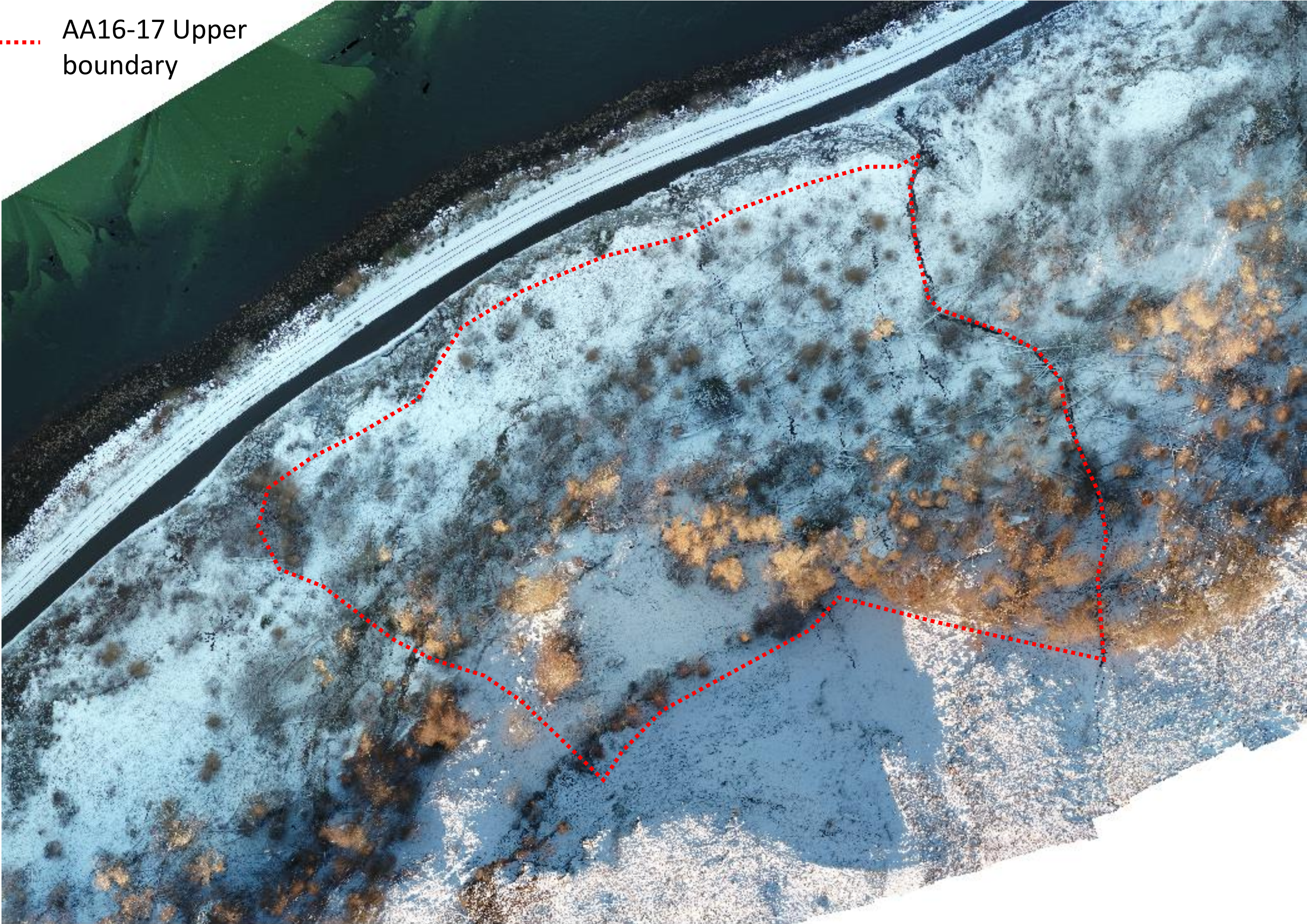
# Stromeferry

AA16\_17 Upper - 2023:2024 Drone Survey Comparison



# 2023 Drone Survey

AA16-17 Upper  
boundary



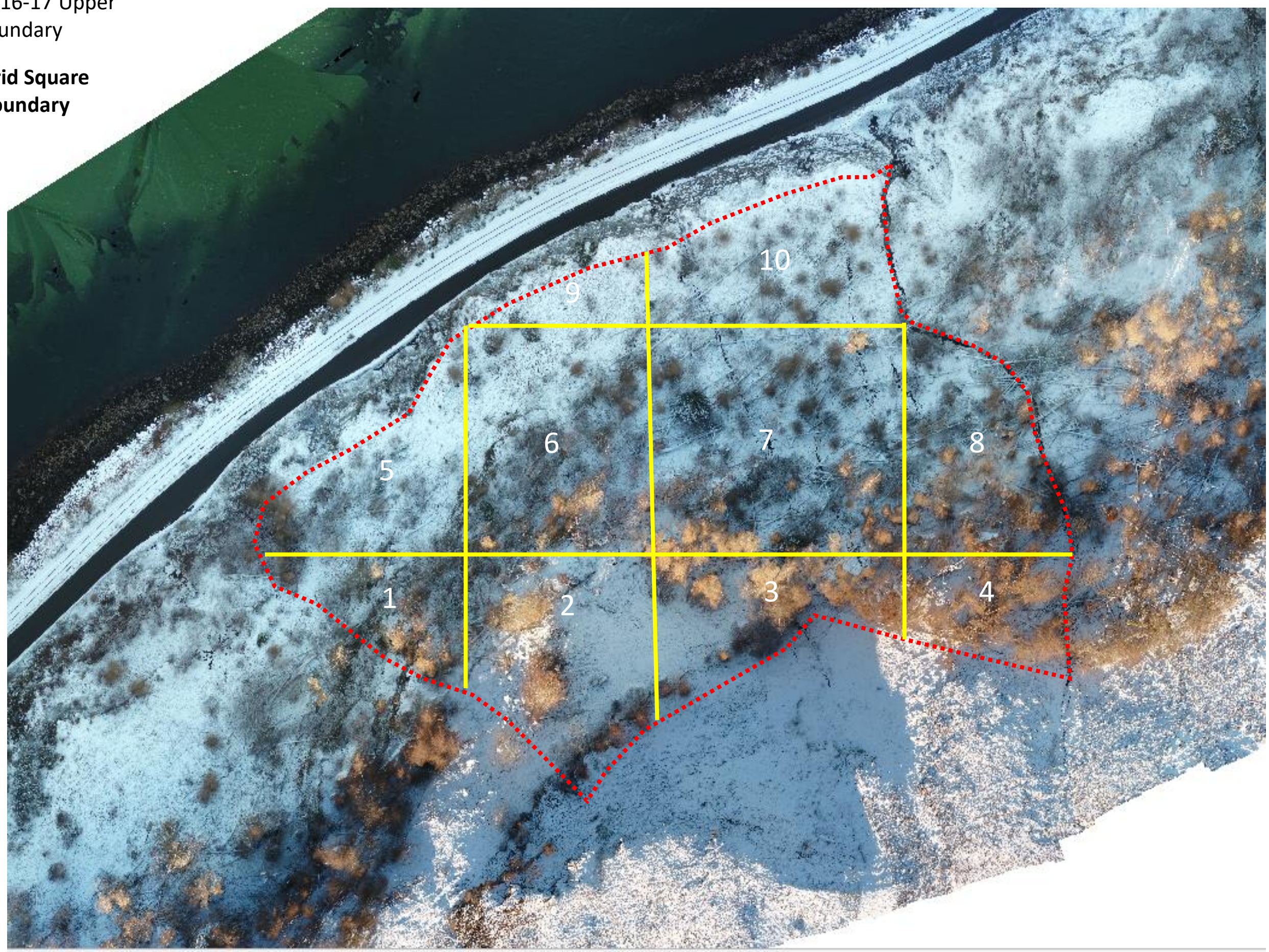
AA16-17 Upper  
boundary



2023 Drone Survey

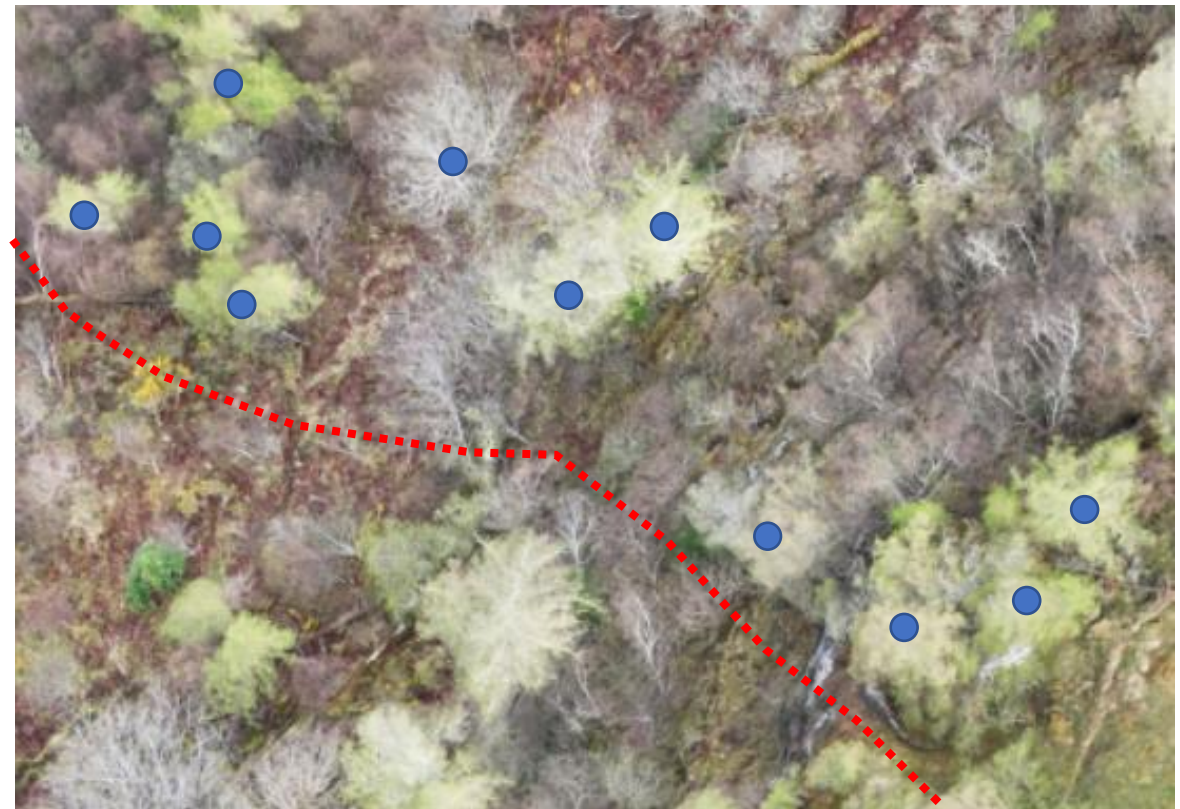
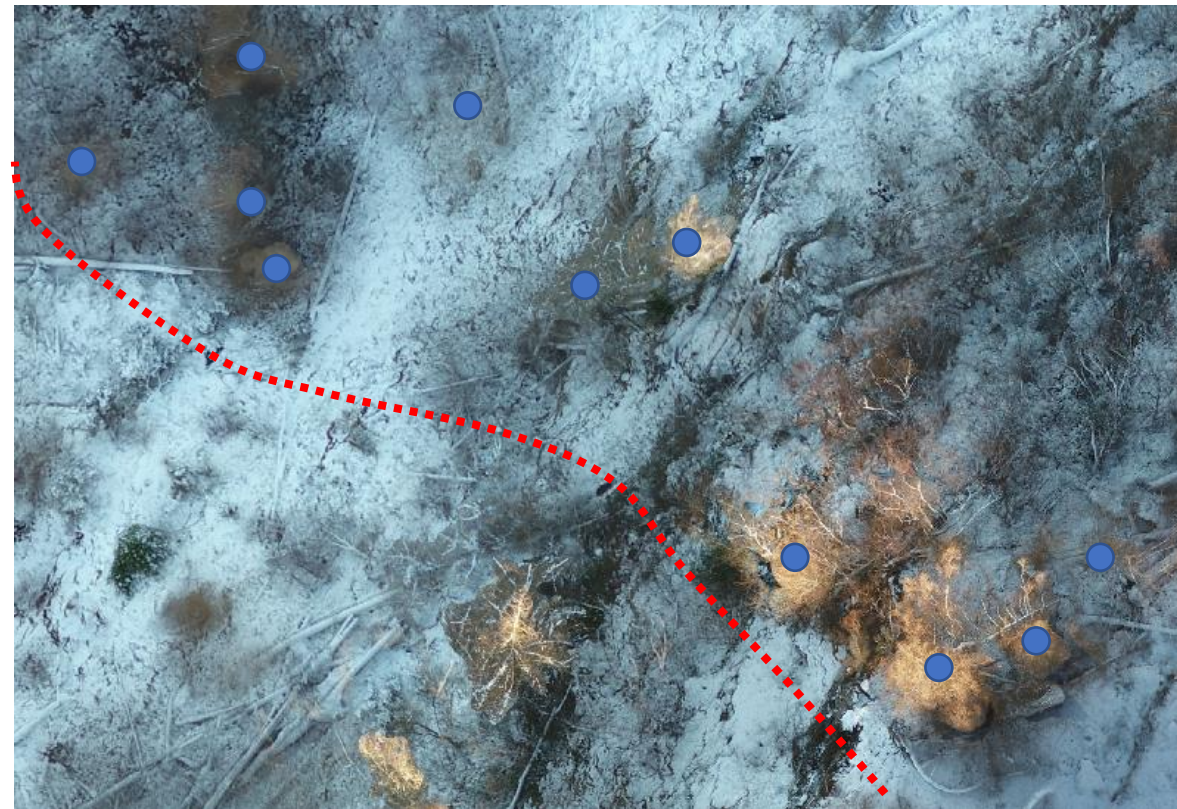
AA16-17 Upper boundary

Grid Square boundary



# 2023 Drone Survey

# 2024 Drone Survey

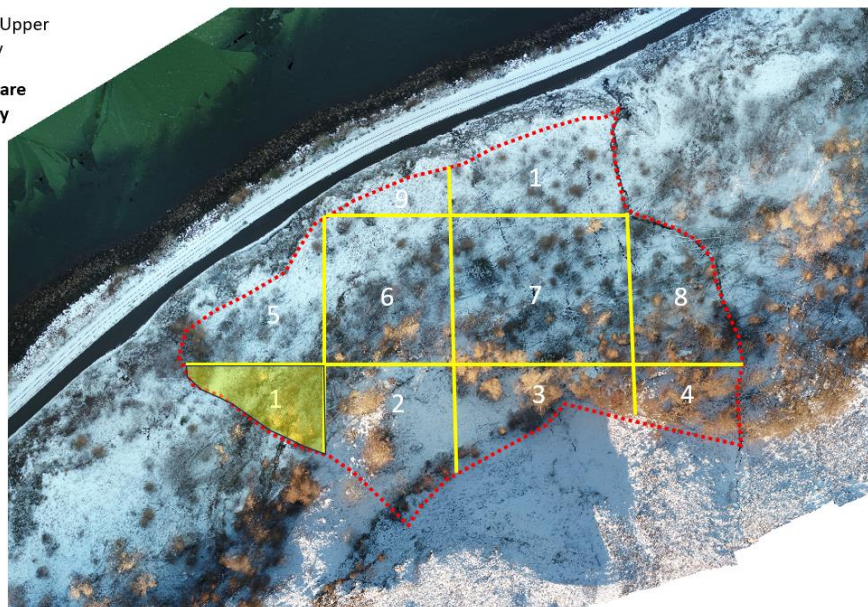


## Grid Square 1

2023 Drone Survey

AA16-17 Upper boundary

Grid Square boundary



● Tree

Approx. number of trees standing in 2023: **11**

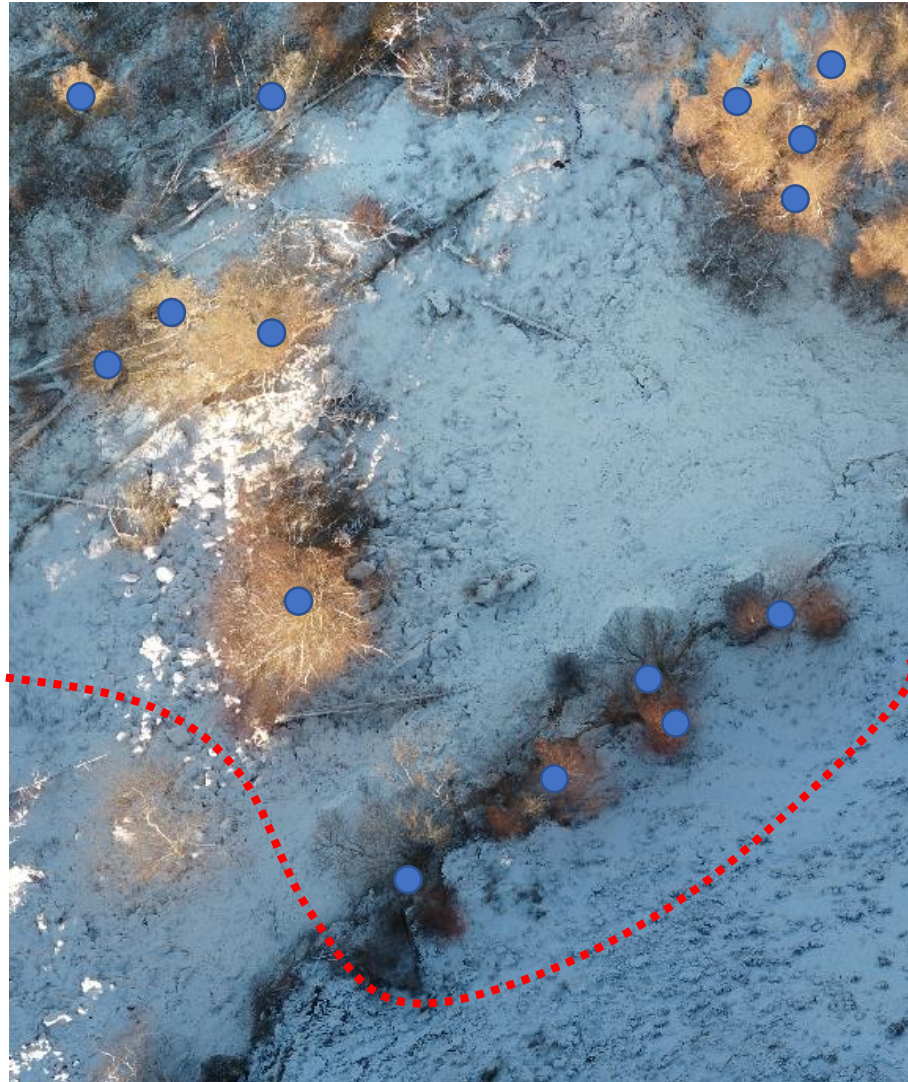
Approx. number of trees standing in 2024: **11**

Approx. number of fallen trees between 2023 to 2024: **0**

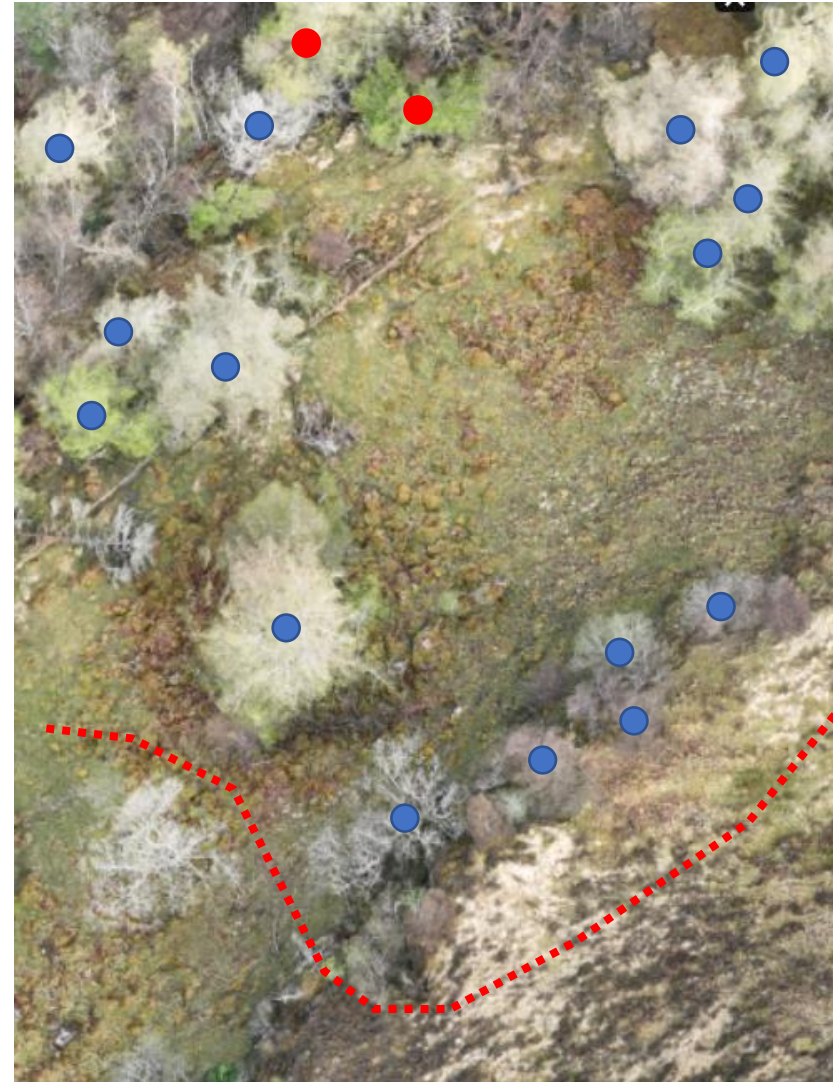
% of trees that have fallen: **0**

Note: red dots are 'new trees' noted in 2024 survey but not identified in 2023 survey. These have not been included in the summary information but have been highlighted to show they have not been missed out.

# 2023 Drone Survey



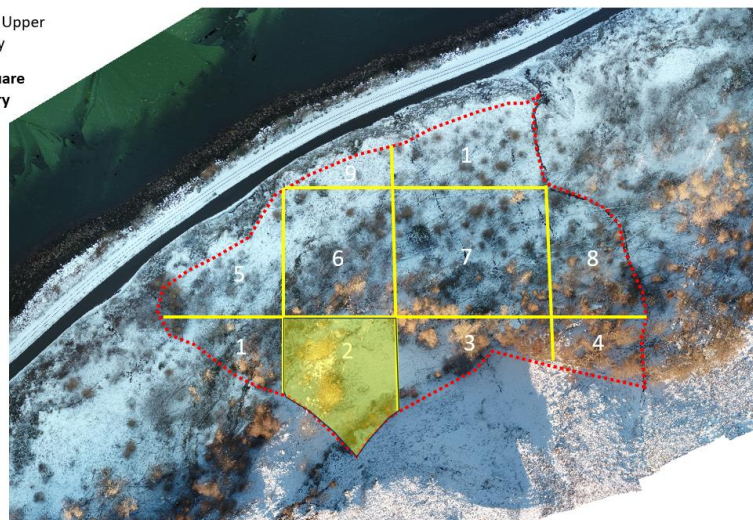
# 2024 Drone Survey



## Grid Square 2

2023 Drone Survey

- AA16-17 Upper boundary
- Grid Square boundary



● Tree

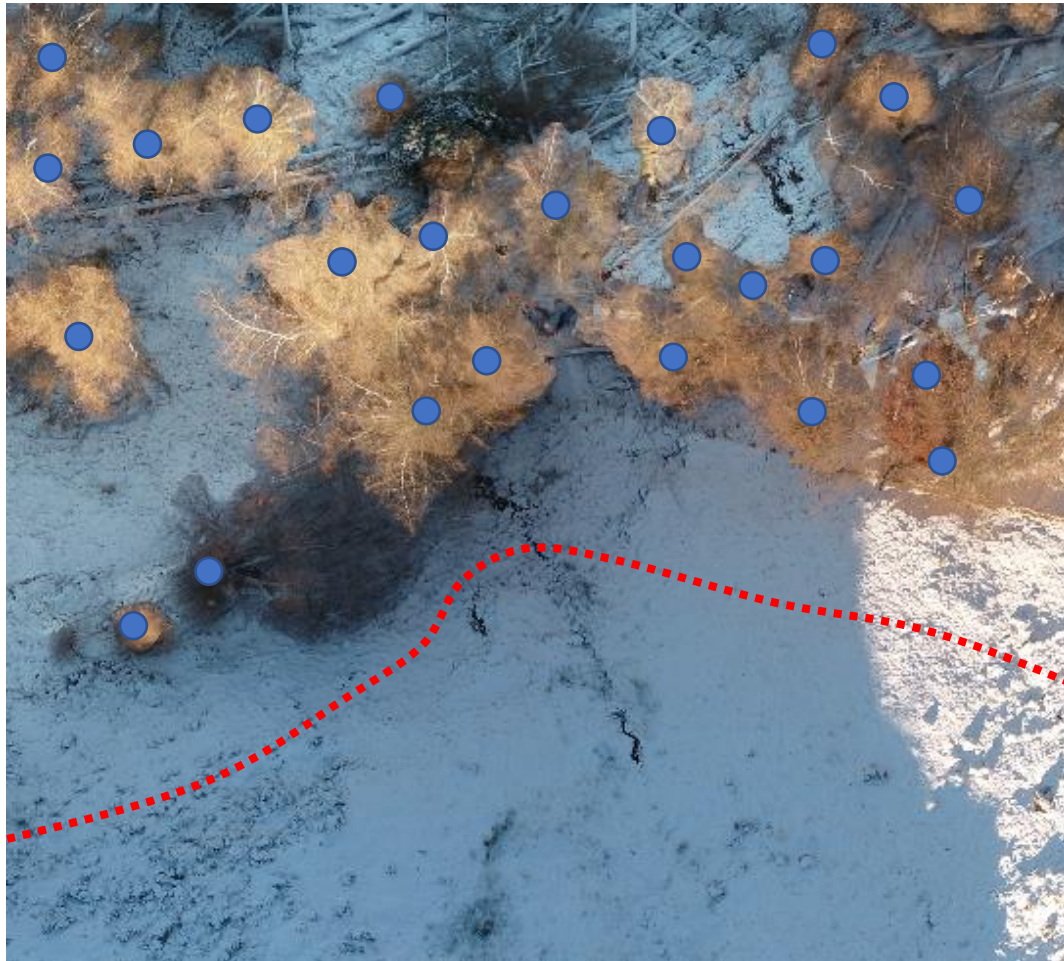
Approx. number of trees standing in 2023: **15**

Approx. number of trees standing in 2024: **15**

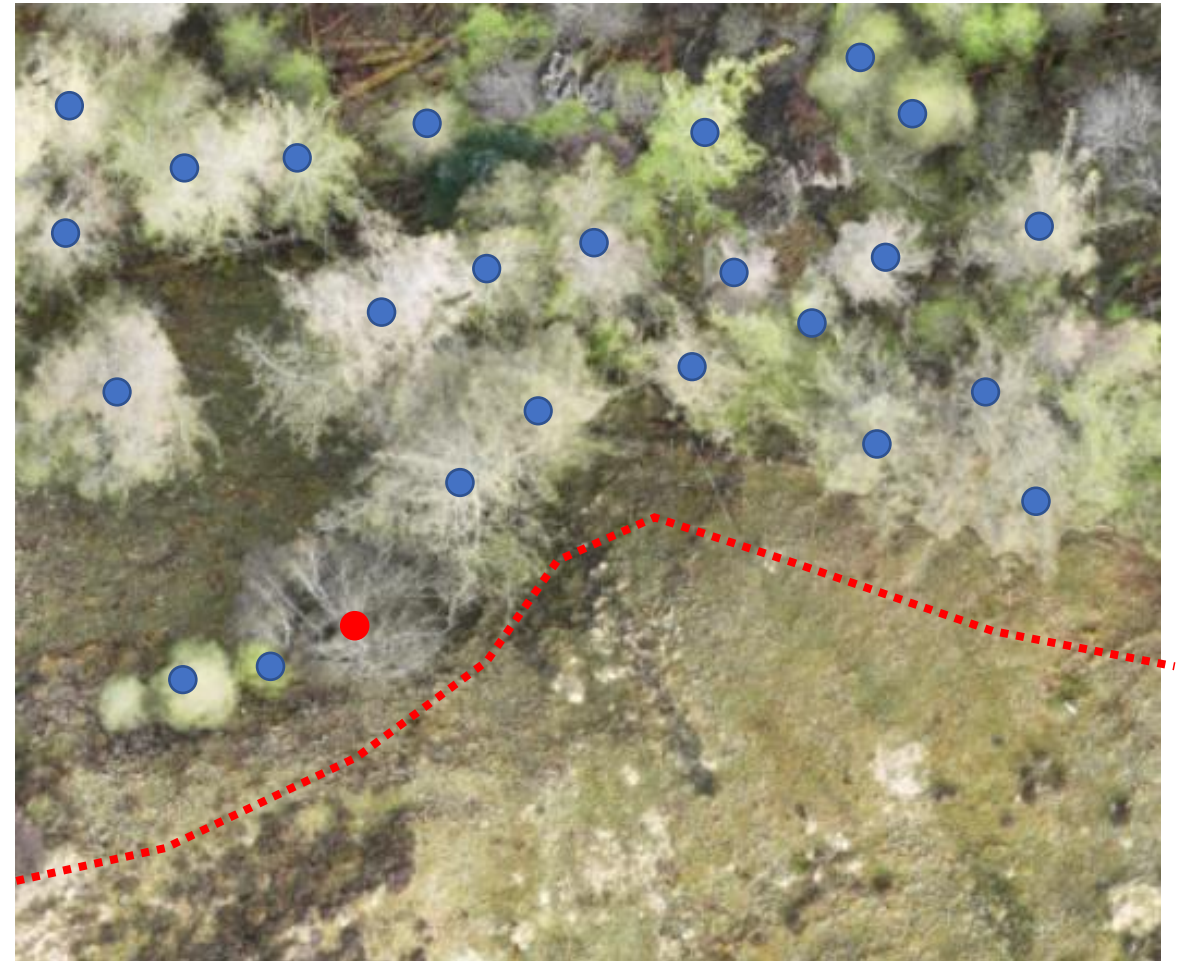
Approx. number of fallen trees between 2023 to 2024: **0**

% of trees that have fallen: **0**

# 2023 Drone Survey



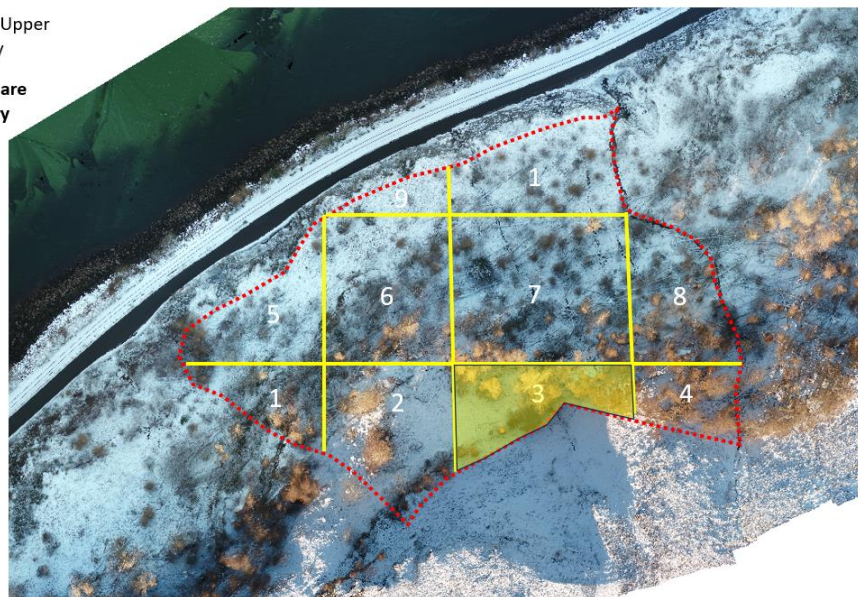
# 2024 Drone Survey



## Grid Square 3

2023 Drone Survey

- AA16-17 Upper boundary
- Grid Square boundary



● Tree

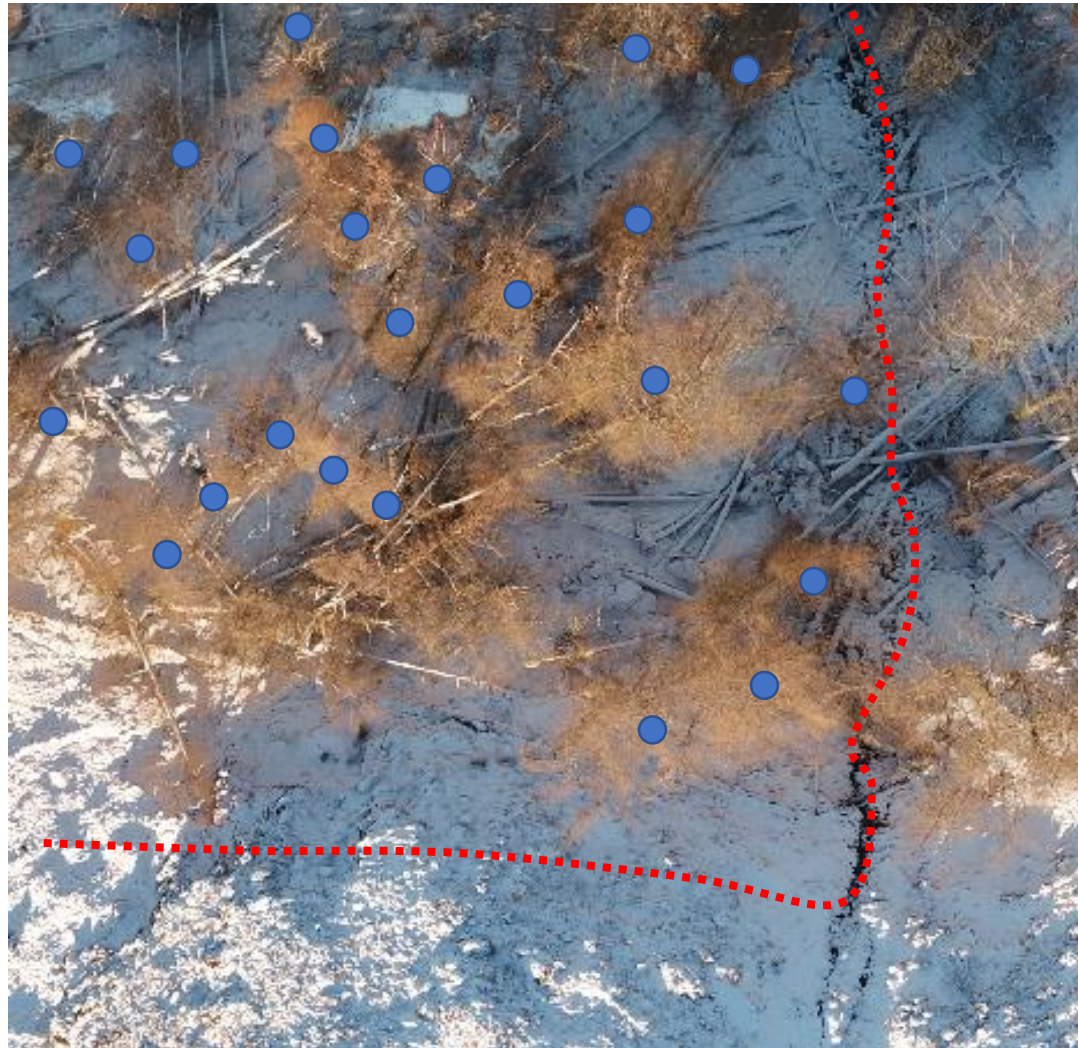
Approx. number of trees standing in 2023: **24**

Approx. number of trees standing in 2024: **24**

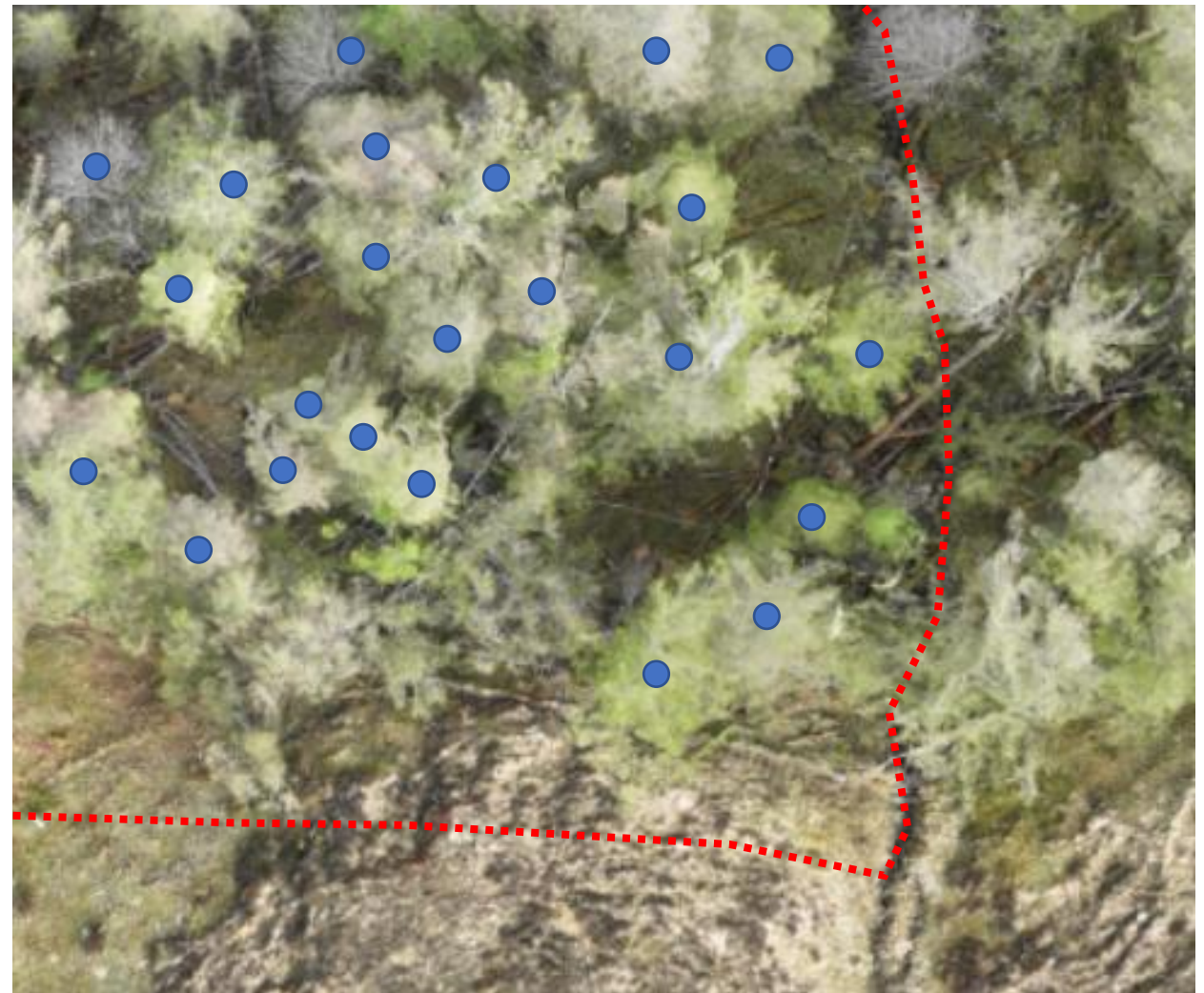
Approx. number of fallen trees between 2023 to 2024: **0**

% of trees that have fallen: **0**

# 2023 Drone Survey



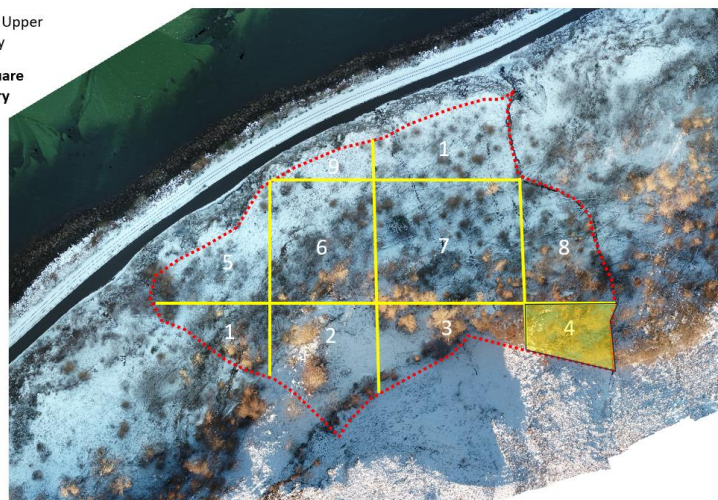
# 2024 Drone Survey



## Grid Square 4

2023 Drone Survey

..... AA16-17 Upper boundary  
—— Grid Square boundary



● Tree

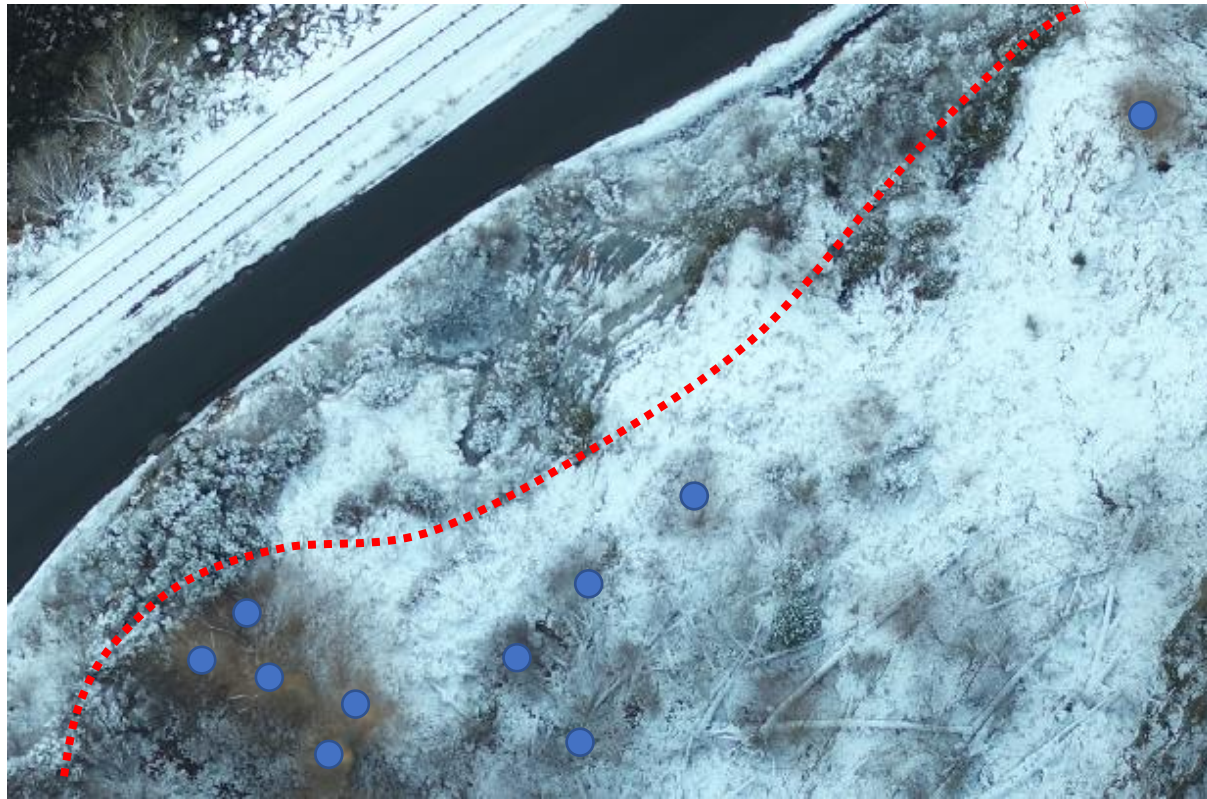
Approx. number of trees standing in 2023: **23**

Approx. number of trees standing in 2024: **23**

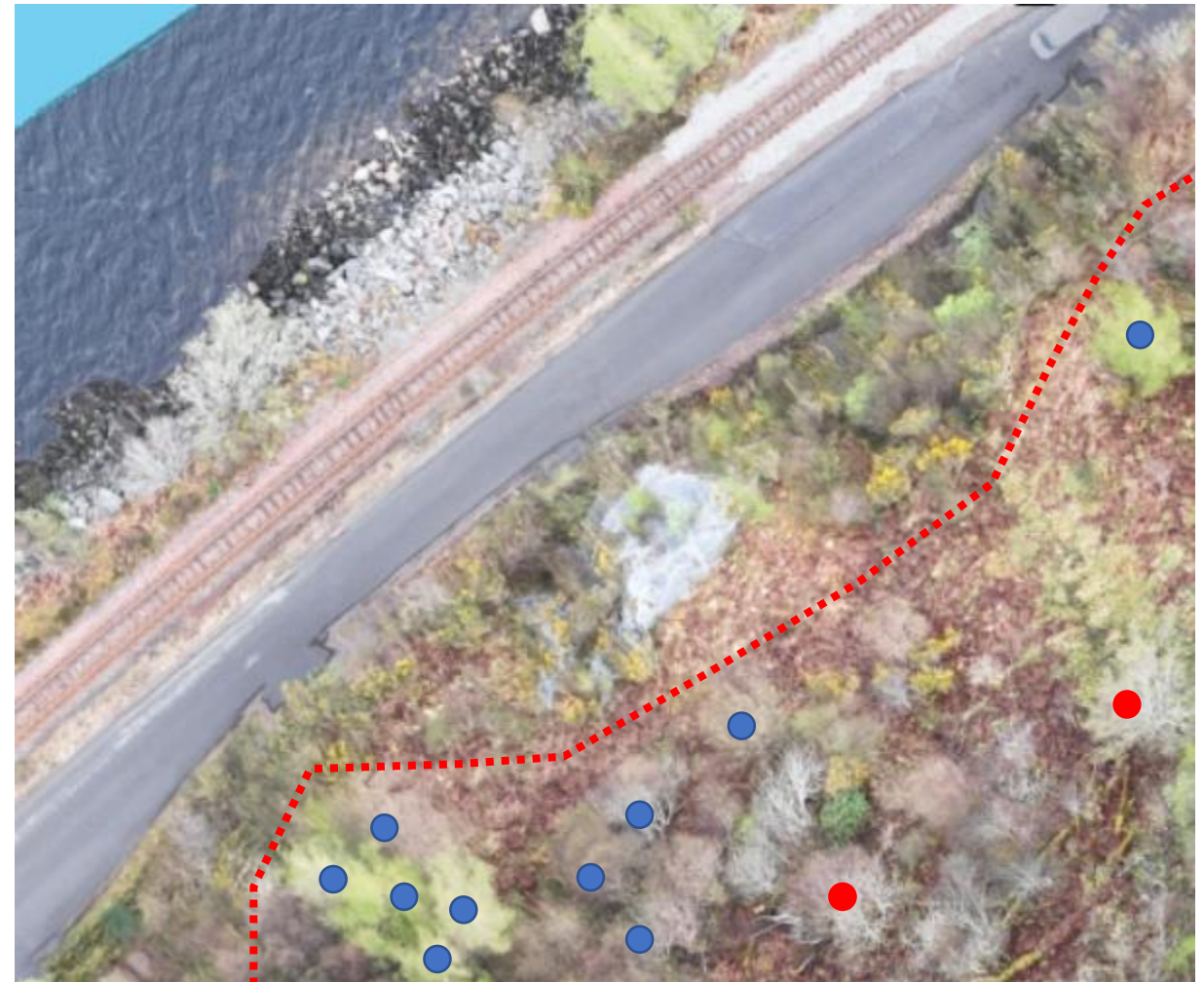
Approx. number of fallen trees between 2023 to 2024: **0**

% of trees that have fallen: **0**

# 2023 Drone Survey



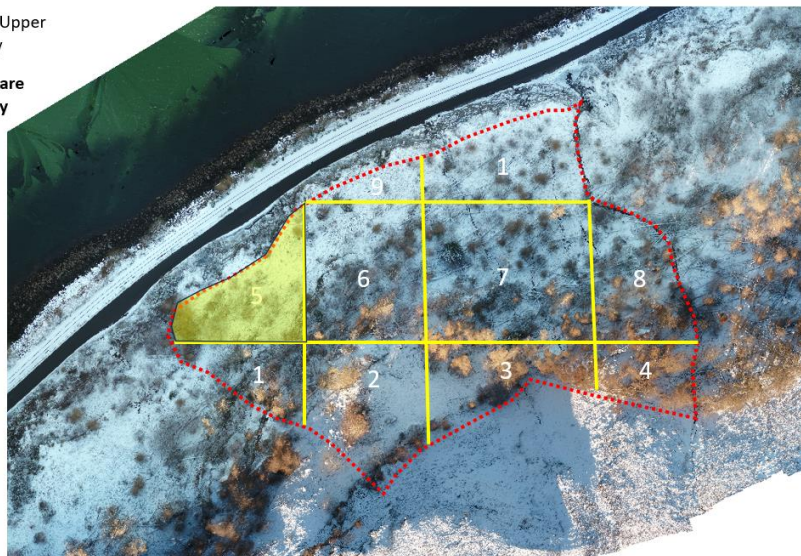
# 2024 Drone Survey



## Grid Square 5

2023 Drone Survey

- AA16-17 Upper boundary
- Grid Square boundary



● Tree

Approx. number of trees standing in 2023: **10**

Approx. number of trees standing in 2024: **10**

Approx. number of fallen trees between 2023 to 2024: **0**

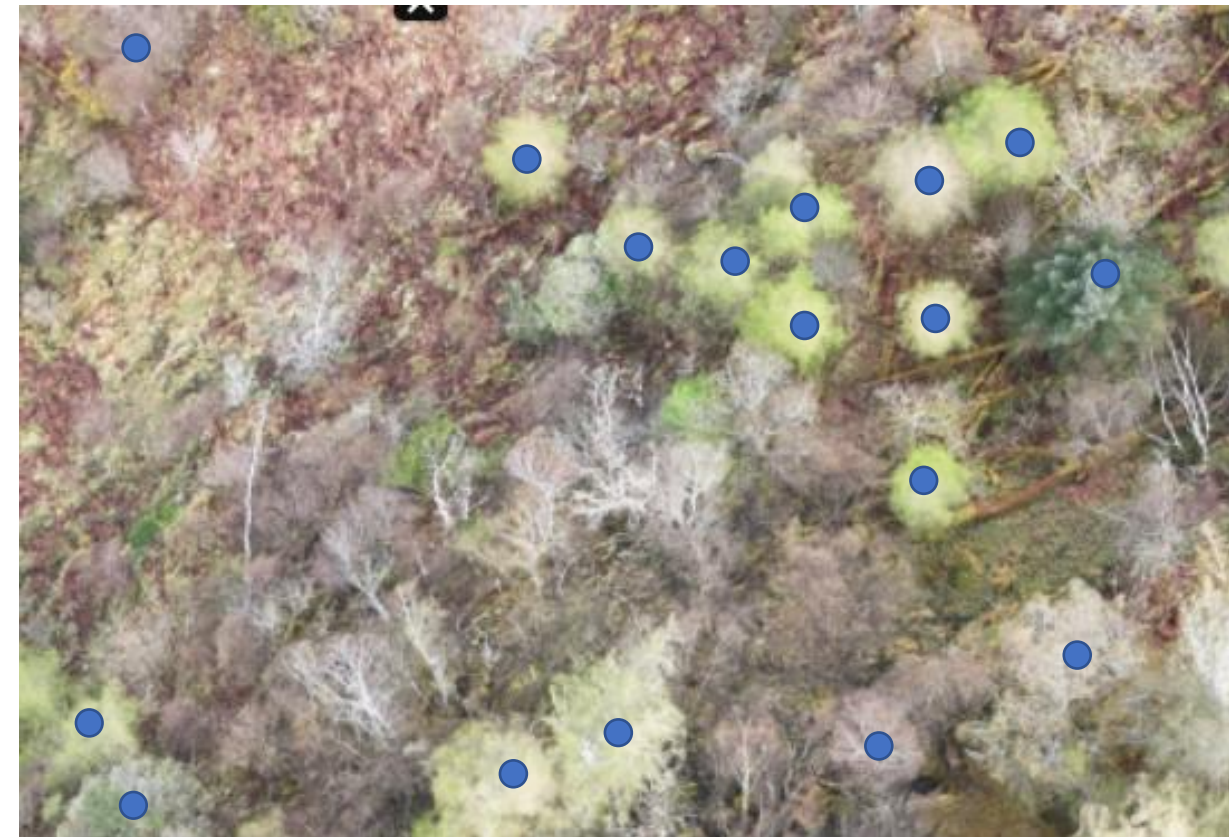
% of trees that have fallen: **0**



# 2023 Drone Survey



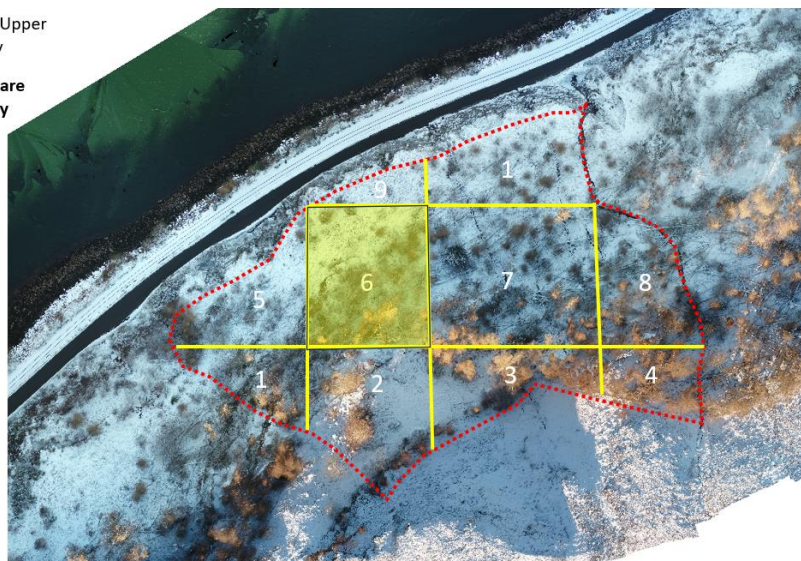
# 2024 Drone Survey



## Grid Square 6

2023 Drone Survey

- AA16-17 Upper boundary
- Grid Square boundary



● Tree

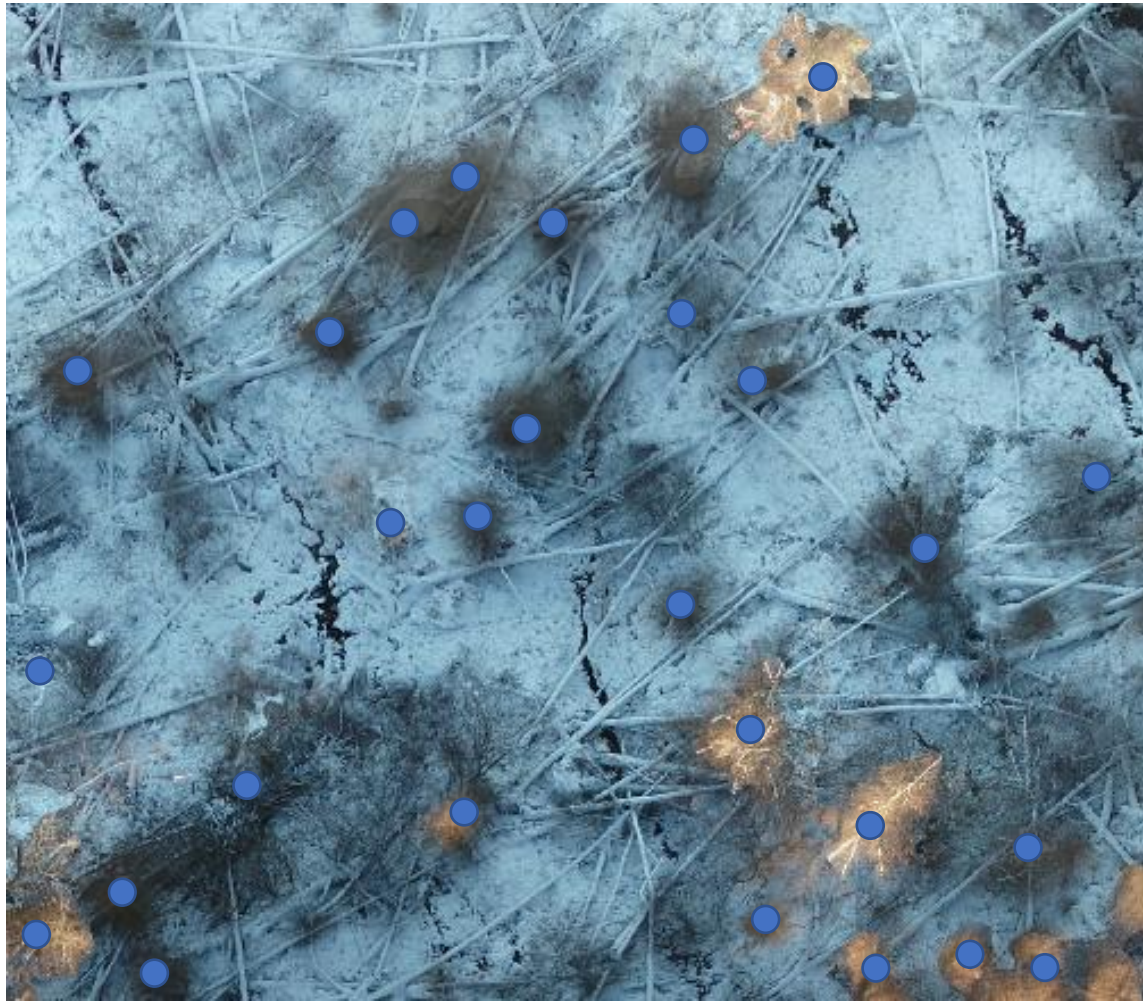
Approx. number of trees standing in 2023: **17**

Approx. number of trees standing in 2024: **17**

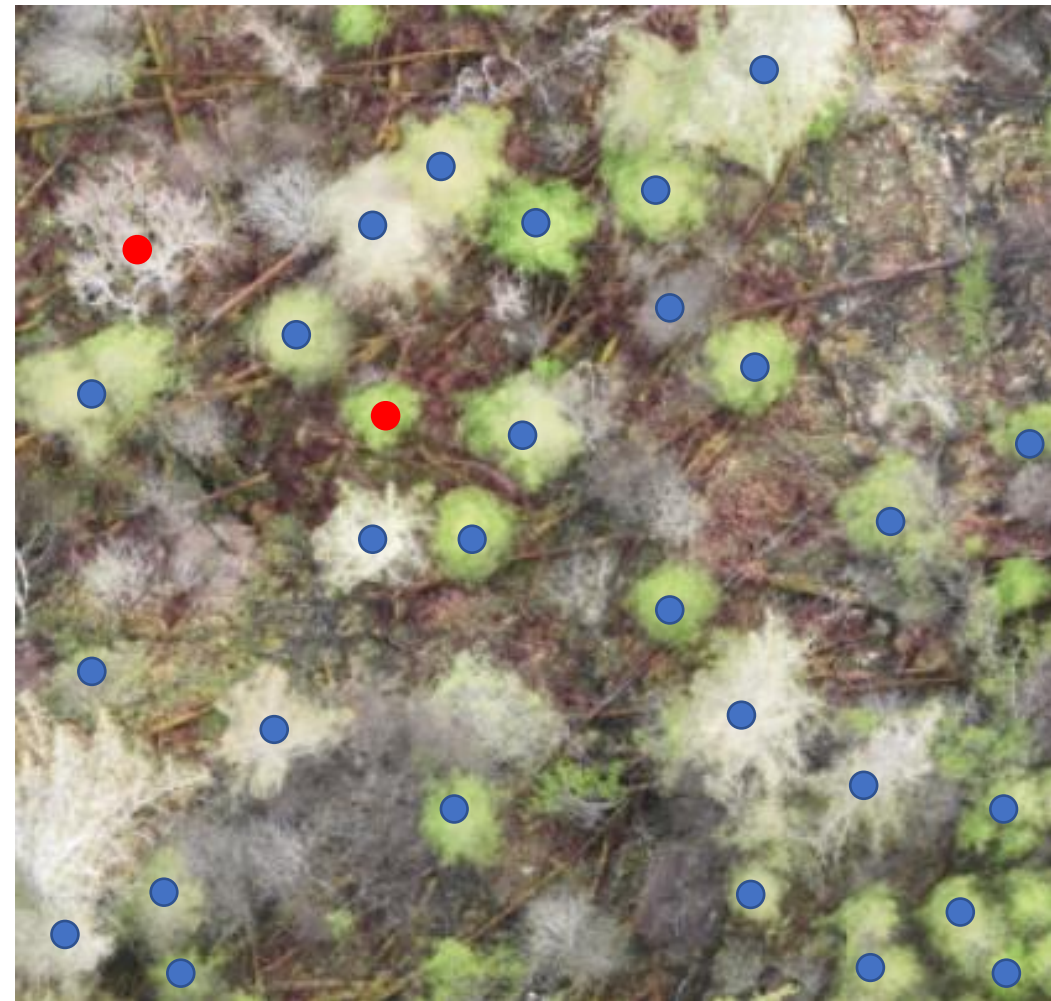
Approx. number of fallen trees between 2023 to 2024: **0**

% of trees that have fallen: **0**

# 2023 Drone Survey



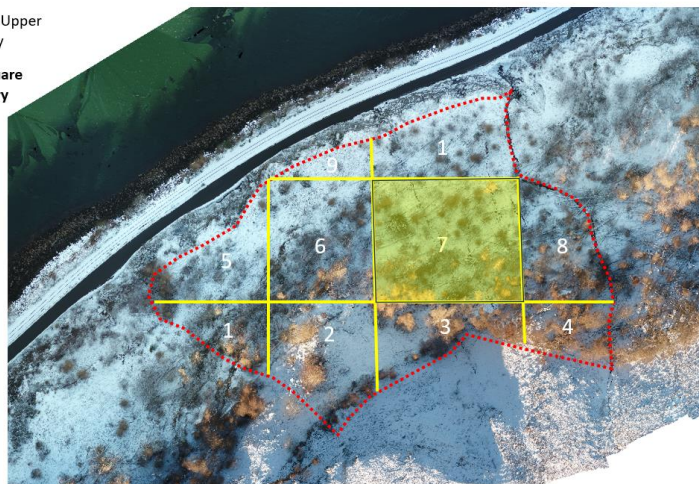
# 2024 Drone Survey



## Grid Square 7

2023 Drone Survey

AA16-17 Upper boundary  
Grid Square boundary



● Tree

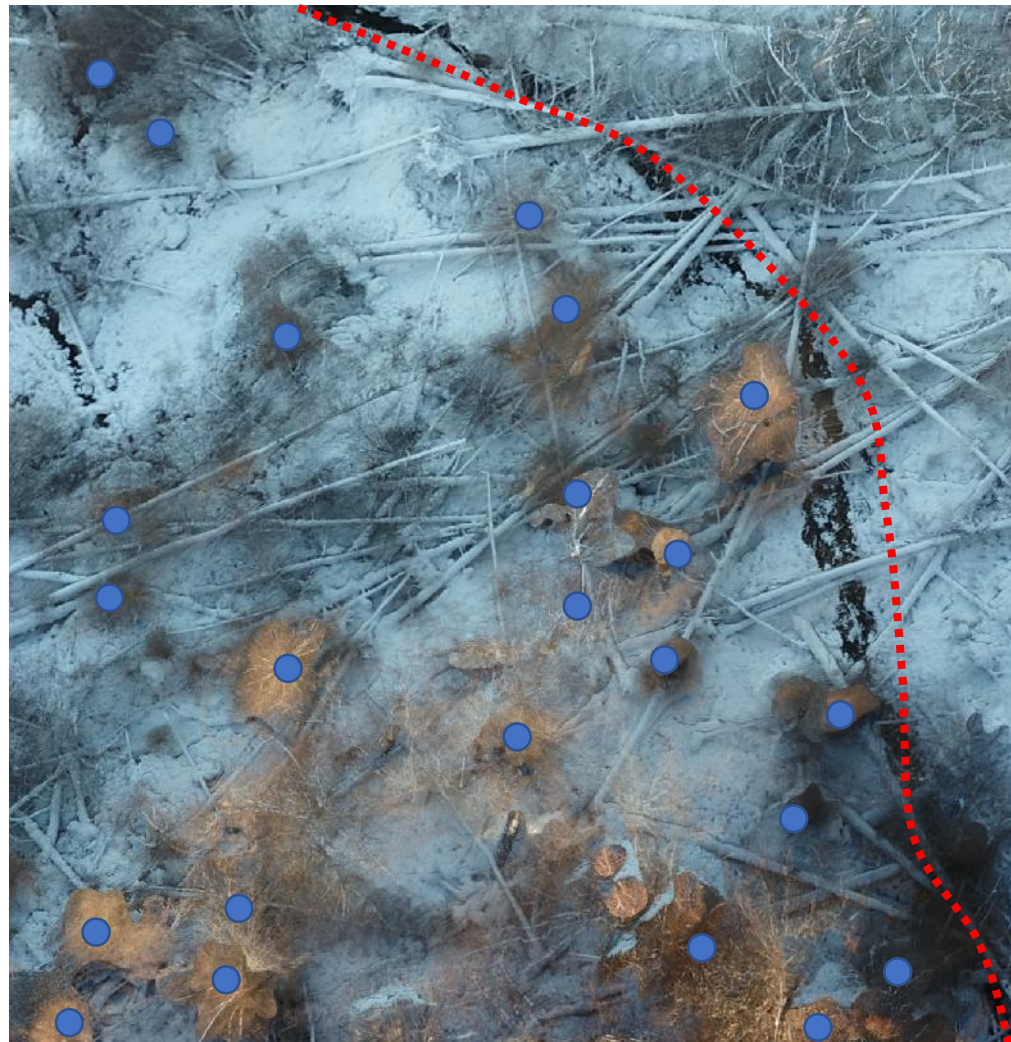
Approx. number of trees standing in 2023: **28**

Approx. number of trees standing in 2024: **28**

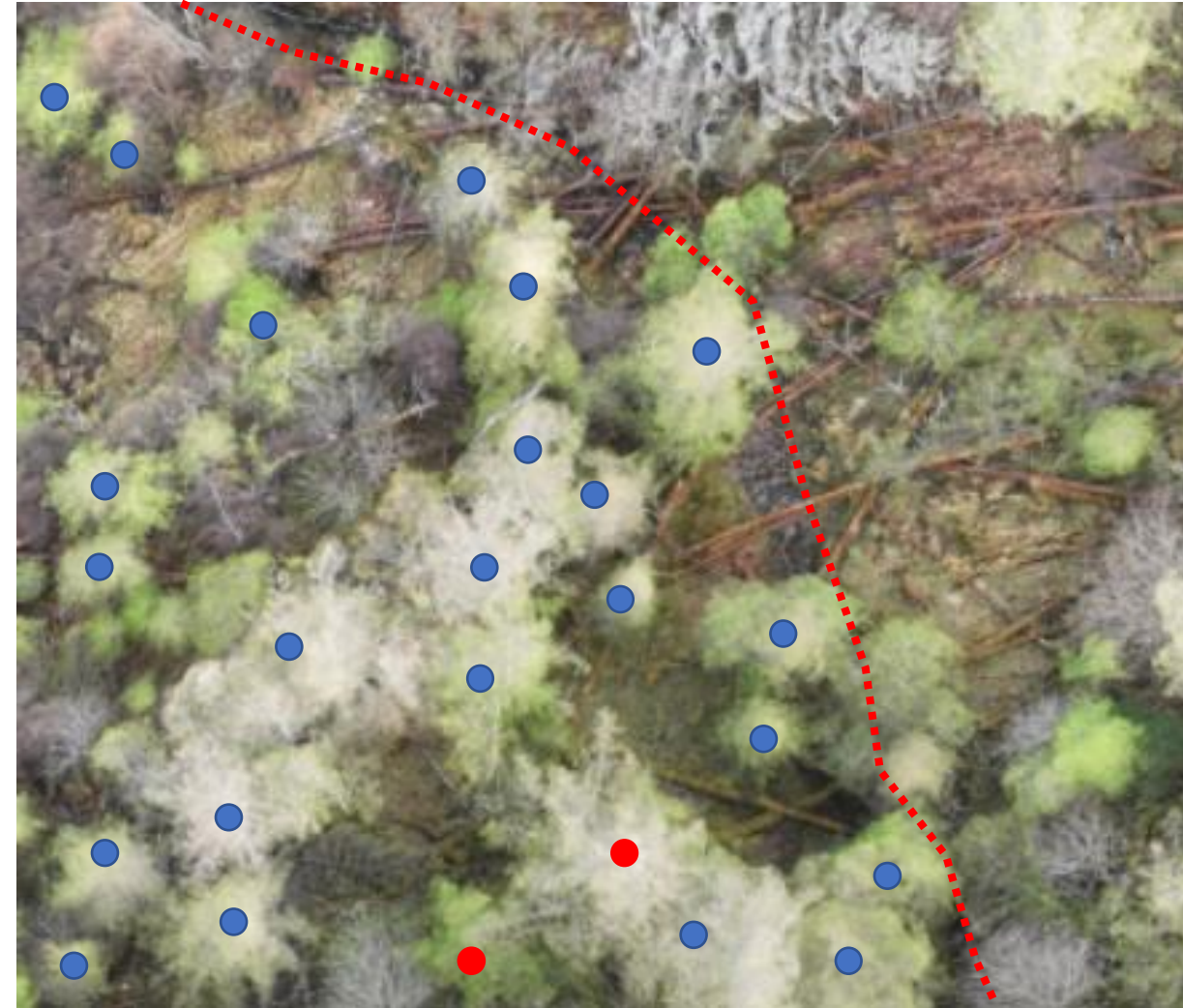
Approx. number of fallen trees between 2023 to 2024: **0**

% of trees that have fallen: **0**

# 2023 Drone Survey



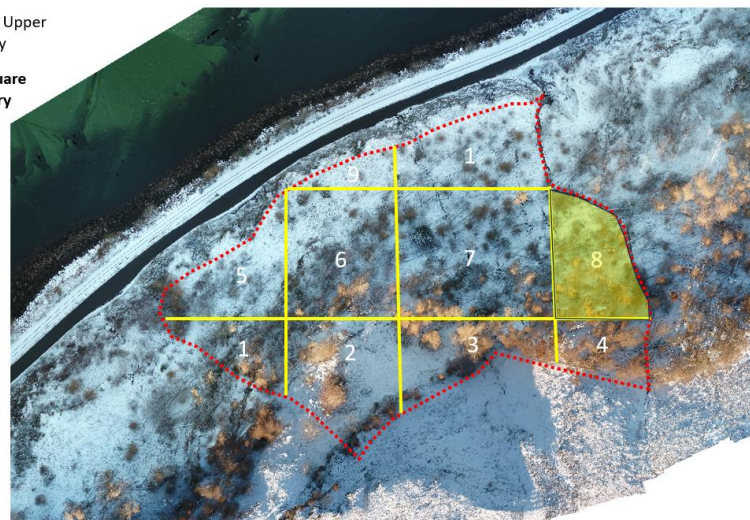
# 2024 Drone Survey



## Grid Square 8

2023 Drone Survey

- AA16-17 Upper boundary
- Grid Square boundary



● Tree

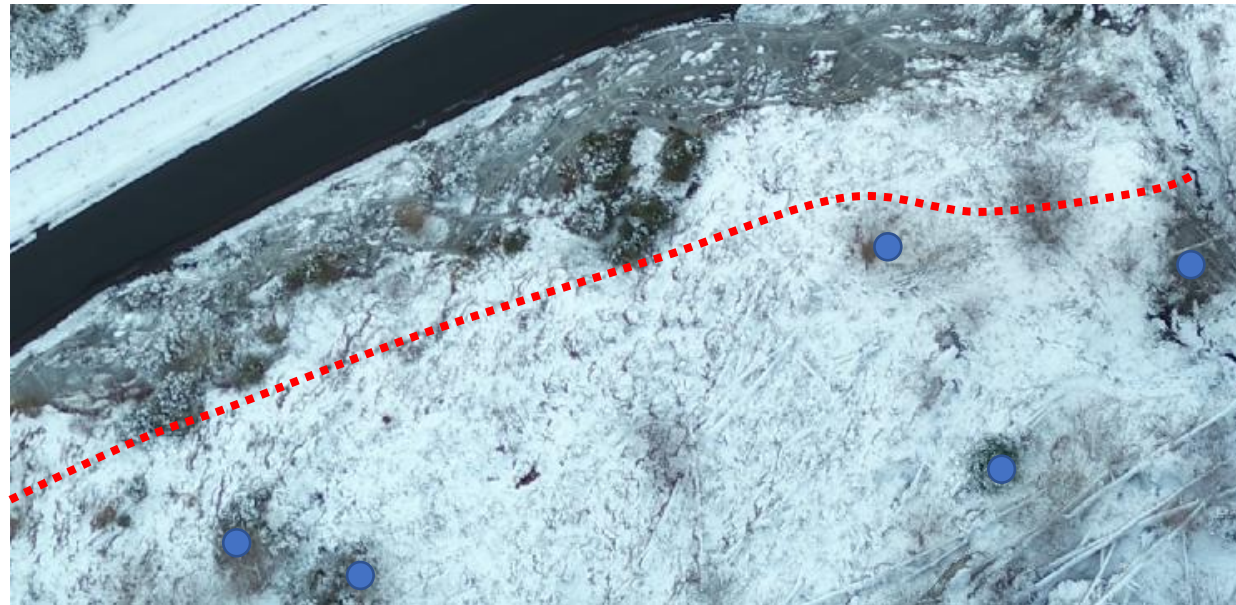
Approx. number of trees standing in 2023: **23**

Approx. number of trees standing in 2024: **23**

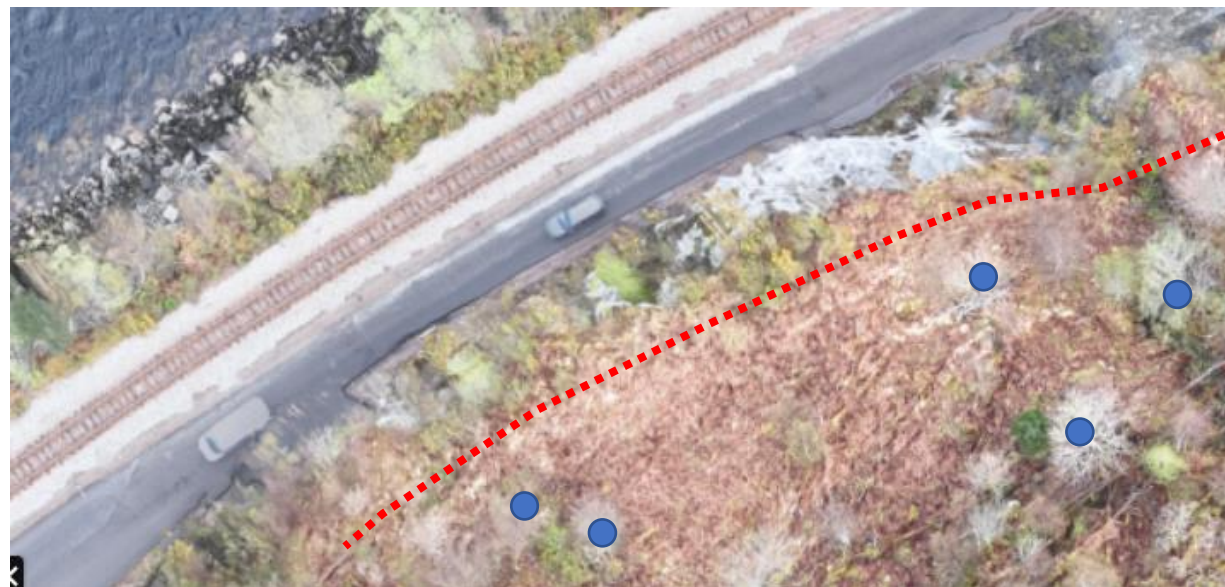
Approx. number of fallen trees between 2023 to 2024: **0**

% of trees that have fallen: **0**

# 2023 Drone Survey



# 2024 Drone Survey



● Tree

Approx. number of trees standing in 2023: **5**

Approx. number of trees standing in 2024: **5**

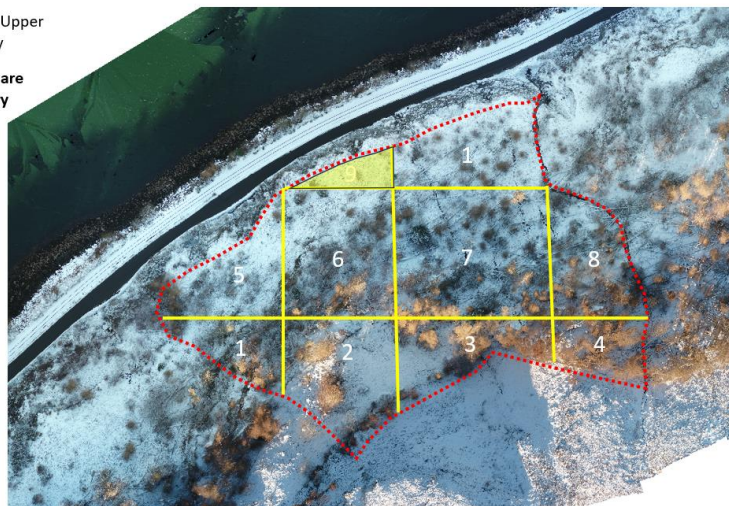
Approx. number of fallen trees between 2023 to 2024: **0**

% of trees that have fallen: **0**

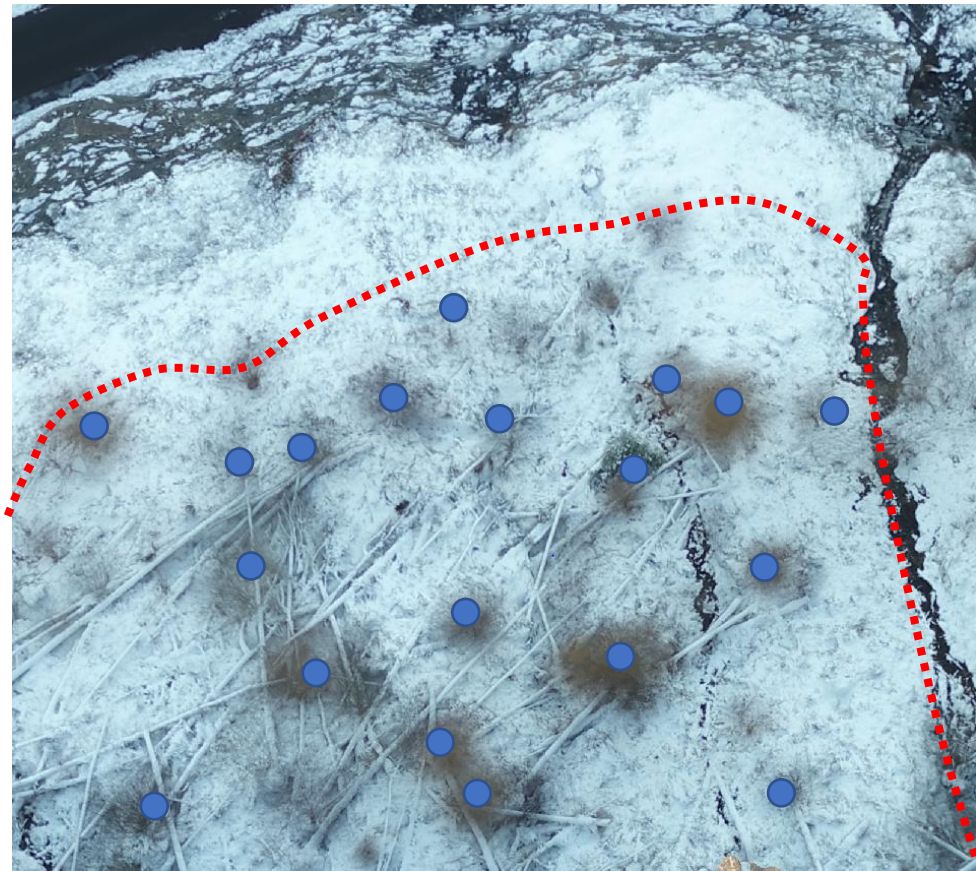
## Grid Square 9

2023 Drone Survey

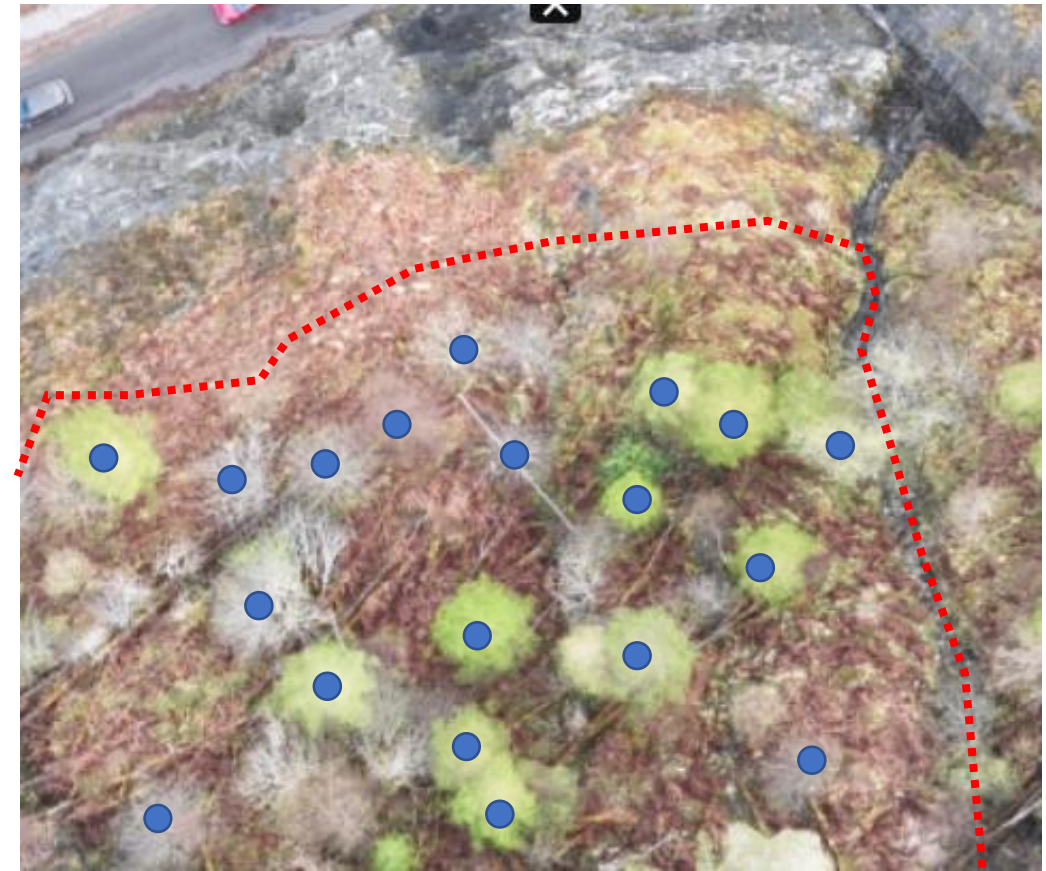
- AA16-17 Upper boundary
- Grid Square boundary



# 2023 Drone Survey



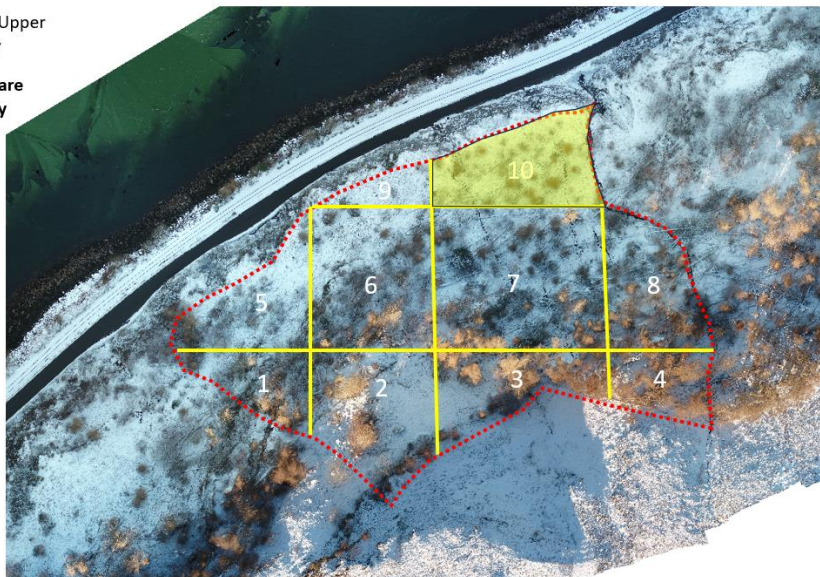
# 2024 Drone Survey



## Grid Square 10

2023 Drone Survey

- AA16-17 Upper boundary
- Grid Square boundary



● Tree

Approx. number of trees standing in 2023: **19**

Approx. number of trees standing in 2024: **19**

Approx. number of fallen trees between 2023 to 2024: **0**

% of trees that have fallen: **0**

## AA16-17 Upper Summary Table

Grid Square	Approx. number of trees standing in 2023	Approx. number of trees standing in 2024	Approx. number of fallen trees between 2023 to 2024	% of trees that have fallen
1	11	11	0	0
2	15	15	0	0
3	24	24	0	0
4	23	23	0	0
5	10	10	0	0
6	17	17	0	0
7	28	28	0	0
8	23	23	0	0
9	5	5	0	0
10	19	19	0	0
<b>ALL (total)</b>	<b>175</b>	<b>175</b>	<b>0</b>	<b>0</b>

