
Appendix 7.4B

Vertigo Report II



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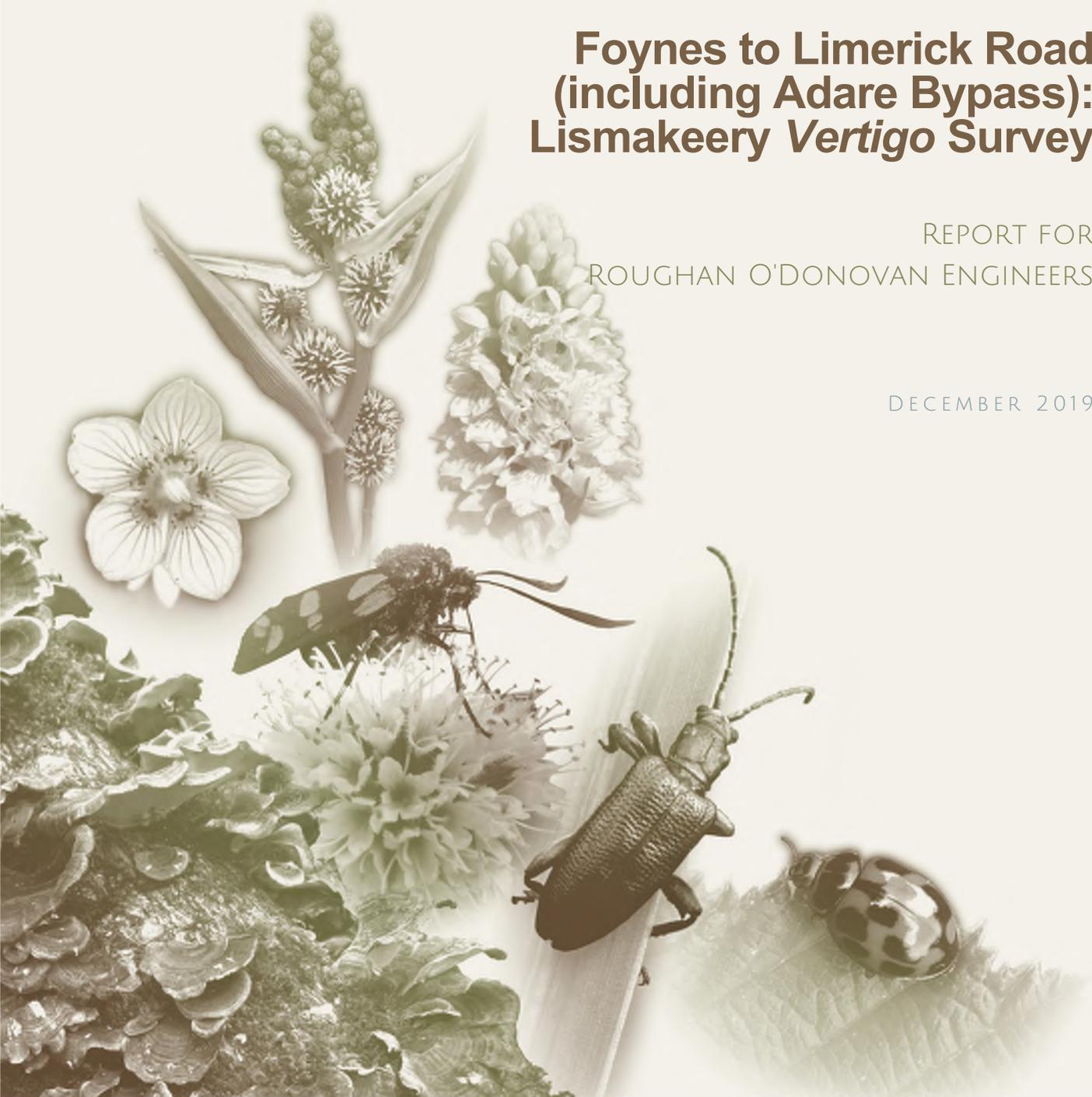
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Foynes to Limerick Road (including Adare Bypass): Lismakeery *Vertigo* Survey

REPORT FOR
ROUGHAN O'DONOVAN ENGINEERS

DECEMBER 2019



Foynes to Limerick Road (including Adare Bypass): Lismakeery *Vertigo* Survey

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1 Introduction

BEC Consultants Ltd was contracted by Roughan O'Donovan Engineers to carry out a survey for the presence of the Desmoulin's whorl snail (*Vertigo moulinsiana*) at three fen sites along the route of the proposed Foynes to Limerick Road (including Adare Bypass) road development: Ballyellinan, Lismakeery and Blossomhill (Brophy, 2019). Based on the results of this survey, *V. moulinsiana* was only recorded as present within the proposed road development land-take at Lismakeery. A further survey was undertaken to assess the distribution of the snail at this site, the extent of suitable habitat and options for enhancing the remaining habitat.

2 Background

2.1 Study Area

The study area for this survey comprised one of three fens along the CPO land-take area for the proposed road development: Lismakeery (Figure 1).

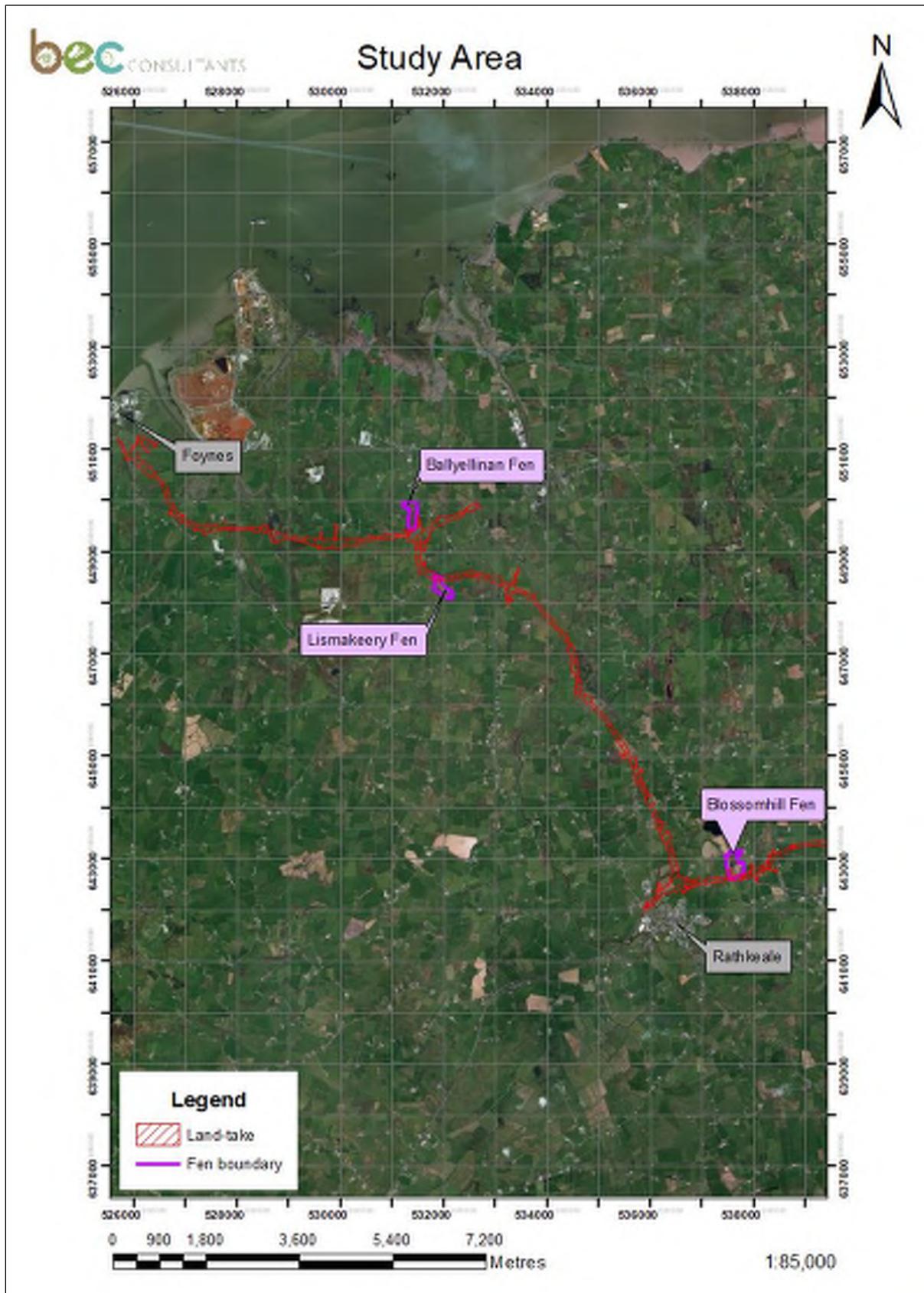


Figure 1. Map of the study area showing the locations of the three surveyed fens, including Lismakeery, and the land-take of the proposed road development

The previously surveyed area at Lismakeery (CPO land take and 50 m buffer) and sample locations are presented in Figure 2.

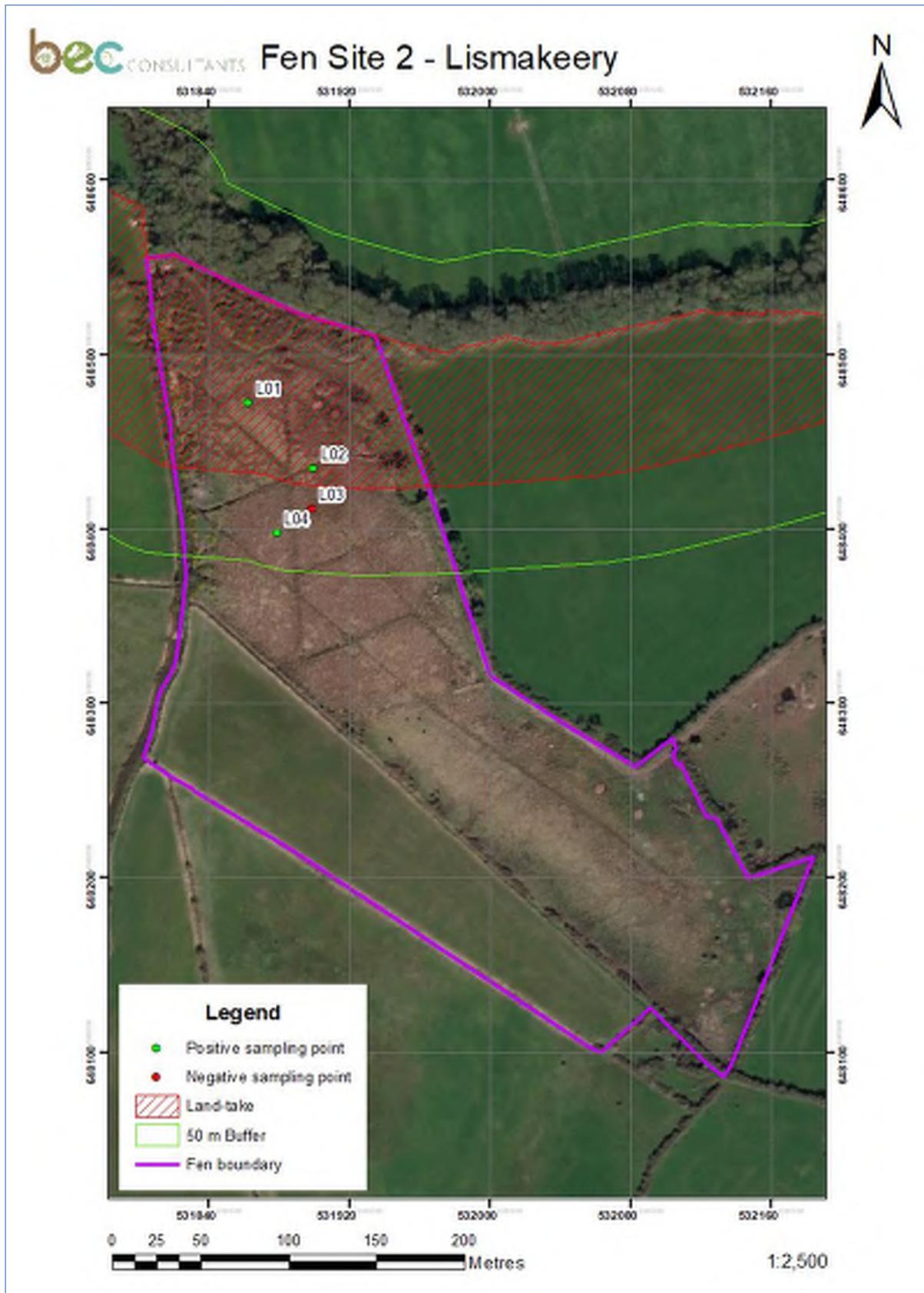


Figure 2. Results of first presence/absence survey for *Vertigo moulinsiana* at Lismakeery

2.2 Survey aims

The aims of the survey at Lismakeery were as follows:

- Establish the extent of suitable habitat for *V. moulinsiana* at the site and assess its quality;
- Establish the extent of the *V. moulinsiana* population at the site; and
- Assess potential enhancement options for the remaining *V. moulinsiana* habitat.

2.3 Desmoulin’s whorl snail (*Vertigo moulinsiana*)

Vertigo moulinsiana is a small (up to 2.7 mm tall) snail found on tall vegetation in calcareous wetland sites, including fens. It is listed under Annex II of the EU Habitats Directive (92/43/EEC) and is a Qualifying Interest in seven Special Areas of Conservation (SACs) across Ireland. The closest known population of *V. moulinsiana* to the Lismakeery is at Curragh Chase, Co. Limerick, located 9 km from Lismakeery.

The overall conservation status of *V. moulinsiana* in Ireland from the last round of monitoring is Unfavourable-Inadequate with a deteriorating trend (NPWS, 2019). This is unchanged from the previous round of monitoring (NPWS, 2013). The apparent improvement from 2007 to 2013 is due to the discovery of new sites, as opposed to the recovery of lost populations (NPWS, 2013). The conservation assessment for *V. moulinsiana* is summarised in Table 1.

Table 1. Conservation assessment summary for *Vertigo moulinsiana* in Ireland (NPWS, 2013; 2019). No trend is stated for the 2019 Future prospects in NPWS (2019).

Year	Range	Population	Habitat for species	Future prospects	Overall status
2007	Bad	Bad	Inadequate	Bad	Bad
2013	Inadequate (deteriorating)				
2019	Inadequate (deteriorating)	Inadequate (deteriorating)	Inadequate (deteriorating)	Inadequate	Inadequate (deteriorating)

3 Methods

The sampling methodology followed that used in the National *Vertigo* Monitoring Project (Long & Brophy, 2019). Suitable vegetation within the fen was sampled by vigorously shaking it over a white tray. At each sample location, three adjacent patches of vegetation were sampled and these were treated as a single sample. *V. moulinsiana* individuals were identified in the field, with a number of specimens transferred to labelled glass vials and returned to the laboratory as vouchers. The optimum time for carrying out *V. moulinsiana* surveys is September to November inclusive (Moorkens & Killeen, 2011).

A handheld computer and GPS (Nomad Trimble) running ArcPad 8.0 was used to navigate within the survey area and to record data in the field.

An assessment of habitat suitability for supporting *V. moulinsiana* at a given sampling point was made based on the vegetation class present (Table 2) and the wetness levels (Table 3) at the time of survey.

Table 2. Vegetation classes used in current survey as recommended by Long & Brophy (2019)

Class I	Class II	Class III	Class IV
Tall <i>Carex</i> species	<i>Phragmites australis</i>	<i>Schoenus nigricans</i>	All other species
<i>Glyceria maxima</i>	<i>Equisetum fluviatile</i>	<i>Carex rostrata</i>	
<i>Sparganium erectum</i>	<i>Typha latifolia</i>	<i>Mentha aquatica</i>	
	<i>Carex paniculata</i>	<i>Epilobium hirsutum</i>	
	<i>Cladium mariscus</i>	<i>Menyanthes trifoliata</i>	
	<i>Iris pseudacorus</i>		

Table 3. Wetness classes for *V. moulinsiana* used in the current survey (Moorkens & Killeen, 2011)

Wetness	Description
1	Dry. No visible moisture on the ground surface
2	Damp. Ground visibly damp, but water does not rise under pressure
3	Wet. Water rises under light pressure
4	Very wet. Pools of standing water, generally less than 5 cm deep
5	Site under water. Entire sampling site in standing or flowing water over 5 cm deep

An assessment of the habitat suitability at a polygon level was made following the criteria of Long & Brophy (2019), as presented in Table 4. The final classification of a polygon takes into account this five-point scale, along with the vegetation and wetness levels recorded.

Table 4. Five-point habitat suitability scale from Long & Brophy (2019)

Habitat class	Definition
Optimal	<i>V. moulinsiana</i> could survive in $\geq 50\%$ of the habitat
Optimal-Suboptimal	<i>V. moulinsiana</i> could survive in $\geq 16-49\%$ of the habitat
Suboptimal	<i>V. moulinsiana</i> could survive in $\geq 5-15\%$ of the habitat
Suboptimal-Unsuitable	<i>V. moulinsiana</i> could survive in $< 5\%$ of the habitat
Unsuitable	There are no areas of habitat where the combination of vegetation and hydrological influence is within the snail's known range of tolerance

Vascular plant nomenclature follows Stace (2019).

4 Results

The presence/absence survey was carried out on 12 October 2019 and the data from that survey is included here. The second survey was carried out on 17 November 2019.

4.1 Lismakeery *Vertigo moulinsiana*

The site at Lismakeery was identified as a Rich Fen (PF1) under the Fossitt (2000) habitat classification (mapping provided by client). The site was dominated by Black Bog-rush (*Schoenus nigricans*) and Purple Moor-grass (*Molinia caerulea*), with patches of Great Fen-sedge (*Cladium mariscus*).

A total of 18 spots were sampled across the site at Lismakeery across the two surveys. Thirteen of the 18 spots were positive for adult, subadult or juvenile *V. moulinsiana* (Table 5; Figure 3).

Table 5. Results of *Vertigo moulinsiana* sampling at Lismakeery on 02/10/2019 and 17/11/2019

Sample	Date	Positive/Negative	Adult	Subadult	Juv.	Habitat suitability
L01	02-10-19	Positive	2	0	3	Suboptimal
L02	02-10-19	Positive	1	0	2	Optimal-Suboptimal
L03	02-10-19	Negative	0	0	0	Suboptimal
L04	02-10-19	Positive	1	0	1	Optimal-Suboptimal
L05	17-11-19	Negative	0	0	0	Suboptimal-Unsuitable
L06	17-11-19	Negative	0	0	0	Suboptimal-Unsuitable
L07	17-11-19	Positive	2	0	1	Suboptimal
L08	17-11-19	Positive	1	0	1	Suboptimal
L09	17-11-19	Positive	1	0	2	Suboptimal
L10	17-11-19	Positive	0	0	2	Suboptimal
L11	17-11-19	Positive	4	0	3	Suboptimal
L12	17-11-19	Negative	0	0	0	Suboptimal-Unsuitable
L13	17-11-19	Positive	1	0	0	Suboptimal
L14	17-11-19	Positive	1	0	1	Suboptimal
L15	17-11-19	Positive	1	1	0	Suboptimal
L16	17-11-19	Positive	0	0	1	Suboptimal
L17	17-11-19	Positive	1	0	1	Suboptimal
L18	17-11-19	Negative	0	0	0	Suboptimal-Unsuitable

Three polygons with habitat suitable for *V. moulinsiana* were defined within Lismakeery Fen: A, B and C (Figure 3). Polygon A was north of the wall/drain bisecting the fen. Polygons B and C were northeast and southwest of the long drain in the southeastern section of the fen. Polygon D was comprised of currently unsuitable habitat surrounding polygons B and C, though with some potential for improvement. The land outside the mapped polygons A-D has no potential for supporting *V. moulinsiana* due to the vegetation and wetness levels. The area and habitat suitability classification of each polygon is presented in Table 6.

Table 6. Habitat polygon suitability for *Vertigo moulinsiana* within Lismakeery Fen, with area in square metres and hectares

Polygon	Habitat suitability	Area (m²)	Area (ha)
A	Suboptimal	19,442	1.94
B	Suboptimal	1,756	0.18
C	Suboptimal-Unsuitable	4,584	0.46
D	Unsuitable	14,070	1.41

A map showing the location of the sample points and the habitat polygons is presented in Figure 3.

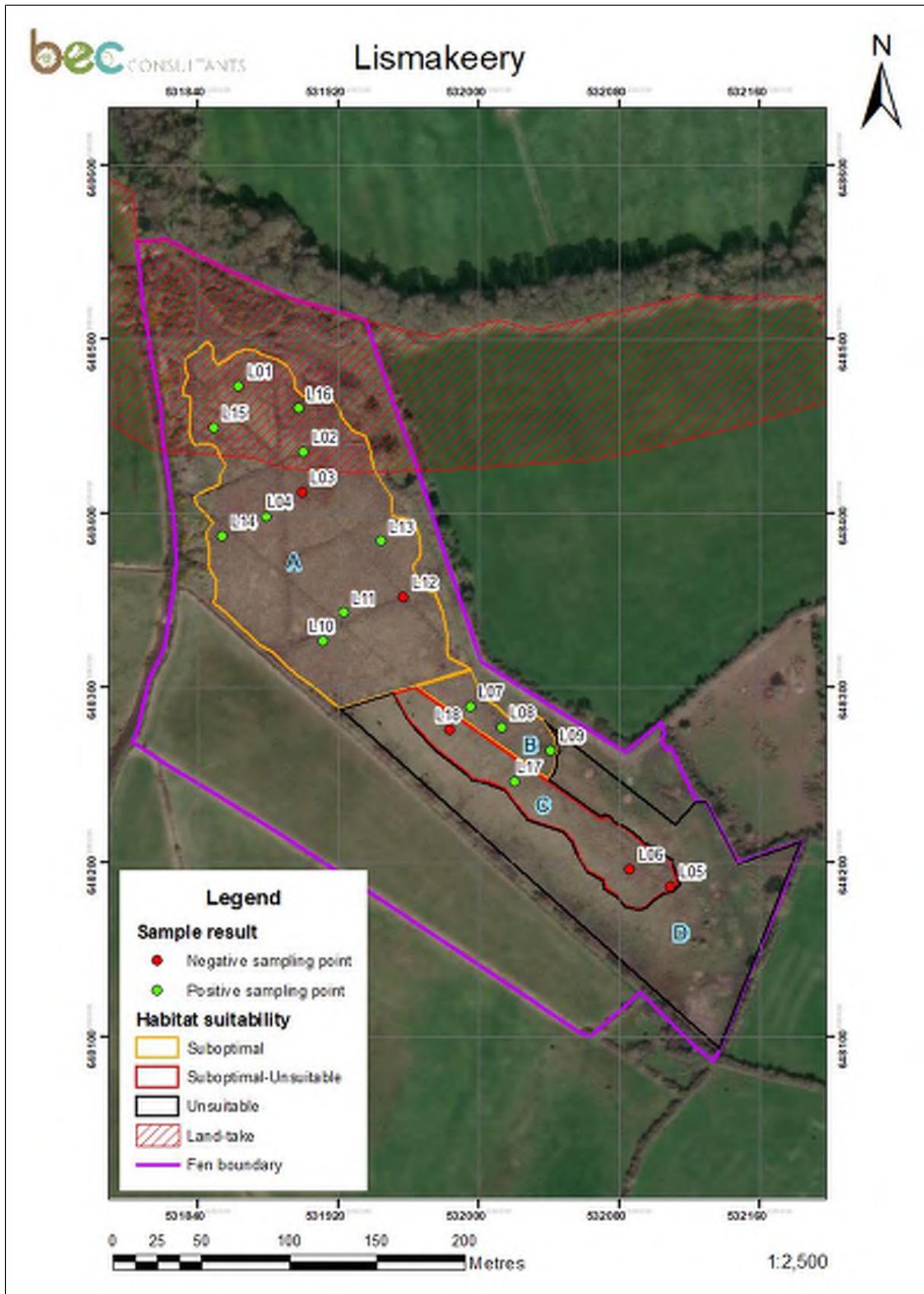


Figure 3. Map of Lismakeery Fen showing the sample locations and extent of habitat suitable for *Vertigo moulinsiana*. The land outside the mapped polygons A-D has no potential for supporting *V. moulinsiana* due to the vegetation and wetness levels.

4.2 Potential enhancement areas

Areas 1, 2, 3 and 4 (Figure 4) were visited on 17 November 2019 to assess their suitability to provide habitat enhancement opportunities. A brief description of each is presented here:

Area 1: Area 1 comprises the existing fen area as it extends to the southeast. Area 1 is divided in two by a drain running across in a west-southwesterly direction, with remains of an old stone wall. North of the wall contains the best fen habitat with extensive areas of Black Bog-rush and small areas of Great Fen-sedge, mostly restricted to the drainage features. There is a spring in the northeast corner, which feeds the fen. South of the wall, there is more limited fen habitat, with Black Bog-rush restricted to areas close to the drain that runs almost the full length of the section in a southeast to northwest direction. The area to the northeast of the drain supports denser stands of Black Bog-rush and is wetter than the area to the southwest of the drain. There is some evidence of the deposition of soil and rock in the eastern part of Area 1 related to agricultural activities, and the area is more grazed by cattle.

Area 2: Area 2 is a semi-improved field, separated from Area 1 by a substantial drain approximately 2 m wide, with a water depth at the time of survey of 0.6 m. The dividing line between Area 2 and Area 3 was the continuation of the drain that bisects Area 1, which has since been infilled. From a review of the 6-inch mapping, Area 2 was reclaimed from an area of rough pasture marked “liable to floods”. The field had been recently mown, was wet underfoot with some shallow pools, and stands of Hard Rush (*Juncus inflexus*) were present.

Area 3: Area 3 is located southeast of Area 2 and is a continuation of the same rushy field. It is also separated from Area 1 by the substantial drain mentioned above.

Area 4: Area 4 is separated from Area 1 by the Lismakeery Stream. The area comprises wet grassland, dominated by Cock’s-foot (*Dactylis glomerata*), with Nettle (*Urtica dioica*). There are a number of hedgerows with Hawthorn (*Crataegus monogyna*), and Brambles (*Rubus fruticosus* agg.) dominate along the river bank.

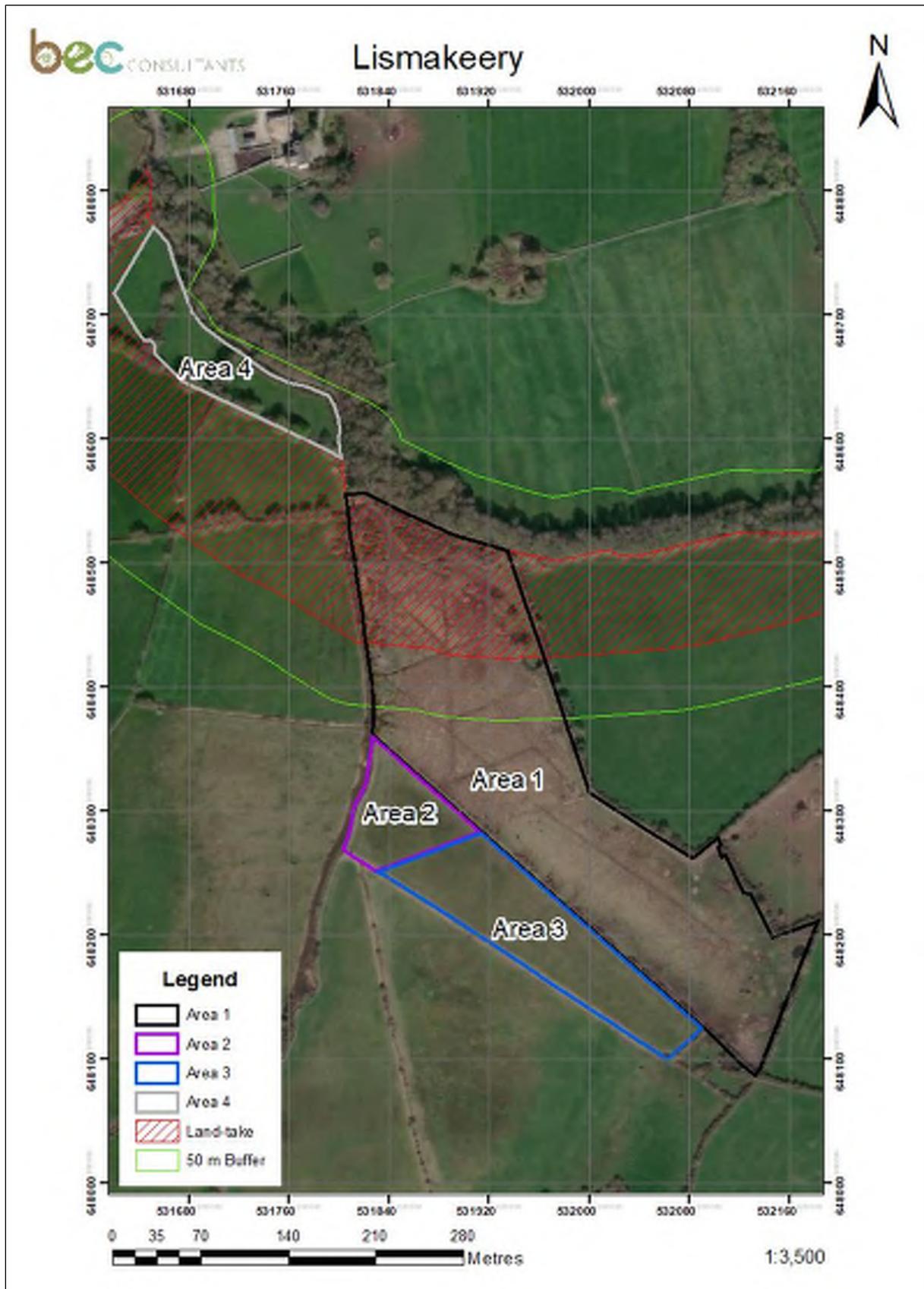


Figure 4. Areas considered for enhancement of remaining *Vertigo moulinsiana* habitat at Lismakeery

5 Discussion

The site at Lismakeery contains extensive areas of vegetation that are suitable for supporting *V. moulinsiana*. Though Black Bog-rush, which dominates the fen along with Purple Moor-grass, is less favoured as a host plant by *V. moulinsiana*, there are also areas of Great Fen-sedge, which is more favoured. The wetness levels across most of the fen are somewhat lower than is ideal, with the most appropriate wetness found alongside the old drains that cross the site. The spring in the northeast of the site will be retained to feed the fen, should the proposed road development go ahead.

At Lismakeery, *V. moulinsiana* was recorded both within the land-take boundary and the 50 m buffer. The land-take area overlaps with an estimated 5,130 m² (0.51 ha) of suitable habitat. As noted, this species is listed under Annex II of the Habitats Directive and its conservation status in Ireland is Unfavourable-Inadequate with a deteriorating trend (NPWS, 2019). As well as direct loss of habitat, changes to the hydrology of *V. moulinsiana* habitat, either by drying out or flooding, is a major cause of loss for this species (NPWS, 2019; JNCC, 2007; Killeen, 2003). As more land is reclaimed for agriculture or development, the area of historical wetland, suitable for supporting *V. moulinsiana* populations, is declining. For this reason, efforts should be made to avoid or minimise any impact on the *V. moulinsiana* habitat and population at Lismakeery.

The following two scenarios were considered:

Scenario 1: No acquisition of land for enhancement

As noted, *V. moulinsiana* is listed under Annex II of the Habitats Directive, as a species of community interest whose conservation requires the designation of Special Areas of Conservation (SAC). The species is a Qualifying Interest in seven SACs across the country and is known to be present in another seven SACs, but not listed as a Qualifying Interest.

In the 2014-2017 survey, the snail was recorded at 17 of the 20 sites surveyed, including five out of seven of the SACs for which it is a Qualifying Interest and in all seven sites that are within SACs, but for which *V. moulinsiana* is not a Qualifying Interest (Long & Brophy, 2019). *V. moulinsiana* was recorded at six sites outside the SAC network (Brophy & Long, 2019). Lismakeery Fen is not within an SAC.

In considering whether Lismakeery Fen should have been designated for the protection of *V. moulinsiana* (along with the associated Annex I fen habitat), it is deemed that there are a number of other sites, both within and outside the existing Natura 2000 network, that would be better candidates for including *V. moulinsiana* as a Qualifying Interest or for the designation of a new site. This is on the basis of the area of suitable *V. moulinsiana* habitat/size of the population, the range of other Annex I habitats and Annex II species present, and the degree of isolation from other populations.

The area at Lismakeery Fen classified as Suboptimal-Unsuitable or better habitat for *V. moulinsiana* has been calculated to be 2.58 ha. In the most recent round of Article 17 monitoring, 189 ha of surveyed *V. moulinsiana* was assessed as Suboptimal-Unsuitable or better (Long & Brophy, 2019). (This is a minimum value, as it does not include the three new sites documented as part of the current project, which also suggests there are other, as yet undiscovered, populations in the

country). Based on these figures, the entire Lismakeery Fen comprises 1.4% of the previously surveyed national area. Assuming some equivalence of population to habitat suitability, this would put the population at Lismakeery Fen above the threshold of 1% for national importance for the site to be classified as being of 'International importance' following the TII guidelines (NRA, 2009).

NPWS (2019) states that the national *V. moulinsiana* range is decreasing, with the Favourable Reference Range (FRR) given as 56 x 10 km squares. The population unit used in the most recent National Conservation Assessment process carried out by NPWS for *V. moulinsiana* is 'occupied 1 km x 1 km grid square' (NPWS, 2019). In 2019, the maximum population was given as 64 x 1 km squares compared to a Favourable Reference Population of 66 x 1 km square (based on records since 1994). The finds as part of the current project add one 10 km square to the range (R34) and four 1 km squares to the population: R3148, R3248 (Lismakeery), R3149 (Ballyellinan), R3742 (Blossomhill) (and most likely R3743, also).

The proposed land-take at Lismakeery Fen would result in the loss of 20% of the *V. moulinsiana* habitat recorded at the site. Based on the figure of 189 ha, this would constitute 0.3% of the previously surveyed national area. The loss of this area would not result in the loss of the species from a 1 km grid square and would not result in a reduction in the range.

Without any habitat enhancement measures, the loss of *V. moulinsiana* due to the proposed road development is considered a moderate, negative permanent effect. This conclusion has been reached on the basis that the current trend at the site is for loss of suitable *V. moulinsiana* habitat through land reclamation and infilling.

Scenario 2: Acquisition of land for enhancement

The possibility of acquiring land to provide enhancement of the remaining *V. moulinsiana* habitat was considered.

Area 4 is ruled out on the basis that it is separated from Lismakeery Fen by the Lismakeery Stream, and so it is less likely that the groundwater conditions would be similar to those within the fen. It would require extensive earthworks to drop the level of the land, with a low certainty of success.

Areas 2 and 3 were historically contiguous with the extant fen area, but this land has been reclaimed for agricultural grassland, with a deep drain separating them from Area 1. Because of the drain separating 2 and 1, which also drains Area 3, it would not be possible to reconnect 2 and 1 without 3. For this reason, the possible restoration of these areas would need to be considered together. At a minimum, it would require the blocking of the large drain. This may be enough to allow wetland vegetation to return, if the land was not subject to infilling as part of its reclamation for agriculture. The translocation of sods of vegetation from the land-take could be considered to expedite establishment of fen vegetation. This option would require extensive investigations of the hydrology and ground levels of the area.

Area 1 currently supports fen vegetation and an extensive *V. moulinsiana* population. The fen is fed by a spring in the northeastern corner of Area 1 and the northern half of the area contains the most suitable habitat. The fen vegetation and the *V. moulinsiana* population extends into the southern half of Area 1 along the long drain. This southern half grades into wet grassland beyond the extent of the Black Bog-rush. Given that Area 1 already supports a *V. moulinsiana* population, the option of

acquiring this area is by far the best option for preserving *V. moulinsiana* and fen habitat at the site. This would require minimal or no intervention, with the main benefit being that the site could be protected from future reclamation or more intensive grazing, both of which impact negatively on *V. moulinsiana*. The site currently shows evidence of some cattle grazing, as well as the deposition of spoil and rock at the eastern end related to agricultural activities.

In the northern half of Area 1, it is not clear if any of the drains reach the Lismakeery Stream, as the bank is heavily vegetated. Sections of concrete pipes at the northern-most drain suggest the connection would be underground. If deemed necessary, the maximum intervention would be the blocking of the western end where two drains meet. This would likely require limited machinery use and dredge spoil from the Lismakeery Stream bank could be used. This would only be a few square metres of works. The option of a sluice, or an alteration to the height of any drain block, may be considered to allow the regulation of water levels in the unlikely event that monitoring shows water levels increasing too much.

The removal of grazing from the southern section of Area 1 may be enough to encourage the expansion of the suitable fen vegetation and allow the expansion of *V. moulinsiana* into the currently unsuitable area of Polygon D (Figure 3). On the historical 6-inch maps, this entire area is marked as rough pasture and 'liable to floods', which suggests a more wetland situation than is currently apparent after agricultural improvement. Any intervention beyond this would require extensive investigations of the hydrology and ground levels of the area.

The removal of grazing pressure and the threat of infilling related to agriculture in Polygons B, C and D could secure the 0.18 ha of Suboptimal habitat in Polygon B, see improvement of the 0.45 ha of Suboptimal-Unsuitable habitat in Polygon C to Suboptimal, and see the improvement of most of the 1.41 ha of Polygon D to Suboptimal-Unsuitable or better. The prospects of success are high due to the current habitat and water levels present.

The protection of Area 1 is the preferred option, as it will ensure *V. moulinsiana* continues to be present within the two 1 km grid squares into the future. This option would also see the loss under the road land-take offset by habitat enhancement or recreation throughout the area and provide more space for *V. moulinsiana* to utilise in the event of changing environmental conditions into the future.

With the proposed enhancement measures implemented, the residual effect of the proposed road development on *V. moulinsiana* is considered to be slight, negative and permanent.

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