

VineMAP Report - example-7

Customer name: vinescapes
Email: vinescapes
Telephone:

Reference:
Date: 14 October 2019

Products:

1. Topographic suitability & grading
2. Soil suitability information, landcover suitability and designated 'protected' areas
3. Flood risk and access maps
4. All terrestrial reports (Reports 1 - 3)
5. Climate (including Frost Risk / Report No.6)
6. Frost risk
7. **All terrestrial and climate suitability reports**

Area coverage: 71.7 hectares (ha)
Location: Stanford le Hope, England, United Kingdom
National Grid reference: TQ 685 855

Report description: This report was generated using Vinescapes' Vineyard suitability Mapping and Assessment Program (VineMAP), powered by maploom. Maps, data, scoring and results within this report are provided to assist in viticulture suitability assessments. Where serious consideration is being given to establishing a vineyard on land evaluated within this report professional expertise should be sought from Vinescapes to advise on and undertake additional analysis. This includes detailed soil assessments, site and soil amelioration requirements, vineyard design, variety and planting material recommendations, business planning and project management. This report should not be relied on as the sole determinant for viticulture suitability, vineyard establishment or wine production business ventures.

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Site Overview – example-7

Variable	Result	Suitability score
Topography	31.2 ha	7.2/20
Elevation	71.7 ha	17.4/20
Aspect	45.7 ha	10.1/20
Slope	50.5 ha	10.8/20
Dominant Soil	Slowly permeable seasonally wet	Requires further analysis
Suitable landcover	68.6 ha	
Area with no protected status	71.7 ha	
Excellent potential vineyard area	30.7 ha	
Good potential vineyard area	0.5 ha	
Low potential vineyard area	0.0 ha	
	10-year averages	Suitability score
Growing season* average temperature (GST)	14.1°C	15/20
Growing Degree Days (GDD)	951	15/20
15th March - 14th April frost days	3.3	5/20
15th April - 31st May frost days	1.3	10/20
Average frost temperatures	-1.2°C	10/20
Growing season rainfall	378	15/20
June rainfall	63	10/20
Combined climatic suitability	Good potential	11.4/20

* The growing season in England is roughly April to October

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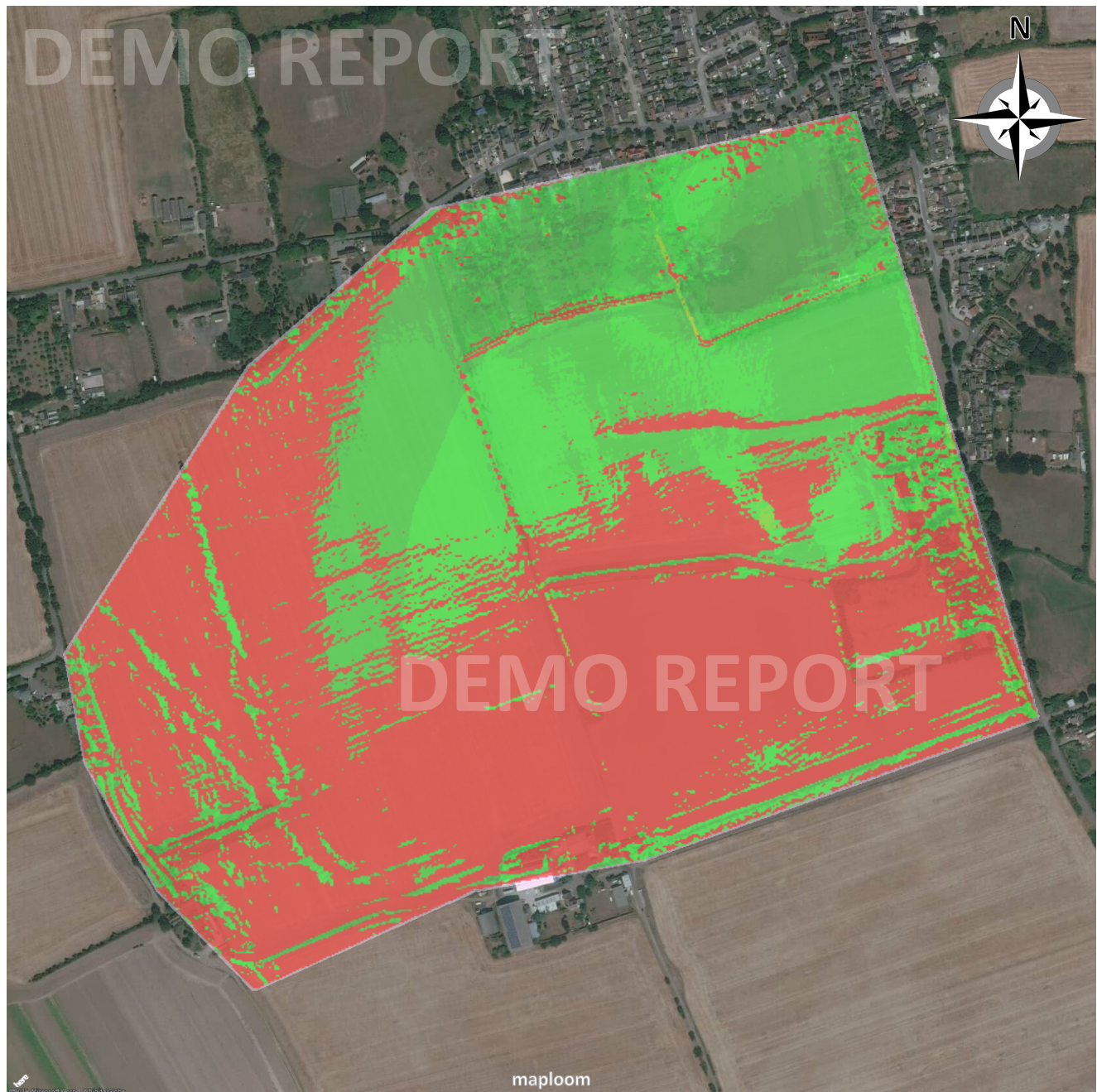
Combined topographic suitability map

Resolution: 2m

Data source: LiDAR Digital Terrain Model

0 m

500 m

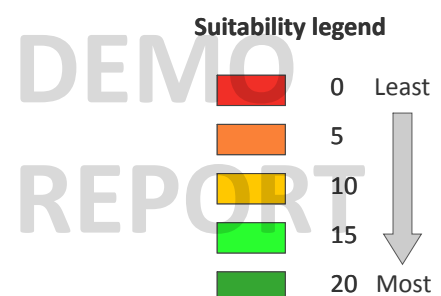


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'The map shows the high and low topographically suitable viticulture areas taking into account land cover suitability and any protected status zones.

Please note that soil suitability is not included in this map/model.

Score	Area (ha)
0/20	40.5
5/20	0.0
10/20	0.5
15/20	28.6
20/20	2.1



Suitable area: 31.2 ha

Area average combined topography suitability score: 7.2/20

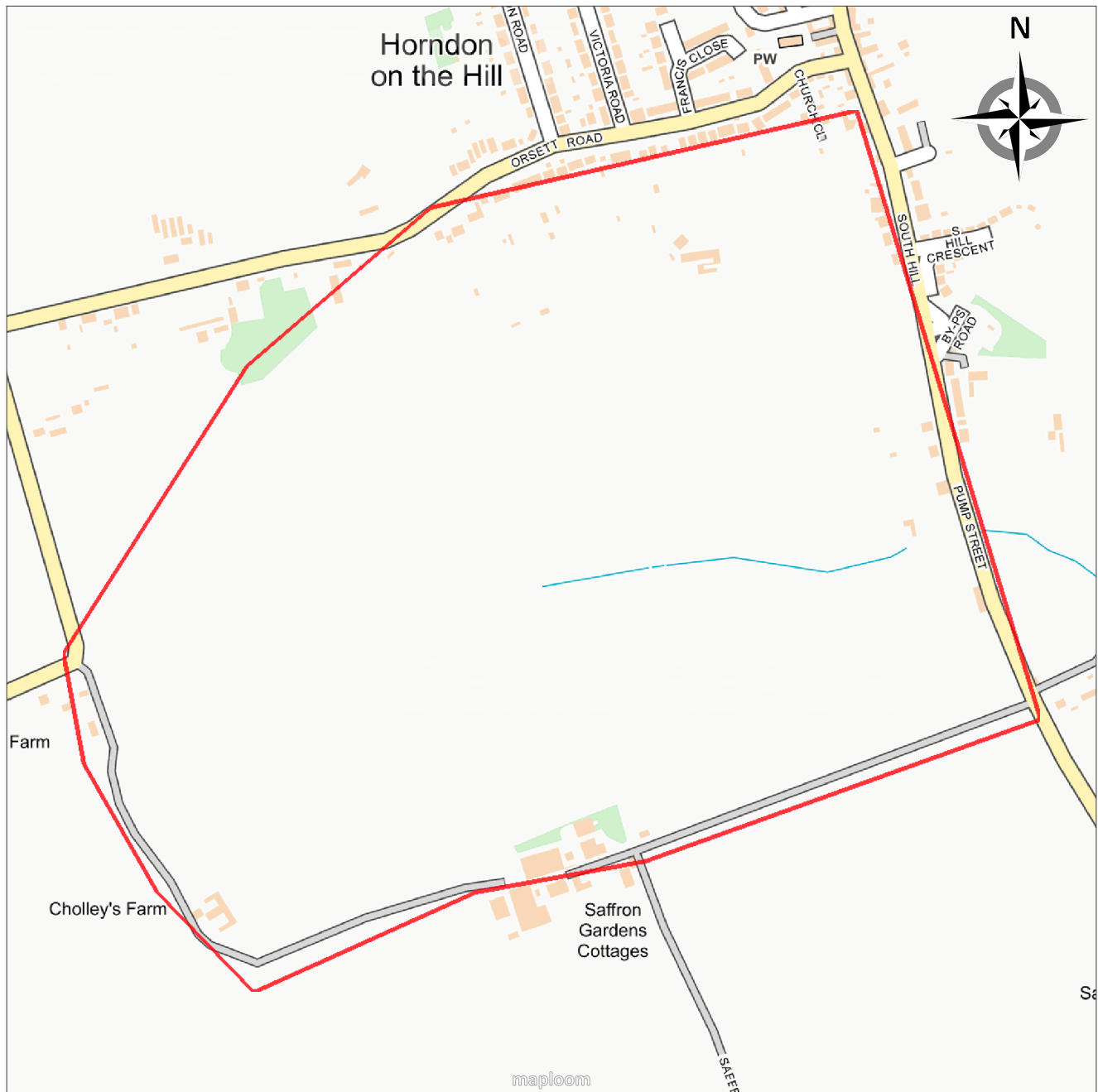
Site Overview: Access

Resolution:

Data source: Ordnance Survey

0 m

500 m



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Topographic suitability criteria for cool-climate viticulture

Elevation: Vineyards in England and Wales are best sited below 100 and not above 150m, with between 25 – 75m being the preferred range. Elevation suitability is restricted by decreasing temperatures at higher altitudes and the greater potential for wind exposure where the surrounding terrain does not afford shelter. Both these variables can reduce yield and quality parameters which in turn may threaten commercial viticulture viability.

Aspect: At higher latitudes south facing slopes (in the northern hemisphere) have greater direct solar radiation gain potential due to their reduced angle of incidence (the angle between the sun's beam and an imaginary line perpendicular to the slope), particularly during the ripening period when the sun is higher in the sky. They are also conducive to reducing the lag phase during which a site heats up and dries out after a cold night. All else being equal such slope aspects are favourable to both yield and grape berry quality parameters. South-westerly facing slopes are at a higher risk of exposure to prevailing south westerly winds.

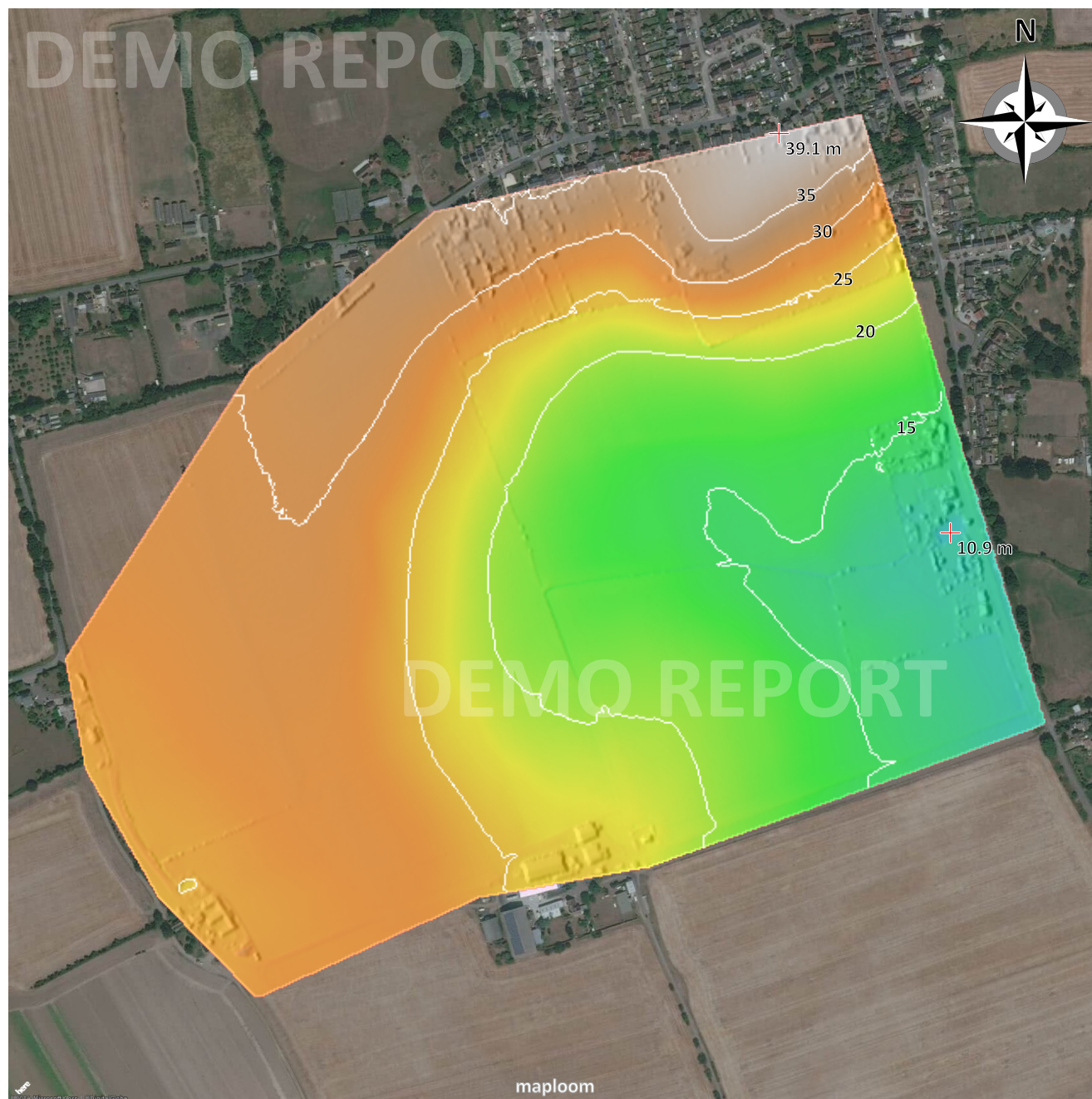
Slope: Optimum slopes for viticulture are 5 – 10%. The potential for mechanical vineyard management activity becomes limited on slopes greater than 10% and erosion risk increases. Below 1% there is an increased risk of cold air accumulation and potential frost damage.

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Elevation and contour map

Resolution: 2m, Contour spacing: 5m
Data source: LiDAR Digital Terrain Model

0 m 500 m









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Elevation suitability for English and Welsh vineyards is between 5 – 150m.

However, for land above 125m please contact the Vinescapes for additional advice.

Elevation range: 10.9 - 39.1m

Elevation (m)	Score	Area (ha)	Elevation legend	
< 5	0/20	0.0		10.9-15.6 m
5-25	15/20	37.6		16.5-21.2 m
25-75	20/20	34.1		22.1-26.8 m
75-100	10/20	0.0		27.8-32.5 m
100-125	5/20	0.0		33.4-38.1 m
125-150	0/20	0.0		39.1-43.8 m

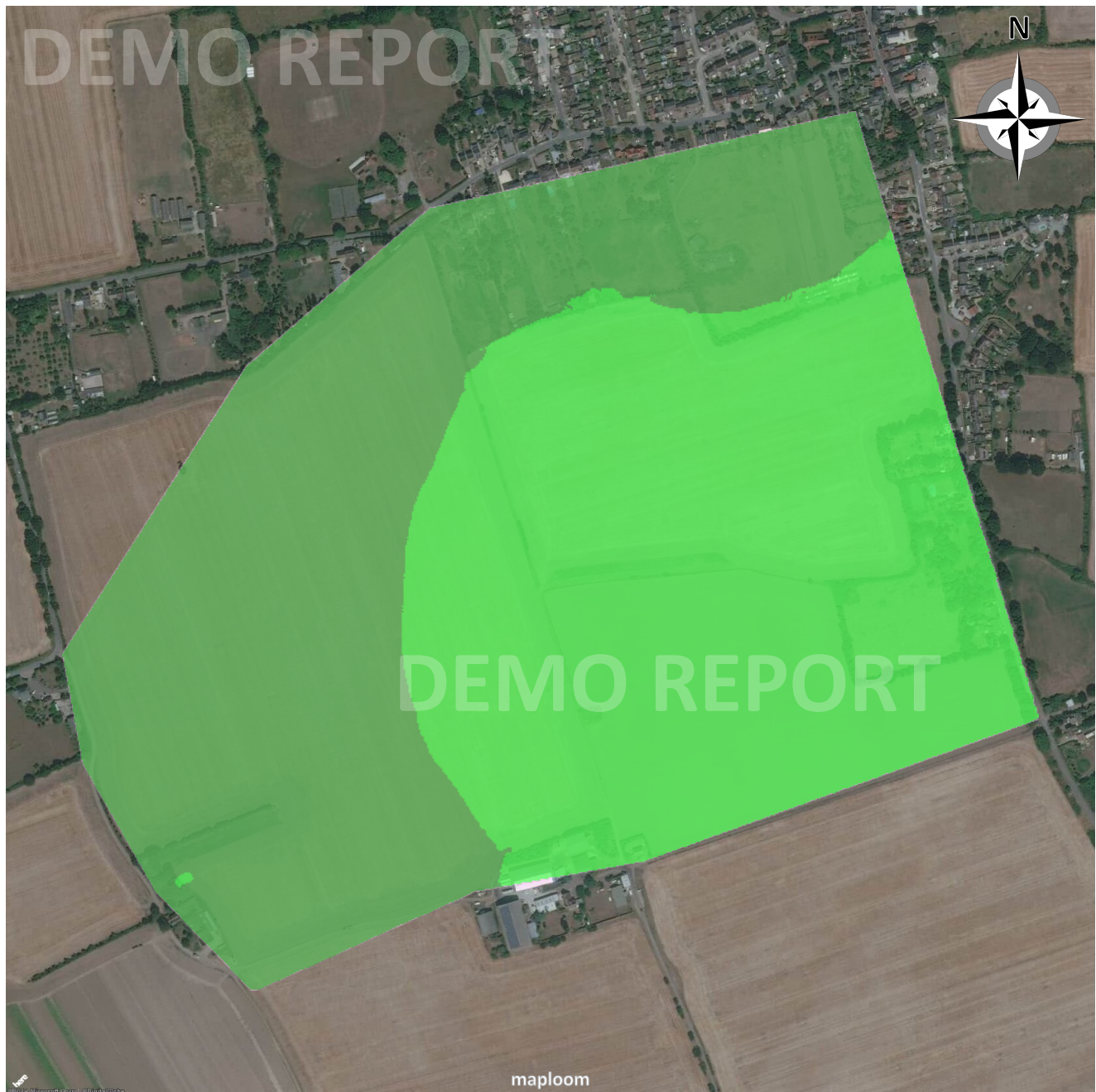
Suitable area: 71.7 ha

Area average elevation suitability score: 17.4/20

Elevation Suitability map

Resolution: 2m
Data source: LiDAR Digital Terrain Model

0 m 500 m



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Elevation suitability for English and Welsh vineyards is between 5 – 150m.

However, for land above 125m please contact the Vinescapes for additional advice.

Elevation range: 10.9 - 39.1m

Elevation (m)	Score	Area (ha)	Suitability legend	
< 5	0/20	0.0	0	Least
5-25	15/20	37.6	5	
25-75	20/20	34.1	10	
75-100	10/20	0.0	15	
100-125	5/20	0.0	20	Most
125-150	0/20	0.0		

Suitable area: 71.7 ha

Area average elevation suitability score: 17.4/20

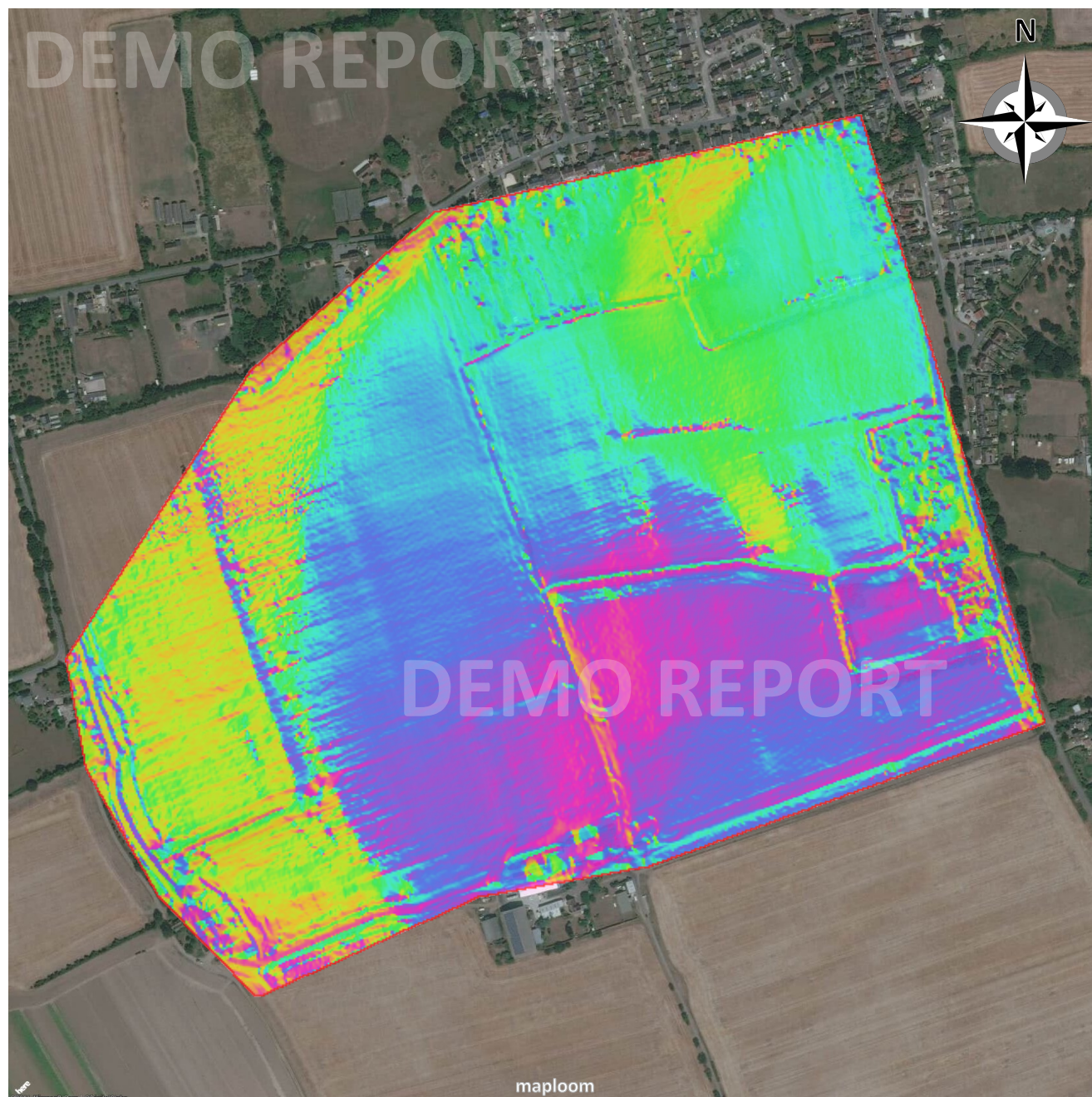
Aspect map

Resolution: 2m

Data source: LiDAR Digital Terrain Model

0 m

500 m



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Aspect suitability for English and Welsh vineyards is southerly, between 90° – 270° (East – West).

For specialist advice on land with other aspects please contact the Vinescapes.

*higher scores can be awarded if the land is not exposed to prevailing south-westerly winds.

Aspect range: 0.0-360.0 degrees

Aspect (°)	Score	Area (ha)	Aspect (degrees)
< 90	0/20	21.3	0-90
90-135	15/20	14.1	90-135
135-180	20/20	15.1	135-180
180-225	15/20	8.8	180-225
225-270	10/20*	7.7	225-270
> 270	0/20	4.7	270-360

Suitable area: 45.7 ha

Area average aspect suitability score: 10.1/20

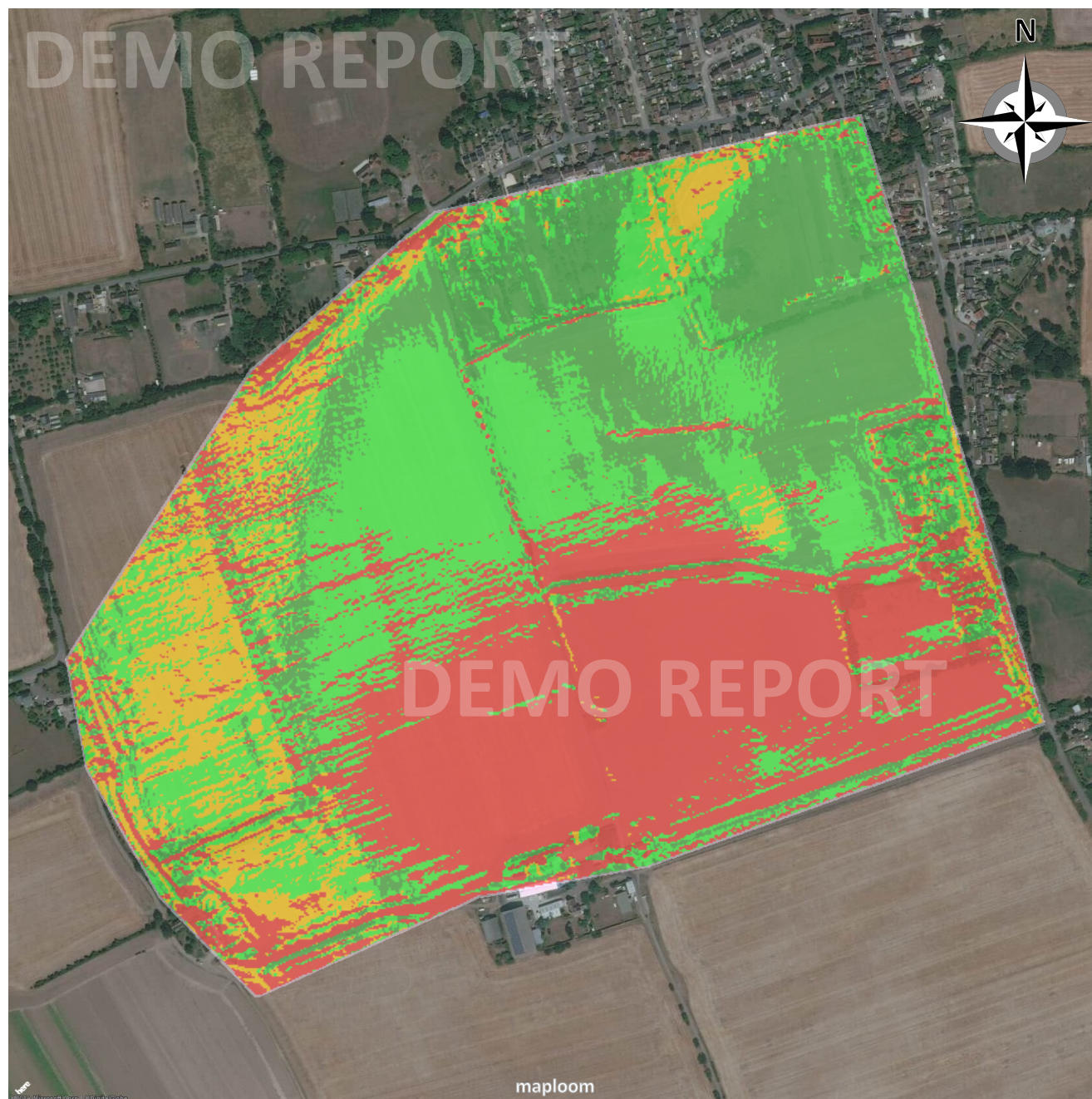
Aspect Suitability map

Resolution: 2m

Data source: LiDAR Digital Terrain Model

0 m

500 m



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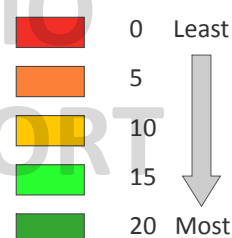
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Aspect range: 0.0-360.0 degrees

Aspect (°)	Score	Area (ha)
< 90	0/20	21.3
90-135	15/20	14.1
135-180	20/20	15.1
180-225	15/20	8.8
225-270	10/20*	7.7
> 270	0/20	4.7

Suitability legend



*higher scores can be awarded if the land is not exposed to prevailing south-westerly winds.

Suitable area: 45.7 ha

Area average aspect suitability score: 10.1/20

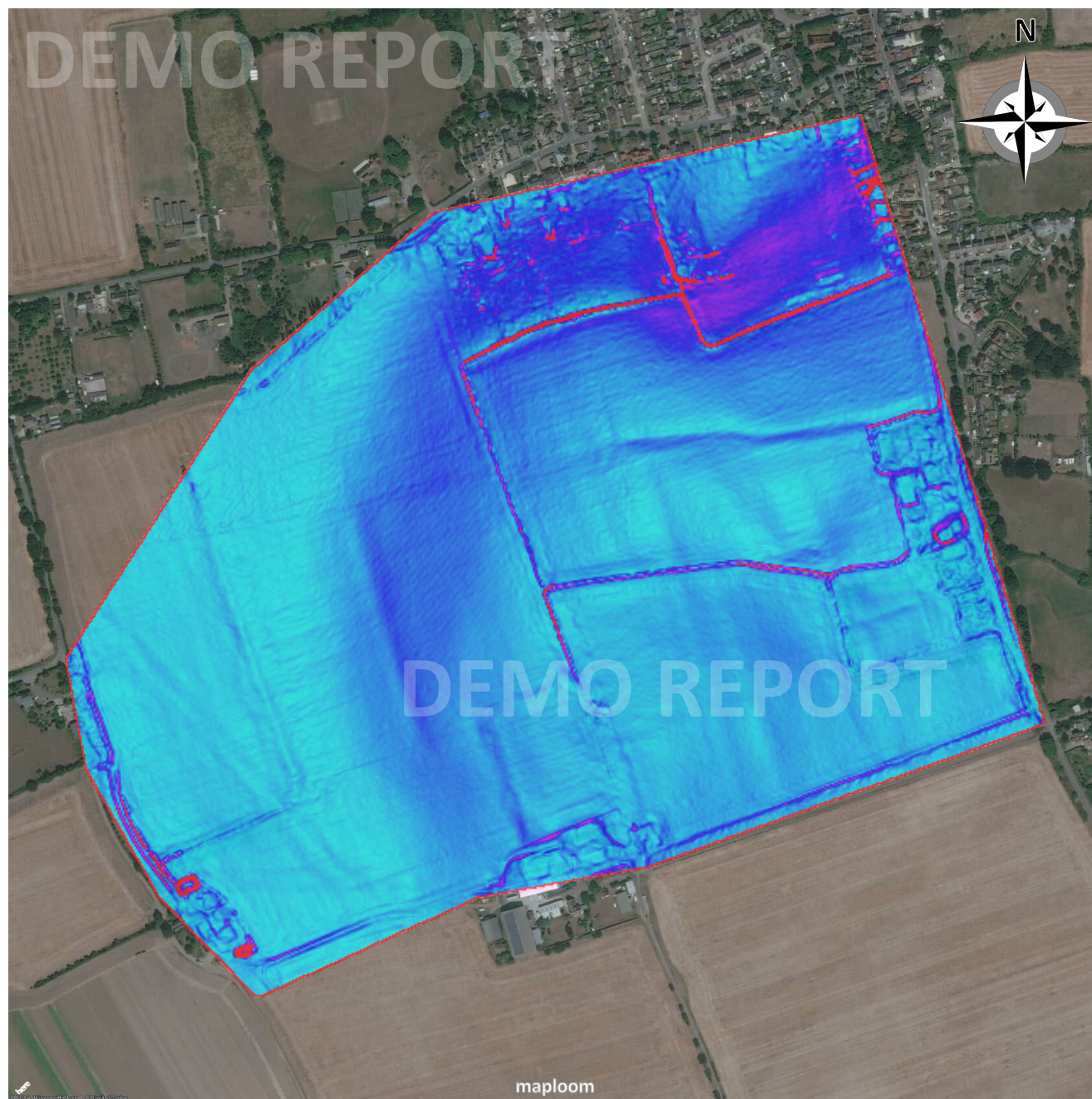
Slope map

Resolution: 2m

Data source: LiDAR Digital Terrain Model

0 m

500 m






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Slope suitability for English and Welsh vineyards is between 1 – 15% (~0.5 – 8.5 degrees).

For advice on land with a flatter or steeper slope please contact the Vinescapes.

Slope range: 0.0-32.3%

Slope (%)	Score	Area (ha)	Slope (percent rise)	
< 1	0/20	21.0		0.0%
1-5	15/20	45.8		5.0%
5-10	20/20	4.4		10.0%
10-12.5	10/20	0.2		
12.5-15	5/20*	0.1		
> 15	0/20	0.2		

* Vineyard sites with such steep slopes can be dangerous and specialist equipment or terracing may be required.

Suitable area: 50.5 ha

Area average slope suitability score: 10.8/20

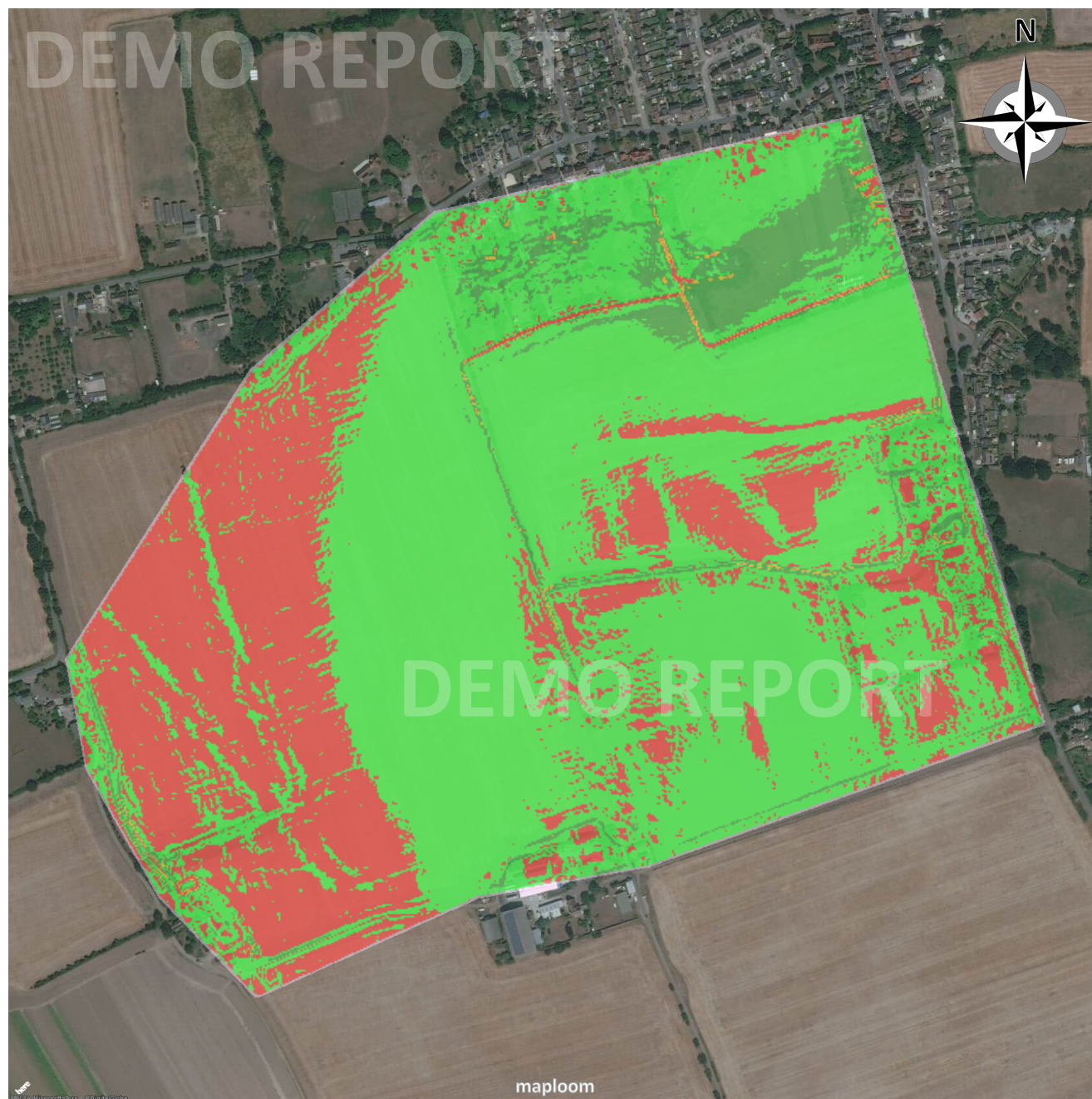
Slope Suitability map

Resolution: 2m

Data source: LiDAR Digital Terrain Model

0 m

500 m



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Slope suitability for English and Welsh vineyards is between 1 – 15% (~0.5 – 8.5 degrees).

For advice on land with a flatter or steeper slope please contact the Vinescapes.

* Vineyard sites with such steep slopes can be dangerous and specialist equipment or terracing may be required.

Slope range: 0.0-32.3%

Slope (%)	Score	Area (ha)
< 1	0/20	21.0
1-5	15/20	45.8
5-10	20/20	4.4
10-12.5	10/20	0.2
12.5-15	5/20*	0.1
> 15	0/20	0.2

Suitability legend



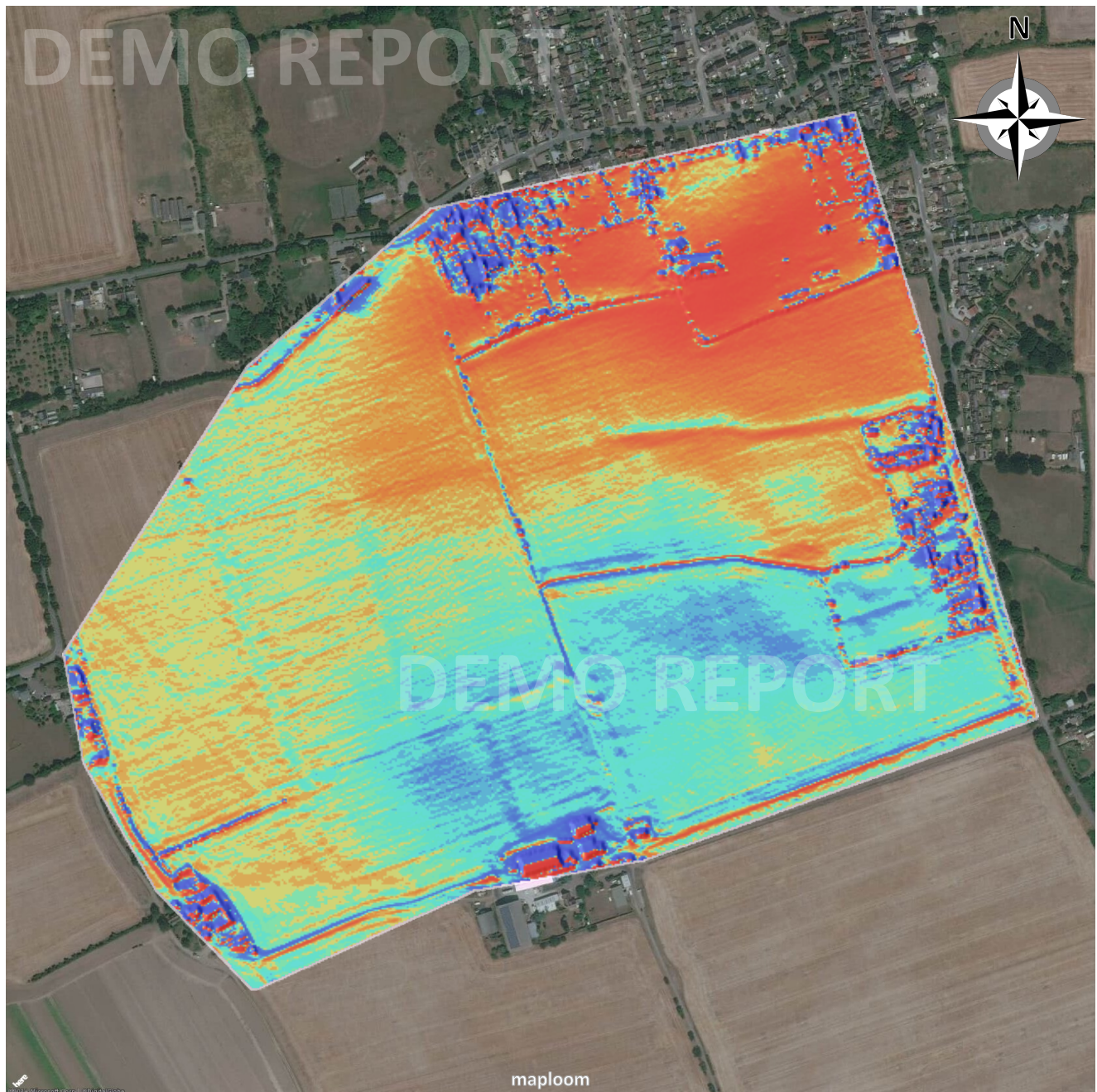
Suitable area: 50.5 ha

Area average slope suitability score: 10.8/20

Solar radiation

Resolution: 2m
Data source: LiDAR Digital Terrain Model

0 m 500 m

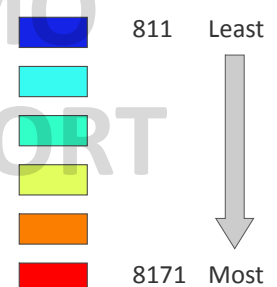


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Solar radiation.

The measure of the potential solar radiation is calculated for the site based on an average of 3 specific days selected by our viticulture specialists (15 May, 15 July, 15 Sept). The calculation models the sun's track across the sky on these days and the potential solar radiation that would be received across the land surface. This varies based on the shading and scattering caused by surface features, particularly vegetation. The map shows variation of low (blue) to high (red) solar radiation values measured in (Wh/sqm). Areas which are potentially more in shade are shown in blue.

Solar Radiation (Wh/sqm)



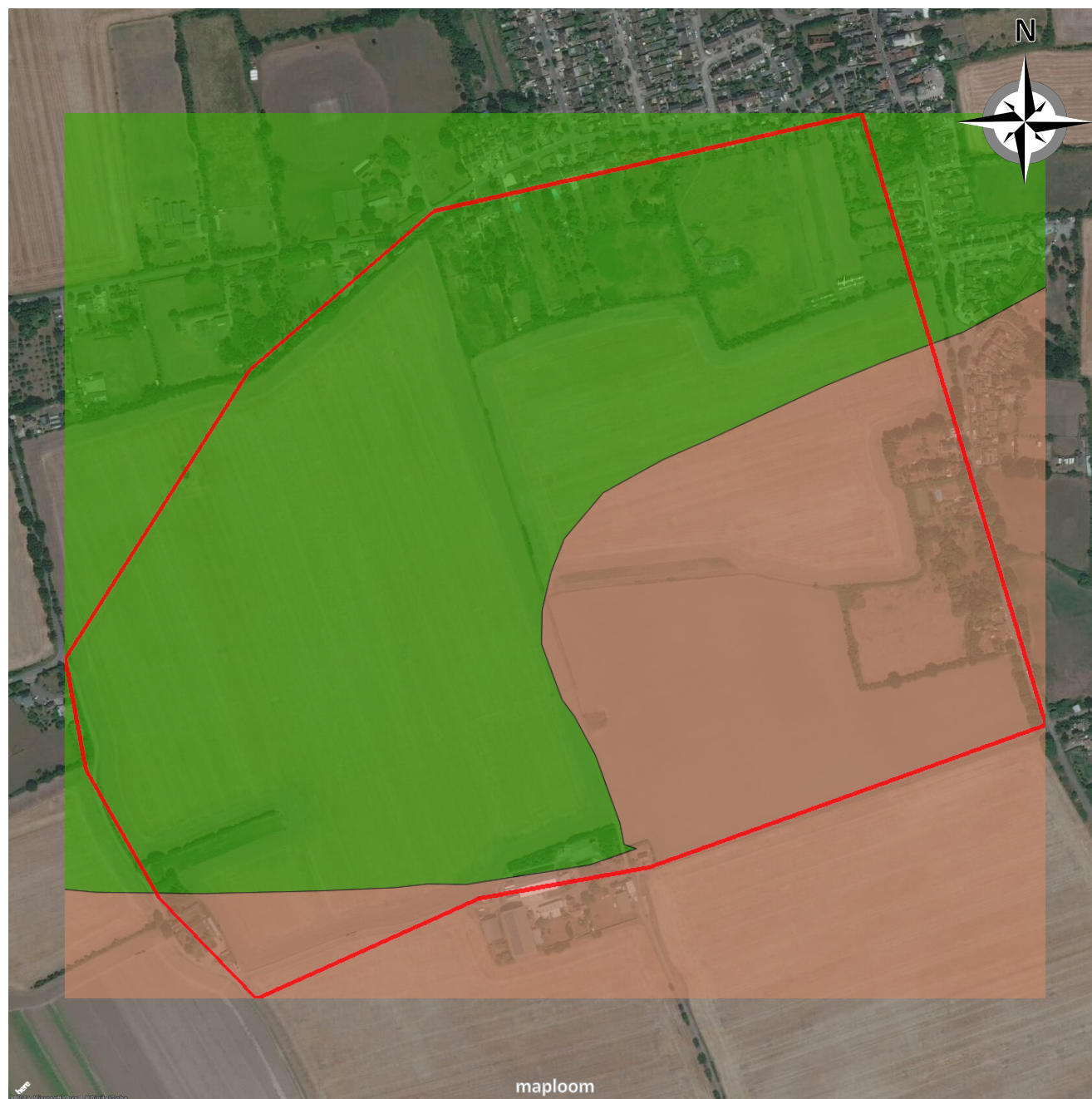
VineMAP soil type

Scale: 1:250,000

Data source: Cranfield Uni. LandIS, National Soil Map.

0 m

500 m



Soils Data © Cranfield University (NSRI) and for the Controller of HMSO 2019. © HERE, 2019

KEY



Freely draining slightly acid loamy soils

Coverage: 34 % - Suitable



Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils

Coverage: 66 % - Requires further analysis

VineMAP soil type

Soil: Soil texture, drainage, pH, fertility, nutrient and organic matter content are all important attributes in determining viticultural suitability. Their influences on vine nutrient and water availability, soil temperature and humidity, the solubility of metal ions and the supply of nutrient cations and anions, the number of beneficial microbes, and contributions to soil chemical, physical and biological properties all impact vine health, growth and productivity. Although a range of desirable soil characteristics exist for viticulture, for example it is generally accepted that soil pH should be between 5.5–8.0 for optimum vine growth and soil microbial composition, no one prescriptive ‘ideal’ set of soil properties exists. Rather a broad and generalised range is presented as being suitable under different environmental circumstances and for different rootstocks, clones, varieties, planting densities and training systems. It should also be noted that many soil characteristics, particularly nutrient availability, can be ameliorated via soil management activities to achieve desired traits.

Soil suitability for English and Welsh vineyards is considered to be one or more of the following soils, as described through the LandIS NATMAP SoilScapes (<http://www.landis.org.uk/soilscapes/>) product:

- Shallow lime-rich soils over chalk or limestone
- Freely draining acid loamy soils over rock
- Freely draining lime rich loamy soils
- Freely draining sandy Breckland soils
- Freely draining slightly acid but base rich soils
- Freely draining slightly acid loamy soils
- Freely draining slightly acid sandy soils
- Freely draining very acid sandy and loamy soils

Other soils that may be considered (on a case by case basis) are those classified as:

- Lime rich loamy and clayey soils with impeded drainage
- Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils
- Slowly permeable seasonally wet acid loamy and clayey soils
- Slightly acid loamy and clayey soils with impeded drainage

VineMAP uses the Cranfield university, LandIS, National soil Map of England and Wales, datasource to provide an indicative measure of soil characteristics across land but please note that this dataset is not developed for micro field scale assessments and should therefore not be relied on as entirely representative of the soils in your selected area / field.

Soil characteristics can vary over a matter of meters and therefore all prospective vineyard sites require in-field soil sampling and assessment to determine site / field specific soil characteristics, amelioration requirements, rootstock, clonal and viticulture suitability. Please contact Vinescapes directly to discuss soil suitability further or/and to undertake this process.

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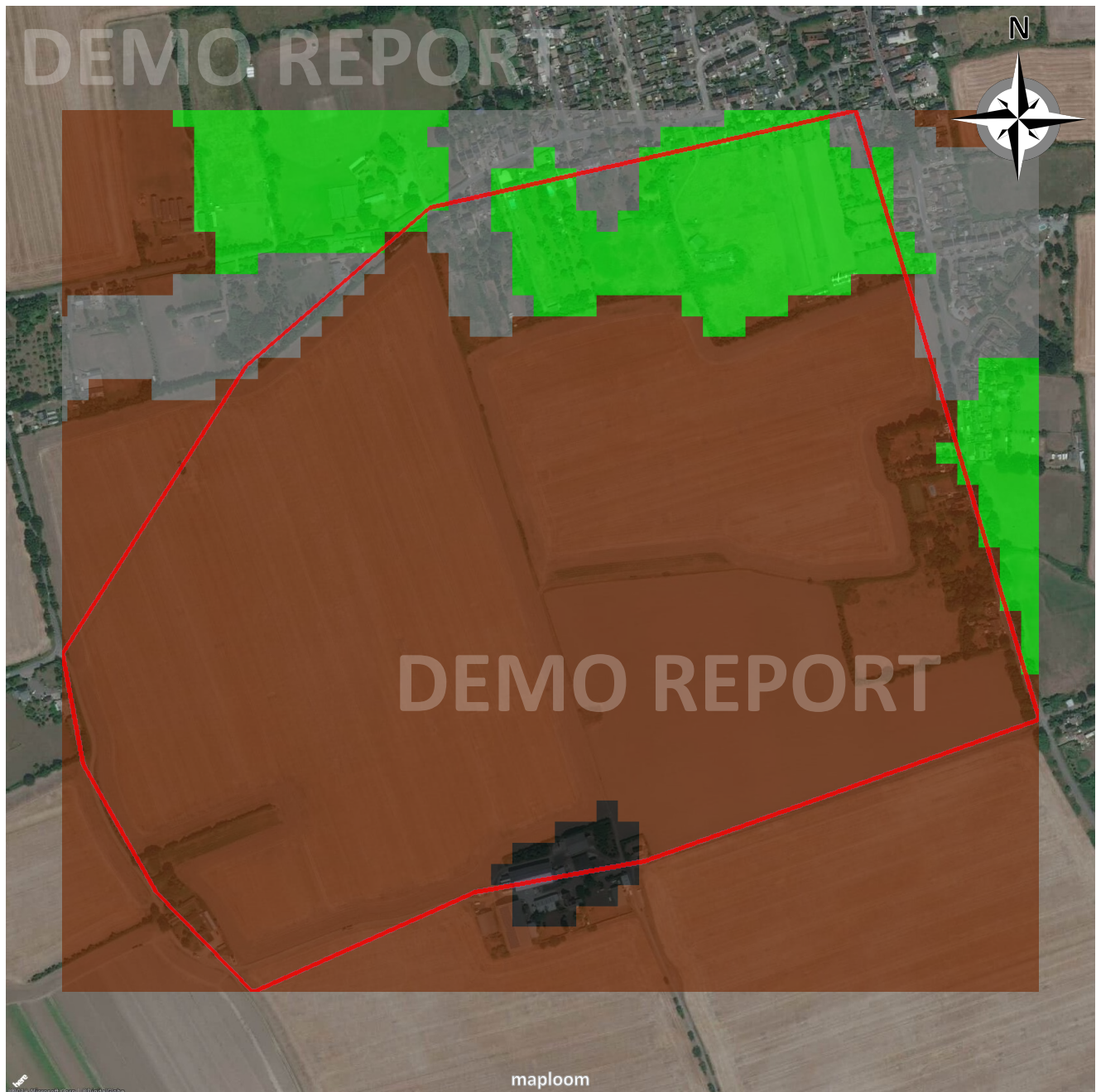
Land Cover

Resolution: 25m

Data source: Centre for Ecology and Hydrology

0 m

500 m



Rowland, C.S.; Morton, R.D.; Carrasco, L.; McShane, G.; O'Neil, A.W.; Wood, C.M. (2017) Land Cover Map 2015 (25m raster, GB). NERC Environmental Information Data Centre. <https://doi.org/10.5285/bb15e200-9349-403c-bda9-b430093807c7>. © HERE, 2019

Landcover legend

	Broadleaved woodland		Fen, Marsh and Swamp		Supra-littoral Rock
	Coniferous Woodland		Heather		Supra-littoral Sediment
	Arable and Horticulture *		Heather grassland		Littoral Rock
	Improved Grassland *		Bog		Littoral sediment
	Neutral Grassland *		Inland Rock		Saltmarsh
	Calcareous Grassland *		Saltwater		UrbanSuburban
	Acid grassland		Freshwater		Suburban

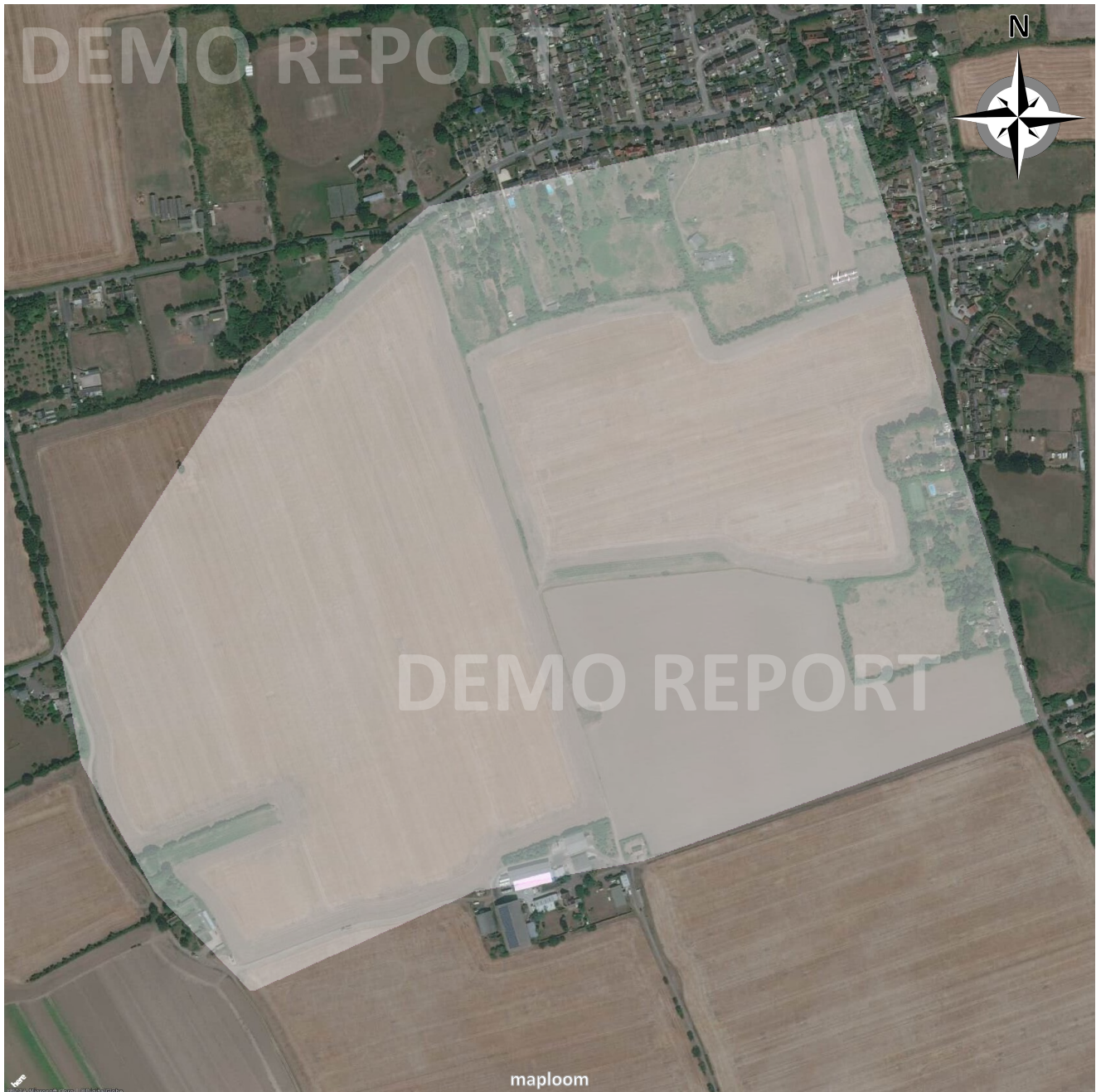
* Potentially suitable areas for viticulture are limited to those classified as arable, horticulture or grassland because they are deemed most likely to exhibit viticulture suitability parameters. Please note that the Land Cover data/classifications are from 2015 and may change with time and land use variations

Environmental designations

Data source: Natural England

0 m

500 m



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No environmental designations were detected within the site.

All land considered for viticulture and/or wine production related activities, whether or not areas are shown in this report as containing designated sites within or near the selected land, may have restrictions regarding viticulture and/or wine production related activities. Always seek advice regarding any restrictions or implications from the relevant authorities before deciding if the land is suitable for your desired purpose.

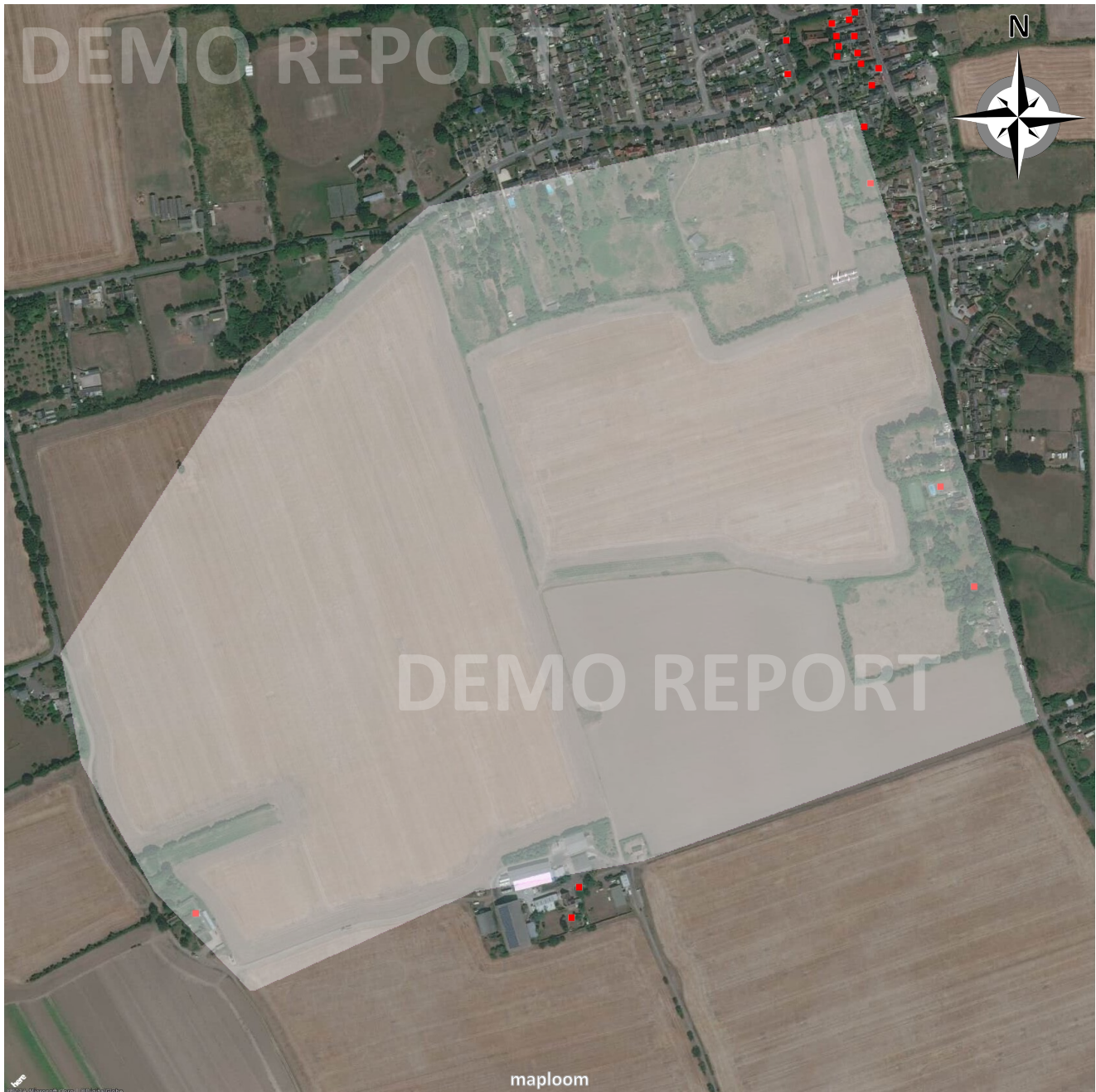
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Historical / Heritage designations

Data source: Historic England

0 m

500 m



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Designated sites	within	near by
Listed Buildings	2	20
World Heritage Sites	-	-
Parks and Garden	-	-
Battlefields	-	-
Scheduled Monuments	-	-
Building Preservation Notices	-	-
Certificates of Immunity	-	-

Where present, historical designations at the site are shown in the map above. This is based on Historic England open data maps for Listed Buildings, World Heritage Sites, Parks and Garden, Battlefields, Scheduled Monuments, Building Preservation Notices, Certificates of Immunity. Searches against these designations are shown in the table and provides both designations within the selected area and those nearby (within the wider map area).

All land considered for viticulture and/or wine production related activities, whether or not areas are shown in this report as containing designated sites within or near the selected land, may have restrictions regarding viticulture and/or wine production related activities. Always seek advice regarding any restrictions or implications from the relevant authorities before deciding if the land is suitable for your desired purpose.

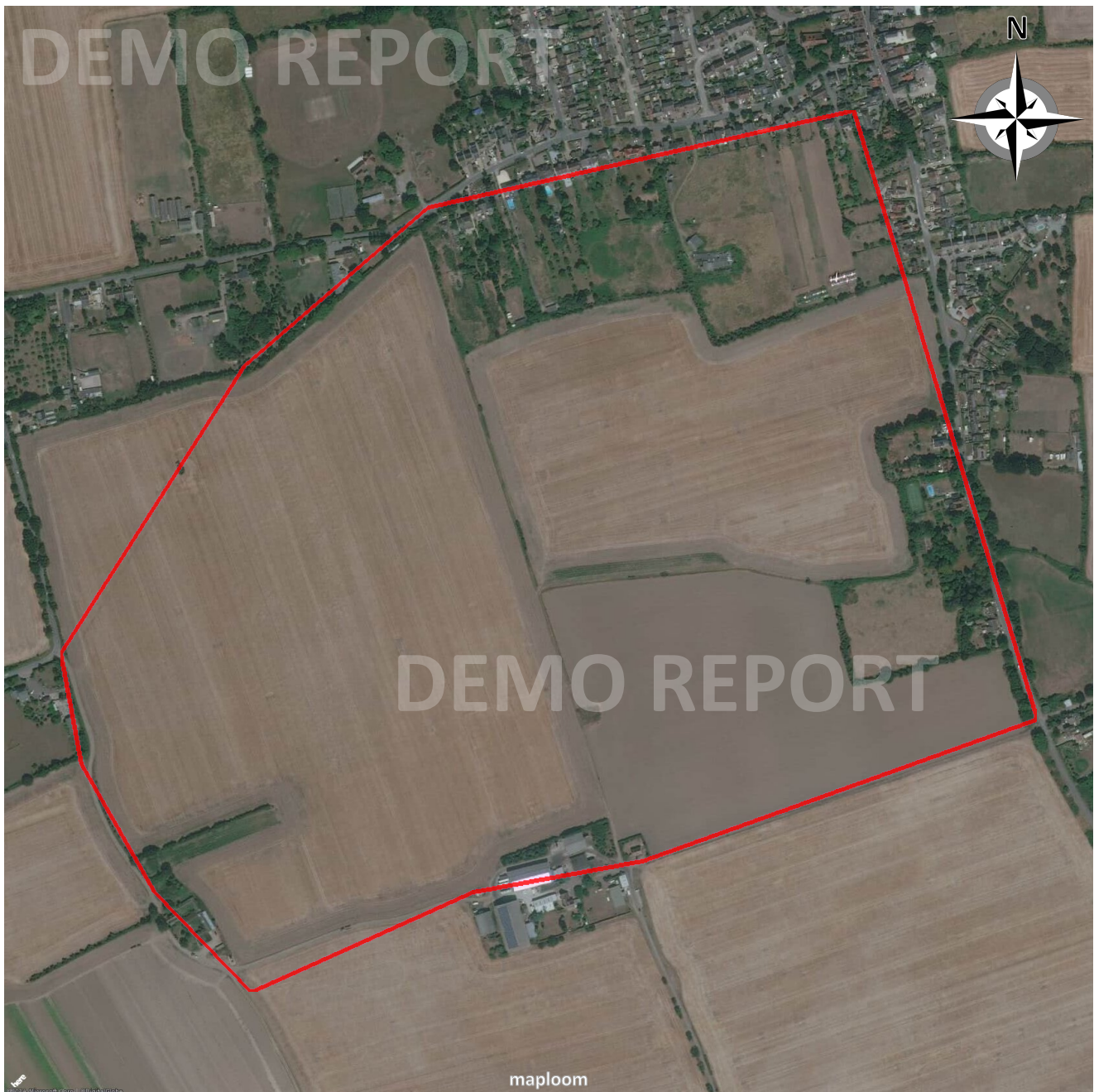
Flood risk

Resolution:

Data source: Environment Agency

0 m

500 m



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Flood Zone 3 is Environment Agency's best estimate of the areas of land at risk of flooding, when the presence of flood defences are ignored and covers land with a 1 in 100 (1%) or greater chance of flooding each year from Rivers; or with a 1 in 200 (0.5%) or greater chance of flooding each year from the Sea. Land within flood zone 3 includes land identified by Local planning authorities in their Strategic Flood Risk Assessments as areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency.

Flood zones legend



flood zone 3

flood zone 2

Flood Zone 2. Land and property in flood zone 2 have a medium probability of flooding. This includes land with between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. Land falling within this zone requires a flood risk assessment as part of the planning process.

Flood Zone 1 defines areas which have a greater than 1 in 1,000 year flood risk. They are not shown on the map as effectively they are "everything else". A flood risk assessment may be required for developments in flood zone 1 and more than > 1 hectare; in an area with critical drainage problems as notified by the Environment Agency.

For further information visit: <https://flood-map-for-planning.service.gov.uk/>

Climatic suitability criteria for cool-climate viticulture

Temperature

Temperature plays a critical role in viticulture viability, grapevine growth and in modulating the final content of compounds in grape berries such as sugars, acids, phenolics, flavour compounds and proteins.

In viticulture temperature suitability is often presented through bioclimatic indices (BCIs), metrics which provide simplistic illustrations and assessments of viticulture or varietal suitability. BCIs place numerical or descriptive envelopes around summed or averaged daily or monthly growing-season temperatures to express suitability ranges. Various indices exist, two of which are used in this suitability assessment report: Growing Season Average Temperature (GST) and Growing Degree Days (GDD).

It is important to note that they do not necessarily resolve the range of climatic processes, intra-annual variability or critical daily or hourly time-scale events which can boost or threaten vineyard productivity and they may not adequately illustrate varietal 'potential' or the adaptive capacity of viticulture through vineyard management techniques. Therefore, whilst they are useful indicators they should not be relied on as the sole determinants of viticulture or varietal suitability.

In this report the employment of GSTs and GDDs is for the purpose of scoring threshold values above which larger bioclimatic values present greater viticulture potential.

GST is calculated as the average daily mean temperatures summed for the growing season (Northern Hemisphere: April–October). GST is easier to calculate than GDD but is functionally identical.

$$\frac{\sum_{d=1}^n [T_{max} + T_{min}] / 2}{n}$$

GDDs are calculated as a summation of the daily mean ($T_{max} + T_{min} / 2$) temperature above a base of 10°C, for April – October (Northern Hemisphere). The 10°C base temperature is a subjective minimum threshold considered necessary for grapevines to initiate their growing cycle.

$$\sum_{d=1}^n \max \left[\frac{T_{max} + T_{min}}{2} - 10, 0 \right]$$

Frost

Frosts, especially radiation frosts during mid-March – May are amongst the most common detrimental effects of minimum temperature extremes on *Vitis vinifera* L. grapevines. Notwithstanding frost protection, they pose a significant economic risk to vineyards. Frost events can kill or severely damage emerging buds and shoots and reduce yields and grape quality parameters. Cool-climate wine producing regions are particularly exposed to the risk of early season frost events when the advancement of budburst occurs in response to increased spring air temperatures.

Days of air frost ($\leq 0^{\circ}\text{C}$) are provided in this report for the 15th March – 14th April and the 15th April – 31st May. During the latter period buds, inflorescences and young shoots are likely to be at a higher risk of damage as they are more exposed. However, degree of exposure / development will depend on varietal, clone and seasonal weather conditions at the vineyard location as well as vineyard management.

Climatic suitability criteria for cool-climate viticulture

Rainfall

Wine grape quality and quantity are affected by precipitation and water availability. High levels of rainfall, usually accompanied by reduced sunlight can negatively affect vine growth, berry quality and quantity through associated issues such as increased disease pressure, overstimulated vegetative growth, reduced flowering, millerandage (where grape bunches contain berries that differ greatly in size and maturity, sometimes referred to as 'chicken and hen'), coulure (flowers fail to set and are shed at or after flowering) and a sugar/acidity imbalance. In England areas with lower growing season (April – October) rainfall are favoured as a shortage of rainfall is not presently deemed to be a significant risk to viticulture.

High rainfall during June, when grapevine flowering commonly occurs in England, can have a negative impact on flowering and subsequent grape yield. As such, areas within England with lower average June rainfall are awarded higher levels of viticulture suitability within VineMAP.

Sunshine

Sunshine and more specifically solar radiation at the earth's surface: insolation, provides energy through photosynthetic processes for grapevine growth and plays a particularly beneficial role during berry ripening and maturation when sugar and phenolic contents are determined. A solar radiation map for your selected area can be purchased as part of the Topography report (Report 1).

Wind

A breeze is considered favourable within a vineyard environment to aid in drying out vines and reducing disease pressure, through a reduction in humidity. However, wind can reduce flowering success, damage vine canopy structures and reduce meso- and micro-scale temperatures within a vineyard. Wind / exposure also makes spraying more challenging and may limit the number of available spray days.

In-site wind speed and direction can be a result of local topography and site exposure so the VineMAP topography report and amelioration considerations such as windbreaks should be examined to more fully determine suitability from both prevailing winds and local scale wind directions and speed.

Data and coverage

This report includes historic temperature, frost and rainfall information relevant to the UK grape growing season, for the selected area. Climate data used in VineMAP for 2008–2017 is provided through a 2.5 x 2.5km gridded re-analysis of interpolated weather station data covering England (Source: Irish Meteorological Service reanalysis, powered by Weatherquest Ltd.). Unless explicitly presented as otherwise, the results data provided below is for the 10-year average.

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Climatic suitability criteria for cool-climate viticulture

Climatic variable	Result	Classification	Score	Notes
GST(°C)	14.1°C	<13°C (unsuitable)	0/20	The classifications and scores provided relate to cool-climate suitability for growing varieties commonly found in southern and south-eastern England. *Varietal dependant. Contact Vinescapes to discuss viticulture and varietal suitability. **Many vineyards in south-east and south-central England operate within this range.
		13–14°C (marginal)*	10/20	
		14–15°C (suitable)**	15/20	
		15–16°C (very suitable)	20/20	
		≥ 16°C (Exceptional)	20/20	
GDD	951	< 750 (unsuitable)	0/20	* Similar to Chablis (950), the Loire (980) and many vineyards in south and south- central England. ** Similar to Champagne (1050) and many vineyards in south-east and eastern England. Early ripening varieties and appropriate clones can achieve high quality. *** Similar to the Rheingau (1100) and Burgundy (1140).
		750 – 900 (marginal)	10/20	
		900–1000*	15/20	
		1000–1100**	20/20	
		≥ 1100***	20/20	
Growing season rainfall (mm)	378	>500	0/20	
		450-500	5/20	
		400-450	10/20	
		350-400	15/20	
		<350	20/20	
June rainfall (mm)	63	>70	0/20	
		65-70	5/20	
		60-65	10/20	
		55-60	15/20	
		<55	20/20	
Frost days (15th March - 14th April)	3.3	>5 (extreme risk)	0/20	For results showing moderate risk or above please view the Cold Air Flow and Cold Air Accumulation maps for an indication of in-site risk locations and contact Vinescapes for frost protection advice.
		3-5 (high risk)	5/20	
		1-3 (moderate risk)	10/20	
		0-1 (low risk)	15/20	
		0	20/20	
Frost days (15th April - 31st May)	1.3	>5 (extreme risk)	0/20	For results showing moderate risk or above please view the Cold Air Flow and Cold Air Accumulation maps for an indication of in-site risk locations and contact Vinescapes for frost protection advice.
		3-5 (high risk)	5/20	
		1-3 (moderate risk)	10/20	
		0-1 (low risk)	15/20	
		0	20/20	
Average frost temperatures (15th March – 31st May)	-1.2	< -3 (extreme risk)	0/20	For results showing moderate risk or above please view the Cold Air Flow and Cold Air Accumulation maps for an indication of in-site risk locations and contact Vinescapes for frost protection advice.
		-2 - -3 (high risk)	5/20	
		-1 - -2 (moderate risk)	10/20	
		0 - -1 (low risk)	15/20	
		0	20/20	

Combined climatic suitability

11.4/20

Grading matrix

0-5 = Unsuitable

5.1-10 = Low potential

10.1-15 = Good potential

15.1-20 = Excellent potential

Climatic suitability criteria for cool-climate viticulture

Additional monthly climate data (10-year average)	Time period	Variable	Variable	Variable
Temperature	Month	Minimum (°C)	Max (°C)	
	April	4.3	14.2	
	May	7.5	16.8	
	June	10.4	19.8	
	July	13.1	22.4	
	August	13.2	22.0	
	September	10.8	19.2	
	October	8.3	15.3	
Frost	Year	15/03 – 14/04 (Days < 0°C)	15/04 – 31/05 (Days < 0°C)	Minimum temperatures (°C)
	2017	0	1	-1
	2016	1	3	-0.6,-0.3,-0.3,-0.3
	2015	2	0	-0.1,-2.3
	2014	1	0	-1
	2013	15	3	-0.7,-1.1,-0.5,-0.8,-2.1,-2.9,-2.6,-3.1,-1.6,-2.7,-0.5,-0.8,-0.4,-0.8,-4.8,-1.2,-0.6,-0.1
	2012	1	1	-1.9,-1.3
	2011	2	0	-1.7,-0.6
	2010	0	4	-0.4,-0.8,-0.2,-0.6
	2009	3	0	-1.4,-1,-0.5
	2008	8	1	-0,-1.7,-1.7,-1.4,-1,-1.2,-2.2,-0.3
	Average	3.3	1.3	-1.2
Growing season rainfall	Month	Mean (mm)		
	April	40.7		
	May	51.9		
	June	63.3		
	July	64.9		
	August	58.6		
	September	40.7		
	October	58.1		
	Growing season total	378.2		

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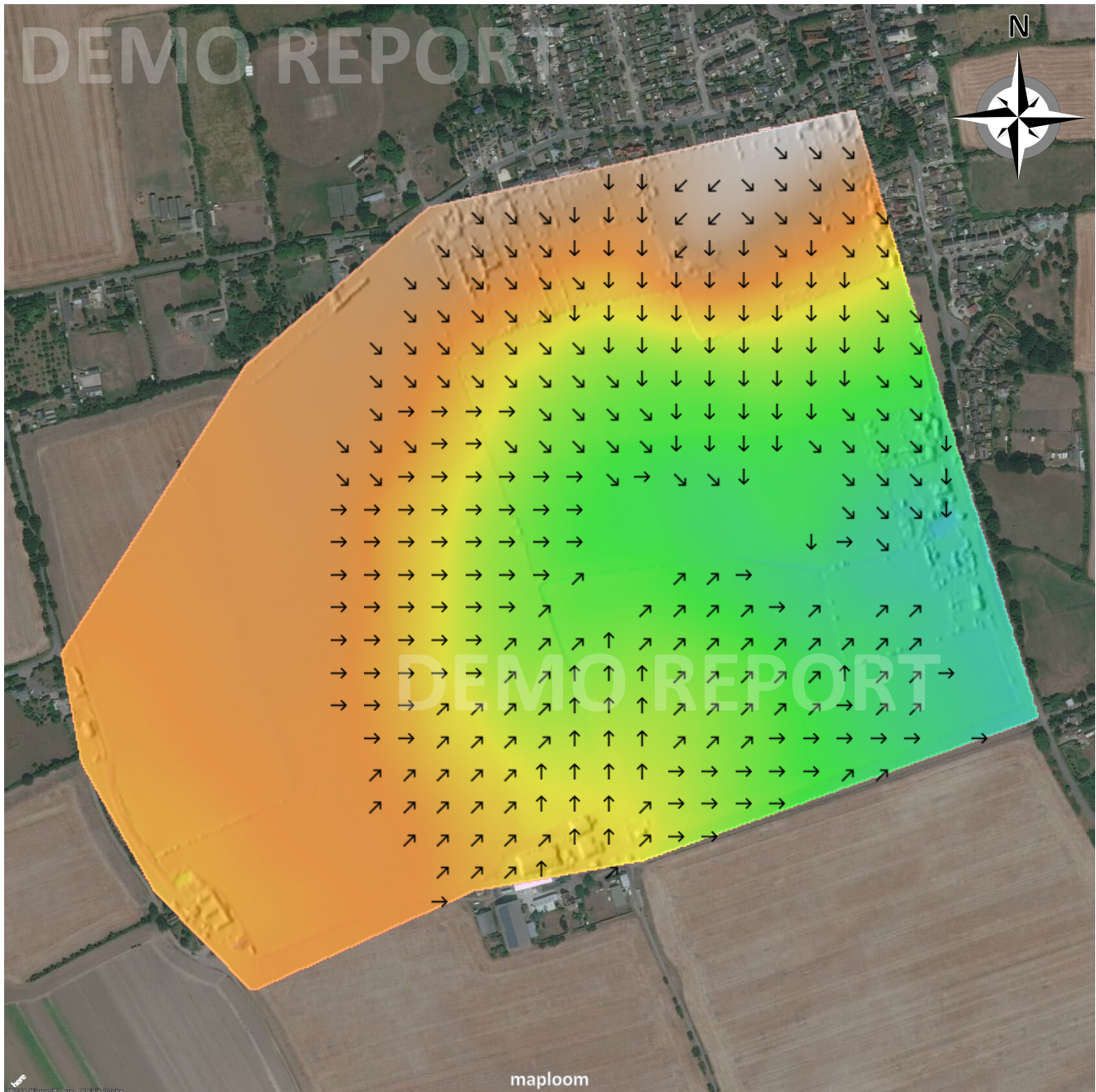
Cold air flow

Resolution: 2m

Data source: LiDAR Digital Terrain Model

0 m

500 m



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Cold air flow. This map shows the terrain and slope direction of the selected area. Under radiation frost conditions cold air flows down slope and has the potential to be trapped where surface features (e.g. trees, hedges or buildings) form barriers to prevent the cold air from dispersing. Areas where arrows converge or the flow meets natural barriers have the potential for frost risk as cold air may accumulate and engulf planted areas.

Elevation legend

	10.9-15.6 m
	16.5-21.2 m
	22.1-26.8 m
	27.8-32.5 m
	33.4-38.1 m
	39.1-43.8 m

flow direction

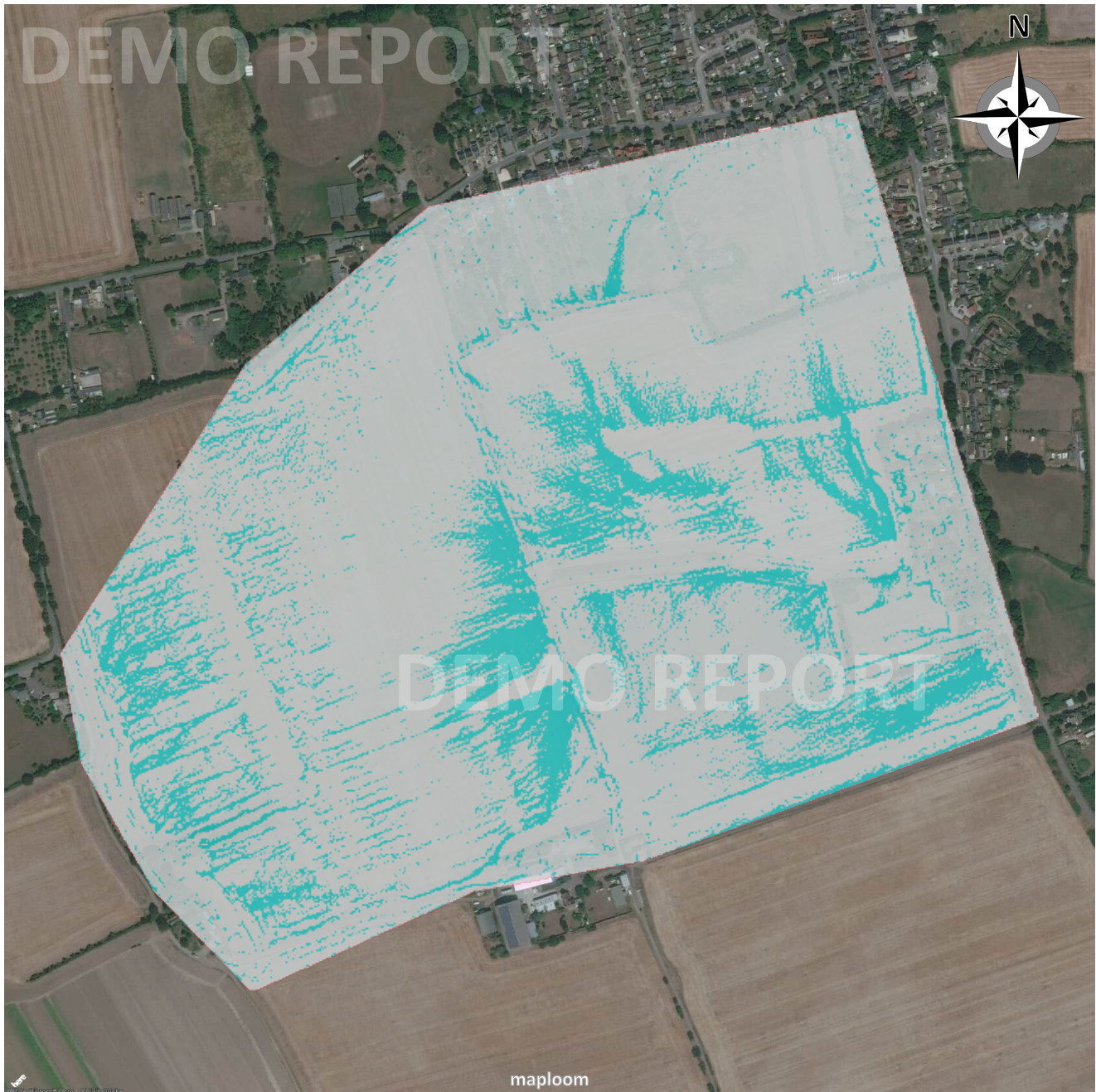
Cold air accumulation

Resolution: 2m

Data source: LiDAR Digital Terrain Model

0 m

500 m



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Potential cold air accumulation / radiation frost risk areas. In addition to the cold air flow map, this cold air accumulation map provides some indication of the potential for areas where cold air could converge. This is based on a hydrological metric (topographic index) which calculates “wetness” per grid cell based on modelled water flow from the contributing “upstream” area. The light green areas show higher accumulation from a larger contributing up-slope area (and therefore have a greater potential frost risk) than the darker areas. While water and cold air do not behave exactly the same (and cold air sits above the surface), this map is a proxy for where cold air is likely to accumulate and present a radiation frost risk.

Cold air legend



Greatest cold air accumulation / radiation frost risk areas

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Mapping Overview

Mapping for this report was generated using the maploom platform. This is a cloud based geospatial analysis and modelling platform that uses open standards and open source analysis tools to deliver a wide range of location-based insights to non-specialist users. Further details can be found at www.maploom.com.

Mapping Datasets

The geospatial datasets used within the report are predominantly drawn from open source datasets. For each map, the data sources and relevant citations are provided.

Further details are summarised below:

Dataset	Map In report	Source	Credit / Disclaimer
Aerial Photography	Extensive use throughout the report	HERE	© HERE, 2019
LiDAR	Extensive use throughout the report	Environment Agency	© Environment Agency copyright and/or database right 2019. All rights reserved.
SSSI - Sites of Special Scientific Interest LNR - Local Nature Reserves NNR – National Nature Reserves SAC – Special Areas of Conservation SPA – Special Protection Areas	Environmental designations	Natural England	© Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right 2019.
Registered Battlefields Registered Parks and Gardens Listed Buildings Scheduled Monuments Building Preservation Notices Certificates of Immunity	Historical Designations	Historic England	© Historic England 2019. Contains Ordnance Survey data © Crown copyright and database right 2019.
World Heritage Sites	Historical Designations	UNESCO	© Historic England 2019 / UNESCO. Contains Ordnance Survey data © Crown copyright and database right 2019.
OpenMap Local	Site Overview: Access	Ordnance Survey	Contains OS data © Crown copyright and database right 2019.
Flood zones 2 and 3	Flood Risk	Environment Agency	© Environment Agency copyright and/or database right 2019. All rights reserved.
LandIS, National Soil Map	Soil type	Cranfield Uni. LandIS	Soils Data © Cranfield University (NSRI) and for the Controller of HMSO 2019
CEH Land Cover Map 2015	Land Cover	Centre for Ecology and Hydrology	Rowland, C.S.; Morton, R.D.; Carrasco, L.; McShane, G.; O’Neil, A.W.; Wood, C.M. (2017) Land Cover Map 2015 (25m raster, GB). NERC Environmental Information Data Centre. https://doi.org/10.5285/bb15e200-9349-403c-bda9-b430093807c7



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