

Monmouth

ALC_ID 006_17

Agricultural Land Classification

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1 Executive Summary

The Agricultural Land Classification of approximately 90 ha of land to the west of Raglan was assessed by ADAS in June 2017.

The land was surveyed to provide targeted reconnaissance information on the Agricultural Land Classification quality for Welsh Government.

2 Introduction

ADAS was instructed by Welsh Government to undertake a reconnaissance Agricultural Land Classification (ALC) on an area of land (ALC_ ID 006_17) lying west of Raglan and south of the A40 road. The purpose of the survey was to inform the Welsh Government on the quality of the agricultural land. The aim was for Welsh Government to use the information to support its regional validation exercise in considering a Predictive Agricultural Land Classification Map for Wales prepared by Cranfield University.

The land was classified using the system outlined in the Ministry of Agriculture, Fisheries and Food (MAFF now Defra) publication: 'Agricultural Land Classification of England and Wales - Revised guidelines and criteria for grading the quality of agricultural land' (October 1988).

3 Methodology

3.1 Fieldwork

A desk study of soils and climatic information was undertaken using reference material held by ADAS, followed by reconnaissance fieldwork to study soil and site limitations.

The scope of works specified that the survey work be based on a 200m Ordnance Survey sample aligned grid. Soil pits were to be dug only where completely necessary and at the discretion of the surveyor. Fieldwork was undertaken with a hand held 50mm diameter "Dutch" auger and/or spade to a depth of 1.2m where possible. In addition, a soil pit was excavated, to determine subsoil characteristics which could not be identified from the auger samples. No samples for laboratory particle size distribution determination were taken.

In the area 16 auger borings and one soil pit were examined to determine the quality of the sample point (**Appendix 1**) and the findings are given in the spreadsheet at **Appendix 2 (separate)**. Where auger penetration was not possible to 120 cm the profile depth has been extended to depth using nearby profile information to enable soil droughtiness calculations to be made.

The fieldwork was carried out on 19th- 21st June 2017. The survey dates were during a period of high temperatures and lack of rain.

3.2 The Agricultural Land Classification System

The Agricultural Land Classification System (ALC) provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use. The limitations can operate in one or more of four principal ways.

They may affect:

- the range of crops which can be grown
- the level of yield
- the consistency of yield
- the cost of obtaining the crop

The classification system gives considerable weight to flexibility of cropping, whether actual or potential, but the ability of some land to produce consistently high yields of a somewhat narrower range of crops is also taken into account.

The principal physical factors influencing agricultural production are climate, site (including relief) and soil. By assessing these factors, it is possible to assign land into one of five land classification grades, Grade 1 land being the highest quality and Grade 5 the lowest quality land. Grade 3 is sub-divided into Subgrades 3a and 3b, to identify good quality agricultural land from moderate quality land (see **Appendix 3** for a description of the grades used in the ALC system). By considering site specific climate, site and soil factors the land can be classified into 1 of 5 agricultural grades or certain non-agricultural grades.

4 Geology, Soils and Present Land Use

4.1 Geology

The geology map¹ shows that land is underlain by siltstones and mudstones of the Raglan Mudstone Formation. There are superficial deposits of Till consisting of clay, silt and sand in the area. The resulting soils are mapped on the soil map² of the area as Milford Association, a stony fine loamy soil which is well drained (Wetness Class I). A typical profile is described as having a moderately stony or slightly stony dark reddish brown stony clay loam topsoil and subsoil to 70 cm depth over a stony lower subsoil of reddish brown stone coatings.

4.2 Soils

The topsoils are typically sandy silt loams, occasionally medium clay loams, overlying subsoils of sandy silt loam and medium clay loam. The reddish soils show no signs of impeded drainage in the form of gley colours or mottling above 70 cm or a slowly permeable layer within 80 cm. Where reddish colours (Munsell colour of hue 5YR or redder are dominant in the matrix) were found there was no signs of impeded drainage in the form of brownish or ochreous mottles or ferri-manganiferous concentrations (at least 2%) and dominantly pale coloured ped faces. The soils are very slightly stony and in places augering to depth was not possible due to stone. In the subsoil there were occasional large stones (>10 cm longest dimension).

4.3 Present Land Use

The agricultural land was under cereals, grass and maize.

5 Previous Land Classification Surveys

The Provisional Agricultural Land Classification Map³ shows the area as Grade 3 land. This map is for strategic purposes only and does not differentiate between better quality (Subgrade 3a) and lower quality (Subgrade 3b) land. There have been no known previous detailed surveys of the land.

6 Results

The sections below illustrate the main considerations and limitations to the grading of the land.

6.1 Climate

The site climatic variables have been interpolated from grid point data surrounding the site, as follows:

Table 1: Climatic Variables

Grid Reference (mid-point of site)	3405 2075
Altitude (m)	65
Accumulated Temperature (day °C)	1464
Average Annual Rainfall (mm)	1007
Overall Climatic Grade	1
Field Capacity Days	210
Moisture deficit (mm): Wheat	95
Moisture deficit (mm): Potatoes	84

The area falls within Grade 1 according to the climatic criteria. It is noted that the climatic criteria for Average Annual Rainfall and Accumulated Temperature (day °C) place the area close to the Grade1/2 boundary according to climate. The gently undulating landform is predominantly easterly facing and the influence of aspect on the local scale has not been considered at the reconnaissance mapping scale.

6.2 Site Limitations

Gradient: The land is slightly undulating and rises from 45m A.O.D on the eastern boundary to about 70m A.O.D on the western boundary. Gradient is not a limiting factor in classifying the land.

Flooding: at the request of Welsh Government the flood risk was not considered in classifying the land.

6.3 Soil and Interactive Limitations

The soils typically show few signs of seasonal wetness in the form of pale and grey colours and mottling in the profiles and do not have a slowly permeable layer within 80cm depth. These soils fall into Wetness Class I. The combination of medium topsoil textures and Wetness Class FCD influence the ALC grade.

The soil profiles in the area have a moisture balance that place them in Grade 1.

The main factors affecting agricultural land quality are:

- Soil texture and wetness class, which mainly affect the ALC grade due to a wetness limitation.

6.4 Land Quality

A brief description of the findings is given below.

6.4.1 Grade 1

The topsoils are a very slightly stony sandy silt loam typically to a depth of 30cm over a subsoil of sandy silt loam typically to a depth of 65cm and lower subsoils of loamy medium sand, sand or sandy clay loam. There are no signs of impeded drainage in the profile, which place the soils in Wetness Class I. There is no droughtiness limitation to these profiles.

6.4.2 Grade 2.

The topsoils are a very slightly stony medium clay loam or sandy clay loam typically to a depth of 30cm over a subsoil of sandy silt loam typically to a depth of 65cm and lower subsoils of loamy medium sand, sand or sandy clay loam. There are no signs of impeded drainage in the profile, which place the soils in Wetness Class I. The combination of the topsoil texture and Field Capacity Days figure of 210 place these profiles in Grade 2. There is no droughtiness limitation to these profiles.

6.4.3 Grade 3, Subgrade 3a

No profiles have been placed in Subgrade 3a.

6.4.4 Grade 3, Subgrade 3b

One boring (006-17 14), in a slightly lower lying area than the surrounding land in the south western part of the area is classified as Subgrade 3b. The topsoil of medium clay loam overlies clay at about 37 cm and shows signs of impeded drainage. The profile is placed in Wetness Class IV and in combination with Field Capacity Days figure of 210 and topsoil texture is classified as Subgrade 3b.

6.4.5 Grade 4

No profiles have been placed in this grade.

6.4.6 Grade 5

No profiles have been placed in this grade.

6.4.7 Urban land

No urban land is recorded.

6.5 Summary of Land Quality in the Survey Area

The typical profile findings are a topsoil texture of sandy silt loam for the majority of auger borings with the others being medium clay loam or sandy clay loam over a subsoil of either sandy silt loam or medium clay loam and occasionally loamy sand and sand.

The profiles fall into Wetness Class I and are classified as Grade 1 where the topsoil is a sandy silt loam or Grade 2 where the topsoil is a medium clay loam or sandy clay loam, due to the slightly heavier topsoil texture. Soil droughtiness is not a limiting factor in the area.

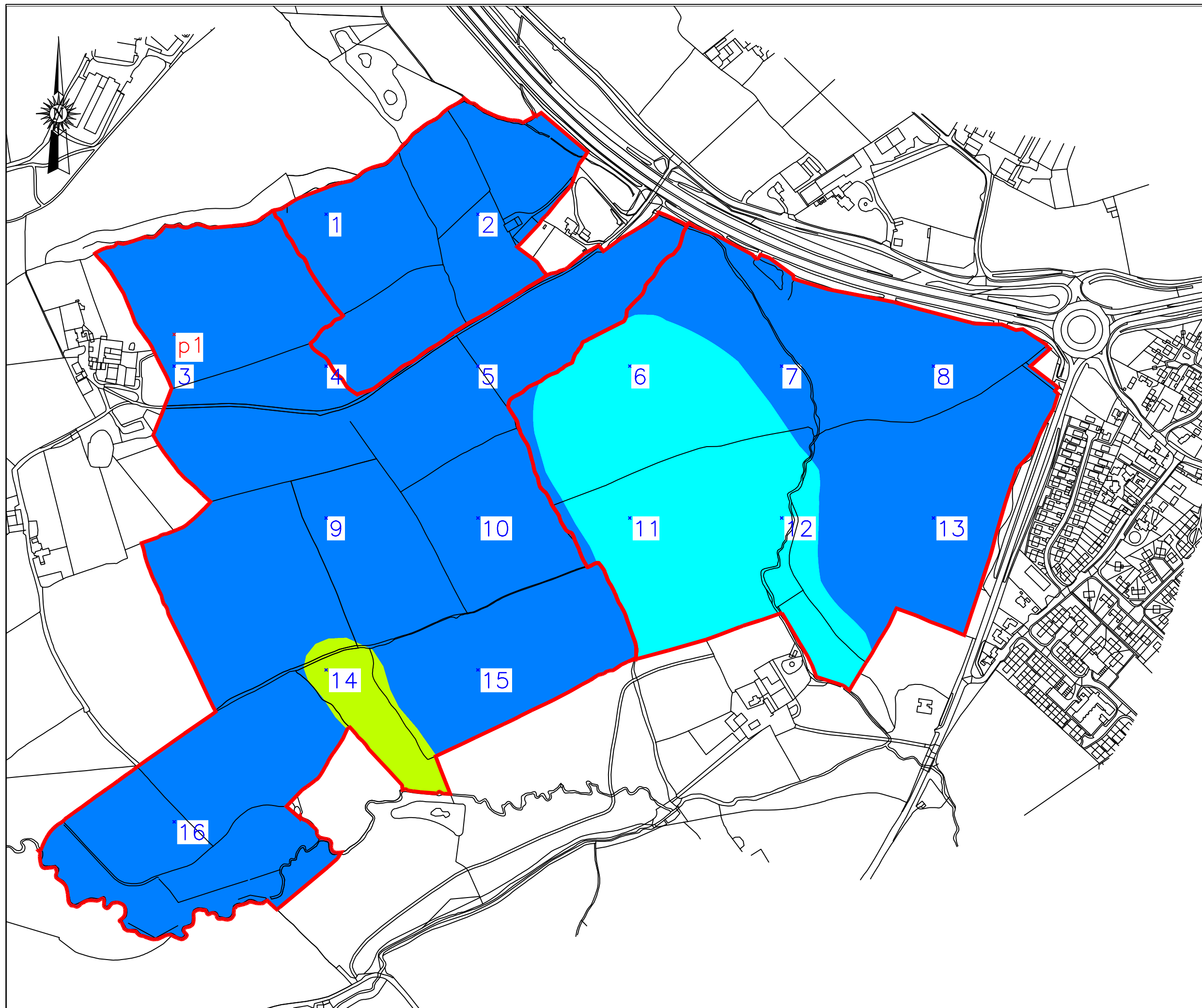
The area is climatically Grade 1, but it is close to the Grade1/Grade2 border.

7 Conclusions

Soil profiles of Agricultural Land Classification Grades 1 (12 of 16 auger boring profiles plus the pit) and 2 (3 of 16 auger boring profiles) are found in Monmouth ALC_ ID 006_17. One profile in a low lying wet area is classified as Subgrade 3b.

The Agricultural Land Classification grade according to climate is close to the boundary of Grades 1 and 2.

APPENDIX 1: Location of Soil Pits and Auger Borings



AGRICULTURAL LAND CLASSIFICATION

- × 1-16 Auger Boring
× p1 Pit Location
- Grade 1
Grade 2
Grade 3a
Grade 3b
Grade 4
Grade 5
- Land predominantly in urban use.
Other land primarily in non-agricultural use
Pond
Area not surveyed
Survey Boundary

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Ailgynhyrchwyd gan caniatâd yr Arolwg Ordnans ar ran Rheolwr Llyfrfa Ei Mawrhydi, © Hawlfraint y Goron â hawl gronfa ddata 2009. Cedwir pob hawl. Llywodraeth Cynulliad Cymru. Rhif trwydded 100017916.

31.10.17	KH	RM	A	AGRICULTURAL LAND CLASSIFICATION
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DATE	DRAWN	CHECKED	REVISED	ISSUE
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MONMOUTH - SITE A

AGRICULTURAL LAND CLASSIFICATION

SCALE	Not to Scale	MASTER SIZE	A3
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DRAWING NO.	NAW0001/W13J-00/ALC 006	ISSUE	A
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CLIENT.



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APPENDIX 2: Soil Profile Descriptions

(SEPARATE FILE)

APPENDIX 3: Description of the Grades and Sub-grades

The ALC grades and Sub-grades are described below in terms of the types of limitation which can occur, typical cropping range and the expected level and consistency of yield. In practice, the grades are defined by reference to the land's physical characteristics, for which the cut-offs are described in Section 3 of Ministry of Agriculture, Fisheries and Food (MAFF now Defra) publication: 'Agricultural Land Classification of England and Wales - Revised guidelines and criteria for grading the quality of agricultural land' (October 1988). The most productive and flexible land falls into Grades 1, 2 and Sub-grade 3a and collectively comprises about one-third of the agricultural land in England and Wales. About half the land is either of moderate quality (Sub-grade 3b) or poor quality (Grade 4). Although less significant on a national scale, such land can be locally valuable to agriculture and the rural economy where poorer farmland predominates. The remainder is very poor quality land in Grade 5, which mostly occurs in the uplands.

Descriptions are also given of other land categories which may be used on ALC maps.

Grade 1 - excellent quality agricultural land

Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.

Grade 2 - very good quality agricultural land

Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than on Grade 1 land.

Grade 3 - good to moderate quality agricultural land

Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.

Sub-grade 3a - good quality agricultural land

Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.

Sub-grade 3b - moderate quality agricultural land

Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

Grade 4 - poor quality agricultural land

Land with severe limitations which significantly restrict the range of crops and/or level of yields. It is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yields of which are variable. In moist climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land.

Grade 5 - very poor quality agriculture land

Land with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

APPENDIX 4: References

- 1) British Geological Society: <http://www.bgs.ac.uk/data/mapViewers/>
- 2) Information from Welsh Government and landis.org.uk
- 3) Provisional Agricultural Land Classification Series Wales 1:250 000