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THE ORGANIC ADVISORY SERVICE
ELM FARM

The Organic Advisory Service supplementary report for:

Lammas Low-Impact Initiatives Ltd

by

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Contents

1. Introduction

1.1. This supplementary report has been produced in relation to a planning permission re-application prepared by Lammas Low Impact Initiatives Ltd for the establishment of an Eco-Village at Pant y Gafel Farm, Glandwr, Pembrokeshire. It is intended to accompany an agricultural appraisal submitted to Lammas in November 2008.

1.2. The report has been prepared with particular reference to the site in question and the best available knowledge and experience. It is intended to serve as an impartial factual appraisal of the horticultural potential of the proposed activities.

1.3. This report has been prepared by Roger Hitchings, Head of Advisory Services at the Organic Research Centre, Elm Farm. A full statement of his background and qualifications is given in the earlier appraisal.

1.4. The specific brief of this report is to present an assessment of the potential for personal horticultural production with particular reference to the requirement of SPG 52 that 75% or more of living needs are met from within the holding.

1.5. A site visit was undertaken as mentioned in the earlier appraisal to carry out a hands on assessment of the soils and their condition as well as reviewing the general lie of the land including slope and aspect. This will be covered in the body of the report.

1.6. Some additional comments will be included concerning the assessment of labour requirements by others in connection with this application.

2. Site visit report

2.1. A visit was made to the site on the afternoon of Thursday December 18th in what were fairly wet weather conditions. The fields were walked to the greatest extent allowed by weather and light. A number of assessment holes were dug to examine the physical characteristics of the soils *in situ.* In all plots 1-4, 5, 6 and 9 were accessed.

2.2. A certain amount of background information was picked up in conversations with Lammas representatives and the land owner.

3. Review of the site and soil suitability

3.1. The site is open and is either level or generally sloping to the south or south east. The one exception seen was plot 5 where the open ground slopes to the north. Light levels will generally be good for the majority of cropping areas. An open site brings a risk of exposure to wind but the planned development will break up the existing field areas with hedges, coppice areas and other plantings. This will be an early priority in the event of a successful application.

3.2. Other submissions and/or commissions linked to this application have commented on the soils on this site. In one case reference was made to the DEFRA land classification system citing the fact that the land on this farm is grade 4 and much is part of the MANOD soil series. All of this is factually correct and the references to the relevant literature (and previous land use) have been used to effectively dismiss the potential of this land for the production of horticultural crops in significant and/or commercial quantities.

3.3. My concern is that this assessment has been carried out from a distance and without a site visit to actually assess the soils *in situ.* Anyone who has studied soils (as I have) knows that broad brush classifications are extremely useful when considering large scale trends and developments. When it comes to the small scale it can often be a very different story – soils can vary significantly across a single field – and this can only be assessed by actually handling the soil on site.

3.4. I would also note that lower grade soils can be the basis of successful horticultural businesses. In work I carried out in 1999 for the then Welsh Office Agricultural Department as part of a team from the Scottish Agricultural College I correlated organic horticultural businesses with soil grade among other things. I found that most were located on grade 3 soils with a significant minority on grade 4 soils – all were enjoying commercial success in varying degrees.

3.5. Previous land use is not necessarily a consistent indicator of land potential as studies of areas of Wales such as Anglesey and the Lleyn Peninsula have shown. Historically many areas have supported both arable and horticultural production in varying degrees although the predominant activity in recent years has been grass based livestock production.

3.6. A number of holes were dug to a spade depth across the various plots and the appearance, colour and texture of the soils were assessed at every point. There were minor variations from one hole to the next but it is possible to give a general and consistent description that can be applied to all of the soils seen.

3.7. In terms of soil type as defined by soil texture the soils on the southern half of the site are relatively fine textured silty loams, a conclusion that agrees with the description in the ADAS report but is somewhat at odds with the conclusions of the soil survey commissioned by Lammas.

3.8. At all points on this site survey the top soil depth was at least the depth of the spade (27.5cm or 11 inches). No solid rock was encountered although there were some shale fragments in the lower top soil. It is accepted that the soils could be shallower in places but a visual assessment of vegetation suggests that this will be the exception rather than the rule.

3.9. The rainy conditions on the day of the visit gave rise to free water on the surface of the soil and it could easily be concluded that the drainage on the site is poor. The reality is that water is unable to percolate into the soil in any great quantity because the top 2-3 inches (5-7.5cm) is compacted. This has occurred because of the impact of livestock grazing and machinery use over many years. This combination of fine textured soils and surface compaction is the *status quo* of many Welsh soils as I have seen for myself over 11 years of conducting advisory visits.

3.10. Below the surface compaction all of the soils were well structured breaking down easily into fine crumbs that would make an excellent seed bed. They were also well drained with moisture contents significantly lower that those found on the surface. The colours of the various soils examined ranged between brown to a greyish brown. The latter colour is indicative of imperfect aeration, a condition created by the surface compaction preventing adequate exchange of oxygen and carbon dioxide.

3.11. There is no doubt in my mind that if the surface compaction problems are addressed these soils can be brought out of grass to create more than adequate seed beds for the sowing and planting of horticultural crops. They are not, however, suitable for continuous cultivation as the structural integrity of such soils will be degraded over time. I speak from direct experience having grown organic horticultural crops on similar soils on a site near Carmarthen. Organic systems require a rotational approach that includes fertility building breaks based on legumes such as clovers and vetches. Such breaks also provide opportunities for the regeneration of good structure and the right balance of fertility building and fertility exploiting can ensure good levels of cropping over long periods of time. This is taken into account in the review of horticultural cropping potential in the next section.

3.12. The other key soil characteristic essential for productivity is fertility. The results of the soil survey nutrient tests suggest that phosphorus levels are generally low and potassium levels range from low to adequate. I would note that I regard the Palintest System as indicative but not as robust as the Olsen and similar tests carried out by established laboratories. That said the indications broadly agree with what I would expect. The values for nitrogen cannot be treated with any seriousness as it is recognised by agronomists and soil scientists that nitrogen levels in soils vary from hour to hour and day to day. The other key measurement is pH or acidity and the soil survey results are again broadly in line with levels found in many Welsh grassland soils.

3.13. It will be necessary to address these issues at the outset and suggested treatments include a generous application of ground limestone across all areas to lift the pH into range 6 to 6.5. An application of rock phosphate is also recommended although it should not be applied at the same time (a minimum 4 months apart is standard practice).

3.14. It has been suggested in the ADAS submission that it could take 4 years or more before fertility levels could be lifted to the point where adequate yields of crops could be generated. I believe it is possible to achieve this in a much shorter time providing appropriate measures are taken. This will include applications of green waste compost and/or composted manure. Once the system is up and running sufficient fertility can be generated within the system through on-site composting, on-site manure production, fertility crops and the re-cycling of crop residues.

4. Evaluation of the potential for horticultural self-sufficiency

4.1. SPG 52 requires that over 75% of living needs are met from within an enterprise set up under its guidelines. There is much within the planning application that addresses the ways in which these requirements will be met. This report provides a focus on the ability of plot holders to meet their personal food requirements from within – this has been done with particular reference to horticultural crops.

4.2. Comment has already been made on the use of standard figures and the compiling of assessments from a distance, and further comment will be made on time inputs later in the report. This section will concentrate on the production issues and the land areas required to meet a minimum of 75% of vegetables, salads and herbs from the land on the various plots.

4.3. As with all such assessments assumptions have to be made and the first relates to the production potential of the soils on the site. The soils have been discussed in some detail in

the previous section and the assumption made for the purposes of this section is that the soils can brought close to full production potential in two years from the start.

4.4. Assumptions have also to be made concerning the level and nature of consumption of the families. The figures I have produced are based on some work I have done concerning production for a vegetable box scheme of some 50 customers and the assumption made is that each box is sufficient to meet the needs of a typical small family (2 parents and 2 children). Examination of the figures shows that for most weeks of the production period there will be a very generous selection of vegetables and salads – this is assumed to be appropriate to the eating habits of the potential residents.

4.5. The production data are based on figures taken from the Organic Farm Management Handbook (areas required) and commercial seed company catalogues (plant spacing and population density). All figures have been increased by 50% to take account of so-called 'field factors' such as pest/disease problems, weather issues, etc.

4.6. The protected cropping figures show that the total area required for the production quantities shown is in the order of 17 square metres. I would recommend that this figure is increased to 20 square metres to allow space for propagation. This equates to a glasshouse or polythene tunnel of 5 metres in length by 4 metres in width (in Imperial measurements this would be approximately 22 feet by 14 feet). I would note that the production figures are based on the assumption that these are unheated structures.

4.7. The open ground figures include a provision for fertility crops for 2 years out of the 6 year rotation grown. This has been included because it should provide sufficient nitrogen fertility to sustain the rest of the rotation and it also (as noted in the soils section) deals with the issue of soil structure regeneration. I would recommend Option B as the best option for soil conditioning as it allows for 2 years cropping followed by 1 year fertility on a continuous basis.

4.8. In area terms and allowing for the fertility breaks the production quantities shown would require in the order of 270 square metres (27 metres by 10 metres or 30 yards by 11 yards). For comparison I think it is useful to consider the size of the standard allotment – historically this is measured as 10 square rods which is equivalent to 300 square yards or 250 square metres.

4.9. Taken together and allowing for a small area of fruit production I would suggest on the basis of experience and available figures that an area of around 300 square metres would be required to provide the level of self sufficiency required by SPG 52. This will be clearly achievable within the areas of the various plots although some plot holders may need to adjust their plans to take account of this.

5. Comments on labour requirements

5.1. This is a separate issue to the main purpose of the report but after reading some of the material connected with labour assessment and functional need I consider it important to redress the balance. This is a specific reference to the ADAS Assessment of Data prepared for the Planning Department. My argument is, in essence, that the use of so-called standard labour figures bears little if any relationship to the kind of production systems proposed by the Lammas plot holders.

5.2. The use of such figures has effectively been abandoned and while tables of such figures exist in peoples' filing cabinets it is virtually impossible to find a current reference to them using a well known search engine. Much of the reason for their falling into disuse is that it has been recognised that the variation between holdings can be significant despite a superficial resemblance.

5.3. The only things that can be found on the Internet are references to Standard Labour Requirement (SLR) coefficients. These are not used to assess businesses for their actual labour requirements but are used alongside Standard Gross Margins to place farms in different size bands by the Farm Business Survey.

5.4. The problem involved in the use of such figures is that they can give a reasonable indication on larger areas with a high level of mechanisation. They generally break down completely when applied to areas that are fractions of a hectare. They also become increasingly irrelevant in systems that are more dependent on hand labour. In the case of plot 8 a figure of 680 hours per hectare (1 hectare = 2.5 acres) is cited for the production of mixed vegetables. When applied to the proposed production area of 581 square metres (0.0581ha) the *pro rata* time allowance is shown as 39 hours. When the fact that this is an annual time input is considered alongside the fact that the area equates to twice the area calculated in the previous (i.e. 2 full allotments) it can be clearly seen that there is a complete breakdown in the calculations. It is saying that the production of 75% of the annual fresh produce requirements of 2 families can be managed on an average time input of 45 minutes per week, a clearly ridiculous proposal.

5.5. There are many other examples of inappropriate time allowance for small scale cropping scattered through the data assessment report including inappropriate figures for strawberry production on plot 1. In my view and at this scale of production the figure should be significantly higher for the outdoor strawberry production.

5.6. There is an arithmetical mistake in the table for plot 8 concerning greenhouse production – 41 square metres of production area at a standard labour rate of 10,920 hours per year gives a figure of 37.5 hours per year as opposed to the 248 quoted. This implies that the production of over twice the area considered in the earlier calculations can be managed on an average weekly time input of 40 minutes! Once again this is clearly inappropriate.

5.7. In the assessment of plot 9 it is suggested that 500 square metres of walled garden production can be managed on 45 minutes per week. I carried out an assessment of time input on a walled garden as part of a Farming Connect technical visit and concluded that the operation needed an average annual time input of 45 minutes per square when all relevant activities were taken into account. On this basis the time allowance for plot 9's walled area should be 375 hours per year or around 7 hours per week.

5.8. These are just some of the inappropriate time assessments that have been used for horticultural crops in my view. I cannot claim to be experienced enough to make the same judgement about the livestock enterprises.

6. Conclusions

6.1. A site visit established that the site is suitable for horticultural production in terms of access, aspect, slope and drainage.

6.2. The same visit established that in the 7 plots assessed the soils were of good depth, well drained and well-structured below a compacted surface layer.

6.3. These silty loams are suitable for horticultural cropping but not on a continuous basis. It is recommended that a rotational cropping scheme of 1 year fertility building fallow followed by 2 years of cropping is adopted.

6.4. The soils show a significant level of acidity and it is recommended that ground limestone is applied in the preparation stages to increase soil pH to a level more appropriate for horticultural production.

6.5. The soils presently have low levels of fertility and permitted inputs (under the organic standards) such as rock phosphate should be applied in the early stages of preparation.

6.6. If additions of bulky organic fertility inputs are used at an early stage these soils could be approaching optimum productivity levels by the second or third year at the latest.

6.7. Once these levels are reached productivity should be maintained through the use of nitrogen fixing fertility crops, on-site composting, on-site manure production and the recycling of crop residues.

6.8. Detailed calculations accepted by the organic community (includes scientists, growers and advisors) have been used to establish that the fresh produce needs of a family of four can be met from 270 square metres of open ground production and 20 square metres of greenhouse or polytunnel production.

6.9. The figures used to assess the labour requirements of the various plot-based enterprises are appropriate to large scale mechanised production of crops but break down completely when considering small areas of mixed cropping using mainly hand labour. Some of the examples quoted are irrelevant, inappropriate and frankly misleading.

6.10. Providing plot holders are prepared to work to the areas described above and they take appropriate conditioning action, the soils on this site will produce sufficient produce (vegetables, salads and herbs) to meet over 75% of their annual needs.

Roger Hitchings

Appendices 1 & 2 detail the calculations used to produce the required quantities of produce. They should ideally be read together as both production systems contribute to the weekly harvest in varying measures according to the time of year.

Appendix 1

Weekly produce requirements for a family of four – protected crops

Crop	Unit size	Frequency	Eating period	No of weeks	Total requirement	50% increase for field factors	Yield per plant	No of plants	Plants per square metre	Total area in sq metres
Tomatoes	0.5kg	weekly	Jun-Oct	20	10kg	15kg	2.5kg	6	2	3
Aubergine	400g	fortnightly	Jun-Oct	10	4kg	6kg	1kg	6	2	3
Cucumbers	1no	weekly	Jun-Oct	20	20no	30no	20	2	1	2
Peppers	300g	fortnightly	Jun-Oct	10	3kg	4.5kg	1.5kg	3	4	0.75
Cl French beans	400g	weekly	May-Jul	10	4kg	6kg	0.5kg	12	10	1.2
Onions	500g	weekly	Jul-Sep	12	6kg	9kg	0.25kg	36	25	1.5
Courgettes	500g	fortnightly	Jul-Jul	4	2kg	3kg	2.5kg	2	1	2
Parsley	50g	weekly	Jan-May	16	0.8kg	1.2kg	0.4kg	3	20	0.15
Basil	60g	fortnightly	Jun-Oct	11	0.66kg	1kg	0.27kg	4	20	0.2
Salad leaves(a)	100g	weekly	Sep-Mar	26	2.6kg	4kg	0.5kg	8	10	0.8
Salad leaves(b)	100g	weekly	Sep-Mar	26	2.6kg	4kg	0.5kg	8	10	0.8
Salad onions	bunch	weekly	Feb-Jun	16	16no	24no	0.2no	120	400	0.3
Spinach	200g	fortnightly	Mar-Jun	10	2kg	3kg	0.5kg	6	16	0.4
Early beetroot	bunch	fortnightly	May-Jun	5	5no	8no	0.07kg	40	80	0.5
Early carrots	bunch	weekly	Apr-Jun	10	10no	15no	0.05kg	120	250	0.5

17.1

(a) Brassicas rocket, mizuna, tatsoi, mibuna, red mustard, green mustard

(b) Non brassicas Claytonia, chrysanthemum greens, Chinese celery, cornsalad,

The size of house can be smaller because of double cropping

Appendix 2: Weekly produce requirements for family of four – outdoor crops											
Crop	Unit size	Frequency	Eating period	No of weeks	Total requirement	Total area in sq m	Areas inc field factors (+50%)	Rotation blocks	Area of rotation block in sq m	Full rotation including fertility building breaks	Rotation block areas rounded
Potatoes	2.25kg	weekly	Jul-March	40	90kg	30	45	Potatoes	45	Option A	
										Grass/clover	45
Broccoli	400g	weekly	Jul-Oct	15	6kg	12	18	Brassicas	45	Grass/clover	45
Cabbage(various)	1 head	weekly	Sep-Mar	32	32 heads	12	18	Brassicas		Potatoes	45
PSB	300g	weekly	Feb-Mar	10	3kg	6	9	Brassicas		Brassicas	45
										Alliums/cucurbits	45
Onions	500g	weekly	Sep-Mar	32	16kg	8	12	All/cuc	47	Rts/leg/sal/corn	45
Squash	1no	fortnightly	Aug-Dec	11	11no	2	3	All/cuc			270 sq m
Leeks	600g	weekly	Sep-Mar	32	16kg	13	20	All/cuc		Option B	
Courgettes	500g	weekly	Jul-Oct	16	8kg	8	12	All/cuc		Grass/clover	45
										Potatoes	45
Sweet corn	2 cobs	weekly	Jul-Sep	10	20 cobs	5	7.5	Rts/leg/sal/corn	43.2	Alliums/cucurbits	45
Carrots	500g	weekly	Jul-March	40	20kg	6	9	Rts/leg/sal/corn		Grass/clover	45
Lettuce(Gem)	twin pack	weekly	Jul-Oct	17	34 heads	4.4	6.6	Rts/leg/sal/corn		Brassicas	45
Beans (various)	500g	weekly	Jul-Oct	16	8kg	4	6	Rts/leg/sal/corn		Rts/leg/sal/corn	45
Spinach	450g	fortnightly	Jul-Oct	8	3.6kg	4	6	Rts/leg/sal/corn			270 sq m
Beetroot	bunch	fortnightly	Jul-Oct	8	3.6kg	1.8	2.7	Rts/leg/sal/corn			
Parsnip	450g	fortnightly	Oct-Mar	14	6.3kg	3.6	5.4	Rts/leg/sal/corn	Standard allotment of 10 rods =		250 sq m
					TOTALS	119.8	180.2		180.2	A or B	
A typical range of crops though this can vary according to taste	These are fairly typical but could vary	Another factor that will vary according to taste	This will depend on variety choice, storage, etc.	Weeks in the eating period	This total requirement assumes harvest success	Area needed in ideal terms Ofmh)	Realistic increase to take account of problems	Potatoes & brassicas clearly need own blocks	Actual areas allowing for field factors	There are merits in both options; combination blocks could vary	