A REPORT ON FARM BUSINESS FINANCIAL VIABILITY:

PUMP & BLOORS FARMS, KENT

UPDATED VERSION DECEMBER 2020

Prepared by:

E J Pelham

Andersons Midlands

Parsonage Farm

Eardisley

Hereford

HR3 6LX

Tel: 01544 327746

Email: jpelham@andersons.co.uk

CONTENTS **Page No.**

TABLES

APPENDICES

INTRODUCTION

EJ Pelham – background and experience

1.1 I am a Partner in Andersons Midlands, one of four independent business advisory practices trading under the style of Andersons the Farm Business Consultants. Andersons Midlands specialises in providing independent business advice to agricultural, horticultural and rural businesses as well as the allied industries. A summary of advice service areas is included in Appendix I.

1.2 Having completed a degree in Agricultural and Forest Sciences from Oxford University, I gained six years farm management experience before joining what was then David Anderson and Company in October 1985, becoming a Partner in 1990. I am now a Partner in the Andersons Midlands Partnership, formed in the spring of 2001. I work with all types of businesses, in both crop and livestock production, advising on a wide range of issues including strategy, investment appraisal, budgeting, costings and cost of production benchmarking. I have a specialist knowledge of horticultural production and work with some ninety businesses in this sector, approximately half of whom are growers of tree fruit, such as apples and pears. A curriculum vitae is included in Appendix II.

Instruction

1.3 I have been instructed by AC Goatham and Son to prepare an expert report on the financial viability of Pump and Bloors farms, Lower Rainham for horticultural, agricultural, biomass and pharmaceutical production.

1.4 I confirm that I have undertaken work previously for AC Goatham & Son, as follows:

- the preparation of economic crop Models for orchard fruit;
- a report on the business's requirement to invest in further fruit storage;
- an expert report in respect of a financial damages claim.

Financial viability

1.5 This report investigates the current and future capacity of Pump and Bloors farms to support a financially viable farming operation, that is one capable of creating adequate profit to meet a business's essential financial requirements, including:

- a return on the proprietor's time;
- the payment of tax;
- the repayment of capital.

1.6 This assessment of the financial viability of Pump and Bloors farms considers both:

- The physical characteristics of the farms – their features and facilities.
- The economics of the enterprises which may reasonably be undertaken on the farms.

1.7 Financial viability is influenced by a wide range of features (e.g. soil type, drainage, field size and layout, climate, frost and hail risk) and facilities (e.g. buildings, fencing and irrigation), as well as the economics of the enterprises that may be undertaken.

1.8 In the case of perennial crops, such as apples and pears, whose life cycle may be 15–20 years, the assessment of whether they are financially viable must take account of potential future, as well as current, profitability.

Report content

1.9 Section 2 includes a description of the holding.

1.10 Section 3 reviews the features and facilities of Pump and Bloors farms.

1.11 Section 4 considers the changing economics of farm production, including an illustration of changing costs for dessert apple production.

1.12 Section 5 investigates the requirement for reinvestment in orchards at Pump and Bloors farms.

1.13 Section 6 considers looks in detail at the economics of a new orchard planting (by reference to a financial model for the lifetime of an orchard), the financial consequences of hail damage and the suitability of Pump and Bloors farms for replanting.

1.14 Section 7 looks at the suitability of Pump and Bloors farms for other farming enterprises, including biomass and pharmaceutical crops.

1.15 Section 8 summarises the findings and conclusions of this report.

2 DESCRIPTION OF THE FARMS

Location and summary

2.1 Pump and Bloors farms are owned by AC Goatham & Son and are located at Lower Rainham, near Gillingham in north Kent, ME8 7TJ.

2.2 Both farms are bounded by the Lower Rainham Road to the north, by the railway line to the south and are separated by Pump Lane.

2.3 The gross area of Pump Farm is some 25.5 hectares, that of Bloors is 24.9 hectares, a combined total of 50.4 hectares.

2.4 The gross area figure given for Pump Farm includes a rented area of 4.2 hectares. This land is occupied under an informal annual agreement and has been excluded from the cropping areas set out in this report.

Soil type

2.5 The Soil Survey of England and Wales identifies the soils as belonging to the Hamble 1 Soil Association, which are described as:

"Deep well drained often stoneless silty soils and similar soils affected by groundwater, over gravel locally. Usually flat land".

2.6 The Survey describes potential uses as follows:

"Fruit and horticultural crops; field vegetables; cereals and potatoes; some hops."

Soil classification

2.7 The DEFRA Agricultural Land Classification ("ALC") system ranks soil productive potential into five grades, with Grade 1 being the most and Grade 5 the least productive. Grade 3 is sub-divided into 3a (more productive) and 3b (less productive).

2.8 The higher grades of land (Grades 1, 2 and 3a) outwardly suggest more flexibility in the range of crops that can be grown ("versatility"), as well as typically requiring less inputs and producing more consistent yields.

2.9 Factors affecting the grade are climate, site and soil characteristics, and the important interactions between them, taking into account:

***Climate**: temperature and rainfall; aspect, exposure and frost risk.*

***Site**: gradient, microrelief and flood risk.*

***Soil**: texture, structure, depth and stoniness; chemical properties which cannot be corrected.*

2.10 There is, however, one highly influential factor which the grading system does not take into account – due to its variable and often highly localised occurrence – and that is hail. This is particularly relevant for Pump Farm, where AC Goatham & Son have recorded a high incidence of hail - in five out of the nine seasons that they have owned the farm (similar evidence is not available for Bloors farm which was not acquired by AC Goatham & Son until 2016, but the likelihood is that historically the incidence of hail has not been dissimilar). The issue of hail is dealt with more fully in Sections 3 and 6 of this report.

2.11 The soils at Pump and Bloors Farms include Grades 1, 2 and 3a, the proportions of each grade being 17%, 79% and 4% respectively (*Source: Reading Agricultural Consultants "Agricultural Land Classification and Soil Resources at Pump Farm, Lower Rainham").*

2.12 The predominant Grade 2 category is defined as follows:

"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 Grade 1."

Layout and boundaries

2.13 Pump Farm is a single parcel of land with a cropping area of 21.75 hectares (excluding rented land), of which 20.19 hectares are dessert apples (Gala, Braeburn and Discovery) and 1.56 hectares are Conference pears. It is currently planted in a total of fourteen orchards.

2.14 Bloors Farm is effectively two parcels of land, divided by a bridleway. The cropping area to the north of the bridleway is 9.5 hectares, currently planted in two orchards. Cropping area to the south is 12.06 hectares, planted in three orchards. The total Bloors area of 21.56 hectares is planted with dessert apples (Gala and Braeburn).

2.15 Plans of the orchard areas for Pump and Bloors farms are included in Appendices III and IV respectively.

2.16 The southern boundary to each of Pump and Bloors farms is a chainlink fence supported by concrete posts, erected against the railway.

2.17 Other boundaries include hedges, trees and some lengths of wire fencing, some of which is dilapidated former stock fencing. None of these boundaries are livestock-proof. There is no vermin-proof fencing on either farm, with vermin control for the orchards currently being undertaken through the use of individual tree guards.

Public access

2.18 Bloors Farm itself has no public rights of way (the bridleway that runs east/west across the centre of the farm is not in the ownership of AC Goatham and Son). Local residents are currently claiming that a public footpath has been established at Bloors, running north/south through the holding.

2.19 Pump Farm has no public rights of way.

2.20 Unauthorised public access is an issue on both farms. This not only has Health & Safety implications (particularly for the operation of orchard machinery, such as sprayers), but also has led to many instances of both crop and tree loss. Site security is an issue.

Accommodation and Buildings

2.21 There is no permanent residential accommodation for staff at either Pump or Bloors farms.

2.22 Bloors Farm has no farm buildings of any type.

2.23 Farm buildings at Pump Farm include:

- Agricultural storage building – 6 bay box profile clad building, roller shutter door, earth floor.
- Timber barn lean-to building.
- Spray shed – metal roof, concrete floor.
- 14 temporary mobile caravans

2.24 There are no fruit storage facilities at Pump Farm, with all harvested fruit being transported to AC Goatham & Sons' Flanders Farm.

Drainage and irrigation

2.25 Both sites are free draining; it is not known whether an underdrainage system has been installed in the past.

2.26 Both sites have independent bore hole irrigation. The licence is for trickle application.

Current cropping

2.27 Both Pump and Bloors Farms are currently cropped exclusively with apples and pears. Total cropped area is 43.31 hectares in nineteen separate orchards. Only two orchards are over 5 hectares in area, both of which are at Bloors Farm.

2.28 40.71 hectares is planted with dessert apples, principally the varieties Gala and Braeburn, with 4.45 hectares of Discovery. The oldest orchards were planted in 2002/2003.

2.29 The 2.6 hectares of pears (located on Pump Farm) were planted in c. 1950.

3 PUMP & BLOORS FARMS – FEATURES AND FACILITIES

Summary

3.1 Pump and Bloors farms both have high-quality soils, comprising ALC Grades 1, 2 and 3a, have little risk of frost (due to their proximity to the sea) and access to borehole trickle irrigation.

3.2 However, there are four aspects of the combined holdings which restrict or undermine their financial viability under current and (in all likelihood) future economic conditions. These are:

- Satellite operation
- Farms layout
- Buildings and Fixed Equipment
- Hail

Satellite operation

3.3 The long-term trend – in all sectors of UK agriculture and horticulture – is for individual farms to increase in size, to counter continuing reductions in farm profitability. Consequently, the minimum area required to support an independent farming operation has increased with time.

3.4 Whilst the profitability of forty years ago would have enabled both Pump and Bloors farms to each support a full-time proprietor and their own workforce, declining profitability means that their combined area, of some 43 hectares, is of inadequate scale to be operated as an independent unit today. To provide some financial context, in 1980 an apple grower would have needed to sell 20 tonnes of apples to pay the wages of a full-time man; in 2020 the equivalent figure is over 50 tonnes.

3.5 Today both Pump and Bloors are operated as a satellite to a farming operation whose base is elsewhere, as they have been for the majority of the last ten years. AC Goatham & Son took on the farming of Pump in 2011 and Bloors in 2016, purchasing the latter from another fruit-growing business that operated Bloors as a satellite unit.

3.6 The operation of satellite sites leads to significant additional costs of production for transport of equipment, staff and produce, as well as for management directing and overseeing the farming operations. These additional costs are proportionately higher for smaller areas of land than they are for larger areas (say 100 hectares or more). In my experience the additional costs of apple production for a satellite site can be in the range £20–50 per tonne,

depending on the size of the satellite site and the travel time from the main holding. This is equivalent to additional costs of £900–2,250 per hectare for a crop yielding 45 tonnes per hectare.

3.7 These additional costs of satellite operations are becoming increasingly hard to support in the face of radical recent reductions in farming profits, most notably for those horticultural crops with a high requirement for labour. This issue is dealt with more fully in the following Section 4.

3.8 An assessment of the financial viability of Pump and Bloors farms for fruit growing, or indeed for any other enterprise, will need to take into account the significantly higher costs of production that arise from their operation as a satellite to another farming unit.

Farms layout

3.9 As already noted, Pump and Bloors farms comprise three main blocks, which are currently planted to a total of nineteen orchards.

3.10 Of the existing orchards, seven are less than 1 hectare in area and a further five are less than 2 hectares; the overall average is just over 2 hectares. The twelve orchards of less than 2 hectares are financially unviable in 2020 due to their disproportionately high costs.

3.11 Costs of production increase as orchards reduce in size due to greater downtime for field operations (e.g. from additional requirement for turning at row ends) and harvesting (with additional movements for bins, pickers, supervisors and transport).

3.12 Orchards are ideally planted with rows running north/south, as this reduces shading and increases crop yield and quality (e.g. apple colour). At Pump Farm eight out of the fourteen orchards are planted south-east/north-west, an area of 13.75 hectares or over 60% of the crop area. This alignment will reduce their potential for profit.

3.13 If replanting were undertaken there would be some opportunities to increase orchard size, but this is constrained on both farms by field shape and layout, as well as by the requirement for north/south planting. The implications are dealt with more fully in Section 5.

Buildings and Equipment

3.14 The combined facilities of the two farms are very limited. There are no buildings at Bloors Farm and the main building at Pump Farm, although of a reasonable size, has an earth floor, limiting its use without further investment. There are no facilities for livestock production and limited stockproof fencing. There is no fencing for vermin control (the current orchard trees are protected by individual guards) which, as in many farming sites across the UK with a neighbouring railway line, is an issue at Pump and Bloors.

3.15 The dilemma for any potential operator of Pump and Bloors farms is that whilst further investment (and therefore increased costs) will be required in buildings and/or other equipment if the holding is to have the basic facilities to meet modern production standards (e.g. for assurance / health and safety) and the security requirements of a satellite site, such additional costs are unlikely to reduce the already higher costs of operating at distance.

Hail

3.16 AC Goatham and Son's own evidence indicates that Pump Farm has a history of hail events.

3.17 During the nine seasons that they have been in occupation of the farm (2012-2020), there have been incidents of hail in five separate years.

3.18 Those years, and their losses of marketable yield, are as follows:

TABLE 1

HAIL INCIDENTS AT PUMP FARM 2012 – 2020

Year	Hail incident(s) – Yes / No	% Crop Damage
2012	No	
2013	Yes	8
2014	Yes	35
2015	Yes	18
2016	Yes	15
2017	No	
2018	No	
2019	No	
2020	/Yes	15–20*

* Provisional

3.19 AC Goatham and Son acquired Bloors Farm in 2016. In the current 2020 season Bloors Farm has suffered the same level of hail damage (i.e. 15-20%) as neighbouring Pump Farm.

3.20 The susceptibility to hail undermines the financial viability of Pump and Bloors farms, from both reductions in output (lost yield and reduced fruit quality)) and additional costs (e.g. for harvesting and packing). Hail is not only a significant issue for the apple and pear crops currently grown at Pump and Bloors, but would also be for other horticultural crops, whether tree or bush fruit, vegetables or salads. In most cases any hail damage to horticultural produce makes it unmarketable and loss-making. The economic damage is exacerbated in that the profit from an equivalent amount of marketable produce will be

required to offset this financial loss.

3.21 In my consistent experience if the crop damage is over 10% then it is likely that the entire crop will be loss-making. On this basis AC Goatham & Son will have incurred financial losses at Pump Farm in four out of the last nine years.

3.22 In the future, in the light of continuing cost inflation, the level of damage that can be carried before the crop becomes loss-making is likely to decline below this 10% figure.

3.23 As the following section will set out, the economics of growing tree fruit and other crops is becoming increasingly challenged, to the extent that it is no longer possible to accommodate the risk of hail within potential farm profitability.

3.24 Section 6 investigates the consequences for the lifetime financial viability of a newly-planted orchard which incurs the same level of hail damage as that experienced at Pump Farm by AC Goatham & Son.

4 THE ECONOMICS OF TREE FRUIT AND OTHER FARMING ENTERPRISES

Background to changing economics

4.1 A central feature of the economics of all farming enterprises – whether crop or livestock production – is that in the long-term:

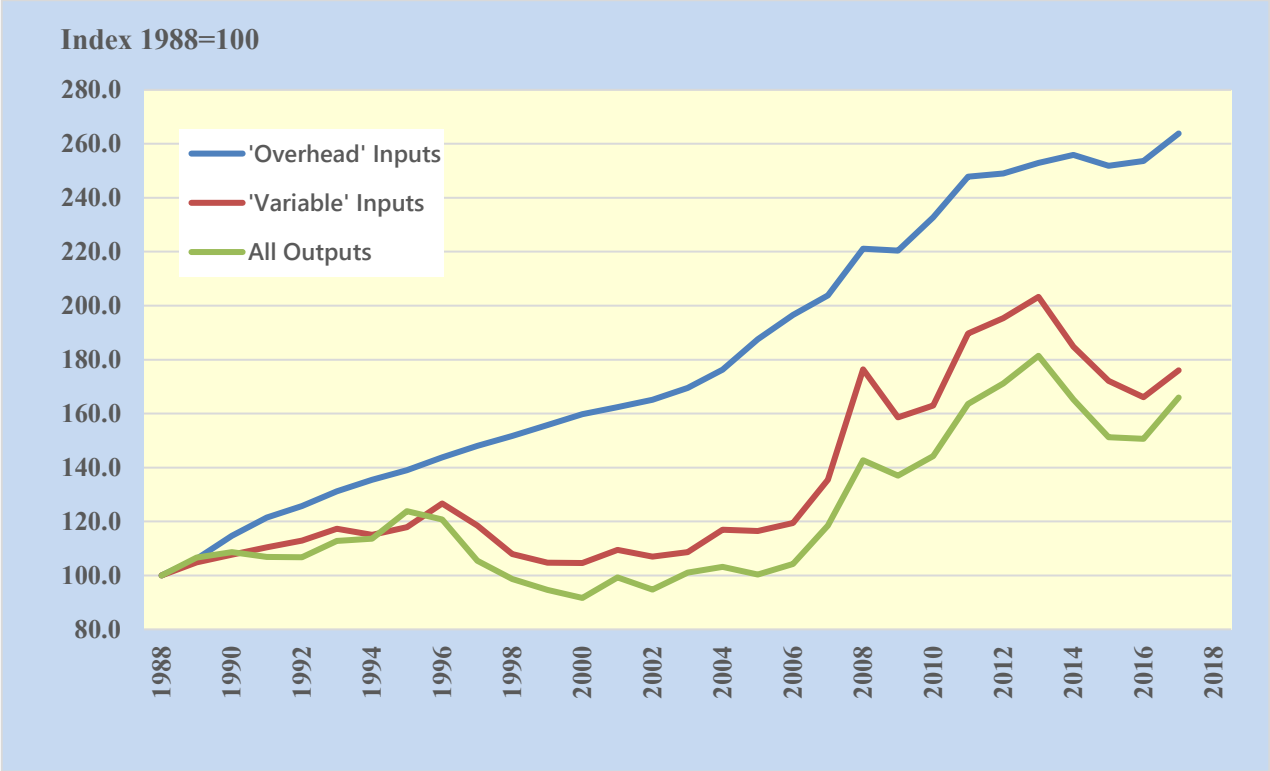
- sale prices tend to remain static, albeit with periods of temporary reductions or increases;
- the costs of "Variable" inputs (i.e. those directly linked to production such as fertilisers and animal feeds) tend to fluctuate in line with sale prices;
- the cost of "Overhead" inputs consistently increase.

4.2 The following table illustrates how general agricultural output values and input costs have changed over the last thirty years. In short, costs have continued to rise at a greater rate than output, with the result that profits have consistently declined.

TABLE 2

CHANGING AGRICULTURAL OUTPUT VALUES & INPUT COSTS

1988 – 2018



Source:DEFRA / Andersons Research

4.3 The inevitable consequence of this financial "pincer" is that the profits of all farming enterprises decline with time, unless farmers are able to improve productivity.

4.4 In UK agriculture and horticulture, amongst the most important ways by which productivity improvements have been achieved are through changes to production methods (resulting in improved yields) and in increased scale of operations (i.e. farms have become larger). In some cases this has led to a reduction in the land required for production; this is well illustrated by two horticultural crops – dessert apples and strawberries – both grown extensively in south-east England.

4.5 In 1985 the UK production of dessert apples was some 154,000 tonnes from an area of 12,771 hectares; by 2018 this had increased to 203,000 tonnes from 6,078 hectares (*Source:DEFRA)*, an increase in average yields from 12 to over 33 tonnes per hectare.

4.6 In 1985 the UK production of strawberries was some 50,000 tonnes from an area of 6,078 hectares; by 2018 this had increased to 132,000 tonnes from 4,731 hectares (*Source:DEFRA)*, an increase in average yields from some 8 to 28 tonnes per hectare.

4.7 Futhermore, these figures for strawberries do not fully reflect the changing requirement for more fertile land (i.e. the better quality Grade 1, 2 and 3a soils), as there has been a significant shift since 2010 in the production of strawberries from soil to substrate (or artificial growing medium, such as coir). Whilst figures are not available for the proportion of the UK crop in substrate in 2018, the figure for 2015 was estimated at 55% (*Source: British Summer Fruits "The Impact of Brexit on the UK Soft Fruit Industry").* Applying this percentage to the 2018 crop area of 4,731 hectares indicates that merely 2,131 hectares relied on soil quality; for the remaining 2,600 hectares of substrate-grown strawberries soil quality was irrelevant.

Increasing costs of production

4.8 Whilst most costs tend to increase over time, there are some categories where the rate of inflation is higher than others; most important of these is the cost of employment, that is the wages paid to full-time, part-time and seasonal employees.

4.9 To put the long-term trend of inflationary wage increases into a recent context, between 2000–2020 there has been a threefold increase in labour costs (based on the National Minimum Wage/National Living Wage rates) – or wage inflation of some 200% over the last twenty years.

4.10 High rates of wage inflation are a particular issue for those enterprises where labour represents a significant proportion of their production costs –most importantly horticultural crops such apples, pears, strawberries, hops and many vegetable and salad crops.

4.11 The response to wage inflation, where the opportunity allows, has been to seek ways to reduce the labour requirement through the investment of capital (whose cost is less than the labour it replaces) and an increase in the scale of operations.

4.12 The result has been the committed and continuing mechanisation of UK farming, in a range of areas – including field operations, stores and packhouses – and an increase in the size of holdings.

4.13 Whilst the general trend has been to replace labour with capital, the opportunity to do so varies between enterprises. This is illustrated by horticultural crops, with some now highly mechanised (e.g. carrots, vining peas), whilst others continuing to have a considerable (often seasonal) labour requirement for husbandry and harvest operations (for crop examples see paragraph 4.10).

4.14 Employment is not the only category where producers have seen significant, continuing increases in their input costs; other important examples include machinery, crop protection products, seeds, plants and trees.

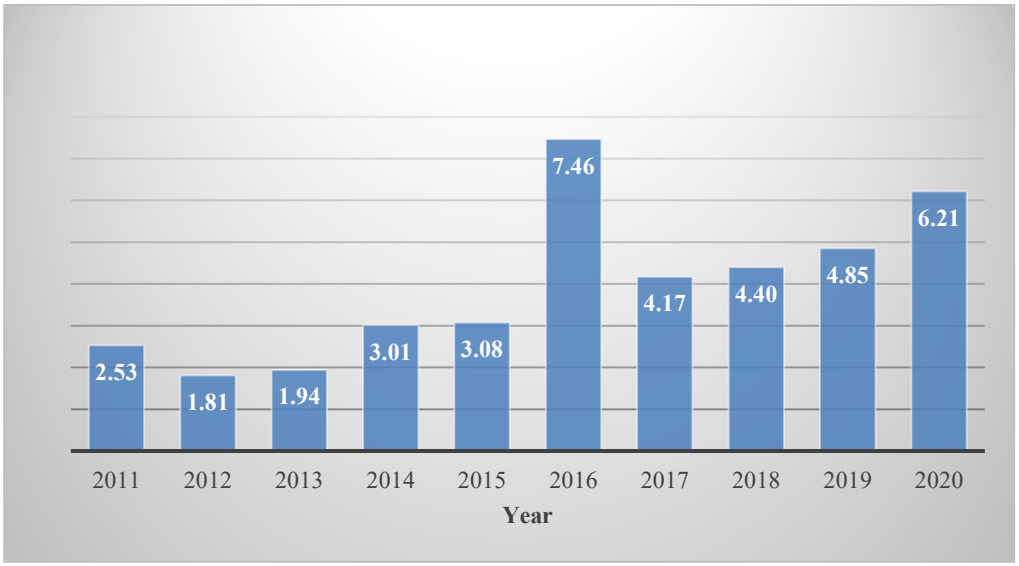
Seasonal Worker Wage inflation 2016 –2020

4.15 Over the last five years there have been unusually high increases in the wage rates for seasonal workers as the following table, which compares 2016-2020 with the preceding five-year period, illustrates:

TABLE 3

ANNUAL WAGE INFLATION 2011 – 2020

%



4.16 The National Living Wage was introduced in the UK on 1st April 2016. The previous award, under the National Minimum Wage, was made on 1st October 2015. What is not immediately clear from the above table is that for the 2016 year, the wage rates for seasonal workers effectively increased twice (in October 2015 and April 2016) since the previous season. The increases of 3.08% and 7.46% – i.e. a combined 10.54% – was the annual increase in cost to the employers of seasonal labour between 2015 and 2016.

4.17 The total increase between the 2015 and 2020 hourly rates is some 34%, although in practice many growers have incurred increases of over 40% in this period when other factors (e.g. pension, provision of accommodation) are taken into account.

4.18 These recent cost increases, unmatched by an improvement in sale prices, have significantly altered the economics of many farming enterprises. This is particularly so for the growers of those horticultural crops with a high requirement for seasonal labour, which includes apples and pears.

4.19 Any assessment of the financial viability of Pump and Bloors farms will need to take into account the consequences of wage inflation – and in particular the unusually high increases of the last five years – as well as increases in other cost categories (e.g. crop protection and mechanisation) for the growing of tree fruit and for the alternative crop or livestock enterprises that might also be considered. The potential economics of future orchard plantings at Pump and Bloors farms is considered in detail in Section 6 of this report.

Increasing costs – dessert apple production

4.20 A significant proportion of the crops grown in the UK are annual, that is they are planted, grown and harvested in a single season.

4.21 By contrast, perennial crops – which are nearly all horticultural – have an extended life and are planted for life cycles of between five years (e.g. asparagus) and fifty years (e.g. cider apples); replanting only takes place at longer intervals. Many of these crops, such as the apples and pears grown Pump and Bloors farms, also have a high requirement for labour, which makes them particularly exposed to wage inflation.

4.22 To understand the financial implications of inflation, the following illustration indicates how the costs of production have changed over the last ten years for Gala dessert apple production; the figures are based on actual grower data. It is assumed that the orchard was planted in 2006, reached full yield in its fifth year (i.e. 2010), and has a yield of 45 tonnes per hectare. The following figures show how costs of production – in £ per tonne – have changed over ten years:

TABLE 4

GALA COST INFLATION 2010 / 2020

YIELD AT 45 TONNES PER HECTARE

ILLUSTRATION BASED ON ACTUAL GROWER DATA

GALA 2006 PLANTING - COST INFLATION 2010 / 2020			
Category	2010 Cost	2020 Cost	Increase
	£/T	£/T	£/T
Orchard Depreciation	40	40	0
Fertilisers & Crop Protection	25	45	20
Other Crop Costs	5	7	2
Labour – Husbandry	20	29	9
Labour – Harvest	45	76	69
Labour – Packing	95	140	45
Packaging, Haul, Commission	220	260	40
Overheads – Labour	32	47	15
Overheads – Power/Machinery	40	60	20
Overheads – Administration	20	25	5
Overheads – Property	15	18	3
Overheads – Rent & Finance	14	14	0
TOTAL	**571**	**761**	**190**

4.23 Over the ten year period costs of production have increased by £190 per tonne, or over 33%.

4.24 Over the same period the sale price for Gala apples has remained static, although may have actually reduced in the case of a clone (e.g. Mondial) that has been replaced by better coloured versions.

The key factors in orchard financial viability

4.25 Whilst yield is important, extensive evidence of the economics of apple and pear production (as for many other horticultural crops) shows that the most important factor in determining profit – and therefore financial viability – is crop sale price.

4.26 That evidence also shows that the most important factor in determining sale price is the proportion of the crop that meets Class1, or supermarket, specification – being that part of the crop that has the highest value.

4.27 Apple and pear crops typically divide into four grades, each with a different value. The differing proportions of each grade for a specific crop are collectively described as the

"grade-out".

4.28 The four grades – and an indication of their value for apples and pears – are as follows:

TABLE 5

APPLE & PEAR GRADES / VALUE

Grade	Typical Value Range £ per Tonne
Class 1	700–1,200
Class 2	300–450
Processing	50–120
Waste	0

4.29 To demonstrate the sensitivity of sale price – and therefore financial viability – to changes in grade-out, the following illustration shows the difference between the average sale value for two crops – the first with a 95% Class 1 grade-out and the second with an 80% Class 1 grade-out. The figures are as follows:

TABLE 6

ILLUSTRATION OF RELATIONSHIP BETWEEN GRADE-OUT & SALE PRICE

	Version 1		Version 2	
Grade	**%**	**Price £/Tonne**	**%**	**Price £/Tonne**
Class 1	95	935	80	935
Class 2	2	350	5	350
Process	2	100	14	100
Waste	1	0	1	0
Weighted Average Price		**897**		**779**

4.30 To illustrate the relative importance of price and yield on orchard profitability, the following example compares the profit from a Gala orchard at two levels of yield and price.

4.31 Orchard 1 has a yield of 45 tonnes per hectare and an 80% Class 1 grade-out (as per Version 2 in Table 6).

4.32 Orchard 2 has a yield of 35 tonnes per hectare and a 95% Class 1 grade-out (as per Version 1 in Table 6).

4.33 For the purpose of the calculations the 2020 costs from Table 4 have been used, adjusted as appropriate (for Growing and Overhead costs) for the reduced yield of Orchard 2.

4.34 The results are as follows:

TABLE 7

ILLUSTRATION OF YIELD vs. GRADE-OUT

	Unit	Orchard 1	Orchard 2
Yield	T/Ha	45	35
Direct costs – Growing	£/T	121	155
Harvesting/Marketing costs	£/T	476	476
Overhead costs	£/T	164	211
Total costs	£/T	761	842
Sale price	£/T	779	897
Profit	**£/T**	**18**	**55**
Profit	**£/Ha**	**810**	**1,925**

4.35 Despite Orchard 2 having a yield of 10 tonnes per hectare less than Orchard 1 (a reduction in yield of over 20%), the profit is well over double that of the higher yielding Orchard 1 – exclusively as a result of an improved grade-out for the lower yielding orchard.

4.36 The conclusion is clear – that any factors that change grade-out will have a considerably greater influence than yield on the financial viability of an orchard.

5 THE REQUIREMENT FOR ORCHARD INVESTMENT

Requirement for replanting – general observations

5.1 Whilst forty years a new orchard would have been planted at lower densities with an anticipated life at least 20–30 years, the subsequent trend has been to increase the density of tree planting. This has had two main effects – to bring crop production earlier and to reduce the orchard lifetime. For dessert apple orchards planted in the last, say, twenty years an orchard's expected life would typically be 12–18 years.

5.2 There are four main reasons why an orchard may need to be replaced – age, disease or damage, crop variety or clone and orchard size.

5.3 All of the orchards at Pump and Bloors farms are either at, or approaching, the time at which they will require replacement, for the following reasons:

- Existing orchard age.
- Current apple varieties and clones.
- Existing orchard size and alignment.

Existing orchard age

5.4 All of the 1.56 hectares of pears on owned land are some seventy years old. Over 10% of the original trees have been lost (principally to disease) and, as a result, yields are low (below 30 tonnes per hectare) and the orchards are loss-making. These orchards have reached the end of their working lives and require replacement.

5.5 Based on my experience in preparing both crop costings and financial forecasts for new plantings, any future pear plantings will, at best, generate very small profits, but in all likelihood will be loss-making over their lifetime. In my opinion, based on my experience, it is no longer financially viable to plant pears in the UK.

5.6 Of the dessert apple area of 40.71 hectares, a total of 4.80 hectares is over fifteen years old and, on age alone, will require replacement in the next 2–3 years.

Current apple varieties and clones

5.7 There are three dessert apple varieties planted at Pump and Bloors farms – Discovery, Gala and Braeburn.

5.8 The younger "Discovery" orchards have yielded below what was anticipated and, coupled with reduced customer demand, means that they require replacement. The area of Discovery orchards at Pump Farm is 4.45 hectares.

5.9 An apple clone is, in effect, a "sub-variety" which has been selected for its characteristics. The Gala "Mondial" clone and the Braeburn "Hilwell" clone, which represent the majority of these varieties at Pump and Bloors farms, have been superseded by clones whose features (most importantly for colour) better meet customers' requirements. As a result, it is becoming increasingly difficult to sell the Mondial and Hilwell clones at a profit – because of their reduced grade-out – despite their good yield performance.

5.10 Whilst individual orchard grade-out information is unavailable for Pump and Bloors farms (small average orchard size makes this practically impossible in a large-scale packhouse operation), AC Goatham & Son report that a comparison of the grade-out of Gala and Braeburn clones clones Mondial / Hilwell and the Gala and Braeburn coloured clones of Royal Beaut / Mariri Red shows that Mondial and Hilwell typically have a Class 1 proportion that is c. 10% lower than the coloured clones. This is consistent with my own experience with other growers of these varieties and clones.

5.11 Furthermore, "Mondial" and "Hilwell" have higher costs of production, as a result of the picking operation having to be undertaken twice, and sometimes three times, to try and improve crop colour. This compares with a single picking for the coloured clones.

5.12 87% of the combined Gala and Braeburn area at Pump and Bloors is planted to Mondial Gala and Hilwell Braeburn.

Existing orchard size and alignment

5.13 As noted in Section 2, the combined Pump/Bloors crop area of 43.31 hectares comprises nineteen orchards, of which twelve are less than 2 hectares and only two are over 5 hectares in area. With the continuing erosion of the profitability of apple production by cost inflation, such small production areas – with their disproportionately high costs for both husbandry (e.g. spraying) and harvest – are no longer financially viable for any grower.

5.14 As noted in Section 3, over 60% of the Pump Farm cropping area is planted on a south-east/north-west alignment, rather than the preferable north/south. Profit is therefore reduced in these areas, as a consequence of poorer apple colouration and reduced grade-out.

6 THE ECONOMICS OF ORCHARD REINVESTMENT

Orchard replanting – a lifetime financial Model

6.1 In order to understand the potential financial viability of orchard replanting, a lifetime financial Model has been prepared for a 2024 planting of a Gala dessert apple; a coloured clone (such as Royal Beaut) has been assumed.

6.2 A full version of the Model is included in Appendix V.

6.3 The key assumptions for this lifetime Gala Model – which is prepared on a "per hectare" basis – are as follows:

- Soil quality equivalent to that found at Pump and Bloors farms.
- Negligible risk of frost and/or hail.
- Planted in 2024 with a 16-year life.
- Tree rows planted on a north – south alignment.
- Total trees per hectare = 2,857 (spacing 3.5 x 1 metre).
- Total establishment cost = £29,035 per hectare.
- Full production reached in Year 5 with a yield of 55 tonnes per hectare.
- Weighted average sale price of £936 /tonne (93.6 pence per kilo) with 95% of the crop sold as Class 1 and the remaining 5% for processing.
- Sale price unchanged throughout crop lifetime, consistent with past and current evidence.
- Direct and Overhead costs of production based on experience of a wide range of grower data.
- Costs of production increased annually, consistent with past and current evidence.
- Labour costs increased at 4% per annum, broadly in line with average of last twenty years – but below the significantly higher rate of the last five years (since the introduction of the National Living Wage – see page 14).
- Other costs inflated at 1–3%, depending on category.

6.4 In summary, the results for the lifetime of the crop are as follows:

TABLE 8

GALA CROP MODEL SUMMARY LIFETIME PERFOMANCE

Average Sale Price	93.6 pence per kilo (£936/tonne)
Average Cost of Production	91.3 pence per kilo (£913/tonne)
Average Profit	2.2 pence per kilo (£22/tonne)
Lifetime Gross Sales	£694,141
Lifetime Profit	£16,585 per hectare
Lifetime Profit	2.39% of turnover
Payback	In Year 9
Internal Rate of Return	4.72%

6.5 The continuing economic changes, set out in Section 4, are evident in the forecast financial performance of this 2024 Gala planting. The projected profit of £16,585 per hectare over the sixteen-year period is equivalent to only 2.39% of total sales, making the financial outcome highly sensitive to changes in sale price.

6.6 As set out in paragraphs 4.25 and following, the most important factor in determining the price is the proportion of fruit sold as Class 1, the values of which – as set out on page 2 of the Model in Appendix V – vary between £800 and £1,075 per tonne.

6.7 To illustrate how sensitive the economic viability is to grade-out, a re-working of the proportion of Class 1 fruit from 95% to 91% converts a profit of some £16,000 per hectare over the orchard's lifetime to a loss of some £2,000.

6.8 High Class 1 grade-outs are vital to the financial viability of future orchard plantings and any factor that puts grade-out at risk is likely to compromise financial viability. In this respect the incidence of hail at Pump and Bloors farms is highly relevant.

The effect of hail on financial viability

6.9 In order to understand the consequences of hail for the potential financial viability of a new Gala planting, the 2024 planted Gala lifetime crop model has been re-worked, based on the average hail damage suffered by AC Goatham & Son in the nine years that they have farmed Pump Farm. Those figures are set out on page 11 of this report and are equivalent to an annual average of 10.4% hail damage (a median figure of 17.5% has been used for the 2020 estimate in calculating this average).

6.10 The re-worked model is included in full in Appendix VI and includes the following additional assumptions to those used in the preparation of the version included in Appendix V:

- The proportion of the crop sold as Class 1 has been reduced by 10.4%, from 95% to 84.6%.
- Each of the four Class 1 size bands has been reduced equally (by 2.6%).
- The proportion of the crop sold for processing has been increased by 10.4%, from 5% to 15.4%.

6.11 In summary, the results for the lifetime of the hail affected crop are as follows:

TABLE 9

GALA CROP MODEL SUMMARY

RE-WORKED LIFETIME PERFORMANCE – HAIL

Average Sale Price	84.8 pence per kilo (£848/tonne)
Average Cost of Production	89.0 pence per kilo (£890/tonne)
Average Loss	4.2 pence per kilo (£42/tonne)
Lifetime Gross Sales	£629,031
Lifetime Loss	£31,320 per hectare
Lifetime Loss	4.98% of turnover
Payback	No Payback
Internal Rate of Return	No return

6.12 The evidence demonstrates that a replacement Gala planting at Pump/Bloors farms would generate significant losses over its productive life, if the future incidence of hail were to be the same as that experienced – on average – by AC Goatham & Son between 2012-2020.

6.13 It is also my opinion, based on my experience, that a similar conclusion would be reached for other dessert apple varieties, such as Braeburn.

Issues to consider when planting orchards

6.14 The key issues, when considering orchard planting, are:

- whether there are potential productivity gains that a grower can adopt, when planting a new orchard, that will enable future cost inflation to be managed to a level that enables a profit to be made

  and

- whether there are features of the site that restrict profit as a result of increased risk (e.g. frost, hail).

6.15 As has already been noted, the cost category that increases at the highest rate is labour and productivity gains in this area will be vital for a new orchard planting to be financially viable over its lifetime.

6.16 There are two developments for orchard production – one current and one anticipated – which will be important in improving productivity. These are:

- Three-row sprayers.
- Mechanical harvesting.

6.17 Until ten years ago all orchard spraying (of both fertilisers and crop protection materials) was undertaken with machines being driven between every row in the orchard, an operation undertaken up to twenty times per orchard per season.

6.18 The development of three-row sprayers has, with the use of an elevated boom, enabled growers to spray three rows, rather than a single row, at a pass. The result has been a significant reduction in both the labour and other costs of spraying, coupled with the collateral benefit of improved timeliness of operations (due to improved work rates).

6.19 However, as a consequence of its increased size, this machine requires larger orchards of a regular shape, and with wider turning headlands, to deliver its full benefits.

6.20 It also has to be based on a single site, as it is not appropriate for movement on the roads.

6.21 Due to its high capital cost (of £70-80,000), it is my opinion that an individual farming unit would need to be a minimum area of 60 hectares (and ideally larger) in order to carry the higher depreciation costs associated with such an investment.

6.22 Mechanical harvesting is now being trialled commercially in a number of the main apple-producing areas of the world and will become an important way by which UK apple growers seek to contain, at least in part, continuing increases in labour costs in their future orchard plantings.

6.23 The introduction of three-row sprayers and the prospect of mechanical harvesting have both significantly altered the specification for new orchard sites, capable of delivering the benefits of both these developments. The key requirements are orchards of a large size, of regular shape, all within the context of tree rows with a north/south alignment.

6.24 The relationship between orchard size and cost of production has already been noted in Section 3 – with costs of production increasing as orchards reduce in size. Whilst there is no definitive ideal size, in my experience the area of a newly-planted orchard is likely to be minimum of 8–10 hectares in order to be financially viable; orchards of lesser area, particularly if accompanied by irregular field shape, will lose much of the financial benefit of this mechanisation, both for orchard husbandry operations (e.g. increased down-time from additional turning and short runs) and harvest (e.g. increased movement requirement for bins, pickers, supervisors and transport).

6.25 To conclude, the following illustration shows how the costs of conventional spraying reduce with increasing orchard size, by comparing the cost for orchards of one and ten hectares. It also compares the cost of conventional spraying with that of a three-row sprayer.

6.26 The figures are as follows:

TABLE 10

SPRAYING COST COMPARISON

ORCHARD SIZE & CONVENTIONAL vs. THREE-ROW SPRAYERS

	Unit	Orchard 1	Orchard 2	Orchard 3
Sprayer type		Conventional	Conventional	Three-row
Orchard area	Hectares	1.0	10.0	10.0
Orchard dimensions	Metres	100 x 100	400 x 250	400 x 250
Spraying time per application	Hours	0.65	6.0	2.1
Applications per year	Number	16	16	16
Spraying time per year	Hours	10.4	96	33.6
Application cost	£ per Hour	45.0	45.0	60.0
Cost per year	Total £	468	4,320	2,016
Cost per year	£ per hectare	468	432	202

6.27 The figures for Orchards 2 and 3 show that the cost of a three-row sprayer is under half that for conventional spraying, a reduction of £230 per hectare per year.

6.28 To put this financial improvement into context, the Gala crop model is Appendix V assumes the use of a conventional sprayer. If this new planting were part of a block at least 60 hectares and the orchard itself was a minimum area of, say, 8 hectares, then the cost saving of using a three-row rather than conventional sprayer would be almost £4,000 per hectare over the lifetime of the orchard (accounting for inflation) – equivalent to an increase of some 25% in the lifetime orchard profit.

6.29 The financial viability of any future orchard planting will rely on improvements in productivity gains, such as three-row spraying. The scale of tree fruit growing units, and orchard size, will need to designed accordingly.

Orchard replanting: suitability of Pump and Bloors farms

6.30 As has already been identified, Pump and Bloors farms currently include a total of nineteen orchards on a total crop area of 43.31 hectares, an average orchard size of just over 2 hectares. Such an orchard layout would be financially unviable for future plantings.

6.31 The requirements for area and block size with any new orchard plantings (whether at Pump and Bloors farms, or elsewhere), in order to accommodate the improvements in mechanization that will be vital to their financial viability, has been set out above.

6.32 In respect of overall size, the combined area of Pump and Bloors farms of some 43 hectares is below the minimum 60 hectares that is required, in my opinion, to support the significant investment in three-row spraying.

6.33 Furthermore, in my experience the layout of the two farms indicates that it is impossible to organize the land into the required block size and shape. At Pump Farm, for example, although a single large block of the right orientation is possible, this would lead to an area of the farm having to remain uncropped (because of field shape and the location of buildings), which would make the farm operation financially unviable.

7 THE SUITABILITY OF THE FARMS FOR OTHER ENTERPRISES

Summary of options

7.1 As noted in Section 2, the Soil Survey of England and Wales identifies the following potential uses for land of the type found at Pump and Bloors farms:

"Fruit and horticultural crops; field vegetables; cereals and potatoes; some hops."

7.2 The Agricultural Land Classification similarly bears out the importance of these soils, of Grade 1, 2 and Grade 3a designations, for a wide range of crops (whose production may be limited or impossible on soils of lesser quality).

The changing requirement for land for horticultural crops

7.3 As has already been noted in Section 5, the requirement for better quality land (Grades 1,2 and 3a) for horticultural crops has been declining, as underlying economic trends have driven improvements in production methods, resulting in increased yields and reductions in crop areas.

7.4 By way of illustration, in Kent the area of horticultural crops in 1985 was 26,636 hectares. By 2016 this had declined to 16,238 hectares, of which over 1,000 hectares is likely to be in substrate production, in either glasshouses or polytunnels. Over thirty years the requirement for best and most versatile land for horticultural crops has fallen by over 11,000 hectares (or over 40%).

The availability of best and most versatile land in Kent

7.5 Whilst there is no data available for the precise available area of Grades 1,2 and 3a soils in Kent for farm production, it is possible to prepare an indicative estimate, based on the data available. Natural England suggest that some 21% of all farmland in England falls into Grades 1 and 2, with a further 21% in Grade 3a (*Source: Natural England Technical Information Note TIN049, published January 2009)*.

7.6 If this proportion of 42% of best and most versatile (BMV) land is applied to the 2016 farmed area in Kent – possibly a conservative assumption – of 221,331 hectares (*Source: DEFRA),* then some 93,000 hectares of Grades 1,2 and 3a land (i.e. 221K hectares x 42%) are available for the growing of some 15,000 hectares of soil-grown horticultural crops.

7.7 In other words, DEFRA's figures indicate that only 16% (i.e.15K / 93K hectares) of BMV land in Kent was being used for horticultural crops in 2016. The evidence suggests that there is considerably more Grade 1, 2 and 3a land available in Kent than is needed for production of the more specialist crops, such as apples and pears, that are suited to soils of this type.

7.8 The remainder of this section will consider each of the crops that could be grown at Pump and Bloors farms as an alternative to apple and pears, together with observations on the potential for livestock production and the growing of non-food crops.

Fruit

7.9 There are two categories of fruit that could be grown at Pump and Bloors farms instead of apples and pears – other tree fruit and soft fruit.

7.10 Other tree fruit would principally include cherries and plums. As with apples and pears, both of these crops are now grown on 15–20 year cycles and, as a result, face the same problems of continuing cost inflation over an extended period with limited, if any, any prospect of sale price increases. In the case of cherries recent evidence is of sale price deflation, with the significant expansion of the UK crop area during the last decade.

7.11 In my experience of preparing financial forecasts for growers, new plantings for both cherries and plums are likely to generate financial losses. In my opinion, neither crop is a commercial alternative to apples and pears.

7.12 In 2020 the main UK soft fruit crops, strawberries and raspberries, are almost exclusively grown under crop covers, or polytunnels. In the south-east, the majority of strawberry production, and a significant proportion of raspberry production, is also undertaken in an artificial growing medium, or substrate (generally coir); soil quality is therefore no longer relevant.

7.13 Whilst the combined area of Pump and Bloors farms is theoretically of a scale to support an independent soft fruit production unit, it is my opinion that a soft fruit grower is most unlikely to seek to establish a new operation at this site. Not only would there be the significant cost of submitting a planning application for both polytunnnels and worker accommodation, but there continues to be considerable uncertainty over seasonal labour availability. In my experience, where growers wish to increase their output, the recent trend has been to either expand or intensify production at existing sites.

Other horticultural crops including field vegetables

7.14 The decline in the area of field vegetables grown in Kent provides a clear illustration of the consequences of the underlying economic trends described in Section 5.

7.15 In 1985 the area of vegetables grown in the county was 7,595 hectares (*Source; DEFRA)*. The last three-yearly survey undertaken by DEFRA in 2016 showed that the area had declined to 1,291 hectares. Over a thirty-year period the area had reduced by 6,304 hectares, or 83%, and with it the demand for the higher grade soils required to grow these more specialist crops.

7.16 The issues in respect of Pump and Bloors farms for the specialist vegetable grower (of which there has been a significant decline in numbers) are similar to those of the potential apple and pear grower, including the disproportionate Overhead Costs associated with what is now a small satellite unit and the lack of any modern building facilities.

7.17 However, there are two key factors which make the growing of vegetable and salad crops financially unviable – vermin and hail.

7.18 Both Pump and Bloors farms are bordered by a railway line which, in common with many such sites throughout the UK, provides an ideal environment for rabbits (and to a lesser extent hares) to live and breed. As a result, all of the trees in the existing orchards have individual guards to protect against vermin damage. If vegetable and salad crops were to be grown it would be necessary to erect vermin-proof fencing, the cost of which is typically £8-10 per metre. The combined perimeter of Pump and Bloors farms is some 4.5 kilometres, requiring an investment of £350-450,000 if vegetables/salads were to be grown on the whole site. Such an additional capital could not be supported by the potential profits of vegetable/salad production, making these crops financially unviable on the Pump and Bloors sites.

7.19 Furthermore, there is also the hail risk, which in my experience can be equally as damaging to the financial viability of vegetable and salad crops as it is for tree fruit crops.

7.20 The combined problems of vermin and hail make the growing of vegetable and salad crops financially unviable at Pump and Bloors farms.

7.21 As has already been noted, there is a plentiful supply of land of the appropriate quality in Kent for these crops – without the vermin and hail risks – that is currently only being used to grow lower profit cereal crops.

Cereals and potatoes

7.22 For the purpose of this section the term "Cereals" has been taken to include other "combinable crops" such as oilseed rape and beans, which are typically grown in cropping rotations that also include cereals (such as wheat and barley).

7.23 Pump and Bloors farms are too small to be an independent unit for combinable crops and potatoes, with no facilities for either crop drying or storage. They would therefore need to be farmed as a satellite to another farming operation.

7.24 For both crop categories the long-term effect of the continuing price:cost pincer has been an increase in the scale of operations, characterized by fewer staff and larger machines, in order to maintain profitability. As a result, the growers of combinable crops and potatoes now require "satellite" land that is in larger blocks (many would cite a minimum of 80-100

hectares) with high average field size of regular shape.

7.25 The key reason for the notable unattractiveness of Pump/Bloors to prospective growers of cereals and potatoes is the small area involved, creating disproportionately high travel costs. Costings indicate that wheat grown on satellite holdings, without grain storage, can incur travel costs of between £5-10 per tonne; Pump and Bloors farms, because of their small size, are likely to be at the top of this range. To this additional travel cost would need to be added the cost of grain drying, handling and storage of, say, £6-15 per tonne. These additional costs, together with the smallness of the unit (< 50 hectares), divided into a number of small fields of irregular shape, make Pump and Bloors uncommercial for cereal production.

7.26 For husbandry reasons potato cropping can only be undertaken one year in five; in my experience it is most unlikely that a grower would wish to take on Pump and Bloors farms for an annual area of potatoes of less than 10 hectares.

7.27 The impending reduction and eventual discontinuation of the Basic Payment Scheme (by 2028), the area-based subsidy paid to UK producers, will also further reduce the economic viability of Pump and Bloors, particularly for combinable crop production.

7.28 The following table sets out the current costs of production compared with sale price for three widely-grown combinable crops – winter wheat, oilseed rape and beans – based on the yields that are potentially achievable at Pump and Bloors farms:

TABLE 11

COMBINABLE CROP COSTS vs. SALE PRICE

Category	Wheat Range	Wheat Median	OSR Range	OSR Median	Beans Range	Beans Median
Direct Costs £/Hectare	480-560	520	450-520	485	260-300	280
Overhead Costs £/Hectare	500-800	650	500-800	650	400-700	650
Rent/Rent Equivalent £/Ha	300-500	400	300-500	400	300-500	400
Total Cost £/Hectare	1,280 – 1,860	1,670	1,250-1,820	1,635	960-1,500	1,430
Yield Tonnes/Hectare	10-12	11	3.5-5.00	4.25	4-5	4.5
COP* £/Tonne	107 - 186	146	250-520	385	192-375	284
Sale price range £/Tonne	130-180	155	290-350	320	160-220	190
Sale price less COP £/Tonne		9		(65)		(94)
Profit per hectare		**99**		**(276)**		**(423)**

* COP=Cost of production

Source: John Nix Pocketbook for Farm Management, 50th Edition / Andersons Midlands

7.29 Without subsidy, and at "median" levels of performance, only the wheat crop shows a profit, of £9 per tonne. Both oilseed rape and beans are loss-making at the median level of performance.

7.30 Typically, over a two-year period, a crop of wheat would be grown in the first year, to be followed by a break crop, such as oilseed rape and beans, in the second year. The figures in Table 8 show that at a median level of performance, and despite the high yields associated with the fertile soils at Pump and Bloors, the combined "profit" of the two years will, in fact, be a loss.

7.31 The financial viability of combinable crop production at Pump and Bloors – as it is throughout the UK - is highly dependent on the Basic Payment subsidy which, under the Agriculture Act 2020, is to be phased out by 2028. This raises a significant doubt over the financial viability of Pump and Bloors farms for combinable crop production.

7.32 In summary, in light of the pressure on profit for both combinable crops and potatoes, the additional costs for both travel and crop storage and the pending decline and removal of subsidy, it is my opinion that Pump and Bloors farms are capable of, at best, generating a low level of profit with these crops, but that this is likely to disappear with the reduction and removal of the Basic Payment subsidy.

Hops

7.33 Formerly hops were extensively grown in the south-east, but the consequence of the price:cost pincer has been a significant decline in the crop area, as the economics have become marginal or financially unviable. In 1985 there were over 2,500 hectares of hops grown in the south-east, which has declined to a present area of less than 500 hectares (*Source: DEFRA/British Hop Association*). My experience in preparing financial budgets for new hop plantings, indicates that they are likely to be loss-making. In my opinion hops are not a financially viable alternative to apples and pears.

Livestock

7.34 There are five mainstream livestock enterprises on the UK farm – dairy, beef, sheep, pigs and poultry.

7.35 The combined area of Pump and Bloors farms is too small to support an independent unit of any of the grassland-using enterprises – dairy, beef or sheep – an issue compounded by a lack of appropriate buildings. By way of illustration, current economics indicate that investment in a new dairy unit would require a minimum herd size of 200 cows to be financially viable; the area at Pump and Bloors farms would be able to support no more than 35-40 dairy cows.

7.36 The alternative of summer grazing for either beef or sheep would be unprofitable when accounting for the cost of erecting new, stockproof fencing around the perimeter of both farms (save for the southern boundary next to the railway), internal fencing (to create manageable paddocks), the installation of drinkers and handling facilities.

7.37 The combined issues of smell and the availability of land for the disposal of waste make Pump and Bloors farms unsuitable for either pig or poultry enterprises.

Non-food crops

7.38 There are two main categories of non-food crop currently grown in the UK – for biomass and for pharmaceutical use.

Biomass

7.39 The two principal crops grown for biomass are Short Rotation Coppice ("SRC" – most commonly willow) and Miscanthus. Both are perennial crops, with a life expectancy of at least fifteen years and are most commonly grown on soils of lower quality (Grades 3b, 4 and 5).

7.40 Gross margins for both crops are below most cereal enterprises, with high costs, particularly for transport, drying and, in the case of willow, chipping. The following table compares the gross margins for winter wheat, SRC and miscanthus:

TABLE 12

COMAPARATIVE GROSS MARGINS

WHEAT / SRC / MISCANTHUS

Crop	Gross Margin per Hectare £
Winter Wheat	761
Short Rotation Coppice (SRC)	361
Miscanthus	294

Source: John Nix Pocketbook for Farm Management, 50th Edition ("Average" figures)

7.41 There are a number of features of biomass crops which make them unsuitable for planting on many sites, including:

- Planting costs are expensive, for either cuttings (SRC) or rhizomes (Miscanthus). The Energy Crop Scheme, which previously part-funded the planting of these crops, was discontinued in 2013.

- Vermin control – rabbit proof fencing would be required, with an installed cost of typically between £8-10 per metre.
- SRC has the potential to damage land drainage systems.
- Availability of harvest contractors for SRC, of which there are four in the UK, based in Cumbria, Yorkshire, Nottinghamshire and Warwickshire. Due to logistics and additional costs it is unlikely that these contract harvest services would be available in Kent.
- SRC is winter harvested, typically at three yearly intervals, generally using large scale machinery; there is a high risk of soil damage.

7.42 In addition, there is the further complexity of removing both crops at the end of their production period. The technique currently employed is the use of Glyphosate herbicide and cultivations, although some growers have found it difficult to remove Miscanthus in this way. There is also a possibility that the use of Glyphosate will be prohibited in the future; at present there is no effective alternative.

7.43 With their relatively small field size, absence of vermin-proof fencing (as noted in paragraph 7.18, the capital cost to secure the perimeter of Pump and Bloors would be £350-450,000), difficulty of access for large machinery, as well as limited, if any, production of this type in the locality, it is my opinion that Pump and Bloors farms are not suitable for the growing of biomass crops, either as an independent or satellite operation.

Pharmaceutical crops

7.44 Two main crops are grown outdoors for pharmaceutical use in the UK – borage and poppies.

7.45 There is also a relatively small area of cannabis grown for pharmaceutical use in the UK under glass; glasshouse production is not relevant for Pump and Bloors farms.

7.46 Borage is an oil crop with a high gamma linolenic acid content, used in both pharmaceuticals and cosmetics.

7.47 Up to some 5,000 hectares of borage have been grown in the UK annually, all of which is under contract. In some seasons (e.g. 2009-2011) no crop was grown, as no contracts were available, due to a world surplus.

7.48 Borage is grown by a small number of specialist growers who have the appropriate knowledge and experience.

7.49 The crop is low-yielding with a high risk of seed shedding at maturity and difficulties at harvesting.

7.50 Being small seeded, facilities for crop drying, cleaning, handling and storage need to be of a high standard. Such facilities are not available at Pump and Bloors farms which means that if this crop were to be grown it would have to be as a satellite operation of a specialist grower. Due to the relatively small areas required for this crop it is unlikely to be undertaken as a satellite operation to another farm.

7.51 Commercial growing of poppies commenced in the UK some twenty years ago, the poppy heads being processed to produce morphine for pharmaceutical uses. By 2016 some 2,000 hectares were grown, all under contract. However, since 2017 no contracts have been offered and production has largely ceased in the UK. Poppy production is therefore not an option for Pump and Bloors farms.

A final observation

7.52 It should also be noted that in assessing the financial viability of any enterprise other than orchard cropping, account may need to be taken of the costs of converting from orchards to the new enterprise, including removal of the existing trees and orchard structures.

7.53 This cost might typically be in the range cost £1,000-2,500 per hectare, or a total cost of between c. £40,000-100,000 for the two farms.

8 REPORT SUMMARY

In summary the key points of this report are as follows:

8.1 Pump and Bloors farms were once farmed as separate and independent fruit holdings. The long-term downward trend in the profitability of all farming enterprises, described in Section 4 – including that of orchard production – has resulted in them being operated, for much of the last decade, as satellite units of larger businesses. This increase in the number of blocks of land farmed as satellites of other operations is widespread, not only in Kent, but throughout the UK.

8.2 The cropping area of the two farms of some 43 hectares currently includes nineteen orchards, of which only two are over 5 hectares. The majority of the orchards are now too small to be financially viable, for the reasons set out in Section 4.

8.3 As a result of orchard size, age and alignment, as well as issues with and varieties/clones, all of the crops at Pump and Bloors will require replacement in the next 2–3 years at a very significant expense. Orchard establishment costs are typically between £25-35,000 per hectare, indicating a total cost for orchard replacement at Pump and Bloors farms of between £1.1 million and £1.5 million.

8.4 In common with all other farming enterprises, the profits from the growing of apples and pears have notably declined with time, as a consequence of static sale prices and increasing costs of production.

8.5 The most significant of these costs is labour, which has increased considerably. Over the last twenty years the wage rates for seasonal workers, of particular importance for the growers of horticultural crops such as apples and pears, have increased by over 200% (i.e. a threefold increase).

8.6 Unusually high wage increases in the last five years have reduced the profits of many existing UK apple and pear orchards to such an extent that, in my experience, many are producing little, if any, profit and indeed some are now loss-making.

8.7 Growers have sought to address the price:cost (of production) pincer by adopting new developments to improve productivity. These are typically implemented when a new crop is established and are particularly important for those longer-lived crops, such as apples and pears, where the opportunity to introduce new developments during the orchard's life is often limited.

8.8 The new developments of both three-row spraying and mechanical harvesting will require scale in order to deliver their practical and financial benefits, in the form of a farm with a minimum area, in my opinion, of 60 hectares which is made up of large, ideally rectangular, blocks of land. Whilst there is no definitive ideal block size, in my experience the area of a newly-planted orchard is likely to be minimum of 8–10 hectares in order to be financially viable. Orchards of lesser area, particularly if accompanied by irregular field shape, will gain little or no net financial benefit from developments in mechanisation, both for orchard husbandry operations (e.g. increased down-time from additional turning and short runs) and harvest (e.g.increased movement requirement for bins, pickers, supervisors, transport).

8.9 Nonetheless, Pump and Bloors farms, even with any such improvement in orchard size, cannot be organised into a layout that could enable an advantage from this new mechanisation to be adopted, without which new plantings will be financially unviable.

8.10 Despite their fertility and the availability of irrigation, Pump and Bloors farms suffer clear intrinsic shortcomings in both size and layout, when considering their suitability for the planting of new orchards.

8.11 As important in determining their suitability for orchard planting (or, indeed, a number of other horticultural crops) is the susceptibility of the farms to hail. This risk can only be overcome with the use of hail nets for protection. In my experience the additional cost of hail nets makes future orchard replanting financially unviable for most dessert apple varieties.

8.12 In the light of current and future economics, in my experience it is not financially viable to plant an orchard on any site that has an identified risk of hail. Hail would be also be a key issue for a number of other horticultural crops (e.g. plums, salads) that might be considered as alternative enterprises for Pump and Bloors farms.

8.13 DEFRA data indicate that the area of soil-grown horticultural crops in Kent is currently some 15,000 hectares. The best and most versatile land – Grades 1, 2 and 3a – available for the growing of these specialist crops in Kent is over 90,000 hectares. With such capacity it should be possible to locate new plantings of high-risk horticultural crops on sites with limited, if any, risk of hail.

8.14 A review of the alternative enterprises to apples and pears – as set out in Section 6 – indicates that in nearly all cases their financial viability would be undermined by the same two key features of Pump and Bloors farms that make future apple and pear production financially unviable – namely scale and hail, exacerbated by a lack of facilities for either crop or livestock production. . For some crops (e.g. vegetables, salads and biomass) the high capital

cost of erecting vermin-proof fencing further undermines their financial viability.

8.15 Continuing cost inflation and reductions in farm subsidies will further erode future financial viability.

8.16 In summary, the conspicuous smallness of the area of Pump and Bloors, their unattractive, irregular layout, the lack of buildings and other facilities (such as vermin-proof fencing fencing) and, perhaps most importantly, their susceptibility to hail means that their capacity for profit is limited or non-existent. When the additional costs of being satellites of another operation are properly taken into account it is my opinion that Pump and Bloors farms generate little, if any, profit and, only then, in years when there is no incidence of hail.

9 EXPERT DECLARATION

I, ERIC JOHN PELHAM DECLARE THAT

1. I understand that my duty in providing written reports and giving evidence is to help the Inspector appointed by the Secretary of State , and that this duty overrides any obligation to the party by whom I am engaged or the person who has paid or is liable to pay me. I confirm that I have complied and will continue to comply with my duty.
2. I am aware of the requirements of CPR Part 35 and the Guidance for the Instruction of Experts in Civil Claims 2014.
3. I confirm that I have made clear which facts and matters referred to within this report are within my own knowledge and which are not. Those which are within my knowledge I confirm to be true. The opinions that I have expressed represent my true and complete professional opinion on the matters to which they refer.
4. I have endeavoured to include in my report those matters, of which I have knowledge or of which I have been made aware, that might adversely affect the validity of my opinion. I have clearly stated any qualifications to my opinion.
5. I have identified the sources of all information I have used, bracketed and in italics.
6. I have not without forming an independent view included or excluded anything which has been suggested to me by others including my instructing lawyers.
7. I will notify those instructing me immediately and confirm in writing if for any reason my existing report requires any correction or qualification.
8. I understand that;
    a) my report, subject to any corrections before swearing as to its correctness, will form the evidence to be given under oath or affirmation;
    b) I may be cross-examined on my report by a cross-examiner assisted by an expert;
    c) I am likely to be the subject of public adverse criticism if the Inspector and/or the Secretary of State concludes that I have not taken reasonable care in trying to meet the standards set out above.
9. I confirm that I have not entered into any arrangement where the amount or payment of my fees is in any way dependent on the outcome of the case.

Signed: E J Pelham ..... Date: 17th January 2021

APPENDIX I

Andersons Midlands Service Areas

ANDERSONS MIDLANDS SERVICE AREAS

- Business appraisal and strategic planning
- Investment planning and appraisal
- Financial planning including budget and cashflow preparation
- Enterprise costings and benchmarking
- Farm business administration
- IT and software design
- Contract Farming Agreements and Joint Ventures
- Cooperation and collaboration
- Diversification
- Understanding CAP schemes and grant support
- Single payment / agri-environment claims and problem solving
- Preparation of grant applications
- Tenancy matters, rent review and arbitration
- Expert witness
- Insolvency
- Recruitment

APPENDIX II

EJ Pelham curriculum vitae

EJ PELHAM CURRICULUM VITAE

John Pelham - MA (Oxon) Agricultural & Forest Sciences

Joined what was, then, David Anderson & Company in 1985, becoming a Partner in 1990 and assuming responsibility for the management of a consultancy team operating throughout the Midlands region. One of the founding Partners of the Andersons Midlands practice, formed in 2001, and is now based at their West Midlands office in Hereford.

With over 30 years' consultancy experience, he has provided advice to a large number of farming businesses throughout the UK, working with both cropping and livestock systems and drawing extensively on the seven years' practical experience previously gained in farming and farm management. He increasingly advises on strategy and business development and has particular expertise in helping businesses address the issue of succession.

He has a detailed working knowledge of all aspects of business advice with particular experience in:

* Strategic Business Planning
* Financial forecasts and Investment Appraisal
* Detailed enterprise costings and benchmarking for all crop and livestock systems
* Specialist business advice for top and soft fruit growers
* Farming systems and agricultural support
* Contract Farming Agreements and Joint Ventures
* Expert Witness
* Training and Recruitment

Background and Practical Farming Experience

Brought up with farming background, Father being Principal of Hertfordshire College of Agriculture and Horticulture

1974-75	Farm worker on 700 acre farm with dairy, beef, pig and arable enterprises in Hertfordshire
1978	Graduated from Oxford University with degree in Agricultural and Forest Sciences
1978-79	Farm worker on 900 acre farm with dairy, beef, sheep and arable enterprises in Devon
1979-1983	Assistant Farm Manager on arable, fruit, livestock and leisure business in Suffolk
1983-1985	Farm Manager on 1,000 acres in County Westmeath, Eire including a 400 cow dairy herd, dairy youngstock and cereal cropping

APPENDIX III

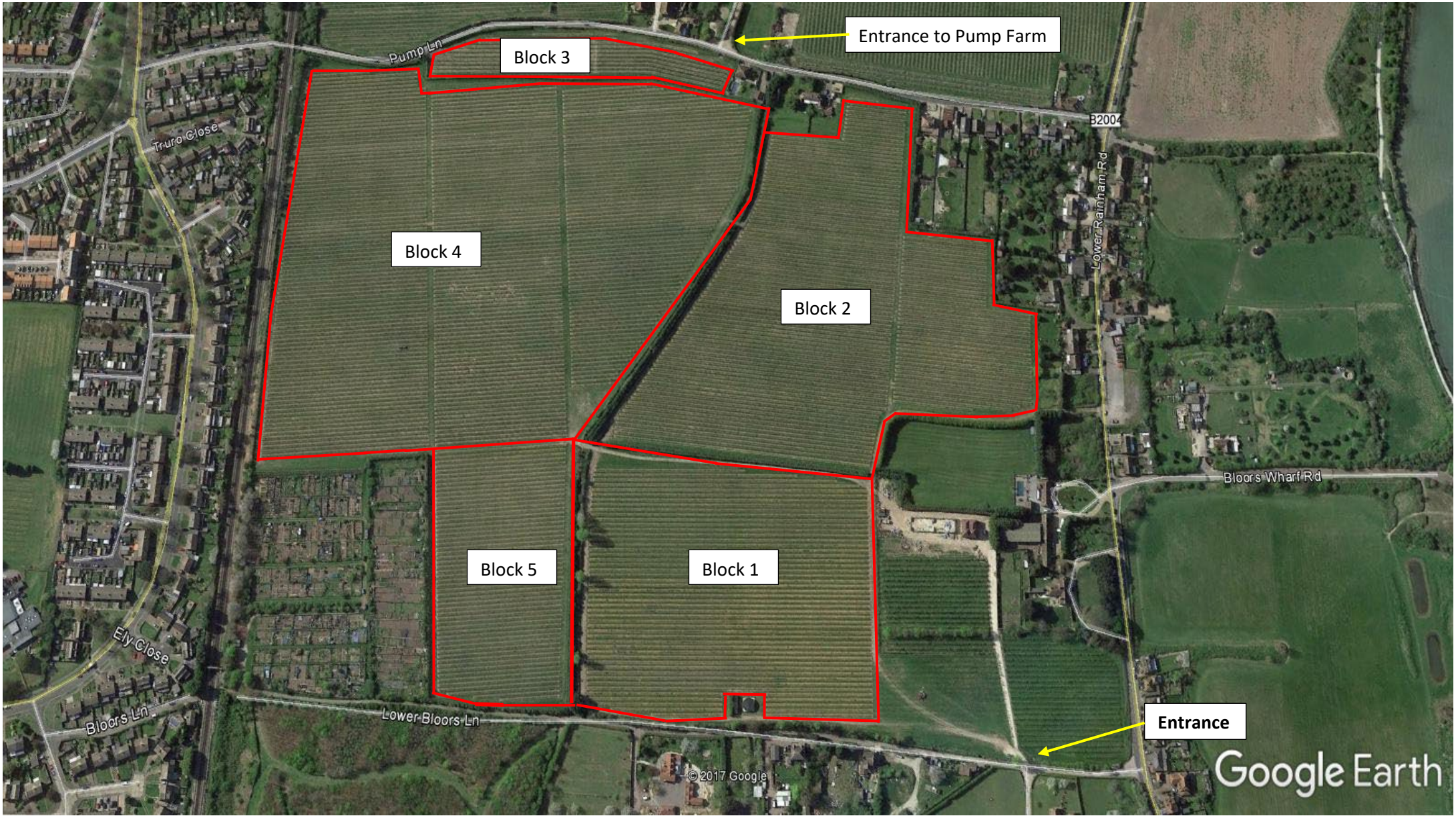
Pump Farm Plan

Pump Farm – Pump Lane, Lower Rainham Road, Gillingham, Kent Me8 7TJ

APPENDIX IV

Bloors Farm Plan

Bloors Farm – Lower Bloors Lane, Rainham, Kent ME8 7TJ



APPENDIX V

Gala Lifetime Crop Model
2024 Planting

ANDERSONS *Midlands*

ORCHARD LIFETIME FINANCIAL PLANNER

JUNE 2020 VERSION

GROWER & CROP DETAILS

Grower Name	Pump & Bloors Farm	
Grower address	Lower Rainham Gillingham Kent ME8 7TJ	
Crop	Dessert Apple	
Orchard Name	Pump/Bloors Gala 2024	
Orchard Area	1.00	Hectares
Main Variety	Gala	
Main Variety Area	1.00	Hectares
Pollinating Variety	Malus	
Pollinating Variety Area	N/A	Hectares
Tree density	2,857	Trees per hectare
Year of Planting	2024	
Year 1	2024	
Orchard Life	**16**	Years
Date of Preparation	08/12/2020	

© ANDERSONS MIDLANDS

Prepared:
08/12/2020

ANDERSONS *Midlands*

Dessert Apple
Gala

GROWER: **Pump & Bloors Farm**

ORCHARD LIFETIME FINANCIAL PLANNER

ESTABLISHMENT, GRADE-OUT AND OPERATING COSTS

ORCHARD ESTABLISHMENT COSTS

	£ per Hectare	NOTES
Ground preparation	500	
Irrigation	5,000	Trickle installation
Trees	15,035	2,857 Gala trees @ £5 per tree + pollinators (£750)
Stakes, Wirework & Structures	5,500	
Planting/Establishment costs	2,500	
Ties & Training materials	500	
Total	**29,035**	No PO contribution

Year 1:

	£ per Hectare	
Fertiliser/spray costs	1,500	
Crop Sundries		
Pruning/Tree Management	100	
Spraying/Mowing		
Thinning	100	
	£ per Tonne	
Picking		If appropriate

MAIN VARIETY GRADE-OUT AND PRICE

Class 1	%	£ per Tonne
55-60	15	850
60-68	32	1,075
68-73	30	1,050
73+	18	800
Class 2		
Process	5	100
Waste		
Total	100	
Average Price		**935.5**

Weighted average

DIRECT COSTS - GROWING

	Inflation p.a.	£ per Hectare
Fertiliser/Spray costs in Year 2	2	2,000
Crop Sundries *	2	300
Labour:		
Pruning / Tree Management	4	750
Spraying / Mowing	4	225
Thinning	4	900
		£ per Tonne
Picking/Supervision costs	4	90
Bin costs (no inflation)	0	10

Inc £10/T transport to store/bin return

Bins w/o over 12 years

* including replacement trees, wires, ties, guards, bees, picking aids, irrigation, etc.

DIRECT COSTS - STORAGE, GRADING, PACKING & MARKETING

		£ per Tonne
Storage (no inflation)	0	90
Grading / Packing / Handling	1	160
Packaging costs	1	85
Haulage costs	1	75
Marketing / Commission / Levies (%)		6.0

OVERHEAD COSTS

		£ per Hectare	
Labour	4	1,750	Inc. Management and Administration
Power & Machinery	3	2,250	
Administration	2	600	
Property	2	350	
Rent (or rent equivalent)		650	Actual or notional

© ANDERSONS MIDLANDS

Prepared:
08/12/2020

ANDERSONS *Midlands*

ORCHARD LIFETIME FINANCIAL PLANNER

RESULTS SUMMARY

Grower: Pump & Bloors Farm
Crop: Dessert Apple
Variety: Gala

1. OUTPUT

Lifetime yield	742	tonnes per hectare
Average annual yield	46	tonnes per hectare
Average annual yield	16	kilos per tree
Class 1 %	95	%
Lifetime yield - Class 1	705	tonnes per hectare
Average sale price	£ 936	per tonne
Average sale price	93.6	pence per kilo

2. COSTS OF PRODUCTION - LIFETIME AVERAGE

	PENCE PER KILO	% TOTAL COSTS
Growing	28.0	30.7
Storage, Packing & Marketing	48.2	52.8
Overheads	15.0	16.5
Total Costs of Production	91.3	

3. PROFIT

			% TURNOVER
Lifetime profit	2.2	pence per kilo	2.39
Lifetime profit	£ 16,585	per hectare	

4. LIFETIME CASHFLOW

YEARS 0-4	YEARS 5-9	YEARS 10+
-36,801	36,818	16,569

5. ALL LABOUR COSTS

	PENCE PER KILO	% TURNOVER
Growing/Grading & Packing/Overheads	39.8	42.53

6. INVESTMENT PERFORMANCE

Payback	In Year 9	
Internal Rate of Return	4.72%	before interest / taxation / risk

© ANDERSONS MIDLANDS

ORCHARD LIFETIME FINANCIAL PLANNER
£ PER HECTARE

Grower: Pump & Bloors Farm
Main Variety: Gala
Crop: Dessert Apple
Area (Ha.) 1.00
Prepared: *08/12/2020*

Orchard Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
Calendar Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	
OUTPUT																	
Yield - Tonnes per Hectare	0.0	12.0	28.0	42.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	**742**
Price - £ per Tonne	936	936	936	936	936	936	936	936	936	936	936	936	936	936	936	936	**936**
Total Output	**0**	**11,226**	**26,194**	**39,291**	**51,453**	**51,453**	**51,453**	**51,453**	**51,453**	**51,453**	**51,453**	**51,453**	**51,453**	**51,453**	**51,453**	**51,453**	**694,141**
DIRECT COSTS - Growing																	
Fertiliser / Spray	1,500	2,000	2,040	2,081	2,122	2,165	2,208	2,252	2,297	2,343	2,390	2,438	2,487	2,536	2,587	2,639	36,087
Crop Sundries	0	300	306	312	318	325	331	338	345	351	359	366	373	380	388	396	5,188
Labour:																	
Pruning/Tree Management	100	750	780	811	844	877	912	949	987	1,026	1,067	1,110	1,155	1,201	1,249	1,299	15,118
Spraying/Mowing	0	225	234	243	253	263	274	285	296	308	320	333	346	360	375	390	4,505
Thinning	100	900	936	973	1,012	1,053	1,095	1,139	1,184	1,232	1,281	1,332	1,386	1,441	1,499	1,559	18,121
Picking/Supervision	0	1,080	2,621	4,088	5,568	5,792	6,022	6,263	6,514	6,722	7,044	7,326	7,618	7,920	8,242	8,573	91,393
Bin cost	0	120	280	420	550	550	550	550	550	550	550	550	550	550	550	550	7,420
Total Direct Costs-Growing	**1,700**	**5,375**	**7,197**	**8,929**	**10,668**	**11,025**	**11,393**	**11,776**	**12,174**	**12,533**	**13,011**	**13,455**	**13,914**	**14,389**	**14,889**	**15,405**	**177,832**
GROSS MARGIN-HARVEST	-1,700	5,851	18,997	30,362	40,785	40,428	40,060	39,677	39,279	38,920	38,441	37,997	37,538	37,064	36,563	36,047	**516,309**
(before Establishment Costs)																	
DIRECT COSTS - Storage, Grading. Packing & Marketing																	
Storage	0	1,080	2,520	3,780	4,950	4,950	4,950	4,950	4,950	4,950	4,950	4,950	4,950	4,950	4,950	4,950	66,780
Grading/Packing/Handling	0	1,920	4,525	6,854	9,064	9,152	9,240	9,328	9,416	9,504	9,592	9,680	9,768	9,856	9,944	10,032	127,875
Packaging	0	969	2,284	3,459	4,574	4,619	4,663	4,708	4,752	4,797	4,841	4,885	4,930	4,974	5,019	5,063	64,537
Haulage	0	855	2,015	3,052	4,036	4,076	4,115	4,154	4,193	4,232	4,271	4,311	4,350	4,389	4,428	4,467	56,944
Marketing/Commission/Levies	0	674	1,572	2,357	3,087	3,087	3,087	3,087	3,087	3,087	3,087	3,087	3,087	3,087	3,087	3,087	41,648
Total Direct Costs-S,P & M	**0**	**5,498**	**12,915**	**19,504**	**25,712**	**25,884**	**26,055**	**26,227**	**26,398**	**26,570**	**26,742**	**26,913**	**27,085**	**27,256**	**27,428**	**27,600**	**357,785**
GROSS MARGIN - SOLD	-1,700	353	6,082	10,858	15,073	14,544	14,005	13,450	12,881	12,350	11,700	11,084	10,453	9,807	9,135	8,448	**158,524**
OVERHEAD COSTS																	
Labour	1,750	1,820	1,893	1,969	2,047	2,129	2,214	2,303	2,395	2,491	2,590	2,694	2,802	2,914	3,030	3,152	38,193
Power & Machinery	2,250	2,318	2,387	2,459	2,532	2,608	2,687	2,767	2,850	2,936	3,024	3,115	3,208	3,304	3,403	3,505	45,353
Administration	600	612	624	637	649	662	676	689	703	717	731	746	761	776	792	808	11,184
Property	350	357	364	371	379	386	394	402	410	418	427	435	444	453	462	471	6,524
Rent (Notional / Actual)	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650	10,400
Total Overhead Costs	**5,600**	**5,757**	**5,918**	**6,085**	**6,258**	**6,436**	**6,621**	**6,811**	**7,008**	**7,212**	**7,422**	**7,640**	**7,865**	**8,097**	**8,337**	**8,586**	**111,653**
Establishment Costs £														**End of Life Costs £**			
29,035																**1,250**	**1,250**
£ NET(Annual)	-7,300	-5,403	164	4,773	8,815	8,108	7,384	6,639	5,872	5,138	4,277	3,444	2,589	1,710	798	-1,388	
£ NET(cumulative)	-36,335	-41,738	-41,574	-36,801	-27,986	-19,878	-12,495	-5,856	16	5,154	9,431	12,876	15,465	17,175	17,973	16,585	**16,585**

© ANDERSONS MIDLANDS

ORCHARD LIFETIME FINANCIAL PLANNER
PENCE PER KILOGRAMME

Grower: Pump & Bloors Farm **Crop:** Dessert Apple
Main Variety: Gala **Area (Ha.)** 1.00
Prepared: *08/12/2020*

Orchard Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Average
Calendar Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	
OUTPUT																	
Yield - Tonnes per Hectare	0.0	12.0	28.0	42.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	**46.4**
Price - Pence per Kg.	0.0	93.6	93.6	93.6	93.6	93.6	93.6	93.6	93.6	93.6	93.6	93.6	93.6	93.6	93.6	93.6	
Total Output (P/Kg.)	**0.0**	**93.6**	**93.6**	**93.6**	**93.6**	**93.6**	**93.6**	**93.6**	**93.6**	**93.6**	**93.6**	**93.6**	**93.6**	**93.6**	**93.6**	**93.6**	**93.6**
DIRECT COSTS - Growing																	
Orchard Depreciation	0.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
Fertiliser / Spray	0.0	16.7	7.3	5.0	3.9	3.9	4.0	4.1	4.2	4.3	4.3	4.4	4.5	4.6	4.7	4.8	4.9
Crop Sundries	0.0	2.5	1.1	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Labour:																	
Pruning/Tree Management	0.0	6.3	2.8	1.9	1.5	1.6	1.7	1.7	1.8	1.9	1.9	2.0	2.1	2.2	2.3	2.4	2.0
Spraying/Mowing	0.0	1.9	0.8	0.6	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.6
Thinning	0.0	7.5	3.3	2.3	1.8	1.9	2.0	2.1	2.2	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.4
Picking/Supervision	0.0	9.0	9.4	9.7	10.1	10.5	10.9	11.4	11.8	12.2	12.8	13.3	13.9	14.4	15.0	15.6	12.3
Bin cost	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Total Direct Costs-Growing	**0.0**	**48.9**	**29.8**	**25.3**	**23.5**	**24.1**	**24.8**	**25.5**	**26.2**	**26.9**	**27.7**	**28.5**	**29.4**	**30.2**	**31.2**	**32.1**	28.0
GROSS MARGIN-HARVEST	0.0	44.7	63.8	68.2	70.1	69.4	68.8	68.1	67.3	66.7	65.8	65.0	64.2	63.3	62.4	61.5	**65.5**
DIRECT COSTS - Storage, Grading. Packing & Marketing																	
Storage	0.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Grading/Packing/Handling	0.0	16.0	16.2	16.3	16.5	16.6	16.8	17.0	17.1	17.3	17.4	17.6	17.8	17.9	18.1	18.2	17.2
Packaging	0.0	8.1	8.2	8.2	8.3	8.4	8.5	8.6	8.6	8.7	8.8	8.9	9.0	9.0	9.1	9.2	8.7
Haulage	0.0	7.1	7.2	7.3	7.3	7.4	7.5	7.6	7.6	7.7	7.8	7.8	7.9	8.0	8.1	8.1	7.7
Marketing/Commission/Levies	0.0	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
Total Direct Costs-S,P & M	**0.0**	**45.8**	**46.1**	**46.4**	**46.7**	**47.1**	**47.4**	**47.7**	**48.0**	**48.3**	**48.6**	**48.9**	**49.2**	**49.6**	**49.9**	**50.2**	**48.2**
GROSS MARGIN - SOLD	0.0	-1.1	17.6	21.8	23.3	22.4	21.4	20.4	19.3	18.4	17.2	16.1	14.9	13.7	12.5	11.3	**21.4**
OVERHEAD COSTS																	
Labour	0.0	15.2	6.8	4.7	3.7	3.9	4.0	4.2	4.4	4.5	4.7	4.9	5.1	5.3	5.5	5.7	5.1
Power & Machinery	0.0	19.3	8.5	5.9	4.6	4.7	4.9	5.0	5.2	5.3	5.5	5.7	5.8	6.0	6.2	6.4	6.1
Administration	0.0	5.1	2.2	1.5	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.5	1.5
Property	0.0	3.0	1.3	0.9	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9
Rent (Notional / Actual)	0.0	5.4	2.3	1.5	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.4
Total Overhead Costs	**0.0**	**48.0**	**21.1**	**14.5**	**11.4**	**11.7**	**12.0**	**12.4**	**12.7**	**13.1**	**13.5**	**13.9**	**14.3**	**14.7**	**15.2**	**15.6**	**15.0**
TOTAL COSTS	0.0	142.7	97.0	86.3	81.6	82.9	84.2	85.6	87.0	88.3	89.9	91.4	92.9	94.5	96.2	97.9	**91.3**
PROFIT - Pence per Kilo	0.0	-49.1	-3.5	7.3	11.9	10.7	9.3	8.0	6.6	5.3	3.7	2.2	0.6	-1.0	-2.6	-4.3	**2.2**
PROFIT - % Turnover	0.0	-52.5	-3.7	7.8	12.8	11.4	10.0	8.5	7.1	5.6	4.0	2.3	0.7	-1.0	-2.8	-4.6	**2.4**

© ANDERSONS MIDLANDS

APPENDIX VI

Gala Lifetime Crop Model with 10.4% Hail
2024 Planting

ANDERSONS *Midlands*

ORCHARD LIFETIME FINANCIAL PLANNER

JUNE 2020 VERSION

GROWER & CROP DETAILS

Grower Name	Pump & Bloors Farm	
Grower address	Lower Rainham Gillingham Kent ME8 7TJ	
Crop	Dessert Apple	
Orchard Name	Pump/Bloors Gala 2024	
Orchard Area	1.00	Hectares
Main Variety	Gala - 10.4% Hail Damage	
Main Variety Area	1.00	Hectares
Pollinating Variety	Malus	
Pollinating Variety Area	N/A	Hectares
Tree density	2,857	Trees per hectare
Year of Planting	2024	
Year 1	2024	
Orchard Life	**16**	Years
Date of Preparation	08/12/2020	

© ANDERSONS MIDLANDS

Prepared:
08/12/2020

ANDERSONS *Midlands*

Dessert Apple
Gala - 10.4% Hail Damage

GROWER: **Pump & Bloors Farm**

ORCHARD LIFETIME FINANCIAL PLANNER

ESTABLISHMENT, GRADE-OUT AND OPERATING COSTS

ORCHARD ESTABLISHMENT COSTS

	£ per Hectare	NOTES
Ground preparation	500	
Irrigation	5,000	Trickle installation
Trees	15,035	2,857 Gala trees @ £5 per tree + pollinators (£750)
Stakes, Wirework & Structures	5,500	
Planting/Establishment costs	2,500	
Ties & Training materials	500	
Total	**29,035**	No PO contribution

Year 1:

	£ per Hectare	
Fertiliser/spray costs	1,500	
Crop Sundries		
Pruning/Tree Management	100	
Spraying/Mowing		
Thinning	100	
	£ per Tonne	
Picking		If appropriate

MAIN VARIETY GRADE-OUT AND PRICE

Class 1	%	£ per Tonne
55-60	12.4	850
60-68	29.4	1,075
68-73	27.4	1,050
73+	15.4	800
Class 2		
Process	15.4	100
Waste		
Total	100	
Average Price		**847.75**

Weighted average

DIRECT COSTS - GROWING

	Inflation p.a.	£ per Hectare
Fertiliser/Spray costs in Year 2	2	2,000
Crop Sundries *	2	300
Labour:		
Pruning / Tree Management	4	750
Spraying / Mowing	4	225
Thinning	4	900
		£ per Tonne
Picking/Supervision costs	4	90
Bin costs (no inflation)	0	10

Inc £10/T transport to store/bin return

Bins w/o over 12 years

* including replacement trees, wires, ties, guards, bees, picking aids, irrigation, etc.

DIRECT COSTS - STORAGE, GRADING, PACKING & MARKETING

		£ per Tonne
Storage (no inflation)	0	90
Grading / Packing / Handling	1	160
Packaging costs	1	85
Haulage costs	1	75
Marketing / Commission / Levies (%)		6.0

OVERHEAD COSTS

		£ per Hectare	
Labour	4	1,750	Inc. Management and Administration
Power & Machinery	3	2,250	
Administration	2	600	
Property	2	350	
Rent (or rent equivalent)		650	Actual or notional

© ANDERSONS MIDLANDS

Prepared:
08/12/2020

ANDERSONS *Midlands*

ORCHARD LIFETIME FINANCIAL PLANNER

RESULTS SUMMARY

Grower: Pump & Bloors Farm

Crop: Dessert Apple

Variety: Gala - 10.4% Hail Damage

1. OUTPUT

Lifetime yield	742	tonnes per hectare
Average annual yield	46	tonnes per hectare
Average annual yield	16	kilos per tree
Class 1 %	85	%
Lifetime yield - Class 1	628	tonnes per hectare
Average sale price	£ 848	per tonne
Average sale price	84.8	pence per kilo

2. COSTS OF PRODUCTION - LIFETIME AVERAGE

	PENCE PER KILO	% TOTAL COSTS
Growing	28.0	31.5
Storage, Packing & Marketing	45.9	51.6
Overheads	15.0	16.9
Total Costs of Production	89.0	

3. PROFIT

			% TURNOVER
Lifetime profit	-4.2	pence per kilo	-4.98
Lifetime profit	£ -31,320	per hectare	

4. LIFETIME CASHFLOW

YEARS 0-4	YEARS 5-9	YEARS 10+
-42,182	18,939	-8,077

5. ALL LABOUR COSTS

	PENCE PER KILO	% TURNOVER
Growing/Grading & Packing/Overheads	39.8	46.93

6. INVESTMENT PERFORMANCE

Payback	NO PAYBACK	
Internal Rate of Return	NO VALUE	before interest / taxation / risk

© ANDERSONS MIDLANDS

ORCHARD LIFETIME FINANCIAL PLANNER
£ PER HECTARE

Grower: Pump & Bloors Farm
Main Variety: Gala - 10.4% Hail Damage
Crop: Dessert Apple
Area (Ha.) 1.00
Prepared: *08/12/2020*

Orchard Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
Calendar Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	
OUTPUT																	
Yield - Tonnes per Hectare	0.0	12.0	28.0	42.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	**742**
Price - £ per Tonne	848	848	848	848	848	848	848	848	848	848	848	848	848	848	848	848	**848**
Total Output	**0**	**10,173**	**23,737**	**35,606**	**46,626**	**46,626**	**46,626**	**46,626**	**46,626**	**46,626**	**46,626**	**46,626**	**46,626**	**46,626**	**46,626**	**46,626**	**629,031**
DIRECT COSTS - Growing																	
Fertiliser / Spray	1,500	2,000	2,040	2,081	2,122	2,165	2,208	2,252	2,297	2,343	2,390	2,438	2,487	2,536	2,587	2,639	36,087
Crop Sundries	0	300	306	312	318	325	331	338	345	351	359	366	373	380	388	396	5,188
Labour:																	
Pruning/Tree Management	100	750	780	811	844	877	912	949	987	1,026	1,067	1,110	1,155	1,201	1,249	1,299	15,118
Spraying/Mowing	0	225	234	243	253	263	274	285	296	308	320	333	346	360	375	390	4,505
Thinning	100	900	936	973	1,012	1,053	1,095	1,139	1,184	1,232	1,281	1,332	1,386	1,441	1,499	1,559	18,121
Picking/Supervision	0	1,080	2,621	4,088	5,568	5,792	6,022	6,263	6,514	6,722	7,044	7,326	7,618	7,920	8,242	8,573	91,393
Bin cost	0	120	280	420	550	550	550	550	550	550	550	550	550	550	550	550	7,420
Total Direct Costs-Growing	**1,700**	**5,375**	**7,197**	**8,929**	**10,668**	**11,025**	**11,393**	**11,776**	**12,174**	**12,533**	**13,011**	**13,455**	**13,914**	**14,389**	**14,889**	**15,405**	**177,832**
GROSS MARGIN-HARVEST	-1,700	4,798	16,540	26,676	35,959	35,602	35,233	34,850	34,453	34,093	33,615	33,171	32,712	32,237	31,737	31,221	**451,198**
(before Establishment Costs)																	
DIRECT COSTS - Storage, Grading. Packing & Marketing																	
Storage	0	1,080	2,520	3,780	4,950	4,950	4,950	4,950	4,950	4,950	4,950	4,950	4,950	4,950	4,950	4,950	66,780
Grading/Packing/Handling	0	1,920	4,525	6,854	9,064	9,152	9,240	9,328	9,416	9,504	9,592	9,680	9,768	9,856	9,944	10,032	127,875
Packaging	0	863	2,034	3,081	4,074	4,113	4,153	4,192	4,232	4,271	4,311	4,351	4,390	4,430	4,469	4,509	57,472
Haulage	0	761	1,794	2,718	3,594	3,629	3,664	3,699	3,734	3,769	3,804	3,839	3,874	3,909	3,943	3,978	50,711
Marketing/Commission/Levies	0	610	1,424	2,136	2,798	2,798	2,798	2,798	2,798	2,798	2,798	2,798	2,798	2,798	2,798	2,798	37,742
Total Direct Costs-S,P & M	**0**	**5,235**	**12,297**	**18,570**	**24,480**	**24,642**	**24,805**	**24,967**	**25,130**	**25,292**	**25,454**	**25,617**	**25,779**	**25,942**	**26,104**	**26,267**	**340,579**
GROSS MARGIN - SOLD	-1,700	-437	4,243	8,107	11,479	10,960	10,429	9,883	9,323	8,801	8,161	7,554	6,933	6,296	5,633	4,955	**110,619**
OVERHEAD COSTS																	
Labour	1,750	1,820	1,893	1,969	2,047	2,129	2,214	2,303	2,395	2,491	2,590	2,694	2,802	2,914	3,030	3,152	38,193
Power & Machinery	2,250	2,318	2,387	2,459	2,532	2,608	2,687	2,767	2,850	2,936	3,024	3,115	3,208	3,304	3,403	3,505	45,353
Administration	600	612	624	637	649	662	676	689	703	717	731	746	761	776	792	808	11,184
Property	350	357	364	371	379	386	394	402	410	418	427	435	444	453	462	471	6,524
Rent (Notional / Actual)	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650	10,400
Total Overhead Costs	**5,600**	**5,757**	**5,918**	**6,085**	**6,258**	**6,436**	**6,621**	**6,811**	**7,008**	**7,212**	**7,422**	**7,640**	**7,865**	**8,097**	**8,337**	**8,586**	**111,653**
Establishment Costs £														**End of Life Costs £**			
29,035																**1,250**	**1,250**
£ NET(Annual)	-7,300	-6,193	-1,675	2,021	5,221	4,523	3,808	3,072	2,315	1,589	738	-86	-932	-1,801	-2,704	-4,881	
£ NET(cumulative)	-36,335	-42,528	-44,203	-42,182	-36,961	-32,438	-28,630	-25,558	-23,243	-21,654	-20,915	-21,001	-21,933	-23,734	-26,438	-31,320	**-31,320**

© ANDERSONS MIDLANDS

ORCHARD LIFETIME FINANCIAL PLANNER
PENCE PER KILOGRAMME

Grower: Pump & Bloors Farm **Crop:** Dessert Apple
Main Variety: Gala - 10.4% Hail Damage **Area (Ha.)** 1.00
Prepared: *08/12/2020*

Orchard Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Average
Calendar Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	
OUTPUT																	
Yield - Tonnes per Hectare	0.0	12.0	28.0	42.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	**46.4**
Price - Pence per Kg.	0.0	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	
Total Output (P/Kg.)	**0.0**	**84.8**	**84.8**	**84.8**	**84.8**	**84.8**	**84.8**	**84.8**	**84.8**	**84.8**	**84.8**	**84.8**	**84.8**	**84.8**	**84.8**	**84.8**	**84.8**
DIRECT COSTS - Growing																	
Orchard Depreciation	0.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
Fertiliser / Spray	0.0	16.7	7.3	5.0	3.9	3.9	4.0	4.1	4.2	4.3	4.3	4.4	4.5	4.6	4.7	4.8	4.9
Crop Sundries	0.0	2.5	1.1	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Labour:																	
Pruning/Tree Management	0.0	6.3	2.8	1.9	1.5	1.6	1.7	1.7	1.8	1.9	1.9	2.0	2.1	2.2	2.3	2.4	2.0
Spraying/Mowing	0.0	1.9	0.8	0.6	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.6
Thinning	0.0	7.5	3.3	2.3	1.8	1.9	2.0	2.1	2.2	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.4
Picking/Supervision	0.0	9.0	9.4	9.7	10.1	10.5	10.9	11.4	11.8	12.2	12.8	13.3	13.9	14.4	15.0	15.6	12.3
Bin cost	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Total Direct Costs-Growing	**0.0**	**48.9**	**29.8**	**25.3**	**23.5**	**24.1**	**24.8**	**25.5**	**26.2**	**26.9**	**27.7**	**28.5**	**29.4**	**30.2**	**31.2**	**32.1**	28.0
GROSS MARGIN-HARVEST	0.0	35.9	55.0	59.4	61.3	60.6	60.0	59.3	58.6	57.9	57.0	56.2	55.4	54.5	53.6	52.7	**56.7**
DIRECT COSTS - Storage, Grading. Packing & Marketing																	
Storage	0.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Grading/Packing/Handling	0.0	16.0	16.2	16.3	16.5	16.6	16.8	17.0	17.1	17.3	17.4	17.6	17.8	17.9	18.1	18.2	17.2
Packaging	0.0	7.2	7.3	7.3	7.4	7.5	7.6	7.6	7.7	7.8	7.8	7.9	8.0	8.1	8.1	8.2	7.7
Haulage	0.0	6.3	6.4	6.5	6.5	6.6	6.7	6.7	6.8	6.9	6.9	7.0	7.0	7.1	7.2	7.2	6.8
Marketing/Commission/Levies	0.0	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1
Total Direct Costs-S,P & M	**0.0**	**43.6**	**43.9**	**44.2**	**44.5**	**44.8**	**45.1**	**45.4**	**45.7**	**46.0**	**46.3**	**46.6**	**46.9**	**47.2**	**47.5**	**47.8**	**45.9**
GROSS MARGIN - SOLD	0.0	-7.7	11.1	15.2	16.8	15.8	14.9	13.9	12.9	11.9	10.8	9.7	8.5	7.4	6.2	4.9	**14.9**
OVERHEAD COSTS																	
Labour	0.0	15.2	6.8	4.7	3.7	3.9	4.0	4.2	4.4	4.5	4.7	4.9	5.1	5.3	5.5	5.7	5.1
Power & Machinery	0.0	19.3	8.5	5.9	4.6	4.7	4.9	5.0	5.2	5.3	5.5	5.7	5.8	6.0	6.2	6.4	6.1
Administration	0.0	5.1	2.2	1.5	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.5	1.5
Property	0.0	3.0	1.3	0.9	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9
Rent (Notional / Actual)	0.0	5.4	2.3	1.5	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.4
Total Overhead Costs	**0.0**	**48.0**	**21.1**	**14.5**	**11.4**	**11.7**	**12.0**	**12.4**	**12.7**	**13.1**	**13.5**	**13.9**	**14.3**	**14.7**	**15.2**	**15.6**	**15.0**
TOTAL COSTS	0.0	140.5	94.8	84.0	79.4	80.6	81.9	83.3	84.6	86.0	87.5	89.0	90.6	92.1	93.8	95.5	**89.0**
PROFIT - Pence per Kilo	0.0	-55.7	-10.1	0.7	5.4	4.1	2.8	1.5	0.1	-1.2	-2.7	-4.2	-5.8	-7.4	-9.0	-10.7	**-4.2**
PROFIT - % Turnover	0.0	-65.7	-11.9	0.9	6.4	4.9	3.4	1.8	0.2	-1.4	-3.2	-5.0	-6.8	-8.7	-10.6	-12.6	**-5.0**

© ANDERSONS MIDLANDS