
Soil and Water Management Control Plan

Hillwood Berries, Hillwood Road, Hillwood

September 2020



Pinion Advisory
112 Wright Street | East Devonport | Tasmania | 7310
Phone: 03 6427 5300 | Fax: 03 6427 0876 | Email: admin@pinionadvisory.com
Web: www.pinionadvisory.com.au

Report author: Jason Lynch

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Contents

| | | |
|----|---|----|
| 1 | Introduction | 6 |
| 2 | Qualifications and Experience..... | 6 |
| 3 | Location..... | 6 |
| 4 | Waterways and water resources | 7 |
| 5 | Site details..... | 8 |
| 6 | Current site conditions and agricultural activities | 8 |
| 7 | Land capability | 10 |
| 8 | Soils | 12 |
| 9 | Soil management | 13 |
| 10 | Weeds and pests..... | 14 |
| 11 | Erosion control..... | 15 |
| 12 | Runoff..... | 15 |
| 13 | Property development timelines | 17 |
| 14 | References | 18 |
| 15 | Declaration..... | 19 |
| 16 | Appendices..... | 20 |

Figure Index

| | | |
|----------|---|----|
| Figure 1 | Location of the property (outlined in blue) subject to the development with the subject development block on the northern area (highlighted in red)..... | 6 |
| Figure 2 | On stream dam in the Macquarie Rivulet..... | 7 |
| Figure 3 | Current condition of the land present on the site of the proposed development..... | 9 |
| Figure 4 | Land capability present on the subject development area | 11 |
| Figure 5 | Brown sandy clay loam over yellow/brown clay subsoil, as per the Legana soil association | 12 |
| Figure 6 | Tunnel structure framework and footings..... | 13 |
| Figure 7 | Existing drains (green lines) and proposed new drains (yellow lines) on the development area (outlined in red) and adjacent property (as 105 Hillwood Road) and waterways present (blue line) | 16 |
| Figure 8 | Current drain located at the southern end of the development area which directs runoff from Hillwood Road into the Macquarie Rivulet | 16 |
| Figure 9 | Forest Practices Plan of development (page 8, FPP No SRL0049-01) | 20 |

Table Index

| | | |
|---------|--|----|
| Table 1 | Detailed site land capability information..... | 21 |
|---------|--|----|

1 Introduction

This report, prepared by Jason Lynch, Senior Consultant, Pinion Advisory, has been prepared to provide a soil and water management control plan.

This report reviews the current agricultural usage of the present land title and the controls required for the development of polytunnels. This includes soils, aspect, topography, water resource, and vegetation management during construction and future management.

2 Qualifications and Experience

Jason Lynch is an agricultural science graduate from the University of Tasmania with over 20 years of experience in primary industry production, research and consulting. Mr Lynch has worked with a variety of farming enterprises and agricultural developments throughout Tasmania.

3 Location

The property proposed for polytunnel development, is situated on the north western parcel of land on Lot 1 East Tamar Highway, Hillwood.

The property is PID 3086996, and the north western parcel of consists of approximately 10 hectares and has been recently cleared and converted from bushland in preparation for a polyhouse based strawberry production enterprise. The land clearing and preparation was conducted in accordance with an issued Forest Practice Plan (FPP No SRL00490-1) and the completed works were inspected during winter 2020.

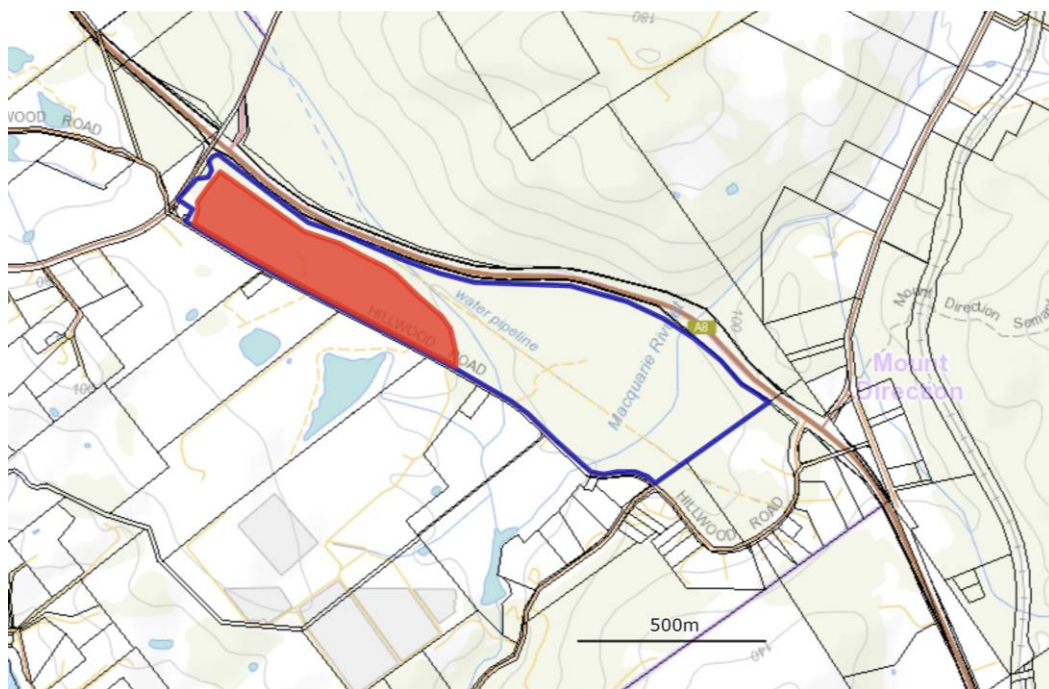


Figure 1 Location of the property (outlined in blue) subject to the development with the subject development block on the northern area (highlighted in red)

The property is bordered by Hillwood Road to the west, East Tamar Highway to the east and Hillwood Jetty Road to the north.

Adjacent and nearby land use activity includes:

- Berry production including polytunnels and in-ground production systems to the south and south west
- East Tamar Highway adjacent to the east
- Orcharding and viticulture to the north and central western
- Mixed residential and smaller scale agricultural use (principally for pastoral use) on small acreage blocks on land zoned for rural resource
- Further to the south and west are a number of residential dwelling on rural living zoned land

4 Waterways and water resources

The Macquarie Rivulet flows through the far southern end of the property in an east-west direction and is bisected by an unnamed tributary of this waterway which flows through the centre of the block.

The land subject to the development does not include any of the riparian land associated with these waterways with a minimum 40m setback from these sensitive areas as described by the approved Forest Practice Plan which regulated the clearing of the ground.

The Macquarie Rivulet and its unnamed tributary converge on the 105 Hillwood property (as owned by the proponent) into a licenced on-stream dam, Permit 3359, which is licenced for irrigation extraction.



Figure 2 On stream dam in the Macquarie Rivulet

5 Site details

No riparian areas are subject to this management plan.

The riparian land associated with the waterways present on the property in question have not been cleared and have been provided with a minimum 40m setback buffer from the site of the development.

The 40m riparian land setback buffer is covered by retained native vegetation.

The gradient associated with the site of the development varies from 3-8% with a generally south easterly aspect, and when fully developed will be covered by polyhouses with the land under and between these structures covered by grass vegetation.

Once the site is developed it is expected that there will be a low erosion risk due to the inability to maintain ground cover, minimal surface run-off and minor slope of the land.

6 Current site conditions and agricultural activities

The area of the property subject to the development was covered by native vegetation and was not been used for primary production land use activities.

The area of the property subject to the development was cleared subject to the permitted conditions and undertaken in accordance with an issued Forest Practice Plan (FPP No SRL00490-1) and the completed works were inspected during winter 2020.

At the time of the site visit by the report author (July 2020) the land was in a semi-prepared condition with land cleared of forest and the time residue piled into log heaps ready for burning.



Figure 3 Current condition of the land present on the site of the proposed development

7 Land capability

The Land capability of the property was assessed according to the Tasmanian Land Capability Classification System (Grose, 1999). Land is ranked according to its ability to sustain a range of agricultural activities without degradation of the land resource. Class 1 land is the best land and Class 7 land is the poorest. A wide range of limitations are considered and the most significant limitation determines its final classification, or ranking. Limitations in relation to soils include stoniness, topsoil depth, drainage and erosion hazard. Limitations to topography include slope and associated erosion hazard. Limitations relating to climate include low rainfall and frost.

A full explanation of the Land Capability System is available in the *DPIPWE Tasmanian Land Capability Handbook*.

The classification system assumes an average standard of land management and that production will be sustainable if the land is managed according to the guidelines of its Class. The system does not take into account the economics of production, distance from markets, social or political factors, all of which can change over time.

The DPIPWE mapping of the region at a 1:100,00 scale indicates that the entire property is Class 4.

A more detailed, site specific assessment of land classification of the property proposed for development was undertaken by the author and confirmed that it is Class 4s.

Class 4 land is described as follows:

Land primarily suitable for grazing but which may be used for occasional cropping. Severe limitations restrict the length of cropping phase and/or severely restrict the range of crops that could be grown. Major conservation treatments and/or careful management is required to minimize degradation.

Cropping rotations should be restricted to one to two years out of ten in a rotation with pasture or equivalent, during 'normal' years to avoid damage to the soil resource. In some areas longer cropping phases may be possible but the versatility of the land is very limited.

The key land capability limitation associated with the property titles are:

- Soils (s) associated with the shallow topsoil depth, imperfect drainage and texture contrast between the top and sub soil

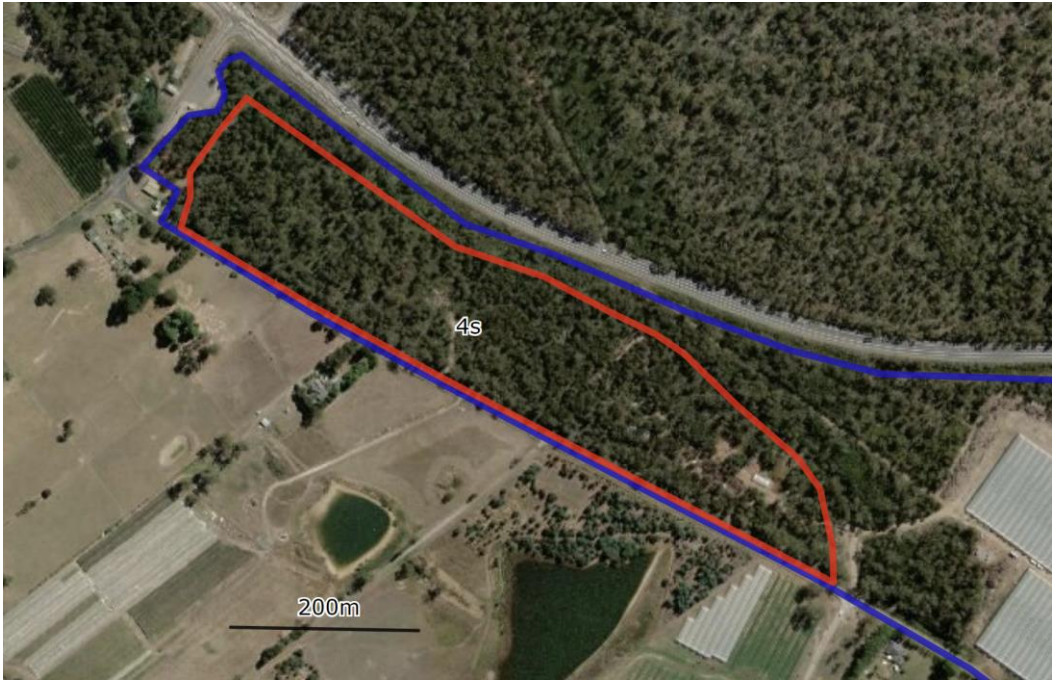


Figure 4 Land capability present on the subject development area

8 Soils

The soil present on the area of the subject to the development is a grey sandy clay loam, Podzol, imperfectly drained over alluvium deposits and is consistent with the Legana soil association.

The soil profile transitions from the grey sandy clay loam topsoil to a brown/yellow clay in the subsoil.

These soils in conjunction with the slope of land are not prone to mass movement, however surface water movement on exposed and bare soils could result in rill and sheet erosion.

It is important to establish and maintain ground cover on these soils.

None of the land on the property subject to the development has been identified as being associated with having any landslip risk (LIST landslip planning map- hazard bands).



Figure 5 Brown sandy clay loam over yellow/brown clay subsoil, as per the Legana soil association

These agricultural qualities of these soils are constrained by the imperfect soil drainage characteristics, relatively shallow topsoil depth and would be suited for low intensity long rotation cropping activities and pastoral use.

Polyhouse based berry fruit production does involve soil as a growing media and therefore is not constrained by the soil characteristics present.

9 Soil management

Hydroponic berry production does not use the soil as a supporting medium. The only requirement for the production system is a gently sloping to flat surface that either table structures for strawberries can be constructed on or in the case of raspberries and blueberries, place pots with media on.

It is important to maintain a level to gently sloping site for access by machinery and personnel and this is achieved by establishing and maintaining ground cover under the tunnel structure using pasture grasses so that the root mass binds and stabilises the soil preventing any mass movement. The soil preparation prior to tunnel construction is the same as a normal pasture cultivation process using conventional agricultural machinery and practices.

No further movement of soil is required for the construction of the tunnels. The footings for the tunnel structures requires minimal excavation or soil disturbance, this is demonstrated in Figure 6.



Figure 6 Tunnel structure framework and footings

Once the tunnels are constructed, a conventional agricultural seed drill is used to sow grass seed for ground cover establishment. Conventional agricultural management practices are used to maintain a weed free grass cover within the tunnel footprint, and the grass is regularly mowed throughout the year.

10 Weeds and pests

It is anticipated that once the site is developed for the berry fruit production it reasonable to considered that weeds would appear in the grassed areas. The weeds present would be typical of the region and predominantly introduced European annual weeds including thistles, chickweed, brassicas and winter grass. These are all common agricultural weeds that can be controlled using selective herbicides and mechanical control (eg mowing). Spot spraying based on the application of broadleaf weed selective herbicides would be utilised to control these annual introduced weeds.

The application of all herbicides would be in accordance with applicable agricultural chemical label directions, and associated AVPMA guidelines and the Tasmanian Code of Practice for Ground Spraying.

It is reasonable to anticipate that herbicide application would be required during the grass establishment phase and subsequently as required to prevent the establishment of weeds on the block.

The frequent mowing on the grassed areas would provide ongoing weed suppression.

The vegetation buffers adjacent to the north, east and south of the development site would be inspected on an annual basis to monitor for the presence of invasive environmental weeds, such as gorse, which could result in a gradual decline of the native vegetation. If invasive environmental weeds are identified actions should be taken to manage the situation including:

- Clearly mark and identify the environmental weed infestation
- Undertake an appropriate control program which may include various activities depending on the location of the weeds and proximity to sensitive zones (ie riparian land) such as:
 - Manual removal of the weeds
 - Careful spot spraying application of suitable herbicide(s) of the weeds present
- It would be appropriate to seek timely agronomic advice prior to the application of any herbicides
- Every effort should be made to avoid the non-target application of herbicides

No agricultural pest species were observed during the site inspection.

11 Erosion control

No clearing of the riparian vegetation associated the waterways present on the block is associated with the development and a 40m setback buffer is present to prevent erosion of these sensitive areas.

Once the tunnel structures are erected, the area under and adjacent to the tunnels will be sown down to grass to stabilise the soil and ensure that the working surfaces of the polytunnel remain accessible for agricultural activities, the buffer zone between the polytunnel and the water courses will be managed to ensure that a mix of native ground cover and shrub species are established as a filter and to “diffuse” rainfall run off into the riparian setback buffer zone and associated waterways.

Full ground cover under the tunnels will be maintained as grass at all times. Species to be used are commercial pasture grasses that will be maintained weed free using registered commercial agricultural herbicide applications and mechanical control (eg mowing).

12 Runoff

The polytunnels are modular in design and shed rainfall at 8.5 metre spacing across the structure.

The impact of natural rainfall will not be significantly modified by the tunnel structure and the grass ground cover beneath the tunnels will adsorb much of the run off as it would if the area was as a pasture system. Any direct run off to the unnamed tributary waterway will be through the newly established 40m native vegetation riparian buffer zone which will act as a diffuser of run off water thereby reducing velocity of run off and also a natural sedimentation trap and filter.

New drains would be installed on the block including:

- A collection drain located on the eastern side of the polyhouse development
- A cut off drain located on the western side of the polyhouse development adjacent to Hillwood Road to collect any surface water run off from the road

These drains would collect run-off from the development block and direct it into the existing drainage network on the 105 Hillwood Road property.

Once the development site is sown down it is expected that negligible sediment would flow into these drains, however the drains should be inspected annually in March and in September to check for sediment build up and as required clean the drains out to ensure they are correctly flowing.

The production system for fruit that will be utilised is hydroponic and all water and nutrient solution applied to the plants is fully contained and will be collected at the lower end of the tunnels and piped to a central storage area. This will prevent any additional runoff or nutrients from entering Macquarie Rivulet. Irrigation water and associated nutrients collected will be either reused or applied to agricultural land.



Figure 7 Existing drains (green lines) and proposed new drains (yellow lines) on the development area (outlined in red) and adjacent property (as 105 Hillwood Road) and waterways present (blue line)



Figure 8 Current drain located at the southern end of the development area which directs runoff from Hillwood Road into the Macquarie Rivulet

13 Property development timelines

It is anticipated that the development site will undergo progressive development over the coming 9 months and would conclude by July 2021 and during the intervening period would include:

- Log heap and timber waste clearing up
- Land preparation to ready for the site for grass establishment
- Install new drains
- Erect the polyhouse structures

By July 2021 the polyhouse would be erect and berry fruit plants under production.

14 References

Forest Practice Plan. Certification Number 2016-0464.FPP No. SRL0049-01.

Grose C.J. (1999) Land Capability Handbook: Guidelines for the Classification of Agricultural Land in Tasmania. 2nd Edition, Department of Primary Industries Water and Environment, Tasmania.

Noble K. E. (1992) Land Capability Survey of Tasmania. Tamar Report. Department of Primary Industry, Tasmania.

Spanswick S.B. & Kidd D. (2001) Beaconsfield-Georgetown soil report, Reconnaissance Soil Map. Department of Primary Industries, Water and Environment, Tasmania.

<https://maps.thelist.tas.gov.au/>

15 Declaration

I declare that I have made all the enquiries which I consider desirable or appropriate, and no matters of significance which I regard as relevant have, to my knowledge, been withheld.

Jason Lynch

Jason Lynch B. App. Sci (Hort), CPag
Senior Consultant
Pinion Advisory
September 2020

16 Appendices

Attachment A: Forest Practices Plan of Development 2016

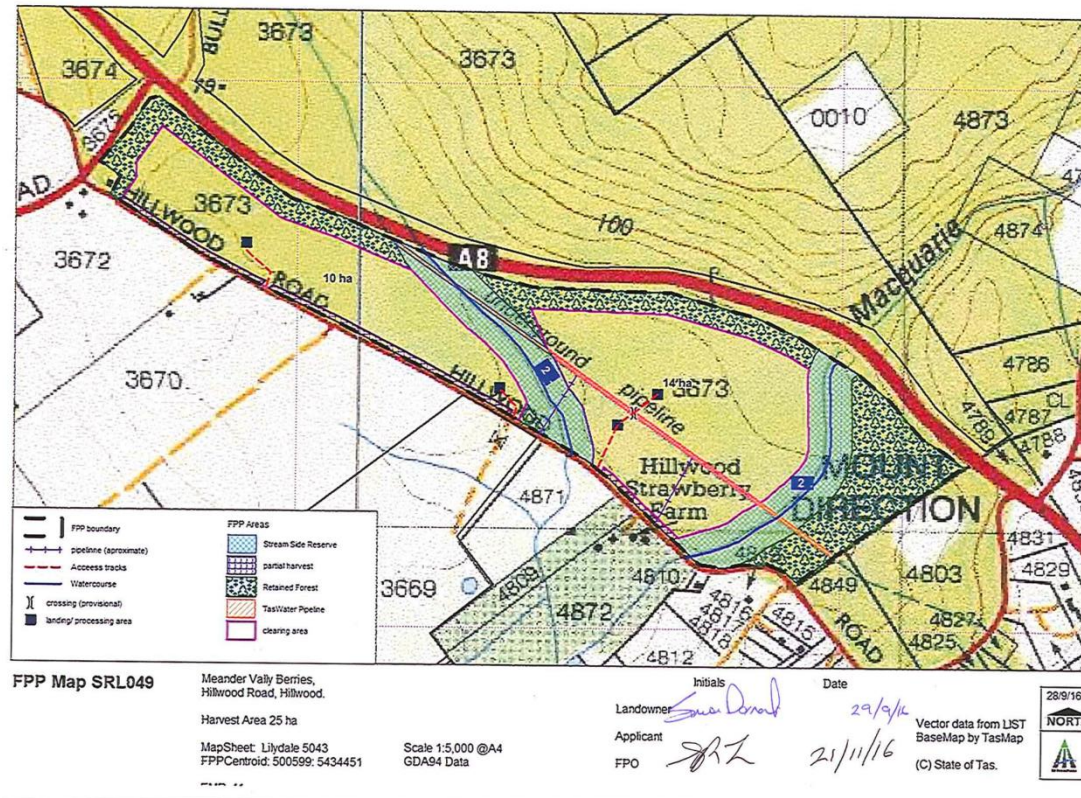


Figure 9 Forest Practices Plan of development (page 8, FPP No SRL0049-01)

Attachment B: Land capability

Table 1 Detailed site land capability information

| Land Capability Class (ha) | Land Characteristics | | | | | | | |
|----------------------------|---|---------|--|---|--|---|--|--|
| | Geology & Soils | Slope % | Topography & Elevation | Erosion Type & Severity | Climatic Limitations | Soil Qualities | Main Land Management Requirements | Agricultural Versatility |
| 4s (approx. 10 ha) | Sandy clay loam podzol soil derived from non-marine sequences of gravel, sand, silt, clay and regolith. Grey clay top soils over a heavy clay subsoil. | 3-8 | Gently sloping land. 60-70m ASL | Low risk. Associated with the risk of rill and sheet erosion on bare and exposed soils, the potential for degraded soil structural due to pugging from livestock movement on waterlogged soils and/or inappropriate and excessive ground cultivation activities. | Minor This land experiences cool winters and mild summer conditions. Receives on average 860 mm annual rainfall, has 10-20 annual frost events, has 1050 GDD (Oct to April) and 950 chill hours (0-7°C May to August). | These soils are imperfectly drained, have a moderate soil moisture holding capacity, are potentially prone to waterlogging and have small stone and rock fragments present in the soil profile Variable topsoil depth from 10-30cm deep. | Avoid situations that lead to the exposure of bare soil, therefore maintain sufficient ground cover. Avoid over cultivation of the land (frequency, depth and when soils are too moist). Where possible grow green manure crops and pasture and incorporate crop stubbles. | Suitable for cropping and could be cropped up to two times out of ten with a highly restricted range of crops, and the land is suitable for pastoral land use activity with minor/moderate limitations. Well suited to polyhouse berry fruit production due to prevailing mild climate and gently sloping topography. |

