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WASTE WATER DISPOSAL
REPORT FOR D.A. 17/1191

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REF: 2765WW

VERSION [1.0]

MARCH 6, 2018

Harrisenvironmental
CONSULTING

SOIL AND SITE ASSESSMENT FOR ONSITE WASTEWATER DISPOSAL

63-75 ALLAN ROAD, MULGOA, NSW

LGA: Penrith

Lot 6 DP 1201432

CLIENT: S Ayres & M Payne

HARRIS ENVIRONMENTAL CONSULTING
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VERSION CONTROL

Title	Soil And Site Assessment For Onsite Wastewater Disposal			
Site address	63-75 Allan Road, Mulgoa, NSW			
Description	Proposed residential dwelling			
Created By	Pichamon Sarakan B.Env Engineering (UOW)			
Date Created	6/03/2018			
Version Number	**Modified By**	**Modifications Made**	**Date Modified**	**Status**
[1.0]	P.S.	Issue for client review	6/03/2018	Complete
				-
				-
				-

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1. ASSESSMENT CRITERIA

This Site and Soil Assessment for On-site Wastewater was prepared by Harris Environmental Consulting at the request of owners, S Ayres & M Payne. It relates to the construction of a 5-bedroom dwelling (including study) on Lot 6 DP 1201432 at 63-75 Allan Road, Mulgoa, NSW.

Field work was undertaken by Harris Environmental Consulting (HEC) on the 2nd March 2018. This plan is based on the primary investigation of the soils, topography and hydrology of the site observed on the day of inspection. Soil samples and photos of the site were taken for further analysis. This assessment was undertaken for a proposal to install an Aerated Wastewater Treatment System (AWTS) for wastewater treatment, and a surface irrigation for treated wastewater disposal on site.

Harris Environmental Consulting was commissioned by the owner to undertake this Soil and Site Assessment for On Site Wastewater Management in accordance with:

- Penrith City Council's On-site Sewage Management and Greywater Reuse Policy;
- Environment and Health Protection Guidelines (1998) On-site Sewage Management for Single Households (Department of Local Government); and;
- Local Government Act 1993
- AS/NZ 1547:2012 On-site wastewater management (Standards Australia, 2012).
- AS/NZS 3500 Plumbing and Drainage 2015 (Standards Australia, 2012)

FIGURE 1 LOCATION OF PROPERTY

Source: SixMaps

2. SITE INFORMATION

Owner/postal address:	S Ayres & M Payne P: 0412 117 265, 0417 277 311 E: Sa1@ayres.minister.nsw.gov.au, marisepayne@gmail.com	
Size of property:	~9970 m^2	
Legal title:	Lot 6 DP 1201432	
Local Government:	Penrith Council	
Water supply:	Town (150L/person/day)	
Wastewater design load and daily wastewater (L/day)	No Bedrooms	Assumed 2 master (2 per room) + 3 standard bedrooms = 5 bedrooms
	2 master (2persons/room) = 4 3 bedrooms (1 person/room) = 3 = 7 persons x 150L/d	
	Total wastewater load	1050L/day
Proposed wastewater treatment:	AWTS	
Proposed wastewater disposal:	Spray irrigation	
Date site assessed:	March 2, 2018	
Date report amended:	March 6, 2018	
Report prepared by	Pichamon Sarakan B.Env Engineering (UOW)	
Site assessor:	Sean Harris	Msc Env Science (UOW), Grad dip Nat Res (UNE), BscAppSc, Agriculture (HAC)

3. SITE ASSESSMENT

Climate - rainfall	Penrith Rainfall Station (median annual 779mm)
Climate - evaporation	Badgerys Creek (median 1557mm)
Flood potential	Proposed wastewater treatment system is above 1 in 100 year flood level; minor limitation. Proposed wastewater disposal area above 1 in 20 year flood level; minor limitation.
Frost potential	The site is not known to be subject to severe frosts, minor limitation
Exposure	Northern aspect; minor limitation
Slope	4-6%, minor limitation for spray irrigation
Landform	Uniform slope, minor limitation
Run-on and seepage	Minor upslope stormwater runon; minor limitation
Erosion potential	Moderate erosion potential
Site drainage	Moderate to well drained soil profile; minor limitation
Evidence of fill	No evidence of fill; minor limitation
Domestic groundwater use	No groundwater bores within 100m
Surface rock	No surface rock; minor limitation
Area available for effluent disposal	Area available for effluent disposal within designated Effluent Management Area (EMA), minor limitation
Buffer distance from wastewater management system:	Permanent waters : 100m+ Intermittent waters : 40m+ Boundary of premises: 3-6m Swimming pools: 6m+ Buildings (shed): 15m

4. SOIL ASSESSMENT

Method:	Hand augur/crowbar/shovel			
Depth to bedrock (m):	>1000mm to restrictive layer; minor limitation			
Depth to high soil watertable:	No groundwater or subsoil mottling encountered at a depth of 1000mm; minor limitation			
Coarse (%):	No coarse fragments in subsoil, minor limitation			
pH (soil/water):	pH 6-6.5; minor limitation			
Electrical conductivity:	<4, indicating salinity is not a constraint; minor limitation			
Salinity hazard:	The Department of Infrastructure, Planning and Natural Resources map of salinity hazard throughout Western Sydney shows the proposed irrigation area as having a **moderate salinity hazard.**			
Domestic groundwater use:	The Department of Primary Industries Office of Water search of groundwater bores found there are **no known groundwater bores** within 100m of the proposed effluent management area			
Geological unit: Soil landscape: Greater Soil Group:	Wianamatta Group (sandstone, siltstone and shale) CSIRO Classification: Yellow duplex Soil Landscape Red Podzolic Soils - less fertile (granites and metasediment).			
Surface rock:	No surface rock in proposed effluent management area			
Bulk density:	Friable, moderately structured topsoil; minor limitation			
Phosphorus balance assumptions:	P sorption 600,000 mg/m^2. Available soil depth is 1m soil depth, of which 30% of profile is available for P sorption (potential rage of 30-75%)			
Soil profile:	Layer 1		DIR	DLR
	Texture Colour Depth Structure Coarse frag.	Clay loam Black 0-400mm Well structured No	NA	NA
	Layer 2		DIR	DLR
	Texture Colour Depth Structure Coarse frag.	Medium clay Dark red 400-1000mm Moderately structured No	NA	NA
	Layer 3		DIR	DLR
	Texture Colour Depth Structure Coarse frag.	NA	NA	NA

5. SUMMARY OF SOIL AND SITE CONSTRAINTS

It is proposed that a new 5-bedroom dwelling (including study) will be constructed on this approximately 9970m^2 property located in the Penrith Local Government Area.

There are no significant soil or site constraints that would prevent the installation of a domestic AWTS to treat wastewater and fixed spray irrigation for treated wastewater disposal.

The required irrigation area for a 5 bedroom on town water is 883m^2 in accordance with PCC DCP. The proposed irrigation area is located at the south (downslope) of the proposed dwelling, in a location that is compliant with all buffers and set back distances in accordance with Penrith City Councils DCP, which includes being more than 15m from dwellings, 6m downslope & 3m upslope of driveways and property boundaries.

The clay loam to medium clay soil profile has suitable permeability and nutrient absorption properties for this method of treatment and disposal. This assessment assumes the proposed irrigation area will be fully grassed and the lawns managed, with clippings removed after mowing.

Photo 1 On-site soil assessment

Photo 2 Looking south towards the proposed irrigation area

Photo 3 Terrain and landform of site

6. PROPOSED METHOD OF WASTEWATER TREATMENT

6.1 Wastewater Treatment System

An Aerated Wastewater Treatment System is proposed for wastewater treatment. The design wastewater load is **1050L/day**. The owner is required to provide Council with the AWTS manufacturer's specifications of the proposed treatment system. (Information on proposed AWTS can be obtained from the manufacturer or NSW Heath Register of Accredited Sewage Management Systems at http://www.health.nsw.gov.au/publichealth/environment/water/waste_water.asp).

The owner will need to lodge an application to install/operate a Sewage Management System under the Local government act 1993, Section 68. Council will require the owner to have selected an AWTS manufacturer and provide Council with the necessary plans and specifications including NSW Health Accreditation, tank dimensions and capacity, operation and maintenance details, plus Licensed Plumber's name, address, phone number and license number.

The AWTS will be installed and maintained in accordance with Section 5 of the guidelines 'On-site Sewage Management for Single Households' (Department of Local Government, 1998) and AS/NZS 1547-2012 'On-site Domestic Wastewater Management' (Standards Australia, 2012). **Upon approval from Penrith Council, the owner is to enter into a servicing contract with an approved servicing agent for the life of the system. Copies of the written service reports should be lodged with Penrith Council following each quarterly service.**

6.2 Location of proposed AWTS

The location of the AWTS should be decided in conjunction by the licensed plumber in consultation with the property owner. The AWTS must be positioned on a stable, level base and be downslope of the building so there is sufficient fall from drainage outlets in the dwelling. The location of AWTS must be

- Downslope of the buildings from where wastewater is generated;
- at least 2.5m away from the building
- at least 5m from the property boundary
- at least 6m downslope from any in ground water storage tanks.

AWTS installation must comply with the manufacturer's recommendations, AS/NZS 3500.2:2015 Plumbing and Drainage Part 2 Sanitary Plumbing and Drainage' and Council requirements.

6.3 Installation of pipes

The sewer pipes between the house, AWTS and irrigation area must be buried at a depth that provides protection against mechanical damage or deformation, in accordance with 'AS/NZS 3500(Set):2015 Plumbing and Drainage Set'. Table 3 shows the minimum pipe depth for trafficable areas.

TABLE 1 MINIMUM PIPE DIAMETER CALCULATIONS

Nominal pipe size (DN)	Minimum grade %	Minimum grade ratio
65	2.5	1:40
80	1.65	1:60
100	1.65	1:60
125	1.25	1:80
150	1.00	1:100

Source: 'AS/NZS 3500.2.:2015 Plumbing and Drainage Part 2 Sanitary Plumbing and Drainage' Table 3.2. NB: pipe grades are expressed as a percentage of vertical to horizontal distances.

TABLE 2 MINIMUM PIPE DEPTH FOR TRAFFICABLE AREAS

Location	Minimum depth of cover (mm)
Where subject to heavy vehicular traffic	500
Where subject to light vehicular traffic	450
Elsewhere	300
Source:'AS/NZS 3500:2015 Table 3.4 Minimum Cover for Buried Piping'	

7. REQUIRED IRRIGATION AREA

In accordance with *Table 2 Sizing of Domestic Aerated Wastewater Treatment Systems Effluent Disposal Areas* of the Penrith City Council's On Site Sewage Management Policy, (Appendix II) the required irrigation area for a dwelling on clay soil types with reticulated water supply:

- 5 bedroom house will require a 833m^2 irrigation area

8. LOCATION AND METHOD OF IRRIGATION

8.1 Fixed spray irrigation is proposed. This involves a 300mm deep buried, 25mm purple line polythene pipe (distribution line) from the AWTS to the irrigation area.

8.2 Fixed sprinklers are to be installed in 7 zones. Each zone is to have at least 2 sprinklers in operation at any one time. Each zone is to be automatically activated by water rotor.

9. SUMMARY

This assessment recommends the following:

- Install a domestic Aerated Wastewater Treatment System (AWTS) to treated wastewater from the proposed 5-bedroom dwelling;
- Install 833m^2 fixed spray irrigation as described in the Appendix and shown on the Site Plans.

10. REFERENCES

Department of Local Government (1998) *On-site Sewage Management for Single Households*. NSW Government.

Standards Australia (2012) Australian/New Zealand Standard 1547:2012 *On-site domestic wastewater management*. Standards Australia.

NSW Health Septic Tank Accreditation Guidelines (2001).

Hazelton, P.A and Murphy, B.W ed. (1992) *What Do All the Numbers Mean? A Guide for the Interpretation of Soil Test Results*. Department of Conservation and Land Management (incorporating the Soil Conservation Service of NSW), Sydney.

APPENDIX I FIXED SPRAY IRRIGATION

Irrigation set up

a) The irrigation area is to be split into four zones;

b) Within each zone, low plume sprinklers should not be capable of producing aerosols;

c) All distribution lines shall be buried to a minimum depth of 300mm below finished surface level or, where this is not possible, covered with 150mm of concrete;

d) The throw on the sprinklers shall not exceed beyond the designated disposal area.

Note: The AWTS has the capacity to effectively operate 3 sprinklers during a pump cycle. The irrigation area is to be split into zones that can be rotated between pump cycles. Alternatively, the owner can rotate the three active sprinklers between turf valves.

Management of irrigation area

e) The grass within the irrigation should be mown on a regular basis to ensure sprinklers can be seen through grass and any breakage or leaks can be seen and repaired;

f) The effluent disposal area shall be clearly identified within the property by post or some other means.

g) All stormwater and seepage from higher levels shall be diverted away from the effluent disposal area using a dish drain or similar.

h) Fruit or salad vegetables should not be irrigated with effluent from the wastewater treatment system.

i) The irrigation area should not be used for recreational purposes or used for parking a car.

j) Horse and cattle should not be kept within the effluent disposal area.

k) Buffer distances are 6m if area up gradient and 3m if area down gradient of swimming pools, property boundaries and driveways; 15m buffer to buildings.

l) A warning sign complying with AS1319:1994 – Safety signs for the occupational environment should be located at the boundary of the designated area in one or two places, clearly visible to property uses, with wording such as, RECYCLED WATER, AVOID CONTACT, DO NOT DRINK'.

APPENDIX II PENRITH CITY COUNCIL, TABLE 2

Sizing of AWTS Effluent Disposal Areas			
Suburb	**No. of Bedrooms**	**Surface and Sub-Surface Irrigation Areas (m^2)**	
		Reticulated Water	Tank Water
Sandy Soil Types ***Agnes Banks - east of Castlereagh Road. Castlereagh - north of Devlin Road and east of Castlereagh Road.***	2	584	467
	3	779	623
	4	973	778
	5	1168	934
	6	1326	1090
Clay Soil Types ***Most other areas***	2	417	334
	3	556	444
	4	695	556
	5	833	667
	6	972	778

Notes: *(1) The irrigation areas in Table 2 are calculated using conservative figures to enable the sustainable management of effluent. A property owner can provide a Wastewater Assessment Report to support a proposal for a smaller irrigation area.*

(2) The Effluent Disposal Area (EDA) is based on nutrient balances as they are considered to be the most limiting factors in these areas.

(3) Figures in Table 2 are based on:

- *150 litres per person/day or 120 litres per person/day for tank water supply*
- *One person per bedroom and two for a master bedroom*
- *TN output value of 25 mg/L and a Critical Loading Rate of 27 mg/m^2/day*
- *TP output value of 12 mg/L*
- *P sorption capacity - 600,000 mg/m^2/depth for clay soil types or 400,000 mg/m^2/depth for sandy soil types*
- *Design Irrigation rate of 15 mm/week for clay soil types or 35 mm/week for sandy soil types.*

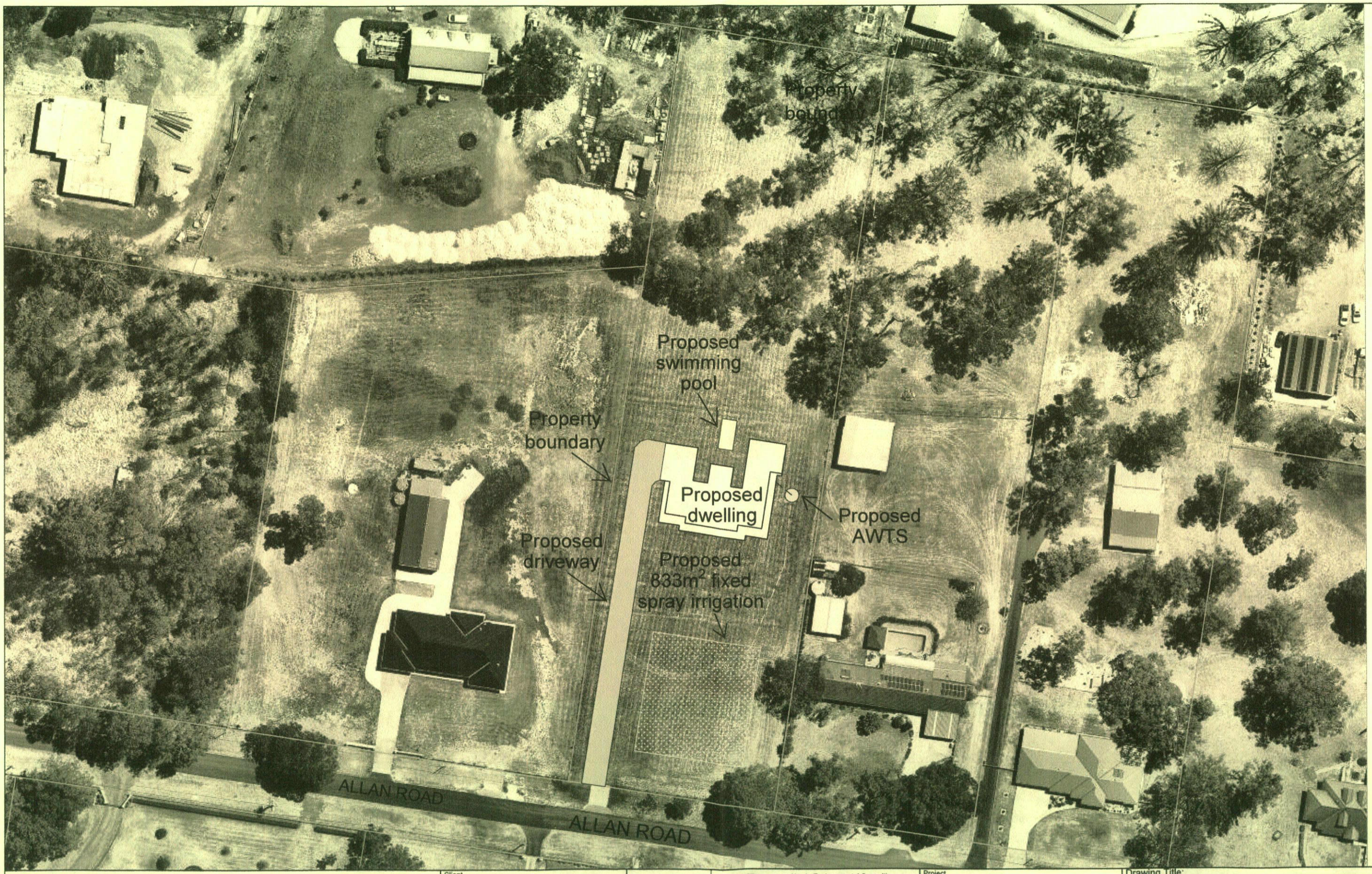
(4) A Wastewater Assessment Report is required for applications with more than 6 bedrooms.

(5) Council assesses effluent loading based on two persons for a master bedroom, two persons for a guest room and one person per additional bedroom. A study or any other room that has the potential to be used as a bedroom will be considered as an additional bedroom.

APPENDIX III REQUIRED BUFFERS

The following buffers must be applied when installing all onsite sewage management systems in accordance with the Penrith Council Development Control Plan

SYSTEM	BUFFER DISTANCES
All Onsite Sewage Management Systems	• 100 metres to domestic groundwater well • 100 metres to permanent surface waters (e.g. rivers, creeks, streams, lakes etc.) • 150m to SCA named rivers • 40 metres to other waters (e.g. dams, intermittent water courses, overland flow paths etc.) • 15metres from in-ground water tank • 1 metre from the drip line of native trees and shrubs
Surface spray irrigation	• 6 metres if area up-slope and 3 metres if area down-slope of buildings, driveways and property boundaries • 15m to dwellings • 3m to paths and walkways • 6m to swimming pools
Subsurface irrigation	• 6 metres if area up-slope and 3 metres if area down-slope of buildings, driveways and property boundaries
Absorption system	• 12m if area up-slope and 6m if area down-slope of property boundary • 6 metres if area up-slope and 3 metres if area down-slope of buildings, driveways and property boundaries



Issue:	Description:	Date	Drawn	Approved
A	HEC Standard Drawing	6/03/18	PS	SH

North

Client: STUART AYRES & MARISE PAYNE

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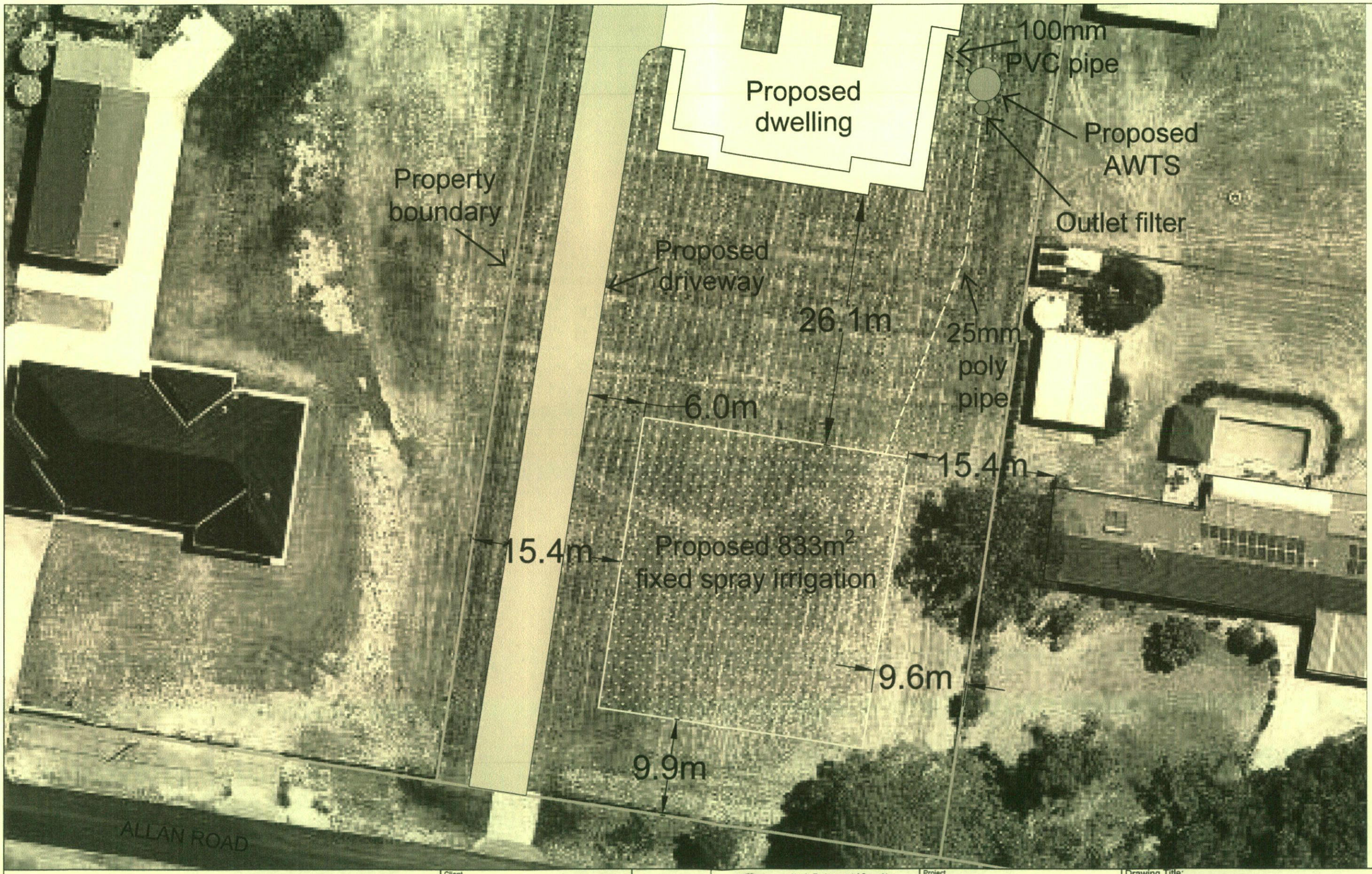
Wastewater | Bushfire | Stormwater

Project: PROPOSED RESIDENTIAL DWELLING
LOT: 6 DP: 1201432
63-75 ALLAN ROAD, MULGOA, NSW
LGA: PENRITH

Drawing Title: ON-SITE WASTEWATER MANAGEMENT SHEET 1

Drawn:	Date:	Scale:	Q.A. Check: Date:
PS	6/03/2018	NTS	6/03/2018
Designed:	Our reference:		Dwg. No. / Issue:
PS	2765ww		#1 / A



Issue:	Description:	Date	Drawn	Approved
A	HEC Standard Drawing	6/03/18	PS	SH

North: N

Client: STUART AYRES & MARISE PAYNE

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Project: PROPOSED RESIDENTIAL DWELLING
LOT: 6 DP: 1201432
63-75 ALLAN ROAD, MULGOA, NSW
LGA: PENRITH

Drawing Title: ON-SITE WASTEWATER MANAGEMENT SHEET 2

Drawn:	Date:	Scale:	Q.A. Check: Date:
PS	6/03/2018	NTS	6/03/2018
Designed:	Our reference:		Dwg. No. / Issue:
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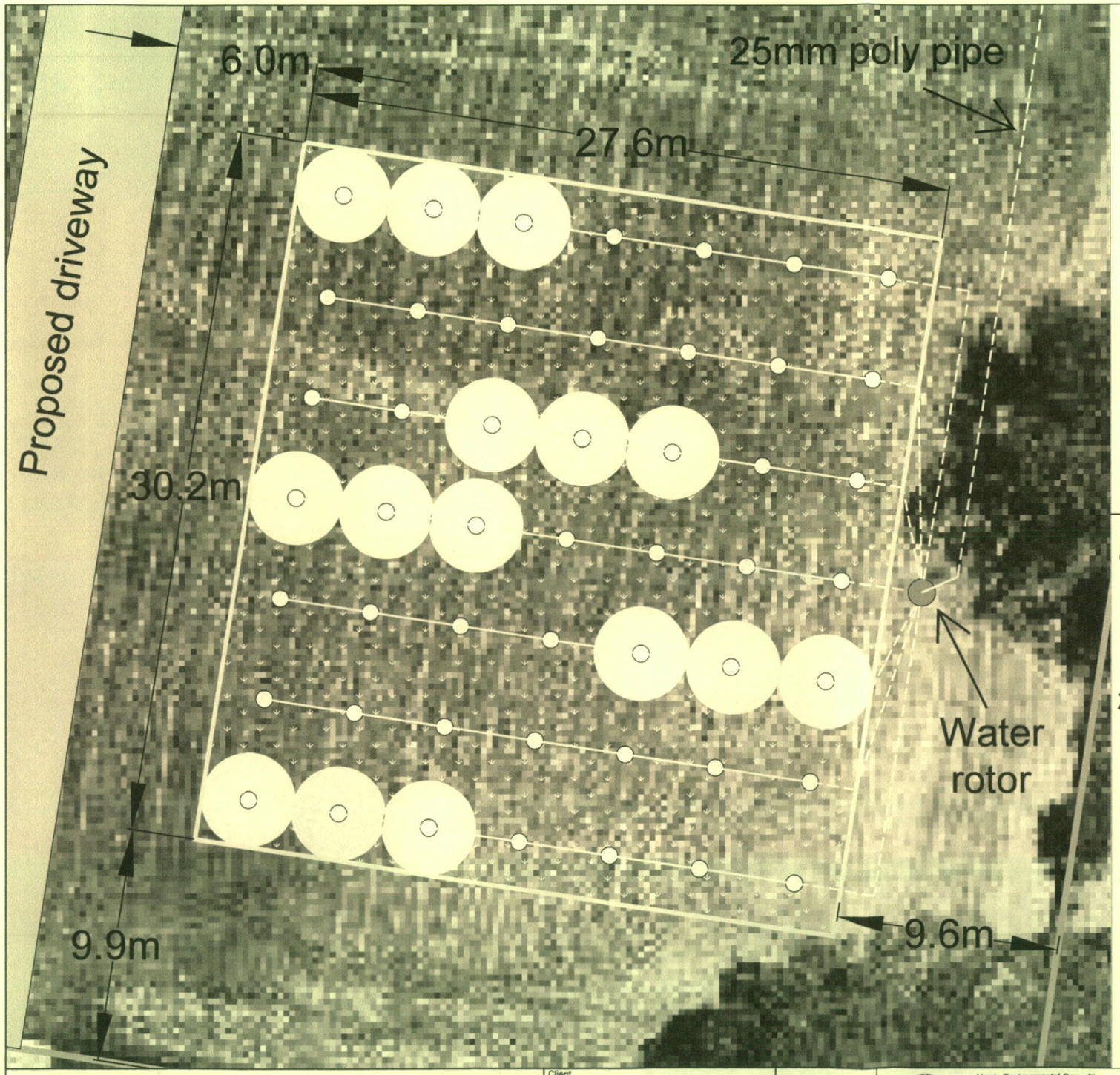


GENERAL DESIGN AND CONSTRUCTION

Irrigation set up

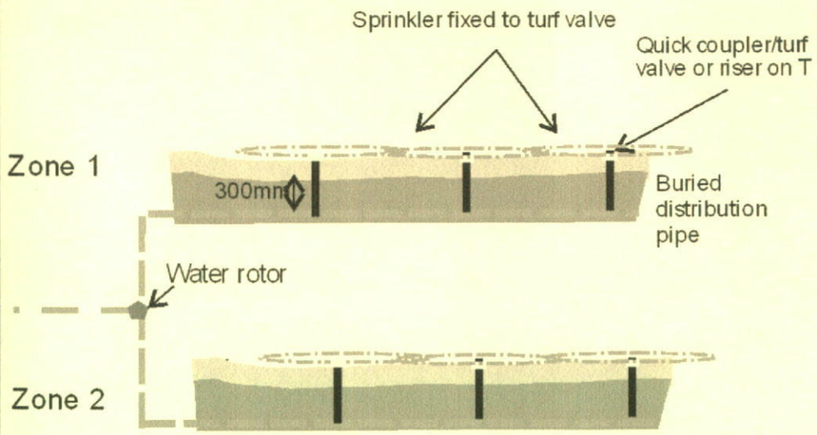
a) The irrigation area is to be split into equal zones;

b) Within each zone, 3 low plume sprinklers should not be capable of producing aerosols;

c) All distribution lines shall be buried to a minimum depth of 300mm below finished surface level or, where this is not possible, covered with 150mm of concrete;

d) The throw on the sprinklers shall not exceed beyond the designated disposal area.

Fixed Spray Irrigation



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Issue:	Description:	Date	Drawn	Approved
A	HEC Standard Drawing	6/03/18	PS	SH

North: N

Client: STUART AYRES & MARISE PAYNE

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Wastewater | Bushfire | Stormwater

Project: PROPOSED RESIDENTIAL DWELLING
LOT: 6 DP: 1201432
63-75 ALLAN ROAD, MULGOA, NSW
LGA: PENRITH

Drawing Title: ON-SITE WASTEWATER MANAGEMENT SHEET 3

Drawn:	Date:	Scale:	Q.A. Check:	Date:
PS	6/03/2018	as noted		6/03/2018
Designed:	Our reference:		Dwg. No.	Issue:
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