25 January 2022

Glenn Wright
55 Settlement Road
MAIN ARM NSW

Dear Glenn

Onsite sewer Management System Review Existing Dwelling and Farm shed Lot 4 DP 585928, No 55 Settlement Road Main Arm

1. Introduction

At your request Tim Fitzroy & Associates (TFA) has undertaken a review of the existing onsite sewer management systems (OSMS) servicing the existing dwelling and farm shed at Lot 4 DP 585928 No 55 Settlement Road Main Arm. This review has been triggered in support of a Planning Proposal to Byron Shire Council (BSC) to amend the Byron Local Environmental Plan (BLEP) 2014 to formalise the use of the existing dwelling located at the subject site.

The site is an irregular shape, covers an area of about 23.85ha and is located on the southern side of Settlement Road. The site is undulating ranging from 130m AHD in the south to 40m AHD in the north interspersed with a series of gullies. The vast bulk of site (estimated at over 80%) is covered with vegetation. A portion of the central and north west of the site has been partially cleared whereupon the dwelling, shed and dam are located (see Site Diagram **Attachment A**).

There are a number of constraints which impact the site's capabilities to effectively assimilate treated effluent namely a mix of :

- Steep to moderate sloping land;
- Protected vegetation;
- Numerous gullies and intermittent water courses; and
- Light clay soils

This review has included:

- Discussions with Glenn Wright; and
- A site assessment inclusive of discussions of the key components of the existing OSMS's.

2. **Existing Onsite wastewater Management Systems**
    a. There are 2 OSMS's onsite. One servicing the 3 bedroom dwelling and a second servicing the 1 bedroom dwelling (farm shed).
    b. 3 bedroom dwelling
        i. The OSMS for the dwelling comprises:
            1. Grease Trap (50 litres),
        ii. 3.0kL Septic (plastic) tank located in gully 20m west of dwelling, trenches in gully (unknown length and size)
    c. 1 bedroom dwelling:
        i. 3.0k/L (plastic) septic tank located about 3.5m north west of the farm shed drains to an ETA bed (unknown length and size)
        ii. to be converted to shed (kitchen to be removed)
        iii. The OSMS appears to be operating satisfactorily

See photos of existing OSMS in **Attachment B.**

3. Proposed Development

The planning proposal comprises:

- An application to BSC to amend the Byron Local Environmental Plan (BLEP) 2014 to formalise the use of the existing dwelling located at Lot 5 DP585928, No 55 Settlement Road, Main Arm.

4. Site Assessment

The site:

- is undulating ranging from 130m AHD in the south to 40m AHD in the north interspersed with a series of gullies
- drains in a north and north easterly direction via a series of gullies to the Brunswick River (450m offsite)
- There are no registered groundwater bores on the subject site. A search of NSW Department of Primary Industries Office of Water noted 3 registered bores within 250m and 49 registered bores within a 2km radius of the site. The results of the groundwater bore search (within 250m of the subject site) are summarised in Table 4.1 and below and included in full in **Attachment C**.
- comprises 3 different geological units:
    - Southern section
        - are described as Lismore Basalt
    - Middle section
        - are described as Neranleigh-Fernvale beds
    - Northern section
        - are described as Undifferentiated alluvial deposits; sand, silt, clay and gravel; some residual and colluvial deposits

The area where wastewater disposal occurs is located within the Burringbar soil landscape (light clay) (see **Attachment D**).

Table 4.1 Summary of Registered Groundwater Bores within 250m of the subject site

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW303945	30BL180384	Bore	Private	Domestic	Domestic		03/12/2002	27.00	27.00	220	10.00	1.010		86m	North West
GW307045	30BL185863	Bore	Private	Farming	Farming		22/01/2012	36.60	36.60	105	18.00	1.263		192m	North East
GW306766	30BL180808	Bore	Private	Domestic, Stock	Domestic, Stock		01/01/1992	36.50			35.60	0.200		233m	South West

While the OSMS servicing the farm shed appears to be operating satisfactorily the OSMS for the dwelling is located within a gully and intermittent water course and the location of the effluent trenches is unknown but likely to either be within or in close proximity to the gully. The location of the dwelling's OSMS within the gully is in contravention of Council's OSMS Guidelines and requires relocation free of this constraint.

5. OSMS Assessment

As part of our due diligence, we have conducted a series of calculations for a new secondary treated wastewater management system for the 3-bedroom dwelling to be located free of environmental constraints at the subject site based on current modelling requirements. A conceptual onsite wastewater management system has been prepared for each of the following scenarios:

- A 3 bedroom dwelling
    - With conventional combined black and grey water treatment
    - With separate black water (compost toilets) and separate grey water treatment

These preliminary calculations are based on the current Byron Shire Council OSMS Design Model (see **Attachment E**).

The conceptual onsite wastewater management system has been designed to achieve the following general objectives:

1. Protection of public health: applied effluent is to be assimilated in the soil profile and remain beneath the soil surface. No effluent resurfacing is to occur.
2. Ecologically Sustainable Beneficial Reuse: design is to maximise assimilation of nutrients and pathogens within the land applications areas.
3. Neutral or Beneficial Impact Test: design is to produce a sustainable net beneficial of neutral impact over the long term.

To achieve the objectives listed above, the following analyses have been completed:

1. Evaluation of predicted wastewater generation for the nominated scenarios;
2. Conceptual design of system to public health standards (AS/NZS 1547, 2000); NSW EPA (2005) and the Byron Shire Council Guidelines for Onsite Wastewater Generation; and
3. Assessment of local site and soil conditions.

Key parameters used in the model for 3 Bedroom dwelling include:

- Soils based on light clay texture;
- Lot size was:
    - 12,500m2 (based on 50% of total area due to existing osms for shed)
- Secondary Treated Aerated wastewater treatment system (AWTS);
- Evapo transpiration bed beds; and
- Hydraulic flow rate of 115 litre per person per day

For dwelling with compost toilets

- Hydraulic flow rate of 90 litre per person per day
- Reduced nutrients

Note: The existing septic tank, grease trap and ETA beds servicing the existing 3 bedroom dwelling are to be decommissioned

Site Constraints

- Steep to moderate sloping land;
- Protected vegetation; and
- Numerous gullies and intermittent water courses.

The results of preliminary OSMS modelling are provided in **Table 5.1**

Table 5.1 Onsite Wastewater Modelling for upgrade 3 bedroom dwelling

Scenario	Hydraulic Area (m2)	Nitrogen Area (m2)	Phosphorus Area (m2)	Land Area Requirement (m2) – based on largest area of preceding 3 columns	Soil Type
3 Bedroom Dwelling					
AWTS + ETA	55	68	66	**68**	Light Clay
AWTS + CT+ ETA	54	0.00	32	**54**	Light Clay

AWTS = Aerated Wastewater Treatment System
ETA = Evapo transpiration beds
CT = Compost Toilet

Model scenarios provided in Table 5.1 are located in **Attachment E**.

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6. Conclusion

a. Our site assessment has revealed that

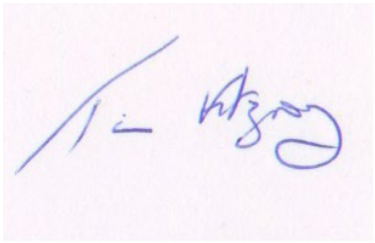
i. The site is capable of assimilating treated effluent from the existing farm shed and 3 bedroom dwelling;

ii. The existing OSMS servicing the farm shed is operating satisfactorily and suitable to service the farm shed;

iii. The existing OSMS servicing the 3 bedroom dwelling is to be decommissioned and replaced with an OSMS to be located free of existing gullies and intermittent water courses.

If you have any enquiries with regard to the content of this correspondence do not hesitate to contact me on 044 848 3837 or tim@timfitzroy.com.au

Kind regards,



Tim Fitzroy
Environmental Health Scientist
Environmental Auditor

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Attachment A Site Diagram

Site Diagram

55 Settlement Road, Main Arm, NSW 2482

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Attachment B Site Photos

Photo A Dwelling

Photo B OSMS for Dwelling

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Photo C Farm Shed

Photo D OSMS for Farm Shed

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Photo E Potential for new OSMS for Dwelling

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Attachment C **Registered Boreholes within 2km of subject site**

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Groundwater Boreholes

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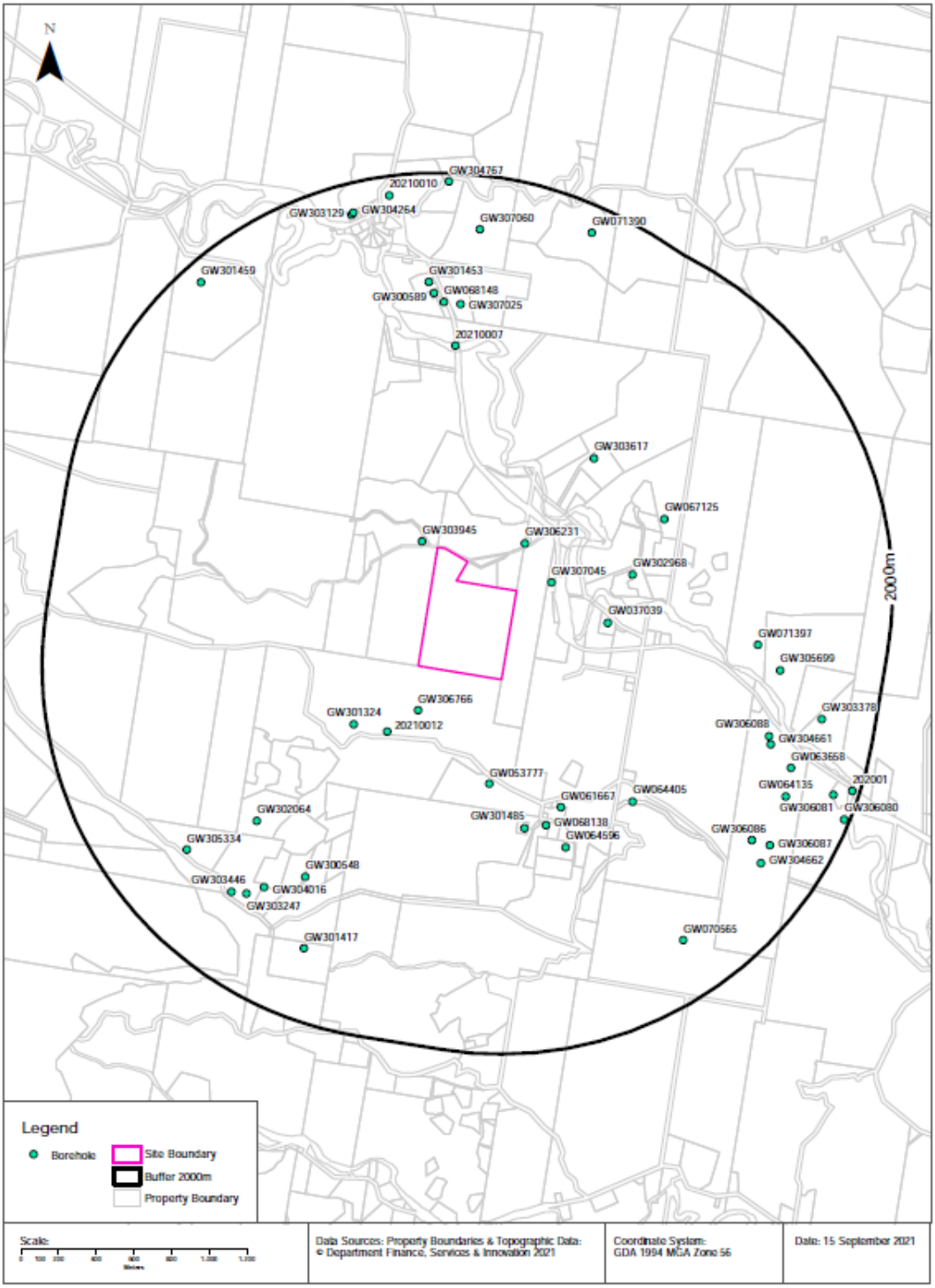

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Groundwater Boreholes

Boreholes within the dataset buffer:

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW303945	30BL180384	Bore	Private	Domestic	Domestic		03/12/2002	27.00	27.00	220	10.00	1.010		86m	North West
GW307045	30BL185663	Bore	Private	Farming	Farming		22/01/2012	36.60	36.60	105	18.00	1.263		192m	North East
GW306766	30BL180608	Bore	Private	Domestic, Stock	Domestic, Stock		01/01/1992	36.50			35.60	0.200		233m	South West
GW306231	30BL184454	Bore	Private	Domestic	Domestic		20/09/2007	30.50	30.50	140	12.00	0.632		256m	North East
20210012					UNK								66.80	387m	South West
GW301324	30BL176989	Bore		Domestic	Domestic			24.00	24.00	Good	6.00	0.505		463m	South West
GW037039		(Unknown)	Other Govt		General Use		01/01/1968	29.50	29.60					507m	East
GW053777	30BL122276, 30BL178740	Excavation	Private	Domestic, Irrigation, Stock	Irrigation		01/02/1983	3.00	3.00	0-500 ppm				562m	South
GW302968	30BL179165	Bore		Domestic, Stock	Domestic, Stock		10/12/2000	42.00	42.00	200	12.00	1.000		623m	East
GW061667	30BL134081	Excavation	Private	Domestic, Stock	General Use			1.80						753m	South East
GW301485	30BL178039	Bore		Domestic	Domestic		07/05/1998	35.00	35.00		9.80	0.688		803m	South
GW068138	30BL139891	Bore	Private	Domestic, Stock			09/08/1989	19.50	19.50	Good	3.00	0.470		814m	South
GW303617	30BL181010	Bore		Domestic	Domestic		13/12/2002	30.50	30.50	120	9.00	5.052		818m	North East
GW067125	30BL144721			Domestic	Domestic		06/12/1991	36.00	36.00	Good	20.00	0.708	75.00	873m	North East
GW064405	30BL136481	Bore	Private	Domestic, Stock	Domestic, Stock		01/09/1987	25.00	25.00	Good				956m	South East
GW064596	30BL136554	Bore	Private	Domestic	Domestic		01/07/1987	27.00	27.00					962m	South East
20210007					UNK								32.47	1082m	North
GW302064	30BL178195	Bore	Private	Domestic	Domestic, Irrigation									1192m	South West
GW300548	30BL177501	Bore		Domestic	Domestic		30/11/1996	31.00	31.00	Good	8.00	7.578		1275m	South West
GW307025	30WA307417	Bore	Private	Domestic	Domestic		14/10/2011	18.00	18.00		7.50	0.320		1304m	North
GW068148	30BL139950	Bore	Private	Domestic			23/08/1989	12.00	12.00		4.00	0.300		1311m	North
GW071397	30BL153320	Bore		Domestic	Domestic		26/10/1993	41.00	41.00	Good	23.00	0.354		1315m	East
GW300589	30BL177400	Bore		Domestic	Domestic		21/11/1996	15.25	15.25		6.50	0.375		1357m	North
GW301453	30BL177764	Bore		Domestic	Domestic		04/08/1997	13.70	13.70		5.80	0.750		1418m	North
GW304016	30BL181170	Bore	Private	Domestic	Domestic		31/12/1996	15.00	15.00		10.00	5.500		1437m	South West
GW305699	30BL180737	Bore	Private	Stock	Domestic, Stock		08/10/2005	24.00	24.00			1.000		1454m	East
GW306088	30BL184037	Bore	Local Govt	Monitoring Bore	Monitoring Bore		03/10/2006	7.50	7.50		3.80			1457m	East

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GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m bgl)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW304661	30BL179971	Bore	Local Govt	Monitoring Bore	Monitoring Bore		25/02/2002	3.50	3.50					1475m	East
GW303247	30BL179958	Bore		Domestic, Stock	Domestic, Stock		23/04/2002	17.00	17.00					1520m	South West
GW303446	30BL180342	Bore		Domestic, Farming, Irrigation, Stock	Domestic, Farming, Irrigation, Stock		01/06/2002	48.80	48.80			2.970		1561m	South West
GW305334	30BL183922	Bore		Domestic, Farming, Irrigation	Domestic, Stock		13/09/2005	30.00	30.00	90	16.00	0.700		1573m	South West
GW306086	30BL184037	Bore	Local Govt	Monitoring Bore	Monitoring Bore		03/10/2006	7.00	7.00		4.00			1586m	South East
GW063658	30BL135210	Bore	Private	Domestic, Stock	Domestic, Stock		01/10/1986	4.00	4.00					1612m	South East
GW301417	30BL177217	Bore		Domestic, Stock	Domestic, Stock		05/02/1996	22.00	22.00	Good	6.00	0.300		1625m	South West
GW064135	30BL136176	Bore	Private	Domestic, Stock	Domestic, Stock		01/02/1987	14.00	17.00					1636m	South East
GW306087	30BL184037	Bore	Local Govt	Monitoring Bore	Monitoring Bore		03/10/2006	7.00	7.00		4.50			1681m	South East
GW304662	30BL179971	Bore	Local Govt	Monitoring Bore	Monitoring Bore		25/02/2004	5.80	5.80					1694m	South East
GW070565	30BL150663	Bore	Private	Domestic	Domestic		01/09/1992	22.00	22.00	Good	10.00	0.590	30.00	1696m	South East
GW307060	30BL181223	Bore	Private	Domestic	Domestic		04/07/2002	50.00	50.00	280	15.00	0.500		1712m	North
GW303378	30BL179759	Bore		Domestic	Domestic		01/06/2002	3.20			2.00	1.000		1717m	East
GW303129	30BL179667	Bore		Domestic	Domestic		21/11/2001	32.00	32.00					1833m	North
GW304264	30BL181500	Bore	Private	Domestic	Domestic		03/09/2003	26.00	26.00		15.00	0.531		1842m	North
GW071390	30BL152942	Bore		Domestic, Stock	Domestic, Stock		21/09/1993	55.00	55.00	Good	30.00	0.700		1857m	North
GW306081	30BL184036	Bore	Local Govt	Monitoring Bore	Monitoring Bore		04/10/2006	6.00	6.00		1.20			1872m	South East
GW301459	30BL177813	Bore		Domestic, Farming, Stock	Domestic, Farming, Stock		25/10/1997	25.90	25.90		4.00	2.250		1892m	North West
20210010					UNK								37.23	1896m	North
GW304767	30BL180876	Bore		Domestic	Domestic		05/06/2004	54.00	54.00		2.50	2.500		1955m	North
202001					UNK								17.31	1960m	South East
GW306080	30BL184036	Bore	Local Govt	Monitoring Bore	Monitoring Bore		04/10/2006	7.50	7.50		4.50			1972m	South East

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Attachment D Soil Conditions

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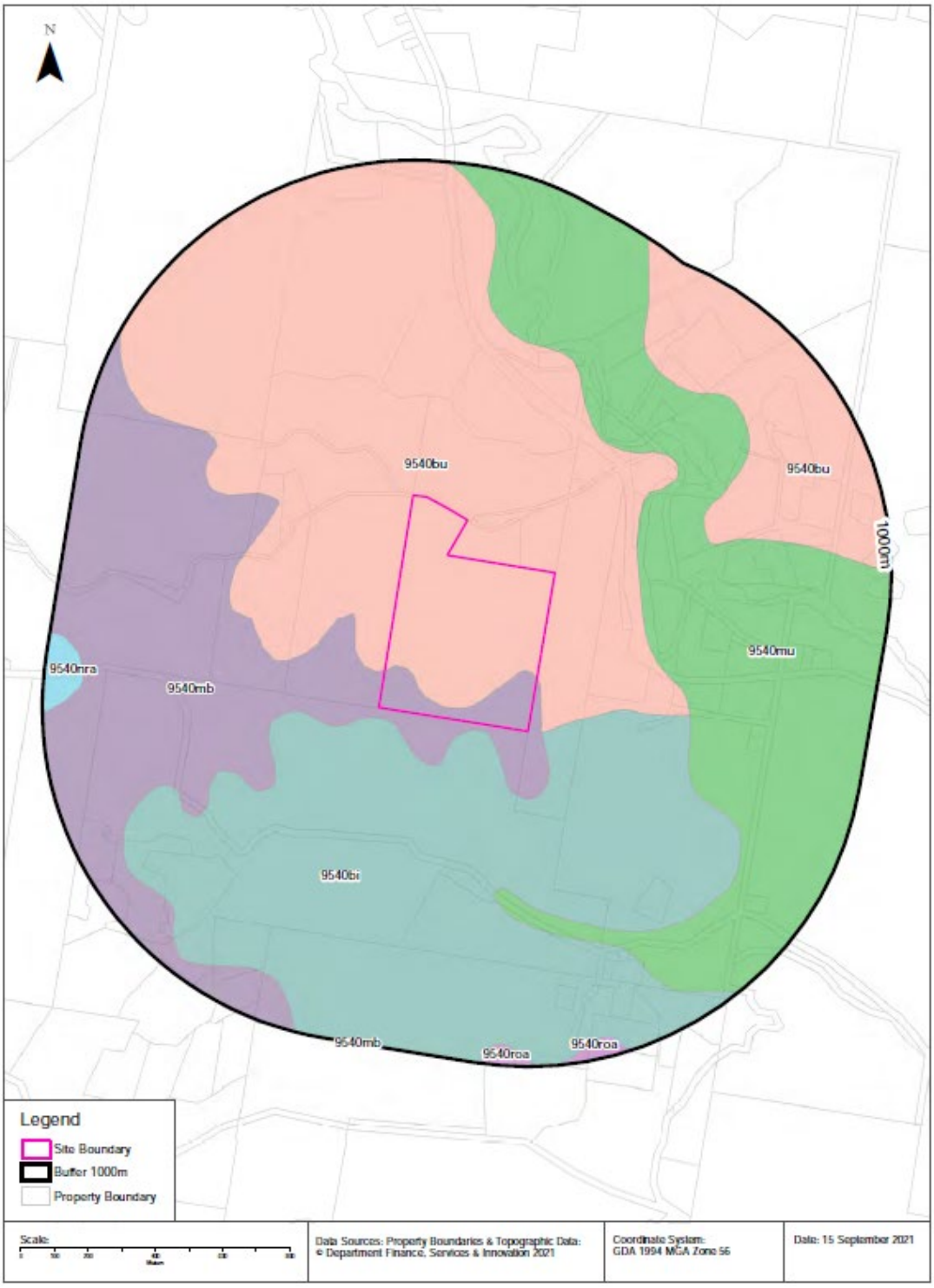
Soil Landscapes of Central and Eastern NSW

55 Settlement Road, Main Arm, NSW 2482



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Soils

55 Settlement Road, Main Arm, NSW 2482

Soil Landscapes of Central and Eastern NSW

Soil Landscapes of Central and Eastern NSW within the dataset buffer:

Soil Code	Name	Distance	Direction
9540bu	Burringbar	0m	On-site
9540mb	Mount Burrell	0m	On-site
9540bi	Billinudgel	17m	South
9540mu	Mullumbimby	246m	East
9540nra	Nimbin Rocks variant a	881m	West
9540roa	Rosebank variant a	937m	South

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Attachment E OSMS Model Results

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Byron OSMS Design Model *Version:* 3 Bed AWTS Taylex ALL.xlsm **_Period of Rainfall & Evaporation Record: 01/07/1980 - 30/06/2001_**

Set Defaults

STEP 1: bedrooms / persons

STEP 2: **# bedrooms (Grp 1)** 3 — # bedrooms (Grp 2)

STEP 3: Buffer to permanent water / Buffer to intermittant water

STEP 4: **Block size (m2)** 12,500 — 100

STEP 5: **Daily effluent flow accord. water supply type**
- Reticulated supply (bore,spring,creek) 180L/p.d
- Reticulated + std. water saving devices 145L/p.d
- Roof water harvesting 140L/p.d
- Roof water harvesting + std. water sav. 115L/p.d

STEP 6:

Grp1	Grp 2
☑ Toilet	☐ Toilet
☑ Bathroom	☐ Bathroom
☑ Laundry	☐ Laundry
☑ Kitchen	☐ Kitchen

Wastewater stream

STEP 7: **Treatment system**
- Septic (primary teatment only)
- AWTS
- Septic + single pass sandfilter (SPF)
- Septic + SPF, 25% septic return flow
- Septic + recirculating sandfilter
- Septic + reedbed

Total Daily Flow (L/day) *	517.5	Daily Effluent Flow per person (L/day)	115	% black to tot WW in a full system	32%
TN production per year (kg/year)	18.90	N prod. per capita (kg/person/yr)	4.20	% black to tot WW in a full system: TN	70%
TN reduced by all N loss (kg/year) *	7.56	N loss in treatment system (% reduction)	50%	N loss in disposal bed (% reduction)	20%
N Plant Uptake rate (kg/ha/year)	200				
Phosphorus in effluent (Ip) (kg/yr) *	2.70	P prod. per person per yr (kg/person/yr)	0.60	wastewater in a full system: TP	40%

STEP 8: **P soil sorption accord. soil type**
- "Alluvial"Soils 1 (dp,mu,my,te) 10,000 kg/ha/m
- "Alluvial"Soils 2 (cr) 2,000 kg/ha/m
- Red Basaltic Soils (bg,ca,co,el,ew,mb,ro,wo) 10,000 kg/ha/m
- Duplex Soils (ba, bi,bu,mi, ni) 8,000 kg/ha/m
- Podzol Soils (ab,bo,br,eb,fh,ki,ku,og,po,ty,wy) 1,000 kg/ha/m

Nitrogen Report

P uptake by plants (Hp) (kg/ha/yr)	10	N plant uptake (kg/yr)	1.35	Total N-load 7.56kg/yr	
P soil sorption (Ps) (kg/ha/m depth)	8000	N load exceedence	0.00		
Water Table/ Bedrock Depth (m) (STEP 10)	3.00	N load percolated (kg/yr)	6.21		
Buffer to Water Table (Bwt) (m)	0.5	N released (perc+exceed.) (kg/yr)	6.21		
Time for accumulation of P(years)	50	Enviro.N limit (kg/yr)	7.13		
Final area (m²)	**68**	Nitrogen area (m²)	21		
		Capped H area 68m2. Hydraulic area (m2)	55		
Phosphorus area (m²)	66				
Water balance area (m²)	68	total ETA trench area	49.52		
☑ Specific Crop Coeff.(grass=1.00)	1.00	ETA trench length (m)	12.38		
% Effective Rainfall	65%	number of ETA beds	2		
Percolation (mm/d)	12	beds total plus separating spaces: X Y dimensions = 13.0m x 6.6m Area =86 m2			

STEP 9: **Soil texture & structure beneath system**
- Gravels,Sands Ksat >3.0m/d
- Sandy loams - weakly structured Ksat >3.0m/d
- Sandy loams - massive Ksat 1.4 - 3.0m/d
- Loams - high/moderate structured Ksat 1.5 - 3.0m/d
- Loams - weakly structured or massive Ksat 0.5 - 1.5m/d
- Clay loams - high/mod structured Ksat 0.5 - 1.5m/d
- Clay loams - weakly structured Ksat 0.12 - 0.5m/d
- Clay loams - massive structured Ksat 0.06 - 0.12m/d
- Light clays - strongly structured Ksat 0.12 - 0.5m/d
- Light clays - moderately structured Ksat 0.06 - 0.12m/d
- Light clays - weak. structured or massive Ksat <0.06m/d
- Med. to heavy clays - strong. struct. Ksat 0.06-0.5m/d
- Med. to heavy clays - mod. structured Ksat <0.06m/d
- Med. to hvy clays - weak. struct. or massive Ksat<0.06m/d
- DISPERSIVE soil (Modified Emerson Aggregate test)

STEP 11: **% Effective Rainfall**
- Mounded bed
- Level bed with grass

STEP 12: **Soil texture in root zone**
- Coarse Sand
- Fine sand, Sandy loams
- Loams,Clay loams,Silt
- Clay (light,med,heavy)

Avg depth of root zone (m)	0.15	Effective porosity of root zone	0.34	Avail.Water Capacity (AWC) of root zone	0.13
Avg depth bluemetal (etc) in trench below root zone (m)	0.15	Effective porosity of bluemetal in trench below root zone	0.43	Default AWC of bluemetal in trench below root zone	0.00
Soil Moisture Holding Capacity: saturation & AWC (mm)	111.90	24.69			
Permissible percentile exceedence	5.00%	ETA trench width (m)	2.00	Lateral seepage width (m)	0.300

Trench under root zone <-

STEP 13 -> **Land Application Type**
- SSI
- ETA

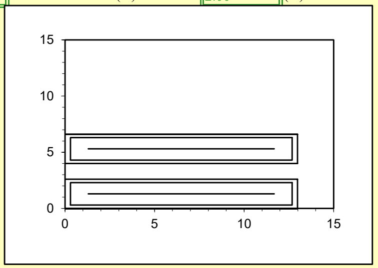
STEP 14: Calculate (or Cntl- q)

STEP 15: ETA trench separation 2.00

2

Minimum effluent application (mm/day/m²) 7.67

Exceedence (L) 0.00000



Byron OSMS Design Model *Version:* 3 Bed AWTS Taylex CTxlsm.xlsm ***Period of Rainfall & Evaporation Record: 01/07/1980 - 30/06/2001***

Set Defaults

STEP 1 — bedrooms / persons

STEP 2

# bedrooms (Grp 1)	3
# bedrooms (Grp 2)	
Total Daily Flow (L/day) *	351.9
TN production per year (kg/year)	5.67
TN reduced by all N loss (kg/year) *	2.27
N Plant Uptake rate (kg/ha/year)	200
Phosphorus in effluent (Ip) (kg/yr) *	1.62
P uptake by plants (Hp) (kg/ha/yr)	10
P soil sorption (Ps) (kg/ha/m depth)	8000
Water Table/ Bedrock Depth (m)	3.00
Buffer to Water Table (Bwt) (m)	0.5
Time for accumulation of P(years)	50
Final area (m^2)	**54**
Phosphorus area (m^2)	**40**
Water balance area (m^2)	54
Specific Crop Coeff.(grass=1.00)	1.00
% Effective Rainfall	85%
Percolation (mm/d)	10
Avg depth of root zone (m)	0.15
Avg depth bluemetal (etc) in trench below root zone (m)	0.15
Soil Moisture Holding Capacity: saturation & AWC (mm)	111.78
Permissible percentile exceedence	5.00%
Minimum effluent application (mm/day/m^2)	6.55
Exceedence (L)	0.02478

STEP 3 — Buffer to permanent water / Buffer to intermittant water

STEP 4 — Block size (m2): 12,500 / 100

Daily Effluent Flow per person (L/day)	115
N prod. per capita (kg/person/yr)	4.20
N loss in treatment system (% reduction)	50%
P prod. per person per yr (kg/person/yr)	0.60

Nitrogen Report

N plant uptake (kg/yr)	1.07
N load exceedence	0.00
N load percolated (kg/yr)	1.19
N released (perc+exceed.) (kg/yr)	1.19
Enviro.N limit (kg/yr)	7.13
Nitrogen area (m^2)	0
Hydraulic area (m2)	54
total ETA trench area	38.90
number of ETA beds	2
beds total plus separating spaces: X Y dimensions = 10.3m x 6.6m Area =68 m2	

STEP 5 — **Daily effluent flow accord. water supply type**

- Reticulated supply (bore,spring,creek) 180L/p.d
- Reticulated + std. water saving devices 145L/p.d
- Roof water harvesting 140L/p.d
- Roof water harvesting + std. water sav. 115L/p.d

STEP 6

	Grp1	Grp 2
Toilet	☐	☐
Bathroom	☑	☐
Laundry	☑	☐
Kitchen	☑	☐

% black to tot WW in a full system	32%
% black to tot WW in a full system: TN	70%
N loss in disposal bed (% reduction)	20%
wastewater in a full system: TP	40%

Wastewater stream

STEP 7 — **Treatment system**

- Septic (primary teatment only)
- AWTS
- Septic + single pass sandfilter (SPF)
- Septic + SPF, 25% septic return flow
- Septic + recirculating sandfilter
- Septic + reedbed

STEP 8 — **P soil sorption accord. soil type**

- "Alluvial"Soils 1 (dp,mu,my,te) 10,000 kg/ha/m
- "Alluvial"Soils 2 (cr) 2,000 kg/ha/m
- Red Basaltic Soils (bg,ca,co,el,ew,mb,ro,wo) 10,000 kg/ha/m
- Duplex Soils (ba, bi,bu,mi, ni) 8,000 kg/ha/m
- Podzol Soils (ab,bo,br,eb,fh,ki,ku,og,po,ty,wy) 1,000 kg/ha/m

STEP 9 — **Soil texture & structure beneath system**

- Gravels,Sands Ksat >3.0m/d
- Sandy loams - weakly structured Ksat >3.0m/d
- Sandy loams - massive Ksat 1.4 - 3.0m/d
- Loams - high/moderate structured Ksat 1.5 - 3.0m/d
- Loams - weakly structured or massive Ksat 0.5 - 1.5m/d
- Clay loams - high/mod structured Ksat 0.5 - 1.5m/d
- Clay loams - weakly structured Ksat 0.12 - 0.5m/d
- Clay loams - massive structured Ksat 0.06 - 0.12m/d
- Light clays - strongly structured Ksat 0.12 - 0.5m/d
- Light clays - moderately structured Ksat 0.06 - 0.12m/d
- Light clays - weak. structured or massive Ksat <0.06m/d
- Med. to heavy clays - strong. struct. Ksat 0.06-0.5m/d
- Med. to heavy clays - mod. structured Ksat <0.06m/d
- Med. to hvy clays - weak. struct. or massive Ksat<0.06m/d
- DISPERSIVE soil (Modified Emerson Aggregate test)

Wetted depth(m)	0.50
N% removal	50.0%
Seed bed area (m2)	10.2
BOD target of 20mg/L is	Current Outlet BOD

STEP 10 — Water Table/ Bedrock Depth (m): 3.00

STEP 11 — **% Effective Rainfall**

- Mounded bed
- Level bed with grass

STEP 12 — **Soil texture in root zone**

- Coarse Sand
- Fine sand, Sandy loams
- Loams,Clay loams,Silt
- Clay (light,med,heavy)

Effective porosity of root zone	0.34
Effective porosity of bluemetal in trench below root zone	0.43
Avail.Water Capacity (AWC) of root zone	0.13
Default AWC of bluemetal in trench below root zone	0.00

Trench under root zone <-

Land Application Type

STEP 13 — SSI / ETA

Lateral seepage width (m): 0.300

STEP 14 — Calculate (or Cntl- q)

STEP 15 — ETA trench separation: 2.00

ETA trench width (m): 2.00

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