

J. Forrest Locality Report

1j. Introduction

Forest is located approximately 22km southeast of Colac in the northern hinterlands of the Otway Ranges. The town is located along a ridgeline that separates two well defined catchments. The majority of the locality is located outside DWSCs; however, small portions (10%) along the north-western and south-eastern boundaries fall within the Gellibrand River and Upper Barwon DWSCs, respectively.

There are approximately 354 and 167 unsewered properties/parcels within the Forrest locality and town, respectively, with 130 DWM system permits that have been inspected to date by COS. The current DW permits and their associated treatment system and LAA method within Forrest are summarised as follows:

- 23 AWTS (9 drip irrigation, 2 trenches, 7 subsurface irrigation and 5 unknown);
- 38 sand filters (1 trench and 37 subsurface irrigation);
- 39 septic tanks (10 trenches, 1 irrigation and 28 unknown);
- 2 worm farms (2 trenches); and
- 28 unknown (10 trenches, 1 subsurface irrigation and 17 unknown).

No field investigations were conducted within the Forrest locality as part of the 2014 field assessments.

2j. Background Documentation

Refer to the following documents for additional detail regarding the locality:

- Forrest Structure Plan (2011); and
- Colac Otway Domestic Wastewater Management Plan (2007);
- COS Planning Scheme; and
- Rural Living Strategy (2011).

3j. Summary of Constraints to DWM

Characteristic	Description
Climate Zone	Zones 2 and 3.
Surface waterways & catchments	A small region of the locality is located with DWSCs, being the Upper Barwon and Gellibrand River, but the town is located outside a DWSC. West Barwon Reservoir is located approximately 8km to the south of the town inside Barwon DWSC. Barwon River West Branch traverses north and east of the town. Other waterways within the locality include: Road Knight Creek, Porcupine Creek, and Barwon River East Branch. Limited surface water concerns are located along the ridgeline.
Groundwater	Proximity to groundwater bores: distributed throughout the northern

Characteristic	Description
	region and along the river, but density is less than other localities.
Land subject to inundation	Transverses locality north-south along Barwon River West Branch which runs along the eastern perimeter of the town.
Useable lot area Town (Locality)	High: 88 (129) Moderate: 55 (62) Low: 24 (157) Compliant: 0 (6)
Minimum lot size compliance with Planning Scheme Zoning	<p>The locality is zoned a variety of different uses, predominantly being zoned Farming Zone, Public Conservation and Resource Zone, and Public Use Zone around the reservoir. The town is zoned as Township Zone, Rural Living Zone and Rural Activity Zone.</p> <p>Compliance is variable throughout the locality, with the majority of the properties/parcels within the town compliant and surrounding properties/parcels non-compliant.</p> <p>Compliant: 150 (178) Non-compliant: 17 (176)</p>
Slope Town (Locality)	High: 7 (88) Moderate: 22 (63) Low: 138 (203)
Geology	<p>Town – Dilwyn Formation of Wangeripp Group (shallow marine, coastal barrier and back beach lagoonal deposit);</p> <p>North: Gellibrand Marl of Hytesbury Group (continental shelf deposit);</p> <p>South – Eumeralla Formation of the Otway Group (fluvial and braided stream deposits) with alluvial flood plain deposits along the creek.</p>
Soil suitability Town (Locality)	<p>High: 0 (28) Moderate: 167 (326) Low: 0 (0)</p> <p>The town consists of soil landscape unit '73' which form on the steep rolling hills on the northern periphery of the Otway Range and consists of texture contrast soils with ironstone to 2m depth. The soils consist of weakly structured sandy loam over strongly structured medium to heavy clay. Limitations include low fertility, low p-sorb, sodic, dispersive, restricted drainage and coarse fragments.</p> <p>The regions adjacent to the river to the north and west of the town consist of soil landscape unit '95' which forms on the alluvial floodplain</p>

Characteristic	Description
	<p>of the Barwon River and its tributaries with numerous cut-off meanders. The soil consists of a moderately structured fine sandy clay loam over medium clay to more than 2m depth. Limitations include restricted drainage and dispersive.</p> <p>South and east facing slopes are linear and consist of in situ weathered rock with brown gradational soils covered by loam. North and west facing slopes consist of in situ weathered rock with brown duplex soils covered by loam.</p>
Sensitivity Overlay	<p>Depth to Groundwater Compliance: predominantly compliant, except in the northeast of the locality along Barwon River East Branch.</p> <p>Landslip: extensive around locality and surrounding locality</p> <p>Vegetation: Otway Forest Park surrounds the town, with a small region of Great Otway National Park.</p>
Sensitivity Analysis Rating Town (Locality)	<p>Very High: 0 (9)</p> <p>High: 14 (45)</p> <p>Moderate: 153 (287)</p> <p>Low: 0 (13)</p>

4j. Sensitivity Analysis (Maps)

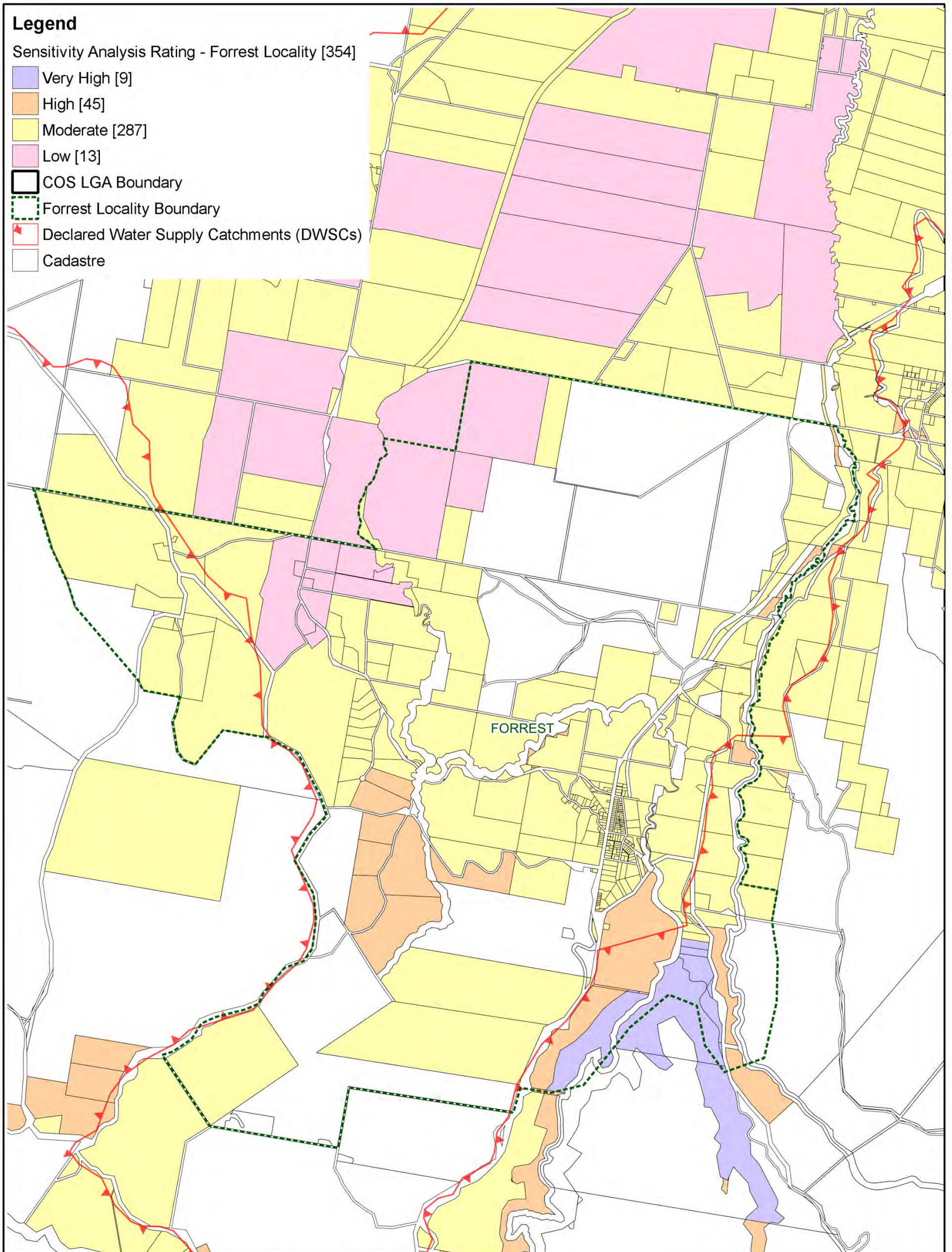


Figure j1: Sensitivity Analysis - Forreast Locality

Colac Otway Shire DWMP Review

Whitehead & Associates Environmental Consultants

0 1 2 3 4 5 km (Approx Scale)

Revision 3
 Drawn JK
 Approved MS

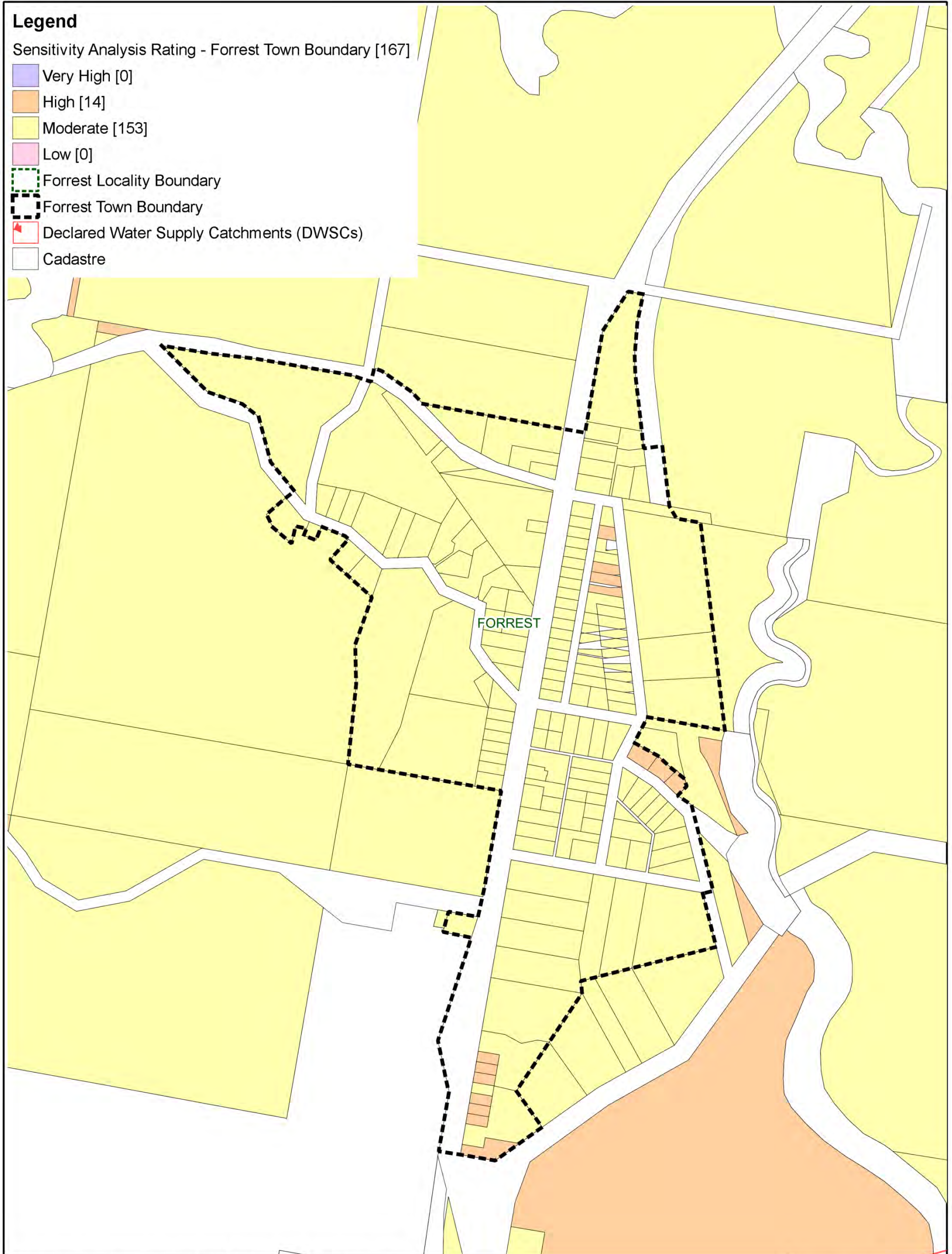


Figure j2: Sensitivity Analysis - Forrest Town			
Colac Otway Shire DWMP Review			
Whitehead & Associates Environmental Consultants	<p>0 150 300 450 600 750 m</p> <p>(Approx Scale)</p>	Revision	3
		Drawn	JK
		Approved	MS

5j. System Selection

Due to the dominance of heavy-textured soils in the Forrest area, conventional absorption trenches and beds are not likely to be feasible and are discouraged. Appendix A of the EPA Code of Practice (2013) prohibits LPED systems on Category 5 and 6 soils (medium to heavy clays). The System Sizing Tables (below) indicate which systems are likely to be the most appropriate for the locality.

6j. System Sizing Tables

Sizing Tables for each system type were created using conservative monthly water balances, following methods described in the MAV Model LCA, 2014. The water balances used monthly 70th percentile rainfall and average evapotranspiration data for Gellibrand, as it was compared with that of Forrest and found to be very similar, with very little size differences in water balance results. The climate data for Gellibrand was sourced from SILO (Scientific Information for Land Owners) climate databases, which are managed by the Queensland Government. The SILO databases use accurate meteorological data collected throughout Australia over long time periods.

The Design Loading Rates (DLRs) and Design Irrigation Rates (DIRs) were taken from the current EPA Code of Practice. Where the Code of Practice has precluded use of a particular type of system on a certain soil type, it is shown as 'Not Applicable' for that soil type in the Sizing Tables. Where the evapotranspiration deficit requires unrealistically large land application areas for a particular system on a certain soil type, it is also shown as 'Not Applicable' for that soil type in the Sizing Tables. Detailed, site-specific LCAs and system designs would be required to further investigate the feasibility of systems deemed 'Not Applicable' in the sizing tables. Mitigation measures (such as importation of topsoil to appropriate depths in the land application area), may be required to sustainably achieve land application of effluent on constrained properties/parcels.

Sizing Tables for the Forrest locality are provided below.

7j. General Conclusion

The properties/parcels within Forrest have been assigned all classes of Sensitivity Rating to sustainable DWM, with the majority of the properties/parcels assigned a Moderate Sensitivity Rating. Predominantly, Standard LCAs will be required, with the use of System Sizing Tables deemed appropriate. The Low Sensitivity Rating properties/parcels that fall within a DWSC are required to complete a Standard LCA as per the current EPA Code of Practice's requirements. Particular attention needs to be directed towards ensuring that the degree of slope is taken into consideration when designing the LAA. The locality is also extensively considered to be prone to landslip; a geotechnical report by a suitably qualified person will need to be conducted to address this constraint.

Forrest										
Drip and Spray Irrigation Systems* - Secondary Treated Effluent only										
	Soil Category	Gravels & Sands (1)	Sandy Loams (2)	Loams (3)	Clay Loams (4)	Light Clays (5)	Medium to Heavy Clays (6)			
	DIR (mm)	5	5	4	3.5	3	2			
Development Type	Daily (L/day)	Total min. irrigation area required for zero wet weather effluent storage (m ²) not including spacing or setbacks								
5 + bedroom residence	1,080	380		586	804	1,269	1,881			
4 bedroom residence	900	317		489	670	1,068	1,568			
1-3 bedroom residence	720	254		391	536	854	1,254			
Note: * irrigation system sizes are based on the assumption that the land application area is less than 10% slope. Reductions in DIR apply for slopes above 10% according to Table M2 of AS1547:2012										
Conventional Absorption Trenches and Beds - Primary Treated Effluent										
	Soil Category	Gravels & Sands (1)	Sandy Loams (2)	Loams (3)	Weak Loams & High/Mod Clay Loams (3 & 4)	Weak Clay Loams (4)	Light Clays (5)	Massive Clay Loams (4)	Medium to Heavy Clays (6)	
	DLR (mm)	Not supported (Alternative Land Application System Required)								
Development Type	Daily (L/day)									
5 + bedroom residence	1,080									
4 bedroom residence	900									
1-3 bedroom residence	720									
Evapotranspiration-Absorption Trenches and Beds - Primary Treated Effluent (Category 1 to 5) and Secondary Treated Effluent only (Category 6)										
	Soil Category	Gravels & Sands (1)	Sandy Loams (2)	Loams (3a)	Weak/Massive Loams (3b)	High/Mod Clay Loams (4a)	Weak Clay Loams (4b) & Strong Light Clays (5a)	Massive Clay Loams (4c) and Mod & Weak Light Clays (5b, 5c)	Medium to Heavy Clays (6) - Secondary Effluent Only	
	DLR (mm)	20*	20*	15	10	12	8	5	5	
Development Type	Daily (L/day)	Total min. basal or 'wetted area' required for zero wet weather storage (m ²) not including spacing & setbacks								
5 + bedroom residence	1,080	62		87	144	114	197		431	
4 bedroom residence	900	52		72	120	95	164		360	
1-3 bedroom residence	720	42		58	96	76	131		288	
Note: * Gravels, Sands and sandy loams are unsuitable for conventional absorption trenches and beds if there is a high watertable, including seasonal and perched watertables. Value based on average of conservative rate and maximum rate for Category 2b and 3a soils in AS1547:2012										
LPED Irrigation Systems - Primary or Secondary Treated Effluent										
	Soil Category	Gravels & Sands (1)	Sandy Loams (2)	Loams (3)	Clay Loams (4)	Light Clays (5)	Medium to Heavy Clays (6)			
	DIR (mm)	N/A (Alternative Land Application System Required)	4	3.5	N/A (Alternative Land Application System Required)	N/A (Alternative Land Application System Required)	N/A (Alternative Land Application System Required)			
Development Type	Daily (L/day)		Total min. basal or 'wetted area'†							
5 + bedroom residence	1,080		717	1,073						
4 bedroom residence	900		598	895						
1-3 bedroom residence	720		478	716						
† required for zero wet weather storage (m ²) not including spacing & setbacks										
Wick Trenches and Beds - Secondary Treated Effluent Only										
	Soil Category	Gravels & Sands (1)	Sandy Loams (2) Loams (3) & High/Mod Clay Loams (4a,b)	Weak Clay Loams (4)	Massive Clay Loams (4)	Strong Light Clays (5a)	Moderate Light Clays (5b)	Weak Light Clays (5c)	Medium to Heavy Clays (6)	
	DLR (mm)	25	30	20	10	12	8	8	N/A (Alternative Land Application System Required)	
Development Type	Daily (L/day)	Total min. basal or 'wetted area' required for zero wet weather storage (m ²) not including spacing & setbacks								
5 + bedroom residence	1,080	48	40	62	145	114	197			
4 bedroom residence	900	40	33	52	121	95	164			
1-3 bedroom residence	720	32	27	42	97	76	132			