

I. Cororooke Locality Report

1i. Introduction

Cororooke is a rural locality located approximately 7km northwest of Colac in close proximity to the Coragulac and Alvie localities within the Red Rock region. The landform features undulating agricultural land on the Western Volcanic Plains.

There are approximately 301 and 112 unsewered properties/parcels located within the Cororooke locality and town, respectively, with 67 DWM system permits that have been inspected to date by COS. The current DWM permits and their associated treatment system and LAA method within the Cororooke locality are summarised as follows:

- 12 AWTS (5 drip irrigation, 1 irrigation, 1 trench and 5 unknown);
- 1 sand filter (1 drip irrigation);
- 41 septic tanks (3 trenches, 1 irrigation, 1 subsurface irrigation and 36 unknown); and
- 13 unknown (2 trenches and 11 unknown).

No field investigations were conducted in the Cororooke locality as part of the 2014 field assessments.

2i. Background Documentation

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

- Red Rock Region Community Infrastructure Plan (September, 2013);
- COS Planning Scheme; and
- Rural Living Strategy (2011).

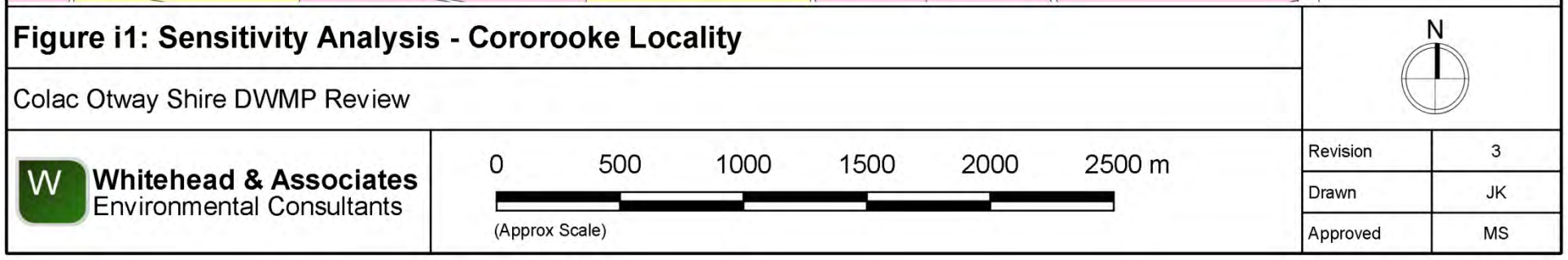
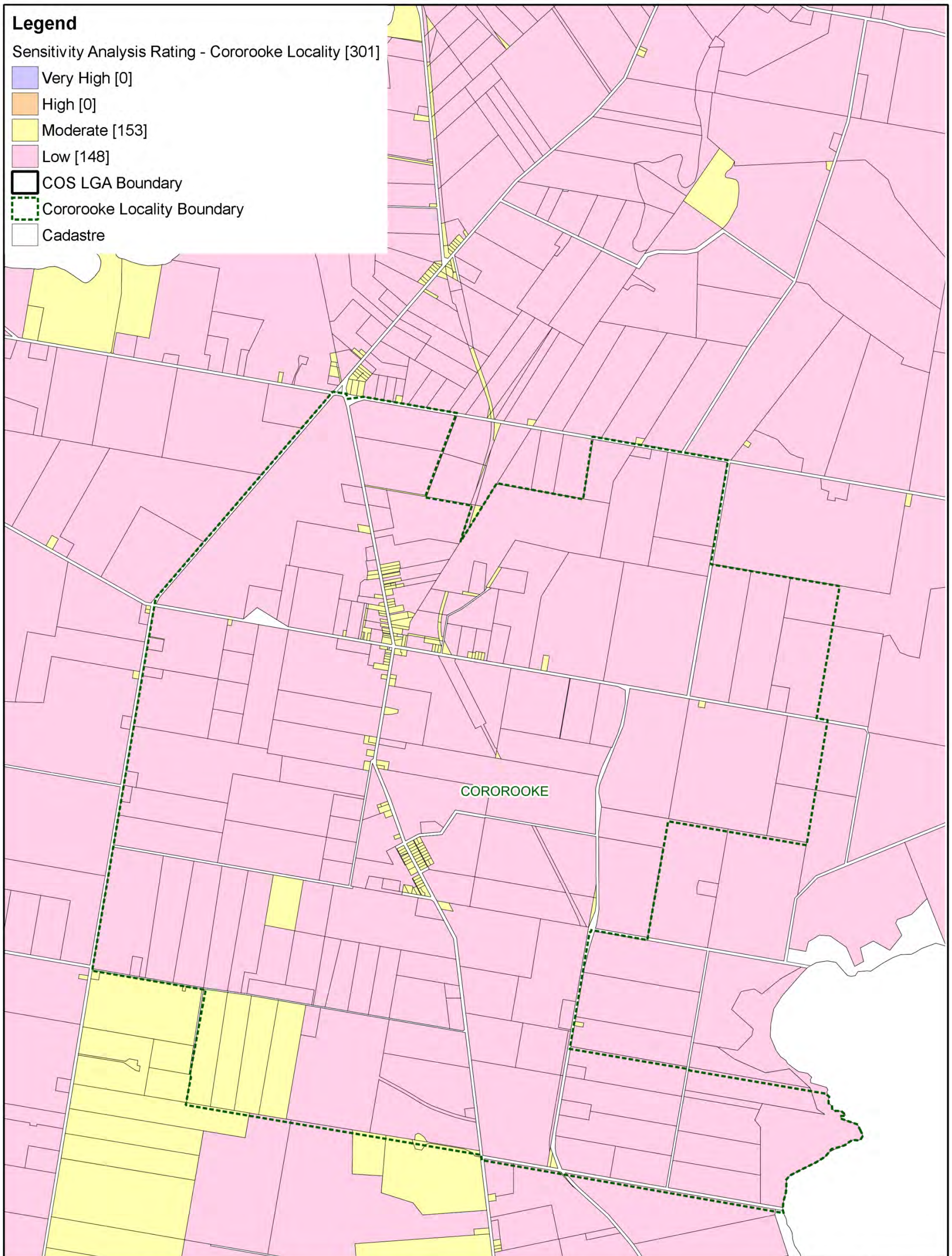
3i. Summary of Constraints to DWM

Characteristic	Description
Climate Zone	Zone 2.
Surface waterways & catchments	Located outside of a DWSC. Minimal drainage features, with Lake Colac to the east.
Groundwater	Proximity to groundwater bores: distributed throughout the locality, similar to Coragulac.
Land subject to inundation	Nil but extensive to the east (associated with Lake Colac).
Useable lot area Town (Locality)	High: 69 (95) Moderate: 26 (45) Low: 17 (158) Compliant: 0 (3)

Characteristic	Description
Minimum lot size compliance with Planning Scheme Zoning	<p>The locality is predominantly zoned Farming Zone. The town is zoned Township Zone and Rural Living Zone.</p> <p>Compliance is variable throughout the locality, with the majority of the rural properties/parcels non-compliant.</p> <p>Compliant: 69 (77)</p> <p>Non-compliant: 43 (224)</p>
Slope Town (Locality)	<p>High: 0 (0)</p> <p>Moderate: 0 (2)</p> <p>Low: 112 (299)</p>
Geology	<p>Variable.</p> <p>The town is predominately underlain by unnamed stony rises and hummocky lava flows of the Newer Volcanic Group Transversing east-west.</p> <p>North of the town – unnamed phreatomagmatic deposits (tuff rings) of Newer Volcanic Group</p> <p>South of the town – Quaternary unnamed swamp, lake and estuarine deposits.</p> <p>Southern region – Hanson Plain sand of the Brighton Group which is comprised of fluvial and minor shallow marine deposits</p> <p>Along southern boundary – unnamed sheet flow basalt of the Newer Volcanic Group.</p>
Soil suitability Town (Locality)	<p>High: 0 (14)</p> <p>Moderate: 112 (287)</p> <p>Low: 0 (0)</p> <p>Variable throughout locality (6 in total).</p> <p>The dominant soil landscape unit, which also includes the town, is '114' which forms on gently undulating plains and stony rises of the Volcanic Western Plains. Soil type changes significantly with landform, but generally consists of moderately to strongly structured, friable clay loam over strongly structured medium clay to less than 1.5m depth. Limitations include restricted drainage.</p>
Sensitivity Overlay	<p>Depth to Groundwater Compliance: all compliant, including town, except for the eastern properties/parcels around Lake Colac.</p> <p>Landslip: Nil</p> <p>Vegetation: Lake Colac to southeast.</p>

Characteristic	Description
Final Sensitivity Rating Town (Locality)	Very High: 0 (0) High: 0 (0) Moderate: 95 (153) Low: 17 (148)

4i. Sensitivity Analysis (Maps)



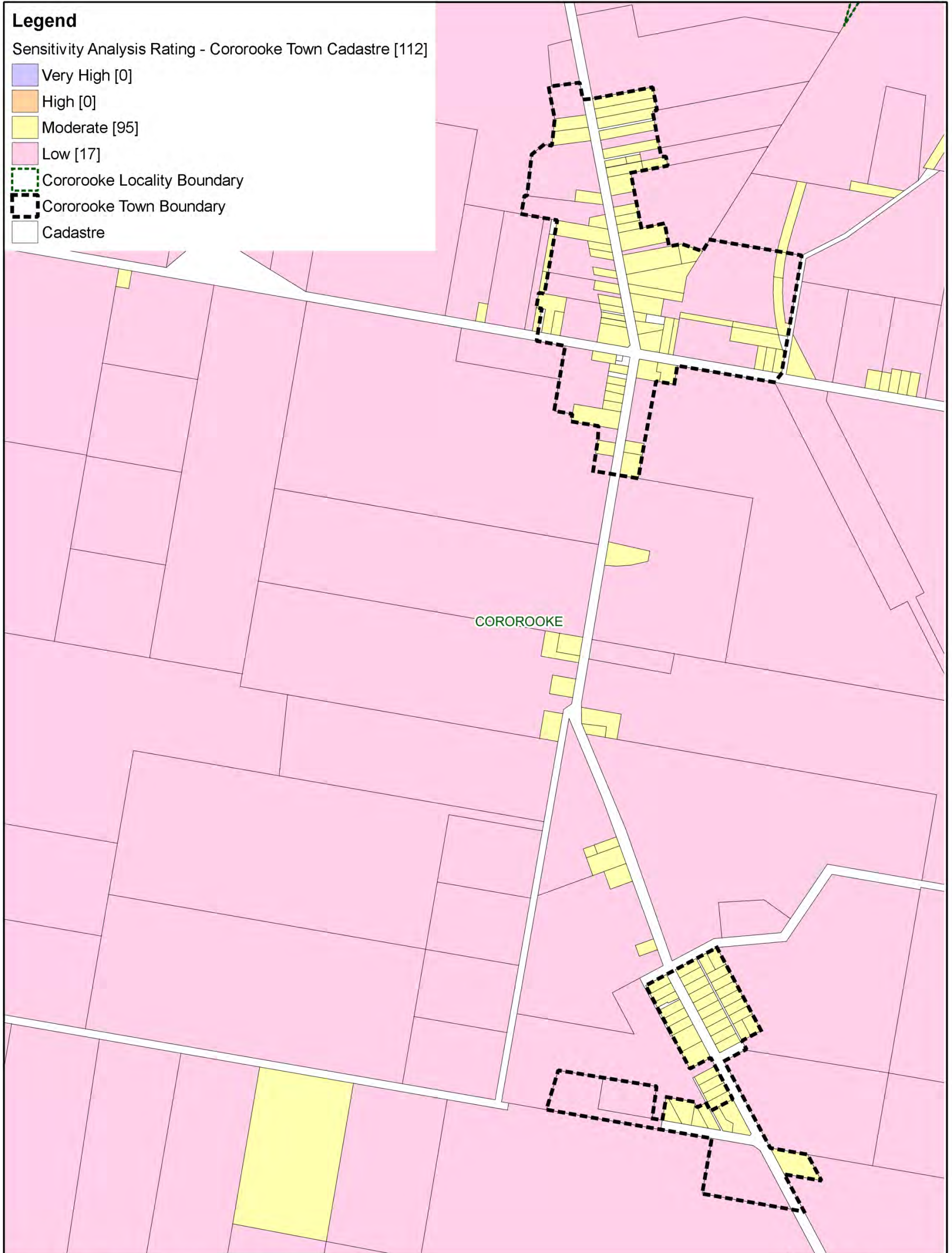





Figure i2: Sensitivity Analysis - Cororooke Town			
Colac Otway Shire DWMP Review			
 Whitehead & Associates Environmental Consultants	0 200 400 600 800 1000 m  (Approx Scale)		Revision 3
			Drawn JK
			Approved MS

5i. System Selection

Based on soil types and indicative depths, the Cororooke locality has the potential to sustainably accommodate a broad range of system types, depending on the influences of climate. The System Sizing Tables (below) indicate which systems are likely to be the most appropriate for the locality.

6i. 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 a single geographic point between Cororooke and Coragulac, due to their proximity. The climate data 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 Cororooke locality are provided below.

7i. General Conclusion

The properties/parcels within Cororooke have been assigned a Moderate or Low Sensitivity Rating to sustainable DWM. Both Standard and Council LCAs will be required, with the use of System Sizing Tables deemed appropriate. The constraints within Cororooke are quite low in comparison to other localities. Particular attention should be directed towards ensuring that the quality of the groundwater resources is maintained and the correct decommissioning of groundwater bores occurs where necessary.

Cororooke									
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 & setbacks							
5 + bedroom residence	1,080	287	390	476	610	1,397			
4 bedroom residence	900	239	325	396	508	1,164			
1-3 bedroom residence	720	191	260	317	407	932			
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 or Secondary Treated Effluent									
Soil Category	Gravels & Sands (1)	Sandy Loams (2)	Loams (3)	Weak Loams & High/Mod Clay Loams (3 & 4)	Weak Clay Loams (4)	Massive Clay Loams (4)	Light Clays (5)	Medium to Heavy Clays (6)	
DLR (mm)	20*	20*	15	10	6	4	5		
Development Type	Daily (L/day)	Total min. basal or 'wetted' area required for zero wet weather effluent storage (m ²) not including spacing & setbacks							
5 + bedroom residence	1,080	59	80	127	238	424	305	N/A (Alternative Land Application System Required)	
4 bedroom residence	900	49	67	106	198	353	254		
1-3 bedroom residence	720	39	54	85	159	283	203		
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									
Evapotranspiration-Absorption Trenches and Beds - Primary or Secondary 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 effluent storage (m ²) not including spacing & setbacks							
5 + bedroom residence	1,080	59	80	127	103	165	305		
4 bedroom residence	900	49	67	106	86	138	254		
1-3 bedroom residence	720	39	54	85	69	110	203		
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	4	3.5	3	2.5				
Development Type	Daily (L/day)	Total min. basal or 'wetted' area for zero wet weather storage (m ²)†				N/A (Alternative Land Application System Required)			
5 + bedroom residence	1,080	424	527	697	1,029				
4 bedroom residence	900	353	440	581	858				
1-3 bedroom residence	720	283	352	465	686				
† 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	5	
Development Type	Daily (L/day)	Total min. basal or 'wetted' area required for zero wet weather effluent storage (m ²) not including spacing & setbacks							
5 + bedroom residence	1,080	46	38	59	127	103	165	305	
4 bedroom residence	900	39	32	49	106	86	138	254	
1-3 bedroom residence	720	31	26	39	85	69	110	203	