

On-site Wastewater Management Training Course

Land Capability Assessment: Desktop Study

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Land Capability Assessment

- The Environment Protection Act 2017 sets out requirements for reducing the risk of harm to the environment or human health from all activities (including domestic wastewater management) using:
 - Part 3.2 General Environmental Duty (GED), and
 - Part 7.3 Obligations for Managers of Land or Infrastructure (OMLI)
- Infrastructure includes “wastewater treatment and septic tank systems”

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General Environmental Duty

- Commence 1 July 2021 under EP Act 2017
- Businesses (and persons) are responsible for protecting the environment and human health
- Intended to reduce the risk of harm from activities:
 - to human health and the environment
 - from pollution or waste
- Additional detail in Section 13.1 in notes

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OMLI

- Section 156 of EP Act 2017
- Managers (Councils) to minimise the risk of harm to environment and human health from pollution by:
 - taking specified actions,
 - taking specified account, or
 - complying with specified guidance (Codes, Standards etc.)

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OMLI 2023

- Part 3 On-Site Wastewater Management
- Councils develop an ‘On-site Wastewater Management Plan’ (OWMP) that:
 - identifies existing and future risks from OWM (including cumulative impacts)
 - identifies appropriate actions to address risks (including timeframes), and
 - outlines compliance and enforcement procedures

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EP Regulations 2021

- Impose obligations for managers (Councils) relating to on-site wastewater management (OWM) systems (<5,000L/day)
- Council permit and condition the construction, installation, alteration and operation of OWM systems
- If required by Council, the permit application must be supported by a Land Capability Assessment

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Land Capability Assessment

- Residential developments that generate wastewater may require a Land Capability Assessment (LCA) to be undertaken at some time before the development proceeds, for submission to the local Council
- The LCA should demonstrate that wastewater can be treated and retained within allotment boundaries
- May be done at subdivision (required) or single lot development stage

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Definition

- Environmental Protection regulation (EPR) 47/2021 defines LCA as:

“an assessment of the risks of harm to human health and the environment of the proposed or existing on-site wastewater management system at the site, taking into account the proposed or existing use of the system”

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Reference Material

- The Code of Practice (CoP) – Onsite Wastewater Management, Publication 891.4 (EPA, 2016) refers to the requirement for LCA, and directs to:
- Model LCA Report (MAV & DSE, 2006 as amended)
- i.e. Victorian Land Capability Assessment Framework (MAV, DEPI & EPA 2014)

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Victorian Land Capability Assessment Framework

Document from www.mav.asn.au

- Victorian Land Capability Assessment Framework (Word - 1.13MB)

Water Balance resources from www.onsiteisite.com

- VLCAF irrigation area sizing spreadsheet (Excel - 36.4KB)
- VLCAF trench and bed sizing spreadsheet (Excel - 21.3KB)

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Purpose

Generally, an LCA is intended to:

- Identify locality, landscape and soil characteristics significant in the selection, location and sizing of an on-site wastewater management system
- Assess the capability of a Site to sustainably manage wastewater within allotment boundaries; and
- Determine risk, gather relevant information to inform the design process and formulate a sustainable 'Management Plan'

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When is LCA required?

- Recommended for all unsewered development
- May not be required by Council if site is considered low risk or if adequate information is already available
- OWMP will advise 'risk' status of land
- Mandatory for all unsewered development in Special Water Supply Catchment areas (Section 3.6 CoP)

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Who should undertake LCA?

- Must be completed by a person that Council considers is “suitably qualified and to a standard acceptable to the Council”
- Generally, a person who has appropriate technical expertise and experience in site and soil assessment and on-site wastewater design
- Councils may require written verification of qualifications, experience, professional membership and professional indemnity insurance

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Consultation and Review

- Council officers assessing LCAs should be similarly qualified and experienced to competently and confidently interpret and evaluate LCA reports and specify permit conditions
- Developers and LCA Assessors should consult with Council before and during the preparation of a LCA

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Important Advice

- **Consultation is the Key:** early consultation between Council and the Assessor is vital in determining what is expected in the LCA, what special issues might apply in the area, or additional information available from Council
- Other matters:
 - planning or sensitivity overlays
 - utility / infrastructure plans
 - legal instruments (e.g. easements)
 - local OWM performance issues

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Undertaking LCA

- Single-lot or subdivision/planning scheme changes
- Focus here is on single-lot LCAs
- Reporting based on EPA Code of Practice 891.4 and Australian Standard AS/NZS1547:2012
- Level of detail depends on site and surroundings
- LCA assigns a level of constraint to each site and soil characteristic
- Should be undertaken “as early as possible in the planning phase”

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‘Site’ characteristics

- | | |
|----------------------|-----------------------------|
| • Climate | • Drainage (indicative) |
| • Flood potential | • Fill |
| • Exposure | • (Available) Land Area |
| • Slope (%) | • Geology and rock outcrops |
| • Landform | • Vegetation |
| • Run-on and seepage | |
| • Erosion potential | |

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Stages of Data Collection

- Desktop Study (focus of this session)
- Site and soil check
- Soil description and profile assessment
- Calculations
- Collection of additional data
- Identify opportunities and constraints
- Mitigation options?
- Selection of appropriate system

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Desktop Study

- Undertaken in consultation with the site owner
- Involves the collation and interpretation of available information
- Much can be derived online or from Council and relevant Government agencies and authority databases

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Desktop Study

- Collects preliminary data from readily available sources
- Provides an overview of opportunities and constraints
- Determines what information is relevant
- Identifies information gaps and what additional information is required

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Imagery

- Satellite imagery www.google.com/earth/
- Free to download and activate
- Image quality varies
- Location (latitude/longitude), elevation and has capacity for measurement and historical imagery
- Images can be rotated for different views (including Street View)

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Imagery



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Topographic Maps

Show:

- Landscape
- Contours
- Anthropogenic (human) features
- Cadastral boundaries
- Grid references
- 1:25,000 maps have 10 metre contours

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Topographic Maps

Can determine or identify:

- Shape of land
- Drainage direction
- Water bodies and drainage lines
- Slope
- Relief (difference in elevation)
- Aspect (facing direction)

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Topographic Maps



Image: MapshareVic

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Maps and Spatial Information

- NSW www.maps.six.nsw.gov.au
- NSW www.nratlas.nsw.gov.au
- TAS www.mrt.tas.gov.au
- VIC www.mapshare.vic.gov.au/mapsharevic
- WA www2.landgate.wa.gov.au

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Geological Maps

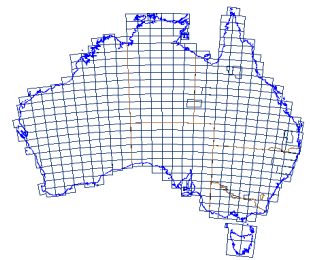
- Scanned 1:250,000 geological maps of much of Australia available from Geoscience Australia:
- www.geoscience.gov.au
- Geological maps of Victoria available from:
- <http://dpistore.efirst.com.au>

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Geological Maps

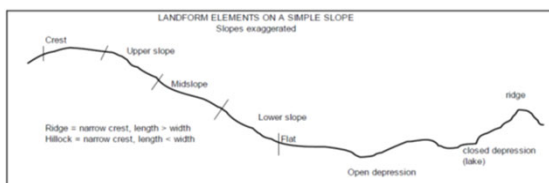
- Select location
- Choose resolution
- Relate landforms
- Solid geology
- Superficial deposits
 - Alluvium
 - Beach deposits
 - Colluvium



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Site Landform

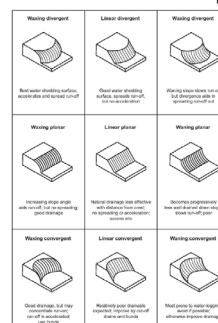


Landform elements on a simple slope

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Slope Configuration



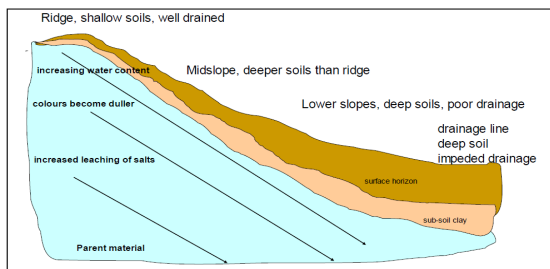
- Slope (gradient and shape)
- Important to understand how surface water will flow in or near LAA
- Waning / waxing / linear
- Converging or diverging

FIGURE 12 SLOPE CONFIGURATION AND SURFACE DRAINAGE

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Soil Properties and Topography



Position in landscape significant in soil profile characteristics

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Soil Information Sources

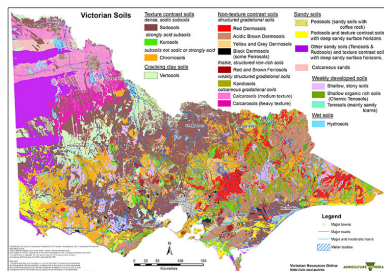
- Atlas of Australian Resources, Volume 1 Soils and Land Use (Division of National Mapping, Canberra, 1980)
- VIC soils maps and data from Department of Primary Industries www.dpi.vic.gov.au/vro

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Soil Maps

- Soil maps of VIC available from Victorian Resources Online (VRO) www.dpi.vic.gov.au/vro



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Soil Data online

- Australian Soil Resource Information System (ASRIS) <http://www.asris.csiro.au/mapping/viewer.htm>
- TERN ecosystem data collection (90m resolution) Australian Soil Classification <https://www.tern.org.au/news-australian-soil-classification-map/>

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Climate Data

- Bureau of Meteorology www.bom.gov.au
- Rainfall
- Evaporation
- SILO or Data Drill data available if no suitable or local station

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SILO Data Drill

- QLD DNR www.longpaddock.qld.gov.au/silo/

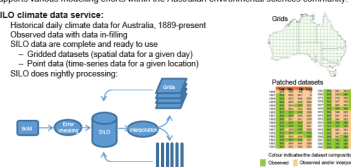
SILO Climate data online resource

SILO (Scientific Information for Land Owners) is a Queensland Government database containing point and gridded daily climate data for Australia from 1889 until present. SILO was designed to serve the needs of agricultural and hydrological modelling and bridges the gap between meteorological services and modellers.

SILO provides daily point and spatially interpolated data with continuous (no missing days) datasets covering the period of 1889 until present. Consistent long-term climate data-series supports various modelling efforts within the Australian environmental sciences community.

SILO climate data service:

- Historical daily climate data for Australia, 1889-present
- Observed data with data in-filling
- SILO data are complete and ready to use
 - Gridded datasets (spatial data for a given day)
 - Point data (time-series data for a given location)
- SILO does nightly processing:



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Groundwater

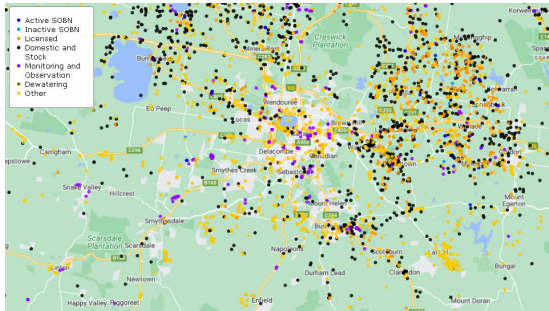


Image: DELWP (GW bores Ballarat)

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Groundwater

- DELWP Water Measurement Information System <https://data.water.vic.gov.au/>
- Visualising Victoria's Groundwater <https://www.vvg.org.au/>

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Other Resources

- Vegetation maps
- Bushfire maps
- Special Water Supply Catchment maps
- Flood maps
- Maps of services (water, sewer)
- Local studies

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Site Plan and Description

- A Site Plan should be prepared showing, as a minimum:
 - contours, boundaries, location of watercourses, location of any buildings,
 - the wastewater treatment system, and
 - the area available for the application of the treated effluent
- A description of the nature of the key site and soil features

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Buffers or Setbacks

- Provide mitigation against unidentified or unintended hazards
- Reduce potential pathways for human and environmental exposure
- Valuable and cost-effective risk management strategy for OWM
- Appropriate buffer selection based on EPA Code of Practice 891.4 (Table 5) and AS/NZS 1547:2012 (Table R1)

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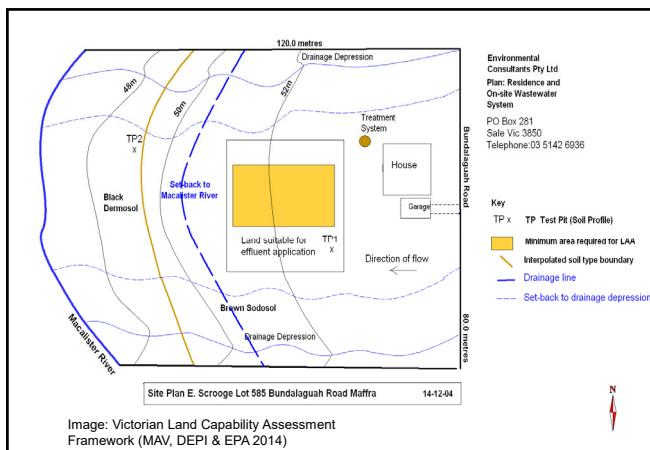


Image: Victorian Land Capability Assessment Framework (MAV, DEPI & EPA 2014)

Table 5: Setback distances for primary and secondary treatment plants and effluent disposal/irrigation areas in sewered and unsewered areas (where applicable) ^{1, 2, 4, 10}

Landscape feature or structure	Setback distances (m)		
	Primary sewage and greywater systems	Secondary sewage and greywater systems	Advanced secondary greywater systems ¹
Buildings			
Wastewater field up-slope of building ¹	6	3	3
Wastewater field down-slope of building	3	1.5	1.5
Wastewater up-slope of cutting/embankment ¹	15	15	15
Protected boundaries			
Wastewater field up-slope of adjacent lot	6	3	1
Wastewater field down-slope of adjacent lot	3	1.5	0.5
Services			
Water supply pipe	3	1.5	1.5
Wastewater up-slope of potable supply channel	300	150	150
Wastewater field down-slope of potable supply channel	20	10	10
Gas supply pipe	3	1.5	1.5
In-ground water tank ¹⁰	15	7.5	3
Stormwater drain	6	3	2
Recreational areas			
Children's grassed playground ¹⁰	6	3 ¹⁰	2 ¹⁰
In-ground swimming pool	6	3 ¹⁰	2 ¹⁰
Surface waters (up-slope of)			
Dam, lake or reservoir (potable water supply) ^{1, 10}	300	300 ¹	150
Waterways (potable water supply) ^{1, 10}	100	100 ^{1, 10}	50
Waterways, wetlands (continuous or ephemeral, non-potable) estuaries, ocean beach at high-tide mark, dams, reservoirs or lakes (stock and domestic, non-potable) ^{1, 10}	60	30	30
Environmental values			
Category 1 and 2a soils	NA ¹	50 ¹⁰	20
Category 2b to 6 soils	20	20	20
Vegetation			
Vertical depth from base of trench to the highest seasonal water table ¹⁰	1.5	1.5	1.5
Vertical depth from irrigation pipes to the highest seasonal water table ¹⁰	NA	1.5	1.5

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Desktop Summary

- Tabulate data
- Assessment of level of constraint for each relevant site and soil characteristic
- Design on most limiting feature, or
- Engineer out (mitigate) limiting features

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Preliminary 'Constraint' mapping

- Undertaken in advance of and to prepare for field study
- Guides field study
- Identifies data gaps to be filled by field study
- Most importantly, saves time and money

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Into the Field we go....

Desktop Study – the study will have identified potentially suitable effluent dispersal areas (EDAs) from available information sources. A preliminary constraints map will also identify:

- Appropriate setback areas from natural or built features (existing and proposed)
- Identified physical constraints (e.g. bedrock, fill)
- Data gaps (areas for investigation)
- Regional soil landscapes (including boundaries)
- Recommended soil (test pit) locations
- Indicative groundwater depth

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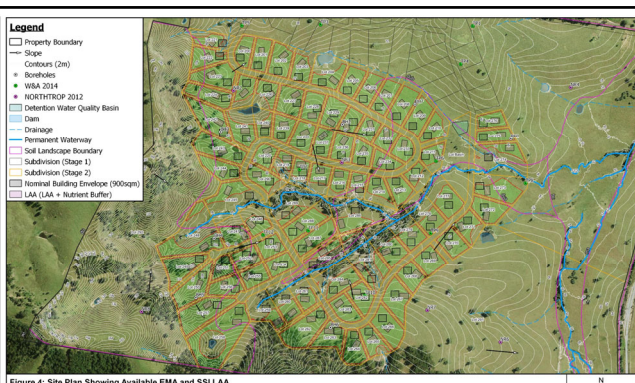
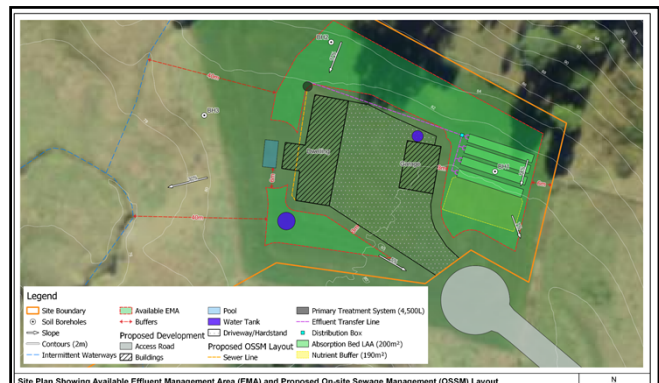


Figure 4: Site Plan Showing Available EMA and SSI LAA

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Site Plan Showing Available Effluent Management Area (EMA) and Proposed On-site Sewage Management (OSSM) Layout

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