Government of **Western Australia**
Department of **Health**

Assessment of Site-and-Soil Evaluation Reports

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Senior Scientific Officer

Environmental Health Directorate

27 August 2021

better health ▪ better care ▪ better value

Overview

- SSE regulatory requirements
- Government Sewerage Policy 2019/Draft SPP 2.9
- What is Site-and-soil evaluation(SSE) report?
- SSE procedure of AS/NZS 1547:2012
- SSE guidance material:
  - Guidance note
  - Template
  - Water Balance spreadsheet
  - Checklist

SSE regulatory requirements

Planning and Development proposals

Government Sewerage Policy/SPP 2.9

(Planning and Development Act 2005)

SSE required for most unsewered proposals as per **AS/NZS 1547**

Application to install a wastewater system

Regulations 1974

(Health (MP) Act 1911)

SSE required for large commercial applications as per

AS/NZS 1547

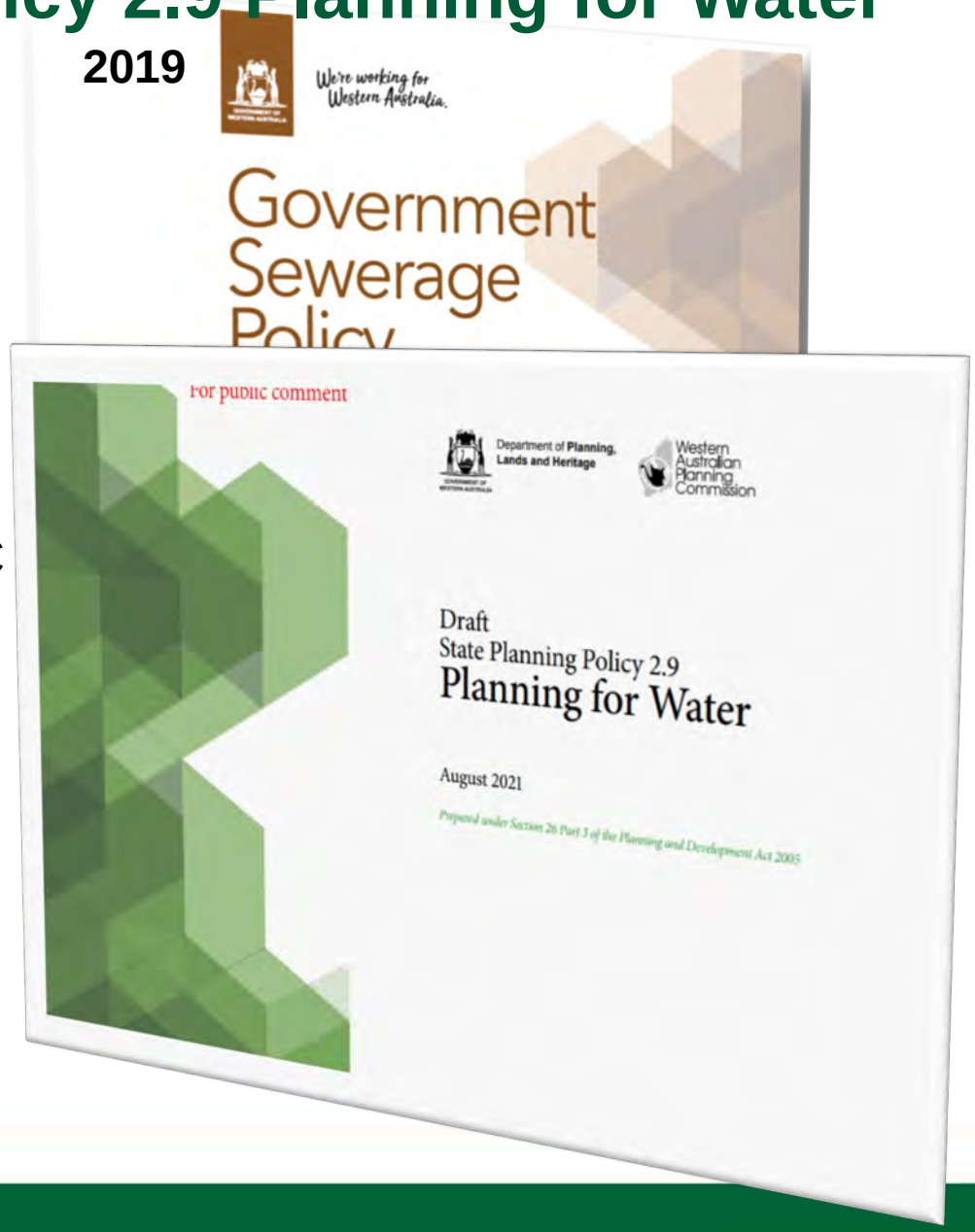
Proposed Wastewater Regulations

(Public Health Act 2016)

Almost for all applications

Government Sewerage Policy 2019
Draft State Planning Policy 2.9 Planning for Water

- The Policy was developed by the DPLH with input from DOH and DWER;
- Administered by DPLH in accordance with the planning legislative framework
- Multi-agency involvement- WAPC referrals to LG, DOH, DWER and other agencies;
- The DPLH is the final decision making agency for any WAPC submission.
- Draft SPP 2.9 and Guidelines released for public consultation



Policy Application

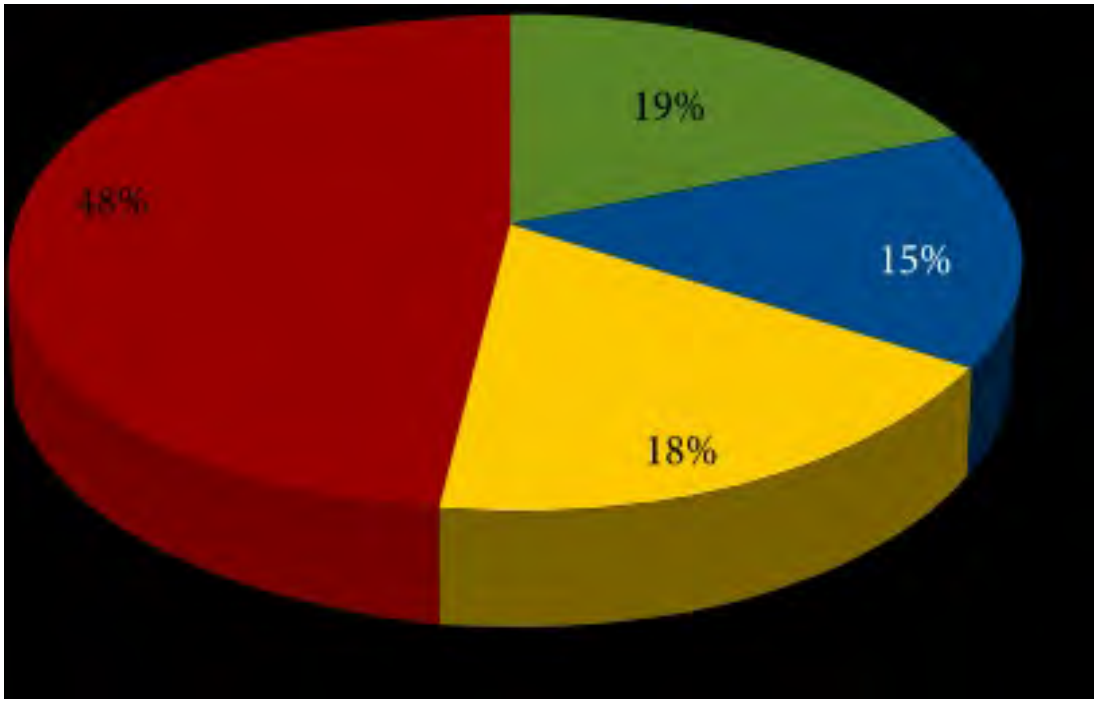
- Only applies to planning proposals
- **Does not apply to:**
  - building applications
  - subdivision applications for lots >4 hectares
  - development applications for:
    - a single house on a single lot
    - rural use
  - applications to install an on-site wastewater system but if any conditions are imposed at early stage of development (e.g. subdivision, DA) it will be considered at this stage

Policy Intent

- Sets WA position on the provision of sewerage services in the State
- Requires connection to reticulated sewerage
- Adopts a best practice approach to the provision of on-site sewage management, in accordance with AS1547
- Encourages reuse of sewage

Causes of Failures

- Groundwater and surface water ingress
- Incorrect system installation
- Unsuitable soil type
- Undersized

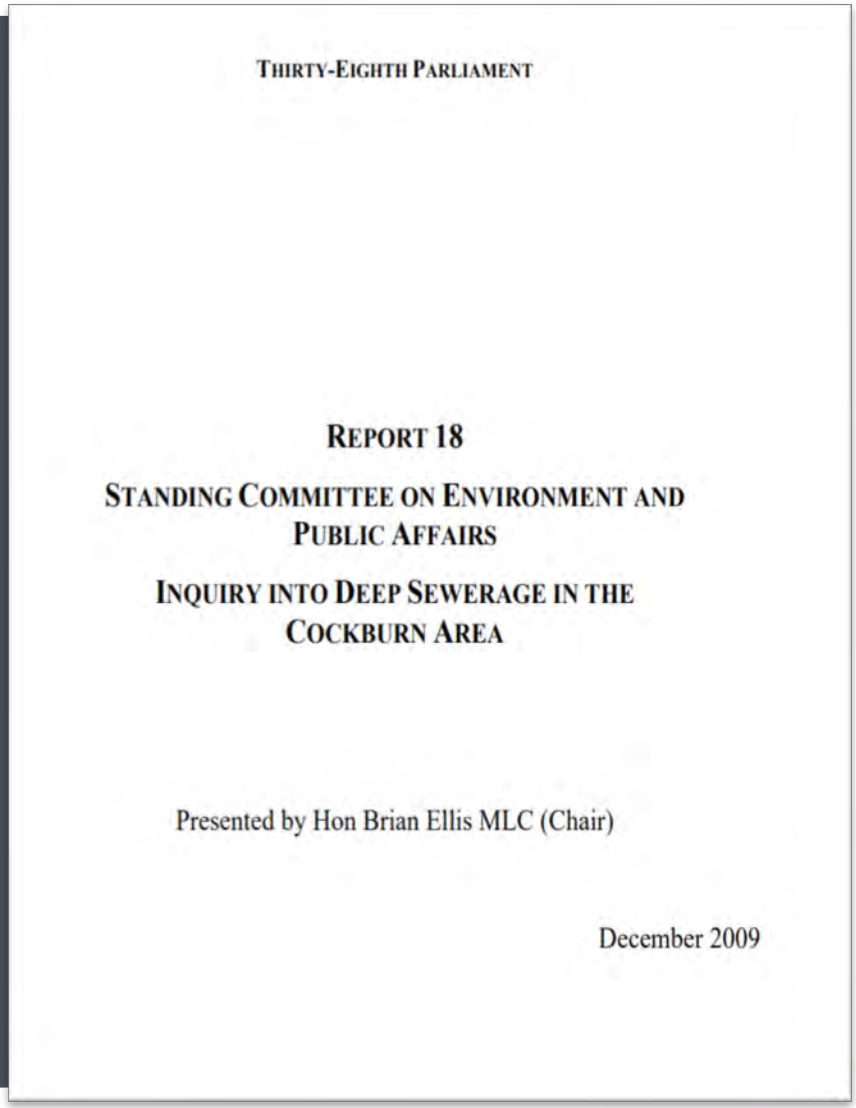


A Review of Onsite Wastewater Treatment System Installations and Failures in WA from 1997 – 2011. Published in 2015

The adverse impacts of septic tanks are real and documented

According to WALGA survey: The most serious health concern raised by Local Government is the overflowing of aging and inappropriately designed septic and leach drains systems and the potential for direct contact with humans. Local Government has indicated that there is anecdotal evidence of children becoming sick from coming into contact with sewerage from malfunctioning septic systems. The pooling of raw sewerage provides an opportunity for contact with disease and also provides ideal breeding ground for mosquitoes, which can spread further disease amongst the community.

This is particularly problematic in areas with heavy clay soils and high water tables.



THIRTY-EIGHTH PARLIAMENT

REPORT 18

STANDING COMMITTEE ON ENVIRONMENT AND PUBLIC AFFAIRS

INQUIRY INTO DEEP SEWERAGE IN THE COCKBURN AREA

Presented by Hon Brian Ellis MLC (Chair)

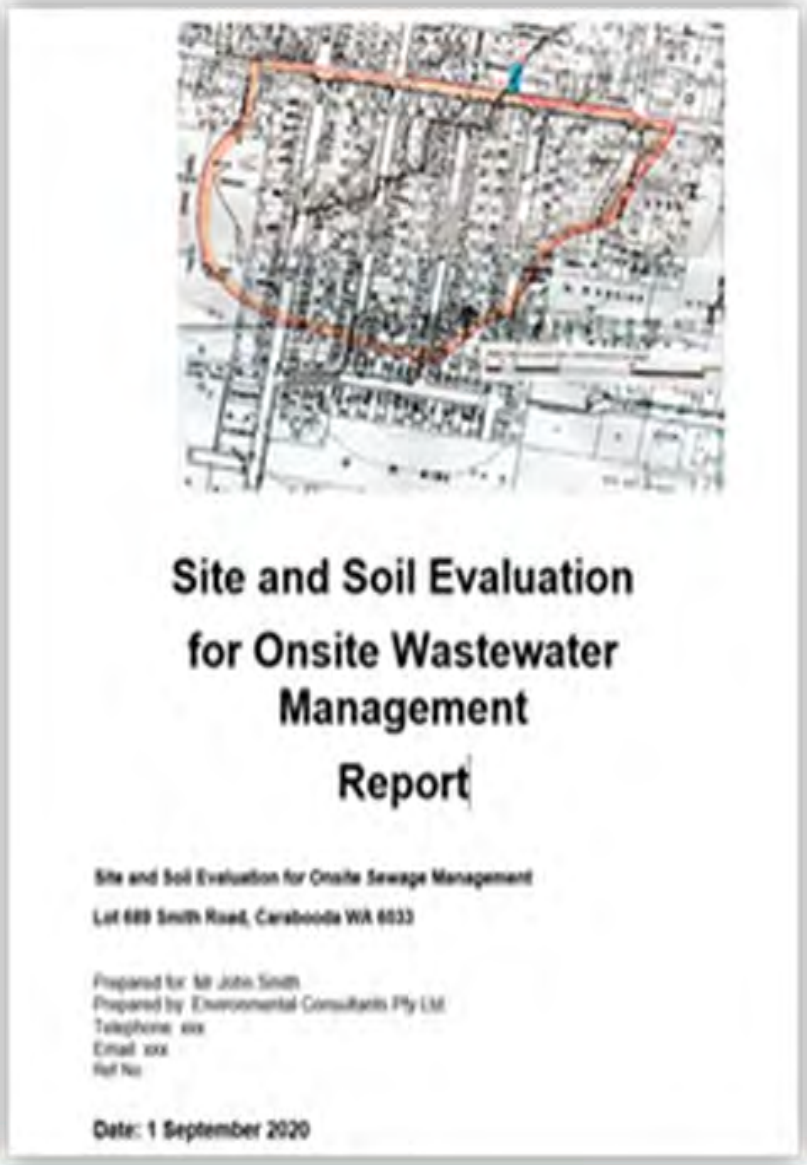
December 2009

Impacts of Poorly Performing Systems

- Transmission of diseases, e.g. gastroenteritis, diarrhea, hepatitis, skin infection, parasitic infection.
- Emission of offensive odours.
- Contamination of water bodies.
- Degradation of soil & water quality.
- Eutrophication & algae blooms.

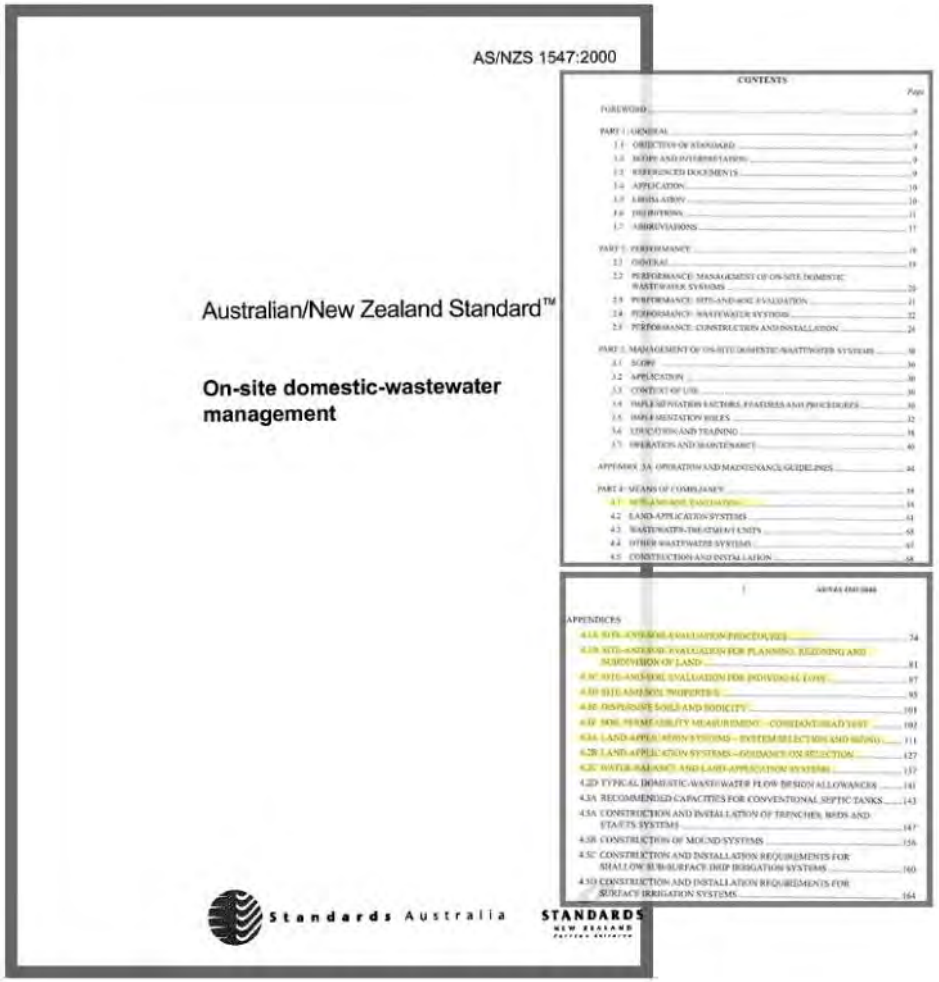
What is Site-and-soil evaluation?

- A written report that details the results of an assessment of a development, subdivision or individual lot for public health, environmental, legal and economic factors which are likely to affect the siting and design of an on-site wastewater system.
- **It is NOT a Geotechnical report** prepared in accordance with:
  - *AS 1726:2017 Geotechnical site investigation* or
  - *AS 2870-2011 Residential Slabs and Footings*



Site-and-soil evaluation procedures

AS/NZS 1547:2012



- SSE is based on the risk management framework of AS1547
- Sets system design criteria to address site conditions
- Innovative onsite systems and private service providers are encouraged.
- Shift from waste disposal to land irrigation/garden watering
- SSE required as early as possible in the planning phase.

Who should undertake a SSE?

AS/NZS 1547:2012

Individual landowners or developers are responsible for engaging a suitably qualified and experienced professional to undertake an SSE to support unsewered planning and development applications.

When is SSE required?

Stages in Planning Process	Scale of Proposal	Level of Assessment Required	Purpose
Sub-regional/district plans and local planning strategies	• catchment-wide (multiple local government areas) • one local government area	• broad SSE to determine areas which are most favourable for new developments • desktop analysis based on soil landscape maps, GIS (geographic information systems), reports, studies and local knowledge • SSE may be included within Regional or District Water Management Reports (WMR)	• review practicability of sewered versus unsewered option for wastewater management • determine broad suitability for on-site wastewater management • eliminate areas not suitable for on-site wastewater management • evaluating environmental and public health risks, identify local government resourcing requirements to monitor on-site wastewater management
Rezoning and local structure plan	• one local government area • part of a local government area specific site	• detailed SSE for site-specific rezoning	• determine minimum lot sizes • identify appropriate treatment technologies and on-site wastewater management system (e.g. disposal, reuse) • Identify area best suitable for LAA

When is SSE required? Cont.

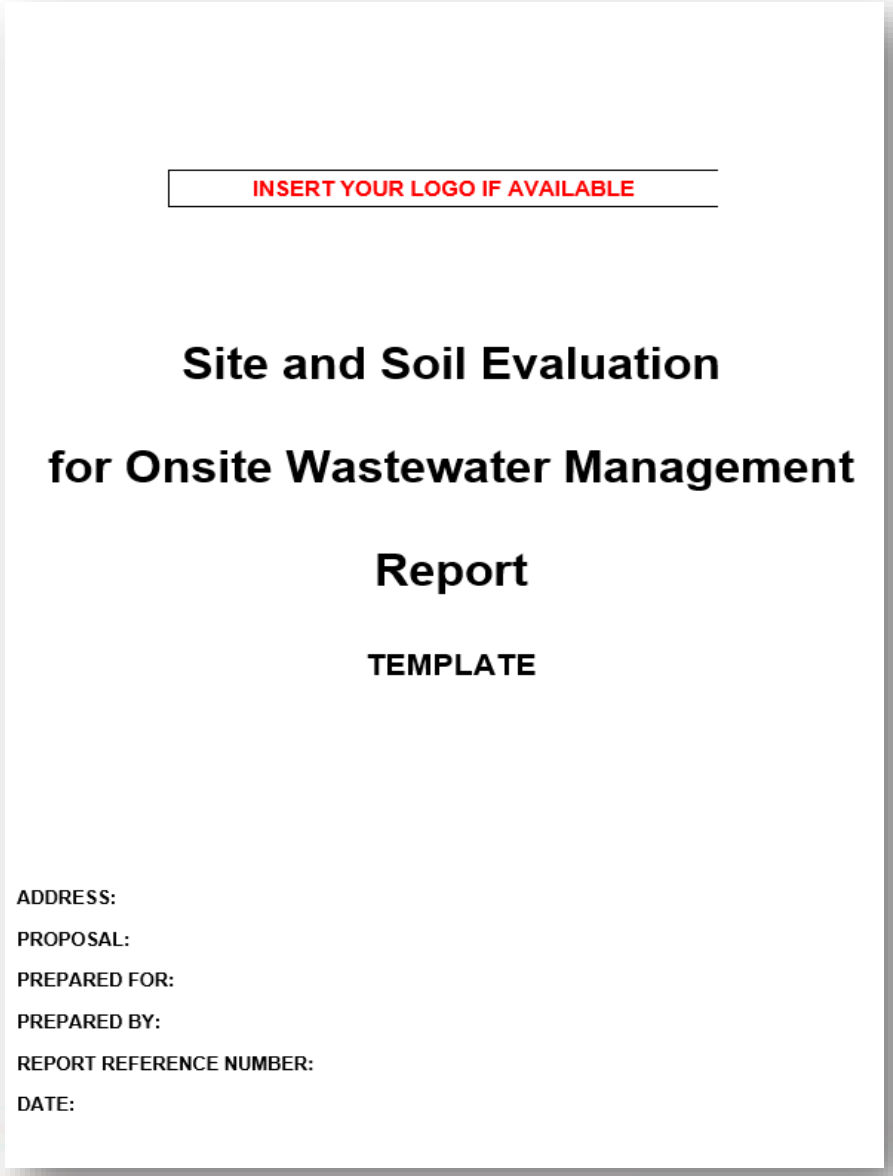
Stages in Planning Process	Scale of Proposal	Level of Assessment Required	Purpose
Subdivision	• specific site	• detailed SSE if not done at the earlier planning stage	• determine capacity of proposed lots to contain sewage on-site without compromising environmental and public health outcomes • select and size treatment/on-site wastewater management system, including LAA • identify management and monitoring options • Identify constrains and mitigation measures
Development	• individual lot	• site specific SSE if not done at the earlier planning stage	• determine capacity of site to contain proposed development and sewage on-site, without compromising environmental and public health outcomes • design precise treatment/on-site wastewater management system implement management and monitoring options

SSE guidance material

- Guidance note
- SSE Report Template
- Checklist
- Water Balance spreadsheet

Assessment of SSE Reports

- Site and Soil Evaluation Report Template - provides consistency and guidance
- Checklist is based on SSE template structure



INSERT YOUR LOGO IF AVAILABLE

Site and Soil Evaluation

for Onsite Wastewater Management

Report

TEMPLATE

ADDRESS:

PROPOSAL:

PREPARED FOR:

PREPARED BY:

REPORT REFERENCE NUMBER:

DATE:

Site-and-soil evaluation procedure

AS/NZS 1547:2012

1. Desktop study
2. Comprehensive an onsite and surrounding area field check
   - Topography, slope, services, identify potential health/environmental constraints, define land-application area, delineate exclusion area, soil permeability, etc
3. Detailed site and soil assessment
   - Determine site and soil characteristic
   - Identify and describe the level of constraint presented by each site and soil characteristic and provide the mitigation measures when required
4. Provide recommendations for system design

Section 1- Introduction

SSE report template

- Competency of SSE evaluator:
  - an appropriate tertiary-level qualification; or
  - specific knowledge and practical experience of soil science, in particular soil hydrological and soil chemical processes.
    - technical expertise and experience including skills in the interpretation of site, soil and climate conditions, undertaking water and nutrient balances, selection and design of appropriate wastewater treatment systems, disposal and reuse options, and other relevant skills.
- Purpose of SSE
  - Support development or planning application or
  - Support Application to Install a wastewater system

Section 2–Site and development description

SSE report template

- Estimation of anticipated wastewater volume including sewage and trade waste
- Description of the development

Development Characteristic	Description		
Site Address			
Owner/Developer			
Postal Address			
Contact for SSE	Ph:	Mob:	Email:
Date of field work			
Local Government			
Zoning			
Lot size/s			
Proposal			
Water Supply			
Availability of Sewer			
Development located within:	Public drinking water source area ☐		Sewage Sensitive Areas ☐
Anticipated Wastewater Volume	Sewage (L)		Trade waste (L)

Sewage Sensitive Areas

The location of SSA's can be found on the Department of Planning, Lands and Heritage website. Mapping is indicative: https://espatial.dplh.wa.gov.au/planwa/Index.html?viewer=planwa&layertheme=Government%20Sewerage%20Policy&run=ActivateLayerList

Public Drinking Water Source Areas

- The location of Public Drinking Water Sources areas can be found on the DWER's website

Public drinking water source area mapping tool

SHARE

PDWSA online mapping tool

Use the Public drinking water source areas (PDWSA) online mapping tool to find out if you are living, working or recreating in a drinking water catchment.

The mapping tool will show you if your home, development, project or activity is in a public drinking water source area. Once you know this, you can help us avoid, minimise or manage water quality and public health contamination risks.

Priority areas

It will also show you the public drinking water source areas within a 5-kilometre radius of your location. It displays the priority areas (P1, P2 and P3) that are defined to guide land use planning.

For more information about priority areas, and for a list of land uses and activities that are appropriate within them:

- Land use compatibility tables for public drinking water source areas
- Recreation within public drinking water source areas on Crown land

Protection zones

The mapping tool displays special areas called protection zones, which protect the immediate area around where drinking water is abstracted. These are called reservoir protection zones (when they surround a dam or reservoir) or wellhead protection zones (when they surround a bore).

We determine the boundaries, priority areas and protection zones for each public drinking water source area in a drinking water source protection report. These reports provide specific information about each public drinking water source area you see on the map. You can find these reports via the 'search publication' function on our website.

Protecting drinking water

Protecting drinking water for current and future generations is a shared responsibility. Safe, reliable and good quality drinking water is important for all Western Australians, because it supports our lives, culture, homes, recreation, environment, development, agriculture and mining.

Drinking water for our cities and towns comes from public drinking water source areas. Public drinking water source areas can be surface or groundwater sources. Surface water sources are the catchments that feed dams and reservoirs, and groundwater sources are underground aquifers that feed bores.

For more information, email drinkingwater@dwer.wa.gov.au

Section 3 - Site and Soil Assessment

SSE report template

- Defining the key characteristics of the site and soils
- Use risk based approach to identify level of constraint and assign adequate mitigation measure:
  - ***Nil or Low:*** *If all constraints are Low, standard designs are generally satisfactory and no mitigation measures are required.*
  - ***Moderate:*** *For each Moderate constraint an appropriate mitigation measure or design modification over and above that of a standard design, should be outlined.*
  - ***High:*** *Any High constraint might prove an impediment to successful on-site wastewater management, or alternatively will require in-depth investigation and incorporation of sophisticated mitigation measures in the design to permit compliant onsite wastewater management.*
- Example of key site characteristics outlined in Table 2

Soil Assessment

AS/NZS 1547:2012

- Review published soil and geological information
- On site at least 3 test pits for single lot development and for a broader planning proposal soil test pits must represent changes in the soil variation.
- Profile depth is at least 1.5m (2m in PDWSAs) below LAA
- Assessment of soil physical characteristics- soil drainage, structure, texture & permeability
- Soil permeability test as per AS/NZS 1547:2012 -Constant Head Test
- Assessment of soil chemical characteristics
- Determine soil category and DIR/DLR
- Photographs of the soil profile are required

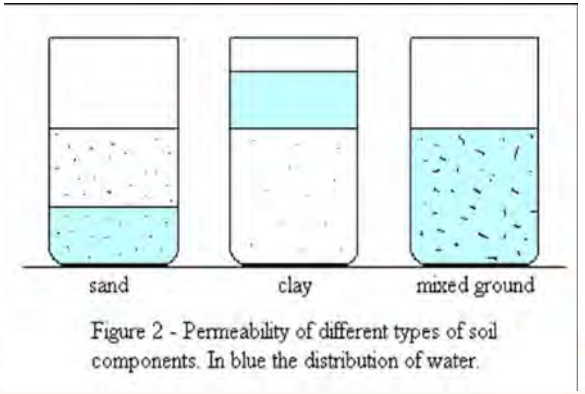


Figure 2 - Permeability of different types of soil components. In blue the distribution of water.

Determination of soil category

AS/NZS 1547:2012

TABLE 5.1
DETERMINATION OF SOIL CATEGORY

Soil category (see Notes 1 and 2)	Soil texture	Structure	Indicative permeability (K_{sat}) (m/d) (see Note 2)
1	Gravels and sands	Structureless (Massive)	> 3.0
2	Sandy loams	Weakly structured	> 3.0
		Massive	1.4 – 3.0
3	Loams	High/moderate structured	1.5 – 3.0
		Weakly structured or massive	0.5 – 1.5
4	Clay loams	High/moderate structured	0.5 – 1.5
		Weakly structured	0.12 – 0.5
		Massive	0.06 – 0.12
5 (Note 3)	Light clays	Strongly structured	0.12 – 0.5
		Moderately structured	0.06 – 0.12
		Weakly structured or massive	< 0.06
6 (Note 3)	Medium to heavy clays	Strongly structured	0.06 – 0.5
		Moderately structured	< 0.06
		Weakly structured or massive	< 0.06

Soil categories and DIR/DLR

TABLE 5.2
SOIL CATEGORIES AND RECOMMENDED DESIGN IRRIGATION/LOADING RATES (DIR/DLR) FOR LAND-APPLICATION SYSTEMS

Soil Category	Soil texture	Structure	Indicative permeability (K_{sat}) (m/d)	Design irrigation/loading rate (DIR/DLR) (mm/day)						
				Trenches and beds (see Table L1)			ETA/ETS beds and trenches (Table L1)	Drip and spray irrigation (Table M1)	LPED irrigation (Table M1)	Mounds (basal area) (Table N1)
				Primary treated effluent		Secondary treated effluent				
				Conservative rate	Maximum rate					
1	Gravels and sands	Structureless (massive)	> 3.0	(see Note 1 of Table L1 for DLR values)			(see Note 4 of Table L1)	5 (see Note 2 of Table M1)	(see Note 3 of Table M1)	32
2	Sandy loams	Weakly structured massive	> 3.0						4	24
			1.4 – 3.0	15	25	50				
3	Loams	High/ moderate structured	1.5 – 3.0	15	25	50		4 (see Note 1 of Table M1)	3.5	24
		Weakly structured or massive	0.5 – 1.5	10	15	30				16
4	Clay loams	High/ moderate structured	0.5 – 1.5	10	15	30	12	3.5 (see Note 1 of Table M1)	3	16
		Weakly structured	0.12 – 0.5	6	10	20	8			8
		Massive	0.06 – 0.12	4	5	10	5			(see Note to Table N1)
5	Light clays	Strongly structured	0.12 – 0.5	5	8	12	8	3 (see Note 1 of Table M1)	2.5 (see Note 4 of Table M1)	8
		Moderately structured	0.06 – 0.12	(see Notes 2 and 3 of Table L1)	5	10	5 (see Notes 2, 3, and 5 of Table L1)			(see Note to Table N1)
		Weakly structured or massive	< 0.06			8				
6	Medium to heavy clays	Strongly structured	0.06 – 0.5					2 (see Note 2 of Table M1)	(see Note 3 of Table M1)	
		Moderately structured	< 0.06							
		Weakly structured or massive	< 0.06							

Risk Assessment of Site Characteristics- Table 6

SSE report template

Characteristic	Level of Constraint			Assessed Level of Constraint for Site
	Nil or Low	Moderate	High	
General Characteristics				
Climate (difference between average annual rainfall and average pan evaporation, mm/year)	Excess of evaporation over rainfall in the wettest months	Rainfall approximates to evaporation	Excess of rainfall over evaporation in the wettest months	
Exposure to sun and wind	Full sun and/or high wind or minimal shading and North / North-East / North-West aspect	Dappled light East / West / South-East / South-West aspect	Limited patches of light and little wind to heavily shaded all day and South aspect	
Vegetation coverage over the site	Plentiful vegetation with healthy growth and good potential for nutrient uptake Turf or pasture	Limited variety of vegetation	Sparse vegetation or no vegetation, dense forest with little understorey	
Landslip (or landslip potential)	Nil	Low to moderate	High or Severe	

Section 4- Wastewater system type and design

SSE report template

- Recommendation for system design should be provided based on the findings of SSE
- Setback distances – APPENDIX 1
- Stormwater Management
- Water Balance Excel spreadsheet is available for detailed assessment and Appendix 5 for the southwest of WA

Section 6 – Conclusion and Recommendations

SSE report template

- Written in plain English so that the landowner is able to understand and act on the recommendations.
- The relationship between the assessment and the recommendations must be outlined and clearly explained.
- Location and size of LAA is identified and shown on the site plan.
- Maintenance requirements should be stated

ATTACHMENTS

SSE report template

- Locality plan with indicative distances to water resources.
- Fully dimensioned and accurately scaled plan of the proposal, including lots sizes, contours at a sufficient interval to justify system design, the location of the proposed building envelope and other development works, wastewater management system components, location and size of LAA, physical site features, cut off drains and setback distances etc.
- Photographs of the site and soil test location including a log, GPS coordinates and site plan showing the location of soil sample sites.
- Soil Bore Logs, colour photo of each test site and a diagram of the soil profile from onsite test sites.
- Proposed onsite wastewater system design.
- Water Balance calculation.

Thank you ☺

Questions?

Natalia.Ramswell@health.wa.gov.au

Draft State Planning Policy 2.9 Planning for Water

Loretta van Gasselt

Planning Manager, Strategy and Engagement

27 August 2021

WESTERN AUSTRALIAN PLANNING FRAMEWORK

Western Australian Planning Commission

STATE PLANNING STRATEGY PRINCIPLES

Community	Economy	Environment	Infrastructure	Regional Development	Governance
Enable diverse, affordable, accessible and safe communities	Facilitate trade, investment, innovation, employment and community betterment	Conserve the State's natural assets through sustainable development	Ensure infrastructure supports development	Build the competitive and collaborative advantages of the regions	Build community confidence in development processes and practices

STATE PLANNING FRAMEWORK

Planning and Development Act 2005	Establishes the Western Australian Planning Commission (WAPC) and provides for an efficient and effective land use planning system which promotes the sustainable use and development of land in the State.
State Planning Strategy	Provides a strategic framework and identifies principles, strategic goals and strategic directions for planning and development in Western Australia.
State Planning Policies	Provide the highest level of planning policy control and guidance in Western Australia. Prepared under Part 3 of the *Planning and Development Act 2005*.
Regional & Sub-regional Strategies	Provide for the comprehensive planning of regions, sub-regions or particular locations to guide change and a basis for cooperative action to be taken by State and local government on land use and development.
Operational Policies	Guide decision making in relation to planning applications.
Position Statements	A statement setting out the policy position of the WAPC with respect to a particular matter.
Guidelines	Provide detailed guidance on the application of WAPC policies.

What is proposed

Current situation

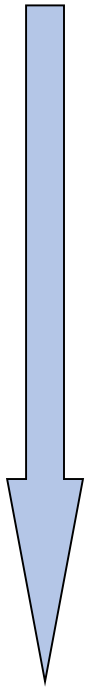
- Multiple policy instruments
- Complex, some duplication
- Cumulatively more than 400 pages

WAPC direction

- Amalgamate 3 drinking water SPPs (2.2, 2.3 & 2.7)
- Amalgamate 3 water resource SPPs (2.1, 2.9 & 2.10)
- Combine the 2 new water SPPs
- Incorporate the Government Sewerage Policy

Project history

Review initiation, approvals and internal review	Mid 2016
Stakeholder meetings & issues scoping	Mid 2017
Drafting issues papers, stakeholder meetings	Mid-late 2017
Submission analysis & issues paper finalisation SRG	Early 2018
First Stakeholder Reference Group meeting	March 2018
Drafting policy directions paper, stakeholder meetings	Mid 2018
Submissions analysis & directions paper finalisation	Sep 2018
WAPC endorsement of directions paper	Oct 2018
Commence BUWM review	Nov 2018
Policy & guideline drafting	Apr-Jun 2019
Stakeholder comment, analysis & policy redrafting	Jun 2019-June 2020
Approvals for public comment	Sep 2020
Public comment for 3 months	Aug - Nov 2021
Public submissions analysis, refine policy & guideline	Nov 2021 – Early 2022
Final approvals, gazettal & release	Mid 2022



Current Stage

Stakeholder Reference Group

- Western Australian Planning Commission
- Department of Planning, Lands & Heritage
- Department of Water and Environmental Regulation
- Department of Primary Industries and Regional Development
- Department of Biodiversity, Conservation and Attractions
- Department of Health
- Swan River Trust
- New Waterways
- Australian Water Association
- Cooperative Research Centre for Water Sensitive Cities
- Water Corporation
- Main Roads WA
- Institute of Public Works Engineering Australia
- Western Australian Local Government Association
- Eastern Metropolitan Regional Council
- Peel Region Local Governments
- Peel Harvey Catchment Council
- Ord/ Gascoyne/Harvey Water
- Perth NRM
- Urban Development Institute of Australia
- Property Council of Australia
- Planning Institute of Australia


WESTERN AUSTRALIA'S TOTAL WATER CYCLE MANAGEMENT SYSTEM + GOVERNANCE
METROPOLITAN ARTERIAL DRAINAGE ACT 1982
COUNTRY AREAS WATER SUPPLY ACT 1947
METROPOLITAN WATER SUPPLY, SEWERAGE AND DRAINAGE ACT 1909
WATER SERVICES ACT 2012
WATER AGENCIES (POWERS) ACT 1984
HEALTH ACT 1911
WATER EFFICIENCY + LABELLING ACT 2006
PLANNING + DEVELOPMENT ACT 2005
LOCAL GOVERNMENT ACT 1995
SOIL + CONSERVATION ACT 1945
CONTAMINATED SITES ACT 2003
RIGHTS IN WATER + IRRIGATION ACT 1914
ENVIRONMENTAL PROTECTION ACT 1986
WATERWAYS CONSERVATION ACT 1976
ENVIRONMENT PROTECTION + BIODIVERSITY CONSERVATION ACT 1999 (cwth)
CONSERVATION + LAND MANAGEMENT ACT 1984
SWAN + CANNING RIVERS MANAGEMENT ACT 2006
WATER RESOURCES, WETLANDS, WATERWAYS, GROUNDWATER, BIODIVERSITY, SURFACE WATER, ENVIRONMENT, WATER QUALITY
STORMWATER, RAIN, DRAINAGE, FLOOD + RISK
POTABLE WATER SUPPLY TRADITIONAL
WASTE WATER TRADITIONAL TREATMENT
RECYCLED WATER + WATER EFFICIENCY + DEMAND MANAGEMENT
ABSTRACTION, IRRIGATION, LANDSCAPING, POS, LICENCING, ALLOCATION, REGULATION
SITE CONDITIONS + CLIMATE CHANGE
BUILT FORM + INFRASTRUCTURE, LAND DEVELOPMENT PLANNING
WATER FOREVER (2004)
STATE WATER STRATEGY FOR WA (2003)
STATE WATER PLAN (2007)
WATER WISE PERTH (2018)
DBCA
GEOMORPHIC WETLAND MAPPING CLASSIFICATION
EPA
NUTRIENT TARGETS
UNDO TOOL
WATER QUALITY MONITORING
CWTH GOVT
EPPS
WATER QUALITY IMPROVEMENT PLANS
MNES RAMSAR
BUSH FOREVER REGIONAL OPEN SPACE
LOCAL GOVERNMENT
LISTED SPECIES PROTECTED AREAS
VEGETATION CLEARING
SWAN RIVER TRUST
FORESHORE MGT
PRECINCT PLAN
DWER
STORMWATER MANAGEMENT MANUAL + DECISION PROCESS
CATCHMENT MANAGEMENT
WETLAND BUFFERS
GROUNDWATER ATLAS
GROUNDWATER INVESTIGATIONS
ENVIRONMENT MANAGEMENT
SPP 2.8 BUSH FOREVER
WATER RESOURCES SPP 2.1, 2.10, 2.9
DPLH
SPP 2.0 ENVIRONMENT + NATURAL RESOURCES
WATER CORPORATION
LOCAL GOVERNMENT
FLOODPLAIN MGT MAPPING
ASSET MANAGEMENT
DRAINAGE + WATER MANAGEMENT PLANNING (DWMP)
DISEASE VECTOR + NUISANCE INSECT (MOSQUITO)
SPP 3.4 NATURAL HAZARDS + DISASTERS
SPP 2.6 COASTAL PLANNING
SPP 2.2, 2.3, 2.7 DRINKING WATER SOURCE PROTECTION
LICENCED PROVIDERS
PUBLIC DRINKING WATER SOURCE AREAS + PLANNING
INFRASTRUCTURE
GROUNDWATER
DESALINATION DAMS
COMMUNITY AWARENESS
DEMAND MANAGEMENT
DEPT OF HEALTH
WATER QUALITY PROTECTION NOTES
OCEAN OUTFALLS
AUSTRALIAN STANDARDS
INFRASTRUCTURE
WWTP BUFFERS
PUBLIC HEALTH
SEWAGE
INDUSTRIAL WASTE
WATER CORPORATION
GOVERNMENT SEWERAGE POLICY
WATER BALANCE MODELLING UNDO / SQUARE
REGIONAL WATER PLANS
LIVEABLE NEIGHBOURHOODS
WATER LICENCES + PERMITS
WATER MONITORING GUIDELINES FOR BUWM MGT STRATEGIES + PLANS (2012)
DWER
WATER SOURCE PLANNING
WATER SENSITIVE URBAN DESIGN + RETROFITTING
GUIDELINES FOR DWMS, LWMS (2013)
DC 2.3 POS IN RESERVE AREAS
DLGSCI
IRRIGATED AGRICULTURE
ERA
LICENCING
PUBLIC PARKLAND PLANNING + DESIGN GUIDE
LANDSCAPE ZONE
LAND / SOIL CAPABILITY MAPPING
SEWERAGE SENSITIVE AREA MAPPING
ACID SULFATE SOILS MAPPING
DPIRD
WATER ALLOCATION PLANNING
CONTAMINATED SITES
FLOOD MAPPING
CSIRO
ADAPTATION + MITIGATION
MARINE ENVIRONMENT? IMPACTS - DESAL, OCEAN OUTFALLS
URBAN TREE CANOPY MONITORING
BUILT FORM CONTROLS
LAND USE + DEVT CONTROLS
WATERWISE COUNCIL PROGRAM
GREYWATER INDUSTRY
ALTERNATIVE WATER SUPPLIES
SPP 7.0 DESIGN WA
NON-DRINKING WATER APPROVAL GUIDELINES
LOT SCALE WATER RECYCLING
MANAGED AQUIFER RECHARGE
BETTER URBAN FOREST PLANNING
REGIONAL WATER MANAGEMENT STRATEGIES (RWMS)
IPWEA SUBDIVISION GUIDELINES
WATER SENSITIVE URBAN DESIGN
BETTER URBAN WATER MANAGEMENT (DPLH / DWER)
Land-use planning and development system ensures decision-making is underpinned by informed consideration of the total water cycle. Specifically, Better Urban Water Management details how water issues should be addressed at each planning stage

Planning Reform

- Easier to understand and navigate
- Consistent and efficient planning systems
- Respond quickly to changing needs and expectations
- Greater focus on outcomes

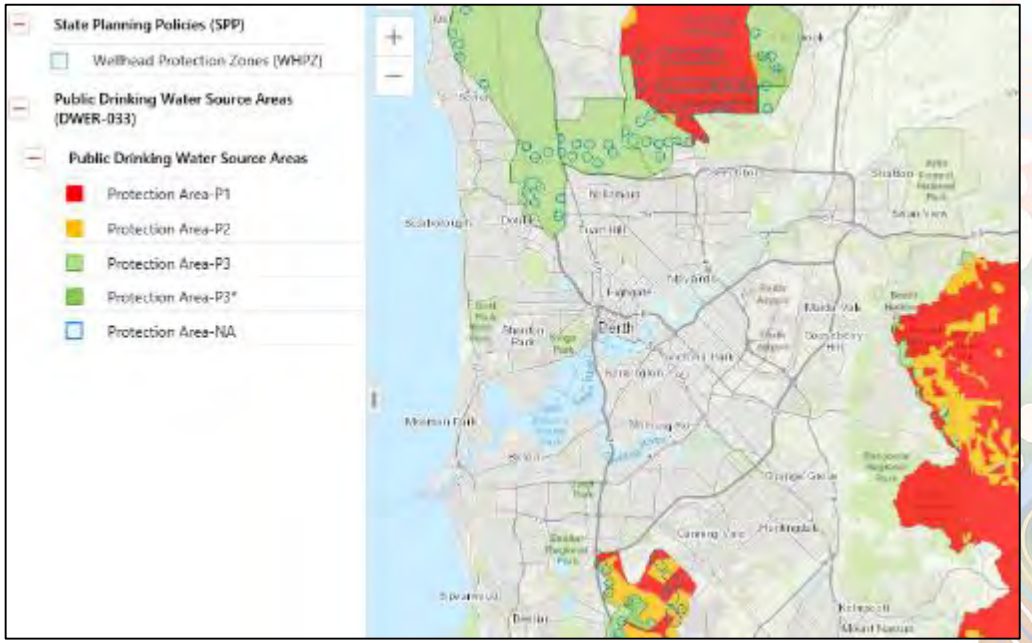
SPP template

POLICY INTENT	APPLICATION	OBJECTIVE	OUTCOME	MEASURE	GUIDELINE CONTENT
A statement of the intention or purpose of the policy. The overarching rationale for why it exists. The intent should be in the context of the planning system and focus on the 'mechanics' or process of the policy.	A statement of: - What type of proposal the policy applies to (e.g. *P&D Act* proposals) - Where in WA it applies - What it needs to be considered in conjunction with (e.g. guidelines, mapping, other SPP etc) - What the policy does not apply to (exemptions) (i.e. proposals subject to other legislation	A concise list of what we want to achieve, focused at a whole-of-government level. Objectives should be broad, high-level, long-term, future-focused and something we will continue to work towards achieving.	A statement of the benefits, results, impacts or other long-term changes sought from implementing the policy. Outcomes add detail to the brief objectives and are focus on what the planning system can deliver toward the broader 'whole-of-govt' objectives. Outcomes are more measurable than objectives.	The course of action, means, plan or process of doing something to achieve the objective. What the policy puts in place to achieve the objective/outcome.	In response to the measure's <u>what</u> the policy requires, the guidelines provide information on the <u>how</u>, <u>when</u>, <u>where</u>, <u>who</u> and <u>why</u>: The guidelines detail: - How to implement / satisfy the requirements of a specific measure - Links to relevant standards, criteria, practices etc relevant to satisfying the requirements of a measure - What implementing the measures looks like at each planning stage
To frame the **intent**, ask: *Why does the policy exist?* or *What does the policy do?'* The result is a one paragraph statement, starting with the word 'To'.	To frame the **application**, ask: *What proposals does the policy apply to?* *Where in WA does the policy apply?* *What should the policy be applied in conjunction with?* *What does the policy not apply to?*	To frame an **objective**, ask: *What does the policy seek to achieve every time it is applied/implemented?*	To frame an **outcome**, ask: *What does achieving the objective look like in a land use planning context?* or *What change can planning achieve to contribute to the objective?*	To frame a **measure**, ask: *<u>What</u> should a:* - *Proposal demonstrate?* - *Decision considers?* - *Local government do (i.e. to give effect to the policy in their local framework)?* The result is a one sentence statement that reads as a 'requirement'.	

Mapping updates

Draft mapping layers available online

- Public drinking water source areas
- Peel Harvey coastal plain catchment
- Swan Canning river system
- Sensitive water resource areas



Key improvements

- Holistic consideration of all water matters
- Minimised duplication
- New SPP format
- Guiding principles
- Climate change and cumulative impacts
- Terminology and reference updates
- Name change

Key improvements continued

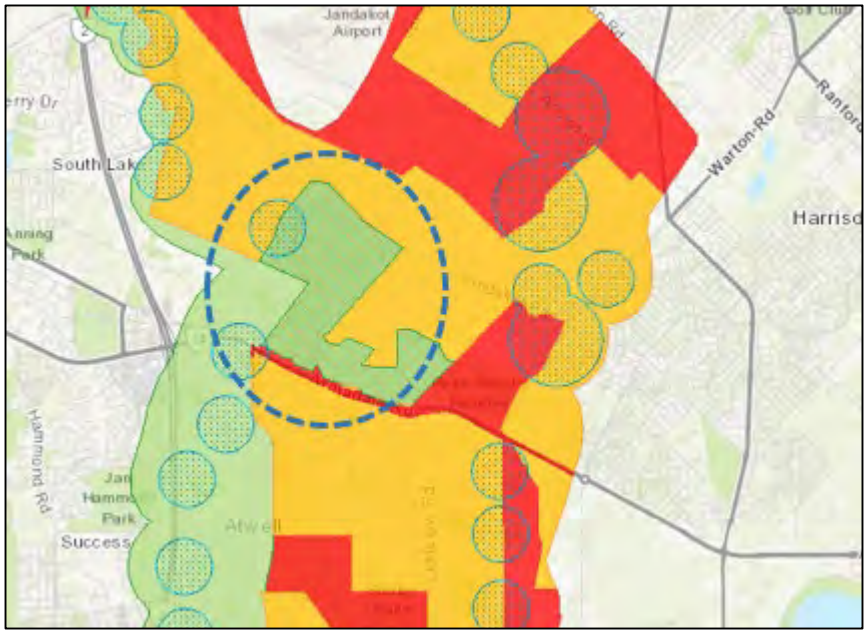
- New mapping
- Aboriginal and historic heritage
- Flooding
- Peel-Harvey
- Swan-Canning
- General wording style change
- Dams, crossings and rural drains
- Government Sewerage Policy

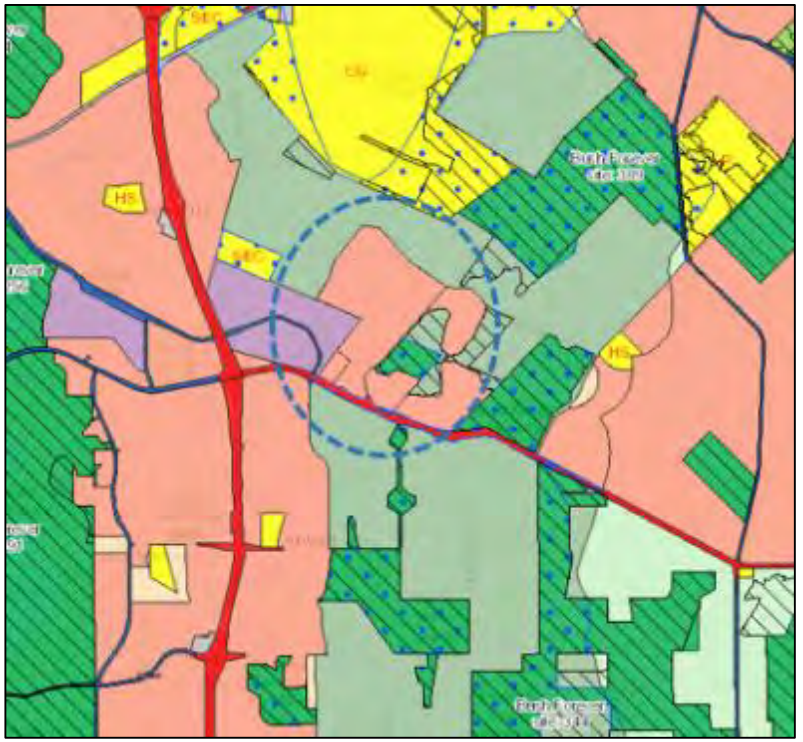
GSP issues

- The GSP was approved in 2019 with the agreement it would be incorporated into SPP2.9
- Secondary treatment system:
  - nutrient removal criteria
  - requirements
- Application to Health approval processes
- *AS/NZS 1547 On-Site Domestic Wastewater Management*
- Information required in support of development applications

Public drinking water source areas

- Identification of P3 areas in local planning schemes
- Primacy of protecting public drinking water source areas



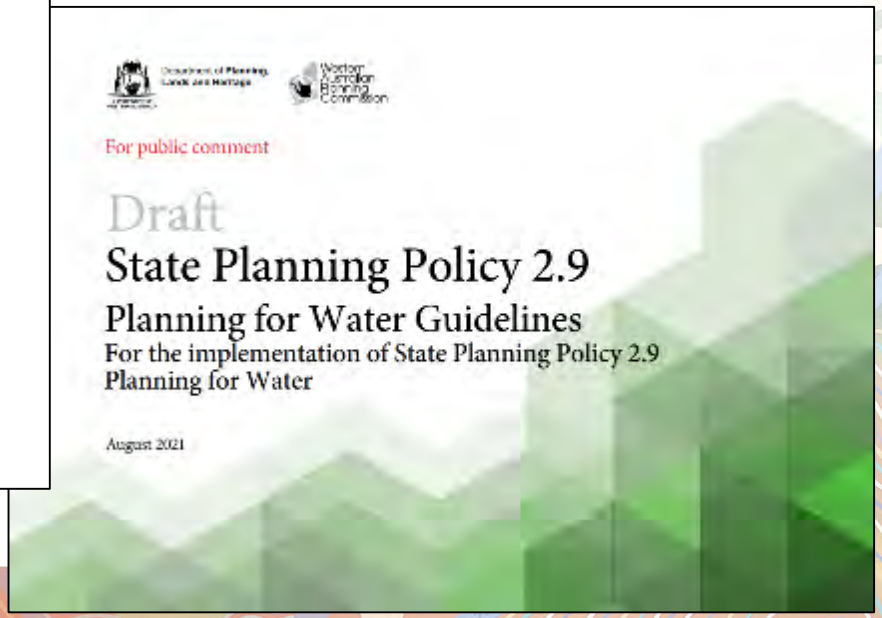


Cumulative impacts

Impact of onsite sewerage on a lot by lot basis versus a holistic approach to an area

Summary and next steps

- 90 day public comment period
- Further refinement



Questions?

Thankyou

Contact: waterpolicies@dplh.wa.gov.au

Planning and Development Approval and Referral Process

Government Sewerage Policy (Sep 2019)
and
Site and Soil Evaluations

Requirement for a Site and Soil Evaluation

Application of Government Sewerage Policy

Strategic Plans
- Regional planning frameworks.
- Sub regional plans.
- Local planning strategies.

Structure Plans.

Development Applications, excludes:
- rural land uses.
- a single house on single lot.

Planning Schemes
- Region and local schemes.
- Scheme amendments.
- Excludes rural land use purposes.

Subdivision of lots less than four hectares.

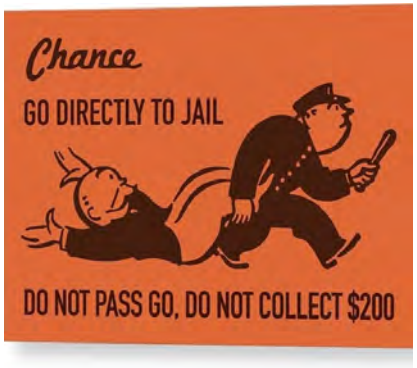
But not Strategic Industrial Areas

Requirement for a Site and Soil Evaluation

Is connection to reticulated sewer required?

YES

- Required directly by the planning framework;
- Existing connections;
- Connection is reasonable;
- Not connecting will jeopardise future connection;
- Not connecting poses unacceptable environmental and health risk;
- Groundwater is too high.



NO

On-site sewage disposal may be considered subject to demonstrating that the site is capable through preparing a Site and Soil Evaluation.

What a Site and Soil Evaluation Demonstrates?

The requirements of the Government Sewerage Policy:

Water resource separation
Ground water separation
Soil type
Type of on-site treatment system
Land application area size
Lot size

What a Site and Soil Evaluation Demonstrates?

Water Resources

What a Site and Soil Evaluation Demonstrates?

Ground Water Separation

Location	Soil type	Separation distance (metres)	Policy justification and source
Public drinking water source areas	All soil types	2	*WQPN 70: Wastewater treatment and disposal – domestic systems* (Department of Water, 2016, and as may be amended from time to time)
Sewage sensitive areas	All soil types	1.5	Department of Biodiversity, Conservation and Attractions *Corporate Policy Statement No. 51: Planning for Wastewater Management Affecting the Swan Canning Development Control Area* (p5) recommends at least 1.2 to 1.5 metres separation, dependent on the permeability and nutrient-retentive properties of the soil. These areas often have poor sandy soil profiles and are sensitive to nutrients.
Outside public drinking water source areas and sewage sensitive areas	Loams and heavy soils	0.6	Values developed in consideration of *AS/NZS 1547 Onsite domestic wastewater management* (Tables R1, R2 and K2). Values for sand identified in consideration of soil conditions in Western Australia. Where soils are highly permeable, nutrients and micro-organisms such as faecal bacteria are easily transported.
	Gravels	1	
	Sands • primary treatment • secondary treatment with nutrient removal	1.5 0.6	

What a Site and Soil Evaluation Demonstrates?

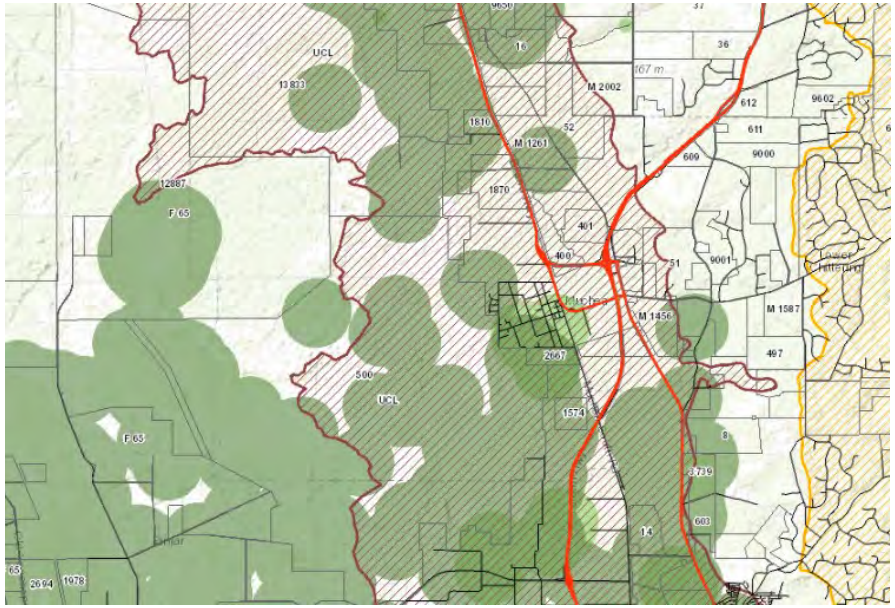
Soil Type vs Land Application Area

Table 3: Land application areas for a single house (occupancy of 6 persons in a 5 bedroom house)

Soil category	Soil texture	Land application area (m^2)[7]	
		Primary treatment (includes area required for setbacks)	Secondary treatment (excludes setbacks)
1	Gravels and sands	339	180
2	Sandy loams	339	180
3	Loams	429	225
4	Clay loams	620	257
5	Light clays	1,156	300
6	Medium to heavy clays	Special design	450

What a Site and Soil Evaluation Demonstrates?

Type of System



- b) The Brockman River Catchment
- g) Habitats of threatened and priority ecological communities and specially protected water-dependent fauna - point
- a) Estuary catchments on the Swan and Scott Coastal Plains
- c) Within 2km of selected estuaries and inlets*
- d) Within 2km of the estuarine areas of selected rivers*
- e) Within 2km of selected coastal embayments
- f) Within 1km of significant wetlands
- g) Habitats of threatened and priority ecological communities and specially protected water-dependent fauna - polygon
- h) Wild rivers catchments

What a Site and Soil Evaluation Demonstrates?

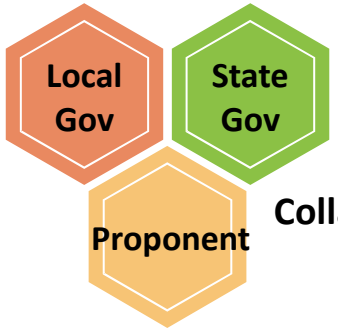
Lot Size

Location/Land use	Minimum lot size	Notes
Public drinking water source areas in rural, rural residential/rural living zones	One to four hectare	Minimum lot size dependent upon priority area (P1, P2 and P3) and zone. Refer to *Water quality Protection Note 25: Land use Compatibility Tables for Public Drinking Water Source Areas* for further guidance
Sewage sensitive areas	One hectare	Land in a sewage sensitive area that is already zoned for urban use with a residential density coding of R 2 to R10 under a local planning scheme or structure plan endorsed by the Western Australian Planning Commission, may be subdivided in accordance with the existing density coding. Where R10 subdivision is proposed, it should be demonstrated that the density coding was assigned with the understanding that reticulated sewerage would not be provided. Smaller lots in sewage sensitive areas may be considered for non-residential, commercial and industrial subdivision on a case-by-case basis where it can be demonstrated that the proposal meet the minimum site requirements and the responsible authority, in consultation with relevant agencies is satisfied that the proposal is consistent with the objectives of this policy.
Urban/Industrial subdivision outside public drinking water source areas and sewage sensitive areas	2,000m^2	For heavy soils, secondary treatment systems will be required to achieve this lot size (refer to Table 1 in Schedule 2).
Outside public drinking water source areas and sewage sensitive areas and: • Infill residential or commercial subdivision in existing urban areas; or • Residential and commercial subdivision in towns outside the Metropolitan and Peel Region Scheme areas without an established reticulated sewerage scheme; or • Residential and commercial subdivision in towns outside the Metropolitan and Peel Region Scheme areas with existing sewerage schemes (as listed in Schedule 3) where unsewered subdivision at the density proposed is specifically provided for through the provisions of the local planning scheme or a local structure plan endorsed by the Western Australian Planning Commission	1,000m^2	The average lot size is not to be less than 1,000m^2, with a minimum individual lot size of 950m^2. Does not apply for soil category 6 (medium to heavy clay), where larger lot sizes are required. For soil categories 4 (clay loams) and 5 (light clays), secondary treatment systems will be required (refer to Table 1 in Schedule 2).
Survey strata lot or strata lot for an approved grouped dwelling, commercial or industrial development (outside public drinking water source areas)	Case-by-case assessment	The on-site system for strata schemes must service each lot and should be owned and operated by a single person or entity contracted to provide the service or the strata company for the strata scheme. An acceptable maintenance program should be in place for the system and disposal area. Due regard to be given to impacts within sewage sensitive areas

Planning Proposals

Planning Schemes and Strategies → **Structure Plans and Amendments** → **Subdivision** → **Development Application**

- Information provided is to be commensurate with the proposal and its purpose.
  - Schedule 1 of the Government Sewerage Policy.
- Most proposals involve referral to government agencies:
  - DoH will comment on the adequacy of a Site and Soil Evaluation;
  - DWER comment on water resources;
  - DBCA comment on environmental values.



Collaboration

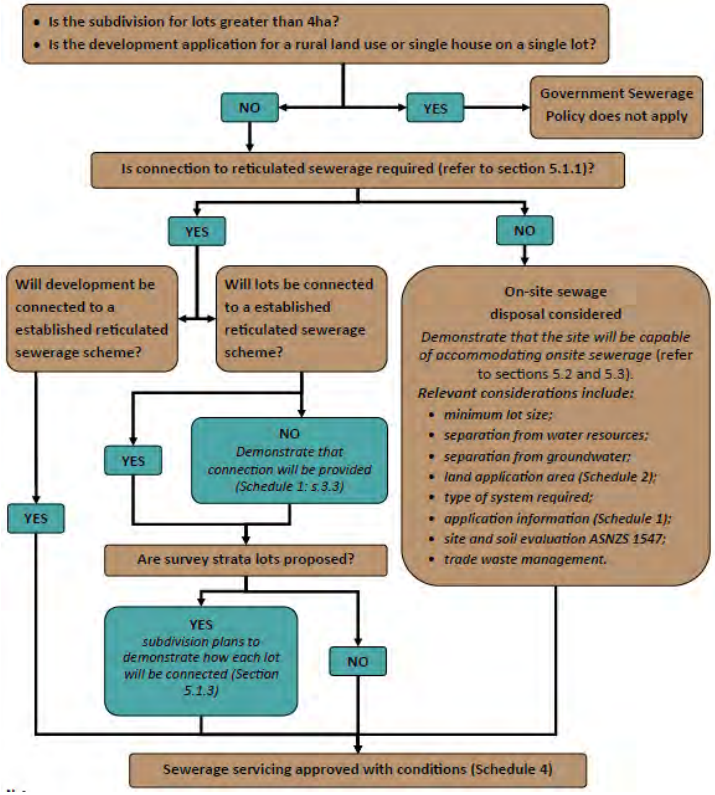
Planning Schemes and Strategies

- Planning Schemes zone land for subdivision and development.
  - Approved by the Minister for Planning under the *Planning and Development Act 2005*.
- Planning Strategies provide the rationale for the zoning of Land.
  - Approved by the WAPC under the *Planning and Development (Local Planning Schemes) Regulations 2015*.
- Government Sewerage Policy - high level analysis:
  - Infrastructure limitations;
  - Areas where on-site disposal may or may not appropriate;
  - Should connection to reticulated sewer be required?
- Schemes and Strategies prepared by local government, publicly advertised and referred to government agencies.

Scheme Amendments and Structure Plans

- Structure Plans set out the use (zoning) and subdivision of land.
  - Approved by the WAPC under the Regulations.
- Amendments to Planning Schemes rezone land or require/implement a structure plan to facilitate subdivision and development.
- Structure Plans and Amendments facilitate site specific proposals.
  - Demonstrate site capability - Site and Soil Evaluation and Local Water Management Strategy;
  - Less than 0.5m groundwater separation – sewer connection required.
- Local Government publicly advertises Structure Plans and Amendments, refers them to government agencies and provides a recommendation to the WAPC.
- Both are required to address information outlined by the Regulations – otherwise local government may refuse to accept or adopt for advertising.

Subdivision and Development Applications



- Statutory Approvals to carry out subdivision and development.
  - Subdivisions approved by WAPC;
  - Development applications approved under planning schemes.
- Site and Soil Evaluation to be provided with the applications.
  - Unless exempt or conditioned.
- Application referral by decision maker:
  - Subdivision must be referred to Government agencies;
  - Some development applications *must* be advertised, all *may* be advertised.
- If approved, conditions may be applied.

Site and Soil Evaluation Exemptions

Requirement for a Site and Soil Evaluation may be varied where the site conditions are known or the health and environmental impacts are minimal.

Known site conditions examples:

- Site and Soil Evaluation done at previous planning stage;
- Adjacent proposals;
- State Government agency data;
- Data should be credible/verified.

Site and Soil Evaluation as Condition of Approval

Site and Soil Evaluation can be required as a condition of approval for subdivision and development applications.

Should be certainty that the proposal will comply with the Government Sewerage Policy.

Generally have to know the groundwater separation.

Should only be used to finalise the location of land application areas.

Questions?

Government of **Western Australia**
Department of **Water and Environmental Regulation**

Local stormwater flooding and groundwater variation

5.2.2 Separation from water resources

An on-site sewage system is not to be located within:

- a wellhead protection zone or on Crown land within a reservoir protection zone;
- 100 metres of the high water mark of a reservoir or 100 metres of any bore used for public drinking water supply where:
  - a wellhead protection zone or reservoir protection zone has not been assigned; or
  - where existing lots would be rendered undevelopable by the wellhead protection zone;
- 30 metres of a private bore used for household/ drinking water purposes;
- 100 metres of a waterway or significant wetland and not within a waterway foreshore area or wetland buffer. The separation distance should be measured outwards from the outer edge of riparian or wetland vegetation;
- 100 metres of a drainage system that discharges directly into a waterway or significant wetland without treatment; or
- any area subject to inundation and/or flooding in a 10 per cent Annual Exceedance Probability (AEP) rainfall event.

Smaller setbacks may be considered where a proponent demonstrates, to the satisfaction of the responsible authority in consultation with the relevant advisory agencies (Department of Water and Environmental Regulation and/or Department of Biodiversity, Conservation and Attractions, Department of Health and/or Local Government) that the reduced setbacks will not have a significant impact on the environment or public health. In seeking a reduced setback, it is likely that secondary treatment systems with nutrient removal will be required. Smaller setbacks from reservoirs or bores used for public drinking water will not be supported.

5.2.3 Separation from groundwater

The discharge point of the on-site sewage system should be at least the following distances above the highest groundwater level, taking into account the range of seasonal groundwater conditions in the context of long term variability and possible groundwater rise following development:

- two metres in public drinking water source areas;
- 1.5 metres in sewage sensitive areas; and
- 0.6 to 1.5 metres in all other areas, depending on soil type and the type of treatment system used (refer to schedule 2).

Where the use of fill is proposed to achieve separation distances, proponents may be required to provide additional information to demonstrate that solutions are effective, do not impact on other lots through water diversion, are not cost prohibitive and will not compromise amenity or landscape values.

The use of drains to achieve separation distances will only be considered for land that is already zoned for urban development and where a drainage management plan is provided to the satisfaction of the responsible authority in consideration of advice from referral agencies to demonstrate:

- how separation from groundwater will be achieved;
- adequate separation between sewage disposal areas and drains in accordance with 5.2.2; and
- that re-directed water will not impact upon surrounding properties or receiving water bodies.

5.2.4 Land application area

Each lot should be of sufficient size to accommodate development and an unencumbered land application area for the disposal of sewage in accordance with Schedule 2 of this policy.

5.2.5 Type of on-site treatment system required

Secondary treatment systems with nutrient removal will generally be required in public drinking water source areas and sewage sensitive areas.

In all other instances, secondary treatment systems should only be required to address site-specific physical or environmental constraints (refer to Schedule 2).

In rural and remote areas, determination of the type of treatment system required should consider the availability of maintenance personnel required to service secondary treatment systems in accordance with Department of Health requirements.

Government of Western Australia
Department of Water and Environmental Regulation

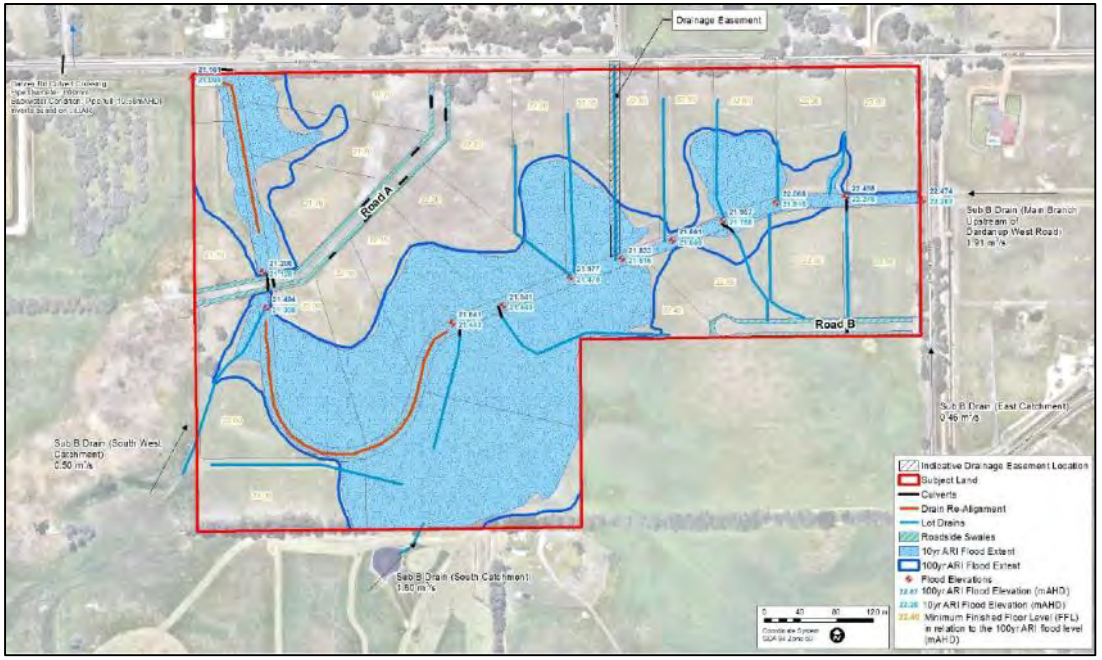
Point 6, Clause 5.2.2

- Land application areas should not be placed in areas subject to inundation and/or flooding in a 10% AEP rainfall event
- The intent of this clauses is to avoid pollution pathways that may leach to surface and cause human health risks
- this is relevant to riverine and local stormwater flooding

Government of Western Australia
Department of Water and Environmental Regulation

Point 6, Clause 5.2.2 - Expectations

- Structure plans are supported with mapping that clearly shows areas subject to inundation and/or flooding in a 10% AEP rainfall event post development
- The mapping needs to be provided for both riverine flooding and localised stormwater inundation



Government of Western Australia
Department of Water and Environmental Regulation

Point 6, Clause 5.2.2

- Departmental models / mapping:
  - for major riverine flooding are available via the flood mapping tool: https://www.water.wa.gov.au/maps-and-data/maps/flood-maps
  - for some areas the 10% AEP flood levels / extent will be available, BUT you will need to ask for this

- Proponent led flood models:
  - any local area catchment flood modelling prepared should consider the guidance in Australian Rainfall and Runoff (http://arr.ga.gov.au/home)
  - Any local stormwater flood modelling prepared should be in accordance with industry best practice

Government of Western Australia
Department of Water and Environmental Regulation

Point 6, Clause 5.2.2 - Assessment

- The Department:
  - may review local area catchment flood modelling to ensure they are fit for purpose
  - does not usually peer review local stormwater models

Government of Western Australia
Department of Water and Environmental Regulation

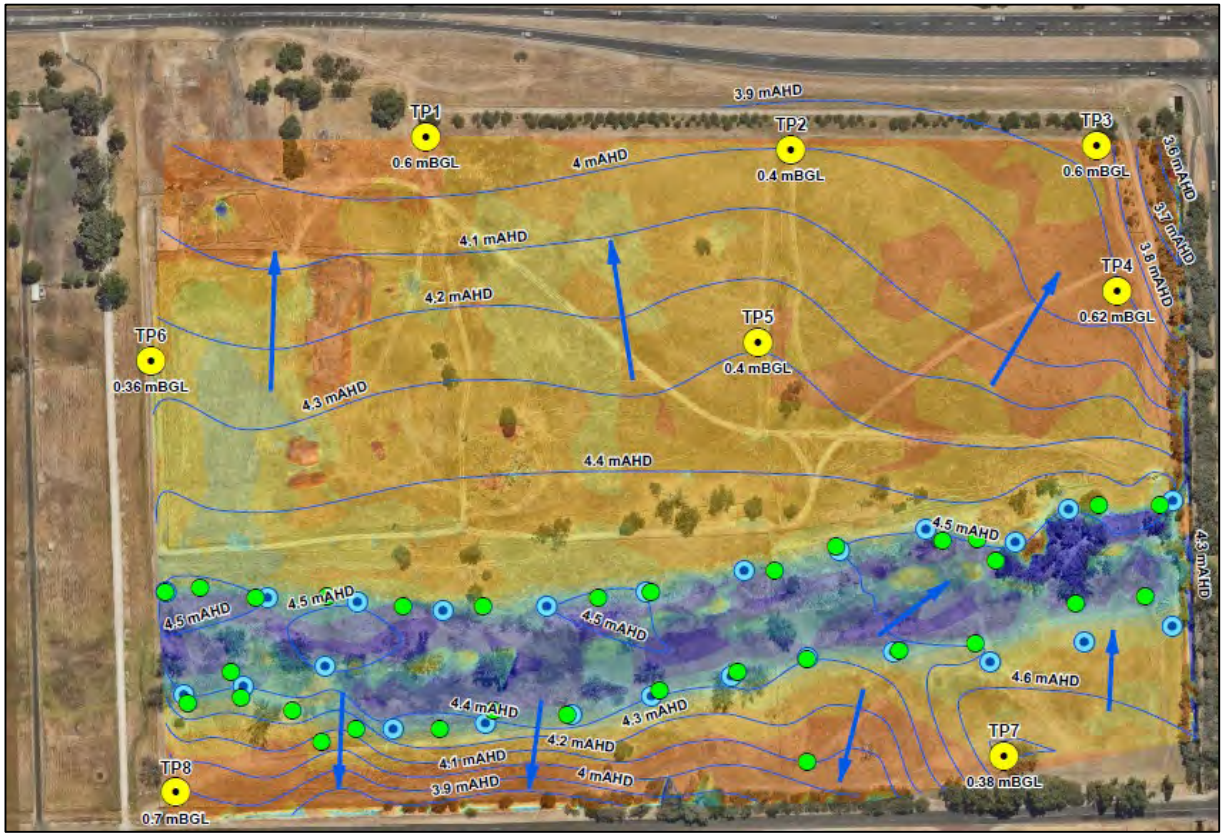
Clause 5.2.3

- Land application areas are required to have a vertical separation to the highest groundwater level
- The separations are variable and based on catchment values and soils conditions, as specified in clause 5.2.3 and schedule 2
- The intent of this clause is to avoid pollution pathways that may leach to surface and cause a human health risks

Government of Western Australia
Department of Water and Environmental Regulation

Clause 5.2.3 - Expectations

- Structure plans are supported with mapping that clearly shows the depth below ground level to the highest groundwater level post development



Clause 5.2.3 - Types of groundwater systems

- Consideration is required of whether the highest groundwater level is dictated by seasonal variations or is event based:
  - seasonal consideration is required where local or regional groundwater systems are encountered, e.g. on the coastal plain
  - event consideration is required for isolated perched systems, e.g. on the scarp

- On-site monitoring:
  - to observe seasonal groundwater levels would be expected for sites where local or regional groundwater systems are encountered
  - of perched systems has limited value due to the groundwater levels being dictated by the general topography of the area and the topography of the underlying impervious layer

Government of Western Australia
Department of Water and Environmental Regulation

Clause 5.2.3 - Groundwater datasets

- Numerous data sets can be considered to assess the groundwater regime, as outlined in Table 1 of *Water resource considerations when controlling groundwater levels in urban development* (*https://www.water.wa.gov.au/__data/assets/pdf_file/0012/1722/104909.pdf*)
- Spatial dataset – groundwater contours - maximum (Perth metro only) (https://atlases.water.wa.gov.au/idelve/dowdataext/download/default.html)
- Long term data from departmental project specific or network groundwater bores can be accessed via Water Information Reporting: https://www.water.wa.gov.au/maps-and-data/maps/water-information-reporting2
- Care should be taken to only make use of observation bore data that has monitored the surficial/superficial aquifer

Government of Western Australia
Department of Water and Environmental Regulation

Clause 5.2.3 - Groundwater management

- The assessment needs to consider the post development highest groundwater level, noting that for sites where perched systems exist these may be controlled by earthworks and drainage to remove trapped lows
- Where surface or sub-surface drainage is used to manage post-development groundwater it is important to consider dot point 5 of Clause 5.2.2 which states “100 metres of a drainage system that [intercept groundwater and] discharges directly into a waterway or significant wetland without treatment”, noting:
  - the additional wording “intercept groundwater” has been agreed across government as relevant as we are interested in pollution pathways
  - treatment follow water sensitive urban design principles

Clause 5.2.3 - Assessment

- The Department:
  - may review datasets, assumptions and correlation factors used to ensure the groundwater regime has been adequately considered

Questions

Innovating around Perth's high urban groundwater

A win-win-win for developers, homeowners and the environment

Sally Thompson (UWA), Greg Claydon, Margaret Shanafield, Ana Manero

CRC for Water Sensitive Cities

Check out:

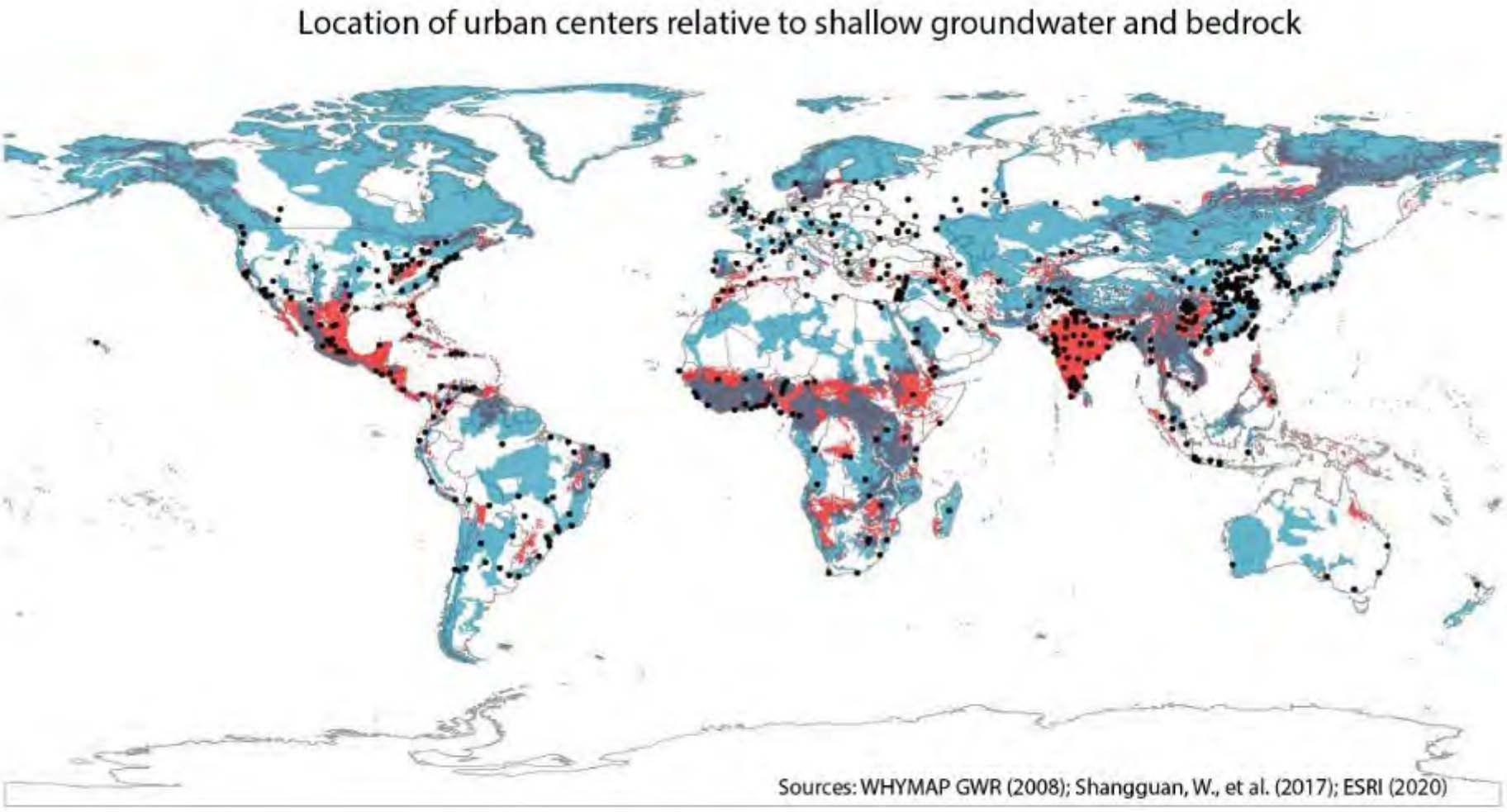
AWA's Water Source:

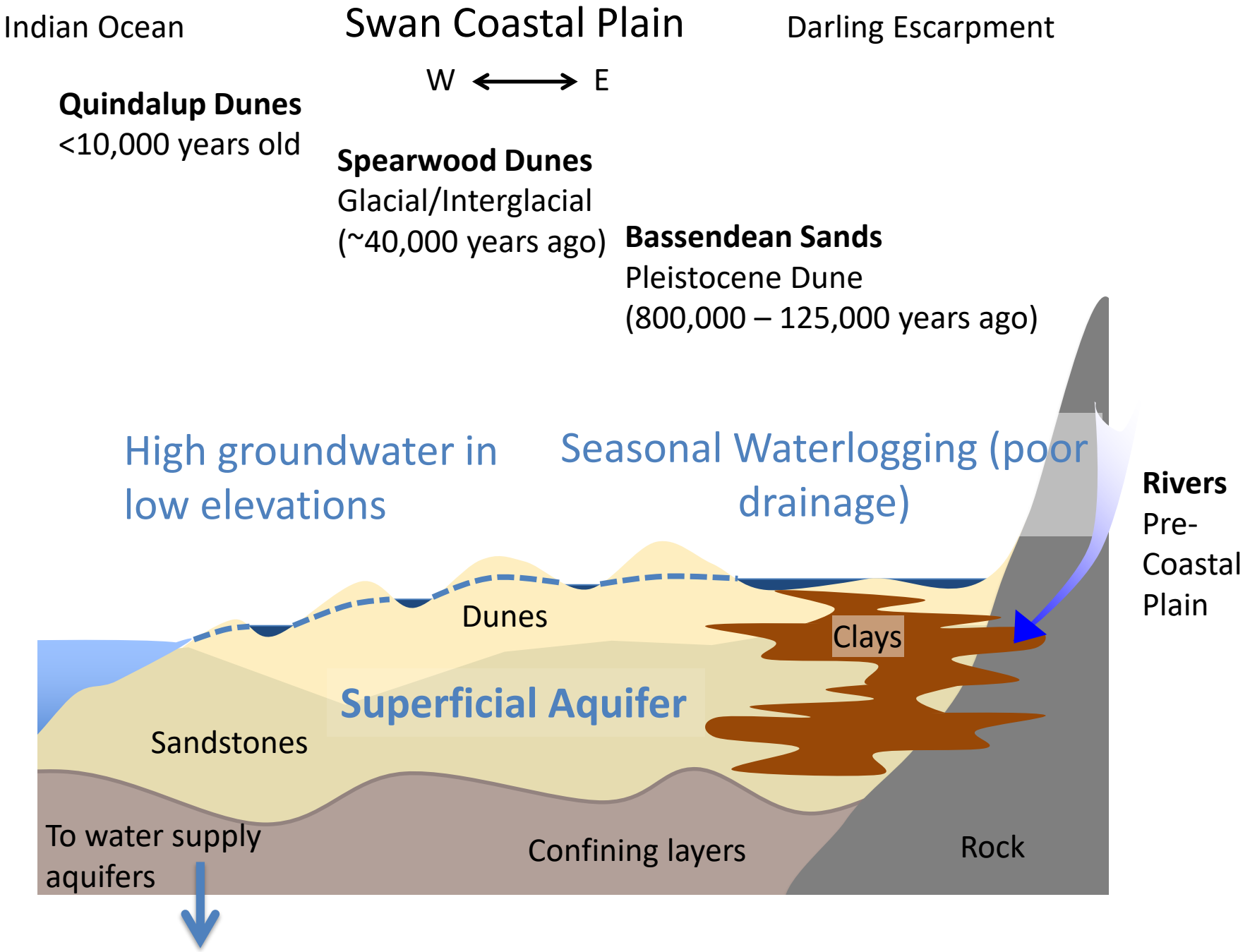
https://watersource.awa.asn.au/publications/technical-papers/when-urban-stormwater-meets-high-groundwater/

The Conversation:

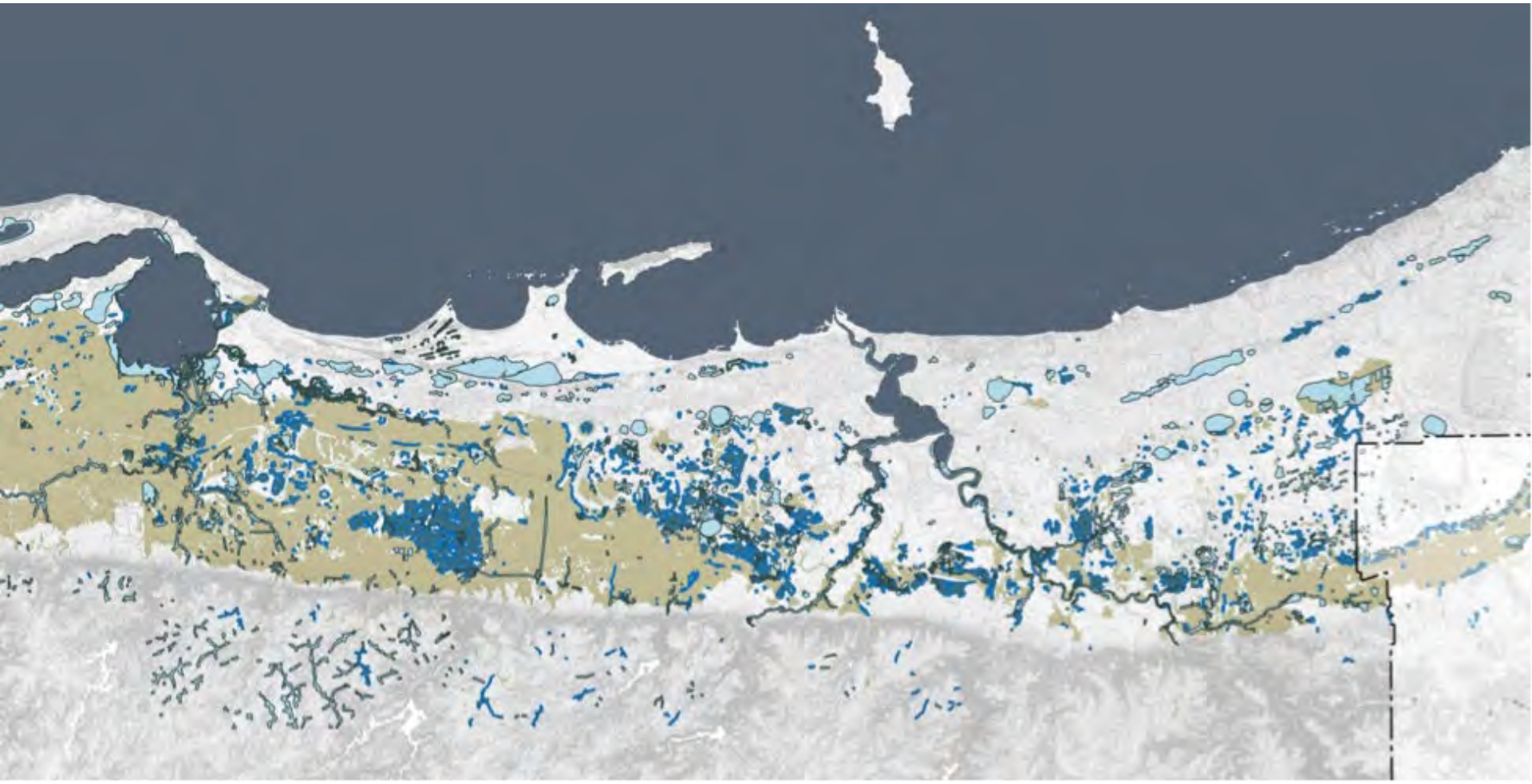
https://theconversation.com/how-the-water-and-sewage-under-your-feet-could-end-up-flooding-your-home-and-what-to-do-about-it-158527

High urban groundwater is common globally




Indian Ocean
Swan Coastal Plain
Darling Escarpment
W ⟷ E
Quindalup Dunes
<10,000 years old
Spearwood Dunes
Glacial/Interglacial
(~40,000 years ago)
Bassendean Sands
Pleistocene Dune
(800,000 – 125,000 years ago)
High groundwater in low elevations
Seasonal Waterlogging (poor drainage)
Rivers
Pre-Coastal Plain
Dunes
Clays
Superficial Aquifer
Sandstones
To water supply aquifers
Confining layers
Rock

In the dune swales, the groundwater forms wetlands



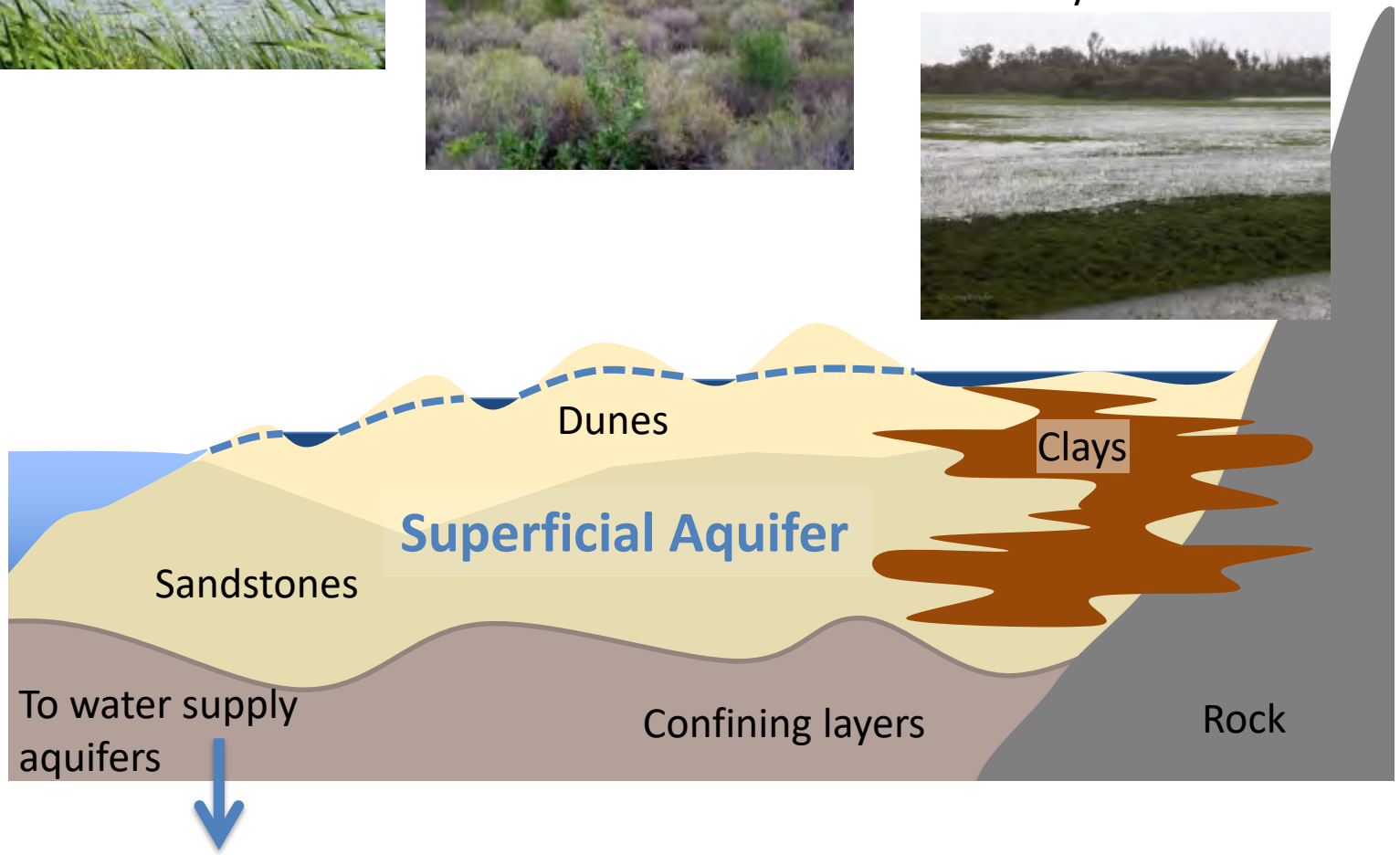
Kullmann, K. (2014). The Emergence of Suburban Terracing on Coastal Dunes: Case Studies along the Perth Northern Corridor, Western Australia, 1930–2010. Journal of Urban Design, 19(5), 593-621. http://dx.doi.org/10.1080/13574809.2014.943704

Wetlands - windows into the groundwater

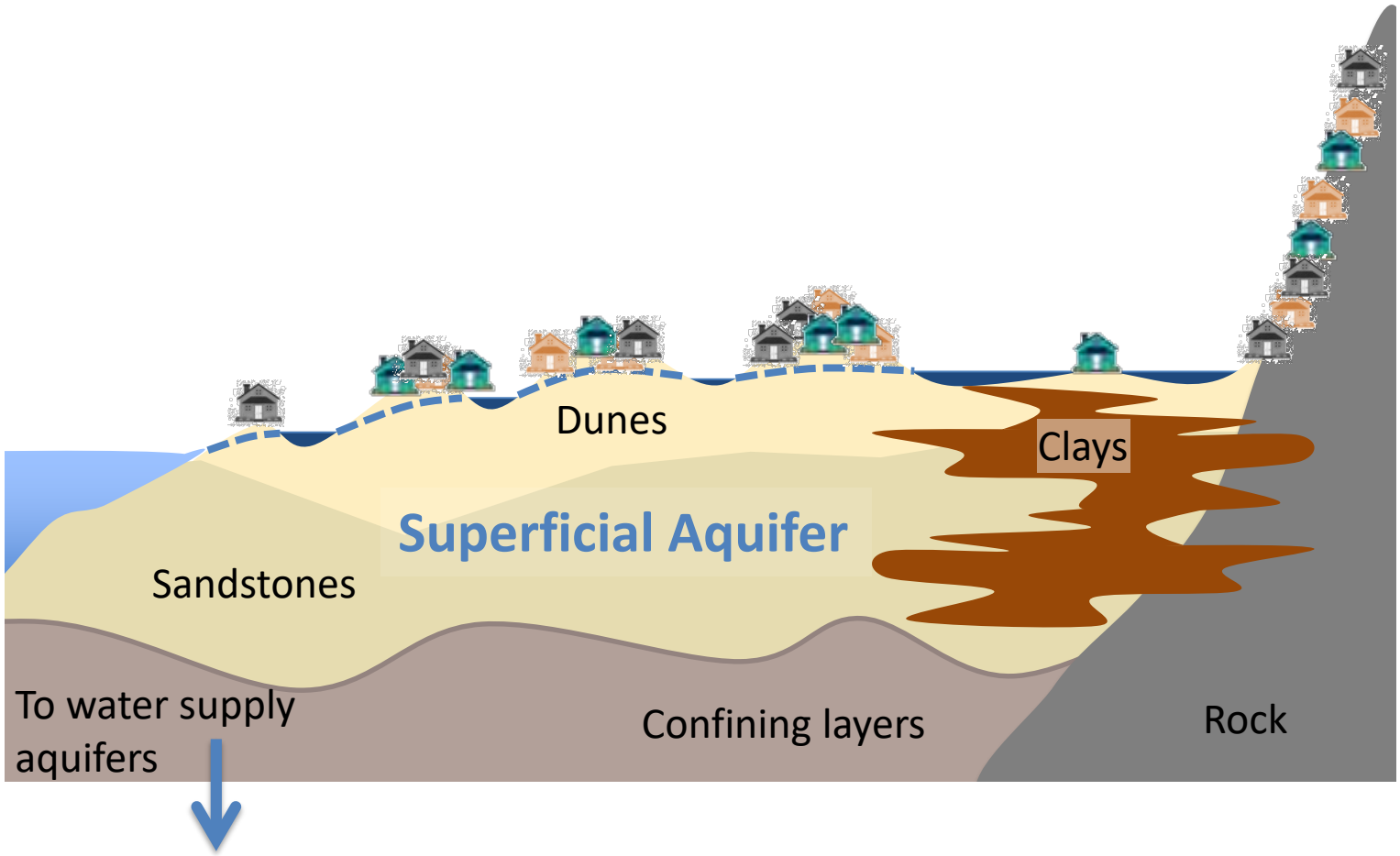
Permanent Wetlands

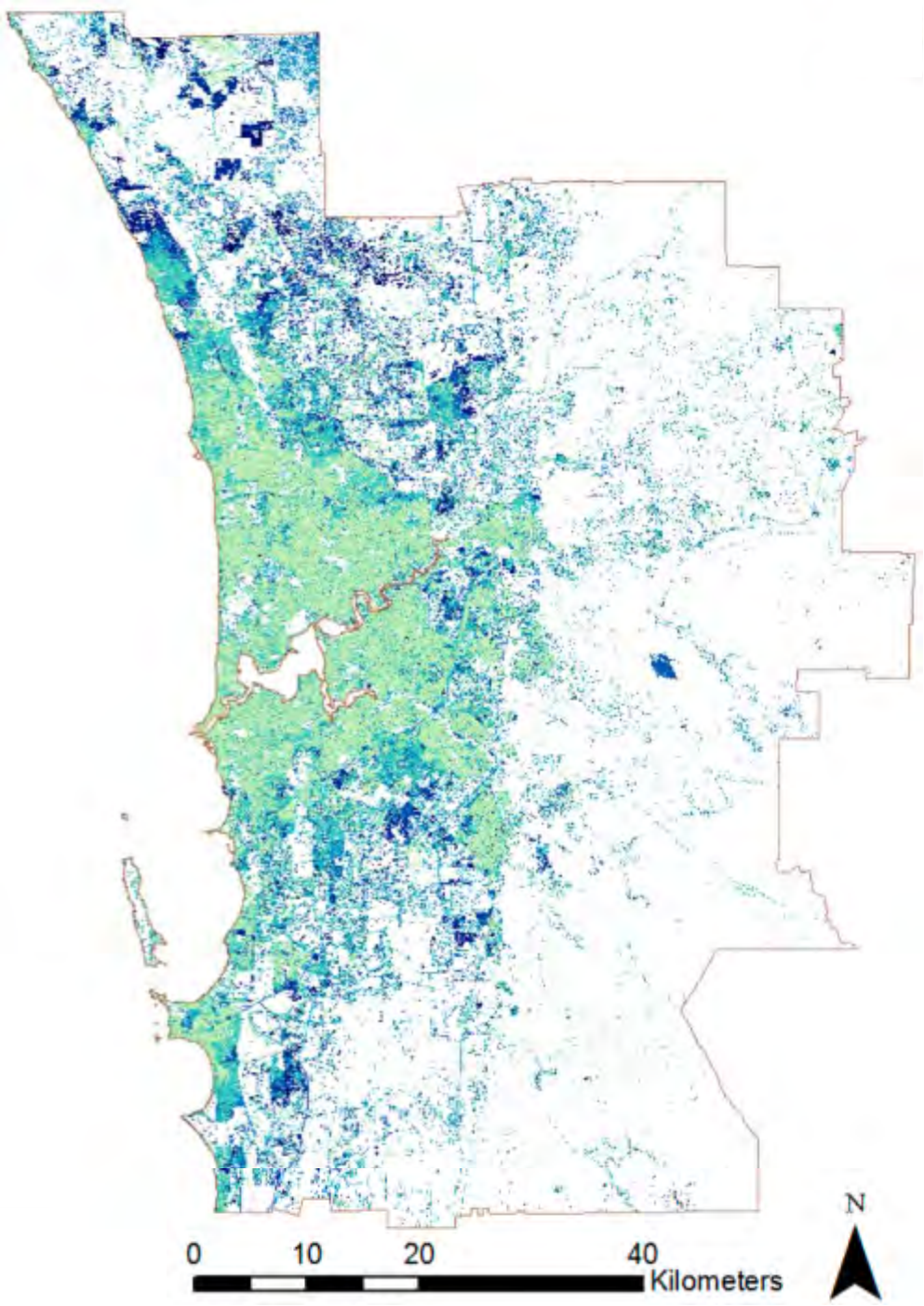
Seasonal Wetlands

Poorly drained, seasonally saturated



We built on the dune crests



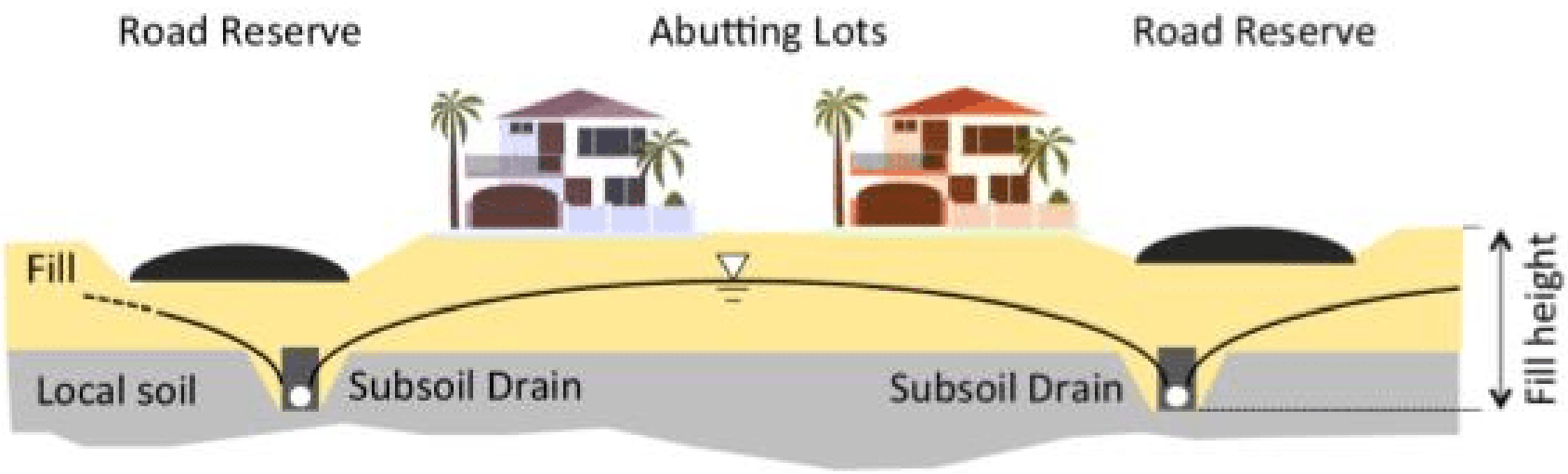


McLachlan et al, 2016, 6(1), 9;
https://doi.org/10.3390/land6010009

New land releases in high groundwater environments

Challenges:

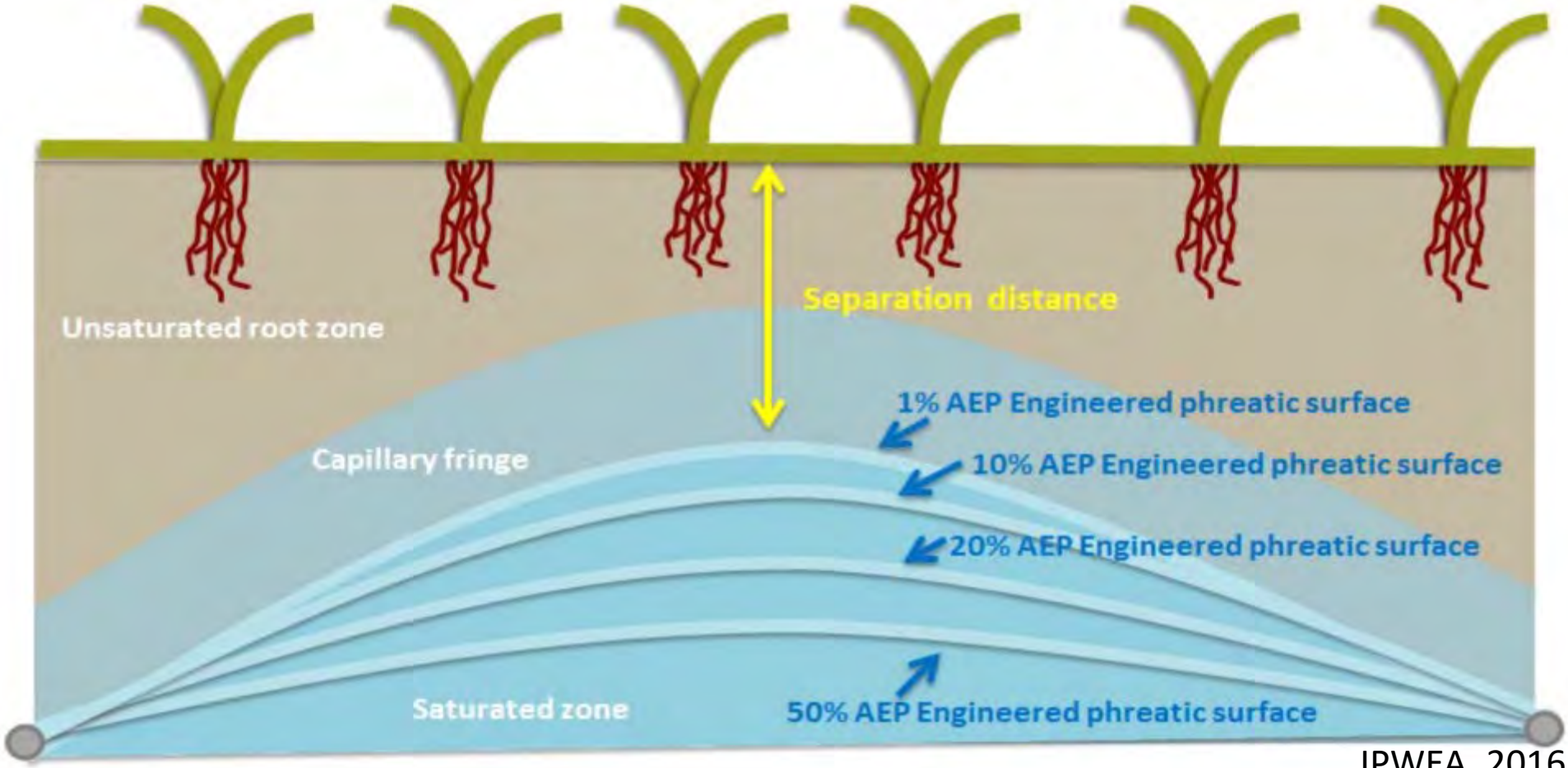
(1) Prescribed separation distances



after Peel Development Commission, 2006

Challenges:

(1) Prescribed separation distances



IPWEA, 2016

Challenges:

(2) Geotechnical Classification

TABLE 2.1

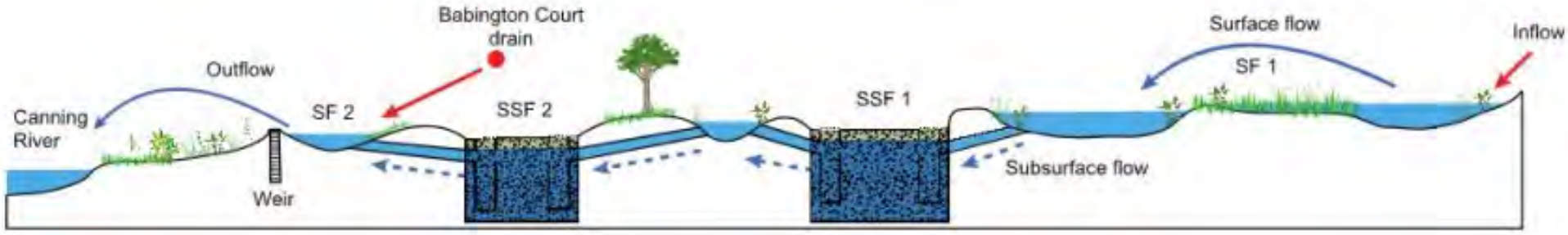
CLASSIFICATION BASED ON SITE REACTIVITY

Class	Foundation
A	Most sand and rock sites with little or no ground movement from moisture changes
S	Slightly reactive clay sites, which may experience only slight ground movement from moisture changes
M	Moderately reactive clay or silt sites, which may experience moderate ground movement from moisture changes
H1	Highly reactive clay sites, which may experience high ground movement from moisture changes
H2	Highly reactive clay sites, which may experience very high ground movement from moisture changes
E	Extremely reactive sites, which may experience extreme ground movement from moisture changes

AS2870 – site classification

Challenges:

(3) Creating functional hydraulics



WSUD may increase needs for fall?


MYOSD?
(Make your own sand dune?)
~3-4 m fill

But - so what?

- Costly

But - so what?

- Costly

But - so what?

- Costly
- Clearing and quarrying

But - so what?

- Costly
- Clearing and quarrying
- Haulage/CO_2

But - so what?

- Costly
- Clearing and quarrying
- Haulage/CO_2
- Frankenstein landscapes

But - so what?

- Costly
- Clearing and quarrying
- Haulage/CO_2
- Frankenstein landscapes

But - so what?

- Costly
- Clearing and quarrying
- Haulage/CO_2
- Frankenstein landscapes

But - so what?

- Costly
- Clearing and quarrying
- Haulage/CO_2
- Frankenstein landscapes

What if we get it wrong?

What if we get it wrong?

What if we get it wrong?

What can we do?

Modify and Remediate

- Conservative separation distances
- Correct problems on as needs basis

Minimise fill and use resilient designs

- Minimise fill - best practice methods
- Design for high groundwater

Technical

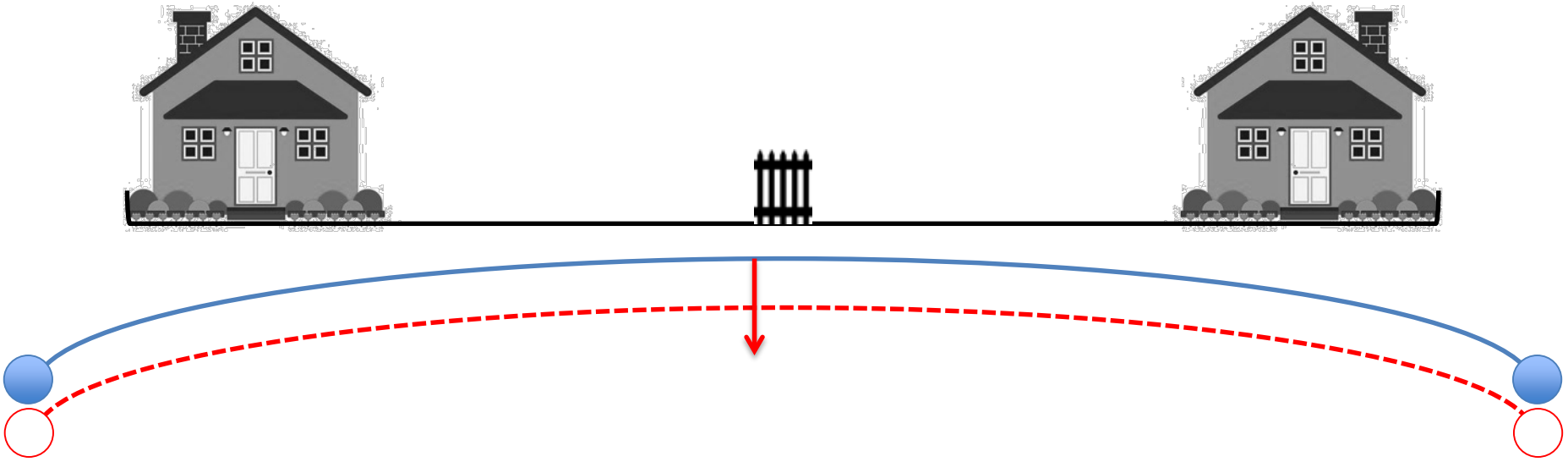
- Site rating scheme – design/assess to risk
- Better numbers
  - Fill K_{sat}
  - ET change
  - Sensitivity analysis
- ARR – add groundwater?

Designing for high groundwater?

Demonstration and pilot developments needed to prove concepts, build trust, inspire

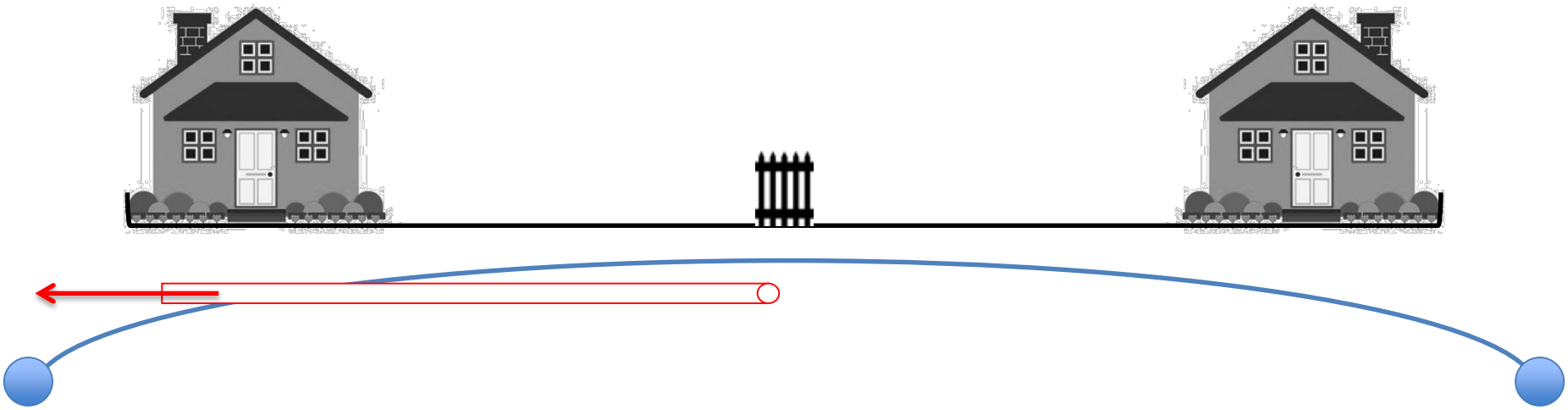
Designing for high groundwater?

E.g. Grade underlying clay?



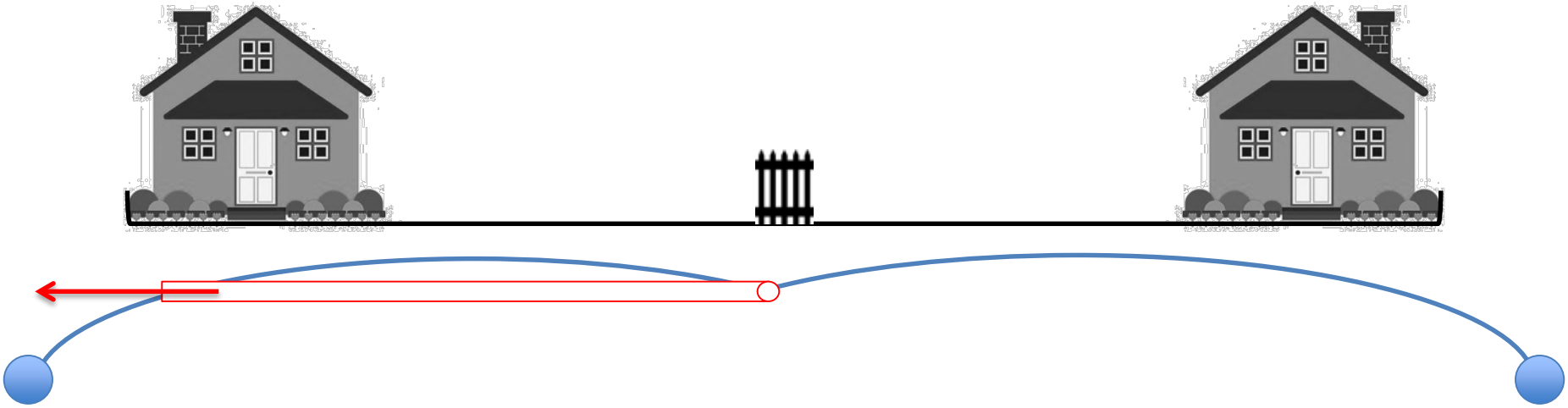
Designing for high groundwater?

E.g. Direct connected rear of lot drainage?



Designing for high groundwater?

E.g. Direct connected rear of lot drainage?



Demonstration and support to homeowners managing drainage infrastructure needed

Local Government in the Hot Seat

Local Government

Evaluation, adaptation, approval

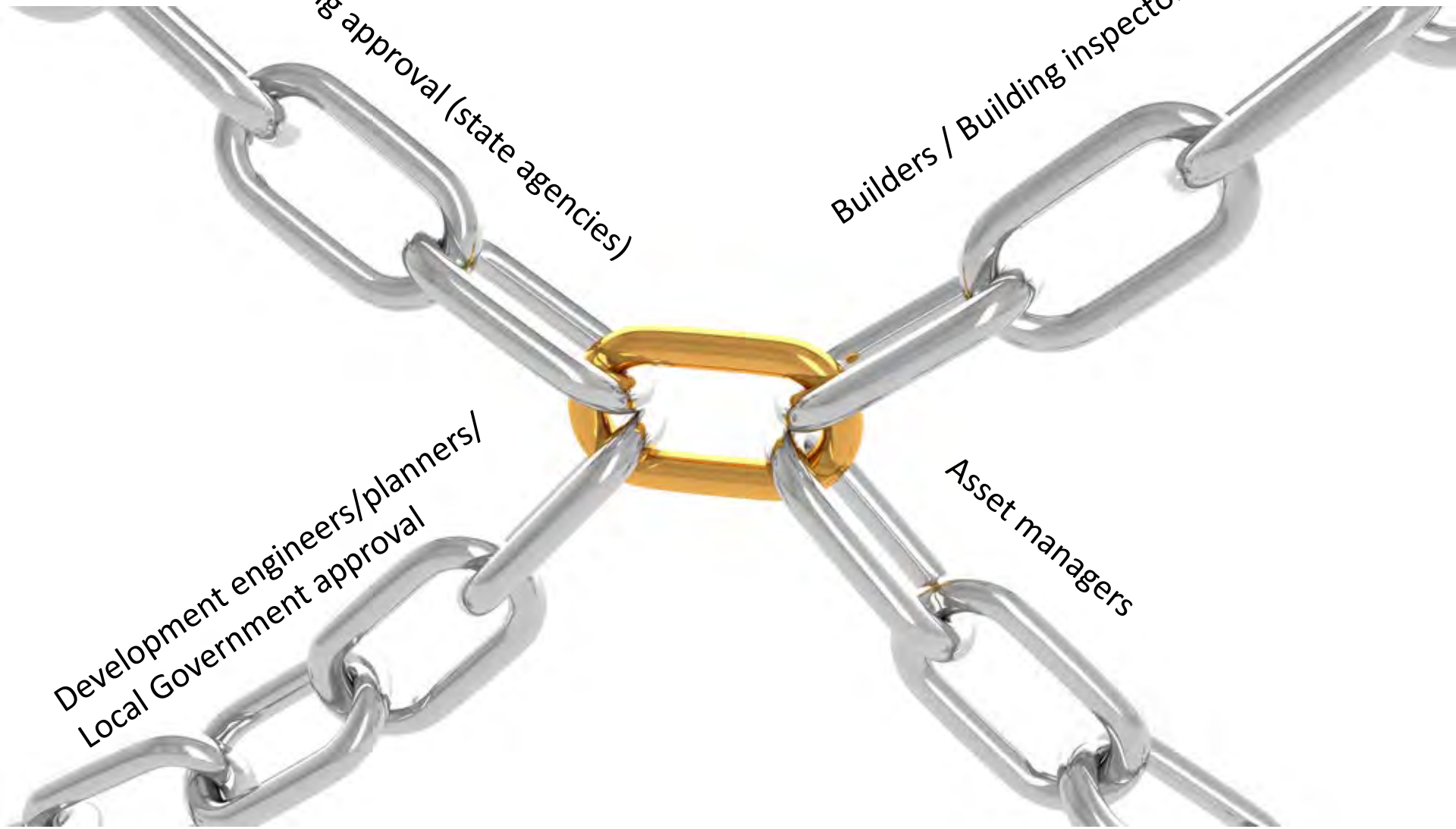
Often liable when problems occur

Evaluation and approval

- Complex problems
- Resource constraints

Capacity building?

Liability


Planning approval (state agencies)
Builders / Building inspectors
Development engineers/planners/
Local Government approval
Asset managers

Opportunities?

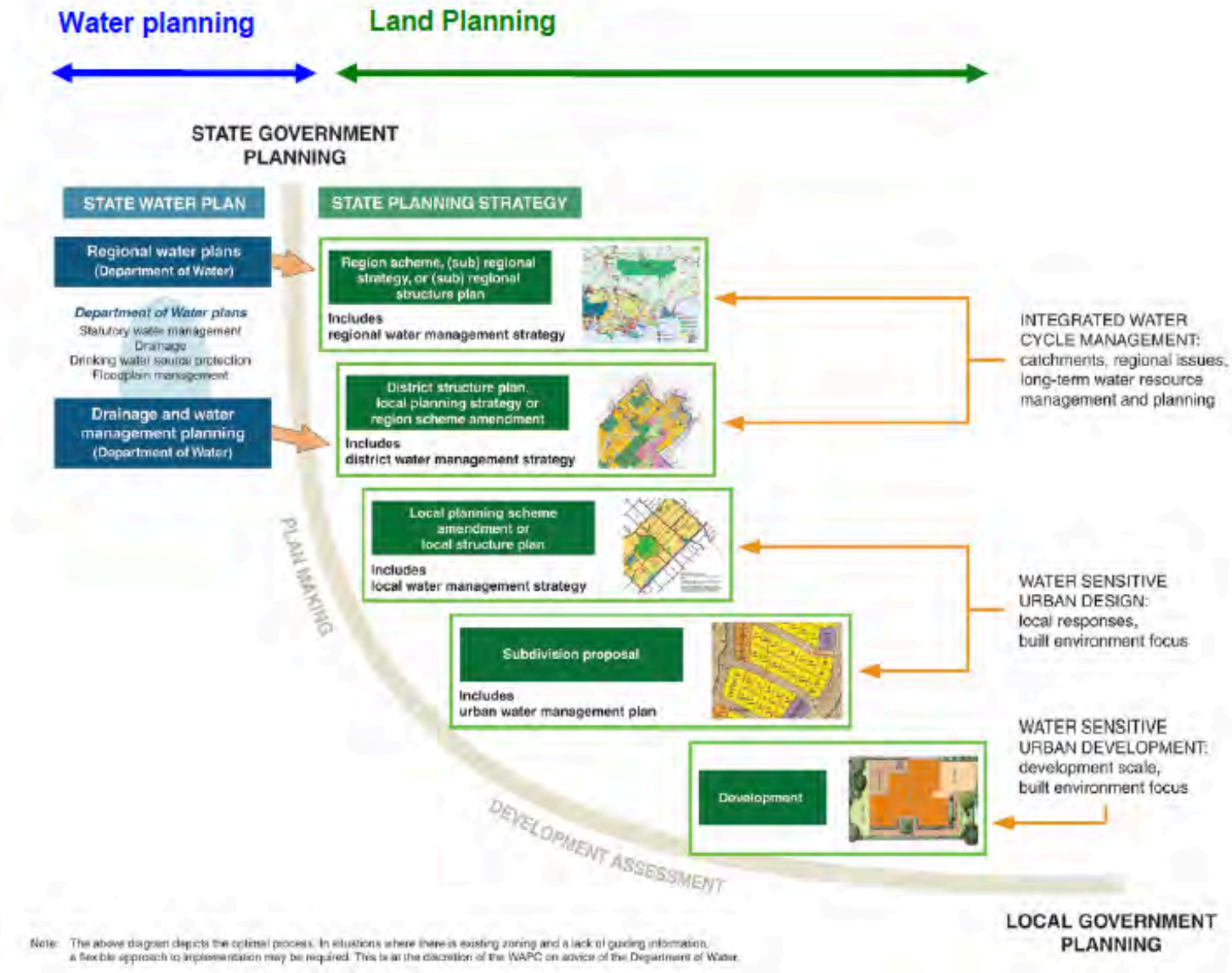
- Reductions in fill use
- Technical best practice
- Innovation
  - construction methods
  - design
  - stormwater management
- Improve planning /decision-making
  - Cumulative impacts
  - Maximise LG capability

How do we get there from here?

How do we get there from here?

How do we get there from here?

How do we get there from here?




Innovating around urban high groundwater
A win-win-win for developers, homeowners and the environment
Thanks to **CRC-WSC IRP5**, the **IRP5 Steering Committee**, and everyone who **participated** in the Expert Panel discussions.

Government of **Western Australia**
Department of **Health**

Wastewater System Design

Site and Soil Evaluation Reports Workshop

Jared Chong
Environmental Health Directorate
27 August 2021

health.wa.gov.au

Overview

- Section 4.1 General Assessment SSE
  - Site suitability assessment for onsite wastewater management
  - Recommend the type (selection and design) of onsite wastewater system (OWS).

- Section 4.2 Specific Assessment SSE
  - Detailed system design specifications, sizing and management recommendations for submission of application to construct/install an apparatus

Section 4.1 General Assessment – Selection and design of the system

- Determine site suitability (SSE) at early stage of planning.
- Desktop study, field investigations, sampling and analysis of site and soil conditions.
- Consideration of the treatment system, treatment quality or level of treatment of effluent, and land application area and system, all of which must be within the capability of the land on which the system will be sited.

Section 4.1 General Assessment – Selection and design of the system

Outline:

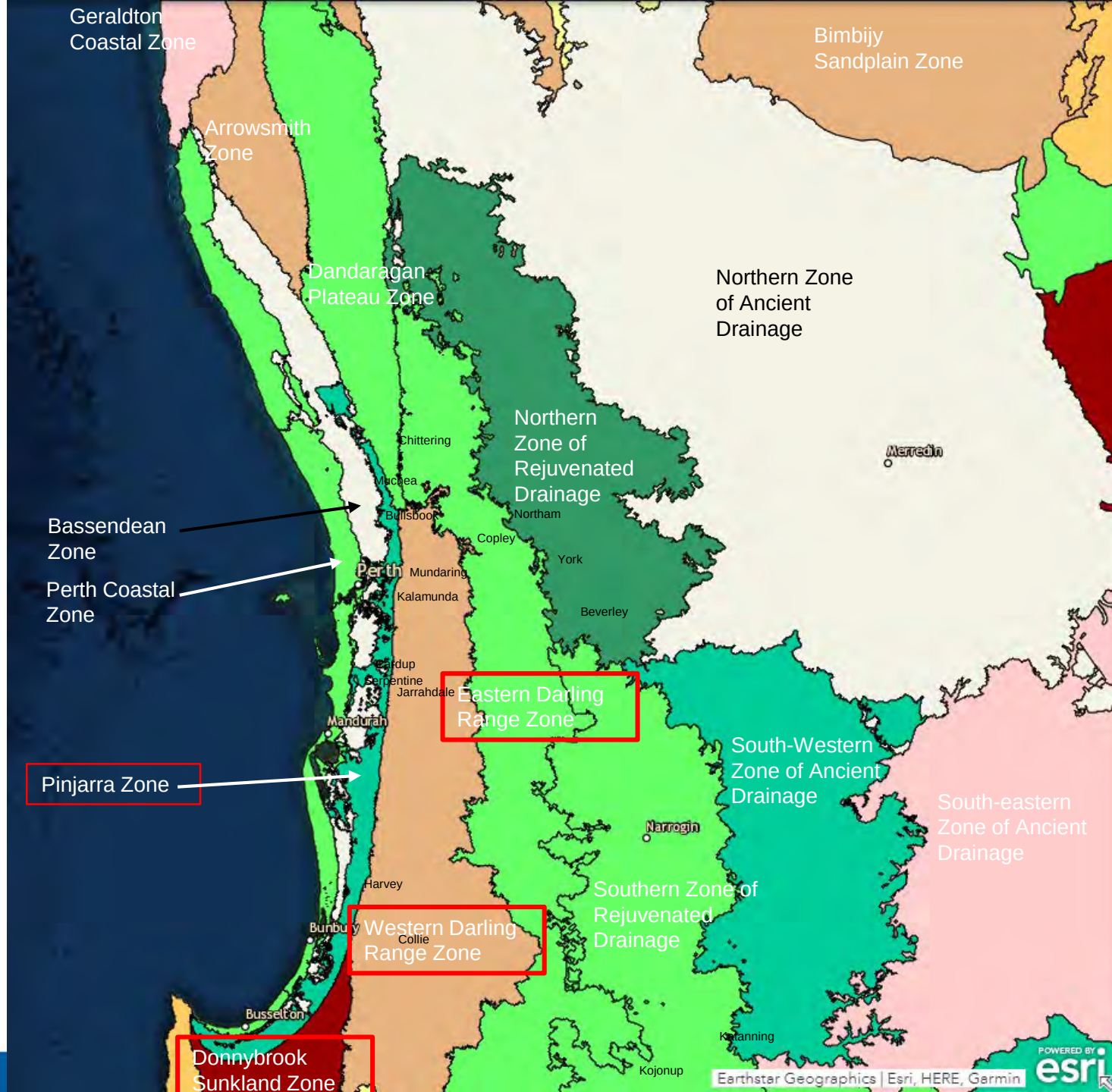
- Address the findings in Table 6 (SSE Template), focusing on limiting and/or high risk factors
- How the OWS complies with GSP, relevant Australian Standards and legislation requirements
  - Reticulated sewerage or on-site sewage disposal
  - Treatment system, quality of effluent, land application system and size, setback distances
- Management strategies are in place to ensure ongoing compliance with the relevant Standards and legislation

Assessment Tools

Assessment Tools Links	Information
Water Corporation ESInet	Provides information of Water Corporation's sewerage infrastructure, contours, drainage,
Department of planning, Lands and Heritage's (DPLH) Map Viewer	Sewage Sensitive Areas Planning, land and heritage information
Western Australia Floodplain Mapping	Flooding Map – 1 in 100 (1%) annual exceedance probability flood event
Department of Primary Industries and Regional Development (DPIRD) Natural Resource Information	Public Drinking Water Source Areas, hydrography, hydrology, hydrographic catchments Soil-Landscape Mapping Soil-Land Qualities – Site Drainage Potential, Waterlogging and Inundation Risk, Flood Hazard
Google Maps Google Earth	Site location, aerial and street, view, historical aerial view
Department of Water and Environmental Regulations	Public Drinking Water Source Areas Perth Groundwater Map Public Drinking Water Source Area Mapping Tool Floodplain Mapping Tool
Australian Rain & Run Off Data Hub	Flood Estimation

Soil Landscape Zone

Know your area



Source: https://maps.agric.wa.gov.au/nrm-info/

Soil Landscape Zones

1. Perth Coastal Zone
- Sandy soils
- Deep Groundwater
- Low/no runoff
- No waterways
- May be groundwater dependent wetlands in low lying areas

2. Bassendean Zone
- Shandy topsoils overlying clay
- Shallow groundwater
- Low runoff
- Ephemeral waterways
- Wetlands in low lying areas

3. Pinjarra Zone
- Impervious/clay soils
- Perched or shallow groundwater
- High runoff
- Sluggish waterways
- Wetlands & large areas of landscape storage

4. Western Darling Range Zone
- Mixed rocky/gravelly soils (gravelly sand in valley floors)
- Patchy groundwater in rock fissures and valley floors
- High runoff
- Flashy waterways

Source: Decision Process for Stormwater Management in WA, New Water Ways, 2021

Section 4.1 General Assessment SSE – Selection and Design of the OWS

Design:

1. Site condition
2. Disposal
   - Land application area and system
   - Reuse?
3. Treatment
   - Primary or Secondary or Advanced Secondary?

System Selection to fit the Site and the Soil

Site/Soil Constraint	System Selection and Consideration
Small lot size	• All system – care is needed for the design and sizing (System footprint – volume, effluent quality, setback) • Limit the scale of development? Reuse? Irrigate plants? • Water-balance analysis?
Slope	• Benching/Terrace, risk of erosion • Interception drains to divert uphill run-on • Surface irrigation (spray and drip). Evapotranspiration (ET) systems – up to 10% slope • Mounds (Inverted system), conventional trenches, low pressure effluent disposal – up to 15% slope • Subsurface drip irrigation – up to 30% slope
Slope instability/ mass movement	• Onsite land application may not be suitable • Geotech advice required • Low DLR rates over a large area?

System Selection to fit the Site and the Soil (Cont.)

Site/Soil Constraint	System Selection and Consideration
Shallow soil	• Special design? Soil amendment/replacement? Fill? • Irrigation, mounds, ET systems • Soil does not waterlogged, 0.6m unsaturated soil below, GW level monitoring
Very shallow soils over creviced bedrock	• Nutrient Leaching? Mounds with suitable sand-fill media • Fill? 0.6m unsaturated soil below
Shallow permanent water table, Seasonal waterlogging by perched water tables	• Poor drainage – unsuitable for land application. Assess feasibility of a scheme • If OWS is the only option, special design – consider mounds and irrigation systems, interceptor/drains for run-on/seepage diversion, reduce DLR over a large area • Fill? 0.6m unsaturated soil below • Post-development drainage – GW monitoring?
Periodic inundations/flooding	• Unsuitable for land application • Special design? Elevated composting toilet?

System Selection to fit the Site and the Soil (Cont.)

Site/Soil Constraint	System Selection and Consideration
Groundwater quality at risk (Cat 1 and 2 soils) – High Permeability	• Special design, secondary treatment, disinfection and nutrient removal • Composting toilet • Mounds, ET system, irrigation, dosed effluent over a large area? • System management – GW quality monitoring
Soils with very low permeability (Cat 5 and 6 soils)	• Reduce DLR over a large area • Special designs, mounds, ET systems, irrigation, water-balance analysis? • Improve permeability – Soil amendment/cultivation/deep rigging/gypsum application? Installation technicality; discharge control – sodium content
Highly disturbed soil areas or fill	• Special designs depending on result of investigation • Test system on installation? • Monitor for seepage and effect on GW?

System Selection to fit the Site and the Soil (Cont.)

Site/Soil Constraint	System Selection and Consideration
Cold or wet climates	• Surface water and soil drainage controls • All system, increase LAA, interceptor bunds/drains to divert surface run-on and subsurface seepage
Hot or dry climates	• All system • Deep soil drainage to avoid salt build-up in root zone
Dispersive or sodic soils	• Minimal disturbance to the natural soil • Discharge control – sodium content, gypsum application • Installation technicality • Reduce DLR over a large area
Soil salinization	• Soil drainage system, reduce DLR • Manage subsurface water, GW level monitoring
Susceptible ecological areas or water bodies down slopes	• Prevent overflows, run-off and nutrients reaching the susceptible areas – Interceptor bunds/drains downslope to divert run-off and seepage?

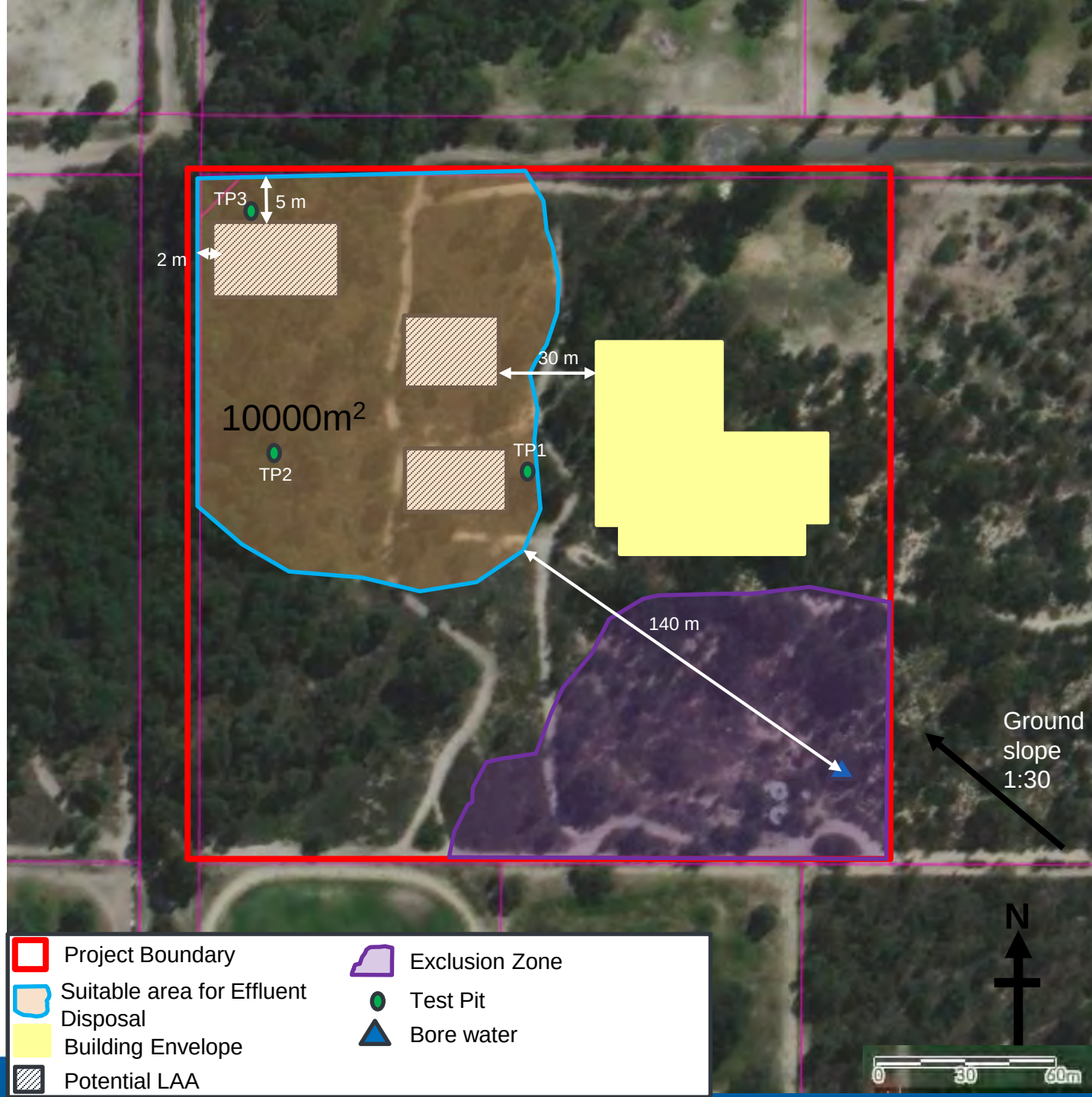
Type of Treatment and Land Application Systems

Level of Treatment	Treatment System Examples*	Land Application and Reuse System*
Primary	• Septic Tank • Greywater Diversion Device • (Waterless) Composting Toilet	• Subsurface absorption system • Evapotranspiration system • Amended soil and mounds • Burial (for composting toilets)
Secondary	• Aerated Wastewater Treatment System • Greywater Treatment System	• Subsurface Irrigation • Surface spray or drip irrigation • Other disposal systems appropriate for primary treated effluent as above
Advanced Secondary	• Membrane System • Greywater Treatment with Disinfection • Secondary Treatment with additional Disinfection (UV, Chlorination, etc.)	• Restricted non-potable reuse (e.g. toilet flushing, outdoor use) • Other disposal systems as above

*Check the list of approved wastewater systems on DoH website

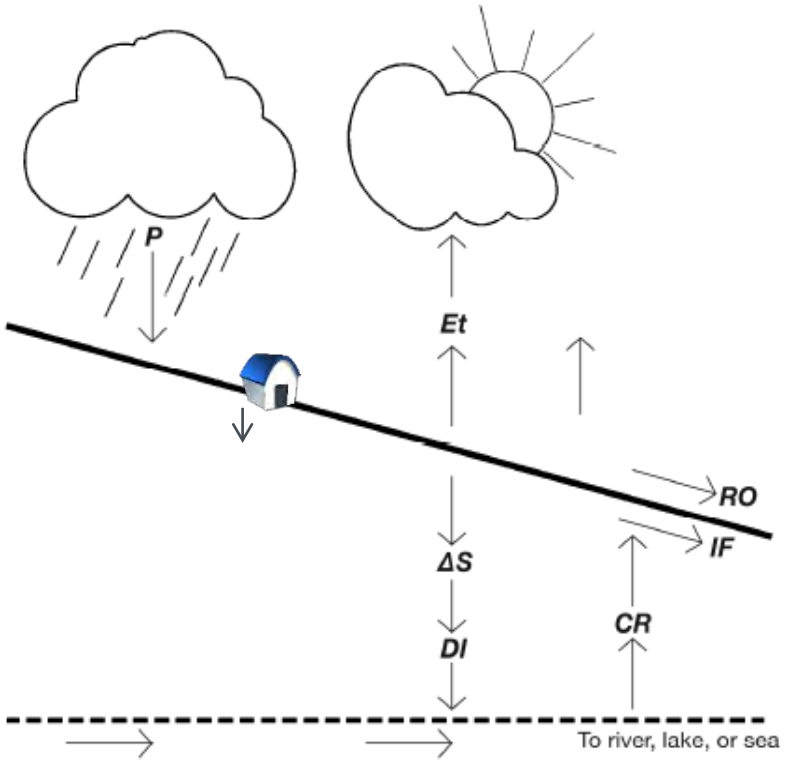
For Example:

- Sewage Sensitive Area
- Residential design loading rate: 150L/person/day
- Land Application Area: hydraulic load (L/day) x conversion factor from Table 2 of GSP



Water Balance

- To estimate LAA requirements based on climate, site condition and wastewater production



Legend

P = precipitation
CR = capillary rising flow from a shallow water table
Et = evapotranspiration from a vegetated soil surface
RO = run-off
IF = interflow (lateral subsurface seepage)
DI = deep infiltration (groundwater recharge)
ΔS = changes in the amount of water stored in the soil.

INPUTS	=	OUTPUTS
precipitation + applied wastewater	=	evapotranspiration + percolation + runoff

- Wet weather Storage

INPUT – OUTPUT = STORAGE REQUIREMENT

Section 4.2 Specific Assessment – Sizing for Treatment System and LAA

- Nature of the development (commercial /domestic/ mix use)
- Water usage
- Wastewater and trade waste generation and management
- Trade waste management
- Sizing of treatment systems
- Design, location and size of LAA
- Daily application rates
- Service and maintenance
- Information about fill (if applicable)

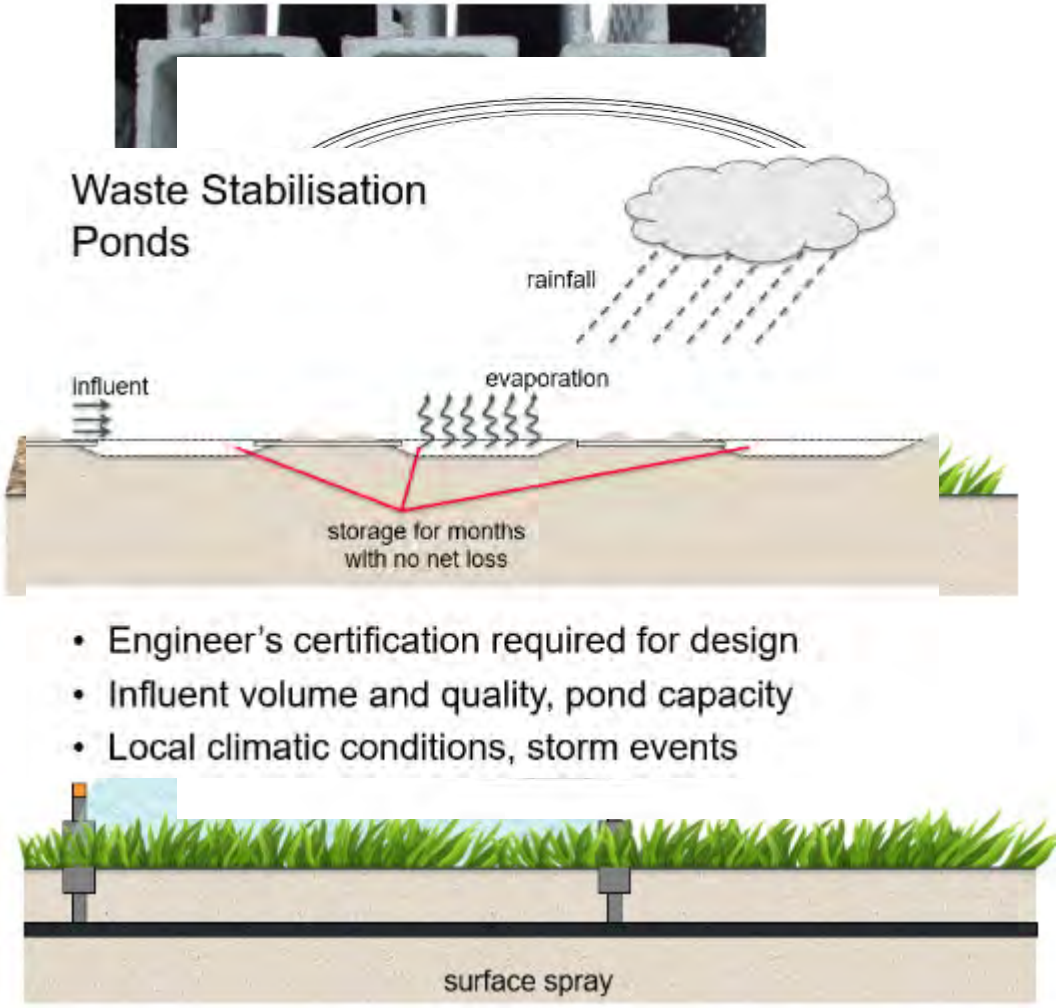
Treatment Systems

1. Primary Treatment system – Septic Tanks
2. Secondary Treatment systems
   - AS1546.3: 2017 certified
   - Aerated Wastewater Treatment Systems – AS1546.3: 2008 certified – superseded, phased out soon.
   - Wastewater Treatment Plants
   - Waste Stabilisation Ponds
3. Other Systems
   - Alternative Systems (DoH Website)
   - Greywater Diversion/Treatment System
   - Waterless Toilets

Land Application Systems

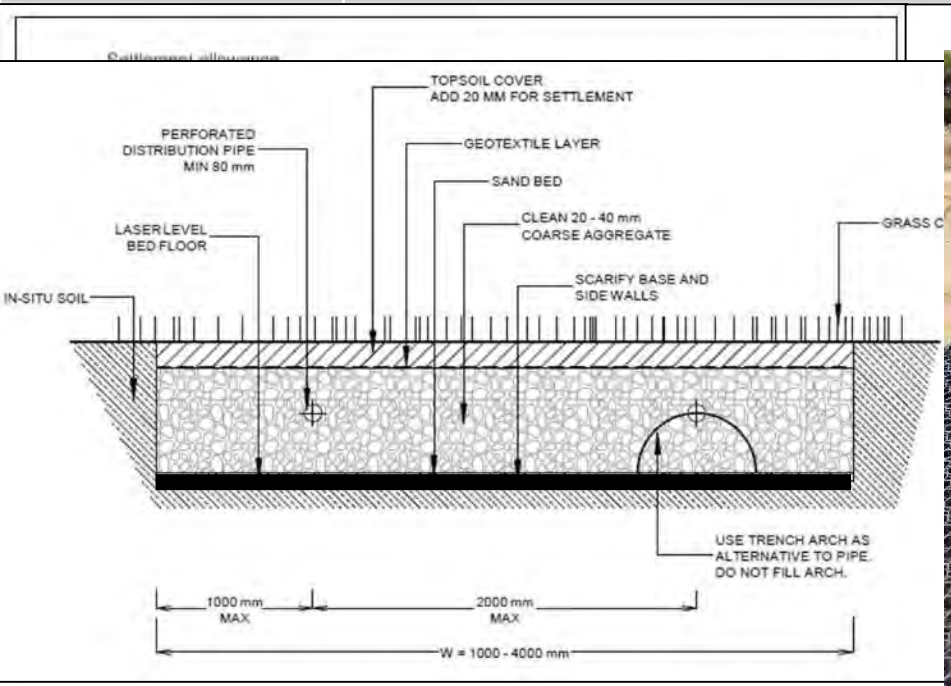
<u>Health Regs 1974 – Regs 49 and 50</u>

- Leach, French, Evaporation Drains
- Holding Tanks
- Soakwells – Sand only
- Waste Stabilization Pond
- Irrigation (COP ATU) – Surface, subsurface and substrata



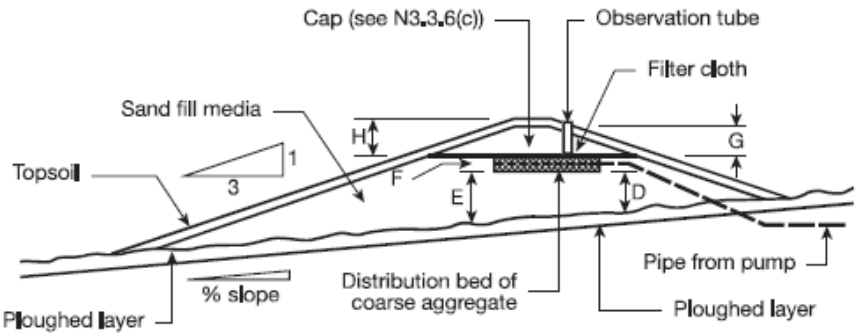
Common land application systems (adapted from AS/NZS 1547:2012)

System	Considerations
Conventional Absorption Trench and Beds	• Only requires primary effluent treatment • Cheaper to install than other methods, and less influenced by climatic factors • Requires deep soil, generally >1.5m, above limiting layers (e.g. bedrock or seasonal water tables) • Treatment by absorption trench may be impeded due to high % of coarse fragments • Soil supplementation may be an option to improve absorptive capacity • Sodic soils may lose permeability over life of system; larger trench lengths required • Ideal for sites with little to no constraints in terms of soil depth, rock content, waterlogging, inundation or shallow water tables



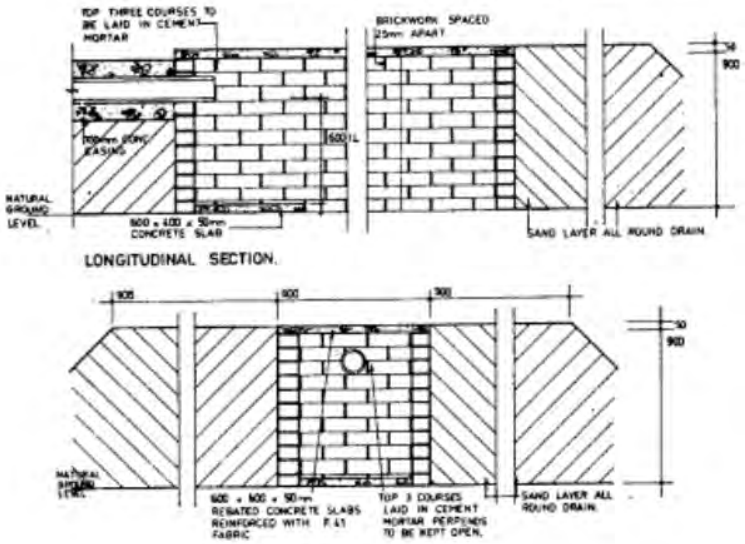
Common land application systems (adapted from AS/NZS 1547:2012)

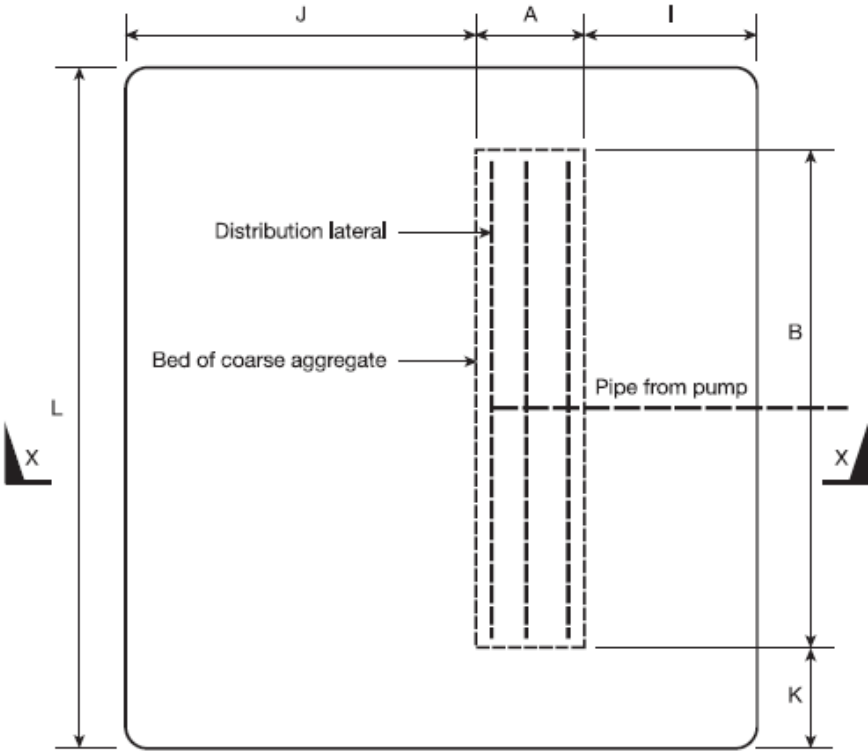
System	Considerations
Amended Soil and Mounds	• Beneficial for shallow soils, high rock contents, or high water tables • Requires an above-ground mound for effluent absorption that contains imported sand/soil • Treatment will not be limited by soil absorption capacity, and less influenced by sodic soils as new soil can be imported. • Less influenced by climatic factors



CROSS SECTION VIEW OF MOUND ON SLOPING LAND

FULLY INVERTED TYPE LEACH DRAIN

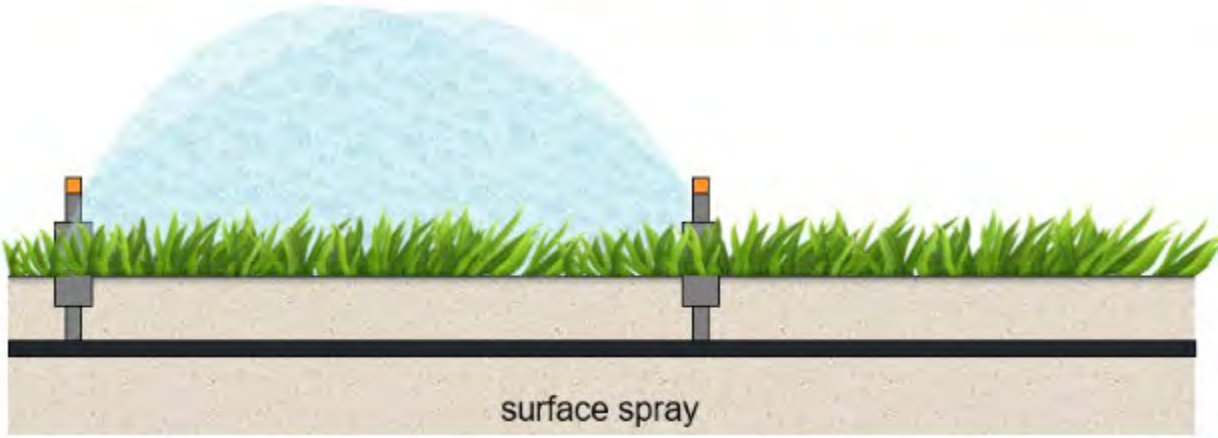




PLAN VIEW OF DISTRIBUTION BED

Common land application systems (adapted from AS/NZS 1547:2012)

System	Considerations
Subsurface Irrigation	• Secondary treatment is required prior to irrigation • Suitable for areas of high exposure with high evaporation rates (limited during wet season) • Suitable for sites with shallow soils • Not suitable for areas that are seasonally inundated or waterlogged • Sodic soils may lose permeability over life of system; but sodicity generally lower in surface soils than subsoils • Can be hindered by high rock or gravel content



Land Application Area

- LAA should be unencumbered. Activities within the LAA should be controlled or prohibited.
- LAA should be protected in a way that will avoid the likelihood of penetration of roots or entry of groundwater.

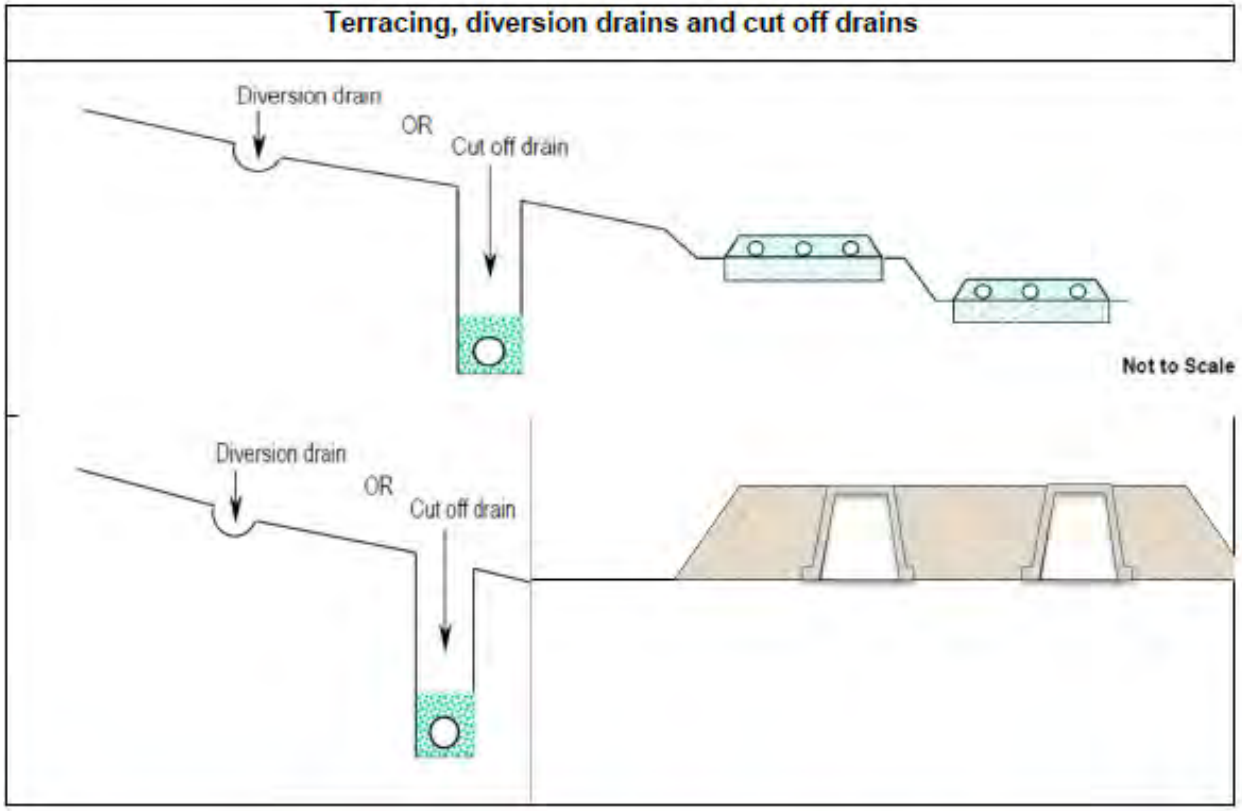
Sitting and Configuration of the Land Application Area

Setback Distances

Site Feature	Setback Distance, m
Horizontal setback distances	
Treatment tanks to buildings, property boundaries, driveways, paths and other tanks	1.2
Tranches, beds and soak wells to boundary, building, tanks and other land application systems	1.8
Tranches, beds and soak wells to trafficable areas	1.2
Vertical setback distances	
Discharge point of the on-site wastewater system to the highest known groundwater level:	
• PDWSA	2.0
• Sensitive water resource areas	1.5
• All other areas -	
○ Sands	1.5
○ Gravels	1.0
○ Loams and heavy soils	0.6
Hardpan or bedrock (depends on quality of treated wastewater and type of LAS)	0.6-1.5
Subsurface Dripper:	
• Boundaries, buildings, treatment tanks, driveways etc	0.5
• Sub-soil and open drain	3.0
• Swimming pool	2.0
• Garden bore	10.0
On-site wastewater system to water resources (for more details refer to Section 5.2.2 of the GSP)	100
On-site wastewater system must not be located within any area subject to inundation and/or flooding in a 10 per cent Annual Exceedance Probability (AEP) rainfall event	

Sitting and Configuration of the Land Application Area

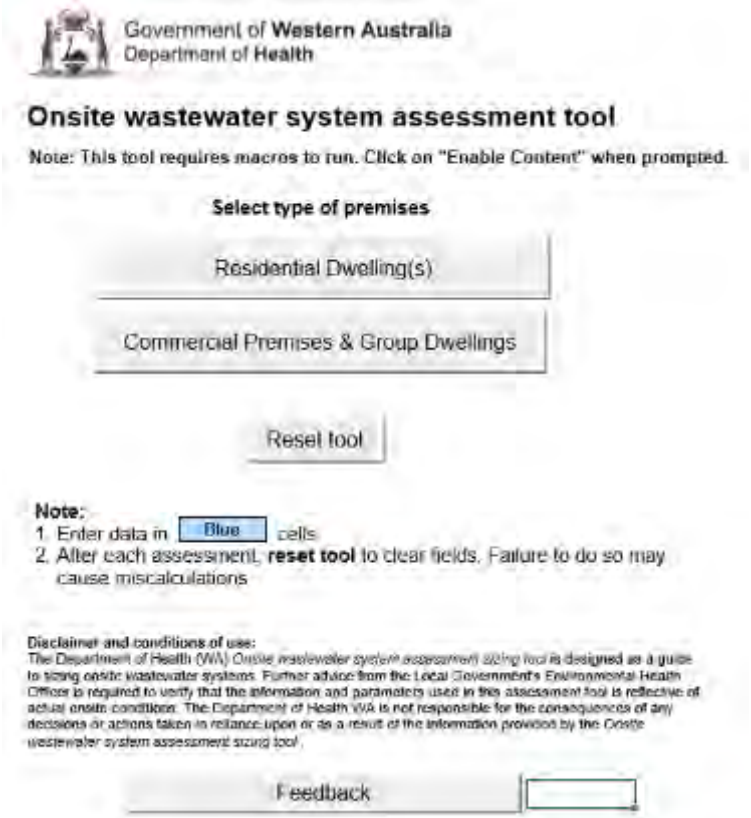
Stormwater Management



Recommended reductions in DIR according to slope (adopted from Table M2 AS/NZS 1547:2012)	
Slope	**Reduction in DIR**
Flat up to 10%	No reduction
10% to 20%	20%
10% to 30%	50%
>30%	Advice required from a suitably qualified and experienced person

Assessment Tool

- Wastewater Calculator



Thank you.

Questions?

Jared.chong@health.wa.gov.au

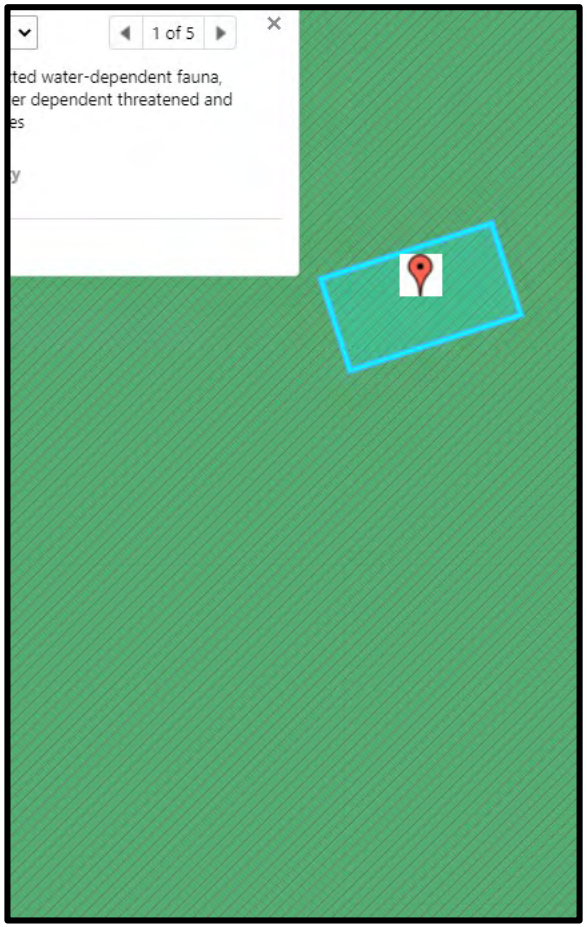
Government of **Western Australia**
Department of **Health**

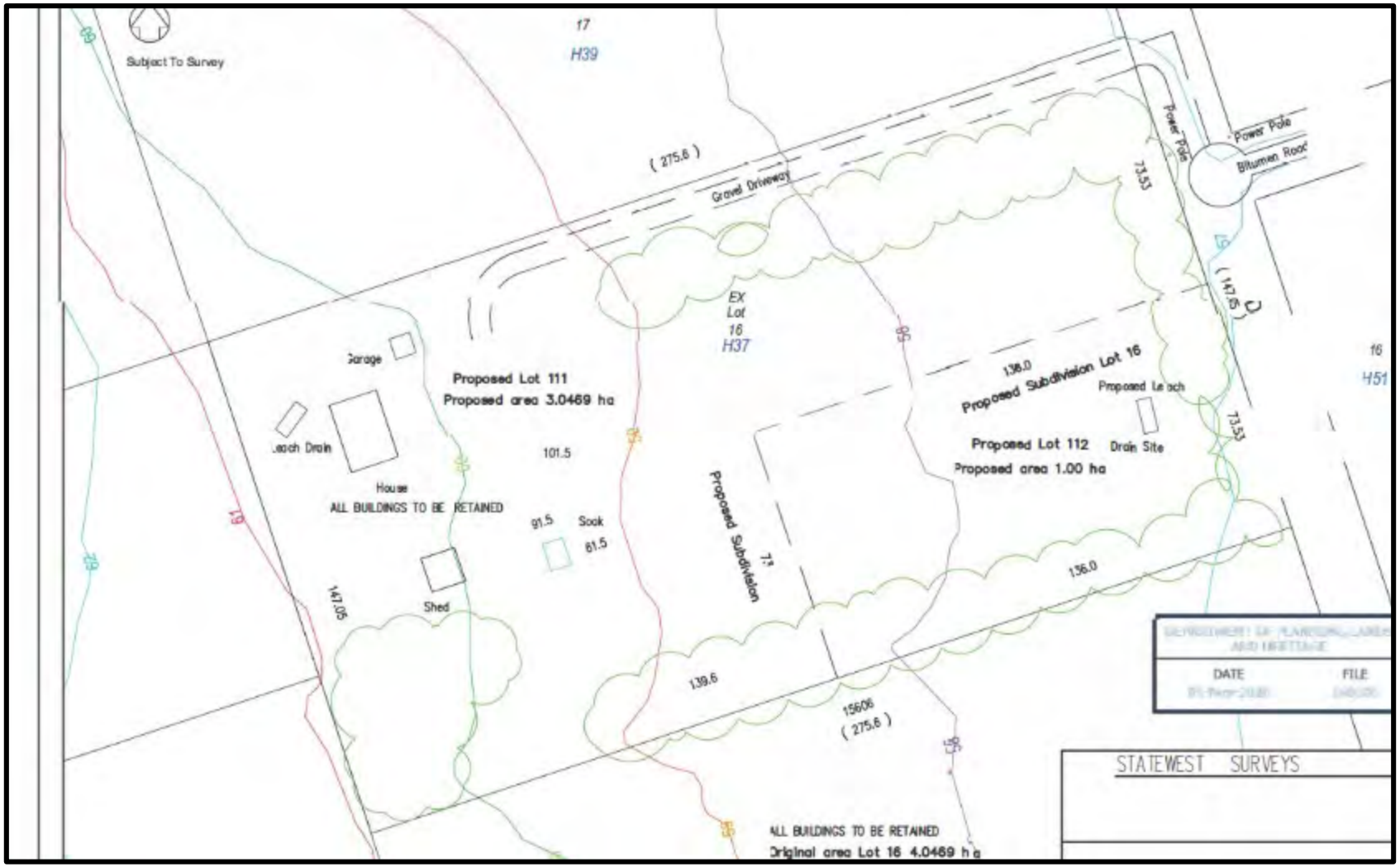
Assessment
Site and Soil Evaluation Reports: Case studies

Nilu Gunarathne,
Environmental Health Directorate, Department of Health

Report 1

Site




Subject To Survey
17
H39
(275.6)
Gravel Driveway
Power Pole
Power Pole
Bitumen Road
73.53
(147.05)
Ex
Lot
16
H37
Garage
Proposed Lot 111
Proposed area 3.0469 ha
Leach Drain
101.5
House
ALL BUILDINGS TO BE RETAINED
91.5
Soak
61.5
Shed
147.05
Proposed Subdivision
136.0
Proposed Subdivision Lot 16
Proposed Leach
Drain Site
Proposed Lot 112
Proposed area 1.00 ha
73.53
136.0
139.6
15606
(275.6)
DATE
FILE
STATEWEST SURVEYS
ALL BUILDINGS TO BE RETAINED
Original area Lot 16 4.0469 ha

Reference

2. Description of the Development

At the time of the field investigation the area was covered in light vegetation with isolated trees. Dams, water courses or surface water features were not apparent on the site.

There is sufficient land available for sustainable onsite sewage management in compliance with the Health (treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974.

Assessment time

3. Site and Soil Assessment

ABC Consulting undertook the site investigation on 19 June 2020.

5.3.1 Site and soil evaluations	Where there are concerns regarding the seasonal water table or drainage, a hydrogeological assessment of the site under the wettest time of the year conditions may be required to address local government and Department of Health concerns.

Lot size

Lot size	40,526m²
Proposal	2 x Lot Subdivision consisting 1 x 8,094m² and 1 x 32,432m² Lots.

5.2.1 Lot sizes

Location/Land use	Minimum lot size	Notes
Public drinking water source areas in rural, rural residential/rural living zones	One to four hectare	Minim Refer t *Source*
Sewage sensitive areas	One hectare	Land ir of R 2 t Plannir subdiv unders Smalle industr the mi is satis

Land application area

Data to be used in the sizing of Leach Drains:

- Estimated Daily Hydraulic Load (4 bedroom residence);
  - 4 Residents = 829L
  - Totalling 829L/day Hydraulic Load (from Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste)1974)
- Soil Classification – Silty Sand

= 15.35m

16.8m provided 2 x 8.4m (7 sections) x 0.85m Maddington Concrete Products Leach Drains, requiring a LAA (inclusive of 1.8m setbacks and 1.8m between leach drains) of 7.1m x 12.0m. The required total length of leach drain required is calculated on the approved filtrative area

SCHEDULE 2:
Site requirements for on-site sewage systems

3 Land application areas for single houses

Table 3: Land application areas for a single house (occupancy of 6 persons in a 5 bedroom house)

Soil category	Soil texture	Land application area (m^2)[7]	
		Primary treatment (includes area required for setbacks)	Secondary treatment (excludes setbacks)
1	Gravels and sands	339	180
2	Sandy loams	339	180
3	Loams	429	225
4	Clay loams	620	257

Separation from ground water

- 1.8m from building footings
- The distance between the base of the disposal system (i.e. trench bottom, bed base) and the groundwater table should not be less than 1.5m (for standard septic systems) and 0.6m (for secondary treatment systems).
- On completion of the proposed disposal area, appropriate landscaping should be undertaken (i.e. planting of shallow rooted grasses / shrubs).

5.2.3 Separation from groundwater

The discharge point of the on-site sewage system should be at least the following distances above the highest groundwater level, taking into account the range of seasonal groundwater conditions in the context of long term variability and possible groundwater rise following development:

- two metres in public drinking water source areas;
- 1.5 metres in sewage sensitive areas; and
- 0.6 to 1.5 metres in all other areas, depending on soil type and the type of treatment system used (refer to schedule 2).

Permeability

			hydraulic loads
Soil Permeability & Design Loading Rates	Subsoil consistent with Silty Sand with a permeability of 0.2m/day using the Constant Head Method.	Medium	Installation of secondary treatment system with Leach drain type effluent disposal
Soil Texture &	Subsoil: Silty		As noted above

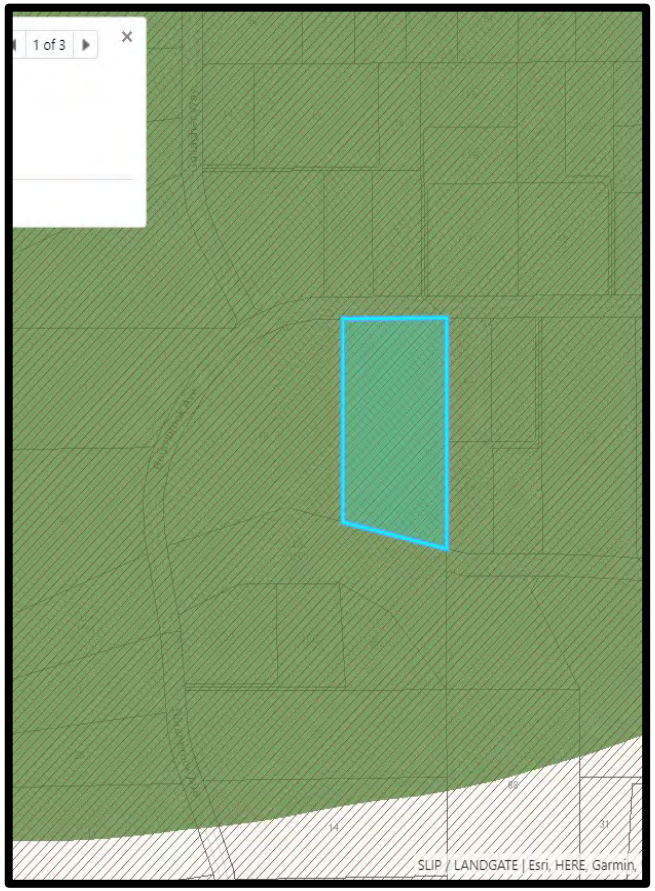
AS/NZS 1547:2012

RECOMMENDED DESIGN LOADING RA

Soil category	Soil texture	Structure	Indicative permeability (K_{sat})(m/d)	
1	Gravels and sands	Structureless (massive)	> 3.0	
2	Sandy loams	Weakly structured	> 3.0	
		Massive	1.4 – 3.0	
3	Loams	High/ moderate structured	1.5 – 3.0	
		Weakly structured or massive	0.5 – 1.5	
4	Clay loams	High/ moderate structured	0.5 – 1.5	
		Weakly structured	0.12 – 0.5	
		Massive	0.06 – 0.12	

Report 2

Site




EXISTING DWELLING
A
1ha
EXISTING STRUCTURES
601
2.0077ha
B
944m²
(1.0077ha)
A 46753


EXISTING DWELLING
A
1ha
EXISTING STRUCTURES
601
B
118
117
PZ3
TP1
TP5
TP7
TP4
TP8
TP9
TP6
PZ2
TP10
TP3
TP2
PZ1
A 46753
Legends:
Test pits
Permeability test location
Piezometers


Bassendean Sand
Sandy Clay
FIGURE 3. Surface Geology


Legend:
FIGURE 4. Min and Max Groundwater Level

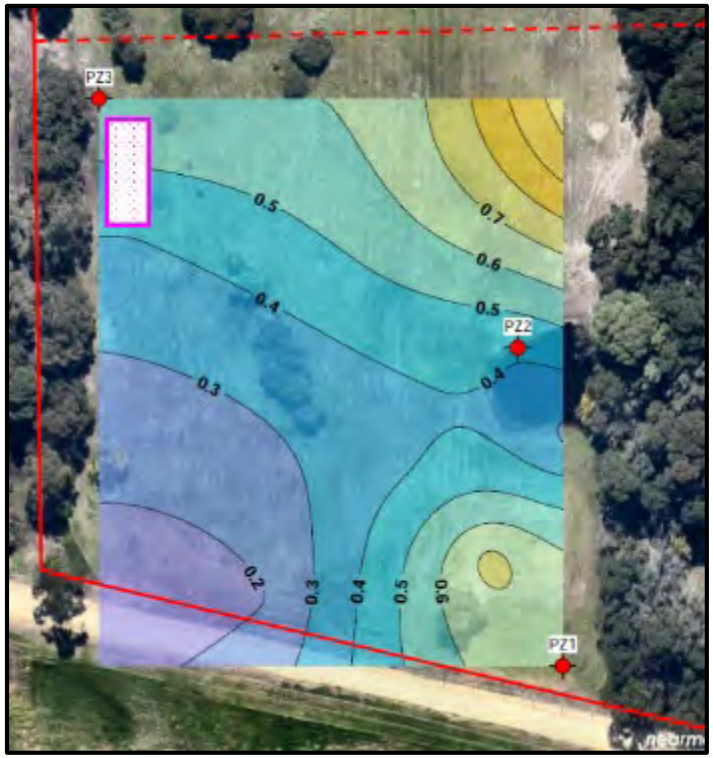

Legend:
FIGURE 5. Groundwater licensees in the vicinity of the site


Legend:
FIGURE 7. Acid Sulfate Soil Risk Map

Land application area

Table 9: LAA Calculations

Hydraulic Load (L/day)*	Soil Category	Conversion factor	LAA (m^2)
Occupancy rate (persons) x design loading rate (L/person/day) = 4 x 120 = 480	2	0.2	96



Subject to inundation?

Plate 1: Pictures of the pond (a), and the overflow drain connecting the pond to the major drain (b)

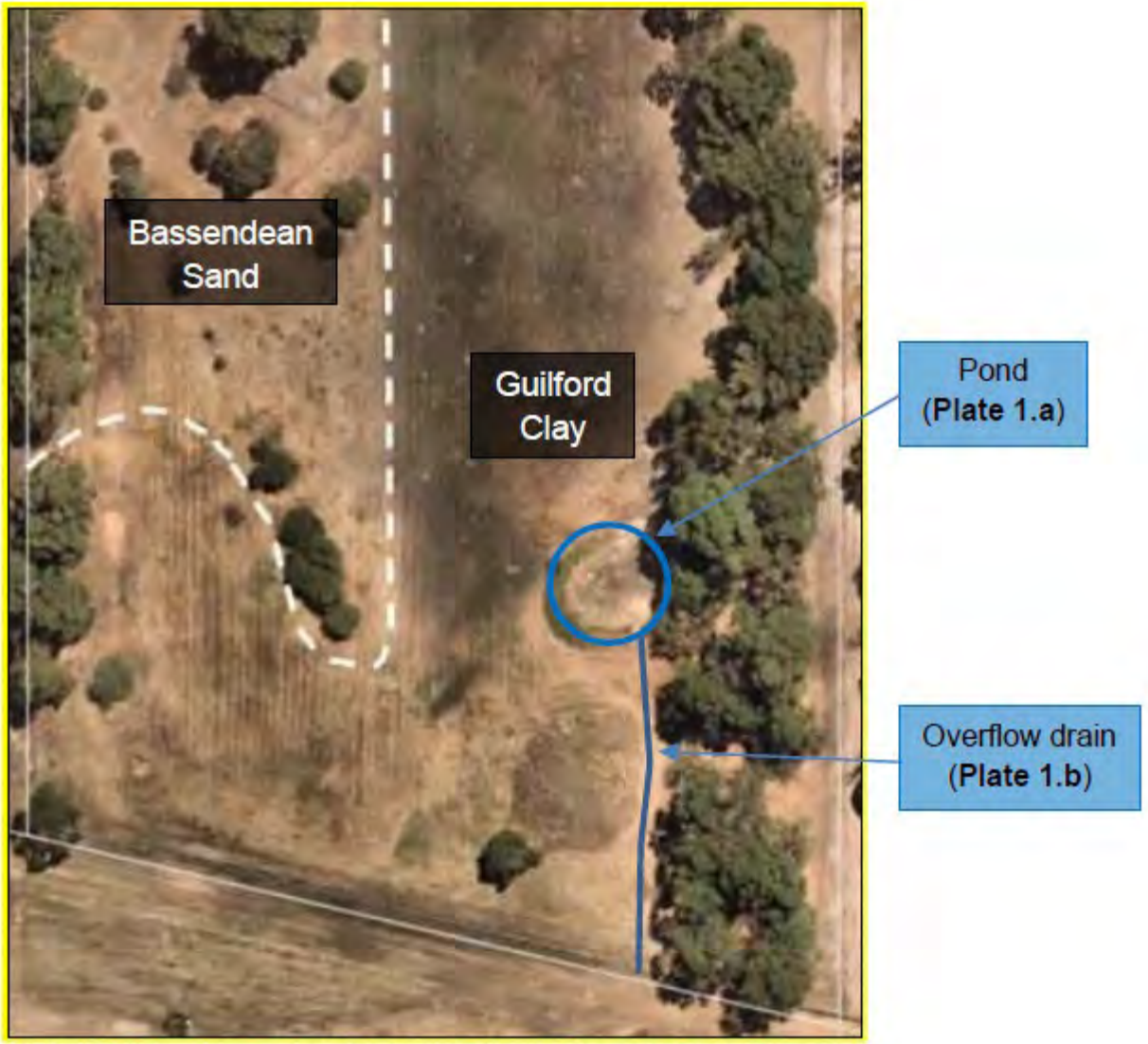


Plate 2: Summer aerial photography of the site from Nearmap

System Requirement

3.3 Land Use and Zoning

Currently, the northern-western section of the site has a dwelling, a water tank and other structures, as shown on **Appendix A**.

The area is zoned Rural pursuant to the Metropolitan Region Scheme and the Shire of Serpentine Jarrahdale Town Planning Scheme No.2.

It is also noted that the site is within a sensitive sewerage area according to the Department of Planning, Lands and Heritage's Sewerage Sensitive Area Database.

7.3 Land Application System

The site is not connected to reticulated sewerage and is located within a sensitive sewerage area. The *GSP 2019* recommends a secondary treatment unit, ATU, to manage on-site effluent. We recommend that discharge from the ATU is done via a surface drip irrigation system. The adequacy of this system is detailed in **Table 11** below. It complies with the criteria presented in *Table K1 of AS/NZS 1547:2012*.

Government of **Western Australia**
Department of **Health**

GSP and Subdivision Proposals SSE Review

Julie Phelps

V5

DOH role

- DOH serves as a referral agency for some planning proposals
- We provide advice to DPLH/WAPC (and SAT) with regard to GSP and SSEs
- Input at various stages of the planning system.

DOH role cont.

- District Plans, local planning strategies, rezonings, local structure plans, subdivision, DAs
- Big to little, broad to specific
- *Not the 'Responsible authority' with regard to these planning applications*
- One of several sources of information

Concerns about what is referred

- GSP Schedule 1 sets out Supporting information and requirements at various stages of the planning system
- Site and soil evaluations called up in many sections.
- Part of the supporting documents sent out to referral agencies
- DOH uses information in these to consider the application with regard to the GSP

Sometimes we don’t have enough information

- GSP requirements not addressed
- SSEs for subdivisions are different – consultants need to know what the work is being done for.
- Gaps, contradictions, wrong reference docs
- Issues not addressed

What happens?

- Have to advise can’t support at that time or request additional detail.
- *Time consuming, costly, conflict*
- How can we improve process?

Improving the process
Identifying key issues

- Seeing Frequent ‘friends’?
- If we can identify problems, hopefully it can improve process
- Communicate with consultants and Local Government

Review

- DOH subdivision responses post 2019 GSP
- Identified key points from 50 refusals
- Majority related to referrals with SSEs but also included some useful others
- Put them in a table!

Key point summary table

Key points	Number
Fieldwork timing (or not stated)	18
LAA placement concerns	17
Didn't address GSP requirements	16
Groundwater concerns	14
LAA undersized	11
SSA requirements not covered	9
Waterway setbacks	9
Lack of information	8
Contradictory information	7
Wrong standard used	4
Lot sizing requirements not addressed	4
Strata requirements not addressed	2
Fill concerns	5
LAA undersized (loadings specific)	5
No LAA	7
Conflicting information on soil classification	6
Shallow termination	3
Rock issues not addressed	4
Rezoning, LSP claims	4
Documents stating onsite disposal not proposed , but found to be unsewered area	3
Older reports	2
Sewer nearby	1
Different Subdivision layout in SSE plan and WAPC plan	1
Claimed no SSE required due to lot sizes	1
Changing sewered proposal over to unsewered	1
PDWSA requirements not addressed	1

Top 10

- 26 down to top 10 topics
- Local Government Liaison

- Didn’t address GSP requirements
- Fieldwork timing
- SSA requirements not covered
- Inundation issues & Groundwater heights
- Land Application Areas

Top 10 cont.

- Waterway setbacks
- Lot sizing
- Soil classification
- Relying on history
- Garden basket…‘Other’

Top Ten

Didn’t address GSP requirements

- Section 5.3 Information to support planning proposals.
- Schedule 1 Supporting information and requirements at various stages of the planning system
- Schedule 1 Section 3 Subdivision – calls up the Section 5.2 issues (eg setbacks, clearances, SSA, PDWSA requirements) and Schedule 2

Didn’t address GSP requirements cont.

- Wrong Standard (also LGs)
- LG point – conflict when asking for specified standard
- LG point – some reports identify constraints but don’t ensure application complies with GSP.

Fieldwork timing

- Demonstrate adequate timing
- DOH can't support on the basis of future work
- *'full assessment of groundwater to be done at more appropriate time'??*
- LG point - needs relevant detail, local times
- LG point – over reliance on regional rather than site specific.

Lot sizes

- Section 4. Policy application – subdivisions, lots of less than 4 Ha.
- Not exempt from GSP or SSE requirements if the *parent* lot is greater than 4Ha.
- *‘surrounded by lots of similar size’* - not grounds

Lot sizes

- Reports need to demonstrate proposal meets Table 5.2.1 Lot sizes criteria
- Establishes minimum lot sizes for PDWSA, SSA
- Criteria for smaller lots (1000m2 proposals) and strata lots.
- Soil classifications may apply

Lot sizes cont.

5.2.1 Lot sizes

Location/Land use	Minimum lot size	Notes
Public drinking water source areas in rural, rural residential/rural living zones	One to four hectare	Minimum lot size dependent upon priority area (P1, P2 and P3) and zone. Refer to *Water quality Protection Note 25: Land use Compatibility Tables for Public Drinking Water Source Areas* for further guidance
Sewage sensitive areas	One hectare	Land in a sewage sensitive area that is already zoned for urban use with a residential density coding of R 2 to R10 under a local planning scheme or structure plan endorsed by the Western Australian Planning Commission, may be subdivided in accordance with the existing density coding. Where R10 subdivision is proposed, it should be demonstrated that the density coding was assigned with the understanding that reticulated sewerage would not be provided. Smaller lots in sewage sensitive areas may be considered for non-residential, commercial and industrial subdivision on a case-by-case basis where it can be demonstrated that the proposal meet the minimum site requirements and the responsible authority, in consultation with relevant agencies is satisfied that the proposal is consistent with the objectives of this policy.
Urban/Industrial subdivision outside public drinking water source areas and sewage sensitive areas	2,000m²	For heavy soils, secondary treatment systems will be required to achieve this lot size (refer to Table 1 in Schedule 2).
Outside public drinking water source areas and sewage sensitive areas and: • Infill residential or commercial subdivision in existing urban areas; or • Residential and commercial subdivision in towns outside the Metropolitan and Peel Region Scheme areas without an established reticulated sewerage scheme; or • Residential and commercial subdivision in towns outside the Metropolitan and Peel Region Scheme areas with existing sewerage schemes (as listed in Schedule 3) where unsewered subdivision at the density proposed is specifically provided for through the provisions of the local planning scheme or a local structure plan endorsed by the Western Australian Planning Commission	1,000m²	The average lot size is not to be less than 1,000m², with a minimum individual lot size of 950m². Does not apply for soil category 6 (medium to heavy clay), where larger lot sizes are required. For soil categories 4 (clay loams) and 5 (light clays), secondary treatment systems will be required (refer to Table 1 in Schedule 2).
Survey strata lot or strata lot for an approved grouped dwelling, commercial or industrial development (outside public drinking water source areas)	Case-by-case assessment	The on-site system for strata schemes must service each lot and should be owned and operated by a single person or entity contracted to provide the service or the strata company for the strata scheme. An acceptable maintenance program should be in place for the system and disposal area. Due regard to be given to impacts within sewage sensitive areas

State Government of Western Australia – September 2019

Lot sizes & Strata

- Show 2000 Sqm (and less) lots are outside of PDWSA and SSA
- Soil category restrictions AND exclusions
- Strata has additional clauses too eg communal, management

Waterway setbacks

- Drains not shown
- Setbacks not shown
- Non specific tables, broad statements
- Need to demonstrate
- SSA – requirements not normally reduced.

Groundwater

- As with Timing –show basis
- Report date may not match field work date
- Perching issues or inundation? Address
- *'potentially locally inundated during winter'*
- Clearances 2m PDWSA 1.5m SSA
- Vague fill statements
- LG point – ponding not being addressed

SSA/PDWSA

- *'special water supply catchment area'?*
- Secondary specified -groundwater clearances and drainage line clearances not reduced by.
- No 0.6 on basis of secondary here
- Approved systems – ATU doesn't mean secondary for GSP purposes
- LG query – SSA issues, amendments, PRI debates

Land Application Areas

- No LAA
- Placement issues
- Undersized LAA 92 proposed v 339 GSP
- Undersized – loadings
- Rock

LAA cont.

- Sizings - GSP Schedule 2 Table 3
- *Not Regs or Code*

3 Land application areas for single houses

Table 3: Land application areas for a single house (occupancy of 6 persons in a 5 bedroom house)

Soil category	Soil texture	Land application area (m^2) [7]	
		Primary treatment (includes area required for setbacks)	Secondary treatment (excludes setbacks)
1	Gravels and sands	339	180
2	Sandy loams	339	180
3	Loams	429	225
4	Clay loams	620	257
5	Light clays	1,156	300
6	Medium to heavy clays	Special design	450

LAA cont

- 900L …6 persons @ 150L
- Subdivisions - Use GSP criteria, not lower loadings from other sources
- No lower loadings accepted for rainwater
- LG queries – moving the LAA potential issues, stormwater issues
- LG point – recommendations contrary to soil profile

Soil classification

- Need to specify. Vagueness, contradictory.
- How was it determined?
- Shallow terminations – what is most restrictive category?
- Not fill
- Site variations
- Cross check data
- LG query – please use suitable equipment

Don’t Rely on history

- Only stands if it received earlier formal approval (and are still valid). GSP [Section 6 Implementation].
- New Subdivisions need to meet new GSP
- History does not mean that the subject land is suitable for further break up or meets current GSP requirements

Don’t rely on history cont.

- *It was rezoned*
- *Parent lot has OED, my neighbour has it*
- *‘Shire Health regs permit OED in this section of town*’
- *Block next door has sand pad height at X*
- LG query about whether reports ‘expire’.
- Old reports may not have been prepared with regard to GSP or AS 1547

Other

- Unapproved systems
- Reference to Tables rather than recommendations included. Need to specify what is proposed and demonstrate.
- Different plans
- Sewer in area (Check ESInet)
- Sewer proposed but not in area

Other continues

- LG – some reports ID issues but then don't address or make recommendations
- LG – qualifications/OED understanding of those writing reports. Training?
- LG – developers not engaging correct consultants

Talk to us

- And also to LG & DPLH if changing the SSE
- Others need to know. Any changes might impact on different issues eg envelopes, bushfire
- Data bases

Useful sites

- SSA
- https://espatial.dplh.wa.gov.au/PlanWA/Index.html?viewer=PlanWA

- PDWSA
- https://dow.maps.arcgis.com/apps/webappviewer/index.html?id=63ddb4ec2a6e463f84028aa3977bab2b

- Water Corporation
- ESInet