On-site Wastewater Management Training Course Day 2 FAQs

Land Capability Assessment

Q: Which mapping portal do you use in NSW?

A: I've used Six Maps in NSW many times and have found it a great portal to use. https://maps.six.nsw.gov.au/

It is user friendly and gave me all the info I needed.

Q: We are seeing a number of proposals for trenches on slopes >20% where the EMA is constrained by size such that sub surface irrigation is not achievable. Some proposals are also for 1.2m wide trenches to further minimise the required LAA. What advice do you have on approving such proposals? Is benching a suitable mitigation?

A: AS/NZS1547:2012 Appendix K recommends trenches not be built on slopes >15%, beds on slopes >10% and subsurface irrigation >30%. Appendix M suggests LPED should not be built on slopes >27%, but they need 250mm of good quality topsoil. The issue is generally one of keeping the linear loading rate (LLR) low enough to ensure that there is not surface breakout or seepage as effluent migrates downslope. The WaterNSW CRP document has a table of recommended linear loading rates based on work by Jerry Tyler (University of Wisconsin) which considers slope and soil thickness for soils of different textural classes. That may be helpful. Further to the above: it should say "maximum acceptable linear loading" rate for a particular slope.

A2: I would add that 'benching' tends to result in excavating the construction surface further into the more limiting (typically) subsoil conditions. This can be appropriate, as long as the trench/bed design is sized using the appropriate design loading rate (DLR) for those soils.

A3: The only way to reduce the area of the LAA is to reduce the hydraulic load. One of the concerns about attempting to do this and therefore incorporate in an approved design is that these things change with home ownership and occupation.

Soil Absorption Systems; Trenches and Beds

Q: What on-site disposal method is appropriate for heavy clays?

A: Table K1 in AS/NZS 1547:2012 provides a good summary of the suitability of various land application system options for a range of 'limiting' site and soil characteristics.

A: Generally, for heavy clay soils (Cat 6), absorption systems (beds/trenches) will be difficult to achieve because the very low DLRs recommended will result in preventatively large area requirements. That's why the Australian Standard does not support those systems on Cat 6 soils as other LAA options are more suited.

Really interesting article some weeks ago in The Guardian about increase in Strongyloides infection in the US as a result of consistently failing septic systems. The particular community under study is called Rancho Vista. Really poor. Really bad soils. Nearest municipal sewer line less than 2km away.

Q: Should we be encouraging a standard trench/bed in place of wick trenches, or are they okay to accept? (If sizing and design is satisfactory).

A: My only caution with 'wick trench' designs is the DLR reduction built in to the rule-of-thumb sizing method used in most guidelines. This effectively assumes a ~20% reduction in DLR to account for the added benefit of the wick design.

A2: Really all (ETA) beds should be sized using a water balance to show that they will not overtop or remain saturated for too long a period. Wick Trenches should be sized similarly though a slightly more complex water balance is required. Wick Trenches no doubt do dispose of a bit more water than conventional trenches, but the sizing method presented in the WaterNSW CRP and in EPA VIC 891.4 is just an estimate.

A3: With regard to the assumption of a ~20% reduction in DLR to account for the added benefit of the wick design, I have not seen any data which supports this. It is an assumption!

Great thanks guys. We use a water balance for standard trench and bed sizing but like you said, this isn't set up for wick trenches, so I'm not 100% confident in determining the size required…

Passive Dosing Systems, LPED Systems

Q: If applicable - do the different densities of effluent affect the performance of the system and also larger particles or trash getting into the system?

Q: How does the flout prevent the floating sludge entering the system?

A: The key is to prevent any floating materials (sludge) from entering the dosing tank in the first place. This can be achieved by making sure the septic tank outlet (T-piece) is fitted and working properly and, additionally, an outlet filter can be installed.

Q: Could this type of system be utilised on properties that are less than the recommended allotment size for OSSMs?

A: I'm not quite sure what this approach is hoping to address. The LPED (irrigation) LAA is still required to be sized based on the recommended DLR, so the footprint will be dictated by that. Lot size is not relevant. The LPED LAA will be proportionally larger than an equivalent secondary irrigation LAA in all instances.

Evapotranspiration Systems

Q: Does the Evapotranspiration method require secondary treatment?

A: ETA beds are a valid 'primary' land application method, but it is recommended that required sizing is confirmed by water balance, particularly in higher rainfall areas.

Q: Is there a guideline for what runoff coefficient to use in the water balance? We currently refer to a table which refers to slope, vegetation type and soil type but I'm unsure of its credibility. For example; clay soil, grass/turfed, with a slope <5% = 0.55. Would this be considered suitable?

A: That seems low. What you are essentially estimating is the proportion of the rainfall you are going to include in the water balance (sizing) calculation. A runoff fraction of 0.55 assumes that 45% of the incident rainfall will not enter the LAA (i.e. bed) and will runoff. On flat ground (<5% slope) there is much greater opportunity for infiltration, so values greater than 0.75-0.9 are more appropriate (depending on how conservative you want to be).

Q: Is there a list of values that we can refer to, or is it really up to the assessing officer to estimate based off slope, etc.

A: Many textbooks contain lists of assumed runoff coefficients. They would not have anything as specific as this application, but reason needs to prevail in that there has to be some justification for what is selected and used.

Q: That's one of the problems we are facing, the difference is in the runoff coefficient Council and the consultant are using which is creating a significant difference in the minimum areas required. Without a guideline document, I don't have specific values to reference, so am just unsure how to justify this when the consultant is determined the sizing is correct… in particular for subsurface irrigation.

Similar to what is happening at Coffs Harbour to deal with high nutrient load coming off the berry farms.

A: You can do a simple thought experiment. Imagine a flat ground surface on sand (gradient 0%) with water poured onto it. 100% of the water would soak in and 0% would run off, so the retained rainfall would be 100%. Now if the soil were a heavy clay and water were poured on, some water would be shed and as the slope increased the amount being shed would increase. If the tops of beds are domed, they shed some water. For domed beds on soils, we conservatively assume that ~25% is shed and ~75% is retained, i.e. the retained rainfall is 75% of the total rainfall. However, on flatter surfaces (shallower gradients) we assume that a larger proportion of the rainfall is retained (up to 90%). Unfortunately some designers manipulate these variables to suit themselves and their designs, so regulators need to be aware!

Q: Are you saying that best practice is now to dispose of disinfected (usually chlorinated) wastewater subsurface as well? Far out, we're behind the times down here.

A: I would suggest that removing disinfection for SSI is acceptable in situations where available EMA is not limiting and where no other public health risks are identified.

A: Although NSW Health indicate that effluent should be disinfected if disposed of <300mm deep, subsurface irrigation puts effluent reasonably well out of human contact, so risks are low if it is not disinfected. Certainly Science and a risk assessment would suggest disinfection is not required for subsurface irrigation. Disinfection requirements are set by Council, so Council can decide. Some require disinfection, others don't.

Nutrients and Land Application Areas

Q: How critical is it to assess nutrients, specifically in relation to property boundaries, or structures like a shed or pool on the property? Our current focus is on ensuring there is an appropriate nutrient buffer to waterways, dams, stormwater. (LAA sized on the water balance).

A: Unless you are in close proximity to a sensitive receiving area (i.e. waterway) I would agree that nutrient assimilation is a lower priority when determining appropriate setbacks than hydraulic area requirements. Nutrient balances can be very subjective and are often misused or misinterpreted. Ensuring the appropriate buffers are provided based on the hydraulic area at the very least minimises the risk of off-site discharges.

Q: What options do we have for domestic P recovery, if any? Interested in commercial scale as well, given that P is a finite resource in the world.

A: While I am aware of some of the P recovery options at the municipal scale, there is very little opportunity for P recovery at the small domestic scale. Most effort has been into reduced generation and not much effort with recovering it in the effluent

Irrigation Systems

Q: What would be your advice for a proposal for subsurface drippers on slope 30%, on site constrained by size and vegetation.

A: AS/NZS1547:2012 allows SSI on slopes of 30%, but table M2 suggests that DIRs should be reduced by 50% on such slopes.

Q: When is secondary treatment required? Is this dictated by the local authority?

A: The requirement is generally set by the relevant Code or Guidelines. Secondary treatment may be required in sensitive environments, e.g. drinking water catchments, near coastal lakes and estuaries etc.

Q: Is it routine for water corporations to monitor nutrient reductions for P and N in any runoff from tree farm treatment systems to monitor uptake of nutrients? In WA application of advanced secondary treatment of municipal waste water is applied to a tree farm, but I am not sure about the monitoring of this as a management tool?

A: The real issue in NSW is the information on nutrients in the Guidelines or Silver Book. It is just incorrect and the approach which is outlined has led to confusion as different Councils interpret and use it in different ways. There is no plan to update it either. It is possible to find Councils with common boundaries requiring different things e.g. North Coast of NSW.

Q: Are there typical irrigation layouts that are commonly used, or will this be at the discretion of the designer? i.e. for a particular shape or size there is a standard pipe layout?

A: Manufacturers (e.g. Netafim, GeoFlow, Wasteflow, Toro etc.) have standard drawings of irrigation systems on their websites, in their literature and design guides. It is generally best to try to keep layout simple, e.g. rectangular areas; but triangular areas are possible.

Failing Systems: Auditing and Troubleshooting

Q: Do you require a ticket for confined spaces if you are just removing lids for the purpose of a routine inspection? Thanks.

Q: Anecdotal stories around people undergoing chemo killing their septic. Anyone seen this?

Q: I have also heard about this, but I have not seen it personally.

A: Yes, chemo and other long term medications (antibiotics), can kill off the bacteria in a system. The systems become pretty smelly and the water may become blue-grey in colour, with no crust.

Q: For installation compliance is this mainly taken care of by the installer / plumber and Fair Trade (or equivalent authority)? To which extent is the designer involved in the system installation compliance and signoff? I am mainly with this question referring to NSW.

A: Generally the designer should be responsible for the design, the installer for the installation “as per the approved design" and the regulator for approval. If you look at the WaterNSW CRP document there is some of the required documentation for their approvals in the back.

Q: Also had a customer tell us that they were 'dosing' their septic with yoghurt for 'good bugs'. Lactobacillus really a highly effective microorganism for septic tanks?

Q: I have always been told that off milk is a good way to get the good bacteria going in a septic, is this true?

A: Additives should not be required. Often, they are used to mask a problem and become a permanent cost burden as the additives become required on an ongoing basis. Getting to the root cause of the problem and solving it is often the best approach. The problem may be as simple as stopping people putting the wrong things in their systems or getting them to change their household practices.

Q: Isn't it the Blackwater that is the issue with chemo impacting OSSMs? What is best solution for this?

A: The chemo issues are difficult to deal with. A larger septic tank for longer detention times and recirculating the effluent over a coarse roughing filter can be helpful to dissipate the odours.

Q: Are there consultants, technicians, scientists etc. that offer services to assess existing systems or is this still typically done by designers/engineers who are capable of designing this system? i.e. do we need to have any accreditation, tickets or specific qualifications that allow us to inspect, test, assess existing systems?

A: Sometimes Councils require/expect people working on systems have some qualifications/experience/insurance. Requirements vary widely. For inspecting, auditing, troubleshooting etc. our AWTS Servicing and Maintenance and Package Treatment Plant courses may be helpful.

Q: Could some previously approved design plans and/or full system designs for varying scenarios be shared, if they haven't been already on Onsite-i-Site?

Q: Is this the same process for failed trenches? LAA? are you ever required to remove contaminated soils?

A: Soils can often be remediated in-situ once the effluent load is no longer being applied and the area has dried out.

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