Issue Paper for Technical Subcommittee Meeting		*Number of Members Present: ____*	
Engineering / Design Topics	**Topic Number: 12A**	*50% +1= ____*	*Two Thirds = ____*

Topic Statement	Establish hydraulic loading rates (long-term acceptance rates) for different soils for sizing drainfields.
Problem Statement	Each square foot of infiltrative surface area in a drainfield can transmit into the soil a maximum number of gallons/day of effluent before the drainfield starts to pond. This is true for distilled water, as well as for effluent from sewage treatment technologies. As concentrations of organic material, solids, and oils and greases increase, the hydraulic loading rates dramatically decrease (and the size of the drainfield increases). A key step in the design of a LOSS is to determine how many square feet of infiltrative surface area (trench/bed bottom area) is needed for the drainfield. The two necessary pieces of information needed are the soil type and the daily design flow. What should the hydraulic loading rates for different soil types be?
Background	• The existing Chapter 246-272B WAC contains loading rates from the 1995 State Board of Health rule. These loading rates were based on research done in the 1980s and earlier. The maximum loading rate was 1.2 gal/ft^2/day, but both the TRC and the 2002 USEPA manual suggested that maximum of 1.2 was too high to assure long-term performance. • WAC 246-272A-0234 contains hydraulic loading rates for different soil types. This was primarily based on research done by Jerry Tyler with the loading rates suggested in the 2002 USEPA manual. (See reference section of this issue paper.) Is there any reason to think that the long-term hydraulic loading rates for a LOSS should be different than for a small OSS? • As effluent gets cleaner, the long term acceptance (hydraulic loading) rate of the soil increases. The 4th column in the table in the reference section contains hydraulic loading rates for effluent cleaner than 25 mg/L CBOD and 30 mg/L TSS. Higher hydraulic loading rates are available only to those LOSS using treatment technologies that produce higher quality effluent. If a treatment technology is used that produces effluent qualities approaching that of water and the soil is only needed for disposal, should an additional allowance be made? Data has not been found that provides a suggested different loading rate for such a situation. Due to the larger flows in a LOSS, should we include an increase in hydraulic loading rate for cleaner effluent in the LOSS rule? Should this vary depending on system size? • WAC 246-272A-0234(8) states that if the increased loading rate is used because cleaner effluent is produced (results in a reduced infiltrative surface area), 100% of both the primary and reserve drainfield areas are still needed (area required if using septic tank effluent), in case additional area is needed. This creates its own issues concerning how additional drainfield is added if it is needed (layout issues, affects pumping/hydraulic characteristics). How consistent with the small OSS rule should this be for LOSS? • Gravelless technologies overcome some of the concerns when using gravel in drainfields. The RS&Gs for gravelless technologies suggest local health officers may allow reductions in drainfield sizing (increases in hydraulic loading rates) when using gravelless technologies. This reduction is available even for septic tank effluent. When a design professional chooses to use that reduction, the same volume of effluent is being transmitted to a smaller drainfield area. This results in driving constituents within the wastewater deeper into the soil profile. This concern may be increased with LOSS due to the larger volumes of wastewater in a concentrated area. • WAC 246-272A-0234(8) states no other reductions can be taken (e.g. by using gravelless technologies) if an increased loading rate due to the use of cleaner effluent is used.
Reference / Research	• WAC 246-272A-0234 hydraulic loading rate allowances

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Soil Type	Soil Textural Classification Description	Gal/ft^2/day (Septic Tank Effluent)	Gal/ft^2/day (CBOD≤25 mg/L TSS≤30 mg/L)
1	Gravelly and very gravelly coarse sands, all extremely gravelly soils excluding Soil types 5 & 6, all soil types with greater than or equal to 90% rock fragments.	1.0	2.0
2	Coarse sands.	1.0	2.0
3	Medium sands, loamy coarse sands, loamy medium sands.	0.8	1.6
4	Fine sands, loamy fine sands, sandy loams, loams.	0.6	1.2
5	Very fine sands, loamy very fine sands; or silt loams, sandy clay loams, clay loams and silty clay loams with a moderate structure or strong structure (excluding a platy structure).	0.4	0.6
6	Other silt loams, sandy clay loams, clay loams, silty clay loams.	0.2	0.3
7	Sandy clay, clay, silty clay and strongly cemented firm soils, soil with a moderate or strong platy structure, any soil with a massive structure, any soil with appreciable amounts of expanding clays.	Not Suitable	Not suitable

- 2002 USEPA Manual – Loading rates range from 0.2 to 0.8 for septic tank effluent, 0.3 to 1.6 for effluent with BOD ≤30 mg/L

Questions

1. Should the hydraulic loading rates for a LOSS drainfield be consistent with the loading rates in the small OSS rule and the USEPA manual?
   a. If **YES** (as noted in the table in the reference section), go to question # 2.
   b. If **NO**, determine what they should be for the different soil types before going to question #2.

TRS Recommendation: YES. Also, allow some waiver or mitigation process that may justify use of Type 6 soils.

Committee Vote		
GRN	***YEL***	***RED***

- May be using increased treatment level.

- Should require a detailed hydrogeological report.

2. Should increased hydraulic loading rates be allowed for LOSS using a treatment technology that produces better quality effluent?

TRS Recommendation: YES.

Committee Vote		
GRN	YEL	RED

- This is consistent with the small system rule, WAC 246-272A. Wouldn't encourage flow-splitting.
- Could address treatment level increase when considering vertical separation.
- Soils, solids, hydraulic loading, treatment level: full package must be evaluated by engineer and hydrogeo.
- What if treatment fails or doesn't perform to expectations? Effluent still goes to soil.
- Add a third column for Treatment Level A or better (~ reclaimed water). Add fecal and total coliform levels. (If reclaimed water, Ecology process costs a lot.)
- Does AKART push us to reclaimed water treatment levels?
- Should a LOSS be considered a reclaimed water system (if appropriate treatment)?
- Pretreatment reduces potential for organic loading failure.

a. If **YES:**

i. What should the allowances be?

1. What's available in the small OSS rule (Noted in the table in the reference section)
2. Something else? What should the loading rates be?

TRS Recommendation: Use what is available in WAC 246-272A (small OSS rule).

Committee Vote		
GRN	YEL	RED

ii. Should a special allowance be made for higher loading rates yet if a treatment technology is used that produces effluent approaching water quality?

TRS Recommendation: MAYBE. Come back to this question.

Committee Vote		
GRN	YEL	RED

iii. Like the small OSS rule, should 100% of both primary and reserve areas based on using septic tank effluent still be required, though the initial installation may only be

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50% of that required for septic tank effluent?

TRS Recommendation: YES.

Committee Vote		
GRN	*YEL*	*RED*

b. If **NO**, go to question 3.

3. Should increased loading rates be permitted when using gravelless technologies in the drainfield?

TRS Recommendation: NO.

Committee Vote		
GRN	*YEL*	*RED*

a. If **YES**:

i. What should the loading rates be – same as permitted in the RS&G or ?

ii. Can this loading rate increase be combined with the increase allowed for using higher quality effluent?

b. If **NO**, this topic is finished.